

**SUPPLEMENTAL GROUNDWATER INVESTIGATION REPORT
EMERSON POWER TRANSMISSION FACILITY
ITHACA, NEW YORK**

PREPARED

BY

ENVIRONMENTAL STRATEGIES CONSULTING LLC

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1.0 Introduction

On behalf of Emerson, Environmental Strategies Consulting LLC conducted a supplemental groundwater investigation at the Emerson Power Transmission (EPT) facility in Ithaca, New York. The objective of the investigation was to further evaluate groundwater quality in areas immediately downgradient of the current remediation area. The scope of work involved installing and sampling three offsite groundwater monitoring wells within the upper most portion of fractured bedrock. The work was conducted in accordance with the Supplemental Groundwater Investigation Work Plan approved by the New York State Department of Environmental Conservation (NYSDEC) on July 18, 2005. The work plan was submitted to the NYSDEC in fulfillment of requirements outlined in the July 13, 1987, Consent Order entered into by the NYSDEC and Emerson. The field activities were also conducted in accordance with the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation, dated December 25, 2002.

The following section of this report presents background information on the site. Section 3.0 describes the objectives and a summary of the components of the investigation. Section 4.0 describes the scope of work in greater detail. This is followed by a discussion of the results and conclusions.

2.0 Site Background

2.1 Site Location and History

The EPT facility is located at 620 South Aurora Street in Ithaca, New York. The site comprises approximately 110 acres within the City of Ithaca and the Town of Ithaca in Tompkins County and includes the New York State Electric and Gas (NYSEG) substation property to the west. The area surrounding the site is mostly residential. The campus of Ithaca College borders the site on the east across South Aurora Street. The southern portion of the property is unused and vacant. Wooded land and residential areas border the property to the west, and residential areas are located to the north. Cayuga Lake is approximately 2 miles north of the site.

The Emerson Power Transmission plant was built in 1906 by Morse Industrial Corporation, which manufactured steel roller chain for the automobile industry. From approximately 1928 to 1982, Borg Warner owned the company and manufactured automotive components and power transmission equipment. Up until the early 1980s, Morse Industrial Corporation used trichloroethylene (TCE), a widely-used solvent for cleaning and degreasing metal parts. In 1983, Morse Industrial Corporation was purchased from Borg-Warner Corporation by Emerson, and became known as Emerson Power Transmission. Emerson Power Transmission manufactures industrial roller chain, bearings and clutching for the power transmission industry. Under Emerson's ownership, TCE was not used at the Ithaca facility. Investigations conducted by Emerson revealed onsite groundwater contamination in 1987, originating from a fire-water reservoir located on the western portion of the property. Emerson promptly reported these findings to the New York State Department of Environmental Conservation.

2.2 Site Geology

Unconsolidated overburden material at the site is comprised of glacial till. The overburden is approximately 5 to 10 feet thick in most areas of the site. The overburden deposits consist of dark gray compacted clay with trace amounts of coarse gravel and are referred to as the A-zone.

Beneath the overburden lies bedrock of the Ithaca Member, consisting of a fractured siltstone. The siltstone is divided into three distinct zones, based on the frequency of bedding planes and fractures: an upper “stress relief zone” (B-zone), a middle “transitional zone” (C-zone), and a lower “lithologically controlled zone” (D-zone). The uppermost B-zone is weathered bedrock and highly fractured. The B-zone extends to a maximum depth of approximately 22 feet below ground surface (bgs) and has an average thickness of approximately 8 to 10 feet on the west portion of the site where the current remediation system is located.

The transitional zone (C-zone) extends from the base of the B-zone to a maximum depth of approximately 55 feet bgs beneath the site. The lower lithologically controlled zone (D-zone) extends from the bottom of the C-zone to a minimum depth of 145 feet bgs. In this lower zone, fractures are reportedly confined to intervals that are widely spaced, and their occurrence is controlled by lithology.

