SITE INVESTIGATION OF THE EXTENT OF NAPL WITHIN THE NEW YORK POWER AUTHORITY CONDUIT RIGHT-OF-WAY IN THE VICINITY OF ROYAL AVENUE CITY OF NIAGARA FALLS NIAGARA COUNTY, NEW YORK

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1.0 INTRODUCTION

The New York Power Authority (NYPA) retained the services of TVGA Consultants (TVGA) to determine the lateral and vertical extent of non-aqueous phase liquids (NAPL) that were previously observed at the overburden-bedrock interface within the NYPA conduit right-of-way (ROW) in the vicinity of Royal Avenue. The project site is located on the east side of the conduit ROW south of Royal Avenue in the City of Niagara Falls, Niagara County, New York (Figure 1). This report presents the findings of the investigation and includes:

- A summary of the investigation/remediation reports and other relevant information regarding nearby industries reviewed during the course of this investigation;
- The investigative methods employed to characterize the site;
- A description of the physical characteristics of the site;
- Discussion of potential sources of the NAPL; and
- Discussion of regulatory implications.

2.0 BACKGROUND

During an assessment of the effects of the NYPA conduits on regional groundwater flow as part of the relicensing studies for the Niagara Power Project, NAPL was encountered in a boring within the NYPA ROW at 20 feet below grade. A sample of this material indicated the presence of fuel oil, motor oil, and mineral spirits as well as other constituents including volatile organic compounds, pesticides, and PCBs. This boring is referred to herein as the Initial Discovery Boring.

Following the detection and characterization of NAPL, NYSDEC requested a work plan for delineating the extent of NAPL contamination within the NYPA ROW. The resulting NYSDEC-approved work plan (*Work Plan for the Investigation of Spill No. 0302316 in the vicinity of Royal Avenue and NYPA Conduits*) was submitted in September 2003 and described the investigative activities that were subsequently performed at the project site during the investigation discussed in this report.

3.0 SITE DESCRIPTION

3.1 General

The project site is generally flat-lying and has an elevation of approximately 570 feet above mean sea level (AMSL), based on USGS topographic mapping of the area. The project site is covered by overgrown grass and is generally absent of trees and aboveground structures other than the NYPA pump house, fencing, monitoring well casings, manholes and power poles. A number of subsurface utilities are located within the ROW, including the conduits, public sewers, and two 12-inch brine lines. These utilities, fencing around the adjacent Harper Substation, and the NYPA ROW limits restricted the drilling activities to a narrow strip that was less than 30 feet wide, as shown on Figures 1 and 2.

A mixture of residential and industrial uses comprises the land use in the project site's vicinity. Residential properties are located west of the project site, while industrial properties are located north, east and south of the project site. All field activities were confined to the NYPA ROW. The project site is bounded to the west by the conduits within the ROW and to the east by lands owned by the Niagara Mohawk Power Cooperation. Royal Avenue is located immediately north of the project site, and the Falls Street Tunnel is located under Royal Avenue. The Falls Street Tunnel is a hand-excavated tunnel that conveys wastewater discharged from combined sewers.

3.2 Site Geology and Hydrogeology

The following discussion is based on TVGA's observations made during the drilling activities as well as the following documents:

- "Preliminary Site Assessment (PSA) - Groundwater Investigation Report" for Niagara Mohawk's Harper Substation, prepared by Blasland, Bouck and Lee, Inc. (BBL). September 2000.
- "Off-Site Investigation (OSI) Program" Summary and Phase 2 Reports for Occidental Chemical Corporation's Buffalo Avenue Plant, prepared by Conestoga-Rovers & Associates, August 1992 and November 1993.
- "Supplemental Remedial Investigation" of Frontier Chemical – Royal Avenue Site, prepared by Ecology and Environment, November 2001.
- Draft version of "Determine to What Extent Project Operations Affect the Transport of Groundwater and Contaminants" prepared by URS Corporation, April 2004.
- "Contamination Encountered at Well Location GW03-16" prepared by URS Corporation, July 2003.

The last report listed above describes the field activities associated with the discovery of NAPL within the NYPA ROW and presents the analytical results from the NAPL sampling. This NAPL discovery prompted the NYSDEC to require additional investigation activities be performed to delineate the extent of NAPL within the ROW.

3.2.1 Site Geology

The project site is located in the Ontario Basin of the Erie-Ontario Lowland Physiographic Province. The Province is generally characterized by low topographic relief as a result of erosion and deposition of sediments adjacent to lakes Erie and Ontario. Surface water bodies in the vicinity of the project site include Gill Creek located approximately 2,000 feet west of the project site, which flows into the Niagara River located approximately one-half mile from the project site. Stormwater that does not percolate into the subsurface most likely flows into storm sewers between the project site and these water bodies.

Based on a review of environmental reports for sites in the vicinity of the project site, the subsurface stratigraphy in the vicinity of the project site consists of an unconsolidated overburden layer that is approximately 15 feet thick, underlain by generally horizontal layers

of sedimentary bedrock. There are three main types of overburden deposits in the vicinity of the project site including: glacial till; lacustrine clays, silts and fine sands; and lenses of sand and gravel. Bedrock in the vicinity of the project site consists of the Silurian Lockport Dolomite Group, which consists of a horizontal, massive to medium-bedded argillaceous dolomite.

3.2.2 Site Hydrogeology

Due to the low hydraulic conductivity in overburden soils in the vicinity of the project site, the overburden is not an economically important source of groundwater. Groundwater flow within the overburden deposits is predominately downward, recharging the underlying bedrock aquifer through the infiltration of precipitation. Preferential vertical flow of groundwater to the bedrock aquifer occurs where natural soils have been removed or disturbed by past excavation activities. In addition, localized horizontal flow likely occurs within the bedding of subsurface utility lines and/or former stream channels.

With the exception of seasonal and/or perched water table conditions in the overburden, the uppermost water-bearing zone occurs in the weathered bedrock of the Lockport Dolomite. The water-bearing openings are generally permeable zones consisting of gypsum cavities as well as both vertical and horizontal bedding joints that have widened through solution. Groundwater in this zone occurs under confined, semi-confined or unconfined conditions, with artesian conditions predominating. Water level data and groundwater modeling performed as part of the re-licensing efforts indicate that the groundwater in the upper weathered bedrock water-bearing zone in the vicinity of the project site flows toward the conduit drainage system (CDS) and Falls Street Tunnel. Therefore, groundwater flow in the vicinity of the site is generally to the west or northwest.

4.0 SCOPE OF WORK

All work associated with this project was completed in accordance with the NYSDEC-approved work plan as well as the Field Sampling and Quality Assurance/Quality Control Plans prepared by TVGA Consultants. The NYSDEC-approved work plan is included in Attachment B. The scope of work associated with this investigation included:

- Preparation of a site-specific Field Sampling Plan (FSP), Quality Assurance/Quality Control Plan (QA/QC Plan) and Health and Safety Plan (HASP);
- Review of investigation and remediation reports and other relevant information regarding nearby industries from the NYSDEC;
- Review of NAPL discovery data, limited industry information (from Niagara Mohawk and Occidental), and hydrogeologic information supplied by NYPA;
- Determination of the presence/absence of NAPL in proximal monitoring wells OW-651D and GW03-016;
- Drilling of seven test borings to evaluate the subsurface soil/fill and the upper most bedrock zone for evidence of NAPL;

- Collection of samples from investigation-derived waste for characterization analysis; and
- Preparation of this report.

The implementation and findings of these tasks are discussed in Sections 5.0 and 6.0, respectively.

TVGA retained the services of North Star Drilling Inc. of Cortland, New York to complete the test borings. The auger cuttings and decontamination fluids were collected in 55-gallon drums and were transported for off-site disposal at the Modern Landfill in Model City, New York by Waste Technology Services, Inc. (WTS). Mitkem Corporation of Warwick, Rhode Island, performed the chemical analysis of characterization samples collected during this investigation.

5.0 EXISTING REPORT / DATA REVIEW

TVGA reviewed the documents listed in Section 3.2 to enhance our understanding of the project site and evaluate potential sources of NAPL at the project site. TVGA also held conversations with NYPA personnel and reviewed aerial photographs to evaluate potential contaminant sources. TVGA did not identify any current or historical sources of NAPL within the NYPA conduit ROW, as no contamination was reported during construction and there has been no change in land use since construction. Therefore, the potential for off-site sources of NAPL was evaluated through the review of the previously referenced investigation and remediation reports for nearby industries, the review of aerial photographs, and discussions with the NYSDEC project managers associated with those sites.

Initially TVGA identified three potential sources of the NAPL identified within the NYPA conduit ROW including:

- Niagara Mohawk's Harper Substation;
- Occidental Chemical Corporation's Buffalo Avenue Plant; and
- Frontier Chemical's Royal Avenue Site.

A summary of the information within these reports pertaining to the discovery of NAPL in the subsurface is presented in the following paragraphs.

Niagara Mohawk's Harper Substation is located to the east adjacent to the project site. A Preliminary Site Assessment (PSA), including a groundwater investigation, of this site was initiated through a NYSDEC consent order. During this investigation, NAPL was encountered in a bedrock monitoring well located approximately 250 feet southeast of the Initial Discovery Boring, at a depth of 18 to 24 feet below grade. Chemical analysis of this NAPL revealed the presence of VOCs and SVOCs, primarily aromatic hydrocarbons that are commonly associated with petroleum products. Additionally, high concentrations of unidentified organic compounds were also detected in the NAPL sample. Table 1 provides a comparison of the analytical results for the NAPL from this site and the NAPL within the NYPA ROW. Although the analytical methods applied to each of the NAPLs were not the same, the specific analytes varied, and the chemical constituents of the two NAPLs do not exactly match, there are a few consistencies between the two that may indicate a relationship:

- NAPL was discovered on both sites at approximately the same depths below grade.

