GRAFTECH INTERNATIONAL HOLDINGS INC.

2016 PERIODIC REVIEW REPORT

AND

ANNUAL SITE MANAGEMENT PLAN (SMP) REPORT

FOR THE CLOSED LANDFILL SITE

SWMF #32N03

(Formerly UCAR Carbon Company, Republic Site Registry No. 932035)

Per the SMP Approved on November 17, 2016

January 26, 2016

2016 PERIODIC REVIEW REPORT AND SMP REPORT

For SWMF #32N03

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1.0 INTRODUCTION

This Periodic Review Report (PRR) is being submitted for the GrafTech International Holdings Inc. (GrafTech) (formerly UCAR Carbon Company Inc.) closed landfill facility, SWMF #32N03 (Registry No. 932035) ("Landfill" or "Site"), under the provisions of the Division of Environmental Remediation (DER) Inactive Hazardous Waste Site Program. The Landfill is located in the Town of Niagara, Niagara County, State of New York, on Parcel # 130.20-1.1. The Site is located off Hyde Blvd. behind the former UCAR Republic Plant. The Landfill was closed and capped in 1987. The Site is comprised of 61.80 acres, of which 16.48 acres make up the landfill cap. The Site is secured by a perimeter metal fence with two (2) locked entrance gates. In 1997, the Landfill was reclassified by the state from Class 2a to a Class 4 Inactive Hazardous Waste Site. **There is no required Remedial Program or remedial objectives for this Site**.

The purpose of this PRR is to document GrafTech's implementation and full compliance with the post-closure care procedures and institutional/engineering controls contained in the Site Management Plan (SMP). GrafTech voluntarily submitted a proposed SMP to the New York State Department of Environmental Conservation (NYSDEC) Region 9 on December 17, 2013, to bring the Plan in line with the state's Technical Guidance for Site Investigation and Remediation, DER-10. The more comprehensive SMP incorporated and replaced the prior Operation, Maintenance and Monitoring (OM&M) Plan, which the state had previously approved on November 4, 2009.

During 2016, the NYSDEC made two (2) important decisions concerning Site's management and reporting. First, on May 25, 2016, NYSDEC communicated to GrafTech that, going forward, the Site would be managed under the state programs of the Division of Environmental Remediation (DER), and no longer the Division of Materials Management (DMM), thereby eliminating some prior reporting and oversight redundancies. Then, on November 17, 2016, Mr. Glenn May, Environmental Geologist II, NYSDEC, issued a letter (see Enclosure 2) approving GrafTech's proposed December 2013 SMP; the only change being that GrafTech would no longer be required to submit a separate annual groundwater monitoring report to the NYSDEC, DMM, in line with NYSDEC's prior 2016 decision to only oversee the GrafTech Site under the applicable DER Programs.

The approved SMP specifies the routine site inspection, maintenance and groundwater monitoring programs, and describes provisions for an approved Excavation Plan to manage potentially contaminated soils at the Site in the event that GrafTech has future plans to excavate soil from any areas outside the footprint of the Landfill. In addition, the SMP outlines the reporting and record retention requirements for the Site.

This PRR covers the period of January 1, 2016 through December 31, 2016. It should be noted that, in past agreement with Mr. Michael Hinton, NYSDEC, DER, Region 9, the annual SMP compliance report for this Site is incorporated in this annual PRR to eliminate unnecessary redundancy.

For the report period specified above, GrafTech has designated the Sr. Manager, Corporate Environmental Risk Management, to be responsible for managing the Site. This position is currently filled by Ms. Juanita M. Bursley, who is located at the Corporate Headquarters, Suite 300 Park Center 1, 6100 Oak Tree Boulevard, Independence, Ohio 44131. In addition, GrafTech has also contracted the services of National Maintenance Contracting Corporation (NMCC), a local general maintenance contractor, to act as the local point-of-contact for the Site. NMCC is responsible for managing the routine operations at the Landfill, including site security; conducting the routine site inspections according to the schedule and protocols established in the SMP; completing or arranging for any needed maintenance and/or repairs at the Site; escorting approved visitors at the Site such as environmental contractors commissioned by GrafTech; responding to neighborhood requests, etc. All NMCC activities are supervised by Ms. Bursley.

NMCC was also responsible for communicating to Ms. Bursley whenever any significant event took place that could have possibly prevented full conformance with the SMP, or for any other important matters concerning the Landfill outside the scope of this Plan. Ms. Bursley has been granted the authority by GrafTech to requisition the necessary resources, so that appropriate corrective actions can then be promptly implemented to adequately address any identified deficiency and ensure full conformance with the provisions of the SMP.

2.0 INSTITUTIONAL CONTROL AND ENGINEERING CONTROLS (IC/EC)

There is no required Remedial Program or remedial objectives for this Site.

The engineering controls (EC) in place at the Landfill include a physical barrier installed in 1987, which is an engineered cap to contain and eliminate potential exposure pathways to the contaminants in the waste disposal area. Another EC employed at the Site that helps prevent unauthorized access is a security system consisting of an eight (8) foot high metal hurricane-style perimeter fence and two (2) locked gates. In addition, the casings on the groundwater monitoring wells are equipped with locking devices and padlocks to prevent unauthorized access and potential contamination to groundwater.

These controls were routinely inspected and repaired/replaced, as needed, to ensure that unauthorized access was restricted. The padlocks were kept locked except when drawing groundwater samples or when performing internal inspections of the monitoring wells.

The institutional control (IC) at this Site was the implementation of the SMP, including the Operation and Monitoring Plan discussed below, which specifies the groundwater monitoring program; the routine facility inspections for the engineered cap and the security features of the Site; maintenance of the Site; and the recordkeeping and reporting requirements. These inspection and groundwater monitoring programs were conducted in 2016 in accordance with the state-approved SMP to ensure the EC remained in place, were properly maintained and continued to be effective.

Annual groundwater monitoring for the identified Contaminants of Concern was also conducted per the rotating schedule established in the SMP, which in this compliance period was a fall sampling campaign for an even numbered year. Further details of the 2016 groundwater monitoring program are provided below in subsection 3.1 of Section 3.0 Operation and Monitoring Plan.

No soil vapor monitoring program is required for the Landfill, based on the results of a prior soil vapor monitoring investigation; details are provided below in subsection 3.2 of Section 3.0 Operation and Monitoring Plan.

Inspections of the Site were performed and documented weekly and quarterly in accordance with the approved SMP. Further details of the 2016 site inspection programs are provided below in subsection 3.3 of Section 3.0 Operation and Monitoring Plan.

3.0 OPERATION AND MONITORING (O&M) PLAN

3.1 Groundwater Monitoring

Overview of the Historical Annual Groundwater Monitoring Programs for the Landfill

The Landfill was capped and closed in 1987. The groundwater monitoring well network at the Landfill site consists of eleven (11) active on-site wells; seven (7) of which are sampled for analysis annually and another four (4) of which are used only to take water level readings. In addition, there are seven (7) inactive groundwater wells, which are included in the Site inspection program only.

The history of the groundwater monitoring program requirements is as follows. Between 1987 and 2000, groundwater monitoring was conducted quarterly. Following their review of the collected groundwater quality data, the NYSDEC, Division of Environmental Remediation and the Division of Solid and Hazardous Materials, approved a modified semi-annual sampling program in a letter dated January 18, 2000, in accordance with the requirements of 6 NYCRR Section 360 to monitor the effectiveness of the solid waste landfill closure in protecting groundwater quality. This new monitoring program was implemented from April 2000 to November 2005.

Following a subsequent review of the post-closure groundwater monitoring program and historical groundwater quality data, the NYSDEC DER and the Division of Solid and Hazardous Materials agreed to a modified annual post-closure groundwater monitoring program, which was first implemented in the fall of 2006.

Since that time, the new monitoring program consists of sampling a network of seven (7) of the eighteen (18) on-site groundwater wells at the Landfill (specifically, MW3-79, BW1-86, BW2-86, BW3-86, BW4-86, GW8B-93 and GW9B-93) and testing the collected representative samples by the specified EPA Methodologies for Volatile Organic Compounds (VOCs), Total and Dissolved Iron, Potassium and Zinc, Ammonia, Nitrite and Total Kjeldahl Nitrogen (TKN).

In addition, field measurements for Turbidity, Specific Conductance, pH and Temperature are also taken on these same monitoring wells to determine when the well has reached stabilization, so that well purging can be stopped and the representative samples collected. Water level readings are also taken on these seven (7) monitoring wells plus four (4) other wells (specifically, MW1-78, MW2-78, BW5-86 and BW6-86). A map of the Landfill showing the locations of the groundwater monitoring wells is included as part of the Site inspection forms (refer to Enclosure 1).

Groundwater monitoring wells GW-10A and GW-10B are located outside the Landfill perimeter security fencing on neighboring property not owned by GrafTech. Following GrafTech's request during a state inspection of the Landfill in May 2010, NYSDEC subsequently reviewed the Preliminary Site Assessment records and confirmed that NYSDEC had installed and still owns these two (2) wells; thus, GrafTech is not responsible to secure, maintain or sample these wells and, therefore, they were not included in the Landfill programs covered under the SMP.

Under the current NYSDEC approved groundwater monitoring program for the Landfill, one (1) sampling event must occur in every calendar year; scheduling of the sample collection must be rotated every year between spring (every odd year) and fall (every even year). Groundwater elevation measurements are also recorded during each annual sampling campaign.

Summary of the 2016 Groundwater Sampling Campaign, Reports and Results

The annual groundwater sampling campaign was conducted by GrafTech's environmental consultant, GHD Services Inc. (GHD) (fka Conestoga-Rovers & Associates (CRA)), on September 21, 2016. Samples collected from seven (7) wells were submitted to Test America for analysis of the listed parameters per Table 2 of the SMP (also refer to Section 3.1 of the PRR above). Analytical test results were compared to the New York State Class GA water criteria and to the results of the historical monitoring data for the Landfill.

A copy of the Test America analytical report, dated September 29, 2016, is included in Enclosure 3. See Enclosure 4 for GHD's Annual Groundwater Sampling Memorandum, dated October 3, 2016, which includes the field measurements, field notes, and overburden and bedrock groundwater contour maps for the September 21, 2016 sampling event.

A copy of GHD's Analytical Data Assessment and Full Validation Report (dated November 16, 2016, revised November 29, 2016), which includes summary tables of the 2016 analytical results, is included in Enclosure 5.

The 2016 analytical data for all six (6) downgradient wells sampled were consistent with the historical data; therefore, **no discernible negative trend in groundwater quality was observed for this Site**. Further details are provided below.

The analytical results from the annual groundwater monitoring events have remained relatively stable since 2010, with the exception of the deep aquifer upgradient (background) well BW4-86, which during the October 2014 sampling event had notable increases in the concentrations of four (4) volatile organic compounds (VOCs), namely Tetrachloroethane (PCE), Trichloroethene (TCE), Vinyl Chloride (VC), and Cis-1,2-dichloroethane (cis-1,2-DCE). During the following spring sampling event conducted in May 2015, the VOC concentrations in well BW4-86 all decreased from the 2014 levels, although they remained elevated in comparison to the applicable state standards. The concentrations of all four (4) of these VOCs decreased again at this background well in the September 2016 sampling event, although they all remained well above the applicable state standards (NYS Class GA Criteria), consistent with prior years.

The concentration of VC at downgradient well BW3-86 remained above the applicable state standard (2 parts per billion (ppb)) during the September 2016 sampling event, but was consistent with the analytical results from the prior years (i.e., $\leq$ 6.4 ppb since 2010). Three (3) of these VOCs, namely Cis-1,2-DEC, TCE and VC, were also detected above the applicable state criteria in downgradient groundwater well GW8B-93 in the 2016 sampling event, which was also consistent with the monitoring data from prior years. It is noteworthy that these VOC concentrations, although they remain above the applicable state criteria, continue to be detected in much lower concentrations (by 2 to 3 orders of magnitude) than the VOC test results at the background well BW4-86. Refer to the data summary table below. Despite the higher VOC contamination levels first detected during the October 2014 sampling campaign in monitoring well BW4-86, located upgradient of the Landfill, the VOC concentration levels in the downgradient wells have remained about the same since that sampling event; thus, this indicates that contaminant migration has not occurred. Refer to the VOC monitoring data trend charts for 2010 through 2016 provided in Enclosure 6.

SUMMARY OF DOWNGRADIENT WELL VOC TEST RESULTS

WELL NUMBER	PARAMETER	STATE LIMIT (ppb)	MAY 2013 TEST RESULTS (ppb)	OCT. 2014 TEST RESULTS (ppb)	MAY 2015 TEST RESULTS (ppb)	SEPT. 2016 TEST RESULTS (ppb)
BW3-86	Vinyl Chloride	2	**6.0**	**4.1**	**3.2**	**3.1**
GW8B-93	Cis-1,2-DEC	5	**20.0**	**22.0**	**17.0**	**24.0**
GW8B-93	Trichloroethene	5	**7.2**	**12.0**	**12.0**	**9.7**
GW8B-93	Vinyl Chloride	2	**3.8**	**2.7**	1.6	**3.1**

Because of the sampling results in October 2014, GrafTech commissioned CRA in January 2015 to conduct a voluntary supplemental investigation of the entire groundwater well network at the Site, including external inspections of all well installations and also internal inspections of well BW4-86 and three (3) other selected monitoring wells (MW1-78, MW3-79 and BW1-86). The purpose of these inspections was to identify any structural abnormalities of these well installations. CRA verified the integrity of the BW4-86 well casing, thus ruling out well casing damage as a possible cause of the increase in VOC contaminant levels detected in 2014. CRA also found no structural abnormalities at any of the other seventeen (17) well installations on-site. A copy of CRA's well inspection report was submitted with the 2014 PRR.

The concentrations of two (2) other VOCs, namely Chloroform and Trans-1,2-dichloroethene, also exceeded the applicable state standard in the upgradient well BW4-86 during the 2015 and/or 2016 groundwater monitoring campaigns. Iron (Total and Dissolved) and Ammonia were also detected in concentrations exceeding the respective state standards in this upgradient well. In addition, Iron (Total and Dissolved) was also detected in concentrations exceeding the state standard in the upgradient well BW-4, and in wells BW-1, BW-2 and BW-3, in both the 2015 and 2016 sampling events. All the above exceedances were one (1) order of magnitude or less, and these results are consistent with prior years.

3.2 Soil Vapor Monitoring

No Soil vapor monitoring was required during the report year. The following information is provided for background.

On February 8, 2007, NYSDEC approved a modified Work Plan specifying the installation of four (4) soil vapor implants along the south fence line of the Landfill property in order to collect soil gas samples near the residences along Rhode Island Street. These implants were installed on March 8, 2007. On March 26 - 27, 2007, these implants were purged and sampled in accordance with the sample collection criteria in the approved Work Plan. The volume of collected soil vapor at each sampling location was insufficient to analyze the contents in the laboratory. The inability to draw soil vapor from any of the implants suggested that the clay soils are too tight to allow migration of vapors. In May 2007, GrafTech submitted a Soil Intrusion Evaluation Report to NYSDEC, which concluded that there is no threat to neighboring residential properties, based on the results of the attempted March 2007 soil vapor sampling event, and recommended that no further action concerning vapor studies was warranted.

On December 28, 2008, the NYSDEC and the New York State Department of Health (NYS DOH) informed GrafTech, in writing, that they had reviewed the submitted Soil Intrusion Evaluation Report for the Landfill and determined that the potential for soil vapor intrusion into neighboring homes and businesses had been satisfactorily evaluated. Furthermore, the agencies concurred with GrafTech's recommendation that no further action is needed at this Site regarding soil vapor intrusion. Therefore, no vapor intrusion monitoring program is required at this Landfill.

3.3 Site Inspections and Records

NYSDEC did not conduct a state inspection of the Landfill in 2016.

Based on a deficiency in the groundwater well inspection program that was identified by NYSDEC during its last Site inspection in May 2013, GrafTech increased the frequency of its inspections of the monitoring wells on a temporary basis between August 2013 through December 2013, by including them in the scheduled weekly inspections. GrafTech also proposed to NYSDEC a formal modification to the Site inspection program to consist of:

- weekly general and security inspections at the Site; and
- quarterly monitoring well inspections (increased from annually).

NYSDEC subsequently approved this proposal. GrafTech implemented the improved inspection program starting in January 2014. GrafTech incorporated the modified Site inspection protocol and inspection forms into the proposed SMP, which was submitted to the state for approval in December 2013, and subsequently approved by NYSDEC in November 2016. There have been no other deficiencies identified in the approved institutional/engineering controls (IC/EC) at this Site nor any other recommended improvements to the SMP during the prior or current certification periods.

Routine inspections continued to be performed at the Site in 2016 by the current contracted GrafTech-Designated Representative, NMCC, in accordance with the modified protocol specified in the SMP. Further details are provided below.

Routine inspections of the facilities and established controls at the Landfill Site were conducted and the results documented by NMCC, (refer to the standard forms for documenting the weekly and quarterly inspections, respectively, in Enclosure 1). NMCC was responsible for scheduling and managing the routine maintenance, repairs or any other actions needed to correct any deficiencies identified during these periodic inspections, under the supervision of the GrafTech Representative, currently Juanita M. Bursley.

Details are provided below of the modified weekly and the quarterly inspection programs, first initiated in 2014.

General Landfill and Site Security Inspections and Records - Weekly

The following areas were inspected once per week and the inspection results documented on the standard inspection form.

- Fence (general condition, evidence of security breaches).
- Gate (general condition, lock, evidence of security breaches).
- Cap (general condition, signs of erosion, adequate vegetation).
- Surrounding area (general condition).

Note: if any evidence of a Site security breach was found during the above inspections, the groundwater well installations were also inspected for potential tampering or damage, and those inspections were documented on the standard quarterly monitoring well inspection form.

Any noted deficiency was identified on the inspection record and the corrective action was documented on the same or a subsequent inspection record when completed. Any fence areas that were found to be damaged were also duly noted on the inspection map.

Groundwater Monitoring Well Inspections and Records - Quarterly

The GrafTech-Designated Representative, currently NMCC, or another contracted inspector, inspected all the active on-site GrafTech-owned groundwater monitoring well installations quarterly to ensure they were kept in good condition and were properly secured with a lock. The inspector recorded his/her name, the date and time of the inspection, the inspection results and any recommended corrective actions on the standard report form.

- Closed locks on the well casing caps.
- Condition of outer well casing.
- Condition of concrete seals.

Documentation of any needed corrective actions were recorded on the same or a subsequent inspection record when completed.

3.4 Routine Maintenance and Repairs

The following maintenance and repair activities were conducted per the SMP:

a. Repairs were made as needed by outside contractor(s) to timely correct any deficiencies discovered during the routine weekly Site security and quarterly monitoring well inspections. These included repairs to the perimeter security fencing and the concrete pads at the well installations, as needed.
b. Mowing of the vegetative cover on the Landfill cap and the perimeter lawn of the Landfill, and other general care of the Site were scheduled, as needed.

c. General clean-up of any debris found along the fence line and inside the Site were performed, as needed, to keep the Landfill and surrounding area clear of any objectionable or unsightly materials.

3.5 Record Retention

All inspection records are being retained for a minimum period of three (3) years. Completed inspection forms will be made available for review during scheduled NYSDEC Site inspections, or copies will be made available to the state upon reasonable written request.

4.0 EXCAVATION PLAN STATUS

The state has agreed that there is no requirement for a written soil management plan for this Landfill, because there are no immediate plans or anticipation of any future plans to excavate and/or remove soils from the property surrounding the Landfill footprint. However, should this situation change at any time in the future, the SMP stipulates that GrafTech must prepare a written Soil Management Plan addressing the particulars of the planned project and submit the proposed plan to the NYSDEC for approval a minimum of thirty (30) days prior to commencing such excavation activities.

In the event of an unlikely and unforeseen emergency event requiring GrafTech to disturb the soils on-site without such prior notification to the state, GrafTech would follow all applicable OSHA regulations to fully protect the workers, and would also stage the removed soils as close to the excavation site as safely possible. GrafTech would contact the NYSDEC within forty-eight (48) hours of this emergency event.

5.0 PROPERTY TRANSFER STATUS

GrafTech has no immediate plans or anticipates any future plans to either change the use of the Site or divest the Landfill, which might constitute a change in use of the Site pursuant to state rules. However, should these circumstances change in the future, provisions will be made to timely transfer management responsibilities for the Site to the new owner, including the routine Site inspections, and the required notifications and reports to the NYSDEC. GrafTech would provide Site related documentation to the new owner, including a copy of the approved SMP, with any proposed updates; the completed Site inspection reports; the most recent PRR submitted to the NYSDEC; and the signed IC/EC certification for the period of time between January 1st of the year ownership was transferred, and the property sale closing date. The new owner would be responsible for complying with all provisions of the SMP from the date of closing the sale transaction, including submittal of the PRR to the NYSDEC by the established due date for the calendar year in which the property was divested, and meeting the IC/EC certification requirements. NYSDEC will be notified within ten (10) business days of a transfer of ownership, in accordance with the provisions in the SMP.

Should the property transfer constitute a change in use of the Landfill Site pursuant to 6 NYCRR 375-1.11(d), NYSDEC will be notified at least sixty (60) days in advance of the change in ownership, including notification of GrafTech's fulfillment of the applicable requirements outlined in this section of the SMP. The new owner will be responsible for reporting the date of the change of ownership, the date of document transfer from GrafTech to the new owner, and the change of use designation, if applicable, in the first PRR submitted to the NYSDEC following the closure of the sale transaction for the Site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

All Site inspections, monitoring and maintenance activities, and reporting requirements were implemented as required in the SMP for the Landfill during the certification period. The analytical results from the last three (3) annual groundwater monitoring campaigns are consistent with the historical analytical data, with the exception of the deep aquifer upgradient (background) well (BW4-86), which in October 2014 had notable increases in the concentrations of four (4) VOCs, namely PCE, TCE, VC and cis-1,2-DCE. The analytical results for the May 2015 sampling event at well BW3-86 for these VOCs indicated that all the concentrations decreased from the October 2014 levels. The concentrations of all four (4) VOCs in this upgradient well decreased further in the 2016 sampling campaign, back to pre-2014 concentration levels, although they remained considerably elevated in comparison to the applicable state standards (NYS Class GA Criteria).

As in past years, the concentration of only one (1) VOC, namely VC, remained slightly elevated (3.1 ppb) compared to the state standard (2.0 ppb) in downgradient well BW3-86 during the 2016 groundwater monitoring campaign. Three (3) of the same VOCs, namely Cis-1,2-DEC, TCE and VC, were also detected above the applicable state standard in downgradient well GW8B-93 in 2016, which is also consistent with the historical groundwater data (with the exception that the ~~VOC~~ concentration was slightly below (1.6 ppb) the state limit (2.0 ppb) in the 2015 sampling event). However, it is noteworthy that the VOC exceedances in these two (2) wells located downgradient of the Landfill were detected in much lower concentrations (from 1.5 to 5 times the applicable state standard) than at the background well BW4-86. Despite the higher VOC levels upgradient of the Landfill initially detected in the October 2014 sampling campaign, the VOC concentrations at downgradient wells BW3-86 and GW8B-93 have remained about the same over the past three (3) years, thus indicating there has been no negative impact on downgradient wells.

Because of the background well BW4-86 sampling results in October 2014, GrafTech commissioned CRA in January 2015 to conduct a voluntary supplemental investigation of all eighteen (18) well installations at the Site to identify any structural abnormalities. CRA verified the integrity of the BW4-86 well casing and found no structural abnormalities at any of the well installations. A copy of CRA's well inspection report was submitted with the 2014 PRR.

CRA did observe a build-up of sediment in well BW4-86 during the January 2015 internal well inspection, but was still able to obtain clear samples from this well during the May 2015 sampling event. GrafTech subsequently commissioned GHD to redevelop well BW4-86, which was completed three (3) weeks prior to GHD conducting the fall sampling event on September 21, 2016. Refer to the GHD Memorandum in Enclosure 4 for additional details.

