GEI Consultants

Consulting Engineers and Scientists

March 12, 2021

Brian Sadowski
Project Manager
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14209-2915

Re: Site Management Periodic Review Report (PRR) and IC/EC Certification Submittal (2020)
NFG - Iroquois Gas/Westwood Pharm Riparian Site: Site # 915141B
Scajaquada Creek, Upstream of West Ave. Bridge – Buffalo, NY

Dear Mr. Sadowski:

On behalf of National Fuel Gas (NFG), GEI Consultants, Inc. P.C. (GEI) is submitting the attached 2020 Periodic Review Report and IC/EC Certification Submittal for the Iroquois Gas/Westwood Pharm Riparian Site on Scajaquada Creek via email transmittal. A hardcopy will follow via UPS.

If you have any questions please contact the undersigned or Ms. Katie Hoelscher of NFG at (716) 667-5506.

Sincerely yours,
GEI CONSULTANTS, INC., P.C.

Richard H. Frappa, P.G.
Senior Consultant

Kelly R. McIntosh, Ph.D., P.E.
Senior Consultant

Enclosure
cc: C. Staniszewski, NYSDEC (1 electronic copy - email)
K. Hoelscher (1 hardcopy - UPS,1 electronic copy - email)
T. Alexander (1 electronic copy – email)

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GEI Consultants

Consulting
Engineers and
Scientists

Site Management Periodic Review Report and IC/EC Certification (2020)

Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B
Buffalo, New York

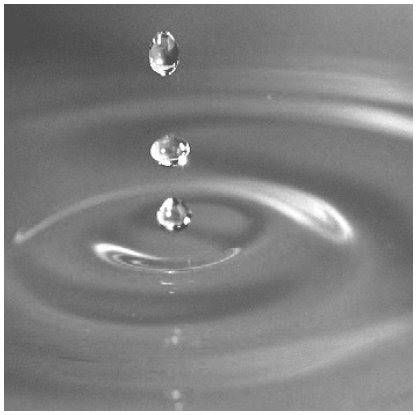
Submitted to:
NYSDEC Region 9

Submitted by:
GEI Consultants, Inc., P.C.
100 Sylvan Pkwy, Suite 400
Amherst, NY 14228

On behalf of:
National Fuel Gas
Williamsville, New York 14221

March 2021

Project 1403480



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1. Executive Summary

GEI Consultants, Inc., P.C. (GEI) was retained to conduct the Site Management Periodic Review Report (PRR) and IC/EC Certification submittal for the Iroquois Gas/Westwood Pharmaceutical Site located in Buffalo, New York. This PRR presents and evaluates the results of operation and maintenance (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 visual inspections of the Scajaquada Creek sediment cap, the creek banks and site restoration elements, creek cap repairs with placement of additional armor stone, and maintenance checks on the Northern and Southern DNAPL recovery systems.

In conducting this periodic review, GEI determined the components of the O&M Plan dated February 8, 2005 (serves as the Site Management Plan or {SMP}) and amended frequencies of inspections as agreed to in NYSDEC correspondence dated December 2, 2009 to assess compliance during this reporting period (February 15, 2020 through February 15, 2021):

- ICs/ECs have been in place and effective.
- Inspections were performed as required.

Based upon the inspections and compliance with the O&M Plan, the site remedy continues to meet the remedial objectives for the site.

2. Site Overview

2.1 Site Description

The Scajaquada Creek Site is the riparian portion of the Iroquois Gas/Westwood Pharmaceutical (IG/WP) Site and is situated in a mixed industrial and residential area of Buffalo, New York. The site comprises approximately 2.5 acres along a 1,600-foot long reach of Scajaquada Creek. The Site location and Site layout are shown on Figure 1 and Figure 2, respectively. Manufactured gas plant (MGP) operations were conducted at a former Iroquois Gas facility situated upgradient of the Site on property at 100 Forest Avenue from the 1890s 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 constituents were migrating into the creek. Remedial activities (i.e., sheet pile wall installation, sediment excavation, capping, and installation and operation of dense non-aqueous phase liquid (DNAPL) recovery systems) have been performed since 1999 to address these impacts.

2.2 Site Remedial Program Summary

In 1996, National Fuel 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 which separates the terrestrial remedial action (the responsibility of others) from the riparian remedial action. National Fuel conducted the riparian remedial action in two phases:
1. Sediment/soil removal and capping in Scajaquada Creek; and 2. DNAPL collection and removal from permeable soil below the creek sediment cap. The riparian remedial design was conducted in 1997/1998 and received approval in June 1998. Remedial excavation and capping began in July 1998 and completed in May 1999. Installation and startup of the southern DNAPL recovery system was completed in June 1999. Following completion of property access agreements, installation, and startup of the northern DNAPL recovery system was completed in August 2001. In summary, the components of the selected remedy include:

- Installation of a sheet pile barrier wall beneath a 70-foot width of the creek, close to West Avenue bridge.
- Installation of approximately 450 linear feet of a steel sheet pile barrier along the east bank of the creek (bordering property of former MGP operations).
- 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 resulting in a horizontal barrier (cap) along the 1,600 foot reach of Scajaquada Creek. The cap consists of geosynthetic clay liner (GCL), angular sand, geotextile, and anchoring (armor) stone.
- Installation of two DNAPL recovery systems near the West Avenue Bridge and the Conrail railroad bridge.
- Implementation of an O&M Plan as an institutional control to verify and ensure the performance of the remedial systems.

Excluding O&M activities, no significant changes have been made to the remedy since remedy selection.

Details of the Remedial Action are presented in the Final Engineering Report (FER), prepared by ThermoRetec (August 2000) with a supplemental FER prepared by Retec (November 2001).

