GROUNDWATER TECHNOLOGY

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OZONE INJECTION FEASIBILITY STUDY REPORT
OSMOSE WOOD PRESERVING, INC.
980 ELLICOTT STREET
BUFFALO, NEW YORK, 14209

April 5, 1994

Submitted To:

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1.0 INTRODUCTION

1.1 Background

Osmose Wood Preserving, Inc. (Osmose) operates a facility which manufactures a variety of preservatives used in the treatment of wood and lumber products. The facility is located at 980 Ellicott Street, Buffalo, New York (Figure 1, Site Location Map). During removal of three underground storage tanks (USTs) in August, 1989 evidence of a release to the subsurface, believed to be #2 fuel oil and brushing grade creosote, was discovered.

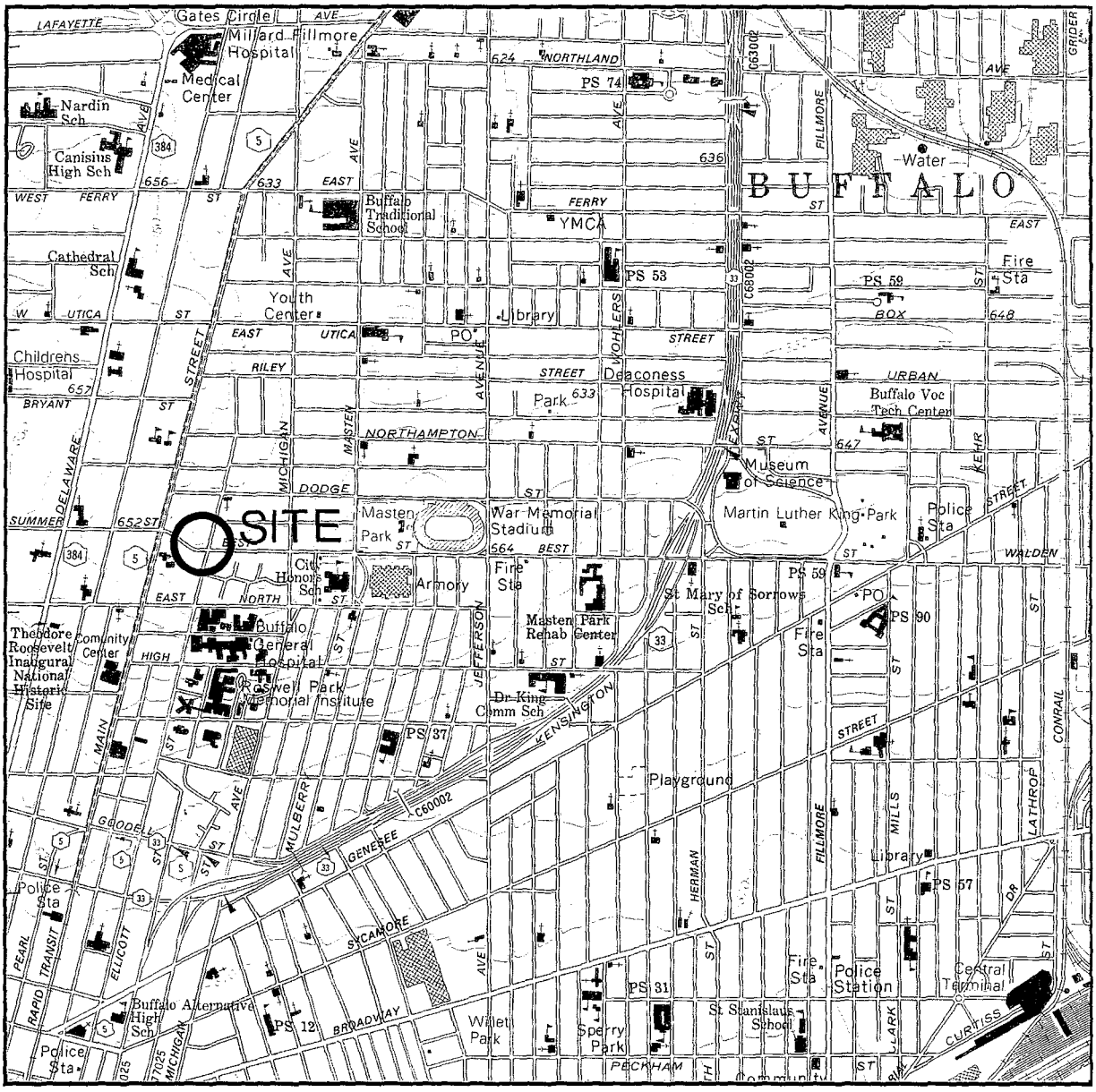
In June, 1990, Osmose was notified by the New York State Department of Environmental Conservation (NYSDEC) of their inclusion in the New York State Registry of Inactive Hazardous Waste Disposal Sites, and assigned NYSDEC Site Number 915143. The site was classified as "2a".

