

Ms. Jamie Verrigni New York State Department of Environmental Conservation Division of Environmental Remediation Remedial Bureau C, 625 Broadway, 11th Floor Albany, New York 12233-7014

Subject: NAPL Recovery Well Installation, Monitoring, and Reporting Orange and Rockland Utilities, Inc. Port Jervis Former MGP Site City of Port Jervis, Orange County, New York ARCADIS of New York, Inc. 855 Route 146, Suite 210 Clifton Park New York 12065-Tel 518 250 7300 Fax 518 250 7301 www.arcadis-us.com

ENVIRONMENT

Date: November 10, 2014

Contact: Adam Etringer

Phone: 518.250.7314

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Our ref: B0043021.0009

Dear Ms. Verrigni:

ARCADIS of New York, Inc. (ARCADIS) has completed services in connection with the installation of angle non-aqueous phase liquid (NAPL) recovery wells at the Orange and Rockland Utilities (O&R) Port Jervis Former manufactured gas plant (MGP) site in Port Jervis, New York. These activities were conducted to implement a monitoring and recovery program if recoverable quantities of NAPL were observed during drilling beneath Pike Street.

This work was performed per the *NAPL Recovery Work Plan* that was approved by the New York State Department of Environmental Conservation (NYSDEC) on May 1, 2014. This letter report summarizes the scope and results of the following activities:

- Clearing each boring location for utilities by air knifing and/or hand clearing to a depth of five feet below ground surface (bgs) at each location,
- Drilling of five soil borings and installation of NAPL recovery wells at each boring location,
- Logging and classifying soils at each boring location, and
- Initiation of periodic NAPL gauging and recovery events.

Each of these activities is discussed in further detail below.

Utility Clearing

Based on historical utility figures provided by O&R and physical utility markings provided by DigSafe NY, each location was specifically selected to avoid contact with known utilities. The utilities in the vicinity of the drilling consisted of gas and electric provided by O&R, and water and sewage provided by the City of Port Jervis.

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ARCADIS subcontracted Cascade Drilling, L.P. (Cascade) to clear each of the proposed boring locations with the use of hand tools or by air-knifing to a depth of at least five feet bgs. Each location was then visually cleared of utilities or other obstructions. In the event that drilling did not immediately commence at the cleared location, the open hole was temporarily backfilled with the removed soils. RW-5 and RW-6 were hand-cleared on August 5, 2014. Clearing by air-knife was conducted at RW-7, RW-8D on August 6, 2014, and at RW-8S on August 14, 2014.

Drilling Activities and Well Installation

The angled drilling and well installation activities were performed from August 5, 2014 to August 15, 2014 and included:

- Drilling of five soil borings (RW-5, RW-6, RW-7, RW-8S, and RW-8D), and
- Installation of five NAPL recovery wells, including well development and surface completion.

The primary goal of the program was to determine if recoverable quantities of NAPL were observed beneath Pike Street. If, through discussions with O&R and the NYSDEC, it was determined that visual observations of NAPL were deemed to be recoverable, then NAPL recovery wells were to be installed. The locations of the recovery wells are shown on Figure 1. The soil boring and recovery well construction logs are provided in Attachment A.

Soil Borings

Soil borings were drilled by Cascade using Sonic drilling methods. Oversight and documentation of subsurface conditions was conducted by an ARCADIS geologist. Soil samples were collected continuously at each location using 6-inch, 10-foot long core barrel sampler. Recovered soil was visually characterized for soil type and the presence of any NAPL. Representative soil samples from each boring location were also screened for the presence of volatile organic compound (VOC) vapors using a photoionization detector (PID) and were subsequently transferred to 55-gallon drums for off-site disposal.

Each boring was drilled at a 40 degree angle in order to target the subsurface beneath Pike Street. As such, boring and well depths are presented in feet as "drill string from ground surface" (dsfgs). This notation is not meant to represent the vertical depth below the ground surface, since the wells were installed at an angle. Rather, this is the length of well casing, as measured from the ground surface during drilling. The approximate depths of the angled wells in feet below the ground surface are listed in the notes on Table 1.

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The soils in the upper 20 to 25 feet dsfgs primarily consisted of fine and fine-to-medium sands. From 25 to 40 feet dsfgs the lithology primarily consisted of a cobbles and gravel. Fine-to-medium sands were observed again between 40 and 70 feet dsfgs.

Yellow oil-like-material (OLM) and petroleum-like odors were observed between 20 and 30 feet dsfgs. Brown OLM and coal-tar-like odors were generally observed at deeper intervals between 40 and 60 feet dsfgs.

Monitoring Well Installation

Angled recovery wells were installed at each of the soil boring locations. Wells were constructed of 6-inch Schedule 40 polyvinyl chloride (PVC). The annulus around the well casing was filled by native material collapse, pea gravel, hydrated bentonite chips, and/or bentonite/concrete grout, depending on the specific well. The ground surface at each well was completed with a locking j-plug and a flush-mount steel cover. The specific well construction details are shown on the Well Logs. The following table summarizes the justification for the recovery well construction, based on observations of NAPL and discussions with O&R and the NYSDEC. Monitoring wells RW-5 and RW-8S were installed as light-NAPL (LNAPL) recovery wells, and therefore do not have sumps. The remaining wells were constructed as dense-NAPL (DNAPL) recovery wells.

