From: "Finn, John" <JFinn@geiconsultants.com>
To: John Spellman <jtspellm@gw.dec.state.ny.us>
CC: "Jones, William R. (NYED)" <William.R.Jones@nationalgrid.com>, "Gorges,Aaron" <agorges@geiconsultants.com>, "Zak, Jerry" <JZak@geiconsultants.com>
Date: 3/2/2012 1:27 PM
Subject: Schenectady Clinton St. NAPL Recovery 2011 Report
Attachments: report.v00474.2012-03-02.Schenectady_NAPL_Recovery.pdf

John,
Attached is the NAPL recovery report summarizing the results to date. We are continuing the monthly gauging and recovery work in 2012. Please let us know if you have questions or comments, or if you require a hard copy.

John

John T. Finn, P.E.
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March 2, 2012

Mr. John Spellman
New York State Department of Environmental Conservation
Bureau of Remedial Action
Division of Environmental Remediation
625 Broadway, 11th Floor
Albany, New York 12233-7010

Geotechnical
Environmental
Water Resources
Ecological

Subject: Pilot NAPL Recovery Program, Annual Report
Schenectady Clinton Street Former MGP Site, OU1 and OU2
NYSDEC Site #V00474
Voluntary Consent Order Index #: D0-0001-0011

Dear Mr. Spellman:

National Grid, pursuant to a Voluntary Consent Order between National Grid and the New York State Department of Environmental Conservation (NYSDEC), is conducting Remedial Investigations (RI) at the Clinton Street Non-Owned Former Manufactured Gas Plant (MGP) Site in Schenectady, New York (Figure 1).

At the request of the NYSDEC, in a letter dated June 23, 2010 (NYSDEC, 2010), National Grid gauges, monitors, and recovers non-aqueous phase liquid (NAPL) in wells in Operable Units 1 and 2 (OU1 and OU2) at the Site (Figure 2). This effort is required to establish the feasibility and practicality of a more formal NAPL recovery program.

This letter report describes NAPL gauging, monitoring, and recovery from October 2010 through December 2011 (since the Pre-Design Investigation [PDI] Report of Findings [GEI, 2011b], and the June 24, 2011 Pilot NAPL Recovery Program Progress Report [GEI, 2011a]).

Site Background and Description

The Clinton Street, Non-Owned Manufactured Gas Plant (MGP) operated for about 48 years (ca. 1866 to 1914) on the east side of Broadway (Figure 2), using coal to produce gas, which was distributed to consumers through buried mains. Several residuals could be generated during gas production process including coal tar, coke, and ash. All three residuals have been observed in limited amounts at the site.

OU1 consists of the area of the former MGP process operations, which is now occupied by the Schenectady Municipal Housing Authority (SMHA) and a portion of Clinton Street. The SMHA provides subsidized public housing for elderly or handicapped adults in several buildings at the site. One NAPL recovery well (SB-44/MW-8D (08)) is located on the east side of Broadway in OU1 (Figure 2).

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OU2 consists of several roadways and portions of two city blocks to the west of the SMHA property. The NAPL recovery area in OU2 is on the 318, 330, and 340 Broadway properties. Depth to groundwater ranges from 7 to 8 feet below ground surface (bgs), with groundwater flow generally from east to west. Two monitoring wells with accumulated NAPL (SB-30/ MW12D(08) and SB-43/MW14D(08)) and one NAPL recovery well (SB-117/RW-1(10)) are located on the west side of Broadway in OU2 (Figure 2).

Previous Investigations

The OU1 RI was substantially completed by AECOM in June 2009 (AECOM, 2009). NYSDEC approval of the OU1 RI report is pending. The OU1 RI found MGP impacts beneath the parking lot area of the SMHA property, and the remnants of several subsurface MGP structures. The OU2 RI is on-going, but MGP impacts are present at depth under Broadway and west of Broadway. NAPL has accumulated in wells SB-44/MW-8D (08), SB-19/MW-8S(06), SB-30/MW-12D(08), SB-43/MW-14D(08), and SB-117/RW-1(10). SB-117/RW-1(10) is a pilot NAPL recovery well that was installed near SB-30/MW-12D (08) as part of the PDI for the NAPL Recovery Interim Remedial Measure (IRM). The PDI results were provided to NYSDEC in the Report of Findings (GEI, 2011b).