Osmose contracted Groundwater Technology, Inc. (Groundwater Technology) to investigate the extent of hydrocarbon impacts at the Ellicott Street facility. A total of three reports have been prepared which fully characterize the Osmose site. These reports include:

- Subsurface Investigation Report, dated June 28, 1991
- Supplemental Investigation Report, dated July 28, 1992
- Supplemental Investigation (Phase II) Report, dated August 31, 1993

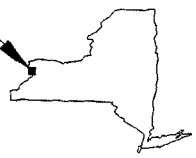
As part of the scope of work during the subsurface investigations, a baseline risk assessment was conducted to develop risk driven remediation goals for polynuclear aromatic hydrocarbons (PAHs) adsorbed on soils. Based upon a conservative approach, the risk assessment identified 473 parts per million (ppm) total PAHs as a remedial goal protective of human health and the environment. Although no determination has been rendered by the NYSDEC to this proposed soil remediation goal, it is assumed for the purposes of this feasibility study that the proposed 473 ppm total PAHs concentration will apply as closure criteria for on-site and off-site soils.

The results of the remedial investigations indicated that soils in two areas of the Osmose site posses elevated concentrations of PAHs at levels exceeding 473 ppm. A total of approximately 720 cubic yards (yds^3) of soil was estimated to exist above this concentration. The two areas of the site are



SOURCE: N.Y.S.D.O.T. TOPOGRAPHIC QUADRANGLE
BUFFALO NE QUADRANGLE
7.5 MINUTE SERIES
DATE: 1989

QUAD LOCATION



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GROUNDWATER TECHNOLOGY

1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

DESIGNED: JOG

DETAILED: DEO

CHECKED:

SITE LOCATION MAP

CLIENT: OSMOSE WOOD PRESERVING

DRAWING DATE: 8/13/93

LOCATION: 980 ELLICOTT STREET
BUFFALO, NEW YORK

FIGURE: 1

depicted in Figure 1-2, Areal Extent of Soils Above 473 ppm Total PAHs. Area 1 is located in the vicinity of monitoring well MW-8, which is located in the western portion of the parking lot. Elevated levels of PAHs in this area were found at 2-4 feet below grade and were limited to the vadose zone. Soils in this area typically consist of fine to coarse sands with some silt and clay (Figure 1-3, Geologic Cross Section). The Supplemental Investigation Report estimated that approximately 85 yds^3 of soil existed in this area with total PAHs above 473 ppm given the existing data.

As shown on Figure 1-2, Area 2 is immediately downgradient of the former tank pit and extends to Ellicott Street. The soil in this area is stratified: the top of a 4-10 foot thick clay lens is located 3-5 feet below grade and is underlain by more permeable silts and sands (Figure 1-3, Geologic Cross Section). Groundwater is found near the bottom of the clay lens. Concentrations of PAHs above 473 ppm in this area are primarily in the interval from 7-11 feet below grade which is at the top of the water table. Soils, therefore, in both the clay lens and the more permeable underlying stratum posses adsorbed PAHs above the risk-based action level. Again, based upon previous assessment data, an estimate of approximately 370 yds^3 of soils existed in this area with total PAHs above 473 ppm.

