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Final

Quarterly Report

July through September 2016
Penta Wood Products Superfund Site

Wisconsin Department of Natural Resources

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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 July through September 2016 including:

- Groundwater monitoring and sampling (Section 2)
- Residential well sampling (Section 3)
- Microcosm study (Section 4)
- Bio-trap study (Section 5)
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2. Groundwater Monitoring and Sampling

Groundwater monitoring and sampling was conducted at the Site in July 2016 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 primary purpose of the baseline event was to confirm the dissolved plume size and extent and the concentration distribution at the Site after operation of the remediation system. 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 July 18, 2016. The groundwater and LNAPL elevation data along with recent 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 July 18, 2016 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 0.0004 ft/ft (as calculated between wells MW10S 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 July 2016 event, LNAPL was present in monitoring well MW18 at a measurable thickness, LNAPL was present but not at measureable thicknesses in wells MW10S and MW20, and LNAPL was not present in well MW19. LNAPL was present in five extraction wells (EW06S, EW07S, EW10S, EW12S, and EW14S) with casings screened in the unconfined (upper) aquifer during the July 2016 monitoring event. With the exception of LNAPL absence in well EW05S during July 2016, this is consistent with previous monitoring. LNAPL was not observed in any wells with casings screened in the semiconfined (lower) aquifer during July 2016. LNAPL thickness measurements are shown on Figure 2.3.

LNAPL was observed on the monitoring equipment at extraction well EW07S. Prior to April 2016, groundwater and LNAPL levels were not measured in this extraction well since the casing was not accessible due to the presence of a glued fitting over the top of the well casing. An absorbent sock was installed in the well casing to recover the LNAPL and confirm whether LNAPL re-enters the well. The absorbent sock was removed from the well in May 2016. The presence of LNAPL during the July 2016 confirmed the presence of LNAPL in well EW07S.During April 2016, LNAPL was present in one extraction well (EW06D) with a casing screened in the semiconfined (lower) aquifer. Groundwater and LNAPL levels were not previously measured in the extraction wells screened in the semiconfined (lower) aquifer since the casings were not accessible due to the presence of the submersible pumps and piping. An absorbent sock was installed in the well casing to recover the LNAPL and confirm whether LNAPL re-enters the well without pumping. The absorbent sock was removed from the well in May 2016. Based on the absence of LNAPL in well EW06D during July 2016, it is likely that LNAPL entered this extraction well casing during pumping and when pumping was discontinued in November 2015, the water level rose inside the casing and trapped the LNAPL above the screened interval. The well will continue to be monitored for the presence of LNAPL.

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 0.006 ft/ft (MW10/MW10S) to 0.014 ft/ft (MW12/MW16). As expected, these values have decreased compared to 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 July 19 through 26, 2016 and consisted of collecting groundwater samples from seventeen (17) monitoring wells (MW1, MW3, MW6S, MW10, MW10S, MW12, MW13, MW16, MW17, MW21, MW22, MW23, MW25, MW28, MW29, MW30, and MW31) and three (3) extraction wells (EW11D/S, and EW13S). Wells MW20, EW7D/S 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 July 2016 naphthalene and BTEX analytical data are summarized in Table 2.3. Naphthalene was detected in two monitoring wells (MW10S and MW29) 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 July 2016 PCP analytical data are summarized in Table 2.3. PCP was detected in seventeen wells (MW1, MW3, MW6S, MW10, MW10S, MW12, MW13, MW21, MW23, MW25, MW28, MW29, MW30, MW31, EW11D/S, and EW13S) at concentrations exceeding the PAL of 0.1 µg/L. Of those seventeen wells, the PCP concentrations in thirteen wells (MW1, MW10, MW10S, MW12, MW13, MW21, MW28, MW29, MW30, MW31, EW11D/S, 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 July 2016 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.

The extent of PCP concentrations exceeding the ES (1 µg/L) is not currently delineated to the southeast and east with the existing monitoring well network in the unconfined (upper) aquifer and to the southeast with the existing network in the semiconfined (lower) aquifer. Additional monitoring is recommended to determine if additional wells and/or actions are necessary.

2.2.3 Dissolved Arsenic Analytical Data

The July 2016 dissolved arsenic analytical data are summarized in Table 2.3. Arsenic was detected in one well (EW13S) at concentrations exceeding the PAL (1 µg/L) and 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 July 2016 dissolved metals analytical data are summarized in Table 2.3. Zinc was not detected above the PAL or ES in any of the seventeen monitoring wells and three extraction wells.

Copper was detected in one well at a concentration exceeding the PAL (130 µg/L) but below the ES (1,300 µg/L).

Iron was detected in seven wells at concentrations exceeding the PAL (150 µg/L) and four wells at concentrations exceeding the ES (300 µg/L).

Manganese was detected in eight wells at concentrations exceeding the PAL (25 µg/L) and seven 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 will be conducted during the microcosm and bio-trap studies in 2016 and 2017 (refer to Sections 4 and 5).

3. Residential Well Sampling

Residential well sampling is conducted on a semi-annual basis. Sampling was not conducted during July through September 2016 and will be conducted in October 2016. The six residential wells sampled during semi-annual sampling events are:

- 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.

4. Microcosm Study

A microcosm study was initiated in accordance with the Remediation System Shutdown Pilot Study Work Plan (GHD; November 2015). The objectives of this laboratory study are 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

During the drilling and well installation activities in November and December 2015, soil and groundwater samples were collected at borehole SB1. Borehole SB1 is located downgradient of the LNAPL where the groundwater is expected within the aerobic (i.e., oxygen rich) zone. Borehole/well MW29 is located closer to the LNAPL and elevated PCP concentrations where the groundwater is expected within the anaerobic (i.e., oxygen poor) zone. Both locations are shown on Figure 1.2. Soil samples were collected from boreholes SB1 and MW29 during drilling in December 2015. A groundwater sample was collected from borehole SB1 during drilling in December 2015. A groundwater sample was collected from well MW29 during April 2016. All samples were submitted to the GHD Innovative Technology Group (ITG) laboratory located in Niagara Falls, New York for the microcosm study.

Upon arrival at the laboratory, the soil and groundwater samples were analyzed for the following parameters to provide a characterization of baseline conditions for the study:

- pH
- PCP
- Diesel range organics
- Ammonia-nitrogen
- Orthophosphate-phosphorus
- Total and dissolved metals (groundwater)
- Total metals (soil)

Microcosms were set up to assess the potential for natural attenuation of PCP under aerobic and aerobic conditions using soil and groundwater samples collected at the Site. After 0, 3, 6, and 12 months, duplicate microcosms for each treatment will be sacrificed and the soil and groundwater samples would be analyzed for PCP. Depending on the results, additional testing may be conducted at extended durations.

4.1 Initial Groundwater and Soil Microcosm Tests

The results from the initial analysis of groundwater SB1, the groundwater from the aerobic area, showed 87 µg/L of PCP and 0.176 milligrams 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 4.1.

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 shown in Table 4.2.

4.2 Aerobic Microcosm Tests

Microcosms were set up to assess the potential for natural attenuation of PCP and petroleum hydrocarbons under aerobic conditions using soil SB1 and groundwater SB1.

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, significant treatment 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. 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 suggests that natural attenuation is effective for treatment of PCP and TPH in the aerobic zone of the Site. These data are shown in Tables 4.3 and 4.4.

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 shown in Tables 4.5 and 4.6.

Since both PCP and TPH(C_9-C_{36}) have been reduced to non-detect levels, no further analyses of these microcosms will be performed.

4.3 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 the anaerobic zone of the Site. Microcosms were set up in the anaerobic hood.

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. Additional testing will be performed after 18 and 24 months, if required.

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, removal of TPH(C_9-C_{36}) was observed. Removal of TPH(C_9-C_{36}) was also 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 on Tables 4.7 and 4.8.

5. Bio-Trap Study

A bio-trap study was initiated in accordance with the Remediation System Shutdown Pilot Study Work Plan (GHD; November 2015) in April 2016. The objectives of the bio-trap study were the gather the data necessary to:

1. Determine whether bacteria capable of degrading PCP are present at the Site
2. Demonstrate in situ biodegradation of PCP using a bio-trap

The Microbial Insights bio-trap laboratory report is provided in Appendix C. The bio-trap data are summarized in Table 5.1.

5.1 Bio-Trap Study

Bio-traps baited with ^{13}C labelled PCP were obtained from Microbial Insights. 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 bio-traps were left in place for 32 days and then were removed and analyzed for the following:

- ^{13}C PCP concentration
- Phospholipid Fatty Acids (PLFA)
- Stable Isotope Probing
- Dissolved ^{13}C Inorganic Carbon

5.1.1 ^{13}C Pentachlorophenol Concentration

An attempt to quantify ^{13}C PCP in the bio-traps 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 bio-traps were retrieved from the wells to the initial concentration of PCP in the bio-traps.

5.1.2 Phospholipid Fatty Acids

The biomass collected in the bio-traps was analyzed for PLFA. The biomass in the four bio-traps was similar with the source area. Bio-traps from source area wells MW20 and MW29 had counts of 3.8×10^5 cells per bead and 1.9×10^6 cells per bead, respectively. Bio-traps 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 bio-trap was Proteobacteria, which are fast growing gram negative bacteria and utilize many carbon sources and adapt quickly to a variety of environments. The dominant class of organism in the well MW29 bio-trap was Fimicutes, which are anaerobic fermenting bacteria. The well MW20 BioTrap also contained Fimicutes.

In the downgradient wells, the dominant type of organism in both wells was the Proteobacteria with very low percentage of Fimicutes. These data show that anaerobic bacteria were dominant in well MW29 and also present in well MW-20 but not present in the downgradient wells. This is consistent with the source area being anaerobic while the downgradient area is more aerobic.

5.1.3 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 x 10^4 cells per bead for wells MW9, MW29, and EW11S and 2.2 x 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:

δ(‰) = (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 Fimicutes, 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 Fimicutes.

5.1.4 Dissolved ^{13}C Inorganic Carbon

$\delta^{13}C$ value for dissolved inorganic carbon was also measured in the bio-traps. If inorganic carbon was enriched in ^{13}C, it would indicate that complete mineralization of the PCP to 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 bio-traps ranged from 1.08 to 1.09, which is very close to the natural abundance. $\delta^{13}C$ 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 bio-raps were in place.

6. Microcosm and Bio-Trap Study Conclusions and Recommendations

The results from the microcosm tests indicate that PCP and TPH(C_9-C_{36}) are readily degradable under aerobic conditions and that TPH(C_9-C_{36}) is also degradable under anaerobic conditions. PCP degradation under anaerobic conditions is slower.

These conclusions are supported by the data from the bio-traps. In the bio-traps 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 bio-trap data appears to indicate that well MW20 may be in a transitional zone where some aerobic and some anaerobic processes are occurring. Although the bio-trap 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 was observed in the bio-trap study; however, the bio-traps 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 bio-trap data shows that PCP degradation does occur under anaerobic conditions; however, slower biodegradation rates are expected. Analysis of the microcosm after more time has elapsed will provide information about the rates that can be expected.

7. Waste Management and Disposal

Historical hazardous waste disposal is summarized in Appendix A. No waste was disposed during July through September 2016. GHD continues to collect and containerize PPE and other waste produced during sampling events onsite.

8. 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)

8.1 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:
    a. The selected remedy (i.e. remediation system shutdown pilot study and associated monitoring) remains in place and remains effective
    b. 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:
    a. Removal of the existing barrier or cover
    b. Replacement with another barrier or cover
    c. Excavating or grading of the land surface
    d. Filling on covered or paved areas
    e. Plowing for agricultural cultivation
    f. Construction or placement of a building or other structure
    g. 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 July 26, 2016 and a copy of the continuing obligations inspection form is included in Appendix D.

8.2 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 will be closed and locked following the groundwater sampling event in July 2016
- 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 July 18, 2016 and a copy of the well inspection form is included in Appendix D.

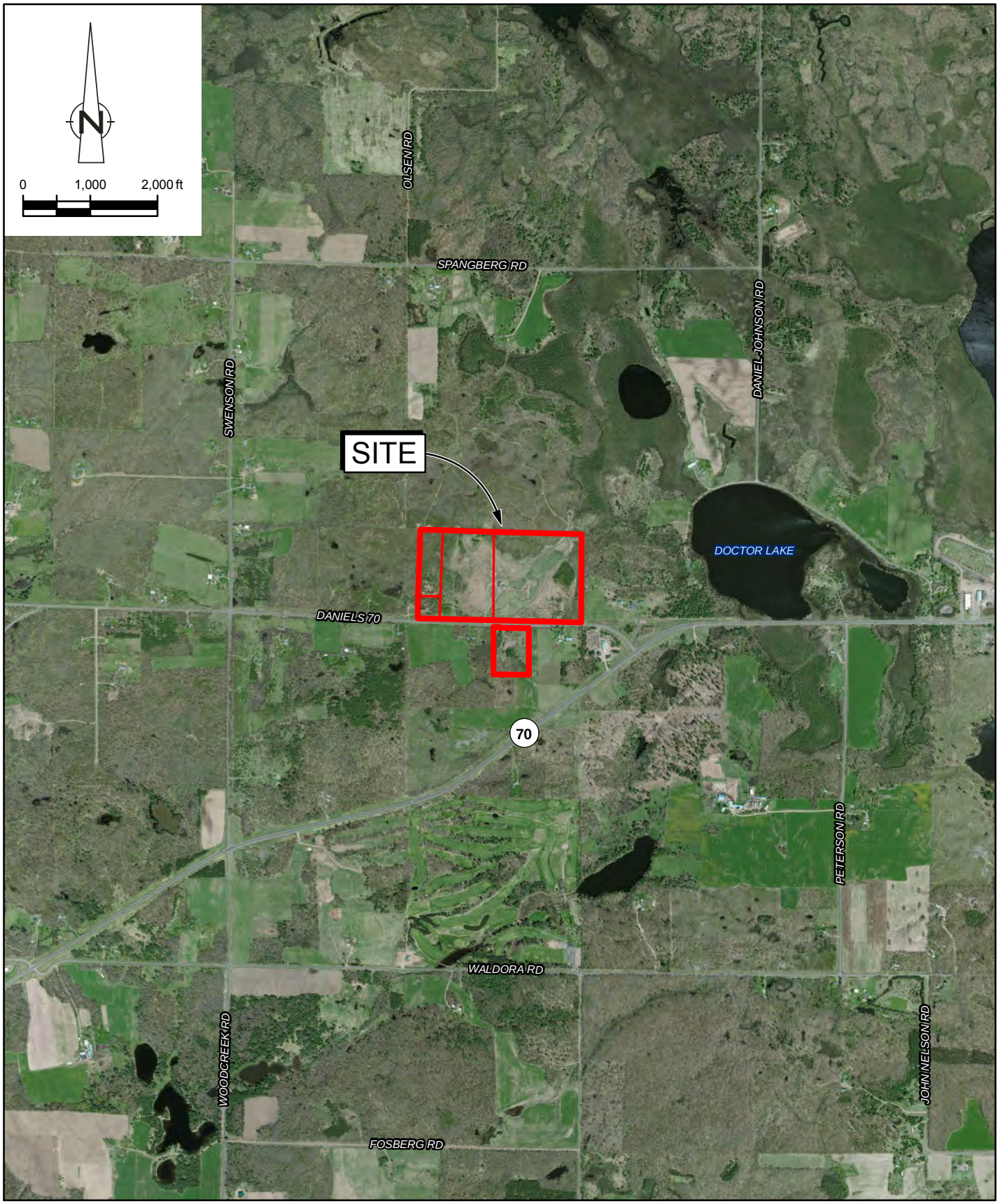
9. Recommendations

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

- The remediation system shut down and continue the pilot study monitoring and sampling at the Site based on the USEPA approved scope and schedule
- Continue microcosm study laboratory analyses and evaluation
- Conduct quarterly groundwater monitoring and sampling during October 2016
- Conduct semiannual residential well sampling during October 2016
- Repair wells MW4 and MW14 and collect groundwater samples to obtain baseline analytical data and assess whether additional wells are necessary to delineate the extent of PCP in the semiconfined (lower) aquifer
- Collect groundwater samples from wells EW07S and EW06D during October 2016 if LNAPL is not present to obtain baseline analytical data
- 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 quarterly reports

10. 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

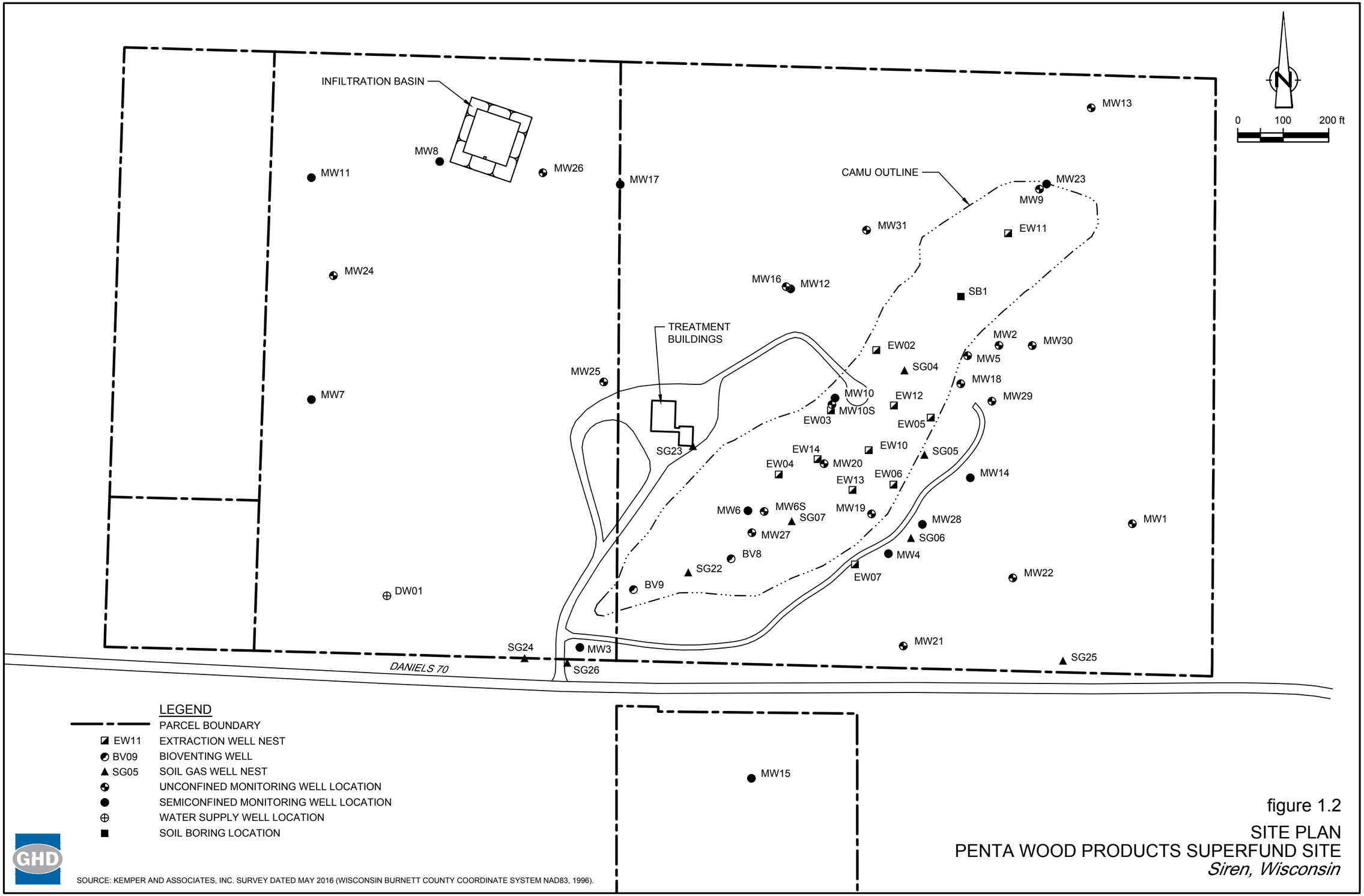
086165-03-13

Sep 29, 2016

SITE LOCATION

FIGURE 1.1

GIS File: I:\GIS\Projects\6-chars\08----\0861--\086165\086165-REPORTS\086165-03(012)\086165-03(012)GIS-SP001.mxd

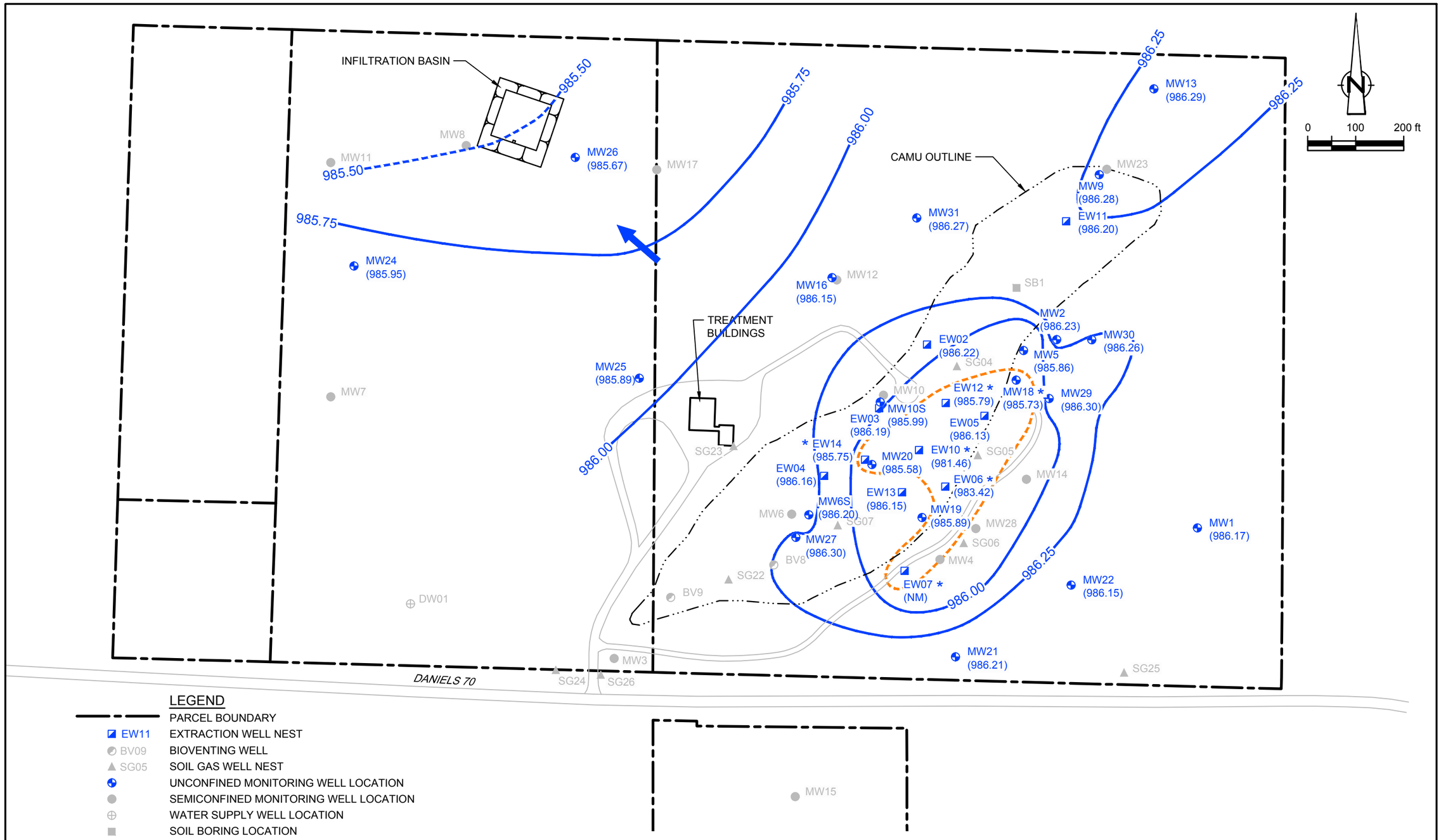


SOURCE: KEMPER AND ASSOCIATES, INC. SURVEY DATED MAY 2016 (WISCONSIN BURNETT COUNTY COORDINATE SYSTEM NAD83, 1996).

figure 1.2

SITE PLAN
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-03(012)GN-WA001 SEP 29, 2016



LEGEND

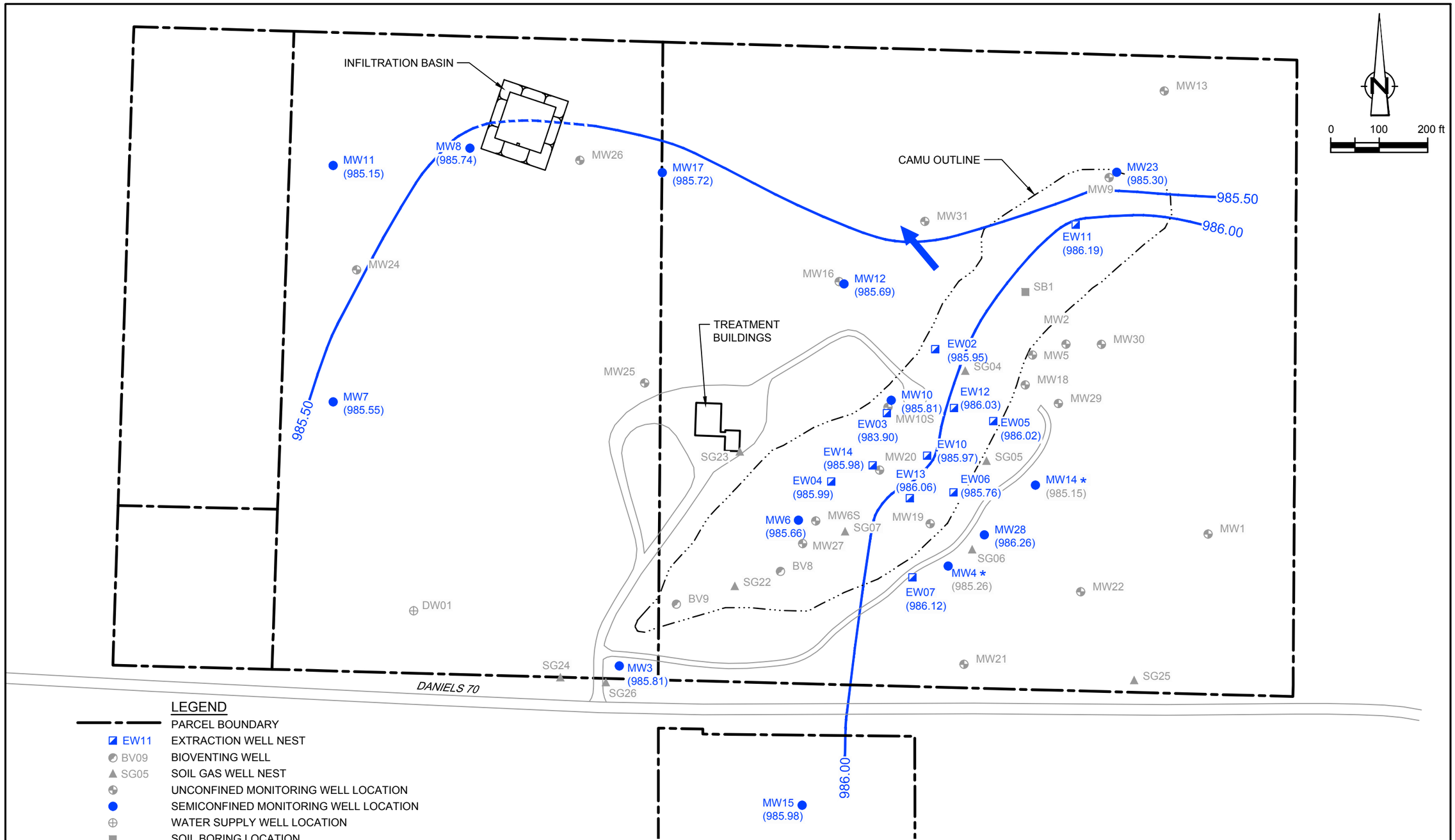
- PARCEL BOUNDARY
- EW11 EXTRACTION WELL NEST
- BV09 BIOVENTING WELL
- SG05 SOIL GAS WELL NEST
- UNCONFINED MONITORING WELL LOCATION
- SEMICONFINED MONITORING WELL LOCATION
- WATER SUPPLY WELL LOCATION
- SOIL BORING LOCATION
- (985.45) GROUNDWATER ELEVATION
- 986.00 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- * LNAPL PRESENT IN WELL
- APPROXIMATE LNAPL LIMIT

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

figure 2.1

UNCONFINED (UPPER) AQUIFER GROUNDWATER CONTOURS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA002 OCT 11, 2016



LEGEND

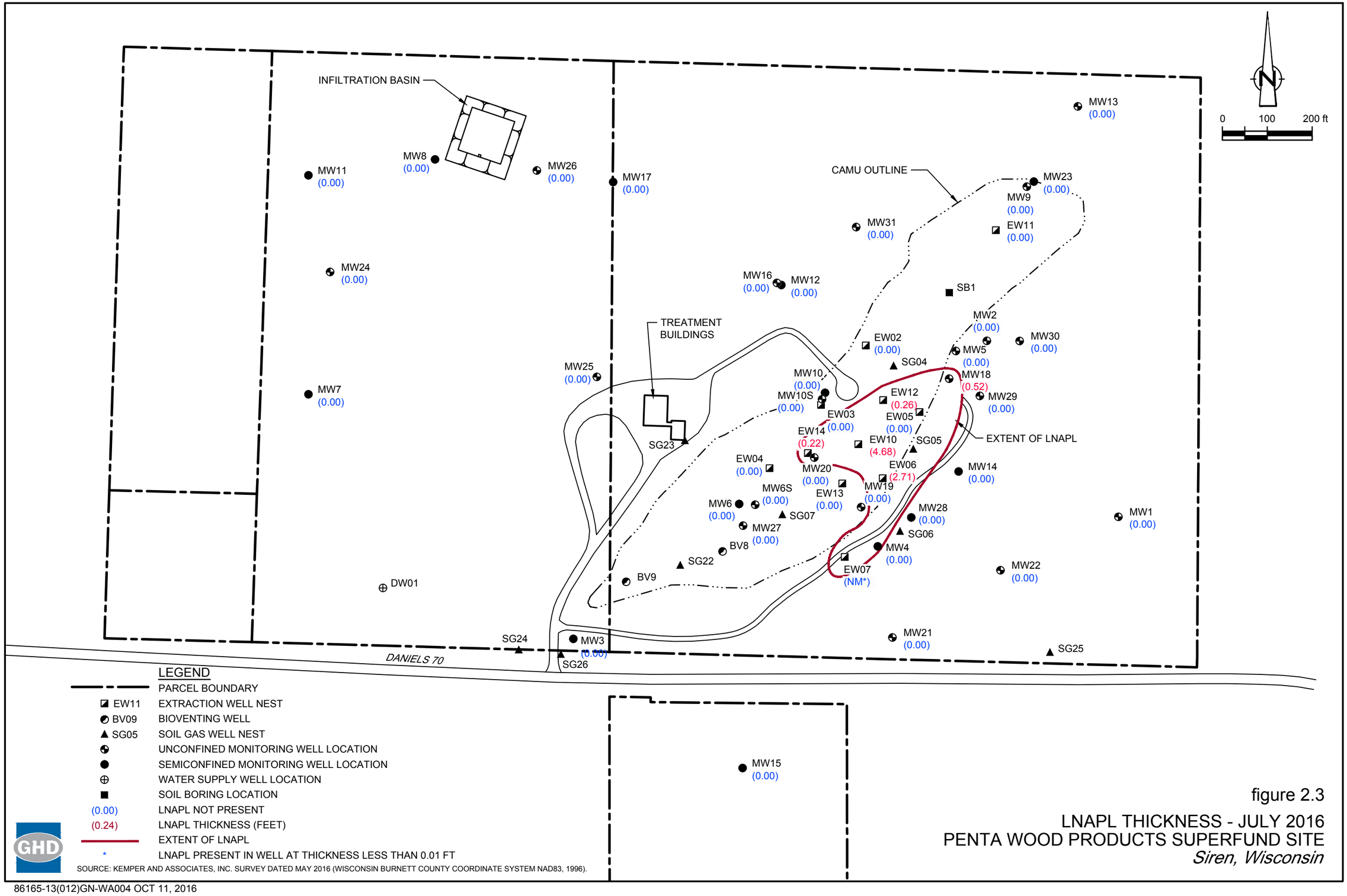
- PARCEL BOUNDARY
- EW11 EXTRACTION WELL NEST
- BV09 BIOVENTING WELL
- SG05 SOIL GAS WELL NEST
- UNCONFINED MONITORING WELL LOCATION
- SEMICONFINED MONITORING WELL LOCATION
- WATER SUPPLY WELL LOCATION
- SOIL BORING LOCATION
- (985.45) GROUNDWATER ELEVATION
- 986.00 GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER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

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

figure 2.2

SEMICONFINED (LOWER) AQUIFER GROUNDWATER CONTOURS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA003 NOV 10, 2016



LEGEND

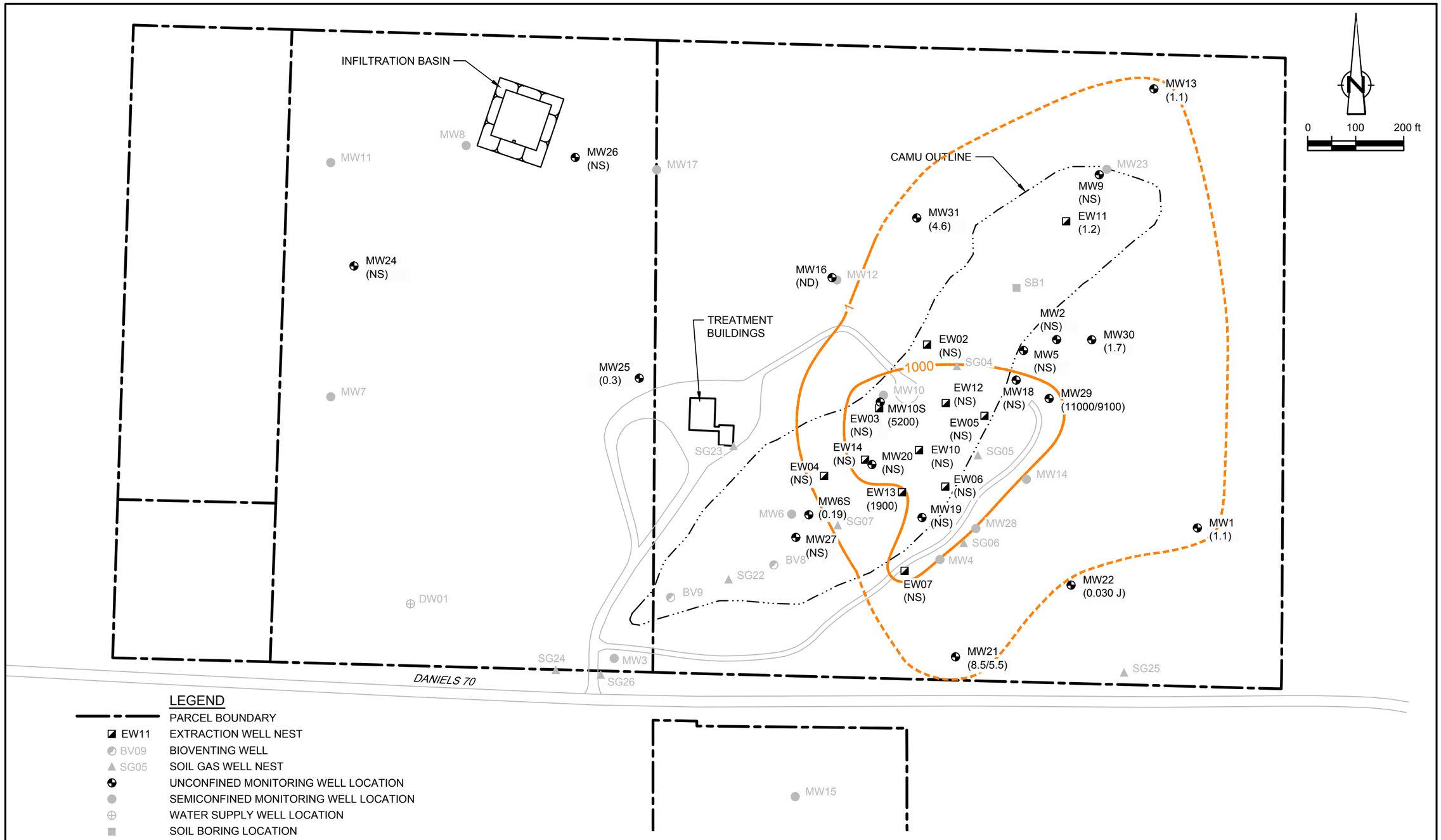
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(0.00)	LNAPL NOT PRESENT
(0.24)	LNAPL THICKNESS (FEET)
	EXTENT OF LNAPL
*	LNAPL PRESENT IN WELL AT THICKNESS LESS THAN 0.01 FT

