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Chelmsford, MA 01824
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March 1, 2013

Mr. Glenn May, C.P.G.
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203

Subject: 2012 Periodic Review Report
Scajaquada Creek Site (#915141B), Buffalo, NY

Dear Mr. May,

National Fuel Gas Distribution Corporation (NFG) completed construction on the remedial action for the Scajaquada Creek site in August 2002. Since then, NFG has performed operations and maintenance (O&M) activities for the remedy in accordance with the 2005 O&M Plan for the site. Those activities have included preparation of semi-annual reports. In a letter dated July 9, 2009, NFG proposed modification to the O&M Plan, which included decreasing the frequency of O&M reporting from semi-annual to annual and decreasing the frequency of DNAPL measurements from quarterly to annually. The New York State Department of Environmental Conservation (NYSDEC) agreed upon these changes in a letter dated December 2, 2009. Because of changes in NYSDEC reporting requirements, AECOM Technical Services, Inc. (AECOM) has prepared this Periodic Review Report (PRR) on behalf of NFG rather than an O&M Report to meet the reporting requirements of the O&M Plan. This PRR summarizes activities that have occurred from February 2012 to February 2013. The required Institutional and Engineering Controls Certification Form is included in Attachment 1.

1.0 Introduction

The Scajaquada Creek site is the riparian portion of the Iroquois Gas/Westwood Pharmaceutical (IG/WP) site in a mixed industrial and residential area of Buffalo, New York. The site comprises a 1,600-foot long reach of Scajaquada Creek. Manufactured gas plant (MGP) operations were conducted on the site from the 1890's to the 1950s and gas storage continued until 1972. Investigations indicated that soil and groundwater were impacted with chemicals associated with gas manufacturing processes and that contaminants were migrating into the creek. Remedial activities (i.e., sheet pile wall installation, sediment excavation, capping and installation of DNAPL recovery systems) have been performed since 1999 to address these impacts.

This PRR presents and evaluates the results of O&M activities performed at the site over the past year and since the remedial action was completed in 2002. The O&M activities include inspections of the cap, the creek banks, and the site restoration elements and maintenance checks on the Northern and Southern DNAPL Systems. Data collection during performance of these activities is presented in Attachment 2 and evaluation of the effectiveness of the remedy is presented below.

The remedial action has been operated in accordance with the provisions of the O&M Plan and engineering controls remain intact and effective except as noted below. Observations show that the cap continues to be effective in preventing human and environmental contact with contaminants

related to past MGP operations. The DNAPL recovery program continues and both recovery systems continue to function properly.

2.0 Site Overview

The Scajaquada Creek site lies in a mixed industrial and residential area of Buffalo. The site comprises a 1,600-foot long reach of Scajaquada Creek extending from a location about 400 feet northeast of the former (abandoned) Conrail Railroad Bridge downstream to the West Avenue Bridge. The site comprises an area of about 2.5 acres. Much of the site is bounded by steep banks. Portions of the site are beneath the elevated I-198 Scajaquada Expressway. The Expressway is supported by concrete piers which are set in the creek bed and along the banks.

The creek flows through a zone of active and inactive industrial facilities upstream and downstream of the site. Untreated sewage has been observed flowing into Scajaquada Creek from combined sewers in upstream locations and through the outfall on the east bank of the site. The creek normally flows southwest into the Black Rock Canal of the Niagara River, approximately one-half mile downstream. When the level of the Black Rock Canal rises above the creek level, however, the flow direction at the site is reversed.

In 1996, NFG constructed a sheet pile wall along the eastern bank of the creek, adjacent to the IG/WP property. The sheet pile wall was an initial component of the remedial action. NFG conducted the sediment remedial design in 1997/1998 and received approval for the design in June 1998. Remedial excavation and capping was started in July 1998 and completed in May 1999. Installation and startup of the Southern DNAPL recovery system was completed in June 1999. Installation and startup of the Northern DNAPL recovery system was completed in August 2002. In summary, the components of the selected remedy included:

- Installation of a sheet pile wall across the 70 foot width of the creek close to West Avenue. Approximately 450 linear feet of steel sheet piling was installed
- Excavation of the creek bottom and off-site disposal of 18,976 cubic yards of contaminated sediment and debris. The overall goal of excavation was to remove sediments with concentrations of PAHs greater than 50 mg/kg within the site boundary, taking into account the physical limitations at the site.
- Capping of the creek bottom resulted in a horizontal barrier along the 1,600 foot reach of Scajaquada Creek. The cap consists of geosynthetic clay liner (GCL), angular sand, geotextile, and anchoring stone.
- Installation of two DNAPL recovery systems near the West Avenue Bridge and the Railroad Bridge
- Implementation of an O&M Plan as an institutional control to verify and ensure the performance of the remedial systems

No significant changes have been made to the remedy since remedy selection.

