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ENVIRONMENT

Mr. William Wu
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7014

Subject:
National Fuel
Dunkirk Former MGP Site
Remedial Investigation
Interim Data Summary

Date:
February 13, 2014

Contact:
Scott A. Powlin

Phone:
315 671 9456

Email:
Scott.Powlin@arcadis-us.com

Our ref:
B0023301 #5

Dear Mr. Wu:

On behalf of National Fuel (NFG), this letter presents the results of recent activities completed in connection with the Remedial Investigation (RI) of the former manufactured gas plant (MGP) site located at 31 West 2nd Street in Dunkirk, New York. NFG has reviewed the results contained herein and recognizes that additional subsurface investigations are warranted to further characterize the nature and extent of site-related impacts in soil and groundwater. The purpose of this letter is to provide the New York State Department of Environmental Conservation (NYSDEC) with an update of the subsurface RI data collected to date in preparation for a proposed meeting or teleconference to discuss a path forward for the RI. A summary of the completed subsurface RI field activities is provided below, followed by a brief discussion of the results. The investigation locations are shown on Figures 1 and 2.

Note that this letter does not include the results of the soil vapor intrusion (SVI) evaluation completed in April 2013. The results of this evaluation were previously provided to the NYSDEC in a May 7, 2013 e-mail from ARCADIS. The NYSDEC and New York State Department of Health (NYSDOH) were also copied on June 13, 2013 letters to the owners of 17 Second Street and 24 Second Street regarding the sampling results.

Summary of Subsurface RI Field Activities

The RI activities were conducted in accordance with the scope of work detailed in the NYSDEC-approved RI Work Plan (ARCADIS, 2013). The activities were conducted between September 30 and October 17, 2013, and consisted of the following general tasks:

- Drilling 13 soil borings (SB-13 through SB-25), each to refusal (assumed to be bedrock surface) at approximately 18 to 20 feet below grade.

- Installing 12 temporary wells inside the above borings (except for SB-21), each with a 1-inch diameter, 10-foot long screen installed at the bottom of the boring. Four

temporary wells were installed inside Former Holder #1, and the remaining temporary wells were installed immediately outside the holder wall and upgradient and downgradient from the holder.

- Installing three monitoring wells (MW-9, MW-12, and MW-13), each with 2-inch diameter, schedule 40 PVC, 0.010-inch slot screens installed at the following intervals (in feet below grade): MW-9 (6.5 to 16.5), MW-12 (9.0 to 19.0), and MW-13 (5.0 to 15.0).

- Collecting 26 soil samples for analysis of Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-VOCs (SVOCs), and total cyanide. Two samples were collected from each boring, one from soil intervals exhibiting odors and/or elevated photoionization detector (PID) readings and another at the bottom of the borehole (assumed to be at the top of bedrock).

- Collecting 12 grab groundwater samples from temporary wells for analysis of TCL VOCs. Samples were obtained using new, disposable polyethylene bailers to remove approximately one well volume from the temporary wells prior to collecting the sample.

- Excavating three shallow (2 feet below grade or less) mini-trenches across the wall of Former Holder #1 to fine-tune the location of the holder and facilitate installation of borings/temporary wells inside and outside the holder wall.

Field activities were conducted in accordance with the procedures detailed in the NYSDEC-approved SC Work Plan for the Dunkirk Former MGP Site (ARCADIS, 2009) and the following supporting appendices:

- Field Sampling Plan (FSP)
- Quality Assurance Sampling and Analysis Project Plan (QA/SAPP)
- Health and Safety Plan (HASP)
- Community Air Monitoring Plan (CAMP)

As described in the QA/SAPP, analytical samples were submitted for laboratory analysis using United States Environmental Protection Agency (USEPA) SW-846 Methods, as referenced in the most recent edition of the NYSDEC Analytical Services Protocol (ASP), with Category B analytical laboratory reports. Data Usability Summary Reports (DUSRs) of the laboratory data packages were prepared, and the results of the DUSR were incorporated into the analytical tables attached to this letter.

Although the majority of the investigations proposed in the RI Work Plan were completed during this mobilization, several field efforts could not be completed due to access issues regarding an off-site property. As the NYSDEC is aware, despite numerous attempts by National Fuel, access was not granted to install proposed

monitoring wells MW-10 and MW-11 on the property at 114-120 Eagle Street (i.e., the "church property"). As such, the NYSDEC transmitted a December 3, 2013 letter to the property owner stating that NFG is granted access by the NYSDEC in accordance with the Environmental Conservation Law (ECL) Article 27 § 1309 (3)–(4) and ECL Article 27 § 1313 (8). As stated in NYSDEC's December 3, 2013 letter, NFG can access the property on or after December 20, 2013. NFG has not accessed the property since issuance of this letter; therefore, monitoring wells MW-10 and MW-11 have not yet been installed. In addition, groundwater samples have not yet been collected from new monitoring wells MW-9, MW-12, and MW-13 or existing monitoring wells MW-5 through MW-8.

Summary of Subsurface RI Results (including Site Characterization results)

The summary of subsurface Site Characterization (SC) and RI results is provided in the following attached information:

Table 1 – Sample Summary	*Comprehensive summary of soil and groundwater samples collected during the SC and RI*
Table 2 – Monitoring Well Construction Details	*Construction details of monitoring wells installed during the SC and RI*
Table 3 – Soil Sample Analytical Results – Detected Compounds	*Comprehensive summary of soil sampling results for compounds detected during the SC and RI*
Table 4 – Groundwater Sample Analytical Results – Detected Compounds	*Comprehensive summary of groundwater sampling results for compounds detected during the SC and RI*
Figure 1 – Investigation Locations	*Locations of soil borings and monitoring wells completed during the SC and RI*
Figure 2 – A-A' Cross-Section Location	*Locations of soil borings and monitoring wells completed during the SC and RI and location of geologic cross-section A-A'*
Figure 3 – Cross-Section A-A'	*Subsurface geologic and structure information along the approximate groundwater flow path*
Figure 4 – Water Table Contours – 8/28/12	*Approximate water table for water-level measurements obtained on 8/28/12*

Figure 5 – Subsurface Soil Analytical Results	*Total BTEX (benzene, toluene, ethylbenzene, xylenes), total PAH (polycyclic aromatic hydrocarbon), and total cyanide detected in soil samples collected during the SC and RI*
Figure 6 – Total BTEX in Groundwater	*Total BTEX concentrations detected in groundwater samples collected during the SC and RI*

Geology/Hydrogeology

The overburden is approximately 17 to 20 feet in thickness beneath the site and consists of three generalized geologic units:

Fill – Typically 4 to 6 feet in thickness, with increased thickness in the area of the holders. This unit is comprised of varying amounts of silt, cinders, coal, ash, concrete, and red brick, with trace amounts of fine to coarse sand and gravel as well as natural organics such as roots, wood, and grass.

Silt and Clay – Typically 3 to 6 feet in thickness. This unit can range from a gray to dark brown mottled clay with trace silt to silt with trace clay. This unit is typically stiff to very stiff and exhibits high to slight plasticity.

Silt with Sand Lenses - Typically 6 to 9 feet in thickness. This unit is comprised of gray silt with lenses of fine to coarse sand and trace clay and fine to coarse subrounded gravel. It is typically stiff to very stiff and is distinguished by its non-plastic nature.

The bedrock beneath the overburden deposits has been mapped as the Dunkirk Shale (Rickard and Fisher, 1970).

The water table is typically encountered between 2 to 4 feet below grade and fluctuates by 1 to 2 feet, depending on the length of time between a storm event and the date of a given water level measurement round. Water levels measured in the temporary wells installed during the RI indicate that the depth to water within the limits of Former Holder #1 is noticeably shallower than the depth to water outside of the holder limits – approximately 1 to 2 feet below grade within the holder and 3 feet below grade outside the holder. This suggests that the holder walls are relatively water-tight. It should be noted, however, that the floor of Former Holder #1 has not been encountered in any of the borings drilled within the holder limits. This suggests that the holder may have been a “water seal” gas holder without a constructed bottom.

As shown on Figure 4, the August 28, 2012 round of water-level measurements indicates that groundwater flow in the overburden is generally to the northeast across the site; however, several other water-level measurement rounds indicate a

groundwater divide (i.e., mound) exists near Former Holder #2, where groundwater in the western half of the site moves to the northwest and groundwater in the eastern half of the site moves to the northeast. The groundwater flow direction is likely influenced by storm events and the ability of the overburden materials to transmit water. Since the upper portion of the saturated overburden consists of a low permeable silt and clay unit, a degree of groundwater mounding is expected.

Soil Characterization

As noted in the boring logs contained in Attachment A, visual impacts (i.e., staining, sheen, non-aqueous phase liquid [NAPL]) have not been observed in any of the 25 soil borings or 11 monitoring wells installed since initiation of the SC, and all of the locations have terminated on the bedrock surface at approximately 17 to 20 feet below grade. Odors and/or elevated PID readings, however, have been observed primarily within the lowest overburden unit (silt with sand lenses) at borings located immediately outside of, and downgradient from, Former Holder #1. The odors/PID readings are generally observed between approximately 9 and 18 feet below grade and are often within the sand lenses observed in this unit. Odors and elevated PID readings were observed between 5 and 13 feet below grade at monitoring well MW-9, which is located approximately 280 feet north of the site. Potential impacts at this location are expected to be unrelated to the MGP site. The results of groundwater sampling (yet to be conducted) will be evaluated to assess the potential source of impacts at MW-9.

Subsurface soil analytical results are presented in Table 3 and on Figure 5 in comparison to the NYSDEC's restricted residential use and commercial use soil cleanup objectives (RSCOs and CSCOs, respectively) presented in 6 NYCRR Part 375-6.8(b). Given that the site property is owned by National Fuel and also comprises an active service center, it is reasonable to assume that the CSCOs are the most appropriate screening criteria for evaluating on-site soil data. As shown in Table 3 and on Figure 5, 10 of the 50 total soil samples collected to date contain benzene, PAHs, and/or total cyanide at concentrations above CSCOs. Benzene exceedances were detected in samples collected below 10 feet at two locations (MW-1 and SB-15) located near Former Holder #1. PAH exceedances were detected in samples collected within the fill unit at five locations (MW-3, MW-4, SB-1, SB-3, and SB-22) scattered across the site. The PAH exceedances are attributed to the PAH-laden materials observed in the fill, such as coal, ash, and cinders. The cyanide exceedances were also detected in samples collected within the fill material (at SB-3, SB-16, and SB-20).

Groundwater Characterization

Groundwater analytical results are presented in Table 4 and on Figure 6 in comparison to the Standards and Guidance Values presented in the NYSDEC Division of Water Technical and Operational Guidance Series document, titled Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC 1998)

(TOGS). As shown in Table 4 and on Figure 6, BTEX has been detected above TOGS in groundwater at several monitoring well and temporary well locations. In general, BTEX exceedances are within, immediately outside of, and downgradient from Former Holder #1 and downgradient from Former Holder # 3. The exceedances near Former Holder #3 are likely associated with residual impacts linked to a petroleum spill that was remediated by National Fuel in 1997. The source of the BTEX exceedances near Former Holder #1 has not yet been conclusively identified. Benzene concentrations comprise the majority of the total BTEX concentrations shown in the area of Former Holder #1 (Figure 6). Groundwater samples collected inside of the holder contain concentrations of benzene several orders of magnitude *lower* than groundwater samples collected immediately outside of and downgradient from the holder. This suggests that the contents of the holder may not be the source of the benzene plume. The highest concentrations of benzene in groundwater were detected at locations exhibiting elevated PID readings and odors at depths below 10 feet (i.e., MW-1, SB-15, SB-18, SB-19, and SB-23). Elevated benzene levels have been detected in groundwater sampled from two monitoring wells (MW-7 and MW-8) located approximately 100 feet downgradient from Former Holder #1. As previously discussed, groundwater has not yet been sampled from newly installed downgradient monitoring wells MW-9 and MW-12, and proposed downgradient monitoring wells MW-10 and MW-11 have not yet been installed. These new wells are located between approximately 220 and 340 feet downgradient from Former Holder #1, depending on location.

Three other VOCs have been detected in groundwater at levels slightly above TOGS at a few temporary well locations. These include naphthalene (which can also be considered a PAH) at SB-9 and SB-10, isopropylbenzene at SB-17, and styrene at SB-18.

As shown in Table 4, PAHs have not been detected in groundwater above TOGS at any monitoring well locations. Other SVOCs (phenol, 4-methylphenol, and/or bis[2-ethylhexyl]phthalate), however, have been detected in groundwater at levels slightly above TOGS at MW-1, MW-3, MW-7, and MW-8.

Cyanide has been detected above TOGS in groundwater samples collected from two monitoring wells (MW-2 and MW-3) located in the northwestern quadrant of the site.

Closing

Based on the groundwater sampling results presented above, NFG believes additional investigation is warranted to further evaluate the source of the benzene plume that appears to originate near Former Holder #1. As such, NFG proposes to hold a teleconference or meeting with the NYSDEC within the next few weeks to discuss the RI data collected to date and a potential scope of work for evaluating the source of benzene in groundwater. Please contact me by phone at 315.671.9456 or e-mail at

scott.powlin@arcadis-us.com at your earliest convenience to schedule the teleconference or meeting.

Sincerely,

ARCADIS of New York, Inc.

Scott A. Powlin
Sr. Geologist

Attachments

Copies:
Tanya Alexander, CHMM, REM, National Fuel
Lee Hartz, National Fuel
Gardiner Cross, NYSDEC
Anthony Lopes, NYSDEC – Region 9
Nathan Freeman, NYSDOH
Terry Young, ARCADIS

References:

ARCADIS. 2009. *Site Characterization Work Plan*, Dunkirk Former Manufactured Gas Plant Site (Site No. 9-07-035), Dunkirk, New York. August 2009.

ARCADIS. 2013a. *Remedial Investigation Work Plan*, Dunkirk Former Manufactured Gas Plant Site (Site No. 9-07-035), Dunkirk, New York. March 2013.

NYSDEC. 1998. *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS).

Rickard, L. V. and Fisher, D. W., 1970. *Geologic Map of New York – Finger Lakes Sheet*. New York State Museum and Science Service.

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Tables

TABLE 1
SAMPLE SUMMARY

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Matrix	Location	Date Collected	Depth Start	Depth End	Total Cyanide	Free Cyanide	SVOCs	VOCs	TPH-DRO	PIANO
Groundwater	MW-1	9/9/2010	8	18	X		X	X		
	MW-1 [BD-090910]	9/9/2010	8	18	X		X	X		
	MW-1	6/20/2011	8	18	X		X			X
	MW-1	8/10/2011	8	18					X	
	MW-2	9/9/2010	7.8	17.8	X		X	X		
	MW-2	6/20/2011	7.8	17.8	X	X	X	X		
	MW-3	9/9/2010	5	15	X		X	X		
	MW-3	6/20/2011	5	15	X	X	X	X		
	MW-3 [BD-062011]	6/20/2011	5	15	X	X	X	X		
	MW-4	9/9/2010	8	18	X		X	X		
	MW-4	6/20/2011	8	18	X		X	X		
	MW-5	9/13/2011	9	19	X		X	X		
	MW-6	9/13/2011	7	17	X		X	X		
	MW-6 [BD-091311]	9/13/2011	7	17	X		X	X		
	MW-7	8/28/2012	8.5	18.5	X		X	X		
	MW-8	8/28/2012	9	19	X		X	X		
	SB-9	8/8/2011	1.3	1.3					X	X
	SB-9	8/8/2011	8	10					X	X
	SB-9	8/8/2011	16	18					X	X
	SB-10	8/10/2011	1	10					X	X
	SB-10	8/9/2011	14	16					X	X
	SB-11	8/10/2011	1	11					X	X
	SB-11	8/9/2011	15	17					X	X
	SB-12	8/11/2011	1	11					X	X
	SB-12	8/9/2011	16	18					X	X
	SB-13-TW	10/10/2013	9	19				X		
	SB-14-TW	10/10/2013	8	18				X		
	SB-15-TW	10/10/2013	8.5	18.5				X		
	SB-16-TW	10/10/2013	8	18				X		
	SB-17-TW	10/10/2013	7.8	17.8				X		
	SB-18-TW	10/10/2013	7.5	17.5				X		
	SB-19-TW	10/10/2013	8.5	18.5				X		
	SB-20-TW	10/10/2013	8.5	18.5				X		
	SB-22-TW	10/10/2013	8	18				X		
	SB-23-TW	10/10/2013	7.5	17.5				X		
	SB-24-TW	10/10/2013	9.3	19.3				X		
	SB-25-TW	10/10/2013	9.8	19.8				X		
Soil	MW-01	8/4/2010	8	11	X		X	X		
	MW-01	8/4/2010	11	14	X		X	X		
	MW-2	8/9/2010	5	9	X		X	X		
	MW-2	8/9/2010	17	17.8	X		X	X		
	MW-3	8/9/2010	5	9	X		X	X		
	MW-3 [BD-080910]	8/9/2010	5	9	X		X	X		
	MW-3	8/9/2010	11	15.2	X		X	X		
	MW-04	8/5/2010	2	3	X		X	X		
	MW-04	8/5/2010	18	20	X		X	X		
	SB-01	8/4/2010	8	11	X		X	X		
	SB-01	8/4/2010	16	18	X		X	X		
	SB-02	8/3/2010	8	10	X		X	X		
	SB-02	8/3/2010	15.8	16.8	X		X	X		
	SB-03	8/4/2010	2	3	X		X	X		
	SB-03	8/4/2010	14.9	16.9	X		X	X		
	SB-04	8/2/2010	8	11	X		X	X		
	SB-04	8/2/2010	14	17	X		X	X		
	SB-05	8/3/2010	8	10	X		X	X		
	SB-05	8/3/2010	15.8	16.8	X		X	X		
	SB-06	8/3/2010	8	10	X		X	X		
	SB-06	8/3/2010	14.8	16.8	X		X	X		
	SB-07	8/3/2010	8	10	X		X	X		

See Notes on Page 2.

TABLE 1
SAMPLE SUMMARY

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Matrix	Location	Date Collected	Depth Start	Depth End	Total Cyanide	Free Cyanide	SVOCs	VOCs	TPH-DRO	PIANO
Soil (Cont.)	SB-07	8/3/2010	12.4	13.4	X		X	X		
	SB-08	8/2/2010	8	10	X		X	X		
	SB-08	8/2/2010	15	17.5	X		X	X		
	SB-08 [BD-080210]	8/2/2010	15	17.5	X		X	X		
	SB-13	10/7/2013	4	6	X		X	X		
	SB-13	10/7/2013	18	19	X		X	X		
	SB-14	10/7/2013	4	8	X		X	X		
	SB-14	10/7/2013	16	18	X		X	X		
	SB-15	10/8/2013	10	11	X		X	X		
	SB-15	10/8/2013	16	18.5	X		X	X		
	SB-16	10/8/2013	4	6	X		X	X		
	SB-16	10/8/2013	16	18.5	X		X	X		
	SB-17	10/8/2013	3	4	X		X	X		
	SB-17	10/8/2013	16.8	17.8	X		X	X		
	SB-18	10/8/2013	13	14	X		X	X		
	SB-18	10/8/2013	16.5	17.5	X		X	X		
	SB-19	10/8/2013	14	16	X		X	X		
	SB-19	10/8/2013	18	18.5	X		X	X		
	SB-20	10/8/2013	4	6	X		X	X		
	SB-20	10/8/2013	17.5	18.5	X		X	X		
	SB-21	10/9/2013	4	6	X		X	X		
	SB-21	10/9/2013	17	18	X		X	X		
	SB-22	10/9/2013	4	5	X		X	X		
	SB-22	10/9/2013	17	18	X		X	X		
	SB-23	10/9/2013	15	16	X		X	X		
	SB-23	10/9/2013	16.5	17.5	X		X	X		
	SB-24	10/9/2013	4	8	X		X	X		
	SB-24	10/9/2013	17.3	19.3	X		X	X		
	SB-25	10/9/2013	4	8	X		X	X		
	SB-25	10/9/2013	18.8	19.8	X		X	X		

Notes:
SVOCs = Semi-Volatile Organic Compounds.
VOCs = Volatile Organic Compounds.
Depths given in feet below grade.
TPH-DRO = Total petroleum hydrocarbon - Diesel Range Organics.
PIANO = Paraffin, isoparaffin, aromatic (includes BTEX compounds), naphthene, and olefin compounds.
[BD-######] = Blind duplicate sample collected at this location.

TABLE 2
MONITORING WELL CONSTRUCTION DETAILS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID	Date Completed	Measuring Point Elevation (ft. amsl)	Well Diameter (in.)	Casing/ Screen Type	Screen Slot Size (in.)	Screen Length (ft.)	Depth to Screened Interval (ft. bgs)		Total Well Depth
							Top	Bottom	ft. bgs
MW-1	8/6/10	583.14	2	PVC	0.01	10.0	8.0	18.0	18.2
MW-2	8/11/10	582.91	2	PVC	0.01	10.0	7.8	17.8	17.8
MW-3	8/9/10	582.97	2	PVC	0.01	10.0	5.0	15.0	15.0
MW-4	8/5/10	585.19	2	PVC	0.01	10.0	8.0	18.0	18.0
MW-5	8/10/11	584.74	2	PVC	0.01	10.0	9.0	19.0	19.0
MW-6	8/10/11	583.52	2	PVC	0.01	10.0	7.0	17.0	17.0
MW-7	6/12/12	583.50	2	PVC	0.01	10.0	8.5	18.5	18.5
MW-8	6/11/12	583.16	2	PVC	0.01	10.0	9.0	19.0	19.0
MW-9	10/4/13	581.95	2	PVC	0.01	10.0	6.5	16.5	16.6
MW-12	10/3/13	584.42	2	PVC	0.01	10.0	9.0	19.0	19.0
MW-13	10/3/13	582.33	2	PVC	0.01	10.0	5.0	15.0	15.0

