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Thomas C. Jorling
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IMMEDIATE ATTENTION

TO: Bob Wither 7-6716

FROM: Scott Rodabaugh

Region 7 Kirkwood Office

DATE: 10-31-91

NUMBER OF PAGES 10 PLUS COVER

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Bob,

I'll send a letter to Joe K. w/ some info. early next week.

Thanks,

Scott

SECTION 1 - INTRODUCTION

1.01 Project Background

The Owego Heat Treat (OHT) facility is located approximately 1000 feet south of the Susquehanna River in the Town of Apalachin, Tioga County, New York (Figure 1). The OHT property is bounded by the Susquehanna River to the north and Route 17 to the south. The land surface in the immediate vicinity of the site is relatively flat with elevations ranging from 810 to 850 feet above mean sea level. Two ponds are present on the southern side of the property. Current OHT personnel indicated that these ponds are the result of past sand and gravel mining on the property.

Heat treating operations began at the OHT facility in 1953 and were confined to one building. Subsequent buildings were added as the company grew. Currently, six buildings comprise the OHT operations as shown on Figure 2. Five of these buildings (B-1, B-2, B-3, B-5, and B-6) are associated with the actual operations. Building B-4 is used for offices. Three residences are also located on the property, all of which are owned or occupied by members of the OHT Board of Directors. These residences are designated H-1, H-2, and H-3 on Figure 2. All of the residences use ground water obtained from wells as a source of potable water. These wells are similarly designated H-1, H-2 and H-3 and are shown on Figure 2. Two ground water supply wells supply water for the heat treating operations. These wells are designated B-3 and B-5 based on the building they are located adjacent to.

The general heat treating operations performed at the facility involve heating of prefabricated parts to specified temperatures and then controlling the rate of

cooling through the use of oil quenching techniques. Once the quenching operation is completed, the oils are removed from the cooled parts by placing them in tetrachloroethylene (PCE) baths. Historically, the facility has used PCE as a degreasing agent. However, OHT personnel have indicated that there were limited trial uses of trichloroethylene (TCE) in 1982 and 1984. Following the trial use, the spent TCE was properly disposed.

Both the oil quenching and PCE tanks are made of stainless steel which are placed in concrete-lined pits located inside of the process buildings. These pits are primarily used to facilitate access to the tops of the tanks and also serve as secondary containment areas to prevent material (oil and solvent) loss. The PCE tanks are cooled by circulating non-contact cooling water which is obtained from the two on-site ground water supply wells. After the non-contact cooling water passes through the tanks, it is discharged via outfalls to a drainage ditch on the southern side of the site. This ditch discharges to the large pond located on the southern side of the property (Figure 2). This discharge is regulated by a SPDES permit. In the summer of 1991, the non-contact cooling water system was reconfigured to recirculate, thus eliminating the discharge to the pond.

Bob, they will be deleting this permit. *

During renovation of Building B-2 in December 1987, water was found in the concrete pit under the PCE tank and a strong odor was observed emanating from the soil underlying the floor in the southeast corner of the building. The standing water was pumped into 55-gallon drums and then disposed of at an appropriate landfill following analysis. OHT subsequently removed two 55-gallon drums of soil containing volatile organic compounds (VOCs) from this area for similar disposal at a landfill. Analysis of this soil revealed the presence of 13 ppm of VOCs, primarily

PCE. The remainder of the soils removed from the excavation were placed near the small pond on the southern side of the site (Figure 2). Analysis of a sample collected from the soil left in place indicated that less than 0.05 ppm of VOCs were present.

To assess if the VOCs found in the soil had entered the ground water system, OHT sampled the two on-site supply wells (B-3 and B-5) and the three residential wells (H-1, H-2, and H-3) located on the property (Figure 2). These wells were sampled and analyzed on two occasions, once in January 1988 and once in February 1988. The analyses were completed by Southern Tier Analytical (STA) and Friend Laboratory Inc. (FLI), both of Waverly, New York. The results of these analyses revealed the presence of VOCs in the ground water in supply well B-3 and residential well H-1. The New York State Department of Environmental Conservation (NYSDEC) was notified of the findings.