In 2010, NFG identified damage to the sediment cap armor layer along the sheet pile wall on the east bank of the river. In order to address this damage, in August and September 2011, NFG completed repairs to the cap's armor stone protective layer. The re-construction of the armored bank was completed using excavators stationed at the top of the bank and divers working in the

creek. Work in the creek was performed under the provisions of a Protection of Waters permit (Permit No. 9-1402-00813/00003) issued by NYSDEC and an approval by the Army Corps to perform the work under the provisions of Nationwide Permit No. 3. A more detailed description of the work was provided in the 2011 PRR.

3.0 Evaluate Remedy Performance, Effectiveness, and Protectiveness

The overall goal of the remedial work at the Scajaquada Creek site was to provide a remedy which:

- Was protective of human health and the environment
- Did not damage structures or properties
- Was financially practicable.

The objectives of the excavation operation were to remove the required sediments without releasing contaminants outside of the work area. The remedy integrated removal and isolation technologies to achieve this goal.

Preventing human contact with the impacted material was addressed by excavating sediments from the creek; capping areas where impacted material was left in place; and providing protection for workers. The effectiveness of the remedial action in meeting these objectives is evaluated by performing an annual inspection to verify that engineering controls remain intact and that site use has not changed. The results of this year's inspection indicate that the cap remains intact and that the remedy continues to be effective and protective.

Preventing leaching of impacted material to the site was addressed by installing a sheet pile wall; capping areas where impacted material was left in place; and installing two DNAPL recovery systems. The effectiveness of the remedial action in meeting these objectives is evaluated by performing an annual inspection on the cap and the recovery systems. As described above, the site inspection found that engineering controls, including the sediment cap and NAPL collection systems, remain intact and effective.

DNAPL volumes have been collected from June 24, 1999 through April 18, 2012. This data is presented in Attachment 2. DNAPL flow in the Southern System has reduced from the original flows at system startup, approximately 4.4 gallons per day (gpd) to 0.8 gpd, although there is variability from year to year. The original flow at startup from the Northern System was approximately 0.17 gpd, but from 2009 through 2011, there was no measureable flow of NAPL. This year a DNAPL flow of 0.25 gpd was measured in the Northern System.

4.0 O&M Plan Compliance Report

The components of the O&M program for the Scajaquada Creek site include inspections of the cap and DNAPL recovery systems, maintenance checks on the DNAPL recovery systems, maintenance and repair of engineering controls, field observations and reporting. Details of this program are described in the February 8, 2005 O&M Plan and a letter from NYSDEC dated December 2, 2009 approving changes in the O&M program. This report summarizes O&M activities performed at the site from February 2012 to February 2013.

O&M activities completed from February 2012 through February 2013 include:

- An annual site inspection performed on April 19, 2012
- Operation of the DNAPL recovery system
- Monthly inspections of the DNAPL recovery system and sediment cap

Constructed Sediment Cap Observations

A site inspection was conducted on April 19, 2012 by Thomas P. Clark, P.E. of AECOM. No significant areas of cap disruption or erosion were noted. Repairs to the armor stone on the east side of Scajaquada Creek made in 2011 were intact and effective. It was noted during site visits by NFG personnel in 2012 that vegetation has not been established in areas on the bank that were disturbed during armor repairs. Erosion control fabric installed during construction remains in place and has prevented bank erosion. Two small areas of exposed geotextile were identified on the west side of the creek.

In January 2013, NFG was notified by GES of the discovery of seeps through construction lift holes in the sheet pile wall. The seeps will be tested in the future for laboratory analysis. NFG is working in conjunction with the DEC on this discovery.

DNAPL Systems Operations

The Northern and Southern DNAPL collection systems were checked monthly by National Fuel Gas staff between February 2012 and February 2013. During these visits the automatic timer was adjusted to maximize the flow of DNAPL while minimizing the flow of groundwater, and tubing was advanced or replaced as needed to optimize the performance of the system's peristaltic pump.