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

figure 2.3

LNAPL THICKNESS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA004 OCT 11, 2016



LEGEND

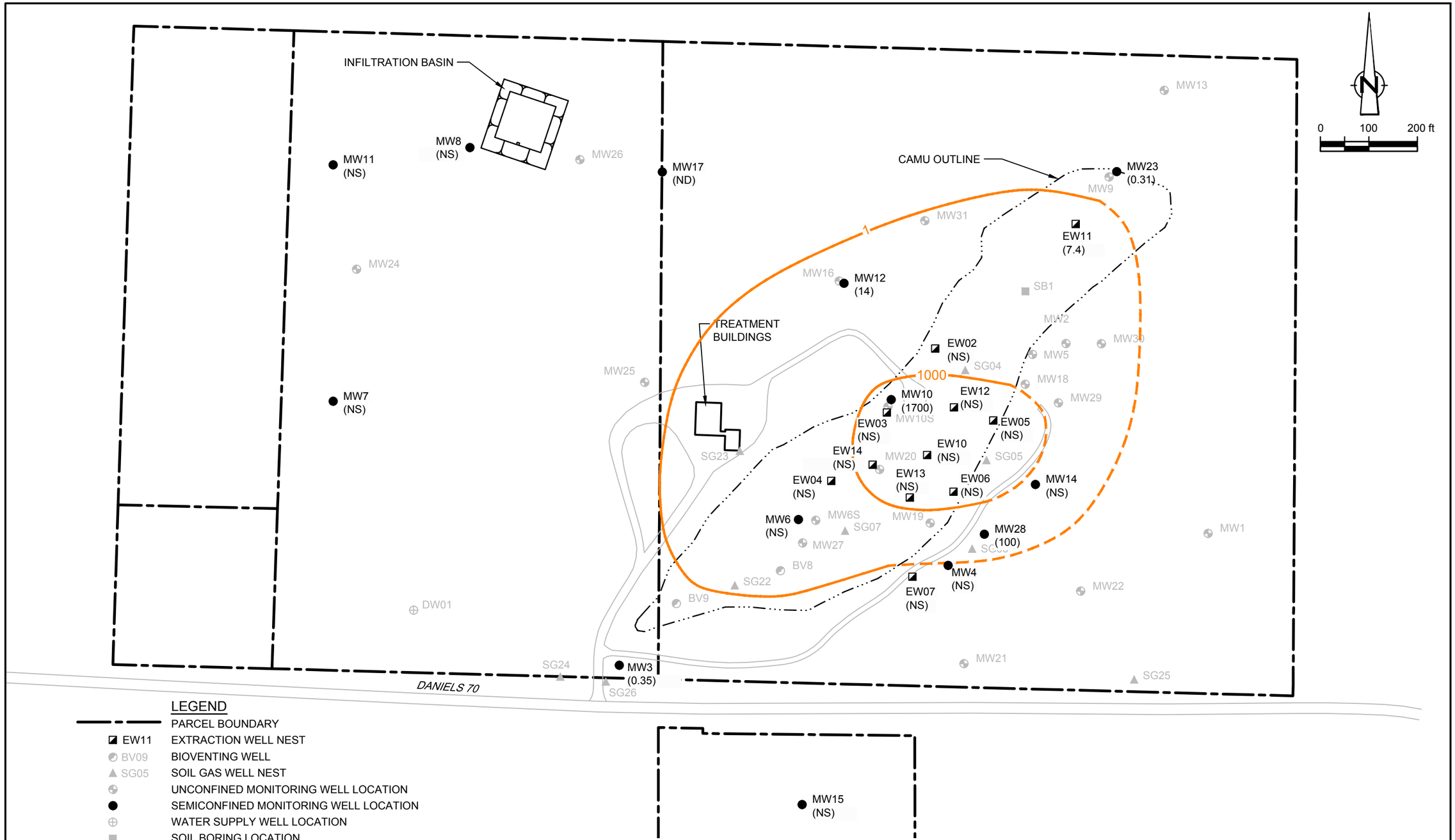
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(17/15)	PENTACHLOROPHENOL CONCENTRATION (WITH DUPLICATE) (µg/L)
1	PENTACHLOROPHENOL CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE

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

figure 2.4

UNCONFINED (UPPER) AQUIFER PENTACHLOROPHENOL CONCENTRATIONS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA005 NOV 10, 2016



LEGEND

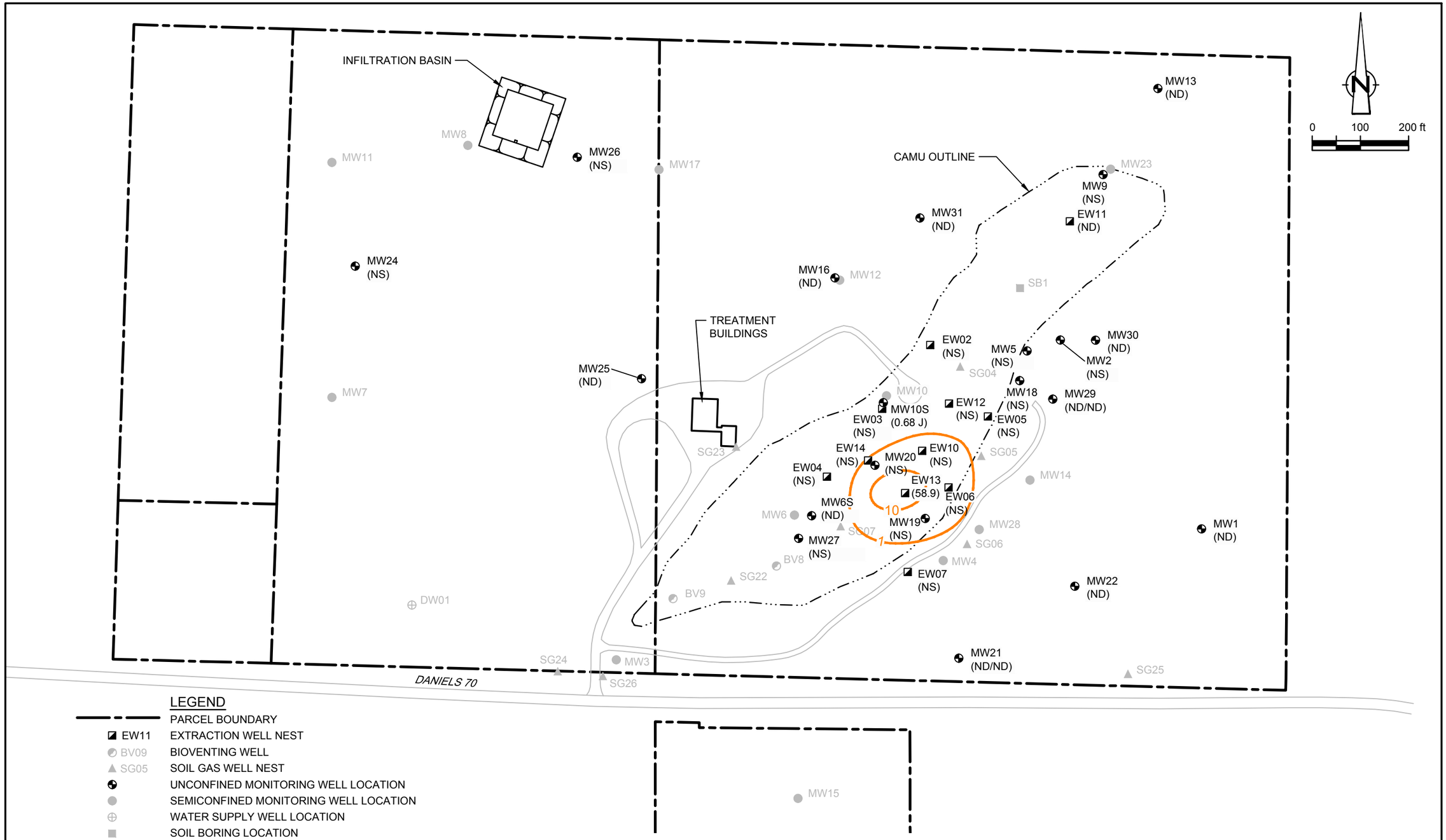
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(2800/2700)	PENTACHLOROPHENOL CONCENTRATION (WITH DUPLICATE) (µg/L)
1	PENTACHLOROPHENOL CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE

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

figure 2.5

SEMICONFINED (LOWER) AQUIFER PENTACHLOROPHENOL CONCENTRATIONS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA006 OCT 11, 2016



LEGEND

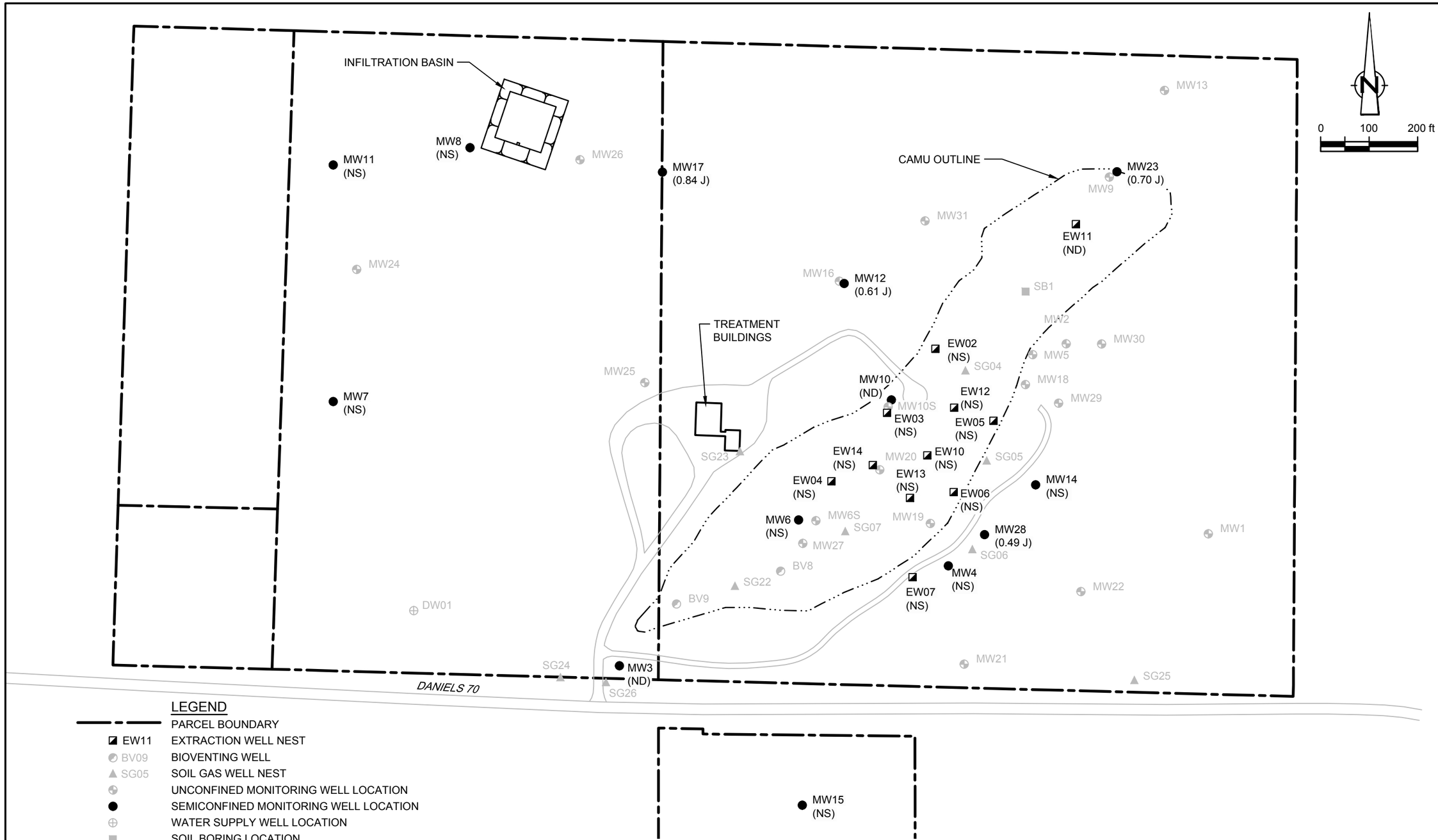
	PARCEL BOUNDARY
EW11	EXTRACTION WELL NEST
BV09	BIOVENTING WELL
SG05	SOIL GAS WELL NEST
	UNCONFINED MONITORING WELL LOCATION
	SEMICONFINED MONITORING WELL LOCATION
	WATER SUPPLY WELL LOCATION
	SOIL BORING LOCATION
(17/15)	ARSENIC CONCENTRATION (WITH DUPLICATE) (µg/L)
1	ARSENIC CONCENTRATION CONTOUR (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE

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

figure 2.6

UNCONFINED (UPPER) AQUIFER ARSENIC CONCENTRATIONS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA007 NOV 9, 2016



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
(2800/2700)	ARSENIC CONCENTRATION (WITH DUPLICATE) (µg/L)
ND	NOT DETECTED
NS	NOT SAMPLED
J	ESTIMATED VALUE

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

figure 2.7

SEMICONFINED (LOWER) AQUIFER ARSENIC CONCENTRATIONS - JULY 2016
PENTA WOOD PRODUCTS SUPERFUND SITE
Siren, Wisconsin

86165-13(012)GN-WA008 NOV 10, 2016

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	7/18/2016	1129.44	143.63	ND	985.81	NA	0.00
MW4	7/18/2016	1087.74	102.48	ND	985.26	NA	0.00
MW6	7/18/2016	1109.11	123.45	ND	985.66	NA	0.00
MW7	7/18/2016	1096.25	110.70	ND	985.55	NA	0.00
MW8	7/18/2016	1091.13	105.39	ND	985.74	NA	0.00
MW10	7/18/2016	1089.01	103.20	ND	985.81	NA	0.00
MW11	7/18/2016	1085.48	100.33	ND	985.15	NA	0.00
MW12	7/18/2016	1080.91	95.22	ND	985.69	NA	0.00
MW14	7/18/2016	1078.37	93.22	ND	985.15	NA	0.00
MW15	7/18/2016	1127.09	141.11	ND	985.98	NA	0.00
MW17	7/18/2016	1084.43	98.71	ND	985.72	NA	0.00
MW23	7/18/2016	1017.45	32.15	ND	985.30	NA	0.00
MW28	7/18/2016	1083.52	97.26	ND	986.26	NA	0.00
EW02D	7/18/2016	1083.00	97.05	ND	985.95	NA	0.00
EW03D	7/18/2016	1089.48	105.58	ND	983.90	NA	0.00
EW04D	7/18/2016	1101.09	115.10	ND	985.99	NA	0.00
EW05D	7/18/2016	1076.99	90.97	ND	986.02	NA	0.00
EW06D	7/18/2016	1083.39	97.63	ND	985.76	NA	0.00
EW07D	7/18/2016	1087.52	101.40	ND	986.12	NA	0.00
EW10D	7/18/2016	1088.55	102.58	ND	985.97	NA	0.00
EW11D	7/18/2016	1048.19	62.00	ND	986.19	NA	0.00
EW12D	7/18/2016	1086.41	100.38	ND	986.03	NA	0.00
EW13D	7/18/2016	1092.88	106.82	ND	986.06	NA	0.00
EW14D	7/18/2016	1098.28	112.30	ND	985.98	NA	0.00
Unconfined Aquifer (Upper)							
MW1	7/18/2016	1072.27	86.10	ND	986.17	NA	0.00
MW2	7/18/2016	1065.03	78.80	ND	986.23	NA	0.00
MW5	7/18/2016	1071.39	85.53	ND	985.86	NA	0.00
MW6S	7/18/2016	1108.35	122.15	ND	986.20	NA	0.00
MW9	7/18/2016	1019.58	33.30	ND	986.28	NA	0.00
MW10S	7/18/2016	1090.12	104.13	ND	985.99	NA	0.00
MW13	7/18/2016	1005.81	19.52	ND	986.29	NA	0.00
MW16	7/18/2016	1081.95	95.80	ND	986.15	NA	0.00
MW18	7/18/2016	1071.96	86.23	85.71	985.73	986.25	0.52
MW19	7/18/2016	1087.96	102.07	ND	985.89	NA	0.00
MW20	7/18/2016	1098.16	112.58	ND	985.58	NA	0.00
MW21	7/18/2016	1095.82	109.61	ND	986.21	NA	0.00
MW22	7/18/2016	1084.65	98.50	ND	986.15	NA	0.00
MW24	7/18/2016	1084.04	98.09	ND	985.95	NA	0.00
MW25	7/18/2016	1095.25	109.36	ND	985.89	NA	0.00
MW26	7/18/2016	1086.87	101.20	ND	985.67	NA	0.00
MW27	7/18/2016	1110.96	124.66	ND	986.30	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)
MW29	7/18/2016	1070.24	83.94	ND	986.30	NA	0.00
MW30	7/18/2016	1048.98	62.72	ND	986.26	NA	0.00
MW31	7/18/2016	1076.34	90.07	ND	986.27	NA	0.00
EW02S	7/18/2016	1082.25	96.03	ND	986.22	NA	0.00
EW03S	7/18/2016	1088.66	102.47	ND	986.19	NA	0.00
EW04S	7/18/2016	1101.01	114.85	ND	986.16	NA	0.00
EW05S	7/18/2016	1077.04	90.91	ND	986.13	NA	0.00
EW06S	7/18/2016	1083.61	100.19	97.48	983.42	986.13	2.71
EW07S [1]	7/18/2016	1087.49	NM	101.40	NM	986.09	NM
EW10S	7/18/2016	1088.72	107.26	102.58	981.46	986.14	4.68
EW11S	7/18/2016	1047.23	61.03	ND	986.20	NA	0.00
EW12S	7/18/2016	1086.31	100.52	100.26	985.79	986.05	0.26
EW13S	7/18/2016	1092.88	106.73	ND	986.15	NA	0.00
EW14S	7/18/2016	1098.32	112.57	112.35	985.75	985.97	0.22

Notes:

1 - Depth to water was not measure due to inability to break through LNAPL with probe
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	7/20/2016	W-160720-PS-10	10:25	2.6	13.95	185	0.0	8.80	7.57	115	-	-
			10:30	5.3	12.99	186	0.0	8.09	7.52	104	-	-
			10:35	7.9	12.77	186	0.0	7.94	7.49	105	-	-
			10:40	10.6	12.72	185	0.0	7.79	7.45	107	-	-
			10:45	13.2	12.77	184	0.0	7.64	7.42	109	ND	ND
MW3	7/21/2016	W-160721-PS-15	9:50	0.9	11.90	0	149	0.70	7.84	-101	-	-
			9:55	1.8	12.69	1	124	2.66	7.57	-21	-	-
			10:00	2.8	13.13	1	130.0	3.54	7.51	-2	-	-
			10:05	3.7	13.16	1	126.0	4.10	7.47	8	-	-
			10:10	4.6	13.14	1	125.0	4.00	7.46	9	-	-
			10:15	5.5	13.24	1	128.0	4.16	7.45	11	6.9	ND
MW6S	7/25/2016	W-160725-PS-19	11:10	3.0	19.73	210	632	5.42	7.25	134	1.5	ND
MW10	7/25/2016	W-160725-PS-22	13:05	NM	12.88	393	0.0	0.00	7.60	-119	-	-
			13:10	NM	12.85	391	0.0	0.00	7.55	-113	-	-
			13:15	NM	12.84	390	0.0	0.00	7.51	-103	-	-
MW10S	7/25/2016	W-160725-PS-21	12:30	4.0	13.00	277	20.6	0.00	6.68	21	-	-
			12:35	7.9	13.02	267	0.0	0.00	6.66	17	-	-
			12:40	11.9	13.05	262	0.0	0.00	6.65	16	-	-
			12:45	15.9	13.07	261	0.0	0.00	6.65	15	0.1	ND
MW12	7/19/2016	W-160719-PS-04	13:20	4.0	13.23	593	7.1	5.72	7.33	72	-	-
			13:25	7.9	13.44	609	0.0	3.36	7.26	70	-	-
			13:30	11.2	13.90	630	0.0	2.02	7.18	74	-	-
			13:35	14.5	13.84	633	0.0	1.44	7.16	79	-	-
			13:40	17.8	13.85	634	0.0	1.41	7.15	81	-	-
			13:45	21.1	13.87	634	0.0	1.40	7.15	83	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)
MW13	7/20/2016	W-160720-PS-11	12:20	2.6	11.41	90	41.4	5.79	5.89	187	-	-
			12:25	5.3	10.99	90	4.3	5.73	5.84	197	-	-
			12:30	7.9	10.86	91	0.0	5.51	5.77	206	1.5	ND
MW16	7/19/2016	W-160719-PS-05	13:35	3.0	14.15	121	57	6.40	7.65	74	1.0	ND
MW17	7/19/2016	W-160719-PS-03	11:00	4.0	13.70	632	0.0	5.70	7.68	82	-	-
			11:05	7.9	14.04	626	0.0	4.14	7.69	76	-	-
			11:10	11.9	14.04	619	0.0	3.86	7.68	81	-	-
			11:15	15.9	14.10	615	0.0	3.63	7.68	83	-	-
			11:20	19.8	14.18	614	0.0	3.60	7.68	86	ND	ND
MW21	7/20/2016	W-160716-PS-06	8:25	1.3	13.22	364	118.0	8.64	7.04	130	-	-
		W-160716-PS-07 (Duplicate)	8:30	2.6	14.71	358	29.0	8.86	7.09	118	-	-
			8:35	4.0	14.99	355	14.0	8.68	7.11	112	-	-
			8:40	5.3	14.86	352	0.0	8.41	7.12	108	ND	ND
MW22	7/20/2016	W-160720-PS-09	9:50	3.0	17.62	127	202.0	8.75	7.32	108	0.8	ND
MW23	7/20/2016	W-160720-PS-12	12:45	NM	11.87	453	20.8	4.72	7.87	14	-	-
			12:50	NM	11.45	470	0.0	4.63	7.94	42	-	-
			12:55	NM	11.23	473	0.0	4.68	7.95	56	-	-
			13:00	NM	11.20	474	0.0	4.63	7.94	58	-	-
			13:05	NM	11.19	473	0.0	4.54	7.96	63	ND	ND
MW25	7/26/2016	W-160726-PS-24	9:42	1.3	12.00	300	29	12.58	6.70	158	-	-
			9:47	2.6	12.25	297	0.0	11.54	6.73	160	-	-
			9:52	4.0	12.18	295	0.0	11.15	6.73	159	-	-
			9:57	5.3	12.14	294	0.0	10.87	6.73	159	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)
MW28	7/21/2016	W-160721-PS-14	9:07	1.3	11.77	292	0.0	11.21	7.85	66	-	-
			9:12	2.6	12.81	296	0.0	8.30	7.83	46	-	-
			9:17	4.0	12.85	296	0.0	7.70	7.83	45	-	-
			9:22	5.3	12.80	297	0.0	7.66	7.82	45	ND	ND
MW29	7/21/2016	W-160721-PS-16	11:30	NM	13.91	231	122.0	1.85	6.35	26	-	-
		W-160721-PS-17 (Duplicate)	11:35	NM	13.86	232	38.5	1.26	6.28	40	-	-
			11:40	NM	13.75	230	28.3	0.22	6.26	48	-	-
			11:45	NM	13.92	227	16.2	0.00	6.22	58	-	-
			11:50	NM	13.84	225	0.0	0.00	6.21	60	2.4	ND
MW30	7/21/2016	W-160721-PS-18	13:20	6.6	10.34	196	10.2	3.99	6.46	129	-	-
			13:25	13.2	10.30	143	0.0	3.00	6.43	144	-	-
			13:30	19.8	10.26	149	0.0	2.30	6.41	150	-	-
			13:35	26.4	10.30	198	0.0	1.51	6.40	154	-	-
			13:40	33.0	10.28	157	0.0	1.47	6.40	157	-	-
			13:45	39.6	10.37	198	0.0	1.38	6.40	159	ND	ND
MW31	7/20/2016	W-160720-PS-13	13:50	9.2	14.37	200	56.3	11.98	7.36	66	-	-
			14:00	11.9	14.09	201	25.6	9.47	7.36	72	-	-
			14:05	13.2	13.77	202	0.0	9.04	7.35	78	-	-
			14:10	14.5	13.71	201	0.0	8.69	7.34	83	-	-
			14:15	15.9	13.80	200	0.0	8.44	7.34	88	0.1	ND
EW11D	7/19/2016	W-160719-PS-01 (MS/MSD)	8:50	4.0	10.93	269	32.5	1.33	6.04	85	-	-
			8:55	7.9	10.98	281	32	1.06	5.95	94	-	-
			9:00	11.9	11.03	352	26	0.98	6.06	92	-	-
			9:05	15.9	10.98	417	18	1.00	6.21	87	-	-
			9:10	19.8	10.97	432	17	0.97	6.23	87	-	-
			9:15	23.8	10.99	501	8.9	1.06	6.33	80	-	-
			9:20	27.7	10.99	495	9.2	1.01	6.38	80	-	-
			9:25	31.7	11.50	513	8.7	1.05	6.43	77	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)
EW11S	7/19/2016	W-160719-PS-02	9:55	4.0	11.85	285	0	3.21	6.65	130	-	-
			10:00	7.9	11.82	277	0.0	2.91	6.63	119	-	-
			10:05	11.9	11.77	279	0.0	2.74	6.59	99	-	-
			10:10	15.9	11.84	273	0.0	2.61	6.58	94	-	-
			10:15	19.8	11.85	273	0.0	2.52	6.58	93	ND	ND
EW13S	7/26/2016	W-160726-PS-23	13:50	NM	14.59	684	88.9	3.31	6.92	-113	-	-
			13:55	NM	16.02	685	219	0.00	6.99	-126	-	-
			14:00	NM	16.14	788	0	0.00	7.13	-154	-	-
			14:05	NM	16.12	651	0	0.00	6.94	-131	-	-
			14:10	NM	16.16	595	0	0.00	6.79	-79	-	-
			14:15	NM	16.15	590	0	0.00	6.78	-79	-	-
			14:20	NM	16.15	586	0	0.00	6.77	-69	7.4	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 was 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)[3]	Manganese (dissolved)[3]	Zinc (dissolved)[3]	Pentachlorophenol	Naphthalene	Benzene	Toluene	Ethylbenzene	Xylenes (total)
		ES[1]	-	250	-	10	250	-	-	10	1300	300	50	5000	1	100	5	800	700	2000
		PAL[2]	-	125	-	2	125	-	-	1	130	150	25	2500	0.1	10	0.5	160	140	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-160719-PS-01	7/19/2016	151	9.1	242	2.2	112 F1	1.9	1.1	0.49 U	2.7 B	292	54.5	50	7.4 F1	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U
MW3	W-160721-PS-15	7/21/2016	215	45.5	248	1.4	9.2	1	2.5	0.49 U	0.75 U	317 B	16.2	7.3 U	0.35	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U
MW10	W-160725-PS-22	7/25/2016	160	12.3	188	0.035 U	31.7	11.6	8.6	0.49 U	3.7 B	826 B	744	7.3 U	1700 B	5.2	0.35 U	0.64 J	0.66 J	5.2
MW12	W-160719-PS-04	7/19/2016	238	10.1	358	1.4	134	0.96 J	0.080 U	0.61 J	1.6 JB	16.0 U	388	7.3 U	14	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U
MW17	W-160719-PS-03	7/19/2016	195	14.7	336	2.8	142	0.52 J	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	0.23 U	0.25 U	0.52 U
MW23	W-160720-PS-12	7/20/2016	195 B	30.6	230	1.8	7.2	0.66 J	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	0.23 U	0.25 U	0.52 U
MW28	W-160721-PS-14	7/21/2016	127	11.4	138	1.9	5.4	1.9	0.10 J	0.49 J	0.75 U	25.9 JB	10.8	7.3 U	100	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U
Unconfined Aquifer (Upper)																				
EW11S	W-160719-PS-02	7/19/2016	65.7	7.9	106	6	36.5	2.7	0.080 U	0.49 U	2.3 B	84.2 J	37.3	7.3 U	1.2	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U
EW13S	W-160726-PS-23	7/26/2016	312	21.2	292	0.035 U	7.8	32.6 ^	20	58.9	133	45600	2580	52.2	1900 B	4	0.35 U	0.35 J	0.31 J	4.4
MW1	W-160720-PS-10	7/20/2016	82.4	5.6	30	0.53	5.2	0.83 J	0.080 U	0.49 U	0.75 U	16.0 U	1.1 U	7.3 U	1.1	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U
MW6S	W-160725-PS-20	7/25/2016	49.4	13.8	86	7.7 F1	8	3.7	0.080 U	0.49 U	3.4 B	118 B	6.1	7.3 U	0.19 B	0.061 U	0.35 U	0.23 U	0.25 U	0.52 U
MW10S	W-160725-PS-21	7/25/2016	107	7.7	124	0.035 U	11.8	15.6	0.080 U	0.68 J	9.2 B	183 B	315	7.3 U	5200 B	13	0.35 U	0.23 U	0.39 J	5.6
MW13	W-160720-PS-11	7/20/2016	39.5 B	0.91 J	86	1	2.2	2.1	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	0.23 U	0.25 U	0.52 U
MW16	W-160719-PS-05	7/19/2016	32.4	2.2	34	0.42	2.6	5.8	0.080 U	0.49 U	2.2 B	114	11.5	7.3 U	0.015 U	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U
MW21	W-160720-PS-06	7/20/2016	29.4 B	84.5	84	1.7	6.8	0.93 J	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	0.23 U	0.25 U	0.52 U
MW21 (duplicate)	W-160720-PS-07	7/20/2016	29.9 B	84.9	78	1.7	6.6	0.90 J	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	0.23 U	0.25 U	0.52 U
MW22	W-160720-PS-09	7/20/2016	58.6 B	1.2	64	0.6	3.1	1.7	0.080 U	0.49 U	3.4	235	10	7.3 U	0.030 J	0.060 U	0.35 U	0.23 U	0.25 U	0.52 U
MW25	W-160726-PS-24	7/26/2016	40.3	49.1	108	3.2	5	0.70 J ^	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	0.23 U	0.25 U	0.52 U
MW29	W-160721-PS-16	7/21/2016	84	9.2	110	0.035 U	10.4	50.5	0.67	0.49 U	2.1 B	1290 B	2800	7.3 U	11000	35	0.35 U	1.3	0.74 J	9.1
MW29 (duplicate)	W-160721-PS-17	7/21/2016	83.8	9.2	110	0.035 U	10.5	51.6	0.69	0.49 U	2.1 B	1250 B	2740	7.3 U	9100	30	0.35 U	1.2	0.83 J	9.3
MW30	W-160721-PS-18	7/21/2016	44.5	2.9	82	4	29.9	1.4	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	0.23 U	0.25 U	0.52 U
MW31	W-160720-PS-13	7/20/2016	105 B	0.76 J	100	0.49	1.9	0.68 J	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	0.23 U	0.25 U	0.52 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

- Concentration exceeds the ES

- Concentration exceeds the PAL

Well MW20 was not sampled due to the presence of LNAPL

Table 4.1

Initial Groundwater 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 4.2

Initial Soil 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 4.3

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

Notes:

< - Compound not detected above the reporting limit
µg/L - Micrograms per liter
mg/L - Milligrams per liter
J - Estimated value

Table 4.4

Aerobic Biostudy SB1 Soil 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	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

Table 4.5

Aerobic Biostudy SB1 Groundwater Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
	Date Analyzed	**1/11/2016**	**8/1/2016**	**8/1/2016**	**8/1/2016**
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	< 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

Table 4.6

Aerobic Biostudy SB1 Soil Analytical Data (6-Month Period) - Microcosm Study
Penta Wood Products Superfund Site
Siren, Wisconsin

			6-Month Period		
	Date Analyzed	**1/11/2016**	**8/1/2016**	**8/1/2016**	**8/1/2016**
Parameters	**Units**	**Start of Microcosm Study**	**Soil and Groundwater**	**Soil, Groundwater, and Oxygen**	**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

Table 4.7

Anaerobic Biostudy MW29 Groundwater 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	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

Table 4.8

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

Table 5.1

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

Appendix A
Historical Site Data

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) 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 U H	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									
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
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	

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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 ^	
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
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
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	
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			

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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
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	

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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	
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	
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													
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
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 U H	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														

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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														
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	

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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	
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

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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														
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

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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
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

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Penta Wood Products Superfund Site
Siren, Wisconsin

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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														
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	
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 =			
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			

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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													
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	
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													

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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																									
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			

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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	
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

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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	
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
MW23	2/26/98	N2		1 U		2 U		14.2 U							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	
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 ^	
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														

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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														
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														
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

Appendix A.1

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

Location	Compound [1] / Date [2]	Units / Type [3]	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)
			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
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
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	
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	
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	
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	
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									
RW01	7/7/05	N													0.043 J	0.95 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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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														
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									

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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									
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									
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														

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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									
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									
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									

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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									
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									

Appendix A.1

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

Location	Date[2]	Compound [1] / Units / Type[3]	Methane ug/L	Arsenic (dissolved) ug/L	Arsenic ug/L	Copper (dissolved) ug/L	Copper ug/L	Iron (dissolved) ug/L	Iron ug/L	Magnesium ug/L	Manganese (dissolved) ug/L	Manganese ug/L	Zinc (dissolved) ug/L	Zinc ug/L	Pentachlorophenol ug/L	Naphthalene ug/L	Benzene ug/L	Ethylbenzene ug/L	Toluene ug/L	Xylenes (total) ug/L	Alkalinity, hydroxide (as CACO3) mg/l	Alkalinity, total (as CaCO3) mg/l	Chloride mg/l	Hardness, carbonate mg/l	Hardness mg/l	Nitrate (as N) mg/l	Sulfate mg/l	TOC averages mg/l	Total organic carbon (TOC) mg/l
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									
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									

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

Notes:

NM - Not Measured

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)	Water (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

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.

lb - pounds

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	

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
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: 240-67404-1
Client Project/Site: 86165, 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:
8/2/2016 9:23:29 AM

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

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

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

TestAmerica Job ID: 240-67404-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

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
F1	MS and/or MSD Recovery is outside acceptance limits.
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, Penta Wood

TestAmerica Job ID: 240-67404-1

Job ID: 240-67404-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-67404-1

Comments
No additional comments.

Receipt
The samples were received on 7/20/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.2º C, 1.4º C, 3.2º C and 4.6º 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
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for 182772 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.

