GrafTech International Holdings Inc.
Suite 300 Park Center I
6100 Oak Tree Boulevard
Independence, OH 44131
(216) 676-2175
Facsimile (216) 676-2697
juanita.bursley@graftech.com

Juanita M. Bursley
Senior Manager, Corporate Environmental Risk Management

January 29, 2016

Mr. Brian Sadowski
Project Manager
New York State Department of Environmental Conservation
270 Michigan Ave.
Buffalo, NY 14203-2915

Subject: GrafTech International Holdings Inc. closed landfill site, SWMF #32N03 (formerly Site #932035)

Dear Mr. Sadowski:

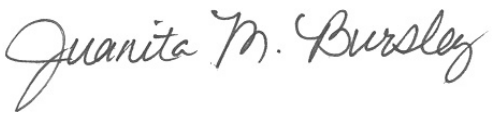
Electronic files in searchable PDF format of this cover letter and the full Periodic Review Report (PRR) for the subject GrafTech International Holdings Inc. (GTIH) closed landfill site (Landfill), SWMF #32N03 (formerly Union Carbide Corporation, Carbon Products Division and UCAR Republic Site #932035), are being submitted to you and Mr. Hinton by email, in accordance with the established procedures and deadline per the state's 45-Day Reminder Notice, dated December 4, 2015. This Landfill was closed and capped in 1987 and, in 1997, the state classified the Landfill as a Class 4 Inactive Hazardous Waste Site. There are no required Remedial Program and/or remedial objectives established for this site.

The purpose of the submitted PRR is to document GTIH's implementation and full compliance with the proposed Site Management Plan (SMP) that GrafTech submitted voluntarily 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 NYSDEC had approved on November 4, 2009. The state's formal approval of the submitted SMP is still pending as of the date of this letter.

As is also required, a hard copy of the original signed Institutional and Engineering Controls (IC/EC) Certification Form (Enclosure 3 of the PRR), which covers the compliance period between January 1, 2015 and December 31, 2015, was mailed to you.

Please contact me should you have any questions or need additional information regarding the PRR. My contact information is provided above in the letter header.

Sincerely,



Juanita M. Bursley
Senior Manager, Corporate Environmental Risk Management
GrafTech International Holdings Inc.

Enclosure

GRAFTECH INTERNATIONAL HOLDINGS INC.

2015 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 Submitted on 12/17/13

January 28, 2016

2015 PERIODIC REVIEW REPORT AND SMP REPORT

For SWMF #32N03

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ENCLOSURES

Enclosure 1	Weekly General Landfill and Site Security Inspection Report Form, Quarterly Groundwater Well Inspection Report Form and Site Map Showing Locations of Groundwater Monitoring Wells, Security Fencing and Locking Gates
Enclosure 2	Annual Groundwater Sampling Memorandum including Contour Maps, Annual Groundwater Monitoring Program, GrafTech International Holdings Inc., Niagara Falls, New York, May 2015 (Conestoga-Rovers & Associates, Internal Memorandum to Jim Kay, dated May 13, 2015)
Enclosure 3	Analytical Results and Full Validation, Annual Groundwater Monitoring Program, GrafTech International Holdings Inc., Niagara Falls, New York, May 2015 (Conestoga-Rovers & Associates, Internal Memorandum to Jim Kay, dated June 4, 2015, revised January 15, 2016)
Enclosure 4	Copy of Signed Institutional and Engineering Controls Certification Form

1.0 INTRODUCTION

This Periodic Review Report (PRR) is being submitted for the GrafTech International Holdings Inc. (GTIH) (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 GTIH's full implementation and compliance with the post-closure care procedures and institutional/engineering controls contained in the Site Management Plan (SMP). GTIH voluntarily submitted the 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 SMP replaced the prior Operation, Maintenance and Monitoring (OM&M) Plan, which had been approved by the state on November 4, 2009. The 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 GTIH 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, 2015 through December 31, 2015. It should be noted that, in agreement with Mr. Michael Hinton, NYSDEC Division of Environmental Remediation, 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, GTIH 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, located at Suite 300 Park Center 1, 6100 Oak Tree Boulevard, Independence, Ohio 44131. In addition, GTIH 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 GTIH; responding to neighborhood requests, etc.

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 GTIH 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 this 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 2015 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 case was a spring sampling campaign for odd numbered years. Further details of the 2015 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 SMP. Further details of the 2015 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 New York State Department of Environmental Conservation (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 Division of Environmental Remediation and the Division of Solid and Hazardous Materials agreed to a modified annual post-closure groundwater monitoring program, which was first implemented in the autumn 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). 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 GTIH. Following GTIH'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, GTIH 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 autumn (every even year). Groundwater elevation measurements are also recorded during each annual sampling campaign. An Annual Monitoring Report in the required EDD format must be submitted every year to the NYSDEC within ninety (90) days of the sampling event.

Summary of the 2015 Groundwater Sampling Campaign, Reports and Results

The annual groundwater sampling campaign was conducted by GTIH's environmental consultant, Conestoga-Rovers & Associates (CRA), on May 4, 2015. Samples collected from seven (7) wells were submitted to TestAmerica for analysis of the parameters listed on Table 2 of the SMP. 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. CRA submitted the standardized electronic data deliverable (EDD) report to the state on June 22, 2015 on behalf of GTIH. Please note that as of July 1, 2015, CRA has changed its company name to GHD Services Inc. (GHD).

On behalf of GTIH, CRA also submitted hard copies on June 22, 2015 of the full groundwater monitoring report for the May 2015 sampling campaign to Ms. Mary McIntosh, Engineering Geologist II, NYSDEC, Division of Solid and Hazardous Materials; the Niagara County Director Environmental Health; and the Clerk, Town of Niagara. As specified in the SMP, this report included CRA's Analytical Data Assessment and Full Validation Report, the laboratory's analytical reports, documentation of the quality assurance/quality control procedures and the field logs.

