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ENVIRONMENT

Ms. Elizabeth B. Lukowski
Engineering Geologist
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
Off-Site Monitoring Well Groundwater Sampling Results

Date:
October 5, 2012

Contact:
Scott A. Powlin

Phone:
315 671 9456

Email:
Scott.Powlin@arcadis-us.com

Our ref:
B0023301 #8

Dear Ms. Lukowski:

On behalf of National Fuel (NFG), this letter presents the results of recent field activities completed in connection with the Site Characterization (SC) of the former manufactured gas plant (MGP) site located at 31 West 2nd Street in Dunkirk, New York. The field activities consisted of the installation and subsequent groundwater sampling of two off-site monitoring wells (MW-7 and MW-8) in accordance with scope of work detailed in NFG's February 22, 2012 letter to the New York State Department of Environmental Conservation (NYSDEC). The NYSDEC approved the scope of work as documented in a March 8, 2012 e-mail to ARCADIS. The purpose of the two off-site monitoring wells (MW-7 and MW-8) was to attempt to define the downgradient extent of elevated volatile organic compound (primarily benzene) concentrations detected in on-site groundwater in the MW-1 area and determine whether the dissolved-phase plume is migrating off site.

Field Activities

Monitoring wells MW-7 and MW-8 were installed on June 11 and 12, 2012 at the locations shown on Figure 1. These new wells were installed in the City Rights of Way (ROWs) at the intersection of West 2nd Street and Eagle Street. Monitoring wells MW-7 and MW-8 were installed and developed using the same methods previously used to install monitoring wells MW-1 through MW-6. Prior to monitoring well installation, a vacuum-excavation truck was used to clear each monitoring well location to approximately 5 feet below grade. Upon clearing each location, the monitoring well borings were drilled using conventional 4.25-inch inner diameter hollowed-stem auger (HSA) drilling techniques and continuous split-spoon sampling. Soil samples were collected continuously from the borings for visual characterization and headspace-screening with a photoionization detector (PID).

Monitoring well screens were installed at the approximate same depth as the monitoring wells previously installed at the site - on the bedrock surface, which was

encountered at 18.5 feet below grade at MW-7 and 19 feet below grade at MW-8. Both monitoring well screens were constructed using 10-foot long, 10-slot, and 2-inch diameter schedule 40 PVC. The filter pack material, consisting of Grade #0 sand, was installed to approximately two feet above the well screens. An approximate two-foot thick hydrated bentonite seal was placed on top of the filter pack, and the remaining annular space was filled with cement/bentonite grout up to approximately 1-foot below grade. Each well was secured at the surface with an 8-inch diameter, flush-mounted curb box. Approximately 24 hours after installation, the monitoring wells were developed using a surging/bailing technique. Well development resulted in removal of approximately 10.5 well volumes from MW-7 and nine well volumes from MW-8. Please refer to the monitoring well installation logs in Attachment A for more details regarding the well construction and the characteristics of the soils encountered during the installations.

Groundwater samples were collected from MW-7 and MW-8 on August 28, 2012. Samples were collected using low-flow sampling techniques, and were submitted for analysis of Target Compound List (TCL) VOCs, TCL semi-VOCs (SVOCs), and total cyanide. A comprehensive round of water-level measurements was also obtained at all site monitoring wells during the sampling event. Water table contours for the August 28th round of water levels are provided on Figure 1. A comprehensive summary of groundwater sampling results for all groundwater samples collected during the SC is provided in Table 1 and on Figure 2.

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)
- DNAPL Contingency Plan (DCP)
- Community Air Monitoring Plan (CAMP)

As described in the QAPP, 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 Table 1 and Figure 2.

Results

Visual or olfactory impacts were not observed in soil samples recovered from either monitoring well boring. PID readings were non-detect for all sampling intervals, with the exception of the 13 to 15 feet below grade sample collected from the MW-7

boring – PID readings of 3.4 and 3.9 parts per million (ppm) were measured in sand seams located within this interval. As shown in Table 1 and on Figure 2, the groundwater samples collected from MW-7 and MW-8 contained concentrations of benzene at 7,800 and 380 micrograms per liter (ug/L), respectively, which exceed the NYSDEC Class GA Standard of 1 ug/L. The only other compound detected above its Class GA Standard at MW-7 and MW-8 was phenol – the Standard is 1 ug/L. Phenol was detected at 17 ug/L at MW-7 and at an estimated concentration of 2.9 ug/L at MW-8. As shown on Figure 1, monitoring wells MW-7 and MW-8 are located downgradient from the MW-1 area. In addition, the chemical fingerprint (i.e., high levels of benzene relative to other VOCs) is similar to the fingerprint of samples collected in the MW-1 area. For these reasons, NFG believes the constituents detected in groundwater at MW-7 and MW-8 likely originate from the same source as those constituents detected in the MW-1 area.