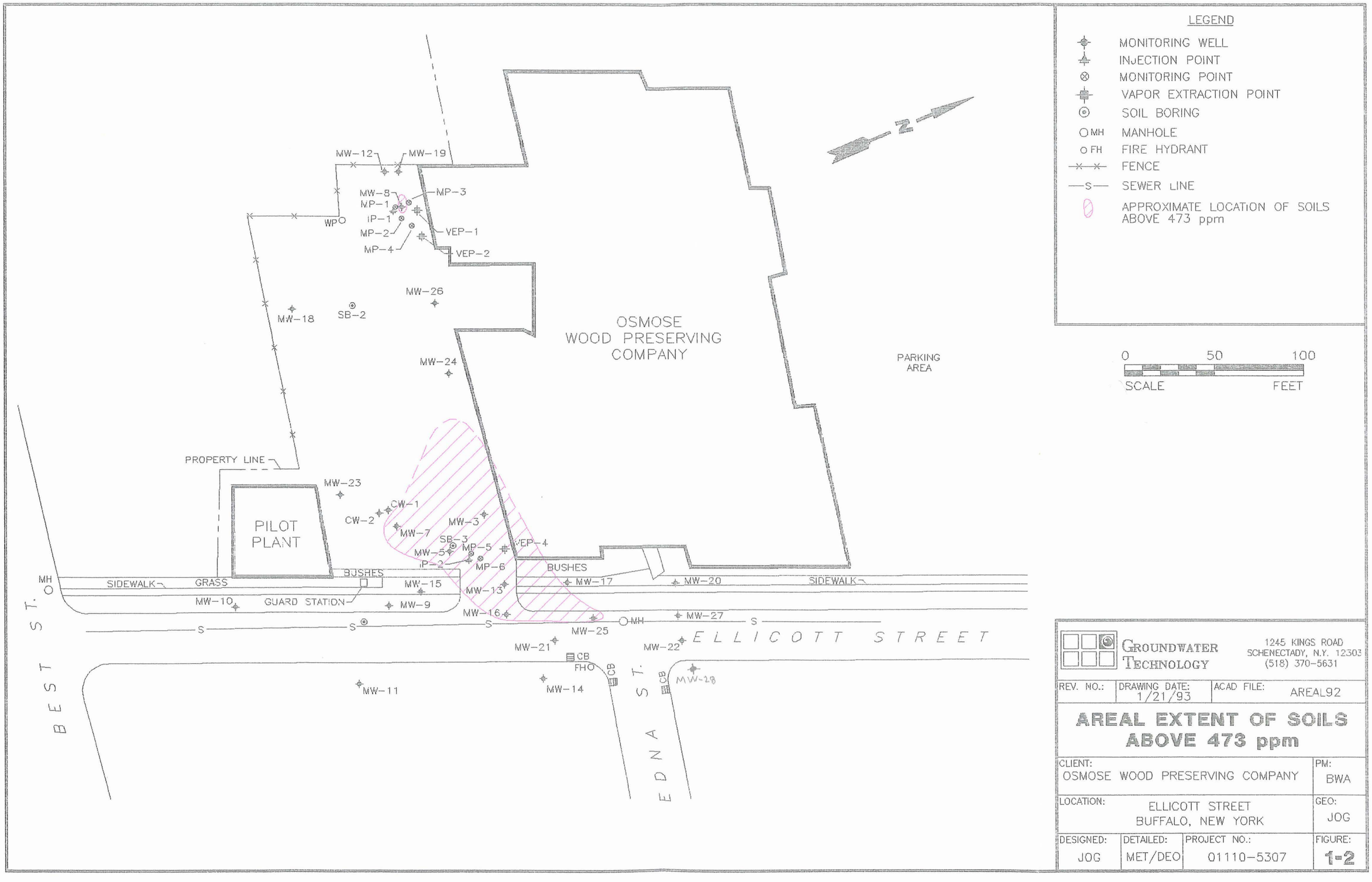
Traditional treatment for these types of highly condensed hydrocarbons consists of excavation and off-site incineration, which was estimated to cost approximately $\$1,500/yd^3$. Lack of available space precludes on-site incineration of soils. Recent laboratory studies have indicated that PAHs may be degraded in-situ through the injection of ozone into the subsurface, at considerably lower costs. Ozone is a highly reactive form of oxygen which reacts preferentially with unsaturated organic molecules (i.e. those containing double bonds). Such molecules include PAHs, chlorinated ethylene solvents (DCE, TCE and PCE), aromatic solvents (benzene, toluene, xylene, chlorobenzene, etc.) and phenolic compounds. Ozone does not rapidly react with saturated organic compounds. Ozone has been used since 1890 to oxidize organic compounds in water, and is commonly used in Europe for water treatment.