- The inferred direction of groundwater flow in the water-bearing unit in which the NAPLs were detected is generally west to northwest from the Harper Substation towards the conduits and the Falls Street Tunnel, and therefore towards the project site.
- Although the concentrations of specific individual analytes in the two NAPLs do not correlate well, the vast majority of individual chemical compounds detected in each NAPL are not compounds that appear on the USEPA Target Compound List (TCL). Therefore, the chemical composition of the NAPLs may be similar for the reasons discussed below:

    - The two NAPLs consist of petroleum hydrocarbons.
    - The NAPL on the NYPA ROW consists primarily of fuel oil, mineral spirits, and motor oil, which were found at a cumulative concentration of 241,000 mg/kg, while the concentrations of individual analytes appearing on the TCL totaled less than 150 mg/kg. Although TICs were not reported for this sample, the compounds comprising the fuel oil, mineral spirits, and motor oil would very likely be identified as TICs if TICs were reported. Therefore, it can be concluded that the cumulative concentration of TICs in the NAPL on the NYPA ROW is likely very high and is orders of magnitude higher than the cumulative concentration of specific analytes that appear on the TCL.
    - Similarly, the cumulative concentration of TICs in the NAPL at the Harper Substation was more than an order of magnitude higher than that of the individual analytes appearing on the TCL. The total concentration of TICs (VOCs and SVOCs) in the NAPL at the Harper Substation was 63,760 mg/kg in July 1999, while the cumulative concentration of specific analytes appearing on the TCL was only 1723 mg/kg. Petroleum fingerprint analysis was not performed on the samples of the NAPL from the Harper Substation.
    - Because the concentrations of TICs in the NAPL at the Harper Substation and the concentrations of what would very likely be identified as TICs in the NAPL on the NYPA ROW are significantly higher (by more than an order of magnitude) than the individual analytes appearing on the TCL in the samples, the comparison of the analytical results of the entire composition of the NAPLs is more appropriate than comparing the results for only individual analytes, which comprises only a small portion (less than ten percent) of the NAPL. In addition, it is possible that differential weathering and migration rates could account for some of the differences in the suites and concentrations of individual analytes appearing on the TCL that were detected in the NAPL samples.
    - Therefore, because both NAPLs consist of petroleum hydrocarbons and that each is either known to or likely consists primarily of TICs, it is possible that the two NAPLs may be related. However, additional characterization using identical analytical methods would be required to confirm or deny a correlation.

The Occidental Chemical Corporation's Buffalo Avenue Plant is located approximately one-quarter mile southeast of the project site. Reviewed reports pertaining to this facility consisted of investigations to identify off-site contaminant migration from the Buffalo Avenue Plant. During these investigations, NAPL was discovered in several Occidental wells that are located to the south and east of the project site. As previously discussed, groundwater flow in the vicinity of the site is towards

the west, so the potential exists for NAPL in those Occidental wells east of the project site to migrate towards the project site. Additionally, subsurface utilities may act as preferential pathways for the migration of NAPL to the project site. However, the NAPL in the Occidental wells east of the project site was discovered approximately 37 feet deeper that the NAPL on the project site. In addition, the chemical composition of the NAPL in the Occidental wells, which consisted primarily of chlorinated solvents, differs from that of the NAPL discovered on the project site, which does not appear to contain chlorinated solvents.

The Frontier Chemical Royal Avenue Site is located approximately 1000 feet northeast of the project site and is situated north of Royal Avenue, the Fall Street Tunnel, and Southside Interceptor Tunnel. Hydrogeological investigations at Frontier Chemical identified significant organic contamination in on-site soils and overburden and bedrock groundwater. The areas of maximum overburden contamination, as indicated by the presence of NAPL, center on the former hazardous waste sludge settler, transfer operations, and chemical storage tanks that were used to store solvents. NAPL, comprised primarily of chlorinated solvents, was detected in bedrock monitoring wells located at the property boundary immediately adjacent to, and at approximately the same elevation (539 feet above mean sea level) as the unlined Falls Street Tunnel. Groundwater elevation data indicates that groundwater flow across the Frontier Chemical Royal Avenue Site is south toward the tunnel, which likely intercepts any NAPL migrating off-site. In addition to TVGA's document review, TVGA interviewed the NYSDEC project manager for the Frontier Chemical site. He indicated that highest concentrations of site-derived contaminants within groundwater were detected in the weathered bedrock. He also indicated that groundwater and NAPL in this water-bearing zone are likely intercepted by the unlined Falls Street Tunnel.

Following the detailed review of the aforementioned reports and discussions with NYSDEC personnel it is unlikely that NAPL discovered on the project site originated from the Occidental Plant or the Frontier Chemical – Royal Avenue Site. Additionally, based on the fact that no current or historical sources of NAPL were identified within the boundaries of the project site, the source of NAPL discovered on the project site is likely from an off-site source. Therefore, Niagara Mohawk's Harper Substation remains a potential source of the NAPL discovered within the NYPA ROW.

6.0 FIELD INVESTIGATION

6.1 Test Borings

To delineate the NAPL discovered within the NYPA ROW, seven test borings were advanced on June 29, 30, and July 1, 2004 with oversight provided by a TVGA scientist. Prior to the initiation of drilling activities, TVGA used a Solinst Model 122 oil/water interface probe to determine if NAPL was present in proximal monitoring wells OW-651D and GW03-016. No NAPL was identified in either monitoring well.

The sequence to determine the locations of the test borings is outlined in the NYSDEC-approved work plan. Since no evidence of NAPL was encountered in OW-651D or GW03-016, initial borings (TB-1N and TB-1S) were drilled 100 feet north and south, respectively, of

the Initial Discovery Boring. NAPL was not encountered in either of the initial borings and therefore, a second set of borings (TB-2N and TB-2S) were advanced at locations 50 feet north and south of the Initial Discovery Boring. Since NAPL was not encountered in the second set of borings, a final set of borings (TB-3N and TB-3S) was drilled 25 feet closer to the Initial Discovery Boring. Additionally, in an attempt to verify the findings of the Initial Discovery Boring, TB-1 was advanced immediately adjacent to the Initial Discovery Boring.

The seven test borings were completed at the project site using a track-mounted Central Mine Equipment Model 45B / ATV (CME-45B) drill rig. The test borings were advanced using 2-1/4-inch inside diameter (I.D.) hollow stem augers (HSAs). The lead auger was slotted to allow for the infiltration of NAPL into the augers. Split-spoon samples were continuously collected throughout the total depth of each test boring. The test boring depths ranged from 13.5 to 14.6 feet below grade and each boring was advanced to split-spoon and/or auger refusal. Test boring locations are depicted on Figure 2. As a health and safety precaution, the work zone was monitored for total organic vapors (TOVs) using a MiniRAE 2000 photoionization detector (PID) equipped with a 10.6 eV bulb.

Upon retrieval, each soil sample was field screened with a PID for TOVs, visually classified and a representative sample was placed in a clean driller's jar. Field screening was accomplished by separating the soil column with a stainless steel spoon and placing the PID probe tip near the void. This was recorded as a "direct" TOV reading. In addition, the PID tip was placed into the air headspace above the soil in the driller's jar to obtain a "headspace" TOV measurement. Test boring logs presenting the drilling methodology, soil descriptions, and field screening results are provided in Appendix A.

The HSAs were steam cleaned prior to use at each test boring location. The split-spoon samplers were decontaminated with a detergent wash and potable water rinse prior to the collection of each soil sample. Decontamination fluids generated during the investigation were transferred to a 55-gallon drum. With the exception of the upper 18 inches from each test boring, all auger cuttings and left over split-spoon samples were placed into 55-gallon drums. All drums containing investigation-derived waste were staged in the secure fenced area surrounding the NYPA pump house until removal from this location for off-site disposal.

After the boring program was completed, TVGA returned to the project site to survey the boring locations using a hand-held Global Positioning System unit with accuracy of one meter. Figure 2 shows the surveyed boring locations.

6.2 Subsurface Conditions

TVGA evaluated the subsurface conditions at the project site based on observations made during the advancement of the seven test borings. Similar subsurface conditions were encountered at each boring location. Six distinct soil types were encountered during the investigation and included, in descending order:

- A thin layer of topsoil that ranged in thickness from less than one inch to one foot was encountered in each test boring location as the uppermost overburden layer. The topsoil was generally a brown, silty soil with varying amounts of organic material.
- A layer of gravely silt, with varying amounts of fine-grained sand, that extended up to two feet below grade was encountered in each of the test boring locations with the exception of TB-1S.
- An approximately two foot layer of brown, fine-grained sand and silt was encountered below the gravelly silt layer in TB-1S, TB2S, TB-3N and TB-1 advanced adjacent to the Initial Discovery Boring.
- A reddish-brown clayey-silt to silty-clay averaging five feet thick was encountered in each of the test boring locations.
- A layer of reddish brown silty-sand with trace amounts of clay and gravel averaging five feet thick was encountered in each of the test boring locations with the exception of TB-1S. Very moist to saturated conditions were typically encountered within this layer. Saturated conditions were encountered in perched lenses.
- A layer of gray gravel with trace to little silt was encountered at the bottom of each of the borings. Based on visual evidence and a review of test boring logs from other environmental reports, this layer appears to be weathered dolomite, which comprises the uppermost bedrock at the project site.

With the exception of TB-1N, relatively low TOV readings (0.1 to 4.5 ppm) were recorded in the test borings. The highest TOV readings were recorded at the bottom of the test borings in the weathered bedrock. Additionally, there was slight olfactory evidence of petroleum and/or solvents within the weathered bedrock in each of the test borings. Elevated TOV readings were recorded in TB-1N (82 ppm) in the weathered bedrock at a depth of 12 to 13.3 feet below grade. Material from this interval had a faint solvent odor but did not produce a sheen when placed in water.