Path Forward

Although the February 22, 2012 letter work plan proposed a second round of sampling form monitoring wells MW-7 and MW-8 prior to making decisions regarding the future of the site, NFG believes there is sufficient information for evaluating a path forward for the site right now. As such, NFG proposes to hold a meeting with the NYSDEC within the new few weeks to discuss a path forward for the project. NFG believes additional investigation is warranted given the findings at monitoring wells MW-7 and MW-8; however, NFG feels it would be more constructive to discuss these findings and a path forward for the site during a face-to-face meeting. 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 meeting.

Sincerely,

ARCADIS of New York, Inc.

Scott A. Powlin
Sr. Geologist

Attachment

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

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Table

TABLE 1
GROUNDWATER SAMPLE RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
SITE CHARACTERIZATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	NYDEC 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
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
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
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]**	NA	NA	**719 J**	NA	**324 J**	NA	20.0 UJ	NA	NA	NA
Cyanide	0.2	mg/L	NA	**0.0140 J**	NA	NA	**0.560 J**	NA	**0.400 J [0.160 J]**	NA	R	0.00500 U	0.00500 U [0.00500 U]
Hydrocarbons													
Diesel Range Organics [C10-C28]	- -	mg/L	NA	NA	**0.62**	NA	NA	NA	NA	NA	NA	NA	NA

See Notes on Page 3.

TABLE 1
GROUNDWATER SAMPLE RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
SITE CHARACTERIZATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Location ID: Sample Depth(Feet): Date Collected:	NYDEC 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
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
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
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
Acetone	50	ug/L	1,000 U [1,000 U]	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
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**
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
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
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**
Indane	- -	ug/L	NA	NA	**26**	**50**	**41**	10 U	10 UJ	4.0 U	10 UJ	2.0 U	2.0 U
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
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
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
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
Naphthalene	10	ug/L	NA	NA	**11**	**30**	**23**	10 U	**13 J**	4.0 U	10 UJ	2.0 U	2.0 U
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
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
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
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
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
Xylenes (total)	5	ug/L	200 U [200 U]	**3.3 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total BTEX	- -	ug/L	NA	NA	**43**	**67**	**100**	**5,400**	**4,300 J**	**3,700**	**5,100**	ND	**56**
Total VOCs	- -	ug/L	NA	NA	**43**	**67**	**100**	**5,400**	**4,300 J**	**3,700**	**5,100**	ND	**56**
Semivolatile Organics													
2-Methylnaphthalene	- -	ug/L	4.7 U [5.0 U]	5.0 U	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
4-Methylphenol	1	ug/L	9.4 U [10 U]	9.9 U	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
Anthracene	50	ug/L	4.7 U [5.0 U]	5.0 U	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
Carbazole	- -	ug/L	4.7 U [5.0 U]	5.0 U	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
Di-n-butylphthalate	50	ug/L	4.7 U [5.0 U]	5.0 U	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
Phenanthrene	50	ug/L	4.7 U [5.0 U]	5.0 U	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
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
Cyanide	0.2	mg/L	**0.00670 J [0.00970 J]**	**0.00870 J**	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons													
Diesel Range Organics [C10-C28]	- -	mg/L	NA	NA	**2.9**	1.6 UB	**1.6 B**	**0.56**	0.83 UB	**0.51**	0.47 UB	NA	**0.46 J**

See Notes on Page 3.