Well ID	Screen Interval (feet dsfgs)	Sump Interval (feet dsfgs)	Justification
RW-5	22.15 - 31.60	No sump	Yellow OLM coated soil from 24-30 feet dsfgs
RW-6	45.15 – 55.00	55.00 – 57.00	brown OLM coated soil from 50-55 feet dsfgs
RW-7	45.15 – 54.61	54.61 – 57.00	moderate to heavy brown OLM from 50-55 feet dsfgs
RW-8S	24.50 – 33.48	No sump	yellow OLM coating on soil from 26.5 to 32 feet dsfgs
RW-8D	40.00 – 49.50	49.50 – 52.00	seams of brown OLM from 41 to 42 feet dsfgs; OLM coated soil at 49.6 feet dsfgs

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Following installation, each well was developed by Cascade using air-lifting techniques to ensure that any accumulated sediment was removed, and to improve the hydraulic communication between the well and the surrounding formation.

Management of Investigation-Derived Waste

Investigation-derived waste (IDW) generated during the angled drilling and well installation included: 1) soil cuttings from the drilling activities; 2) decontamination wash-water and development water; 3) PVC from temporary well constructions; and 4) personal protective equipment and plastic sheeting (from the decontamination pad). IDW was stored in appropriately labeled 55-gallon drums and staged at the O&R Port Jervis Operations Center and at the former Meder property for subsequent off-site disposal.

NAPL Monitoring Events

Following the installation and development of the recovery wells, a periodic NAPL monitoring program was initiated to monitor for, and subsequently remove accumulated NAPL if observed. Per the *NAPL Recovery Work Plan*, four weekly monitoring events were conducted on August 26, September 2, September 9, and September 16, 2014. The first monthly event was conducted on October 20, 2014. In addition to the newly installed wells, the following existing wells were included in the monitoring events: RW-1, RW-2, RW-3, RW-4, and MW-8R.

During each event, static fluid level measurements were obtained using an oil/water interface probe and a weighted measuring tape, and observations of NAPL (if any) were recorded. Recovery well MW-8R was the only well where recoverable NAPL was observed during the events listed above. The NAPL thickness at MW-8R varied from between 6 and 9 feet. A stainless steel bailer was used to remove the NAPL during each event. A summary of the data collected during the NAPL monitoring events is presented on Table 1. Subsequent monitoring and removal data will be populated onto Table 1, which will be submitted following the completion of future events. NAPL removed during the events is being stored in a labeled drum located at the O&R Port Jervis Service Center. Disposal will be coordinated once a sufficient volume is generated.

If you have any questions regarding the information contained herein, please contact me at any time.

Ms. Maribeth McCormick November 10, 2014

Sincerely,

ARCADIS of New York, Inc.

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Adam Etringer Senior Project Manager

Enclosures:

Table

1 Summary of NAPL Monitoring Data

Figure

1 Recovery Well Locations

Attachment

A Soil Boring Logs

Copies: Megan Miller, ARCADIS David Cornell, ARCADIS Table 1Summary of NAPL Monitoring DataOrange and Rockland UtilitiesPort Jervis Former MGP SitePort Jervis, New York

Well ID	Date	Depth to Bottom (dsfgs)	Depth to Water (dsfgs)	Depth to Product (dsfgs)	NAPL Thickness (feet)	NAPL Removed (gallons)	Cunulative NAPL Removed (gallons)
	9/2/14	39.10	21.20				
	9/9/14	39.30	21.45				
RW-1	9/16/14	39.30	21.31				
	10/20/14	39.20	21.00				
	9/2/14	42.20	20.85				
	9/9/14	42.40	21.10				
RW-2	9/16/14	42.20	20.94				
	10/20/14	42.60	23.73				
	8/26/14	43.25	20.27				
	9/2/14	43.23	20.38				
RW-3	9/9/14	43.40	20.62				
	9/16/14	43.40	20.52				
	10/20/14	43.50	20.20				
	8/26/14	41.50	20.20				
	9/2/14	41.50	20.30				
RW-4	9/9/14	40.65	20.57				
	9/16/14	40.70	20.43				
	10/20/14	41.00	20.17				
	8/26/14	30.20	24.64				
	9/2/14	30.20	24.48				
RW-5	9/9/14	30.20	24.80				
	9/16/14	30.20	24.75				
	10/20/14	30.20	24.26				
	8/26/14	54.60	25.73				
	9/2/14	54.60	25.87				
RW-6	9/9/14	54.60	26.21				
	9/16/14	54.60	25.93				
	10/20/14	54.60	25.65				
	8/26/14	52.60	24.60				
	9/2/14	52.60	24.77				
RW-7	9/9/14	52.60	25.04				
	9/16/14	52.60	25.02				
	10/20/14	52.60	24.59				
	8/26/14	32.80	23.81				
	9/2/14	32.80	24.20				
RW-8S	9/9/14	32.80	24.28				
	9/16/14	32.80	24.30				
	10/20/14	32.80	23.84				
	8/26/14	44.70	24.21				
	9/2/14	45.40	24.25				
RW-8D	9/9/14	45.20	24.51				
	9/16/14	44.60	24.49				
	10/20/14	44.70	24.08				
	8/26/14	50.00	23.25	47.00	6.00	2	2
	9/2/14	50.00	22.97	43.00	7.00	3	5
MW-8R	9/9/14	50.00	23.20	44.00	6.00	3	8
	9/16/14	50.00	22.15	44.00	6.00	3	11
	10/20/14	50.00	23.73	41.00	9.00	3	14

Notes:

dsfgs = drill string from ground surface

The following wells were drilled and set at a 40 degree angle: RW-5, RW-6, RW-7, RW-8S, RW-8D RW-1 and RW-2 were not monitored on August 26, 2014 due to ground surface obstructions.

