ARCADIS of New York, Inc.
6723 Towpath Road
PO Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.446.8053
www.arcadis-us.com

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
Scope of Work for Benzene Source Investigation

Date:
March 25, 2014

Contact:
Scott A. Powlin

Phone:
315.671.9456

Email:
Scott.Powlin@arcadis-us.com

Our ref:
B0023301

Dear Mr. Wu:

On behalf of National Fuel Gas Distribution Corporation (NFG), ARCADIS is pleased to present this proposed Scope of Work (SOW) for investigating the source of a benzene plume at the former manufactured gas plant (MGP) site located at 31 West 2nd Street in Dunkirk, New York. The general elements of this SOW were discussed during the March 7, 2014 meeting between the New York State Department of Environmental Conservation (NYSDEC), New York State Department of Health (NYSDOH), NFG, and ARCADIS. The purpose of the meeting was to discuss the results of the Remedial Investigation (RI) activities conducted to date and agree upon a general approach for investigating the source of a benzene plume emanating from the area of former Holder #1 in the eastern portion of the site. The meeting was attended by Ms. Tanya Alexander of NFG, Mr. Gardiner Cross and Mr. William Wu of the NYSDEC, Mr. Nathan Freeman of the NYSDOH, and Mr. Terry Young and Mr. Scott Powlin of ARCADIS.

During the meeting, NFG and the NYSDEC discussed and agreed that the SOW would consist of investigations inside and outside of the Service Center building (building), focusing on areas adjacent to former Holder #1 where elevated levels of dissolved-phase benzene have been detected in groundwater. As discussed during the meeting, the interior investigation will consist of drilling soil borings, installing temporary well clusters, and collecting soil and groundwater samples for chemical testing, and the exterior investigation will consist of excavating a trench along the perimeter of the former holder and collecting soil samples for chemical testing. The primary objective of the investigations is to put forth a best effort attempt to determine the source of the benzene plume, which is suspected to be non-aqueous phase liquid (NAPL) and/or structures containing NAPL (e.g., condensate drip or tar well). This SOW provides details regarding National Fuel's proposed approach for implementing these investigations. The proposed approach is presented below and proposed investigation locations are shown on Figure 1.

Interior Investigations

NFG proposes to drill soil borings, install temporary wells, and collect soil and groundwater samples inside the building to investigate the source and upgradient extent of the benzene plume. The details for these investigations are provided below.

Source Soil Borings/Temporary Well Clusters

Up to four borings (SB-28 through SB-31) are proposed near and hydraulically upgradient from a previous boring (SB-15) where 33,000 micrograms per liter (ug/L) of benzene were detected in a grab groundwater sample obtained from a temporary well installed in the boring (Figure 1). The borings will be drilled in a phased approach whereby the outer borings (the borings to bracket the area – SB- 28 and SB-29) are drilled first. Once these borings are drilled, visual observations will dictate the need and position of the additional borings (SB-30 and SB-31) in this area. As an example, if NAPL is encountered in the initial outer borings (SB-28 and SB-29), the two inner borings (SB-30 and SB-31) will be re-positioned to delineate the tar observed in the initial borings. Each boring will be drilled to bedrock, unless refusal is encountered prior to reaching bedrock. Note that refusal (assumed bedrock surface) was encountered with direct-push drilling equipment at approximately 18.5 feet below ground surface (bgs) at SB-15. As such, these borings are expected to extend to approximately 18 to 20 feet bgs. A minimum of two soil samples will be collected from each boring for laboratory analysis for Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-VOCs (SVOCs), and total cyanide. Samples for laboratory analysis will be preferentially selected from soil intervals exhibiting potential visual and/or olfactory impacts, and/or photoionization detector (PID) readings. One of the samples will be collected from the soil interval above the bedrock surface.

If NAPL is not observed in any of the above borings, temporary well clusters are proposed to be installed in two of the borings to provide data regarding the vertical distribution of dissolved-phase benzene and vertical hydraulic gradients within the overburden. The borings selected for temporary well installation will be selected based on visual and olfactory observations, and/or PID readings. Temporary well clusters will be installed using schedule 40 polyvinyl chloride (PVC) material and 5-foot long, 0.010-inch slotted well screens. Temporary well clusters will consist of one 5-foot screen section installed near the bottom of the boring within the lower silt unit (i.e., within the 10 to 20 feet bgs range) and another 5-foot screen section installed near the water table within the fill and/or upper silt and clay unit (i.e., with the 2 to 8 feet bgs range). Filter sand will be placed around each well screen and a minimum 2-foot hydrated bentonite seal will be emplaced between well screens.

NFG recognizes that additional (contingent) soil borings/temporary well clusters may be required to attempt to locate the source of the benzene plume. As such, based on field observations and the grab groundwater sample analytical results (discussed below), additional contingent soil borings/temporary well clusters will be drilled/installed until the source is found (to the extent practicable). We have assumed a maximum of five contingent borings may be required to define the source of benzene and that temporary well clusters will be installed in two of the contingent borings (if NAPL is not observed).