Notes:
in. = inches.
Depths given in feet below ground surface (ft. bgs).
ft. amsl = feet above mean sea level.
Reference datum NAVD88.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	MW-01 8 - 11 08/04/10	MW-01 11 - 14 08/04/10	MW-2 5 - 9 08/09/10	MW-2 17 - 17.8 08/09/10	MW-3 5 - 9 08/09/10	MW-3 11 - 15.2 08/09/10	MW-04 2 - 3 08/05/10	MW-04 18 - 20 08/05/10	SB-01 8 - 11 08/04/10	SB-01 16 - 18 08/04/10	SB-02 8 - 10 08/03/10	SB-02 15.8 - 16.8 08/03/10
Volatile Organics															
1,2-Dichloroethane	30	2.3	mg/kg	0.0058 U	0.0083 U	0.0063 UJ	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.0056 UJ	0.0057 U	0.0064 U
2-Butanone	500	100	mg/kg	0.0027 J	0.042 U	0.032 UJ	0.028 U	0.0055 J [0.0051 J]	0.0040 J	0.011 J	0.028 U	0.0096 J	0.028 U	0.029 U	0.032 U
Acetone	500	100	mg/kg	0.029 UB	0.042 UB	0.032 UBJ	0.028 UB	0.031 UB [0.030 UB]	0.030 UB	0.075	0.028 UB	0.055 UB	0.028 UB	0.033 UB	0.037 UB
Benzene	44	2.9	mg/kg	0.84 D	*53 D*	0.0063 UJ	0.0056 U	0.0027 J [0.0060 U]	0.0075	0.0043 J	0.0057 U	0.017	*7.4 DJ*	0.0057 U	0.018
Carbon Disulfide	- -	- -	mg/kg	0.0058 U	0.0063 J	0.0063 U	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.0034 J	0.0057 U	0.0064 U
Chloroform	350	10	mg/kg	0.0058 U	0.0083 U	0.0063 UJ	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.0056 U	0.0057 U	0.0064 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	390	30	mg/kg	0.0058 U	0.010	0.0063 UJ	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.054 J	0.0057 U	0.0064 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	500	51	mg/kg	0.0039 J	0.0083 U	0.0063 UB	0.0056 UB	0.0059 UB [0.0060 UB]	0.0060 UB	0.0061 U	0.0057 UB	0.0050 J	0.0034 J	0.0032 J	0.0039 J
Styrene	- -	- -	mg/kg	0.0058 U	0.0083 U	0.0063 UJ	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.0056 U	0.0057 U	0.0064 U
Toluene	500	100	mg/kg	0.0058 U	0.0059 J	0.0063 UJ	0.0056 U	0.0059 U [0.0060 U]	0.0060 U	0.0061 U	0.0057 U	0.0075 U	0.026 J	0.0057 U	0.0046 J
Xylenes (total)	500	100	mg/kg	0.012 U	0.0054 J	0.013 UJ	0.011 U	0.012 U [0.012 U]	0.012 U	0.012 U	0.011 U	0.0076 J	0.075 J	0.011 U	0.013 U
Total BTEX	- -	- -	mg/kg	0.84	53 J	ND	ND	0.0027 J [ND]	0.0075	0.0043 J	ND	0.025 J	7.6 J	ND	0.023 J
Total VOCs	- -	- -	mg/kg	0.85 J	53 J	ND	ND	0.0082 J [0.0051 J]	0.012 J	0.090 J	ND	0.039 J	7.6 J	0.0032 J	0.027 J
Semivolatile Organics															
1,1'-Biphenyl	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	- -	- -	mg/kg	0.39 U	0.54 U	2.1 U	0.37 U	1.9 U [2.0 U]	2.0 U	4.0 U	0.040 J	20 U	0.37 U	0.37 U	2.1 U
2,4-Dimethylphenol	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.19 U	0.99 U [1.0 U]	1.0 U	2.1 U	0.19 U	10 U	0.19 U	0.19 U	1.1 U
2-Methylnaphthalene	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.041 J	2.1 J [0.057 J]	0.14 J	0.42 J	0.19 U	0.93 J	0.041 J	0.19 U	1.1 U
4-Chloroaniline	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.19 U	0.99 U [1.0 U]	1.0 U	2.1 U	0.19 U	10 U	0.19 U	0.19 U	1.1 U
4-Methylphenol	500	34	mg/kg	0.39 U	0.54 U	2.1 U	0.37 U	0.082 J [2.0 U]	2.0 U	4.0 U	0.37 U	20 U	0.37 U	0.37 U	2.1 U
Acenaphthene	500	100	mg/kg	0.20 U	0.28 U	1.1 U	0.0093 J	2.5 J [0.16 J]	0.13 J	0.46 J	0.19 U	4.8 J	0.19 U	0.19 U	1.1 U
Acenaphthylene	500	100	mg/kg	0.20 U	0.28 U	1.1 U	0.011 J	0.43 J [0.071 J]	0.12 J	2.1 U	0.19 U	10 U	0.013 J	0.19 U	1.1 U
Anthracene	500	100	mg/kg	0.20 U	0.28 U	1.1 U	0.020 J	9.0 J [0.35 J]	0.20 J	1.7 J	0.19 U	9.4 J	0.19 U	0.014 J	1.1 U
Benzo(a)anthracene	5.6	1	mg/kg	0.20 U	0.28 U	0.079 J	0.027 J	*11 J [1.2 J]*	0.65 J	*4.8*	0.19 U	*16*	0.013 J	0.025 J	1.1 U
Benzo(a)pyrene	1	1	mg/kg	0.20 U	0.28 U	0.085 J	0.026 J	*8.7 J [1.7 J]*	0.79 J	*7.1*	0.19 U	*16*	0.19 U	0.19 U	1.1 U
Benzo(b)fluoranthene	5.6	1	mg/kg	0.20 U	0.28 U	0.11 J	0.024 J	*7.5 J [1.5 J]*	0.81 J	*6.2*	0.19 U	*15*	0.19 U	0.19 U	1.1 U
Benzo(g,h,i)perylene	500	100	mg/kg	0.20 U	0.28 U	0.056 J	0.020 J	3.7 [1.1]	0.54 J	5.9	0.19 U	8.0 J	0.19 U	0.19 U	1.1 U
Benzo(k)fluoranthene	56	1	mg/kg	0.20 U	0.28 U	1.1 UID4	0.011 J	*3.9 J [0.76 J]*	0.34 J	*2.3*	0.19 U	*6.9 J*	0.19 U	0.19 U	1.1 U
Benzyl Alcohol	- -	- -	mg/kg	0.39 U	0.54 U	2.1 U	0.0093 J	1.9 U [2.0 U]	2.0 U	4.0 U	0.37 U	20 U	0.37 U	0.37 U	2.1 U
Bis(2-ethylhexyl)phthalate	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.50	0.99 U [0.37 J]	0.82 J	2.1 U	0.20	10 U	0.073 J	0.19 U	1.1 U
Carbazole	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	56	1	mg/kg	0.20 U	0.037 J	0.064 J	0.051 J	*9.4 J [1.2 J]*	0.76 J	*4.7*	0.050 J	*15*	0.042 J	0.024 J	1.1 U
Dibenzo(a,h)anthracene	0.56	0.33	mg/kg	0.20 U	0.28 U	1.1 U	0.19 U	*1.7 J [0.23 J]*	0.11 J	*1.4 J*	0.19 U	*2.4 J*	0.19 U	0.19 U	1.1 U
Dibenzofuran	350	14	mg/kg	0.20 U	0.28 U	1.1 U	0.0082 J	3.5 J [0.089 J]	0.10 J	0.44 J	0.19 U	3.1 J	0.19 U	0.19 U	1.1 U
Diethylphthalate	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.019 J	0.99 U [1.0 U]	1.0 U	2.1 U	0.19 U	10 U	0.19 U	0.19 U	1.1 U
Fluoranthene	500	100	mg/kg	0.20 U	0.28 U	0.10 J	0.056 J	19 J [1.9 J]	1.6	7.5	0.19 U	31	0.19 U	0.043 J	1.1 U

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	MW-01 8 - 11 08/04/10	MW-01 11 - 14 08/04/10	MW-2 5 - 9 08/09/10	MW-2 17 - 17.8 08/09/10	MW-3 5 - 9 08/09/10	MW-3 11 - 15.2 08/09/10	MW-04 2 - 3 08/05/10	MW-04 18 - 20 08/05/10	SB-01 8 - 11 08/04/10	SB-01 16 - 18 08/04/10	SB-02 8 - 10 08/03/10	SB-02 15.8 - 16.8 08/03/10
Semivolatile Organics (Cont.)															
Fluorene	500	100	mg/kg	0.20 U	0.28 U	1.1 U	0.015 J	5.4 J [0.13 J]	0.15 J	0.40 J	0.19 U	5.9 J	0.19 U	0.19 U	1.1 U
Indeno(1,2,3-cd)pyrene	5.6	0.5	mg/kg	0.20 U	0.28 U	0.048 J	0.021 J	*3.8 [1.0]*	0.50 J	*4.9*	0.19 U	*7.4 J*	0.19 U	0.19 U	1.1 U
Naphthalene	500	100	mg/kg	0.20 U	0.28 U	1.1 U	0.19 UB	2.3 J [0.16 JB]	0.35 JB	0.34 J	0.19 U	4.0 J	1.7	0.19 UB	16 B
N-nitrosodiphenylamine	- -	- -	mg/kg	0.20 U	0.28 U	1.1 U	0.019 J	0.99 U [1.0 U]	1.0 U	2.1 U	0.19 U	10 U	0.19 U	0.19 U	1.1 U
Phenanthrene	500	100	mg/kg	0.20 U	0.28 U	0.060 J	0.080 J	23 J [1.1 J]	1.1	6.1	0.028 J	40	0.059 J	0.049 J	0.10 J
Phenol	500	100	mg/kg	0.20 U	0.090 J	1.1 U	0.19 U	0.99 U [1.0 U]	1.0 U	2.1 U	0.19 U	10 U	0.19 U	0.19 U	1.1 U
Pyrene	500	100	mg/kg	0.20 U	0.28 U	0.091 J	0.056 J	16 J [1.7 J]	1.3	7.2	0.19 U	32	0.19 U	0.037 J	1.1 U
Total PAHs	- -	- -	mg/kg	ND	0.037 J	0.69 J	0.47 J	130 J [14 J]	9.6 J	61 J	0.078 J	210 J	1.9 J	0.19 J	16 J
Total SVOCs	- -	- -	mg/kg	ND	0.13 J	0.69 J	1.0 J	130 J [15 J]	11 J	62 J	0.32 J	220 J	1.9 J	0.19 J	16 J
Inorganics															
Cyanide	27	27	mg/kg	0.600 U	1.10 U	0.900 U	0.900 U	0.900 U [1.00 U]	1.10	1.00 U	1.00 U	2.60	1.20 U	0.900 U	2.30

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-03 2 - 3 08/04/10	SB-03 14.9 - 16.9 08/04/10	SB-04 8 - 11 08/02/10	SB-04 14 - 17 08/02/10	SB-05 8 - 10 08/03/10	SB-05 15.8 - 16.8 08/03/10	SB-06 8 - 10 08/03/10	SB-06 14.8 - 16.8 08/03/10	SB-07 8 - 10 08/03/10	SB-07 12.4 - 13.4 08/03/10	SB-08 8 - 10 08/02/10	SB-08 15 - 17.5 08/02/10	SB-13 4 - 6 10/07/13
Volatile Organics																
1,2-Dichloroethane	30	2.3	mg/kg	0.056 U	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.0056 U	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 U
2-Butanone	500	100	mg/kg	0.046 J	0.028 U	0.032 U	0.028 U	0.029 U	0.028 U	0.029 U	0.028 U	0.032 U	0.027 U	0.030 U	0.028 U [0.025 U]	0.031 U
Acetone	500	100	mg/kg	0.18 J	0.028 UB	0.032 UB	0.028 UB	0.029 UB	0.028 UB	0.029 UB	0.028 UB	0.032 UB	0.027 UB	0.030 UB	0.028 UB [0.013 UB]	0.028 J
Benzene	44	2.9	mg/kg	0.056 U	0.0056 U	0.0064 U	0.032	0.0059 U	0.0057 U	0.056	2.5 D	0.029	0.0053 U	0.0061 U	*7.0 D [5.1 D]*	0.0062 UJ
Carbon Disulfide	- -	- -	mg/kg	0.041 J	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.0056 U	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 U
Chloroform	350	10	mg/kg	0.056 U	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.0056 U	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0062 U
Ethylbenzene	390	30	mg/kg	0.035 J	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.018	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 UJ
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0062 U
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0062 U
Methylene Chloride	500	51	mg/kg	0.050 J	0.0035 J	0.0053 J	0.0052 J	0.0055 J	0.0047 J	0.0040 J	0.0044 J	0.0064 U	0.0034 J	0.0054 J	0.0052 J [0.0036 J]	0.0062 U
Styrene	- -	- -	mg/kg	0.056 U	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.0056 U	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 U
Toluene	500	100	mg/kg	0.026 J	0.0056 U	0.0064 U	0.0056 U	0.0059 U	0.0057 U	0.0059 U	0.047	0.0064 U	0.0053 U	0.0061 U	0.0055 U [0.0050 U]	0.0062 U
Xylenes (total)	500	100	mg/kg	0.060 J	0.011 U	0.013 U	0.011 U	0.012 U	0.011 U	0.012 U	0.044	0.013 U	0.011 U	0.012 U	0.011 U [0.010 U]	0.012 U
Total BTEX	- -	- -	mg/kg	0.12 J	ND	ND	0.032	ND	ND	0.056	2.6	0.029	ND	ND	7.0 [5.1]	ND
Total VOCs	- -	- -	mg/kg	0.44 J	0.0035 J	0.0053 J	0.037 J	0.0055 J	0.0047 J	0.060 J	2.6 J	0.029	0.0034 J	0.0054 J	7.0 J [5.1 J]	0.028 J
Semivolatile Organics																
1,1'-Biphenyl	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	9.5 U	1.5 U	0.42 U	0.37 U	0.38 U	0.37 U	0.39 U	0.36 U	0.41 U	0.35 U	0.40 U	0.37 U [0.32 U]	NA
2,4-Dimethylphenol	- -	- -	mg/kg	4.9 U	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.21	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
2-Methylnaphthalene	- -	- -	mg/kg	0.61 J	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.41	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
4-Chloroaniline	- -	- -	mg/kg	4.9 U	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
4-Methylphenol	500	34	mg/kg	9.5 U	1.5 U	0.42 U	0.37 U	0.38 U	0.37 U	0.39 U	0.36 U	0.41 U	0.35 U	0.40 U	0.37 U [0.32 U]	0.40 U
Acenaphthene	500	100	mg/kg	0.81 J	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.41	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Acenaphthylene	500	100	mg/kg	0.45 J	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.026 J	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Anthracene	500	100	mg/kg	4.4 J	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.041 J [0.17 U]	0.029 J
Benzo(a)anthracene	5.6	1	mg/kg	*9.7*	0.77 U	0.024 J	0.042 J	0.022 J	0.043 J	0.030 J	0.027 J	0.21 U	0.18 U	0.034 J	0.037 J [0.17 U]	0.060 J
Benzo(a)pyrene	1	1	mg/kg	*5.8*	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Benzo(b)fluoranthene	5.6	1	mg/kg	*9.8*	0.77 U	0.22 U	0.19 U	0.022 J	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.077 J
Benzo(g,h,i)perylene	500	100	mg/kg	6.4	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Benzo(k)fluoranthene	56	1	mg/kg	*4.5 J*	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.032 J
Benzyl Alcohol	- -	- -	mg/kg	9.5 U	1.5 U	0.42 U	0.37 U	0.38 U	0.37 U	0.39 U	0.36 U	0.41 U	0.35 U	0.40 U	0.37 U [0.32 U]	NA
Bis(2-ethylhexyl)phthalate	- -	- -	mg/kg	4.9 U	0.77 U	0.22 U	0.19 U	0.20	0.25	0.20 U	0.19 U	0.21 U	0.099 J	0.13 J	0.19 U [0.17 U]	0.093 J
Carbazole	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.21 U
Chrysene	56	1	mg/kg	*9.2*	0.078 J	0.22 U	0.19 U	0.045 J	0.19 U	0.013 J	0.19 U	0.21 U	0.18 U	0.20 U	0.013 J [0.042 J]	0.066 J
Dibenzo(a,h)anthracene	0.56	0.33	mg/kg	*1.5 J*	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Dibenzofuran	350	14	mg/kg	9.9	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.13 J	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Diethylphthalate	- -	- -	mg/kg	4.9 U	0.77 U	0.22 U	0.012 J	0.20 U	0.016 J	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.024 J [0.17 U]	0.21 U
Fluoranthene	500	100	mg/kg	28	0.77 U	0.22 U	0.19 U	0.019 J	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.046 J

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-03 2 - 3 08/04/10	SB-03 14.9 - 16.9 08/04/10	SB-04 8 - 11 08/02/10	SB-04 14 - 17 08/02/10	SB-05 8 - 10 08/03/10	SB-05 15.8 - 16.8 08/03/10	SB-06 8 - 10 08/03/10	SB-06 14.8 - 16.8 08/03/10	SB-07 8 - 10 08/03/10	SB-07 12.4 - 13.4 08/03/10	SB-08 8 - 10 08/02/10	SB-08 15 - 17.5 08/02/10	SB-13 4 - 6 10/07/13
Semivolatile Organics (Cont.)																
Fluorene	500	100	mg/kg	5.9	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.14 J	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Indeno(1,2,3-cd)pyrene	5.6	0.5	mg/kg	*5.9*	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Naphthalene	500	100	mg/kg	4.6 J	0.77 U	0.22 U	0.19 UB	0.20 UB	0.19 UB	0.20 UB	3.5	0.21 UB	0.18 U	0.20 UB	0.19 UB [0.17 UB]	0.21 U
N-nitrosodiphenylamine	- -	- -	mg/kg	4.9 U	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.21 U
Phenanthrene	500	100	mg/kg	40	0.090 J	0.22 U	0.051 J	0.026 J	0.022 J	0.20 U	0.14 J	0.21 U	0.18 U	0.20 U	0.042 J [0.032 J]	0.029 J
Phenol	500	100	mg/kg	4.9 U	0.77 U	0.22 U	0.19 U	0.20 U	0.19 U	0.20 U	0.036 J	0.21 U	0.18 U	0.20 U	0.047 J [0.044 J]	0.21 U
Pyrene	500	100	mg/kg	25	0.77 U	0.22 U	0.19 U	0.020 J	0.19 U	0.017 J	0.19 U	0.21 U	0.18 U	0.20 U	0.19 U [0.17 U]	0.055 J
Total PAHs	- -	- -	mg/kg	160 J	0.17 J	0.024 J	0.093 J	0.15 J	0.065 J	0.060 J	4.7 J	ND	ND	0.034 J	0.13 J [0.074 J]	0.39 J
Total SVOCs	- -	- -	mg/kg	170 J	0.17 J	0.024 J	0.11 J	0.35 J	0.33 J	0.060 J	5.0 J	ND	0.099 J	0.16 J	0.20 J [0.12 J]	0.49 J
Inorganics																
Cyanide	27	27	mg/kg	*132 D08*	0.900 U	0.900 U	1.00 U	0.900 U	0.900 U	0.900 U	1.00 U	0.900 U	0.800 U	1.00 U	0.900 U [0.900 U]	1.20 U

See Notes on Page 9.

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SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-13 18 - 19 10/07/13	SB-14 4 - 8 10/07/13	SB-14 16 - 18 10/07/13	SB-15 10 - 11 10/08/13	SB-15 16 - 18.5 10/08/13	SB-16 4 - 6 10/08/13	SB-16 16 - 18.5 10/08/13	SB-17 3 - 4 10/08/13	SB-17 16.8 - 17.8 10/08/13	SB-18 13 - 14 10/08/13	SB-18 16.5 - 17.5 10/08/13	SB-19 14 - 16 10/08/13	SB-19 18 - 18.5 10/08/13	SB-20 4 - 6 10/08/13
Volatile Organics																	
1,2-Dichloroethane	30	2.3	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0055 U	0.0071 U
2-Butanone	500	100	mg/kg	0.028 U	0.033 U	0.028 U	0.030 U	0.028 U	0.032 U	0.027 U	0.028 U	0.028 U	0.028 U	0.027 U	0.028 U	0.028 U	0.035 U
Acetone	500	100	mg/kg	0.0079 J	0.060	0.0073 J	0.030 U	0.0067 J	0.021 J	0.027 U	0.014 J	0.028 U	0.028 U	0.027 U	0.028 U	0.0058 J	0.067
Benzene	44	2.9	mg/kg	0.0015 J	0.0065 U	*7.5 D*	*62 D*	*6.4 D*	0.012	0.0049 J	0.0056 U	*26 D*	*22 D*	*14 D*	*20 D*	*21 D*	0.010
Carbon Disulfide	- -	- -	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.0064 UJ	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0055 U	0.0071 U
Chloroform	350	10	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0055 U	0.0071 U
Cyclohexane	- -	- -	mg/kg	0.0056 U	0.00091 J	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0011 J	0.0071 U
Ethylbenzene	390	30	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.00080 J	0.0055 U	0.0056 U	0.00049 J	0.013 J	0.00078 J	0.13	0.0019 J	0.0071 U
Isopropylbenzene	- -	- -	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.012	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0055 U	0.0071 U
Methylcyclohexane	- -	- -	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.0055 U	0.0055 U	0.0056 U	0.0025 J	0.0071 U
Methylene Chloride	500	51	mg/kg	0.0056 U	0.0035 J	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.0055 UB	0.0055 U	0.0056 UB	0.0055 U	0.0071 U
Styrene	- -	- -	mg/kg	0.0056 U	0.0065 U	0.0056 U	0.0060 U	0.0057 U	0.0064 U	0.0055 U	0.0056 U	0.0056 U	0.011 J	0.0055 U	0.011	0.0055 U	0.0071 U
Toluene	500	100	mg/kg	0.0056 U	0.0065 U	0.017	0.14	0.017	0.0064 U	0.0055 U	0.0056 U	0.0062	0.015 J	0.0044 J	0.068	0.0080	0.0071 U
Xylenes (total)	500	100	mg/kg	0.011 U	0.013 U	0.011 U	0.012 U	0.011 U	0.0015 J	0.011 U	0.011 U	0.011 U	0.019 J	0.011 U	0.18	0.0017 J	0.014 U
Total BTEX	- -	- -	mg/kg	0.0015 J	ND	7.5	62	6.4	0.014 J	0.0049 J	ND	26 J	22	14 J	20	21 J	0.010
Total VOCs	- -	- -	mg/kg	0.0094 J	0.064 J	7.5 J	62	6.4 J	0.035 J	0.0049 J	0.014 J	26 J	22 J	14 J	20 J	21 J	0.077
Semivolatile Organics																	
1,1'-Biphenyl	- -	- -	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
2-Methylnaphthalene	- -	- -	mg/kg	0.19 U	0.014 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.022 J	0.021 J	0.19 U	0.19 U	0.19 U	0.013 J	0.053 J
4-Chloroaniline	- -	- -	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.083 J	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
4-Methylphenol	500	34	mg/kg	0.37 U	0.42 U	0.36 U	0.40 U	0.37 U	8.5 UJ	0.36 U	0.37 U	0.37 U	0.36 U	0.36 U	0.36 U	0.37 U	2.3 U
Acenaphthene	500	100	mg/kg	0.19 U	0.023 J	0.19 U	0.20 U	0.19 U	0.18 J	0.18 U	0.0072 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.065 J
Acenaphthylene	500	100	mg/kg	0.19 U	0.014 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Anthracene	500	100	mg/kg	0.19 U	0.070 J	0.19 U	0.20 U	0.19 U	0.51 J	0.18 U	0.029 J	0.036 J	0.19 U	0.055 J	0.19 U	0.19 U	0.12 J
Benzo(a)anthracene	5.6	1	mg/kg	0.19 U	0.16 J	0.19 U	0.20 U	0.19 U	1.0 J	0.18 U	0.14 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.24 J
Benzo(a)pyrene	1	1	mg/kg	0.19 U	0.18 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.11 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.18 J
Benzo(b)fluoranthene	5.6	1	mg/kg	0.19 U	0.25	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.20	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.31 J
Benzo(g,h,i)perylene	500	100	mg/kg	0.19 U	0.091 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Benzo(k)fluoranthene	56	1	mg/kg	0.19 U	0.094 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.076 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.12 J
Benzyl Alcohol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	- -	- -	mg/kg	0.19 U	0.14 J	0.19 U	0.20 U	0.16 J	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.75 J
Carbazole	- -	- -	mg/kg	0.19 U	0.061 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.092 J
Chrysene	56	1	mg/kg	0.19 U	0.16 J	0.19 U	0.20 U	0.19 U	0.80 J	0.18 U	0.12 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.24 J
Dibenzo(a,h)anthracene	0.56	0.33	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Dibenzofuran	350	14	mg/kg	0.19 U	0.031 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.015 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Diethylphthalate	- -	- -	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Fluoranthene	500	100	mg/kg	0.19 U	0.35	0.19 U	0.20 U	0.035 J	4.2 J	0.046 J	0.27	0.051 J	0.19 U	0.19 U	0.19 U	0.19 U	0.72 J

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-13 18 - 19 10/07/13	SB-14 4 - 8 10/07/13	SB-14 16 - 18 10/07/13	SB-15 10 - 11 10/08/13	SB-15 16 - 18.5 10/08/13	SB-16 4 - 6 10/08/13	SB-16 16 - 18.5 10/08/13	SB-17 3 - 4 10/08/13	SB-17 16.8 - 17.8 10/08/13	SB-18 13 - 14 10/08/13	SB-18 16.5 - 17.5 10/08/13	SB-19 14 - 16 10/08/13	SB-19 18 - 18.5 10/08/13	SB-20 4 - 6 10/08/13
Semivolatile Organics (Cont.)																	
Fluorene	500	100	mg/kg	0.19 U	0.034 J	0.19 U	0.20 U	0.19 U	0.83 J	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Indeno(1,2,3-cd)pyrene	5.6	0.5	mg/kg	0.19 U	0.11 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.073 J	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Naphthalene	500	100	mg/kg	0.19 U	0.059 J	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.051 J	0.34	0.19 U	0.19 U	1.8	0.018 J	0.79 J
N-nitrosodiphenylamine	- -	- -	mg/kg	0.19 U	0.22 U	0.19 U	0.20 U	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Phenanthrene	500	100	mg/kg	0.19 U	0.37	0.056 J	0.20 U	0.047 J	6.9 J	0.068 J	0.16 J	0.093 J	0.19 U	0.055 J	0.19 U	0.028 J	0.50 J
Phenol	500	100	mg/kg	0.19 U	0.22 U	0.19 U	0.68	0.19 U	4.4 UJ	0.18 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1.2 U
Pyrene	500	100	mg/kg	0.19 U	0.28	0.19 U	0.20 U	0.19 U	3.4 J	0.18 U	0.29	0.042 J	0.19 U	0.19 U	0.19 U	0.19 U	0.55 J
Total PAHs	- -	- -	mg/kg	ND	2.3 J	0.056 J	ND	0.082 J	18 J	0.11 J	1.5 J	0.58 J	ND	0.11 J	1.8	0.059 J	3.9 J
Total SVOCs	- -	- -	mg/kg	ND	2.4 J	0.056 J	0.68	0.24 J	18 J	0.11 J	1.6 J	0.67 J	ND	0.11 J	1.8	0.059 J	4.6 J
Inorganics																	
Cyanide	27	27	mg/kg	1.10 U	1.30 U	1.10 U	1.20 U	1.10 U	*379*	1.00 U	1.10 U	1.10 U	1.10 U	1.00 U	1.10 U	1.00 U	*39.4*