Approximate depths of angled wells (feet below ground surface)

RW-5	24.21
RW-6	43.66
RW-7	43.66
RW-8S	25.65
RW-8D	39.83



LEGEND:

	PROPERTY LINE
	EDGE OF WATER (APPROXIMATE)
	EXISTING BUILDING
xx	EXISTING CHAIN-LINK FENCE
-0-0-0-0-0-0-0-0-	EXISTING WOOD FENCE
<u> </u>	EXISTING WIRE FENCE
	EXISTING GUARDRAIL
	36-INCH-DIAMETER STORM SEWER LINE (APPROXIMATE)
MW14S 🔶	MONITORING WELL LOCATION
PZ1 🔍	PIEZOMETER LOCATION
RW-4 -	EXISTING NAPL RECOVERY WELL
RW-8 🕀	NAPL RECOVERY WELL
\+	APPROXIMATE WELL PROJECTION

NOTES:

- BASE MAP MODIFIED FROM DRAWINGS PORT_JERVIS_08.DWG AND FIG2-1_GW3-08.DWG PROVIDED BY AECOM AND BASED ON ELECTRONIC COPY OF SURVEY DRAWING NO. 100204, TITLED "SURVEY OF PROPERTY", DATED 03-25-10, PROVIDED BY BORBAS SURVEYING AND MAPPING, LLC.
- HORIZONTAL DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD 83); NEW YORK STATE PLANE EAST COORDINATE SYSTEM, IN U.S. SURVEY FEET. VERTICAL DATUM IS THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).



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Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column		Stratigraphic Description				Well/Boring Construction				
										Steel flush cover Locking J-I	Plug			
- 1	0-5	NA	NA		Hand clea	red to 5' dsfgs.				Concrete F 0.5' dsfgs) Sand Drair 1' dsfgs)				
2	5-10	5	0.0 0.0 0.0 0.0 0.0		Brown ver	y fine SAND, trace Silt, trace fine to coarse ang	ular Gravel, mois	t.		Bentonite// Grout (1-14 dsfgs)	8'			
3	10-15	5	0.0 0.0 0.0 0.0 0.0							6° Sch 40 I Riser (0.5- dsfgs)				
					Rem	Recovery. Well set at 40 degree angle. Coordinates are based on th Zone, U.S. Survey Foot.	ne North Ame	rican Dati	um of 1983,	NEW YORK EASTE	RN			
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Well/Boring ID: RW-5

Borehole Depth: 70' dsfgs

Site Location: Port Jervis Former MGP Site Headspace (ppm) Sample Run Number Geologic Column Sample/Int/Type Well/Boring ELEVATION Stratigraphic Description Recovery Construction DEPTH PID Grayish light brown fine SAND, moist. Bentonite/Concrete 0.0 Grout (1-18' dsfgs) 4 15-20 5 0.0 420 0.0 Hydrated Bentonite Chips (18-20' dsfgs) : 1 0.0 20 6" Sch 40 PVC Riser (0.5-22.15' dsfgs) 0.0 Pea Gravel (20-23' dsfgs) 3.1 Trace fine to coarse rounded Gravel, petroleum like odor between 20-24.5' dsfgs. Yellow Oil like Material (OLM) coated soil, moist between 23-24.5' 5 20-25 5 50.3 dsfqs. Č? 415 × × 163.8 × × × Grayish light brown fine SAND, some rounded Cobble, little fine to coarse rounded Gravel, yellow OLM coated soil, moist to wet. × - 25 × Gray rounded COBBLES, some fine to coarse rounded Gravel, trace fine to coarse Sand, strong petroleum like odor, yellow OLM coated soil, wet. × × × Water table at 26.04' dsfgs. × × 6" Sch 40 PVC 0.020" Slot × 69 Screen (22.15-× × 6 25-30 4 31.6' dsfgs) × × 54.6 410 × × × 6.8 × × × Native Material 30 Yellow OLM coated sample is absent between 30-35' dsfgs, yellow OLM Collapse (23-31.6' dsfgs) present in slough. × × × \land 44.6 × × × × × × × x × 8.8 × 7 30-35 3 x × 3.0 405 - 35 Native Material Эġ Gray coarse SAND and fine rounded Gravel, little Cobble, trace medium to coarse Collapse (31.6-× rounded Gravel, fine to medium Sand, wet. 70' dsfgs) 8 35-40 1.5 0.0 <u>ک</u> Remarks: dsfgs= drill string from ground surface; NA = Not Applicable/Available, NR= No Recovery. Infrastructure · Water · Environment · Buildings Well set at 40 degree angle. Coordinates are based on the North American Datum of 1983, NEW YORK EASTERN Zone, U.S. Survey Foot. Figure Elevations are based on the North American Vertical Datum of 1988. Project: B0043021.0009.00001 Page: 2 of 4 Template: G:Clifton Park Data File:RW-5.dat Date: 10/28/2014 Created/Edited by: SD