Based upon this information, an ozone pilot test feasibility study was proposed to the NYSDEC. An Ozone Pilot Test Work Plan, dated September 25, 1992, was prepared to assess the technical effectiveness of ozone injection at this site.

1.2 Objectives

Ozone chemistry has been well documented in the treatment of dissolved organics in water under controlled conditions. The objective of the field feasibility testing was to assess the ability to control ozone, and the oxidation process in the subsurface and to evaluate the technical effectiveness of ozone injection for the treatment of adsorbed PAHs at this site through the performance of an extended feasibility study. The feasibility study was targeted at both unsaturated (Area 1) and saturated (Area 2) soils which were impacted with PAHs. The objective of Figure 1-2, Areal Extent of Soils > 473 ppm this Ozone Injection Feasibility Study Report, therefore, is to present the methods and results from the field work and to present a discussion as to the applicability of ozone injection as a final site remediation strategy.

Presented in the following sections are details of the tasks performed in conjunction with the field testing. Section 2.0 provides pilot test equipment and installation details, and Section 3.0 discusses the daily operation of the feasibility testing. The results of the field testing is presented in Section 4.0, followed by a discussion and conclusions in Section 5.0.



GROUNDWATER TECHNOLOGY	1245 KINGS ROAD SCHENECTADY, N.Y. 12303 (518) 370-5631

REV. NO.:	DRAWING DATE:	ACAD FILE:
	1/21/93	AREAL92

AREAL EXTENT OF SOILS ABOVE 473 ppm

CLIENT: OSMOSE WOOD PRESERVING COMPANY			PM: BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK			GEO: JOG
DESIGNED: JOG	DETAILED: MET/DEO	PROJECT NO.: 01110-5307	FIGURE: 1-2

WEST
A

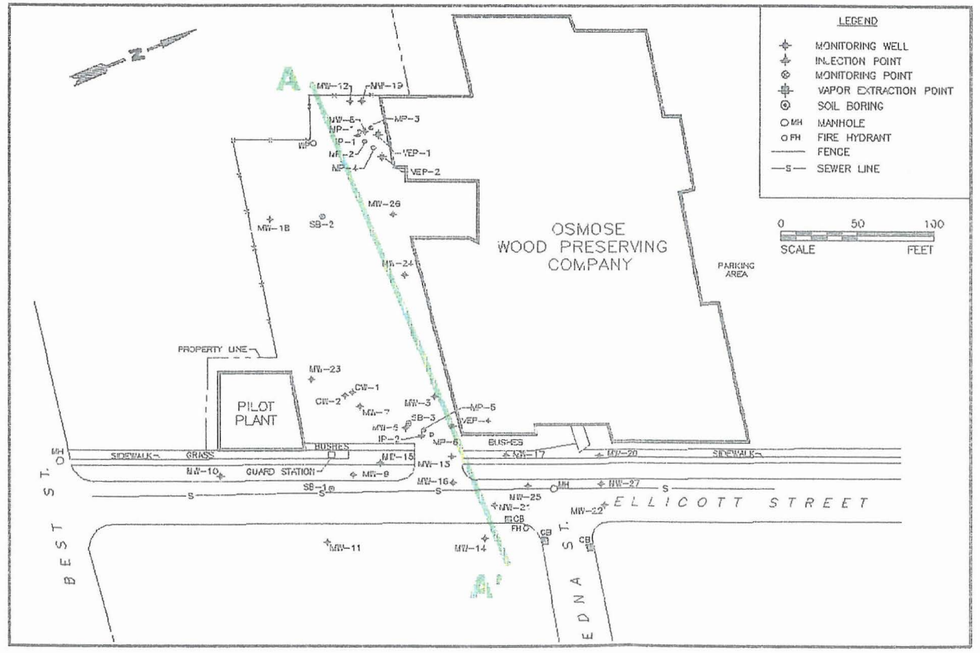
EAST
A'