Objective

The objective was to continue NAPL gauging and recovery in the wells along Broadway that have accumulated NAPL, in order to assess the feasibility of a more formal NAPL recovery program. The gauging and recovery was continued through 2011, in accordance with the PDI Report of Findings for NAPL Recovery (GEI, 2011b).

Field Work

NAPL gauging and recovery was performed as many as 18 times (depending on the recharge rates at NAPL wells). Each monitoring well was gauged with an oil/water interface probe for groundwater level, water/NAPL interface, and bottom of the well. Measureable NAPL was then pumped with a peristaltic pump at approximately 1/4 gallons per minute through 3/8-inch tubing, which remained in the well. The NAPL was pumped into a 5 gallon bucket until the discharge became more water than NAPL. Recently, we have begun to switch from the 3/8-inch tubing to a 1/2-inch Teflon™ lined tubing, which does not clog as easily as the 3/8-inch tubing.

All NAPL collected over the time period was placed in a 55-gallon drum and stored in the secure investigation-derived waste (IDW) area. The drummed NAPL was subsequently transported from the site for treatment and disposal by Clean Harbors, Inc.

Gauging and recovery data for the pilot NAPL recovery wells are included in Tables 1 through 4 and are detailed below. Volume and foot recoveries for each well are shown in Figures 3 and 4, respectively.

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- **Table 1 - SB-44/MW-8D(08)** – This well contained 2.25 feet of NAPL the first time it was gauged in October 2010. The NAPL was removed at that time, as was additional NAPL until November 2010. Continuous gauging since then has not resulted in the presence of measurable NAPL. This well now has little or no NAPL recharge.
- **Table 2 - SB-30/MW-12D(08)** – This well is close to well SB-117/RW-1(10). It has not been pumped since June 2011 to avoid any potential effect at well SB-117/RW-1(10). However, it exhibited moderate potential for NAPL recharge, prior to June 2011, taking approximately 1 month to fully recharge.
- **Table 3 - SB-43/MW-14D(08)** – This well showed high potential for recharge; almost fully recharged in 3 hours between gauging and recovery events on June 9, 2011. Recharge curves (Figures 5 and 6) were developed for this well. Figure 5 depicts four NAPL recovery cycles after removal on October 4, 2011. Figure 6 depicts three NAPL recovery cycles after removal on October 6, 2011.
- **Table 4 - SB-117/RW-1(10)** – This well was installed specifically as a NAPL recovery well in a location where tar saturation was apparent in the subsurface. It has not, however, generated recoverable NAPL in volumes that were expected based on tar saturation in the subsurface. In addition, sediment mixing in the sump has made it difficult to determine NAPL thickness. NAPL blebs have been observed with well cameras.

  In September 2011, the well was developed with jetting and pumping. This resulted in a reduction of sediment in the well sump. Further gauging will need to be performed in order to assess the effectiveness of the development.
- **SB-19/MW-8S(06)** – This well was gauged in 2010, and contained a very thick, tar-like NAPL. The NAPL is so viscous it is not recoverable. Gauging and recovery are no longer being attempted at this well.

Conclusions and Recommendations

Conclusions

The 6-inch recovery well, SB-117/RW-1(10), did not produce as much NAPL as anticipated. Additional well development was conducted at SB-117/RW-1(10) in September 2011 to attempt to increase the rate of flow of NAPL into the well. The development activities included pumping out sediment collected in the sump and surging the well to remove additional fine-grained material that was thought to be present in the sand pack surrounding the screen.

The NYSDEC has suggested that there may be a relationship between SB-44/MW-8D(08) and SB-43/MW-14D(08). SB-43/MW-14D(08) is located on the west side of Broadway, and SB-44/MW-8D(08) is located on the east side of Broadway. The zone of NAPL saturation for each well is at approximately the same depth.

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Preliminary results indicate a high potential for recharge from SB-43/MW-14D (08). During September, frequent gauging and recovery of SB-43/MW-14D (08) was performed over 2 consecutive days. This allowed the development of short-term recharge curves (Figures 5 and 6). The curves indicate the potential exists for a more rigorous recovery program for MW-14, perhaps with the implementation of a more advanced recovery system.

Recommendations

- We recommend continued gauging of SB-117/RW-1(10) through 2012 to evaluate the effectiveness of the well development. If NAPL begins to accumulate in this well, then recovery will proceed.
- We recommend continued gauging and NAPL removal through 2012 at wells SB-30/MW-12D(08) and SB-43/MW-14D(08), both of which have shown adequate recovery potential.
- Monitoring should continue at SB-44/MW-8D(08) in order to evaluate if a relationship exists between SB-43/MW-14D(08) and SB-44/MW-8D(08).
- Additional longer term recharge recovery curves should be developed through 2012 for SB-43/MW-14D(08) prior to discussion of advanced recovery technologies.