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, Penta Wood

TestAmerica Job ID: 240-67404-1

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, Penta Wood

TestAmerica Job ID: 240-67404-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-67404-1	W-160719-PS-01	Water	07/19/16 09:30	07/20/16 09:30
240-67404-2	W-160719-PS-02	Water	07/19/16 10:15	07/20/16 09:30
240-67404-3	W-160719-PS-03	Water	07/19/16 11:25	07/20/16 09:30
240-67404-4	W-160719-PS-04	Water	07/19/16 13:50	07/20/16 09:30
240-67404-5	W-160719-PS-05	Water	07/19/16 13:55	07/20/16 09:30
240-67404-6	W-TRIP-001	Water	07/19/16 15:00	07/20/16 09:30

Detection Summary

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-01 — Lab Sample ID: 240-67404-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	1.1		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	7.4	F1	0.19	0.030	ug/L	8		8151A	Total/NA
Copper	2.7	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	292		100	16.0	ug/L	1		6020	Dissolved
Manganese	54.5		5.0	1.1	ug/L	1		6020	Dissolved
Zinc	50.0		20.0	7.3	ug/L	1		6020	Dissolved
Alkalinity	151		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	242		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	9.1		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	112	F1	5.0	0.65	mg/L	5		300.0	Total/NA
Total Organic Carbon	1.9		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160719-PS-02 — Lab Sample ID: 240-67404-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	1.2		0.10	0.016	ug/L	4		8151A	Total/NA
Copper	2.3	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	84.2	J	100	16.0	ug/L	1		6020	Dissolved
Manganese	37.3		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	65.7		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	106		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	7.9		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	6.0		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	36.5		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	2.7		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160719-PS-03 — Lab Sample ID: 240-67404-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.84	J	5.0	0.49	ug/L	1		6020	Dissolved
Copper	1.4	J B	2.0	0.75	ug/L	1		6020	Dissolved
Alkalinity	195		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	336		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	2.8		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	142		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.52	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160719-PS-04 — Lab Sample ID: 240-67404-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	14		0.53	0.082	ug/L	20		8151A	Total/NA
Arsenic	0.61	J	5.0	0.49	ug/L	1		6020	Dissolved
Copper	1.6	J B	2.0	0.75	ug/L	1		6020	Dissolved
Manganese	388		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	238		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	10.1		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	1.4		0.10	0.035	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160719-PS-04 (Continued) — Lab Sample ID: 240-67404-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Sulfate	134		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.96	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160719-PS-05 — Lab Sample ID: 240-67404-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Copper	2.2	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	114		100	16.0	ug/L	1		6020	Dissolved
Manganese	11.5		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	32.4		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	34.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	2.2		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.42		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	2.6		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	5.8		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-TRIP-001 — Lab Sample ID: 240-67404-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160719-PS-01
Date Collected: 07/19/16 09:30
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-1
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 13:36	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 13:36	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 13:36	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 13:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*07/28/16 13:36*	*1*
4-Bromofluorobenzene (Surr)	*97*		*61 - 120*		*07/28/16 13:36*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/28/16 13:36*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/28/16 13:36*	*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		07/21/16 07:48	07/25/16 14:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*71*		*42 - 120*	*07/21/16 07:48*	*07/25/16 14:52*	*1*
2-Fluorophenol (Surr)	*31*		*10 - 120*	*07/21/16 07:48*	*07/25/16 14:52*	*1*
2,4,6-Tribromophenol (Surr)	*61*		*35 - 125*	*07/21/16 07:48*	*07/25/16 14:52*	*1*
Nitrobenzene-d5 (Surr)	*66*		*36 - 120*	*07/21/16 07:48*	*07/25/16 14:52*	*1*
Phenol-d5 (Surr)	*17*		*10 - 120*	*07/21/16 07:48*	*07/25/16 14:52*	*1*
Terphenyl-d14 (Surr)	*54*		*17 - 120*	*07/21/16 07:48*	*07/25/16 14:52*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1.1**		0.50	0.080	ug/L			07/21/16 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*107*		*76 - 121*		*07/21/16 15:27*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**7.4**	**F1**	0.19	0.030	ug/L		07/25/16 03:39	07/27/16 11:13	8

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*32*		*18 - 125*	*07/25/16 03:39*	*07/27/16 11:13*	*8*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/21/16 11:30	07/26/16 13:15	1
Copper	**2.7**	**B**	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 13:15	1
Iron	**292**		100	16.0	ug/L		07/21/16 11:30	07/26/16 13:15	1
Manganese	**54.5**		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 13:15	1
Zinc	**50.0**		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 13:15	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**151**		5.0	1.9	mg/L			07/21/16 16:18	1
Hardness as calcium carbonate	**242**		5.0	3.1	mg/L			07/22/16 08:40	1
Chloride	**9.1**		1.0	0.41	mg/L			07/21/16 03:22	1
Nitrate as N	**2.2**		0.10	0.035	mg/L			07/21/16 03:22	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-01
Date Collected: 07/19/16 09:30
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	112	F1	5.0	0.65	mg/L			07/21/16 11:46	5
Total Organic Carbon	1.9		1.0	0.080	mg/L			07/29/16 11:44	1

Client Sample ID: W-160719-PS-02

Date Collected: 07/19/16 10:15
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-2

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 14:43	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 14:43	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 14:43	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 14:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*07/28/16 14:43*	*1*
4-Bromofluorobenzene (Surr)	*97*		*61 - 120*		*07/28/16 14:43*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/28/16 14:43*	*1*
Dibromofluoromethane (Surr)	*97*		*79 - 120*		*07/28/16 14:43*	*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		07/21/16 07:48	07/25/16 21:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*	*07/21/16 07:48*	*07/25/16 21:19*	*1*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/21/16 07:48*	*07/25/16 21:19*	*1*
2,4,6-Tribromophenol (Surr)	*70*		*35 - 125*	*07/21/16 07:48*	*07/25/16 21:19*	*1*
Nitrobenzene-d5 (Surr)	*69*		*36 - 120*	*07/21/16 07:48*	*07/25/16 21:19*	*1*
Phenol-d5 (Surr)	*19*		*10 - 120*	*07/21/16 07:48*	*07/25/16 21:19*	*1*
Terphenyl-d14 (Surr)	*52*		*17 - 120*	*07/21/16 07:48*	*07/25/16 21:19*	*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			07/21/16 16:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*105*		*76 - 121*		*07/21/16 16:36*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1.2**		0.10	0.016	ug/L		07/25/16 03:39	07/27/16 12:49	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*43*		*18 - 125*	*07/25/16 03:39*	*07/27/16 12:49*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/21/16 11:30	07/26/16 15:40	1
Copper	**2.3**	**B**	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 15:40	1
Iron	**84.2**	**J**	100	16.0	ug/L		07/21/16 11:30	07/26/16 15:40	1
Manganese	**37.3**		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 15:40	1
Zinc	<7.3		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 15:40	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**65.7**		5.0	1.9	mg/L			07/21/16 21:20	1
Hardness as calcium carbonate	**106**		5.0	3.1	mg/L			07/22/16 09:04	1
Chloride	**7.9**		1.0	0.41	mg/L			07/21/16 04:12	1
Nitrate as N	**6.0**		0.10	0.035	mg/L			07/21/16 04:12	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-02
Date Collected: 07/19/16 10:15
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	36.5		1.0	0.13	mg/L			07/21/16 04:12	1
Total Organic Carbon	2.7		1.0	0.080	mg/L			07/29/16 12:28	1

Client Sample ID: W-160719-PS-03
Date Collected: 07/19/16 11:25
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-3
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 15:05	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 15:05	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 15:05	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 15:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*07/28/16 15:05*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/28/16 15:05*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/28/16 15:05*	*1*
Dibromofluoromethane (Surr)	*97*		*79 - 120*		*07/28/16 15:05*	*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		07/21/16 07:48	07/25/16 21:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*72*		*42 - 120*	*07/21/16 07:48*	*07/25/16 21:43*	*1*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/21/16 07:48*	*07/25/16 21:43*	*1*
2,4,6-Tribromophenol (Surr)	*67*		*35 - 125*	*07/21/16 07:48*	*07/25/16 21:43*	*1*
Nitrobenzene-d5 (Surr)	*68*		*36 - 120*	*07/21/16 07:48*	*07/25/16 21:43*	*1*
Phenol-d5 (Surr)	*18*		*10 - 120*	*07/21/16 07:48*	*07/25/16 21:43*	*1*
Terphenyl-d14 (Surr)	*55*		*17 - 120*	*07/21/16 07:48*	*07/25/16 21:43*	*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			07/21/16 16:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*104*		*76 - 121*		*07/21/16 16:53*	*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		07/25/16 03:39	07/27/16 13:37	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*41*		*18 - 125*	*07/25/16 03:39*	*07/27/16 13:37*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.84**	**J**	5.0	0.49	ug/L		07/21/16 11:30	07/26/16 15:44	1
Copper	**1.4**	**J B**	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 15:44	1
Iron	<16.0		100	16.0	ug/L		07/21/16 11:30	07/26/16 15:44	1
Manganese	<1.1		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 15:44	1
Zinc	<7.3		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 15:44	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**195**		5.0	1.9	mg/L			07/21/16 21:30	1
Hardness as calcium carbonate	**336**		5.0	3.1	mg/L			07/22/16 09:07	1
Chloride	**14.7**		1.0	0.41	mg/L			07/21/16 04:28	1
Nitrate as N	**2.8**		0.10	0.035	mg/L			07/21/16 04:28	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-03
Date Collected: 07/19/16 11:25
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	142		1.0	0.13	mg/L			07/21/16 04:28	1
Total Organic Carbon	0.52	J	1.0	0.080	mg/L			07/29/16 12:55	1

Client Sample ID: W-160719-PS-04
Date Collected: 07/19/16 13:50
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-4
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 15:27	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 15:27	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 15:27	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*07/28/16 15:27*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*07/28/16 15:27*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/28/16 15:27*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/28/16 15:27*	*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		07/21/16 07:48	07/25/16 22:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*57*		*42 - 120*	*07/21/16 07:48*	*07/25/16 22:07*	*1*
2-Fluorophenol (Surr)	*27*		*10 - 120*	*07/21/16 07:48*	*07/25/16 22:07*	*1*
2,4,6-Tribromophenol (Surr)	*57*		*35 - 125*	*07/21/16 07:48*	*07/25/16 22:07*	*1*
Nitrobenzene-d5 (Surr)	*53*		*36 - 120*	*07/21/16 07:48*	*07/25/16 22:07*	*1*
Phenol-d5 (Surr)	*15*		*10 - 120*	*07/21/16 07:48*	*07/25/16 22:07*	*1*
Terphenyl-d14 (Surr)	*49*		*17 - 120*	*07/21/16 07:48*	*07/25/16 22:07*	*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			07/21/16 17:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*102*		*76 - 121*		*07/21/16 17:11*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**14**		0.53	0.082	ug/L		07/25/16 03:39	07/27/16 14:25	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*27*	*p*	*18 - 125*	*07/25/16 03:39*	*07/27/16 14:25*	*20*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.61**	**J**	5.0	0.49	ug/L		07/21/16 11:30	07/26/16 15:48	1
Copper	**1.6**	**J B**	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 15:48	1
Iron	<16.0		100	16.0	ug/L		07/21/16 11:30	07/26/16 15:48	1
Manganese	**388**		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 15:48	1
Zinc	<7.3		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 15:48	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**238**		5.0	1.9	mg/L			07/21/16 21:52	1
Hardness as calcium carbonate	**358**		5.0	3.1	mg/L			07/22/16 09:10	1
Chloride	**10.1**		1.0	0.41	mg/L			07/21/16 04:44	1
Nitrate as N	**1.4**		0.10	0.035	mg/L			07/21/16 04:44	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-04
Date Collected: 07/19/16 13:50
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	134		1.0	0.13	mg/L			07/21/16 04:44	1
Total Organic Carbon	0.96	J	1.0	0.080	mg/L			07/29/16 13:22	1

Client Sample ID: W-160719-PS-05

Date Collected: 07/19/16 13:55
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-5

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 15:50	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 15:50	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 15:50	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 15:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*07/28/16 15:50*	*1*
4-Bromofluorobenzene (Surr)	*98*		*61 - 120*		*07/28/16 15:50*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/28/16 15:50*	*1*
Dibromofluoromethane (Surr)	*100*		*79 - 120*		*07/28/16 15:50*	*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		07/21/16 07:48	07/25/16 22:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*	*07/21/16 07:48*	*07/25/16 22:31*	*1*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/21/16 07:48*	*07/25/16 22:31*	*1*
2,4,6-Tribromophenol (Surr)	*66*		*35 - 125*	*07/21/16 07:48*	*07/25/16 22:31*	*1*
Nitrobenzene-d5 (Surr)	*69*		*36 - 120*	*07/21/16 07:48*	*07/25/16 22:31*	*1*
Phenol-d5 (Surr)	*18*		*10 - 120*	*07/21/16 07:48*	*07/25/16 22:31*	*1*
Terphenyl-d14 (Surr)	*53*		*17 - 120*	*07/21/16 07:48*	*07/25/16 22:31*	*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			07/21/16 17:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*104*		*76 - 121*		*07/21/16 17:28*	*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		07/25/16 03:39	07/27/16 15:13	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*48*		*18 - 125*	*07/25/16 03:39*	*07/27/16 15:13*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/21/16 11:30	07/26/16 15:52	1
Copper	**2.2**	**B**	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 15:52	1
Iron	**114**		100	16.0	ug/L		07/21/16 11:30	07/26/16 15:52	1
Manganese	**11.5**		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 15:52	1
Zinc	<7.3		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 15:52	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**32.4**		5.0	1.9	mg/L			07/21/16 22:00	1
Hardness as calcium carbonate	**34.0**		5.0	3.1	mg/L			07/22/16 09:14	1
Chloride	**2.2**		1.0	0.41	mg/L			07/21/16 05:01	1
Nitrate as N	**0.42**		0.10	0.035	mg/L			07/21/16 05:01	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-05
Date Collected: 07/19/16 13:55
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	2.6		1.0	0.13	mg/L			07/21/16 05:01	1
Total Organic Carbon	5.8		1.0	0.080	mg/L			07/29/16 13:49	1

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-TRIP-001
Date Collected: 07/19/16 15:00
Date Received: 07/20/16 09:30

Lab Sample ID: 240-67404-6
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 16:12	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 16:12	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 16:12	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 16:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*07/28/16 16:12*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*07/28/16 16:12*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/28/16 16:12*	*1*
Dibromofluoromethane (Surr)	*96*		*79 - 120*		*07/28/16 16:12*	*1*

Surrogate Summary

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

TestAmerica Job ID: 240-67404-1

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	(78-125)	(61-120)	(80-120)	(79-120)
240-67404-1	W-160719-PS-01	92	97	102	98
240-67404-1 MS	W-160719-PS-01	90	107	104	101
240-67404-1 MSD	W-160719-PS-01	89	106	103	104
240-67404-2	W-160719-PS-02	90	97	103	97
240-67404-3	W-160719-PS-03	90	100	102	97
240-67404-4	W-160719-PS-04	91	99	102	98
240-67404-5	W-160719-PS-05	93	98	103	100
240-67404-6	W-TRIP-001	91	99	102	96
LCS 240-240170/4	Lab Control Sample	90	105	104	103
MB 240-240170/6	Method Blank	89	99	103	97

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)
240-67404-1	W-160719-PS-01	71	31	61	66	17	54
240-67404-1 MS	W-160719-PS-01	71	29	73	70	16	39
240-67404-1 MSD	W-160719-PS-01	78	41	83	79	23	53
240-67404-2	W-160719-PS-02	73	33	70	69	19	52
240-67404-3	W-160719-PS-03	72	33	67	68	18	55
240-67404-4	W-160719-PS-04	57	27	57	53	15	49
240-67404-5	W-160719-PS-05	78	33	66	69	18	53
LCS 240-239104/21-A	Lab Control Sample	74	66	79	79	52	80
MB 240-239104/20-A	Method Blank	65	61	61	64	51	73

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)
240-67404-1	W-160719-PS-01	107
240-67404-1 MS	W-160719-PS-01	103
240-67404-1 MSD	W-160719-PS-01	101

Surrogate Summary

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

TestAmerica Job ID: 240-67404-1

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)
240-67404-2	W-160719-PS-02	105
240-67404-3	W-160719-PS-03	104
240-67404-4	W-160719-PS-04	102
240-67404-5	W-160719-PS-05	104
LCS 240-239141/5	Lab Control Sample	109
MB 240-239141/4	Method Blank	102

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)
240-67404-1	W-160719-PS-01	32	23
240-67404-1 MS	W-160719-PS-01	111	104
240-67404-1 MSD	W-160719-PS-01	125	114
240-67404-2	W-160719-PS-02	43	41
240-67404-3	W-160719-PS-03	37	41
240-67404-4	W-160719-PS-04	51	27 p
240-67404-5	W-160719-PS-05	42	48
LCS 180-182772/2-A	Lab Control Sample	28	28
MB 180-182772/1-A	Method Blank	62	56

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

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

Lab Sample ID: MB 240-240170/6
Matrix: Water
Analysis Batch: 240170

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/28/16 10:37	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/28/16 10:37	1
Toluene	<0.23		1.0	0.23	ug/L			07/28/16 10:37	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/28/16 10:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*07/28/16 10:37*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*07/28/16 10:37*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/28/16 10:37*	*1*
Dibromofluoromethane (Surr)	*97*		*79 - 120*		*07/28/16 10:37*	*1*

Lab Sample ID: LCS 240-240170/4
Matrix: Water
Analysis Batch: 240170

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	10.4		ug/L		104	80 - 120
Ethylbenzene	10.0	10.8		ug/L		108	80 - 120
Toluene	10.0	10.5		ug/L		105	80 - 120
Xylenes, Total	20.0	21.1		ug/L		106	80 - 120
m-Xylene & p-Xylene	10.0	10.1		ug/L		101	80 - 120
o-Xylene	10.0	11.0		ug/L		110	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*
4-Bromofluorobenzene (Surr)	*105*		*61 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*79 - 120*

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 240170

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.35		10.0	9.76		ug/L		98	73 - 121
Ethylbenzene	<0.25		10.0	10.2		ug/L		102	68 - 121
Toluene	<0.23		10.0	10.1		ug/L		101	72 - 122
Xylenes, Total	<0.52		20.0	19.9		ug/L		100	67 - 122
m-Xylene & p-Xylene	<0.24		10.0	9.71		ug/L		97	66 - 123
o-Xylene	<0.25		10.0	10.2		ug/L		102	68 - 121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*
4-Bromofluorobenzene (Surr)	*107*		*61 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*79 - 120*

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

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 240170

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.35		10.0	10.0		ug/L		100	73 - 121	3	13
Ethylbenzene	<0.25		10.0	10.6		ug/L		106	68 - 121	4	16
Toluene	<0.23		10.0	10.3		ug/L		103	72 - 122	1	15
Xylenes, Total	<0.52		20.0	20.6		ug/L		103	67 - 122	4	14
m-Xylene & p-Xylene	<0.24		10.0	9.94		ug/L		99	66 - 123	2	15
o-Xylene	<0.25		10.0	10.7		ug/L		107	68 - 121	4	14

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*
4-Bromofluorobenzene (Surr)	*106*		*61 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*79 - 120*

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

Lab Sample ID: MB 240-239104/20-A
Matrix: Water
Analysis Batch: 239514

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 239104

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/21/16 07:48	07/24/16 18:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*65*		*42 - 120*	*07/21/16 07:48*	*07/24/16 18:12*	*1*
2-Fluorophenol (Surr)	*61*		*10 - 120*	*07/21/16 07:48*	*07/24/16 18:12*	*1*
2,4,6-Tribromophenol (Surr)	*61*		*35 - 125*	*07/21/16 07:48*	*07/24/16 18:12*	*1*
Nitrobenzene-d5 (Surr)	*64*		*36 - 120*	*07/21/16 07:48*	*07/24/16 18:12*	*1*
Phenol-d5 (Surr)	*51*		*10 - 120*	*07/21/16 07:48*	*07/24/16 18:12*	*1*
Terphenyl-d14 (Surr)	*73*		*17 - 120*	*07/21/16 07:48*	*07/24/16 18:12*	*1*

Lab Sample ID: LCS 240-239104/21-A
Matrix: Water
Analysis Batch: 239514

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 239104

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	15.4		ug/L		77	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*
2-Fluorophenol (Surr)	*66*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*79*		*35 - 125*
Nitrobenzene-d5 (Surr)	*79*		*36 - 120*
Phenol-d5 (Surr)	*52*		*10 - 120*
Terphenyl-d14 (Surr)	*80*		*17 - 120*

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

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239645

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA
Prep Batch: 239104

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	<0.060		19.0	12.7		ug/L		67	37 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*71*		*42 - 120*
2-Fluorophenol (Surr)	*29*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*73*		*35 - 125*
Nitrobenzene-d5 (Surr)	*70*		*36 - 120*
Phenol-d5 (Surr)	*16*		*10 - 120*
Terphenyl-d14 (Surr)	*39*		*17 - 120*

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239645

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA
Prep Batch: 239104

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Naphthalene	<0.060		21.7	16.2		ug/L		74	37 - 120	24	33

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*78*		*42 - 120*
2-Fluorophenol (Surr)	*41*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*83*		*35 - 125*
Nitrobenzene-d5 (Surr)	*79*		*36 - 120*
Phenol-d5 (Surr)	*23*		*10 - 120*
Terphenyl-d14 (Surr)	*53*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-239141/4
Matrix: Water
Analysis Batch: 239141

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			07/21/16 13:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*102*		*76 - 121*		*07/21/16 13:26*	*1*

Lab Sample ID: LCS 240-239141/5
Matrix: Water
Analysis Batch: 239141

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane			199	178		ug/L		90	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*109*		*76 - 121*

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

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239141

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	1.1		199	171		ug/L		85	48 - 159

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*103*		*76 - 121*

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239141

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	1.1		199	169		ug/L		84	48 - 159	1	23

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,1,1-Trifluoroethane	*101*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-182772/1-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 182772

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.078		0.50	0.078	ug/L		07/25/16 03:39	07/27/16 10:49	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*18 - 125*	*07/25/16 03:39*	*07/27/16 10:49*	*20*

Lab Sample ID: LCS 180-182772/2-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 182772

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol			1.00	0.650		ug/L		65	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*28*		*18 - 125*

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 183051

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA
Prep Batch: 182772

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	7.4	F1	1.92	15.0	F1	ug/L		397	30 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*111*		*18 - 125*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 183051

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA
Prep Batch: 182772

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	7.4	F1	1.92	15.7	F1	ug/L		433	30 - 150	4	35

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

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-239182/1-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 239182

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/21/16 11:30	07/26/16 13:03	1
Copper	1.81	J	2.0	0.75	ug/L		07/21/16 11:30	07/26/16 13:03	1
Iron	<16.0		100	16.0	ug/L		07/21/16 11:30	07/26/16 13:03	1
Manganese	<1.1		5.0	1.1	ug/L		07/21/16 11:30	07/26/16 13:03	1
Zinc	<7.3		20.0	7.3	ug/L		07/21/16 11:30	07/26/16 13:03	1

Lab Sample ID: LCS 240-239182/2-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 239182

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	959.1		ug/L		96	80 - 120
Copper	1000	982.0		ug/L		98	80 - 120
Iron	10000	9656		ug/L		97	80 - 120
Manganese	1000	944.3		ug/L		94	80 - 120
Zinc	1000	936.4		ug/L		94	80 - 120

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239961

Client Sample ID: W-160719-PS-01
Prep Type: Dissolved
Prep Batch: 239182

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	<0.49		1000	949.8		ug/L		95	75 - 125
Copper	2.7	B	1000	922.7		ug/L		92	75 - 125
Iron	292		10000	9434		ug/L		91	75 - 125
Manganese	54.5		1000	966.2		ug/L		91	75 - 125
Zinc	50.0		1000	942.6		ug/L		89	75 - 125

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239961

Client Sample ID: W-160719-PS-01
Prep Type: Dissolved
Prep Batch: 239182

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	<0.49		1000	940.1		ug/L		94	75 - 125	1	20
Copper	2.7	B	1000	920.8		ug/L		92	75 - 125	0	20
Iron	292		10000	9430		ug/L		91	75 - 125	0	20

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

Lab Sample ID: 240-67404-1 MSD — **Client Sample ID: W-160719-PS-01**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 239961 — **Prep Batch: 239182**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Manganese	54.5		1000	962.4		ug/L		91	75 - 125	0	20
Zinc	50.0		1000	943.9		ug/L		89	75 - 125	0	20

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-239362/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			07/21/16 16:05	1

Lab Sample ID: LCS 240-239362/6 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	379.8		mg/L		103	90 - 127

Lab Sample ID: 240-67404-1 MS — **Client Sample ID: W-160719-PS-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	151		500	598.4		mg/L		90	10 - 160

Lab Sample ID: 240-67404-1 MSD — **Client Sample ID: W-160719-PS-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Alkalinity	151		500	583.1		mg/L		86	10 - 160	3	24

Lab Sample ID: 240-67404-1 DU — **Client Sample ID: W-160719-PS-01**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	151		153.8		mg/L		2	20

Lab Sample ID: 240-67404-3 DU — **Client Sample ID: W-160719-PS-03**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239362

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	195		197.5		mg/L		1	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-239304/1
Matrix: Water
Analysis Batch: 239304

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			07/22/16 08:30	1

Lab Sample ID: LCS 240-239304/2
Matrix: Water
Analysis Batch: 239304

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	172.0		mg/L		101	88 - 110

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239304

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	242		400	636.0		mg/L		99	87 - 114

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239304

Client Sample ID: W-160719-PS-01
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	242		400	652.0		mg/L		103	87 - 114	2	20

Lab Sample ID: 240-67404-1 DU
Matrix: Water
Analysis Batch: 239304

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	242		234.0		mg/L		3	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-239032/51
Matrix: Water
Analysis Batch: 239032

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			07/21/16 02:50	1
Sulfate	<0.13		1.0	0.13	mg/L			07/21/16 02:50	1

Lab Sample ID: LCS 240-239032/52
Matrix: Water
Analysis Batch: 239032

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	52.55		mg/L		105	90 - 110
Sulfate	50.0	49.37		mg/L		99	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239032

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	9.1		50.0	64.55		mg/L		111	80 - 120

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239032

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	9.1		50.0	64.43		mg/L		111	80 - 120	0	15

Lab Sample ID: MB 240-239130/51
Matrix: Water
Analysis Batch: 239130

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			07/21/16 02:50	1

Lab Sample ID: LCS 240-239130/52
Matrix: Water
Analysis Batch: 239130

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: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239130

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.2		2.50	4.76		mg/L		103	80 - 120

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239130

Client Sample ID: W-160719-PS-01
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	2.2		2.50	4.73		mg/L		102	80 - 120	1	15

Lab Sample ID: MB 240-239184/3
Matrix: Water
Analysis Batch: 239184

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			07/21/16 11:13	1

Lab Sample ID: LCS 240-239184/4
Matrix: Water
Analysis Batch: 239184

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	50.0	48.44		mg/L		97	90 - 110

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 239184

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfate	112	F1	50.0	155.6		mg/L		87	80 - 120		

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 239184

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	112	F1	50.0	154.5		mg/L		85	80 - 120	1	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-240551/4
Matrix: Water
Analysis Batch: 240551

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			07/29/16 11:20	1

Lab Sample ID: LCS 240-240551/6
Matrix: Water
Analysis Batch: 240551

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			14.4	14.16		mg/L		98	88 - 115		

Lab Sample ID: LLCS 240-240551/5
Matrix: Water
Analysis Batch: 240551

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			7.20	7.34		mg/L		102	88 - 115		

Lab Sample ID: 240-67404-1 MS
Matrix: Water
Analysis Batch: 240551

Client Sample ID: W-160719-PS-01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon	1.9		25.0	25.78		mg/L		95	72 - 136		

Lab Sample ID: 240-67404-1 MSD
Matrix: Water
Analysis Batch: 240551

Client Sample ID: W-160719-PS-01
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	1.9		25.0	26.06		mg/L		97	72 - 136	1	20

QC Association Summary

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

TestAmerica Job ID: 240-67404-1

GC/MS VOA

Analysis Batch: 240170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	8260B	
240-67404-2	W-160719-PS-02	Total/NA	Water	8260B	
240-67404-3	W-160719-PS-03	Total/NA	Water	8260B	
240-67404-4	W-160719-PS-04	Total/NA	Water	8260B	
240-67404-5	W-160719-PS-05	Total/NA	Water	8260B	
240-67404-6	W-TRIP-001	Total/NA	Water	8260B	
MB 240-240170/6	Method Blank	Total/NA	Water	8260B	
LCS 240-240170/4	Lab Control Sample	Total/NA	Water	8260B	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	8260B	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 239104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	3510C	
240-67404-2	W-160719-PS-02	Total/NA	Water	3510C	
240-67404-3	W-160719-PS-03	Total/NA	Water	3510C	
240-67404-4	W-160719-PS-04	Total/NA	Water	3510C	
240-67404-5	W-160719-PS-05	Total/NA	Water	3510C	
MB 240-239104/20-A	Method Blank	Total/NA	Water	3510C	
LCS 240-239104/21-A	Lab Control Sample	Total/NA	Water	3510C	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	3510C	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	3510C	

Analysis Batch: 239514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-239104/20-A	Method Blank	Total/NA	Water	8270C	239104
LCS 240-239104/21-A	Lab Control Sample	Total/NA	Water	8270C	239104

Analysis Batch: 239645

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	8270C	239104
240-67404-2	W-160719-PS-02	Total/NA	Water	8270C	239104
240-67404-3	W-160719-PS-03	Total/NA	Water	8270C	239104
240-67404-4	W-160719-PS-04	Total/NA	Water	8270C	239104
240-67404-5	W-160719-PS-05	Total/NA	Water	8270C	239104
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	8270C	239104
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	8270C	239104

GC VOA

Analysis Batch: 239141

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	RSK-175	
240-67404-2	W-160719-PS-02	Total/NA	Water	RSK-175	
240-67404-3	W-160719-PS-03	Total/NA	Water	RSK-175	
240-67404-4	W-160719-PS-04	Total/NA	Water	RSK-175	
240-67404-5	W-160719-PS-05	Total/NA	Water	RSK-175	
MB 240-239141/4	Method Blank	Total/NA	Water	RSK-175	

GC VOA (Continued)

Analysis Batch: 239141 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-239141/5	Lab Control Sample	Total/NA	Water	RSK-175	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	RSK-175	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 182772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	8151A	
240-67404-2	W-160719-PS-02	Total/NA	Water	8151A	
240-67404-3	W-160719-PS-03	Total/NA	Water	8151A	
240-67404-4	W-160719-PS-04	Total/NA	Water	8151A	
240-67404-5	W-160719-PS-05	Total/NA	Water	8151A	
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	8151A	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	8151A	

Analysis Batch: 183051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	8151A	182772
240-67404-2	W-160719-PS-02	Total/NA	Water	8151A	182772
240-67404-3	W-160719-PS-03	Total/NA	Water	8151A	182772
240-67404-4	W-160719-PS-04	Total/NA	Water	8151A	182772
240-67404-5	W-160719-PS-05	Total/NA	Water	8151A	182772
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	182772
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	182772
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	8151A	182772
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	8151A	182772

Metals

Prep Batch: 239182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Dissolved	Water	3005A	
240-67404-2	W-160719-PS-02	Dissolved	Water	3005A	
240-67404-3	W-160719-PS-03	Dissolved	Water	3005A	
240-67404-4	W-160719-PS-04	Dissolved	Water	3005A	
240-67404-5	W-160719-PS-05	Dissolved	Water	3005A	
MB 240-239182/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-239182/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
240-67404-1 MS	W-160719-PS-01	Dissolved	Water	3005A	
240-67404-1 MSD	W-160719-PS-01	Dissolved	Water	3005A	

Analysis Batch: 239961

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Dissolved	Water	6020	239182
240-67404-2	W-160719-PS-02	Dissolved	Water	6020	239182
240-67404-3	W-160719-PS-03	Dissolved	Water	6020	239182
240-67404-4	W-160719-PS-04	Dissolved	Water	6020	239182

Metals (Continued)

Analysis Batch: 239961 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-5	W-160719-PS-05	Dissolved	Water	6020	239182
MB 240-239182/1-A	Method Blank	Total Recoverable	Water	6020	239182
LCS 240-239182/2-A	Lab Control Sample	Total Recoverable	Water	6020	239182
240-67404-1 MS	W-160719-PS-01	Dissolved	Water	6020	239182
240-67404-1 MSD	W-160719-PS-01	Dissolved	Water	6020	239182

General Chemistry

Analysis Batch: 239032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	300.0	
240-67404-2	W-160719-PS-02	Total/NA	Water	300.0	
240-67404-3	W-160719-PS-03	Total/NA	Water	300.0	
240-67404-4	W-160719-PS-04	Total/NA	Water	300.0	
240-67404-5	W-160719-PS-05	Total/NA	Water	300.0	
MB 240-239032/51	Method Blank	Total/NA	Water	300.0	
LCS 240-239032/52	Lab Control Sample	Total/NA	Water	300.0	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	300.0	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	300.0	

Analysis Batch: 239130

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	300.0	
240-67404-2	W-160719-PS-02	Total/NA	Water	300.0	
240-67404-3	W-160719-PS-03	Total/NA	Water	300.0	
240-67404-4	W-160719-PS-04	Total/NA	Water	300.0	
240-67404-5	W-160719-PS-05	Total/NA	Water	300.0	
MB 240-239130/51	Method Blank	Total/NA	Water	300.0	
LCS 240-239130/52	Lab Control Sample	Total/NA	Water	300.0	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	300.0	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	300.0	

Analysis Batch: 239184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	300.0	
MB 240-239184/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239184/4	Lab Control Sample	Total/NA	Water	300.0	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	300.0	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	300.0	

Analysis Batch: 239304

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	2340C-1997	
240-67404-2	W-160719-PS-02	Total/NA	Water	2340C-1997	
240-67404-3	W-160719-PS-03	Total/NA	Water	2340C-1997	
240-67404-4	W-160719-PS-04	Total/NA	Water	2340C-1997	
240-67404-5	W-160719-PS-05	Total/NA	Water	2340C-1997	
MB 240-239304/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-239304/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 239304 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	2340C-1997	
240-67404-1 DU	W-160719-PS-01	Total/NA	Water	2340C-1997	

Analysis Batch: 239362

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	2320B-1997	
240-67404-2	W-160719-PS-02	Total/NA	Water	2320B-1997	
240-67404-3	W-160719-PS-03	Total/NA	Water	2320B-1997	
240-67404-4	W-160719-PS-04	Total/NA	Water	2320B-1997	
240-67404-5	W-160719-PS-05	Total/NA	Water	2320B-1997	
MB 240-239362/7	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-239362/6	Lab Control Sample	Total/NA	Water	2320B-1997	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	2320B-1997	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	2320B-1997	
240-67404-1 DU	W-160719-PS-01	Total/NA	Water	2320B-1997	
240-67404-3 DU	W-160719-PS-03	Total/NA	Water	2320B-1997	

Analysis Batch: 240551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67404-1	W-160719-PS-01	Total/NA	Water	9060	
240-67404-2	W-160719-PS-02	Total/NA	Water	9060	
240-67404-3	W-160719-PS-03	Total/NA	Water	9060	
240-67404-4	W-160719-PS-04	Total/NA	Water	9060	
240-67404-5	W-160719-PS-05	Total/NA	Water	9060	
MB 240-240551/4	Method Blank	Total/NA	Water	9060	
LCS 240-240551/6	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-240551/5	Lab Control Sample	Total/NA	Water	9060	
240-67404-1 MS	W-160719-PS-01	Total/NA	Water	9060	
240-67404-1 MSD	W-160719-PS-01	Total/NA	Water	9060	

Lab Chronicle

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

TestAmerica Job ID: 240-67404-1

Client Sample ID: W-160719-PS-01

Lab Sample ID: 240-67404-1

Date Collected: 07/19/16 09:30

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 13:36	LEE	TAL CAN
Total/NA	Prep	3510C			239104	07/21/16 07:48	JDR	TAL CAN
Total/NA	Analysis	8270C		1	239645	07/25/16 14:52	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239141	07/21/16 15:27	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		8	183051	07/27/16 11:13	JMO	TAL PIT
Dissolved	Prep	3005A			239182	07/21/16 11:30	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 13:15	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239362	07/21/16 16:18	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 08:40	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239032	07/21/16 03:22	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239130	07/21/16 03:22	LCN	TAL CAN
Total/NA	Analysis	300.0		5	239184	07/21/16 11:46	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 11:44	TPH	TAL CAN

Client Sample ID: W-160719-PS-02

Lab Sample ID: 240-67404-2

Date Collected: 07/19/16 10:15

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 14:43	LEE	TAL CAN
Total/NA	Prep	3510C			239104	07/21/16 07:48	JDR	TAL CAN
Total/NA	Analysis	8270C		1	239645	07/25/16 21:19	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239141	07/21/16 16:36	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 12:49	JMO	TAL PIT
Dissolved	Prep	3005A			239182	07/21/16 11:30	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 15:40	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239362	07/21/16 21:20	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:04	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239032	07/21/16 04:12	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239130	07/21/16 04:12	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 12:28	TPH	TAL CAN

Client Sample ID: W-160719-PS-03

Lab Sample ID: 240-67404-3

Date Collected: 07/19/16 11:25

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 15:05	LEE	TAL CAN
Total/NA	Prep	3510C			239104	07/21/16 07:48	JDR	TAL CAN

Client Sample ID: W-160719-PS-03

Lab Sample ID: 240-67404-3

Date Collected: 07/19/16 11:25

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8270C		1	239645	07/25/16 21:43	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239141	07/21/16 16:53	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 13:37	JMO	TAL PIT
Dissolved	Prep	3005A			239182	07/21/16 11:30	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 15:44	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239362	07/21/16 21:30	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:07	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239032	07/21/16 04:28	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239130	07/21/16 04:28	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 12:55	TPH	TAL CAN

Client Sample ID: W-160719-PS-04

Lab Sample ID: 240-67404-4

Date Collected: 07/19/16 13:50

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 15:27	LEE	TAL CAN
Total/NA	Prep	3510C			239104	07/21/16 07:48	JDR	TAL CAN
Total/NA	Analysis	8270C		1	239645	07/25/16 22:07	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239141	07/21/16 17:11	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		20	183051	07/27/16 14:25	JMO	TAL PIT
Dissolved	Prep	3005A			239182	07/21/16 11:30	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 15:48	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239362	07/21/16 21:52	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:10	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239032	07/21/16 04:44	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239130	07/21/16 04:44	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 13:22	TPH	TAL CAN

Client Sample ID: W-160719-PS-05

Lab Sample ID: 240-67404-5

Date Collected: 07/19/16 13:55

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 15:50	LEE	TAL CAN
Total/NA	Prep	3510C			239104	07/21/16 07:48	JDR	TAL CAN
Total/NA	Analysis	8270C		1	239645	07/25/16 22:31	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239141	07/21/16 17:28	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 15:13	JMO	TAL PIT

Lab Chronicle

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

TestAmerica Job ID: 240-67404-1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Prep	3005A			239182	07/21/16 11:30	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 15:52	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239362	07/21/16 22:00	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:14	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239032	07/21/16 05:01	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239130	07/21/16 05:01	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 13:49	TPH	TAL CAN

Client Sample ID: W-TRIP-001

Lab Sample ID: 240-67404-6

Date Collected: 07/19/16 15:00

Matrix: Water

Date Received: 07/20/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240170	07/28/16 16:12	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

Certification Summary

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

TestAmerica Job ID: 240-67404-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999518190	08-31-16 *

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

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998027800	08-31-16

* Certification renewal pending - certification considered valid.