Well/Boring ID: RW-5

Borehole Depth: 70' dsfgs

Site Location:

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
- - - - - - -	8	35-40	1.5	0.0	000000000	Gray coarse SAND and fine rounded Gravel, little Cobble, trace medium to coarse rounded Gravel, fine to medium Sand, wet.	x x
- - 395 -	9	40-45	NR	NA		No recovery.	x x
45 - - - 390 -	10	45-50	0.3	0.0		Gray fine to medium SAND, little fine to coarse Gravel and Cobble, trace coarse Sand, Coal Tar Like (CTL) odor,	x x x x x x Collapse (31.6 x x x x x 70' dsfgs) x x x x x
50 .	11	50-55	4.0	1.8 0.4 0.7 0.3		Brownish gray fine to medium SAND, trace rounded fine to coarse Gravel and coarse Sand, trace sheen, mild CTL like and moth ball like odor, wet. 1' of slough wet with CTL like odors and trace brown blebs of OLM.	<pre></pre>
55	12	55-60	5.0			Gray fine SAND, little medium Sand, trace coarse Sand, light brown fine Sand lense at 59.5' dsfgs, CTL and moth ball like odor, trace sheen, wet.	
Infrasti	The second second	RC. Nater · Er	A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR A CONTRAC	1.		Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery. Well set at 40 degree angle.	µµiicaule/Avaliable, INK= NO
Figur						Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic	

Well/Boring ID: RW-5

Borehole Depth: 70' dsfgs

Site Location:

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
38	- - 30 - -	12	55-60	5.0	17.5 9.4 84.4 2.6		Gray fine SAND, little medium Sand, trace coarse Sand, light brown fine Sand lense at 59.5' dsfgs, CTL and moth ball like odor, trace sheen, wet.	× × × × × × × × × × × × × × × × × × ×
		13	60-65	1.5	0.0		Gray fine SAND, mild CTL like odor, wet.	<pre></pre>
65 37	70 -	14	65-70	3.5	0.0			<pre></pre>
36	_ _ 55 _ _						End of boring.	
	əstruc		RC. Vater · Er				Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery. Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic	um of 1983, NEW YORK EASTERN

Dril Dril Dril San	lling C ller's I lling N npling	Compa Name: Method Method	h: 8/5/ ny: Cas Frank : Rotos od: 6 ir Longye	scade D Gardell onic nch X 1	i 0 foot d		rrel	Easting: 438350.824 Casing Elevation: NA Client: Ora				g ID: RW-6 ange and Rockland Utilities, Inc. Port Jervis Former MGP Site			
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column		Stratigraphic De	Well/Boring Construction						
-	- 440 -												 Steel flushmount cover Locking J-Plug 		
-	- - 435 -	1	0-5	NA	NA		Hand clea	ared to 5' dsfgs.					 Concrete Pad (0- 0.5' dsfgs) Sand Drain (0.5- 2' dsfgs) 		
- 5		2	5-10	5	0.1 0.1 0.1 0.1 0.1		Brown ve	ry fine SAND, trace Silt and fine to c	xoarse Gravel, moist.				Bentonite/Concrete Grout (2-41' dsfgs)		
- 10	-	3	10-15	5	0.0 0.0 0.0			absent between 10-13' dsfgs. ght brown fine SAND, moist.					• 6" Sch 40 PVC Riser (0.5-45.15' dsfgs)		
	425 -	4	15-20	5	0.0 0.0 0.0		Brown fin moist.	e SAND, trace medium to coarse Sa	and and fine to coarse ro	ounded Gravel,					
	ofrastru igure	ucture · I	RC Water · Er				Rem	arks: dsfgs= drill string fr Recovery. Well set at 40 degr Coordinates are ba Zone, U.S. Survey	ee angle. Ised on the North / Foot.	American Da	tum of 1983,	NEW YOR			
Proje	ect: BC		1.0009.(at	00001			Template	Elevations are base e: G:Clifton Park Date: 10/28/2014		/Edited by: S			e: 1 of 4		

Well/Boring ID: RW-6

Borehole Depth: 70' dsfgs

Site Location: Port Jervis Former MGP Site

DEPTH EI EVATION	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
- 420		4	15-20	5	0.0 0.0 0.0		Brown fine SAND, trace medium to coarse Sand and fine to coarse rounded Gravel, moist.	
- 20	-	5	20-25	5	0.0 0.0 0.0 0.0 0.0		Brown fine to coarse rounded GRAVEL, some Cobble, little fine Sand, trace medium to coarse Sand, moist. Petroleum like odor, moist to wet last 2' of the sample.	Bentonite/Concre Grout (2-41' dsfgs) 6" Sch 40 PVC
- 25	-				6.1		Gray fine to coarse rounded GRAVEL, some Cobble, little fine Sand, trace medium to coarse Sand, moist, petroleum like odor, sheen, trace yellow Oil Like Material (OLM), wet. Water table at 27.2' dsfgs.	Riser (0.5-45.15' dsfgs) Centralizer (26- 27.5' dsfgs)
410 - 30	- 0 - -	6	25-35	10	41.733.718.16.1		Gray multicolored coarse SAND, little rounded fine to coarse Gravel, trace rounded Cobble, fine to medium Sand, wet.	
405 - 35	5 -				4.5			
G	2		35-45				Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery.	vpplicable/Available, NR= No
Figu		.cure · V	Vater · Er	wironine	ent · DUl	ungs	Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic	
Project: Data File	B00			00001			Template: G:Clifton Park Date: 10/28/2014 Created/Edited by: SI	Page: 2 of 4