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-20 17.5 - 18.5 10/08/13	SB-21 4 - 6 10/09/13	SB-21 17 - 18 10/09/13	SB-22 4 - 5 10/09/13	SB-22 17 - 18 10/09/13	SB-23 15 - 16 10/09/13	SB-23 16.5 - 17.5 10/09/13	SB-24 4 - 8 10/09/13	SB-24 17.3 - 19.3 10/09/13	SB-25 4 - 8 10/09/13	SB-25 18.8 - 19.8 10/09/13
Volatile Organics														
1,2-Dichloroethane	30	2.3	mg/kg	0.070	0.0060 U	0.0054 U	0.0065 U	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
2-Butanone	500	100	mg/kg	0.029 U	0.030 U	0.027 U	0.033 U	0.027 U	0.029 U	0.028 U	0.031 U [0.031 U]	0.028 U [0.029 U]	0.030 U	0.027 U
Acetone	500	100	mg/kg	0.029 U	0.047	0.027 U	0.063	0.027 U	0.029 U	0.028 U	0.012 J [0.013 J]	0.028 U [0.029 U]	0.019 J	0.027 U
Benzene	44	2.9	mg/kg	*27 D*	0.0060 U	*8.3 D*	0.029	0.047	*11 D*	1.2 D	0.0048 J [0.0014 J]	0.0027 J [0.0035 J]	0.0018 J	0.0027 J
Carbon Disulfide	- -	- -	mg/kg	0.0058 U	0.0060 U	0.0054 U	0.0065 U	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
Chloroform	350	10	mg/kg	0.0058 U	0.0060 U	0.0054 U	0.0065 U	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0016 J]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
Cyclohexane	- -	- -	mg/kg	0.0058 U	0.0060 U	0.0054 UJ	0.0012 J	0.0055 U	0.0059 U	0.0055 U	0.0062 UJ [0.00095 J]	0.0056 U [0.0058 U]	0.0060 U	0.0012 J
Ethylbenzene	390	30	mg/kg	0.00051 J	0.0060 U	0.0054 U	0.038	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 UJ [0.0058 U]	0.0060 U	0.0054 U
Isopropylbenzene	- -	- -	mg/kg	0.0058 U	0.0060 U	0.0054 U	0.0065 U	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
Methylcyclohexane	- -	- -	mg/kg	0.0058 U	0.0060 U	0.0054 U	0.0032 J	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0026 J]	0.0056 U [0.0058 U]	0.0060 U	0.0042 J
Methylene Chloride	500	51	mg/kg	0.0036 J	0.0033 J	0.0054 UB	0.0065 U	0.0042 J	0.0039 J	0.0028 J	0.0062 U [0.0063 UB]	0.0042 J [0.0058 U]	0.0034 J	0.0054 U
Styrene	- -	- -	mg/kg	0.0058 U	0.0060 U	0.0054 U	0.013	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
Toluene	500	100	mg/kg	0.048	0.0060 U	0.0029 J	0.064	0.0055 U	0.0059 U	0.0055 U	0.0062 U [0.0063 U]	0.0056 U [0.0058 U]	0.0060 U	0.0054 U
Xylenes (total)	500	100	mg/kg	0.012 U	0.012 U	0.011 U	0.19	0.011 U	0.012 U	0.011 U	0.012 U [0.013 U]	0.011 U [0.012 U]	0.012 U	0.011 U
Total BTEX	- -	- -	mg/kg	27 J	ND	8.3 J	0.32	0.047	11	1.2	0.0048 J [0.0014 J]	0.0027 J [0.0035 J]	0.0018 J	0.0027 J
Total VOCs	- -	- -	mg/kg	27 J	0.050 J	8.3 J	0.40	0.051 J	11 J	1.2 J	0.017 J [0.022 J]	0.0069 J [0.0035 J]	0.024 J	0.0027 J
Semivolatile Organics														
1,1'-Biphenyl	- -	- -	mg/kg	0.99 U	0.058 J	0.18 UJ	2.1 J	0.19 UJ	0.20 UJ	0.19 UJ	0.21 UJ [0.21 UJ]	0.19 UJ [0.20 UJ]	0.20 UJ	0.18 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	0.99 U	0.21 U	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
2-Methylnaphthalene	- -	- -	mg/kg	0.99 U	0.18 J	0.18 U	8.2 J	0.19 U	0.20 U	0.19 U	0.0096 J [0.21 U]	0.19 U [0.20 U]	0.20 U	0.013 J
4-Chloroaniline	- -	- -	mg/kg	0.99 U	0.21 U	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
4-Methylphenol	500	34	mg/kg	1.9 U	0.41 U	0.35 U	4.3 UJ	0.36 U	0.39 U	0.36 U	0.42 U [0.41 U]	0.37 U [0.38 U]	0.40 U	0.36 U
Acenaphthene	500	100	mg/kg	0.99 U	0.15 J	0.18 U	1.7 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
Acenaphthylene	500	100	mg/kg	0.99 U	0.36	0.18 U	8.0 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
Anthracene	500	100	mg/kg	0.99 U	0.63	0.18 U	13 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Benzo(a)anthracene	5.6	1	mg/kg	0.99 U	*1.6*	0.18 U	*12 J*	0.19 U	0.20 U	0.19 U	0.033 J [0.068 J]	0.19 UJ [0.20 U]	0.20 U	0.032 J
Benzo(a)pyrene	1	1	mg/kg	0.99 U	*1.7*	0.013 J	*9.9 J*	0.19 U	0.20 U	0.19 U	0.029 J [0.055 J]	0.19 UJ [0.20 U]	0.038 J	0.18 U
Benzo(b)fluoranthene	5.6	1	mg/kg	0.99 U	*2.3*	0.016 J	*10 J*	0.19 U	0.20 U	0.19 U	0.043 J [0.073 J]	0.19 UJ [0.20 U]	0.065 J	0.18 U
Benzo(g,h,i)perylene	500	100	mg/kg	0.99 U	0.54	0.18 U	5.2 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Benzo(k)fluoranthene	56	1	mg/kg	0.99 U	*1.1*	0.18 U	*4.9 J*	0.19 U	0.20 U	0.19 U	0.013 J [0.030 J]	0.19 U [0.20 U]	0.028 J	0.18 U
Benzyl Alcohol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	- -	- -	mg/kg	0.99 U	0.098 J	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.078 J [0.21 U]	0.098 J [0.083 J]	0.20 U	0.18 U
Carbazole	- -	- -	mg/kg	0.99 U	0.45	0.18 U	4.4 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
Chrysene	56	1	mg/kg	0.99 U	*2.1*	0.034 J	*10 J*	0.19 U	0.20 U	0.19 U	0.034 J [0.060 J]	0.19 UJ [0.20 U]	0.044 J	0.010 J
Dibenzo(a,h)anthracene	0.56	0.33	mg/kg	0.99 U	0.21 U	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Dibenzofuran	350	14	mg/kg	0.99 U	0.50	0.18 U	7.8 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Diethylphthalate	- -	- -	mg/kg	0.99 U	0.21 U	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Fluoranthene	500	100	mg/kg	0.99 U	5.8	0.030 J	28 J	0.19 U	0.20 U	0.19 U	0.043 J [0.082 J]	0.19 UJ [0.20 U]	0.097 J	0.18 U

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	Part 375 Restricted Use SCOs Commercial	Restricted Use SCOs Residential	Units	SB-20 17.5 - 18.5 10/08/13	SB-21 4 - 6 10/09/13	SB-21 17 - 18 10/09/13	SB-22 4 - 5 10/09/13	SB-22 17 - 18 10/09/13	SB-23 15 - 16 10/09/13	SB-23 16.5 - 17.5 10/09/13	SB-24 4 - 8 10/09/13	SB-24 17.3 - 19.3 10/09/13	SB-25 4 - 8 10/09/13	SB-25 18.8 - 19.8 10/09/13
Semivolatile Organics (Cont.)														
Fluorene	500	100	mg/kg	0.99 U	0.73	0.18 U	9.1 J	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Indeno(1,2,3-cd)pyrene	5.6	0.5	mg/kg	0.99 U	0.50	0.18 U	*4.7 J*	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 UJ [0.20 U]	0.20 U	0.18 U
Naphthalene	500	100	mg/kg	0.049 J	0.25	0.18 U	29 J	0.19 U	0.20 U	0.19 U	0.058 J [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
N-nitrosodiphenylamine	- -	- -	mg/kg	0.99 U	0.21 U	0.18 U	2.2 UJ	0.19 U	0.20 U	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
Phenanthrene	500	100	mg/kg	0.051 J	6.6	0.052 J	39 J	0.039 J	0.20 U	0.054 J	0.21 U [0.021 J]	0.19 UJ [0.023 J]	0.11 J	0.035 J
Phenol	500	100	mg/kg	0.14 J	0.21 U	0.063 J	2.2 UJ	0.19 U	0.082 J	0.19 U	0.21 U [0.21 U]	0.19 U [0.20 U]	0.20 U	0.18 U
Pyrene	500	100	mg/kg	0.99 U	4.3	0.023 J	23 J	0.19 U	0.20 U	0.19 U	0.034 J [0.059 J]	0.19 UJ [0.20 U]	0.076 J	0.18 U
Total PAHs	- -	- -	mg/kg	0.10 J	29 J	0.17 J	220 J	0.039 J	ND	0.054 J	0.30 J [0.45 J]	ND [0.023 J]	0.46 J	0.090 J
Total SVOCs	- -	- -	mg/kg	0.24 J	29 J	0.23 J	220 J	0.039 J	0.082 J	0.054 J	0.37 J [0.45 J]	0.098 J [0.11 J]	0.46 J	0.090 J
Inorganics														
Cyanide	27	27	mg/kg	1.20 U	1.20 U	1.10 U	3.10	1.10 U	1.20 U	1.10 U	1.10 U [1.20 U]	1.00 U [1.00 U]	1.20 U	1.00 U

See Notes on Page 9.

TABLE 3
SOIL SAMPLE ANALYTICAL RESULTS – DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Lab Qualifiers	Definition
B	Analyte was also detected in the associated method blank.
D	Compound quantitated using a secondary dilution.
J	Indicates an estimated value.
ND	None detected.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Notes:
mg/kg = milligrams per kilogram which is equivalent to parts per million (ppm).
Shading indicates that the sample result exceeds the NYSDEC 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives for Commercial Use.
Italicized font indicates that the sample result exceeds the NYSDEC 6 NYCRR Part 375 Restricted Use Soil Cleanup Objectives for Residential Use.

TABLE 4
GROUNDWATER SAMPLE ANALYTICAL RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Standard/ Guidance Value (shade)	Units	MW-1 - - 09/09/10	MW-1 - - 06/20/11	MW-1 - - 08/10/11	MW-2 - - 09/09/10	MW-2 - - 06/20/11	MW-3 - - 09/09/10	MW-3 - - 06/20/11	MW-4 - - 09/09/10	MW-4 - - 06/20/11	MW-5 - - 09/13/11	MW-6 - - 09/13/11
Volatile Organics													
1,2,3-Trimethylbenzene	- -	ug/L	NA	**1.7 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	5	ug/L	NA	**3.4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	- -	ug/L	NA	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	50	ug/L	10 UJ [10 U]	NA	NA	10 U	1.3 U	40 U	6.6 U [6.6 U]	10 U	1.3 U	1.3 U	1.3 U [1.3 U]
Acetone	50	ug/L	**10 UJ [4.0 J]**	NA	NA	10 U	**3.8 J**	51 UB	**26 J [19 J]**	1.0 UB	**4.6 J**	3.0 U	3.0 U [3.0 U]
Benzene	1	ug/L	**28,000 D [25,000 D]**	**17,000 D**	NA	1.0 U	1.0 UB	**100**	**130 [130]**	1.3 UB	1.0 UB	0.41 U	0.41 U [0.41 U]
Benzothiophene	- -	ug/L	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	60	ug/L	1.0 UJ [1.0 U]	NA	NA	1.0 U	0.19 U	4.0 U	0.95 U [0.95 U]	1.0 U	0.19 U	0.19 U	0.19 U [0.19 U]
Cyclohexane	- -	ug/L	NA	20 U	NA	NA	**1.1**	NA	0.90 U [0.90 U]	NA	**5.9**	**0.19 J**	0.18 U [0.18 U]
Ethylbenzene	5	ug/L	**33 J [31]**	**20**	NA	1.0 U	0.74 U	4.0 U	3.7 U [3.7 U]	**0.86 J**	0.74 U	0.74 U	0.74 U [0.74 U]
Indane	- -	ug/L	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indene	- -	ug/L	NA	**10 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopentane	- -	ug/L	NA	**7.7 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	5	ug/L	NA	20 U	NA	NA	0.79 U	NA	4.0 U [4.0 U]	NA	0.79 U	0.79 U	0.79 U [0.79 U]
Methyl Tert-butyl Ether	10	ug/L	NA	20 U	NA	NA	0.16 U	NA	**5.5 [5.9]**	NA	0.16 U	0.16 U	0.16 U [0.16 U]
Methylcyclohexane	- -	ug/L	NA	20 U	NA	NA	**0.66 J**	NA	0.80 U [0.80 U]	NA	**4.1**	**0.36 J**	0.16 U [0.16 U]
Naphthalene	10	ug/L	NA	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
O-xylene	5	ug/L	NA	**12 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
P/m-xylene	- -	ug/L	NA	**5.4 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	5	ug/L	**2.6 J [2.6]**	20 U	NA	1.0 U	0.73 U	4.0 U	3.7 U [3.7 U]	1.0 U	0.73 U	0.73 U	0.73 U [0.73 U]
Thiophene	- -	ug/L	NA	**410**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	5	ug/L	**13 J [14]**	**5.3 J**	NA	1.0 U	0.51 U	**11**	**13 [12]**	**2.5**	**0.55 J**	0.51 U	0.51 U [0.51 U]
Xylenes (total)	5	ug/L	**40 J [42]**	NA	NA	2.0 U	0.66 U	8.0 U	3.3 U [3.3 U]	**3.7**	0.66 U	0.66 U	0.66 U [0.66 U]
Total BTEX	- -	ug/L	**28,000 J [25,000]**	**17,000 J**	NA	ND	ND	**110**	**140 [140]**	**7.1 J**	**0.55 J**	ND	ND [ND]
Total VOCs	- -	ug/L	**28,000 J [25,000 J]**	**17,000 J**	NA	ND	**3.8 J**	**110**	**170 J [160 J]**	**7.1 J**	**5.2 J**	ND	ND [ND]
Semivolatile Organics													
2-Methylnaphthalene	- -	ug/L	**0.58 J [0.68 J]**	**1.3 J**	NA	4.7 U	0.57 U	4.8 U	0.58 U [0.57 UJ]	4.9 U	0.61 U	0.57 U	0.57 U [0.60 U]
2-Methylphenol	1	ug/L	4.7 U [4.7 U]	0.38 U	NA	4.7 U	0.38 U	**0.66 J**	0.38 U [0.38 U]	4.9 U	0.40 U	0.38 U	0.38 U [0.40 U]
4-Methylphenol	1	ug/L	9.4 U [9.5 U]	0.34 UJ	NA	9.5 U	0.34 U	**12**	**7.0 J [5.5 J]**	9.8 U	0.36 U	0.34 U	0.34 U [0.36 U]
Acenaphthene	20	ug/L	4.7 U [4.7 U]	0.39 UJ	NA	4.7 U	0.39 U	**0.49 J**	0.39 U [0.39 UJ]	4.9 U	0.41 U	0.39 U	0.39 U [0.41 U]
Anthracene	50	ug/L	**4.7 U [0.30 J]**	0.26 UJ	NA	4.7 U	0.27 U	**0.66 J**	0.27 U [0.26 UJ]	4.9 U	0.28 U	0.27 U	0.26 U [0.28 U]
Bis(2-ethylhexyl)phthalate	5	ug/L	**4.7 U [2.3 J]**	**5.6 J**	NA	**4.3 J**	1.7 U	4.8 U	1.7 U [1.7 UJ]	4.9 U	1.8 U	1.7 U	1.7 U [1.8 U]
Carbazole	- -	ug/L	NA	0.28 UJ	NA	NA	0.29 U	NA	**0.58 J [0.28 UJ]**	NA	0.30 U	0.29 U	0.28 U [0.30 U]
Diethylphthalate	50	ug/L	4.7 U [4.7 U]	0.21 UJ	NA	4.7 U	0.21 U	4.8 U	0.21 U [0.21 UJ]	4.9 U	0.22 U	**0.25 J**	0.21 U [0.22 U]
Di-n-butylphthalate	50	ug/L	**4.7 U [0.30 J]**	0.29 UJ	NA	4.7 U	0.30 U	**0.31 J**	0.30 U [0.29 UJ]	4.9 U	0.31 U	4.8 UB	0.29 U [0.31 U]
Naphthalene	10	ug/L	4.7 U [4.7 U]	0.72 UJ	NA	4.7 U	0.72 U	**3.4 J**	**1.5 J [1.2 J]**	4.9 U	0.77 U	0.72 U	0.72 U [0.76 U]
Phenanthrene	50	ug/L	4.7 U [4.7 U]	**0.69 J**	NA	**0.45 J**	0.42 U	**0.64 J**	**0.48 J [0.42 UJ]**	4.9 U	0.44 U	0.42 U	0.42 U [0.44 U]
Phenol	1	ug/L	**15 [13]**	**11**	NA	4.7 U	0.37 U	**22**	**12 [8.8]**	4.9 U	0.39 U	0.37 U	0.37 U [0.39 U]
Total PAHs	- -	ug/L	**0.58 J [0.98 J]**	**2.0 J**	NA	**0.45 J**	ND	**5.2 J**	**2.0 J [1.2 J]**	ND	ND	ND	ND [ND]
Total SVOCs	- -	ug/L	**16 J [17 J]**	**19 J**	NA	**4.8 J**	ND	**40 J**	**21 J [16 J]**	ND	ND	**0.66 J**	ND [ND]
Inorganics													
Cyanide	200	ug/L	**23.0 J [25.2 J]**	**14.0 J**	NA	**719 J**	**560 J**	**324 J**	**400 J [160 J]**	20.0 UJ	R	5.00 U	5.00 U [5.00 U]
Hydrocarbons													
DRO [C10-C28]	- -	ug/L	NA	NA	**620**	NA	NA	NA	NA	NA	NA	NA	NA

See Notes on Page 4.

TABLE 4
GROUNDWATER SAMPLE ANALYTICAL RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Standard/ Guidance Value (shade)	Units	MW-7 - - 08/28/12	MW-8 - - 08/28/12	SB-09 1 - 3 08/08/11	SB-09 8 - 10 08/08/11	SB-09 16 - 18 08/08/11	SB-10 9 - 11 08/10/11	SB-10 14 - 16 08/09/11	SB-11 9 - 11 08/10/11	SB-11 15 - 17 08/09/11	SB-12 9 - 11 08/11/11	SB-12 16 - 18 08/09/11	SB-13-TW 9 - 19 10/10/13
Volatile Organics														
1,2,3-Trimethylbenzene	- -	ug/L	NA	NA	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	NA
1,2,4-Trimethylbenzene	5	ug/L	NA	NA	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	NA
1-Methylnaphthalene	- -	ug/L	NA	NA	5.0 U	**8.6**	**6.5**	25 U	25 UJ	10 U	25 UJ	5.0 U	5.0 U	NA
2-Butanone	50	ug/L	1,000 U [1,000 U]	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	50 U
Acetone	50	ug/L	1,000 U [1,000 U]	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	**22 J**
Benzene	1	ug/L	**7,800 [6,800]**	**380**	**43**	**67**	**99**	**5,400**	**4,100 D**	**3,700**	**5,100 D**	2.0 U	**51**	**82**
Benzothiophene	- -	ug/L	NA	NA	2.0 U	**2.1**	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	NA
Carbon Disulfide	60	ug/L	100 U [100 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.0 U
Cyclohexane	- -	ug/L	100 U [100 U]	**7.2**	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	5.0 UJ
Ethylbenzene	5	ug/L	100 U [100 U]	5.0 U	2.0 U	2.0 U	**2.3**	10 U	**120 J**	4.0 U	10 UJ	2.0 U	**4.8**	5.0 U
Indane	- -	ug/L	NA	NA	**26**	**50**	**41**	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	NA
Indene	- -	ug/L	NA	NA	**3.3**	**6.9**	**6.6**	10 U	**160 J**	4.0 U	10 UJ	2.0 U	2.0 U	NA
Isopentane	- -	ug/L	NA	NA	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	NA
Isopropylbenzene	5	ug/L	100 U [100 U]	5.0 U	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	5.0 U
Methyl Tert-butyl Ether	10	ug/L	100 U [100 U]	5.0 U	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	5.0 U
Methylcyclohexane	- -	ug/L	100 U [100 U]	**10**	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	5.0 UJ
Naphthalene	10	ug/L	NA	NA	**11**	**30**	**23**	10 U	**13 J**	4.0 U	10 UJ	2.0 U	2.0 U	NA
O-xylene	5	ug/L	NA	NA	2.0 U	**2.5**	**2.8**	10 U	**27 J**	4.0 U	10 UJ	2.0 U	2.0 U	NA
P/m-xylene	- -	ug/L	NA	NA	4.0 U	4.0 U	4.0 U	20 U	**56 J**	8.0 U	20 UJ	4.0 U	4.0 U	NA
Styrene	5	ug/L	100 U [100 U]	5.0 U	2.0 U	2.0 U	2.0 U	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U	5.0 U
Thiophene	- -	ug/L	NA	NA	2.0 U	2.0 U	**2.6**	**250**	**100 J**	**170**	**260 J**	2.0 U	2.0 U	NA
Toluene	5	ug/L	100 U [100 U]	**3.3 J**	2.0 U	2.0 U	**2.3**	10 U	**13 J**	4.0 U	10 UJ	2.0 U	2.0 U	5.0 U
Xylenes (total)	5	ug/L	200 U [200 U]	**3.3 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	10 U
Total BTEX	- -	ug/L	**7,800 [6,800]**	**390 J**	**43**	**67**	**100**	**5,400**	**4,300 J**	**3,700**	**5,100**	ND	**56**	**82**
Total VOCs	- -	ug/L	**7,800 [6,800]**	**390 J**	**43**	**67**	**100**	**5,400**	**4,300 J**	**3,700**	**5,100**	ND	**56**	**100 J**
Semivolatile Organics														
2-Methylnaphthalene	- -	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	1	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1	ug/L	9.4 U [10 U]	9.9 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	20	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	50	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	5	ug/L	**2.0 J [5.0 U]**	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	- -	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	50	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	50	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	10	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	ug/L	4.7 U [5.0 U]	5.0 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	1	ug/L	**17 [18]**	**2.9 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	- -	ug/L	ND [ND]	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total SVOCs	- -	ug/L	**19 J [18]**	**2.9 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics														
Cyanide	200	ug/L	**6.70 J [9.70 J]**	**8.70 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons														
DRO [C10-C28]	- -	ug/L	NA	NA	**2,900**	1,600 UB	**1,600 B**	**560**	830 UB	**510**	470 UB	NA	**460 J**	NA

See Notes on Page 4.

TABLE 4
GROUNDWATER SAMPLE ANALYTICAL RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: / Sample Depth(Feet): / Date Collected:	Standard/ Guidance Value (shade)	Units	SB-14-TW 8 - 18 10/10/13	SB-15-TW 8.5 - 18.5 10/10/13	SB-16-TW 8 - 18 10/10/13	SB-17-TW 7.8 - 17.8 10/10/13	SB-18-TW 7.5 - 17.5 10/10/13	SB-19-TW 8.5 - 18.5 10/10/13	SB-20-TW 8.5 - 18.5 10/10/13	SB-22-TW 8 - 18 10/10/13	SB-23-TW 7.5 - 17.5 10/10/13	SB-24-TW 9.3 - 19.3 10/10/13	SB-25-TW 9.8 - 19.8 10/10/13
Volatile Organics													
1,2,3-Trimethylbenzene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	5	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	50	ug/L	50 U	**3.3 J**	50 UJ	50 U	50 UJ	50 U	50 UJ	10 UJ	10 UJ	10 U	10 U
Acetone	50	ug/L	50 U	**17 J**	50 UJ	50 U	50 UJ	**21 J**	50 UJ	**4.0 J**	**6.3 J**	**7.9 J**	**7.8 J**
Benzene	1	ug/L	**55**	**33,000 D**	**90 J**	**73**	**23,000 D**	**10,000 D**	**95 J**	**2,700 D**	**37,000 D**	**0.67 J**	**0.82 J**
Benzothiophene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	60	ug/L	5.0 U	1.0 UJ	**3.5 J**	**3.3 J**	5.0 UJ	5.0 U	5.0 UJ	1.0 UJ	1.0 UJ	1.0 U	**0.60 J**
Cyclohexane	- -	ug/L	**1.2 J**	**0.51 J**	**1.4 J**	**1.5 J**	5.0 UJ	5.0 UJ	**1.5 J**	**0.41 J**	**0.36 J**	**0.37 J**	1.0 UJ
Ethylbenzene	5	ug/L	5.0 U	**23 J**	5.0 UJ	**77**	**14 J**	**80**	**47 J**	**78 J**	1.0 UJ	1.0 U	1.0 U
Indane	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopentane	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	5	ug/L	5.0 U	1.0 UJ	5.0 UJ	**6.4**	5.0 UJ	5.0 U	**4.6 J**	1.0 UJ	1.0 UJ	1.0 U	1.0 U
Methyl Tert-butyl Ether	10	ug/L	5.0 U	1.0 UJ	5.0 UJ	5.0 U	5.0 UJ	5.0 U	5.0 UJ	1.0 UJ	1.0 UJ	1.0 U	1.0 U
Methylcyclohexane	- -	ug/L	**1.3 J**	**0.42 J**	**1.9 J**	**2.4 J**	5.0 UJ	5.0 UJ	**2.8 J**	**0.33 J**	**0.24 J**	**0.46 J**	**0.25 J**
Naphthalene	10	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
O-xylene	5	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
P/m-xylene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	5	ug/L	5.0 U	1.0 UJ	5.0 UJ	**4.2 J**	**15 J**	5.0 U	5.0 UJ	1.0 UJ	1.0 UJ	1.0 U	1.0 U
Thiophene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	5	ug/L	**23**	**130 EJ**	**3.4 J**	**17**	**710 D**	**53**	**17 J**	**15 J**	**4.2 J**	1.0 U	1.0 U
Xylenes (total)	5	ug/L	**9.6 J**	**110 J**	**14 J**	**410**	**40 J**	**76**	**74 J**	**36 J**	2.0 UJ	2.0 U	2.0 U
Total BTEX	- -	ug/L	**88 J**	**33,000**	**110 J**	**580**	**24,000**	**10,000**	**230 J**	**2,800**	**37,000**	**0.67 J**	**0.82 J**
Total VOCs	- -	ug/L	**88 J**	**33,000 J**	**110 J**	**580 J**	**24,000 J**	**10,000 J**	**230 J**	**2,800 J**	**37,000 J**	**8.6 J**	**9.2 J**
Semivolatile Organics													
2-Methylnaphthalene	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	1	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	1	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	20	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	50	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bis(2-ethylhexyl)phthalate	5	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbazole	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	50	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	50	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	10	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenol	1	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total PAHs	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total SVOCs	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics													
Cyanide	200	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons													
DRO [C10-C28]	- -	ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See Notes on Page 4.