2.3 O&M Plan

O&M requirements for the Site are documented in the NYSDEC-approved O&M Plan dated February 8, 2005 (O&M Plan) and a modification of monitoring frequency as described in a correspondence prepared by AECOM dated July 9, 2009 and approved by the NYSDEC by letter dated December 2, 2009. These documents serve as the Site Management Plan (SMP) for the site. Components of the SMP for the Scajaquada Creek Site include:

- inspection of the Scajaquada Creek sediment cap;
- inspection of the DNAPL recovery systems;
- maintenance checks on the operation of the DNAPL recovery systems;
- maintenance and repair of engineering controls; and
- field observations and reporting.

Each of these elements was conducted between February 15, 2020 and February 15, 2021.

3. Remedy Performance Evaluation

The remedial performance is evaluated based on the following:

1. Periodic inspection of the Scajaquada Creek sediment cap.
2. Periodic inspection of the DNAPL recovery systems.

3.1 Scajaquada Creek Sediment Cap

3.1.1 2020 Annual Inspection

The 2020 annual inspection of the Scajaquada Creek Sediment Cap was conducted by Mr. Richard Frappa, P.G. of GEI on April 29, 2020. Photographs of the inspection were discussed with and reviewed by Mr. Kelly McIntosh, P.E. of GEI. The annual visual inspection was performed to evaluate remedy effectiveness in protecting human health and the environment. The inspection also included the assessment of cap maintenance activities completed on February 10 and 11, 2020 which were documented in the 2019 PRR including earlier maintenance activities completed in 2015 (as shown on attached Figure 2 and in the photograph logs in Appendix A-1) and protectiveness of the sediment cap.

Sheen was not observed on Scajaquada Creek surface water nor was NAPL seepage seen along the eastern shoreline adjacent to the Westwood Terrestrial site. The GEI April 2020 inspection observations did not identify deficiencies in the capping system nor any incipient problems meriting corrective measures.

3.1.2 2020 Supplemental Inspections

During the 2020 remedy monitoring period, Lake Erie seiche conditions occurred during prolonged high winds during storm events in the months of November and December 2020. During seiche conditions on Lake Erie, surface water elevations of the lake along the Buffalo shoreline rise several feet causing surface water in creeks and streams rise. On November 19, 2020 and December 28, 2020 GEI conducted supplement site inspections with NFG staff to assess the condition of the remedy following seiche conditions that caused lake levels to rise in excess of 6 feet. Photographs taken during the two supplemental inspections are included in Appendix A-2. No deficiencies in the capping system were identified after these high water seiche conditions.

3.2 DNAPL Recovery Systems

The Southern and Northern DNAPL recovery systems (see Figure 2 for locations) were checked monthly by NFG staff with Allied Environmental or Sun Environmental facilitating closed space entry between February 2020 and February 2021. GEI periodically supported monthly system checks and provided recommended improvements in system function focusing on maximizing DNAPL volume collection while minimizing water volume collection. No changes to system operations were recommended to achieve this goal in 2020. Monthly system check are summarized below for the Southern and Northern DNAPL recovery systems. Systems information is logged in Appendix B.

3.2.1 Southern DNAPL Recovery System

The southern DNAPL recovery system was observed to function properly during the period of this report. Maintenance activities performed on the southern DNAPL recovery system during this period included: changing flexible tubing near the pump head in each vault, and resetting timers to Daylight Savings Time. No pump run time adjustments were performed during the 2020 PRR period.

DNAPL level measurements were recorded periodically from the collection tank of the southern DNAPL recovery system. During monthly inspection events conducted with GEI staff, depth to water and DNAPL, as well as calculated quantities were determined and are reported on the DNAPL recovery system monitoring log presented in Appendix B-1. Volumes were calculated by taking measurements in the tanks with a water level meter and also measuring the length of DNAPL staining on a weighted string lowered to the tank bottom and an electronic water level meter. The DNAPL volume recovered between February 2020 and February 2021 was approximately 256 gallons.

Actions Taken to Monitor System Function and Improve DNAPL Recovery (in addition to monthly checks):

- April 20, 2020 – Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank. The tubing in the peristaltic pump head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

- June 25, 2020 – Inspected system. The system was found to be in good operating condition.

- August 27, 2020 – Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank.

- October 20, 2020– Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank

- January 21, 2021 – Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank. The tubing in the peristaltic pump head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

The south vault DNAPL collection system continues to operate efficiently. Since operation startup in 1999, approximately 3,346 gallons of DNAPL have been collected by the south vault collection system.

3.2.2 Northern DNAPL Recovery System

Maintenance activities performed on the northern DNAPL recovery system during this period included: improving methods of obtaining DNAPL volume estimates, changing flexible tubing near the pump head as necessary, and resetting timers to Daylight Savings Time. No pump run timer setting adjustments were performed during the 2020 PRR period.

DNAPL level measurements were recorded periodically from the collection tank of the northern DNAPL recovery system. During monthly inspection events conducted with GEI staff, depth to water and DNAPL, as well as calculated quantities were determined and reported on the DNAPL recovery system monitoring log presented in Appendix B-2. Volumes were calculated by taking measurements in the tanks with a water level meter and also measuring the length of DNAPL staining on a weighted string lowered to the tank bottom and an electronic water level meter. The DNAPL volume recovered between February 2020 and February 2021 was approximately 93 gallons.

Actions Taken to Monitor System Function and Improve DNAPL Recovery (in addition to monthly checks):

- April 20, 2020 – Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank. The tubing in the peristaltic pump head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

- June 25, 2020 – Inspected system. The system was found to be in good operating condition. The tubing in the peristaltic pump head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

- October 20, 2020– Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank. The tubing in the peristaltic pump

head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

- January 21, 2021 – Inspected system to assess overall DNAPL collection volume and measured DNAPL collected in hanging pail inside tank. The tubing in the peristaltic pump head was inspected and found to be flattened and no longer functioning. The tubing was replaced.

NAPL recovery rates during the February 2020 to February 2021 period were generally consistent between assessment events.

Since operation startup in 2001, approximately 770 gallons of DNAPL have been collected by the north vault system.

4. IC/EC Compliance

4.1 IC/EC Requirements

ICs include the following.