The Southern DNAPL collection system was observed to function properly during the period of this report. Maintenance activities performed on the Southern System during this period include the following:

- April 18, 2012 – Measured NAPL levels

The Northern DNAPL collection system was observed to function properly during the period of this report except as noted below. Maintenance activities performed on the Northern System during this period include the following:

- March 1, 2012 – Replaced light bulb
- April 18, 2012 – Measured NAPL levels
- May 31, 2012 – Changed tubing
- June 14, 2012 – Replaced float switch
- July 31, 2012 – No power to pump. Removed pump for repair.
- August 9, 2012 – Replaced rebuilt pump

- October 18, 2012 – Reset clock
- November 16, 2012 – Replaced fan motor

On April 18, 2012, NAPL level measurements were taken in the Northern and Southern Systems. Based on those measurements 77 gallons were recovered by the Northern System and 247 gallons were collected by the Southern System in 2012. Volumes were calculated by taking measurements in the tanks with an oil/water interface probe. The volumes of DNAPL recovered to date were determined to be approximately 1,606 gallons by the Southern System and 472 gallons by the Northern System. System monitoring logs are included in Attachment 2.

Conclusions

The O&M program at the Scajaquada Creek site is being implemented in accordance with the provisions of the O&M Plan. The results of the site inspection indicate that engineering and institutional controls continue to be effective in meeting remedial objectives.

5.0 Overall PRR Conclusions and Recommendations

As discussed above, the O&M program is being implemented in accordance with the provisions of the O&M Plan, including the July 2009 modification. The results of the site inspection indicate that engineering and institutional controls remain intact and continue to be effective in meeting remedial objectives. The results of system monitoring and maintenance show that the Northern and Southern NAPL collection systems continue to operate as designed.

Please call Thomas Clark with questions at 978-905-2161.

Regards,

Thomas P. Clark, P.E.
Senior Engineer

Attachments:
Attachment 1 – Institutional and Engineering Controls Certification Form
Attachment 2 – System Monitoring Logs
Attachment 3 – Photographs

CC: B. Sadowski – NYSDEC, Buffalo
J. Clark, T. Alexander – NFG
K. Hogan – PLHB&B

Attachment 1

Institutional and Engineering Controls Certification Form

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 915141B

Site Name NFG - Iroquois Gas/Westwood Pharm. Riparian

Site Address: Scajaquada Creek, Upstream of West Ave. Bridge Zip Code: 14213
City/Town: Buffalo
County: Erie
Site Acreage: 2.5

Reporting Period: February 15, 2012 to February 15, 2013

	YES	NO
1. Is the information above correct?	☒	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☒
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☒
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☒
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☒

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Commercial and Industrial	☒	☐
7. Are all ICs/ECs in place and functioning as designed?	☒	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____
Signature of Owner, Remedial Party or Designated Representative Date

SITE NO. 915141B **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
	No Owner	
		O&M Plan

Box 4

Description of Engineering Controls

Parcel	Engineering Control
	Cover System
	Groundwater Treatment System
	Subsurface Barriers

Control Description for Site No. 915141B

Parcel:

In March 1994, a Record of Decision (ROD) was issued for this site. The remedial action at this site was completed between 1998 and 2001. Engineering controls for a section of Scajaquada Creek include: (1) 1,600 feet of 18-inch thick stream bed cap consisting of a geo-synthetic clay liner overlain by sand, geotextile and stone; and (2) two DNAPL extraction wells to recover DNAPL from the substrata of the creek. Post-closure maintenance of the cap, creek banks and pumping systems are required to ensure long term effectiveness of the remedy. There is no SBL identification for this parcel.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☒	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☒	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____

Signature of Owner, Remedial Party or Designated Representative — Date

IC CERTIFICATIONS
SITE NO. 915141B

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Jay W Lesch at 6363 Main St Williamsville NY 14221
print name print business address

am certifying as _____ (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ 3/12/13
Signature of Owner, Remedial Party, or Designated Representative Rendering Certification Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Thomas P. Clark (print name) at AECOM, 250 Apollo Dr., Chelmsford, MA 01824 (print business address)

am certifying as a Professional Engineer for the National Fuel Gas Distribution Company (Owner or Remedial Party)

Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

Date 3/1/13

Attachment 2

System Monitoring Logs

Scajaquada Creek DNAPL System Monitoring Log

NORTHERN SYSTEM

Date	Initials	Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery)					Operator's Notes
		Manhole rim to top of LNAPL (ft)	Manhole rim to top of Water (ft) (estimated)	Manhole rim to top of DNAPL (ft)	Manhole rim to bottom of Tank (ft)	LNAPL (gal)	Water (gal)	DNAPL (gal)	Total (gal)	Water Increase (gal)	NAPL Increase (gal)	% NAPL	NAPL (gpd)	Total Flow (gpd)	
28-Nov-01	mrh/cd	8.89	8.89	8.89	8.89	0	0	0	0	0	0	0%	0.00	0.0	Develop well with hand operated diaphragm pump. Measurements are approximate.
7-Feb-02	hs/jc	8.62	8.62	8.85	8.89	0	71	12	83	71	12	15%	0.17	1.2	Pump well by hand.
8-Mar-02	hs/jc	8.61	8.61	8.85	8.89	0	74	12	86	3	0	0%	0.00	0.1	Pump well by hand.
10-Apr-02	mrh	8.59	8.59	8.84	8.89	0	77	15	93	3	3	50%	0.09	0.2	Pump well by hand.
7-May-02	hs/jc	8.51	8.51	8.83	8.89	0	99	19	117	22	3	12%	0.11	0.9	Hand pump not working well.
25-Jun-02	cd	8.51	8.51	8.83	8.89	0	99	19	117	0	0	0%	0.00	0.0	Hand pump not working. Discarded.
2-Aug-02	mrh/jc	8.51	8.51	8.83	8.89	0	99	19	117	0	0	0%	0.00	0.0	Begin peristaltic startup. Setting #6.5, 2hr 15 min per day
8-Oct-02	mrh/jc	7.43	7.44	8.55	8.89	3	343	105	451	244	90	27%	1.34	5.0	Additional system checks/adjustments made by J Clark on 8/15, 8/21, 8/27, 9/09, and 9/12.
4-Feb-03	mrh/jc	7.36	7.37	8.52	8.89	3	355	114	472	12	9	43%	0.08	0.2	Numbers approximate. Surface of contents frozen. Turn on heat.
10-Apr-03	mrh/jc	7.28	7.29	8.50	8.89	3	374	120	497	19	6	25%	0.10	0.4	Pumping mostly water, changed timer to 30 min/week.
23-Jul-03	mrh	7.05	7.06	8.49	8.89	3	442	124	568	68	3	4%	0.03	0.7	Additional system checks/adjustments made by J Clark on 5/5, 5/20, 6/12, and 6/24.
23-Apr-04	mrh	6.90	6.91	8.42	8.89	3	466	145	614	25	22	47%	0.08	0.2	Additional system checks/adjustments made by NFG on 8/01, 8/06, 9/05, 9/08, 9/11, 9/17, 9/25, 10/30, 11/18.
24-Nov-04	jl, jc	6.66	6.67	8.41	8.89	3	537	148	689	71	3	4%	0.01	0.3	O/W interface probe not working accurately, depth of DNAPL is estimated.
19-Apr-05	mh,jc,jl,sh	6.45	6.46	8.39	8.89	3	596	154	753	59	6	10%	0.04	0.4	Additional system checks/adjustments made by J Clark on 11/24, 1/20/2005, 3/7, 3/11, 4/12, 4/18.
26-Oct-05	mrh, jc	6.33	6.34	8.30	8.89	3	605	182	790	9	28	75%	0.15	0.2	New OWI probe, but readings inconsistent with previous readings. System checks by NFG 5/11, 6/24, 7/28, 8/25, 10/06.
22-Mar-06	mrh, jc	6.20	6.21	8.23	8.89	3	624	204	831	19	22	54%	0.15	0.3	Additional system checks by NFG 10/26/05, 12/14/05, 1/6/06, 2/24/06.