Based on the findings of the sampling and analysis, NYSDEC requested that OHT undertake a hydrogeologic investigation to evaluate whether the source of the VOCs was still present and also assess the extent of VOCs in the ground water. As an interim measure to prevent further exposure, carbon filters were placed on the residential wells and bottled water was brought in for drinking water at the facility. A replacement well for residential well H-1 was installed at a later date. OHT then retained O'Brien & Gere Engineers, Inc (OBG) to assist in completion of the site investigation.

A series of site investigation tasks have been completed to date. An initial investigation consisting of monitoring well installations, ground water sampling and analysis, and completion of a soil gas survey was completed in 1988. The findings

of this initial investigation are included in the Site Investigation Report dated February 1989, a copy of which was previously provided to Frank Trent of NYSDEC under cover of a February 3, 1989 letter. OHT and OBG subsequently completed additional investigations as a result of additional conversations with and agreement by the NYSDEC. A summary of the additional investigations is included in Section 2 of this Work Plan.

As a result of the investigations completed at the site, a recovery well (RW-1) was installed in the vicinity of Building B-2 for the purpose of minimizing further migration of the VOCs from the suspected source area. To facilitate initiation of a ground water recovery and treatment program, Owego Heat Treat entered into an Administrative Order on Consent (Order) with the NYSDEC, effective August 29, 1991. This Order requires completion of an aquifer performance test using a temporary treatment system and the design of a final treatment system. This Work Plan presents the details of the aquifer performance test and establishes a schedule for the design and operation of a final treatment system.

1.02 Project Objective and Scope

The purpose of this Work Plan is to detail the work efforts to be conducted in association with the aquifer testing. Included in this Work Plan is a summary of the work efforts completed to date and a discussion of the existing conditions. Additionally, details pertaining to the temporary treatment system design and operating parameters are also presented. Associated air discharge, water discharge and construction permit applications are being prepared and submitted under separate cover.

the site area occurs between 8 feet and 23 feet below the ground surface with seasonal fluctuations of 2 to 4 feet. Using the ground water elevation data collected on May 2, 1991, a ground water flow direction map was constructed and included as Figure 6. This figure indicates ground water flows northwest towards the Susquehanna River, which is consistent with the ground water flow direction presented in the Site Investigation Report (O'Brien & Gere, 1989).

3.03 Ground Water Quality

The ground water quality data summarized on Table 2 indicate that VOCs are generally found in wells MW-2 and MW-7. MW-2 is installed in the upper portion of the shallow aquifer approximately 60 feet north of Building B-2. MW-7 is installed at the base of the shallow aquifer between MW-4 and MW-5. Trace levels of tetrachloroethylene have also been observed in well MW-6, located at the base of the aquifer immediately north of Building B-2. This pattern of VOCs suggests that, near the suspected source area, the VOCs are migrating primarily within the upper portion of the aquifer and migrating deeper as the plume migrates further northward. The concentrations observed within the ground water do not suggest that this downward migration is a result of density differences. However, the deeper portion of the aquifer is generally more permeable, which affects the ground water flow direction, thereby facilitating vertical migration of the VOCs.

Ground water monitoring wells MW-1, MW-2, MW-3, MW-4, and MW-5 were installed in the upper portion of the shallow sand and gravel aquifer. These wells have been sampled on several occasions. The data collected indicated that VOCs are present in MW-2. The concentrations of PCE in this well ranged from 690 ppb

to 4,500 ppb, trichloroethylene (TCE) ranged from 2,000 ppb to 6,400 ppb, trans-1,2-dichloroethene (t-1,2-DCE) ranged from 270 ppb to 2,500 ppb, and vinyl chloride was detected on three occasions at 13 ppb, 62 ppb and 200 ppb. MW-2 was also sampled in April 1988 for PCBs, acid extractable/base neutral compounds and filtered and unfiltered metals. The data indicated that only bis(2-ethylhexyl)phthalate was detected at 37 ppb. Bis(2-ethylhexyl)phthalate is commonly attributed to the polypropylene rope and rubber gloves used during sampling collection. No other compounds quantified by the analytical methods were detected.