TABLE 1
GROUNDWATER SAMPLE RESULTS - DETECTED COMPOUNDS

NATIONAL FUEL
SITE CHARACTERIZATION
DUNKIRK FORMER MANUFACTURED GAS PLANT SITE
DUNKIRK, NEW YORK

Qualifier Type	Lab Qualifiers	Definition
Inorganic	J	Indicates an estimated value.
Inorganic	R	Rejected.
Inorganic	U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Organic	B	Analyte was also detected in the associated method blank.
Organic	D	Compound quantitated using a secondary dilution.
Organic	J	Indicates an estimated value.
Organic	ND	None detected.
Organic	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 NYSDEC Class GA Standards or Guidance Values.
Detected values are in bold.

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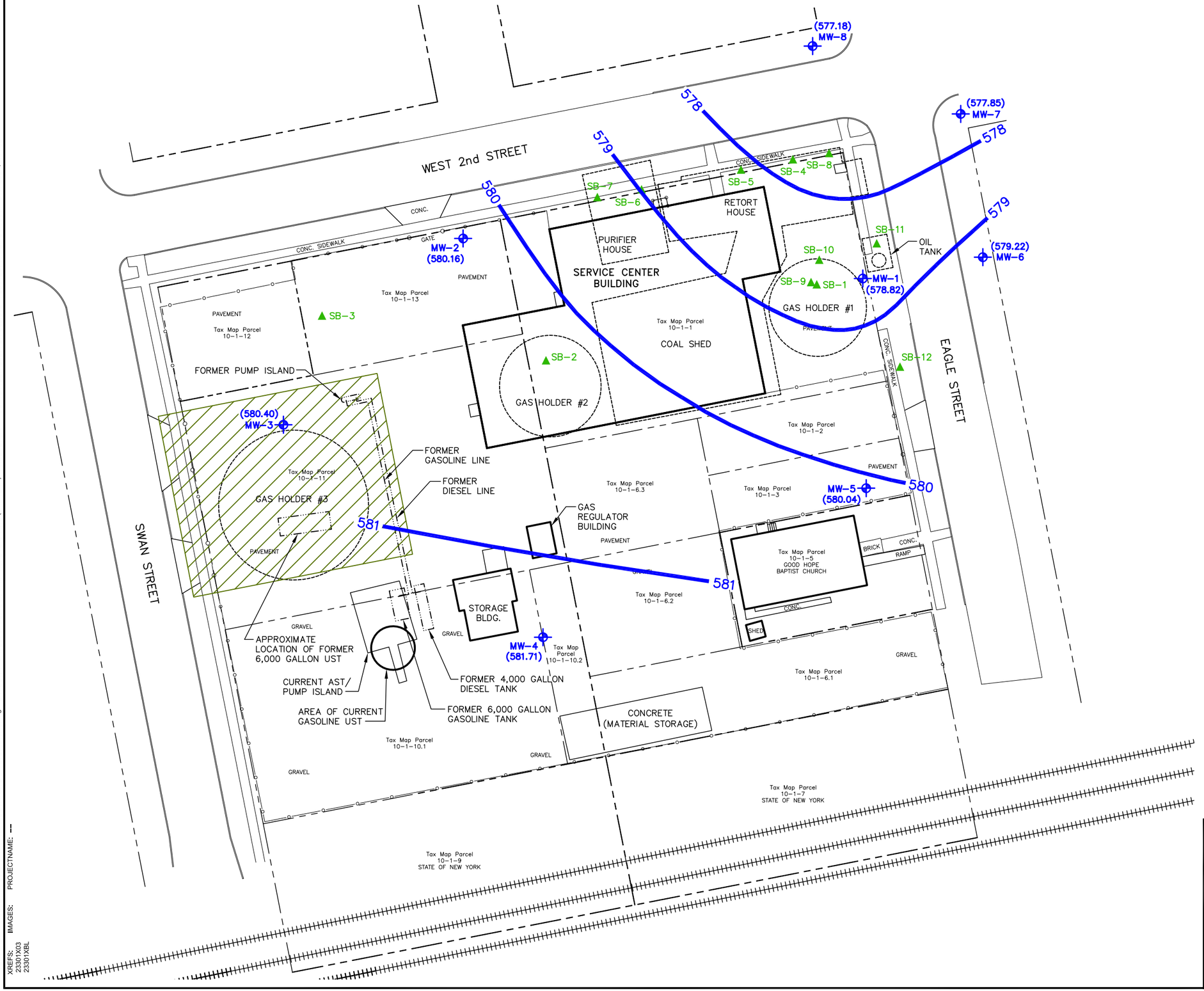
Figures