- Implementation of Site O&M Plan.
- Monitoring and inspection to assess the performance and effectiveness of the remedy.

The Site is a New York State waterway and property use is limited to its function as a conveyance of surface water in the City of Buffalo.

ECs include the following.

- Sediment cap consisting of GCL overlain by sand, geotextile, and anchoring stone.
- Collection of mobile DNAPL below the sediment cap.
- Maintenance of the creek sediment cap and operation and maintenance of the DNAPL collection systems.

4.2 IC/EC Compliance

The NYSDEC-approved O&M Plan is in place. All required inspections were performed during this reporting period in accordance with the plan.

4.3 IC/EC Certification

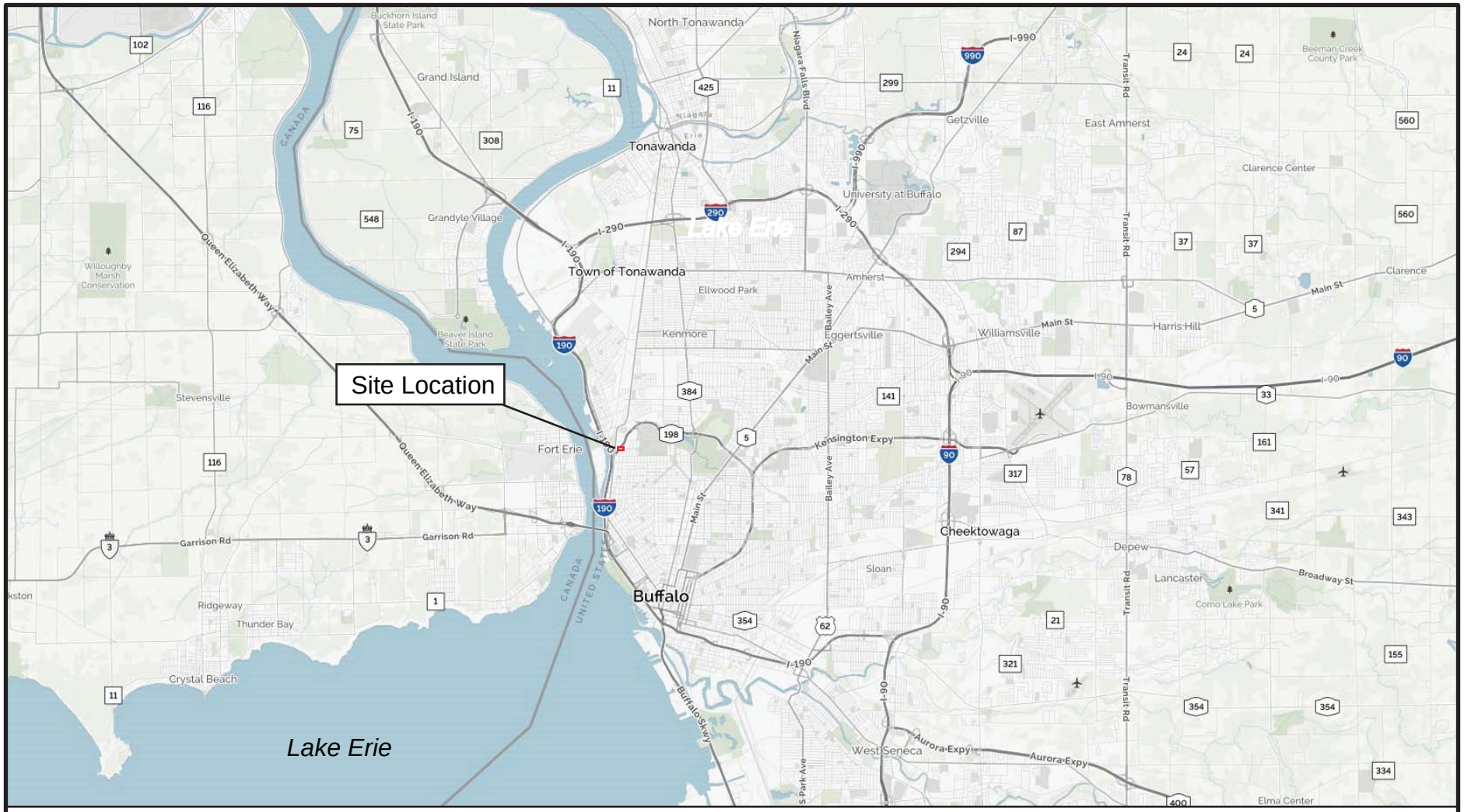
The IC/EC Certification is included in Appendix C.

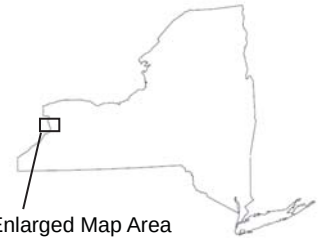
5. Conclusions and Recommendations

Each component of the O&M Plan dated February 8, 2005 and amended frequencies of inspections as agreed to in NYSDEC correspondence dated December 2, 2009, collectively regarded as the SMP, were in compliance during this reporting period (February 15, 2020 through February 15, 2021). The ICs/ECs have been in place and effective. Inspections and maintenance were performed as required.

Based upon the inspections and compliance with the SMP, the site remedy continues to meet the remedial objectives for the site.