An annual report of findings will be prepared in early 2013, with further conclusions and recommendations.

Please feel free to contact me at (607) 216-8956 with any questions you may have regarding the information provided in this report. Please direct the Department's official comments or response to Bill Jones, P.E., National Grid's Project Coordinator for the site.

Sincerely,

GEI CONSULTANTS, INC.

John T. Finn

John T. Finn, P.E.
Senior Engineer

JTF:mlr

Attachments: Table 1 – NAPL Recovery Logs - SB-44/MW-8D(08)
Table 2 – NAPL Recovery Logs - SB-30/MW-12D(08)
Table 3 – NAPL Recovery Logs - SB-43/MW-14D(08)
Table 4 – NAPL Recovery Logs - SB-117/RW-1(10)
Figure 1 – Site Location
Figure 2 – Boring Locations
Figure 3 – NAPL Recovery Graph
Figure 4 – NAPL Gauging Graph
Figure 5 – SB-43/MW-14D(08) NAPL Recharge Curve (October 4, 2011)
Figure 6 – SB-43/MW-14D(08) NAPL Recharge Curve (October 6, 2011)

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References

AECOM, 2009. Remedial Investigation Report, Operable Unit 1, Schenectady (Clinton Street) Non-Owned Former MGP Site, June 28, 2009.

GEI, 2011a. Pilot NAPL Recovery Program, Schenectady (Clinton Street) OU2 Non-Owned Former MGP Site, June 24, 2011.

GEI, 2011b. Pre-Design Investigation Report of Findings – NAPL Recovery, Schenectady (Clinton Street) OU2 Non-Owned Former MGP Site, March 25, 2011.

NYSDEC, 2010. Letter from Charles Post of NYSDEC to Edward Neuhauser of National Grid. "NAPL Extraction form Monitoring Wells Located in Operable Unit 1 and 2", June 23, 2010.

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Tables

Table 1
Schenectady Clinton Street Non-Owned Former MGP Site
NAPL Recovery Logs
SB-44/MW-8D(08)

Date	Measured Thickness (feet)	Volume Removed (gallons)	Time Between Events (days)	Cumulative volume (gallons)	Notes
10/25/2010	2.25	1.00	-	1	
11/2/2010	0.75	0.00	8	1	
11/10/2010	1.22	0.53	8	1.53	
11/11/2010	0.75	1.00	1	2.53	
11/12/2010	2.58	1.00	1	3.53	
12/16/2010	0.20	0.00	34	3.53	Recharge Diminished
3/25/2011	0.25	0.00	99	3.53	Recharge Diminished
5/9/2011	0.25	0.00	45	3.53	Recharge Diminished
6/9/2011	0.20	0.00	31	3.53	Recharge Diminished

Table 2
Schenectady Clinton Street Non-Owned Former MGP Site
NAPL Recovery Logs
SB-30/MW-12D(08)

Date	Measured Thickness (feet)	Volume Removed (gallons)	Time Between Events (days)	Cumulative volume (gallons)	Notes
10/25/2010	3.50	1.00	-	1	
11/2/2010	2.84	0.00	8	1	
11/10/2010	0.96	0.75	8	1.75	
11/11/2010	2.20	1.05	1	2.8	
11/12/2010	1.30	0.00	1	2.8	
12/16/2010	3.50	1.25	34	4.05	
3/25/2011	3.60	1.25	99	5.3	
5/9/2011	3.40	1.25	45	6.55	
6/9/2011	3.70	1.00	31	7.55	
10/4/2011	3.50	0.00	117	7.55	Not recovered to allow RW-1 to develop
10/6/2011	3.70	0.00	2	7.55	Not recovered to allow RW-1 to develop
12/1/2011	3.70	0.00	56	7.55	Not recovered to allow RW-1 to develop