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
- 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.
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.
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
SITE CHARACTERIZATION

WATER TABLE CONTOURS - 8/28/12

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FIGURE
1

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*
G:\ENVCAD\SYRACUSE\ACTIB\023301\000\100002\DWG\SITE-CHAR\23301W02.dwg LAYOUT: 1 SAVED: 10/3/2012 3:01 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/3/2012 3:03 PM BY: ALLEN, ROYCE
XREFS: 23301X03 23301XBL IMAGES: PROJECTNAME: ---

MW-2		
Date	9/9/2010	6/20/2011
Total BTEX	ND	ND
Total PAHs	0.45 J	ND
Total Cyanide	719 J	560 J
Free Cyanide	NA	5.0 UB

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

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

MW-8	
DATE	8/28/2012
Total BTEX	386.6
Total PAHs	ND
Total Cyanide	0.67 J

MW-7	
DATE	8/28/12
Total BTEX	7,800 [6,800]
Total PAHs	ND [ND]
Total Cyanide	0.67 J [0.97 J]

MW-6	
Date	9/13/2011
Total BTEX	ND [ND]
Total PAHs	ND [ND]
Total Cyanide	5.0 U [5.0 U]

MW-3		
Date	9/9/2010	6/20/2011
Total BTEX	111	143 [142]
Total PAHs	5.2 J	2.98 J [1.2 J]
Total Cyanide	324 J	400 J [160 J]
Free Cyanide	NA	5.0 UB [1.10 U]

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

MW-1		
Date	9/9/2010	6/20/2011
Total BTEX	28,086 J [25,087 J]	17,042.7 J
Total PAHs	0.58 J [0.98 J]	1.99 J
Total Cyanide	23.0 J [25.2 J]	14 J

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

MW-5	
Date	9/13/2011
Total BTEX	ND
Total PAHs	ND
Total Cyanide	5.0 U

MW-4		
Date	9/9/2010	6/20/2011
Total BTEX	7.1 J	0.55 J
Total PAHs	ND	ND
Total Cyanide	20.0 UJ	R

WEST 2nd STREET
SWAN STREET
EAGLE STREET
CONC. SIDEWALK
CONC.
GATE
PAVEMENT
METAL POLE O
RETORT HOUSE
PURIFIER HOUSE
SERVICE CENTER BUILDING
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.
FUEL VENT
CURRENT AST/ PUMP ISLAND
AREA OF CURRENT GASOLINE UST
FORMER 4,000 GALLON DIESEL TANK
FORMER 6,000 GALLON GASOLINE TANK
CONCRETE (MATERIAL STORAGE)
GOOD HOPE BAPTIST CHURCH
BRICK
RAMP
SHED
GRAVEL
Tax Map Parcel 10-1-11
Tax Map Parcel 10-1-13
Tax Map Parcel 10-1-12
Tax Map Parcel 10-1-1
Tax Map Parcel 10-1-2
Tax Map Parcel 10-1-6.3
Tax Map Parcel 10-1-3
Tax Map Parcel 10-1-5
Tax Map Parcel 10-1-6.2
Tax Map Parcel 10-1-10.2
Tax Map Parcel 10-1-6.1
Tax Map Parcel 10-1-10.1
Tax Map Parcel 10-1-9 STATE OF NEW YORK
Tax Map Parcel 10-1-7 STATE OF NEW YORK
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
SB-1
SB-2
SB-3
SB-4
SB-5
SB-6
SB-7
SB-8
SB-9
SB-10
SB-11
SB-12

LEGEND:

- SOIL BORING
- MONITORING WELL
- 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 FORM 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
SITE CHARACTERIZATION

GROUNDWATER ANALYTICAL RESULTS

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FIGURE 2

CITY: SYRACUSE, N.Y. DN/GROUP: ENV/IM-DIV DB: L. POSENAUER, L. FORAKER, R. ALLEN LD: PIC: PM: S. POWLIN TM: S. POWLIN LYR: ON=*; OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0023301\0001\0000\2\DWG\SITE-CHAR\23301C02.dwg LAYOUT: 2 SAVED: 10/3/2012 3:07 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/3/2012 3:07 PM BY: ALLEN, ROYCE
XREFS: IMAGES: PROJECTNAME: ---
23301X03
23301XBL