2.2.1 Vertical Joint Sets and Fractures

Four regular joint sets are recognized regionally: Two cross-strike joint sets (Ia and Ib) related to separate phases of the Alleghanian Orogeny, a strike-parallel set (II), and an oblique set (III) reflecting the contemporary stress field. Engelder and Geisler (1980) measured orientations of the joint sets in Tompkins County and throughout the Appalachian Plateau of New York. The average strike of Ib joints at 11 outcrops of the Genesee Group in Tompkins County was $341^{\circ} \pm 3^{\circ}$ (N19W). The average strike of Ia joints at 2 outcrops of the Genesee Group in Tompkins County was $007^{\circ} \pm 3^{\circ}$ (N7E). The average orientation of the strike-parallel joint set (II) was 82° .

Engelder and Geisler (1980) also observed that joints in the siltstones are more likely to have regular spacing, while joints in the shales were less likely to be regularly spaced. Vertically, joints tended to terminate at lithologic boundaries.

2.3 **Site Hydrogeology**

Groundwater is present in the overburden and in bedrock. The direction of groundwater flow in the overburden and the upper portion of fractured bedrock (B-zone) is to the northwest. Groundwater within the overburden and upper portion of fractured bedrock are in direct hydraulic communication and unconfined. The deeper zones of fractured bedrock (C- and

D-zones) are under semi-confined conditions. Historic groundwater elevations from well clusters screened at greater depths within bedrock indicate a downward hydraulic gradient.

Based on groundwater elevation data collected on May 19, 2005, the direction of groundwater flow within the shallow bedrock (B-zone) aquifer is to the northwest. The overall pattern of flow generally mimics the surface topography, with a steep gradient observed between the EPT facility and West Spencer Street (South Hill) and a flatter gradient west of West Spencer Street.

3.0 Objectives

The objective of the supplemental groundwater investigation was to further evaluate groundwater quality immediately downgradient (west) of the current remediation area. The scope of work included:

- installing and sampling three groundwater monitoring wells (MW-30B, MW-31B, and MW-32B) within the upper portion of fractured bedrock (B-zone) immediate west and northwest of the current remediation area

4.0 Scope of Work

4.1 **Monitoring Well Installation**

Three groundwater monitoring wells (MW-30B, MW-31B, and MW-32B) were installed downgradient of the current remediation area near the NYSE&G South Cayuga Substation between July 27 and August 9, 2005. The well locations are shown in Figure 1.

In accordance with the approved scope of work, each well was installed and screened in the upper portion of the fractured bedrock (B-zone). The wells were completed between 14 and 18 feet bgs. Boreholes for the monitoring wells were drilled through the overburden using 8.25-inch inside-diameter (ID) hollow-stem augers. Continuous soil samples were collected from the ground surface to refusal at bedrock using 2-foot-long, split-spoon samplers. The soils recovered from the split spoons were screened for organic vapors in the field using a photoionization detector (PID). Sample descriptions and PID readings were recorded in a field notebook.

Bedrock was cored to determine the quantity of fractures and for logging purposes (Appendix A). The screened interval and final depth of the monitoring wells depended on the quantity of fractures present. The boreholes were terminated as the quantity of fractures began to diminish with depth. Once the terminal depth of each well was reached, the borehole for each well was expanded (reamed) using a 6.25-inch rotary air hammer.

The monitoring wells were constructed of 2-inch-ID threaded, flush jointed, Schedule 40 polyvinyl chloride (PVC) blank casing attached to screens with 0.010-inch horizontal slots. Screen length ranged from 6 to 8 feet. A clean sand filter pack was placed from the bottom of the well borehole to approximately 2 feet above the top of the screen. A 3-foot-thick bentonite seal was then placed on top of the sand filter pack. The remaining annular space was backfilled with a cement-bentonite grout mixture (tremie piped from the bottom to the top).