24-Oct-06	mrh, jc	5.20	5.21	7.89	8.89	3	828	309	1139	204	105	34%	0.49	1.4	Depth to NAPL reading is approximate. Additional system checks by NFG 5/11, 6/29, 7/26, 9/07.
25-Apr-07	mrh, jc	4.90	4.91	7.80	8.89	3	892	337	1232	65	28	30%	0.15	0.5	Depth to NAPL reading is approximate. Additional system checks by NFG 10/31/2006, 11/16/2006, 3/02/2007.
30-Oct-07	dms, jc	4.68	4.69	7.70	8.89	3	929	367	1300	37	31	45%	0.16	0.4	Depth to NAPL reading is approximate. Tubing changed out.
13-May-08	dms, jc	3.46	3.47	7.65	8.89	3	1291	383	1677	361	15	4%	0.08	1.9	Depth of DNAPL is estimated. Additional system checks by NFG on 1/08/08, 3/20/08 and 5/08/08. Tank pumped out.
25-Mar-09	jl, dz	8.75	8.76	8.88	8.89	3	37	3	43	34	9	20%	0.03	0.1	Data for depth to DNAPL changed to prevent table indicating a reduction in NAPL volume. Actual measurement 8.87.
8-Jun-09	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Covered exposed fabric on the bank and on the creek bed with angular stone.
10-Jul-09	tr, jc	8.46	8.47	8.88	8.89	3	127	3	133	90	0	0%	0.00	0.8	O/W interface probe is working accurately
23-Sep-09	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	J Clark changed pum run time from 45 minutes to 30 minutes.
6-Oct-09	tr, jc	8.08	8.09	8.88	8.89	3	244	3	250	117	0	0%	0.00	1.3	A skim of LNAPL and DNAPL were present, the thickness (not measureable) is estimated to be 0.01 ft.
14-Jan-10	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	J. Clark repaired air vent hose.
24-Feb-10	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Repaired hose.
26-Mar-10	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Fabric visible on east side of creek.
21-Apr-10	tr, jc, tc	8.00	8.01	8.88	8.89	3	269	3	275	25	0	0%	0.00	0.1	A skim of LNAPL and DNAPL were present, the thickness (not measureable) is estimated to be 0.01 ft. Damage to armor stone observed by sheet pile wall.
21-Aug-10	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Changed tubing.
21-Oct-10	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Reset time.
Various	jc	---	---	---	8.89	---	---	---	---	---	---	---	---	---	Additional checks made by J. Clark on 5/20, 6/24, 7/22, 9/16, 11/18, 12/17, and 1/27/11. No adjustments made.
7-Apr-11	tr, jc	4.27	4.28	8.88	8.89	3	1420	3	1427	1152	0	0%	0.00	3.3	A skim of LNAPL and DNAPL were present, the thickness (not measureable) is estimated to be 0.01 ft.
16-Jun-11	jc	8.89	8.89	8.89	8.89	0	0	0	0	---	---	---	---	---	Tank pumped out. NAPL and water transported to offsite treatment facility.
18-Apr-12	el, jc	8.85	8.85	8.86	9.11	0	3	77	80	3	77	96%	0.25	0.3	Measured water and NAPL levels.
Cumulative gallons :										2711	472				
										Water	NAPL				