Attachment A

Monitoring Well Installation Logs

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

Northing: 906575.42
Easting: 945093.12
Casing Elevation: 583.50

Borehole Depth: 18.5' bgs
Surface Elevation: 583.79

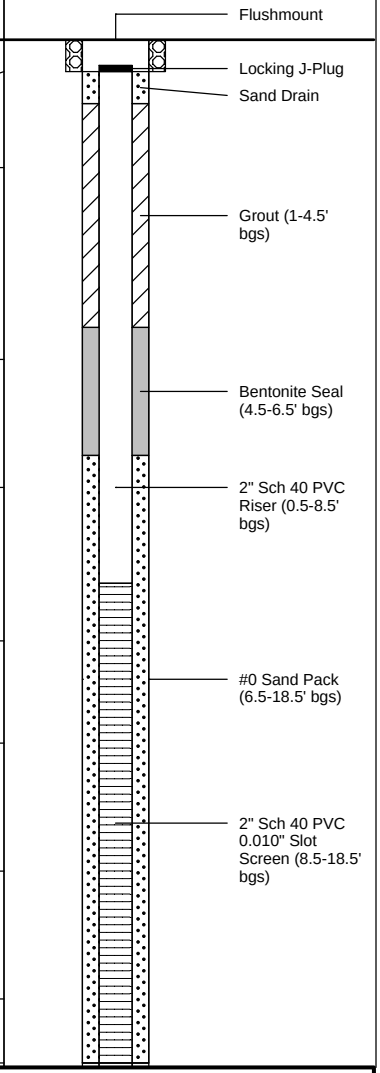
Descriptions By: Levia Terrell

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	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	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.
5	-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.
							Stiff.
10	-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.
		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	-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	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	17-19	1.2	0.0			#0 Sand Pack (6.5-18.5' bgs)
						Refusal at 18.5' bgs.	
20 -20							
25 -25							
30 -30							
35 -35							

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

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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

Northing: 906610.43
Easting: NA
Casing Elevation: 583.16

Borehole Depth: 19' bgs
Surface Elevation: 583.55

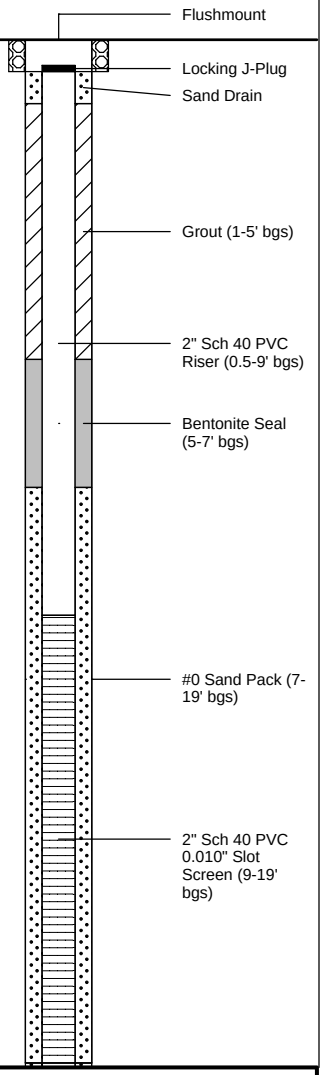
Descriptions By: Levia Terrell

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	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
0	0						
		NA	0-5	NA	0.0		Brown SILT, little fine Sand, trace fine to coarse Gravel, Cobble, and Organics, moist. Air knifed 0-5' bgs.
							Grey Silty CLAY, trace fine to coarse Gravel. moist.
5	-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.
10	-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.
		5	13-15	1.8	0.0		Gray SILT, trace fine to coarse Gravel, non plastic, soft, moist to dry.
15	-15	6	15-17	0.7	0.0		Gray coarse GRAVEL (fractured Rock), dry.



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

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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	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	6	15-17	0.7	0.0		Gray coarse GRAVEL (fractured Rock), dry.	
						Gray brown Clayey SILT, mottled, slightly plastic, stiff, moist.	
	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.	2" Sch 40 PVC 0.010" Slot Screen (9-19' bgs) #0 Sand Pack (7-19' bgs)
						Refusal at 19' bgs.	
20 -20							
25 -25							
30 -30							
35 -35							

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