Figures

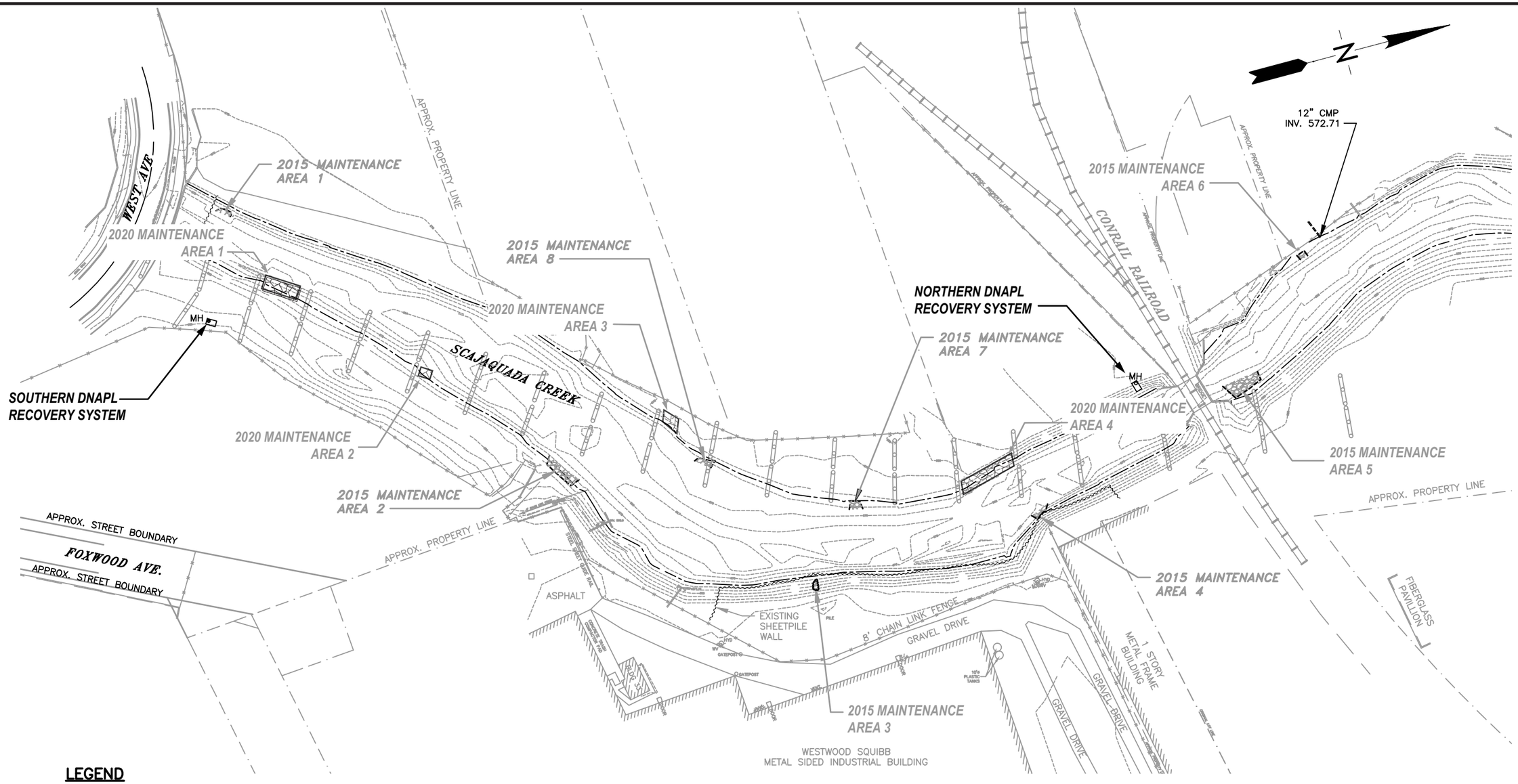




0 1 4

Scale
(miles, approximate)

National Fuel Gas Corporation	GEI Consultants	SITE LOCATION SCAJAQUADA CREEK SITE
Buffalo, New York	Project 1403480	March 2020 Figure 1



LEGEND

Approximate area of maintenance activities performed Nov. 18-20, 2015 and Feb. 10 and 11, 2020 Upland Boundary Surveyed)

Approximate limits of Dredge Cap. (Approximated from "Sediment Remediation" Drawings, RETEC Engineering, P.C., June 1998)

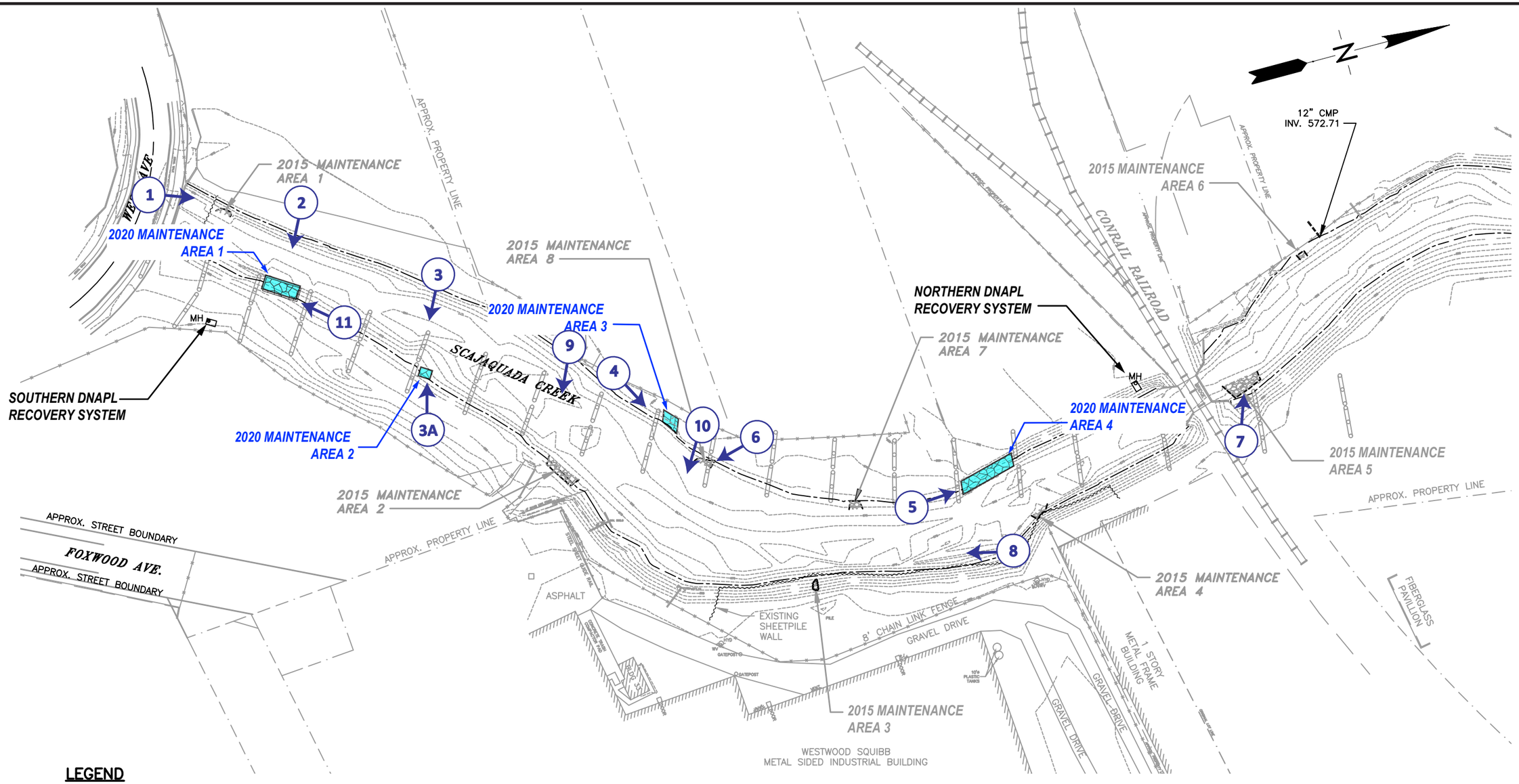
NOTES:
1. Base modified from original figure prepared by Clough, Harbrour & Associates from a September 1995 field survey and presented by AECOM in the Summary of 2016 Site Inspection Activities Report.
2. Property lines shown hereon are for information purposes only, and should not be used for the transfer of property. The property lines shown are depicted from a partial field boundary survey, record deeds and map information.