The wells were completed flush with the ground surface using protective, steel well coverings, with the exception of MW-30B and MW-31B, where above-grade lockable steel casing was used. The inner casing of the flush-mounted wells was fitted with a watertight lockable cap. Well construction information was recorded in a field notebook, and boring logs and as-built well construction diagrams were prepared for each monitoring well after completion of the field activities (Appendix A). All wells were completed and installed by Parratt Wolff,

Inc., a driller licensed in the state of New York, in accordance with Environmental Conservation Law 15-1525.

Drill cuttings and water generated during monitoring well installation were contained in Department of Transportation-approved, 55-gallon steel drums. The drums were labeled and moved to a staging area on the EPT site. Water generated during the well installation was collected and added to the onsite groundwater treatment system. All solid investigative-derived waste (i.e., drill cuttings) will be sampled and analyzed for disposal characterization. Used protective clothing and equipment was managed in a manner consistent with the U.S. Environmental Protection Agency Guidance Document, Management of Investigative Derived Waste During Site Inspections (May 1991), OERR 9345.3-02.

All drilling and sampling activities were conducted with clean equipment. Split-spoon samplers were decontaminated at the EPT site in accordance with Environmental Strategies' standard operating procedures (SOPs). The drilling equipment (augers, rods, and hammer bit) was decontaminated at the EPT site using a portable steam cleaner. All decontamination fluids generated during the drilling activities were contained in 55-gallon steel drums and managed in the same manner as water generated during the well installation.

The ground surface elevations and the top of the PVC well casing at each new monitoring well were surveyed to the nearest 0.01 foot. The horizontal locations of the new wells were determined to the nearest 0.1 foot and referenced to the state plane coordinate system. A surveyor licensed in New York State surveyed the well locations and elevations. The locations and elevations of the monitoring wells were tied into the existing base map for the site.

4.1.1 Groundwater Sampling and Development Procedures

The new monitoring wells were developed to remove sediments and to ensure effective communication between the well screens and surrounding saturated zones. The wells were developed by surging the screened interval to loosen any fine-grained sediment in the sand filter pack and adjacent aquifer material. Groundwater from the well was removed by bailing or pumping. Turbidity, pH, temperature, and specific conductance were monitored during the development process to ensure that groundwater representative of the screened portion of the aquifer was entering the well. Development continued until the discharge was relatively free of suspended sediments. Water generated during the well development was collected in drums and added to the EPT onsite groundwater treatment system.

All development activities were conducted with clean equipment to prevent potential cross-contamination between well locations. Non-dedicated equipment was cleaned between use in each well.

Before initiating sampling, water level measurements were collected from the newly installed monitoring wells on August 17, 2005. Following the water level measurements, each well was purged dry (approximately three well volumes). After being allowed to recharge overnight, the wells were purged a second time as part of the standard sampling procedures. Measurements of pH, conductivity, temperature, and redox potential were obtained at least three times (beginning, middle, and end) during the well purging process, except in instances where the well experienced incomplete recharge. In these instances, measurements were made at least once before the well was purged dry. Groundwater sampling logs are included in Appendix B.

Groundwater samples were collected from each monitoring well on August 18, 2005, for analysis of volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and polychlorinated biphenyls (PCBs) using disposable polyethylene bailers. It should be noted that well MW-31B was sampled for VOCs only, due to insufficient well volume.

All non-dedicated groundwater sampling equipment was decontaminated in the field. All monitoring well purging, groundwater sampling, and decontamination was conducted according to Environmental Strategies' SOPs, which are consistent with procedures outlined in the Resource Conservation and Recovery Act's Groundwater Monitoring Technical Enforcement Guidance Document.

Quality assurance/quality control samples, consisting of trip blanks and duplicates, were collected in accordance with SOPs. All samples were sealed, labeled, placed in a cooler with ice, and shipped to STL-Buffalo for analysis. Appropriate chain-of-custody procedures were followed.