A copy of CRA's Analytical Data Assessment and Full Validation Report (dated June 4, 2015, revised January 15, 2016), which includes summary tables of the 2015 analytical results, is included in Enclosure 2.

The 2015 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 for the last two (2) years are consistent with the historical analytical data, with the exception of the deep aquifer upgradient (background) well (BW4-86), which had notable increases in the concentrations of four (4) volatile organic compounds (VOCs), namely Tetrachloroethane, Trichloroethylene (TCE), Vinyl Chloride (VC), and Cis-1,2-dichloroethane (cis-1,2-DCE), compared to past years. The increase was first noted in the fall 2014 sampling event. During the following sampling event in May 2015, the analytical results for these VOCs all decreased from the 2014 levels, although they remain elevated in comparison to the applicable state limits (NYS Class GA Criteria).

Three (3) of these VOCs, namely Cis-1,2-DEC, TCE and/or VC, were also detected above the applicable state criteria in groundwater wells BW3-86 and GW8B-93 in the 2013, 2014 and 2015 sampling events, but in much lower concentrations than at the background well BW4-86 (all less than 5X the applicable state criteria). Refer to the data summary table below. Despite the higher VOC contamination levels first detected during the fall 2014 sampling campaign in the monitoring well upgradient of the Landfill, the concentration levels in the downgradient wells have remained about the same during the past three (3) sampling events, thus indicating that contaminant migration has not occurred.

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

Because of the sampling results in October 2014, GTIH 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 recent increase in VOC contaminant levels. 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.

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, GTIH 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 GTIH, 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 GTIH'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 2015.

Based on a deficiency in the groundwater well inspection program that was identified by NYSDEC during its last Site inspection in May 2013, GTIH 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. GTIH 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. GTIH 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 implemented the improved inspection program starting in January 2014. 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 were performed at the Site in 2015 by the current contracted GTIH-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 GTIH 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 (See Enclosure 1).

1) Fence (general condition, evidence of security breaches).

2) Gate (general condition, lock, evidence of security breaches).

3) Cap (general condition, signs of erosion, adequate vegetation).

4) Surrounding area (general condition).

5) Note: if any evidence of a Site security breach was found during the above inspections, the groundwater well installations were also be inspected for potential tampering or damage, and those inspections were documented on the standard quarterly monitoring well inspection form (See Enclosure 1).

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 GTIH-Designated Representative, currently NMCC, or another contracted inspector, inspected all the active on-site GTIH-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. (See Enclosure 1).

1) Closed locks on the well casing caps.

2) Condition of outer well casing.

3) 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 GTIH 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 GTIH to disturb the soils on-site without such prior notification to the state, GTIH 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. GTIH would contact the NYSDEC within forty-eight (48) hours of this emergency event.

5.0 PROPERTY TRANSFER STATUS

GTIH 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. GTIH 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 GTIH'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 GTIH 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 two (2) 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 Tetrachloroethane, TCE, VC and cis-1,2-DCE. The analytical results for the following May 2015 sampling event for these VOCs indicated that the concentrations all decreased from the October 2014 levels, although they remain considerably elevated in comparison to the applicable state limits (NYS Class GA Criteria).

Cis-1,2-DEC, TCE and VC were also detected above the applicable state criteria in groundwater wells BW3-86 and GW8B-93 in the 2013, 2014 and 2015 sampling events, but in much lower concentrations (less than 5X the applicable state criteria) 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 wells BW3-86 and GW8B-93 have remained about the same over the past three (3) years, thus indicating there has been no impact on downgradient wells.

Because of background well BW4-86 sampling results in October 2014, GTIH 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. While CRA was able to obtain clear samples from this well during the May 2015 sampling event, GTIH plans to commission the redevelopment of this well in sufficient time to ensure that the well recalibrates to the new conditions before the fall 2016 sampling event.

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 3.

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-eight (28) years since closure of the Site has identified no negative trends in the groundwater quality at downgradient wells;

GTIH recommends that compliance be maintained with the proposed SMP, still pending NYSDEC approval as of this report date, until thirty (30) years post-closure. An assessment should be made at that time to determine whether groundwater monitoring can be safely discontinued and/or other modifications made to the Site management programs.