TABLE 4
GROUNDWATER SAMPLE ANALYTICAL RESULTS - DETECTED COMPOUNDS

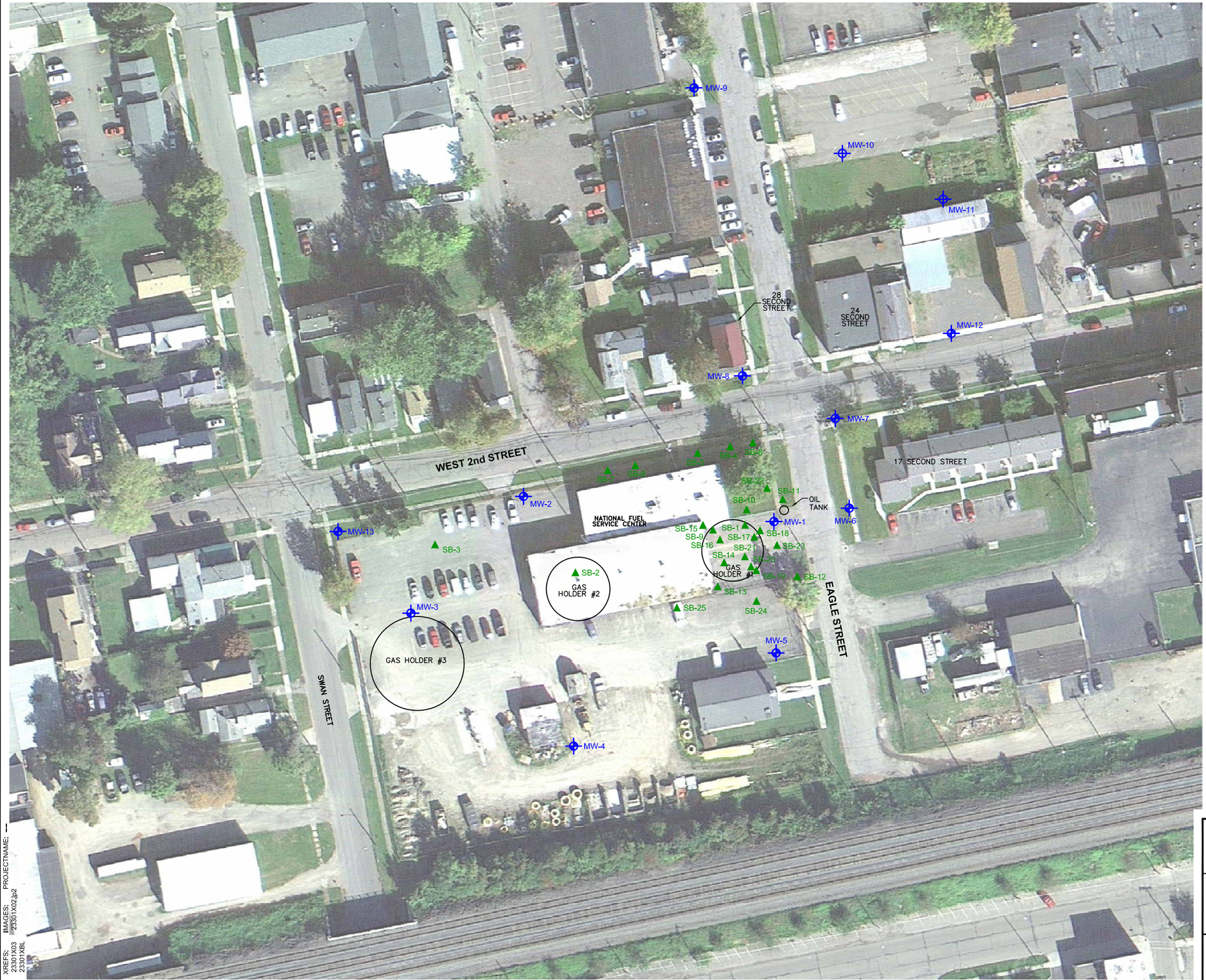
NATIONAL FUEL
REMEDIAL INVESTIGATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Lab Qualifiers	Definition
B	Analyte was also detected in the associated method blank.
D	Compound quantitated using a secondary dilution.
J	Indicates an estimated value.
ND	None detected.
R	Rejected.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Notes:
-- = No available standard/guidance value.
NA = Not analyzed.
ug/L = micrograms per liter.
Shaded values indicate the result exceeds Standards and Guidance Values presented in the NYSDEC Division of Water Technical, and Operational Guidance Series document titled, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC 1998).
Detected values are in bold.

ARCADIS

Figures



LEGEND:

- MONITORING WELL
- PROPOSED MONITORING WELL
- SOIL BORING

NOTES:

1. ALL LOCATIONS APPROXIMATE.
2. LOCATIONS OF GAS HOLDERS 2 AND 3 DIGITIZED FROM A MAY 10, 1956 DRAWING PROVIDED BY NATIONAL FUEL. ALL OTHER MGP STRUCTURES DIGITIZED FROM 1893 AND 1904 SANBORN FIRE INSURANCE MAPS.
3. MONITORING WELLS MW-5 AND MW-6, AND SOIL BORINGS SB-9 THROUGH SB-12 FROM SURVEY FILE PROVIDED BY C.T. MALE ASSOCIATES, DATED 10/7/11. MONITORING WELLS MW-7 AND MW-8 FROM SURVEY FILE PROVIDED BY C.T. MALE ASSOCIATES, DATED 10/1/12.
4. MONITORING WELLS MW-9, MW-12 & MW-13, AND SOIL BORINGS SB-13 THROUGH SB-25 FROM SURVEY FILE PROVIDED BY C.T. MALE ASSOCIATES, DATED 1/16/13.
5. AERIAL PHOTOGRAPH FROM GOOGLE EARTH PRO OBTAINED ON JANUARY 28, 2012 DATED OCTOBER 6, 2011.

0 80' 160'

GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

INVESTIGATION LOCATIONS

ARCADIS

FIGURE 1

CITY: SYRACUSE, N.Y. DN/GROUP: ENV/IM-DIV DB: LPOSENAUER, R.ALLEN, R.BASSETT LDI:(Opt) PIC:(Opt) PM: S.POWLIN TM:(Opt) LYR:(Opt)ON="OFF"REF"
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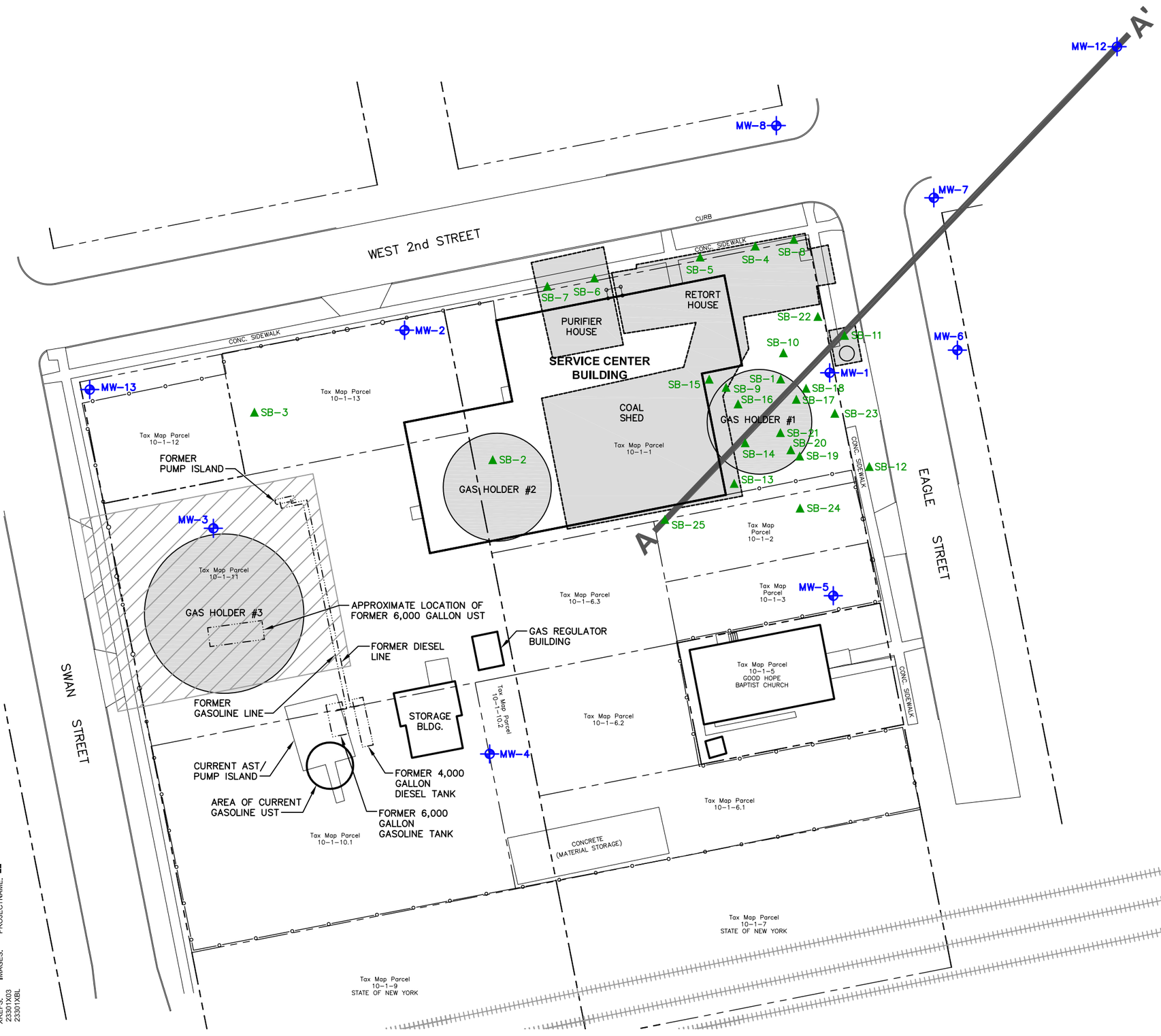

LEGEND:

- SOIL BORING
- MONITORING WELL
- FORMER MGP STRUCTURE
- FORMER PETROLEUM DISTRIBUTION STRUCTURES
- APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA
- APPROXIMATE PROPERTY LINE
- RAILROAD
- EXISTING BUILDING
- CHAIN LINK FENCE
- A—A' LINE OF CROSS SECTION

NOTES:

1. ALL LOCATIONS APPROXIMATE.
2. BASEMAP FROM NYS GIS CLEARINGHOUSE WEBPAGE FOR ORTHOIMAGERY AND CT MALE SURVEY OBTAINED ON SEPTEMBER 14, 2010.
3. APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA BASED ON A HAND SKETCH MAP PROVIDED BY NATIONAL FUEL ON JANUARY 26, 2009. DATE OF REMEDIATION NOT DEFINED ON THAT MAP.
4. LOCATIONS OF GAS HOLDERS 2 AND 3 DIGITIZED FROM A MAY 10, 1956 DRAWING PROVIDED BY NATIONAL FUEL. ALL OTHER MGP STRUCTURES DIGITIZED FROM 1893 AND 1904 SANBORN FIRE INSURANCE MAPS.
5. LOCATIONS OF FORMER USTs, PUMP ISLAND, AND ASSOCIATED DISTRIBUTION LINES FROM MESCH ENGINEERING, P.C. DRAWING ENTITLED "SITE PLAN", ORIGINAL DRAWING DATED 9/17/87.

0 50' 100'

GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

A-A' CROSS SECTION LOCATION

ARCADIS

FIGURE
2

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM-DV DB: LPOSENAUER, R. ALLEN LDs:(Opt) PICs:(Opt) PMs:S. POWLIN TMs:(Opt) LYRs:(Opt)ON=*;OFF=*REF*
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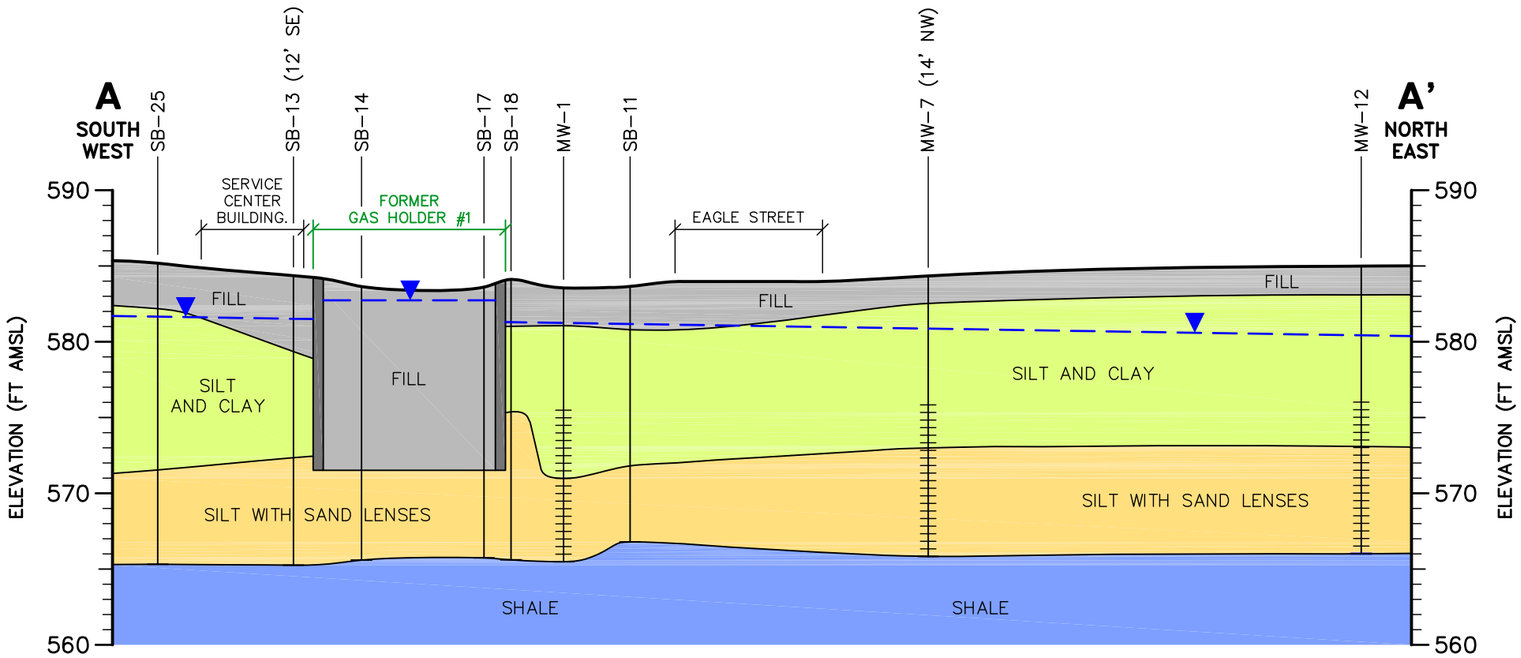

LEGEND:

- MW-12 — WELL OR BORING ID
- GROUND SURFACE
- APPROXIMATE WATER TABLE
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREEN
- BOTTOM OF BORING
- FILL
- SILT AND CLAY
- SILT WITH SAND LENSES
- SHALE

VERTICAL EXAGGERATION = 4X

0 10' 20'
GRAPHIC SCALE

0 40' 80'
GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

CROSS SECTION A - A'

ARCADIS

FIGURE
3

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM-DV DB: LPOSENAUER, R. ALLEN LD:(Opt) PIC:(Opt) PM:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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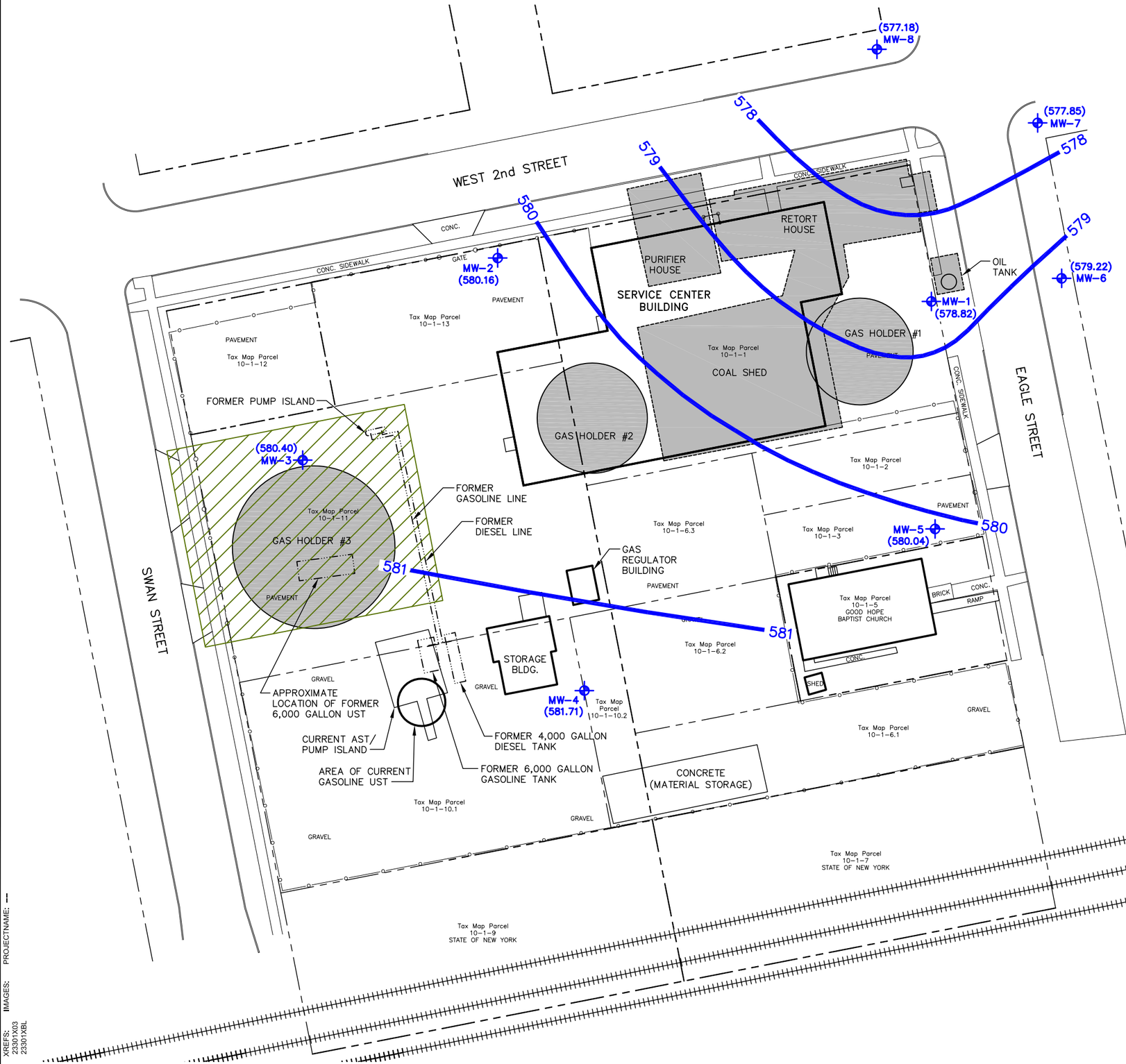

LEGEND:

- MONITORING WELL
- FORMER MGP STRUCTURE
- FORMER PETROLEUM DISTRIBUTION STRUCTURES
- APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA
- APPROXIMATE PROPERTY LINE
- RAILROAD
- EXISTING BUILDING
- CHAIN LINK FENCE
- 580 — GROUND WATER ELEVATION CONTOUR
- (579.22) — GROUND WATER ELEVATION

NOTES:

1. ALL LOCATIONS APPROXIMATE.
2. BASEMAP FORM NYS GIS CLEARINGHOUSE WEBPAGE FOR ORTHOIMAGERY AND CT MALE SURVEY OBTAINED ON SEPTEMBER 14, 2010, AND OCTOBER 1, 2012.
3. APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA BASED ON A HAND SKETCH MAP PROVIDED BY NATIONAL FUEL ON JANUARY 26, 2009. DATE OF REMEDIATION NOT DEFINED ON THAT MAP.
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6. MONITORING WELLS MW-5 AND MW-6, AND SOIL BORINGS SB-9 THROUGH SB-12 FROM SURVEY FILE PROVIDED BY C.T. MALE ASSOCIATES, DATED 10/7/11. MONITORING WELLS MW-7 AND MW-8 FROM SURVEY FILE PROVIDED BY C.T. MALE ASSOCIATES, DATED 10/1/12.