MW-12 MW-19 MW-8 SB-2 MW-26 MW-24 MW-6 MW-3 MP-6 MW-13 MW-16 MW-21 MW-14

0
10
20
30
40
50
60

6-8': .04/.03
18-20': .0008/.02
2-4': 98/ND
16-18': .005/ND
54-55': ND/ND
2-4': 501/ND
2-4': 0.3/ND
8-10': 0.5/0.02
8-10': 0.67/0.65
10'-12' ND/ND
18-20' ND/ND
8-10': 3.8/0.22
10'-12' 7.5/ND
18-20' 6.6/ND
SP
SP
6-8': 622
10-12': 81/7.5
SP
6-8': 35/3
8-10': 1013/7.2
SP
6-7': 46/1.6
7-8': 639/9.1
18-20' .02/ND
6-7': .004/ND
7-8': .001/ND
18-20' .01/ND
10-12': ND/ND
61-63': .08/.01

10
0
30
SCALE IN FEET



LEGEND

GLACIAL OUTWASH DEPOSITS AND FILL
- FINE SANDS
- FINE TO COARSE SANDS WITH SILT/CLAY
- COARSE SANDS WITH GRAVEL
- SILTY SANDS WITH GRAVEL

GLACIAL LAKE DEPOSITS
- SILTY SANDS, SILTS, CLAYEY SANDS
- CLAY

6-7': .004/ND DEPTH: PAHs/VOCs (FT.) (ppm)(ppm)

SP- SEPARATE PHASE PRESENT IN WELL

DEPTH THAT SATURATED SOILS WERE ENCOUNTERED DURING DRILLING

STATIC WATER TABLE (12/17/92)

GROUNDWATER TECHNOLOGY
1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

REV. NO.:	DRAWING DATE:	ACAD FILE:
	3/22/93	5307-6X

CROSS-SECTION A - A'

CLIENT:	PM:
OSMOSE WOOD PRESERVING INC.	BWA
LOCATION: 980 ELLICOTT STREET BUFFALO, NEW YORK	PE/RG: JOG

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
JOG	MET/DEO	01110-5307	1-3

1.3 Health and Safety Planning

Groundwater Technology's policy is to take every precaution to minimize exposure to its personnel, Osmose personnel and the general public to potentially hazardous substances, and to respond promptly and correctly should such exposure occur. The existing site Health and Safety Plan (HSP), prepared in accordance with Occupational Safety and Health Administration (OSHA) standard "Hazardous Waste Operations and Emergency Response" guidelines (29 CFR 1910.120), and previously approved by the NYSDEC, was revised to include the current scope of work. A copy of this revised HSP was submitted to the NYSDEC and New York State Department of Health (NYSDOH) for review and approval.

As required by the HSP, daily ozone monitoring was conducted within the Osmose facility during pilot test operations to insure employee safety. Ambient air monitoring for ozone and volatile organic compounds (VOCs) was also performed by the Groundwater Technology Site Safety Officer during all site activities, in addition to community air monitoring during all soil disturbance activities. Details of the health and safety monitoring program are described in Section 3.0, below.

In addition to preparing a HSP, a hazard communication briefing in accordance with OSHA 1910.1200 was presented to the Osmose employees by a Groundwater Technology Health & Safety Specialist prior to initiating the feasibility studies.