Based on this review, there are currently no required treatment or mitigation systems at this Site, and no indication that any changes are needed. The engineering controls and associated institutional controls are still in place, are performing properly, remain effective, and continue to be protective of public health and the environment. A copy of the completed and signed IC/EC Certification form is attached in Enclosure 7.

Due to the following facts:

1) this Landfill is a Class 4 Inactive Hazardous Waste Site;
2) there is no required Remedial Program or remedial objectives; and
3) the monitoring program for the past twenty-nine (29) years since closure of the Site has identified no negative trends in the groundwater quality at downgradient wells;

GrafTech recommends that compliance be maintained with the approved SMP during 2017, thus completing the mandatory thirty (30) years post-closure care period. Once the spring 2017 groundwater monitoring campaign has been completed, and the data is available from the laboratory and has been validated by GHD, an assessment will be made at that time to determine whether groundwater monitoring can be safely discontinued and/or other modifications made to the established Site management programs. GrafTech will communicate the results of its assessment to NYSDEC with its recommendations for proposed changes to the Site Management Plan for this Landfill.

ENCLOSURE 1

Weekly General Landfill and Site Security Inspection Report Form, and Quarterly Groundwater Well Inspection Report Form and Site Plan Map Showing Locations of Groundwater Monitoring Wells, Security Fencing and Locking Gates

APPENDIX A - WEEKLY GENERAL LANDFILL AND SITE SECURITY INSPECTION REPORT

Date	Time	Inspector Name

ENCE ARE	OK	DAMAGED	REPAIR DATE	REMARKS
A				
B				
C				
D				
E				
F				
G				
H				
I				
J				

GATE	OK	DAMAGED	REPAIR DATE	REMARKS
1				
2				
3				

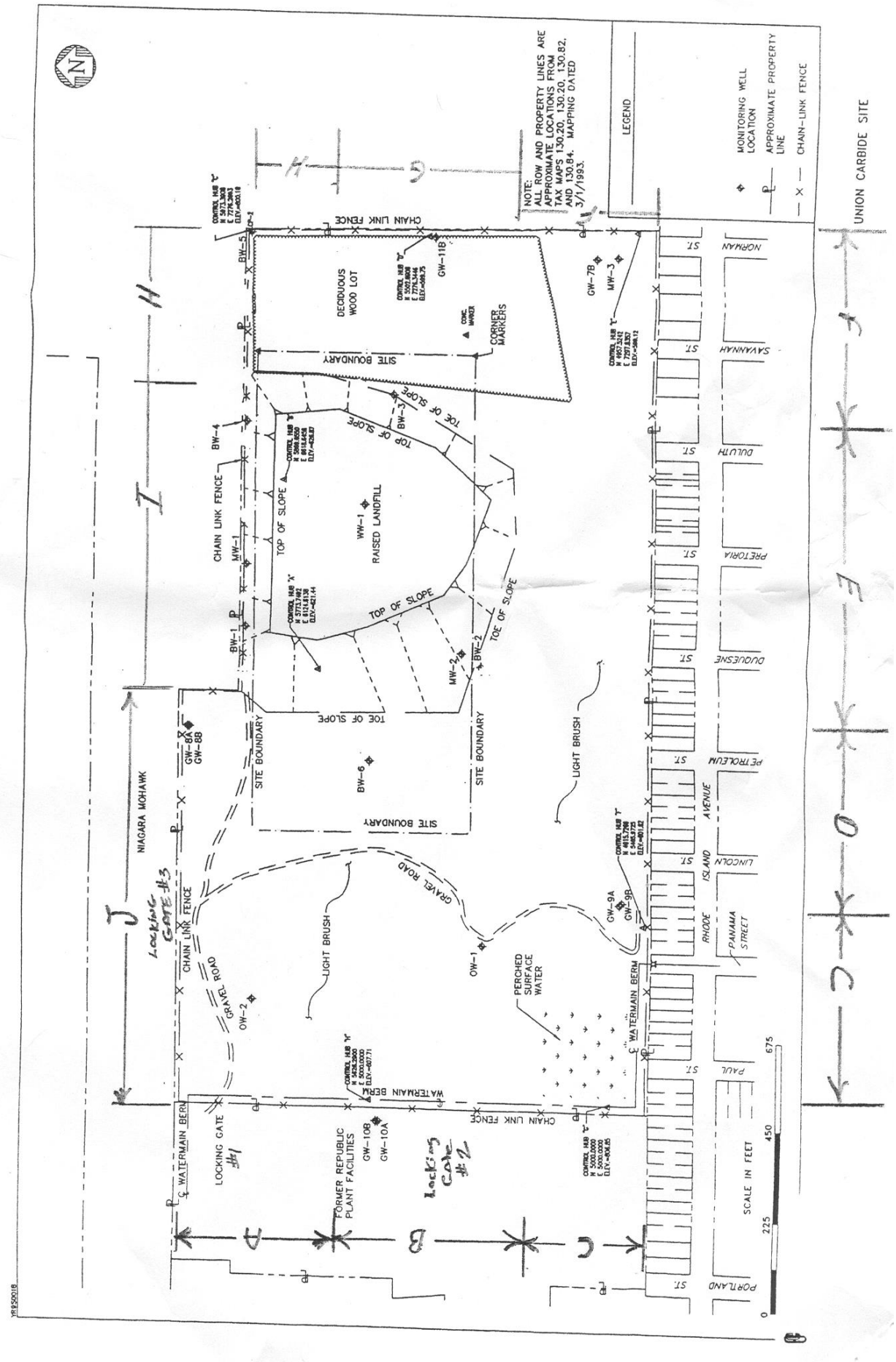
SECURITY-RELATED ENGINEERED CONTROLS COMMENTS: (Check for condition, damage, signs of security breach)

CAP COMMENTS: (Check for erosion and adequate vegetation)

SURROUNDING AREA COMMENTS: (Check for condition, damage, signs of security breach)

RECORD THE DATE(S) THAT THE ENTIRE CAP WAS MOWED:_____

IN THE EVENT THAT ANY SIGN OF A SITE SECURITY BREACH IS IDENTIFIED DURING THE ABOVE SITE INSPECTIONS, COMPLETE A FULL GROUNDWATER MONITORING WELL INSPECTION AND DOCUMENT RESULTS USING THE QUARTERLY GROUNDWATER WELL INSPECTION REPORT FORM (APPENDIX B) AND ATTACH TO THIS FORM.


LEGEND
MONITORING WELL LOCATION
APPROXIMATE PROPERTY LINE
CHAIN-LINK FENCE
NOTE: ALL ROW AND PROPERTY LINES ARE APPROXIMATE LOCATIONS FROM TAX MAPS 130.20, 130.20, 130.82, AND 130.84. MAPPING DATED 3/1/1993.
UNION CARBIDE SITE
DECIDUOUS WOOD LOT
CORNER MARKERS
SITE BOUNDARY
TOP OF SLOPE
TOE OF SLOPE
RAISED LANDFILL
CHAIN LINK FENCE
LIGHT BRUSH
GRAVEL ROAD
PERCHED SURFACE WATER
WATERMAIN BERM
LOCKING GATE #1
LOCKING GATE #2
LOCKING GATE #3
FORMER REPUBLIC PLANT FACILITIES
NIAGARA MOHAWK
NORMAN ST.
SAVANNAH ST.
DULUTH ST.
PRETORIA ST.
DUQUESNE ST.
PETROLEUM AVENUE
LINCOLN ST.
ISLAND
RHODE
PANAMA STREET
PAUL ST.
PORTLAND ST.
SCALE IN FEET
0
225
450
675

APPENDIX B - QUARTERLY GROUNDWATER WELL INSPECTION REPORT

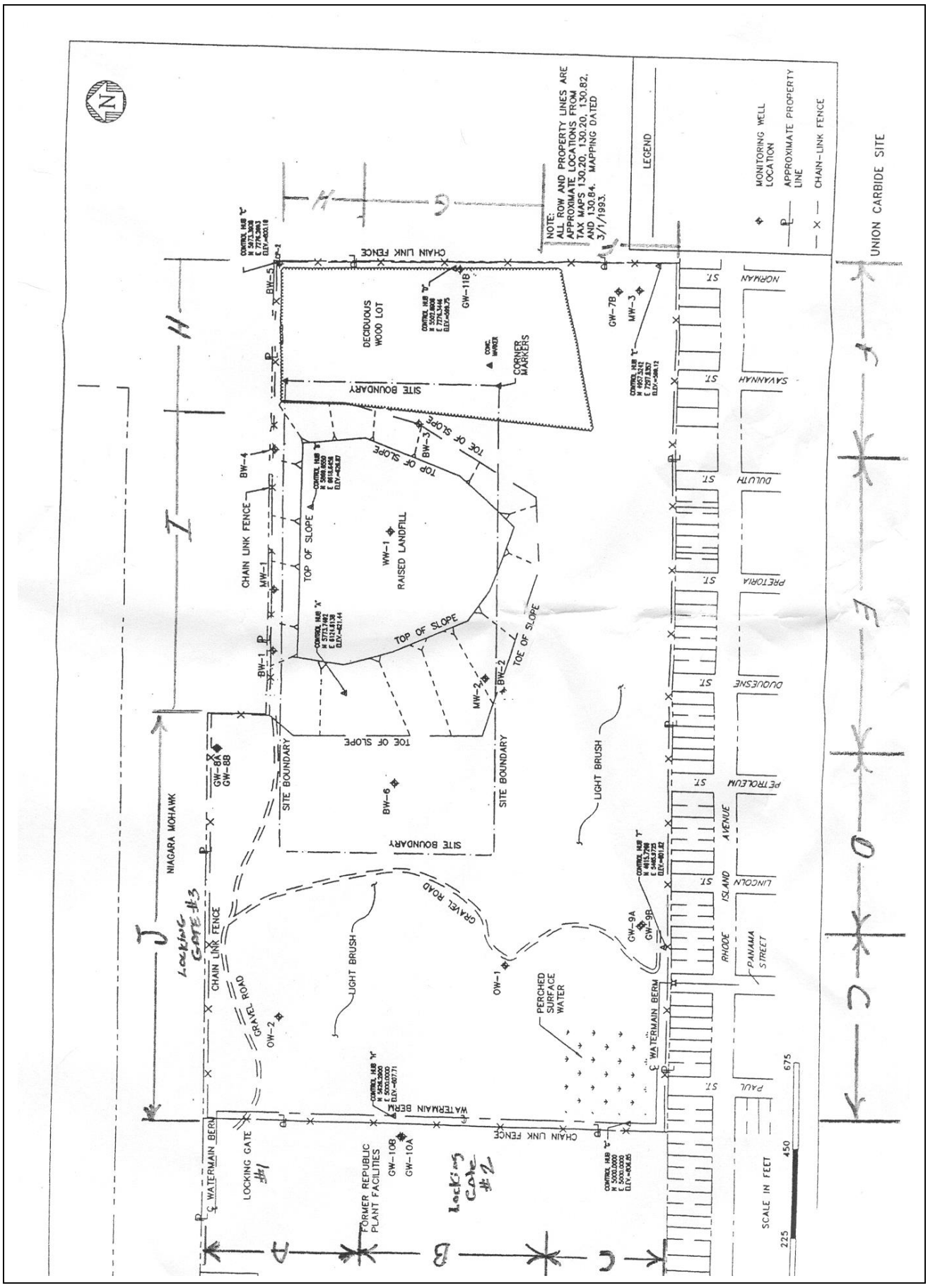
GRAFTECH WELLS

WELL I.D. NUMBER	WELL I.D. TAG INTACT (YES/NO)	LOCK CONDITION	OUTER CASING CONDITION	CONCRETE SEAL CONDITION	COMMENTS
MW1-78					
MW2-78					
MW3-79					
BW1-86					
BW2-86					
BW3-86					
BW4-86					
BW5-86					
BW6-86					
WW1-86					
OW1-88					
OW2-88					

ON-SITE WELLS INSTALLED BY NYSDEC

(Installed Sept./Oct. 93)

WELL I.D. NUMBER	WELL I.D. TAG INTACT (YES/NO)	LOCK CONDITION	OUTER CASING CONDITION	CONCRETE SEAL CONDITION	COMMENTS
GW7B-93					
GW8A-93					
GW8B-93					
GW9A-93					
GW9B-93					
GW11B-93					


N
NOTE:
ALL ROW AND PROPERTY LINES ARE APPROXIMATE LOCATIONS FROM TAX MAPS 130.20, 130.20, 130.82, AND 130.84. MAPPING DATED 3/1/1993.
LEGEND
MONITORING WELL LOCATION
APPROXIMATE PROPERTY LINE
CHAIN-LINK FENCE
UNION CARBIDE SITE
CHAIN LINK FENCE
DECIDUOUS WOOD LOT
CORNER MARKERS
SITE BOUNDARY
TOP OF SLOPE
TOE OF SLOPE
RAISED LANDFILL
LIGHT BRUSH
GRAVEL ROAD
PERCHED SURFACE WATER
WATERMAIN BERM
NIAGARA MOHAWK
LOCKING GATE #3
LOCKING GATE #1
LOCKING GATE #2
FORMER REPUBLIC PLANT FACILITIES
NORMAN ST.
SAVANNAH ST.
DULUTH ST.
PRETORIA ST.
DUQUESNE ST.
PETROLEUM AVENUE
LINCOLN ISLAND
RHODE
PANAMA STREET
PAUL ST.
SCALE IN FEET
225
450
675

ENCLOSURE 2

Letter from New York State Department of Environmental Conservation, Division of Environmental Remediation, Region 9, to GrafTech International Holdings Inc. (GrafTech), dated November 17, 2016

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Region 9
270 Michigan Avenue, Buffalo, NY 14203-2915
P: (716) 851-7220 I F: (716) 851-7226
www.dec.ny.gov

November 17, 2016

Ms. Juanita Bursley
Senior Manager, Corporate Environmental Risk Management
GrafTech International Holdings Inc.
6100 Oak Tree Boulevard
Suite 300 Park Center I
Independence, Ohio 44131

Dear Ms. Burlsey:

GrafTech International Holdings Inc.
NYSDEC Site Nos. 932035 & 32N03
Niagara, Niagara County, New York

It has recently come to my attention that the Site Management Plan (SMP) submitted by Graftech International Holdings Inc. in December 2013 was never formally approved by the New York State Department of Environmental Conservation (NYSDEC). As a result, I completed a detailed review of the SMP and found it to be acceptable with the caveat that the submittal of a separate annual groundwater monitoring report to the NYSDEC's Division of Materials Management is no longer required (NYSDEC letter dated February 25, 2016 from Mr. Glenn May to Ms. Juanita Bursley). This letter, therefore, transmits formal NYSDEC approval of the December 2013 Site Management Plan.

Please note that Ms. Mary McIntosh has been promoted and is now a Regional Spill Geologist for the NYSDEC's Division of Environmental Remediation in Region 9.

Should you have any questions, please feel free to contact me at (716) 851-7220.

Sincerely yours,

Glenn M May

Glenn M. May, CPG
Environmental Geologist II

GMM: tm

ecc: Ms. Mary McIntosh, NYSDEC, Division of Environmental Remediation, Region 9
Mr. Peter Grasso, NYSDEC, Division of Materials Management, Region 9
Mr. Brian Sadowski, NYSDEC, Division of Environmental Remediation, Region 9

ENCLOSURE 3

Test America Analytical Report for GHD Services Inc., Job ID 480-106316-1, Project/Site 5513, GrafTech Annual GW Monitoring,GrafTech International Holdings Inc., Niagara Falls, New York, Release Date September 29, 2016

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Tel: (716)691-2600

TestAmerica Job ID: 480-106316-1
Client Project/Site: 5513, GrafTech Annual GW Monitoring

For:
GHD Services Inc.
2055 Niagara Falls Blvd., Suite 3
Niagara Falls, New York 14304

Attn: Ms. Deborah Andrasko

Authorized for release by:
9/29/2016 12:27:51 PM
Rebecca Jones, Project Management Assistant I
rebecca.jones@testamericainc.com

Designee for

Melissa Deyo, Project Manager I
(716)504-9874
melissa.deyo@testamericainc.com

Table of Contents

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.
F1	MS and/or MSD Recovery is outside acceptance limits.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

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: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Job ID: 480-106316-1

Laboratory: TestAmerica Buffalo

Narrative

Job Narrative
480-106316-1

Receipt
The samples were received on 9/21/2016 2:24 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.1° C.

GC/MS VOA
Method(s) 8260C: The following samples were diluted to bring the concentration of target analytes within the calibration range: WG-5513-092116-SG-003 (480-106316-4), (480-106316-F-4 MS) and (480-106316-F-4 MSD). 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.

Metals
Method(s) 6010C: The Low Level Continuing Calibration Verification (CCVL 480-322599/24) contained Dissolved Iron outside the control limits. All reported samples WG-5513-092116-SG-003 (480-106316-4), (LCS 480-322210/2-A) and (MB 480-322210/1-A) associated with this CCVL were either below the laboratory's standard reporting limit for this analyte or contained this analyte at a concentration greater than 10X the value found in the CCVL; therefore, re-analysis of samples was not performed.

Method(s) 6010C: The recovery of Post Spike, (480-106316-C-2-D PDS), in batch 480-322210 exhibited a result outside the quality control limits for Dissolved Potassium. However, the Serial Dilution of this sample was compliant. Therefore, no corrective action was necessary.

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

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

Detection Summary

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: TB-5513-092116-SG — Lab Sample ID: 480-106316-1

No Detections.

Client Sample ID: WG-5513-092116-SG-001 — Lab Sample ID: 480-106316-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.85	J	1.0	0.81	ug/L	1		8260C	Total/NA
Vinyl chloride	3.1		1.0	0.90	ug/L	1		8260C	Total/NA
Iron	0.41		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	3.2		0.50	0.10	mg/L	1		6010C	Total/NA
Iron	0.37		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	3.2		0.50	0.10	mg/L	1		6010C	Dissolved
Ammonia	0.39	F1	0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	0.59		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-002 — Lab Sample ID: 480-106316-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	0.18		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	4.6		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.0020	J	0.010	0.0015	mg/L	1		6010C	Total/NA
Iron	0.23		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	4.6		0.50	0.10	mg/L	1		6010C	Dissolved
Zinc	0.0058	J	0.010	0.0015	mg/L	1		6010C	Dissolved
Ammonia	0.43		0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	0.86		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-003 — Lab Sample ID: 480-106316-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,2,2-Tetrachloroethane	3.4		1.0	0.21	ug/L	1		8260C	Total/NA
1,1,2-Trichloroethane	0.29	J	1.0	0.23	ug/L	1		8260C	Total/NA
1,1-Dichlorethylene	3.3		1.0	0.29	ug/L	1		8260C	Total/NA
Chloroform	12		1.0	0.34	ug/L	1		8260C	Total/NA
Chloromethane	0.64	J	1.0	0.35	ug/L	1		8260C	Total/NA
cis-1,2-Dichloroethene	1000	E	1.0	0.81	ug/L	1		8260C	Total/NA
Tetrachloroethene	280	E	1.0	0.36	ug/L	1		8260C	Total/NA
Toluene	0.79	J	1.0	0.51	ug/L	1		8260C	Total/NA
trans-1,2-Dichloroethene	4.5		1.0	0.90	ug/L	1		8260C	Total/NA
Trichloroethene	820	E	1.0	0.46	ug/L	1		8260C	Total/NA
Vinyl chloride	190	E	1.0	0.90	ug/L	1		8260C	Total/NA
Xylenes, Total	0.76	J	2.0	0.66	ug/L	1		8260C	Total/NA
Chloroform - DL	14	J	20	6.8	ug/L	20		8260C	Total/NA
cis-1,2-Dichloroethene - DL	930	F1	20	16	ug/L	20		8260C	Total/NA
Methylene Chloride - DL	11	J	20	8.8	ug/L	20		8260C	Total/NA
Tetrachloroethene - DL	240		20	7.2	ug/L	20		8260C	Total/NA
Trichloroethene - DL	660	F1	20	9.2	ug/L	20		8260C	Total/NA
Vinyl chloride - DL	180		20	18	ug/L	20		8260C	Total/NA
Iron	6.2		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	21.4		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.013		0.010	0.0015	mg/L	1		6010C	Total/NA
Iron	5.2	^	0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	21.5		0.50	0.10	mg/L	1		6010C	Dissolved

This Detection Summary does not include radiochemical test results.

Client Sample ID: WG-5513-092116-SG-003 (Continued) — Lab Sample ID: 480-106316-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Zinc	0.0028	J	0.010	0.0015	mg/L	1		6010C	Dissolved
Ammonia	3.5		0.040	0.018	mg/L	2		350.1	Total/NA
Total Kjeldahl Nitrogen	4.5		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-004 — Lab Sample ID: 480-106316-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	0.17		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	4.6		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.0030	J	0.010	0.0015	mg/L	1		6010C	Total/NA
Iron	0.15		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	4.7		0.50	0.10	mg/L	1		6010C	Dissolved
Zinc	0.0037	J	0.010	0.0015	mg/L	1		6010C	Dissolved
Ammonia	0.44		0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	0.90		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-005 — Lab Sample ID: 480-106316-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	1.6		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	4.4		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.70		0.010	0.0015	mg/L	1		6010C	Total/NA
Iron	0.58		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	4.3		0.50	0.10	mg/L	1		6010C	Dissolved
Ammonia	0.53		0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	1.1		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-006 — Lab Sample ID: 480-106316-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroethane	1.2		1.0	0.32	ug/L	1		8260C	Total/NA
Iron	0.93		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	6.5		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.28		0.010	0.0015	mg/L	1		6010C	Total/NA
Iron	0.30		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	6.4		0.50	0.10	mg/L	1		6010C	Dissolved
Zinc	0.025		0.010	0.0015	mg/L	1		6010C	Dissolved
Ammonia	0.46		0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	1.1		0.20	0.15	mg/L	1		351.2	Total/NA

Client Sample ID: WG-5513-092116-SG-007 — Lab Sample ID: 480-106316-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichlorethylene	0.43	J	1.0	0.29	ug/L	1		8260C	Total/NA
cis-1,2-Dichloroethene	24		1.0	0.81	ug/L	1		8260C	Total/NA
Trichloroethene	9.7		1.0	0.46	ug/L	1		8260C	Total/NA
Vinyl chloride	3.1		1.0	0.90	ug/L	1		8260C	Total/NA
Iron	0.12		0.050	0.019	mg/L	1		6010C	Total/NA
Potassium	6.1		0.50	0.10	mg/L	1		6010C	Total/NA
Zinc	0.39		0.010	0.0015	mg/L	1		6010C	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: WG-5513-092116-SG-007 (Continued)

Lab Sample ID: 480-106316-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	0.11		0.050	0.019	mg/L	1		6010C	Dissolved
Potassium	5.9		0.50	0.10	mg/L	1		6010C	Dissolved
Zinc	0.40		0.010	0.0015	mg/L	1		6010C	Dissolved
Ammonia	0.078	F1	0.020	0.0090	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	0.29		0.20	0.15	mg/L	1		351.2	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: TB-5513-092116-SG

Lab Sample ID: 480-106316-1

Date Collected: 09/21/16 00:00

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 03:44	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 03:44	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 03:44	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 03:44	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 03:44	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 03:44	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 03:44	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 03:44	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 03:44	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 03:44	1
Acetone	ND		10	3.0	ug/L			09/27/16 03:44	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 03:44	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 03:44	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 03:44	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 03:44	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 03:44	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 03:44	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 03:44	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 03:44	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 03:44	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 03:44	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 03:44	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 03:44	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 03:44	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 03:44	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 03:44	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 03:44	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 03:44	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 03:44	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 03:44	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 03:44	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 03:44	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 03:44	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 03:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*77 - 120*		*09/27/16 03:44*	*1*
4-Bromofluorobenzene (Surr)	*99*		*73 - 120*		*09/27/16 03:44*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 03:44*	*1*
Dibromofluoromethane (Surr)	*114*		*75 - 123*		*09/27/16 03:44*	*1*