5.0 Results

5.1 Groundwater Sampling Results

The August 2005 groundwater sampling results are summarized in Table 1 and shown in Figure 2. The laboratory data sheets are included in Appendix C.

Site related compounds were detected in two of the three monitoring wells. Monitoring well MW-32B, which is located 180 feet northwest of the remediation area on South Cayuga, contained detectable levels of 1,1,1-trichloroethane (3 microgram per liter [$\mu\text{g/l}$]), TCE (200 $\mu\text{g/l}$) and its associated degradation product *cis*-1,2,-dichlorethene (DCE; 160 $\mu\text{g/l}$). Low levels of TCE (5.5 $\mu\text{g/l}$) and *cis*-1,2-DCE (1.3 $\mu\text{g/l}$) were detected in monitoring MW-31B, which is located 180 feet west of the remediation area and 60 feet north of the NYSE&G substation. No site-related VOCs were detected in monitoring well MW-30B, located 220 feet west of remediation area.

In addition to the site-related compounds detected in two of the new wells, chloroform, a common laboratory contaminant, was detected in each of the new wells at concentrations ranging from 1.6 $\mu\text{g/l}$ in MW-30B to 24 $\mu\text{g/l}$ in MW-31B. The presence of chloroform in the samples is likely the result of laboratory contamination.

No SVOCs or PCBs were detected in the samples collected from the three new wells.

6.0 Conclusions

The sampling results for the three new wells installed downgradient of the remediation area showed TCE in two wells and *cis*-1,2-DCE in one well above the state groundwater standards. Low levels of 1,2-DCE were detected in the second well, while no VOCs were found in the third well. Based groundwater investigations conducted to date, the area of affected groundwater related to the fire water reservoir appears to be restricted primarily to within the current remediation area. No SVOCs or PCBs were detected in samples collected from the three new wells.