TestAmerica Canton

4101 Shuffel Street, N. N.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

2.2/3.2 3.6/4.6 0.2/1.2 0.4/1.4

Chain of Custody Record

121335

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager:	Site Contact: Peter Storlie	Date: 7-19-16	COC No:
Company Name: GHD	Tel/Fax:	Lab Contact:	Carrier: FedEx	1 of 1 COCs
Address: 1801 OLD HWY 8	Analysis Turnaround Time			Sampler:
City/State/Zip: ST PAUL MN	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 651-247-4218	TAT if different from Below STANDARD			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: Penta Wood	☐ 1 week			Job / SDG No.:
Site: Siren MN	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PCP-8151	NAPHTHALENE 8270	BTEX, METHANE	TOC	Cl, NO3, SO4	ALKALINITY	HARDNESS	As, Cu, Zn, Fe, Mn	Field Filtered	Sample Specific Notes:
W-160719-PS-01	7/19/16	0930	G	W	51		N	X	XX	XX	XX	XXX	X	X			
02		1015	G		17		N	X	XX	XX	XX	XXX	X	X			
03		1125	G		17		N	X	XX	XX	XX	XXX	X	X			
04		1350	G		17		N	X	XX	XX	XX	XXX	X	X			
05		1355	G		17		N	X	XX	XX	XX	XXX	X	X			
W-TRIP-001	↓	1500		↓	1		N			X BTEX only							

Preservation Used: 1= Ice, 2= HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	GHD		Ryan Hendrickson	TA	7-20-16 9:30
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

240-67404 Chain of Custody

TestAmerica Canton Sample Receipt Form/Narrative Login # : 67404
Canton Facility

Client GHD Site Name Siren MN
Cooler Received on 7-20-16 Opened on 7-20-16
Cooler unpacked by: Regan Henderson
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 +1.3 °C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
   IR GUN #36 (CF +1.0°C) Observed Cooler Temp. ____ °C Corrected Cooler Temp. ____ °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 each Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? 3 Total 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# HC574756
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # B607501VB 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:

Sample PS-02 Recieved 1xHCL preserved VOA Broken

15. SAMPLE CONDITION

Sample(s) ____ were received after the recommended holding time had expired.
Sample(s) PS-02 1xHCL 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
Canton Facility

Login # : 67404

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
client	36	2.2	3.2	wet ice
↓	↓	3.6	4.6	↓
		0.2	1.2	
↓	↓	0.4	1.4	↓

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-160719-PS-01	240-67404-AE-1	Plastic 250ml - with Nitric Acid	<2		
W-160719-PS-01	240-67404-AF-1	Plastic 250ml - with Nitric Acid	<2		
W-160719-PS-01	240-67404-AG-1	Plastic 250ml - with Nitric Acid	<2		
W-160719-PS-01	240-67404-AK-1	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-01	240-67404-AL-1	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-01	240-67404-AM-1	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-02	240-67404-K-2	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-02	240-67404-M-2	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-03	240-67404-K-3	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-03	240-67404-M-3	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-04	240-67404-K-4	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-04	240-67404-M-4	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-05	240-67404-K-5	Plastic 500ml - with Nitric Acid	<2		
W-160719-PS-05	240-67404-M-5	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-67404-1

Login Number: 67404
List Number: 2
Creator: Davis, Ellen G

List Source: TestAmerica Pittsburgh
List Creation: 07/22/16 10:53 AM

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: 240-67404-1

Login Number: 67404
List Number: 3
Creator: Davis, Ellen G

List Source: TestAmerica Pittsburgh
List Creation: 07/22/16 10:54 AM

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: 240-67430-1
Client Project/Site: 86165-03-11, 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:
8/2/2016 10:27:34 AM

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

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

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.
X	Surrogate is outside control limits

Metals

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

General Chemistry

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.

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Job ID: 240-67430-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-67430-1

Comments
No additional comments.

Receipt
The samples were received on 7/21/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 5 coolers at receipt time were 1.5º C, 1.7º C, 1.8º C, 1.9º C and 2.6º 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
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for 182772 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.

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-67430-1	W-160720-PS-06	Water	07/20/16 08:45	07/21/16 09:30
240-67430-2	W-160720-PS-07	Water	07/20/16 08:50	07/21/16 09:30
240-67430-3	W-160720-PS-08	Water	07/20/16 09:30	07/21/16 09:30
240-67430-4	W-160720-PS-09	Water	07/20/16 10:00	07/21/16 09:30
240-67430-5	W-160720-PS-10	Water	07/20/16 10:50	07/21/16 09:30
240-67430-6	W-160720-PS-11	Water	07/20/16 12:35	07/21/16 09:30
240-67430-7	W-160720-PS-12	Water	07/20/16 13:10	07/21/16 09:30
240-67430-8	W-160720-PS-13	Water	07/20/16 14:20	07/21/16 09:30
240-67430-9	TRIP BLANK-002	Water	07/20/16 15:00	07/21/16 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-06 — Lab Sample ID: 240-67430-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.11	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	8.5		0.47	0.073	ug/L	20		8151A	Total/NA
Copper	1.3	J	2.0	0.75	ug/L	1		6020	Dissolved
Iron	29.4	J	100	16.0	ug/L	1		6020	Dissolved
Alkalinity	29.4	B	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	84.5		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	6.8		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-160720-PS-07 — Lab Sample ID: 240-67430-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	5.5		0.097	0.015	ug/L	4		8151A	Total/NA
Copper	0.86	J	2.0	0.75	ug/L	1		6020	Dissolved
Iron	23.5	J	100	16.0	ug/L	1		6020	Dissolved
Alkalinity	29.9	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	78.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	84.9		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	6.6		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.90	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-08 — Lab Sample ID: 240-67430-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.32		0.11	0.017	ug/L	4		8151A	Total/NA
Total Organic Carbon	0.25	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-09 — Lab Sample ID: 240-67430-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.030	J p	0.10	0.016	ug/L	4		8151A	Total/NA
Copper	3.4		2.0	0.75	ug/L	1		6020	Dissolved
Iron	235		100	16.0	ug/L	1		6020	Dissolved
Manganese	10		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	58.6	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	64.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	1.2		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.60		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	3.1		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	1.7		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-10 — Lab Sample ID: 240-67430-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	1.1		0.095	0.015	ug/L	4		8151A	Total/NA
Alkalinity	82.4	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	30.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-10 (Continued) — Lab Sample ID: 240-67430-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Chloride	5.6		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	0.53		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	5.2		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.83	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-11 — Lab Sample ID: 240-67430-6

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	1.1		0.097	0.015	ug/L	4		8151A	Total/NA
Copper	1.5	J	2.0	0.75	ug/L	1		6020	Dissolved
Iron	19.4	J	100	16.0	ug/L	1		6020	Dissolved
Alkalinity	39.5	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	86.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	0.91	J	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	2.2		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	2.1		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-12 — Lab Sample ID: 240-67430-7

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.31		0.096	0.015	ug/L	4		8151A	Total/NA
Arsenic	0.70	J	5.0	0.49	ug/L	1		6020	Dissolved
Alkalinity	195	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	230		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	30.6		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	7.2		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.66	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160720-PS-13 — Lab Sample ID: 240-67430-8

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	4.6		0.094	0.015	ug/L	4		8151A	Total/NA
Copper	0.86	J	2.0	0.75	ug/L	1		6020	Dissolved
Manganese	2.2	J	5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	105	B	5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	100		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	0.49		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	1.9		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.68	J	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: TRIP BLANK-002 — Lab Sample ID: 240-67430-9

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160720-PS-06
Date Collected: 07/20/16 08:45
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-1
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 16:31	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 16:31	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 16:31	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 16:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*78 - 125*		*07/29/16 16:31*	*1*
4-Bromofluorobenzene (Surr)	*97*		*61 - 120*		*07/29/16 16:31*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/29/16 16:31*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*07/29/16 16:31*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.062		0.20	0.062	ug/L		07/23/16 09:56	07/26/16 16:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*63*		*42 - 120*	*07/23/16 09:56*	*07/26/16 16:50*	*1*
2-Fluorophenol (Surr)	*22*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:50*	*1*
2,4,6-Tribromophenol (Surr)	*55*		*35 - 125*	*07/23/16 09:56*	*07/26/16 16:50*	*1*
Nitrobenzene-d5 (Surr)	*62*		*36 - 120*	*07/23/16 09:56*	*07/26/16 16:50*	*1*
Phenol-d5 (Surr)	*11*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:50*	*1*
Terphenyl-d14 (Surr)	*68*		*17 - 120*	*07/23/16 09:56*	*07/26/16 16:50*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.11**	**J**	0.50	0.080	ug/L			07/22/16 17:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*104*		*76 - 121*		*07/22/16 17:14*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**8.5**		0.47	0.073	ug/L		07/25/16 03:39	07/27/16 16:01	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*43*		*18 - 125*	*07/25/16 03:39*	*07/27/16 16:01*	*20*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:18	1
Copper	**1.3**	**J**	2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:18	1
Iron	**29.4**	**J**	100	16.0	ug/L		07/22/16 10:31	07/26/16 19:18	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:18	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:18	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**29.4**	**B**	5.0	1.9	mg/L			07/22/16 15:29	1
Hardness as calcium carbonate	**84.0**		5.0	3.1	mg/L			07/22/16 09:17	1
Chloride	**84.5**		1.0	0.41	mg/L			07/21/16 18:53	1
Nitrate as N	**1.7**		0.10	0.035	mg/L			07/21/16 18:53	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-06
Date Collected: 07/20/16 08:45
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	6.8		1.0	0.13	mg/L			07/21/16 18:53	1
Total Organic Carbon	0.93	J	1.0	0.080	mg/L			07/29/16 14:34	1

Client Sample ID: W-160720-PS-07
Date Collected: 07/20/16 08:50
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-2
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 16:54	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 16:54	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 16:54	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 16:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*07/29/16 16:54*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 16:54*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 16:54*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*07/29/16 16:54*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.075		0.24	0.075	ug/L		07/23/16 09:56	07/26/16 16:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*62*		*42 - 120*	*07/23/16 09:56*	*07/26/16 16:02*	*1*
2-Fluorophenol (Surr)	*29*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:02*	*1*
2,4,6-Tribromophenol (Surr)	*52*		*35 - 125*	*07/23/16 09:56*	*07/26/16 16:02*	*1*
Nitrobenzene-d5 (Surr)	*61*		*36 - 120*	*07/23/16 09:56*	*07/26/16 16:02*	*1*
Phenol-d5 (Surr)	*16*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:02*	*1*
Terphenyl-d14 (Surr)	*71*		*17 - 120*	*07/23/16 09:56*	*07/26/16 16:02*	*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			07/22/16 17:32	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*104*		*76 - 121*		*07/22/16 17:32*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**5.5**		0.097	0.015	ug/L		07/25/16 03:39	07/27/16 17:37	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*35*		*18 - 125*	*07/25/16 03:39*	*07/27/16 17:37*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:22	1
Copper	**0.86**	**J**	2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:22	1
Iron	**23.5**	**J**	100	16.0	ug/L		07/22/16 10:31	07/26/16 19:22	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:22	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:22	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**29.9**	**B**	5.0	1.9	mg/L			07/22/16 15:36	1
Hardness as calcium carbonate	**78.0**		5.0	3.1	mg/L			07/22/16 09:23	1
Chloride	**84.9**		1.0	0.41	mg/L			07/21/16 19:09	1
Nitrate as N	**1.7**		0.10	0.035	mg/L			07/21/16 19:09	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-07
Date Collected: 07/20/16 08:50
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	6.6		1.0	0.13	mg/L			07/21/16 19:09	1
Total Organic Carbon	0.90	J	1.0	0.080	mg/L			07/29/16 15:00	1

Client Sample ID: W-160720-PS-08
Date Collected: 07/20/16 09:30
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-3
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 17:16	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 17:16	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 17:16	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 17:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*07/29/16 17:16*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 17:16*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/29/16 17:16*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/29/16 17:16*	*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		07/23/16 09:56	07/26/16 15:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*61*		*42 - 120*	*07/23/16 09:56*	*07/26/16 15:38*	*1*
2-Fluorophenol (Surr)	*24*		*10 - 120*	*07/23/16 09:56*	*07/26/16 15:38*	*1*
2,4,6-Tribromophenol (Surr)	*45*		*35 - 125*	*07/23/16 09:56*	*07/26/16 15:38*	*1*
Nitrobenzene-d5 (Surr)	*57*		*36 - 120*	*07/23/16 09:56*	*07/26/16 15:38*	*1*
Phenol-d5 (Surr)	*13*		*10 - 120*	*07/23/16 09:56*	*07/26/16 15:38*	*1*
Terphenyl-d14 (Surr)	*73*		*17 - 120*	*07/23/16 09:56*	*07/26/16 15:38*	*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			07/22/16 17:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*103*		*76 - 121*		*07/22/16 17:49*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.32**		0.11	0.017	ug/L		07/25/16 03:39	07/27/16 18:25	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*41*		*18 - 125*	*07/25/16 03:39*	*07/27/16 18:25*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:35	1
Copper	<0.75		2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:35	1
Iron	<16.0		100	16.0	ug/L		07/22/16 10:31	07/26/16 19:35	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:35	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:35	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	<1.9		5.0	1.9	mg/L			07/22/16 15:42	1
Hardness as calcium carbonate	<3.1		5.0	3.1	mg/L			07/22/16 09:26	1
Chloride	<0.41		1.0	0.41	mg/L			07/21/16 19:26	1
Nitrate as N	<0.035		0.10	0.035	mg/L			07/21/16 19:26	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-08
Date Collected: 07/20/16 09:30
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	<0.13		1.0	0.13	mg/L			07/21/16 19:26	1
Total Organic Carbon	**0.25**	**J**	1.0	0.080	mg/L			07/29/16 15:26	1

Client Sample ID: W-160720-PS-09
Date Collected: 07/20/16 10:00
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-4
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 17:39	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 17:39	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 17:39	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 17:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*07/29/16 17:39*	*1*
4-Bromofluorobenzene (Surr)	*103*		*61 - 120*		*07/29/16 17:39*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 17:39*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*07/29/16 17:39*	*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		07/23/16 09:56	07/26/16 16:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*48*		*42 - 120*	*07/23/16 09:56*	*07/26/16 16:26*	*1*
2-Fluorophenol (Surr)	*14*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:26*	*1*
2,4,6-Tribromophenol (Surr)	*41*		*35 - 125*	*07/23/16 09:56*	*07/26/16 16:26*	*1*
Nitrobenzene-d5 (Surr)	*41*		*36 - 120*	*07/23/16 09:56*	*07/26/16 16:26*	*1*
Phenol-d5 (Surr)	*10*		*10 - 120*	*07/23/16 09:56*	*07/26/16 16:26*	*1*
Terphenyl-d14 (Surr)	*48*		*17 - 120*	*07/23/16 09:56*	*07/26/16 16:26*	*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			07/22/16 18:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*102*		*76 - 121*		*07/22/16 18:24*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.030**	**J p**	0.10	0.016	ug/L		07/25/16 03:39	07/27/16 19:12	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*39*		*18 - 125*	*07/25/16 03:39*	*07/27/16 19:12*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:39	1
Copper	**3.4**		2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:39	1
Iron	**235**		100	16.0	ug/L		07/22/16 10:31	07/26/16 19:39	1
Manganese	**10**		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:39	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:39	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**58.6**	**B**	5.0	1.9	mg/L			07/22/16 15:50	1
Hardness as calcium carbonate	**64.0**		5.0	3.1	mg/L			07/22/16 09:29	1
Chloride	**1.2**		1.0	0.41	mg/L			07/21/16 19:42	1
Nitrate as N	**0.60**		0.10	0.035	mg/L			07/21/16 19:42	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-09
Date Collected: 07/20/16 10:00
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.1		1.0	0.13	mg/L			07/21/16 19:42	1
Total Organic Carbon	1.7		1.0	0.080	mg/L			07/29/16 15:54	1

Client Sample ID: W-160720-PS-10

Date Collected: 07/20/16 10:50
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-5

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 18:01	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 18:01	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 18:01	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 18:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*07/29/16 18:01*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 18:01*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 18:01*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/29/16 18:01*	*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		07/23/16 09:56	07/26/16 14:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*64*		*42 - 120*	*07/23/16 09:56*	*07/26/16 14:02*	*1*
2-Fluorophenol (Surr)	*31*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:02*	*1*
2,4,6-Tribromophenol (Surr)	*58*		*35 - 125*	*07/23/16 09:56*	*07/26/16 14:02*	*1*
Nitrobenzene-d5 (Surr)	*65*		*36 - 120*	*07/23/16 09:56*	*07/26/16 14:02*	*1*
Phenol-d5 (Surr)	*17*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:02*	*1*
Terphenyl-d14 (Surr)	*64*		*17 - 120*	*07/23/16 09:56*	*07/26/16 14:02*	*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			07/22/16 18:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*100*		*76 - 121*		*07/22/16 18:41*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1.1**		0.095	0.015	ug/L		07/25/16 03:39	07/27/16 20:00	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*38*		*18 - 125*	*07/25/16 03:39*	*07/27/16 20:00*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:43	1
Copper	<0.75		2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:43	1
Iron	<16.0		100	16.0	ug/L		07/22/16 10:31	07/26/16 19:43	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:43	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:43	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**82.4**	**B**	5.0	1.9	mg/L			07/22/16 16:03	1
Hardness as calcium carbonate	**30.0**		5.0	3.1	mg/L			07/22/16 09:32	1
Chloride	**5.6**		1.0	0.41	mg/L			07/21/16 19:58	1
Nitrate as N	**0.53**		0.10	0.035	mg/L			07/21/16 19:58	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-10
Date Collected: 07/20/16 10:50
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.2		1.0	0.13	mg/L			07/21/16 19:58	1
Total Organic Carbon	0.83	J	1.0	0.080	mg/L			07/29/16 16:20	1

Client Sample ID: W-160720-PS-11
Date Collected: 07/20/16 12:35
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-6
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 18:24	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 18:24	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 18:24	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 18:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*78 - 125*		*07/29/16 18:24*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 18:24*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 18:24*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/29/16 18:24*	*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		07/23/16 09:56	07/26/16 14:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*64*		*42 - 120*	*07/23/16 09:56*	*07/26/16 14:26*	*1*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:26*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*07/23/16 09:56*	*07/26/16 14:26*	*1*
Nitrobenzene-d5 (Surr)	*68*		*36 - 120*	*07/23/16 09:56*	*07/26/16 14:26*	*1*
Phenol-d5 (Surr)	*18*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:26*	*1*
Terphenyl-d14 (Surr)	*64*		*17 - 120*	*07/23/16 09:56*	*07/26/16 14:26*	*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			07/22/16 18:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*105*		*76 - 121*		*07/22/16 18:59*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1.1**		0.097	0.015	ug/L		07/25/16 03:39	07/27/16 20:47	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*45*		*18 - 125*	*07/25/16 03:39*	*07/27/16 20:47*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:47	1
Copper	**1.5**	**J**	2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:47	1
Iron	**19.4**	**J**	100	16.0	ug/L		07/22/16 10:31	07/26/16 19:47	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:47	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:47	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**39.5**	**B**	5.0	1.9	mg/L			07/22/16 16:21	1
Hardness as calcium carbonate	**86.0**		5.0	3.1	mg/L			07/22/16 09:35	1
Chloride	**0.91**	**J**	1.0	0.41	mg/L			07/21/16 20:15	1
Nitrate as N	**1.0**		0.10	0.035	mg/L			07/21/16 20:15	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-11
Date Collected: 07/20/16 12:35
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-6
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	2.2		1.0	0.13	mg/L			07/21/16 20:15	1
Total Organic Carbon	2.1		1.0	0.080	mg/L			07/29/16 16:47	1

Client Sample ID: W-160720-PS-12
Date Collected: 07/20/16 13:10
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-7
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 18:46	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 18:46	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 18:46	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 18:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*07/29/16 18:46*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*07/29/16 18:46*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 18:46*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 120*		*07/29/16 18:46*	*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		07/23/16 09:56	07/26/16 14:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*48*		*42 - 120*	*07/23/16 09:56*	*07/26/16 14:50*	*1*
2-Fluorophenol (Surr)	*24*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:50*	*1*
2,4,6-Tribromophenol (Surr)	*38*		*35 - 125*	*07/23/16 09:56*	*07/26/16 14:50*	*1*
Nitrobenzene-d5 (Surr)	*48*		*36 - 120*	*07/23/16 09:56*	*07/26/16 14:50*	*1*
Phenol-d5 (Surr)	*13*		*10 - 120*	*07/23/16 09:56*	*07/26/16 14:50*	*1*
Terphenyl-d14 (Surr)	*46*		*17 - 120*	*07/23/16 09:56*	*07/26/16 14:50*	*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			07/22/16 19:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*99*		*76 - 121*		*07/22/16 19:16*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.31**		0.096	0.015	ug/L		07/25/16 03:39	07/27/16 21:35	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*13*	*X p*	*18 - 125*	*07/25/16 03:39*	*07/27/16 21:35*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.70**	**J**	5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:51	1
Copper	<0.75		2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:51	1
Iron	<16.0		100	16.0	ug/L		07/22/16 10:31	07/26/16 19:51	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:51	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:51	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**195**	**B**	5.0	1.9	mg/L			07/22/16 16:31	1
Hardness as calcium carbonate	**230**		5.0	3.1	mg/L			07/22/16 09:38	1
Chloride	**30.6**		1.0	0.41	mg/L			07/21/16 21:04	1
Nitrate as N	**1.8**		0.10	0.035	mg/L			07/21/16 21:04	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-12
Date Collected: 07/20/16 13:10
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-7
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.2		1.0	0.13	mg/L			07/21/16 21:04	1
Total Organic Carbon	0.66	J	1.0	0.080	mg/L			07/29/16 17:31	1

Client Sample ID: W-160720-PS-13
Date Collected: 07/20/16 14:20
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-8
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 19:08	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 19:08	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 19:08	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 19:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*78 - 125*		*07/29/16 19:08*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 19:08*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/29/16 19:08*	*1*
Dibromofluoromethane (Surr)	*101*		*79 - 120*		*07/29/16 19:08*	*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		07/23/16 09:56	07/26/16 15:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*62*		*42 - 120*	*07/23/16 09:56*	*07/26/16 15:14*	*1*
2-Fluorophenol (Surr)	*28*		*10 - 120*	*07/23/16 09:56*	*07/26/16 15:14*	*1*
2,4,6-Tribromophenol (Surr)	*52*		*35 - 125*	*07/23/16 09:56*	*07/26/16 15:14*	*1*
Nitrobenzene-d5 (Surr)	*63*		*36 - 120*	*07/23/16 09:56*	*07/26/16 15:14*	*1*
Phenol-d5 (Surr)	*16*		*10 - 120*	*07/23/16 09:56*	*07/26/16 15:14*	*1*
Terphenyl-d14 (Surr)	*60*		*17 - 120*	*07/23/16 09:56*	*07/26/16 15:14*	*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			07/22/16 19:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*101*		*76 - 121*		*07/22/16 19:34*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**4.6**		0.094	0.015	ug/L		07/25/16 03:39	07/27/16 22:23	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*35*		*18 - 125*	*07/25/16 03:39*	*07/27/16 22:23*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 19:55	1
Copper	**0.86**	**J**	2.0	0.75	ug/L		07/22/16 10:31	07/26/16 19:55	1
Iron	<16.0		100	16.0	ug/L		07/22/16 10:31	07/26/16 19:55	1
Manganese	**2.2**	**J**	5.0	1.1	ug/L		07/22/16 10:31	07/26/16 19:55	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 19:55	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**105**	**B**	5.0	1.9	mg/L			07/22/16 16:40	1
Hardness as calcium carbonate	**100**		5.0	3.1	mg/L			07/22/16 09:41	1
Chloride	**0.76**	**J**	1.0	0.41	mg/L			07/21/16 21:21	1
Nitrate as N	**0.49**		0.10	0.035	mg/L			07/21/16 21:21	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-13
Date Collected: 07/20/16 14:20
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-8
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1.9		1.0	0.13	mg/L			07/21/16 21:21	1
Total Organic Carbon	0.68	J	1.0	0.080	mg/L			07/29/16 17:58	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: TRIP BLANK-002
Date Collected: 07/20/16 15:00
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-9
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 19:31	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 19:31	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 19:31	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 19:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*		*07/29/16 19:31*	*1*
4-Bromofluorobenzene (Surr)	*98*		*61 - 120*		*07/29/16 19:31*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*07/29/16 19:31*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*07/29/16 19:31*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

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	(78-125)	(61-120)	(80-120)	(79-120)
240-67430-1	W-160720-PS-06	95	97	102	99
240-67430-2	W-160720-PS-07	93	100	103	99
240-67430-3	W-160720-PS-08	91	100	102	98
240-67430-4	W-160720-PS-09	93	103	103	99
240-67430-5	W-160720-PS-10	93	100	103	98
240-67430-6	W-160720-PS-11	93	100	103	98
240-67430-7	W-160720-PS-12	92	99	103	98
240-67430-8	W-160720-PS-13	95	100	102	101
240-67430-8 MS	W-160720-PS-13	92	106	105	104
240-67430-8 MSD	W-160720-PS-13	90	106	104	103
240-67430-9	TRIP BLANK-002	92	98	103	99
LCS 240-240389/4	Lab Control Sample	91	105	104	105
MB 240-240389/6	Method Blank	91	100	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)
240-67430-1	W-160720-PS-06	63	22	55	62	11	68
240-67430-2	W-160720-PS-07	62	29	52	61	16	71
240-67430-3	W-160720-PS-08	61	24	45	57	13	73
240-67430-4	W-160720-PS-09	48	14	41	41	10	48
240-67430-5	W-160720-PS-10	64	31	58	65	17	64
240-67430-6	W-160720-PS-11	64	33	59	68	18	64
240-67430-7	W-160720-PS-12	48	24	38	48	13	46
240-67430-8	W-160720-PS-13	62	28	52	63	16	60
LCS 240-239488/24-A	Lab Control Sample	84	50	86	87	31	93
MB 240-239488/23-A	Method Blank	67	43	59	64	26	79

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)

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

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)
240-67430-1	W-160720-PS-06	104
240-67430-2	W-160720-PS-07	104
240-67430-3	W-160720-PS-08	103
240-67430-4	W-160720-PS-09	102
240-67430-5	W-160720-PS-10	100
240-67430-6	W-160720-PS-11	105
240-67430-7	W-160720-PS-12	99
240-67430-8	W-160720-PS-13	101
LCS 240-239364/5	Lab Control Sample	107
MB 240-239364/4	Method Blank	111

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)
240-67430-1	W-160720-PS-06	43	30
240-67430-2	W-160720-PS-07	35	28
240-67430-3	W-160720-PS-08	41	41
240-67430-4	W-160720-PS-09	34	39
240-67430-5	W-160720-PS-10	38	36
240-67430-6	W-160720-PS-11	45	44
240-67430-7	W-160720-PS-12	38	13 X p
240-67430-8	W-160720-PS-13	35	28
LCS 180-182772/2-A	Lab Control Sample	28	28
MB 180-182772/1-A	Method Blank	62	56

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

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

Lab Sample ID: MB 240-240389/6
Matrix: Water
Analysis Batch: 240389

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			07/29/16 12:03	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			07/29/16 12:03	1
Toluene	<0.23		1.0	0.23	ug/L			07/29/16 12:03	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			07/29/16 12:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*07/29/16 12:03*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*07/29/16 12:03*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*07/29/16 12:03*	*1*
Dibromofluoromethane (Surr)	*100*		*79 - 120*		*07/29/16 12:03*	*1*

Lab Sample ID: LCS 240-240389/4
Matrix: Water
Analysis Batch: 240389

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	80 - 120
Ethylbenzene	10.0	10.5		ug/L		105	80 - 120
Toluene	10.0	10.4		ug/L		104	80 - 120
Xylenes, Total	20.0	20.8		ug/L		104	80 - 120
m-Xylene & p-Xylene	10.0	10.0		ug/L		100	80 - 120
o-Xylene	10.0	10.8		ug/L		108	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*
4-Bromofluorobenzene (Surr)	*105*		*61 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*79 - 120*

Lab Sample ID: 240-67430-8 MS
Matrix: Water
Analysis Batch: 240389

Client Sample ID: W-160720-PS-13
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	<0.35		10.0	10.0		ug/L		100	73 - 121
Ethylbenzene	<0.25		10.0	10.1		ug/L		101	68 - 121
Toluene	<0.23		10.0	10.1		ug/L		101	72 - 122
Xylenes, Total	<0.52		20.0	19.7		ug/L		99	67 - 122
m-Xylene & p-Xylene	<0.24		10.0	9.53		ug/L		95	66 - 123
o-Xylene	<0.25		10.0	10.2		ug/L		102	68 - 121

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*92*		*78 - 125*
4-Bromofluorobenzene (Surr)	*106*		*61 - 120*
Toluene-d8 (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*79 - 120*

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

Lab Sample ID: 240-67430-8 MSD
Matrix: Water
Analysis Batch: 240389

Client Sample ID: W-160720-PS-13
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	<0.35		10.0	9.83		ug/L		98	73 - 121	2	13
Ethylbenzene	<0.25		10.0	9.91		ug/L		99	68 - 121	2	16
Toluene	<0.23		10.0	10.0		ug/L		100	72 - 122	1	15
Xylenes, Total	<0.52		20.0	19.7		ug/L		98	67 - 122	0	14
m-Xylene & p-Xylene	<0.24		10.0	9.49		ug/L		95	66 - 123	0	15
o-Xylene	<0.25		10.0	10.2		ug/L		102	68 - 121	1	14

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*
4-Bromofluorobenzene (Surr)	*106*		*61 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*79 - 120*

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

Lab Sample ID: MB 240-239488/23-A
Matrix: Water
Analysis Batch: 239737

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 239488

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/23/16 09:56	07/26/16 07:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*42 - 120*	*07/23/16 09:56*	*07/26/16 07:12*	*1*
2-Fluorophenol (Surr)	*43*		*10 - 120*	*07/23/16 09:56*	*07/26/16 07:12*	*1*
2,4,6-Tribromophenol (Surr)	*59*		*35 - 125*	*07/23/16 09:56*	*07/26/16 07:12*	*1*
Nitrobenzene-d5 (Surr)	*64*		*36 - 120*	*07/23/16 09:56*	*07/26/16 07:12*	*1*
Phenol-d5 (Surr)	*26*		*10 - 120*	*07/23/16 09:56*	*07/26/16 07:12*	*1*
Terphenyl-d14 (Surr)	*79*		*17 - 120*	*07/23/16 09:56*	*07/26/16 07:12*	*1*

Lab Sample ID: LCS 240-239488/24-A
Matrix: Water
Analysis Batch: 239737

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 239488

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	16.3		ug/L		82	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)	*86*		*35 - 125*
Nitrobenzene-d5 (Surr)	*87*		*36 - 120*
Phenol-d5 (Surr)	*31*		*10 - 120*
Terphenyl-d14 (Surr)	*93*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-239364/4
Matrix: Water
Analysis Batch: 239364

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			07/22/16 15:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*111*		*76 - 121*		*07/22/16 15:12*	*1*

Lab Sample ID: LCS 240-239364/5
Matrix: Water
Analysis Batch: 239364

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	172		ug/L		86	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*107*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-182772/1-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 182772

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.078		0.50	0.078	ug/L		07/25/16 03:39	07/27/16 10:49	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*18 - 125*	*07/25/16 03:39*	*07/27/16 10:49*	*20*

Lab Sample ID: LCS 180-182772/2-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 182772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	1.00	0.650		ug/L		65	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*28*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-239348/1-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 239348

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/22/16 10:31	07/26/16 18:06	1
Copper	<0.75		2.0	0.75	ug/L		07/22/16 10:31	07/26/16 18:06	1

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

Lab Sample ID: MB 240-239348/1-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 239348

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<16.0		100	16.0	ug/L		07/22/16 10:31	07/26/16 18:06	1
Manganese	<1.1		5.0	1.1	ug/L		07/22/16 10:31	07/26/16 18:06	1
Zinc	<7.3		20.0	7.3	ug/L		07/22/16 10:31	07/26/16 18:06	1

Lab Sample ID: LCS 240-239348/2-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 239348

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	1014		ug/L		101	80 - 120
Copper	1000	1037		ug/L		104	80 - 120
Iron	10000	10080		ug/L		101	80 - 120
Manganese	1000	997.9		ug/L		100	80 - 120
Zinc	1000	994.0		ug/L		99	80 - 120

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-239580/5
Matrix: Water
Analysis Batch: 239580

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.04	J	5.0	1.9	mg/L			07/22/16 14:17	1

Lab Sample ID: LCS 240-239580/4
Matrix: Water
Analysis Batch: 239580

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	376.4		mg/L		102	90 - 127

Lab Sample ID: 240-67430-5 DU
Matrix: Water
Analysis Batch: 239580

Client Sample ID: W-160720-PS-10
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	82.4	B	83.79		mg/L		2	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-239304/1
Matrix: Water
Analysis Batch: 239304

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			07/22/16 08:30	1

Method: 2340C-1997 - Hardness, Total (Continued)

Lab Sample ID: LCS 240-239304/2
Matrix: Water
Analysis Batch: 239304

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	172.0		mg/L		101	88 - 110

Lab Sample ID: 240-67430-1 DU
Matrix: Water
Analysis Batch: 239304

Client Sample ID: W-160720-PS-06
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	84.0		82.00		mg/L		2	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-239184/27
Matrix: Water
Analysis Batch: 239184

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			07/21/16 17:47	1
Sulfate	<0.13		1.0	0.13	mg/L			07/21/16 17:47	1

Lab Sample ID: MB 240-239184/3
Matrix: Water
Analysis Batch: 239184

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			07/21/16 11:13	1

Lab Sample ID: LCS 240-239184/28
Matrix: Water
Analysis Batch: 239184

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	52.05		mg/L		104	90 - 110
Sulfate	50.0	48.89		mg/L		98	90 - 110

Lab Sample ID: LCS 240-239184/4
Matrix: Water
Analysis Batch: 239184

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	51.42		mg/L		103	90 - 110

Lab Sample ID: MB 240-239237/27
Matrix: Water
Analysis Batch: 239237

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			07/21/16 17:47	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 240-239237/28
Matrix: Water
Analysis Batch: 239237

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	2.50		mg/L		100	90 - 110

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-240551/4
Matrix: Water
Analysis Batch: 240551

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			07/29/16 11:20	1

Lab Sample ID: LCS 240-240551/6
Matrix: Water
Analysis Batch: 240551

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	14.4	14.16		mg/L		98	88 - 115

Lab Sample ID: LLCS 240-240551/5
Matrix: Water
Analysis Batch: 240551

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	7.20	7.34		mg/L		102	88 - 115

Lab Sample ID: 240-67430-6 MS
Matrix: Water
Analysis Batch: 240551

Client Sample ID: W-160720-PS-11
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	2.1		25.0	24.04		mg/L		88	72 - 136

Lab Sample ID: 240-67430-6 MSD
Matrix: Water
Analysis Batch: 240551

Client Sample ID: W-160720-PS-11
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	2.1		25.0	24.35		mg/L		89	72 - 136	1	20

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

GC/MS VOA

Analysis Batch: 240389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	8260B	
240-67430-2	W-160720-PS-07	Total/NA	Water	8260B	
240-67430-3	W-160720-PS-08	Total/NA	Water	8260B	
240-67430-4	W-160720-PS-09	Total/NA	Water	8260B	
240-67430-5	W-160720-PS-10	Total/NA	Water	8260B	
240-67430-6	W-160720-PS-11	Total/NA	Water	8260B	
240-67430-7	W-160720-PS-12	Total/NA	Water	8260B	
240-67430-8	W-160720-PS-13	Total/NA	Water	8260B	
240-67430-9	TRIP BLANK-002	Total/NA	Water	8260B	
MB 240-240389/6	Method Blank	Total/NA	Water	8260B	
LCS 240-240389/4	Lab Control Sample	Total/NA	Water	8260B	
240-67430-8 MS	W-160720-PS-13	Total/NA	Water	8260B	
240-67430-8 MSD	W-160720-PS-13	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 239488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	3510C	
240-67430-2	W-160720-PS-07	Total/NA	Water	3510C	
240-67430-3	W-160720-PS-08	Total/NA	Water	3510C	
240-67430-4	W-160720-PS-09	Total/NA	Water	3510C	
240-67430-5	W-160720-PS-10	Total/NA	Water	3510C	
240-67430-6	W-160720-PS-11	Total/NA	Water	3510C	
240-67430-7	W-160720-PS-12	Total/NA	Water	3510C	
240-67430-8	W-160720-PS-13	Total/NA	Water	3510C	
MB 240-239488/23-A	Method Blank	Total/NA	Water	3510C	
LCS 240-239488/24-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 239737