With the exception of TB-1, the auger assemblies were left in the test borings overnight to allow for the infiltration of NAPL into the augers. The following morning an oil/water interface probe was lowered into each of the auger assemblies to evaluate for the presence of NAPL and determine the level of groundwater in the test borings. NAPL was not encountered in any of the test borings and there was less than one inch of water in each boring.

6.3 Waste Characterization and Disposal

In accordance with the Work Plan, one waste characterization sample was collected from each of the drums of investigation-derived waste to determine the appropriate disposal method and location. The samples from two soil drums were analyzed for:

- The following RCRA Characteristics:
  - Corrosivity
  - Flashpoint
  - Reactivity

- Toxicity

- Total PCBs

The drum of decontamination water was analyzed for:

- VOCs
- SVOCs
- Pesticides
- PCBs
- The following metals:
  - Cadmium
  - Chromium
  - Copper
  - Lead
  - Mercury
  - Nickel
  - Zinc
- Total phenols
- Total organic carbon
- Total suspended solids
- Cyanide

The waste characterization results are included in Appendix C. These results indicated that low levels of barium, cadmium, and lead were detected during the chemical analysis of the leachate resulting from the application of the toxicity characteristic leaching procedure on the soil samples. These concentrations were below the Maximum Concentrations of Contaminants for the Toxicity Characteristic, and the drummed soil was therefore considered non-hazardous.

Di-n-butylphthalate, alpha-BHC, and five metals were detected in the sample collected from the drum of decontamination water. The detected concentrations were below applicable regulatory values and the water was therefore deemed non-hazardous.

The three drums were removed from the project site on August 30, 2004 and transported to and disposed of at the Modern Landfill in Model City, New York by Waste Technology Services, Inc.

7.0 DISCUSSION AND CONCLUSIONS

Although NAPL was encountered in the Initial Discovery Boring at 20 feet below grade at what was identified as the overburden-bedrock interface in the initial discovery boring, NAPL was not encountered during this investigation. The drilling method utilized during this investigation precluded advancement of the test borings past the top of the bedrock, which was encountered at 14 to 15 feet below grade. The NAPL was identified as being located at the overburden-bedrock interface in the Initial Discovery Boring. However, the results of TVGA's investigation suggest that the NAPL is actually located within the upper bedrock rather than at the overburden-bedrock interface.

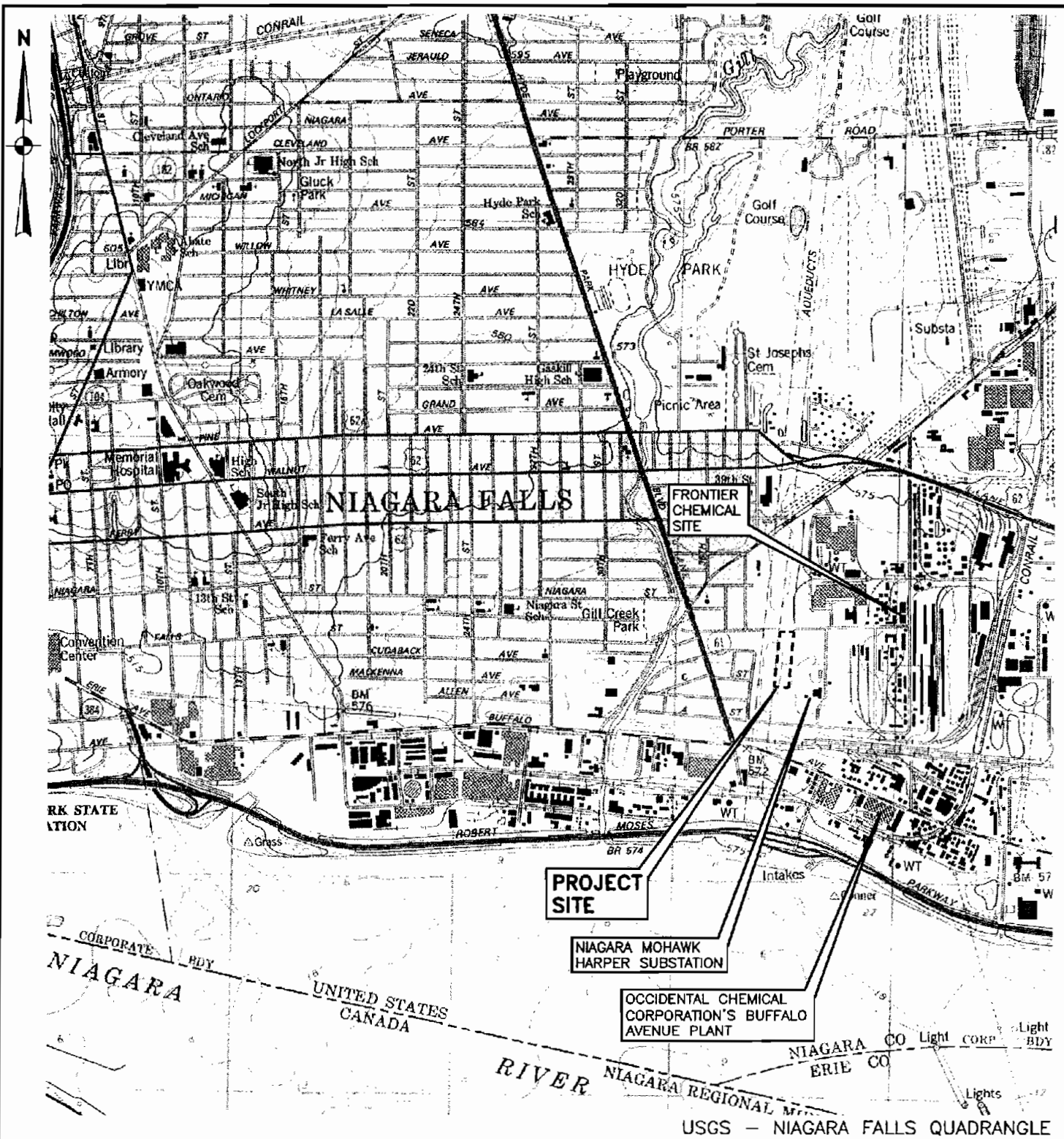
Based on the fact that no current or historical sources of NAPL were identified within the boundaries of the project site, the source of NAPL discovered on the project site is likely located off-site. As previously discussed in Section 5.0, three potential off-site sources were initially identified during the review of existing information. Two of these sites were dismissed as unlikely to be sources of NAPL on the project site while current evidence indicates Niagara Mohawk's Harper Substation remains a potential source of the NAPL discovered within the NYPA ROW. Additional characterization of the NAPL on the NYPA ROW and at the Harper Substation using identical analytical methods may confirm or deny a correlation between the two NAPLs.

Regulatory implications with respect to NYSDEC requirements for further investigation and/or remedial action at the project site are not known; however, a number of factors currently minimize potential threats to human health and the environment associated with the detected contaminants on-site, and would likely be considered during NYSDEC's evaluation. These factors include:

- The depth of NAPL and the presence of more than 14 feet of overburden limit human exposure pathways.
- The drainage system that surrounds the conduits as well as the South Side Interceptor Trench and the Falls Street Tunnel likely limit the horizontal migration of NAPL within the bedrock.
- The lack of local reliance on groundwater and the existence of a public potable water supply system.

FIGURE 1

SITE LOCATION MAP



USGS – NIAGARA FALLS QUADRANGLE

SITE LOCATION MAP

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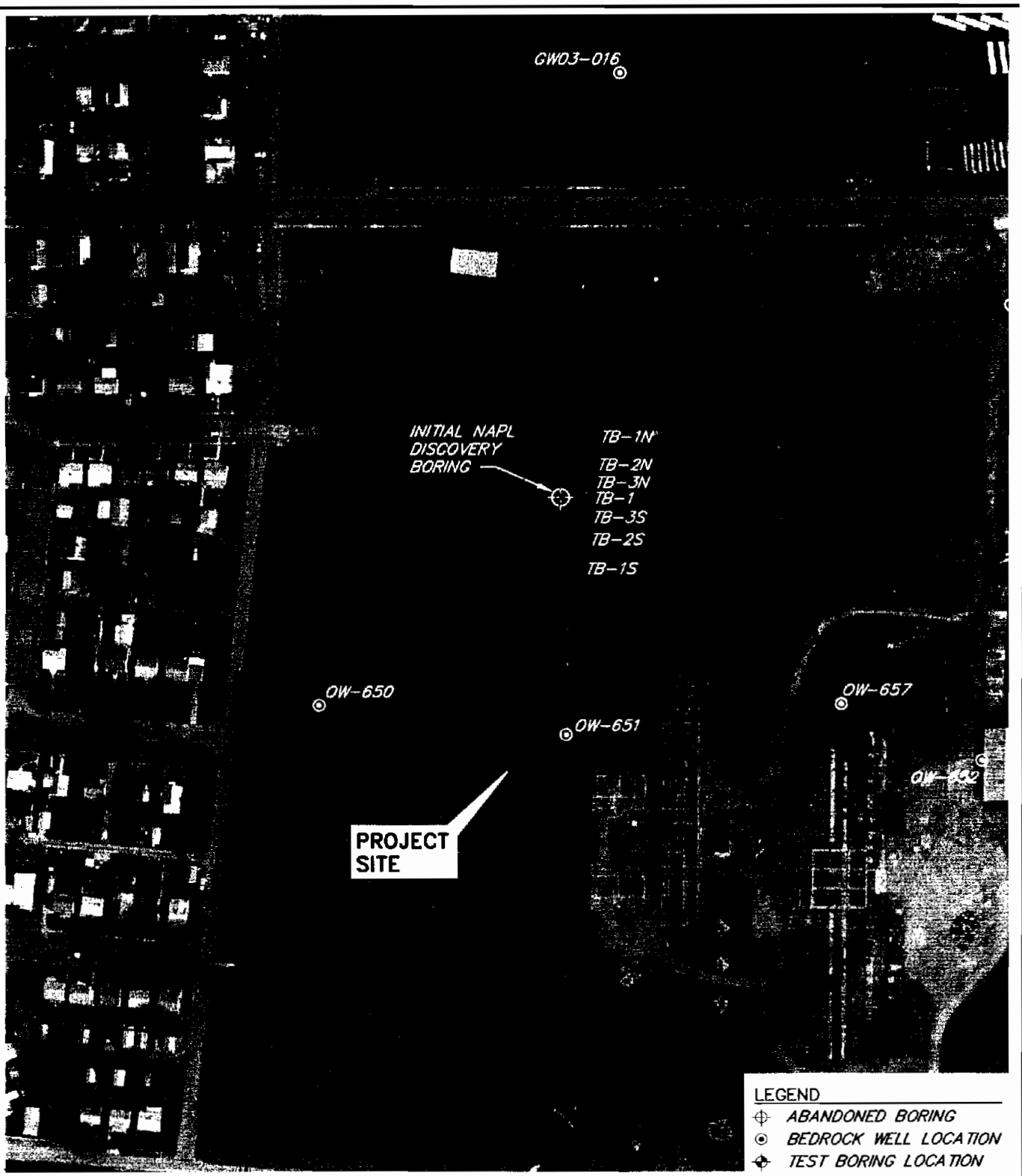
PROJECT NO. 2004.0193.00	SCALE: 1" = 2000'	DATE: SEPTEMBER 2004	FIGURE NO. 1