100' 0 100'
SCALE IN FEET

National Fuel Gas Corporation	GEI Consultants	SITE LAYOUT- SCAJAQUADA CREEK SITE
Buffalo, New York	Project 1403480	March 2020 Figure 2

Appendix A

Scajaquada Creek Cap Inspection Photographs and Observations



LEGEND

Approximate area of maintenance activities performed Nov. 18-20, 2015 and Feb. 10 and 11, 2020 (blue) Upland Boundary Surveyed)

Approximate limits of Dredge Cap. (Approximated from "Sediment Remediation" Drawings, RETEC Engineering, P.C., June 1998)

Location and Direction of April 29, 2020 photograph

NOTES:
1. Base modified from original figure prepared by Clough, Harbrour & Associates from a September 1995 field survey and presented by AECOM in the Summary of 2016 Site Inspection Activities Report.
2. Property lines shown hereon are for information purposes only, and should not be used for the transfer of property. The property lines shown are depicted from a partial field boundary survey, record deeds and map information.

100' 0 100'
SCALE IN FEET

National Fuel Gas Corporation	GEI Consultants	FIELD OBSERVATION PHOTO LOCATIONS- APRIL 29, 2020 SCAJAQUADA CREEK SITE
Buffalo, New York	Project 1403480	March 2021 Appendix A-1

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	1 of 11
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Photo 1. View looking northeast of west bank of creek at 2015 Maintenance Area 1. Vegetation and stone armor remain in place.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	2 of 11
		GEI Proj. No.	1403480

Photo 2. View looking east of east bank of creek at 2020 Maintenance Area 1. Rip rap remains in place.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	3 of 11
		GEI Proj. No.	1403480

Photo 3. East view and downslope view (Photo 3A) on east bank of 2020 Maintenance Area 2. Stone armor remains in place.

Photo 3A

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	4 of 11
		GEI Proj. No.	1403480

Photo 4. View looking at west bank at 2020 Maintenance Area 3. Stone armor remains in place. BMS Sheet Pile on east bank in far view of photo.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	5 of 11
		GEI Proj. No.	1403480

Photo 5. Closeup of west bank of 2020 Maintenance Area 4. Rip rap in good condition.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	6 of 11
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Photo 6. Southeast view of west bank at Maintenance Area 8, rip rap in good condition, no erosion on down slope of drain spout.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	7 of 11
		GEI Proj. No.	1403480

Photo 7. North view of Maintenance Area 5. No visible erosion. Rip rap and stone block in place.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	8 of 11
		GEI Proj. No.	1403480

Photo 8. Closeup view of Steel Sheet Pile along BMS Terrestrial Site. No visual NAPL seepage along entire length of sheet pile.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	9 of 11
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Photo 9. East bank view of 2015 Maintenance Area 2. No visible erosion.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	10 of 11
		GEI Proj. No.	1403480

Photo 10. View of west bank at BMS outfall with gabion baskets. No visible erosion or NAPL seepage.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection	**Date: 04/29/20**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	11 of 11
		GEI Proj. No.	1403480

Photo 11. South view of east bank north of South Vault showing rip rap and West Avenue Bridge. No visible erosion above or at creek bank.

Appendix A-2

Supplemental Observations (November 19, 2020 and December 28, 2020)

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection Supplemental Observations	**Date: 11/19/20 & 12//28/2020**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	1 of 2
		GEI Proj. No.	1403480

Supplemental periodic inspection on November 19, 2020 following high westerly wind event causing seiche conditions on Lake Erie causing high water backflow condition in Creek. No damage to cap observed.

FIELD OBSERVATION PHOTOGRAPHS

Project :	Iroquois Gas/Westwood Pharmaceutical Riparian Site No. 915141B - 2020 Creek Cover System Inspection Supplemental Observations	**Date: 11/19/20 & 12//28/2020**	
Client :	National Fuel Gas	**Report No. PRR'20**	
Photo by:	R. Frappa, P.G./**Reviewed by:** K. McIntosh, P.E.	**Page:**	2 of 2
		GEI Proj. No.	1403480

Supplemental periodic inspection on December 28, 2020 following high westerly wind event causing seiche conditions on Lake Erie causing high water backflow condition in Creek. No damage to cap observed.