Scajaquada Creek DNAPL System Monitoring Log

SOUTHERN SYSTEM

Date	Initials	Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery)					Operator's Notes
		Manhole rim to top of LNAPL (ft)	Manhole rim to top of Water (ft) (estimated)	Manhole rim to top of DNAPL (ft)	Manhole rim to bottom of Tank (ft)	LNAPL (gal)	Water (gal)	DNAPL (gal)	Total (gal)	Water Increase (gal)	NAPL Increase (gal)	% NAPL	NAPL (gpd)	Total Flow (gpd)	
24-Jun-99	mrh	9.05	9.05	9.05	9.05	0	0	0	0	0	0	0%		0	90% construction complete, begin initial testing
29-Jun-99	mrh/day	6.80	6.80	9.05	9.05	0	695	0	695	695	0	0%		139	Complete initial system test, PW2003 has silt damage
23-Jul-99	mrh/day	6.80	6.80	9.05	9.05	0	695	0	695	0	0	0%		0	Recommence shakedown with peristaltic pump
30-Jul-99	day	6.34	6.34	8.95	9.05	0	806	31	837	111	31	22%	4.41	20	Shakedown, flow adjustment
26-Aug-99	jhe	5.90	5.90	8.73	9.05	0	874	99	973	68	68	50%	2.52	5	Routine system check, slow drip from tank bung noted (0.5 gpd?)
16-Sep-99	mrh/bdc	5.79	5.80	8.75	9.05	3	911	93	1007	37	-3	---		2	Significant (2 gpd?) DNAPL loss through bung drip, PW2003 reinstalled
28-Sep-99	mrh/cc	3.30	3.32	8.61	9.05	6	1633	136	1775	723	46	6%	3.86	64	Tank emptied (was full, pump off), bung replaced,
28-Sep-99	mrh/cc	9.05	9.05	9.05	9.05	0	0	0	0	0	0	0%		0	vault cleaned, flow setting reduced to 4.5
3-Oct-99	mrh	8.75	8.75	9.03	9.05	0	86	6	93	86	6	7%	1.24	19	Measurements are visual estimates only, flow setting reduced to 3.5
11-Oct-99	cc	8.75	8.75	9.03	9.05	0	86	6	93	0	0	0%		0	No flow observed, flow setting increased to 5.0
29-Oct-99	cc	6.81	6.81	8.98	9.05	0	670	22	692	584	15	3%	0.86	33	Flow setting decreased to 4.0
2-Dec-99	mrh/day	6.09	6.10	8.77	9.05	3	824	86	914	154	68	31%	2.00	7	Flow setting increased to 4.7 (24 gpd), timer installed/set for 1pm to 2pm operation
16-Dec-99	cc	---	---	---	---	---	---	---	---	---	---	---		---	Pump running but no flow, Timer reset for 3 hr per day operation
9-Mar-00	mrh/day	6.09	6.10	8.89	9.05	3	861	49	914	37	-37	---		0	PW2000 running but no flow, Peristaltic installed (2 hr/day), DNAPL thickened over time
11-Apr-00	mrh/day	4.71	4.73	8.82	9.05	6	1263	71	1340	401	25	6%	0.75	13	New peristaltic purchased/installed. Flow setting #7 (for 2 hr/day).
1-May-00	mrh/dms	4.62	4.64	8.80	9.05	6	1284	77	1368	22	6	22%	0.31	1	No flow (tubing collapsed). Repaired.
4-May-00	day/jc	4.62	4.64	8.80	9.05	6	1284	77	1368	0	0	0%		0	No flow (tubing leak). Tank emptied. System turned off.
8-May-00	mrh/jtf	9.05	9.05	9.05	9.05	0	0	0	0	0	0	0%		0	Original tubing replaced with silicon. System restarted at flow setting #3 (for 2 hr/day).
8-Jun-00	mrh/day	8.55	8.56	8.98	9.05	3	130	22	154	130	25	16%	0.80	5	Backfill settled around vault. Total depth shallow; measurements estimated. Tubing adjusted.
10-Jul-00	mrh/dms	8.10	8.11	8.90	9.05	3	244	46	293	114	25	18%	0.77	4	Tubing was worn; adjusted.
25-Aug-00	day	7.30	7.31	8.80	9.05	3	460	77	540	216	31	12%	0.67	5	Tubing adjusted.
20-Oct-00	mrh	6.25	6.26	8.64	9.05	3	735	127	865	275	49	15%	0.88	6	Tubing worn; adjusted.
30-Nov-00	mrh	5.75	5.77	8.55	9.05	6	858	154	1019	124	31	20%	0.75	4	Tubing worn; adjusted. Flow rate setting reduced from 3.0 to 1.5; timer not changed.
18-Jan-01	mrh	5.75	5.77	8.55	9.05	6	858	154	1019	0	0	---		0	Pump starts rough and sounds bad. Pump removed and sent in for repairs.
7-Feb-01	mrh/hs	5.75	5.77	8.55	9.05	6	858	154	1019	0	0	0%		0	Temporary FloJet pump installed but insufficient NPSH due to low creek elevation.
30-Mar-01	mrh	5.75	5.77	8.55	9.05	6	858	154	1019	0	0	0%		0	Peristaltic (geopump) installed, full speed, 600 rpm, system OK. NAPL is hi viscocity/settled.
10-Apr-01	mrh	5.70	5.72	8.51	9.05	6	861	167	1034	3	12	80%	1.12	1.4	3/16" id tubing replaced with 3/8" id tubing. Float switch replaced (plus relay).
18-May-01	dms/jc	5.65	5.68	8.52	9.05	9	877	164	1050	15	0	0%	0.00	0.4	Tubing worn and soft; adjusted.
30-Aug-01	mrh/hs	5.53	5.55	8.39	9.05	6	877	204	1087	0	37	100%	0.36	0.4	NAPL appears to be accumulated in well. Timer set to 3 hrs/day. Original peristaltic re-installed.
3-Oct-01	hs/jc	5.46	5.48	8.35	9.05	6	886	216	1108	9	12	57%	0.36	0.6	NAPL may still be accumulated in well. Timer increased to 4 hrs/day.
6-Nov-01	hs/jc	5.30	5.32	8.27	9.05	6	911	241	1158	25	25	50%	0.73	1.5	Additional NAPL purged from well after readings taken. Timer decreased to 3 hrs/day.