Client Sample ID: WG-5513-092116-SG-001

Lab Sample ID: 480-106316-2

Date Collected: 09/21/16 10:20

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 04:09	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 04:09	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 04:09	1

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-001
Date Collected: 09/21/16 10:20
Date Received: 09/21/16 14:24

Lab Sample ID: 480-106316-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 04:09	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 04:09	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 04:09	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 04:09	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 04:09	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 04:09	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 04:09	1
Acetone	ND		10	3.0	ug/L			09/27/16 04:09	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 04:09	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 04:09	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 04:09	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 04:09	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 04:09	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 04:09	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 04:09	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 04:09	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 04:09	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 04:09	1
cis-1,2-Dichloroethene	**0.85**	**J**	1.0	0.81	ug/L			09/27/16 04:09	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 04:09	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 04:09	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 04:09	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 04:09	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 04:09	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 04:09	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 04:09	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 04:09	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 04:09	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 04:09	1
Vinyl chloride	**3.1**		1.0	0.90	ug/L			09/27/16 04:09	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 04:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*77 - 120*		*09/27/16 04:09*	*1*
4-Bromofluorobenzene (Surr)	*98*		*73 - 120*		*09/27/16 04:09*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*09/27/16 04:09*	*1*
Dibromofluoromethane (Surr)	*112*		*75 - 123*		*09/27/16 04:09*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.41**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:04	1
Potassium	**3.2**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:04	1
Zinc	ND		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:04	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.37**		0.050	0.019	mg/L		09/24/16 08:23	09/28/16 02:00	1
Potassium	**3.2**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:11	1
Zinc	ND		0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:11	1

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-001

Lab Sample ID: 480-106316-2

Date Collected: 09/21/16 10:20

Matrix: Water

Date Received: 09/21/16 14:24

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.39**	**F1**	0.020	0.0090	mg/L			09/22/16 13:04	1
Total Kjeldahl Nitrogen	**0.59**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:19	1
Nitrite	ND	F1	0.050	0.020	mg/L			09/21/16 22:14	1

Client Sample ID: WG-5513-092116-SG-002

Lab Sample ID: 480-106316-3

Date Collected: 09/21/16 09:45

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 13:58	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 13:58	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 13:58	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 13:58	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 13:58	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 13:58	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 13:58	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 13:58	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 13:58	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 13:58	1
Acetone	ND		10	3.0	ug/L			09/27/16 13:58	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 13:58	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 13:58	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 13:58	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 13:58	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 13:58	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 13:58	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 13:58	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 13:58	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 13:58	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 13:58	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 13:58	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 13:58	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 13:58	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 13:58	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 13:58	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 13:58	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 13:58	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 13:58	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 13:58	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 13:58	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 13:58	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 13:58	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 13:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*		*09/27/16 13:58*	*1*
4-Bromofluorobenzene (Surr)	*102*		*73 - 120*		*09/27/16 13:58*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 13:58*	*1*
Dibromofluoromethane (Surr)	*105*		*75 - 123*		*09/27/16 13:58*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.18**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:30	1
Potassium	**4.6**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:30	1
Zinc	**0.0020**	**J**	0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:30	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.23**		0.050	0.019	mg/L		09/24/16 08:23	09/28/16 02:27	1
Potassium	**4.6**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:29	1
Zinc	**0.0058**	**J**	0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.43**		0.020	0.0090	mg/L			09/22/16 12:50	1
Total Kjeldahl Nitrogen	**0.86**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:19	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 22:07	1

Client Sample ID: WG-5513-092116-SG-003

Lab Sample ID: 480-106316-4

Date Collected: 09/21/16 11:20

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 05:00	1
1,1,2,2-Tetrachloroethane	**3.4**		1.0	0.21	ug/L			09/27/16 05:00	1
1,1,2-Trichloroethane	**0.29**	**J**	1.0	0.23	ug/L			09/27/16 05:00	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 05:00	1
1,1-Dichlorethylene	**3.3**		1.0	0.29	ug/L			09/27/16 05:00	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 05:00	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 05:00	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 05:00	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 05:00	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 05:00	1
Acetone	ND		10	3.0	ug/L			09/27/16 05:00	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 05:00	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 05:00	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 05:00	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 05:00	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 05:00	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 05:00	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 05:00	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 05:00	1
Chloroform	**12**		1.0	0.34	ug/L			09/27/16 05:00	1
Chloromethane	**0.64**	**J**	1.0	0.35	ug/L			09/27/16 05:00	1
cis-1,2-Dichloroethene	**1000**	**E**	1.0	0.81	ug/L			09/27/16 05:00	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 05:00	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 05:00	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 05:00	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 05:00	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 05:00	1
Tetrachloroethene	**280**	**E**	1.0	0.36	ug/L			09/27/16 05:00	1
Toluene	**0.79**	**J**	1.0	0.51	ug/L			09/27/16 05:00	1
trans-1,2-Dichloroethene	**4.5**		1.0	0.90	ug/L			09/27/16 05:00	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 05:00	1
Trichloroethene	**820**	**E**	1.0	0.46	ug/L			09/27/16 05:00	1

Client Sample ID: WG-5513-092116-SG-003
Date Collected: 09/21/16 11:20
Date Received: 09/21/16 14:24

Lab Sample ID: 480-106316-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	**190**	**E**	1.0	0.90	ug/L			09/27/16 05:00	1
Xylenes, Total	**0.76**	**J**	2.0	0.66	ug/L			09/27/16 05:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*09/27/16 05:00*	*1*
4-Bromofluorobenzene (Surr)	*96*		*73 - 120*		*09/27/16 05:00*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*09/27/16 05:00*	*1*
Dibromofluoromethane (Surr)	*108*		*75 - 123*		*09/27/16 05:00*	*1*

Method: 8260C - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		20	16	ug/L			09/27/16 14:22	20
1,1,2,2-Tetrachloroethane	ND		20	4.2	ug/L			09/27/16 14:22	20
1,1,2-Trichloroethane	ND		20	4.6	ug/L			09/27/16 14:22	20
1,1-Dichloroethane	ND		20	7.6	ug/L			09/27/16 14:22	20
1,1-Dichlorethylene	ND		20	5.8	ug/L			09/27/16 14:22	20
1,2-Dichloroethane	ND		20	4.2	ug/L			09/27/16 14:22	20
1,2-Dichloropropane	ND		20	14	ug/L			09/27/16 14:22	20
2-Butanone	ND		200	26	ug/L			09/27/16 14:22	20
2-Hexanone	ND		100	25	ug/L			09/27/16 14:22	20
4-Methyl-2-pentanone	ND		100	42	ug/L			09/27/16 14:22	20
Acetone	ND		200	60	ug/L			09/27/16 14:22	20
Benzene	ND		20	8.2	ug/L			09/27/16 14:22	20
Bromodichloromethane	ND		20	7.8	ug/L			09/27/16 14:22	20
Bromoform	ND		20	5.2	ug/L			09/27/16 14:22	20
Bromomethane	ND		20	14	ug/L			09/27/16 14:22	20
Carbon disulfide	ND		20	3.8	ug/L			09/27/16 14:22	20
Carbon tetrachloride	ND		20	5.4	ug/L			09/27/16 14:22	20
Chlorobenzene	ND		20	15	ug/L			09/27/16 14:22	20
Chloroethane	ND		20	6.4	ug/L			09/27/16 14:22	20
Chloroform	**14**	**J**	20	6.8	ug/L			09/27/16 14:22	20
Chloromethane	ND		20	7.0	ug/L			09/27/16 14:22	20
cis-1,2-Dichloroethene	**930**	**F1**	20	16	ug/L			09/27/16 14:22	20
cis-1,3-Dichloropropene	ND		20	7.2	ug/L			09/27/16 14:22	20
Dibromochloromethane	ND		20	6.4	ug/L			09/27/16 14:22	20
Ethylbenzene	ND		20	15	ug/L			09/27/16 14:22	20
Methylene Chloride	**11**	**J**	20	8.8	ug/L			09/27/16 14:22	20
Styrene	ND		20	15	ug/L			09/27/16 14:22	20
Tetrachloroethene	**240**		20	7.2	ug/L			09/27/16 14:22	20
Toluene	ND		20	10	ug/L			09/27/16 14:22	20
trans-1,2-Dichloroethene	ND		20	18	ug/L			09/27/16 14:22	20
trans-1,3-Dichloropropene	ND		20	7.4	ug/L			09/27/16 14:22	20
Trichloroethene	**660**	**F1**	20	9.2	ug/L			09/27/16 14:22	20
Vinyl chloride	**180**		20	18	ug/L			09/27/16 14:22	20
Xylenes, Total	ND		40	13	ug/L			09/27/16 14:22	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*		*09/27/16 14:22*	*20*
4-Bromofluorobenzene (Surr)	*98*		*73 - 120*		*09/27/16 14:22*	*20*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 14:22*	*20*

Client Sample ID: WG-5513-092116-SG-003

Lab Sample ID: 480-106316-4

Date Collected: 09/21/16 11:20

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS - DL (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Dibromofluoromethane (Surr)	*107*		*75 - 123*		*09/27/16 14:22*	*20*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**6.2**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:34	1
Potassium	**21.4**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:34	1
Zinc	**0.013**		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:34	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**5.2**	**^**	0.050	0.019	mg/L		09/24/16 08:23	09/26/16 23:33	1
Potassium	**21.5**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:33	1
Zinc	**0.0028**	**J**	0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**3.5**		0.040	0.018	mg/L			09/22/16 13:14	2
Total Kjeldahl Nitrogen	**4.5**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:19	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 21:35	1

Client Sample ID: WG-5513-092116-SG-004

Lab Sample ID: 480-106316-5

Date Collected: 09/21/16 09:45

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 14:46	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 14:46	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 14:46	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 14:46	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 14:46	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 14:46	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 14:46	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 14:46	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 14:46	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 14:46	1
Acetone	ND		10	3.0	ug/L			09/27/16 14:46	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 14:46	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 14:46	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 14:46	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 14:46	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 14:46	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 14:46	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 14:46	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 14:46	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 14:46	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 14:46	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 14:46	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 14:46	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 14:46	1

Client Sample ID: WG-5513-092116-SG-004

Lab Sample ID: 480-106316-5

Date Collected: 09/21/16 09:45

Matrix: Water

Date Received: 09/21/16 14:24

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 14:46	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 14:46	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 14:46	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 14:46	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 14:46	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 14:46	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 14:46	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 14:46	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 14:46	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 14:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*77 - 120*		*09/27/16 14:46*	*1*
4-Bromofluorobenzene (Surr)	*99*		*73 - 120*		*09/27/16 14:46*	*1*
Toluene-d8 (Surr)	*94*		*80 - 120*		*09/27/16 14:46*	*1*
Dibromofluoromethane (Surr)	*104*		*75 - 123*		*09/27/16 14:46*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.17**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:37	1
Potassium	**4.6**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:37	1
Zinc	**0.0030**	**J**	0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:37	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.15**		0.050	0.019	mg/L		09/24/16 08:23	09/28/16 02:31	1
Potassium	**4.7**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:36	1
Zinc	**0.0037**	**J**	0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.44**		0.020	0.0090	mg/L			09/22/16 12:52	1
Total Kjeldahl Nitrogen	**0.90**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:28	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 22:09	1

Client Sample ID: WG-5513-092116-SG-005

Lab Sample ID: 480-106316-6

Date Collected: 09/21/16 12:15

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 15:10	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 15:10	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 15:10	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 15:10	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 15:10	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 15:10	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 15:10	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 15:10	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 15:10	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 15:10	1

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-005
Date Collected: 09/21/16 12:15
Date Received: 09/21/16 14:24

Lab Sample ID: 480-106316-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	ND		10	3.0	ug/L			09/27/16 15:10	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 15:10	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 15:10	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 15:10	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 15:10	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 15:10	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 15:10	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 15:10	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 15:10	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 15:10	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 15:10	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 15:10	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 15:10	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 15:10	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 15:10	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 15:10	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 15:10	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 15:10	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 15:10	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 15:10	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 15:10	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 15:10	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 15:10	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 15:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*77 - 120*		*09/27/16 15:10*	*1*
4-Bromofluorobenzene (Surr)	*97*		*73 - 120*		*09/27/16 15:10*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 15:10*	*1*
Dibromofluoromethane (Surr)	*105*		*75 - 123*		*09/27/16 15:10*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**1.6**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:40	1
Potassium	**4.4**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:40	1
Zinc	**0.70**		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:40	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.58**		0.050	0.019	mg/L		09/24/16 08:23	09/26/16 23:51	1
Potassium	**4.3**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:51	1
Zinc	ND		0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.53**		0.020	0.0090	mg/L			09/22/16 12:53	1
Total Kjeldahl Nitrogen	**1.1**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:28	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 21:37	1

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-006
Date Collected: 09/21/16 11:00
Date Received: 09/21/16 14:24

Lab Sample ID: 480-106316-7
Matrix: Water

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/28/16 03:18	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/28/16 03:18	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/28/16 03:18	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/28/16 03:18	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/28/16 03:18	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/28/16 03:18	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/28/16 03:18	1
2-Butanone	ND		10	1.3	ug/L			09/28/16 03:18	1
2-Hexanone	ND		5.0	1.2	ug/L			09/28/16 03:18	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/28/16 03:18	1
Acetone	ND		10	3.0	ug/L			09/28/16 03:18	1
Benzene	ND		1.0	0.41	ug/L			09/28/16 03:18	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/28/16 03:18	1
Bromoform	ND		1.0	0.26	ug/L			09/28/16 03:18	1
Bromomethane	ND		1.0	0.69	ug/L			09/28/16 03:18	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/28/16 03:18	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/28/16 03:18	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/28/16 03:18	1
Chloroethane	**1.2**		1.0	0.32	ug/L			09/28/16 03:18	1
Chloroform	ND		1.0	0.34	ug/L			09/28/16 03:18	1
Chloromethane	ND		1.0	0.35	ug/L			09/28/16 03:18	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/28/16 03:18	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/28/16 03:18	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/28/16 03:18	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/28/16 03:18	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/28/16 03:18	1
Styrene	ND		1.0	0.73	ug/L			09/28/16 03:18	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/28/16 03:18	1
Toluene	ND		1.0	0.51	ug/L			09/28/16 03:18	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/28/16 03:18	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/28/16 03:18	1
Trichloroethene	ND		1.0	0.46	ug/L			09/28/16 03:18	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/28/16 03:18	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/28/16 03:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*77 - 120*		*09/28/16 03:18*	*1*
4-Bromofluorobenzene (Surr)	*99*		*73 - 120*		*09/28/16 03:18*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/28/16 03:18*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 123*		*09/28/16 03:18*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.93**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:44	1
Potassium	**6.5**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:44	1
Zinc	**0.28**		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:44	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.30**		0.050	0.019	mg/L		09/24/16 08:23	09/26/16 23:54	1

Client Sample ID: WG-5513-092116-SG-006

Lab Sample ID: 480-106316-7

Date Collected: 09/21/16 11:00

Matrix: Water

Date Received: 09/21/16 14:24

Method: 6010C - Metals (ICP) - Dissolved (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Potassium	**6.4**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:54	1
Zinc	**0.025**		0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.46**		0.020	0.0090	mg/L			09/22/16 12:54	1
Total Kjeldahl Nitrogen	**1.1**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:28	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 21:38	1

Client Sample ID: WG-5513-092116-SG-007

Lab Sample ID: 480-106316-8

Date Collected: 09/21/16 11:55

Matrix: Water

Date Received: 09/21/16 14:24

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 15:58	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 15:58	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 15:58	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 15:58	1
1,1-Dichlorethylene	**0.43**	**J**	1.0	0.29	ug/L			09/27/16 15:58	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 15:58	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 15:58	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 15:58	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 15:58	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 15:58	1
Acetone	ND		10	3.0	ug/L			09/27/16 15:58	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 15:58	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 15:58	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 15:58	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 15:58	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 15:58	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 15:58	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 15:58	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 15:58	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 15:58	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 15:58	1
cis-1,2-Dichloroethene	**24**		1.0	0.81	ug/L			09/27/16 15:58	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 15:58	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 15:58	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 15:58	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 15:58	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 15:58	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 15:58	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 15:58	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 15:58	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 15:58	1
Trichloroethene	**9.7**		1.0	0.46	ug/L			09/27/16 15:58	1
Vinyl chloride	**3.1**		1.0	0.90	ug/L			09/27/16 15:58	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 15:58	1

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-007
Date Collected: 09/21/16 11:55
Date Received: 09/21/16 14:24

Lab Sample ID: 480-106316-8
Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*		*09/27/16 15:58*	*1*
4-Bromofluorobenzene (Surr)	*97*		*73 - 120*		*09/27/16 15:58*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 15:58*	*1*
Dibromofluoromethane (Surr)	*108*		*75 - 123*		*09/27/16 15:58*	*1*

Method: 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.12**		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 20:47	1
Potassium	**6.1**		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 20:47	1
Zinc	**0.39**		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 20:47	1

Method: 6010C - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	**0.11**		0.050	0.019	mg/L		09/24/16 08:23	09/26/16 23:58	1
Potassium	**5.9**		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 23:58	1
Zinc	**0.40**		0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 23:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	**0.078**	**F1**	0.020	0.0090	mg/L			09/22/16 12:55	1
Total Kjeldahl Nitrogen	**0.29**		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 11:28	1
Nitrite	ND		0.050	0.020	mg/L			09/21/16 21:48	1

Surrogate Summary

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Method: 8260C - Volatile Organic Compounds by GC/MS

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

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(77-120)	(73-120)	(80-120)	(75-123)
480-106316-1	TB-5513-092116-SG	114	99	96	114
480-106316-2	WG-5513-092116-SG-001	115	98	98	112
480-106316-2 MS	WG-5513-092116-SG-001	104	107	99	100
480-106316-2 MSD	WG-5513-092116-SG-001	111	108	102	101
480-106316-3	WG-5513-092116-SG-002	102	102	96	105
480-106316-4	WG-5513-092116-SG-003	108	96	97	108
480-106316-4 - DL	WG-5513-092116-SG-003	102	98	96	107
480-106316-4 MS	WG-5513-092116-SG-003	98	102	95	101
480-106316-4 MSD	WG-5513-092116-SG-003	97	104	99	101
480-106316-5	WG-5513-092116-SG-004	103	99	94	104
480-106316-6	WG-5513-092116-SG-005	102	97	96	105
480-106316-7	WG-5513-092116-SG-006	101	99	96	107
480-106316-8	WG-5513-092116-SG-007	104	97	96	108
LCS 480-322449/5	Lab Control Sample	101	108	103	97
LCS 480-322567/4	Lab Control Sample	98	101	98	103
LCS 480-322680/4	Lab Control Sample	95	100	96	103
MB 480-322449/7	Method Blank	108	99	96	107
MB 480-322567/6	Method Blank	100	94	94	106
MB 480-322680/6	Method Blank	103	97	96	107

Surrogate Legend

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

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 480-322449/7
Matrix: Water
Analysis Batch: 322449

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/26/16 23:02	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/26/16 23:02	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/26/16 23:02	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/26/16 23:02	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/26/16 23:02	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/26/16 23:02	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/26/16 23:02	1
2-Butanone	ND		10	1.3	ug/L			09/26/16 23:02	1
2-Hexanone	ND		5.0	1.2	ug/L			09/26/16 23:02	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/26/16 23:02	1
Acetone	ND		10	3.0	ug/L			09/26/16 23:02	1
Benzene	ND		1.0	0.41	ug/L			09/26/16 23:02	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/26/16 23:02	1
Bromoform	ND		1.0	0.26	ug/L			09/26/16 23:02	1
Bromomethane	ND		1.0	0.69	ug/L			09/26/16 23:02	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/26/16 23:02	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/26/16 23:02	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/26/16 23:02	1
Chloroethane	ND		1.0	0.32	ug/L			09/26/16 23:02	1
Chloroform	ND		1.0	0.34	ug/L			09/26/16 23:02	1
Chloromethane	ND		1.0	0.35	ug/L			09/26/16 23:02	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/26/16 23:02	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/26/16 23:02	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/26/16 23:02	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/26/16 23:02	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/26/16 23:02	1
Styrene	ND		1.0	0.73	ug/L			09/26/16 23:02	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/26/16 23:02	1
Toluene	ND		1.0	0.51	ug/L			09/26/16 23:02	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/26/16 23:02	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/26/16 23:02	1
Trichloroethene	ND		1.0	0.46	ug/L			09/26/16 23:02	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/26/16 23:02	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/26/16 23:02	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*77 - 120*		*09/26/16 23:02*	*1*
4-Bromofluorobenzene (Surr)	*99*		*73 - 120*		*09/26/16 23:02*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/26/16 23:02*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 123*		*09/26/16 23:02*	*1*

Lab Sample ID: LCS 480-322449/5
Matrix: Water
Analysis Batch: 322449

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
1,1,1-Trichloroethane			25.0	23.3		ug/L		93	73 - 126		
1,1,2,2-Tetrachloroethane			25.0	21.2		ug/L		85	76 - 120		

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

Lab Sample ID: LCS 480-322449/5
Matrix: Water
Analysis Batch: 322449

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,2-Trichloroethane	25.0	22.6		ug/L		91	76 - 122
1,1-Dichloroethane	25.0	22.8		ug/L		91	77 - 120
1,1-Dichlorethylene	25.0	21.3		ug/L		85	66 - 127
1,2-Dichloroethane	25.0	22.9		ug/L		92	75 - 120
1,2-Dichloropropane	25.0	23.2		ug/L		93	76 - 120
2-Butanone	125	120		ug/L		96	57 - 140
2-Hexanone	125	134		ug/L		107	65 - 127
4-Methyl-2-pentanone	125	126		ug/L		101	71 - 125
Acetone	125	109		ug/L		87	56 - 142
Benzene	25.0	22.3		ug/L		89	71 - 124
Bromodichloromethane	25.0	22.9		ug/L		92	80 - 122
Bromoform	25.0	24.6		ug/L		99	61 - 132
Bromomethane	25.0	23.1		ug/L		92	55 - 144
Carbon disulfide	25.0	19.2		ug/L		77	59 - 134
Carbon tetrachloride	25.0	23.3		ug/L		93	72 - 134
Chlorobenzene	25.0	22.7		ug/L		91	80 - 120
Chloroethane	25.0	22.5		ug/L		90	69 - 136
Chloroform	25.0	21.4		ug/L		85	73 - 127
Chloromethane	25.0	18.8		ug/L		75	68 - 124
cis-1,2-Dichloroethene	25.0	23.7		ug/L		95	74 - 124
cis-1,3-Dichloropropene	25.0	25.1		ug/L		100	74 - 124
Dibromochloromethane	25.0	23.6		ug/L		94	75 - 125
Ethylbenzene	25.0	22.7		ug/L		91	77 - 123
Methylene Chloride	25.0	23.1		ug/L		92	75 - 124
Styrene	25.0	25.7		ug/L		103	80 - 120
Tetrachloroethene	25.0	23.9		ug/L		95	74 - 122
Toluene	25.0	22.1		ug/L		88	80 - 122
trans-1,2-Dichloroethene	25.0	21.5		ug/L		86	73 - 127
trans-1,3-Dichloropropene	25.0	25.3		ug/L		101	80 - 120
Trichloroethene	25.0	22.6		ug/L		91	74 - 123
Vinyl chloride	25.0	21.8		ug/L		87	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*77 - 120*
4-Bromofluorobenzene (Surr)	*108*		*73 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*75 - 123*

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 322449

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		25.0	28.1		ug/L		112	73 - 126
1,1,2,2-Tetrachloroethane	ND		25.0	22.6		ug/L		90	76 - 120
1,1,2-Trichloroethane	ND		25.0	23.7		ug/L		95	76 - 122
1,1-Dichloroethane	ND		25.0	26.7		ug/L		107	77 - 120
1,1-Dichlorethylene	ND		25.0	25.0		ug/L		100	66 - 127