As previously discussed, PCE was found to be present in the soils in Building B-2. The other compounds detected in MW-2 (TCE, t-1,2 DCE and vinyl chloride) are likely by-products of the degradation of PCE (Parsons, F, 1984; Kleopfer, RD, 1985). The low concentrations of PCE in MW-2 as compared to TCE may be a result of both low levels of TCE in the raw PCE product and degradation of PCE.

MW-6 was installed at the bottom of the shallow aquifer, immediately downgradient from Building B-2. MW-6 has been sampled on several occasions and generally indicates concentrations of PCE declining with time from 2,200 ppb in June 1989 to 1 ppb in October 1990. The only other compounds observed above the detection limits in this well were TCE at 16 ppb, and t-1,2-DCE at 41 ppb, both of which occurred in June 1989. Review of this information together with the analytical data from MW-2 suggests that the greatest concentrations of VOCs occur in the upper portion of the aquifer in the vicinity of Building B-2.

In February 1990, MW-7 was installed at the bottom of the shallow aquifer between MW-4 and MW-5 to further evaluate the horizontal and vertical extent of VOCs at the facility (Figure 1). The ground water samples collected to date

indicated PCE levels ranging from 1 ppb to 8 ppb, TCE concentrations from 110 ppb to 530 ppb and t-1,2-DCE ranging from 32 ppb to 150 ppb. Analytical data of samples collected from wells MW-4 and MW-5, installed within the upper portion of the shallow aquifer, indicate that VOCs are not present. This suggests that with increasing distance from Building B-2, VOCs have migrated downward to the base of the shallow aquifer. This phenomenon may be the due to the presence of coarser grained material in the deeper portion of the aquifer.

MW-8 was installed in August 1990 at the bottom of the shallow aquifer approximately 500 feet northwest of MW-7 (Figure 2) to further assess the horizontal extent of the VOC plume. MW-8 has been sampled on five occasions. The analytical results indicated that VOCs are not present at this location.

The on-site supply wells, replacement well H-1, and residential wells H-2 and H-3 which are located on the property, are all installed below the till unit identified to be underlying the shallow aquifer. Analytical data from ground water samples collected from these wells indicated that VOCs are not present. This suggests that the till unit is limiting vertical migration of VOCs.

SECTION 4 - INTERIM REMEDIAL MEASURES

The purpose of this section is to describe the physical test system which is proposed to be employed during the IRM. This test system will consist of an existing recovery well from which ground water will be pumped to an air stripping tower where it will be treated prior to discharge through an existing facility outfall. Recovery well considerations, expected flow rate, contaminant concentrations, air stripping tower specifications, and expected effluent concentrations and location are discussed. Field work conducted in conjunction with the Interim Remedial Measures will adhere to the procedures outlined in the Health and Safety Plan (Appendix C) where appropriate.

4.01 Test System

4.01.1 Recovery Well Considerations

As previously stated, the recovery well is located immediately north of building B-2. This location was selected to control future migration of VOCs from the source. Additionally, the well was designed to allow ground water recovery from the full saturated thickness of the shallow aquifer.

Given that building B-2 is approximately 65 feet long, the minimum radius of inflow needed to capture ground water flowing through the area would be approximately 33 feet. Todd's equation for the radius of inflow was then used to estimate the well yield using a conservative value of 50 feet for the radius of inflow and aquifer characteristics from the initial site investigation report. The results of this calculation indicate that the likely operational

flow for the final ground water recovery and treatment system is approximately 4 gpm. This calculation is included in Appendix B. Given that it is necessary to apply stress to an aquifer to evaluate hydrologic characteristics, the test will be conducted at a rate of 20 gpm.