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	8270C	239488
240-67430-2	W-160720-PS-07	Total/NA	Water	8270C	239488
240-67430-3	W-160720-PS-08	Total/NA	Water	8270C	239488
240-67430-4	W-160720-PS-09	Total/NA	Water	8270C	239488
240-67430-5	W-160720-PS-10	Total/NA	Water	8270C	239488
240-67430-6	W-160720-PS-11	Total/NA	Water	8270C	239488
240-67430-7	W-160720-PS-12	Total/NA	Water	8270C	239488
240-67430-8	W-160720-PS-13	Total/NA	Water	8270C	239488
MB 240-239488/23-A	Method Blank	Total/NA	Water	8270C	239488
LCS 240-239488/24-A	Lab Control Sample	Total/NA	Water	8270C	239488

GC VOA

Analysis Batch: 239364

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	RSK-175	
240-67430-2	W-160720-PS-07	Total/NA	Water	RSK-175	
240-67430-3	W-160720-PS-08	Total/NA	Water	RSK-175	
240-67430-4	W-160720-PS-09	Total/NA	Water	RSK-175	

GC VOA (Continued)

Analysis Batch: 239364 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-5	W-160720-PS-10	Total/NA	Water	RSK-175	
240-67430-6	W-160720-PS-11	Total/NA	Water	RSK-175	
240-67430-7	W-160720-PS-12	Total/NA	Water	RSK-175	
240-67430-8	W-160720-PS-13	Total/NA	Water	RSK-175	
MB 240-239364/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-239364/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 182772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	8151A	
240-67430-2	W-160720-PS-07	Total/NA	Water	8151A	
240-67430-3	W-160720-PS-08	Total/NA	Water	8151A	
240-67430-4	W-160720-PS-09	Total/NA	Water	8151A	
240-67430-5	W-160720-PS-10	Total/NA	Water	8151A	
240-67430-6	W-160720-PS-11	Total/NA	Water	8151A	
240-67430-7	W-160720-PS-12	Total/NA	Water	8151A	
240-67430-8	W-160720-PS-13	Total/NA	Water	8151A	
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	

Analysis Batch: 183051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	8151A	182772
240-67430-2	W-160720-PS-07	Total/NA	Water	8151A	182772
240-67430-3	W-160720-PS-08	Total/NA	Water	8151A	182772
240-67430-4	W-160720-PS-09	Total/NA	Water	8151A	182772
240-67430-5	W-160720-PS-10	Total/NA	Water	8151A	182772
240-67430-6	W-160720-PS-11	Total/NA	Water	8151A	182772
240-67430-7	W-160720-PS-12	Total/NA	Water	8151A	182772
240-67430-8	W-160720-PS-13	Total/NA	Water	8151A	182772
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	182772
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	182772

Metals

Prep Batch: 239348

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Dissolved	Water	3005A	
240-67430-2	W-160720-PS-07	Dissolved	Water	3005A	
240-67430-3	W-160720-PS-08	Dissolved	Water	3005A	
240-67430-4	W-160720-PS-09	Dissolved	Water	3005A	
240-67430-5	W-160720-PS-10	Dissolved	Water	3005A	
240-67430-6	W-160720-PS-11	Dissolved	Water	3005A	
240-67430-7	W-160720-PS-12	Dissolved	Water	3005A	
240-67430-8	W-160720-PS-13	Dissolved	Water	3005A	
MB 240-239348/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-239348/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Metals (Continued)

Analysis Batch: 239961

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Dissolved	Water	6020	239348
240-67430-2	W-160720-PS-07	Dissolved	Water	6020	239348
240-67430-3	W-160720-PS-08	Dissolved	Water	6020	239348
240-67430-4	W-160720-PS-09	Dissolved	Water	6020	239348
240-67430-5	W-160720-PS-10	Dissolved	Water	6020	239348
240-67430-6	W-160720-PS-11	Dissolved	Water	6020	239348
240-67430-7	W-160720-PS-12	Dissolved	Water	6020	239348
240-67430-8	W-160720-PS-13	Dissolved	Water	6020	239348
MB 240-239348/1-A	Method Blank	Total Recoverable	Water	6020	239348
LCS 240-239348/2-A	Lab Control Sample	Total Recoverable	Water	6020	239348

General Chemistry

Analysis Batch: 239184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	300.0	
240-67430-2	W-160720-PS-07	Total/NA	Water	300.0	
240-67430-3	W-160720-PS-08	Total/NA	Water	300.0	
240-67430-4	W-160720-PS-09	Total/NA	Water	300.0	
240-67430-5	W-160720-PS-10	Total/NA	Water	300.0	
240-67430-6	W-160720-PS-11	Total/NA	Water	300.0	
240-67430-7	W-160720-PS-12	Total/NA	Water	300.0	
240-67430-8	W-160720-PS-13	Total/NA	Water	300.0	
MB 240-239184/27	Method Blank	Total/NA	Water	300.0	
MB 240-239184/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239184/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-239184/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 239237

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	300.0	
240-67430-2	W-160720-PS-07	Total/NA	Water	300.0	
240-67430-3	W-160720-PS-08	Total/NA	Water	300.0	
240-67430-4	W-160720-PS-09	Total/NA	Water	300.0	
240-67430-5	W-160720-PS-10	Total/NA	Water	300.0	
240-67430-6	W-160720-PS-11	Total/NA	Water	300.0	
240-67430-7	W-160720-PS-12	Total/NA	Water	300.0	
240-67430-8	W-160720-PS-13	Total/NA	Water	300.0	
MB 240-239237/27	Method Blank	Total/NA	Water	300.0	
LCS 240-239237/28	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 239304

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	2340C-1997	
240-67430-2	W-160720-PS-07	Total/NA	Water	2340C-1997	
240-67430-3	W-160720-PS-08	Total/NA	Water	2340C-1997	
240-67430-4	W-160720-PS-09	Total/NA	Water	2340C-1997	
240-67430-5	W-160720-PS-10	Total/NA	Water	2340C-1997	
240-67430-6	W-160720-PS-11	Total/NA	Water	2340C-1997	
240-67430-7	W-160720-PS-12	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 239304 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-8	W-160720-PS-13	Total/NA	Water	2340C-1997	
MB 240-239304/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-239304/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-67430-1 DU	W-160720-PS-06	Total/NA	Water	2340C-1997	

Analysis Batch: 239580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	2320B-1997	
240-67430-2	W-160720-PS-07	Total/NA	Water	2320B-1997	
240-67430-3	W-160720-PS-08	Total/NA	Water	2320B-1997	
240-67430-4	W-160720-PS-09	Total/NA	Water	2320B-1997	
240-67430-5	W-160720-PS-10	Total/NA	Water	2320B-1997	
240-67430-6	W-160720-PS-11	Total/NA	Water	2320B-1997	
240-67430-7	W-160720-PS-12	Total/NA	Water	2320B-1997	
240-67430-8	W-160720-PS-13	Total/NA	Water	2320B-1997	
MB 240-239580/5	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-239580/4	Lab Control Sample	Total/NA	Water	2320B-1997	
240-67430-5 DU	W-160720-PS-10	Total/NA	Water	2320B-1997	

Analysis Batch: 240551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67430-1	W-160720-PS-06	Total/NA	Water	9060	
240-67430-2	W-160720-PS-07	Total/NA	Water	9060	
240-67430-3	W-160720-PS-08	Total/NA	Water	9060	
240-67430-4	W-160720-PS-09	Total/NA	Water	9060	
240-67430-5	W-160720-PS-10	Total/NA	Water	9060	
240-67430-6	W-160720-PS-11	Total/NA	Water	9060	
240-67430-7	W-160720-PS-12	Total/NA	Water	9060	
240-67430-8	W-160720-PS-13	Total/NA	Water	9060	
MB 240-240551/4	Method Blank	Total/NA	Water	9060	
LCS 240-240551/6	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-240551/5	Lab Control Sample	Total/NA	Water	9060	
240-67430-6 MS	W-160720-PS-11	Total/NA	Water	9060	
240-67430-6 MSD	W-160720-PS-11	Total/NA	Water	9060	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-06

Date Collected: 07/20/16 08:45
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 16:31	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 16:50	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 17:14	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		20	183051	07/27/16 16:01	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:18	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 15:29	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:17	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 18:53	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 18:53	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 14:34	TPH	TAL CAN

Client Sample ID: W-160720-PS-07

Date Collected: 07/20/16 08:50
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 16:54	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 16:02	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 17:32	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 17:37	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:22	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 15:36	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:23	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 19:09	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 19:09	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 15:00	TPH	TAL CAN

Client Sample ID: W-160720-PS-08

Date Collected: 07/20/16 09:30
Date Received: 07/21/16 09:30

Lab Sample ID: 240-67430-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 17:16	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 15:38	TMH	TAL CAN

Client Sample ID: W-160720-PS-08

Lab Sample ID: 240-67430-3

Date Collected: 07/20/16 09:30

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	239364	07/22/16 17:49	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 18:25	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:35	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 15:42	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:26	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 19:26	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 19:26	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 15:26	TPH	TAL CAN

Client Sample ID: W-160720-PS-09

Lab Sample ID: 240-67430-4

Date Collected: 07/20/16 10:00

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 17:39	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 16:26	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 18:24	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 19:12	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:39	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 15:50	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:29	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 19:42	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 19:42	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 15:54	TPH	TAL CAN

Client Sample ID: W-160720-PS-10

Lab Sample ID: 240-67430-5

Date Collected: 07/20/16 10:50

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 18:01	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 14:02	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 18:41	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 20:00	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN

Client Sample ID: W-160720-PS-10

Lab Sample ID: 240-67430-5

Date Collected: 07/20/16 10:50

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6020		1	239961	07/26/16 19:43	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 16:03	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:32	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 19:58	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 19:58	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 16:20	TPH	TAL CAN

Client Sample ID: W-160720-PS-11

Lab Sample ID: 240-67430-6

Date Collected: 07/20/16 12:35

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 18:24	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 14:26	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 18:59	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 20:47	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:47	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 16:21	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:35	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 20:15	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 20:15	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 16:47	TPH	TAL CAN

Client Sample ID: W-160720-PS-12

Lab Sample ID: 240-67430-7

Date Collected: 07/20/16 13:10

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 18:46	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 14:50	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 19:16	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 21:35	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:51	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 16:31	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:38	TPH	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Client Sample ID: W-160720-PS-12

Lab Sample ID: 240-67430-7

Date Collected: 07/20/16 13:10

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	239184	07/21/16 21:04	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 21:04	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 17:31	TPH	TAL CAN

Client Sample ID: W-160720-PS-13

Lab Sample ID: 240-67430-8

Date Collected: 07/20/16 14:20

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 19:08	TJL1	TAL CAN
Total/NA	Prep	3510C			239488	07/23/16 09:56	CS	TAL CAN
Total/NA	Analysis	8270C		1	239737	07/26/16 15:14	TMH	TAL CAN
Total/NA	Analysis	RSK-175		1	239364	07/22/16 19:34	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 22:23	JMO	TAL PIT
Dissolved	Prep	3005A			239348	07/22/16 10:31	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 19:55	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239580	07/22/16 16:40	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	239304	07/22/16 09:41	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239184	07/21/16 21:21	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239237	07/21/16 21:21	LCN	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 17:58	TPH	TAL CAN

Client Sample ID: TRIP BLANK-002

Lab Sample ID: 240-67430-9

Date Collected: 07/20/16 15:00

Matrix: Water

Date Received: 07/21/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240389	07/29/16 19:31	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

Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67430-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999518190	08-31-16 *

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

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998027800	08-31-16

* Certification renewal pending - certification considered valid.

0.8/C1.8 0.7/C1.7 0.5/C1.5
0.9/C1.9 1.6/C2.6

Chain of Custody Record

121336

TestAmerica Canton
4101 Shuffel Street, N. N.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

gant.anderson@ghd.com

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TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

Client Contact	Project Manager:	Site Contact: Pete Stavio	Date: 7-20-16	COC No:
Company Name: GHD	Tel/Fax:	Lab Contact:	Carrier: Fed Ex	1 of 1 COCs
Address: 1801 Old Hwy 8	Analysis Turnaround Time			Sampler:
City/State/Zip: St. Paul MN	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 651-247-4218	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks STANDARD			Lab Sampling:
Project Name: Penta Wood	☐ 1 week			Job / SDG No.:
Site: Siren, WI	☐ 2 days			
PO # 08615-03-11	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PCP-8151	Naphthalene-8270	BTEX / Methane	TOC	Cl, NO3, SO4	Alkalinity Hardness	As, Cu, Zn, Fe, Mn (Field Filtered)	BTEX ONLY	Sample Specific Notes:
W-160720-PS-06	7/20/16	0845	G	W	17		N	X	X	X	X	X	X			
07		0850						X	X	X	X	X	X			
08		0930						X	X	X	X	X	X			
09		1000						X	X	X	X	X	X			
10		1050						X	X	X	X	X	X			
11		1235						X	X	X	X	X	X			
12		1310						X	X	X	X	X	X			
13		1420						X	X	X	X	X	X			
TRIP BLANK-002		1500			1										X	

240-67430 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ Therm ID No.: _____

	Company	Date/Time		Company	Date/Time
Relinquished by:	GHD	7/20/16/1630	Received by:	TA	7-21-16 930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 607430**
Canton Facility

Client GHD Site Name

Cooler unpacked by:

Cooler Received on 7-21-16 Opened on 7-21-16

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 +1.3 °C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
   IR GUN #36 (CF +1.0°C) Observed Cooler Temp. °C Corrected Cooler Temp. °C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 10 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# **HC574756**
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? 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 2 AIK bottles labeled -06, did not recv. -07.
Resplit new AIK bottles off of Amber Liters
will log according to COC.

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 # : 674430
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	36	0.8	1.8	ICE
		0.9	1.9	
		0.7	1.7	
		1.6	2.6	
		0.5	1.5	

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-160720-PS-06	240-67430-K-1	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-06	240-67430-M-1	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-07	240-67430-K-2	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-07	240-67430-M-2	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-08	240-67430-K-3	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-08	240-67430-M-3	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-09	240-67430-K-4	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-09	240-67430-M-4	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-10	240-67430-K-5	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-10	240-67430-M-5	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-11	240-67430-K-6	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-11	240-67430-M-6	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-12	240-67430-K-7	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-12	240-67430-M-7	Plastic 500ml - with Nitric Acid	<2		
W-160720-PS-13	240-67430-K-8	Plastic 250ml - with Nitric Acid	<2		
W-160720-PS-13	240-67430-M-8	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-67430-1

Login Number: 67430
List Number: 2
Creator: Davis, Ellen G

List Source: TestAmerica Pittsburgh
List Creation: 07/22/16 11:00 AM

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: 240-67502-1
Client Project/Site: 86165-03-11, 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:
8/3/2016 1:02:30 PM

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

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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.

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

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)

Case Narrative

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Job ID: 240-67502-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-67502-1

Comments
No additional comments.

Receipt
The samples were received on 7/22/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 1.4º C, 1.6º C, 2.0º C and 2.1º 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: The following sample was diluted due to the nature of the sample matrix: W-160721-PS-17 (240-67502-4). Elevated reporting limits (RLs) are provided.

Method(s) 8270C: The following sample was diluted due to the nature of the sample matrix: W-160721-PS-16 (240-67502-3). 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
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method(s) 8151A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for 182772 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.

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
Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD/DUP) associated with analytical batch 240-239634.

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-67502-1	W-160721-PS-14	Water	07/21/16 09:27	07/22/16 09:30
240-67502-2	W-160721-PS-15	Water	07/21/16 10:20	07/22/16 09:30
240-67502-3	W-160721-PS-16	Water	07/21/16 12:00	07/22/16 09:30
240-67502-4	W-160721-PS-17	Water	07/21/16 12:10	07/22/16 09:30
240-67502-5	W-160721-PS-18	Water	07/21/16 13:50	07/22/16 09:30
240-67502-6	TRIP BLANK-003	Water	07/21/16 14:30	07/22/16 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-14 — Lab Sample ID: 240-67502-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	0.10	J	0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	100		19	2.9	ug/L	800		8151A	Total/NA
Arsenic	0.49	J	5.0	0.49	ug/L	1		6020	Dissolved
Iron	25.9	J B	100	16.0	ug/L	1		6020	Dissolved
Manganese	10.8		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	127		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	138		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	1.9		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	1.9		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160721-PS-15 — Lab Sample ID: 240-67502-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Methane	2.5		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	0.35		0.094	0.015	ug/L	4		8151A	Total/NA
Iron	317	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	16.2		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	215		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	248		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	1.4		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	9.2		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-160721-PS-16 — Lab Sample ID: 240-67502-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.74	J	1.0	0.25	ug/L	1		8260B	Total/NA
Toluene	1.3		1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	9.1		2.0	0.52	ug/L	1		8260B	Total/NA
Naphthalene	35		1.9	0.60	ug/L	10		8270C	Total/NA
Methane	0.67		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	11000		190	29	ug/L	8000		8151A	Total/NA
Copper	2.1	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	1290	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	2800		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	84.0		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	9.2		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	10.4		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	50.5		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160721-PS-17 — Lab Sample ID: 240-67502-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.83	J	1.0	0.25	ug/L	1		8260B	Total/NA
Toluene	1.2		1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	9.3		2.0	0.52	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-17 (Continued) — Lab Sample ID: 240-67502-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	30		1.9	0.60	ug/L	10		8270C	Total/NA
Methane	0.69		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	9100		190	29	ug/L	8000		8151A	Total/NA
Copper	2.1	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	1250	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	2740		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	83.8		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	9.2		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	10.5		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	51.6		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160721-PS-18 — Lab Sample ID: 240-67502-5

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	1.7		0.095	0.015	ug/L	4		8151A	Total/NA
Manganese	52.9		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	44.5		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	82.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	2.9		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	4.0		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	29.9		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: TRIP BLANK-003 — Lab Sample ID: 240-67502-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160721-PS-14
Date Collected: 07/21/16 09:27
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-1
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 13:51	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/02/16 13:51	1
Toluene	<0.23		1.0	0.23	ug/L			08/02/16 13:51	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/02/16 13:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*08/02/16 13:51*	*1*
4-Bromofluorobenzene (Surr)	*103*		*61 - 120*		*08/02/16 13:51*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*08/02/16 13:51*	*1*
Dibromofluoromethane (Surr)	*102*		*79 - 120*		*08/02/16 13:51*	*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		07/23/16 09:39	07/26/16 19:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*63*		*42 - 120*	*07/23/16 09:39*	*07/26/16 19:30*	*1*
2-Fluorophenol (Surr)	*29*		*10 - 120*	*07/23/16 09:39*	*07/26/16 19:30*	*1*
2,4,6-Tribromophenol (Surr)	*72*		*35 - 125*	*07/23/16 09:39*	*07/26/16 19:30*	*1*
Nitrobenzene-d5 (Surr)	*70*		*36 - 120*	*07/23/16 09:39*	*07/26/16 19:30*	*1*
Phenol-d5 (Surr)	*16*		*10 - 120*	*07/23/16 09:39*	*07/26/16 19:30*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*07/23/16 09:39*	*07/26/16 19:30*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.10**	**J**	0.50	0.080	ug/L			07/25/16 18:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*102*		*76 - 121*		*07/25/16 18:35*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**100**		19	2.9	ug/L		07/25/16 03:39	07/27/16 23:10	800

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/25/16 03:39*	*07/27/16 23:10*	*800*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.49**	**J**	5.0	0.49	ug/L		07/25/16 09:34	07/26/16 23:37	1
Copper	<0.75		2.0	0.75	ug/L		07/25/16 09:34	07/26/16 23:37	1
Iron	**25.9**	**J B**	100	16.0	ug/L		07/25/16 09:34	07/26/16 23:37	1
Manganese	**10.8**		5.0	1.1	ug/L		07/25/16 09:34	07/26/16 23:37	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/26/16 23:37	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**127**		5.0	1.9	mg/L			07/25/16 12:32	1
Hardness as calcium carbonate	**138**		5.0	3.1	mg/L			08/02/16 08:38	1
Chloride	**11.4**		1.0	0.41	mg/L			07/23/16 02:12	1
Nitrate as N	**1.9**		0.10	0.035	mg/L			07/23/16 02:12	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-14
Date Collected: 07/21/16 09:27
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-1
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			07/23/16 02:12	1
Total Organic Carbon	1.9		1.0	0.080	mg/L			07/29/16 18:42	1

Client Sample ID: W-160721-PS-15

Date Collected: 07/21/16 10:20
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-2

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 14:14	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/02/16 14:14	1
Toluene	<0.23		1.0	0.23	ug/L			08/02/16 14:14	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/02/16 14:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*08/02/16 14:14*	*1*
4-Bromofluorobenzene (Surr)	*99*		*61 - 120*		*08/02/16 14:14*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*08/02/16 14:14*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*08/02/16 14:14*	*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		07/23/16 09:39	07/26/16 13:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*75*		*42 - 120*	*07/23/16 09:39*	*07/26/16 13:17*	*1*
2-Fluorophenol (Surr)	*35*		*10 - 120*	*07/23/16 09:39*	*07/26/16 13:17*	*1*
2,4,6-Tribromophenol (Surr)	*71*		*35 - 125*	*07/23/16 09:39*	*07/26/16 13:17*	*1*
Nitrobenzene-d5 (Surr)	*84*		*36 - 120*	*07/23/16 09:39*	*07/26/16 13:17*	*1*
Phenol-d5 (Surr)	*20*		*10 - 120*	*07/23/16 09:39*	*07/26/16 13:17*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*07/23/16 09:39*	*07/26/16 13:17*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**2.5**		0.50	0.080	ug/L			07/25/16 18:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*98*		*76 - 121*		*07/25/16 18:53*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.35**		0.094	0.015	ug/L		07/25/16 03:39	07/27/16 23:57	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*40*		*18 - 125*	*07/25/16 03:39*	*07/27/16 23:57*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/25/16 09:34	07/26/16 23:41	1
Copper	<0.75		2.0	0.75	ug/L		07/25/16 09:34	07/26/16 23:41	1
Iron	**317**	**B**	100	16.0	ug/L		07/25/16 09:34	07/26/16 23:41	1
Manganese	**16.2**		5.0	1.1	ug/L		07/25/16 09:34	07/26/16 23:41	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/26/16 23:41	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**215**		5.0	1.9	mg/L			07/25/16 12:42	1
Hardness as calcium carbonate	**248**		5.0	3.1	mg/L			08/02/16 09:04	1
Chloride	**45.5**		1.0	0.41	mg/L			07/23/16 02:28	1
Nitrate as N	**1.4**		0.10	0.035	mg/L			07/23/16 02:28	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-15
Date Collected: 07/21/16 10:20
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	9.2		1.0	0.13	mg/L			07/23/16 02:28	1
Total Organic Carbon	1.0		1.0	0.080	mg/L			07/29/16 19:09	1

Client Sample ID: W-160721-PS-16

Date Collected: 07/21/16 12:00
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-3

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 14:37	1
Ethylbenzene	**0.74**	**J**	1.0	0.25	ug/L			08/02/16 14:37	1
Toluene	**1.3**		1.0	0.23	ug/L			08/02/16 14:37	1
Xylenes, Total	**9.1**		2.0	0.52	ug/L			08/02/16 14:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*78 - 125*		*08/02/16 14:37*	*1*
4-Bromofluorobenzene (Surr)	*102*		*61 - 120*		*08/02/16 14:37*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*08/02/16 14:37*	*1*
Dibromofluoromethane (Surr)	*103*		*79 - 120*		*08/02/16 14:37*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**35**		1.9	0.60	ug/L		07/25/16 10:18	07/27/16 20:02	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*60*		*42 - 120*	*07/25/16 10:18*	*07/27/16 20:02*	*10*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/25/16 10:18*	*07/27/16 20:02*	*10*
2,4,6-Tribromophenol (Surr)	*64*		*35 - 125*	*07/25/16 10:18*	*07/27/16 20:02*	*10*
Nitrobenzene-d5 (Surr)	*65*		*36 - 120*	*07/25/16 10:18*	*07/27/16 20:02*	*10*
Phenol-d5 (Surr)	*21*		*10 - 120*	*07/25/16 10:18*	*07/27/16 20:02*	*10*
Terphenyl-d14 (Surr)	*61*		*17 - 120*	*07/25/16 10:18*	*07/27/16 20:02*	*10*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.67**		0.50	0.080	ug/L			07/25/16 19:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*99*		*76 - 121*		*07/25/16 19:10*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**11000**		190	29	ug/L		07/25/16 03:39	07/28/16 06:40	8000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/25/16 03:39*	*07/28/16 06:40*	*8000*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/25/16 09:34	07/26/16 23:45	1
Copper	**2.1**	**B**	2.0	0.75	ug/L		07/25/16 09:34	07/26/16 23:45	1
Iron	**1290**	**B**	100	16.0	ug/L		07/25/16 09:34	07/26/16 23:45	1
Manganese	**2800**		5.0	1.1	ug/L		07/25/16 09:34	07/26/16 23:45	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/26/16 23:45	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**84.0**		5.0	1.9	mg/L			07/25/16 12:50	1
Hardness as calcium carbonate	**110**		5.0	3.1	mg/L			08/02/16 09:07	1
Chloride	**9.2**		1.0	0.41	mg/L			07/23/16 03:17	1
Nitrate as N	<0.035		0.10	0.035	mg/L			07/23/16 03:17	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-16
Date Collected: 07/21/16 12:00
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	10.4		1.0	0.13	mg/L			07/23/16 03:17	1
Total Organic Carbon	50.5		1.0	0.080	mg/L			07/29/16 19:35	1

Client Sample ID: W-160721-PS-17

Date Collected: 07/21/16 12:10
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-4

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 14:59	1
Ethylbenzene	**0.83**	**J**	1.0	0.25	ug/L			08/02/16 14:59	1
Toluene	**1.2**		1.0	0.23	ug/L			08/02/16 14:59	1
Xylenes, Total	**9.3**		2.0	0.52	ug/L			08/02/16 14:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*78 - 125*		*08/02/16 14:59*	*1*
4-Bromofluorobenzene (Surr)	*109*		*61 - 120*		*08/02/16 14:59*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*08/02/16 14:59*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*08/02/16 14:59*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**30**		1.9	0.60	ug/L		07/25/16 10:18	07/26/16 20:46	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*56*		*42 - 120*	*07/25/16 10:18*	*07/26/16 20:46*	*10*
2-Fluorophenol (Surr)	*27*		*10 - 120*	*07/25/16 10:18*	*07/26/16 20:46*	*10*
2,4,6-Tribromophenol (Surr)	*65*		*35 - 125*	*07/25/16 10:18*	*07/26/16 20:46*	*10*
Nitrobenzene-d5 (Surr)	*59*		*36 - 120*	*07/25/16 10:18*	*07/26/16 20:46*	*10*
Phenol-d5 (Surr)	*16*		*10 - 120*	*07/25/16 10:18*	*07/26/16 20:46*	*10*
Terphenyl-d14 (Surr)	*55*		*17 - 120*	*07/25/16 10:18*	*07/26/16 20:46*	*10*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.69**		0.50	0.080	ug/L			07/25/16 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*98*		*76 - 121*		*07/25/16 19:27*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**9100**		190	29	ug/L		07/25/16 03:39	07/28/16 07:04	8000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/25/16 03:39*	*07/28/16 07:04*	*8000*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/25/16 09:34	07/26/16 23:49	1
Copper	**2.1**	**B**	2.0	0.75	ug/L		07/25/16 09:34	07/26/16 23:49	1
Iron	**1250**	**B**	100	16.0	ug/L		07/25/16 09:34	07/26/16 23:49	1
Manganese	**2740**		5.0	1.1	ug/L		07/25/16 09:34	07/26/16 23:49	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/26/16 23:49	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**83.8**		5.0	1.9	mg/L			07/25/16 12:58	1
Hardness as calcium carbonate	**110**		5.0	3.1	mg/L			08/02/16 09:10	1
Chloride	**9.2**		1.0	0.41	mg/L			07/23/16 03:34	1
Nitrate as N	<0.035		0.10	0.035	mg/L			07/23/16 03:34	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-17
Date Collected: 07/21/16 12:10
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	10.5		1.0	0.13	mg/L			07/23/16 03:34	1
Total Organic Carbon	51.6		1.0	0.080	mg/L			07/29/16 20:03	1

Client Sample ID: W-160721-PS-18
Date Collected: 07/21/16 13:50
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-5
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 15:21	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/02/16 15:21	1
Toluene	<0.23		1.0	0.23	ug/L			08/02/16 15:21	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/02/16 15:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*78 - 125*		*08/02/16 15:21*	*1*
4-Bromofluorobenzene (Surr)	*104*		*61 - 120*		*08/02/16 15:21*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*08/02/16 15:21*	*1*
Dibromofluoromethane (Surr)	*101*		*79 - 120*		*08/02/16 15:21*	*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		07/25/16 10:18	07/26/16 18:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*55*		*42 - 120*	*07/25/16 10:18*	*07/26/16 18:22*	*1*
2-Fluorophenol (Surr)	*23*		*10 - 120*	*07/25/16 10:18*	*07/26/16 18:22*	*1*
2,4,6-Tribromophenol (Surr)	*47*		*35 - 125*	*07/25/16 10:18*	*07/26/16 18:22*	*1*
Nitrobenzene-d5 (Surr)	*52*		*36 - 120*	*07/25/16 10:18*	*07/26/16 18:22*	*1*
Phenol-d5 (Surr)	*13*		*10 - 120*	*07/25/16 10:18*	*07/26/16 18:22*	*1*
Terphenyl-d14 (Surr)	*59*		*17 - 120*	*07/25/16 10:18*	*07/26/16 18:22*	*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			07/25/16 19:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*99*		*76 - 121*		*07/25/16 19:44*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1.7**		0.095	0.015	ug/L		07/25/16 03:39	07/28/16 02:42	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*37*		*18 - 125*	*07/25/16 03:39*	*07/28/16 02:42*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/25/16 09:34	07/27/16 00:02	1
Copper	<0.75		2.0	0.75	ug/L		07/25/16 09:34	07/27/16 00:02	1
Iron	<16.0		100	16.0	ug/L		07/25/16 09:34	07/27/16 00:02	1
Manganese	**52.9**		5.0	1.1	ug/L		07/25/16 09:34	07/27/16 00:02	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/27/16 00:02	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**44.5**		5.0	1.9	mg/L			07/25/16 13:07	1
Hardness as calcium carbonate	**82.0**		5.0	3.1	mg/L			08/02/16 09:16	1
Chloride	**2.9**		1.0	0.41	mg/L			07/23/16 03:50	1
Nitrate as N	**4.0**		0.10	0.035	mg/L			07/23/16 03:50	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-18
Date Collected: 07/21/16 13:50
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-5
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	29.9		1.0	0.13	mg/L			07/23/16 03:50	1
Total Organic Carbon	1.4		1.0	0.080	mg/L			07/29/16 20:32	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: TRIP BLANK-003
Date Collected: 07/21/16 14:30
Date Received: 07/22/16 09:30

Lab Sample ID: 240-67502-6
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 15:44	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/02/16 15:44	1
Toluene	<0.23		1.0	0.23	ug/L			08/02/16 15:44	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/02/16 15:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*78 - 125*		*08/02/16 15:44*	*1*
4-Bromofluorobenzene (Surr)	*106*		*61 - 120*		*08/02/16 15:44*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*08/02/16 15:44*	*1*
Dibromofluoromethane (Surr)	*101*		*79 - 120*		*08/02/16 15:44*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

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	(78-125)	(61-120)	(80-120)	(79-120)
240-67502-1	W-160721-PS-14	89	103	104	102
240-67502-2	W-160721-PS-15	89	99	104	99
240-67502-3	W-160721-PS-16	91	102	104	103
240-67502-4	W-160721-PS-17	88	109	101	99
240-67502-5	W-160721-PS-18	87	104	106	101
240-67502-6	TRIP BLANK-003	88	106	101	101
LCS 240-240802/4	Lab Control Sample	88	104	104	103
MB 240-240802/6	Method Blank	89	100	103	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)
240-67502-1	W-160721-PS-14	63	29	72	70	16	74
240-67502-2	W-160721-PS-15	75	35	71	84	20	74
240-67502-3	W-160721-PS-16	60	33	64	65	21	61
240-67502-4	W-160721-PS-17	56	27	65	59	16	55
240-67502-5	W-160721-PS-18	55	23	47	52	13	59
LCS 240-239485/20-A	Lab Control Sample	77	58	83	86	42	90
LCS 240-239634/20-A	Lab Control Sample	75	62	76	98	50	78
MB 240-239485/19-A	Method Blank	67	56	67	77	42	80
MB 240-239634/19-A	Method Blank	71	63	67	65	49	81

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)
240-67502-1	W-160721-PS-14	102
240-67502-2	W-160721-PS-15	98
240-67502-3	W-160721-PS-16	99
240-67502-4	W-160721-PS-17	98
240-67502-5	W-160721-PS-18	99

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

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)
LCS 240-239649/5	Lab Control Sample	109
MB 240-239649/4	Method Blank	113

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)
240-67502-1	W-160721-PS-14	0 X D	0 X D
240-67502-2	W-160721-PS-15	40	40
240-67502-3	W-160721-PS-16	0 X D	0 X D
240-67502-4	W-160721-PS-17	0 X D	0 X D
240-67502-5	W-160721-PS-18	37	34
LCS 180-182772/2-A	Lab Control Sample	28	28
MB 180-182772/1-A	Method Blank	62	56
MB 180-182772/1-A	Method Blank	29	33

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

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

Lab Sample ID: MB 240-240802/6
Matrix: Water
Analysis Batch: 240802

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/02/16 12:00	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/02/16 12:00	1
Toluene	<0.23		1.0	0.23	ug/L			08/02/16 12:00	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/02/16 12:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*08/02/16 12:00*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*08/02/16 12:00*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*08/02/16 12:00*	*1*
Dibromofluoromethane (Surr)	*100*		*79 - 120*		*08/02/16 12:00*	*1*

Lab Sample ID: LCS 240-240802/4
Matrix: Water
Analysis Batch: 240802

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	10.2		ug/L		102	80 - 120
Ethylbenzene	10.0	10.5		ug/L		105	80 - 120
Toluene	10.0	10.4		ug/L		104	80 - 120
Xylenes, Total	20.0	20.5		ug/L		103	80 - 120
m-Xylene & p-Xylene	10.0	9.93		ug/L		99	80 - 120
o-Xylene	10.0	10.6		ug/L		106	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*88*		*78 - 125*
4-Bromofluorobenzene (Surr)	*104*		*61 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*79 - 120*

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

Lab Sample ID: MB 240-239485/19-A
Matrix: Water
Analysis Batch: 239758

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 239485

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/23/16 09:39	07/26/16 09:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*42 - 120*	*07/23/16 09:39*	*07/26/16 09:23*	*1*
2-Fluorophenol (Surr)	*56*		*10 - 120*	*07/23/16 09:39*	*07/26/16 09:23*	*1*
2,4,6-Tribromophenol (Surr)	*67*		*35 - 125*	*07/23/16 09:39*	*07/26/16 09:23*	*1*
Nitrobenzene-d5 (Surr)	*77*		*36 - 120*	*07/23/16 09:39*	*07/26/16 09:23*	*1*
Phenol-d5 (Surr)	*42*		*10 - 120*	*07/23/16 09:39*	*07/26/16 09:23*	*1*
Terphenyl-d14 (Surr)	*80*		*17 - 120*	*07/23/16 09:39*	*07/26/16 09:23*	*1*

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

Lab Sample ID: LCS 240-239485/20-A
Matrix: Water
Analysis Batch: 239758

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 239485

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	14.2		ug/L		71	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*77*		*42 - 120*
2-Fluorophenol (Surr)	*58*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*83*		*35 - 125*
Nitrobenzene-d5 (Surr)	*86*		*36 - 120*
Phenol-d5 (Surr)	*42*		*10 - 120*
Terphenyl-d14 (Surr)	*90*		*17 - 120*

Lab Sample ID: MB 240-239634/19-A
Matrix: Water
Analysis Batch: 239761

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 239634

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/25/16 10:18	07/26/16 15:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*71*		*42 - 120*	*07/25/16 10:18*	*07/26/16 15:10*	*1*
2-Fluorophenol (Surr)	*63*		*10 - 120*	*07/25/16 10:18*	*07/26/16 15:10*	*1*
2,4,6-Tribromophenol (Surr)	*67*		*35 - 125*	*07/25/16 10:18*	*07/26/16 15:10*	*1*
Nitrobenzene-d5 (Surr)	*65*		*36 - 120*	*07/25/16 10:18*	*07/26/16 15:10*	*1*
Phenol-d5 (Surr)	*49*		*10 - 120*	*07/25/16 10:18*	*07/26/16 15:10*	*1*
Terphenyl-d14 (Surr)	*81*		*17 - 120*	*07/25/16 10:18*	*07/26/16 15:10*	*1*