	Client	: Oran	ge and F	Rocklan	d Utilit	ies, Inc	. Well/Boring	ID: RW-6
:		ocatio	n: Former	MGP S	site		Borehole Do	epth: 70' dsfgs
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	_				1.9	••••	Gray multicolored coarse SAND, little rounded fine to coarse Gravel, trace rounded Cobble, fine to medium Sand, wet.	6" Sch 40 PVC
	-				0.8		Brown multicolored rounded Cobble and fine to coarse rounded Gravel, trace fine to coarse Sand and Silt, wet.	Riser (0.5-45.15' dsfgs)
- - 40 -	- 400 - - -	7	35-45	5	0.4			Bentonite/Concrete Grout (2-41' dsfgs)
- 45	- 395 -	-					No recovery.	(41-43' dsfgs)
-	- - 390 -	8	45-50	NR	NA			
- 50	-				7.8		Gray COBBLE, some fine Sand, little fine to coarse rounded Gravel, trace Silt, trace brown OLM, Coal Tar Like (CTL) like odor, wet. Sample coated with brown OLM.	X X X X X X X X X X X X X X X X X X X
-	-	9	50-55	5	1.7			x - x 6" Sch 40 PVC x 0.020" Slot Screen (45.15- x - 55' dsfgs)
ļ	385 -	-			0.8	ÌŎ		× × × × × × × × × × × × × × × × × × ×
- 55	_				0.4		Light brownish gray fine SAND, wet.	× × 54.2' dsfgs) × × × 6'' Sch 40 PVC × × Sump with Screw
		10	55-65	5	7.8		Remarks: dsfgs= drill string from ground surface; NA = Not A	│ x │ x Cap (55-57' x │ x │ dsfgs)
	8		RC				Recovery.	yphicanic/∩vailanic, Ivi∧- INU
	-igure		Water · Er	nvironme	ent · Bui	lidings	Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic	
		004302 RW-6.d	1.0009.0 at	00001			Template: G:Clifton Park Date: 10/28/2014 Created/Edited by: Sl	Page: 3 of 4

Well/Boring ID: RW-6

Borehole Depth: 70' dsfgs

Site Location:

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		55-65	5	L 4.4 13.9 41.3 11.1 7.1 1.7 2.4 1.4 60.9 7.8 7.6 6.8	C	Light brownish gray fine SAND, CTL like odor top 3' of the sample (Moth ball like odor).	x x x x 6" Sch 40 PVC x x x x cap (55-57" x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x x
	e			4.4		End of boring. Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery. Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertice	rum of 1983, NEW YORK EASTERN

Drill Drill Drill Sam	ling C ler's N ling M npling	compai Name: Nethod Method	h: 8/11 ny: Cas Frank (: Rotos od: 6 ir Longye	cade D Gardelli onic nch X 10	0 foot (rel	Northing: 925105.357 Easting: 438281.683 Casing Elevation: NA Borehole Depth: 70' d Surface Elevation: 43 Descriptions By: Levi	ng ID: RW-7 ange and Rockland Utilities, Inc. Port Jervis Former MGP Site				
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column		Stratigraphic [Description			Well/Boring Construction	
	440 -											Steel flushmour cover Locking J-Plug	
-	- 435 -	1	0-5	NA	NA		Hand clea	ared to 5' dsfgs.				Concrete Pad ((0.5' dsfgs) Sand Drain (0.5 2' dsfgs)	
	 430	2	5-10	5	0.0 0.0 0.0 0.0 0.0		Organics	rown very fine SAND and SILT, tr (roots), moist. ry fine SAND and SILT, trace Org		d Gravel and		Bentonite/concr Grout (2-38' dsfgs)	
- 10	- - 425 - -	3	10-15	5	0.0 0.0 0.0 0.0 0.0		Brown ve Brown SI	edium SAND, little fine Sand, trac ry fine SAND and SILT, moist. LT, trace fine to coarse Sand and ry fine SAND and SILT, moist.		st.		6" Sch 40 PVC Riser (0.5-45.15 dsfgs)	
	frastru	icture · V	15-20				Rem	Zone, U.S. Surve	gree angle. based on the North /	American Da	tum of 1983,	NEW YORK EASTERN	