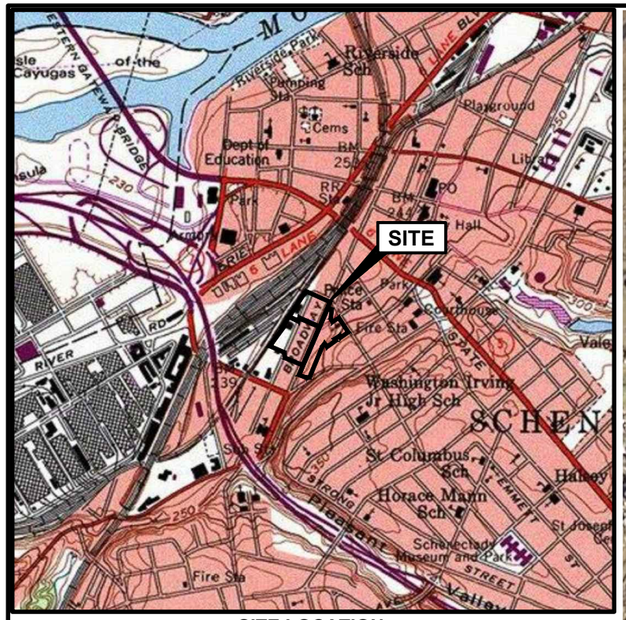
Table 3
Schenectady Clinton Street Non-Owned Former MGP Site
NAPL Recovery Logs
SB-43/MW-14D(08)

Date	Measured Thickness (feet)	Volume Removed (gallons)	Time Between Events (days)	Cumulative volume (gallons)	Notes
10/25/2010	3.9	2.54	-	2.54	
11/2/2010	5.28	3.44	8	5.99	
11/10/2010	4.4	2.87	8	8.86	
11/11/2010	6	3.91	1	12.77	
11/12/2010	5.5	3.59	1	16.36	
12/16/2010	5.29	3.45	34	19.81	
3/25/2011	5.60	3.65	99	23.47	
5/9/2011	5.40	3.52	45	26.99	
6/9/2011	5.31	3.46	32	30.46	
6/9/2011	4.60	3.00	0.11	33.46	
10/4/2011	5.30	3.46	116.36	36.91	Developing NAPL Recover Curve 1-See Fig 5
10/4/2011	3.80	2.48	0	39.39	Developing NAPL Recover Curve 1-See Fig 5
10/4/2011	4.00	2.61	0	42.00	Developing NAPL Recover Curve 1-See Fig 5
10/4/2011	2.40	1.57	0	43.57	Developing NAPL Recover Curve 1-See Fig 5
10/6/2011	4.20	2.74	2	46.31	Developing NAPL Recover Curve 2-See Fig 6
10/6/2011	3.90	2.54	0	48.85	Developing NAPL Recover Curve 2-See Fig 6
10/6/2011	3.50	2.28	0	51.14	Developing NAPL Recover Curve 2-See Fig 6
12/1/2011	4.20	2.74	56	53.88	

Table 4
Schenectady Clinton Street Non-Owned Former MGP Site
NAPL Recovery Logs
SB-117/RW-1(10)

Date	Measured Thickness (feet)	Volume Removed (gallons)	Time Between Events (days)	Cumulative volume (gallons)	Notes
11/12/2010	0	0	-	0	
12/16/2010	0.3	0.5	34	0.5	
3/25/2011	0.10	0.00	99	0.5	
5/9/2011	0.10	0.00	45	0.5	
6/9/2011	0.10	0.0	31	0.5	
10/4/2011	0.10	0.00	117	0.5	Well Development
12/1/2011	0.30	0.00	58	0.5	

Figures



SITE LOCATION

0 200

SCALE, FEET

0 120 240

SCALE, FEET

SOURCES:

1. SURVEY TITLED: *LANDS OF NIAGARA MOHAWK POWER CORPORATION (FORMER MGP SITE),* BROADWAY, CITY OF SCHENECTADY - SCHENECTADY COUNTY, STATE OF NEW YORK, PREPARED BY DELTA ENGINEERS, ARCHITECTS, & LAND SURVEYORS, VERNON, NY, SCALE: 1" = 50', DATE: NOVEMBER 12, 2009, LAST REVISED: NOVEMBER 23, 2010.
2. AERIAL PHOTOGRAPH OBTAINED FROM NEW YORK INTERACTIVE MAPPING GATEWAY (www1.nysgis.state.ny.us), PHOTO TAKEN APRIL 2007, RESOLUTION: 1 FOOT, ACCESSED ON 03/16/11.
3. TOPOGRAPHIC MAP CREATED WITH TOPO! ® © 2001 NATIONAL GEOGRAPHIC (www.nationalgeographic.com/topo)