Scajaquada Creek DNAPL System Monitoring Log

SOUTHERN SYSTEM

Date	Initials	Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery)					Operator's Notes
		Manhole rim to top of LNAPL (ft)	Manhole rim to top of Water (ft) (estimated)	Manhole rim to top of DNAPL (ft)	Manhole rim to bottom of Tank (ft)	LNAPL (gal)	Water (gal)	DNAPL (gal)	Total (gal)	Water Increase (gal)	NAPL Increase (gal)	% NAPL	NAPL (gpd)	Total Flow (gpd)	
7-Feb-02	hs/jc	3.89	3.91	8.22	9.05	6	1331	256	1593	420	15	4%	0.17	4.7	Adjusted peristaltic tubing.
8-Mar-02	hs/jc	3.81	3.83	8.17	9.05	6	1340	272	1618	9	15	62%	0.53	0.9	Adjusted peristaltic tubing.
10-Apr-02	mrh	3.43	3.45	7.88	9.05	6	1368	361	1735	28	90	76%	2.71	3.6	Adjusted tubing. Installed piston pump for one day test (then removed). Timer increased to 4 hrs.
7-May-02	hs/jc	3.15	3.17	7.82	9.05	6	1436	380	1822	68	19	21%	0.69	3.2	Tank full.
7-May-02		9.05	9.05	9.05	9.05	0	0	0	0	---	---	---		---	Tank pumped out.
25-Jun-02	cd	6.00	6.02	9.02	9.05	6	926	9	942	926	15	2%	0.32	19.2	Depth's estimated. Pump set at #4, 3 hrs/day
2-Aug-02	mrh/jc	3.15	3.17	9.00	9.05	6	1800	15	1822	874	6	1%	0.16	23.2	Tank full, mostly water.
6-Sep-02	jc	3.15	3.17	9.00	9.05	6	1800	15	1822	0	0	0%	---	0.0	Tank Emptied.
6-Sep-02		9.05	9.05	9.05	9.05	0	0	0	0	0	0	---	---	---	
8-Oct-02	mrh/jc	8.98	8.98	8.98	9.05	0	0	22	22	0	22	100%	0.68	0.7	Pump removed for repair
18-Nov-02	cd	8.98	8.98	8.98	9.05	0	0	22	22	0	0	0%	---	0.0	Pump reinstalled
4-Feb-03	mrh/jc	4.32	4.32	8.95	9.05	0	1430	31	1460	1430	9	1%	0.12	18.4	Tank again full of mostly water (timer was left on manual?). Tank emptied.
4-Feb-03		9.05	9.05	9.05	9.05	0	0	0	0	---	---	---	---	---	
12-Mar-03	jc	9.00	9.00	9.00	9.05	0	0	15	15	0	15	100%	0.43	0.4	Pump running fast, so removed for evaluation/repair.
10-Apr-03	mrh/jc	9.00	9.00	9.00	9.05	0	0	15	15	0	0	0%		0.0	Pump reinstalled: runs fast/variable with no load, runs OK with flow load. Timer set to 30 min/day, speed 8.
23-Jul-03	mrh/jc	8.78	8.78	8.78	9.05	0	0	83	83	0	68	100%	0.51	0.7	Additional system checks/adjustments made by J Clark on 5/5, 5/20, 6/12, and 6/24.
23-Apr-04	mrh	8.05	8.06	8.55	9.05	3	151	154	309	151	74	33%	0.27	0.8	Additional system checks/adjustments made by NFG on 8/01, 8/06, 9/05, 9/08, 9/11, 9/17, 9/25, 10/30, 11/18.
24-Nov-04	jl,jc	7.31	7.32	8.54	9.05	3	377	157	537	225	3	1%	0.01	1.1	O/W Interface probe not acting precisely, actual DNAPL volume probably greater.
19-Apr-05	mh,jc,jl,sh	7.19	7.20	8.43	9.05	3	380	191	574	3	34	92%	0.23	0.3	Additional system checks/adjustments made by J Clark on 11/24, 1/20/2005, 3/7, 3/11, 4/12, 4/18.
27-Oct-05	mrh, jc	6.96	6.97	8.20	9.05	3	380	262	645	0	71	100%	0.37	0.4	New OWI probe, but readings inconsistent with previous readings. System checks by NFG 5/11, 6/24, 7/28, 8/25, 10/06.
22-Mar-06	mrh, jc	6.78	6.79	8.02	9.05	3	380	318	701	0	56	100%	0.38	0.4	Additional system checks by NFG 10/26/05, 12/14/05, 1/6/06, 2/24/06.
24-Oct-06	mrh, jc	4.90	4.91	7.38	9.05	3	763	516	1281	383	198	34%	0.91	2.7	Depth to NAPL reading is approximate. Additional system checks by NFG 5/11, 6/29, 7/26, 9/07.
2-Mar-07	jc, cb	3.36	3.37	7.15	9.05	3	1167	587	1757	404	71	15%	0.55	3.7	Pump turned off 3/02/07 because tank near full. Readings taken **4/25/07**. Depth to DNAPL reading is approximate.
23-Jun-07		9.05	9.05	9.05	9.05	0	0	0	0	---	---	---	---	---	Tank pumped out.
30-Oct-07	dms, jc	8.55	8.56	9.01	9.05	3	139	12	154	139	15	10%	0.06	1.2	Depth to DNAPL reading is approximate.
13-May-08	dms, jc	---	---	---	---	---	---	---	---	---	---	---	---	---	Data appears to be invalid.
25-Mar-09	jl, dz	7.90	7.91	8.90	9.05	3	306	46	355	167	34	17%	0.07	0.4	O/W interface probe is working accurately
10-Jul-09	tr, jc	7.73	7.74	8.71	9.05	3	300	105	408	300	108	27%	1.01	0.2	O/W interface probe is working accurately
6-Oct-09	tr, jc	7.23	7.24	9.04	9.05	3	556	3	562	556	6	1%	0.07	0.2	A skim of LNAPL and DNAPL were present, the thickness (not measureable) is estimated to be 0.01 ft.
21-Apr-10	tr, jc	6.30	6.31	8.40	9.05	3	645	201	849	645	188	23%	0.96	0.3	A skim of LNAPL was present, the thickness (not measureable) is estimated to be 0.01 ft.
7-Apr-11	tr, jc	5.40	5.40	8.05	9.05	0	818	309	1127	173	105	38%	0.30	0.8	A skim of LNAPL was present, the thickness (not measureable) is estimated to be 0.01 ft.
16-Jun-11	jc	9.05	9.05	9.05	9.05	0	0	0	0	---	---	---	---	---	Tank pumped out. Water and NAPL shipped offsite for disposal.
18-Apr-12	el	6.60	6.60	8.30	9.10	0	525	247	772	525	247	32%	0.80	2.5	
								Cumulative gallons :		10,557	1,606				
										Water	NAPL				