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

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 322449

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethane	ND		25.0	25.2		ug/L		101	75 - 120
1,2-Dichloropropane	ND		25.0	26.1		ug/L		104	76 - 120
2-Butanone	ND		125	128		ug/L		102	57 - 140
2-Hexanone	ND		125	129		ug/L		104	65 - 127
4-Methyl-2-pentanone	ND		125	125		ug/L		100	71 - 125
Acetone	ND		125	122		ug/L		98	56 - 142
Benzene	ND		25.0	25.6		ug/L		102	71 - 124
Bromodichloromethane	ND		25.0	25.8		ug/L		103	80 - 122
Bromoform	ND		25.0	25.6		ug/L		102	61 - 132
Bromomethane	ND		25.0	23.9		ug/L		96	55 - 144
Carbon disulfide	ND		25.0	26.4		ug/L		105	59 - 134
Carbon tetrachloride	ND		25.0	27.3		ug/L		109	72 - 134
Chlorobenzene	ND		25.0	24.1		ug/L		96	80 - 120
Chloroethane	ND		25.0	24.1		ug/L		96	69 - 136
Chloroform	ND		25.0	24.6		ug/L		98	73 - 127
Chloromethane	ND		25.0	20.3		ug/L		81	68 - 124
cis-1,2-Dichloroethene	0.85	J	25.0	27.4		ug/L		106	74 - 124
cis-1,3-Dichloropropene	ND		25.0	26.4		ug/L		106	74 - 124
Dibromochloromethane	ND		25.0	23.9		ug/L		96	75 - 125
Ethylbenzene	ND		25.0	24.6		ug/L		98	77 - 123
Methylene Chloride	ND		25.0	26.3		ug/L		105	75 - 124
Styrene	ND		25.0	27.1		ug/L		108	80 - 120
Tetrachloroethene	ND		25.0	26.5		ug/L		106	74 - 122
Toluene	ND		25.0	24.3		ug/L		97	80 - 122
trans-1,2-Dichloroethene	ND		25.0	25.9		ug/L		104	73 - 127
trans-1,3-Dichloropropene	ND		25.0	25.0		ug/L		100	80 - 120
Trichloroethene	ND		25.0	26.3		ug/L		105	74 - 123
Vinyl chloride	3.1		25.0	25.9		ug/L		91	65 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*77 - 120*
4-Bromofluorobenzene (Surr)	*107*		*73 - 120*
Toluene-d8 (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*75 - 123*

Lab Sample ID: 480-106316-2 MSD
Matrix: Water
Analysis Batch: 322449

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		25.0	27.3		ug/L		109	73 - 126	3	15
1,1,2,2-Tetrachloroethane	ND		25.0	22.6		ug/L		90	76 - 120	0	15
1,1,2-Trichloroethane	ND		25.0	24.3		ug/L		97	76 - 122	3	15
1,1-Dichloroethane	ND		25.0	26.2		ug/L		105	77 - 120	2	20
1,1-Dichlorethylene	ND		25.0	24.6		ug/L		98	66 - 127	1	16
1,2-Dichloroethane	ND		25.0	25.5		ug/L		102	75 - 120	1	20
1,2-Dichloropropane	ND		25.0	26.0		ug/L		104	76 - 120	0	20
2-Butanone	ND		125	132		ug/L		106	57 - 140	3	20

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

Lab Sample ID: 480-106316-2 MSD
Matrix: Water
Analysis Batch: 322449

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
2-Hexanone	ND		125	135		ug/L		108	65 - 127	4	15
4-Methyl-2-pentanone	ND		125	131		ug/L		105	71 - 125	5	35
Acetone	ND		125	123		ug/L		99	56 - 142	1	15
Benzene	ND		25.0	25.5		ug/L		102	71 - 124	1	13
Bromodichloromethane	ND		25.0	25.9		ug/L		104	80 - 122	0	15
Bromoform	ND		25.0	25.7		ug/L		103	61 - 132	0	15
Bromomethane	ND		25.0	26.1		ug/L		104	55 - 144	9	15
Carbon disulfide	ND		25.0	24.8		ug/L		99	59 - 134	6	15
Carbon tetrachloride	ND		25.0	26.6		ug/L		106	72 - 134	2	15
Chlorobenzene	ND		25.0	23.9		ug/L		96	80 - 120	1	25
Chloroethane	ND		25.0	26.3		ug/L		105	69 - 136	9	15
Chloroform	ND		25.0	24.1		ug/L		96	73 - 127	2	20
Chloromethane	ND		25.0	22.4		ug/L		90	68 - 124	10	15
cis-1,2-Dichloroethene	0.85	J	25.0	27.6		ug/L		107	74 - 124	1	15
cis-1,3-Dichloropropene	ND		25.0	26.2		ug/L		105	74 - 124	1	15
Dibromochloromethane	ND		25.0	24.7		ug/L		99	75 - 125	3	15
Ethylbenzene	ND		25.0	24.4		ug/L		98	77 - 123	1	15
Methylene Chloride	ND		25.0	25.2		ug/L		101	75 - 124	4	15
Styrene	ND		25.0	27.4		ug/L		109	80 - 120	1	20
Tetrachloroethene	ND		25.0	26.4		ug/L		106	74 - 122	0	20
Toluene	ND		25.0	24.0		ug/L		96	80 - 122	1	15
trans-1,2-Dichloroethene	ND		25.0	25.5		ug/L		102	73 - 127	2	20
trans-1,3-Dichloropropene	ND		25.0	26.1		ug/L		104	80 - 120	4	15
Trichloroethene	ND		25.0	25.5		ug/L		102	74 - 123	3	16
Vinyl chloride	3.1		25.0	28.0		ug/L		99	65 - 133	8	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*111*		*77 - 120*
4-Bromofluorobenzene (Surr)	*108*		*73 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 123*

Lab Sample ID: MB 480-322567/6
Matrix: Water
Analysis Batch: 322567

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 11:14	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 11:14	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 11:14	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 11:14	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 11:14	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 11:14	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 11:14	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 11:14	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 11:14	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 11:14	1
Acetone	ND		10	3.0	ug/L			09/27/16 11:14	1

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

Lab Sample ID: MB 480-322567/6
Matrix: Water
Analysis Batch: 322567

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.41	ug/L			09/27/16 11:14	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 11:14	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 11:14	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 11:14	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 11:14	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 11:14	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 11:14	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 11:14	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 11:14	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 11:14	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 11:14	1
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 11:14	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 11:14	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 11:14	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 11:14	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 11:14	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 11:14	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 11:14	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 11:14	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 11:14	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 11:14	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 11:14	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 11:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*77 - 120*		*09/27/16 11:14*	*1*
4-Bromofluorobenzene (Surr)	*94*		*73 - 120*		*09/27/16 11:14*	*1*
Toluene-d8 (Surr)	*94*		*80 - 120*		*09/27/16 11:14*	*1*
Dibromofluoromethane (Surr)	*106*		*75 - 123*		*09/27/16 11:14*	*1*

Lab Sample ID: LCS 480-322567/4
Matrix: Water
Analysis Batch: 322567

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	25.0	25.6		ug/L		102	73 - 126
1,1,2,2-Tetrachloroethane	25.0	23.7		ug/L		95	76 - 120
1,1,2-Trichloroethane	25.0	24.5		ug/L		98	76 - 122
1,1-Dichloroethane	25.0	25.0		ug/L		100	77 - 120
1,1-Dichlorethylene	25.0	24.1		ug/L		96	66 - 127
1,2-Dichloroethane	25.0	24.2		ug/L		97	75 - 120
1,2-Dichloropropane	25.0	24.1		ug/L		96	76 - 120
2-Butanone	125	113		ug/L		91	57 - 140
2-Hexanone	125	118		ug/L		94	65 - 127
4-Methyl-2-pentanone	125	114		ug/L		92	71 - 125
Acetone	125	104		ug/L		83	56 - 142
Benzene	25.0	25.2		ug/L		101	71 - 124
Bromodichloromethane	25.0	25.5		ug/L		102	80 - 122

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

Lab Sample ID: LCS 480-322567/4
Matrix: Water
Analysis Batch: 322567

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Bromoform	25.0	24.6		ug/L		98	61 - 132
Bromomethane	25.0	23.6		ug/L		94	55 - 144
Carbon disulfide	25.0	24.9		ug/L		100	59 - 134
Carbon tetrachloride	25.0	25.3		ug/L		101	72 - 134
Chlorobenzene	25.0	24.7		ug/L		99	80 - 120
Chloroethane	25.0	24.3		ug/L		97	69 - 136
Chloroform	25.0	24.7		ug/L		99	73 - 127
Chloromethane	25.0	20.5		ug/L		82	68 - 124
cis-1,2-Dichloroethene	25.0	25.4		ug/L		102	74 - 124
cis-1,3-Dichloropropene	25.0	25.5		ug/L		102	74 - 124
Dibromochloromethane	25.0	25.4		ug/L		102	75 - 125
Ethylbenzene	25.0	24.5		ug/L		98	77 - 123
Methylene Chloride	25.0	26.8		ug/L		107	75 - 124
Styrene	25.0	26.1		ug/L		104	80 - 120
Tetrachloroethene	25.0	25.2		ug/L		101	74 - 122
Toluene	25.0	24.4		ug/L		98	80 - 122
trans-1,2-Dichloroethene	25.0	25.0		ug/L		100	73 - 127
trans-1,3-Dichloropropene	25.0	24.5		ug/L		98	80 - 120
Trichloroethene	25.0	25.2		ug/L		101	74 - 123
Vinyl chloride	25.0	22.1		ug/L		89	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*77 - 120*
4-Bromofluorobenzene (Surr)	*101*		*73 - 120*
Toluene-d8 (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*75 - 123*

Lab Sample ID: 480-106316-4 MS
Matrix: Water
Analysis Batch: 322567

Client Sample ID: WG-5513-092116-SG-003
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		500	541		ug/L		108	73 - 126
1,1,2,2-Tetrachloroethane	ND		500	486		ug/L		97	76 - 120
1,1,2-Trichloroethane	ND		500	486		ug/L		97	76 - 122
1,1-Dichloroethane	ND		500	518		ug/L		104	77 - 120
1,1-Dichlorethylene	ND		500	522		ug/L		104	66 - 127
1,2-Dichloroethane	ND		500	483		ug/L		97	75 - 120
1,2-Dichloropropane	ND		500	498		ug/L		100	76 - 120
2-Butanone	ND		2500	2270		ug/L		91	57 - 140
2-Hexanone	ND		2500	2250		ug/L		90	65 - 127
4-Methyl-2-pentanone	ND		2500	2260		ug/L		90	71 - 125
Acetone	ND		2500	2230		ug/L		89	56 - 142
Benzene	ND		500	515		ug/L		103	71 - 124
Bromodichloromethane	ND		500	518		ug/L		104	80 - 122
Bromoform	ND		500	509		ug/L		102	61 - 132
Bromomethane	ND		500	537		ug/L		107	55 - 144
Carbon disulfide	ND		500	532		ug/L		106	59 - 134

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

Lab Sample ID: 480-106316-4 MS
Matrix: Water
Analysis Batch: 322567

Client Sample ID: WG-5513-092116-SG-003
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon tetrachloride	ND		500	543		ug/L		109	72 - 134
Chlorobenzene	ND		500	496		ug/L		99	80 - 120
Chloroethane	ND		500	560		ug/L		112	69 - 136
Chloroform	14	J	500	511		ug/L		99	73 - 127
Chloromethane	ND		500	422		ug/L		84	68 - 124
cis-1,2-Dichloroethene	930	F1	500	1290	F1	ug/L		72	74 - 124
cis-1,3-Dichloropropene	ND		500	496		ug/L		99	74 - 124
Dibromochloromethane	ND		500	524		ug/L		105	75 - 125
Ethylbenzene	ND		500	498		ug/L		100	77 - 123
Methylene Chloride	11	J	500	545		ug/L		107	75 - 124
Styrene	ND		500	505		ug/L		101	80 - 120
Tetrachloroethene	240		500	707		ug/L		93	74 - 122
Toluene	ND		500	492		ug/L		98	80 - 122
trans-1,2-Dichloroethene	ND		500	518		ug/L		104	73 - 127
trans-1,3-Dichloropropene	ND		500	483		ug/L		97	80 - 120
Trichloroethene	660	F1	500	1010	F1	ug/L		69	74 - 123
Vinyl chloride	180		500	604		ug/L		85	65 - 133

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*77 - 120*
4-Bromofluorobenzene (Surr)	*102*		*73 - 120*
Toluene-d8 (Surr)	*95*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 123*

Lab Sample ID: 480-106316-4 MSD
Matrix: Water
Analysis Batch: 322567

Client Sample ID: WG-5513-092116-SG-003
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		500	513		ug/L		103	73 - 126	5	15
1,1,2,2-Tetrachloroethane	ND		500	484		ug/L		97	76 - 120	0	15
1,1,2-Trichloroethane	ND		500	485		ug/L		97	76 - 122	0	15
1,1-Dichloroethane	ND		500	491		ug/L		98	77 - 120	5	20
1,1-Dichlorethylene	ND		500	482		ug/L		96	66 - 127	8	16
1,2-Dichloroethane	ND		500	451		ug/L		90	75 - 120	7	20
1,2-Dichloropropane	ND		500	481		ug/L		96	76 - 120	4	20
2-Butanone	ND		2500	2280		ug/L		91	57 - 140	0	20
2-Hexanone	ND		2500	2310		ug/L		92	65 - 127	2	15
4-Methyl-2-pentanone	ND		2500	2260		ug/L		91	71 - 125	0	35
Acetone	ND		2500	2210		ug/L		89	56 - 142	1	15
Benzene	ND		500	489		ug/L		98	71 - 124	5	13
Bromodichloromethane	ND		500	512		ug/L		102	80 - 122	1	15
Bromoform	ND		500	525		ug/L		105	61 - 132	3	15
Bromomethane	ND		500	524		ug/L		105	55 - 144	2	15
Carbon disulfide	ND		500	496		ug/L		99	59 - 134	7	15
Carbon tetrachloride	ND		500	506		ug/L		101	72 - 134	7	15
Chlorobenzene	ND		500	486		ug/L		97	80 - 120	2	25
Chloroethane	ND		500	510		ug/L		102	69 - 136	9	15

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

Lab Sample ID: 480-106316-4 MSD
Matrix: Water
Analysis Batch: 322567

Client Sample ID: WG-5513-092116-SG-003
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloroform	14	J	500	502		ug/L		97	73 - 127	2	20
Chloromethane	ND		500	396		ug/L		79	68 - 124	6	15
cis-1,2-Dichloroethene	930	F1	500	1240	F1	ug/L		62	74 - 124	4	15
cis-1,3-Dichloropropene	ND		500	488		ug/L		98	74 - 124	2	15
Dibromochloromethane	ND		500	531		ug/L		106	75 - 125	1	15
Ethylbenzene	ND		500	478		ug/L		96	77 - 123	4	15
Methylene Chloride	11	J	500	522		ug/L		102	75 - 124	4	15
Styrene	ND		500	506		ug/L		101	80 - 120	0	20
Tetrachloroethene	240		500	677		ug/L		87	74 - 122	4	20
Toluene	ND		500	488		ug/L		98	80 - 122	1	15
trans-1,2-Dichloroethene	ND		500	502		ug/L		100	73 - 127	3	20
trans-1,3-Dichloropropene	ND		500	477		ug/L		95	80 - 120	1	15
Trichloroethene	660	F1	500	990	F1	ug/L		65	74 - 123	2	16
Vinyl chloride	180		500	573		ug/L		79	65 - 133	5	15

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*77 - 120*
4-Bromofluorobenzene (Surr)	*104*		*73 - 120*
Toluene-d8 (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*75 - 123*

Lab Sample ID: MB 480-322680/6
Matrix: Water
Analysis Batch: 322680

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.82	ug/L			09/27/16 22:21	1
1,1,2,2-Tetrachloroethane	ND		1.0	0.21	ug/L			09/27/16 22:21	1
1,1,2-Trichloroethane	ND		1.0	0.23	ug/L			09/27/16 22:21	1
1,1-Dichloroethane	ND		1.0	0.38	ug/L			09/27/16 22:21	1
1,1-Dichlorethylene	ND		1.0	0.29	ug/L			09/27/16 22:21	1
1,2-Dichloroethane	ND		1.0	0.21	ug/L			09/27/16 22:21	1
1,2-Dichloropropane	ND		1.0	0.72	ug/L			09/27/16 22:21	1
2-Butanone	ND		10	1.3	ug/L			09/27/16 22:21	1
2-Hexanone	ND		5.0	1.2	ug/L			09/27/16 22:21	1
4-Methyl-2-pentanone	ND		5.0	2.1	ug/L			09/27/16 22:21	1
Acetone	ND		10	3.0	ug/L			09/27/16 22:21	1
Benzene	ND		1.0	0.41	ug/L			09/27/16 22:21	1
Bromodichloromethane	ND		1.0	0.39	ug/L			09/27/16 22:21	1
Bromoform	ND		1.0	0.26	ug/L			09/27/16 22:21	1
Bromomethane	ND		1.0	0.69	ug/L			09/27/16 22:21	1
Carbon disulfide	ND		1.0	0.19	ug/L			09/27/16 22:21	1
Carbon tetrachloride	ND		1.0	0.27	ug/L			09/27/16 22:21	1
Chlorobenzene	ND		1.0	0.75	ug/L			09/27/16 22:21	1
Chloroethane	ND		1.0	0.32	ug/L			09/27/16 22:21	1
Chloroform	ND		1.0	0.34	ug/L			09/27/16 22:21	1
Chloromethane	ND		1.0	0.35	ug/L			09/27/16 22:21	1
cis-1,2-Dichloroethene	ND		1.0	0.81	ug/L			09/27/16 22:21	1

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

Lab Sample ID: MB 480-322680/6
Matrix: Water
Analysis Batch: 322680

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

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,3-Dichloropropene	ND		1.0	0.36	ug/L			09/27/16 22:21	1
Dibromochloromethane	ND		1.0	0.32	ug/L			09/27/16 22:21	1
Ethylbenzene	ND		1.0	0.74	ug/L			09/27/16 22:21	1
Methylene Chloride	ND		1.0	0.44	ug/L			09/27/16 22:21	1
Styrene	ND		1.0	0.73	ug/L			09/27/16 22:21	1
Tetrachloroethene	ND		1.0	0.36	ug/L			09/27/16 22:21	1
Toluene	ND		1.0	0.51	ug/L			09/27/16 22:21	1
trans-1,2-Dichloroethene	ND		1.0	0.90	ug/L			09/27/16 22:21	1
trans-1,3-Dichloropropene	ND		1.0	0.37	ug/L			09/27/16 22:21	1
Trichloroethene	ND		1.0	0.46	ug/L			09/27/16 22:21	1
Vinyl chloride	ND		1.0	0.90	ug/L			09/27/16 22:21	1
Xylenes, Total	ND		2.0	0.66	ug/L			09/27/16 22:21	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*77 - 120*		*09/27/16 22:21*	*1*
4-Bromofluorobenzene (Surr)	*97*		*73 - 120*		*09/27/16 22:21*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*09/27/16 22:21*	*1*
Dibromofluoromethane (Surr)	*107*		*75 - 123*		*09/27/16 22:21*	*1*

Lab Sample ID: LCS 480-322680/4
Matrix: Water
Analysis Batch: 322680

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	25.0	24.7		ug/L		99	73 - 126
1,1,2,2-Tetrachloroethane	25.0	21.7		ug/L		87	76 - 120
1,1,2-Trichloroethane	25.0	22.4		ug/L		90	76 - 122
1,1-Dichloroethane	25.0	24.3		ug/L		97	77 - 120
1,1-Dichlorethylene	25.0	24.1		ug/L		96	66 - 127
1,2-Dichloroethane	25.0	23.0		ug/L		92	75 - 120
1,2-Dichloropropane	25.0	24.0		ug/L		96	76 - 120
2-Butanone	125	125		ug/L		100	57 - 140
2-Hexanone	125	113		ug/L		90	65 - 127
4-Methyl-2-pentanone	125	105		ug/L		84	71 - 125
Acetone	125	143		ug/L		114	56 - 142
Benzene	25.0	24.3		ug/L		97	71 - 124
Bromodichloromethane	25.0	24.5		ug/L		98	80 - 122
Bromoform	25.0	23.6		ug/L		94	61 - 132
Bromomethane	25.0	25.7		ug/L		103	55 - 144
Carbon disulfide	25.0	24.0		ug/L		96	59 - 134
Carbon tetrachloride	25.0	25.1		ug/L		100	72 - 134
Chlorobenzene	25.0	23.3		ug/L		93	80 - 120
Chloroethane	25.0	26.6		ug/L		107	69 - 136
Chloroform	25.0	24.2		ug/L		97	73 - 127
Chloromethane	25.0	21.5		ug/L		86	68 - 124
cis-1,2-Dichloroethene	25.0	24.4		ug/L		97	74 - 124
cis-1,3-Dichloropropene	25.0	23.5		ug/L		94	74 - 124
Dibromochloromethane	25.0	24.5		ug/L		98	75 - 125

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

Lab Sample ID: LCS 480-322680/4
Matrix: Water
Analysis Batch: 322680

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ethylbenzene	25.0	22.9		ug/L		92	77 - 123
Methylene Chloride	25.0	26.0		ug/L		104	75 - 124
Styrene	25.0	24.3		ug/L		97	80 - 120
Tetrachloroethene	25.0	23.9		ug/L		95	74 - 122
Toluene	25.0	23.2		ug/L		93	80 - 122
trans-1,2-Dichloroethene	25.0	24.0		ug/L		96	73 - 127
trans-1,3-Dichloropropene	25.0	22.8		ug/L		91	80 - 120
Trichloroethene	25.0	24.2		ug/L		97	74 - 123
Vinyl chloride	25.0	23.7		ug/L		95	65 - 133

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*77 - 120*
4-Bromofluorobenzene (Surr)	*100*		*73 - 120*
Toluene-d8 (Surr)	*96*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*75 - 123*

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-321680/1-A
Matrix: Water
Analysis Batch: 321918

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 321680

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND		0.050	0.019	mg/L		09/22/16 08:55	09/22/16 19:57	1
Potassium	ND		0.50	0.10	mg/L		09/22/16 08:55	09/22/16 19:57	1
Zinc	ND		0.010	0.0015	mg/L		09/22/16 08:55	09/22/16 19:57	1

Lab Sample ID: LCS 480-321680/2-A
Matrix: Water
Analysis Batch: 321918

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 321680

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	10.0	11.33		mg/L		113	80 - 120
Potassium	10.0	10.05		mg/L		100	80 - 120
Zinc	0.200	0.196		mg/L		98	80 - 120

Lab Sample ID: LCSD 480-321680/22-A
Matrix: Water
Analysis Batch: 321918

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 321680

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	10.0	11.46		mg/L		115	80 - 120	1	20
Potassium	10.0	10.23		mg/L		102	80 - 120	2	20
Zinc	0.200	0.206		mg/L		103	80 - 120	5	20

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 321918

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA
Prep Batch: 321680

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	0.41		10.0	11.57		mg/L		112	75 - 125
Potassium	3.2		10.0	13.28		mg/L		101	75 - 125
Zinc	ND		0.200	0.195		mg/L		97	75 - 125

Lab Sample ID: 480-106316-2 MSD
Matrix: Water
Analysis Batch: 321918

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA
Prep Batch: 321680

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	0.41		10.0	11.69		mg/L		113	75 - 125	1	20
Potassium	3.2		10.0	13.44		mg/L		102	75 - 125	1	20
Zinc	ND		0.200	0.194		mg/L		97	75 - 125	0	20

Lab Sample ID: MB 480-322210/1-A
Matrix: Water
Analysis Batch: 322599

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 322210

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	ND	^	0.050	0.019	mg/L		09/24/16 08:23	09/26/16 22:31	1
Potassium	ND		0.50	0.10	mg/L		09/24/16 08:23	09/26/16 22:31	1
Zinc	ND		0.010	0.0015	mg/L		09/24/16 08:23	09/26/16 22:31	1