0 50' 100'

GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

WATER TABLE CONTOURS - 8/28/12

ARCADIS

FIGURE
4

CITY: SYRACUSE, N.Y. DIV/GROUP: ENV/IM-DIV DB: LPOSENAUER, R.ALLEN LD:(Opt) PIC:(Opt) PM: S.POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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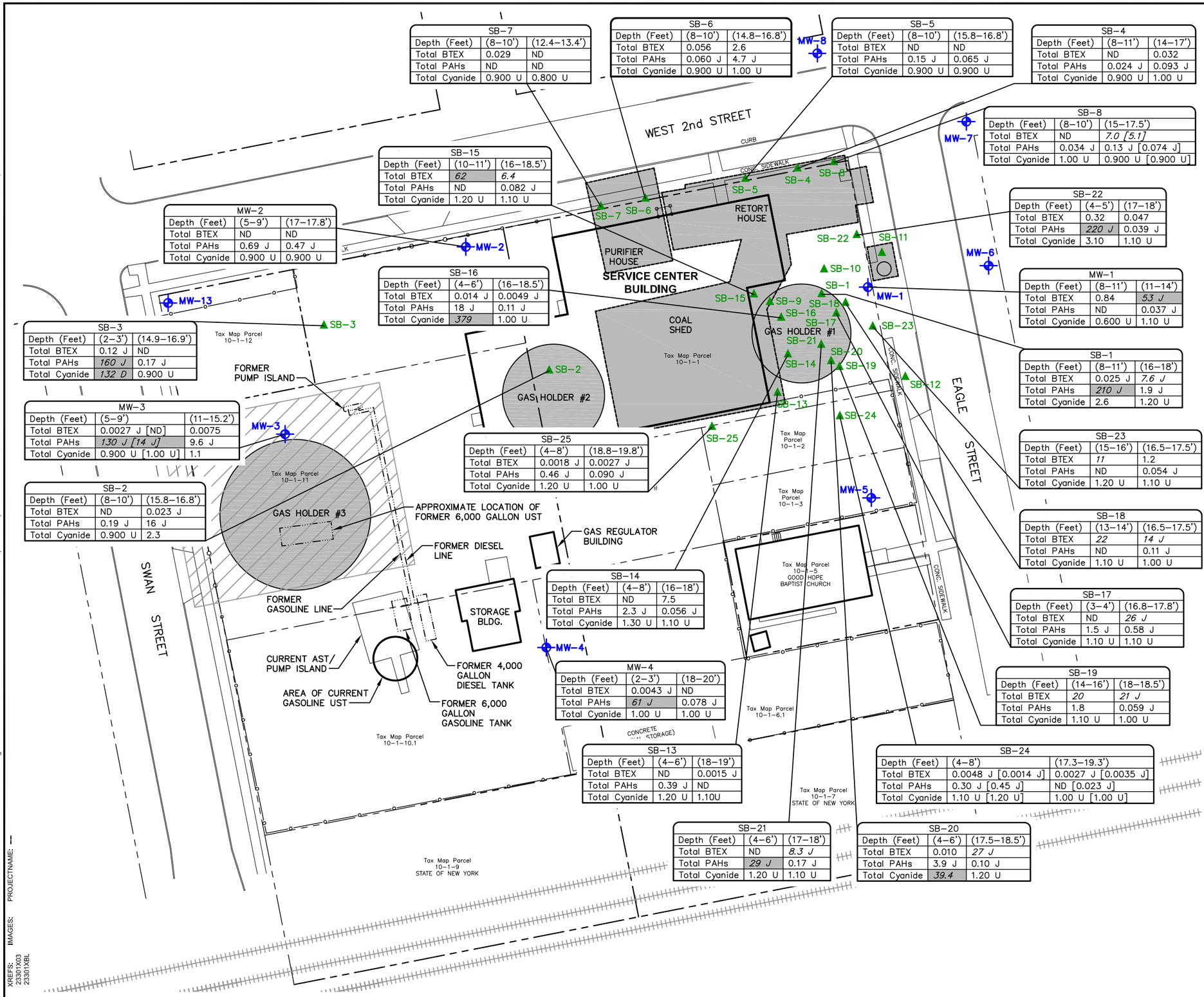

SB-7		
Depth (Feet)	(8–10')	(12.4–13.4')
Total BTEX	0.029	ND
Total PAHs	ND	ND
Total Cyanide	0.900 U	0.800 U

SB-6		
Depth (Feet)	(8–10')	(14.8–16.8')
Total BTEX	0.056	2.6
Total PAHs	0.060 J	4.7 J
Total Cyanide	0.900 U	1.00 U

SB-5		
Depth (Feet)	(8–10')	(15.8–16.8')
Total BTEX	ND	ND
Total PAHs	0.15 J	0.065 J
Total Cyanide	0.900 U	0.900 U

SB-4		
Depth (Feet)	(8–11')	(14–17')
Total BTEX	ND	0.032
Total PAHs	0.024 J	0.093 J
Total Cyanide	0.900 U	1.00 U

SB-8		
Depth (Feet)	(8–10')	(15–17.5')
Total BTEX	ND	*7.0 [5.1]*
Total PAHs	0.034 J	0.13 J [0.074 J]
Total Cyanide	1.00 U	0.900 U [0.900 U]

SB-15		
Depth (Feet)	(10–11')	(16–18.5')
Total BTEX	*62*	*6.4*
Total PAHs	ND	0.082 J
Total Cyanide	1.20 U	1.10 U

MW-2		
Depth (Feet)	(5–9')	(17–17.8')
Total BTEX	ND	ND
Total PAHs	0.69 J	0.47 J
Total Cyanide	0.900 U	0.900 U

SB-22		
Depth (Feet)	(4–5')	(17–18')
Total BTEX	0.32	0.047
Total PAHs	*220 J*	0.039 J
Total Cyanide	3.10	1.10 U

SB-16		
Depth (Feet)	(4–6')	(16–18.5')
Total BTEX	0.014 J	0.0049 J
Total PAHs	18 J	0.11 J
Total Cyanide	*379*	1.00 U

MW-1		
Depth (Feet)	(8–11')	(11–14')
Total BTEX	0.84	*53 J*
Total PAHs	ND	0.037 J
Total Cyanide	0.600 U	1.10 U

SB-3		
Depth (Feet)	(2–3')	(14.9–16.9')
Total BTEX	0.12 J	ND
Total PAHs	*160 J*	0.17 J
Total Cyanide	*132 D*	0.900 U

SB-1		
Depth (Feet)	(8–11')	(16–18')
Total BTEX	0.025 J	*7.6 J*
Total PAHs	*210 J*	1.9 J
Total Cyanide	2.6	1.20 U

MW-3		
Depth (Feet)	(5–9')	(11–15.2')
Total BTEX	0.0027 J [ND]	0.0075
Total PAHs	*130 J [14 J]*	9.6 J
Total Cyanide	0.900 U [1.00 U]	1.1

SB-25		
Depth (Feet)	(4–8')	(18.8–19.8')
Total BTEX	0.0018 J	0.0027 J
Total PAHs	0.46 J	0.090 J
Total Cyanide	1.20 U	1.00 U

SB-23		
Depth (Feet)	(15–16')	(16.5–17.5')
Total BTEX	*11*	1.2
Total PAHs	ND	0.054 J
Total Cyanide	1.20 U	1.10 U

SB-2		
Depth (Feet)	(8–10')	(15.8–16.8')
Total BTEX	ND	0.023 J
Total PAHs	0.19 J	16 J
Total Cyanide	0.900 U	2.3

SB-18		
Depth (Feet)	(13–14')	(16.5–17.5')
Total BTEX	*22*	*14 J*
Total PAHs	ND	0.11 J
Total Cyanide	1.10 U	1.00 U

SB-14		
Depth (Feet)	(4–8')	(16–18')
Total BTEX	ND	7.5
Total PAHs	2.3 J	0.056 J
Total Cyanide	1.30 U	1.10 U

SB-17		
Depth (Feet)	(3–4')	(16.8–17.8')
Total BTEX	ND	*26 J*
Total PAHs	1.5 J	0.58 J
Total Cyanide	1.10 U	1.10 U

MW-4		
Depth (Feet)	(2–3')	(18–20')
Total BTEX	0.0043 J	ND
Total PAHs	*61 J*	0.078 J
Total Cyanide	1.00 U	1.00 U

SB-19		
Depth (Feet)	(14–16')	(18–18.5')
Total BTEX	*20*	*21 J*
Total PAHs	1.8	0.059 J
Total Cyanide	1.10 U	1.00 U

SB-13		
Depth (Feet)	(4–6')	(18–19')
Total BTEX	ND	0.0015 J
Total PAHs	0.39 J	ND
Total Cyanide	1.20 U	1.10U

SB-24		
Depth (Feet)	(4–8')	(17.3–19.3')
Total BTEX	0.0048 J [0.0014 J]	0.0027 J [0.0035 J]
Total PAHs	0.30 J [0.45 J]	ND [0.023 J]
Total Cyanide	1.10 U [1.20 U]	1.00 U [1.00 U]

SB-21		
Depth (Feet)	(4–6')	(17–18')
Total BTEX	ND	*8.3 J*
Total PAHs	*29 J*	0.17 J
Total Cyanide	1.20 U	1.10 U

SB-20		
Depth (Feet)	(4–6')	(17.5–18.5')
Total BTEX	0.010	*27 J*
Total PAHs	3.9 J	0.10 J
Total Cyanide	*39.4*	1.20 U

LEGEND:

- SOIL BORING
- MONITORING WELL
- FORMER MGP STRUCTURE
- FORMER PETROLEUM DISTRIBUTION STRUCTURES
- APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA
- APPROXIMATE PROPERTY LINE
- RAILROAD
- EXISTING BUILDING
- CHAIN LINK FENCE

NOTES:

1. ALL LOCATIONS APPROXIMATE.
2. BASEMAP FROM NYS GIS CLEARINGHOUSE WEBPAGE FOR ORTHOIMAGERY AND CT MALE SURVEY OBTAINED ON SEPTEMBER 14, 2010.
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6. ITALICS INDICATES THAT ONE OR MORE BTEX OR PAH CONSTITUENT WAS DETECTED AT A CONCENTRATION ABOVE THE NYSDEC RESTRICTED USE RESIDENTIAL SCO. SHADING INDICATES THAT ONE OR MORE BTEX OR PAH CONSTITUENT WAS DETECTED AT A CONCENTRATION ABOVE THE NYSDEC RESTRICTED USE COMMERCIAL SCO.
7. RESULTS GIVEN IN MG/KG. DUPLICATE RESULTS SHOWN IN BRACKETS.

   D = COMPOUND QUANTITATED USING A SECONDARY DILUTION

   J = APPROXIMATE VALUE

   U = ANALYTE WAS NOT DETECTED ABOVE GIVEN DETECTION LIMIT

   ND = INDIVIDUAL CONSTITUENT WAS NOT DETECTED

0 50' 100'

GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

ARCADIS

FIGURE 5

CITY: SYRACUSE, NY DIV/GROUP: ENV/IM+DV DB: LPOSENAUER, R. ALLEN LDI:(Opt) PIC:(Opt) PMx:S. POWLIN TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ---
23301X03
23301XBL

SB-15	
Date	10/10/13
Depth	8.5–18.5
Total BTEX	33,000

SB-09		
Date	8/8/2011	8/8/2011	8/8/2011
Depth	1–3	8–10	16–18
Total BTEX	43	69.5	106.4

MW-8	
DATE	8/28/2012
Total BTEX	386.6

SB-22	
Date	10/10/13
Depth	8–18
Total BTEX	2,800

MW-7	
DATE	8/28/12
Total BTEX	7,800 [6,800]

SB-16	
Date	10/10/13
Depth	8–18
Total BTEX	110 J

SB-10		
Date	8/10/2011	8/9/2011
Depth	9–11	14–16
Total BTEX	5,400	4,316 J

MW-2		
Date	9/9/2010	6/20/2011
Total BTEX	ND	ND

SB-11		
Date	8/10/2011	8/9/2011
Depth	9–11	15–17
Total BTEX	3,700	5,100

SB-14	
Date	10/10/13
Depth	8–18
Total BTEX	88 J

MW-6	
Date	9/13/2011
Total BTEX	ND [ND]

MW-1		
Date	9/9/2010	6/20/2011
Total BTEX	28,086 J [25,087 J]	17,042.7 J

MW-3		
Date	9/9/2010	6/20/2011
Total BTEX	111	143 [142]

SB-18	
Date	10/10/13
Depth	7.5–17.5
Total BTEX	24,000

SB-23	
Date	10/10/13
Depth	7.5–17.5
Total BTEX	37,000

SB-25	
Date	10/10/13
Depth	9.8–19.8
Total BTEX	0.82 J

SB-12		
Date	8/11/2011	8/9/2011
Depth	9–11	16–18
Total BTEX	ND	55.8

SB-13	
Date	10/10/13
Depth	9–19
Total BTEX	82

SB-17	
Date	10/10/13
Depth	7.8–17.8
Total BTEX	580

MW-4		
Date	9/9/2010	6/20/2011
Total BTEX	7.1 J	0.55 J

SB-19	
Date	10/10/13
Depth	8.5–18.5
Total BTEX	10,000

SB-20	
Date	10/10/13
Depth	8.5–18.5
Total BTEX	230 J

SB-24	
Date	10/10/13
Depth	9.3–19.3
Total BTEX	0.67 J

MW-5	
Date	9/13/2011
Total BTEX	ND

WEST 2nd STREET

SWAN STREET

EAGLE STREET

SERVICE CENTER BUILDING

RETORT HOUSE

PURIFIER HOUSE

COAL SHED

GAS HOLDER #1

GAS HOLDER #2

GAS HOLDER #3

OIL TANK

FORMER PUMP ISLAND

APPROXIMATE LOCATION OF FORMER 6,000 GALLON UST

FORMER DIESEL LINE

GAS REGULATOR BUILDING

FORMER GASOLINE LINE

STORAGE BLDG.

CURRENT AST/ PUMP ISLAND

AREA OF CURRENT GASOLINE UST

FORMER 4,000 GALLON DIESEL TANK

FORMER 6,000 GALLON GASOLINE TANK

GOOD HOPE BAPTIST CHURCH

CONCRETE (MATERIAL STORAGE)

Tax Map Parcel 10-1-1

Tax Map Parcel 10-1-2

Tax Map Parcel 10-1-3

Tax Map Parcel 10-1-5

Tax Map Parcel 10-1-6.1

Tax Map Parcel 10-1-6.2

Tax Map Parcel 10-1-6.3

Tax Map Parcel 10-1-7 STATE OF NEW YORK

Tax Map Parcel 10-1-9 STATE OF NEW YORK

Tax Map Parcel 10-1-10.1

Tax Map Parcel 10-1-11

Tax Map Parcel 10-1-12

LEGEND:

- MONITORING WELL
- SOIL BORING
- GROUNDWATER SAMPLE FROM THIS LOCATION CONTAINED AT LEAST ONE CONSTITUENT AT A CONCENTRATION EXCEEDING THE NYSDEC CLASS GA DRINKING WATER STANDARD
- FORMER MGP STRUCTURE
- FORMER PETROLEUM DISTRIBUTION STRUCTURES
- APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA
- APPROXIMATE PROPERTY LINE
- RAILROAD
- EXISTING BUILDING
- CHAIN LINK FENCE

NOTES:

1. ALL LOCATIONS APPROXIMATE.
2. BASEMAP FROM NYS GIS CLEARINGHOUSE WEBPAGE FOR ORTHOIMAGERY AND CT MALE SURVEY OBTAINED ON SEPTEMBER 14, 2010, AND OCTOBER 1, 2012.
2. APPROXIMATE EXTENT OF PETROLEUM REMEDIATION AREA BASED ON A HAND SKETCH MAP PROVIDED BY NATIONAL FUEL ON JANUARY 26, 2009. DATE OF REMEDIATION NOT DEFINED ON THAT MAP.
3. LOCATIONS OF GAS HOLDERS 2 AND 3 DIGITIZED FROM A MAY 10, 1956 DRAWING PROVIDED BY NATIONAL FUEL. ALL OTHER MGP STRUCTURES DIGITIZED FROM 1893 AND 1904 SANBORN FIRE INSURANCE MAPS.
4. LOCATIONS OF FORMER USTs, PUMP ISLAND, AND ASSOCIATED DISTRIBUTION LINES FROM MESCH ENGINEERING, P.C. DRAWING ENTITLED "SITE PLAN", ORIGINAL DRAWING DATED 9/17/87.
5. SHADED VALUES EXCEED ONE OR MORE OF THE NYSDEC TOGS STANDARDS OR GUIDANCE VALUES.

RESULTS GIVEN IN µg/L.

J = APPROXIMATE VALUE

U = ANALYTE WAS NOT DETECTED ABOVE GIVEN DETECTION LIMIT

ND = INDIVIDUAL CONSTITUENT WAS NOT DETECTED

R = REJECTED

B = ANALYTE WAS ALSO DETECTED IN THE ASSOCIATED METHOD BLANK

NA = NOT ANALYZED

[ ] = DUPLICATE SAMPLE

0 50' 100'

GRAPHIC SCALE

NATIONAL FUEL
DUNKIRK FORMER MGP SITE
DUNKIRK, NEW YORK
REMEDIAL INVESTIGATION

TOTAL BTEX IN GROUNDWATER

ARCADIS

FIGURE 6

CITY: SYRACUSE, N.Y. DIV/GROUP: ENV/IM-DV DB: L. POSENAUER, L. FORAKER, R. ALLEN LD: PIC: PM: S. POWLIN TM: S. POWLIN LYR: ON=*; OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIB\002330110001\000005\DWG\R23301C05.dwg LAYOUT: 6 SAVED: 2/12/2014 10:14 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/12/2014 10:14 AM BY: ALLEN, ROYCE
XREFS: 23301X03 23301XBL IMAGES: PROJECTNAME: ---

Attachment A

Monitoring Well Construction Logs
and Soil Boring Logs

Date Start/Finish: 8/4 - 8/6/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 4 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT & Truck-Mounted Ingersoll Rand A300

Northing: 906490.5414
Easting: 945042.6278
Casing Elevation: 583.14' AMSL

Borehole Depth: 18.2' bgs
Surface Elevation: 583.50' AMSL

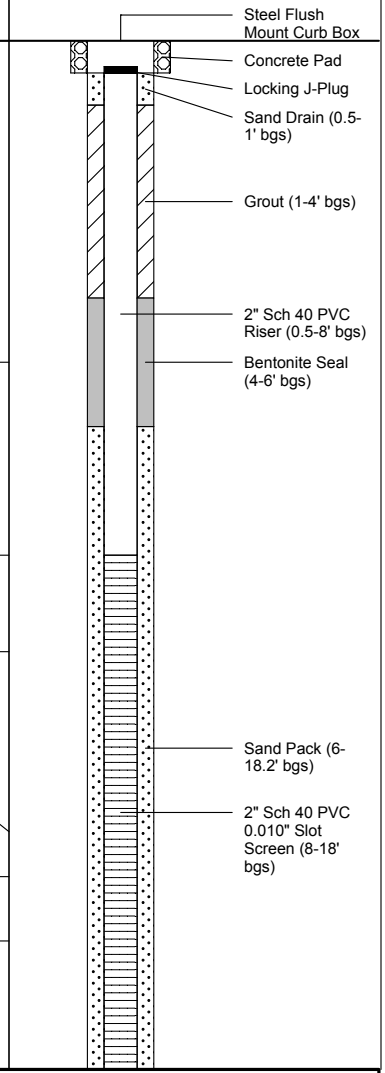
Descriptions By: L.Terrell

Well/Boring ID: MW-1

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585 / 0							
				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
				0.2			
	NA	0-5	NA	0.0			
580				0.0			
				0.2			
5	1	5-8	2.0	0.0			Brown and gray CLAY, trace Silt, mottled, high plasticity, very stiff, moist.
575	2	8-11	2.7	0.7	X		Gray CLAY, trace Silt, high plasticity, very stiff, moist.
10							Gray SILT, trace Clay, non-plastic, stiff, slight coal tar-like odor, moist.
	3	11-14	3.0	20.4	X		Gray fine to coarse SAND, trace Silt and fine to medium sub-round Gravel, coal tar-like odor, wet.
570							Gray SILT, trace fine to coarse sub-angular Gravel and fine to coarse Sand, slight coal tar-like odor, moist to dry.
15	4	14-18	3.6	0.0			Gray SILT, little fine Sand, trace fine to coarse sub-round to sub-angular Gravel and Clay, moist to dry.



ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-11' bgs and 11-14' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 579.12' AMSL on 10/4/2010.

Client: National Fuel

Well/Boring ID: **MW-1**

Borehole Depth: 18.2' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	14-18	3.6	0.0			Gray SILT, little fine Sand, trace fine to coarse sub-round to sub-angular Gravel and Clay, moist to dry.	2" Sch 40 PVC 0.010" Slot Screen (8-18' bgs)
								Black to dark gray fractured SHALE in nose of sampler.	
	565	5	18-20	NR	NA			Refusal with Augers at 18.2' bgs.	Sand Pack (6-18.2' bgs)
20									
	560								
25									
	555								
30									
	550								
35									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-11' bgs and 11-14' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 579.12' AMSL on 10/4/2010.

Date Start/Finish: 8/9-8/11/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 2' x 2" Split Spoon
Auger Size: 4 1/4"
Rig Type: Truck-Mounted Ingersoll Rand A300
Rig Type 2:

Northing: 906511.1924
Easting: 944836.4844
Casing Elevation: 582.91' AMSL

Borehole Depth: 17.8' bgs
Surface Elevation: 583.22' AMSL

Descriptions By: L.Terrell

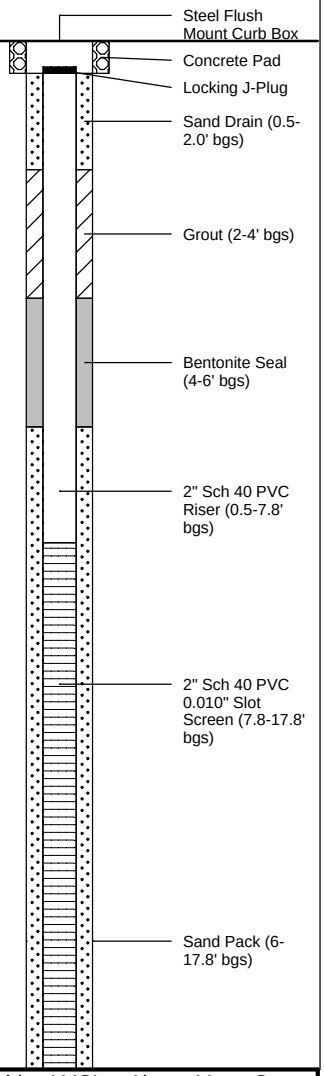
Well/Boring ID: **MW-2**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	585							
0								Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
		NA	0-5	NA	0.0			
	580				0.0			
					0.0			
5		1	5-7	0.3	0.0			Gray CLAY, trace Silt, fine to coarse Sand and coarse sub-round Gravel, wet.
								Brown CLAY, trace Silt, medium plasticity, soft, wet.
		2	7-9	1.5	0.0	X		Brown SILT, trace Clay, non-plastic, soft, moist to wet.
	575							Rusty orange between 0.3-0.5' of recovery, trace fine sub-angular Gravel.
10		3	9-11	1.2	0.0			Gray SILT, trace Clay and fine to medium sub-angular Gravel, non-plastic, stiff, moist.
		4	11-13	1.1	0.0			
	570	5	13-15	NR	NA			No Recovery.
15		6	15-17	0.1	0.0			Gray fractured SHALE, dry.

Well/Boring Construction



ARCADIS
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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; NR = No Recovery; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 5-9' bgs (MS/MSD) and 17-17.8' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 581.06' AMSL on 10/4/2010.

Client: National Fuel

Well/Boring ID: **MW-2**

Borehole Depth: 17.8' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	6	15-17	0.1	0.0			Gray fractured SHALE, dry.	
							Yellow brown SILT, trace Clay and fine to medium sub-round Gravel, non-plastic, stiff, moist.	Sand Pack (6-17.8' bgs)
	7	17-19	0.5	0.0	X		Dark gray fractured SHALE, dry.	
565							Refusal with Augers at 17.8' bgs.	
20								
560								
25								
555								
30								
550								
35								

ARCADIS
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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; NR = No Recovery; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 5-9' bgs (MS/MSD) and 17-17.8' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 581.06' AMSL on 10/4/2010.

Date Start/Finish: 8/9/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 2' x 2" Split Spoon
Auger Size: 4 1/4"
Rig Type: Truck-Mounted Ingersoll Rand A300
Rig Type 2:

Northing: 906415.1166
Easting: 944743.8061
Casing Elevation: 582.97' AMSL

Borehole Depth: 15.8' bgs
Surface Elevation: 583.28' AMSL

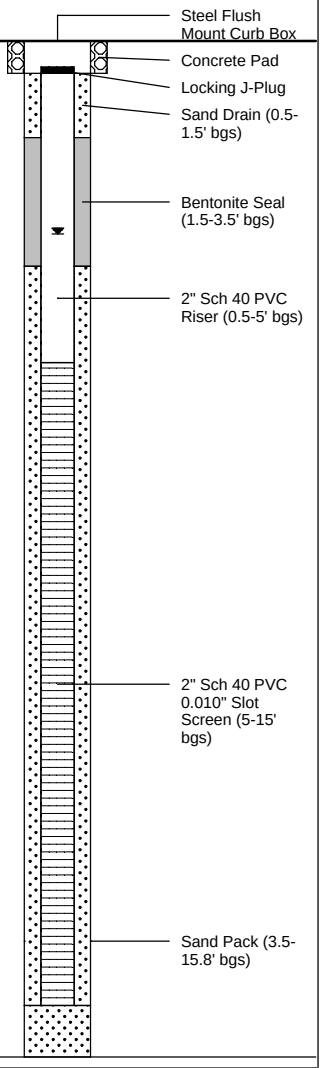
Descriptions By: L.Terrell

Well/Boring ID: **MW-3**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	585							
0								Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
		NA	0-5	NA	0.0			
	580				0.0			
					0.0			
5		1	5-7	0.7	0.5	X		Gray CLAY, trace Silt, high plasticity, stiff, slight coal tar-like odor, moist.
		2	7-9	0.8	0.0			Gray to olive green CLAY, trace Silt, mottled, high plasticity, stiff, slight coal tar-like odor, moist.
	575							Dark brown CLAY, trace Silt, medium plasticity, stiff, moist.
10		3	9-11	0.1	0.0			
		4	11-13	0.7	0.0			Gray to olive green CLAY, trace Silt, trace red Brick, fine to coarse sub-round to sub-angular Gravel, mottled, slight coal tar-like odor, dark brown last 0.1' of recovery, moist.
	570	5	13-15	0.3	0.0	X		Red BRICK, little Concrete and gray Clay, trace Silt, wet.
15		6	15-17	0.1	0.0			Dark brown SILT, CLAY, and fine to coarse SAND, trace red Brick, Wood, and fine sub-round Gravel, wet. Refusal with augers at 15.8' bgs.



Well/Boring Construction

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 5-9' bgs (BD-080910) and 11-15.2' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 580.41' AMSL on 10/4/2010.

Date Start/Finish: 8/5/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 4 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT & Truck-Mounted Ingersoll Rand A300

Northing: 906305.6752
Easting: 944877.7664
Casing Elevation: 585.19' AMSL

Borehole Depth: 20.1' bgs
Surface Elevation: 585.69' AMSL

Descriptions By: L.Terrell

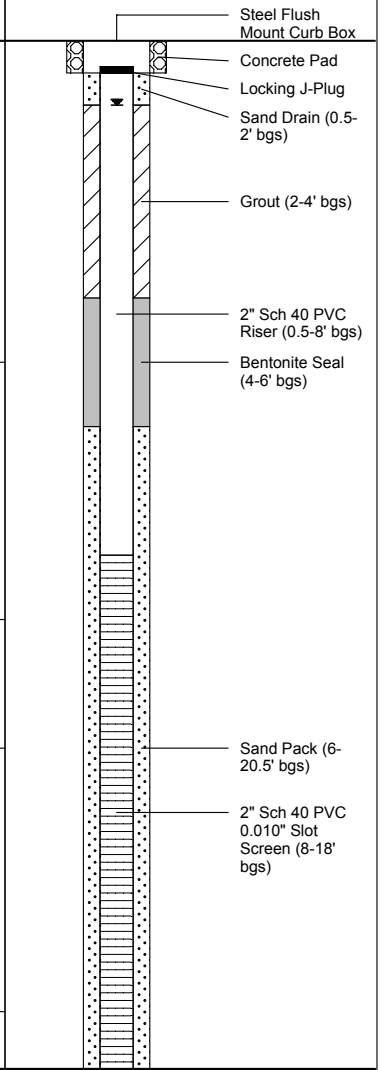
Well/Boring ID: MW-4

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	585				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
					0.0			
		NA	0-5	NA	0.0	X		
					0.0			
					0.0			
5	580	1	5-8	2.2	0.2			Brown and gray CLAY, trace Silt, mottled, high plasticity, very stiff, moist.
		2	8-11	3.0	0.1			Gray CLAY, trace Silt, high plasticity, stiff, moist to wet.
10	575	3	11-14	3.0	0.0			Gray SILT, trace fine to medium sub-round to sub-angular Gravel, fine to coarse Sand and Clay, black fractured Rock at 1.1' of recovery, moist to wet.
15	570	4	14-18	3.6	0.1			Gray SILT, little fine Sand, trace fine to medium sub-round to sub-angular Gravel, moist to dry.