Appendix B

DNAPL Recovery System Monitoring Logs

Appendix B-1

Southern DNAPL Recovery System

APPENDIX B-1 - SOUTHERN DNAPL RECOVERY SYSTEM

		Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery highlighted)					
Date	Initials	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)	Ave Recovery in GPD	Operator's Notes
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.
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.

Scajaquada Creek DNAPL Recovery System Monitoring Log

APPENDIX B-1 - SOUTHERN DNAPL RECOVERY SYSTEM

Date	Initials	Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery highlighted)					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)	Ave Recovery in GPD	
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	8.50	9.05	0	587	170	756	587	170	22%	0.55	2.5	Corrected depth to top of DNAPL and depth to bottom of tank measurements
29-Apr-13	tr, jc	6.12	6.12	8.50	9.05	0	735	170	905	148	0	0%	0	0.4	DNAPL measurement duplicated and accurate. Corrected depth to bottom of tank measurement.
23-May-13	jc	---	---	---	---	0	0	0	0	---	---	---	---	---	Tank pumped out. Water and NAPL shipped offsite for disposal.
23-Apr-14	el, jc	8.38	8.40	8.40	9.10	6	0	216	222	0	222	100%	0.66	0.7	Corrected depth to bottom of tank measurement.
21-May-15	kh	8.28	8.30	8.30	9.06	6	0	235	241	0	19	100%	0.05	0.0	Measurements by Op-Tech
20-Apr-16	kh	6.55	6.55	7.96	9.16	0	435	371	806	435	148	29%	0.20	0.39	Measurements by Op-Tech: weighted rope indicates 1.2 ft of DNAPL in tank. OWI probe did not sense DNAPL
20-Apr-17	kh, rf	6.55	6.55	7.73	9.06	0	364	411	775	435	188	29%	0.17	0.39	Measurements by GEI using weighted cotton string and measured stain height.
16-May-17	mc	---	---	---	---	---	---	---	---	---	---	---	---	---	Removed approximately 90 feet of collection tubing in the recovery with new 0.5 inch diameter PEX tubing . Pumped 4 gallons of water from well.
29-Jun-17	mc	---	---	---	---	---	---	---	---	---	---	---	---	---	High pressure jet cleaning (water lance) used to clean/improve hydraulic communication in well screen. NAPL collection tank emptied by Allied Env. Services, collection piping and vault flooring walls cleaned.
28-Sep-17	mc	8.86	8.86	8.86	9.06	0	0	62	62	0	62	100%	0.12	2.39	Measurements by GEI using weighted cotton string and measured stain height. Differentiation between water and NAPL difficult with this small of a quantity
26-Oct-17	mc	8.86	8.86	8.86		---	---	---	---	---	---	---	---	---	No measurements by GEI. A hole is burned through tubing at pump head. Tubing is replaced, and pumping 100% tar when started back up. Change pump sched to DST.
15-Feb-18	mc	8.86	8.86	8.86	9.06	0	0	62	62	0	trace	100%	trace	0.00	Measurements by GEI using weighted cotton string and measured stain height. Pump malfunction and less than 1/4 gallon DNAPL collected. Pump repaired.
26-Apr-18	mc	5.40	5.40	8.86	9.06	0	1068	67	1130	1	4	100%	trace	15.26	Measurements by GEI using weighted cotton string and measured stain height. 5 gal. liquid in hung bucket, ~4 gal DNAPL. >1000 gal pumped since 3/1. Turn pump rate down by 50%. Will check and re-evaluate.
12-Jul-18	mc	--	--	--	9.06	---	---	5.00	---	trace	5.00	100%	---	---	No measurements by GEI. National Fuel states approximately 5 gallons of NAPL accumulated in bucket hung in tank with bucket overflowing into tank.
16-Aug-18	mc	--	--	--	9.06	---	---	5.00	---	trace	5.00	100%	---	---	No measurements by GEI. National Fuel states approximately 5 gallons of NAPL accumulated in bucket hung in tank with bucket overflowing into tank.
20-Sep-18	mc	9.05	9.05	9.05	9.06	0	0	0	3	trace	trace	trace	trace	0.02	Measurements by GEI. No NAPL accumulated in bucket. Pump rate increased from "30" to "60". (NAPL Storage tank pumped May 2018)
25-Oct-18	mc	--	--	--	9.06	0	0	5	--	trace	5.0	trace	--	--	No measurements by GEI. National Fuel states approximately 5 gallons of NAPL accumulated in bucket hung in tank with bucket overflowing into tank.
16-Jan-19	mc	9.05	9	9.05	9.06	0	15	3	3	15	69.0	100%	0.58	0.03	Measurements by GEI. 5gal of NAPL in bucket hung in tank with bucket overflowing into tank. No adjustments to the system are recommended.
28-Feb-19	mc	8.8	8.8	8.85	9.06	0	15	65	80	0	64.8	84%	1.51	1.87	Measurements by GEI. 5gal of NAPL in bucket hung in tank with bucket overflowing into tank. No adjustments to the system are recommended.
28-Mar-19	mc	7.8	7.8	7.9	9.06	0	31	358	389	15	135.9	44%	4.85	13.89	Measurements by GEI. 5gal of NAPL in bucket hung in tank with bucket overflowing into tank. No adjustments to the system are recommended.
23-May-19	mc	7.4	7.4	7.5	9.06	0	31	482	513	0	240.8	100%	4.30	9.15	Measurements by GEI. 5gal of NAPL in bucket hung in tank with bucket overflowing into tank. No adjustments to the system are recommended.
27-Jun-19	mc	--	--	--	--	0	31	482	513	0.0	0.0	--	--	--	No measurements by GEI. National Fuel personel states that 5 gallons of NAPL present in bucket hung in tank.
18-Jul-19	mc	7.5	7.5	7.5	9.06	0	31	482	513	0	0.0	0%	0	9.16	Measurements by GEI. Bucket hung in tank contains ~ 1 gallon NAPL (minimal water). Peristaltic tubing found to be flat and inoperational. Replaced and operating correctly following inspection.
16-Nov-19	mc	7.3	7.3	7.4	9.06	0	31	513	543	0	30.9	101%	0.22	3.83	Measurements by GEI. Bucket hung in tank contains ~4.50 gallons of water and 0.25 gallons of DNAPL. **(NAPL storage tank pumped on this date.)**
23-Jan-20	mc	9	9	9.03	9.06	0	9	9	19	9	9.0	100%	0.05	0.10	Measurements by GEI. Bucket hung in tank contains ~4.50 gallons of water and 0.25 gallons of DNAPL.
4-Apr-20	mc	9	9	9.03	9.06	0	9	9	19	0	0.0	0%	0	0.13	Measurements by GEI. Bucket hung in tank contains approximately 2 gallons of water and 3 gallons of DNAPL. Tubing replaced in each peristaltic pump head. Suspected tank shift following 11/2019 alterning total tank depth measurment.
25-Jun-20	mc	8.9	8.9	9	9.06	0	31	19	49	22	9.3	30%	0.06	0.32	Measurements by GEI. Bucket hung in tank contains approximately 1.5 gallons of water and 3.5 gallons of DNAPL. Peristaltic tubing in good condition.
27-Aug-20	mc	8.8	8.8	8.8	9.06	0	33	80	80	2	61.8	100%	0.43	0.55	Measurements by GEI. Bucket hung in tank contains approximately 1.5 gallons of water and 3.5 gallons of DNAPL. Peristaltic tubing in good condition.
26-Oct-20	mc	8.7	8.7	8.7	9.06	0	36	111	111	3	30.9	50%	0.25	0.90	Measurements by GEI. Bucket hung in tank contains approximately 1.0 gallons of water and 4.0 gallons of DNAPL. Peristaltic tubing in good condition.
12-Jan-21	mc	8.1	8.1	8.2	9.06	0	38	266	296	2	154.4	83%	1.98	3.80	Measurements by GEI. Bucket hung in tank contains approximately 3.0 gallons of water and 2.0 gallons of DNAPL. Tubing replaced in peristaltic pump head.
								Cumulative gallons :		12,404	3,346				
										Water	NAPL				