Well/Boring ID: RW-7

Borehole Depth: 70' dsfgs

Site Location: Port Jervis Former MGP Site Headspace (ppm) Sample Run Number Geologic Column Sample/Int/Type Well/Boring ELEVATION Stratigraphic Description Recovery Construction DEPTH PID 0.0 Brown fine SAND, moist. 4 15-20 5 0.0 420 0.0 Brown fine to medium SAND, moist, 0.0 20 0.0 0 Brown fine to coarse rounded GRAVEL, some fine to coarse Sand, little rounded Bentonite/Concrete ·⁄> Cobble, petroleum like odor last 1' dsfgs, wet. Grout (2-38' dsfgs) 0.0 $\overline{}$ 0 ろ 5 20-25 5 0.0 415 0.0 6" Sch 40 PVC Riser (0.5-45.15' W dsfgs) 0.9 \mathcal{O} Water Table is at 24.65' below Top of Casing. - 25 Gray rounded COBBLE, some fine to coarse rounded Gravel, little fine to coarse Sand, petroleum like odor, sheen coated soil, wet. 7" Cobble present at the tip of the sample. 8.9 6 25-30 2 410 30.7 30 Grayish brown fine to coarse rounded GRAVEL, some coarse Sand, little fine to medium Sand, petroleum like odor, wet. 30-35 0.3 7 1 405 - 35 Multi-colored rounded COBBLE, trace fine to coarse rounded Gravel, wet. 8 35-40 2.5 Remarks: dsfgs= drill string from ground surface; NA = Not Applicable/Available, NR= No Recovery. Infrastructure · Water · Environment · Buildings Well set at 40 degree angle. Coordinates are based on the North American Datum of 1983, NEW YORK EASTERN Zone, U.S. Survey Foot. Figure Elevations are based on the North American Vertical Datum of 1988. Project: B0043021.0009.00001 Page: 2 of 4 Template: G:Clifton Park Data File:RW-7.dat Date: 10/28/2014 Created/Edited by: SD

Client:	Orange	and	Rockland	Utilities,	Inc.
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Well/Boring ID: RW-7

Borehole Depth: 70' dsfgs

Site Location: Port Jervis Former MGP Site Headspace (ppm) Sample Run Number Geologic Column Sample/Int/Type Well/Boring ELEVATION Stratigraphic Description Recovery Construction DEPTH PID 0.0)// Bentonite/Concrete Grout (2-38' 2.0 Brown multi-colored fine to medium rounded GRAVEL and coarse SAND, little coarse rounded Gravel and Cobble, trace fine to medium Sand, wet. dsfgs) 0 0.0 Эø: 8 35-40 2.5 \mathcal{O} 400 \supset 0 Bentonite Chips (38-40' dsfgs) <u>ک</u> : 2 40 No recovery. × × × × × 6" Sch 40 PVC 5 Riser (0.5-45.15' dsfgs) × × 9 40-45 NR NA × 395 × × × × × 45 Multi-colored rounded COBBLE, little fine to coarse rounded Gravel and coarse × Sand, trace fine to medium Sand, trace sheen, mild Coal Tar Like (CTL) odor, wet. × × × × × × x 10 45-50 1 0.3 × × 390 × Native Material × × Collapse (40-57 dsfgs) × × × 50 × × Gray fine SAND, heavy sheen, moderate to heavy impacts of brown Oil Like Material (OLM) discoloration, strong CTL odor, wet. × × 4.3 × × × 210 6" Sch 40 PVC × 0.020" Slot Screen (45.15-54.61' dsfgs) x × 11 50-55 5 329.4 × × 385 × × 316.8 × × × - 55 6" Sch 40 PVC Gray fine to medium SAND, trace sheen, trace brown OLM coating, CTL like odor, Sump with Screw Cap (54.61-57' × wet. Soil and Silt lense, brown OLM around lense in Sand between 55-55.4' dsfgs and at 55.7' dsfgs. × 12 55-60 5 7.2 dsfgs Remarks: dsfgs= drill string from ground surface; NA = Not Applicable/Available, NR= No Recovery. Infrastructure · Water · Environment · Buildings Well set at 40 degree angle. Coordinates are based on the North American Datum of 1983, NEW YORK EASTERN Zone, U.S. Survey Foot. Figure Elevations are based on the North American Vertical Datum of 1988. Project: B0043021.0009.00001 Page: 3 of 4 Template: G:Clifton Park Data File:RW-7.dat Date: 10/28/2014 Created/Edited by: SD

Well/Boring ID: RW-7

Borehole Depth: 70' dsfgs

Site Location:

DEPTH	UEPTH ELEVATION Sample Run Number Sample/Int/Type Recovery PID Headspace (ppm) Geologic Column			PID Headspace (pp	Geologic Column	Stratigraphic Description	Well/Boring Construction		
-	- 380 - -	12	55-60	5	35.6 22.7 10.8		Gray fine to medium SAND, trace sheen, trace brown OLM coating, CTL like odor, wet. Soil and Silt lense, brown OLM around lense in Sand between 55-55.4' dsfgs and at 55.7' dsfgs. Gray fine SAND, wet.	x x 6" Sch 40 PVC x x Sump with Screw x x x	
60 - -	 _ _ 375 _	13	60-65	5	1.4 4.7 26.1		Gray fine to medium SAND, wet.	x x	
- 65 -	-				17.9 0.6 1.3		Gray fine SAND, moth ball like odor, wet. Gray fine SAND, mild moth ball like odor, wet.	X X	
- 70	- 370 - -	14	65-70	5	5.2 1.7 10.9			X X X X X X X X X X X X X X X X X X X	
	- - 365 -						End of boring.		
- 75	-	Λ	DC				Remarks: dsfgs= drill string from ground surface; NA = Not A	vplicable/Available, NR= No	
Int		icture · V	RC. Vater · Er				Recovery. Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic		