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				

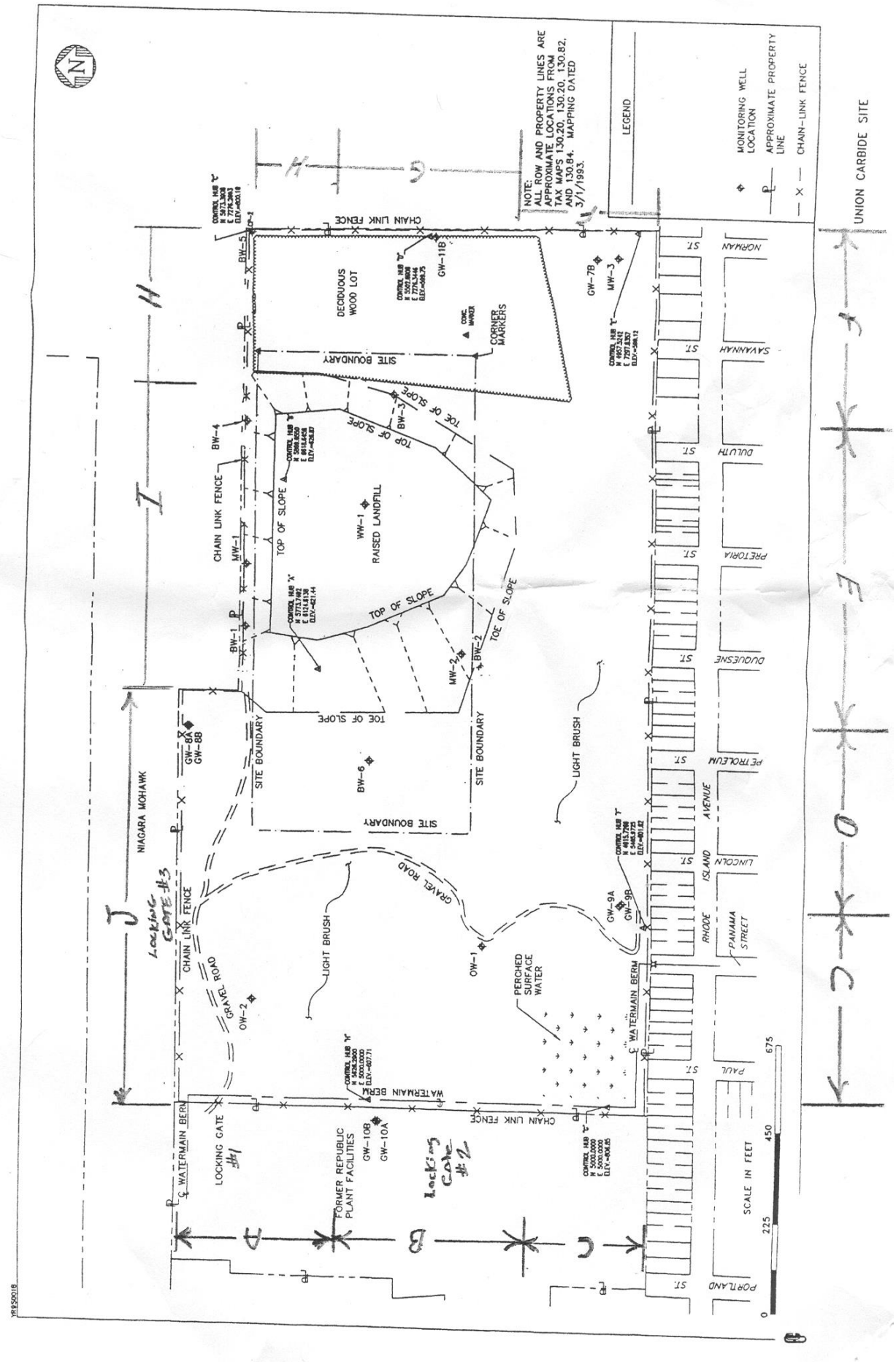
SECURITY-RELATED ENGINEERED CONTROLS COMMENTS: (Check for condition, damage, signs of security breach)

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

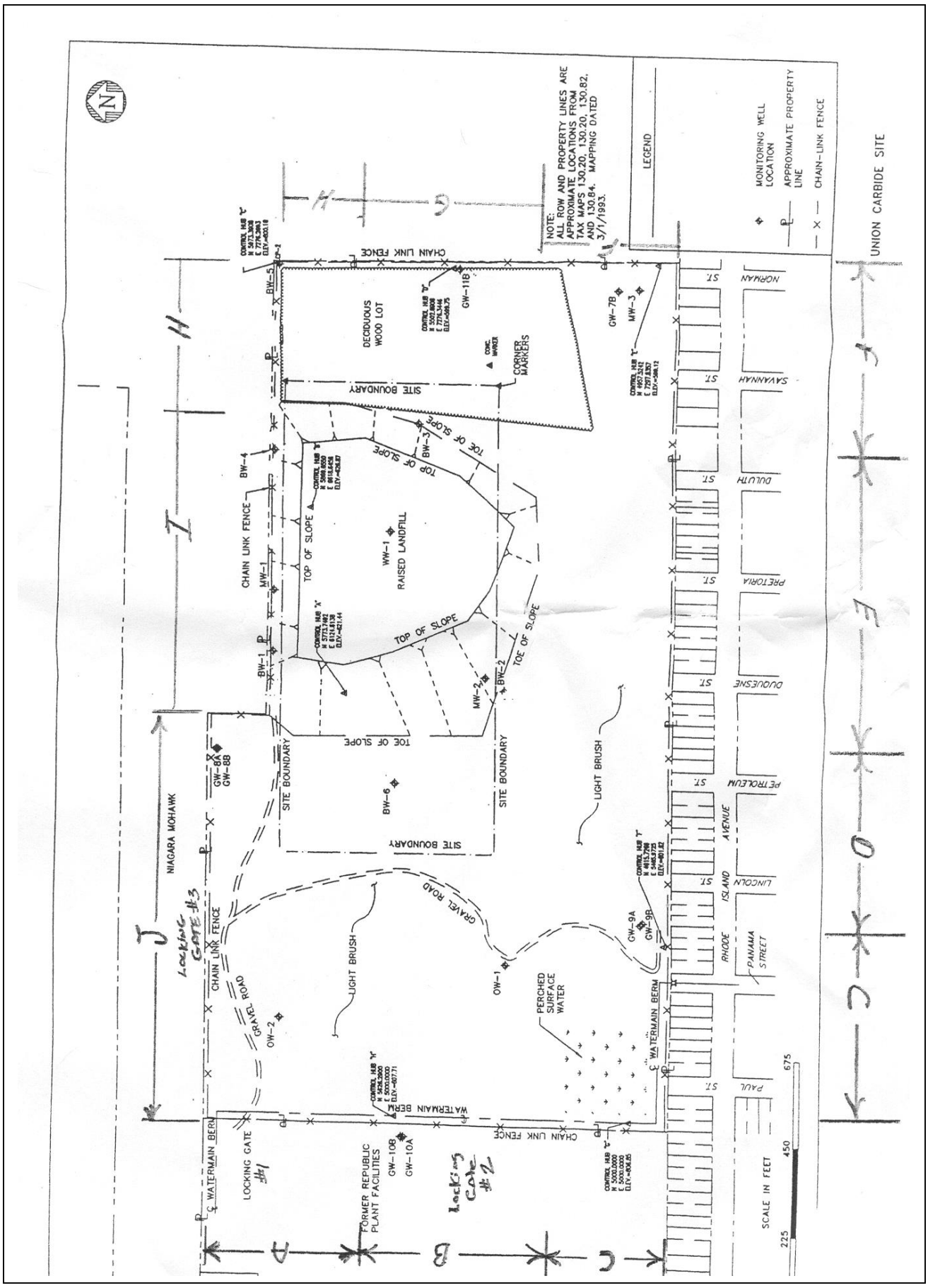
GRAFTECH WELLS

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

Annual Groundwater Sampling Memorandum including Contour Maps, Annual Groundwater Monitoring Program, GrafTech International Holdings Inc., Niagara Falls, New York, May 2015 (Conestoga-Rovers & Associates, Internal Memorandum to Jim Kay, dated May 13, 2015)