Well/Boring Construction



ARCADIS
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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 2-3' bgs (BD-080510) and 18-20' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 582.52' AMSL on 10/4/2010.

Client: National Fuel

Well/Boring ID: **MW-4**

Borehole Depth: 20.1' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	14-18	3.6	0.1			Gray SILT, little fine Sand, trace fine to medium sub-round to sub-angular Gravel, moist to dry.	2" Sch 40 PVC 0.010" Slot Screen (8-18' bgs)
		5	18-20.5	2.0	0.0	X		Black fractured SHALE in tip of sampler.	Sand Pack (6-20.5' bgs)
20	565							Refusal with Augers at 20.5' bgs.	
25	560								
30	555								
35	550								

ARCADIS
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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 2-3' bgs (BD-080510) and 18-20' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Water elevation = 582.52' AMSL on 10/4/2010.

Date Start/Finish: 8/9/11-8/11/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 4 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906382.4057
Easting: 945044.3786
Casing Elevation: 584.74' AMSL

Borehole Depth: 19' bgs
Surface Elevation: 585.04' AMSL

Descriptions By: L.Terrell

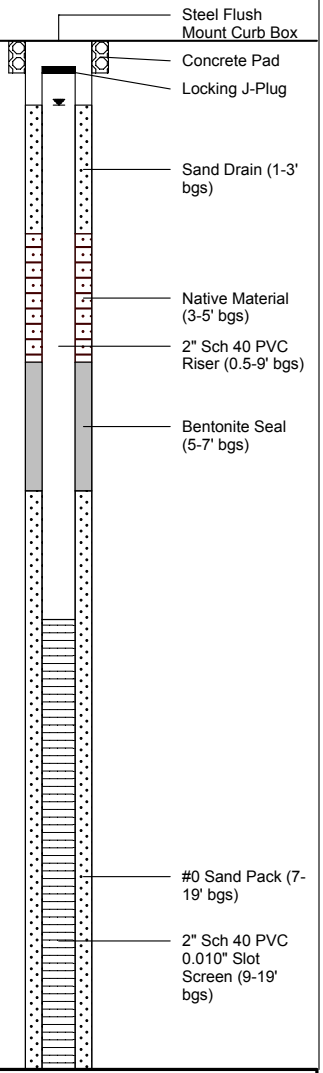
Well/Boring ID: **MW-5**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0	585							
								Black ASPHALT
								CONCRETE, red BRICK, trace fine to medium Gravel and fine to coarse Sand, wet.
		NA	0-5	NA	0.0			
5	580							Brown fine to coarse SAND, fine to coarse Gravel and Wood, sulfur-like odor, wet.
		1	5-8	1.3	0.0			Brown and grey mottled Silty CLAY, medium to coarse Sand seam at 5.7' bgs, somewhat plastic, stiff, moist.
								Brown Silty CLAY, somewhat plastic, soft, moist to wet.
10	575	2	8-12	3.7	0.0			Grey, similar soils as above.
								Grey SILT, trace fine to medium Gravel, non-plastic, soft, moist to wet.
								Grey SILT, trace fine to coarse Gravel, non-plastic, soft b/t 12-12.8' bgs, hard b/t 12.8-16' bgs, moist to wet.
								Wet b/t 12-12.8' bgs, moist b/t 12.8-16' bgs.
		3	12-16	3.8	0.0			
15	570							

Well/Boring Construction



Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

ARCADIS
Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: **MW-5**

Borehole Depth: 19' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	16-19	3.0	0.0			Grey SILT, trace fine to coarse Gravel, non-plastic, hard, moist.	2" Sch 40 PVC 0.010" Slot Screen (9-19' bgs); #0 Sand Pack (7-19' bgs)
20	565							Refusal at 19' bgs.	
25	560								
30	555								
35	550								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/9/11-8/11/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 4 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906501.5342
Easting: 945104.5417
Casing Elevation: 583.52' AMSL

Borehole Depth: 17' bgs
Surface Elevation: 583.82' AMSL

Descriptions By: L.Terrell

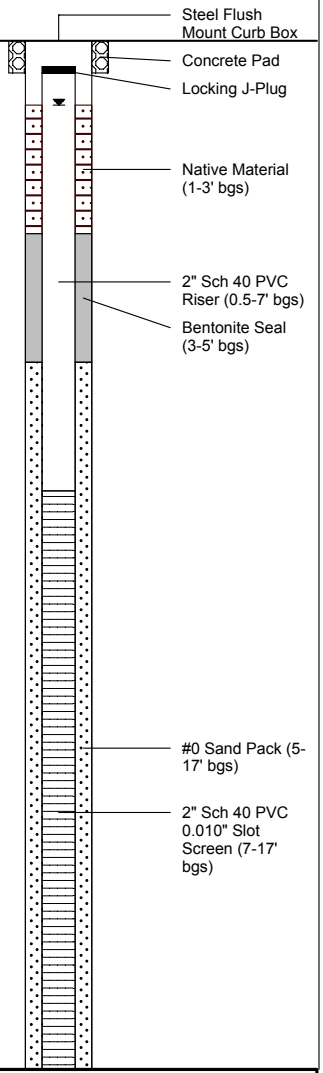
Well/Boring ID: **MW-6**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585 / 0	NA	0-3	NA	0.0			Brown SILT, little fine to coarse Sand and fine to coarse Gravel, trace Organics, moist.
580 / 5	NA	3-5	NA	0.0			Grey Silty CLAY, somewhat plastic, soft, moist.
	1	5-8	1.0	0.0			Grey and brown mottled Silty CLAY, somewhat plastic, soft, moist.
575 / 10	2	8-12	0.5	0.0			Grey SILT, trace fine to coarse Gravel and coarse Sand, non-plastic, soft, moist.
				0.6			
570 / 15	3	12-16	2.0	2.0			
				0.6			

Well/Boring Construction



ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Client: National Fuel

Well/Boring ID: MW-6

Borehole Depth: 17' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	16-17	0.8	0.0			Grey SILT, trace fine to coarse Gravel and coarse Sand, non-plastic, soft, moist.	2" Sch 40 PVC 0.010" Slot Screen (7-17' bgs); #0 Sand Pack (5-17' bgs)
								Refusal at 17' bgs.	
	565								
20									
	560								
25									
	555								
30									
	550								
35									

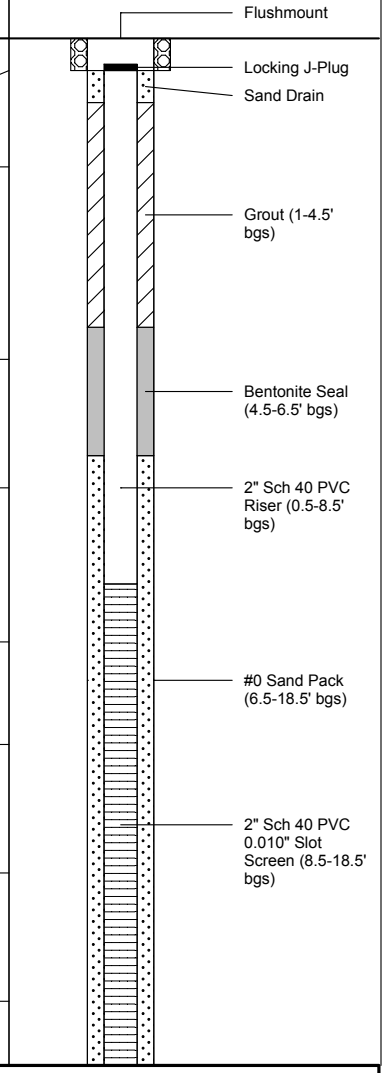
ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 6-12-12 **Drilling Company:** Parratt-Wolff **Driller's Name:** Jolaan Price **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 2' x 2" SS **Rig Type:** Truck Mounted IR **Auger Size:** 4 1/4"	**Northing:** 906575.42 **Easting:** 945093.12 **Casing Elevation:** 583.50 **Borehole Depth:** 18.5' bgs **Surface Elevation:** 583.79 **Descriptions By:** Levia Terrell	**Well/Boring ID: MW-7** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	585						
0							Gray CONCRETE. Air knifed 0-5' bgs.
							Brown SILT, little fine Sand, trace fine to coarse Gravel and Cobble, moist.
		NA	0-5	NA	0.0		Brown and gray Clayey SILT, moist.
	580						
5		1	5-7	2.0	0.0		Brown and gray Clayey SILT, mottled, slightly plastic, stiff, moist.
		2	7-9	1.7	0.0		Brown and gray SILT and CLAY, mottled, non plastic, medium stiff, moist.
	575						Stiff.
10		3	9-11	1.4	0.0		Gray SILT, non-plastic, medium stiff, moist.
		4	11-13	1.2	0.0		Gray SILT, trace fine Gravel, non plastic, moist.
	570	5	13-15	1.5	3.9 3.4		Gray SILT, between 13.2-13.3' bgs a seam of fine Sand and trace medium to coarse Sand, non plastic, moist. PID readings are from the seam of Sand.
15		6	15-17	1.4	0.0		Gray SILT, trace fine to medium Gravel, non plastic, very stiff, moist.



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Client: National Fuel

Well/Boring ID: MW-7

Borehole Depth: 18.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	15-17	1.4	0.0		Gray SILT, trace fine to medium Gravel, non plastic, very stiff, moist.	2" Sch 40 PVC 0.010" Slot Screen (8.5-18.5' bgs)
		7	17-18.5	1.2	0.0			#0 Sand Pack (6.5-18.5' bgs)
	565						Refusal at 18.5' bgs.	
20								
	560							
25								
	555							
30								
	550							
35								

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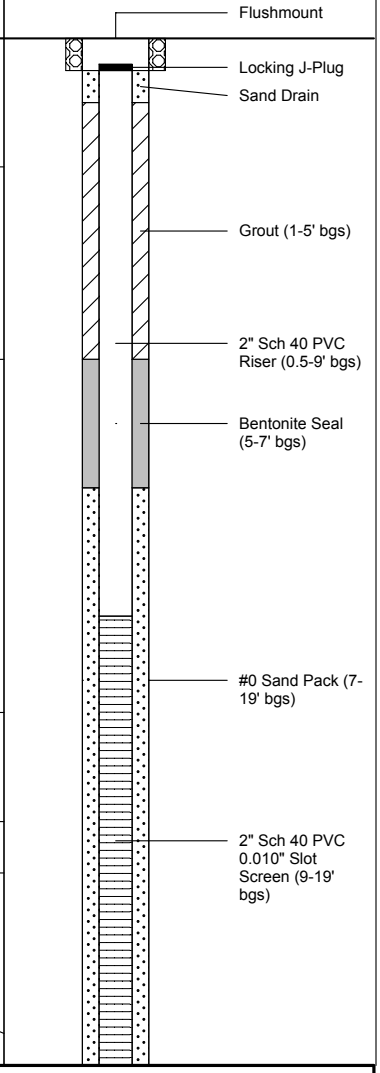
Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Date Start/Finish: 6-11-12 **Drilling Company:** Parratt-Wolff **Driller's Name:** Jolaan Price **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 2' x 2" SS **Rig Type:** Truck Mounted IR **Auger Size:** 4 1/4"	**Northing:** 906610.43 **Easting:** 945016.75 **Casing Elevation:** 583.16 **Borehole Depth:** 19' bgs **Surface Elevation:** 583.55 **Descriptions By:** Levia Terrell	**Well/Boring ID: MW-8** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
585						
0						Brown SILT, little fine Sand, trace fine to coarse Gravel, Cobble, and Organics, moist. Air knifed 0-5' bgs.
	NA	0-5	NA	0.0		Grey Silty CLAY, trace fine to coarse Gravel. moist.
580						
5	1	5-7	2.0	0.0		Brown and gray Silty CLAY, mottled, slightly plastic, stiff, moist.
	2	7-9	1.6	0.0		Gray.
575						
10	3	9-11	1.7	0.0		Soft, moist to wet.
	4	11-13	1.5	0.0		Gray Clayey SILT, non plastic, soft, moist to wet.
						Light gray medium to coarse GRAVEL (fractured rock), little Silt and Clay, dry.
570	5	13-15	1.8	0.0		Gray SILT, trace fine to coarse Gravel, non plastic, soft, moist to dry.
15	6	15-17	0.7	0.0		Gray coarse GRAVEL (fractured Rock), dry.



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Client: National Fuel

Well/Boring ID: **MW-8**

Borehole Depth: 19' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	15-17	0.7	0.0		Gray coarse GRAVEL (fractured Rock), dry.	2" Sch 40 PVC 0.010" Slot Screen (9-19' bgs)
							Gray brown Clayey SILT, mottled, slightly plastic, stiff, moist.	
	565	7	17-19	1.5	0.0		Gray SILT, trace fine to coarse Gravel moist to dry, wet last 0.3' of sample. Fractured rock in nose of spoon. Spoon refusal at 18.5' bgs.	#0 Sand Pack (7-19' bgs)
20							Refusal at 19' bgs.	
	560							
25								
	555							
30								
	550							
35								

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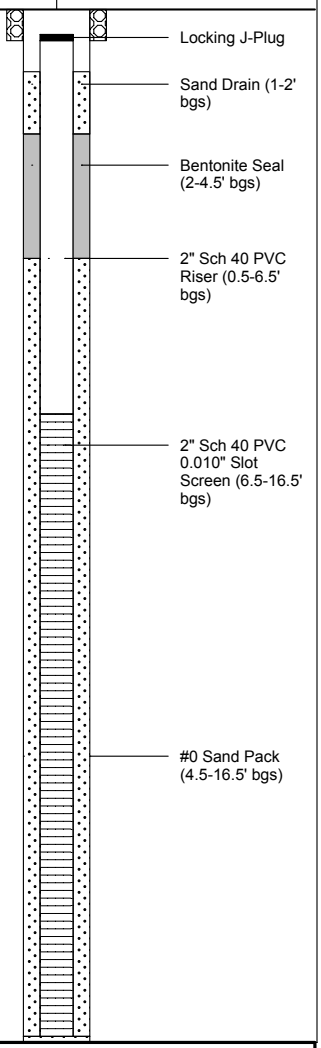
Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Date Start/Finish: 10/1-10/4/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 2' x 2" SS **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:** 4 1/4" HSA	**Northing:** 906847.4844 **Easting:** 944976.8894 **Casing Elevation:** 581.95 **Borehole Depth:** 16.6' bgs **Surface Elevation:** 582.51 **Descriptions By:** Levia Terrell	**Well/Boring ID: MW-9** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
585						
0				0.0		Gray CONCRETE.
				0.0		Dark brown to black CINDERS, ASH, fine to coarse GRAVEL, trace fine to coarse Sand, Silt, red Brick, Slag, and Roots, moist. Air knifed 0-5' bgs.
580	NA	0-5	NA	0.0		Light brown, tan and gray Clayey SILT, mottled, slight plasticity, medium stiff, moist, wet at 4' bgs.
				0.0		
				0.0		
5	1	5-7	1.1	12.5		Light brown, tan, and gray Clayey SILT, very stiff, low plasticity, moist to wet.
				18.1		
575	2	7-9	1.2	276		Gray, stiff.
				274		
10	3	9-11	2.0	15.4		Gray SILT and CLAY, low plasticity, soft, moist to wet.
				45.5		
				46.9		
				38.9		
	4	11-13	1.2	24.2		Gray Clayey SILT, slightly plasticity, soft, moist to wet.
570				24.8		
				27.3		
	5	13-15	1.3	5.6		Gray SILT, trace fine to coarse sub angular to angular Gravel, very stiff, non-plastic, moist.
15				0.0		
	6	15-16.5	1.4	0.0		Gray SILT, trace fine to coarse subangular to angular Gravel and fine to coarse Sand, very stiff, non-plastic, moist..
				0.0		
	7	16.5-16.6	NR	--		Refusal at 16.6' bgs. Black Shale in nose of split spoon.



Well/Boring Construction

Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon; HSA = Hollow Stem Auger; NR = No Recovery.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

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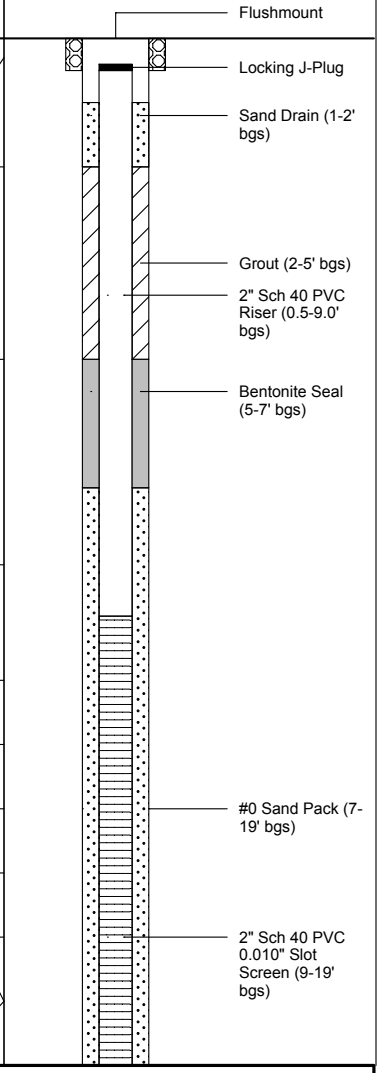
Date Start/Finish: 10/1-10/3/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 2' x 2" SS **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:** 4 1/4" HSA	**Northing:** 906648.6759 **Easting:** 945181.9452 **Casing Elevation:** 584.42 **Borehole Depth:** 19' bgs **Surface Elevation:** 585.00 **Descriptions By:** Levia Terrell	**Well/Boring ID:** **MW-12** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	585				0.0		Gray CONCRETE.
					0.0		Dark brown to black CINDERS, ASH, fine to coarse SAND, little fine to coarse Gravel, moist. Air knifed 0-5' bgs.
		NA	0-5	NA	0.0		Light brown, tan and gray Clayey SILT, mottled, slight plasticity, medium stiff, moist, wet at 3' bgs.
					0.0		
					0.0		
5	580	1	5-7	2.0	0.0		Gray, light brown and tan, Clayey SILT, mottled, slight plasticity, very stiff, moist.
					0.0		
					0.0		
		2	7-9	2.0	0.0		
					0.0		
					0.0		Gray SILT and CLAY, low plasticity, medium stiff, moist.
					0.0		Soft
10	575	3	9-11	2.0	0.0		
					0.0		Gray Clayey SILT, slightly plasticity, stiff, wet.
					0.0		Gray SILT and CLAY, low plasticity, soft, wet.
		4	11-13	1.6	0.0		
					0.0		Gray SILT, trace medium subangular Gravel, non-plastic, medium stiff, moist to wet.
					0.0		Gray SILT and CLAY, low plasticity, very soft, wet.
		5	13-15	1.6	0.0		
					0.0		Gray SILT, trace medium subangular Gravel, non-plastic, medium stiff, moist to wet.
15	570				0.0		Light yellow brown SILT and CLAY, low plasticity, soft, moist.
		6	15-17	2.0	0.0		Gray SILT, trace fine to coarse subangular to angular Gravel, non-plastic, very stiff, moist.



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger; NR = No Recovery.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **MW-12**

Borehole Depth: 19' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		6	15-17	2.0	0.0 0.0		Gray SILT, trace fine to coarse subangular to angular Gravel, non-plastic, very stiff, moist.	
		7	17-19	2.0	0.0 0.0 0.0 0.0		Gray SILT, trace fine to coarse angular to subangular Gravel, non-plastic, very stiff, moist.	2" Sch 40 PVC 0.010" Slot Screen (9-19' bgs)
20	565	8	19-21	NR			Refusal at 19' bgs. Black Shale in nose of split spoon.	
25	560							
30	555							
35	550							

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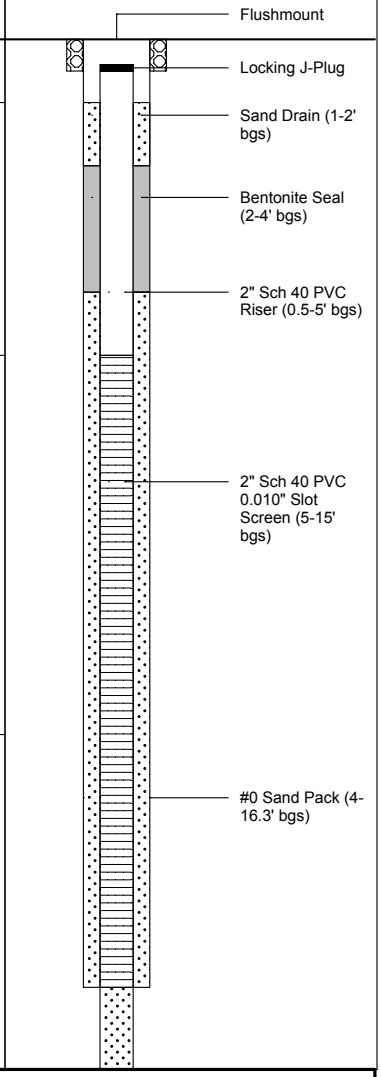
North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 9/30 - 10/03/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 2' x 2" SS **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:** 4 1/4" HSA	**Northing:** 906482.39 **Easting:** 944683.84 **Casing Elevation:** 582.74 **Borehole Depth:** 16.3' bgs **Surface Elevation:** 582.33 **Descriptions By:** Levia Terrell	**Well/Boring ID: MW-13** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
585						
0				0.0		Brown SILT, little fine Sand, trace fine to coarse Gravel, medium to coarse Sand, and Organic (roots and grass), moist. Air knifed 0-5' bgs.
				0.0		Grey and brown Clayey SILT, mottled, slight plasticity, medium stiff. moist.
580	NA	0-5	NA	0.0		
				0.0		
				0.0		
5	1	5-7	1.2	0.0		Orange brown SILT, trace fine to coarse Gravel, mottled, non-plastic, medium dense, moist to wet.
				0.0		
				0.0		
575	2	7-9	2.0	0.0		
				0.0		
				0.0		
				0.0		Gray.
10	3	9-11	1.7	0.0		Between 9.5-9.9' bgs Gray SILT, little fine to medium Sand, trace fine sub-angular Gravel and coarse Sand, loose, wet.
				0.0		
				0.0		
				0.0		Gray SILT, trace fine to coarse Sand and fine to coarse angular to sub-angular Gravel, non-plastic, medium dense, moist to wet.
570	4	11-13	1.9	0.0		
				0.0		
				0.0		
				0.0		
15	5	13-15	1.3	0.0		
				0.0		
				0.0		
				0.0		
	6	15-16.3	1.3	0.0		Black to dark gray SHALE in nose of spoon. Refusal at 16.3' bgs.
				0.0		



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 8/4-8/6/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 3 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT & Truck-Mounted Ingersoll Rand A300

Northing: 906486.8223
Easting: 945018.8745
Casing Elevation: NA

Borehole Depth: 19.2' bgs
Surface Elevation: 583.66' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-1**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
585								
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.	Boring completed with cold asphalt patch (0-0.5' bgs)
				0.1				
	NA	0-5	NA	0.0				
580				0.2				
				0.2				
5	1	5-8	0.8	0.2			Dark brown medium to coarse SAND and red BRICK, little fine sub-round Gravel, trace Concrete, loose, discoloration, coal tar-like odor, wet.	
575	2	8-11	0.5	1.2	X		Black medium SAND, little coarse Sand, trace red Brick, discoloration, coal tar-like odor, wet.	Boring backfilled to grade with bentonite/cement grout (0.5-19.2' bgs)
10	3	11-14	2.0	0.1			Red BRICK, coal tar-like odor, wet. Black fine SAND, little Silt, discoloration, coal tar-like odor, wet. Red BRICK, coal tar-like odor, wet. Gray SILT, trace Clay, coal tar-like odor, moist.	
570								
15	4	14-18	3.7	0.4			Gray fine to medium SAND, trace coarse Sand and fine round Gravel, loose, coal tar-like odor, wet. Gray SILT, trace fine Sand and fine to medium sub-angular Gravel, coal tar-like odor, moist.	