Appendix B-2

Northern DNAPL Recovery System

APPENDIX B-2 - NORTHERN DNAPL RECOVERY SYSTEM

		Field Measurements (by OWI probe)				Calculations (total tank contents) *				Calculations (this period recovery highlighted)					
Date	Initials	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)	Ave. Recovery in GPD	Operator's Notes
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.
	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	8.83	8.89	0	-6	19	12	-6	19	150%	0.06	0.0	Measured water and NAPL levels. Corrected depth to top of DNAPL and depth to bottom of tank measurements.
29-Apr-13	tr, jc	2.87	2.87	8.83	8.89	0	1840	19	1859	1846	1	0%	0.00	4.9	Estimate approximately 1/2 inch DNAPL. Corrected depth to bottom of tank measurement.
23-May-13	jc	---	---	---	---	0	0	0	0	---	---	---	---	---	Tank pumped out. NAPL and water transported to offsite treatment facility.
23-Apr-14	el, jc	7.58	7.58	8.82	8.89	0	383	22	404	383	22	5%	0.06	1.2	Estimate approximately 3/4 inch DNAPL. Corrected depth to bottom of tank measurement.
21-May-15	kh	6.95	6.95	8.80	8.88	0	571	25	596	188	3	2%	0.01	0.5	Measurements by Op-Tech
20-Apr-16	kh,rw	6.55	6.55	8.77	8.88	0	685	34	719	114	9	7%	0.03	0.4	Measurements by Op-Tech
20-Apr-17	kh, rf	6.49	6.49	8.71	8.88	0	685	52	738	0	19	100%	0.05	0.1	Measurements by GEI weighted cotton string (stain height). Changed 62 ft of discharge tubing.
29-Jun-17	mc	---	---	---	---	---	---	---	---	---	---	---	---	---	NAPL collection tank emptied by Allied Env. Services,
29-Sep-17	mc	8.60	8.60	8.60	8.88	0	0	86	86	0	86	100	0.93	4	Measurements by GEI using weighted cotton string and measured stain height. Differentiation between water and NAPL difficult with this small of a quantity
26-Oct-17	mc	8.60	8.60	8.60	8.88	0				0	2				Measurements by GEI. Bucket hung in tank contains ~3.5 gallons, approximately 50% of which is NAPL, 50% water. Change pump sched to DST.
15-Feb-18	mc	8.60	8.60	8.60	8.88	0	0	86	86	4.5	0.25	0%	0.00	0.0	Measurements by GEI. Bucket hung in tank contains 4.5 gallons of water and 0.25 gallons of DNAPL.
26-Apr-18	mc	8.20	8.20	8.60	8.88	0	124	86	210	4.5	0.25	5%	0.00	1.2	Measurements by GEI. Bucket hung in tank contains ~4.75 gallons of water and 0.25 gallons of DNAPL.
12-Jul-18	mc	--	--	--	8.88	---	2.00	2	4.00	2.00	2.00	50%	---	---	No measurements by GEI. National Fuel personel states that 3-5 gallons of oil/water (50%/50%) mixture present in bucket hung in tank.
16-Aug-18	mc	--	--	--	8.88	---	2.00	2	4.00	2.00	2.00	50%	---	---	No measurements by GEI. National Fuel personel states that 3-5 gallons of oil/water (50%/50%) mixture present in bucket hung in tank.
20-Sep-18	mc	8.76	8.76	8.76	8.88	0	2	2	4	1.5	2.00	43%	--	--	Measurements by GEI. Bucket hung in tank contains ~1.5 gallons of water and 2 gallons of DNAPL. **(NAPL storage tank pumped May 2018)**
25-Oct-18	mc	--	--	--	--	--	2	2	4	2.00	2.00	50%	--	--	No measurements by GEI. National Fuel personel states that 3-5 gallons of oil/water (50%/50%) mixture present in bucket hung in tank.
16-Jan-19	mc	8.76	8.76	8.76	8.88	0	2	3	3	2.0	2.50	100%	0.02	0.8	Measurements by GEI. Bucket hung in tank contains ~2.5 gallons of NAPL. Pump was not running during inspection, but breaker was reset and was running at the close of the inspection. Consider increasing pump speed.
28-Feb-19	mc	7.80	7.80	8.60	8.88	0	247	86	333	245.0	84	25%	-	0.1	Measurements by GEI. Bucket hung in tank contains 5 gallons of NAPL. Pump was not running during inspection. Relay reset but only works momentarily and runs pump controller at "600" setting. Pump controller removed for inspection/repair.
28-Mar-19	mc	--	--	--	--	--	--	--	--	--	--	--	--	--	No measurments made. Peristaltic pump out for repair. Rental pump acquired and placed in service on this date.
23-May-19	mc	7.80	7.80	8.60	8.88	0	247	86	333	0.0	0	0%	-	0.0	Measurements by GEI. Bucket hung in tank contains ~ 4 gallons NAPL (minimal water). Pump was reparied and placed back in service on May 16 (double check). Increase pump speed from 80 to 100.
27-Jun-19	mc	--	--	--	--	--	--	--	333	--	--	--	-	--	No measurements by GEI. National Fuel personel states that 5 gallons of NAPL present in bucket hung in tank.
18-Jul-19	mc	7.75	7.75	8.55	8.88	0	247	102	349	1.0	15	100%	-	-	Measurements by GEI. Bucket hung in tank contains ~ 5 gallons NAPL (minimal water).