FIGURE 2

SITE PLAN / TEST BORING LOCATION MAP



PROJECT SITE/TEST BORING LOCATION MAP

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PROJECT NO. 2004.0193.00	SCALE: 1" = 200'	DATE: SEPTEMBER 2004	FIGURE NO. 2

N:\2004.0193.00-NYPA Royal Avenue NAPL Inv\Engineering\CADD\fig-2.dwg 8/31/2004 3:16:41 PM EDT

TABLE 1

TABLE 1

DETECTED ANALYTICAL RESULTS OF NAPL SAMPLES COLLECTED FROM THE NYPA ROW AND THE HARPER SUBSTATION

	Analytical Results (mg/Kg)			
	NYPA NAPL	Harper Substation NAPL		
Volatile Organic Compounds		Jul-99	Apr-00	Sep-00
Methylene Chloride	-	150 J	-	-
n-Propylbenzene	NA	110	49	-
Isopropylbenzene	12	-	20	-
p-Isopropyltoluene	NA	-	34	-
1,3,5-Trimethylbenzene	NA	140	16	-
1,2,4-Trichlorobenzene[1]	57	NA	NA	NA
n-Butylbenzene	NA	250	320	360
Ethylbenzene	6.9	-	2.6 J	-
1,2,4-Trimethylbenzene	NA	240	130	150
sec-Butylbenzene	NA	270	270	280
tert-Butylbenzene	NA	-	23	-
Total Xylenes	47	-	5.3 J	-
1,2-Dichlorobenzene	3.3 J	-	-	-
1,3-Dichlorobenzene	9.4	-	-	-
1,4-Dichlorobenzene	3.3 J	-	-	-
Methycyclohexane	3.9 J	NA	NA	NA
Toluene	2.2 J	-	-	-
Total TICs	NA	32,880 J	36,400	NA
Semi-Volatile Organic Compounds				
1,1-Biphenyl	32 J	NA	NA	NA
1,2,4-Trichlorobenzene[1]	NA	440	530	370
Flourene	-	22 J	-	-
Phenanthrene	-	59 J	-	-
bis(2-Ethylhexyl)phthalate	-	42 J	-	-
Total TICs	NA	30,880 J	15,110 J	NA
Fuel Fingerprint				
Fuel Oil No. 2	140,000 DJ	NA	NA	NA
Mineral Spirits	41,000 J	NA	NA	NA
Motor Oil	60,000	NA	NA	NA
PCBs				
Total PCBs	4.1	37 D	48 D	35
Density (g/ml)				
Density	1.1	NA	NA	NA

Notes:

1. 1,2,4-Trichlorobenzene was reported as a VOC in the sample from the NYPA ROW, while it was reported as an SVOC in the samples from the Harper Substation.

"-" = Analyte was not detected.

NA - Parameter was not analyzed.

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

D - The sample result was reported from a secondary dilution analysis.

mg/Kg = milligrams per kilogram (equivalent to parts per million (ppm)).

APPENDIX A

TEST BORING LOGS

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-1

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 7-1-04
Finish Date 7-1-04
Driller S. Beeds
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
7-1-04	9:00a	13.5 (bgs)	

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
			5 12	17			Brown, Topsoil w/ rootlets, dry Red, silt and gravel, dry.	0	0.1
			20 18						
			16 14	NR			No Recovery.	–	–
			9 9						
	5		5 6	22			Tan-Brown, sand and silt, w/orange + gray mottling, moist.	0	0.2
			5 5						
			6 6	18			Red, clayey-silt w/gray mottling, moist As above, silt and clay.	0	0.1
			7 7						
			1 2	NR			No Recovery	–	–
	10		1 2						
			1 2	<1"			As above.	0	0.1
			4 3						
			5 7	15			Red-Brown, Sandy-silt, trace clay, gravel, saturated	0	0.1
			16 50/0				Gray, silt and gravel, moist	0	0.2
	15						Auger and Split-Spoon refusal @ 13.5' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-1N

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-29-04
Finish Date 6-29-04
Driller S. Breeds
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
6-29-04	2:35		

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
	0	S1	4 15	12			Brown, Topsoil, w/ rootlets, damp		
			15 11				Gray, gravel & reddish-brown silt, dry	0	0.9
		S2	6 7	4			Red-Brown, silt, some clay, little sand, trace gravel, damp.	0	0.9
	5		7 5						
		S3	3 3	20			Brown-Tan, clayey-silt, w/ orange/gray mottling, trace sand, moist	0	0.3
			4 6						
		S4	7 9	15			Red-Brown, fine-coarse sand and silt, trace fine angular gravel wet.	0	0.6
			8 9	17					
		S5	9 9				As above	0	0.6
	10		11 15	14					
		S6	5 7	12			Weathered, gray rock/gravel, some silt, mild petroleum odor, moist		
			11 11						
		S7	12 65	10			As above, stronger petroleum odor.		
			10/3 –						
	15						Split-Spoon refusal @ 13.3' bgs & Auger refusal @ 13.5' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-2N

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-30-04
Finish Date 6-30-04
Driller S. Broods
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
6-30-04	1:30		

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
		S1	4 12 / 20 20	17			Brown, fors.t, w/ rootlets, dry	0	0
							Brown-Red - silt and gravel, dry	0	0
		S2	12 15 / 15 14	15			Brown-Tan, clayey-silt, trace fine sand, w/ orange/gray mottling damp	0	0
	5	S3	8 7 / 6 8	<1"					
		S4	8 7 / 6 7	12			Red-Brown, silt and clay, w/ gray mottles, moist.	0	0
		S5	4 5 / 4 4	14			Red, silty-sand, trace clay, angular gravel, wet		
	10						As above, saturated.	0	0.1
		S6	3 4 / 5 8	NR			No Recovery		
		S7	8 15 / 25 50/5	6			As above		
							Gray weathered rock (dolostone) trace silt, moist.	0	0.2
	15						Split-Spoon Refusal @ 13.5' bgs & Auger Refusal @ 13.7' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-3N

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-30-09
Finish Date 6-30-09
Driller S. Brack
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
6-30-09	2:15		

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
							Brown, topsoil, w/roots, dry.	–	–
		S1	7 44 / 25 30	10			Gray, gravel, & red-Brown, silt, dry	0	0
		S2	10 8 / 7 6	7			Dark Brown, fine sand and silt, orange/gray mottling, damp.	0	0
	5	S3	5 5 / 5 8	15			Tan-Brown, clayey-silt, trace fine sand, w/orange/gray mottling, damp	0	0.1
		S4	4 8 / 5 8	18			Red-Brown, silt and clay, w/gray mottling, Moist.	0	0
		S5	5 5 / 8 7	22			Red-Brown, silty-Sand, trace clay, trace angular gravel, wet.		
	10						As above, little gravel, saturated.	0	0.1
		S6	4 6 / 5 6	21			As above, some gravel.		
		S7	8 15 / 50/0.4 –	11			Weathered rock (bolestone) + gray silt, fair solvent smell, Moist	0	0.2
	15						Split-Spoon refusal @ 13.4' bgs Auger refusal @ 13.8' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-15

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-29-04
Finish Date 6-29-04
Driller S. Breeds
Geologist J. Manzella

Groundwater Data (feet)				Equipment Data			
Date	Time	Depth	Elev		Casing	Sampler	Core
6-29-04	11:50			Type	HSA	SS	
				Diameter	2.25"	2.0"	
				Weight		140 #	
				Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
							Brown topsoil w/ roots, dry	-	-
		S1	3 8 / 15 21	20			Reddish-Brown, Silty-sand and gravel, damp.	0	0.2
		S2	21 18 / 15 12	15			Brown, fine sand and silt, trace gravel, w/ gray mottling, damp	0	0.4
	5	S3	5 6 / 5 7	9			Red-Brown, clay, trace silt, orange/gray/tan mottling, damp.	0	0.6
		S4	8 7 / 9 9	24				0	0.1
		S5	3 2 / 2 4	<1"			As above, wet.	0.	0.6
	10	S6	3 4 / 12 20	29			Red-Brown, clayey-silt and fine sand, little fine gravel, wet.	0	0.7
		S7	15 18 / 80 40	14					
				6			weathered bedrock (gray) with mild petroleum odor	0	4.5
	15	S8	50/0.5 50/0 / - -				Auger and Split-spoon refusal @ 14.6' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-25