CONESTOGA-ROVERS & ASSOCIATES

2055 Niagara Falls Blvd., Suite #3
Niagara Falls, New York 14304
Telephone: (716) 297-6150 Fax: (716) 297-2265
www.CRAworld.com

MEMORANDUM

TO:	Juanita Bursley [juanita.bursley@graftech.com]	REF. NO.:	005513-06
FROM:	Dave Tyran/adh/13 DJT	DATE:	May 13, 2015
CC:	Jim Kay		
RE:	**Annual Groundwater Sampling**		

Introduction

In accordance with Conestoga-Rovers & Associates (CRA) 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 May 4, 2015. Activities associated with this sampling event are described in this memo.

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 well.

Groundwater Monitoring

A total of seven monitoring wells were visited during this sampling round. Purging and sampling of the seven wells were 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.

Future Monitoring

The next scheduled groundwater sampling round will be performed in the fall of 2016.

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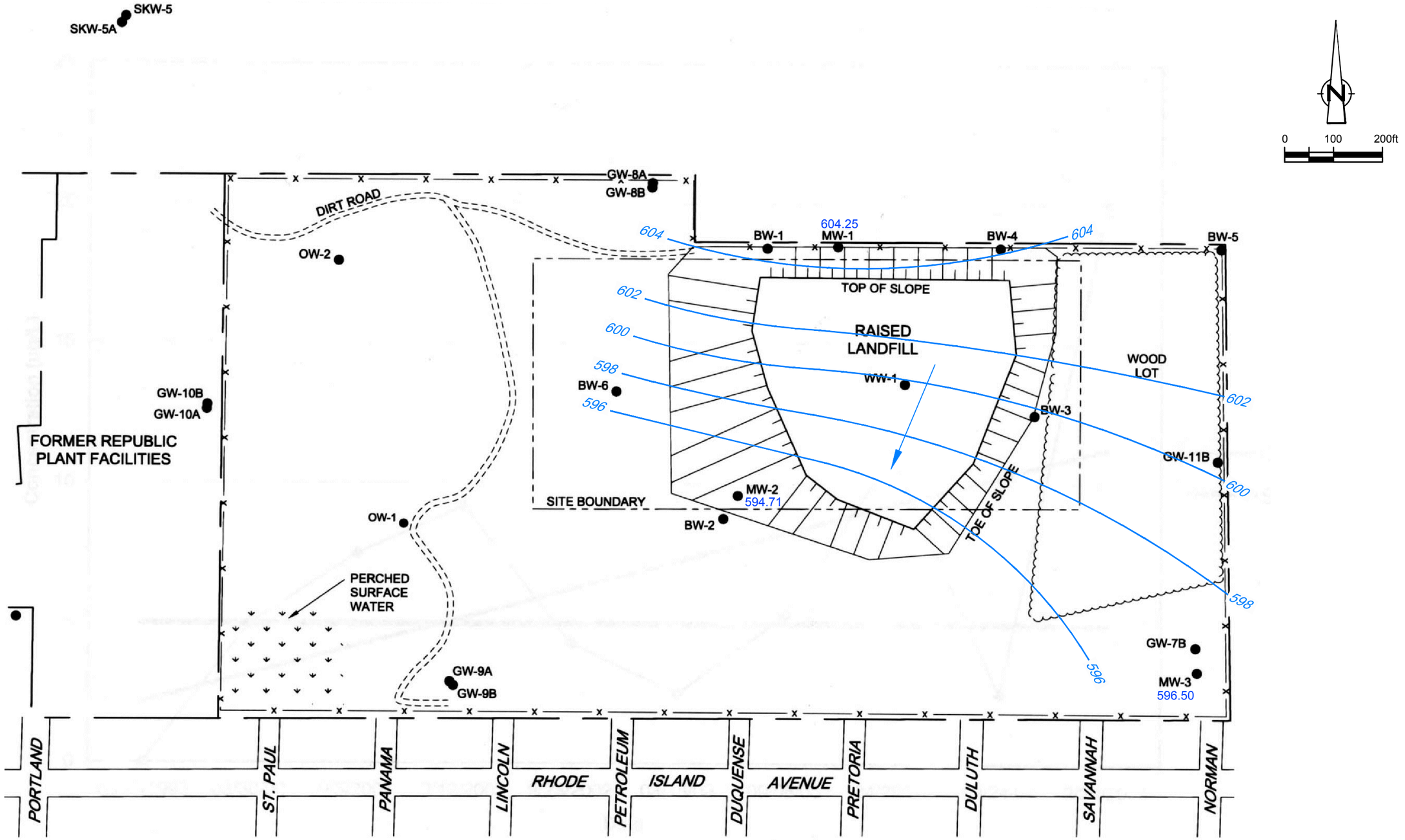
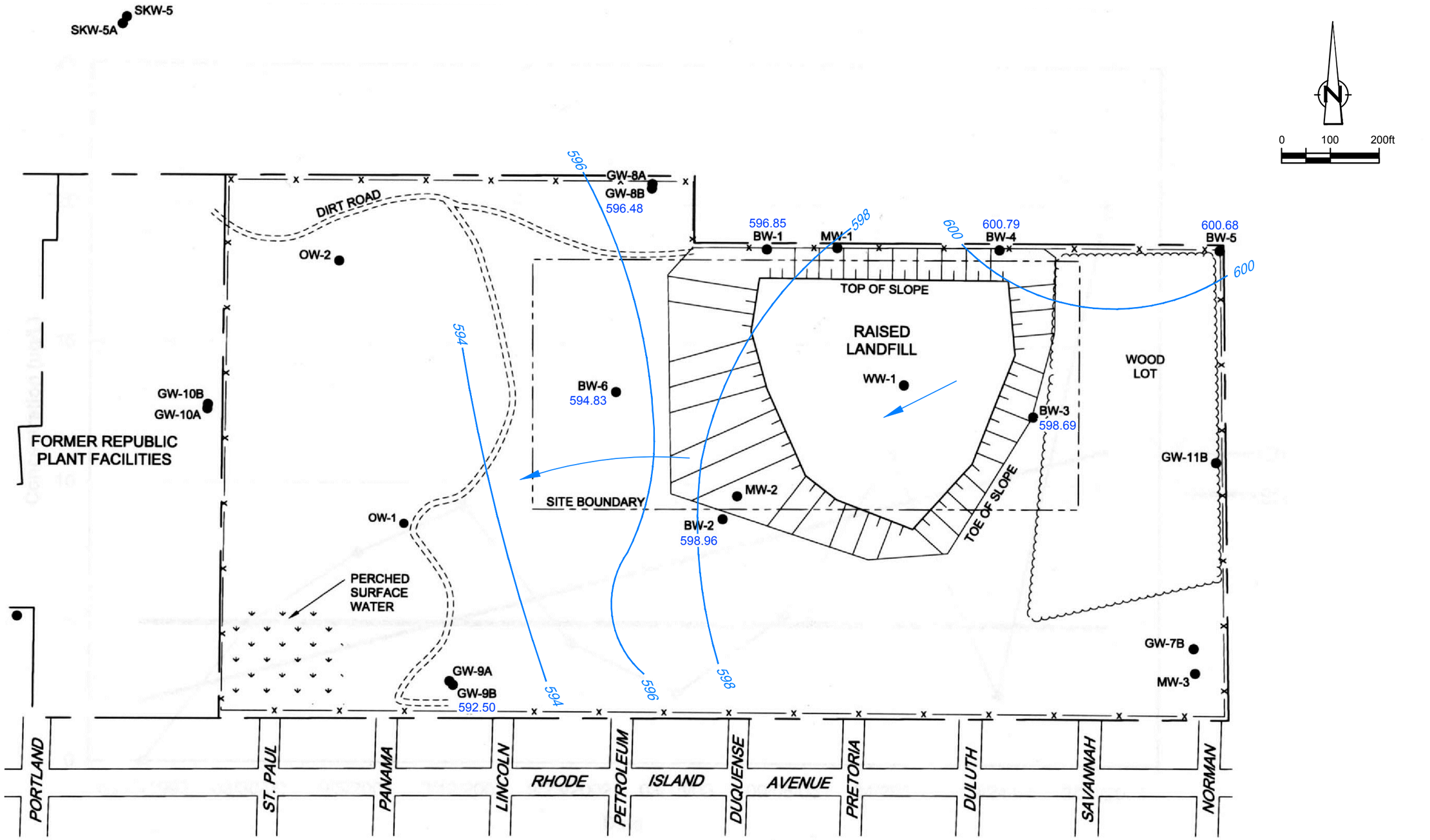