Figure

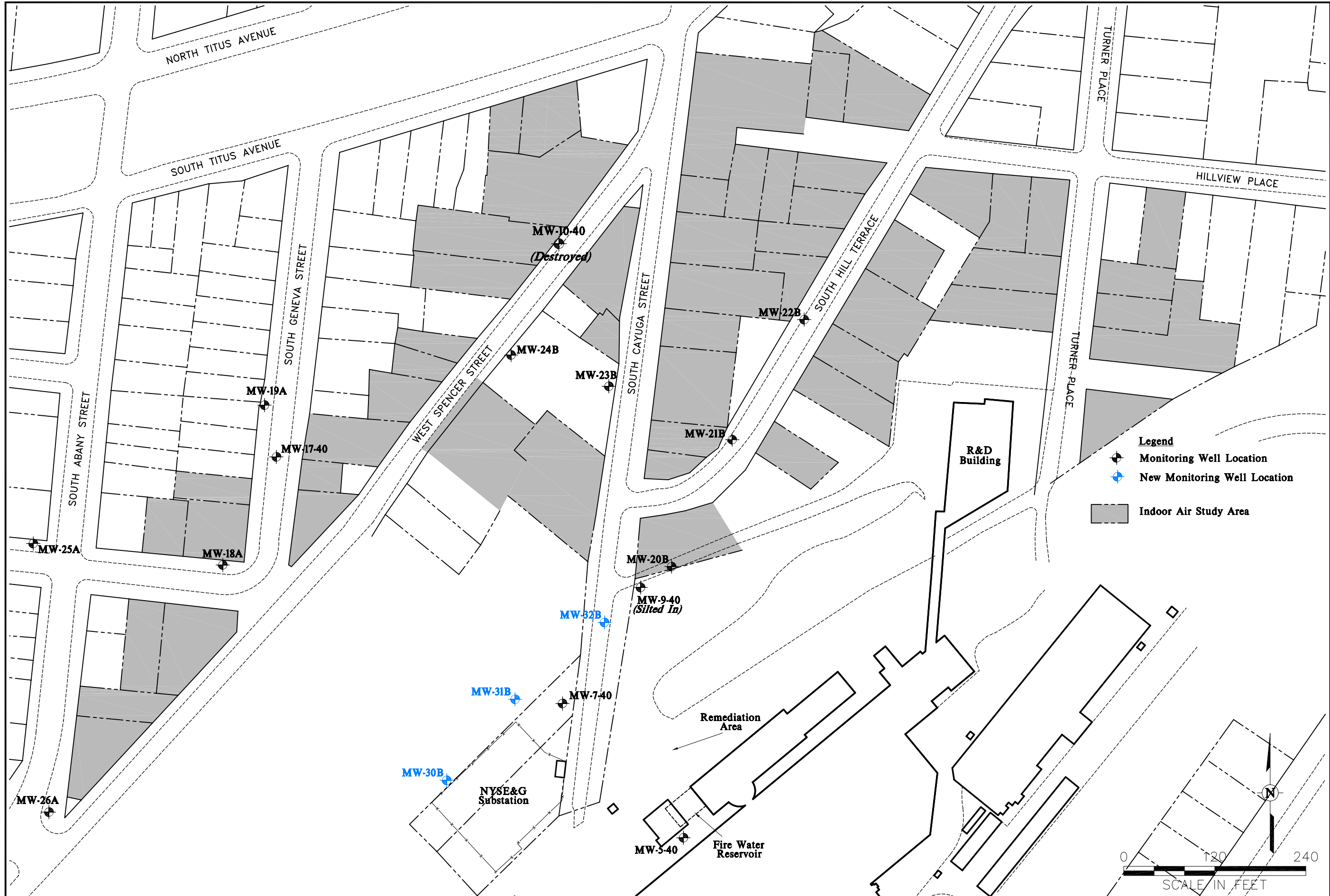


Figure 1
Groundwater Monitoring Well Locations
 Emerson Power Transmission
 Ithaca, New York

ENVIRONMENTAL STRATEGIES CONSULTING LLC
 11911 FREEDOM DRIVE SUITE 900
 RESTON, VIRGINIA 20190
 (703) 709-6500



Table

Table 1

Former Research and Development
 Building Investigation Groundwater Sampling Results
 Emerson Power Transmission
 Ithaca, New York
 August, 2005 (ug/l)

<u>Sample ID:</u>	<u>MW-27B</u>	<u>MW-28B</u>	<u>MW-29B</u>
<u>Date:</u>	8/18/05	8/18/05	8/18/05
Volatile Organic Compounds (ug/l)			
Acetone	5.0 U	5.0 U	5.0 U
Benzene	1.0 U	1.0 U	1.0 U
Bromodichloromethane	1.0 U	1.0 U	1.0 U
Bromoform	1.0 U	1.0 U	1.0 U
Bromomethane	1.0 U	1.0 U	1.0 U
2-Butanone	5.0 U	5.0 U	5.0 U
Carbon disulfide	1.0 U	1.0 U	1.0 U
Carbon tetrachloride	1.0 U	1.0 U	1.0 U
Chlorobenzene	1.0 U	1.0 U	1.0 U
Chloroethane	1.0 U	1.0 U	1.0 U
Chloroform	1.5	5.5	2.4
Chloromethane	1.0 U	1.0 U	1.0 U
Cyclohexane	1.0 U	1.0 U	1.0 U
1,2-Dibromomethane	1.0 U	1.0 U	1.0 U
Dibromochloromethane	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	1.0 U	1.0 U	1.0 U
Dichlorodifluoromethane	1.0 U	1.0 U	1.0 U
1,1- Dichloroethane	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
2-Hexanone	5.0 U	5.0 U	5.0 U
Isopropylbenzene	1.0 U	1.0 U	1.0 U
Methyl acetate	1.0 U	1.0 U	1.0 U
Methylcyclohexane	1.0 U	1.0 U	1.0 U
Methylene chloride	1.0 U	1.0 U	1.0 U
4-Methyl-2-pentanone	5.0 U	5.0 U	5.0 U
Methyl tert butyl ether	1.0 U	1.0 U	1.0 U
Styrene	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	1.0 U	1.0 U	1.0 U
Tetrachloroethene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	1.0 U	1.0 U	1.0 U
1,1,1-Trichloroethane	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	1.0 U	1.0 U	1.0 U
Trichloroethene	1.0 U	1.0 U	1.0 U
Vinyl Chloride	1.0 U	1.0 U	1.0 U
Xylene (total)	3.0 U	3.0 U	3.0 U