Attachment 3

Photographs

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
National Fuel Gas Distribution Corp.	Scajaquada Creek Former MGP Site, Buffalo, New York	60137321

Photo No. 1	Date: 4/19/12

Direction Photo Taken:

Looking east from bicycle path

Description:

Gabions at outfall structure and armor stone by sheet pile wall. Note erosion control blankets on bank slope.

Photo No. 2	Date: 4/19/12

Direction Photo Taken:

Looking east from bicycle path

Description:

Sheet pile wall and armor stone. Note erosion control blankets on bank slope.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
National Fuel Gas Distribution Corp.	Scajaquada Creek Former MGP Site, Buffalo, New York	60137321

Photo No. 3	Date: 4/19/12

Direction Photo Taken:

Looking west from top of west bank

Description:

Erosion control blanket on slope

Photo No. 4	Date: 4/19/12

Direction Photo Taken:

Looking east from top of west bank near West Street

Description:

Area where armor stone was added in 2011

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
National Fuel Gas Distribution Corp.	Scajaquada Creek Former MGP Site, Buffalo, New York	60137321

Photo No. 5	Date: 4/19/12

Direction Photo Taken:

Looking south

Description:

Subaqueous cap area south of the Conrail Bridge

Photo No. 5	Date: 4/19/12

Direction Photo Taken:

Looking north

Description:

Subaqueous cap area north of the Conrail Bridge