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-29-04
Finish Date 6-29-04
Driller S. Breeds
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
6-29-04	1:15		

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
			4 12	12			Brown, topsoil, w/ rootlets, damp.	–	–
		S1	16 12				Gray Fine angular gravel, trace dark brown, silty-sand, dry.	0	0.3
			8 7	21			Brown, Fine sandy-silt w/ orange/gray mottling, moist.	0	0.7
		S2	6 9				As above, wet.		
	5		8 6	24			Brown, clayey-silt, some Fine sand, w/ orange, gray, tan, mottling, moist.	0	0.4
		S3	7 7				Red-Brown, clay & some silt, trace Fine sand, w/ tan mottling, moist. As above wet.	0	0.5
			7 7	24					
		S4	8 8				Red, Fine-coarse sand & silt, trace Fine angular gravel, Saturated	0	0.1
			5 7	24					
	10	S5	6 8						
			2 3	18			Red, Silt and fine-coarse Sand, trace clay, gravel (angular), Saturated	0	0
		S6	8 10						
			10 14	10				0	1.1
		S7	12 14						
	15		10/.4 –	6			weathered rock (shale), trace silt, w/ Faint Petroleum odor, Moist.	0.1	2.5
		S8	– –				Split Spoon Refusal @ 14.4' bgs		
							Auger Refusal @ 14.6' bgs.		
	20								
	25								
	30								

TVGA CONSULTANTS

TEST BORING LOG

BORING NO. TB-35

Project: Site Investigation of the Extent of NAPL within the NYPA Conduit ROW
Client: New York Power Authority (NYPA)
Contractor: Geologic NY Inc.

Project No. 2004.0193.00
GS Elev
WS Ref Elev
N-S Coord
E-W Coord
Start Date 6-30-04
Finish Date 6-30-04
Driller S. Brads
Geologist J. Manzella

Groundwater Data (feet)			
Date	Time	Depth	Elev
6-30-04	11:15		

Equipment Data			
	Casing	Sampler	Core
Type	HSA	SS	
Diameter	2.25"	2.0"	
Weight		140 #	
Fall		30"	

Well Construction	Depth (feet)	Sample No.	Blows per 6"	Recovery (in.)	Log	Unified	Field Description	Remarks PID Reading (ppm) Direct	Head
		S1	5 18 / 16 14	15			Brown, Tan, clayey-silt, trace fine sand, w/orange/gray mottling, damp	0	0.2
		S2	8 8 / 9 10	22			Brown, Tan, clayey-silt, trace fine sand, w/orange/gray mottling, damp. As above, little sand, moist.	0	0.2
	5	S3	7 4 / 4 5	14			Red-Brown, silt and sand, gray mottling, trace clay, moist	0	0.2
		S4	5 6 / 7 7	15			Red-Brown, silt & Clay, Moist.	0	0
		S5	3 2 / 2 3	18			Red-Brown, silt & Fine Sand, little clay, wet.		
	10	S6	1 1 / 2 3	4			As above, Saturated	0	0
		S7	2 8 / 15 50/3	22			As above.		
							Gray, silty-gravel (weathered dolostone), Moist, w/faint Petroleum odor.	0.2	0.1
	15						Auger and Split-Spoon Refusal @ 13.8' bgs		
	20								
	25								
	30								

APPENDIX B

SITE INVESTIGATION WORK PLAN

New York Power Authority

NIAGARA POWER PROJECT

WORK PLAN FOR THE INVESTIGATION OF SPILL NO. 0302316 IN THE VICINITY OF ROYAL AVENUE AND THE NYPA CONDUITS, NIAGARA FALLS, NY

Niagara Power Project

(FERC No. 2216)

Prepared for:

New York Power Authority

Prepared by:

URS Corporation

September 2003

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FIGURES

1.0 INTRODUCTION

On June 4, 2003, URS Corporation (URS), on behalf of the New York Power Authority (NYPA), notified the New York State Department of Environmental Conservation (NYSDEC) that a non-aqueous phase liquid (NAPL) had been discovered that day during URS-supervised drilling in Niagara Falls, New York. The discovery was made in the course of a subsurface investigation being conducted for NYPA. The driller was American Auger and Ditching Co., Inc., of Constantia, New York.

In a July 3, 2003, letter to NYPA, NYSDEC requested a work plan for assessing the extent of NAPL contamination. A description of the events surrounding the original discovery of contamination is provided below as a basis for this work plan. This document also presents the plan for delineating the extent of petroleum product, acknowledging the constraints imposed by subsurface barriers and property restrictions.

1.1 Events Triggering the Spill Report

NYPA is engaged in the relicensing of the Niagara Power Project (NPP) in Lewiston, Niagara County, New York. As part of this relicensing effort, NYPA is conducting an investigation to determine whether and to what extent the Project affects the flow of groundwater. This investigation included the installation of 17 groundwater monitoring wells, GW03-001 through GW03-017, starting on June 2, 2003.

On June 4, 2003, a boring was being advanced for the purpose of installing a bedrock well. The boring was located approximately 50 feet east of the NYPA conduits (within the conduit right of way [ROW]), and approximately 400 feet south of Royal Avenue (between 47th Street and Hyde Park Boulevard) in the City of Niagara Falls (Figure 1). To determine the depth to top of rock, American Auger drilled through the unconsolidated overburden using a Versa-Drill V-2000 drill rig equipped with a 5-7/8-inch diameter air hammer. In accordance with standard URS health and safety procedures and the URS Health and Safety Plan, continuous-monitoring equipment was employed to monitor breathing zone

air quality. Monitoring equipment consisted of a Mini-Rae photoionization detector (PID) equipped with a 10.6eV lamp and a Q-Rae Multigas meter with sensors for monitoring oxygen (O_2), Lower Explosive Limit (LEL), hydrogen sulfide (H_2S), and carbon monoxide (CO).

Drilling proceeded through the unconsolidated overburden to a depth of approximately 19 feet below ground surface (bgs) with no indication of contamination. Overburden sediments were found to consist of dark brown clayey silt and clay. The borehole was advanced to a depth of approximately 20 feet bgs when the driller detected a chemical odor, and immediately shut down the rig. On notification of the URS geologist, work was halted and all personnel were directed to an upwind location while the geologist assessed the situation. PID readings in the work/breathing zone proved to be 8 parts per million (ppm), and within the drill rig shroud surrounding the borehole, 234 ppm. Once the work/breathing zone was determined to be safe, the drill rod and hammer were lifted and an apparent non-aqueous phase liquid (NAPL) was observed coating about three feet of the bottom of the hammer. The suspected NAPL was black, with an oily appearance. To ensure that the borehole remained open, the hammer and drill rods were placed back down the borehole.

The drilling crew remained on standby while the URS Project Manager was informed by telephone of the situation. After conferring with NYPA personnel, a spill notification was made to NYSDEC. The spill number assigned was 0302316.

The URS Project Manager instructed the field geologist to collect a sample of the suspected NAPL for characterization and then to seal the borehole. Once the sampling equipment and containers had been gathered at the site, the drill rod and hammer were removed from the borehole. Upon removal, it was observed that approximately 10 feet of the hammer was now coated with suspected NAPL. Immediately prior to sample collection, the depth to the top of fluid in the borehole was measured at approximately 10 feet bgs. Because an oil/water interface probe was not readily available, NAPL thickness could not be determined.

A clean 1-1/2-inch PVC bailer was used to collect a sample of the suspected NAPL. Sample containment in a 40-milliliter Volatile Organics Analysis vial was attempted. Since, however, the only

two vials available for use at the time contained a hydrochloric acid preservative, the sample effervesced violently upon being poured into the vial, and another container had to be employed. The sample was collected in two 1-liter amber glass sample bottles.

The two 1-liter sample bottles were sealed and immediately placed in a cooler of ice for transport under standard chain-of-custody rules to Severn Trent Laboratory (STL) in Amherst, New York. The samples were submitted for analysis for the following parameters:

- Fuel fingerprint (NYSDOH Method 310.13)
- Total PCBs (USEPA Method 8082)
- TCL Pesticides and Mirex (USEPA Method 8081)
- Density (ASTM D-1298-80)
- RCRA Characteristics
  - Corrosivity (USEPA Method 9045)
  - Flashpoint (USEPA Method 1010)
  - H2S released from waste (SW8463 SECT 7.3) (Reactivity)
  - HCN released from waste (SW8463 SECT 7.3) (Reactivity)
- TCL Volatiles (USEPA Method 8260)
- TCL Semivolatiles (USEPA Method 8270)
- TAL Metals (USEPA Series 6010/7471)

The analytical results indicate that the substance is a non-aqueous phase liquid with a density of 1.1 g/ml, a pH of 7.28, and a flashpoint of 109.7 degrees Fahrenheit. Fuel fingerprinting analysis by NYSDOH method 310.13 indicates the presence of fuel oil #2 (140,000 mg/kg), motor oil (60,000 mg/kg), and mineral spirits (41,000 mg/kg). VOCs detected in the sample include ethylbenzene (6,900 µg/kg), toluene (2,200 µg/kg), xylenes (47,000 µg/kg), methylcyclohexane (3,900 µg/kg), isopropylbenzene (12,000 µg/kg), total dichlorobenzenes (16,000 µg/kg), and 1,2,4-trichlorobenzene (57,000 µg/kg). Biphenyl (32,000 µg/kg) was the only SVOC detected. Pesticides detected include alpha-BHC (1,100 µg/kg), beta-BHC (640 µg/kg), and delta-BHC (620 µg/kg). Results of PCB analysis indicate the presence of Aroclor 1254 at 4.1 mg/kg. Several metals were also detected in the NAPL sample. Concentrations of metals detected in the sample ranged from Not Detected to 24,700 mg/kg (for calcium).