Upgradient Soil Borings/Temporary Well Clusters

Two additional soil borings (SB-26 and SB-27) and two temporary well clusters are proposed to be installed approximately 50 feet west of former Holder #1 (Figure 1). The purpose for these borings/temporary wells is to define the upgradient extent of the benzene plume. These borings/temporary wells will be installed using the same approach and sampling scheme described above for the source delineation borings/temporary wells. Temporary well clusters will be installed at these locations regardless of observed NAPL presence at the source soil boring locations.

Groundwater Sampling and Vertical Hydraulic Gradient Assessment

Grab groundwater samples will be collected from temporary well clusters for laboratory analysis for TCL VOCs. Samples will be collected using new, disposable polyethylene bailers to purge a minimum of one well volume of water prior to collecting the sample. Groundwater samples will be analyzed on an expedited basis so that sampling results will be received prior to demobilization. The five additional borings/temporary wells (discussed above) will be installed based on the results of samples collected from the initial temporary well clusters (i.e., at SB-26 through SB-31). Groundwater samples collected from the contingent temporary wells will be analyzed on a standard turnaround time.

Water levels will be measured at the temporary well clusters relative to the floor surface of the building once static conditions have been reached (if possible). This information will be valuable for assessing vertical hydraulic gradients in the overburden which, in turn, will be useful for evaluating groundwater flow patterns and migration pathways for dissolved-phase benzene.

Drilling Methods

Soil borings will be drilled using the same methods previously employed at the site. Prior to setting up with a drilling rig, the concrete floor will be cored or saw cut and a vacuum-excavation truck or hand-clearing will be used to clear each boring location

to approximately 5 feet below grade. NFG is planning that each location be cleared using this method as an added safety measure to avoid conflicts with below grade utilities during the drilling activities. The hand-clearing will be completed in addition to the DigSafely NY call-in.

Upon clearing each location, the soil borings will be drilled using conventional 3.25-inch inner diameter hollowed-stem auger (HSA) drilling techniques. Soil samples will be collected continuously using either split-spoon samplers or Geoprobe-like sampling equipment (i.e., 4-foot macrocore with plastic liners). Soil samples will be segmented into two-foot intervals for visual characterization and headspace-screening with a PID. Temporary wells will be installed in several of the borings as described above. Soil borings (without temporary wells) will be abandoned by tremie-grouting to grade with a cement/bentonite grout. Soil borings (with temporary wells) will be abandoned by filling temporary wells with a cement/bentonite grout, pulling the well materials, then topping off the boring with cement/bentonite grout to just below the concrete floor of the building. The concrete floor at each boring location will be repaired using a concrete/aggregate mix and hand troweling the repair patch to match the floor surface.

Exterior Investigations

NFG proposes to excavate one test trench along the outside wall of former Holder #1 to investigate the source the elevated benzene concentrations in groundwater observed near this portion of the holder and to gather additional information regarding the construction of the former holder. The details for these investigations are provided below.

Test Trench

One test trench is proposed to be excavated on the outside of the holder as shown on Figure 1. The test trench will be approximately 80 feet in length and will extend to approximately 15 feet bgs adjacent to the outside wall of the holder. To ensure the structure of the building is not compromised, the ends of the trench will terminate approximately 20 feet from the building. The trench will be excavated as a series of mini-trenches, focusing on the area near the location of previous borings where benzene was detected in grab groundwater samples at elevated levels (i.e., SB-18 [24,000 ug/L], SB-19 [10,000 ug/L, and SB-23 [37,000 ug/L]). Each mini-trench will be approximately 10 feet in length by 3 feet in width. Excavating mini-trenches as opposed to one long trench will allow for a controlled excavation, thereby easing water management and minimizing disruption and dangers from sidewall instability (if it occurs).

The test trenching will be conducted in a portion of the driveway/parking lot of the Service Center located near the main entrance to the facility that is subject to regular truck traffic. Given the nature of the materials to be removed from the trench (saturated and consisting of variable materials) the excavated soils may not be able to be adequately compacted to minimize settlement of the driveway areas. ARCADIS is currently evaluating the method for backfilling the test trench to minimize long-term maintenance of the test pit area resulting from normal consolidation of backfill materials (i.e., slumping) after the fieldwork is completed. ARCADIS will notify the NYSDEC of the proposed approach for backfilling within approximately one week prior to mobilization.

NFG plans to collect at least one soil sample from each mini-trench for laboratory analysis for TCL VOCs, TCL SVOCs, and total cyanide. Samples for laboratory analysis will be preferentially selected from soil intervals exhibiting potential visual and/or olfactory impacts, and/or PID readings. Samples will be collected directly from the excavator bucket.

Field Methods and Analytical Protocol

The field activities described in this SOW will be conducted in accordance with the procedures detailed in the NYSDEC-approved Site Characterization (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)

A Community Air Monitoring Plan (CAMP) will also be implemented during test trenching activities. The CAMP monitoring will be performed in accordance with the NYSDEC-approved CAMP that was submitted to the NYSDEC on March 6, 2012.