4.01.2 Expected Flow and Contaminant Concentrations

As previously mentioned, the expected flow rate for conducting this test is 20 gpm. Influent contaminant concentrations were estimated based on the "worst case" monitoring well analytical data for contaminants at the site. These parameters and expected influent concentrations are as follows:

Parameter	Expected Worst Case Influent Concentration, ppb
Tetrachloroethylene	4,500
Trichloroethylene	6,400
trans 1,2-Dichloroethylene	2,500
Vinyl Chloride	200

4.01.3 Treatment System Specifications

Based on the above information, air stripping is proposed as the treatment system for use during the IRM. The specifications for the proposed air stripper have been developed based on an in-house computer simulation using the expected flow rate and expected influent concentrations and required removal efficiencies. An air stripping tower flow schematic is included as Figure 7.

The computer simulation revealed that an air stripper with a 2-foot tower diameter, a packed height of 15 feet of 2-inch Tripak packing and a 1000 CFM blower will provide the required removal efficiency. Based on this information, a suitable unit will be specified. This unit will consist of a 2-foot diameter fiberglass reinforced plastic tower with an open top and a packed height, or equivalent. A 2-inch diameter schedule 80 PVC inlet pipe with a 3/4-inch sampling tap will deliver water up the exterior side and into the top of the tower. The 1000 CFM blower will force air into the tower through the 6-inch air inlet located at the base. Treated water will be collected in the drainage sump, where it will be discharged via pipe to the outfall. It should be noted that the exact configuration of the air stripper will be a function of equipment availability at the time of implementation of the IRM; however, any system used will meet the above criteria.

4.01.4 Expected Effluent Concentrations

The expected effluent concentrations for the pump test are proposed based on information provided by NYSDEC. These concentrations are as follows:

Parameter	Expected Effluent Concentration, ppb
Tetrachloroethylene	5
Trichloroethylene	5
trans 1,2-Dichloroethylene	5
Vinyl Chloride	5

As previously mentioned, the optimum air stripper tower design was determined by using this data and the expected influent data in an in-house computer simulation. Effluent data from the pump test will be submitted to NYSDEC with the Data Summary and Basis of Design Report as discussed in Section 4.03.

4.01.5 Effluent Discharge Location

The effluent discharge location for this IRM pump test is proposed to be the pond located on the south side of the Owego Heat Treat property. This location is designated as outfall 100 in the facility's current SPDES permit (Figure 8). Treated water will be collected in the drainage sump of the air stripper and then piped to the discharge point.

4.01.6 Treatment System Operation

The treatment system will operate for approximately 72 hours. During this period, flow will be monitored by a flow meter installed at the inlet to the air stripper. Monitoring of the stripper effluent will also be performed. This program is discussed in the following section.

4.02 Test Sequence

4.02.1 Water Level Monitoring

A 48-hour aquifer performance test will be conducted on RW-1 to evaluate the hydrology of the aquifer and the effectiveness of the air stripper. The test will be conducted at a constant flow rate of about 20 gpm.

Water level measurements will initially be collected from all monitoring wells for a period of time before the test to evaluate any trend in the water table elevations. During the initial 15 minutes of the test, water levels will only be collected from RW-1 and adjacent monitoring wells MW-2 and MW-6. Because water levels will decline more rapidly during the first few hours of the test, frequent readings will be collected during this period. As pumping continues, the interval between measurements can be increased. The following range of intervals is proposed to be used for water level monitoring during the test:

Time since pump started	Frequency of measurements
0 to 15 minutes	1 minute
15 to 60 minutes	5 minutes
60 to 120 minutes	10 minutes
120 minutes to shutdown of pump	60 minutes

Water levels will be collected from the other site monitoring wells once every four hours. Should the well response differ from what is expected, the frequency of water level measurements will be adjusted accordingly.