OU2 PILOT NAPL RECOVERY PROGRAM
CLINTON STREET FORMER MGP SITE
SCHENECTADY, NEW YORK

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Project 102780-4-1404

SITE LOCATION MAP

January 2012 Figure 1

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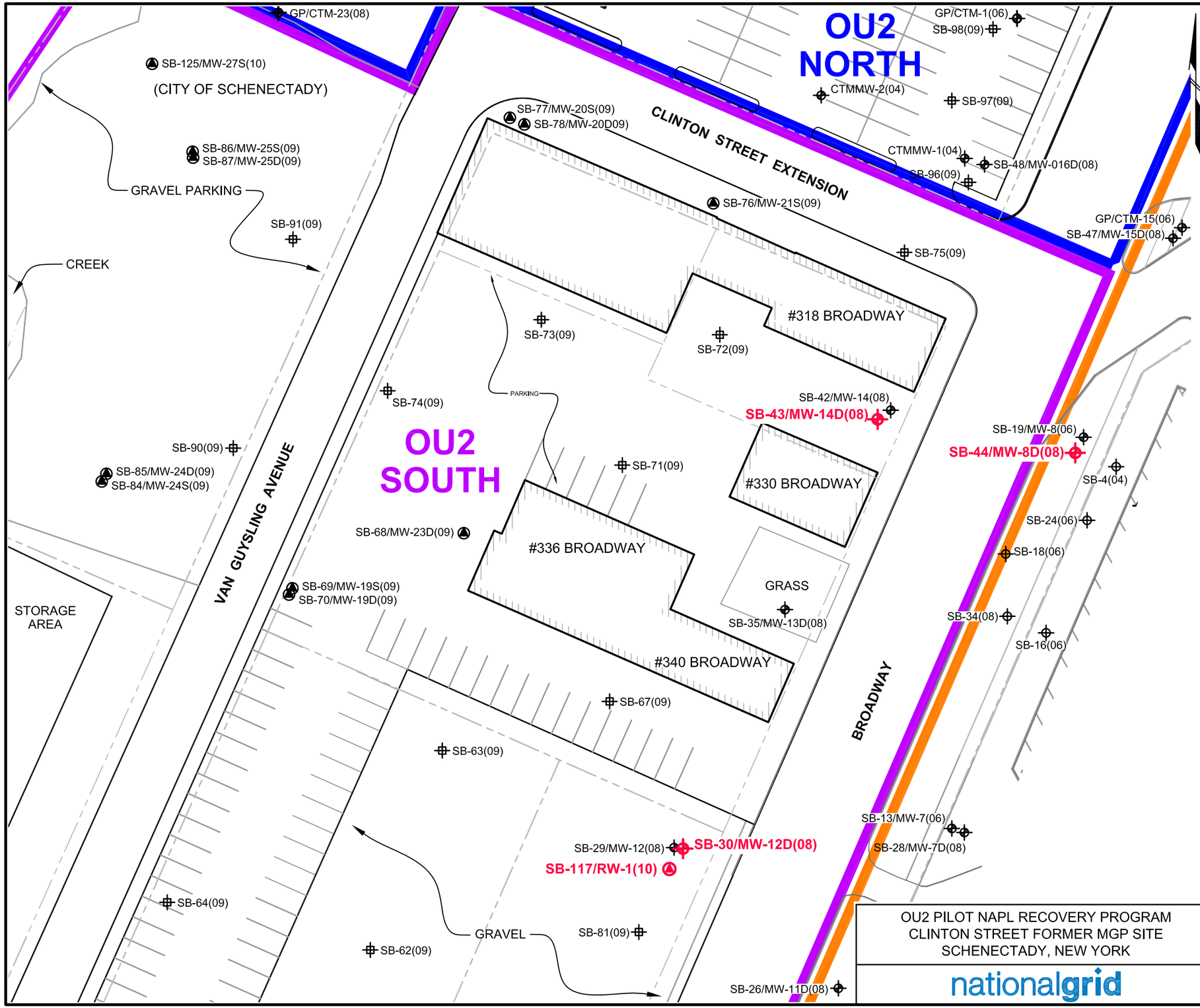

LEGEND:

	PROPERTY BOUNDARY
	EXISTING BUILDING
SB-29/MW-12(08) SB-117/RW-1(10)	PILOT NAPL RECOVERY WELLS
SB-100(10)	PRE-DESIGN INVESTIGATION SOIL BORING (GEI)
SB-84/MW-24S(09)	SOIL BORING/MONITORING WELL (GEI)
CTMMW-1(04) GP/CTM-20(08)	SOIL BORING/MONITORING WELL (CT MALE)
SB-48/MW-016D(08)	SOIL BORING/MONITORING WELL (AECOM)
SB-96(09)	SOIL BORING (GEI)
SB-16(06)	SOIL BORING (LIGHTSHIP ENGINEERING)
(04), (06), (08), (09), (10)	YEAR INSTALLED

NOTE:

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SOURCE:

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DATE: NOVEMBER 12, 2009, LAST REVISED: NOVEMBER 23, 2010.