LEGEND

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

figure 2.1

OVERBURDEN GROUNDWATER CONTOURS (MAY 4, 2015)
GRAFTECH INTERNATIONAL HOLDINGS INC. SITE
Niagara Falls, New York



LEGEND

MW-3	PSA MONITORING WELL LOCATION	595.34	GROUNDWATER ELEVATION (ft.)
	PROPERTY LINE	594	GROUNDWATER CONTOUR (ft.)
x	FENCE		GROUNDWATER FLOW DIRECTION

figure 2.2

BEDROCK GROUNDWATER CONTOURS (MAY 4, 2015)
GRAFTECH INTERNATIONAL HOLDINGS INC. SITE
Niagara Falls, New York

05513-00(MEMO013)GN-WA002 MAY 13/2015

TABLE 1

HYDRAULIC MONITORING
POST-CLOSURE MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC. SWMU #32NO3
NIAGARA FALLS, NEW YORK
MAY 2015

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	7.75	604.25	21.13	21.10
MW-2	608.17	13.46	594.71	24.56	21.10
MW-3	601.89	5.39	596.50	15.22	14.4
BW-1	610.72	13.87	596.85	28.93	35.9
BW-2	608.43	9.47	598.96	24.71	37.1
BW-3	604.72	6.03	598.69	23.47	22.7
BW-4	607.08	6.29	600.79	21.25	27.5
BW-5	603.33	2.65	600.68	25.77	28.20
BW-6	607.04	12.21	594.83	25.87	36.50
GW-8B	603.90	7.42	596.48	29.21	29.5
GW-9B	603.40	10.90	592.50	31.91	31.7

Notes:

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

ENCLOSURE 3

Analytical Results and Full Validation, Annual Groundwater Monitoring Program, GrafTech International Holdings Inc., Niagara Falls, New York, May 2015 (Conestoga-Rovers & Associates, Internal Memorandum to Jim Kay, dated June 4, 2015, revised January 15, 2016)

CONESTOGA-ROVERS & ASSOCIATES

2055 Niagara Falls Boulevard
Niagara Falls, New York 14304
Telephone: (716) 297-6150 Fax: (716) 297-2265
www.CRAworld.com

MEMORANDUM

TO: Jim Kay

REF. NO.: 005513
DATE: June 4, 2015
REVISED: January 15, 2016

FROM: Susan Scrocchi/adh/14

RE: **Analytical Results and Full Validation**
Annual Groundwater Monitoring Program
GrafTech International Holdings, Inc.
Niagara Falls, New York
May 2015

1.0 Introduction

The following 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 May 2015. 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, the chain of custody form, calibration data, blank data, duplicate data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spike (MS) samples, and field quality assurance/quality control (QA/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", United States Environmental Protection Agency (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.