Upon completion of the pump test, recovery data will be collected in select monitoring wells until water levels approach equilibrium conditions. Data from the foregoing tests will be evaluated using methods described in "Analysis and Evaluation of Pumping Test Data" by Kruseman and de Ridder (1990). This analysis will provide information regarding sustained well yield,

transmissivity, hydraulic conductivity, storativity, and aquifer boundary conditions which may exist.

4.02.2 Treatment System Performance Monitoring

To evaluate the effectiveness of volatile organic removal of the air stripping tower, ground water samples will be collected from two locations during the test. The first sampling location will be before the ground water enters the air stripper (influent). The second location will be at the discharge from the air stripping tower (effluent). These samples will be analyzed for volatile organic compounds using EPA Method 601/602. Influent and effluent samples will be collected at the following time intervals: 2 hours, 12 hours, 24 hours, and 48 hours. The 2-hour sample of the effluent will be submitted to the laboratory for 24 hour turnaround to confirm the effectiveness of the stripper. A detailed discussion of the sampling and analysis procedures are included in the Quality Assurance Project Plan (Appendix D).

4.02.3 Ground Water Compatibility Assessment

To evaluate compatibility of the ground water with the treatment system components and address potential operation and maintenance considerations, a sample of the influent will be collected after 24 hours of pumping and submitted to the laboratory for the following analyses:

Parameter	Method
Calcium	6010
Magnesium	6010

Parameter	Method
Alkalinity	310.1
Hardness	6010
Total Suspended Solids	160.2
Total Dissolved Solids	160.1
pH	9040
Langlier Index Corrosivity	203*
Nitrogen, Nitrate	353.2
Nitrogen, Nitrite	353.2
Total Kjeldahl Nitrogen (TKN)	351.2
Chloride	9251
Sulfate	375.2
Oil & Grease	3540
Total Recoverable Petroleum Hydrocarbons (TRPH)	418.1

Note: Analytical methods completed per USEPA SW-846, Analysis of Water and Wastewater unless otherwise indicated.

* - Standard methods 16th Edition

A detailed discussion of the sampling and analysis procedures are included in the Quality Assurance Project Plan (Appendix D).

4.03 Data Summary and Basis of Design Report

A Data Summary and Basis of Design Report will be prepared and submitted approximately 4 weeks after receipt of the analytical data collected during the test. This report will include a summary of the ground water level information and influent and effluent data collected during the test. A recommendation for operation flow rates to minimize further migration of the VOCs from the source will be

presented based on the data collected. In addition to the flow rates, a basis of design will be presented for the permanent treatment system. This basis of design will present expected influent and effluent concentrations based on the findings of the test and discuss the general components of the system. Also presented in this report will be a proposed schedule for design and construction of the permanent system, which will include document submittal and review.

Respectfully Submitted,

O'BRIEN & GERE ENGINEERS, INC.

James T. Mickam, CPG
Vice President

Prepared by:

Deborah Y. Wright, CPG
Managing Hydrogeologist

John Rinko, P.E.
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Table 2

Ground Water Quality Data - Monitoring Wells
Owego Heat Treat
Apalachin, New York