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; NR = No Recovery; SS = Split Spoon; HSA = Hollow Stem Auger
Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-11' bgs and 16-18' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 18' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-1**

Borehole Depth: 19.2' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	14-18	3.7	0.4	X		Gray SILT, trace fine Sand and fine to medium sub-angular Gravel, coal tar-like odor, moist.	
	565	5	18-19.2	NR	NA			Black fractured SHALE, wet.	
20								Refusal with augers at 19.2' bgs.	Boring backfilled to grade with bentonite/cement grout (0.5-19.2' bgs)
	560								
25									
	555								
30									
	550								
35									

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; NR = No Recovery; SS = Split Spoon; HSA = Hollow Stem Auger
Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-11' bgs and 16-18' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 18' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/3/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2:

Northing: 906447.6804
Easting: 944879.2445
Casing Elevation: NA

Borehole Depth: 16.8' bgs
Surface Elevation: 583.75' AMSL

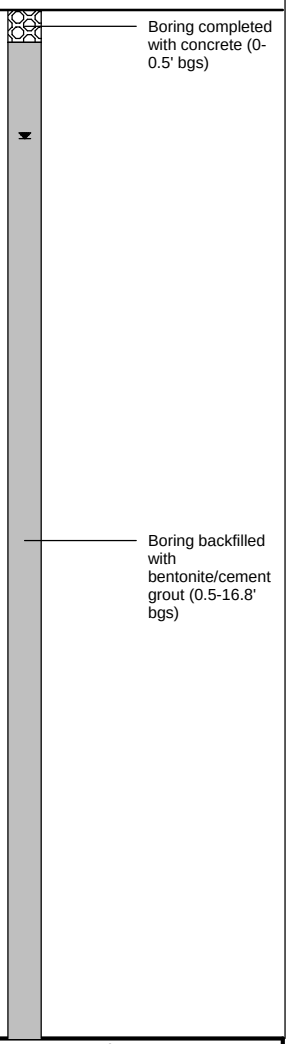
Descriptions By: L.Terrell

Well/Boring ID: **SB-2**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585 / 0							
580 / 5	NA	0-5	NA	NA			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with PID at 1' intervals.
	1	5-8	1.0	0.0			Black to dark gray fine to coarse SAND, little fine angular to sub-round Gravel, loose, petroleum-like odor, wet.
575 / 10	2	8-11	3.0	0.0	X		Black fine to medium SAND, trace yellow Brick, Concrete, and Metal, brown seam 1" thick at 2.8' of recovery, wet.
	3	11-14	3.0	0.0			Black fine to medium SAND, trace red Brick and Metal, loose, slight coal tar-like odor between 0- 2' of recovery, wet.
570 / 15	4	14-17	2.8	0.0			Slight coal tar-like odor between 0-2.8' of recovery.



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 15.8-16.8' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-2**

Borehole Depth: 16.8' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	14-17	2.8	0.0	X		Trace degraded Concrete, red Brick and Metal between 2.7-2.8' of recovery.	
							Refusal at 16.8' bgs.	Boring backfilled with bentonite/cement grout (0.5-16.8' bgs)
565 / 20								
560 / 25								
555 / 30								
550 / 35								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 15.8-16.8' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/4-8/5/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 3 1/4 "
Rig Type: Track-Mounted Geoprobe 6620 DT & Truck-Mounted Ingersoll Rand A300

Northing: 906470.7189
Easting: 944763.7093
Casing Elevation: NA

Borehole Depth: 17.5' bgs
Surface Elevation: 583.13' AMSL

Descriptions By: L.Terrell

Well/Boring ID: SB-3

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
585								
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.	Boring completed with cold asphalt patch (0-0.5' bgs)
				0.0				
	NA	0-5	NA	0.5	X			
580				0.0				
				0.0				
5							Brown gray SILT, little Clay, mottled, low plasticity, very stiff, slight coal tar-like odor, moist to wet.	
	1	5-8	3.0	0.0			Brown SILT, trace Clay and fine angular Gravel, non-plastic, medium stiff, moist to wet.	
575							Trace gray fine to coarse sub-angular Gravel.	Boring backfilled with bentonite/cement grout (0.5-17.5' bgs)
	2	8-11	3.0	0.0				
10								
	3	11-14	3.0	0.2			Gray SILT, trace fine to coarse sub-angular Gravel and fine Sand, moist to dry.	
570								
							Gray fine SAND and SILT, trace fine sub-angular Gravel, moist to dry.	
15	4	14-17	2.7	1.2	X			

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 2-3' bgs and 14.9-16.9' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 17' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).

Client: National Fuel

Well/Boring ID: SB-3

Borehole Depth: 17.5' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	14-17	2.7	1.2			Gray fine SAND and SILT, trace fine sub-angular Gravel, moist to dry.	
		5	17-17.5	0.1	0.0			Black fractured SHALE in the nose of the sampler, slight odor.	
								Refusal with augers at 17.5' bgs.	Boring backfilled with bentonite/cement grout (0.5-17.5' bgs)
	565								
20									
	560								
25									
	555								
30									
	550								
35									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 2-3' bgs and 14.9-16.9' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 17' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).

Date Start/Finish: 8/2/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906551.3235
Easting: 945006.5616
Casing Elevation: NA

Borehole Depth: 16.8' bgs
Surface Elevation: 583.24' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-4**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585							
0 / 583.24				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
				0.0			
	NA	0-5	NA	0.0			
580				0.0			
				0.0			
5	1	5-8	3.0	0.0			Gray brown CLAY, trace Silt, mottled, medium plasticity, stiff, moist.
575							
	2	8-11	2.8	0.0	X		Gray CLAY and SILT, slight plasticity, moist to wet.
10							
	3	11-14	3.0	0.0			Gray SILT, trace fine sub-round to sub-angular Gravel, moist.
570							
							Moist to dry.
15	4	14-17	3.0	0.0			
	4	14-16.8	3.0	0.0	X		Dark gray to black fractured Shale in the tip of the sampler.
							Refusal at 16.8' bgs.

Well/Boring Construction:
- Boring completed with grass and soil (0-0.5' bgs)
- Boring backfilled with bentonite/cement grout (0.5-16.8' bgs)

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-11' bgs and 14-17' bgs (MS/MSD).
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

ARCADIS
Infrastructure, environment, buildings

Date Start/Finish: 8/3/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906545.9857
Easting: 944979.7888
Casing Elevation: NA

Borehole Depth: 16.8' bgs
Surface Elevation: 583.05' AMSL

Descriptions By: L.Terrell

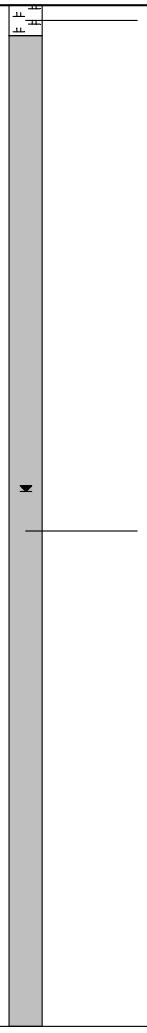
Well/Boring ID: **SB-5**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585							
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.
				0.0			
	NA	0-5	NA	0.0			
580				0.0			
				0.0			
5	1	5-8	2.5	0.0			Brown gray CLAY, trace Silt, mottled, high plasticity, stiff, moist.
575					X		
	2	8-11	2.8	0.0			Gray CLAY, little Silt, medium plasticity, medium stiff, moist to wet.
10	3	11-14	2.9	0.0			Gray SILT, trace fine to coarse sub-round to round Gravel, fine to coarse Sand and Clay, moist to wet.
570							
							No Clay, moist to dry.
15	4	14-16.8	3.0	0.0	X		Refusal at 16.8' bgs.

Well/Boring Construction



ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 15.8-16.8' bgs .
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/3-8/5/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner & 2' x 2" SS
Auger Size: 3 1/4"
Rig Type: Track-Mounted Geoprobe 6620 DT & Truck-Mounted Ingersoll Rand A300

Northing: 906535.8123
Easting: 944928.5302
Casing Elevation: NA

Borehole Depth: 18' bgs
Surface Elevation: 582.91' AMSL

Descriptions By: L.Terrell

Well/Boring ID: SB-6

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
585								
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.	Boring completed with grass and soil (0-0.5' bgs)
				0.0				
	NA	0-5	NA	0.0				
580				0.0				
				0.0				
5	1	5-8	2.5	0.0			Brown and gray CLAY, trace Silt, mottled, high plasticity, stiff, moist.	
575								
	2	8-11	3.0	0.0	X		Gray CLAY, trace Silt, high plasticity, medium stiff, moist to wet.	Boring backfilled to grade with bentonite/cement grout (0.5-18' bgs)
10								
	3	11-14	3.0	0.0			Gray SILT, trace fine to coarse sub-round to sub-angular Gravel, fine to coarse Sand and Clay, slight plasticity, very stiff, moist to wet.	
570								
15	4	14-17	2.8	0.0	X		Gray SILT, trace fine to coarse sub-round to sub-angular Gravel and fine to coarse Sand, slight coal tar-like odor between 0.5-2.8' of recovery, moist to dry.	

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 14.8-16.8' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 17' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).

Client: National Fuel

Well/Boring ID: **SB-6**

Borehole Depth: 18' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	14-17	2.8	5.2			Gray SILT, trace fine to coarse sub-round to sub-angular Gravel and fine to coarse Sand, slight coal tar-like odor between 0.5-2.8' of recovery, moist to dry.	
	5	17-18	0.1	0.0			Dark gray fractured SHALE in nose of sampler.	
565							Refusal with augers at 18' bgs.	Boring backfilled to grade with bentonite/cement grout (0.5-18' bgs)
20								
560								
25								
555								
30								
550								
35								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, SS = Split Spoon; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 14.8-16.8' bgs.
After completing boring with Geoprobe equipment, the driller blind drilled down to 17' bgs with augers to confirm top of bedrock.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).

Date Start/Finish: 8/3/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906531.8140
Easting: 944905.7168
Casing Elevation: NA

Borehole Depth: 13.4' bgs
Surface Elevation: 582.83' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-7**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
585								
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with a PID at 1' intervals.	Boring completed with grass and soil (0-0.5' bgs)
				0.0				
580	NA	0-5	NA	0.0				
				0.0				
				0.0				
5	1	5-8	2.3	0.0			Brown and gray CLAY, trace Silt, mottled, high plasticity, very stiff, slight coal tar-like odor, moist.	Boring backfilled with bentonite/cement grout (0.5-13.4' bgs)
575	2	8-11	3.0	0.0	X		Gray CLAY, trace Silt, high plasticity, stiff.	
10	3	11-13.4	2.2	0.0			Gray SILT, trace Clay, non-plastic, medium stiff, moist to wet.	
570					X		Gray SILT, trace fine to coarse sub-round to round Gravel and fine to coarse Sand, moist to wet. Gray fractured Shale in the tip of the sampler.	
							Refusal at 13.4' bgs.	
15								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 12.4-13.4' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/2/10
Drilling Company: Parratt-Wolff
Driller's Name: D. Richmond/J.C. Chevalier
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906554.5445
Easting: 945025.2347
Casing Elevation: NA

Borehole Depth: 17.5' bgs
Surface Elevation: 583.19' AMSL

Descriptions By: L.Terrell

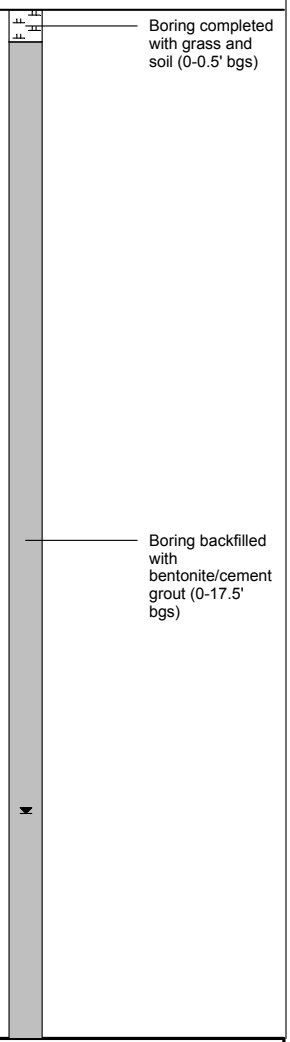
Well/Boring ID: **SB-8**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585							
0				0.0			Boring location hand-cleared to 5' bgs (blind drilled to 5' bgs). Soil was screened with PID at 1' intervals.
				0.0			
	NA	0-5	NA	0.0			
580				0.0			
				0.0			
5	1	5-8	2.4	0.0			Gray brown CLAY, trace Silt, mottled, high plasticity, very stiff, moist to dry.
575							Moist to wet.
10	2	8-12	4.0	0.0	X		
							Gray SILT, trace coarse sub-round Gravel and Clay, non-plastic, moist to wet.
570	3	12-15	2.5	0.0			Gray SILT, trace fine to medium sub-round to sub-angular Gravel and Clay, moist to wet.
							Gray fine SAND, moist to wet.
15	4	15-17.5	2.5	0.0			Gray medium SAND, moist to wet.
							Gray SILT, trace fine to medium sub-round to sub-angular Gravel, hard, moist to

Well/Boring Construction



Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 15-17.5' bgs (Dup-1-080210).
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

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Infrastructure, environment, buildings

Client: National Fuel

Well/Boring ID: SB-8

Borehole Depth: 17.5' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	15-17.5	2.5	0.0	X		dry. Black to dark gray fractured Shale in the tip of the sampler.	
	565							Refusal at 17.5' bgs.	Boring backfilled with bentonite/cement grout (0-17.5' bgs)
20									
	560								
25									
	555								
30									
	550								
35									

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Soil samples collected for VOCs, SVOCs and Total Cyanide at 8-10' bgs and 15-17.5' bgs (Dup-1-080210).
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/8/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 D7
Rig Type 2:

Northing: 906488.0068
Easting: 945015.9350
Casing Elevation: NA

Borehole Depth: 18' bgs
Surface Elevation: 583.86' AMSL

Descriptions By: L.Terrell

Well/Boring ID: SB-9

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
585 / 0							
580 / 0	NA	0-5	NA	0.0	X		Dark brown to black SLAG, coarse GRAVEL, CONCRETE, RED BRICK, little medium to coarse Sand, moist. Wet at 1.3' bgs.
580 / 5	1	5-8	0.4	0.0			Dark brown to black fine to coarse SAND, little red Brick, coal tar-like odor, wet.
575 / 10	2	8-12	0.2	0.0	X		Red and grey RED BRICK and CONCRETE, little medium to coarse Sand, coal tar-like odor, wet. Dark brown to black medium to coarse SAND, trace red Brick, fine to medium Gravel, coal tar-like odor, wet.
570 / 15	3	12-16	3.0	0.0			Grey SILT, trace fine Gravel, coal tar-like odor, wet. Grey fine SAND, little Silt, coal tar-like odor, wet.

Well/Boring Construction

Boring completed with grass and soil (0-0.5' bgs)

Boring backfilled with bentonite/cement grout (0-18' bgs)

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Grab groundwater samples collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1.3' bgs, 18-10' bgs, and 16-18' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-9**

Borehole Depth: 18' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18	2.0	0.0	X		Grey SILT, trace fine Sand and fine Gravel, coal tar-like odor, wet.	Boring backfilled with bentonite/cement grout (0-18' bgs)
							Refusal at 18' bgs.	
565								
20								
560								
25								
555								
30								
550								
35								

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger

Grab groundwater samples collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1.3' bgs, 18-10' bgs, and 16-18' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.

Date Start/Finish: 8/8/11-8/9/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906499.5229
Easting: 945020.1795
Casing Elevation: NA

Borehole Depth: 16' bgs
Surface Elevation: 584.09' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-10**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	585							
0								Brown SILT, little fine Sand and fine to coarse Gravel, trace Organics, moist.
		NA	0-5	NA	0.0			
	580							Grey to dark grey SILT, trace Clay and fine to medium Gravel, non-plastic, soft, coal tar-like odor, moist.
5						X		Grey brown mottled Silty CLAY, somewhat plastic, soft, moist.
		1	5-8	3.0	0.0			
	575							Grey Silty CLAY, somewhat plastic, soft, moist to wet.
10		2	8-12	4.0	0.0			
								Grey SILT, trace fine to coarse Sand, Clay, and fine Gravel, non-plastic, soft, moist to wet.
	570	3	12-16	1.0	0.0			
15						X		Refusal at 16' bgs.

Well/Boring Construction

- Boring completed with grass and soil (0-0.5' bgs)
- Temporary Piezometer: 2" PVC riser and 10 slot screen (0-10' bgs).
- Boring backfilled with bentonite/cement grout (0-16' bgs)
- Temporary screen point sampler (14-16' bgs)

ARCADIS
Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger
Grab groundwater sample collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1-10' bgs and 14-16' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
Soil descriptions for 0-5' bgs based on first boring attempt hand clearing. 5-16' bgs soil descriptions based on second boring attempt drilling/sampling.

Date Start/Finish: 8/9/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906507.9815
Easting: 945049.8179
Casing Elevation: NA

Borehole Depth: 17' bgs
Surface Elevation: 583.70' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-11**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	585							
0		NA	0-3	NA	0.0			Brown SILT, little fine Sand and fine to coarse Gravel, trace Organics, moist.
	580	NA	3-5	NA	0.0			Grey Silty CLAY, trace fine Gravel, somewhat plastic, soft, moist.
5		1	5-8	3.0	0.0	X		Grey and brown mottled Silty CLAY, somewhat plastic, soft, moist.
	575	2	8-12	4.0	5.4 6.0 5.7			Grey Silty CLAY, trace fine Gravel, somewhat plastic, soft, moist.
10		3	12-16	4.0	5.3 4.7 6.0			Grey SILT, trace Clay, fine to coarse Sand, and fine Gravel, non-plastic, soft, moist to wet.
	570							
15		4	16-17	1.0	4.0 4.0	X		Refusal at 17' bgs.

Well/Boring Construction

- Boring completed with grass and soil (0-0.5' bgs)
- Temporary Piezometer: 2" PVC riser and 0.010" slot screen (1-11' bgs).
- Boring backfilled with bentonite/cement grout (0-17' bgs)
- Temporary screen point sampler (15-17' bgs)

ARCADIS
Infrastructure, environment, buildings

Remarks: ags/bgs = above/below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger
Grab groundwater samples collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1-11' bgs and 15-17' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
After 8' bgs, background PID was 4.0 ppm
2" temporary piezometer installed, 0.010" slot screen 1-11' bgs, Riser 1' ags - 1' bgs.

Date Start/Finish: 8/9/11
Drilling Company: Parratt-Wolff
Driller's Name: J.Price/P.Smith
Drilling Method: Geoprobe / HSA
Sampling Method: 4' Acetate Liner
Auger Size:
Rig Type: Track-Mounted Geoprobe 6620 DT
Rig Type 2

Northing: 906444.3643
Easting: 945061.8216
Casing Elevation: NA

Borehole Depth: 18' bgs
Surface Elevation: 584.11' AMSL

Descriptions By: L.Terrell

Well/Boring ID: **SB-12**

Client: National Fuel

Location: National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	585							
0		NA	0-3.5	NA	0.0			Brown SILT, little fine Sand and fine to coarse Gravel, trace Organics, moist.
	580	NA	3.5-5	NA	0.0			Grey Silty CLAY, trace fine Gravel, somewhat plastic, soft, moist.
5		1	5-8	0.2	0.0	X		Brown and grey medium GRAVEL, red BRICK, and Silty CLAY, moist.
	575							Grey Silty CLAY, somewhat plastic, soft, moist.
10		2	8-12	4.0	0.0			Grey SILT, trace Clay, fine to coarse Sand and fine to medium Gravel, non-plastic, soft, moist to wet.
	570	3	12-16	4.0	0.0			
15								

Well/Boring Construction

- Boring completed with grass and soil (0-0.5' bgs)
- Temporary Piezometer: 2" PVC riser and 0.010" slot screen (1-11' bgs)
- Boring backfilled with bentonite/cement grout (0-18' bgs)

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Remarks: ags/bgs = above/below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger
Grab groundwater samples collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1-11' bgs and 16-18' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
2" temporary piezometer installed, 0.010" slot screen 1-11' bgs. Riser 1' ags - 1' bgs.

Client: National Fuel

Well/Boring ID: SB-12

Borehole Depth: 18' bgs

Site Location:
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18	2.0	0.0	X		Grey SILT, trace Clay, fine to coarse Sand and fine to medium Gravel, non-plastic, soft, moist to wet.	Temporary screen point sampler (16-18' bgs)
							Refusal at 18' bgs.	Boring backfilled with bentonite/cement grout (0-18' bgs)
565								
20								
560								
25								
555								
30								
550								
35								

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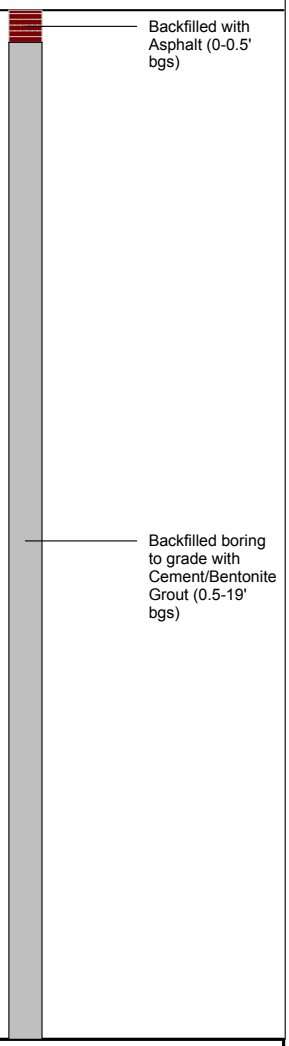
Remarks: ags/bgs = above/below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; HSA = Hollow Stem Auger
Grab groundwater samples collected for TPH-DRO(Test America Labs) & PIANO VOCs(Alpha Analytical) at 1-11' bgs and 16-18' bgs.
Survey coordinates based on NYS Plane Coordinate System (NAD 83).
Elevations based on NAVD 1988 obtained from GPS observations.
2" temporary piezometer installed, 0.010" slot screen 1-11' bgs. Riser 1' ags - 1' bgs.

Date Start/Finish: 10/2 & 10/7/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906436.1920 **Easting:** 944996.3265 **Casing Elevation:** NA **Borehole Depth:** 19' bgs **Surface Elevation:** 584.28 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-13** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	0						
					0.0		Black ASPHALT. Air knifed to 5' bgs.
					0.0		Light brown, tan and gray SILT, some fine to coarse Gravel, little to trace Slag, red Brick and fine to coarse Sand, moist.
		NA	0-5	NA	0.0		Light brown, tan and gray Clayey SILT, trace Slag, fine to coarse Sand and fine to coarse Gravel, trace Wood at 4' bgs and mild coal tar-like odor, mottled, moist.
					0.0		
					0.0		
5	-5						
		1	5-8	4.0	0.0		Light brown, tan and gray Clayey SILT, trace fine to coarse angular to sub angular Gravel, mottled, slight plasticity, very stiff, moist.
					0.0		
					0.0		
					0.0		Gray SILT and CLAY, low plasticity, soft, moist to wet.
10	-10	2	8-12	3.5	0.0		Gray Clayey SILT, trace fine to coarse sub angular Gravel, slight plasticity, medium stiff, moist to wet.
					0.0		
					0.0		
					0.0		Gray SILT, little fine to coarse sub angular Gravel, non-plastic, very stiff, moist to wet.
		3	12-16	4.0	0.0		
					0.0		
15	-15				0.0		Gray fine SAND and SILT, wet.

Well/Boring Construction



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6) (18-19).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (9.0-19.0' bgs. Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-13**

Borehole Depth: 19' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
				0.0		Gray fine SAND and SILT, wet.	
	4	16-19	3.0	0.0 0.0 0.0		Gray SILT, trace fine to coarse sub angular Gravel, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-19' bgs)
20 -20						Refusal at 19' bgs.	
25 -25							
30 -30							
35 -35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6) (18-19).