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2.0 Sample Holding Time and Preservation

Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

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

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

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. 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.

4.0 Initial Calibration - Organic Analyses

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
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.

5.0 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 inductively coupled plasma (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*
ICP/Atomic Absorption (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 was properly calibrated prior to sample analysis.

6.0 Continuing Calibration - Organic Analyses

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
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.

7.0 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.

8.0 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 "Guidelines". The CRDL recoveries were acceptable.

9.0 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.

Organic Analyses

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

Inorganic Analyses

Upon review of the ICBs, CCBs, and method blanks, it was noted that TKN concentrations were observed above the method detection limit (MDL). Most 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. Associated positive sample results with similar concentrations to the levels reported in the blanks were qualified as non-detect (see Table 4).

10.0 Surrogate Spike Recoveries

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

All samples submitted for volatile 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.

11.0 Internal Standards (IS) Analyses - Volatiles

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 volatile IS recoveries and retention times met the above criteria.

12.0 Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects

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

Organic Analyses

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

Inorganic Analyses

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

13.0 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analyses

To evaluate the effects of sample matrices on the extraction or digestion 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 relative percent difference (RPD) between the MS and MSD is used to assess analytical precision. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

MS/MSD analyses were performed as specified in Table 1. The laboratory performed additional site-specific MS analyses internally.

Organic Analyses

The MS/MSD samples were spiked with representative compounds of interest. All percent recoveries and RPD values were within the laboratory control limits, indicating acceptable analytical accuracy and precision.

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, indicating acceptable analytical accuracy and precision.

14.0 Duplicate Sample Analyses – Inorganic Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, duplicate samples were prepared and analyzed by the laboratory for ammonia. The duplicate results were evaluated per the "Guidelines".

All duplicate analyses performed were acceptable, demonstrating acceptable analytical precision.

15.0 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 MDL), the serial dilution results must agree within 10 percent of the original results.

A serial dilution was performed on the MS/MSD sample. Some variability in recoveries was observed. All associated sample results with similar concentrations were qualified as estimated (see Table 5).

16.0 ICP Interference Check Sample (ICS) Analysis

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 results met the criteria above.

17.0 Field QA/QC Samples

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

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.

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 practical quantitation limit (PQL), the evaluation criteria is one times the PQL value for water samples.

All field duplicate results were within acceptable agreement.

18.0 Analyte Reporting

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

Most dissolved metals results were less than the total results or were within the normal variability of the method (20 percent RPD). The dissolved iron result for sample WG-5513-050415-DJT-001 was greater than the total result and was in exceedance of the method variability. The associated results were qualified as estimated (see Table 6).

19.0 Target Compound Identification

To minimize erroneous compound identification during organic analyses, qualitative criteria including compound retention time and mass spectra were evaluated according to the identification criteria established by the methods. The organic compounds reported adhered to the specified identification criteria.

20.0 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
MAY 2015

				Analysis/Parameters					
Sample Identification	***Location***	***Collection Date (mm/dd/yyyy)***	***Collection Time (hr:min)***	***Ammonia***	***Total Kjeldahl Nitrogen***	***Nitrite***	***Total and Dissolved Metals***	***Volatile Organic Compounds***	***Comments***
WG-5513-050415-SG-008	BW-1	05/04/2015	13:45	X	X	X	X	X	
WG-5513-050415-DJT-003	BW-2	05/04/2015	11:45	X	X	X	X	X	
WG-5513-050415-DJT-005	BW-2	05/04/2015	11:45	X	X	X	X	X	FD(WG-5513-050415-DJT-003)
WG-5513-050415-SG-004	BW-3	05/04/2015	11:10	X	X	X	X	X	MS/MSD
WG-5513-050415-SG-006	BW-4	05/04/2015	12:55	X	X	X	X	X	
WG-5513-050415-DJT-007	GW-8B	05/04/2015	12:45	X	X	X	X	X	
WG-5513-050415-DJT-001	GW-9B	05/04/2015	10:40	X	X	X	X	X	
WG-5513-050415-SG-002	MW-3	05/04/2015	09:45	X	X	X	X	X	
TB-5513-050415	-	05/04/2015	-					X	Trip Blank

Notes:

FD - Field Duplicate sample of sample in parenthesis
\- - Not applicable
MS/MSD - Matrix Spike/Matrix Spike Duplicate

TABLE 2

ANALYTICAL RESULTS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

			Location ID:	***BW-1***	***BW-2***	***BW-2***	***BW-3***
			Sample Name:	***WG-5513-050415-SG-008***	***WG-5513-050415-DJT-005***	***WG-5513-050415-DJT-003***	***WG-5513-050415-SG-004***
			Sample Date:	***5/4/2015***	***5/4/2015 (Duplicate)***	***5/4/2015***	***5/4/2015***
	Units	NYS Class GA Criteria					
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
1,1,2,2-Tetrachloroethane	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
1,1,2-Trichloroethane	µg/L	1		5.0 U	5.0 U	5.0 U	1.0 U
1,1-Dichloroethane	µg/L	5		5.0 U	5.0 U	5.0 U	0.66 J
1,1-Dichloroethene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
1,2-Dichloroethane	µg/L	0.6		5.0 U	5.0 U	5.0 U	1.0 U
1,2-Dichloropropane	µg/L	1		5.0 U	5.0 U	5.0 U	1.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	50		50 U	50 U	50 U	10 U
2-Hexanone	µg/L	50		25 U	25 U	25 U	5.0 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-		25 U	25 U	25 U	5.0 U
Acetone	µg/L	50		50 U	50 U	50 U	10 U
Benzene	µg/L	1		5.0 U	5.0 U	5.0 U	1.0 U
Bromodichloromethane	µg/L	50		5.0 U	5.0 U	5.0 U	1.0 U
Bromoform	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Bromomethane (Methyl bromide)	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Carbon disulfide	µg/L	60		5.0 U	5.0 U	5.0 U	1.0 U
Carbon tetrachloride	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Chlorobenzene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Chloroethane	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Chloroform (Trichloromethane)	µg/L	7		5.0 U	5.0 U	5.0 U	1.0 U
Chloromethane (Methyl chloride)	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
cis-1,2-Dichloroethene	µg/L	5		5.0 U	5.0 U	5.0 U	2.8
cis-1,3-Dichloropropene	µg/L	0.4		5.0 U	5.0 U	5.0 U	1.0 U
Dibromochloromethane	µg/L	50		5.0 U	5.0 U	5.0 U	1.0 U
Ethylbenzene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Methylene chloride	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Styrene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Tetrachloroethene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U
Toluene	µg/L	5		5.0 U	5.0 U	5.0 U	1.0 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