Table 1

**Former Research and Development
Building Investigation Groundwater Sampling Results
Emerson Power Transmission
Ithaca, New York
August, 2005 (ug/l)**

<u>Sample ID:</u>	<u>MW-27B</u>	<u>MW-28B</u>	<u>MW-29B</u>
<u>Date:</u>	8/18/05	8/18/05	8/18/05
Semivolatile Organic Compounds			
Acenaphthene	11 U	12 U	11 U
Acenaphthylene	11 U	12 U	11 U
Acetophenone	11 U	12 U	11 U
Anthracene	11 U	12 U	11 U
Atrazine	11 U	12 U	11 U
Benzaldehyde	56 U	61 U	56 U
Benzo(a)anthracene	11 U	12 U	11 U
Benzo(b)fluoranthene	11 U	12 U	11 U
Benzo(k)fluoranthene	11 U	12 U	11 U
Benzo(ghi)perylene	11 U	12 U	11 U
Benzo(a)pyrene	11 U	12 U	11 U
Benzoic acid	170 U	180 U	170 U
Benzyl alcohol	22 U	24 U	22 U
Biphenyl	11 U	12 U	11 U
Bis(2-chloroethoxy) methane	11 U	12 U	11 U
Bis(2-chloroethyl) ether	11 U	12 U	11 U
2,2'-Oxybis(1-Chlorophopane)	11 U	12 U	11 U
Bis(2-ethylhexyl) phthalate	11 U	12 U	11 U
4-Bromophenyl phenyl ether	11 U	12 U	11 U
Butyl benzyl phthalate	11 U	12 U	11 U
4-Chloroaniline	11 U	12 U	11 U
4-Chloro-3-methylphenol	11 U	12 U	11 U
2-Chloronaphthalene	11 U	12 U	11 U
2-Chlorophenol	11 U	12 U	11 U
4-Chlorophenyl phenyl ether	11 U	12 U	11 U
Caprolactum	11 U	12 U	11 U
Chrysene	11 U	12 U	11 U
Dibenzo(a,h)anthracene	11 U	12 U	11 U
Dibenzofuran	11 U	12 U	11 U
Di-n-butyl phthalate	11 U	12 U	11 U
1,2-Dichlorobenzene	11 U	12 U	11 U
1,3-Dichlorobenzene	11 U	12 U	11 U
1,4-Dichlorobenzene	11 U	12 U	11 U
3,3'-dichlorobenzidine	22 U	24 U	22 U
2,4-Dichlorophenol	11 U	12 U	11 U
Diethyl phthalate	11 U	12 U	11 U
2,4-Dimethylphenol	11 U	12 U	11 U
Dimethyl phthalate	11 U	12 U	11 U
4,6-Dinitro-2-methylphenol	56 U	61 U	56 U
2,4-Dinitrophenol	56 U	61 U	56 U
2,4-Dinitrotoluene	11 U	12 U	11 U
2,6-Dinitrotoluene	11 U	12 U	11 U
Di-n-octyl phthalate	11 U	12 U	11 U
Fluoranthene	11 U	12 U	11 U
Fluorene	11 U	12 U	11 U
Hexachlorobenzene	11 U	12 U	11 U
Hexachlorobutadiene	11 U	12 U	11 U
Hexachlorocyclopentadiene	50 U	55 U	50 U
Hexachloroethane	11 U	12 U	11 U
Indeno(1,2,3-cd)pyrene	11 U	12 U	11 U
Isophorone	11 U	12 U	11 U
2-Methylnaphthalene	11 U	12 U	11 U
2-Methylphenol	11 U	12 U	11 U
4-Methylphenol	11 U	12 U	11 U