0 40 80

SCALE, FEET

OU2 PILOT NAPL RECOVERY PROGRAM
CLINTON STREET FORMER MGP SITE
SCHENECTADY, NEW YORK

nationalgrid

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PILOT NAPL RECOVERY - WELL LOCATIONS

Project 102780-4-1404 | January 2012 | Figure 2

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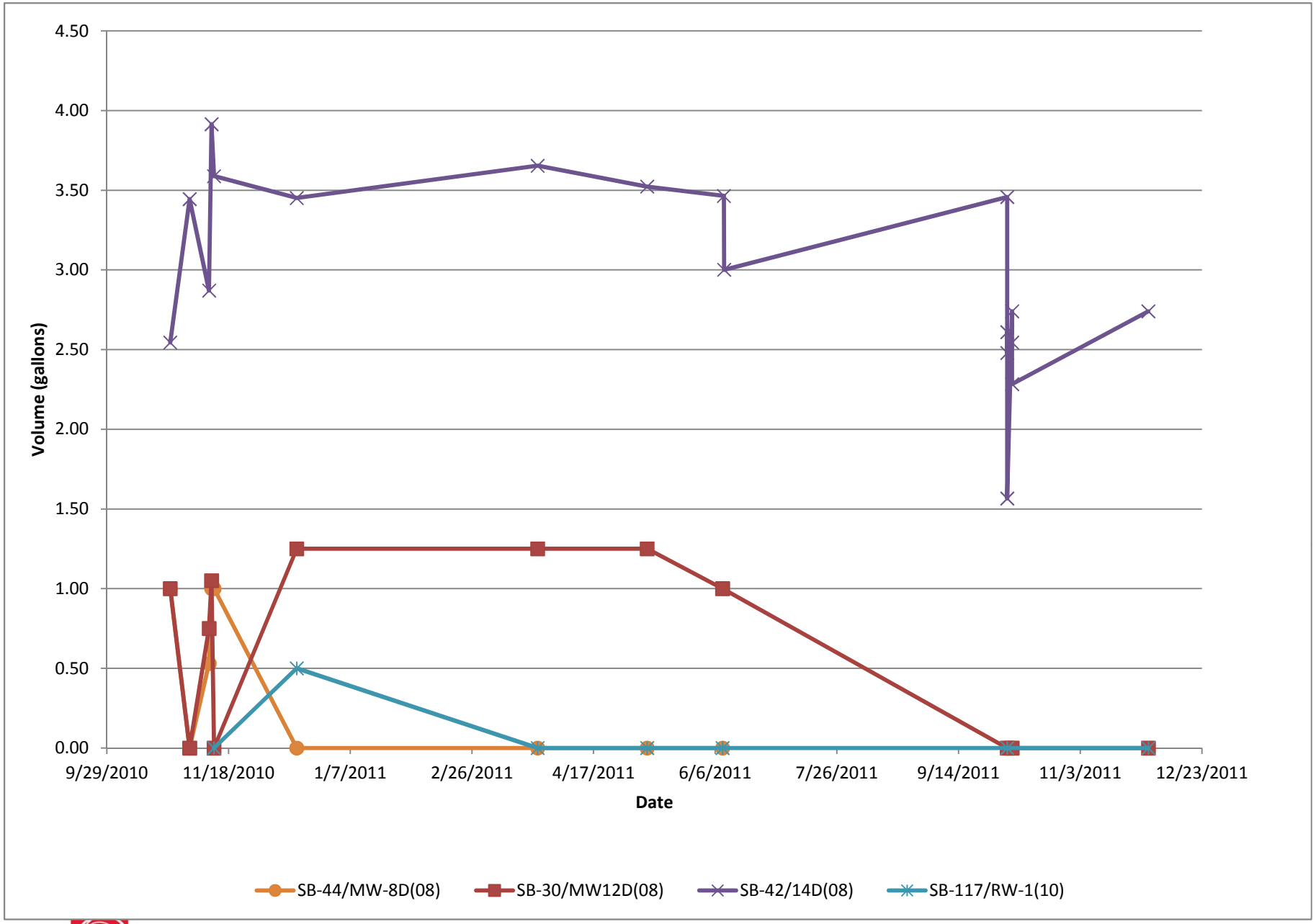
Figure 3
Schenectady Clinton Street Non-Owned Former MGP Site
NAPL Recovery
Time vs Volume