Lab Sample ID: LCS 240-239634/20-A
Matrix: Water
Analysis Batch: 239761

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 239634

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	13.3		ug/L		67	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*75*		*42 - 120*
2-Fluorophenol (Surr)	*62*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*76*		*35 - 125*
Nitrobenzene-d5 (Surr)	*98*		*36 - 120*
Phenol-d5 (Surr)	*50*		*10 - 120*
Terphenyl-d14 (Surr)	*78*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-239649/4
Matrix: Water
Analysis Batch: 239649

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			07/25/16 15:25	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*113*		*76 - 121*		*07/25/16 15:25*	*1*

Lab Sample ID: LCS 240-239649/5
Matrix: Water
Analysis Batch: 239649

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	173		ug/L		87	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*109*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-182772/1-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 182772

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.078		0.50	0.078	ug/L		07/25/16 03:39	07/27/16 10:49	20

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*62*		*18 - 125*	*07/25/16 03:39*	*07/27/16 10:49*	*20*

Lab Sample ID: MB 180-182772/1-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 182772

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.016		0.10	0.016	ug/L		07/25/16 03:39	07/28/16 06:21	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*33*		*18 - 125*	*07/25/16 03:39*	*07/28/16 06:21*	*4*

Lab Sample ID: LCS 180-182772/2-A
Matrix: Water
Analysis Batch: 183051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 182772

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	1.00	0.650		ug/L		65	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*28*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-239619/1-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 239619

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/25/16 09:34	07/26/16 13:34	1
Copper	3.23		2.0	0.75	ug/L		07/25/16 09:34	07/26/16 13:34	1
Iron	17.61	J	100	16.0	ug/L		07/25/16 09:34	07/26/16 13:34	1
Manganese	<1.1		5.0	1.1	ug/L		07/25/16 09:34	07/26/16 13:34	1
Zinc	<7.3		20.0	7.3	ug/L		07/25/16 09:34	07/26/16 13:34	1

Lab Sample ID: LCS 240-239619/2-A
Matrix: Water
Analysis Batch: 239961

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 239619

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	877.7		ug/L		88	80 - 120
Copper	1000	899.4		ug/L		90	80 - 120
Iron	10000	8723		ug/L		87	80 - 120
Manganese	1000	861.7		ug/L		86	80 - 120
Zinc	1000	864.7		ug/L		86	80 - 120

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-239748/5
Matrix: Water
Analysis Batch: 239748

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			07/25/16 10:34	1

Lab Sample ID: LCS 240-239748/4
Matrix: Water
Analysis Batch: 239748

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	413.2		mg/L		112	90 - 127

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-240808/1
Matrix: Water
Analysis Batch: 240808

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			08/02/16 08:30	1

Lab Sample ID: LCS 240-240808/2
Matrix: Water
Analysis Batch: 240808

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	88 - 110

Method: 2340C-1997 - Hardness, Total (Continued)

Lab Sample ID: 240-67502-1 MS
Matrix: Water
Analysis Batch: 240808

Client Sample ID: W-160721-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	138		200	338.0		mg/L		100	87 - 114

Lab Sample ID: 240-67502-1 MSD
Matrix: Water
Analysis Batch: 240808

Client Sample ID: W-160721-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	138		200	342.0		mg/L		102	87 - 114	1	20

Lab Sample ID: 240-67502-1 DU
Matrix: Water
Analysis Batch: 240808

Client Sample ID: W-160721-PS-14
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	138		136.0		mg/L		1	20

Lab Sample ID: 240-67502-5 DU
Matrix: Water
Analysis Batch: 240808

Client Sample ID: W-160721-PS-18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Hardness as calcium carbonate	82.0		82.00		mg/L		0	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-239349/50
Matrix: Water
Analysis Batch: 239349

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			07/23/16 00:00	1
Sulfate	<0.13		1.0	0.13	mg/L			07/23/16 00:00	1

Lab Sample ID: LCS 240-239349/51
Matrix: Water
Analysis Batch: 239349

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	51.87		mg/L		104	90 - 110
Sulfate	50.0	48.86		mg/L		98	90 - 110

Lab Sample ID: 240-67502-5 MS
Matrix: Water
Analysis Batch: 239349

Client Sample ID: W-160721-PS-18
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2.9		50.0	55.50		mg/L		105	80 - 120
Sulfate	29.9		50.0	85.65		mg/L		112	80 - 120

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 240-67502-5 MSD — **Client Sample ID: W-160721-PS-18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239349

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	2.9		50.0	54.69		mg/L		104	80 - 120	1	15
Sulfate	29.9		50.0	84.49		mg/L		109	80 - 120	1	15

Lab Sample ID: MB 240-239360/50 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239360

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			07/23/16 00:00	1

Lab Sample ID: LCS 240-239360/51 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239360

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	2.50	2.49		mg/L		99	90 - 110

Lab Sample ID: 240-67502-5 MS — **Client Sample ID: W-160721-PS-18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239360

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	4.0		2.50	6.76		mg/L		111	80 - 120

Lab Sample ID: 240-67502-5 MSD — **Client Sample ID: W-160721-PS-18**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 239360

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	4.0		2.50	6.67		mg/L		108	80 - 120	1	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-240551/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 240551

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<0.080		1.0	0.080	mg/L			07/29/16 11:20	1

Lab Sample ID: LCS 240-240551/6 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 240551

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon	14.4	14.16		mg/L		98	88 - 115

Method: 9060 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LLCS 240-240551/5
Matrix: Water
Analysis Batch: 240551

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	7.20	7.34		mg/L		102	88 - 115

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

GC/MS VOA

Analysis Batch: 240802

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	8260B	
240-67502-2	W-160721-PS-15	Total/NA	Water	8260B	
240-67502-3	W-160721-PS-16	Total/NA	Water	8260B	
240-67502-4	W-160721-PS-17	Total/NA	Water	8260B	
240-67502-5	W-160721-PS-18	Total/NA	Water	8260B	
240-67502-6	TRIP BLANK-003	Total/NA	Water	8260B	
MB 240-240802/6	Method Blank	Total/NA	Water	8260B	
LCS 240-240802/4	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 239485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	3510C	
240-67502-2	W-160721-PS-15	Total/NA	Water	3510C	
MB 240-239485/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-239485/20-A	Lab Control Sample	Total/NA	Water	3510C	

Prep Batch: 239634

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-3	W-160721-PS-16	Total/NA	Water	3510C	
240-67502-4	W-160721-PS-17	Total/NA	Water	3510C	
240-67502-5	W-160721-PS-18	Total/NA	Water	3510C	
MB 240-239634/19-A	Method Blank	Total/NA	Water	3510C	
LCS 240-239634/20-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 239758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	8270C	239485
240-67502-2	W-160721-PS-15	Total/NA	Water	8270C	239485
MB 240-239485/19-A	Method Blank	Total/NA	Water	8270C	239485
LCS 240-239485/20-A	Lab Control Sample	Total/NA	Water	8270C	239485

Analysis Batch: 239761

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-4	W-160721-PS-17	Total/NA	Water	8270C	239634
240-67502-5	W-160721-PS-18	Total/NA	Water	8270C	239634
MB 240-239634/19-A	Method Blank	Total/NA	Water	8270C	239634
LCS 240-239634/20-A	Lab Control Sample	Total/NA	Water	8270C	239634

Analysis Batch: 239986

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-3	W-160721-PS-16	Total/NA	Water	8270C	239634

GC VOA

Analysis Batch: 239649

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	RSK-175	
240-67502-2	W-160721-PS-15	Total/NA	Water	RSK-175	

GC VOA (Continued)

Analysis Batch: 239649 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-3	W-160721-PS-16	Total/NA	Water	RSK-175	
240-67502-4	W-160721-PS-17	Total/NA	Water	RSK-175	
240-67502-5	W-160721-PS-18	Total/NA	Water	RSK-175	
MB 240-239649/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-239649/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 182772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	8151A	
240-67502-2	W-160721-PS-15	Total/NA	Water	8151A	
240-67502-3	W-160721-PS-16	Total/NA	Water	8151A	
240-67502-4	W-160721-PS-17	Total/NA	Water	8151A	
240-67502-5	W-160721-PS-18	Total/NA	Water	8151A	
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	

Analysis Batch: 183051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	8151A	182772
240-67502-2	W-160721-PS-15	Total/NA	Water	8151A	182772
240-67502-3	W-160721-PS-16	Total/NA	Water	8151A	182772
240-67502-4	W-160721-PS-17	Total/NA	Water	8151A	182772
240-67502-5	W-160721-PS-18	Total/NA	Water	8151A	182772
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	182772
MB 180-182772/1-A	Method Blank	Total/NA	Water	8151A	182772
LCS 180-182772/2-A	Lab Control Sample	Total/NA	Water	8151A	182772

Metals

Prep Batch: 239619

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Dissolved	Water	3005A	
240-67502-2	W-160721-PS-15	Dissolved	Water	3005A	
240-67502-3	W-160721-PS-16	Dissolved	Water	3005A	
240-67502-4	W-160721-PS-17	Dissolved	Water	3005A	
240-67502-5	W-160721-PS-18	Dissolved	Water	3005A	
MB 240-239619/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-239619/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 239961

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Dissolved	Water	6020	239619
240-67502-2	W-160721-PS-15	Dissolved	Water	6020	239619
240-67502-3	W-160721-PS-16	Dissolved	Water	6020	239619
240-67502-4	W-160721-PS-17	Dissolved	Water	6020	239619
240-67502-5	W-160721-PS-18	Dissolved	Water	6020	239619
MB 240-239619/1-A	Method Blank	Total Recoverable	Water	6020	239619
LCS 240-239619/2-A	Lab Control Sample	Total Recoverable	Water	6020	239619

General Chemistry

Analysis Batch: 239349

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	300.0	
240-67502-2	W-160721-PS-15	Total/NA	Water	300.0	
240-67502-3	W-160721-PS-16	Total/NA	Water	300.0	
240-67502-4	W-160721-PS-17	Total/NA	Water	300.0	
240-67502-5	W-160721-PS-18	Total/NA	Water	300.0	
MB 240-239349/50	Method Blank	Total/NA	Water	300.0	
LCS 240-239349/51	Lab Control Sample	Total/NA	Water	300.0	
240-67502-5 MS	W-160721-PS-18	Total/NA	Water	300.0	
240-67502-5 MSD	W-160721-PS-18	Total/NA	Water	300.0	

Analysis Batch: 239360

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	300.0	
240-67502-2	W-160721-PS-15	Total/NA	Water	300.0	
240-67502-3	W-160721-PS-16	Total/NA	Water	300.0	
240-67502-4	W-160721-PS-17	Total/NA	Water	300.0	
240-67502-5	W-160721-PS-18	Total/NA	Water	300.0	
MB 240-239360/50	Method Blank	Total/NA	Water	300.0	
LCS 240-239360/51	Lab Control Sample	Total/NA	Water	300.0	
240-67502-5 MS	W-160721-PS-18	Total/NA	Water	300.0	
240-67502-5 MSD	W-160721-PS-18	Total/NA	Water	300.0	

Analysis Batch: 239748

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	2320B-1997	
240-67502-2	W-160721-PS-15	Total/NA	Water	2320B-1997	
240-67502-3	W-160721-PS-16	Total/NA	Water	2320B-1997	
240-67502-4	W-160721-PS-17	Total/NA	Water	2320B-1997	
240-67502-5	W-160721-PS-18	Total/NA	Water	2320B-1997	
MB 240-239748/5	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-239748/4	Lab Control Sample	Total/NA	Water	2320B-1997	

Analysis Batch: 240551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	9060	
240-67502-2	W-160721-PS-15	Total/NA	Water	9060	
240-67502-3	W-160721-PS-16	Total/NA	Water	9060	
240-67502-4	W-160721-PS-17	Total/NA	Water	9060	
240-67502-5	W-160721-PS-18	Total/NA	Water	9060	
MB 240-240551/4	Method Blank	Total/NA	Water	9060	
LCS 240-240551/6	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-240551/5	Lab Control Sample	Total/NA	Water	9060	

Analysis Batch: 240808

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67502-1	W-160721-PS-14	Total/NA	Water	2340C-1997	
240-67502-2	W-160721-PS-15	Total/NA	Water	2340C-1997	
240-67502-3	W-160721-PS-16	Total/NA	Water	2340C-1997	
240-67502-4	W-160721-PS-17	Total/NA	Water	2340C-1997	
240-67502-5	W-160721-PS-18	Total/NA	Water	2340C-1997	
MB 240-240808/1	Method Blank	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 240808 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-240808/2	Lab Control Sample	Total/NA	Water	2340C-1997	
240-67502-1 MS	W-160721-PS-14	Total/NA	Water	2340C-1997	
240-67502-1 MSD	W-160721-PS-14	Total/NA	Water	2340C-1997	
240-67502-1 DU	W-160721-PS-14	Total/NA	Water	2340C-1997	
240-67502-5 DU	W-160721-PS-18	Total/NA	Water	2340C-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-14

Lab Sample ID: 240-67502-1

Date Collected: 07/21/16 09:27

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 13:51	LEE	TAL CAN
Total/NA	Prep	3510C			239485	07/23/16 09:39	CS	TAL CAN
Total/NA	Analysis	8270C		1	239758	07/26/16 19:30	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239649	07/25/16 18:35	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		800	183051	07/27/16 23:10	JMO	TAL PIT
Dissolved	Prep	3005A			239619	07/25/16 09:34	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 23:37	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239748	07/25/16 12:32	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 08:38	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239349	07/23/16 02:12	LKG	TAL CAN
Total/NA	Analysis	300.0		1	239360	07/23/16 02:12	LKG	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 18:42	TPH	TAL CAN

Client Sample ID: W-160721-PS-15

Lab Sample ID: 240-67502-2

Date Collected: 07/21/16 10:20

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 14:14	LEE	TAL CAN
Total/NA	Prep	3510C			239485	07/23/16 09:39	CS	TAL CAN
Total/NA	Analysis	8270C		1	239758	07/26/16 13:17	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239649	07/25/16 18:53	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/27/16 23:57	JMO	TAL PIT
Dissolved	Prep	3005A			239619	07/25/16 09:34	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 23:41	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239748	07/25/16 12:42	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:04	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239349	07/23/16 02:28	LKG	TAL CAN
Total/NA	Analysis	300.0		1	239360	07/23/16 02:28	LKG	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 19:09	TPH	TAL CAN

Client Sample ID: W-160721-PS-16

Lab Sample ID: 240-67502-3

Date Collected: 07/21/16 12:00

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 14:37	LEE	TAL CAN
Total/NA	Prep	3510C			239634	07/25/16 10:18	JDR	TAL CAN
Total/NA	Analysis	8270C		10	239986	07/27/16 20:02	JMG	TAL CAN

Client Sample ID: W-160721-PS-16

Lab Sample ID: 240-67502-3

Date Collected: 07/21/16 12:00

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	RSK-175		1	239649	07/25/16 19:10	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		8000	183051	07/28/16 06:40	JMO	TAL PIT
Dissolved	Prep	3005A			239619	07/25/16 09:34	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 23:45	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239748	07/25/16 12:50	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:07	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239349	07/23/16 03:17	LKG	TAL CAN
Total/NA	Analysis	300.0		1	239360	07/23/16 03:17	LKG	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 19:35	TPH	TAL CAN

Client Sample ID: W-160721-PS-17

Lab Sample ID: 240-67502-4

Date Collected: 07/21/16 12:10

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 14:59	LEE	TAL CAN
Total/NA	Prep	3510C			239634	07/25/16 10:18	JDR	TAL CAN
Total/NA	Analysis	8270C		10	239761	07/26/16 20:46	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239649	07/25/16 19:27	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		8000	183051	07/28/16 07:04	JMO	TAL PIT
Dissolved	Prep	3005A			239619	07/25/16 09:34	AJC	TAL CAN
Dissolved	Analysis	6020		1	239961	07/26/16 23:49	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239748	07/25/16 12:58	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:10	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239349	07/23/16 03:34	LKG	TAL CAN
Total/NA	Analysis	300.0		1	239360	07/23/16 03:34	LKG	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 20:03	TPH	TAL CAN

Client Sample ID: W-160721-PS-18

Lab Sample ID: 240-67502-5

Date Collected: 07/21/16 13:50

Matrix: Water

Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 15:21	LEE	TAL CAN
Total/NA	Prep	3510C			239634	07/25/16 10:18	JDR	TAL CAN
Total/NA	Analysis	8270C		1	239761	07/26/16 18:22	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	239649	07/25/16 19:44	BPM	TAL CAN
Total/NA	Prep	8151A			182772	07/25/16 03:39	BAP	TAL PIT
Total/NA	Analysis	8151A		4	183051	07/28/16 02:42	JMO	TAL PIT
Dissolved	Prep	3005A			239619	07/25/16 09:34	AJC	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Client Sample ID: W-160721-PS-18

Lab Sample ID: 240-67502-5

Date Collected: 07/21/16 13:50
Matrix: Water
Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6020		1	239961	07/27/16 00:02	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	239748	07/25/16 13:07	LKG	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:16	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239349	07/23/16 03:50	LKG	TAL CAN
Total/NA	Analysis	300.0		1	239360	07/23/16 03:50	LKG	TAL CAN
Total/NA	Analysis	9060		1	240551	07/29/16 20:32	TPH	TAL CAN

Client Sample ID: TRIP BLANK-003

Lab Sample ID: 240-67502-6

Date Collected: 07/21/16 14:30
Matrix: Water
Date Received: 07/22/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240802	08/02/16 15:44	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

Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67502-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999518190	08-31-16 *

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

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998027800	08-31-16

* Certification renewal pending - certification considered valid.

0.6 | C1.6 1.0 | C2.0
1.1 | C2.1
0.4 | C1.4

TestAmerica Canton

4101 Shuffel Street, N. N.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

121337

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

grant.anderson@ghd.com

Client Contact	Project Manager:	Site Contact:	Date: 7-21-16	COC No:
Company Name: GHD	Tel/Fax:	Lab Contact:	Carrier: FedEx	1 of 1 COCs
Address: 1801 OLD HWY 8	Analysis Turnaround Time			Sampler: Peter Storlie
City/State/Zip: St. Paul, MN 55112	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 651-247-4218	TAT if different from Below STANDARD			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling:
Project Name: Penta Wood	☐ 1 week			Job / SDG No.:
Site: 086165-03-11	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	PCP-8151	NAPHTHALENE-8	BTEX/METHANE	TOC	Cl, NO3, SO4	ALKALINITY	HARDNESS	As, Cu, Fe, Mn (Field Filtered)	BTEX only	Sample Specific Notes:
W-160721-PS-14	7/21/16	0927	G	W	17	N		X	X	X	X	X	X	X	X		
15		1020			17			X	X	X	X	X	X	X	X		
16		1200			15			X	X	X	X	X	X	X	X		
17		1210			15			X	X	X	X	X	X	X	X		
18		1350			17			X	X	X	X	X	X	X	X		
TRIPBLANK-003		1430			1					X							

240-67502 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	GHD	7-21-16/1630	Ryan Henderson	TA	7-22-16 9:30
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

8/3/2016

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 107502**
Canton Facility

Client GHD Site Name

Cooler unpacked by: Ryan Henderson

Cooler Received on 7-22-16 Opened on 7-22-16

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 +1.3 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   (IR GUN #36) (CF +1.0°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 each (Yes) No
   -Were custody seals on the outside of the cooler(s) signed & dated? 8 total (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# HC574756
12. Were VOAs on the COC? (Yes) No
13. Were air bubbles >6 mm in any VOA vials? Yes (No) NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # B607501VB (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:

Samples 16 & 17 Marked 15 containers recieved 16 containers each

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 #: 607502**
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
Client	36	0.6	1.6	Wet Ice
↓	↓	1.1	2.1	↓
↓	↓	0.4	1.4	↓
↓	↓	1.0	2.0	↓

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-160721-PS-14	240-67502-K-1	Plastic 250ml - with Nitric Acid			
W-160721-PS-14	240-67502-M-1	Plastic 500ml - w/ Nitric - Dis.	<2		
W-160721-PS-15	240-67502-K-2	Plastic 250ml - with Nitric Acid			
W-160721-PS-15	240-67502-M-2	Plastic 500ml - w/ Nitric - Dis.	<2		
W-160721-PS-16	240-67502-J-3	Plastic 250ml - with Nitric Acid			
W-160721-PS-16	240-67502-L-3	Plastic 500ml - with Nitric Acid	<2		
W-160721-PS-17	240-67502-J-4	Plastic 250ml - with Nitric Acid			
W-160721-PS-17	240-67502-L-4	Plastic 500ml - with Nitric Acid	<2		
W-160721-PS-18	240-67502-K-5	Plastic 250ml - with Nitric Acid			
W-160721-PS-18	240-67502-M-5	Plastic 500ml - w/ Nitric - Dis.	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-67502-1

Login Number: 67502
List Number: 2
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 07/23/16 02:07 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: 240-67502-1

Login Number: 67502
List Number: 3
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 07/23/16 02:07 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: 240-67568-1
Client Project/Site: 86165-03-11, 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:
8/5/2016 2:30:26 PM

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

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Definitions/Glossary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Qualifiers

GC/MS VOA

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

GC Semi VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
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.
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.

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
F1	MS and/or MSD Recovery is outside acceptance limits.
H	Sample was prepped or analyzed beyond the specified holding time

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: 240-67568-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-67568-1

Comments
No additional comments.

Receipt
The samples were received on 7/26/2016 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.4º C and 1.6º C.

GC/MS VOA
Method(s) 8260B: Surrogate recovery for the following sample was outside the upper control limit: W-160725-PS-20 (240-67568-2). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

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

GC/MS Semi VOA
Method(s) 8270C: The following samples were diluted due to the nature of the sample matrix: W-160725-PS-21 (240-67568-3) and W-160725-PS-22 (240-67568-4). 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: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 240-240016.

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 sample was diluted due to the abundance of target analytes: W-160725-PS-21 (240-67568-3)

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: Reanalysis of the following sample was performed outside of the analytical holding time due to needing further dilution. In hold and out of hold data is provided. : W-160725-PS-20 (240-67568-2).

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/sample duplicate (MS/MSD/DUP) associated with analytical batch 240-240049.

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-67568-1	W-160725-PS-19	Water	07/25/16 10:50	07/26/16 09:10
240-67568-2	W-160725-PS-20	Water	07/25/16 11:20	07/26/16 09:10
240-67568-3	W-160725-PS-21	Water	07/25/16 12:50	07/26/16 09:10
240-67568-4	W-160725-PS-22	Water	07/25/16 13:20	07/26/16 09:10
240-67568-5	TRIP BLANK-004	Water	07/25/16 15:30	07/26/16 09:10

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-19 — Lab Sample ID: 240-67568-1

No Detections.

Client Sample ID: W-160725-PS-20 — Lab Sample ID: 240-67568-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.19	B	0.096	0.015	ug/L	4		8151A	Total/NA
Copper	3.4	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	118	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	6.1		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	49.4		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	86.0		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	13.8		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	7.7	F1	0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	8.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	3.7		1.0	0.080	mg/L	1		9060	Total/NA
Nitrate as N - RA	7.0	H	0.50	0.18	mg/L	5		300.0	Total/NA

Client Sample ID: W-160725-PS-21 — Lab Sample ID: 240-67568-3

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.39	J	1.0	0.25	ug/L	1		8260B	Total/NA
Xylenes, Total	5.6		2.0	0.52	ug/L	1		8260B	Total/NA
Naphthalene	13		1.9	0.61	ug/L	10		8270C	Total/NA
Pentachlorophenol	5200	B	240	37	ug/L	10000		8151A	Total/NA
Arsenic	0.68	J	5.0	0.49	ug/L	1		6020	Dissolved
Copper	9.2	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	183	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	315		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	107		5.0	1.9	mg/L	1		2320B-1997	Total/NA
Hardness as calcium carbonate	124		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	7.7		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	11.8		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	15.6		1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160725-PS-22 — Lab Sample ID: 240-67568-4

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.66	J	1.0	0.25	ug/L	1		8260B	Total/NA
Toluene	0.64	J	1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	5.2		2.0	0.52	ug/L	1		8260B	Total/NA
Naphthalene	5.2		1.9	0.60	ug/L	10		8270C	Total/NA
Methane	8.6		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	1700	B	48	7.5	ug/L	2000		8151A	Total/NA
Copper	3.7	B	2.0	0.75	ug/L	1		6020	Dissolved
Iron	826	B	100	16.0	ug/L	1		6020	Dissolved
Manganese	744		5.0	1.1	ug/L	1		6020	Dissolved
Alkalinity	160		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	12.3		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	31.7		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	11.6		2.0	0.16	mg/L	2		9060	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: TRIP BLANK-004 **Lab Sample ID: 240-67568-5**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160725-PS-19

Date Collected: 07/25/16 10:50
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-1

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 18:11	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 18:11	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 18:11	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 18:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*78 - 125*		*08/03/16 18:11*	*1*
4-Bromofluorobenzene (Surr)	*105*		*61 - 120*		*08/03/16 18:11*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*08/03/16 18:11*	*1*
Dibromofluoromethane (Surr)	*110*		*79 - 120*		*08/03/16 18:11*	*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		07/27/16 12:23	08/02/16 12:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*42 - 120*	*07/27/16 12:23*	*08/02/16 12:34*	*1*
2-Fluorophenol (Surr)	*30*		*10 - 120*	*07/27/16 12:23*	*08/02/16 12:34*	*1*
2,4,6-Tribromophenol (Surr)	*64*		*35 - 125*	*07/27/16 12:23*	*08/02/16 12:34*	*1*
Nitrobenzene-d5 (Surr)	*64*		*36 - 120*	*07/27/16 12:23*	*08/02/16 12:34*	*1*
Phenol-d5 (Surr)	*17*		*10 - 120*	*07/27/16 12:23*	*08/02/16 12:34*	*1*
Terphenyl-d14 (Surr)	*73*		*17 - 120*	*07/27/16 12:23*	*08/02/16 12:34*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	<0.015		0.096	0.015	ug/L		07/30/16 20:00	08/03/16 02:02	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*52*		*18 - 125*	*07/30/16 20:00*	*08/03/16 02:02*	*4*
2,4-Dichlorophenylacetic acid	*57*		*18 - 125*	*07/30/16 20:00*	*08/03/16 02:02*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/27/16 09:16	07/30/16 19:59	1
Copper	<0.75		2.0	0.75	ug/L		07/27/16 09:16	07/30/16 19:59	1
Iron	<16.0		100	16.0	ug/L		07/27/16 09:16	07/30/16 19:59	1
Manganese	<1.1		5.0	1.1	ug/L		07/27/16 09:16	07/30/16 19:59	1
Zinc	<7.3		20.0	7.3	ug/L		07/27/16 09:16	07/30/16 19:59	1

Client Sample ID: W-160725-PS-20

Date Collected: 07/25/16 11:20
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-2

Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 18:33	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 18:33	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 18:33	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*119*		*78 - 125*		*08/03/16 18:33*	*1*
4-Bromofluorobenzene (Surr)	*110*		*61 - 120*		*08/03/16 18:33*	*1*
Toluene-d8 (Surr)	*111*		*80 - 120*		*08/03/16 18:33*	*1*
Dibromofluoromethane (Surr)	*129*	*X*	*79 - 120*		*08/03/16 18:33*	*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		07/27/16 12:23	08/02/16 12:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*76*		*42 - 120*	*07/27/16 12:23*	*08/02/16 12:09*	*1*
2-Fluorophenol (Surr)	*33*		*10 - 120*	*07/27/16 12:23*	*08/02/16 12:09*	*1*
2,4,6-Tribromophenol (Surr)	*82*		*35 - 125*	*07/27/16 12:23*	*08/02/16 12:09*	*1*
Nitrobenzene-d5 (Surr)	*72*		*36 - 120*	*07/27/16 12:23*	*08/02/16 12:09*	*1*
Phenol-d5 (Surr)	*19*		*10 - 120*	*07/27/16 12:23*	*08/02/16 12:09*	*1*
Terphenyl-d14 (Surr)	*50*		*17 - 120*	*07/27/16 12:23*	*08/02/16 12:09*	*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			07/27/16 16:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*112*		*76 - 121*		*07/27/16 16:06*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.19**	**B**	0.096	0.015	ug/L		07/30/16 20:00	08/03/16 02:26	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*54*		*18 - 125*	*07/30/16 20:00*	*08/03/16 02:26*	*4*
2,4-Dichlorophenylacetic acid	*55*		*18 - 125*	*07/30/16 20:00*	*08/03/16 02:26*	*4*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/27/16 09:16	07/30/16 20:11	1
Copper	**3.4**	**B**	2.0	0.75	ug/L		07/27/16 09:16	07/30/16 20:11	1
Iron	**118**	**B**	100	16.0	ug/L		07/27/16 09:16	07/30/16 20:11	1
Manganese	**6.1**		5.0	1.1	ug/L		07/27/16 09:16	07/30/16 20:11	1
Zinc	<7.3		20.0	7.3	ug/L		07/27/16 09:16	07/30/16 20:11	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**49.4**		5.0	1.9	mg/L			07/29/16 13:12	1
Hardness as calcium carbonate	**86.0**		5.0	3.1	mg/L			08/02/16 09:27	1
Chloride	**13.8**		1.0	0.41	mg/L			07/26/16 17:06	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-20
Date Collected: 07/25/16 11:20
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	7.7	F1	0.10	0.035	mg/L			07/26/16 17:06	1
Sulfate	8.0		1.0	0.13	mg/L			07/26/16 17:06	1
Total Organic Carbon	3.7		1.0	0.080	mg/L			08/01/16 12:45	1

General Chemistry - RA

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	7.0	H	0.50	0.18	mg/L			07/27/16 17:43	5

Client Sample ID: W-160725-PS-21
Date Collected: 07/25/16 12:50
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-3
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 18:56	1
Ethylbenzene	**0.39**	**J**	1.0	0.25	ug/L			08/03/16 18:56	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 18:56	1
Xylenes, Total	**5.6**		2.0	0.52	ug/L			08/03/16 18:56	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*08/03/16 18:56*	*1*
4-Bromofluorobenzene (Surr)	*104*		*61 - 120*		*08/03/16 18:56*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*08/03/16 18:56*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*08/03/16 18:56*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**13**		1.9	0.61	ug/L		07/27/16 12:23	07/29/16 19:59	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*74*		*42 - 120*	*07/27/16 12:23*	*07/29/16 19:59*	*10*
2-Fluorophenol (Surr)	*32*		*10 - 120*	*07/27/16 12:23*	*07/29/16 19:59*	*10*
2,4,6-Tribromophenol (Surr)	*75*		*35 - 125*	*07/27/16 12:23*	*07/29/16 19:59*	*10*
Nitrobenzene-d5 (Surr)	*70*		*36 - 120*	*07/27/16 12:23*	*07/29/16 19:59*	*10*
Phenol-d5 (Surr)	*19*		*10 - 120*	*07/27/16 12:23*	*07/29/16 19:59*	*10*
Terphenyl-d14 (Surr)	*55*		*17 - 120*	*07/27/16 12:23*	*07/29/16 19:59*	*10*

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			07/27/16 16:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*110*		*76 - 121*		*07/27/16 16:23*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**5200**	**B**	240	37	ug/L		07/30/16 20:00	08/04/16 17:21	10000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/30/16 20:00*	*08/04/16 17:21*	*10000*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/30/16 20:00*	*08/04/16 17:21*	*10000*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.68**	**J**	5.0	0.49	ug/L		07/27/16 09:16	07/30/16 20:15	1
Copper	**9.2**	**B**	2.0	0.75	ug/L		07/27/16 09:16	07/30/16 20:15	1
Iron	**183**	**B**	100	16.0	ug/L		07/27/16 09:16	07/30/16 20:15	1
Manganese	**315**		5.0	1.1	ug/L		07/27/16 09:16	07/30/16 20:15	1
Zinc	<7.3		20.0	7.3	ug/L		07/27/16 09:16	07/30/16 20:15	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**107**		5.0	1.9	mg/L			07/29/16 13:20	1
Hardness as calcium carbonate	**124**		5.0	3.1	mg/L			08/02/16 09:30	1
Chloride	**7.7**		1.0	0.41	mg/L			07/26/16 17:55	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-21
Date Collected: 07/25/16 12:50
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-3
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			07/26/16 17:55	1
Sulfate	**11.8**		1.0	0.13	mg/L			07/26/16 17:55	1
Total Organic Carbon	**15.6**		1.0	0.080	mg/L			08/01/16 13:29	1

Client Sample ID: W-160725-PS-22
Date Collected: 07/25/16 13:20
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-4
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 19:18	1
Ethylbenzene	**0.66**	**J**	1.0	0.25	ug/L			08/03/16 19:18	1
Toluene	**0.64**	**J**	1.0	0.23	ug/L			08/03/16 19:18	1
Xylenes, Total	**5.2**		2.0	0.52	ug/L			08/03/16 19:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*08/03/16 19:18*	*1*
4-Bromofluorobenzene (Surr)	*106*		*61 - 120*		*08/03/16 19:18*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*08/03/16 19:18*	*1*
Dibromofluoromethane (Surr)	*97*		*79 - 120*		*08/03/16 19:18*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**5.2**		1.9	0.60	ug/L		07/27/16 12:23	07/29/16 20:22	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*67*		*42 - 120*	*07/27/16 12:23*	*07/29/16 20:22*	*10*
2-Fluorophenol (Surr)	*28*		*10 - 120*	*07/27/16 12:23*	*07/29/16 20:22*	*10*
2,4,6-Tribromophenol (Surr)	*72*		*35 - 125*	*07/27/16 12:23*	*07/29/16 20:22*	*10*
Nitrobenzene-d5 (Surr)	*67*		*36 - 120*	*07/27/16 12:23*	*07/29/16 20:22*	*10*
Phenol-d5 (Surr)	*18*		*10 - 120*	*07/27/16 12:23*	*07/29/16 20:22*	*10*
Terphenyl-d14 (Surr)	*75*		*17 - 120*	*07/27/16 12:23*	*07/29/16 20:22*	*10*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**8.6**		0.50	0.080	ug/L			07/27/16 16:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*108*		*76 - 121*		*07/27/16 16:40*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1700**	**B**	48	7.5	ug/L		07/30/16 20:00	08/03/16 10:00	2000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/30/16 20:00*	*08/03/16 10:00*	*2000*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/30/16 20:00*	*08/03/16 10:00*	*2000*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/27/16 09:16	07/30/16 20:19	1
Copper	**3.7**	**B**	2.0	0.75	ug/L		07/27/16 09:16	07/30/16 20:19	1
Iron	**826**	**B**	100	16.0	ug/L		07/27/16 09:16	07/30/16 20:19	1
Manganese	**744**		5.0	1.1	ug/L		07/27/16 09:16	07/30/16 20:19	1
Zinc	<7.3		20.0	7.3	ug/L		07/27/16 09:16	07/30/16 20:19	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**160**		5.0	1.9	mg/L			07/29/16 13:35	1
Hardness as calcium carbonate	**188**		5.0	3.1	mg/L			08/02/16 09:33	1
Chloride	**12.3**		1.0	0.41	mg/L			07/26/16 18:12	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-22
Date Collected: 07/25/16 13:20
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-4
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.035		0.10	0.035	mg/L			07/26/16 18:12	1
Sulfate	**31.7**		1.0	0.13	mg/L			07/26/16 18:12	1
Total Organic Carbon	**11.6**		2.0	0.16	mg/L			08/01/16 13:58	2

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: TRIP BLANK-004
Date Collected: 07/25/16 15:30
Date Received: 07/26/16 09:10

Lab Sample ID: 240-67568-5
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 19:40	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 19:40	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 19:40	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 19:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*78 - 125*		*08/03/16 19:40*	*1*
4-Bromofluorobenzene (Surr)	*107*		*61 - 120*		*08/03/16 19:40*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*08/03/16 19:40*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*08/03/16 19:40*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

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

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

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	12DCE (78-125)	BFB (61-120)	TOL (80-120)	DBFM (79-120)
240-67568-1	W-160725-PS-19	102	105	106	110
240-67568-2	W-160725-PS-20	119	110	111	129 X
240-67568-3	W-160725-PS-21	90	104	102	99
240-67568-4	W-160725-PS-22	90	106	102	97
240-67568-5	TRIP BLANK-004	90	107	103	99
LCS 240-240989/4	Lab Control Sample	89	104	102	105
MB 240-240989/6	Method Blank	89	100	102	99