Table 1
Former Research and Development
Building Investigation Groundwater Sampling Results
Emerson Power Transmission
Ithaca, New York
August, 2005 (ug/l)

<u>Sample ID:</u>	<u>MW-27B</u>	<u>MW-28B</u>	<u>MW-29B</u>
<u>Date:</u>	8/18/05	8/18/05	8/18/05
Semivolatile Organic Compounds			
(continued)			
Naphthalene	11 U	12 U	11 U
2-Nitroaniline	56 U	61 U	56 U
3-Nitroaniline	56 U	61 U	56 U
4-Nitroaniline	56 U	61 U	56 U
Nitrobenzene	11 U	12 U	11 U
2-Nitrophenol	11 U	12 U	11 U
4-Nitrophenol	56 U	61 U	56 U
N-Nitrosodiphenylamine	11 U	12 U	11 U
N-Nitroso-Di-n-propylamine	11 U	12 U	11 U
Pentachlorophenol	56 U	61 U	56 U
Phenanthrene	11 U	12 U	11 U
Phenol	11 U	12 U	11 U
Pyrene	11 U	12 U	11 U
1,2,4-Trichlorobenzene	11 U	12 U	11 U
2,4,5-Trichlorophenol	11 U	12 U	11 U
2,4,6-Trichlorophenol	11 U	12 U	11 U
Polychlorinated Biphenyls			
Aroclor 1016	0.61 U	0.65 U	0.57 U
Aroclor 1221	0.61 U	0.65 U	0.57 U
Aroclor 1232	0.61 U	0.65 U	0.57 U
Aroclor 1242	0.61 U	0.65 U	0.57 U
Aroclor 1248	0.61 U	0.65 U	0.57 U
Aroclor 1254	0.61 U	0.65 U	0.57 U
Aroclor 1260	0.61 U	0.65 U	0.57 U

-
- a\ U = Compound not detected above method detection limit; D = Analytical result from a secondary duplicate; NA = Not applicable
b\ Blind duplicate of MW-17-40
c\ Blind duplicate of MW-19A
d\ No analysis for semivolatiles and PCBs due to insufficient sample volume.
e\ Blind duplicate of MW-32

Appendix A – Boring Logs

Boring Log: MW-30B

Project: EPT

Project No.: 127491

Location: Ithaca, NY

Completion Date: August 4, 2005

Surface Elevation (feet AMSL*): 532.55

TOC Elevation (feet AMSL*): 534.64

Total Depth (feet): 24.5

Borehole Diameter (inches): 8/6

*AMSL = Above mean sea level



Sample Data					Subsurface Profile		Well Details
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	
						Ground Surface	
1	1	NA	NA NA NA NA	NA		<p>Clayey Gravel (GC) Gray (N6) to black (N2.5) with coal, shale, and slag fragments; loose; dry; (fill).</p>	
5	2	0.0	1 1 2 2 3 5 8	40			
	3	0.0	6 4 6 6	50			
10	4	0.0	7 12 15	45			
	5	0.0	44 34 18 14	70			
	6	0.0	20 100/4	40			
15	7	0.0	- - -	15			
	8	NA	- - -	100		<p>Silt with Gravel (ML) Brown (7.5YR 5/2) to dark brown (7.5YR 3/2); with trace coal and shale fragments; nonplastic; loose; dry to moist.</p> <p>Silt (ML) Light gray (N7) to brownish yellow (10YR 6/6); with trace limestone and shale fragments; nonplastic; loose; dry.</p> <p>Siltstone Gray (N5); weathered; highly fractured from 15 to 17.5 feet with weathering in fractures; fractures mainly along bedding; fractures mainly mechanical below 21 feet below ground surface; RQD 37% (10 to 14.5) and 75% (19.5 to 24.5).</p>	
20	9	NA	- - -	100			
25						Bottom of Boring at 24.5 feet	
30							