Well No.	Sample Date	Vinyl Chloride	t-1,2-DCE	TCE	PCE
MW-1	4/28/88	<1	<1	<1	<1
MW-1	6/19/89	<1	<1	<1	<1
MW-1	2/13/90	<1	<1	<1	<1
MW-1	4/30/90	<1	<1	<1	<1
MW-1	8/2/90	<1	<1	<1	<1
MW-1	10/31/90	<1	<1	<1	<1
MW-1	2/7/91	<1	<1	<1	<1
MW-1	5/2/91	<1	<1	<1	<1
MW-1	7/29/91	<1	<1	<1	<1
MW-2	4/28/88	13	270	2700	780
MW-2	6/19/89	62	430	2100	690
MW-2	2/13/90	<100	1900	5600	2600
MW-2	4/30/90	<100	860	4200	1600
MW-2	8/2/90	<100	1800	6000	4000
MW-2	10/31/90	200	2500	5600	3200
MW-2	2/7/91	<100	540	2000	1300
MW-2	5/2/91	<100	1000	2100	1500
MW-2	7/29/91	<100	2100	6400	4500
MW-3	4/28/88	<1	<1	<1	<1
MW-3	6/19/89	<1	<1	<1	<1
MW-3	2/13/90	<1	<1	<1	<1
MW-3	4/30/90	<1	<1	<1	<1
MW-3	8/2/90	<1	<1	<1	<1
MW-3	10/31/90	<1	<1	<1	<1
MW-3	2/7/91	<1	<1	<1	<1
MW-3	5/2/91	<1	<1	<1	<1
MW-3	7/29/91	<1	<1	<1	<1
MW-4	4/28/88	<1	<1	<1	<1
MW-4	6/19/89	<1	<1	<1	<1
MW-4	2/13/90	<1	<1	<1	<1
MW-4	4/30/90	<1	<1	<1	<1
MW-4	8/2/90	<1	<1	<1	<1
MW-4	10/31/90	<1	<1	<1	<1
MW-4	2/7/91	<1	<1	<1	<1
MW-4	5/2/91	<1	<1	<1	<1
MW-4	7/29/91	<1	<1	<1	<1
MW-5	4/28/88	<1	<1	<1	<1
MW-5	6/19/89	<1	<1	<1	<1
MW-5	2/13/90	<1	<1	<1	<1
MW-5	4/30/90	<1	<1	<1	<1
MW-5	8/2/90	<1	<1	<1	<1
MW-5	10/31/90	<1	<1	<1	<1
MW-5	2/7/91	<1	<1	<1	<1