26-Nov-19	mc	7.70	7.70	8.51	8.88	0	250	114	364	3.1	12	100%	-	-	Measurements by GEI. Bucket hung in tank contains ~4.50 gallons of water and 0.25 gallons of DNAPL. **NAPL storage tank pumped on this date.**
23-Jan-20	mc	8.80	8.80	8.80	8.88	0	5	0	5	5.0	0	--	0.00	-	Measurements by GEI. Bucket hung in tank contains ~4.50 gallons of water and 0.25 gallons of DNAPL.
4-Apr-20	mc	9.00	9.00	8.88	8.88	0	-37	0	-37	-42.1	0	0%	-	-	Measurements by GEI. Bucket hung in tank contains approximately 2 gallons of water and 3 gallons of DNAPL. Tubing replaced in the peristaltic pump head. Suspected tank shift following 11/2019 alterning total tank depth measurment.
25-Jun-20	mc	8.80	8.80	8.88	8.88	0	25	0	25	61.8	0	0%	-	-	Measurements by GEI. Bucket hung in tank contains minimal water and 2 gallons of DNAPL. Tubing replaced in the peristaltic pump head.
27-Aug-20	mc	--	--	--	--	--	--	--	--	--	--	--	--	--	North vault could not be accessed due to a broken key.
26-Oct-20	mc	8.00	8.00	8.58	8.88	0	179	93	272	154.4	93	34%	-	-	Measurements by GEI. Bucket hung in tank contains approximately 1 gallon of water and 4 gallons of DNAPL. Tubing replaced in the peristaltic pump head.
23-Nov-20	mc	--	--	--	--	--	--	--	--	--	--	--	--	--	No measurements made. Inspection of creek banks following Lake Erie seche event and high water along creek corridor.
28-Dec-20	mc	--	--	--	--	--	--	--	--	--	--	--	--	--	No measurements made. Inspection of creek banks following Lake Erie seche event and high water along creek corridor.
12-Jan-21	mc	7.80	7.80	8.58	8.88	0	241	93	333	61.8	0	28%	-	-	Measurements by GEI. Bucket hung in tank contains approximately 2 gallon of water and 1 gallon of DNAPL. Tubing replaced in the peristaltic pump head.
									Cumulative gallons :	5742	770				

Appendix C

Institutional and Engineering Controls Certification Forms

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: 2.500

Reporting Period: February 15, 2020 to February 15, 2021

	YES	NO
1. Is the information above correct?	X	
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?		X
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?		X
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?		X
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?		X

Box 2

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

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
		Monitoring Plan

In March 1994, a Record of Decision (ROD) was issued for this site. The remedial action at this site was completed between 1996 and 2002 and included: (1) Installation of the sheet pile wall along the eastern bank of Scajaquada Creek. (2) Excavation of contaminated sediment and debris. (3) Construction of a cap along a 1,600 foot reach of the creek and (4) Installation of two DNAPL recovery systems. There is no SBL identification for this parcel as it is a New York State waterway.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
	Subsurface Barriers
	Cover System

Engineering controls for this site include: (1) A stream bed cap that consists of a geosynthetic clay liner overlain by sand, geotextile and anchoring stone and two DNAPL recovery systems to extract DNAPL from the substrata of the creek. Post-closure maintenance of the cap, creek banks and DNAPL recovery systems are required to ensure long term effectiveness of the remedy.

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 Engineering Control 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
X	

2. For each Engineering control listed in Box 4, I certify by checking "YES" below that all of the following statements are true:

   (a) The 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
X	

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 LESCH (print name) at 6363 MAIN ST, WILLIAMSVILLE, NY 14221 (print business address)

am certifying as OWNER (Owner or Remedial Party)

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

Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

3/8/2021
Date

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 Kelly R McIntosh at GEI Consultants 100 Sylvan Pkwy, Suite 400, Amherst, NY 14228

print name — print business address

am certifying as a Professional Engineer for the National Fuel Gas

(Owner or Remedial Party)

STATE OF NEW YORK
KELLY R. McINTOSH
No. 68079
LICENSED PROFESSIONAL ENGINEER

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

Stamp (Required for PE)

3/8/21

Date