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Fugure 3 NAPL recovery

Figure 4
Schenectady Clinton Street Non-Owned Former MGP
NAPL Gauging
Time vs Recovery

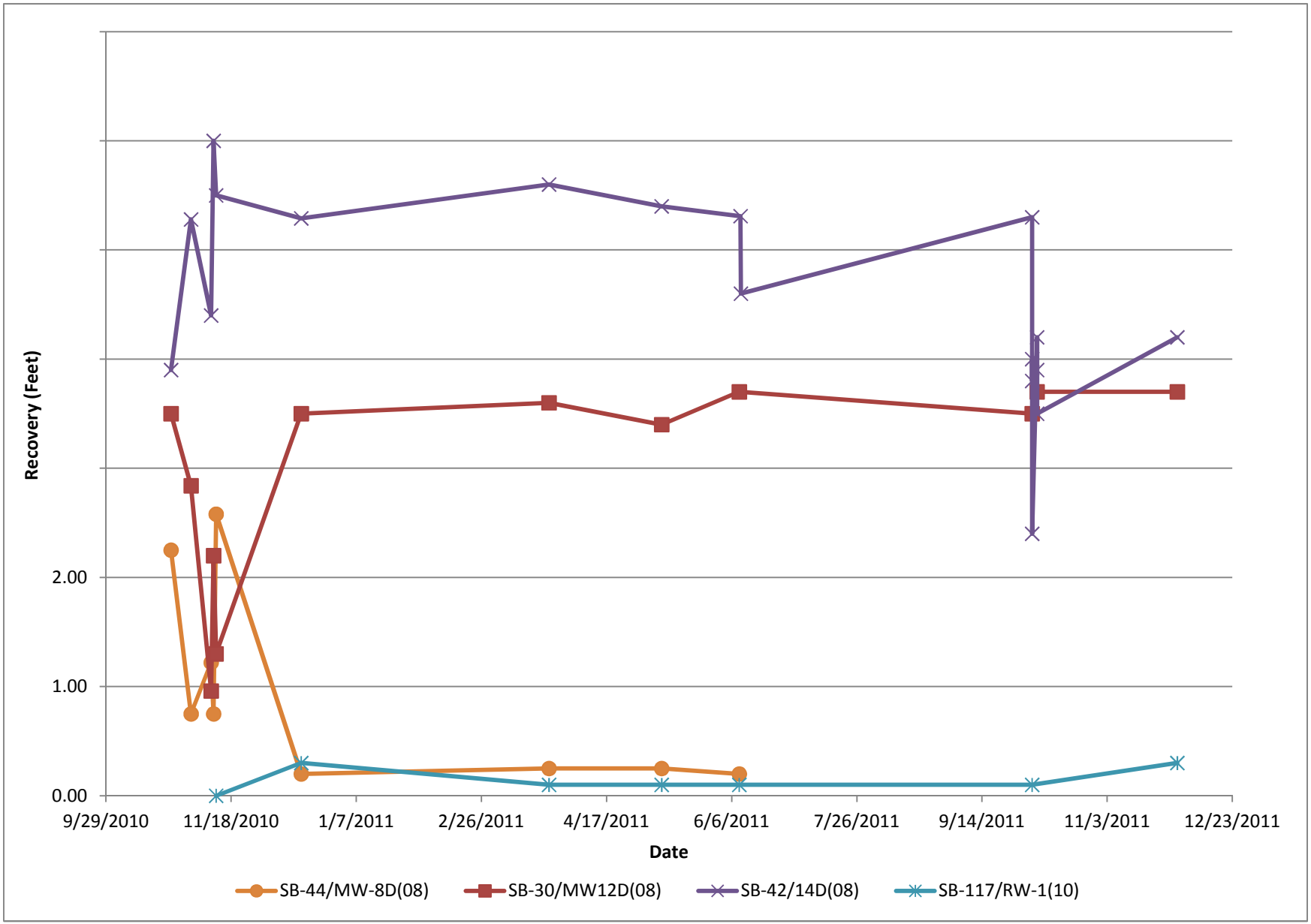

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Figure 4 NAPL Gauging

Figure 5
Schenectady Clinton Street Former MGP
SB-42/MW-14D (08) Recharge Curve 2
Recharge vs Time
10/4/11