Lab Sample ID: LCS 480-322210/2-A
Matrix: Water
Analysis Batch: 322599

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 322210

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	10.0	10.26	^	mg/L		103	80 - 120
Potassium	10.0	9.98		mg/L		100	80 - 120
Zinc	0.200	0.209		mg/L		104	80 - 120

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 322599

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Dissolved
Prep Batch: 322210

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Potassium	3.2		10.0	13.64		mg/L		104	75 - 125
Zinc	ND		0.200	0.214		mg/L		107	75 - 125

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 322731

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Dissolved
Prep Batch: 322210

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Iron	0.37		10.0	10.27		mg/L		99	75 - 125

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: 480-106316-2 MSD — **Client Sample ID: WG-5513-092116-SG-001**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 322599 — **Prep Batch: 322210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Potassium	3.2		10.0	13.52		mg/L		103	75 - 125	1	20
Zinc	ND		0.200	0.210		mg/L		105	75 - 125	2	20

Lab Sample ID: 480-106316-2 MSD — **Client Sample ID: WG-5513-092116-SG-001**
Matrix: Water — **Prep Type: Dissolved**
Analysis Batch: 322731 — **Prep Batch: 322210**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	0.37		10.0	10.23		mg/L		99	75 - 125	0	20

Method: 350.1 - Ammonia

Lab Sample ID: MB 480-321784/27 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321784

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.020	0.0090	mg/L			09/22/16 12:37	1

Lab Sample ID: MB 480-321784/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321784

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.020	0.0090	mg/L			09/22/16 12:16	1

Lab Sample ID: MB 480-321784/51 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321784

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.020	0.0090	mg/L			09/22/16 12:58	1

Lab Sample ID: LCS 480-321784/28 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321784

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	1.00	1.00		mg/L		100	90 - 110

Lab Sample ID: LCS 480-321784/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321784

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	1.00	0.999		mg/L		100	90 - 110

Method: 350.1 - Ammonia (Continued)

Lab Sample ID: LCS 480-321784/52
Matrix: Water
Analysis Batch: 321784

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

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia			1.00	1.00		mg/L		100	90 - 110		

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 321784

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia	0.39	F1	0.200	0.545	F1	mg/L		78	90 - 110		

Lab Sample ID: 480-106316-2 MSD
Matrix: Water
Analysis Batch: 321784

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	0.39	F1	0.200	0.571		mg/L		91	90 - 110	5	20

Lab Sample ID: 480-106316-8 MS
Matrix: Water
Analysis Batch: 321784

Client Sample ID: WG-5513-092116-SG-007
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia	0.078	F1	0.200	0.252	F1	mg/L		87	90 - 110		

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 480-321625/1-A
Matrix: Water
Analysis Batch: 321791

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 321625

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	ND		0.20	0.15	mg/L		09/22/16 02:55	09/22/16 10:32	1

Lab Sample ID: LCS 480-321625/2-A
Matrix: Water
Analysis Batch: 321791

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 321625

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen			2.50	2.48		mg/L		99	90 - 110		

Lab Sample ID: 480-106316-2 MS
Matrix: Water
Analysis Batch: 321791

Client Sample ID: WG-5513-092116-SG-001
Prep Type: Total/NA
Prep Batch: 321625

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Kjeldahl Nitrogen	0.59		1.00	1.57		mg/L		97	90 - 110		

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: 480-106316-2 MSD — **Client Sample ID: WG-5513-092116-SG-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321791 — **Prep Batch: 321625**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Kjeldahl Nitrogen	0.59		1.00	1.64		mg/L		105	90 - 110	5	20

Lab Sample ID: 480-106316-5 MS — **Client Sample ID: WG-5513-092116-SG-004**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321791 — **Prep Batch: 321625**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Kjeldahl Nitrogen	0.90		1.00	1.92		mg/L		102	90 - 110

Method: 353.2 - Nitrogen, Nitrite

Lab Sample ID: MB 480-321613/3 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321613

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrite	0.0215	J	0.050	0.020	mg/L			09/21/16 21:59	1

Lab Sample ID: LCS 480-321613/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321613

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite	1.50	1.54		mg/L		103	90 - 110

Lab Sample ID: 480-106316-2 MS — **Client Sample ID: WG-5513-092116-SG-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321613

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrite	ND	F1	1.00	1.18	F1	mg/L		118	90 - 110

Lab Sample ID: 480-106316-2 MSD — **Client Sample ID: WG-5513-092116-SG-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 321613

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrite	ND	F1	1.00	1.10		mg/L		110	90 - 110	7	20

GC/MS VOA

Analysis Batch: 322449

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-1	TB-5513-092116-SG	Total/NA	Water	8260C	
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	8260C	
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	8260C	
MB 480-322449/7	Method Blank	Total/NA	Water	8260C	
LCS 480-322449/5	Lab Control Sample	Total/NA	Water	8260C	
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	8260C	
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	8260C	

Analysis Batch: 322567

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	8260C	
480-106316-4 - DL	WG-5513-092116-SG-003	Total/NA	Water	8260C	
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	8260C	
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	8260C	
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	8260C	
MB 480-322567/6	Method Blank	Total/NA	Water	8260C	
LCS 480-322567/4	Lab Control Sample	Total/NA	Water	8260C	
480-106316-4 MS	WG-5513-092116-SG-003	Total/NA	Water	8260C	
480-106316-4 MSD	WG-5513-092116-SG-003	Total/NA	Water	8260C	

Analysis Batch: 322680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	8260C	
MB 480-322680/6	Method Blank	Total/NA	Water	8260C	
LCS 480-322680/4	Lab Control Sample	Total/NA	Water	8260C	

Metals

Prep Batch: 321680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	3005A	
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	3005A	
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	3005A	
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	3005A	
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	3005A	
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	3005A	
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	3005A	
MB 480-321680/1-A	Method Blank	Total/NA	Water	3005A	
LCS 480-321680/2-A	Lab Control Sample	Total/NA	Water	3005A	
LCSD 480-321680/22-A	Lab Control Sample Dup	Total/NA	Water	3005A	
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	3005A	
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	3005A	

Analysis Batch: 321918

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	6010C	321680
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	6010C	321680
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	6010C	321680
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	6010C	321680
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	6010C	321680

Metals (Continued)

Analysis Batch: 321918 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	6010C	321680
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	6010C	321680
MB 480-321680/1-A	Method Blank	Total/NA	Water	6010C	321680
LCS 480-321680/2-A	Lab Control Sample	Total/NA	Water	6010C	321680
LCSD 480-321680/22-A	Lab Control Sample Dup	Total/NA	Water	6010C	321680
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	6010C	321680
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	6010C	321680

Prep Batch: 322210

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Dissolved	Water	3005A	
480-106316-3	WG-5513-092116-SG-002	Dissolved	Water	3005A	
480-106316-4	WG-5513-092116-SG-003	Dissolved	Water	3005A	
480-106316-5	WG-5513-092116-SG-004	Dissolved	Water	3005A	
480-106316-6	WG-5513-092116-SG-005	Dissolved	Water	3005A	
480-106316-7	WG-5513-092116-SG-006	Dissolved	Water	3005A	
480-106316-8	WG-5513-092116-SG-007	Dissolved	Water	3005A	
MB 480-322210/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 480-322210/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
480-106316-2 MS	WG-5513-092116-SG-001	Dissolved	Water	3005A	
480-106316-2 MSD	WG-5513-092116-SG-001	Dissolved	Water	3005A	

Analysis Batch: 322599

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210
480-106316-3	WG-5513-092116-SG-002	Dissolved	Water	6010C	322210
480-106316-4	WG-5513-092116-SG-003	Dissolved	Water	6010C	322210
480-106316-5	WG-5513-092116-SG-004	Dissolved	Water	6010C	322210
480-106316-6	WG-5513-092116-SG-005	Dissolved	Water	6010C	322210
480-106316-7	WG-5513-092116-SG-006	Dissolved	Water	6010C	322210
480-106316-8	WG-5513-092116-SG-007	Dissolved	Water	6010C	322210
MB 480-322210/1-A	Method Blank	Total Recoverable	Water	6010C	322210
LCS 480-322210/2-A	Lab Control Sample	Total Recoverable	Water	6010C	322210
480-106316-2 MS	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210
480-106316-2 MSD	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210

Analysis Batch: 322731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210
480-106316-3	WG-5513-092116-SG-002	Dissolved	Water	6010C	322210
480-106316-5	WG-5513-092116-SG-004	Dissolved	Water	6010C	322210
480-106316-2 MS	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210
480-106316-2 MSD	WG-5513-092116-SG-001	Dissolved	Water	6010C	322210

General Chemistry

Analysis Batch: 321613

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	353.2	
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	353.2	

General Chemistry (Continued)

Analysis Batch: 321613 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	353.2	
MB 480-321613/3	Method Blank	Total/NA	Water	353.2	
LCS 480-321613/4	Lab Control Sample	Total/NA	Water	353.2	
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	353.2	
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	353.2	

Analysis Batch: 321614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	353.2	
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	353.2	
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	353.2	
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	353.2	

Prep Batch: 321625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	351.2	
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	351.2	
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	351.2	
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	351.2	
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	351.2	
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	351.2	
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	351.2	
MB 480-321625/1-A	Method Blank	Total/NA	Water	351.2	
LCS 480-321625/2-A	Lab Control Sample	Total/NA	Water	351.2	
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	351.2	
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	351.2	
480-106316-5 MS	WG-5513-092116-SG-004	Total/NA	Water	351.2	

Analysis Batch: 321784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	350.1	
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	350.1	
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	350.1	
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	350.1	
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	350.1	
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	350.1	
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	350.1	
MB 480-321784/27	Method Blank	Total/NA	Water	350.1	
MB 480-321784/3	Method Blank	Total/NA	Water	350.1	
MB 480-321784/51	Method Blank	Total/NA	Water	350.1	
LCS 480-321784/28	Lab Control Sample	Total/NA	Water	350.1	
LCS 480-321784/4	Lab Control Sample	Total/NA	Water	350.1	
LCS 480-321784/52	Lab Control Sample	Total/NA	Water	350.1	
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	350.1	
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	350.1	
480-106316-8 MS	WG-5513-092116-SG-007	Total/NA	Water	350.1	

Analysis Batch: 321791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-2	WG-5513-092116-SG-001	Total/NA	Water	351.2	321625
480-106316-3	WG-5513-092116-SG-002	Total/NA	Water	351.2	321625

General Chemistry (Continued)

Analysis Batch: 321791 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-106316-4	WG-5513-092116-SG-003	Total/NA	Water	351.2	321625
480-106316-5	WG-5513-092116-SG-004	Total/NA	Water	351.2	321625
480-106316-6	WG-5513-092116-SG-005	Total/NA	Water	351.2	321625
480-106316-7	WG-5513-092116-SG-006	Total/NA	Water	351.2	321625
480-106316-8	WG-5513-092116-SG-007	Total/NA	Water	351.2	321625
MB 480-321625/1-A	Method Blank	Total/NA	Water	351.2	321625
LCS 480-321625/2-A	Lab Control Sample	Total/NA	Water	351.2	321625
480-106316-2 MS	WG-5513-092116-SG-001	Total/NA	Water	351.2	321625
480-106316-2 MSD	WG-5513-092116-SG-001	Total/NA	Water	351.2	321625
480-106316-5 MS	WG-5513-092116-SG-004	Total/NA	Water	351.2	321625

Client Sample ID: TB-5513-092116-SG

Lab Sample ID: 480-106316-1

Date Collected: 09/21/16 00:00

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322449	09/27/16 03:44	GTG	TAL BUF

Client Sample ID: WG-5513-092116-SG-001

Lab Sample ID: 480-106316-2

Date Collected: 09/21/16 10:20

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322449	09/27/16 04:09	GTG	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:11	LMH	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322731	09/28/16 02:00	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:04	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 13:04	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:19	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321613	09/21/16 22:14	ELR	TAL BUF

Client Sample ID: WG-5513-092116-SG-002

Lab Sample ID: 480-106316-3

Date Collected: 09/21/16 09:45

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322567	09/27/16 13:58	RRS	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:29	LMH	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322731	09/28/16 02:27	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:30	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 12:50	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:19	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321613	09/21/16 22:07	ELR	TAL BUF

Client Sample ID: WG-5513-092116-SG-003

Lab Sample ID: 480-106316-4

Date Collected: 09/21/16 11:20

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322449	09/27/16 05:00	GTG	TAL BUF

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-003

Lab Sample ID: 480-106316-4

Date Collected: 09/21/16 11:20

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C	DL	20	322567	09/27/16 14:22	RRS	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:33	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:34	AMH	TAL BUF
Total/NA	Analysis	350.1		2	321784	09/22/16 13:14	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:19	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321614	09/21/16 21:35	ELR	TAL BUF

Client Sample ID: WG-5513-092116-SG-004

Lab Sample ID: 480-106316-5

Date Collected: 09/21/16 09:45

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322567	09/27/16 14:46	RRS	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:36	LMH	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322731	09/28/16 02:31	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:37	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 12:52	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:28	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321613	09/21/16 22:09	ELR	TAL BUF

Client Sample ID: WG-5513-092116-SG-005

Lab Sample ID: 480-106316-6

Date Collected: 09/21/16 12:15

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322567	09/27/16 15:10	RRS	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:51	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:40	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 12:53	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:28	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321614	09/21/16 21:37	ELR	TAL BUF

Lab Chronicle

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Client Sample ID: WG-5513-092116-SG-006

Lab Sample ID: 480-106316-7

Date Collected: 09/21/16 11:00

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322680	09/28/16 03:18	GTG	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:54	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:44	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 12:54	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:28	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321614	09/21/16 21:38	ELR	TAL BUF

Client Sample ID: WG-5513-092116-SG-007

Lab Sample ID: 480-106316-8

Date Collected: 09/21/16 11:55

Matrix: Water

Date Received: 09/21/16 14:24

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	322567	09/27/16 15:58	RRS	TAL BUF
Dissolved	Prep	3005A			322210	09/24/16 08:23	MVZ	TAL BUF
Dissolved	Analysis	6010C		1	322599	09/26/16 23:58	LMH	TAL BUF
Total/NA	Prep	3005A			321680	09/22/16 08:55	RMZ	TAL BUF
Total/NA	Analysis	6010C		1	321918	09/22/16 20:47	AMH	TAL BUF
Total/NA	Analysis	350.1		1	321784	09/22/16 12:55	CEA	TAL BUF
Total/NA	Prep	351.2			321625	09/22/16 02:55	DCB	TAL BUF
Total/NA	Analysis	351.2		1	321791	09/22/16 11:28	CLT	TAL BUF
Total/NA	Analysis	353.2		1	321614	09/21/16 21:48	ELR	TAL BUF

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Certification Summary

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Laboratory: TestAmerica Buffalo

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
New York	NELAP	2	10026	03-31-17

Method Summary

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds by GC/MS	SW846	TAL BUF
6010C	Metals (ICP)	SW846	TAL BUF
350.1	Ammonia	MCAWW	TAL BUF
351.2	Nitrogen, Total Kjeldahl	MCAWW	TAL BUF
353.2	Nitrogen, Nitrite	MCAWW	TAL BUF

Protocol References:

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

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

Laboratory References:

TAL BUF = TestAmerica Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

Sample Summary

Client: GHD Services Inc.
Project/Site: 5513, GrafTech Annual GW Monitoring

TestAmerica Job ID: 480-106316-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-106316-1	TB-5513-092116-SG	Water	09/21/16 00:00	09/21/16 14:24
480-106316-2	WG-5513-092116-SG-001	Water	09/21/16 10:20	09/21/16 14:24
480-106316-3	WG-5513-092116-SG-002	Water	09/21/16 09:45	09/21/16 14:24
480-106316-4	WG-5513-092116-SG-003	Water	09/21/16 11:20	09/21/16 14:24
480-106316-5	WG-5513-092116-SG-004	Water	09/21/16 09:45	09/21/16 14:24
480-106316-6	WG-5513-092116-SG-005	Water	09/21/16 12:15	09/21/16 14:24
480-106316-7	WG-5513-092116-SG-006	Water	09/21/16 11:00	09/21/16 14:24
480-106316-8	WG-5513-092116-SG-007	Water	09/21/16 11:55	09/21/16 14:24

CHAIN OF CUSTODY RECORD

COC NO.: 55710

Address: Niagara Falls office

PAGE 1 OF 1

Phone: Fax:

9/29/2016

Project No/ Phase/Task Code: 5513	Laboratory Name: Test America	Lab Location: Amherst NY	SSOW ID:
Project Name: Greatech Landfill Annual GW	Lab Contact: Melissa Deyo		Cool
Project Location: Witmer Rd Niagara Falls			Carrier:
GHD Chemistry Contact: Deb Andrasko			Airbill No: 480-106316 COC
Sampler(s): D. Tyran S. Gardner			Total # of Containers: 64

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Filtered (Y/N)	VOCs	Ammonia	Diss Metals	Total Metals	Nitrate								Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)						HC	H2	HN	HN											
1	TB-5513-092116-SG	9-21-16		TB	G	N	X												1		
2	WG-5513-092116-SG-001	9-21-16	1020	WG	G	Y	X	X	X	X	X								21	X	
3	WG-5513-092116-SG-002	9-21-16	0945	WG	G	Y	X	X	X	X	X								7		
4	WG-5513-092116-SG-003	9-21-16	1120	WG	G	Y	X	X	X	X	X								7		
5	WG-5513-092116-SG-004	9-21-16	0945	WG	G	Y	X	X	X	X	X								7		
6	WG-5513-092116-SG-005	9-21-16	1215	WG	G	Y	X	X	X	X	X								7		
7	WG-5513-092116-SG-006	9-21-16	1100	WG	G	Y	X	X	X	X	X								7		
8	WG-5513-092116-SG-007	9-21-16	1155	WG	G	Y	X	X	X	X	X								7		
9																					DST
10																					
11																					
12																					

Page 44 of 45

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☒ 2 Week ☐ Other:

Notes/ Special Requirements: 3.1 #1

	Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1.	Dan Tyran	GHD	9-21-16	1424	1-	TA Buf.	9/21/16	1424
2.					2.			
3.					3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

GHD Form: COC-10B (20110804)

Login Sample Receipt Checklist

Client: GHD Services Inc.

Job Number: 480-106316-1

Login Number: 106316

List Source: TestAmerica Buffalo

List Number: 1

Creator: Kolb, Chris M

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is 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 sample IDs on the containers 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	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	GHD
Samples received within 48 hours of sampling.	True	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

ENCLOSURE 4

GHD Memorandum to GrafTech, Reference No. 005513, Annual Groundwater Sampling Performed on September 21, 2016 at GrafTech SWMU No. 32N03, dated October 3, 2016 (including contour maps and field logs dated September 21, 2016)

Memorandum

October 3, 2016

To:	Juanita Bursley [Juanita.bursley@graftech.com]	Ref. No.:	005513
From:	Dave Tyran/cs/16	Tel:	716-205-1910
cc:	Jim Kay		

Subject: Annual Groundwater Sampling

1. Introduction

In accordance with GHD Field Sampling Plan (FSP) Post-Closure Monitoring Program for Graftech International Holdings, Inc. Solid Waste Management Unit (SWMU) No. 32NO3, the annual groundwater sampling event was performed on September 21, 2016. Activities associated with this sampling event are described in this memo.

2. Hydraulic Monitoring

Prior to sampling, a complete round of water level measurements and well soundings were taken. Table 1 presents the water level information; in addition, Figures 2.1 and 2.2 show the plotted groundwater contours for the overburden and bedrock wells.

3. Groundwater Monitoring

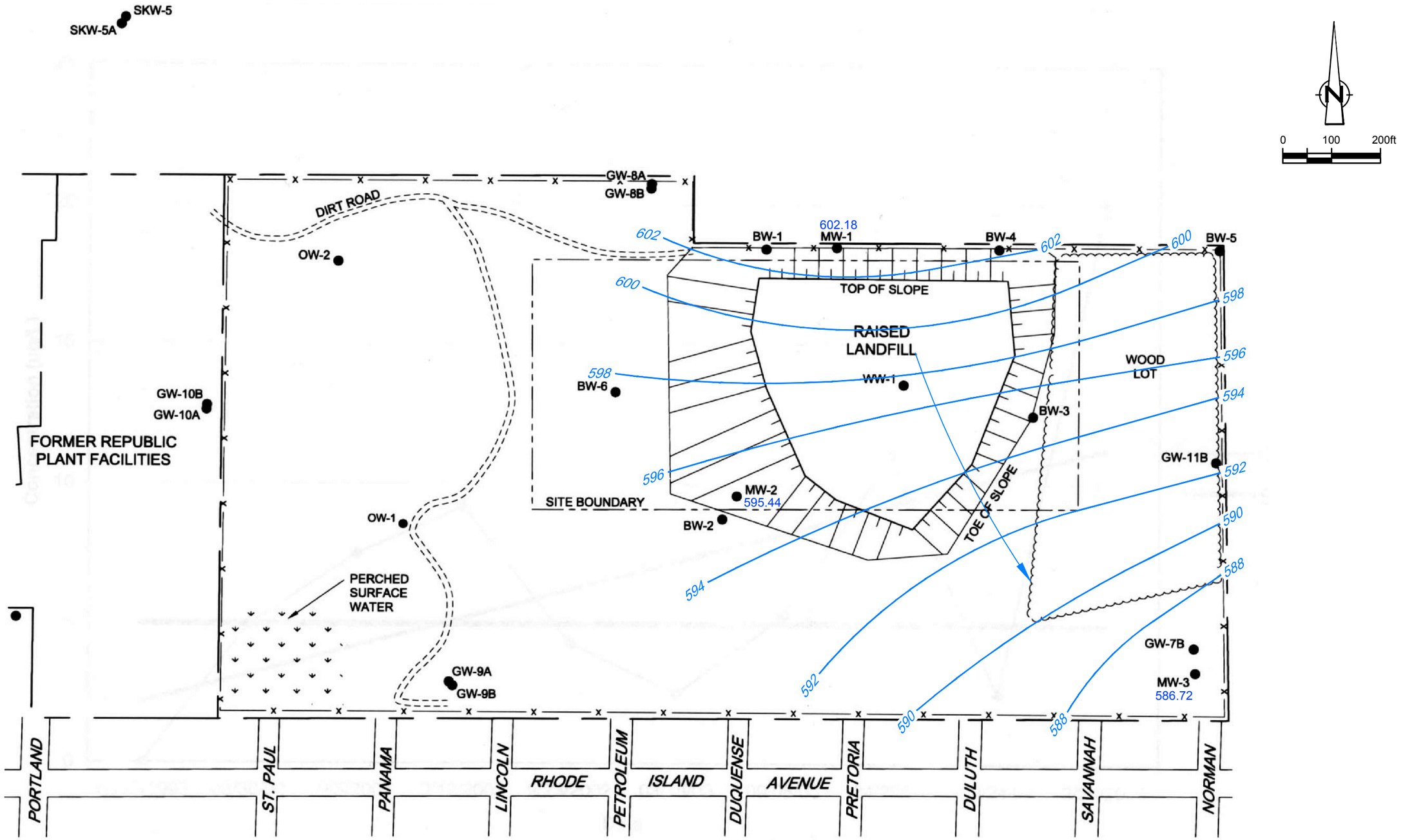
A total of seven monitoring wells were visited during this sampling round. Monitoring well MW-3 was found to have only 0.06' of water and as such was deemed dry and not sampled this round. Purging and sampling of the six remaining wells was accomplished with use of a master flex peristaltic pump with 1/4" inch diameter Teflon tubing following United States Environmental Protection Agency (USEPA) low-flow sampling procedures.