Upon completion of sample collection, the drillers proceeded to seal the borehole. After first confirming that the borehole remained open, the drillers placed bentonite chips from the bottom of the borehole to a depth of approximately 18 inches bgs. During placement of the chips, care was taken to ensure that the level of suspected NAPL would not reach the top of the hole. After allowing sufficient time for hydration of the chips, the remaining 18 inches of borehole was backfilled with clean overburden soil. A new site for well GW03-016 (following abandonment of the boring) was selected approximately 500 feet to the north (within the NYPA conduit ROW, north of Royal Avenue). Drilling and well installation proceeded normally at this location, with no petroleum product being noted.

Once the borehole had been sealed, the drilling equipment was decontaminated. The downhole hammer and drill rod were first wiped down with oil-absorbent pads to remove gross contamination, and then further decontaminated by a thorough washing with a steam cleaner. All decontamination water was collected on the onsite decontamination pad (20-mil plastic sheeting) constructed by the drillers, and transferred to a 55-gallon open-top drum. All soil cuttings were placed into another 55-gallon drum. All personal protective equipment (e.g., Tyvek, nitrile gloves), the oil-absorbent pads, and the 20-mil plastic sheeting were placed in a third drum. On June 6, 2003, samples of drill cuttings and decontamination water were collected from the drums and submitted to Severn Trent for RCRA waste characterization. Pending waste characterization, the drums were placed within the fenced-off NYPA pump station facility, located approximately 300 feet northeast of the borehole. The drums remain within the NYPA pump station fence pending final data review.

1.2 Site Description and Physical Setting

As mentioned above, the abandoned borehole is located along the eastern edge of, and within, the NYPA conduit ROW approximately 50 feet east of the conduits and 400 feet south of Royal Avenue (between 47th Street and Hyde Park Boulevard) in the City of Niagara Falls, New York. The area lies just west of property owned by the Niagara Mohawk Power Corporation. Several other industrial properties are found to the north and east.

The subsurface in the area consists of unconsolidated fill and Pleistocene and Holocene glacial deposits overlying the Lockport Dolomite Group of middle Silurian age. The differing permeabilities of unconsolidated till, lacustrine silts and clay, and alluvial fine sand can lead to the formation of seasonal or perched water table conditions. Significant groundwater flow nevertheless occurs in the secondary fractures and horizontal bedding joints in the uppermost, weathered dolomite. The water table contours for the upper Lockport Dolomite zones indicate influences from the nearby Niagara River, the largely unlined Falls Street Tunnel to the north, and the conduits to the west. Other important factors in controlling groundwater flow include the conduit backfill material and drainage system, the forebay water levels, and the weir control at the Royal Avenue pump station (also known as Pump Station A). Study of this relatively complex hydraulic system is part of NYPA's ongoing relicensing studies.

1.3 Work Plan Objectives

The objective of this work plan is to present the scope of work proposed to investigate both the lateral and vertical extent of NAPL contamination within the NYPA conduit ROW. Emphasis has been placed on implementing the investigation as quickly as possible and reporting results to NYSDEC. The work plan does not include evaluating actual or potential risks to human health or the environment posed by the site.

2.0 NAPL INVESTIGATION AND REPORT

The NAPL investigation is broadly divided between the evaluation of existing data and the collection of data from new locations. Data from five existing monitoring wells in the vicinity (OW650, OW651, OW652, OW654, and OW657) may be helpful in delineating the extent of NAPL contamination (Figure 1). These wells were installed by Occidental Chemical Corporation (Occidental) and are reported to be routinely monitored by Occidental. It is assumed that relevant data (e.g., water levels; the presence and, if present, the thickness, of NAPL) from these nearby Occidental wells and possibly from other wells in the vicinity will be made available to NYPA.

Potential locations for future drilling without leaving NYPA property are restricted by the property boundary and by the presence of the conduits themselves. This narrow (60-foot wide) strip of north-south-running NYPA property also contains a brine-solution pipeline (owned by Texas Brine Company), which further restricts the choice of drilling sites. As a result of these restrictions, any new drilling within the NYPA ROW will necessarily be north and south of the NAPL discovery boring.

Health and Safety (H&S) during field work will be conducted in accordance with the H&S Plan developed for current drilling activities under the relicensing program. QA/QC will be carried out according to the Quality Assurance Project Plan in effect for the groundwater sampling program. Results of the evaluation will be presented in a report to NYSDEC, supported by tables and figures.

2.1 Evaluation of Existing Data from Occidental Wells

NYPA will request data collected from several Occidental wells in the area, in addition to any other pertinent data from the vicinity of the NAPL discovery. Data are expected to include boring logs, water levels, product thickness (if any), and analytical results.

2.2 Proposed Drilling Program

The subsurface within the NYPA ROW will be investigated using hollow-stem auger drilling methods. Depths to bedrock are not expected to exceed approximately 20 feet bgs. Several borings may be necessary. Spacing between the borings will allow for approximating the lateral extent of NAPL. Observations during drilling may also provide some indication of the plume's thickness, or vertical extent.

2.2.1 Lateral Extent of NAPL (North-South)

Lateral extent of the NAPL will be assessed by "stepping out" from the location of the initial discovery. There are two existing wells nearby (one north and one south). North is the replacement well

GW03-016, relocated across Royal Avenue approximately 500 feet from the NAPL discovery. Approximately 250 feet south of the discovery boring is the Occidental well OW651. If approval is granted for access to OW651, then these existing wells will be assessed for evidence of NAPL before any drilling begins. The approximate NAPL limits will be further defined based on data from the new boreholes, as described below.

If NAPL is not detected in the wells mentioned above, initial borings will be established 100 feet north and south of the discovery boring. If NAPL is encountered northward, subsequent boreholes will be advanced at 50-foot intervals further north until the northern limit of the plume is defined or until subsurface structures near Royal Avenue (e.g., Southside Interceptor) are reached. The same procedure will be followed southward, until the southern limit of the plume has been defined or until a point is reached that is within 50 feet of Occidental monitoring well OW651 (assuming no evidence of NAPL in the well).

If no evidence of product appears in one or another of the initial boreholes (i.e., those established 100 feet from the discovery boring), new boreholes will be constructed 50 feet closer to the discovery boring. If no product is encountered at 50 feet, the final borings will be moved in to 25 feet from the discovery boring.

2.2.2 Vertical Extent of NAPL

Information from the initial discovery boring suggests that NAPL is present in the uppermost, fractured bedrock and that it may be confined by the overburden. It is possible, however, that the NAPL occurs at shallower depths in the overburden. To better define the vertical extent of NAPL contamination, continuous split-spoon samples will be collected and screened visually for staining, and, using a photoionization detector (PID), for organic vapors. If staining, vapor readings, or soil saturation should indicate possible NAPL presence in the overburden, a slotted-auger section will be left in the hole overnight for water level and NAPL indications (using an interface probe) the following day. Such readings made without the installation of monitoring wells may have to be qualified when compared to readings from existing wells, but the approach is appropriate for delineating the extent of NAPL. The

URS geologist will check for indications of NAPL that are potentially undetectable by the interface probe (i.e., a very thin layer, visible by sheen).

Caution will be exercised to avoid potential carry-down of contamination from upper zones. If overburden screening is negative, the lead slotted-auger section will be advanced into the uppermost bedrock and left overnight for water level and NAPL measurement. To avoid contaminating deeper fracture zones, further penetration of the bedrock will be kept to a minimum.

No plans exist for the installation of monitoring wells, and the only possible sampling and analysis to be conducted will be for the purpose of comparing NAPL to earlier results.