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)					
Lab Sample ID	Client Sample ID	FBP (42-120)	2FP (10-120)	TBP (35-125)	NBZ (36-120)	PHL (10-120)	TPH (17-120)
240-67568-1	W-160725-PS-19	67	30	64	64	17	73
240-67568-2	W-160725-PS-20	76	33	82	72	19	50
240-67568-3	W-160725-PS-21	74	32	75	70	19	55
240-67568-4	W-160725-PS-22	67	28	72	67	18	75
LCS 240-240049/21-A	Lab Control Sample	73	63	81	81	48	84
MB 240-240049/20-A	Method Blank	59	50	61	58	39	74

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)
240-67568-2	W-160725-PS-20	112
240-67568-3	W-160725-PS-21	110
240-67568-4	W-160725-PS-22	108
LCS 240-240016/5	Lab Control Sample	107
MB 240-240016/4	Method Blank	109

Surrogate Legend

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

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

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)								
240-67568-1	W-160725-PS-19	52	57								
240-67568-2	W-160725-PS-20	54	55								
240-67568-3	W-160725-PS-21	0 X D	0 X D								
240-67568-4	W-160725-PS-22	0 X D	0 X D								
LCS 180-183371/2-A	Lab Control Sample	67	69								
LCSD 180-183371/3-A	Lab Control Sample Dup	70	71								
MB 180-183371/1-A	Method Blank	46	50								

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

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

Lab Sample ID: MB 240-240989/6
Matrix: Water
Analysis Batch: 240989

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 11:28	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 11:28	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 11:28	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 11:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*		*08/03/16 11:28*	*1*
4-Bromofluorobenzene (Surr)	*100*		*61 - 120*		*08/03/16 11:28*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*08/03/16 11:28*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 120*		*08/03/16 11:28*	*1*

Lab Sample ID: LCS 240-240989/4
Matrix: Water
Analysis Batch: 240989

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	10.1		ug/L		101	80 - 120
Ethylbenzene	10.0	10.4		ug/L		104	80 - 120
Toluene	10.0	10.2		ug/L		102	80 - 120
Xylenes, Total	20.0	20.5		ug/L		103	80 - 120
m-Xylene & p-Xylene	10.0	9.81		ug/L		98	80 - 120
o-Xylene	10.0	10.7		ug/L		107	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*89*		*78 - 125*
4-Bromofluorobenzene (Surr)	*104*		*61 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*79 - 120*

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

Lab Sample ID: MB 240-240049/20-A
Matrix: Water
Analysis Batch: 240370

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 240049

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/27/16 12:23	07/29/16 09:10	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*59*		*42 - 120*	*07/27/16 12:23*	*07/29/16 09:10*	*1*
2-Fluorophenol (Surr)	*50*		*10 - 120*	*07/27/16 12:23*	*07/29/16 09:10*	*1*
2,4,6-Tribromophenol (Surr)	*61*		*35 - 125*	*07/27/16 12:23*	*07/29/16 09:10*	*1*
Nitrobenzene-d5 (Surr)	*58*		*36 - 120*	*07/27/16 12:23*	*07/29/16 09:10*	*1*
Phenol-d5 (Surr)	*39*		*10 - 120*	*07/27/16 12:23*	*07/29/16 09:10*	*1*
Terphenyl-d14 (Surr)	*74*		*17 - 120*	*07/27/16 12:23*	*07/29/16 09:10*	*1*

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

Lab Sample ID: LCS 240-240049/21-A
Matrix: Water
Analysis Batch: 240370

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 240049

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Naphthalene			20.0	13.6		ug/L		68	54 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*73*		*42 - 120*
2-Fluorophenol (Surr)	*63*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*81*		*35 - 125*
Nitrobenzene-d5 (Surr)	*81*		*36 - 120*
Phenol-d5 (Surr)	*48*		*10 - 120*
Terphenyl-d14 (Surr)	*84*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-240016/4
Matrix: Water
Analysis Batch: 240016

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			07/27/16 15:31	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*109*		*76 - 121*		*07/27/16 15:31*	*1*

Lab Sample ID: LCS 240-240016/5
Matrix: Water
Analysis Batch: 240016

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane			199	178		ug/L		89	80 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*107*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-183371/1-A
Matrix: Water
Analysis Batch: 183552

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183371

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.0277	J p	0.10	0.016	ug/L		07/30/16 20:00	08/03/16 01:38	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*46*		*18 - 125*	*07/30/16 20:00*	*08/03/16 01:38*	*4*
2,4-Dichlorophenylacetic acid	*50*		*18 - 125*	*07/30/16 20:00*	*08/03/16 01:38*	*4*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: LCS 180-183371/2-A
Matrix: Water
Analysis Batch: 183640

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183371

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Pentachlorophenol			1.00	0.917		ug/L		92	30 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*67*		*18 - 125*
2,4-Dichlorophenylacetic acid	*69*		*18 - 125*

Lab Sample ID: LCSD 180-183371/3-A
Matrix: Water
Analysis Batch: 183640

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183371

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol			1.00	0.948		ug/L		95	30 - 150	3	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*70*		*18 - 125*
2,4-Dichlorophenylacetic acid	*71*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-239989/1-A
Matrix: Water
Analysis Batch: 240627

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 239989

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.49		5.0	0.49	ug/L		07/27/16 09:16	07/30/16 19:27	1
Copper	2.90		2.0	0.75	ug/L		07/27/16 09:16	07/30/16 19:27	1
Iron	17.92	J	100	16.0	ug/L		07/27/16 09:16	07/30/16 19:27	1
Manganese	<1.1		5.0	1.1	ug/L		07/27/16 09:16	07/30/16 19:27	1
Zinc	<7.3		20.0	7.3	ug/L		07/27/16 09:16	07/30/16 19:27	1

Lab Sample ID: LCS 240-239989/2-A
Matrix: Water
Analysis Batch: 240627

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 239989

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			1000	899.2		ug/L		90	80 - 120		
Copper			1000	978.6		ug/L		98	80 - 120		
Iron			10000	9306		ug/L		93	80 - 120		
Manganese			1000	917.1		ug/L		92	80 - 120		
Zinc			1000	963.2		ug/L		96	80 - 120		

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-240651/30
Matrix: Water
Analysis Batch: 240651

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			07/29/16 17:22	1

Lab Sample ID: MB 240-240651/5
Matrix: Water
Analysis Batch: 240651

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			07/29/16 11:01	1

Lab Sample ID: LCS 240-240651/29
Matrix: Water
Analysis Batch: 240651

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	377.4		mg/L		103	90 - 127

Lab Sample ID: LCS 240-240651/4
Matrix: Water
Analysis Batch: 240651

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	376.4		mg/L		102	90 - 127

Lab Sample ID: 240-67568-4 DU
Matrix: Water
Analysis Batch: 240651

Client Sample ID: W-160725-PS-22
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	160		157.2		mg/L		2	20

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-240808/1
Matrix: Water
Analysis Batch: 240808

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			08/02/16 08:30	1

Lab Sample ID: LCS 240-240808/2
Matrix: Water
Analysis Batch: 240808

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	88 - 110

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-239889/3
Matrix: Water
Analysis Batch: 239889

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			07/26/16 16:00	1
Sulfate	<0.13		1.0	0.13	mg/L			07/26/16 16:00	1

Lab Sample ID: LCS 240-239889/4
Matrix: Water
Analysis Batch: 239889

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	51.98		mg/L		104	90 - 110
Sulfate	50.0	49.24		mg/L		98	90 - 110

Lab Sample ID: 240-67568-2 MS
Matrix: Water
Analysis Batch: 239889

Client Sample ID: W-160725-PS-20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	13.8		50.0	70.76		mg/L		114	80 - 120
Sulfate	8.0		50.0	60.92		mg/L		106	80 - 120

Lab Sample ID: 240-67568-2 MSD
Matrix: Water
Analysis Batch: 239889

Client Sample ID: W-160725-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	13.8		50.0	69.87		mg/L		112	80 - 120	1	15
Sulfate	8.0		50.0	59.92		mg/L		104	80 - 120	2	15

Lab Sample ID: MB 240-239890/3
Matrix: Water
Analysis Batch: 239890

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			07/26/16 16:00	1

Lab Sample ID: LCS 240-239890/4
Matrix: Water
Analysis Batch: 239890

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	2.51		mg/L		100	90 - 110

Lab Sample ID: MB 240-239904/3
Matrix: Water
Analysis Batch: 239904

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			07/27/16 10:04	1
Sulfate	<0.13		1.0	0.13	mg/L			07/27/16 10:04	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 240-239904/4
Matrix: Water
Analysis Batch: 239904

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	51.65		mg/L		103	90 - 110
Sulfate	50.0	48.86		mg/L		98	90 - 110

Lab Sample ID: MB 240-239905/27
Matrix: Water
Analysis Batch: 239905

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			07/27/16 16:38	1

Lab Sample ID: MB 240-239905/3
Matrix: Water
Analysis Batch: 239905

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			07/27/16 10:04	1

Lab Sample ID: LCS 240-239905/28
Matrix: Water
Analysis Batch: 239905

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	2.51		mg/L		100	90 - 110

Lab Sample ID: LCS 240-239905/4
Matrix: Water
Analysis Batch: 239905

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	2.48		mg/L		99	90 - 110

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-240745/4
Matrix: Water
Analysis Batch: 240745

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			08/01/16 12:20	1

Lab Sample ID: LCS 240-240745/6
Matrix: Water
Analysis Batch: 240745

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	14.4	14.84		mg/L		103	88 - 115

Method: 9060 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LLCS 240-240745/5
Matrix: Water
Analysis Batch: 240745

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			7.20	7.36		mg/L		102	88 - 115		

Lab Sample ID: 240-67568-2 MS
Matrix: Water
Analysis Batch: 240745

Client Sample ID: W-160725-PS-20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon	3.7		25.0	27.59		mg/L		96	72 - 136		

Lab Sample ID: 240-67568-2 MSD
Matrix: Water
Analysis Batch: 240745

Client Sample ID: W-160725-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
Total Organic Carbon	3.7		25.0	29.22		mg/L		102	72 - 136	6	20

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

GC/MS VOA

Analysis Batch: 240989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Total/NA	Water	8260B	
240-67568-2	W-160725-PS-20	Total/NA	Water	8260B	
240-67568-3	W-160725-PS-21	Total/NA	Water	8260B	
240-67568-4	W-160725-PS-22	Total/NA	Water	8260B	
240-67568-5	TRIP BLANK-004	Total/NA	Water	8260B	
MB 240-240989/6	Method Blank	Total/NA	Water	8260B	
LCS 240-240989/4	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 240049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Total/NA	Water	3510C	
240-67568-2	W-160725-PS-20	Total/NA	Water	3510C	
240-67568-3	W-160725-PS-21	Total/NA	Water	3510C	
240-67568-4	W-160725-PS-22	Total/NA	Water	3510C	
MB 240-240049/20-A	Method Blank	Total/NA	Water	3510C	
LCS 240-240049/21-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 240370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-3	W-160725-PS-21	Total/NA	Water	8270C	240049
240-67568-4	W-160725-PS-22	Total/NA	Water	8270C	240049
MB 240-240049/20-A	Method Blank	Total/NA	Water	8270C	240049
LCS 240-240049/21-A	Lab Control Sample	Total/NA	Water	8270C	240049

Analysis Batch: 240822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Total/NA	Water	8270C	240049
240-67568-2	W-160725-PS-20	Total/NA	Water	8270C	240049

GC VOA

Analysis Batch: 240016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	RSK-175	
240-67568-3	W-160725-PS-21	Total/NA	Water	RSK-175	
240-67568-4	W-160725-PS-22	Total/NA	Water	RSK-175	
MB 240-240016/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-240016/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 183371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Total/NA	Water	8151A	
240-67568-2	W-160725-PS-20	Total/NA	Water	8151A	
240-67568-3	W-160725-PS-21	Total/NA	Water	8151A	
240-67568-4	W-160725-PS-22	Total/NA	Water	8151A	
MB 180-183371/1-A	Method Blank	Total/NA	Water	8151A	

GC Semi VOA (Continued)

Prep Batch: 183371 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-183371/2-A	Lab Control Sample	Total/NA	Water	8151A	
LCSD 180-183371/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	

Analysis Batch: 183552

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Total/NA	Water	8151A	183371
240-67568-2	W-160725-PS-20	Total/NA	Water	8151A	183371
MB 180-183371/1-A	Method Blank	Total/NA	Water	8151A	183371

Analysis Batch: 183640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-4	W-160725-PS-22	Total/NA	Water	8151A	183371
LCS 180-183371/2-A	Lab Control Sample	Total/NA	Water	8151A	183371
LCSD 180-183371/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	183371

Analysis Batch: 183750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-3	W-160725-PS-21	Total/NA	Water	8151A	183371

Metals

Prep Batch: 239989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Dissolved	Water	3005A	
240-67568-2	W-160725-PS-20	Dissolved	Water	3005A	
240-67568-3	W-160725-PS-21	Dissolved	Water	3005A	
240-67568-4	W-160725-PS-22	Dissolved	Water	3005A	
MB 240-239989/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-239989/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 240627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-1	W-160725-PS-19	Dissolved	Water	6020	239989
240-67568-2	W-160725-PS-20	Dissolved	Water	6020	239989
240-67568-3	W-160725-PS-21	Dissolved	Water	6020	239989
240-67568-4	W-160725-PS-22	Dissolved	Water	6020	239989
MB 240-239989/1-A	Method Blank	Total Recoverable	Water	6020	239989
LCS 240-239989/2-A	Lab Control Sample	Total Recoverable	Water	6020	239989

General Chemistry

Analysis Batch: 239889

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	300.0	
240-67568-3	W-160725-PS-21	Total/NA	Water	300.0	
240-67568-4	W-160725-PS-22	Total/NA	Water	300.0	
MB 240-239889/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239889/4	Lab Control Sample	Total/NA	Water	300.0	
240-67568-2 MS	W-160725-PS-20	Total/NA	Water	300.0	
240-67568-2 MSD	W-160725-PS-20	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 239890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	300.0	
240-67568-3	W-160725-PS-21	Total/NA	Water	300.0	
240-67568-4	W-160725-PS-22	Total/NA	Water	300.0	
MB 240-239890/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239890/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 239904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-239904/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239904/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 239905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2 - RA	W-160725-PS-20	Total/NA	Water	300.0	
MB 240-239905/27	Method Blank	Total/NA	Water	300.0	
MB 240-239905/3	Method Blank	Total/NA	Water	300.0	
LCS 240-239905/28	Lab Control Sample	Total/NA	Water	300.0	
LCS 240-239905/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 240651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	2320B-1997	
240-67568-3	W-160725-PS-21	Total/NA	Water	2320B-1997	
240-67568-4	W-160725-PS-22	Total/NA	Water	2320B-1997	
MB 240-240651/30	Method Blank	Total/NA	Water	2320B-1997	
MB 240-240651/5	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-240651/29	Lab Control Sample	Total/NA	Water	2320B-1997	
LCS 240-240651/4	Lab Control Sample	Total/NA	Water	2320B-1997	
240-67568-4 DU	W-160725-PS-22	Total/NA	Water	2320B-1997	

Analysis Batch: 240745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	9060	
240-67568-3	W-160725-PS-21	Total/NA	Water	9060	
240-67568-4	W-160725-PS-22	Total/NA	Water	9060	
MB 240-240745/4	Method Blank	Total/NA	Water	9060	
LCS 240-240745/6	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-240745/5	Lab Control Sample	Total/NA	Water	9060	
240-67568-2 MS	W-160725-PS-20	Total/NA	Water	9060	
240-67568-2 MSD	W-160725-PS-20	Total/NA	Water	9060	

Analysis Batch: 240808

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67568-2	W-160725-PS-20	Total/NA	Water	2340C-1997	
240-67568-3	W-160725-PS-21	Total/NA	Water	2340C-1997	
240-67568-4	W-160725-PS-22	Total/NA	Water	2340C-1997	
MB 240-240808/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-240808/2	Lab Control Sample	Total/NA	Water	2340C-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-19

Lab Sample ID: 240-67568-1
Matrix: Water
Date Collected: 07/25/16 10:50
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240989	08/03/16 18:11	LEE	TAL CAN
Total/NA	Prep	3510C			240049	07/27/16 12:23	JDR	TAL CAN
Total/NA	Analysis	8270C		1	240822	08/02/16 12:34	JMG	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		4	183552	08/03/16 02:02	JMO	TAL PIT
Dissolved	Prep	3005A			239989	07/27/16 09:16	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/30/16 19:59	AS1	TAL CAN

Client Sample ID: W-160725-PS-20

Lab Sample ID: 240-67568-2
Matrix: Water
Date Collected: 07/25/16 11:20
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240989	08/03/16 18:33	LEE	TAL CAN
Total/NA	Prep	3510C			240049	07/27/16 12:23	JDR	TAL CAN
Total/NA	Analysis	8270C		1	240822	08/02/16 12:09	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	240016	07/27/16 16:06	BPM	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		4	183552	08/03/16 02:26	JMO	TAL PIT
Dissolved	Prep	3005A			239989	07/27/16 09:16	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/30/16 20:11	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	240651	07/29/16 13:12	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:27	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239889	07/26/16 17:06	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239890	07/26/16 17:06	LCN	TAL CAN
Total/NA	Analysis	300.0	RA	5	239905	07/27/16 17:43	LCN	TAL CAN
Total/NA	Analysis	9060		1	240745	08/01/16 12:45	TPH	TAL CAN

Client Sample ID: W-160725-PS-21

Lab Sample ID: 240-67568-3
Matrix: Water
Date Collected: 07/25/16 12:50
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240989	08/03/16 18:56	LEE	TAL CAN
Total/NA	Prep	3510C			240049	07/27/16 12:23	JDR	TAL CAN
Total/NA	Analysis	8270C		10	240370	07/29/16 19:59	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	240016	07/27/16 16:23	BPM	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		10000	183750	08/04/16 17:21	JMO	TAL PIT
Dissolved	Prep	3005A			239989	07/27/16 09:16	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/30/16 20:15	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	240651	07/29/16 13:20	JMB	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Client Sample ID: W-160725-PS-21

Lab Sample ID: 240-67568-3

Date Collected: 07/25/16 12:50
Matrix: Water
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:30	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239889	07/26/16 17:55	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239890	07/26/16 17:55	LCN	TAL CAN
Total/NA	Analysis	9060		1	240745	08/01/16 13:29	TPH	TAL CAN

Client Sample ID: W-160725-PS-22

Lab Sample ID: 240-67568-4

Date Collected: 07/25/16 13:20
Matrix: Water
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240989	08/03/16 19:18	LEE	TAL CAN
Total/NA	Prep	3510C			240049	07/27/16 12:23	JDR	TAL CAN
Total/NA	Analysis	8270C		10	240370	07/29/16 20:22	JMG	TAL CAN
Total/NA	Analysis	RSK-175		1	240016	07/27/16 16:40	BPM	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		2000	183640	08/03/16 10:00	JMO	TAL PIT
Dissolved	Prep	3005A			239989	07/27/16 09:16	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/30/16 20:19	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	240651	07/29/16 13:35	JMB	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:33	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239889	07/26/16 18:12	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239890	07/26/16 18:12	LCN	TAL CAN
Total/NA	Analysis	9060		2	240745	08/01/16 13:58	TPH	TAL CAN

Client Sample ID: TRIP BLANK-004

Lab Sample ID: 240-67568-5

Date Collected: 07/25/16 15:30
Matrix: Water
Date Received: 07/26/16 09:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	240989	08/03/16 19:40	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

Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67568-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999518190	08-31-16 *

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

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998027800	08-31-16

* Certification renewal pending - certification considered valid.

TestAmerica Canton 0.4/1.4 0.6/1.4

4101 Shuffel Street, N. W.

North Canton, OH 44720

Phone: 330.497.9396 Fax: 330.497.0772

Chain of Custody Record

121344

TestAmerica

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TestAmerica Laboratories, Inc.

TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

grant.anderson@ghd.com

Client Contact	Project Manager:	Site Contact: P. Storlie	Date: 7-25-16	COC No:
Company Name: GHD	Tel/Fax:	Lab Contact: D. Hecker	Carrier: Fed Ex	1 of 1 COCs
Address: 1801 Old Hwy 8	Analysis Turnaround Time			Sampler: P. Storlie
City/State/Zip: St. Paul, MN 55112	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 651-247-4218	TAT if different from Below			Walk-in Client:
Fax:	☐ 2 weeks STANDARD			Lab Sampling:
Project Name: Penta Wood	☐ 1 week			
Site: 086165-03-11	☐ 2 days			Job / SDG No.:
PO #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PCP - 8151	Naphthalene - 8270	BTEX	Methane	TOC	Cl, NO3, SO4	Alkalinity	Hardness	As, Cu, Zn, Fe, Mn Field Filtered	Sample Specific Notes:
W-160725-PS-19	7-25-16	1050	G	W	8		N	X	X	X						X	
-20		1120			17			X	X	X	X	X	X	X	X	X	
-21		1250			17			X	X	X	X	X	X	X	X	X	
-22		1320			17			X	X	X	X	X	X	X	X	X	
TRIP BLANK-004		1530			1					X							

240-67568 Chain of Custody

Preservation Used: 1= Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd:	Corr'd:	Therm ID No.:

	Company	Date/Time		Company	Date/Time
Relinquished by:	GHD	7-25-16/1645	Received by: Regan Henderson	TA	7-26-16 9:10
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

8/5/2016

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 675608**
Canton Facility

Client GHD Site Name _____ Cooler unpacked by: Reyann Henderson

Cooler Received on 7-26-16 Opened on 7-26-16

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 +1.3 °C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
   IR GUN #36 (CF +1.0°C) Observed Cooler Temp._____°C Corrected Cooler Temp._____°C
2. Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 each Yes No
   -Were custody seals on the outside of the cooler(s) signed & dated? 4 total 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# HC574756
12. Were VOAs on the COC? Yes No
13. Were air bubbles >6 mm in any VOA vials? Yes No NA
14. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # B607501VB 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 # : 675568**
Canton Facility

Cooler #	IR Gun #	Observed Temp °C	Corrected Temp °C	Coolant
client	36	0.4	1.4	wet ice
↓	↓	0.6	1.6	↓

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-160725-PS-19	240-67568-D-1	Plastic 500ml - w/ Nitric - Dis.	<2	_____	_____
W-160725-PS-20	240-67568-K-2	Plastic 250ml - with Nitric Acid	<2	_____	_____
W-160725-PS-20	240-67568-M-2	Plastic 500ml - w/ Nitric - Dis.	<2	_____	_____
W-160725-PS-21	240-67568-K-3	Plastic 250ml - with Nitric Acid	<2	_____	_____
W-160725-PS-21	240-67568-M-3	Plastic 500ml - w/ Nitric - Dis.	<2	_____	_____
W-160725-PS-22	240-67568-K-4	Plastic 250ml - with Nitric Acid	<2	_____	_____
W-160725-PS-22	240-67568-M-4	Plastic 500ml - w/ Nitric - Dis.	<2	_____	_____

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-67568-1

Login Number: 67568
List Number: 2
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 07/27/16 03:44 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: 240-67627-1
Client Project/Site: 86165-03-11, 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:
8/5/2016 2:54:28 PM

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

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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
B	Compound was found in the blank and sample.
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.

General Chemistry

Qualifier	Qualifier Description
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
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: 240-67627-1

Laboratory: TestAmerica Canton

Narrative

Job Narrative
240-67627-1

Comments
No additional comments.

Receipt
The samples were received on 7/27/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.1º 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: Two BN surrogate recoveries for the following sample were outside control limits: W-160726-PS-23 (240-67627-1). Re-extraction and re-analysis was performed with concurring results (see analytical batch 240950). The original analysis has 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: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 240-240202.

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
Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with analytical batch 240-240712.

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

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: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-67627-1	W-160726-PS-23	Water	07/26/16 08:55	07/27/16 09:30
240-67627-2	W-160726-PS-24	Water	07/26/16 10:05	07/27/16 09:30
240-67627-3	TRIP BLANK-005	Water	07/26/16 12:00	07/27/16 09:30

Detection Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Client Sample ID: W-160726-PS-23 — Lab Sample ID: 240-67627-1

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	0.31	J	1.0	0.25	ug/L	1		8260B	Total/NA
Toluene	0.35	J	1.0	0.23	ug/L	1		8260B	Total/NA
Xylenes, Total	4.4		2.0	0.52	ug/L	1		8260B	Total/NA
Naphthalene	4.0		0.39	0.12	ug/L	2		8270C	Total/NA
Methane	20		0.50	0.080	ug/L	1		RSK-175	Total/NA
Pentachlorophenol	1900	B	48	7.5	ug/L	2000		8151A	Total/NA
Arsenic	58.9		5.0	0.35	ug/L	1		6020	Dissolved
Copper	133		2.0	0.36	ug/L	1		6020	Dissolved
Iron	45600		100	5.3	ug/L	1		6020	Dissolved
Manganese	2580		5.0	0.25	ug/L	1		6020	Dissolved
Zinc	52.2		20.0	6.2	ug/L	1		6020	Dissolved
Alkalinity	312		25.0	9.5	mg/L	5		2320B-1997	Total/NA
Hardness as calcium carbonate	292		5.0	3.1	mg/L	1		2340C-1997	Total/NA
Chloride	21.2		1.0	0.41	mg/L	1		300.0	Total/NA
Sulfate	7.8		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	32.6	^	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: W-160726-PS-24 — Lab Sample ID: 240-67627-2

Analyte	Result	Qualifier	LOQ	LOD	Unit	Dil Fac	D	Method	Prep Type
Pentachlorophenol	0.30	B	0.096	0.015	ug/L	4		8151A	Total/NA
Copper	1.3	J	2.0	0.36	ug/L	1		6020	Dissolved
Iron	28.8	J	100	5.3	ug/L	1		6020	Dissolved
Manganese	1.0	J	5.0	0.25	ug/L	1		6020	Dissolved
Alkalinity	40.3		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	49.1		1.0	0.41	mg/L	1		300.0	Total/NA
Nitrate as N	3.2		0.10	0.035	mg/L	1		300.0	Total/NA
Sulfate	5.0		1.0	0.13	mg/L	1		300.0	Total/NA
Total Organic Carbon	0.70	J ^	1.0	0.080	mg/L	1		9060	Total/NA

Client Sample ID: TRIP BLANK-005 — Lab Sample ID: 240-67627-3

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: W-160726-PS-23
Date Collected: 07/26/16 08:55
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-1
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 15:47	1
Ethylbenzene	**0.31**	**J**	1.0	0.25	ug/L			08/03/16 15:47	1
Toluene	**0.35**	**J**	1.0	0.23	ug/L			08/03/16 15:47	1
Xylenes, Total	**4.4**		2.0	0.52	ug/L			08/03/16 15:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*78 - 125*		*08/03/16 15:47*	*1*
4-Bromofluorobenzene (Surr)	*94*		*61 - 120*		*08/03/16 15:47*	*1*
Toluene-d8 (Surr)	*86*		*80 - 120*		*08/03/16 15:47*	*1*
Dibromofluoromethane (Surr)	*104*		*79 - 120*		*08/03/16 15:47*	*1*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	**4.0**		0.39	0.12	ug/L		07/28/16 11:35	07/30/16 21:40	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*35*	*X*	*42 - 120*	*07/28/16 11:35*	*07/30/16 21:40*	*2*
2-Fluorophenol (Surr)	*26*		*10 - 120*	*07/28/16 11:35*	*07/30/16 21:40*	*2*
2,4,6-Tribromophenol (Surr)	*23*	*X*	*35 - 125*	*07/28/16 11:35*	*07/30/16 21:40*	*2*
Nitrobenzene-d5 (Surr)	*52*		*36 - 120*	*07/28/16 11:35*	*07/30/16 21:40*	*2*
Phenol-d5 (Surr)	*14*		*10 - 120*	*07/28/16 11:35*	*07/30/16 21:40*	*2*
Terphenyl-d14 (Surr)	*12*	*X*	*17 - 120*	*07/28/16 11:35*	*07/30/16 21:40*	*2*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**20**		0.50	0.080	ug/L			07/28/16 14:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*109*		*76 - 121*		*07/28/16 14:35*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**1900**	**B**	48	7.5	ug/L		07/30/16 20:00	08/03/16 10:24	2000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*0*	*X D*	*18 - 125*	*07/30/16 20:00*	*08/03/16 10:24*	*2000*

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**58.9**		5.0	0.35	ug/L		07/28/16 11:24	07/31/16 02:14	1
Copper	**133**		2.0	0.36	ug/L		07/28/16 11:24	07/31/16 02:14	1
Iron	**45600**		100	5.3	ug/L		07/28/16 11:24	07/31/16 02:14	1
Manganese	**2580**		5.0	0.25	ug/L		07/28/16 11:24	07/31/16 02:14	1
Zinc	**52.2**		20.0	6.2	ug/L		07/28/16 11:24	07/31/16 02:14	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**312**		25.0	9.5	mg/L			08/04/16 14:45	5
Hardness as calcium carbonate	**292**		5.0	3.1	mg/L			08/02/16 09:36	1
Chloride	**21.2**		1.0	0.41	mg/L			07/28/16 03:18	1
Nitrate as N	<0.035		0.10	0.035	mg/L			07/28/16 03:18	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Client Sample ID: W-160726-PS-23
Date Collected: 07/26/16 08:55
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-1
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.8		1.0	0.13	mg/L			07/28/16 03:18	1
Total Organic Carbon	32.6	^	1.0	0.080	mg/L			08/01/16 16:27	1

Client Sample ID: W-160726-PS-24
Date Collected: 07/26/16 10:05
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-2
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 20:14	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 20:14	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 20:14	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 20:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*78 - 125*		*08/03/16 20:14*	*1*
4-Bromofluorobenzene (Surr)	*87*		*61 - 120*		*08/03/16 20:14*	*1*
Toluene-d8 (Surr)	*87*		*80 - 120*		*08/03/16 20:14*	*1*
Dibromofluoromethane (Surr)	*101*		*79 - 120*		*08/03/16 20:14*	*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		07/28/16 11:35	07/29/16 19:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*79*		*42 - 120*	*07/28/16 11:35*	*07/29/16 19:10*	*1*
2-Fluorophenol (Surr)	*34*		*10 - 120*	*07/28/16 11:35*	*07/29/16 19:10*	*1*
2,4,6-Tribromophenol (Surr)	*83*		*35 - 125*	*07/28/16 11:35*	*07/29/16 19:10*	*1*
Nitrobenzene-d5 (Surr)	*78*		*36 - 120*	*07/28/16 11:35*	*07/29/16 19:10*	*1*
Phenol-d5 (Surr)	*19*		*10 - 120*	*07/28/16 11:35*	*07/29/16 19:10*	*1*
Terphenyl-d14 (Surr)	*96*		*17 - 120*	*07/28/16 11:35*	*07/29/16 19:10*	*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			07/28/16 14:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*107*		*76 - 121*		*07/28/16 14:53*	*1*

Method: 8151A - Herbicides (GC)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	**0.30**	**B**	0.096	0.015	ug/L		07/30/16 20:00	08/03/16 11:12	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*52*		*18 - 125*	*07/30/16 20:00*	*08/03/16 11:12*	*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		07/28/16 11:24	07/31/16 02:18	1
Copper	**1.3**	**J**	2.0	0.36	ug/L		07/28/16 11:24	07/31/16 02:18	1
Iron	**28.8**	**J**	100	5.3	ug/L		07/28/16 11:24	07/31/16 02:18	1
Manganese	**1.0**	**J**	5.0	0.25	ug/L		07/28/16 11:24	07/31/16 02:18	1
Zinc	<6.2		20.0	6.2	ug/L		07/28/16 11:24	07/31/16 02:18	1

General Chemistry

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	**40.3**		5.0	1.9	mg/L			08/04/16 14:54	1
Hardness as calcium carbonate	**108**		5.0	3.1	mg/L			08/02/16 09:39	1
Chloride	**49.1**		1.0	0.41	mg/L			07/28/16 03:34	1
Nitrate as N	**3.2**		0.10	0.035	mg/L			07/28/16 03:34	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Client Sample ID: W-160726-PS-24
Date Collected: 07/26/16 10:05
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-2
Matrix: Water

General Chemistry (Continued)

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0		1.0	0.13	mg/L			07/28/16 03:34	1
Total Organic Carbon	0.70	J ^	1.0	0.080	mg/L			08/01/16 16:56	1

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Client Sample ID: TRIP BLANK-005
Date Collected: 07/26/16 12:00
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-3
Matrix: Water

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

Analyte	Result	Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 20:36	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 20:36	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 20:36	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 20:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*113*		*78 - 125*		*08/03/16 20:36*	*1*
4-Bromofluorobenzene (Surr)	*85*		*61 - 120*		*08/03/16 20:36*	*1*
Toluene-d8 (Surr)	*88*		*80 - 120*		*08/03/16 20:36*	*1*
Dibromofluoromethane (Surr)	*104*		*79 - 120*		*08/03/16 20:36*	*1*

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

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	(78-125)	(61-120)	(80-120)	(79-120)
240-67627-1	W-160726-PS-23	112	94	86	104
240-67627-2	W-160726-PS-24	110	87	87	101
240-67627-3	TRIP BLANK-005	113	85	88	104
LCS 240-241047/4	Lab Control Sample	106	98	89	106
MB 240-241047/6	Method Blank	114	83	86	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)
240-67627-1	W-160726-PS-23	35 X	26	23 X	52	14	12 X
240-67627-2	W-160726-PS-24	79	34	83	78	19	96
LCS 240-240243/23-A	Lab Control Sample	82	56	93	87	36	95
MB 240-240243/22-A	Method Blank	68	59	68	63	45	82

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)
240-67627-1	W-160726-PS-23	109
240-67627-2	W-160726-PS-24	107
LCS 240-240202/5	Lab Control Sample	109
MB 240-240202/4	Method Blank	109

Surrogate Legend

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

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

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)								
240-67627-1	W-160726-PS-23	0 X D	0 X D								
240-67627-2	W-160726-PS-24	49	52								
LCS 180-183371/2-A	Lab Control Sample	67	69								
LCSD 180-183371/3-A	Lab Control Sample Dup	70	71								
MB 180-183371/1-A	Method Blank	46	50								

Surrogate Legend

DCPA = 2,4-Dichlorophenylacetic acid

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

Lab Sample ID: MB 240-241047/6
Matrix: Water
Analysis Batch: 241047

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

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	<0.35		0.50	0.35	ug/L			08/03/16 13:56	1
Ethylbenzene	<0.25		1.0	0.25	ug/L			08/03/16 13:56	1
Toluene	<0.23		1.0	0.23	ug/L			08/03/16 13:56	1
Xylenes, Total	<0.52		2.0	0.52	ug/L			08/03/16 13:56	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*78 - 125*		*08/03/16 13:56*	*1*
4-Bromofluorobenzene (Surr)	*83*		*61 - 120*		*08/03/16 13:56*	*1*
Toluene-d8 (Surr)	*86*		*80 - 120*		*08/03/16 13:56*	*1*
Dibromofluoromethane (Surr)	*103*		*79 - 120*		*08/03/16 13:56*	*1*

Lab Sample ID: LCS 240-241047/4
Matrix: Water
Analysis Batch: 241047

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	8.88		ug/L		89	80 - 120
Ethylbenzene	10.0	9.08		ug/L		91	80 - 120
Toluene	10.0	8.62		ug/L		86	80 - 120
Xylenes, Total	20.0	17.6		ug/L		88	80 - 120
m-Xylene & p-Xylene	10.0	8.57		ug/L		86	80 - 120
o-Xylene	10.0	9.06		ug/L		91	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*78 - 125*
4-Bromofluorobenzene (Surr)	*98*		*61 - 120*
Toluene-d8 (Surr)	*89*		*80 - 120*
Dibromofluoromethane (Surr)	*106*		*79 - 120*

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

Lab Sample ID: MB 240-240243/22-A
Matrix: Water
Analysis Batch: 240352

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 240243

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.063		0.20	0.063	ug/L		07/28/16 11:35	07/29/16 08:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*68*		*42 - 120*	*07/28/16 11:35*	*07/29/16 08:06*	*1*
2-Fluorophenol (Surr)	*59*		*10 - 120*	*07/28/16 11:35*	*07/29/16 08:06*	*1*
2,4,6-Tribromophenol (Surr)	*68*		*35 - 125*	*07/28/16 11:35*	*07/29/16 08:06*	*1*
Nitrobenzene-d5 (Surr)	*63*		*36 - 120*	*07/28/16 11:35*	*07/29/16 08:06*	*1*
Phenol-d5 (Surr)	*45*		*10 - 120*	*07/28/16 11:35*	*07/29/16 08:06*	*1*
Terphenyl-d14 (Surr)	*82*		*17 - 120*	*07/28/16 11:35*	*07/29/16 08:06*	*1*