Geologist(s): Gregory J. Frisch
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Mickey Marshal
Method: Hollow Stem Auger/Roller Bit

Environmental Strategies Consulting LLC

Boring Log: MW-31B

Project: EPT

Project No.: 127491

Location: Ithaca, NY

Completion Date: August 5, 2005

Surface Elevation (feet AMSL*): 532.52

TOC Elevation (feet AMSL*): 534.61

Total Depth (feet): 24.5

Borehole Diameter (inches): 8/6

*AMSL = Above mean sea level



Sample Data					Subsurface Profile		Well Details
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	
						Ground Surface	
1		NA	NA NA NA NA	NA		Silt with Gravel (ML) Gray (N5) to dark grayish brown (10YR 4/2); with coal and shale fragments; loose; dry; (fill).	
5	2	0.0	3 4 4 7	50			
	3	0.0	12 5 8 22	35			
	4	0.0	19 100/2 -	0			
10	5	0.0	19 19 20 18	35			
	6	0.0	12 11 10 8	40			
15	7	0.0	50/1 - -	0			
						Lean Clay with Gravel (CL) Dark gray (N4) to dark grayish brown (10YR 4/2); medium stiff; nonplastic; moist; weathered siltstone in shoe.	
						Siltstone Gray (N5); weathered; highly fractured at 14.5 to 15.0 and 17.3 to 17.8 feet below ground surface; weathering in fractures; fracturing minly along bedding with vertical fracturing in highly fractured zones; fractures mainly mechanical below 21 feet below ground surface; RQD 38% (14.5 19.5) and 75 % (19.5 - 24.5).	
25						Bottom of Boring at 24.5 feet	
30							

Geologist(s): Gregory J. Frisch
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Mickey Marshal
Method: Hollow Stem Auger/Roller Bit

Environmental Strategies Consulting LLC

Boring Log: MW-32B

Project: EPT

Project No.: 127491

Location: Ithaca, NY

Completion Date: August 9, 2005

Surface Elevation (feet AMSL*): 514.49

TOC Elevation (feet AMSL*): 513.95

Total Depth (feet): 11

Borehole Diameter (inches): 8/6

*AMSL = Above mean sea level



Sample Data					Subsurface Profile		Well Details
Depth	Sample/Interval	PID/OVM (ppm)	Blow Count	% Recovery	Lithology	Description	
						Ground Surface	
1	1	NA	NA NA NA NA	NA		Clayey Gravel (GC) Dark gray (N3) to dark brown (10YR3/3); gravel for road base; loose; dry; (fill).	
2						Siltstone Light gray (N7); weathered; fractured; thinly bedded; fractures mainly along bedding with vertical fracturing and weathering from 3.7 to 4.0 feet below ground surface; RQD 66%.	
4	2	NA	- - -	100			
6							
8						Siltstone Same as above with natural fracturing at 10 to 10.2 feet below ground surface and mechanical fractures below 10.2 feet below ground surface; RQD 71%.	
10	3	NA	- - -	100			
12						Bottom of Boring at 11 feet	
14							

Geologist(s): Gregory J. Frisch
Subcontractor: Parratt Wolff, Inc.
Driller/Operator: Mickey Marshal
Method: Hollow Stem Auger/Roller Bit

Environmental Strategies Consulting LLC

Appendix B – Groundwater Sampling Logs

Appendix C - Laboratory Data Sheets