Dril Dril Dril San	lling C ller's N lling N npling	Compai Name: Nethod I Metho	h: 8/13 ny: Cas Frank (: Rotos od: 6 ir Longye	scade D Gardelli onic nch X 10	i 0 foot d		rel	Northing: 925124.766 Easting: 438301.850 Casing Elevation: N Borehole Depth: 70 Surface Elevation: 4 Descriptions By: Le	A ' dsfgs I37.68 ft	g ID: RW-8D ange and Rockland Utilities, Inc. Port Jervis Former MGP Site			
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column		Stratigraphic	c Description			Well/Boring Construction	
-	440 -											Steel flushmount cover Locking J-Plug	
-	- 435 - -	1	0-5	4.0	NA		Hand clea	ared to 5' dsfgs.				Concrete Pad (0- 0.5' dsfgs) Sand Drain (0.5- 2' dsfgs)	
- 5	430 -	2	5-10	5	0.0 0.0 0.0 0.0		Brown fin Brown fin	vn SILT, trace fine to coarse Gr e SAND, trace Organics (roots) e to medium SAND, moist.), moist.			Centralizer (5-6' dsfgs) Bentonite/concrete Grout (2-35' dsfgs)	
- 10 - - - -	- 425 - -	3	10-15	4	0.0 0.0 0.0 0.0 0.0		Brown fin Brown fin	e SAND, trace Organics, moist e to medium SAND, moist. e SAND and SILT, moist.				6" Sch 40 PVC Riser (0.5-40' dsfgs)	
F	igure	ucture · V	15-20 RC Nater · Er	nvironme		ldings		Zone, U.S. Sur	legree angle. e based on the North /	American Da	tum of 1983,	NEW YORK EASTERN	

Well/Boring ID: RW-8D

Borehole Depth: 70' dsfgs

Site Location: Port Jervis Former MGP Site Headspace (ppm) Sample Run Number Geologic Column Sample/Int/Type Well/Boring ELEVATION Stratigraphic Description Recovery Construction DEPTH PID Brown fine to medium SAND, moist. 0.0 420 4 15-20 5 0.0 0.0 Brown fine SAND, petroleum like odor, moist. 0.2 20 Brown fine to medium SAND, mild petroleum like odor, moist. 0.0 Bentonite/Concrete Grout (2-35' dsfgs) 0.0 Gray rounded fine to coarse GRAVEL, some rounded Cobble, little fine to coarse Sand, strong petroleum like odor, trace yellow Oil like Material (OLM) coated soil last 1' of the recovery. 5 20-25 5 0.4 415 34.2 56.7 Centralizer (25-26' dsfgs) - 25 Gray rounded COBBLE, little fine to coarse Sand and fine to coarse rounded Gravel, yellow OLM staining in sample, heavy impacts, strong petroleum like odor, wet. 77.4 6 25-30 2.5 410 90.4 92.5 30 6" Sch 40 PVC Gray rounded fine to coarse COBBLE and GRAVEL, little fine to coarse Sand, trace sheen, brown/black CTL blebs, sticky, mild CTL odor, wet. Riser (0.5-40' dsfgs) 0.1 3.1 NR 7 30-35 405 1.8 - 35 Hydrated Bentonite Chips Multi-colored rounded COBBLES, trace fine to coarse Gravel and Sand, trace . $^{\land}$ sheen, no trace of brown OLM in water, trace CTL like odor, wet. 8 35-40 1.0 (35-40' dsfgs) Remarks: dsfgs= drill string from ground surface; NA = Not Applicable/Available, NR= No Recovery. Infrastructure · Water · Environment · Buildings Well set at 40 degree angle. Coordinates are based on the North American Datum of 1983, NEW YORK EASTERN Zone, U.S. Survey Foot. Figure Elevations are based on the North American Vertical Datum of 1988. Project: B0043021.0009.00001 Page: 2 of 4 Template: G:Clifton Park Data File:RW-8D.dat Date: 10/28/2014 Created/Edited by: SD

Port Jervis Former MGP Site

Site Location:

Well/Boring ID: RW-8D

Borehole Depth: 70' dsfgs

Headspace (ppm) Sample Run Number Geologic Column Sample/Int/Type Well/Boring ELEVATION Stratigraphic Description Recovery Construction DEPTH PID $\tilde{\Sigma}$ Multi-colored rounded COBBLES, trace fine to coarse Gravel and Sand, trace sheen, no trace of brown OLM in water, trace CTL like odor, wet. Hvdrated Bentonite Chips (35-40' dsfgs) \land :и 8 35-40 1.0 0.4 V 400 × × × × 40 . Multi-colored coarse SAND, some fine to medium Sand, trace fine to coarse Sand × × ٠ • and Gravel. × × 17.0 Brown/gray fine SAND, some Cobble, little fine to coarse rounded Gravel, trace medium to coarse Sand, 1" thick heavy sheen, strong CTL like odor, wet. Seams of brown OLM heavy impacts between 41-42' dsfgs. × × × 101.7 × 9 40-45 4.0 395 108.4 × × × 19.4 × 45 Native Material × × Gray fine to medium SAND, trace fine to medium rounded Gravel, OLM coated Collapse (38-52' brown Silt seams at 49.6' dsfgs, sheen 48-50' dsfgs, strong CTL and moth ball like × dsfgs) 22 odor. × × 3.3 6" Sch 40 PVC × 0.020" Slot × × Screen (40-49.5' 10 45-50 5.0 1057 390 dsfgs) × × 44.4 × × 69.6 × 8.0 × Centralizer (50-50 Gray fine to medium SAND, trace sheen at 51' dsfgs, moth ball like odor, wet. 51' dsfgs) × × 2.2 × 6" Sch 40 PVC Sump with Screw Cap (49.5-52' × × 5.6 dsfgs) : **и**. :*v*.:*v*.:*v*.: <u>v.:</u> Hydrated Bentonite Chips 11 50-55 5.0 50.9 385 × × (52-52.5' dsfgs) × × × × × × × × × × × × 55 × × × Native Material × × × × Collapse (52.5-× × × 70' dsfgs) × × × × - 55 × × × Absence of moth ball like odor or sheen between 55-60' dsfgs. × x × 12 55-60 5.0 1.5 Remarks: dsfgs= drill string from ground surface; NA = Not Applicable/Available, NR= No Recovery. Infrastructure · Water · Environment · Buildings Well set at 40 degree angle. Coordinates are based on the North American Datum of 1983, NEW YORK EASTERN Zone, U.S. Survey Foot. Figure Elevations are based on the North American Vertical Datum of 1988.

Well/Boring ID: RW-8D

Borehole Depth: 70' dsfgs

Site Location:

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	_				2.0		Gray fine to medium SAND, trace sheen at 51' bgs, moth ball like odor, wet.	
	380 -	12	55-60	5.0	1.2			
	_				0.8			
- 60	_				0.7	· · · · · · · · · · · · · · · · · · ·	Grayish brown fine to medium SAND, wet.	
	-				1.0		Grayish brown fine SAND, wet.	x x x x x x x Collapse (52.5- x x
	375 -	13	60-65	5.0	0.7			
	-				0.4			
65	-							
	_				0.1			
	370 -	14	65-70	5.0	0.0			
	_				0.7			
-70	_						End of boring.	
	_							
	365 -							
	_							
- 75								
6		A	RC	AD	SI		Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery.	Applicable/Available, NR= No
In	frastru	icture · V	Vater · Er	nvironme	ent - Bui	ldings	Well set at 40 degree angle. Coordinates are based on the North American Da	tum of 1983, NEW YORK EASTERN
Fi	gure	•					Zone, U.S. Survey Foot. Elevations are based on the North American Verti	

Dril Dril Dril San	Date Start/Finish: 8/14/14 Drilling Company: Cascade Drilling Inc. Driller's Name: Frank Gardelli Drilling Method: Rotosonic Sampling Method: 6 inch X 10 foot corebarrel Rig Type: Boart Longyear Rig 200C								Easting: 438296.276 Casing Elevation: NA Client: Ora				g ID: RW-8S ange and Rockland Utilities, Inc. Port Jervis Former MGP Site			
DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column		Stra	atigraphic D	escription				Well/Bori Construct	-	
-	440 -														 Steel flushmount cover Locking J-Plug 	
5	435	1	0-25	NA	NA		Blind drille	ad to 25' dsfgs. No	descriptions col	llected.					 Concrete Pad (0- 0.5' dsfgs) Sand Drain (0.5- 2' dsfgs) Bentonite/concrete Grout (2-19.5' dsfgs) 6" Sch 40 PVC Riser (0.5-24.5' dsfgs) 	
F Proje	igure	ucture · V	RC Nater - Er	nvironme				Coordi Zone,	rery. et at 40 deg inates are b U.S. Survey ions are bas rk	ree angle. ased on the / Foot. sed on the N	North A	American Da	tum of 198	3, NEW YOF of 1988.	R= No RK EASTERN ge: 1 of 2	

Well/Boring ID: RW-8S

Borehole Depth: 35' dsfgs

Site Location:

DEPTH	DEPTH ELEVATION Sample Run Number Sample/Int/Type Recovery PID Headspace (ppm) Geologic Column			PID Headspace (ppm	Geologic Column	Stratigraphic Description	Well/Boring Construction		
42 - 20		1	0-25	NA	NA		Blind drilled to 25' dsfgs. No descriptions collected.	Image: Second system Bentonite/concre Grout (2-19.5' dsfgs) Image: Second system Hydrated Bentonite Chips (19.5-22' dsfgs) Image: Second system Image: Second system Image: Second system Image: Second system <t< td=""></t<>	
- 25 41		2	25-30	3.0	18.8 36.8 104.4		Gray to brown fine to medium SAND, little medium to coarse Gravel, faint petroleum like odor, moist. Gray COBBLES, little fine to coarse Sand and Gravel, yellow Oil like Material, saturated coating on all surfaces, strong petroleum like odor, wet.	x x x x x <tr< td=""></tr<>	
- 30 40		3	30-35	5.0	97.8 78.9 32.4 2.4		Gray COBBLES, some fine to coarse Sand, little fine to coarse Gravel, petroleum like odor, saturated/wet.	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
Infra	astruc		RC. Vater - Er				End of boring. Remarks: dsfgs= drill string from ground surface; NA = Not A Recovery. Well set at 40 degree angle. Coordinates are based on the North American Dat Zone, U.S. Survey Foot. Elevations are based on the North American Vertic	upplicable/Available, NR= No	