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

Lab Sample ID: LCS 240-240243/23-A
Matrix: Water
Analysis Batch: 240352

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 240243

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)	*82*		*42 - 120*
2-Fluorophenol (Surr)	*56*		*10 - 120*
2,4,6-Tribromophenol (Surr)	*93*		*35 - 125*
Nitrobenzene-d5 (Surr)	*87*		*36 - 120*
Phenol-d5 (Surr)	*36*		*10 - 120*
Terphenyl-d14 (Surr)	*95*		*17 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 240-240202/4
Matrix: Water
Analysis Batch: 240202

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			07/28/16 14:01	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,1,1-Trifluoroethane	*109*		*76 - 121*		*07/28/16 14:01*	*1*

Lab Sample ID: LCS 240-240202/5
Matrix: Water
Analysis Batch: 240202

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	199	180		ug/L		91	80 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,1,1-Trifluoroethane	*109*		*76 - 121*

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 180-183371/1-A
Matrix: Water
Analysis Batch: 183552

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 183371

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Pentachlorophenol	0.0277	J p	0.10	0.016	ug/L		07/30/16 20:00	08/03/16 01:38	4

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2,4-Dichlorophenylacetic acid	*50*		*18 - 125*	*07/30/16 20:00*	*08/03/16 01:38*	*4*

Method: 8151A - Herbicides (GC) (Continued)

Lab Sample ID: LCS 180-183371/2-A
Matrix: Water
Analysis Batch: 183640

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 183371

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Pentachlorophenol	1.00	0.917		ug/L		92	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*69*		*18 - 125*

Lab Sample ID: LCSD 180-183371/3-A
Matrix: Water
Analysis Batch: 183640

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 183371

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Pentachlorophenol	1.00	0.948		ug/L		95	30 - 150	3	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2,4-Dichlorophenylacetic acid	*71*		*18 - 125*

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-240231/1-A
Matrix: Water
Analysis Batch: 240627

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 240231

Analyte	MB Result	MB Qualifier	LOQ	LOD	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.35		5.0	0.35	ug/L		07/28/16 16:24	07/31/16 00:32	1
Copper	<0.36		2.0	0.36	ug/L		07/28/16 16:24	07/31/16 00:32	1
Iron	<5.3		100	5.3	ug/L		07/28/16 16:24	07/31/16 00:32	1
Manganese	<0.25		5.0	0.25	ug/L		07/28/16 16:24	07/31/16 00:32	1
Zinc	<6.2		20.0	6.2	ug/L		07/28/16 16:24	07/31/16 00:32	1

Lab Sample ID: LCS 240-240231/2-A
Matrix: Water
Analysis Batch: 240627

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 240231

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	987.2		ug/L		99	80 - 120
Copper	1000	1081		ug/L		108	80 - 120
Iron	10000	10200		ug/L		102	80 - 120
Manganese	1000	1028		ug/L		103	80 - 120
Zinc	1000	1076		ug/L		108	80 - 120

Method: 2320B-1997 - Alkalinity, Total

Lab Sample ID: MB 240-241380/31
Matrix: Water
Analysis Batch: 241380

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			08/04/16 19:13	1

Method: 2320B-1997 - Alkalinity, Total (Continued)

Lab Sample ID: MB 240-241380/4
Matrix: Water
Analysis Batch: 241380

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			08/04/16 14:20	1

Lab Sample ID: LCS 240-241380/3
Matrix: Water
Analysis Batch: 241380

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	382.7		mg/L		104	90 - 127

Lab Sample ID: LCS 240-241380/30
Matrix: Water
Analysis Batch: 241380

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	368	395.6		mg/L		107	90 - 127

Method: 2340C-1997 - Hardness, Total

Lab Sample ID: MB 240-240808/1
Matrix: Water
Analysis Batch: 240808

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			08/02/16 08:30	1

Lab Sample ID: LCS 240-240808/2
Matrix: Water
Analysis Batch: 240808

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	88 - 110

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 240-239904/56
Matrix: Water
Analysis Batch: 239904

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			07/28/16 00:34	1
Sulfate	<0.13		1.0	0.13	mg/L			07/28/16 00:34	1

Lab Sample ID: LCS 240-239904/57
Matrix: Water
Analysis Batch: 239904

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	53.08		mg/L		106	90 - 110
Sulfate	50.0	49.72		mg/L		99	90 - 110

Lab Sample ID: MB 240-239905/56
Matrix: Water
Analysis Batch: 239905

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			07/28/16 00:34	1

Lab Sample ID: LCS 240-239905/57
Matrix: Water
Analysis Batch: 239905

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	2.53		mg/L		101	90 - 110

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 240-240745/37
Matrix: Water
Analysis Batch: 240745

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			08/01/16 23:21	1

Lab Sample ID: MB 240-240745/4
Matrix: Water
Analysis Batch: 240745

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			08/01/16 12:20	1

Lab Sample ID: LCS 240-240745/39
Matrix: Water
Analysis Batch: 240745

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	14.4	13.66	^	mg/L		95	88 - 115

Lab Sample ID: LCS 240-240745/6
Matrix: Water
Analysis Batch: 240745

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	14.4	14.84		mg/L		103	88 - 115

Lab Sample ID: LLCS 240-240745/5
Matrix: Water
Analysis Batch: 240745

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	7.20	7.36		mg/L		102	88 - 115

QC Association Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

GC/MS VOA

Analysis Batch: 241047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	8260B	
240-67627-2	W-160726-PS-24	Total/NA	Water	8260B	
240-67627-3	TRIP BLANK-005	Total/NA	Water	8260B	
MB 240-241047/6	Method Blank	Total/NA	Water	8260B	
LCS 240-241047/4	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 240243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	3510C	
240-67627-2	W-160726-PS-24	Total/NA	Water	3510C	
MB 240-240243/22-A	Method Blank	Total/NA	Water	3510C	
LCS 240-240243/23-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 240352

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-2	W-160726-PS-24	Total/NA	Water	8270C	240243
MB 240-240243/22-A	Method Blank	Total/NA	Water	8270C	240243
LCS 240-240243/23-A	Lab Control Sample	Total/NA	Water	8270C	240243

Analysis Batch: 240531

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	8270C	240243

GC VOA

Analysis Batch: 240202

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	RSK-175	
240-67627-2	W-160726-PS-24	Total/NA	Water	RSK-175	
MB 240-240202/4	Method Blank	Total/NA	Water	RSK-175	
LCS 240-240202/5	Lab Control Sample	Total/NA	Water	RSK-175	

GC Semi VOA

Prep Batch: 183371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	8151A	
240-67627-2	W-160726-PS-24	Total/NA	Water	8151A	
MB 180-183371/1-A	Method Blank	Total/NA	Water	8151A	
LCS 180-183371/2-A	Lab Control Sample	Total/NA	Water	8151A	
LCSD 180-183371/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	

Analysis Batch: 183552

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-183371/1-A	Method Blank	Total/NA	Water	8151A	183371

GC Semi VOA (Continued)

Analysis Batch: 183640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	8151A	183371
240-67627-2	W-160726-PS-24	Total/NA	Water	8151A	183371
LCS 180-183371/2-A	Lab Control Sample	Total/NA	Water	8151A	183371
LCSD 180-183371/3-A	Lab Control Sample Dup	Total/NA	Water	8151A	183371

Metals

Prep Batch: 240231

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Dissolved	Water	3005A	
240-67627-2	W-160726-PS-24	Dissolved	Water	3005A	
MB 240-240231/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-240231/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Analysis Batch: 240627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Dissolved	Water	6020	240231
240-67627-2	W-160726-PS-24	Dissolved	Water	6020	240231
MB 240-240231/1-A	Method Blank	Total Recoverable	Water	6020	240231
LCS 240-240231/2-A	Lab Control Sample	Total Recoverable	Water	6020	240231

General Chemistry

Analysis Batch: 239904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	300.0	
240-67627-2	W-160726-PS-24	Total/NA	Water	300.0	
MB 240-239904/56	Method Blank	Total/NA	Water	300.0	
LCS 240-239904/57	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 239905

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	300.0	
240-67627-2	W-160726-PS-24	Total/NA	Water	300.0	
MB 240-239905/56	Method Blank	Total/NA	Water	300.0	
LCS 240-239905/57	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 240745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	9060	
240-67627-2	W-160726-PS-24	Total/NA	Water	9060	
MB 240-240745/37	Method Blank	Total/NA	Water	9060	
MB 240-240745/4	Method Blank	Total/NA	Water	9060	
LCS 240-240745/39	Lab Control Sample	Total/NA	Water	9060	
LCS 240-240745/6	Lab Control Sample	Total/NA	Water	9060	
LLCS 240-240745/5	Lab Control Sample	Total/NA	Water	9060	

Analysis Batch: 240808

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	2340C-1997	

General Chemistry (Continued)

Analysis Batch: 240808 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-2	W-160726-PS-24	Total/NA	Water	2340C-1997	
MB 240-240808/1	Method Blank	Total/NA	Water	2340C-1997	
LCS 240-240808/2	Lab Control Sample	Total/NA	Water	2340C-1997	

Analysis Batch: 241380

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-67627-1	W-160726-PS-23	Total/NA	Water	2320B-1997	
240-67627-2	W-160726-PS-24	Total/NA	Water	2320B-1997	
MB 240-241380/31	Method Blank	Total/NA	Water	2320B-1997	
MB 240-241380/4	Method Blank	Total/NA	Water	2320B-1997	
LCS 240-241380/3	Lab Control Sample	Total/NA	Water	2320B-1997	
LCS 240-241380/30	Lab Control Sample	Total/NA	Water	2320B-1997	

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Client Sample ID: W-160726-PS-23

Date Collected: 07/26/16 08:55
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	241047	08/03/16 15:47	LRW	TAL CAN
Total/NA	Prep	3510C			240243	07/28/16 11:35	CS	TAL CAN
Total/NA	Analysis	8270C		2	240531	07/30/16 21:40	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	240202	07/28/16 14:35	BPM	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		2000	183640	08/03/16 10:24	JMO	TAL PIT
Dissolved	Prep	3005A			240231	07/28/16 11:24	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/31/16 02:14	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		5	241380	08/04/16 14:45	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:36	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239904	07/28/16 03:18	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239905	07/28/16 03:18	LCN	TAL CAN
Total/NA	Analysis	9060		1	240745	08/01/16 16:27	TPH	TAL CAN

Client Sample ID: W-160726-PS-24

Date Collected: 07/26/16 10:05
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	241047	08/03/16 20:14	LRW	TAL CAN
Total/NA	Prep	3510C			240243	07/28/16 11:35	CS	TAL CAN
Total/NA	Analysis	8270C		1	240352	07/29/16 19:10	MRU	TAL CAN
Total/NA	Analysis	RSK-175		1	240202	07/28/16 14:53	BPM	TAL CAN
Total/NA	Prep	8151A			183371	07/30/16 20:00	MAL	TAL PIT
Total/NA	Analysis	8151A		4	183640	08/03/16 11:12	JMO	TAL PIT
Dissolved	Prep	3005A			240231	07/28/16 11:24	AJC	TAL CAN
Dissolved	Analysis	6020		1	240627	07/31/16 02:18	AS1	TAL CAN
Total/NA	Analysis	2320B-1997		1	241380	08/04/16 14:54	LCN	TAL CAN
Total/NA	Analysis	2340C-1997		1	240808	08/02/16 09:39	TPH	TAL CAN
Total/NA	Analysis	300.0		1	239904	07/28/16 03:34	LCN	TAL CAN
Total/NA	Analysis	300.0		1	239905	07/28/16 03:34	LCN	TAL CAN
Total/NA	Analysis	9060		1	240745	08/01/16 16:56	TPH	TAL CAN

Client Sample ID: TRIP BLANK-005

Date Collected: 07/26/16 12:00
Date Received: 07/27/16 09:30

Lab Sample ID: 240-67627-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	241047	08/03/16 20:36	LRW	TAL CAN

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

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

Certification Summary

Client: GHD Services Inc.
Project/Site: 86165-03-11, Penta Wood

TestAmerica Job ID: 240-67627-1

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999518190	08-31-16 *

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

Analysis Method	Prep Method	Matrix	Analyte
RSK-175		Water	Methane

Laboratory: TestAmerica Pittsburgh

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	998027800	08-31-16

* Certification renewal pending - certification considered valid.

TestAmerica Canton
4101 Shuffel Street, N. U.
North Canton, OH 44720
Phone: 330.497.9396 Fax: 330.497.0772

3.1 / C4.1

Chain of Custody Record

121343

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:

grant.andereson@ghd.com

Client Contact	Project Manager:	Site Contact: P. Storlie	Date: 7-26-16	COC No: 1 of 1 COCs
Company Name: GHD	Tel/Fax:	Lab Contact: 270 D. Heckley	Carrier: Fed Ex	Sampler: P. Storlie
Address: 1801 Old Hwy 8	Analysis Turnaround Time			For Lab Use Only:
City/State/Zip: St. Paul, MN 55112	☐ CALENDAR DAYS ☐ WORKING DAYS			Walk-in Client:
Phone: 651-247-4218	TAT if different from Below STANDARD			Lab Sampling:
Fax:	☐ 2 weeks			Job / SDG No.:
Project Name: Penta Wood	☐ 1 week			
Site: 086165-03-11	☐ 2 days			
PO #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	PLP-8151	Naphthalene-8270	BTEX	Methane	TOC, Cl, NO3, SO4	Alkalinity, Hardness	As, Cu, Zn, Fe, Mn (Field filtered)	Sample Specific Notes:
W-160726-PS-23	7-26-16	0855	G	W	17		N	X	X	X	X	X	X	X	
W-160726-PS-24	↓	1005	↓	↓	17		↓	X	X	X	X	X	X	X	
TRIP BLANK-005	↓	1200	↓	↓	1		↓			X					

240-67627 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: _____ Corr'd: _____ | Therm ID No.: _____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	GHD	7.26.16/1300	Terry Burns	TA Can	7/27/16 0930
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

TestAmerica Canton Sample Receipt Form/Narrative **Login # : 167627**
Canton Facility

Client GHD Site Name _____ Cooler unpacked by: Dennis Burns

Cooler Received on 7/27/16 Opened on 7/27/16

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 +**1.3** °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
   IR GUN #36 (CF +**1.0**°C) Observed Cooler Temp. 3.1 °C Corrected Cooler Temp. 4.1 °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# **HC574756**
12. Were VOAs on the COC? (Yes) No
13. Were air bubbles >6 mm in any VOA vials? 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): _____

Login Container Summary Report

Temperature readings: _____

Client Sample ID	Lab ID	Container Type	Container pH	Preservative Added (mls)	Lot #
W-160726-PS-23	240-67627-K-1	Plastic 250ml - with Nitric Acid	<2		
W-160726-PS-23	240-67627-M-1	Plastic 500ml - with Nitric Acid	<2		
W-160726-PS-24	240-67627-K-2	Plastic 250ml - with Nitric Acid	<2		
W-160726-PS-24	240-67627-M-2	Plastic 500ml - with Nitric Acid	<2		

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 240-67627-1

Login Number: 67627
List Number: 2
Creator: Watson, Debbie

List Source: TestAmerica Pittsburgh
List Creation: 07/29/16 01:54 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
Bio - Trap Laboratory Report

10515 Research Drive
Knoxville, TN 37932
Phone: (865) 573-8188
Fax: (865) 573-8133

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.

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Tel. (865) 573-8188 Fax. (865) 573-8133

PLFA

Client: **GHD Services Inc.**
Project: PentaWood

MI Project Number: **079NE**
Date Received: 05/24/2016

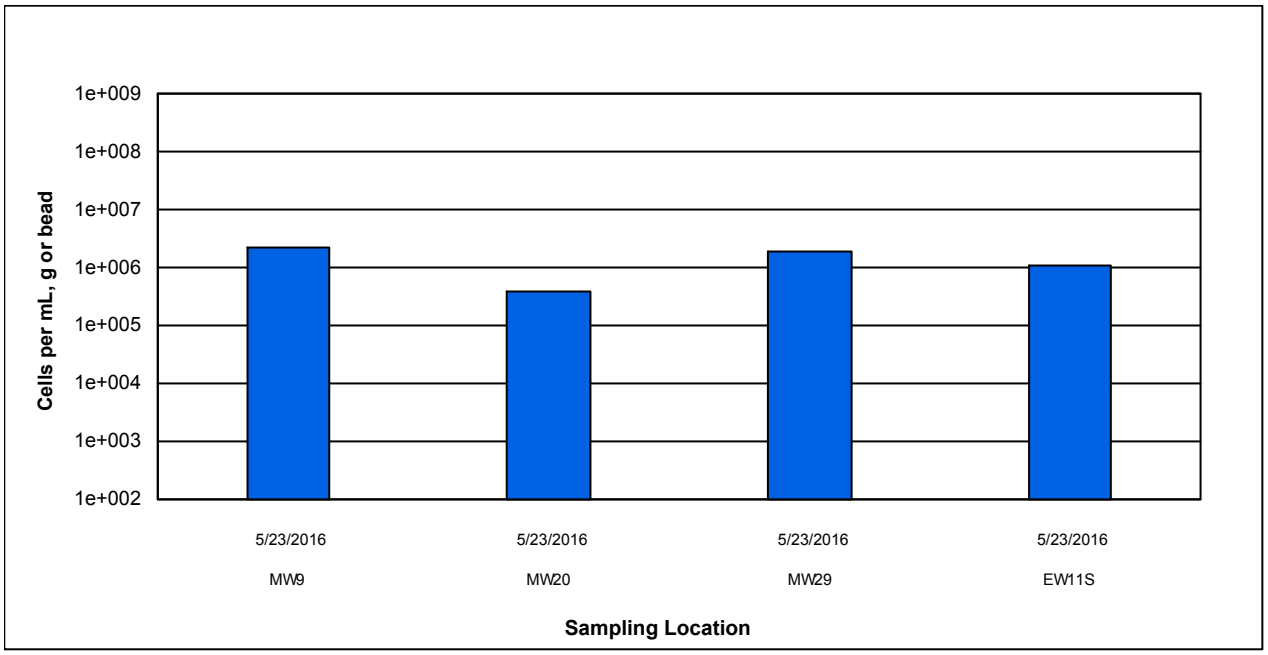

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass

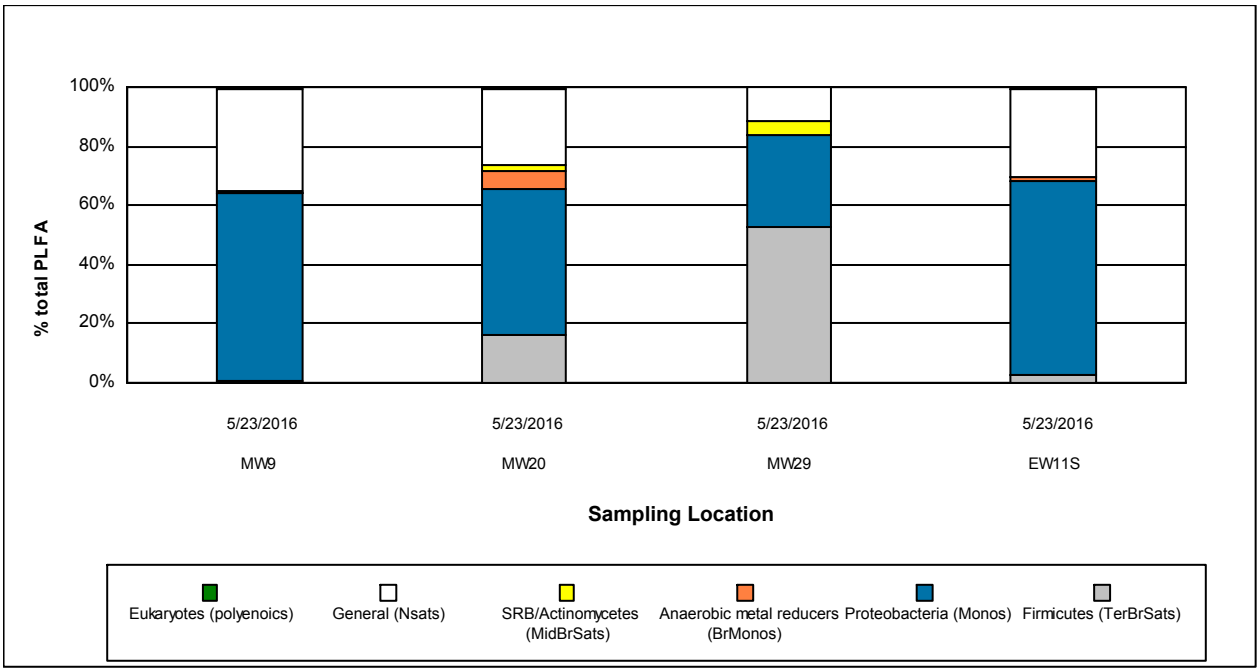

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis.

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
Address: GHD Services, Inc.
1801 Old Hwy 8, Suite 114
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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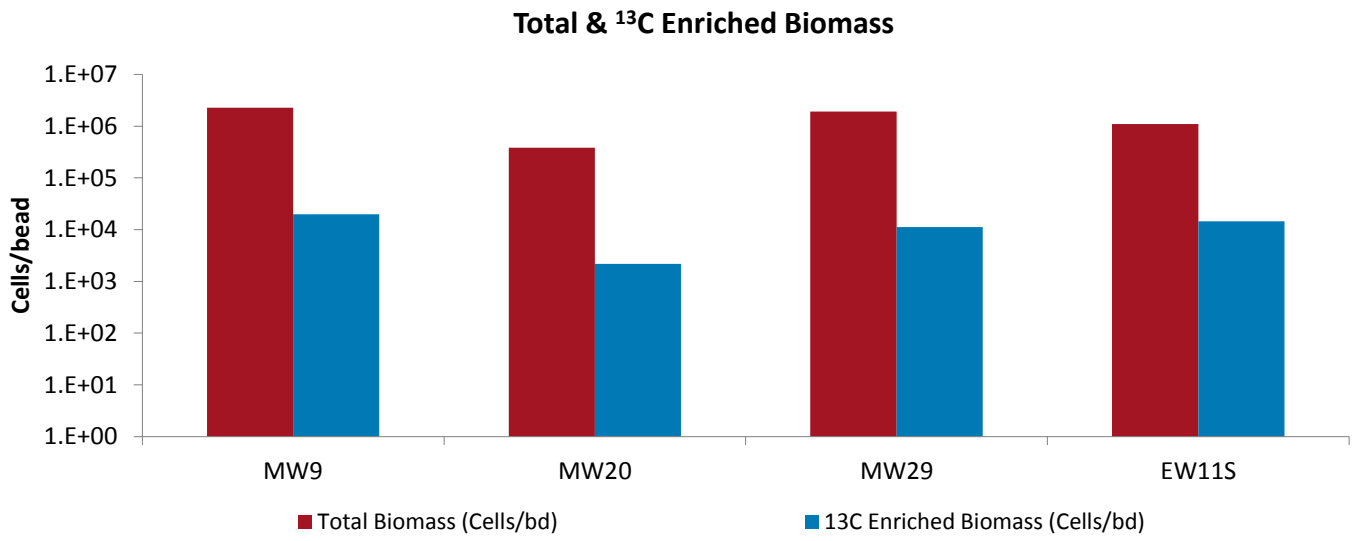

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

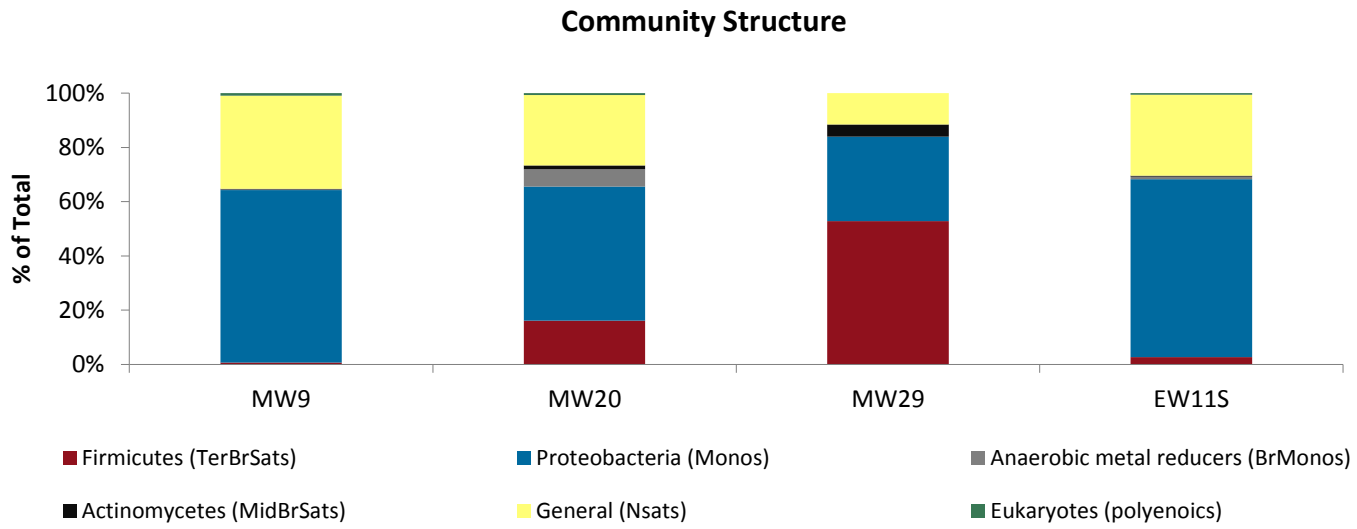

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See the table in the interpretation section for detailed descriptions of the structural groups.

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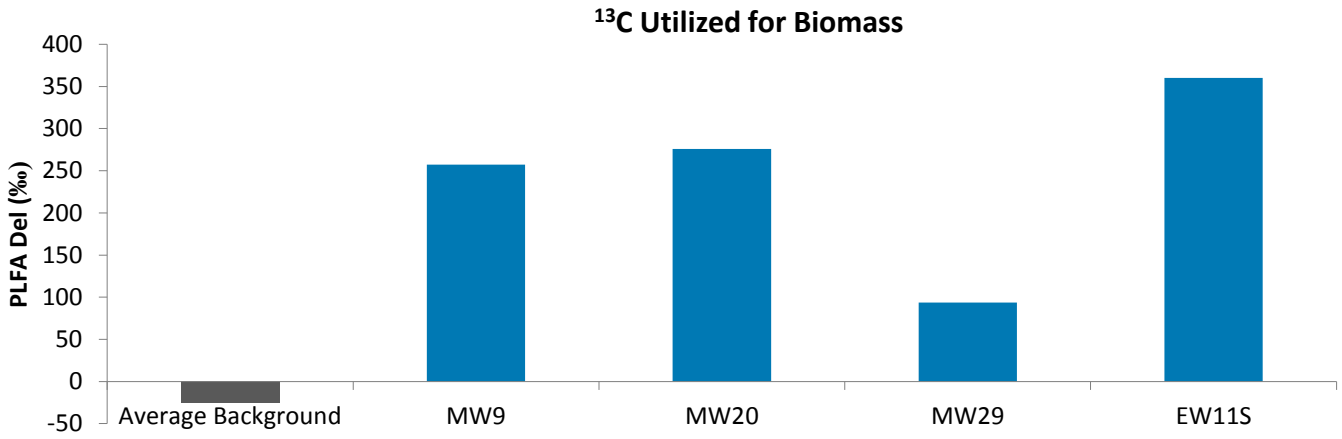

Figure 3. Comparison of the average Del value obtained from PLFA biomarkers from each Bio-Trap® unit to the average background Del observed in samples not exposed to ^{13}C enriched compounds.

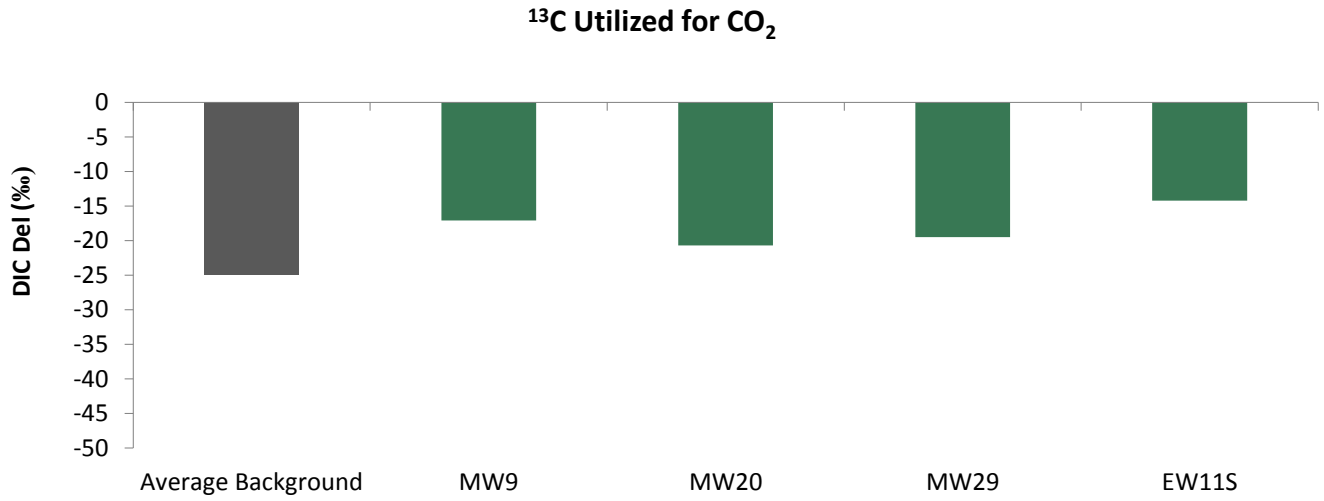

Figure 4. Comparison of the Del value obtained from DIC from each Bio-Trap® unit to the average background Del observed in samples not exposed to ^{13}C enriched compounds.

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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.

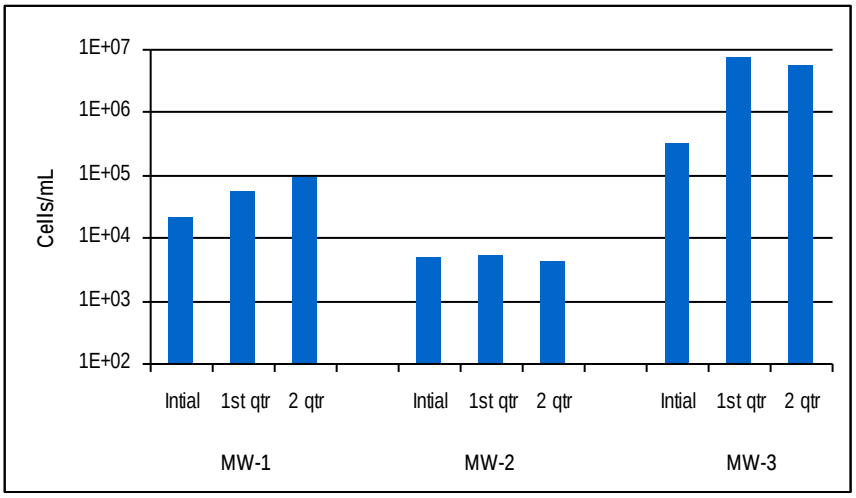

Figure 1. Biomass content is presented as a cell equivalent based on the total amount of phospholipid fatty acids (PLFA) extracted from a given sample. Total biomass is calculated based upon PLFA attributed to bacterial and eukaryotic biomass (associated with higher organisms).

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:

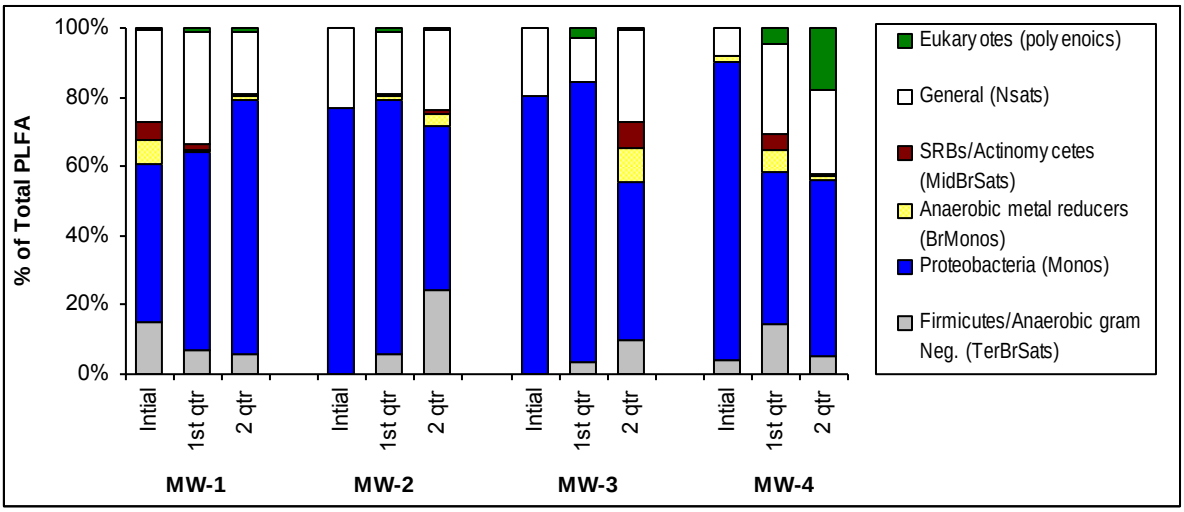

Figure 2. Relative percentages of total PLFA structural groups in the samples analyzed. Structural groups are assigned according to PLFA chemical structure, which is related to fatty acid biosynthesis. See Table 1 for detailed descriptions of structural groups.

- **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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☒ 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																								

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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 D
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	P.S.	P.S.	P.S.	P.S.	P.S.	
MW2	↓	↓	↓	↓	↓	
MW3	↓	↓	↓	↓	↓	
MW4	↓	↓	↓	↓	↓	
MW5	↓	↓	↓	↓	↓	
MW6	↓	↓	↓	↓	↓	
MW6S	↓	↓	↓	↓	↓	
MW7	↓	↓	↓	↓	↓	
MW8	↓	↓	↓	↓	↓	
MW9	↓	↓	↓	↓	↓	
MW10	↓	↓	↓	↓	↓	
MW10S	↓	↓	↓	↓	↓	
MW11	↓	↓	↓	↓	↓	
MW12	↓	↓	↓	↓	↓	
MW13	↓	↓	↓	↓	↓	
MW14	↓	↓	↓	↓	↓	
MW15	↓	↓	↓	↓	↓	
MW16	↓	↓	↓	↓	↓	
MW17	↓	↓	↓	↓	↓	
MW18	↓	↓	↓	↓	↓	
MW19	↓	↓	↓	↓	↓	
MW20	↓	↓	↓	↓	↓	
MW21	↓	↓	↓	↓	↓	
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MW23	↓	↓	↓	↓	↓	
MW24	↓	↓	↓	↓	↓	
MW25	↓	↓	↓	↓	↓	
MW26	↓	↓	↓	↓	↓	
MW27	↓	↓	↓	↓	↓	
MW28	↓	↓	↓	↓	↓	
MW29	↓	↓	↓	↓	↓	
MW30	↓	↓	↓	↓	↓	
MW31	↓	↓	↓	↓	↓	

Extraction Wells

	Vault & Cover	Well Casings	Ground Surface	Notes
EW2	P.S.	P.S.	P.S.	
EW3	↓	↓	↓	
EW4	↓	↓	↓	
EW5	↓	↓	↓	
EW6	↓	↓	↓	
EW7	↓	↓	↓	
EW10	↓	↓	↓	
EW12	↓	↓	↓	
EW13	↓	↓	↓	
EW14	↓	↓	↓	

Gas Probes

	Protective Casing	Lock & Cover	Ground Surface	Inner Casing/Tubing	Notes
SG-04DIS	P.S.	P.S.	P.S.	P.S.	
SG-05DIS	↓	↓	↓	↓	
SG-06DIS	↓	↓	↓	↓	
SG-07DIS	↓	↓	↓	↓	
SG-22	↓	↓	↓	↓	
SG-23	NO	NO			
SG-24	NO	NO			
SG-25	NO	NO			
SG-26	NO	NO	↓	↓	

Inspected By: (Pete Stadi)

Date: 7-18-16

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	P.S.	
CAMU signage is present/visible at all fence gates	P.S.	
CAMU surface soil condition is satifactory and does not require erosion/settlement repairs	P.S.	
Perimeter area fence is satisfactory and does not require repairs	P.S.	
Perimeter signage is present/visible	P.S.	
Site access is limited and all perimeter fence locks in working order	P.S.	
NaOH tank condition is satisfactory with no signs of leaks	P.S.	
FeSO4 tank condition is satisfactory with no signs of leaks	P.S.	
Verify situations have not and are not occuring		
Removal of the existing barrier or cover	P.S.	
Replacement with another barrier or cover	P.S.	
Excavating or grading of the land surface	P.S.	
Filling on covered or paved areas	P.S.	
Plowing for agricultural cultivation	P.S.	
Construction or placement of a building or other structure	P.S.	
Change in use or occupancy of the property	P.S.	

Inspected By: (Peter Storlie)

Date: 7-26-16

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