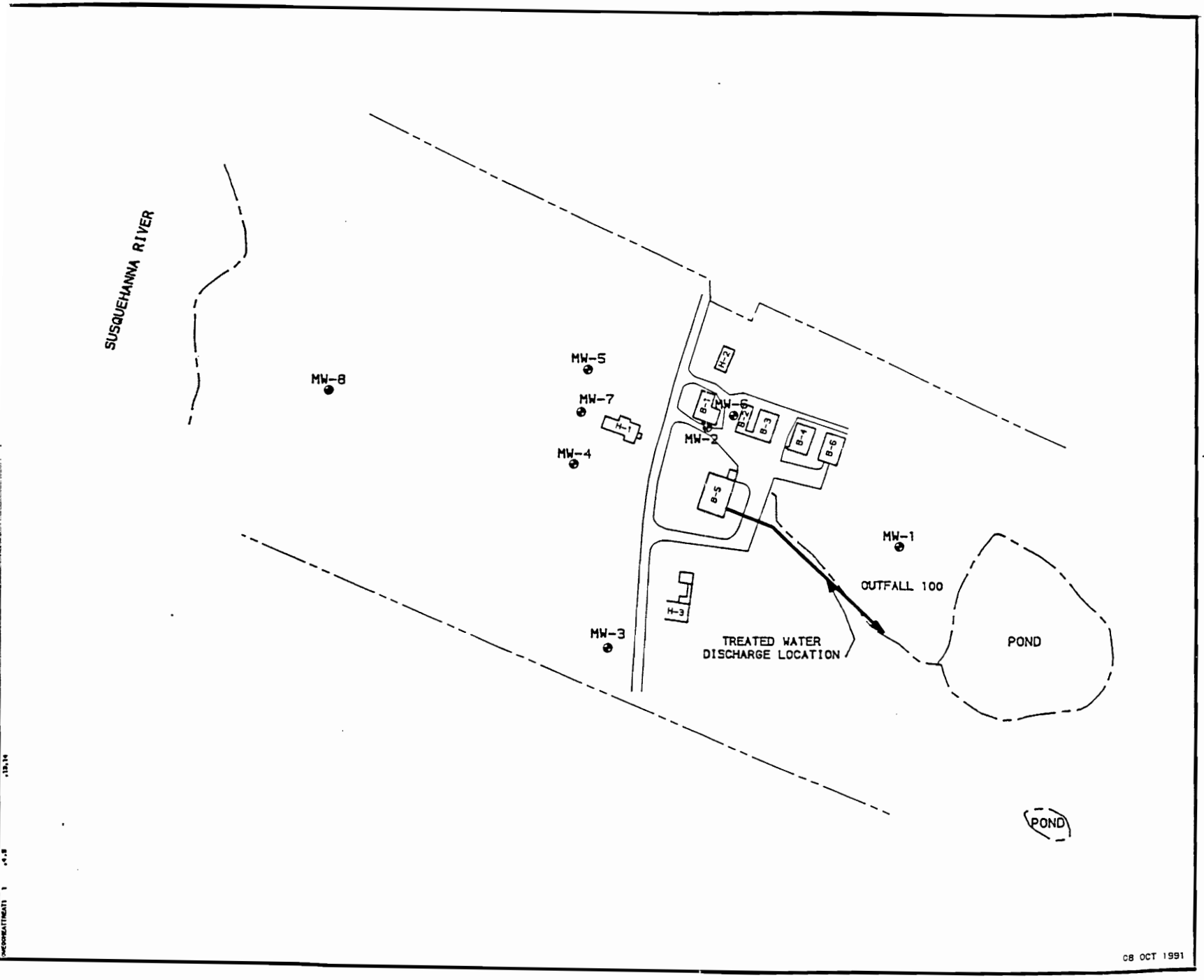
Table 2

Ground Water Quality Data - Monitoring Wells
Owego Heat Treat
Apalachin, New York

Well No.	Sample Date	Vinyl Chloride	t-1,2-DCE	TCE	PCE
MW-5	5/2/91	<1	<1	<1	<1
MW-5	7/29/91	<1	<1	<1	<1
MW-6	6/19/89	<10	41	16	2200
MW-6	2/13/90	<1	<1	<1	14
MW-6	4/30/90	<1	<1	<1	5
MW-6	8/2/90	<1	<1	<1	3
MW-6	10/31/90	<1	<1	<1	1
MW-6	2/7/91	<1	<1	<1	4
MW-6	5/2/91	<1	<1	<1	<1
MW-6	7/29/91	<1	<1	<1	1
MW-7	2/13/90	<1	92	170	8
MW-7	4/30/90	<1	87	160	3
MW-7	8/2/90	1	99	190	2
MW-7	10/31/90	15	150	380	5
MW-7	2/7/91	<1	74	150	1
MW-7	5/2/91	<1	32	110	1
MW-7	7/29/91	<5	120	530	8
MW-8	8/23/90	<1	<1	<1	<1
MW-8	10/31/90	<1	<1	<1	<1
MW-8	2/7/91	<1	<1	<1	<1
MW-8	5/2/91	<1	<1	<1	<1
MW-8	7/29/91	<1	<1	<1	<1

Notes: Laboratory analysis completed by OBG Laboratories, Inc.
All concentrations in ug/l (ppb).
t-1,2-DCE - Trans 1,2-Dichloroethene
TCE - Trichloroethylene
PCE - Tetrachloroethylene

OWEGO HEAT TREAT
APALACHIN, NEW YORK



LEGEND

- MONITORING WELL
- RECOVERY WELL
- B-6 MANUFACTURING FACILITY AND WELL ID.
- H-1 HOUSEHOLD AND WELL ID.
- PROPERTY BOUNDARY

TREATED WATER
DISCHARGE LOCATION

200 0 200

SCALE IN FEET

4100.001.876

O'BRIEN & GERE
ENGINEERS, INC.