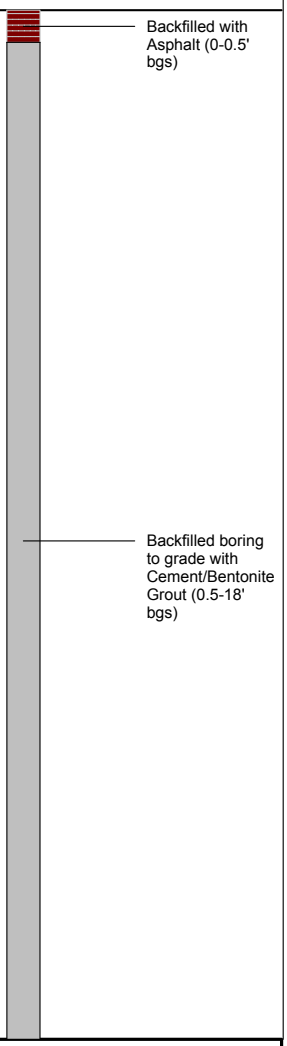
Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (9.0-19.0' bgs. Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/2 & 10/7/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906455.9252 **Easting:** 945001.6353 **Casing Elevation:** NA **Borehole Depth:** 18' bgs **Surface Elevation:** 583.65 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-14** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
585						
0				0.0		Black ASPHALT. Air knifed to 5' bgs.
				0.0		Light brown, tan and gray SILT, some fine to coarse Gravel, little to trace Slag, red Brick and fine to coarse Sand, moist.
				0.0		Light brown, tan and gray Clayey SILT, trace Slag, fine to coarse Sand and fine to coarse Gravel, trace Wood at 4' bgs and mild coal tar-like odor, mottled, moist.
	NA	0-5	NA	0.0		
580				0.0		
5				0.0		
	1	5-8	2.0	0.0		Gray, brown and olive brown SILT and CLAY, trace fine to coarse fine to coarse angular Gravel red Brick and fine to coarse Sand, wet.
				0.0		
575				0.0		
				0.0		Dark gray to black SILT, CLAY and WOOD, trace red Brick, fine to coarse Sand, mild coal tar-like odor, wet.
10	2	8-12	1.5	0.0		
				0.0		
				0.0		Red BRICK and gray fine GRAVEL, little fine to coarse Sand, burnt-like odor, wet.
				0.0		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, moist.
570				0.0		
	3	12-16	3.0	0.0		Gray fine SAND, little Silt, wet.
15				0.0		

Well/Boring Construction



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6) (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.0-18.0' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-14

Borehole Depth: 18' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
						Gray fine SAND, little Silt, wet.	
	4	16-18	2.0	0.0 0.0		Gray SILT, trace fine to coarse Sand and fine to coarse angular to sub angular Gravel, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18' bgs)
565						Refusal at 18' bgs.	
20							
560							
25							
555							
30							
550							
35							

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Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6) (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.0-18.0' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/1 & 10/8/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906486.7213 **Easting:** 944984.2067 **Casing Elevation:** NA **Borehole Depth:** 18.5' bgs **Surface Elevation:** 584.04 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-15** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
585							
0				0.0		Black ASPHALT. Air knifed to 5' bgs.	Backfilled with Asphalt (0-0.5' bgs)
	NA	0-5	NA	0.0 0.0 0.0		Dark brown to black fine to coarse SAND and SILT, little Ash, Cinders, fine to coarse Gravel, between 2.5-3.5' bgs Boulders, at 3' bgs red and yellow Brick, wet at 2.5' bgs.	
580							
5	1	5-8	3.5	0.0 0.0 0.0		Dark gray, gray, light brown and tan Clayey SILT, slight plasticity, stiff, mild coal tar-like, moist	
575				167		Gray SILT and CLAY, low plasticity, stiff, odor unknown, moist to wet.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.5' bgs)
10	2	8-12	3.5	204 318			
				113		Gray Clayey SILT, slight plasticity, stiff, odor unknown, moist to wet.	
570	3	12-16	3.0	160 84.6		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, odor unknown, moist.	
15				222			

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals: (10-11), (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.5-18.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-15**

Borehole Depth: 18.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18.5	2.0	71.6 0.0 0.0		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, odor unknown, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.5' bgs)
565						Refusal at 18.5' bgs.	
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals: (10-11), (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.5-18.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/1 & 10/8/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro-Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906474.7583 **Easting:** 944998.1950 **Casing Elevation:** NA **Borehole Depth:** 18' bgs **Surface Elevation:** 583.59 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-16** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
585							
0				0.0		Black ASPHALT. Air knifed 0-5' bgs.	Backfilled with Asphalt (0-0.5' bgs)
				0.0		Dark brown to black fine to coarse SAND and SILT, little Ash, Cinders, fine to coarse Gravel, between 2.5-3.5' bgs Boulders, at 3' bgs red and yellow Brick, wet at 2.5' bgs.	
	NA	0-5	NA	0.0			
580				0.0			
				0.0			
5				0.0		Gray SILT, little fine to medium angular to round Gravel and fine to coarse Sand, loose, mild coal tar-like odor, wet.	
	1	5-8	2.3	0.0			
				0.0			
575				0.0		No Recovery. Very soft drilling.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.0' bgs)
				0.0			
10	2	8-12	NR	0.0			
				0.0			
				0.0		Black fine to coarse SAND and fine to coarse angular GRAVEL, trace Wood and Silt, coal tar-like odor, wet.	
				0.0		Gray SILT, trace fine to medium sub angular to sub round Gravel, non-plastic, very stiff, mild coal tar-like odor, moist to wet.	
570	3	12-16	3.0	0.0			
15				0.0		Gray fine SAND and SILT, wet.	

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon; NR = No Recovery.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6), (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8-18' bgs). Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-16**

Borehole Depth: 18' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18	2.0	0.0 0.0		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.0' bgs)
565						Refusal at 18' bgs.	
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon; NR = No Recovery.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6), (16-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8-18' bgs). Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 9/30 & 10/8/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906476.9710 **Easting:** 945026.4476 **Casing Elevation:** NA **Borehole Depth:** 17.8' bgs **Surface Elevation:** 583.60 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-17** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
585							
0	NA	0-5	3.0	0.0 0.0 0.0 0.0		Black ASPHALT. Brown fine to coarse SAND, some Silt, little fine round Gravel, trace medium round Gravel, wet. Black fine SAND, trace yellow Brick, Slag and Coal, burnt-like odor, wet.	Backfilled with Asphalt (0-0.5' bgs)
580							
5	1	5-8	0.6	0.0 0.0 0.0		Red BRICK, trace black fine to coarse Sand, Silt and Wood, mild coal tar-like odor, wet. No Wood.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-17.8' bgs)
575							
10	2	8-12	1.5	0.0 0.0 0.0 0.0			
570	3	12-16	3.0	0.0 0.0 0.0 0.0		Gray SILT, trace fine to medium sub round Gravel, mild coal tar-like odor, non-plastic, very stiff, moist.	
15							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (3-4), (16.8-17.8).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.8 -17.8' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-17

Borehole Depth: 17.8' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-17.8	1.8	0.0 0.0		Gray SILT, trace fine to medium sub round Gravel, mild coal tar-like odor, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-17.8' bgs)
565				0.0 0.0		Refusal at 17.8' bgs.	
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (3-4), (16.8-17.8).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.8 -17.8' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 9/30 & 10/8/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906482.3175 **Easting:** 945031.1796 **Casing Elevation:** NA **Borehole Depth:** 17.5' bgs **Surface Elevation:** 583.58 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-18** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
585							
0						Black ASPHALT. Air knifed to 5' bgs.	Backfilled with Asphalt (0-0.5' bgs)
						Dark gray to black COBBLE and red and yellow BRICK, little fine to coarse Sand and Silt, trace Slag and fine to coarse Gravel, moist.	
	NA	0-5	NA	6.8		Gray Silty CLAY, coal tar-like odor, moist to wet.	
580							
5				0.0		Gray, light brown, olive brown and black Clayey SILT, trace red Brick, trace black streaks 2mm thick between 5.4-5.5' bgs, 6.0-6.1' bgs, 6.5-6.6' bgs, coal tar-like odor, unknown odor, slight plasticity, stiff, moist.	
	1	5-8	3.7	0.0		Gray SILT and CLAY, low plasticity, soft, unknown odor, moist.	
				31.7			
575				75.6		Gray SILT, trace fine to coarse sub angular to sub round Gravel, unknown odor, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-17.5' bgs)
10	2	8-12	2.6	31.4			
				37.1			
				23.3			
				14.0		Trace fine Sand between 13-14' bgs.	
570	3	12-16	4.0	171			
				98.9			
15				24.9			

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (13-14), (16.5-17.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.5 -17.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-18

Borehole Depth: 17.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-17.5	1.5	0.0 0.0		Gray SILT, trace fine to coarse sub angular to sub round Gravel, unknown odor, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-17.5' bgs)
						Refusal at 17.5' bgs.	
565							
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (13-14), (16.5-17.5).

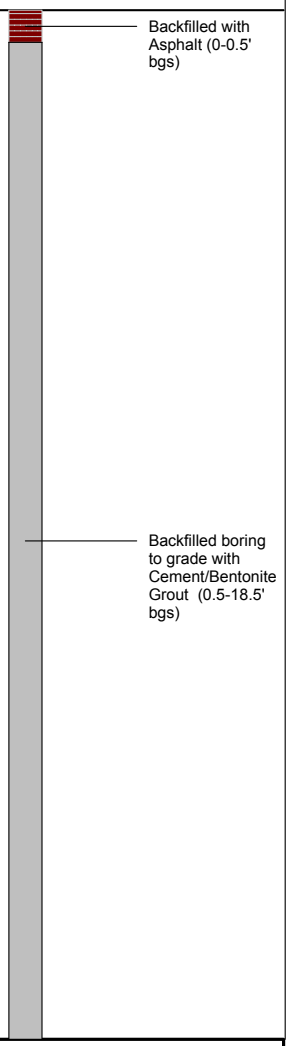
Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.5 -17.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/1 & 10/8/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Air Knifed **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906449.4361 **Easting:** 945028.0761 **Casing Elevation:** NA **Borehole Depth:** 18.5' bgs **Surface Elevation:** 584.11 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-19** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	585						
0					0.0		Black ASPHALT. Air knifed 0-5' bgs.
					0.0		Brown fine to medium SAND and SILT, some fine to coarse Gravel, little Slag, Cobble, red Brick Wall, trace coarse Sand, moist.
					0.0		Gray Clayey SILT, trace fine to coarse Gravel and fine to coarse Sand, moist.
		NA	0-5	NA	0.0		
	580				0.0		
5					0.0		Gray, light brown and tan Clayey SILT, mottled, low plasticity, soft, moist.
		1	5-8	2.6	0.0		Gray, light brown and tan SILT and CLAY, mottled, slight plasticity, soft, black spots 3 mm in diameter at 1.2' of recovery, moist.
					0.0		Gray, light brown and tan Clayey SILT, mottled, low plasticity, stiff, black streaks 2.4-2.5' of recovery, moist.
					0.0		Gray and olive brown SILT and CLAY, trace fine to medium angular Gravel, slight plasticity, soft, moist to wet.
	575				19.3		Gray Clayey SILT, trace fine to medium angular Gravel, low plasticity, soft, moist to wet.
10		2	8-12	3.0	59.3		Gray SILT, trace fine to medium angular Gravel, non-plastic, stiff, moist to wet.
					34.5		
					66.8		Odor unknown between 12-15' bgs, petroleum-like odor between 15-16' bgs.
					98.8		
	570	3	12-16	4.0	198		
15					11.8		

Well/Boring Construction



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (14-16) (18-18.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.5-18.5' bgs. Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-19**

Borehole Depth: 18.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18.5	2.5	0.0 75.4 112 0.0		Gray SILT, trace fine to medium angular Gravel, non-plastic, stiff, odor unknown, moist to wet.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.5' bgs)
565 / 20						Refusal at 18.5' bgs.	
560 / 25							
555 / 30							
550 / 35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (14-16) (18-18.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.5-18.5' bgs. Using a 1" bailer apporximately one well volume of water was removed and a grab ground water sample was collected and submitted for TCL VOCs.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/1 & 10/8/2013
Drilling Company: Parratt-Wolff
Driller's Name: Wayne Nielson
Drilling Method: Direct Push/Air Knifed
Sampling Method: 4' x 2" Macro Core
Auger Size:
Rig Type: Truck Mounted Ingersoll Rand
Rig Type 2

Northing: 906452.5024
Easting: 945023.7838
Casing Elevation: NA

Borehole Depth: 18.5' bgs
Surface Elevation: 584.02

Descriptions By: Levia Terrell

Well/Boring ID: **SB-20**

Client: National Fuel

Location: Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	585								
0					0.0			Black ASPHALT.	Backfilled with Asphalt (0-0.5' bgs)
					0.0			Brown fine to medium SAND and SILT, some fine to coarse Gravel, little Slag, Cobble, red Brick Wall, trace coarse Sand, moist. Air knifed 0-5' bgs.	
		NA	0-5	NA	0.0			Gray Clayey SILT, trace fine to coarse Gravel and fine to coarse Sand, trace sheen in water, mild coal tar-like odor, wet between 2.5-3.0' bgs.	
	580				0.0				
5					0.0				
		1	5-8	3.5	0.0	X		Black fine to coarse SAND and fine to coarse angular to sub angular Gravel, trace Wood, burnt-like odor, wet.	
					0.0				
	575				167			Red BRICK, trace dark gray to black fine to coarse Sand, Concrete and Slag, mild coal tar-like odor, wet.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.5 bgs)
10		2	8-12	3.5	204				
					318				
					113				
					160			Gray SILT, trace fine to medium angular to sub angular Gravel, very stiff, non-plastic, mild coal tar-like odor, moist.	
	570	3	12-16	3.0	84.6				
15					222				

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Samples were collected and analysed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-8) (17.5-18.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen.

Client: National Fuel

Well/Boring ID: SB-20

Borehole Depth: 18.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	16-18.5	2.0	71.6 0.0 0.0	X			Backfilled boring to grade with Cement/Bentonite Grout (0.5-18.5 bgs)
	565							Refusal at 18.5' bgs.	
20									
	560								
25									
	555								
30									
	550								
35									

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Infrastructure, environment, buildings

Remarks: bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; SS = Split Spoon.

Samples were collected and analysed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-8) (17.5-18.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen.

Date Start/Finish: 10/2 & 10/9/2013
Drilling Company: Parratt-Wolff
Driller's Name: Wayne Nielson
Drilling Method: Direct Push/Air Knifed
Sampling Method: 4' x 2" Macro Core
Auger Size:
Rig Type: Truck Mounted Ingersoll Rand
Rig Type 2

Northing: 906460.8262
Easting: 945018.7388
Casing Elevation: NA

Borehole Depth: 18' bgs
Surface Elevation: 583.76

Descriptions By: Levia Terrell

Well/Boring ID: **SB-21**

Client: National Fuel

Location: Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
585								
0				0.0			Black ASPHALT. Hand cleared to 5' bgs.	Backfilled with Asphalt (0-0.5' bgs)
				0.0			Brown fine to medium SAND, some coarse Sand, little fine to coarse Gravel, trace Silt, red Brick and Glass, moist.	
	NA	0-5	NA	0.0				
580				0.0				
5				0.0	X			
	1	5-8	2.0	0.0			Brown SILT, little fine to coarse angular to sub round Gravel, trace Clay, red Brick, fine to coarse Sand, loose, mild coal tar-like odor, burnt-like odor, wet.	
				0.0				
575				0.0			Brown gray and black SILT and CLAY, trace fine to coarse sub angular to angular Gravel, red Brick and Wood, mild coal tar-like odor, and mild burnt-like odor, wet.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18' bgs)
10	2	8-12	2.0	0.0				
				0.0				
				0.0				
				0.0			Gray SILT, trace fine to coarse angular to sub angular Gravel, mild coal tar-like odor and mild unknown odor, moist.	
570	3	12-16	4.0	0.0				
15				0.0				
				0.0				

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6), (17-18).

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: **SB-21**

Borehole Depth: 18' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18	2.0	0.0 0.0	×		Gray SILT, trace fine to coarse angular to sub angular Gravel, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18' bgs)
565							Refusal at 18' bgs.	
20								
560								
25								
555								
30								
550								
35								

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-6), (17-18).

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/2 & 10/9/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Hand Auger **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906517.1611 **Easting:** 945036.8964 **Casing Elevation:** NA **Borehole Depth:** 18' bgs **Surface Elevation:** 583.63 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-22** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York	

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
585							
0				0.0		Brown SILT, little fine to medium Sand, trace fine to coarse Gravel, coarse Sand, and Organics (grass and roots) between 0-0.2' bgs, moist. Hand cleared to 5' bgs.	Backfilled with Asphalt (0-0.5' bgs)
				0.0			
	NA	0-5	NA	0.0		Light brown, tan and gray Clayey SILT, mottled, slight plasticity, stiff, moist.	
580				0.0			
				0.0			
5				0.0		Light brown, tan, and gray Clayey SILT, trace fine to coarse round to sub angular Gravel, mild coal tar-like odor, black between 5.5-5.6' bgs, moist.	
	1	5-8	2.0				
				0.0		Gray, tan and light olive brown SILT and CLAY, trace fine angular Gravel, mottled, mild coal tar-like odor, black streaks < 3mm thick between 5.6-5.7' bgs, slight plasticity, soft, moist.	
575				0.0		Gray and light olive brown SILT and CLAY, black streaks < 3mm thick between 8.3-8.4' bgs, low plasticity, soft, mild coal tar-like odor, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18' bgs)
10	2	8-12	3.3	0.0		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, moist.	
				0.0			
				0.0		Soft.	
570				0.0			
	3	12-16	4.0	0.0		Gray fine to medium SAND, trace coarse Sand and fine sub round Gravel, mild coal tar-like odor, wet.	
15				0.0		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, very stiff, moist.	

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-5) (17-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.0-18.0' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations. Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-22

Borehole Depth: 18' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-18	2.0	0.0 0.0		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, very stiff, between 16.5-16.7' bgs mild unknown odor, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-18' bgs)
565						Refusal at 18' bgs.	
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

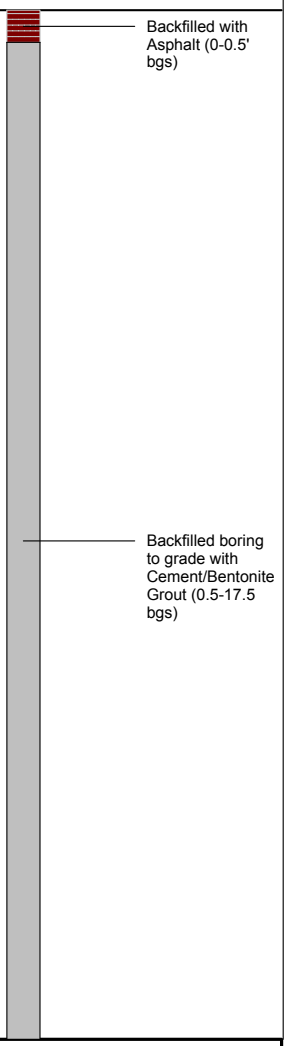
Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-5) (17-18).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (8.0-18.0' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/2 & 10/9/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Hand Auger **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906470.2038 **Easting:** 945045.1247 **Casing Elevation:** NA **Borehole Depth:** 17.5' bgs **Surface Elevation:** 583.46 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-23** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
585						
0				0.0		Black ASPHALT. Hand cleared to 5' bgs.
				0.0		Brown SILT, little fine to medium Sand, trace fine to coarse Gravel, Slag, red Brick and coarse Sand, moist.
				0.0		Light brown, tan, and gray Clayey SILT, slight plasticity, stiff, moist.
	NA	0-5	NA	0.0		
580				0.0		
5				0.0		
	1	5-8	4.0	0.0		Light brown, tan, and gray Clayey SILT, mottled, slight plasticity, very stiff, moist.
				0.0		Gray SILT and CLAY, low plasticity, very stiff, moist.
575				0.0		Gray SILT, trace fine to coarse angular to sub angular Gravel, non-plastic, very stiff, moist.
10	2	8-12	2.5	0.0		
				0.0		
				137		Odor uknown.
570				97.4		Gray fine SAND and SILT, non-plastic, stiff, odor unknown, wet.
	3	12-16	3.7	156		
15				265		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, very stiff, odor unknown, moist.



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (15-16) (16.5-17.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.5-17.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations. Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-23

Borehole Depth: 17.5' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-17.5	1.5	23.1 0.0 0.0		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, very stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-17.5 bgs)
						Refusal at 17.5' bgs.	
565							
20							
560							
25							
555							
30							
550							
35							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

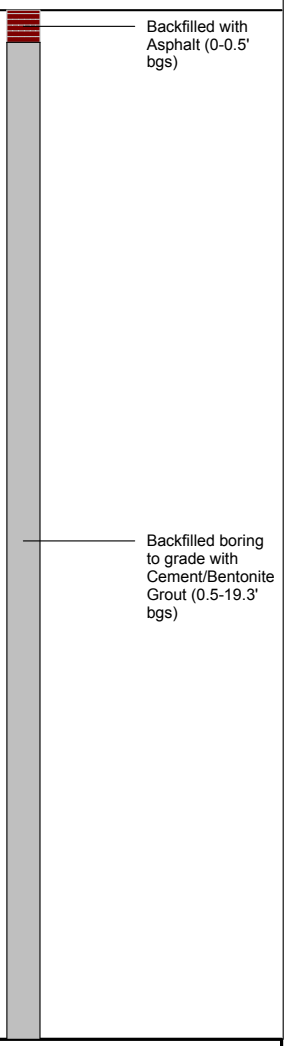
Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (15-16) (16.5-17.5).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (7.5-17.5' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/2 & 10/9/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Hand Auger **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906424.1997 **Easting:** 945028.2732 **Casing Elevation:** NA **Borehole Depth:** 19.3' bgs **Surface Elevation:** 584.96 **Descriptions By:** Levia Terrell	**Well/Boring ID:** **SB-24** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	585						
		NA	0-5	NA	0.0 0.0 0.0 0.0 0.0		Black ASPHALT. Hand cleared to 5' bgs. Brown fine to medium SAND, little fine to coarse Gravel, trace coarse Sand, Silt, red Brick and Glass, moist.
5	580	1	5-8	2.2	0.0 0.0 0.0		Brown SILT and yellow and red BRICK, trace fine to coarse sub angular to angular Gravel, fine to coarse Sand, green Plastic, wet. Gray, light olive brown and tan Clayey SILT, mottled, slight plasticity, very stiff, moist.
10	575	2	8-12	4.0	0.0 0.0 0.0		Brownish gray, gray reddish brown CLAY and SILT, mottled, medium plasticity, stiff, moist. Gray SILT, trace fine to medium sub angular Gravel, non-plastic, stiff, moist.
15	570	3	12-16	4.0	0.0 0.0 0.0 0.0		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, stiff, moist.



Well/Boring Construction

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-8 (BD-100913-2)) (17.3-19.3 (BD-100913-1)).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (9.3-19.3' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-24

Borehole Depth: 19.3' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-19.3	3.3	0.0 0.0 0.0		Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-19.3' bgs)
20 565						Refusal at 19.3' bgs.	
25 560							
30 555							
35 550							

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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

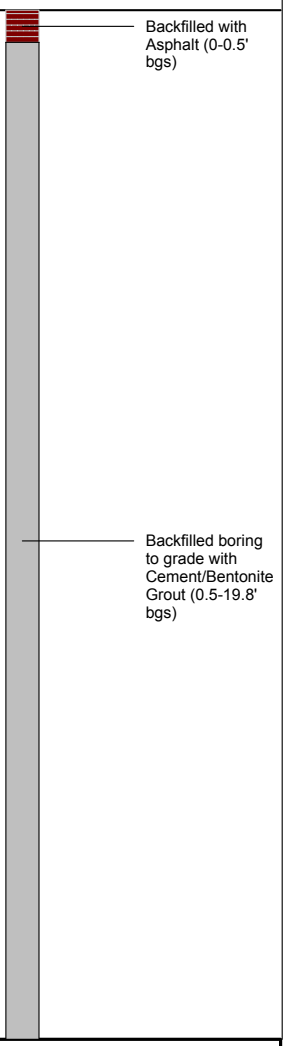
Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-8 (BD-100913-2)) (17.3-19.3 (BD-100913-1)).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (9.3-19.3' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Date Start/Finish: 10/3 & 10/9/2013 **Drilling Company:** Parratt-Wolff **Driller's Name:** Wayne Nielson **Drilling Method:** Direct Push/Hand Auger **Sampling Method:** 4' x 2" Macro Core **Rig Type:** Truck Mounted Ingersoll Rand **Auger Size:**	**Northing:** 906418.7543 **Easting:** 944962.6997 **Casing Elevation:** NA **Borehole Depth:** 19.8' bgs **Surface Elevation:** 585.21 **Descriptions By:** Levia Terrell	**Well/Boring ID: SB-25** **Client:** National Fuel **Location:** Former MGP Site National Fuel Service Center Dunkirk, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	585	NA	0-5	NA	0.0 0.0 0.0		Black ASPHALT. Hand cleared to 5' bgs. Brown fine to coarse GRAVEL, some fine to medium Sand, trace coarse Sand and Silt, moist.
					0.0 0.0		Gray, light brown and tan Clayey SILT, slight plasticity, stiff, moist, wet at 4.5' bgs.
5	580	1	5-8	3.3	0.0 0.0 0.0		Reddish brown and gray Clayey SILT, slight plasticity, very stiff, moist.
		2	8-12	4.0	0.0 0.0 0.0 0.0		Gray SILT and CLAY, low plasticity, soft, moist.
10	575	3	12-16	4.0	0.0 0.0 0.0 0.0		Gray SILT, trace fine to coarse sub angular Gravel, non-plastic, stiff, moist.
15	570						



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Remarks: bgs = below ground surface; NA = Not Applicable/Available; SS = Split Spoon.

Samples were collected and analyzed for TCL VOCs, TCL SVOCs and Total Cyanide at the following intervals; (4-8), (18.8-19.8).

Temporary piezometer was installed using 1" Schedule 40 PVC 0.01" Slot Screen. Native Material was allowed to collapse around the well screen (9.8 -19.8' bgs). Using a 1" bailer a grab ground water sample was collected and submitted for TCL VOCs after one well volume was removed.

North Orientation Based on NYS Plane Coordinate System (NAD 83) obtained from GPS observations.
Vertical Datum based on NAVD 1988 from GPS observations.

Client: National Fuel

Well/Boring ID: SB-25

Borehole Depth: 19.8' bgs

Site Location:
Former MGP Site
National Fuel Service Center
Dunkirk, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	4	16-19.8	3.8	0.0 0.0 0.0 0.0		Gray SILT, trace fine to coarse sub angular Gravel, non-plastic, stiff, moist. Gray fine SAND and SILT, non-plastic, soft, wet. Gray SILT, trace fine to coarse sub angular to angular Gravel, non-plastic, stiff, moist.	Backfilled boring to grade with Cement/Bentonite Grout (0.5-19.8' bgs)
20 / 565						Refusal at 19.8' bgs.	
25 / 560							
30 / 555							
35 / 550							

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