		Location ID:	***BW-1***	***BW-2***	***BW-2***	***BW-3***
		Sample Name:	***WG-5513-050415-SG-008***	***WG-5513-050415-DJT-005***	***WG-5513-050415-DJT-003***	***WG-5513-050415-SG-004***
		Sample Date:	***5/4/2015***	***5/4/2015 (Duplicate)***	***5/4/2015***	***5/4/2015***
	Units	NYS Class GA				
Volatile Organic Compounds		Criteria				
Volatile Organic Compounds (Continued)						
trans-1,2-Dichloroethene	µg/L	5	5.0 U	5.0 U	5.0 U	1.0 U
trans-1,3-Dichloropropene	µg/L	0.4	5.0 U	5.0 U	5.0 U	1.0 U
Trichloroethene	µg/L	5	5.0 U	5.0 U	5.0 U	1.0 U
Vinyl chloride	µg/L	2	5.0 U	5.0 U	5.0 U	**3.2**
Xylenes (total)	µg/L	5	10 U	10 U	10 U	2.0 U
Wet Chenistry						
Ammonia	mg/L	2	0.93	0.59	0.61	0.11
Nitrite (as N)	mg/L	1	0.050 U	0.050 U	0.050 U	0.050 U
Total kjeldahl nitrogen (TKN)	mg/L	-	1.0	0.88 U	0.88 U	0.37 U
Metals						
Iron	mg/L	0.3	**2.9 J**	**1.6 J**	**1.8 J**	**1.3 J**
Iron (dissolved)	mg/L	0.3	**0.51**	**0.73**	**0.84**	**1.1 J**
Potassium	mg/L	-	5.2	5.6	5.6	1.8
Potassium (dissolved)	mg/L	-	4.9	5.2	5.1	1.7
Zinc	mg/L	2	2.6	0.14	0.20	0.25
Zinc (dissolved)	mg/L	-	0.031	0.0023 J	0.0026 J	0.24 J

TABLE 2

ANALYTICAL RESULTS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

	Location ID:		***BW-4***	***GW-8B***	***GW-9B***	***MW-3***
	Sample Name:		***WG-5513-050415-SG-006***	***WG-5513-050415-DJT-007***	***WG-5513-050415-DJT-001***	***WG-5513-050415-SG-002***
	Sample Date:		***5/4/2015***	***5/4/2015***	***5/4/2015***	***5/4/2015***
Volatile Organic Compounds	***Units***	NYS Class GA Criteria				
1,1,1-Trichloroethane	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
1,1,2,2-Tetrachloroethane	µg/L	5	3.9	1.0 U	2.0 U	2.0 U
1,1,2-Trichloroethane	µg/L	1	2.0 U	1.0 U	2.0 U	2.0 U
1,1-Dichloroethane	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
1,1-Dichloroethene	µg/L	5	4.8	0.31 J	2.0 U	2.0 U
1,2-Dichloroethane	µg/L	0.6	2.0 U	1.0 U	2.0 U	2.0 U
1,2-Dichloropropane	µg/L	1	2.0 U	1.0 U	2.0 U	2.0 U
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	50	20 U	10 U	20 U	20 U
2-Hexanone	µg/L	50	10 U	5.0 U	10 U	10 U
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	10 U	5.0 U	10 U	10 U
Acetone	µg/L	50	20 U	4.5 J	20 U	20 U
Benzene	µg/L	1	2.0 U	1.0 U	2.0 U	2.0 U
Bromodichloromethane	µg/L	50	2.0 U	1.0 U	2.0 U	2.0 U
Bromoform	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Bromomethane (Methyl bromide)	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Carbon disulfide	µg/L	60	2.0 U	1.0 U	2.0 U	2.0 U
Carbon tetrachloride	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Chlorobenzene	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Chloroethane	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Chloroform (Trichloromethane)	µg/L	7	**11**	1.0 U	2.0 U	2.0 U
Chloromethane (Methyl chloride)	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
cis-1,2-Dichloroethene	µg/L	5	**1300**	**17**	2.0 U	2.0 U
cis-1,3-Dichloropropene	µg/L	0.4	2.0 U	1.0 U	2.0 U	2.0 U
Dibromochloromethane	µg/L	50	2.0 U	1.0 U	2.0 U	2.0 U
Ethylbenzene	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Methylene chloride	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Styrene	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U
Tetrachloroethene	µg/L	5	**300**	1.0 U	2.0 U	2.0 U
Toluene	µg/L	5	2.0 U	1.0 U	2.0 U	2.0 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