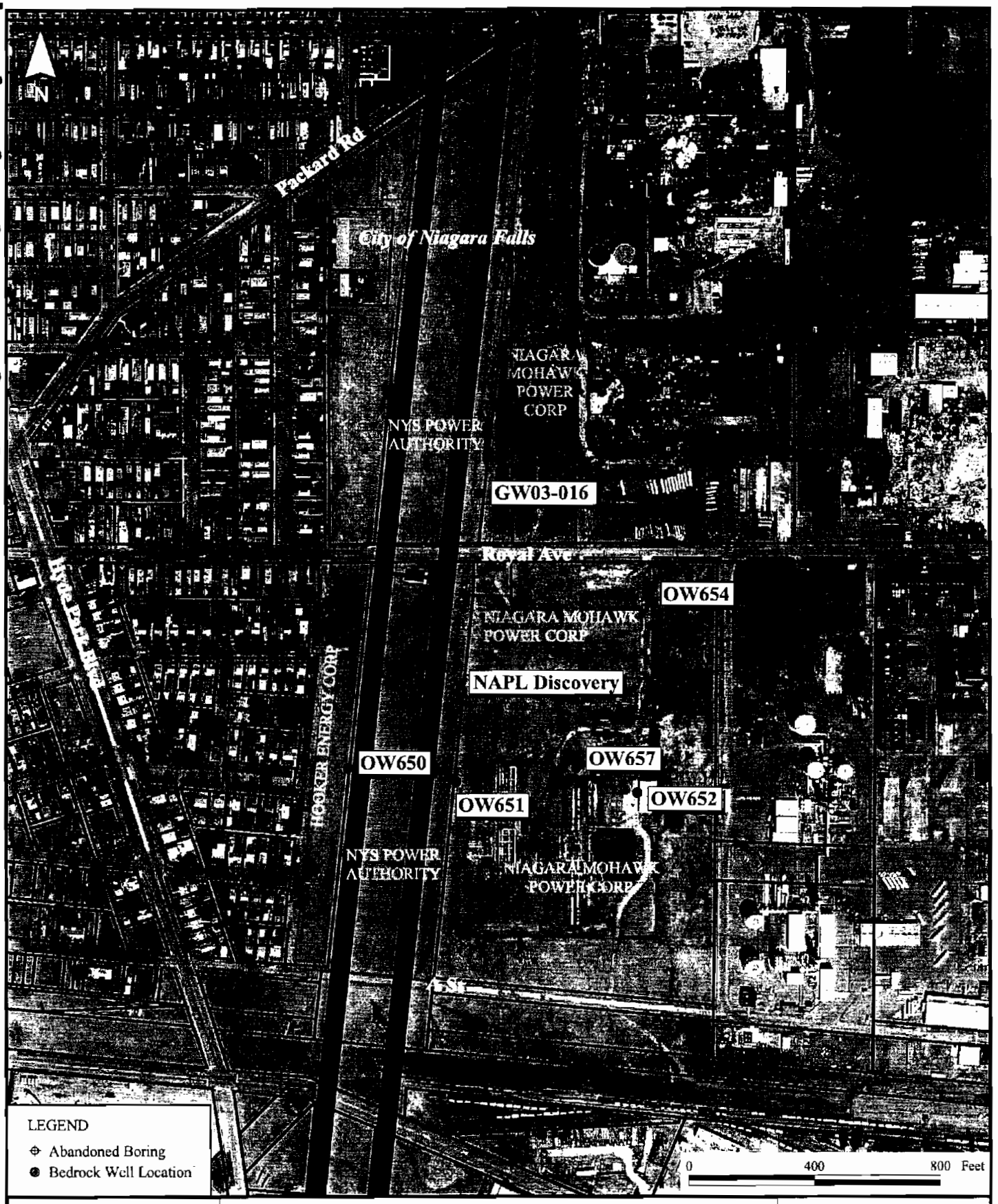
3.0 SCHEDULE

Provided that existing monitoring data are received in a timely fashion and that mobilization of a drilling contractor is not delayed, the written report of investigation results can be prepared and submitted to NYSDEC within 120 days of work plan approval.

FIGURE 1

Approximate Location of Abandoned Boring and Nearby Monitoring Wells

Figure in pdf format



New York Power Authority

NIAGARA POWER PROJECT (FERC NO. 2216)

Approximate Locations of Abandoned Boring and Monitoring Wells

FIGURE 1

NIAGARA POWER PROJECT

Plot date: Sep 24, 2003 ; R:\NIS\GIS data\apr\ss_26_drill.apr

APPENDIX C

ANALYTICAL RESULTS

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPAAC01

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-01B

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6D1132

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: not dec. _____ Date Analyzed: 07/08/04

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
78-93-3	2-Butanone	5	U
67-66-3	Chloroform	5	U
56-23-5	Carbon Tetrachloride	5	U
107-06-2	1,2-Dichloroethane	5	U
71-43-2	Benzene	5	U
79-01-6	Trichloroethene	5	U
127-18-4	Tetrachloroethene	5	U
108-90-7	Chlorobenzene	5	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPAAC01

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-01B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: S4A4421

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: _____ decanted: (Y/N)___ Date Extracted:07/07/04

Concentrated Extract Volume: 1000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
106-46-7	1,4-Dichlorobenzene	33	U
95-48-7	2-Methylphenol	33	U
106-44-5	4-Methylphenol	33	U
67-72-1	Hexachloroethane	33	U
98-95-3	Nitrobenzene	33	U
87-68-3	Hexachlorobutadiene	33	U
88-06-2	2,4,6-Trichlorophenol	33	U
95-95-4	2,4,5-Trichlorophenol	67	U
121-14-2	2,4-Dinitrotoluene	33	U
118-74-1	Hexachlorobenzene	33	U
87-86-5	Pentachlorophenol	67	U
110-86-1	Pyridine	33	U

FORM 1
PCB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC01

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) SOIL Lab Sample ID: C0658-01C

Sample wt/vol: 30.0 (g/mL) G Lab File ID: E2D9945F

% Moisture: 11 decanted: (Y/N) N Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 07/12/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/13/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	37	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

*

FORM 1
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC01

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-01B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: E1E7189F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/07/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/08/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
58-89-9	gamma-BHC (Lindane)	0.17	U
76-44-8	Heptachlor	0.17	U
1024-57-3	Heptachlor epoxide	0.17	U
72-20-8	Endrin	0.33	U
72-43-5	Methoxychlor	1.7	U
8001-35-2	Toxaphene	17	U
12789-03-6	Chlordane (technical)	8.3	U

FORM 1
HERB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC01

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-01B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: E3E7161F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/08/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-99-0	Dalapon	8.3	U
1918-00-9	Dicamba	0.33	U
93-65-2	MCPP	330	U
7085-19-0	MCPA	330	U
120-36-5	Dichlorprop	3.3	U
94-75-7	2,4-D	3.3	U
93-72-1	2,4,5-TP (Silvex)	0.33	U
93-76-5	2,4,5-T	0.33	U
94-82-6	2,4-DB	3.3	U
88-85-7	Dinoseb	1.7	U

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

NYPAAC01

Lab Name: Mitkem Corporation Contract: TBD

Lab Code: MITKEM Case No. SAS No.: SDG No.: mc0658

Matrix (soil/water): SOIL Lab Sample ID: C0658-01

Level (low/med): MED Date Received: 07/02/04

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	16	U		P
7440-39-3	Barium	1290	B		P
7440-43-9	Cadmium	6.8	B		P
7440-47-3	Chromium	3.8	U		P
7439-92-1	Lead	52.1	B		P
7782-49-2	Selenium	9.8	U		P
7440-22-4	Silver	9.1	U		P
7439-97-6	Mercury	0.47	U		CV

Comments:

Hitkem Corporation

Date: *29-Jul-04*

Client: TVGA Consultants
Client Sample ID: NYPAAC01
Lab ID: C0658-01

Project: NYPA
Collection Date: 07/01/04 8:30

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
FLASHPOINT BY PENSKY-MARTENS CLOSED-CUP METHOD				**SW1010_S**			
Ignitability	No Flash up to 137		200	°F	1	07/10/2004 12:00	R7137
REACTIVE CYANIDE RELEASED FROM WASTES				**SW7.3.3.2_S**			
Reactive Cyanide	ND		1.0	mg/Kg	1	07/26/2004 10:17	13584
REACTIVE SULFIDE RELEASED FROM WASTES				**SW7.3.4.2_S**			
Reactive Sulfide	2.3		1.0	mg/Kg	1	07/21/2004 14:04	13583
SOIL AND WASTE PH				**SW9045C_S**			
pH	8.1		1.0	S.U.	1	07/09/2004 11:20	R7119

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPAAC03

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-02B

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6D1133

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: not dec. _____ Date Analyzed: 07/08/04

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
78-93-3	2-Butanone	5	U
67-66-3	Chloroform	5	U
56-23-5	Carbon Tetrachloride	5	U
107-06-2	1,2-Dichloroethane	5	U
71-43-2	Benzene	5	U
79-01-6	Trichloroethene	5	U
127-18-4	Tetrachloroethene	5	U
108-90-7	Chlorobenzene	5	U

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPAAC03

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-02B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: S4A4422

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: _____ decanted: (Y/N)___ Date Extracted:07/07/04

Concentrated Extract Volume: 1000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
106-46-7	1,4-Dichlorobenzene	33	U
95-48-7	2-Methylphenol	33	U
106-44-5	4-Methylphenol	33	U
67-72-1	Hexachloroethane	33	U
98-95-3	Nitrobenzene	33	U
87-68-3	Hexachlorobutadiene	33	U
88-06-2	2,4,6-Trichlorophenol	33	U
95-95-4	2,4,5-Trichlorophenol	67	U
121-14-2	2,4-Dinitrotoluene	33	U
118-74-1	Hexachlorobenzene	33	U
87-86-5	Pentachlorophenol	67	U
110-86-1	Pyridine	33	U

FORM 1
PCB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC03

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) SOIL Lab Sample ID: C0658-02C

Sample wt/vol: 30.0 (g/mL) G Lab File ID: E2D9946F

% Moisture: 18 decanted: (Y/N) N Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SONC Date Extracted:07/12/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/13/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	40	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

FORM 1
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC03

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-02B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: E1E7190F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/07/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/08/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
58-89-9	gamma-BHC (Lindane)	0.17	U
76-44-8	Heptachlor	0.17	U
1024-57-3	Heptachlor epoxide	0.17	U
72-20-8	Endrin	0.33	U
72-43-5	Methoxychlor	1.7	U
8001-35-2	Toxaphene	17	U
12789-03-6	Chlordane (technical)	8.3	U

FORM 1
HERB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPAAC03

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-02B

Sample wt/vol: 300.0 (g/mL) ML Lab File ID: E3E7162F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/08/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-99-0	Dalapon	8.3	U
1918-00-9	Dicamba	0.33	U
93-65-2	MCPP	330	U
7085-19-0	MCPA	330	U
120-36-5	Dichlorprop	3.3	U
94-75-7	2,4-D	3.3	U
93-72-1	2,4,5-TP (Silvex)	0.33	U
93-76-5	2,4,5-T	0.33	U
94-82-6	2,4-DB	3.3	U
88-85-7	Dinoseb	1.7	U

U.S. EPA CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

NYPAAC03

Lab Name: Mitkem Corporation Contract: TBD

Lab Code: MITKEM Case No. SAS No.: SDG No.: mc0658

Matrix (soil/water): SOIL Lab Sample ID: C0658-02

Level (low/med): MED Date Received: 07/02/04

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	16	U		P
7440-39-3	Barium	1330	B		P
7440-43-9	Cadmium	5.6	B		P
7440-47-3	Chromium	3.8	U		P
7439-92-1	Lead	21.8	B		P
7782-49-2	Selenium	9.8	U		P
7440-22-4	Silver	9.1	U		P
7439-97-6	Mercury	0.47	U		CV

Comments:

Weitkem Corporation

Date: *29-Jul-04*

Client: TVGA Consultants
Client Sample ID: NYPAAC03
Lab ID: C0658-02
Project: NYPA
Collection Date: 07/01/04 11:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
FLASHPOINT BY PENSKY-MARTENS CLOSED-CUP METHOD				**SW1010_S**			
Ignitability	No Flash up to 126		200	°F	1	07/10/2004 12:00	R7137
REACTIVE CYANIDE RELEASED FROM WASTES				**SW7.3.3.2_S**			
Reactive Cyanide	ND		1.1	mg/Kg	1	07/26/2004 10:19	13584
REACTIVE SULFIDE RELEASED FROM WASTES				**SW7.3.4.2_S**			
Reactive Sulfide	ND		1.1	mg/Kg	1	07/21/2004 14:04	13583
SOIL AND WASTE PH				**SW9045C_S**			
pH	8.0		1.0	S.U.	1	07/09/2004 11:20	R7119

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quanititation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

1A

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03A

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6D1134

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: not dec. _____ Date Analyzed: 07/08/04

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
75-01-4	Vinyl Chloride	5	U
75-35-4	1,1-Dichloroethene	5	U
75-09-2	Methylene Chloride	5	U
156-60-5	trans-1,2-Dichloroethene	5	U
156-59-2	cis-1,2-Dichloroethene	5	U
67-66-3	Chloroform	5	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon Tetrachloride	5	U
71-43-2	Benzene	5	U
79-01-6	Trichloroethene	5	U
75-27-4	Bromodichloromethane	5	U
108-88-3	Toluene	3	J
79-00-5	1,1,2-Trichloroethane	5	U
127-18-4	Tetrachloroethene	5	U
124-48-1	Dibromochloromethane	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
75-25-2	Bromoform	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03A

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: V6D1227

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: not dec. _____ Date Analyzed: 07/13/04

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
----------	Monochlorobenzotrifluoride	5	U

FORM I VOA

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03B

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S4A4420

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: _____ decanted: (Y/N)___ Date Extracted:07/07/04

Concentrated Extract Volume: 1000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-Methylphenol	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	20	U
131-11-3	Dimethylphthalate	10	U
83-32-9	Acenaphthene	10	U
84-66-2	Diethylphthalate	10	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	20	U
85-01-8	Phenanthrene	10	U
84-74-2	Di-n-butylphthalate	2	J
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-84-0	Di-n-octylphthalate	10	U

(1) - Cannot be separated from Diphenylamine

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03B

Sample wt/vol: 1000 (g/mL) ML Lab File ID: S2E0768

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: _____ decanted: (Y/N)___ Date Extracted:07/07/04

Concentrated Extract Volume: 1000(uL) Date Analyzed: 07/15/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
----------	Monochlorotoluene	10	U
----------	Dichlorobenzotrifluoride	10	U
----------	Dichlorotoluene	10	U
----------	Tetrochlorobenzene	10	U
----------	Trichlorotoluene	10	U

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EPA SAMPLE NO.

NYPADF02

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03B

Sample wt/vol: 100.0 (g/mL) ML Lab File ID: S4A4420

Level: (low/med) LOW Date Received: 07/02/04

% Moisture: _____ decanted: (Y/N)___ Date Extracted:07/07/04

Concentrated Extract Volume: 1000(uL) Date Analyzed: 07/09/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	761-65-9	FORMAMIDE, N,N-DIBUTYL-	8.98	86	NJ
2.	134-62-3	DIETHYLTOLUAMIDE	10.87	190	NJ
3.					
4.					
5.					
6.					
7.					
8.					
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30.					

FORM 1
PCB ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03B

Sample wt/vol: 1000 (g/ml) ML Lab File ID: E2D9915F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/07/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/07/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	1.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

FORM 1
PESTICIDE ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

NYPADF02

Lab Name: MITKEM CORPORATION Contract:

Lab Code: MITKEM Case No.: SAS No.: SDG No.: C0658

Matrix: (soil/water) WATER Lab Sample ID: C0658-03B

Sample wt/vol: 1000 (g/mL) ML Lab File ID: E1E7170F

% Moisture: _____ decanted: (Y/N)___ Date Received: 07/02/04

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:07/07/04

Concentrated Extract Volume: 10000(uL) Date Analyzed: 07/07/04

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.090	
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
33213-65-9	Endosulfan II	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
2385-85-5	Mirex	0.050	U

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO

NYPADF02

Lab Name: Mitkem Corporation Contract: TBD

Lab Code: MITKEM Case No. SAS No.: SDG No.: mc0658

Matrix (soil/water): WATER Lab Sample ID: C0658-03

Level (low/med): MED Date Received: 07/02/04

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7440-43-9	Cadmium	0.12	B		P
7440-47-3	Chromium	5.6	B		P
7440-50-8	Copper	6.3	U		P
7439-92-1	Lead	5.5	B		P
7440-02-0	Nickel	10.3	B		P
7440-66-6	Zinc	78.3			P
7439-97-6	Mercury	0.068	U		CV
	Cyanide	9.1	U		CA

Comments:

Mitkem Corporation

Date: *29-Jul-04*

Client: TVGA Consultants
Client Sample ID: NYPADF02
Lab ID: C0658-03
Project: NYPA
Collection Date: 07/01/04 10:15

Analyses	Result	Qual	RL	Units	DF	Date Analyzed	Batch ID
TOTAL PHOSPHORUS				**E365.2**			
Phosphorus, Total (As P)	0.18		0.033	mg/L	1	07/13/2004 11:36	13458
TOTAL ORGANIC CARBON BY COMBUSTION				**E415.1_TOC_W**			
Organic Carbon, Total	14		10	mg/L	1	07/08/2004 16:04	13415
PHENOLS BY 4-AMINOANTIPYRINE METHOD				**E420.1**			
Phenolics, Total Recoverable	ND		0.20	mg/L	1	07/10/2004 7:18	13439
TOTAL SUSPENDED SOLIDS				**SM2540_TSS**			
Total Suspended Solids	310		10	mg/L	1	07/07/2004 14:40	13396
TOTAL CYANIDE				**SW9012B_W**			
Cyanide	ND		20	µg/L	1	07/08/2004 15:37	13386

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
DF - Dilution Factor
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
RL - Reporting Limit

MITKEM CORPORATION
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Warwick, Rhode Island 02886-1755
(401) 732-3400 • Fax (401) 732-3499
email: mitkem@mitkem.com

CHAIN-OF-CUSTODY RECORD

REPORT TO		INVOICE TO		
COMPANY TVGA Consultants	PHONE 716 [illegible]	COMPANY TVGA Consultants	PHONE 716 [illegible]	LAB PROJECT #:
NAME James Mandelli	FAX 716 [illegible]	NAME Accounts Department	FAX 716 [illegible]	
ADDRESS 1000 Maple Rd.		ADDRESS 1000 Maple Rd.		TURNAROUND TIME:
CITY/ST/ZIP Elma NY 14059		CITY/ST/ZIP Elma NY 14059		

CLIENT PROJECT NAME:	CLIENT PROJECT #:	CLIENT P.O.#:
NYPA Investigation NYPA Conduit Row	2004 0192.00	—

REQUESTED ANALYSES: VOC - 8260; PCB - 8082; [illegible]; VOCs [illegible]; Mult[illegible] [illegible]; [illegible]; TAL Metals [illegible]; TOC by 9060; TSS by 160.2; [illegible]; [illegible]

SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	COMPOSITE	GRAB	WATER	SOIL	OTHER	LAB ID	# OF CONTAINERS	Requested analyses	COMMENTS
NYPA-DF02-NW-0	7-1-04 / 10:15		X	X				13	[illegible]	
	/									
	/									
	/									
	/									
	/									
	/									
	/									
	/									
	/									
	/									

TSF#	RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME	ADDITIONAL REMARKS:	COOLER TEMP:
	James Mandelli	7-1-04 / 14:11		/		
		/		/		
		/		/		

WHITE: LABORATORY COPY YELLOW: REPORT COPY PINK: CLIENT'S COPY

MITKEM CORPORATION
[illegible] Metro Center Boulevard
Warwick, Rhode Island 02886-1755
(401) 732-3400 • Fax (401) 732-3499
email: mitkem@mitkem.com

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

REPORT TO			INVOICE TO		
COMPANY [illegible]	PHONE [illegible]		COMPANY [illegible]	PHONE [illegible]	LAB PROJECT #:
NAME [illegible]	FAX [illegible]		NAME [illegible]	FAX [illegible]	
ADDRESS [illegible]			ADDRESS [illegible]		TURNAROUND TIME:
CITY/ST/ZIP [illegible]			CITY/ST/ZIP [illegible]		

CLIENT PROJECT NAME:	CLIENT PROJECT #:	CLIENT P.O.#:
NYPA [illegible]	[illegible]	—

SAMPLE IDENTIFICATION	DATE/TIME SAMPLED	COMPOSITE	GRAB	WATER	SOIL	OTHER	LAB ID	# OF CONTAINERS	REQUESTED ANALYSES	COMMENTS
NYPA-AC01-2	7/1/04	X			X			[illegible]	X	
NYPA AC02-2	7/1/04	X			X			[illegible]	X	
	/									
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TSF#	RELINQUISHED BY	DATE/TIME	ACCEPTED BY	DATE/TIME
	[illegible]	7/1/04 14:11		/
		/		/
		/		/

ADDITIONAL REMARKS:

COOLER TEMP:

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APPENDIX D

LIMITATIONS

LIMITATIONS

The conclusions presented in this report are based upon information gathered in accordance with the Scope of Services contracted by the Client using generally accepted professional consulting principles and practices. Information provided by outside sources (e.g., agencies, laboratories, etc.), as cited herein, was used in the assessment of the site. The accuracy of the conclusions drawn form this investigation is, therefore, dependent upon the accuracy of information provided by these sources. Furthermore, TVGA is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to the performance of services.