As described in the QAPP, analytical samples will be 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 will be prepared and the results of the DUSR will be incorporated into data tables prepared for the project.

Survey

The location and ground surface elevation of the soil borings and corners of the test trench will be surveyed after the drilling and excavation work has been completed. Consistent with the previous survey work at the site, horizontal coordinates will be tied to New York State Plane Central (3102) coordinate system (NAD 83), and all elevations will be established with respect to NAVD 1988.

Waste Management

Investigation-derived waste (IDW) generated from the drilling and trenching will be containerized for appropriate characterization and disposal. Wastes will be segregated by waste type and placed in Department of Transportation (DOT)-approved 55-gallon steel drums, tanks, and/or roll-offs. Field staff will maintain an inventory of all waste vessels and will appropriately label each container with the contents, generator, location and date. NFG will coordinate off-site disposal of waste materials upon completion of the field activities.

Schedule and Reporting

NFG anticipates conducting the fieldwork described in this SOW in April or May 2014, pending the NYSDEC's approval of this SOW. Note that the two remaining monitoring wells (MW-10 and MW-11) that were scoped in the RI Work Plan will also be installed during this mobilization. As discussed during the March 7, 2014 meeting, NFG would appreciate the NYSDEC contacting the property owner to inform them of the date for installation of monitoring wells MW-10 and MW-11. NFG would also appreciate the NYSDEC's presence during installation of these wells in addition to overseeing the work described in this SOW.

Consistent with the approach for submitting the interim RI results in the February 13, 2014 letter to the NYSDEC, NFG also proposes to submit a data summary report of results for the work described in this SOW, and follow up the submittal with a conference call to discuss the results. We anticipate the data summary will contain:

- Monitoring well completion logs for the monitoring wells MW-10 and MW-11 and logs for the soil borings/temporary wells installed in the building
- Test trench excavation log
- Analytical data summary tables for temporary well groundwater sample results and soil sampling results

- A site plan showing the locations of new and existing soil borings/temporary wells, monitoring wells, and test trench
- A new water table elevation contour map including the hydraulic head information from the new monitoring wells and temporary wells
- Updated cross-sections, as appropriate
- Updated figure depicting dissolved-phase constituents in groundwater
- Updated figure depicting soil analytical results

We look forward to your approval of this SOW. In the meantime, if you have any questions, please feel free to contact me at 315.671.9456 or Tanya Alexander of NFG at 716.857.7410.

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
Nathan Freeman, NYSDOH
Terry Young, ARCADIS

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

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

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

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

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

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

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

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

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

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

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

STORAGE BLDG.

GOOD HOPE BAPTIST CHURCH

FORMER PUMP ISLAND

APPROXIMATE LOCATION OF FORMER 6,000 GALLON UST

FORMER DIESEL LINE

GAS REGULATOR BUILDING

FORMER GASOLINE LINE

CURRENT AST/ PUMP ISLAND

AREA OF CURRENT GASOLINE UST

FORMER 4,000 GALLON DIESEL TANK

FORMER 6,000 GALLON GASOLINE TANK

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

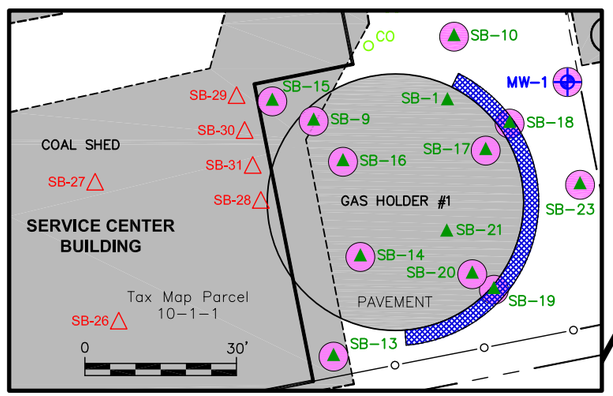
Tax Map Parcel 10–1–7 STATE OF NEW YORK

Tax Map Parcel 10–1–10.1

Tax Map Parcel 10–1–10.2

Tax Map Parcel 10–1–11

Tax Map Parcel 10–1–12



LEGEND:

- PROPOSED TEST TRENCH
- PROPOSED SOIL BORING/TEMPORARY WELL LOCATION
- 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
- SEWER LINE
- WATER LINE
- GAS LINE
- OVERHEAD WIRE

KEY:

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

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.

0 50' 100'

GRAPHIC SCALE

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

PROPOSED SOIL BORING AND TEST TRENCH LOCATIONS

ARCADIS

FIGURE 1

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:\ENV\CAD\SYRACUSE\ACTIB\0023301\100011\00005\DWG\R\23301C05.dwg LAYOUT: 1 SAVED: 3/25/2014 9:24 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---
XREFS: 23301X03 23301XBL IMAGES: PROJECTNAME: ---