4. Redevelopment of BW-4

Three weeks prior to sampling monitoring well BW-4 was redeveloped. Redevelopment was accomplished using a battery-powered submersible pump attached to 1/2" diameter polyethylene tubing. The pump was initially set at the top of the water column and one well volume was purged with a turbidity reading being taken after removal of that volume. The pump was then removed and a surge block was installed and the entire length of the screened interval was surged for two minutes to loosen any built up material on the

GHD
2055 Niagara Falls Boulevard Niagara Falls New York 14304 USA
T 716 297 6150 **F** 716 297 2265 **W** www.ghd.com

screen. After surging the pump was reinstalled and several more well volumes were removed. The surging process was repeated three more times during the redevelopment. Table 2 present the redevelopment data.

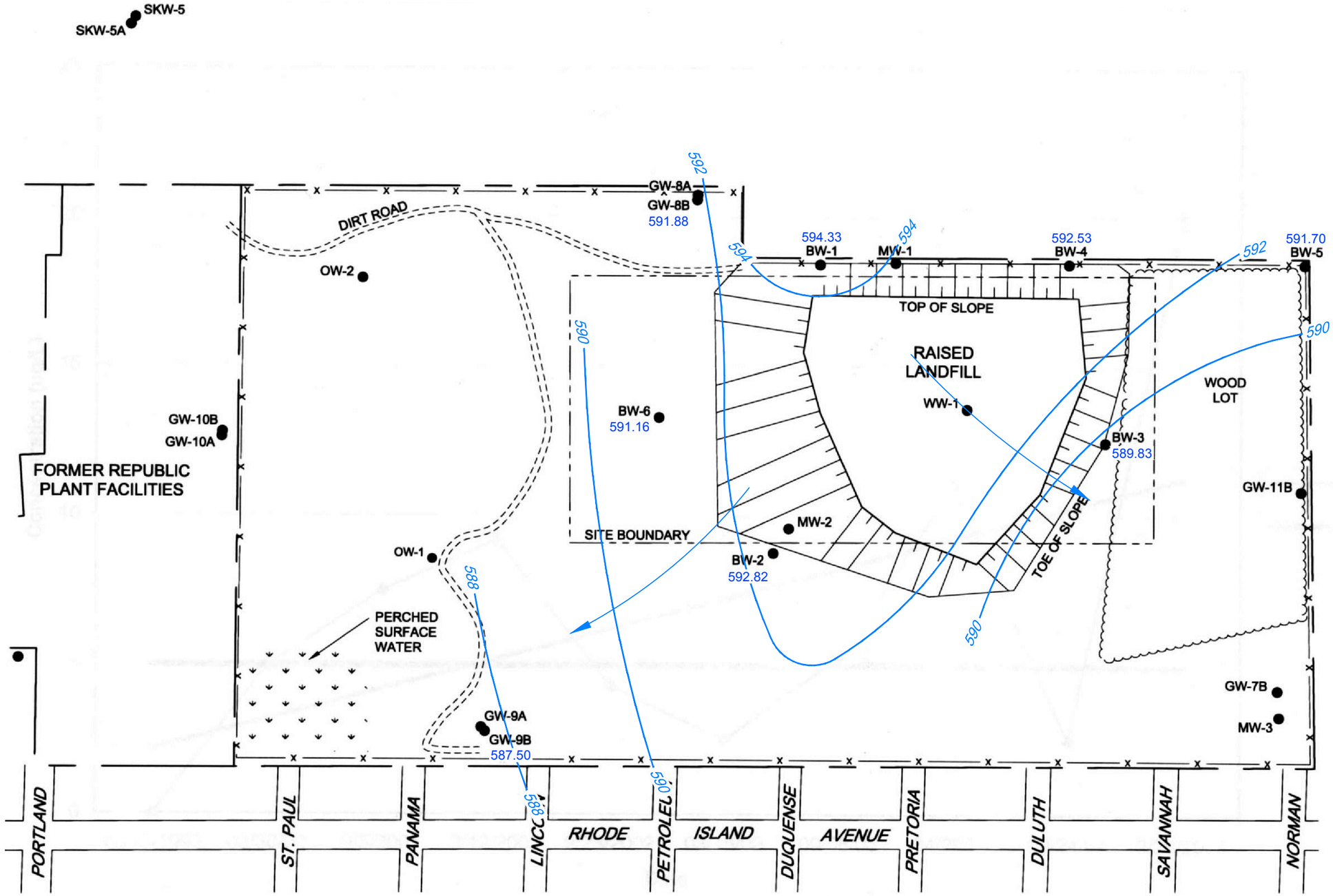


LEGEND

- MW-3 — PSA MONITORING WELL LOCATION
- PROPERTY LINE
- x — FENCE
- 591.38 — GROUNDWATER ELEVATION (ft.)
- GROUNDWATER FLOW DIRECTION

figure 2.1

OVERBURDEN GROUNDWATER CONTOURS (SEPTEMBER 21, 2016)
GRAFTECH INTERNATIONAL HOLDINGS INC. SITE
Niagara Falls, New York



LEGEND

- MW-3 — PSA MONITORING WELL LOCATION
- PROPERTY LINE
- x — FENCE
- 595.34 — GROUNDWATER ELEVATION (ft.)
- GROUNDWATER FLOW DIRECTION

figure 2.2

BEDROCK GROUNDWATER CONTOURS (SEPTEMBER 21, 2016)
GRAFTECH INTERNATIONAL HOLDINGS INC. SITE
Niagara Falls, New York

Table 1

Hydraulic Monitoring
Post-Closure Monitoring Program
Graftech International Holdings, Inc. SWMU #32NO3
Niagara Falls, New York
September 2016

Well I.D.	TOC Elevation (Ft. AMSL)	Depth to Water (Ft. BTOC)	Water Level Elevation (Ft. AMSL)	Sounded Depth (Ft. BTOC)	Installed Depth (Ft. BTOC)
MW-1	612.00	9.82	602.18	21.14	21.10
MW-2	608.17	12.73	595.44	24.67	21.10
MW-3	601.89	15.17	586.72	15.23	14.4
BW-1	610.72	16.39	594.33	28.88	35.9
BW-2	608.43	15.61	592.82	24.65	37.1
BW-3	604.72	14.89	589.83	23.50	22.7
BW-4	607.08	14.55	592.53	21.40	27.5
BW-5	603.33	11.63	591.70	25.77	28.20
BW-6	607.04	15.88	591.16	25.71	36.50
GW-8B	603.90	12.02	591.88	29.10	29.5
GW-9B	603.40	15.90	587.50	31.90	31.7

Notes:

Ft. Feet
AMSL Above Mean Sea Level
BTOC Below Top of Casing

Table 2

Redevelopment Data
Post-Closure Monitoring Program
Graftech International Holdings, Inc. SWMU #32NO3
Niagara Falls, New York
September 2016

Well Volume 4.6 gallons

Volume #	Gallons	Time	Turbidity (NTUs)	Water Quality
1	4.6	9:55	355	Black/Oily Sheen
Remove pump and install surge block. Surge well for 2 minutes. Removed surge block install pump at top of water column.				
2	9.2	10:02	>1000	Black/Turbid/Sheen
3	13.8	10:04	767	Brown/Turbid/Sheen
4	18.4	10:07	204	
5	23.0	10:09	116	
Repeat surge procedure				
6	27.6	10:16	>1000	Brown/Turbid/Sheen
7	32.2	10:19	>1000	Brown/Turbid/Sheen
8	36.8	10:22	554	Light Brown/Sheen
9	41.4	10:24	193	Clearing/Sheen
10	46.0	10:26	131	Clearing/Sheen
Repeat surge procedure				
11	50.6	10:34	>1000	Brown/Turbid/Sheen
12	55.2	10:37	>1000	Brown/Turbid/Sheen
13	59.8	10:39	>1000	Brown/Turbid/Sheen
14	64.4	10:42	>1000	Brown/Turbid/Sheen

Table 2

Redevelopment Data
Post-Closure Monitoring Program
Graftech International Holdings, Inc. SWMU #32NO3
Niagara Falls, New York
September 2016

Repeat surge procedure

Volume #	Gallons	Time	Turbidity (NTUs)	Water Quality
15	69.0	10:51	>1000	Brown/Turbid/Sheen
16	73.6	10:54	>1000	Brown/Turbid/Sheen
17	78.2	10:58	835	Brown/Turbid/Sheen
18	82.8	11:01	437	Clearing/Sheen
19	87.4	11:04	263	Clearing/Sheen
20	92.0	11:07	193	Clearing/Sheen
21	96.6	11:10	139	Clearing/Sheen
22	101.2	11:14	117	Clearing/Sheen
23	105.8	11:16	94.3	Clearing/Sheen
24	110.4	11:19	78.2	Clearing/Sheen

Development complete. Final water quality slightly cloudy, light brown, very slight oily sheen. Final turbidity 75 NTUs.

Graftech Annual GW Sampling

September 21, 2016

Project # 5513
Field File

Water Level Measurement Equipment and Supply Checklist
(Form SP-10)

Date: 09/21/2016 (mm/dd/yyyy)

Reference No. 3573

Instruments

- [x] Water level indicator
- [ ] Steel tape
- [ ] Oil/Water interface probe
- [ ] Air monitoring equipment

Supplies

- [ ] Foil
- [ ] Tyveks (assorted sizes and types)
- [x] Paper towels/Rags
- [x] Decontamination fluids
  - [ ] 2 - Propanol
  - [x] Deionized water
  - [ ] Hexane (pesticide grade)
  - [ ] Methanol (pesticide grade)
  - [ ] Other
- [x] Trash bags
- [x] Plastic spray bottles

Personal Protective Equipment

- [x] Latex gloves
- [ ] Hard hats/liner(s)
- [x] Field overboots
- [x] Work gloves (cotton and chemical resistant)
- [x] Safety glasses/or side shields on
- [ ] OSHA-approved prescription lenses
- [x] First aid kit
- [ ] Respirators
- [x] Check health and safety plan

Documentation

- [ ] Well logs
- [ ] Notebook/Field book
- [ ] Photolog
- [ ] Site pass/badge
- [ ] Previous well logs/previous historical well data
- [ ] Site map
- [x] Blank well data forms

Miscellaneous

- [x] Well cap keys
- [ ] Bolt cutters
- [ ] Camera/Film
- [ ] Knife
- [ ] Spare batteries for instruments
- [ ] Lock deicer (winter)
- [x] Pen/Pencil/Indelible marking pen
- [x] Tool box
- [x] Spare locks/keys
- On site transportation (all-terrain vehicle/snowmobiles)

Completed By: David Tyson (please print)

Date: 09/21/2016 (mm/dd/yyyy)

Groundwater Sampling Equipment and Supply Checklist
(Form SP-05)

Date: 09/21/2016 (mm/dd/yyyy)

Reference No. 5513

Equipment

- [x] Required sampling equipment (as per work plan or QAPP)

Instruments

Water level indicator

Thermometer *

- [ ] pH meter *
- [ ] Conductivity probe *
- [ ] Turbidity meter
- [ ] HNu/OVA/Microtip
- [ ] Air monitoring equipment

Supplies

- [ ] Gasoline can/gas
- [ ] Polypropylene rope
- [ ] Aluminum foil
- [x] Paper towels / Rags
- [x] pH buffer solution(s)
- [x] Conductivity standard solution(s)
- [x] Decontamination fluids (as per work plan and QAPP)
- [x] Sample jars (extra)
- [x] Sample jar labels (GHD) materials
- [ ] Cooler(s)/ice packs/packing materials
- [x] Trash bags
- [ ] Sample preservatives
- [x] Plastic spray bottles
- [ ] Plastic basin or pan
- [x] Sample filter (on line or external filter)
- [ ] Polyethylene sheeting
- [x] First aid kit
- [x] Personal protective equipment (as per HASP)

Documentation

- [ ] Chain of custody forms
- [ ] Well logs
- [ ] Notebook/Field book
- [ ] Photolog
- [ ] Site pass/badge
- [ ] Federal Express manifests
- [ ] Previous well logs/previous historical well data
- [ ] Site map
- [ ] Blank well data forms

Miscellaneous

- [ ] Well cap keys
- [ ] Bolt cutters
- [ ] Camera/film
- [ ] Knife
- [ ] Spare batteries for instruments
- [ ] Lock deicer (winter)
- [ ] Reinforced packing tape
- [ ] Pen/pencil/indelible marking pen
- [ ] Tool box
- [ ] Spare locks/keys
- [ ] On site transportation (all-terrain vehicle/snowmobiles)

Completed By: _____ (please print)

Date: _____ (mm/dd/yyyy)

Project Planning Completion and Follow-Up Checklist
(Form SP-02)

Date: 09/23/2016 (mm/dd/yyyy) Reference No. 5513

Prior Planning and Coordination

- [x] Confirm well-numbers, location and accessibility
- [x] Review of project documents, Health and Safety Plan (HASP), sampling Quality Assurance/Quality Control (QA/QC) and site-specific sampling requirements
- [x] Historical well data; depth, pH, performance and disposition of purge water
- [x] Site access notification and coordination
- [x] Coordination with laboratory through GHD chemistry group
- [x] Procurement, inventory and inspection of all equipment and supplies
- [x] Prior equipment preparation, calibration or maintenance
- [ ] N/A All utilities located and approved

Filed Procedure

- [x] Instruments calibrated daily
- [x] Sampling equipment decontaminated in accordance with the QAPP
- [x] Field measurements and sampling details logged in appropriate field books or an appropriate field form
- [x] Well volume calculated and specified volumes removed
- [x] Specified samples, and QA/QC samples taken per Quality Assurance Project Plan (QAPP)
- [x] Samples properly labeled, preserved and packed
- [x] Sampling locations secured or completed according to work plan
- [x] Sample date times, locations and sample numbers have all been recorded in applicable log(s)
- [x] Samples have been properly stored if not shipped/delivered to lab same day
- [x] Samples were shipped with complete and accurate chain of custody record

Follow-Up Activities

- [x] Questionable measurements field verified
- [x] Confirm all samples collected
- [x] All equipment has been maintained and returned
- [x] Sampling information reduced and required sample keys and field data distributed
- [x] Chain of custody records filed
- [x] Expendable stock supplies replaced
- [x] GHD and client-controlled items returned (i.e., keys)
- [x] Arrange disposal of investigation generated wastes with client
- [x] Confirm all samples collected

Completed By: David Tyron (please print) Date: 09/23/2016 (mm/dd/yyyy)

Control number: NF0611.7, NF0611.8
Date (mm/dd/yyyy): 09/21/2016
User (print name): D. Tyson S. Gardner

Project number: 5513
Project name: Graftech Landfill

Location: Wilmer Rd NF

Additional equipment control numbers and descriptions:

Field procedure before use:

	Check when completed
○ Check for broken or missing parts.	
○ Check battery	☒
○ Check operation of buzzer.	☒
○ Check operation of signal light.	☒
○ Test probe in water to ensure unit operates, both visually and audibly.	☒
○ Check cable.	☒

Filing: Field file

Signature: D. Tyson

Control number: NF090411
Date (mm/dd/yyyy): 09/21/2016
User (print name): D. Tyran

Project number: 5513
Project name: Graftech Landfill

Location: Witmer Rd Niagara Falls

Additional equipment control numbers and descriptions:

20 NTU Lot # A5211 exp 10/2016
100 NTU Lot # A5180 exp 10/2016
800 NTU Lot # A5183 exp 10/2016

Field procedure before use:

Do not calibrate in the field - in-house calibration only by field equipment manager.	Check when completed
Check kit contents;	
○ Meter	☒
○ Low 0-10, medium 0-100, high 0-1000 standards	☒
○ Extra AA batteries	☒
○ Sample vials	☒
Test and record Gelex standards:	☒

	Gelex Standard	*Meter Reading*
○ Low 0-10	20	21.5
○ Medium 0-100	100	104
○ High 0-1000	800	786

Note: Condensation on outside of sample bottles affects meter readings.

Filing: Field file

Signature: D. J. Tyran

Control number: NFO5039
Date (mm/dd/yyyy): 9/21/16
User (print name): SB

Project number: 5513
Project name: GRAFTECH LANDFILL GW SAMPLING
Location: HYDE PARK, NY

Additional equipment control numbers and descriptions:
20 NTU LOT# AS211 EXP. OCT 16'
100 NTU LOT# AS180 EXP. OCT 16'
800 NTU LOT# AS183 EXP. OCT 16'

Field procedure before use:

Do not calibrate in the field - in-house calibration only by field equipment manager.	Check when completed
Check kit contents; ○ Meter ○ Low 0-10, medium 0-100, high 0-1000 standards ○ Extra AA batteries ○ Sample vials	☒ ☒ ☒ ☒
Test and record Gelex standards:	☒

	Gelex Standard	*Meter Reading*
○ Low 0-~~10~~ 20	20	22.6
○ Medium 0-100	100	100
○ High 0-1000	800	796

Note: Condensation on outside of sample bottles affects meter readings.

Filing: Field file

Signature: Sharon Hardner

Graftech Landfill

5513

DAILY LOG

9-21-16 Calibrate Horiba multi-parameter meter control # NF06155 with auto cal solution Lot# C688427 exp 6/2017

	Before	After
pH 4.00	4.09	3.99
Cond 4.49	4.37	4.49
DO	8.84	8.01

0835 DT, SG on site Sunny 65-80°F windy calm
DT start w/c Round SG set up on GW-9B
0940 Complete w/c round set up on BW-3 Purge & Sample Low-flow (MS/MSD)
Trip Blank = TB-5513-092116-SG 1x40ml w/HCL
1052 Set up on BW-4 Purge & Sample Low-flow
1137 Set up on BW-1 Purge & Sample Low-flow
1236 Off-site

DT

DAILY LOG

9/21/16 YSI PRO SERIES # NF076002 CALABRATION USING PH 4.00
AUTO CAL LOT# CL6BL3370 EXP. 4/5/17
PH 4.00 BEFORE 4.14 AFTER 4.00
COND 4.49 BEFORE 4.59. AFTER 4.49
DO% BAR. 751.7 99.2 % READING 8.48
0823 ONSITE SG WEATHER - SUNNY 64°F WINDS N 0-5MPH
0838 SET UP ON MW-3 PURGE AND SAMPLE LOW FLOW - DRY
METHOD - LOW FLOW USING MASTERFLEX PERISTALTIC PUMP
W/ DEDICATED TUBING TO WELL
0850 SET UP ON GW-9B PURGE AND SAMPLE (DUP)
1008 SET UP ON BW-2 PURGE AND SAMPLE
1111 SET UP ON GW-8B PURGE AND SAMPLE
1236 OFFSITE

SG 9/21/16

5513

Sharon Hardin

Project Data:
Project Name: GRAFTECH LANDFILL
Ref. No.: 5513

Date: 9/21/12
Personnel: SG

DRY

Monitoring Well Data:
Well No.: MW-3
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft):
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 15.17

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
	* INSUFFICIENT VOLUME FOR READINGS AND SAMPLE										
	BOTTOM @ 15.23										

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

Sample ID WG-5513-092116-SG-002-001
Sample Time 1020

Monitoring Well Record for Low-Flow Purging
(Form SP-09)

MS/MSD

Project Data:

Project Name: Graftech Landfill
Ref. No.: 5513

Date: 9-21-16
Personnel: D. Tyran

C of C # 55709

Monitoring Well Data:

Well No.: BW-3
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft):
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)(1):
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)(2):
Initial Depth to Water (m/ft): 14.89

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level(3) (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged(4)
			Precision Required:	±3 %	±0.005 or 0.01(5)	±10 %	±10 %	±0.1 Units	±10 mV		
0952	344	14.91	0.02	13.26	1.71	1.53	7.22	6.11	150		
0957	352	14.91	0.02	12.69	1.71	0.93	4.65	6.61	35		
1002		14.91	0.02	12.60	1.71	4.40	4.36	6.84	-16		
1007	344	14.91	0.02	12.66	1.71	2.46	4.39	6.88	-30		
1012		14.91	0.02	12.65	1.71	0.46	4.44	6.93	-42		
1017		14.91	0.02	12.77	1.71	0.38	4.46	6.96	-49		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm. For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

Inst. Control #'s
WL Meter NF06117
Horiba NF06605
Turb. NF05091

Start Purge @ 0944

David Tyran

GHD Form SP-01 – Revision 0 – July 1, 2015

SAMPLE ID# WG-5513-092116-SG-002
BLIND DUPLICATE - WG-5513-092116-SG-004

TIME 0945

Monitoring Well Record for Low-Flow Purging

(Form SP-09)

DUP

Project Data:

Project Name: GRAFTECH LANDFILL
Ref. No.: 5513

Date: 9/21/16
Personnel: SG

Monitoring Well Data:

Well No.: GW-9B
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft): 31.90
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 15.87

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
0910	324	16.42	0.55	11.3	2.30	0.84	0.86	5.84	122.0		
0915		16.48	0.61	11.2	2.24	0.32	0.66	5.94	87.6		
0920	326	16.50	0.63	11.2	2.24	0.62	0.56	5.97	60.4		
0925		16.52	0.65	11.2	2.25	0.69	0.48	5.99	41.0		
0930	326	16.53	0.66	11.2	2.25	0.50	0.43	6.04	23.1		
0935		16.55	0.68	11.2	2.25	0.25	0.38	6.06	14.0		
0940		16.57	0.70	11.2	2.25	0.24	0.37	6.08	9.0		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

INST CONTROL #S
YSI - NF076002
W/L METER - NF041118
TURBIDIMETER - NF030387

START PURGE @ 0904

Sample ID WG-5513-092116-SG-003
Sample Time 1120

Monitoring Well Record for Low-Flow Purging
(Form SP-09)

Project Data:
Project Name: Greftech Landfill
Ref. No.: 5513

Date: 9-21-16
Personnel: D. Tyran

CoC # 55709

Monitoring Well Data:
Well No.: BW-4
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft):
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 14.58

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
1101	252	14.58	0.00	14.16	1.83	43.5	7.11	6.88	-69		
1106	256	14.60	0.02	13.85	1.83	16.9	4.90	6.87	-85		
1111		14.63	0.05	13.93	1.83	8.63	4.45	6.87	-93		
1116	260	14.64	0.06	14.01	1.83	6.87	4.29	6.88	-97		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

Inst. Control #'s
W/L Heta NF06117
Turb- NF05041
Horiba NF06655

Start purge @ 1056

D. Tyran

Sample ID WG-5513-092116-SG-005
Sample Time 1215

Monitoring Well Record for Low-Flow Purging
(Form SP-09)

Project Data:
Project Name: Graftech Landfill
Ref. No.: 5513

Date: 9-21-16
Personnel: D. Tyson

C of C # 55709

Monitoring Well Data:
Well No.: BW-1
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft): 25.85
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 16.39

Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
1149	376	16.58	0.19	13.50	1.48	30.1	6.29	7.47	-80		
1154	378	16.59	0.20	13.26	1.48	25.8	4.55	7.63	-126		
1159	360	16.60	0.21	13.19	1.47	18.8	4.27	7.64	-136		
1204		16.61	0.22	13.33	1.47	12.6	4.13	7.62	-142		
1209	338	16.61	0.22	13.28	1.46	10.5	4.05	7.62	-145		
1214				13.28	1.46	7.22	3.99	7.60	-146		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

Dist. Control #3
W/L Meter NF06617
Horiba NF06155
Turb NF05041

Start Purge @ 1144

SAMPLE ID# WG-5513-092116-SG-002 TIME 1100

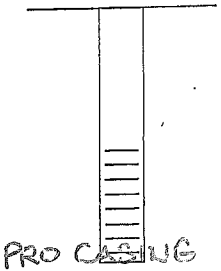
Monitoring Well Record for Low-Flow Purging
(Form SP-09)

Project Data:
Project Name: GRAFTECH LAND FILL
Ref. No.: 5513

Date: 9/21/16
Personnel: SG

Monitoring Well Data:
Well No.: BW-2
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft): 24.65
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 17.44 - TOP OF PRO CASING



Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
1020	348	17.45	0.01	12.0	2.32	10.9	1.11	6.46	-70.5		
1025		17.45	0.01	11.8	2.29	8.25	0.52	6.46	-87.6		
1030	350	17.45	0.01	11.8	2.29	5.77	0.28	6.46	-100.0		
1035		17.45	0.01	11.9	2.29	3.94	0.23	6.49	-124.1		
1040		17.45	0.01	12.0	2.28	4.39	0.25	6.51	-145.3		
1045	348	17.45	0.01	12.0	2.28	4.40	0.25	6.53	-162.1		
1050		17.45	0.01	11.9	2.28	3.78	0.25	6.57	-170.1		
1055		17.45	0.01	11.9	2.28	3.56	0.24	6.62	-178.2		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

INST CONTROL #'S
YSI - NF076602
W/L METER - NF061178
TURBIDIMETER - NF053039

START PURGE @ 1010

Dave Taylor

SAMPLE ID# WG-5513-092116-SG-007 TIME 1155

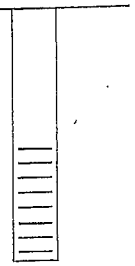
Monitoring Well Record for Low-Flow Purging
(Form SP-09)

Project Data:
Project Name: GRAFTECH
Ref. No.: 5513

Date: 9/21/16
Personnel: SG

Monitoring Well Data:
Well No.: GW-83
Vapour PID (ppm):
Measurement Point:
Constructed Well Depth (m/ft):
Measured Well Depth (m/ft): 29.10
Depth of Sediment (m/ft):

Saturated Screen Length (m/ft):
Depth to Pump Intake (m/ft)[1]:
Well Diameter, D (cm/in):
Well Screen Volume, V_s (L)[2]:
Initial Depth to Water (m/ft): 12.13



Time	Pumping Rate (mL/min)	Depth to Water (m/ft)	Drawdown from Initial Water Level[3] (m/ft)	Temperature °C	Conductivity (mS/cm)	Turbidity NTU	DO (mg/L)	pH	ORP (mV)	Volume Purged, Vp (L)	No. of Well Screen Volumes Purged[4]
Precision Required:				±3 %	±0.005 or 0.01[5]	±10 %	±10 %	±0.1 Units	±10 mV		
1120	140	12.53	0.40	12.7	1.58	8.20	0.56	6.51	-57.6		
1125	146	12.70	0.57	12.6	1.58	5.74	0.41	6.38	-47.4		
1130		12.86	0.73	12.5	1.57	3.01	0.26	6.35	-43.3		
1135	144	12.94	0.81	12.4	1.56	3.13	0.21	6.44	-65.6		
1140	148	13.00	0.93	12.4	1.55	4.43	0.20	6.49	-50.1		
1145	158	13.12	0.99	12.3	1.57	1.54	0.19	6.41	-43.9		
1150		13.17		12.3	1.58	1.39	0.18	6.39	-38.7		

Notes:

(1) The pump intake will be placed at the well screen mid-point or at a minimum of 0.6 m (2 ft) above any sediment accumulated at the well bottom.