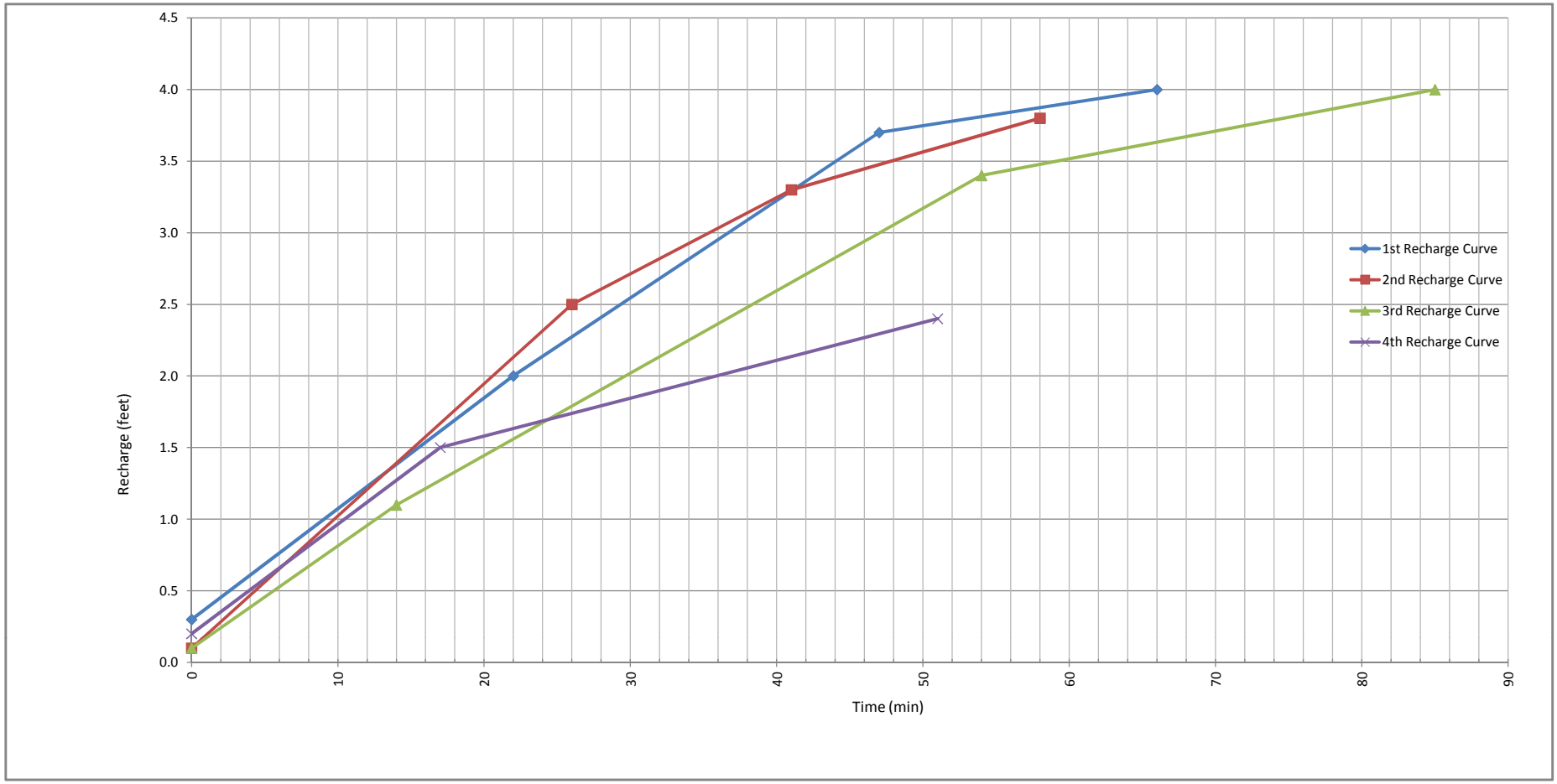

Figure 6
Schenectady Clinton Street Former MGP
SB-42/MW-14D (08) Recharge Curve 2
Recharge vs Time
10/4/11