		Location ID:	***BW-4***	***GW-8B***	***GW-9B***	***MW-3***
		Sample Name:	***WG-5513-050415-SG-006***	***WG-5513-050415-DJT-007***	***WG-5513-050415-DJT-001***	***WG-5513-050415-SG-002***
		Sample Date:	***5/4/2015***	***5/4/2015***	***5/4/2015***	***5/4/2015***
	Units	NYS Class GA				
Volatile Organic Compounds		Criteria				
Volatile Organic Compounds (Continued)						
trans-1,2-Dichloroethene	µg/L	5	**5.4**	1.0 U	2.0 U	2.0 U
trans-1,3-Dichloropropene	µg/L	0.4	2.0 U	1.0 U	2.0 U	2.0 U
Trichloroethene	µg/L	5	**790**	**12**	2.0 U	2.0 U
Vinyl chloride	µg/L	2	**270**	1.6	2.0 U	2.0 U
Xylenes (total)	µg/L	5	4.0 U	2.0 U	4.0 U	4.0 U
Wet Chenistry						
Ammonia	mg/L	2	**2.7**	0.12	0.47	0.044
Nitrite (as N)	mg/L	1	0.050 U	0.050 U	0.050 U	0.050 U
Total kjeldahl nitrogen (TKN)	mg/L	-	3.1	0.24 U	0.77 U	0.32 U
Metals						
Iron	mg/L	0.3	**5.1 J**	0.058	0.12 J	**1.5 J**
Iron (dissolved)	mg/L	0.3	**4.7 J**	0.043 J	0.20 J	**0.75**
Potassium	mg/L	-	14.3	6.4	4.5	2.1
Potassium (dissolved)	mg/L	-	13.7	5.8	4.3	2.0
Zinc	mg/L	2	0.13	0.53	0.0089 J	0.010 U
Zinc (dissolved)	mg/L	-	0.043	0.49 J	0.0073 J	0.0041 J

Notes:

Boxed value is greater than NYS Class GA criteria

- Not applicable

J - Estimated concentration

U - Not detected at the associated reporting limit

NYS - New York State

TABLE 3

SUMMARY OF ANALYTICAL METHODS
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

Parameter	*Method*
TCL VOCs	SW-846 8260C[1]
Iron, Potassium, and Zinc (total and dissolved)	SW-846 6010C[1]
Nitrite	EPA 353.2[2]
Ammonia	EPA 350.1[2]
Total Kjeldahl Nitrogen	EPA 351.2[2]

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 ANALYTE CONCENTRATIONS IN THE INSTRUMENT BLANKS
SAMPLE COLLECTION AND ANALYSIS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

Parameter	*Analyte*	*Blank ID*	*Analysis Date*	*Blank Result*	*Sample ID*	*Original Result*	*Qualified Result*	*Units*
General Chemistry	Total Kjeldahl Nitrogen (TKN)	CCB	05/07/2015	0.179 J	WG-5513-050415-DJT-001	0.77	0.77 U	mg/L
					WG-5513-050415-SG-002	0.32	0.32 U	mg/L
					WG-5513-050415-DJT-003	0.88	0.88 U	mg/L
					WG-5513-050415-SG-004	0.37	0.37 U	mg/L
					WG-5513-050415-DJT-005	0.88	0.88 U	mg/L
					WG-5513-050415-DJT-007	0.24	0.24 U	mg/L

Notes:

CCB - Continuing Calibration Blank
U - Not detected at the associated reporting limit
J - Estimated concentration

TABLE 5

QUALIFIED SAMPLE DATA DUE TO OUTLYING ICP SERIAL DILUTION RESULTS
SAMPLE COLLECTION AND ANALYSIS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

Parameter	*Serial Dilution Sample ID*	*Analyte*	*%D*	*Associated Sample ID*	*Qualified Result*	*Units*
Metals	WG-5513-050415-SG-004	Iron (total)	11	WG-5513-050415-SG-002	1.5 J	mg/L
				WG-5513-050415-DJT-003	1.8 J	mg/L
				WG-5513-050415-SG-004	1.3 J	mg/L
				WG-5513-050415-DJT-005	1.6 J	mg/L
				WG-5513-050415-SG-006	5.1 J	mg/L
				WG-5513-050415-SG-008	2.9 J	mg/L
Metals	WG-5513-050415-SG-004	Iron (dissolved)	16	WG-5513-050415-SG-004	1.1 J	mg/L
				WG-5513-050415-SG-006	4.7 J	mg/L
Metals	WG-5513-050415-SG-004	Zinc (dissolved)	14	WG-5513-050415-SG-004	0.24 J	mg/L
				WG-5513-050415-DJT-007	0.49 J	mg/L

Notes:

%D - Percent Difference
ICP - Inductively Coupled Plasma
J - Estimated concentration

TABLE 6

QUALIFIED SAMPLE DATA DUE TO DISCREPANCY BETWEEN TOTAL AND DISSOLVED RESULTS
SAMPLE COLLECTION AND ANALYSIS SUMMARY
ANNUAL GROUNDWATER MONITORING PROGRAM
GRAFTECH INTERNATIONAL HOLDINGS, INC.
NIAGARA FALLS, NEW YORK
MAY 2015

Parameter	*Sample ID*	*Analyte*	*%D*	*Criteria (percent)*	*Qualified Total Result*	*Qualified Dissolved Result*	*Units*
Metals	WG-5513-050415-DJT-001	Iron	67	20	0.12 J	0.20 J	mg/L

Notes:

%D - Percent Difference
J - Estimated concentration

ENCLOSURE 4

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: January 1, 2015 to December 31, 2015

	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. PLEASE NOTE THAT ON 12/17/13, A PROPOSED SMP WAS SUBMITTED TO NYSDEC, WHICH REPLACES THE O+M PLAN.

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 Darrell A. Blair (print name) at GrafTech International, 6100 Oak Tree Blvd, Suite 300 Park Center I, Independence, OH 44131 (USA) (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.

Darrell A Blair

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

January 27, 2016

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 (USA) (print business address)

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

Juanita M. Bursley	N/A	1/27/16
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date