(2) The well screen volume will be based on a 1.52 metres (5-foot) screen length (L). For metric units, $V_s=\pi*(r^2)*L$ in mL, where r (r=D/2) and L are in cm.
For Imperial units, $V_s=\pi*(r^2)*L*(2.54)^3$, where r and L are in inches

(3) The drawdown from the initial water level should not exceed 0.1 m (0.3 ft). The pumping rate should not exceed 600 mL/min.

(4) Purging will continue until stabilization is achieved or until 20 well screen volumes have been purged (unless purge water remains visually turbid and appears to be clearing, or unless stabilization parameters are varying slightly outside of the stabilization criteria and appear to be stabilizing), No. of Well Screen Volumes Purged= Vp/Vs.

(5) For conductivity, the average value of three readings <1 mS/cm ±0.005 mS/cm or where conductivity >1 mS/cm ±0.01 mS/cm.

INST CONTROL #'S
YSI - NPO 7602
W/L METER - NPO 0118
TURBIDIMETER - NPO 8039

START PURGE @ 1115

Dan Tyler

CHAIN OF CUSTODY RECORD

COC NO.: 55710

Address: Niagara Falls office — PAGE 1 OF 1

Phone: ____ Fax: ____

Project No/ Phase/Task Code: 5513	Laboratory Name: Test America	Lab Location: Amherst NY	SSOW ID:
Project Name: Graftech Landfill Annual GW	Lab Contact: Melissa Deyo		Cooler No:
Project Location: Witmer Rd Niagara Falls			Carrier:
GHD Chemistry Contact: Deb Andrasko			Airbill No:
Sampler(s): D Tyran S. Gardner			Total # of Containers: 64

Item	Sample Identification (Containers for each sample may be combined on one line)	Date (mm/dd/yy)	Time (hh:mm)	Matrix Code (see back of COC)	Grab (G) or Comp (C)	Filtered (Y/N)	VOCs	Ammonia	Diss Metals	Total Metals	Nitrate								Total Containers/sample	MS/MSD Request	Comments/ Special Instructions:
	PRESERVATION - (SEE BACK OF COC FOR ABBREVIATIONS)						HCl	H2SO4	HNO3	HNO3	-										
1	TB-5513-092116-SG	9-21-16		TB	G	N	X												1		
2	WG-5513-092116-SG-001	9-21-16	1020	WG	G	Y	X	X	X	X	X								21	X	
3	WG-5513-092116-SG-002	9-21-16	0945	WG	G	Y	X	X	X	X	X								7		
4	WG 5513 092116-SG-003	9-21-16	1120	WG	G	Y	X	X	X	X	X								7		
5	WG 5513 092116-SG-004	9-21-16	0945	WG	G	Y	X	X	X	X	X								7		
6	WG 5513 092116-SG-005	9-21-16	1215	WG	G	Y	X	X	X	X	X								7		
7	WG 5513 092116-SG-006	9-21-16	1100	WG	G	Y	X	X	X	X	X								7		
8	WG 5513 092116-SG-007	9-21-16	1155	WG	G	Y	X	X	X	X	X								7		DST
9																					
10																					
11																					
12																					

TAT Required in business days (use separate COCs for different TATs):

☐ 1 Day ☐ 2 Days ☐ 3 Days ☐ 1 Week ☑ 2 Week ☐ Other:

Notes/ Special Requirements:

	Relinquished By	Company	Date	Time	Received By	Company	Date	Time
1.	D Tyran	GHD	9-21-16	1424	1.	TA Buf.	9/21/16	1124
2.					2.			
3.					3.			

THE CHAIN OF CUSTODY IS A LEGAL DOCUMENT – ALL FIELDS MUST BE COMPLETED ACCURATELY

Distribution: WHITE – Fully Executed Copy (CRA) YELLOW – Receiving Laboratory Copy PINK – Shipper GOLDENROD – Sampling Crew

GHD Form: COC-10B (20110804)

BW-4 Redevelopment

8/31/16 Proj 5513-02

Sounded Depth 21.30

w/l 14.15

Vol Calc. 21.3 - 14.15 = 7.15 x .65 = 4.6

0950 install monsoon submersible pump and pump out 1 vol (4.6 gal)

w/@ Dark black/brown earth oily sheen. No field parameters except turbidity taken due to sheen in purge water

Vol #	Gal	Time	Turb	w/@
1	4.6	0955	355	Black

Remove pump and install surge block. Surge well for 2 minutes remove surge block install pump pump from top of water column

2	9.2	1002	> 1000	Black/Turbid
3	13.8	1004	767	Brown/Turbid
4	18.4	1007	204	
5	23.0	1009	116	

1016 Repeat surge procedure

Vol #	Gal	Time	Turb	w/@
6	27.6	1016	> 1000	Brown/Turbid
7	32.2	1019	> 1000	Same
8	36.8	1022	554	Lt Brown
9	41.4	1024	198	Clearing
10	46.0	1026	131	Same

1027 Repeat surge procedure

11	50.6	1034	> 1000	Brown/Turbid
12	55.2	1037	> 1000	Same
13	59.8	1039	> 1000	Same
14	64.4	1042	> 1000	Same

1043 Repeat surge procedure final Time

15	69.0	1051	> 1000	Brown/Turbid
16	73.6	1054	> 1000	Same
17	78.2	1058	835	Same
18	82.8	1101	437	Clearing
19	87.4	1104	263	Same
20	92.0	1107	193	Same
21	96.6	1110	139	Same
22	101.2	1114	117	Same
23	105.8	1116	94.3	Same

David Tegen

Cont

(56)

BW-4 Redevelopment

8/31/16

Project # 5513-0

Vol	Gal	Time	Turb	w/l
24	110.4	1119	78.2	clearing

1120 Development complete
final water quality slightly
cloudy light brown Turb - 75
very slight oily sheen on
water.

Hydraulic Monitoring (57)

Date 9-21-16

Project # 5513- Crew DJT, SG

W/L Meter NF0611 7

Well #	Time	w/l	Depth to Bott.
MW-1	0915	9.82	21.64
MW-2	0858	12.73	24.67
MW-3	0911	15.17	15.23
BW-1	0911	~~19.42~~ 16.39	~~25.85~~ 25.55 (57)
BW-2	0854	15.61	24.65
BW-3	0940	14.89	23.50
BW-4	0920	14.55 (57)	21.40
BW-5	0925	~~10.63~~ 11.63	25.77
BW-6	0902	15.88	25.71
GW-8B	0908	12.02	29.10
GW-9B	0849	15.90	31.90

(57)

ENCLOSURE 5

GHD Analytical Results and Full Validation Report, Annual Groundwater Monitoring Program, GrafTech International Holdings Inc., Niagara Falls, New York, September 2016 (GHD Internal Memorandum to Jim Kay, dated November 16, 2016, revised November 29, 2016)

Memorandum

November 16, 2016
Revised: November 29, 2016

To:	Jim Kay	Ref. No.:	005513
From:	Deb Andrasko/mkd/17-NF	Tel:	716-297-6150

Subject: **Analytical Results and Full Validation**
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

1. Introduction

This document details a validation of analytical results for groundwater samples collected in support of the Annual Groundwater Monitoring Program at the Niagara Falls, New York Site during September 2016. Samples were submitted to TestAmerica Laboratory, located in Amherst, New York. A sample collection and analysis summary is presented in Table 1. The validated analytical results are summarized in Table 2. A summary of the analytical methodology is presented in Table 3.

Full Contract Laboratory Program (CLP) equivalent raw data deliverables were provided by the laboratory. Evaluation of the data was based on information obtained from the finished data sheets, raw data, chain of custody forms, calibration data, blank data, duplicate data, recovery data from surrogate spikes/laboratory control samples (LCS)/matrix spike (MS) samples, and field QC samples. The assessment of analytical and in-house data included checks for: data consistency (by observing comparability of duplicate analyses), adherence to accuracy and precision criteria, and transmittal errors.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 3 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review", USEPA 540-R-10-011, January 2010

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review", USEPA 540-R-08-01, June 2008

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature (0-6°C).

3. Gas Chromatography/Mass Spectrometer (GC/MS) – Tuning and Mass Calibration (Instrument Performance Check) – Volatile Organic Compounds (VOCs)

3.1 Organic Analyses

Prior to VOC analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, the method requires the analysis of the specific tuning compound bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the method before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

Tuning compounds were analyzed at the required frequency throughout VOC analysis periods. All tuning criteria were met indicating that proper optimization of the instrumentation was achieved.

4. Initial Calibration - Organic Analyses

4.1 GC/MS

To quantify VOCs of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed to characterize instrument response for each analyte over a specific concentration range. Linearity of the calibration curve and instrument sensitivity are evaluated against the following criteria:

i) All relative response factors (RRFs) must be greater than or equal to 0.05.(0.01 for poor responders)

ii) The percent relative standard deviation (RSD) values must not exceed 20.0 percent (40 percent for poor performers) or a minimum correlation coefficient (R) of 0.99 and minimum coefficient of determination (R^2) of 0.99 if linear and quadratic equation calibration curves, respectively, are used.

The initial calibration data for VOCs were reviewed. All compounds met the above criteria for sensitivity and linearity.

5. Initial Calibration – Inorganic Analyses

Initial calibration of the instruments ensures that they are capable of producing satisfactory quantitative data at the beginning of a series of analyses. For ICP analysis, a calibration blank and at least one standard must be analyzed at each wavelength to establish the analytical curve. For instrumental general chemistry analyses, a calibration blank and a minimum of five standards must be analyzed to establish the analytical curve, and resulting correlation coefficients (R) must be 0.995 or greater.

After the analyses of the calibration curves, an initial calibration verification (ICV) standard must be analyzed to verify the analytical accuracy of the calibration curves. All analyte recoveries from the analyses of the ICVs must be within the following control limits:

Analytical Method	Parameter	Control Limits
Inductively Coupled Plasma/ Atomic Absorbtion (ICP/AA)	Metals	90 - 110%
Instrumental Wet Chemistry	Ammonia, Nitrite, Total Kjeldahl Nitrogen (TKN)	85 - 115%

Upon review of the data, it was determined that the calibration curves and ICVs were analyzed at the proper frequencies and that all of the above-specified criteria were met. The laboratory effectively demonstrated that the instrumentation used for metals and general chemistry analyses were properly calibrated prior to sample analysis.

6. Continuing Calibration - Organic Analyses

6.1 GC/MS

To ensure that instrument calibration for VOC analyses is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours.

The following criteria were employed to evaluate continuing calibration data:

i) All RRF values must be greater than or equal to 0.05 (0.01 for poor performers)

ii) Percent difference (%D) values must not exceed 25 percent (40 percent for poor performers)

Calibration standards were analyzed at the required frequency, and the results met the above criteria for instrument sensitivity and stability.

7. Continuing Calibration - Inorganic Analyses

To ensure that instrument calibration is acceptable throughout the sample analysis period, continuing calibration verification (CCV) standards are analyzed on a regular basis. Each CCV is deemed acceptable if all analyte recoveries are within the control limits specified above for the ICVs. If some of the CCV analyte recoveries are outside the control limits, samples analyzed before and after the CCV, up until the previous and proceeding CCV analyses, are affected.

For this study, CCVs were analyzed at the proper frequency. All analyte recoveries reported for the CCVs were within the specified limits.

8. Contract Required Detection Limit (CRDL) Standard Analyses

To verify the linearity of the ICP calibration near the detection limit, a standard is analyzed which contains the ICP analytes at specified concentrations. This standard must be analyzed at the beginning and end of each sample analysis run or a minimum of twice per 8-hour period.

CRDL recoveries were evaluated using the criteria specified in the October 2004 "Guidelines". The CRDL recoveries were acceptable.

9. Laboratory Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures. Additionally, initial and continuing calibration blanks (ICBs/CCBs) are routinely analyzed after each ICV/CCV for the inorganic parameters.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

9.1 Organic Analyses

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

9.2 Inorganic Analyses

Upon review of the ICBs, CCBs, and method blanks, it was noted that metals and nitrite concentrations were observed above the method detection limit (MDL) in some of the blanks. All investigative samples associated with the low level detections reported either non-detect concentrations or concentrations significantly greater than the associated laboratory blank concentrations for the analytes of interest. These sample results were not impacted by the contamination detected.

10. Surrogate Spike Recoveries

In accordance with the method employed, all samples, blanks, and QC samples analyzed for VOCs are spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for VOC determinations were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the laboratory criteria.

11. Internal Standards (IS) Analyses

IS data were evaluated for all VOC sample analyses.

11.1 Organics Analyses

To ensure that changes in the GC/MS sensitivity and response do not affect sample analysis results, IS compounds are added to each sample prior to analysis. All results are then calculated as a ratio of the IS responses.

The sample IS results were evaluated against the following criteria:

i) The retention time of the IS must not vary more than ±30 seconds from the associated calibration standard.

ii) IS area counts must not vary by more than a factor of two (-50 percent to +100 percent) from the associated calibration standard.

All organic IS recoveries and retention times met the above criteria.

12. Laboratory Control Sample Analyses

LCS and/or laboratory control sample duplicates (LCSD) are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. The relative percent difference (RPD) of the LCS/LCSD recoveries is used to evaluate analytical precision.

For this study, LCS or LCS/LCSD were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

12.1 Organic Analyses

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

12.2 Inorganic Analyses

The LCS or LCS/LCSD contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries and RPDs were within the control limits, demonstrating acceptable analytical accuracy and precision.

13. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the preparation process, measurement procedures, and accuracy of a particular analysis, samples are spiked with known concentrations of the analytes of concern and analyzed as MS/MSD samples. The RPD between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

MS/MSD analyses were performed as specified in Table 1.

13.1 Organic Analyses

The MS/MSD samples were spiked with all compounds of interest. All percent recoveries and RPD values were within the laboratory control limits with the exception of two compounds with low MS/MSD recoveries. The associated sample results were qualified as estimated based on the implied low bias (see Table 4).

13.2 Inorganic Analyses

The MS/MSD samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries and RPD values were within the control limits, demonstrating acceptable analytical accuracy and precision.

14. ICP Serial Dilution - Metals

The serial dilution determines whether significant physical or chemical interferences exist due to sample matrix. A minimum of 1 per 20 investigative samples or at least 1 per analytical batch must be analyzed at a five-fold dilution. For samples with sufficient analyte concentrations (>50 times the method detection limit), the serial dilution results must agree within 10 percent of the original results.

A serial dilution was performed on each MS/MSD sample. All results met the criteria above.

15. ICP Interference Check Sample Analysis (ICS)

To verify that the laboratory has established proper inter-element and background correction factors, ICSs are analyzed. These samples contain high concentrations of aluminum, calcium, magnesium, and iron and are analyzed at the beginning and end of each sample analysis period. The ICSs are evaluated against recovery control limits of 80 to 120 percent.

ICS analysis results were evaluated for all samples using the criteria in the "Guidelines". All ICS recoveries and results were acceptable.

16. Field QA/QC Samples

The field QA/QC consisted of one trip blank sample, and one field duplicate sample set.

16.1 Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, a trip blank was submitted to the laboratory for VOC analysis. All results were non-detect for the compounds of interest.

16.2 Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, a field duplicate sample set was collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one times the RL value for water samples.

The field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision, with the exception of dissolved iron. The associated sample results were qualified as estimated based on the variability demonstrated (see Table 5).

17. Analyte Reporting

The laboratory reported detected results down to the laboratory's method detection limit (MDL) for each analyte. Positive analyte detections less than the RL but greater than the MDL were reported as estimated (J) in Table 2 unless qualified otherwise in this memorandum. Non-detect results were presented as non-detect at the RL in Table 2.

All dissolved metals results were less than the total results or were within the normal variability of the method (20 percent RPD).

18. Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra (if applicable) were evaluated according to the identification criteria established by the methods. The samples identified in Table 1 were reviewed. The organic compounds reported adhered to the specified identification criteria.

19. Conclusion

Based on the assessment detailed in the foregoing, the data summarized in Table 2 are acceptable with the specific qualifications noted herein.

Table 1

Sample Collection and Analysis Summary
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

					Parameters					
Sample Identification	**Location**	**Matrix**	**Collection Date (mm/dd/yyyy)**	**Collection Time (hr:min)**	**Ammonia (as N)**	**TKN**	**Nitrite**	**Metals**	**VOCs**	**Comments**
TB-5513-092116-SG	-	Water	09/21/2016	-					X	TRIP BLANK
WG-5513-092116-SG-001	BW-3	Water	09/21/2016	10:20	X	X	X	X	X	MS/MSD
WG-5513-092116-SG-002	GW-9B	Water	09/21/2016	09:45	X	X	X	X	X	
WG-5513-092116-SG-003	BW-4	Water	09/21/2016	11:20	X	X	X	X	X	
WG-5513-092116-SG-004	GW-9B	Water	09/21/2016	09:45	X	X	X	X	X	FD (WG-5513-092116-SG-002)
WG-5513-092116-SG-005	BW-1	Water	09/21/2016	12:15	X	X	X	X	X	
WG-5513-092116-SG-006	BW-2	Water	09/21/2016	11:00	X	X	X	X	X	
WG-5513-092116-SG-007	GW-8B	Water	09/21/2016	11:55	X	X	X	X	X	

Notes:

-	- Not applicable
FD	- Field Duplicate sample of sample in parenthesis
MS/MSD	- Matrix Spike/Matrix Spike Duplicate
VOCs	- Volatile Organic Compounds
TKN	- Total Kjeldahl Nitrogen

Table 2

Analytical Results Summary
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Location ID:			BW-1	BW-2	BW-3	BW-4	GW-8B
Sample Name:			WG-5513-092116-SG-005	WG-5513-092116-SG-006	WG-5513-092116-SG-001	WG-5513-092116-SG-003	WG-5513-092116-SG-007
Sample Date:			09/21/2016	09/21/2016	09/21/2016	09/21/2016	09/21/2016
Parameters	**Unit**	NYSDEC Class GA Criteria					
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	5	1.0 U	1.0 U	1.0 U	3.4	1.0 U
1,1,2-Trichloroethane	µg/L	1	1.0 U	1.0 U	1.0 U	0.29 J	1.0 U
1,1-Dichloroethane	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	5	1.0 U	1.0 U	1.0 U	3.3	0.43 J
1,2-Dichloroethane	µg/L	0.6	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	NA	10 U	10 U	10 U	10 U	10 U
2-Hexanone	µg/L	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	µg/L	NA	10 U	10 U	10 U	10 U	10 U
Benzene	µg/L	1	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	µg/L	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	µg/L	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon disulfide	µg/L	60	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	µg/L	5	1.0 U	1.2	1.0 U	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	7	1.0 U	1.0 U	1.0 U	**12**	1.0 U
Chloromethane (Methyl chloride)	µg/L	5	1.0 U	1.0 U	1.0 U	0.64 J	1.0 U
cis-1,2-Dichloroethene	µg/L	5	1.0 U	1.0 U	0.85 J	**930 J**	**24**
cis-1,3-Dichloropropene	µg/L	0.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	µg/L	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylene chloride	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Styrene	µg/L	5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	µg/L	5	1.0 U	1.0 U	1.0 U	**240**	1.0 U
Toluene	µg/L	5	1.0 U	1.0 U	1.0 U	0.79 J	1.0 U
trans-1,2-Dichloroethene	µg/L	5	1.0 U	1.0 U	1.0 U	4.5	1.0 U
trans-1,3-Dichloropropene	µg/L	0.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	µg/L	5	1.0 U	1.0 U	1.0 U	**660 J**	**9.7**
Vinyl chloride	µg/L	2	1.0 U	1.0 U	**3.1**	**180**	**3.1**
Xylenes (total)	µg/L	5	2.0 U	2.0 U	2.0 U	0.76 J	2.0 U
Metals							
Iron	mg/L	0.3	**1.6**	**0.93**	**0.41**	**6.2**	0.12
Iron (dissolved)	mg/L	0.3	**0.58**	0.30	**0.37**	**5.2**	0.11
Potassium	mg/L	NA	4.4	6.5	3.2	21.4	6.1
Potassium (dissolved)	mg/L	NA	4.3	6.4	3.2	21.5	5.9

Table 2

Analytical Results Summary
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Location ID:			**BW-1**	**BW-2**	**BW-3**	**BW-4**	**GW-8B**
Sample Name:			**WG-5513-092116-SG-005**	**WG-5513-092116-SG-006**	**WG-5513-092116-SG-001**	**WG-5513-092116-SG-003**	**WG-5513-092116-SG-007**
Sample Date:			**09/21/2016**	**09/21/2016**	**09/21/2016**	**09/21/2016**	**09/21/2016**
Parameters	**Unit**	NYSDEC Class GA Criteria					
Metals (Continued)							
Zinc	mg/L	NA	0.70	0.28	0.010 U	0.013	0.39
Zinc (dissolved)	mg/L	NA	0.010 U	0.025	0.010 U	0.0028 J	0.40
General Chemistry							
Ammonia-N	mg/L	2	0.53	0.46	0.39	**3.5**	0.078
Nitrite (as N)	mg/L	1	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
Total kjeldahl nitrogen (TKN)	mg/L	NA	1.1	1.1	0.59	4.5	0.29

Notes:

Boxed value is greater than criteria.
J - Estimated concentration
U - Not detected at associated reporting limit
UJ - Not detected, estimated reporting limit
NA - Not applicable
NYSDEC - New York Department of Environmental Conservation

Table 2

Analytical Results Summary
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Location ID:			**GW-9B**	**GW-9B**
Sample Name:			**WG-5513-092116-SG-002**	**WG-5513-092116-SG-004**
Sample Date:			**09/21/2016**	**09/21/2016**
				Duplicate
Parameters	**Unit**	NYSDEC		
Volatile Organic Compounds		Class GA Criteria		
1,1,1-Trichloroethane	µg/L	5	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	5	1.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1	1.0 U	1.0 U
1,1-Dichloroethane	µg/L	5	1.0 U	1.0 U
1,1-Dichloroethene	µg/L	5	1.0 U	1.0 U
1,2-Dichloroethane	µg/L	0.6	1.0 U	1.0 U
1,2-Dichloropropane	µg/L	1	1.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	NA	10 U	10 U
2-Hexanone	µg/L	NA	5.0 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	NA	5.0 U	5.0 U
Acetone	µg/L	NA	10 U	10 U
Benzene	µg/L	1	1.0 U	1.0 U
Bromodichloromethane	µg/L	NA	1.0 U	1.0 U
Bromoform	µg/L	NA	1.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	5	1.0 U	1.0 U
Carbon disulfide	µg/L	60	1.0 U	1.0 U
Carbon tetrachloride	µg/L	5	1.0 U	1.0 U
Chlorobenzene	µg/L	5	1.0 U	1.0 U
Chloroethane	µg/L	5	1.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	7	1.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	5	1.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	5	1.0 U	1.0 U
cis-1,3-Dichloropropene	µg/L	0.4	1.0 U	1.0 U
Dibromochloromethane	µg/L	NA	1.0 U	1.0 U
Ethylbenzene	µg/L	5	1.0 U	1.0 U
Methylene chloride	µg/L	5	1.0 U	1.0 U
Styrene	µg/L	5	1.0 U	1.0 U
Tetrachloroethene	µg/L	5	1.0 U	1.0 U
Toluene	µg/L	5	1.0 U	1.0 U
trans-1,2-Dichloroethene	µg/L	5	1.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	0.4	1.0 U	1.0 U
Trichloroethene	µg/L	5	1.0 U	1.0 U
Vinyl chloride	µg/L	2	1.0 U	1.0 U
Xylenes (total)	µg/L	5	2.0 U	2.0 U
Metals				
Iron	mg/L	0.3	0.18	0.17
Iron (dissolved)	mg/L	0.3	0.23 J	0.15 J
Potassium	mg/L	NA	4.6	4.6
Potassium (dissolved)	mg/L	NA	4.6	4.7

Table 2

Analytical Results Summary
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Location ID:			**GW-9B**	**GW-9B**
Sample Name:			**WG-5513-092116-SG-002**	**WG-5513-092116-SG-004**
Sample Date:			**09/21/2016**	**09/21/2016**
				Duplicate
Parameters	**Unit**	NYSDEC Class GA Criteria		
Metals (Continued)				
Zinc	mg/L	NA	0.0020 J	0.0030 J
Zinc (dissolved)	mg/L	NA	0.0058 J	0.0037 J
General Chemistry				
Ammonia-N	mg/L	2	0.43	0.44
Nitrite (as N)	mg/L	1	0.050 U	0.050 U
Total kjeldahl nitrogen (TKN)	mg/L	NA	0.86	0.90

Notes:

☐ Boxed value is greater than criteria.
J - Estimated concentration
U - Not detected at associated reporting limit
UJ - Not detected, estimated reporting limit
NA - Not applicable
NYSDEC - New York Department of Environmental Conservation

Table 3

Analytical Methods
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Parameter	Method	Matrix	Collection to Analysis (Days)
TCL VOCs	SW-846 8260B[1]	Water	14
Total and Dissolved Metals (iron, potassium, and zinc only)	SW-846 6010C[1]	Water	180
Nitrite	EPA 353.2[2]	Water	48 hours
Ammonia	EPA 350.1[2]	Water	28
Total Kjeldahl Nitrogen	EPA 351.2[2]	Water	28

Notes:

(1) - "Test Methods for Solid Waste/Physical Chemical Methods," SW-846, 3rd Edition, September 1986 (with all subsequent revisions)

(2) - "Methods for Chemical Analysis of Water and Wastes", United States Environmental Protection Agency (USEPA) 600/4-79-220, March 1983 (with all subsequent revisions)

TCL - Target Compound List

VOCs - Volatile Organic Compounds

Table 4

Qualified Sample Results Due to Outlying MS/MSD Results
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Parameter	Sample ID	Analyte	MS % Recovery	MSD % Recovery	RPD (percent)	Control Limits % Recovery	Control Limits RPD	Qualified Result	Units
Volatiles	WG-5513-092116-SG-003	cis-1,2-Dichloroethene	72	62	4	74-124	15	930 J	µg/l
		Trichloroethene	69	65	2	74-123	16	660 J	µg/l

Notes:

MS - Matrix Spike
MSD - Matrix Spike Duplicate
RPD - Relative Percent Difference
J - Estimated concentration

Table 5

Qualified Sample Data Due to Variability in Field Duplicate Results
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
September 2016

Parameter	Analyte	Diff	Sample ID	Qualified Result	Field Duplicate Sample ID	Qualified Result	Units
Metals	Iron (dissolved)	> 1X RL	WG-5513-092116-SG-002	0.23 J	WG-5513-092116-SG-004	0.15 J	mg/l

Notes:

Diff - Difference (i.e., >1X RL for waters or >2XRL for soils)
J - Estimated concentration
RL - Reporting Limit

ENCLOSURE 6

Groundwater Monitoring Data Trend Graphs for Four Volatile Organic Compounds for Three Downgradient Wells, 2010 Through 2016

WELL NUMBER	PARAMETER	STATE LIMIT (ppb)	SEPT. 2010 TEST RESULTS (ppb)	MAY 2011 TEST RESULTS (ppb)	SEPT. 2012 TEST RESULTS (ppb)	MAY 2013 TEST RESULTS (ppb)	OCT 2014 TEST RESULTS (ppb)	MAY 2015 TEST RESULTS (ppb)	SEPT 2016 TEST RESULTS (ppb)
BW4-86 (background)	Cis-1,2-DEC	5	N/S	N/S	**1700**	**1300**	**2200J 1700 Dup**	**1300**	**930 J**
BW4-86 (background)	Tetrachloroethene/	5	**97**	**92**	**120**	**92**	**330J**	**300**	**240**
	Tetrachloroethylene (PCE)						**330 Dup**		
BW4-86 (background)	Trichloroethene (TCE)	5	**300**	**330**	**640**	**510**	**1300J**	**730**	**660 J**
							380 Dup		
BW4-86 (background)	Vinyl Chloride	2	**170**	**190**	**290**	**240**	**350J**	**270**	**180**
							270 Dup		
BW3-86	Cis-1,2-DEC	5	N/S	N/S	2	1.7	0.83J	2.8	0.85 J
BW3-86	Tetrachloroethene/	5	5.0U	0.42U	1.0U	1.0U	1.0U	1.0U	1.0 U
	Tetrachloroethylene (PCE)								
BW3-86	Trichloroethene (TCE)	5	5.0U	0.3U	1.0U	1.0U	1.0U	1.0U	1.0 U
BW3-86	Vinyl Chloride	2	**6.4**	0.3U	**5.7**	**6**	**4.1**	**3.2**	**3.1**
GW8B-93	Cis-1,2-DEC	5	5.0U	N/S	**23**	**20**	**22**	**17**	**24**
GW8B-93	Tetrachloroethene/	5	5.0U	0.42U/	1.0U	1.0U	1.0U	1.0U	1.0 U
	Tetrachloroethylene (PCE)			0.42 Dup					
GW8B-93	Trichloroethene (TCE)	5	**8.8**	**8.2/**	**7.6**	**7.2**	**12**	**12**	**9.7**
				8.7 Dup					
GW8B-93	Vinyl Chloride	2	**3.5J**	**2.9J/**	**3.5**	**3.8**	**2.7**	1.6	**3.1**
				3.5J Dup					

NOTES:
The average of the duplicate samples is used to plot the data
U values are ploted as half the detection limit

cis-1,2-DCE

Sample Date	BW4-86 (Background)	BW3-86	GW8B-93
9/1/2010			2.5
5/1/2011			
9/1/2012	1700	2	23
5/1/2013	1300	1.7	20
10/1/2014	1950	0.89	22
5/1/2015	1300	2.8	17
9/21/2016	930	0.85	24

Trichloroethene (TCE)

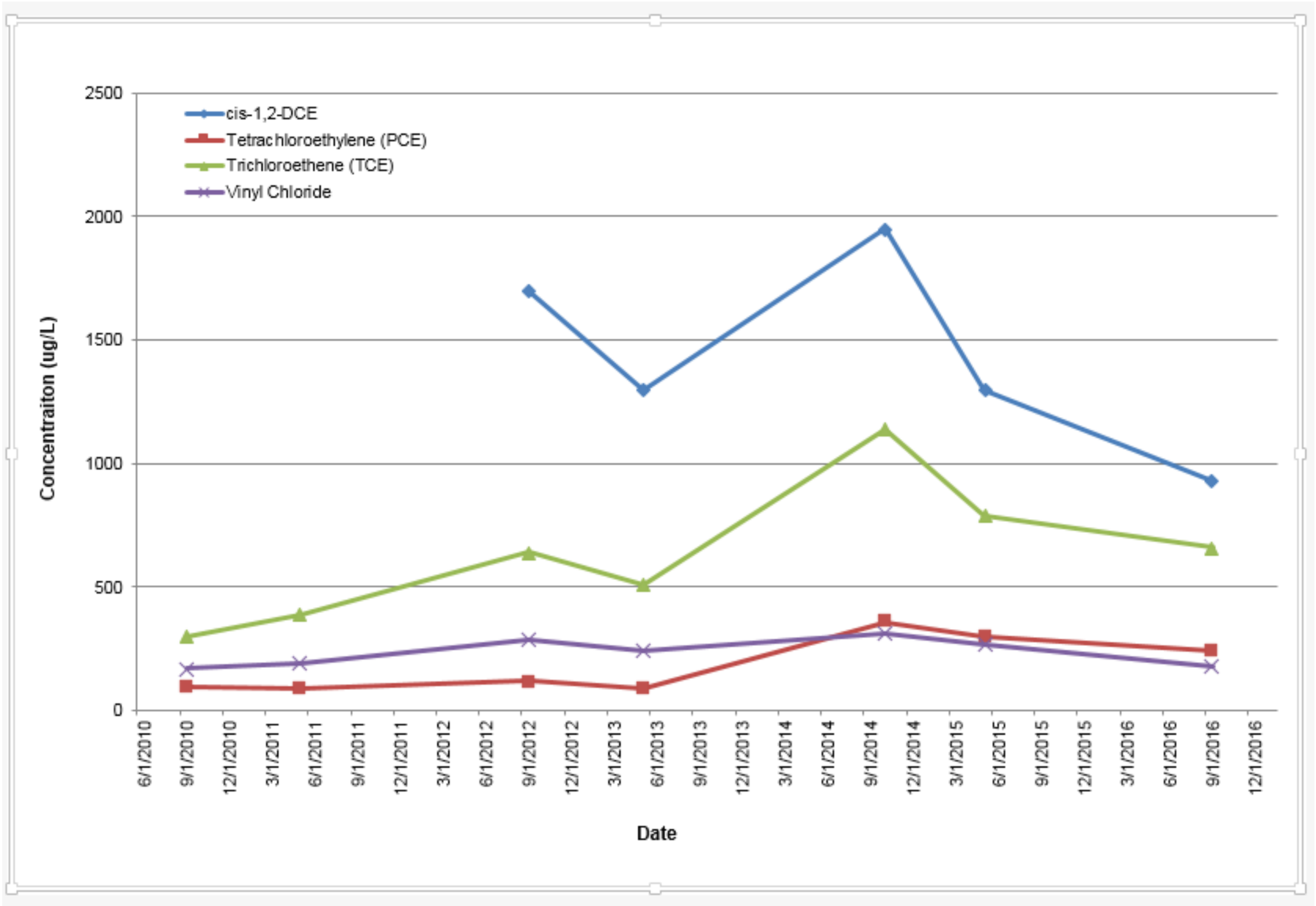
	BW4-86 (Background)	BW3-86	GW8B-93
9/1/2010	300	2.5	8.8
5/1/2011	390	0.15	8.45
9/1/2012	640	0.5	7.6
5/1/2013	510	0.5	7.2
10/1/2014	1140	0.5	12
5/1/2015	790	0.5	12
9/21/2016	660	0.5	9.7

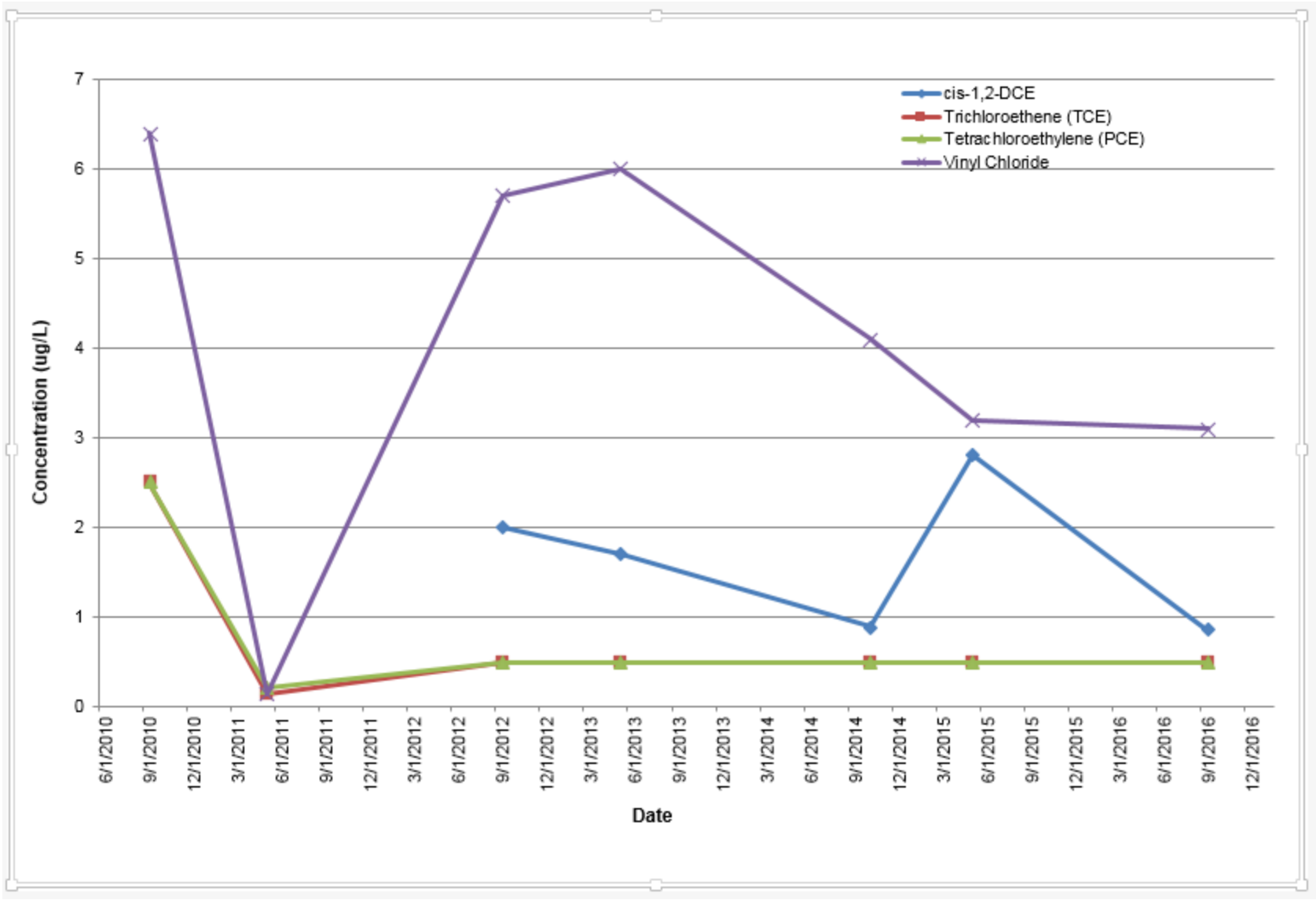
Tetrachloroethylene (PCE)

Sample Date	BW4-86 (Background)	BW3-86	GW8B-93
9/1/2010	97	2.5	2.5
5/1/2011	92	0.21	0.21
9/1/2012	120	0.5	0.5
5/1/2013	92	0.5	0.5
10/1/2014	360	0.5	0.5
5/1/2015	300	0.5	0.5
9/21/2016	240	0.5	0.5

Vinyl Chloride

	BW4-86 (Background)	BW3-86	GW8B-93
9/1/2010	170	6.4	3.5
5/1/2011	190	0.15	3.2
9/1/2012	290	5.7	3.5
5/1/2013	240	6	3.8
10/1/2014	310	4.1	2.7
5/1/2015	270	3.2	1.6
9/21/2016	180	3.1	3.1


cis-1,2-DCE
Tetrachloroethylene (PCE)
Trichloroethene (TCE)
Vinyl Chloride
Concentraiton (ug/L)
2500
2000
1500
1000
500
0
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
9/1/2013
12/1/2013
3/1/2014
6/1/2014
9/1/2014
12/1/2014
3/1/2015
6/1/2015
9/1/2015
12/1/2015
3/1/2016
6/1/2016
9/1/2016
12/1/2016
Date


cis-1,2-DCE
Trichloroethene (TCE)
Tetrachloroethylene (PCE)
Vinyl Chloride
Concentration (ug/L)
0
1
2
3
4
5
6
7
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
9/1/2013
12/1/2013
3/1/2014
6/1/2014
9/1/2014
12/1/2014
3/1/2015
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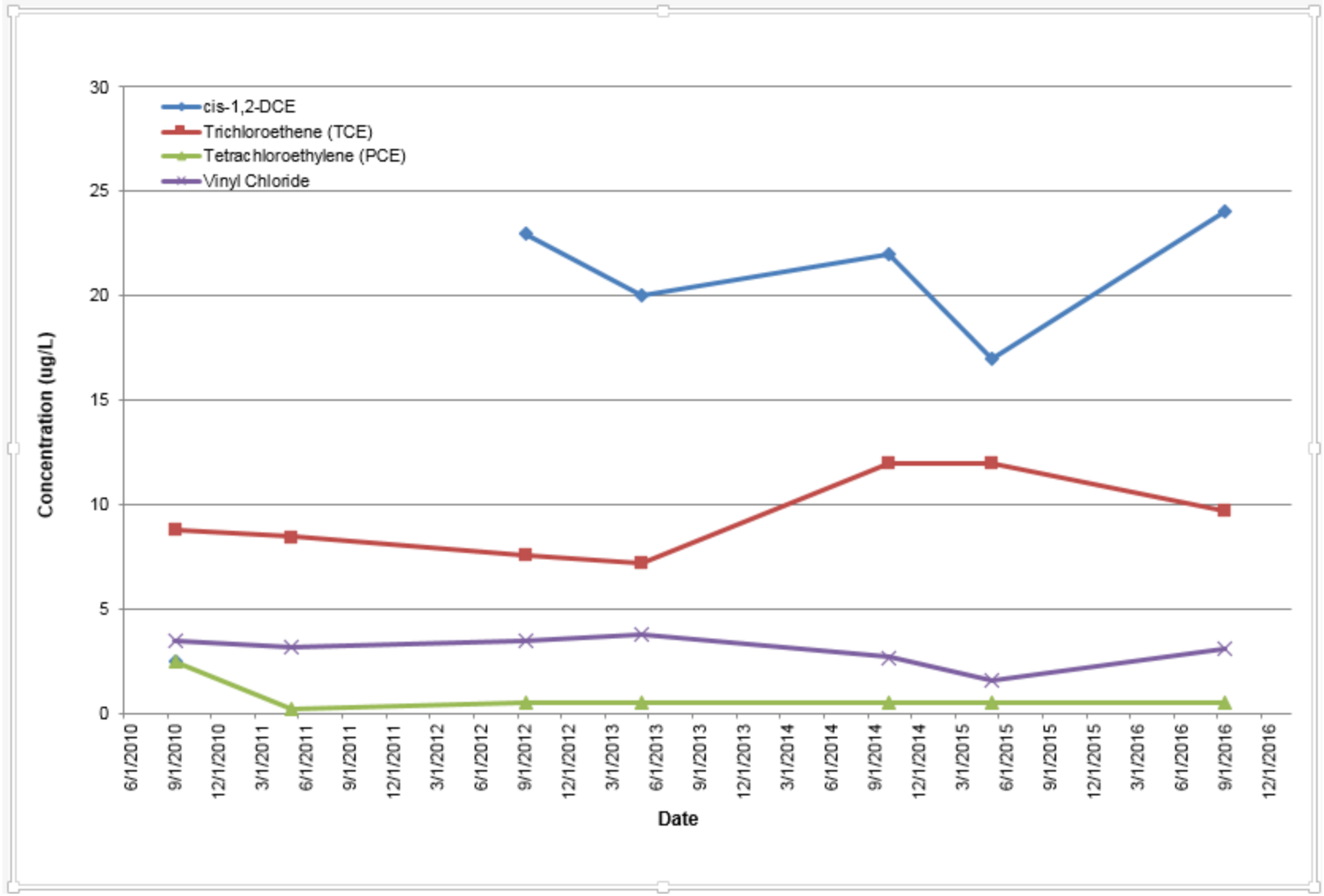
9/1/2015
12/1/2015
3/1/2016
6/1/2016
9/1/2016
12/1/2016
Date


cis-1,2-DCE
Trichloroethene (TCE)
Tetrachloroethylene (PCE)
Vinyl Chloride
Concentration (ug/L)
30
25
20
15
10
5
0
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
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3/1/2014
6/1/2014
9/1/2014
12/1/2014
3/1/2015
6/1/2015
9/1/2015
12/1/2015
3/1/2016
6/1/2016
9/1/2016
12/1/2016
Date

ENCLOSURE 7

Copy of Signed Institutional and Engineering Controls Certification Form

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. **932035**

Site Name GrafTech International Holdings Inc.

Site Address: Hyde Park Boulevard Zip Code: 14303
City/Town: Niagara
County: Niagara
Site Acreage: 61.8

Reporting Period: December 31, 2015 to December 31, 2016

	YES	NO
1. Is the information above correct?	X	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	X
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	X
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	X
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	X

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Industrial	X	☐
7. Are all ICs/ECs in place and functioning as designed?	X	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

N/A
Signature of Owner, Remedial Party or Designated Representative

Date

SITE NO. 932035 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
130.20-1-1	GrafTech International Holdings Inc.	O&M Plan
		Monitoring Plan

Per the revised OM&M Plan dated November 4, 2009, groundwater monitoring and landfill cap maintenance is required. NOTE: DEC. 2013 SMP APPROVED BY NYSDEC ON NOV. 17, 2016.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
130.20-1-1	Fencing/Access Control
	Cover System

Constructed cover system and closed under Division of Materials Management Part 360.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☒	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☒	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

N/A

Signature of Owner, Remedial Party or Designated Representative

Date

IC CERTIFICATIONS
SITE NO. 932035

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I THOMAS R JACQUES at Suite 300, Park Center I 6100 OAK Tree Blvd., INDEPENDENCE OH 44131

print name print business address

am certifying as DESIGNATED REPRESENTATIVE OF OWNER (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

T. R. J. 2/26/17

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification Date

IC/EC CERTIFICATIONS

Box 7

Qualified Environmental Professional Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I, JUANITA M. BURSLEY (print name) at SUITE 300 PARK CENTER I, 6100 OAK TREE BLVD. INDEPENDENCE, OHIO 44131 (print business address),

am certifying as a Qualified Environmental Professional for the OWNER (Owner or Remedial Party)

Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date
Juanita M. Bursley	N/A	1/27/17