All site work was performed in modified Level D protective equipment.

1.4 Quality Assurance Project Plan

The sample management and quality control sampling performed during the implementation of this work scope was specified in the Ozone Pilot Test Work Plan and further detailed in a November 12, 1993 letter correspondence to the NYSDEC. As specified, the laboratory's data package deliverables for the baseline and endpoint sampling of PAHs and VOCs conformed to Project Specific Blue Level QA/QC reporting requirements. The Blue Level package reports the results of the method blank, surrogate recoveries, matrix spike recoveries, and data precision, as well as a QA non-conformance summary. Samples collected for the intermediate sampling event, and all other analyses, including total organic carbon (TOC), chemical oxygen demand (COD), and total organic oxygen (TOO), which were used for in-house qualitative screening and tracking purposes (not delineation or confirmation) required only standard laboratory QA/QC reporting requirements.

As described in the Work Plan, given the specific application intended for the data generated during the feasibility study (as opposed to a general site assessment) a separate data validation report was not required.

1.5 Hydrocarbon Mass Estimate

Prior to initiation of the ozone test, mass balance estimates were included in the Supplemental Investigation Report with the available data for both Area 1 and Area 2. These calculations estimated approximately 85 yd^3 of soil existed in Area 1 with >473 ppm of total PAHs, and 370 yd^3 in Area 2 (total of approximately 455 yd^3). Subsequent investigations were conducted and the estimates were revised in August, 1993. The estimated volume of soils above 473 ppm PAHs was adjusted from the number presented in the Supplemental Assessment Report based on the additional information gathered during the Phase II Investigation. The estimation of the vertical extent of PAHs above 473 ppm in Area 2 was narrowed to 3 feet, while the horizontal extent of impact was increased to over 700 square yards. These numbers yielded an estimated volume of approximately 720 cubic yards of soils above the 473 ppm PAH level. The estimated volume of soils above 473 ppm in Area 1 was revised downward after the installation of the Ozone Injection Feasibility Study well points in November, 1993, to approximately 5 cubic yards.

In Area 1, the total mass of hydrocarbon compounds was estimated to be between 5 and 25 pounds, depending on the areal extent included in the estimate. In Area 2, the mass of hydrocarbons was extimated to be approximately 1,800 pounds. The updated hydrocarbon mass calculation was performed utilizing all historic data collected to date for the Osmose facility. The following conclusions emerged from this estimate:

- Adsorbed-phase hydrocarbons comprise about 44% of the total hydrocarbons on site; approximately 55% of the hydrocarbon mass exists as light non-aqueous phase liquids (LNAPL). Dissolved phase hydrocarbons comprise a negligible mass (less than 1%).
- Of the adsorbed-phase hydrocarbons, approximately 86% of the total exist in the saturated zone, while adsorbed-phase hydrocarbons in the unsaturated zone account for approximately 14% of the total.
- Volatile compounds comprise less than 1% of the total hydrocarbons on site.
- Approximately 95% of the total hydrocarbon mass is accounted for by PAH compounds located between 6 and 12 feet below grade in the entrance gate area.

1.6 Permitting

Three discharge permits were required to operate the ozone feasibility study equipment. Two of the permits were for discharge of water to the Buffalo Sewer Authority (BSA). The third permit was a Process Exhaust and Ventilation (PE&V) permit filed with the NYSDEC Region 9 Division of Air for the SVE air discharge.

Non-contact cooling water from the ozone generator was discharged at a maximum rate of 4 gallons per minute (gpm) to the BSA via an on-site storm sewer. Verbal authorization for the discharge was received from Mr. James Overhault of the BSA on April 21, 1993. No sampling was required of the discharge due to it's strictly non-contact cooling water usage.

Treated groundwater extracted during the operation of the Area 2 study was discharged at an average flow rate of 2 gpm to the BSA via an on-site storm sewer. Verbal authorization for this discharge was received from Mr. James Overhault of the BSA on August 9, 1993 with the following discharge requirements:

- maximum total contaminant concentration of 5.3 mg/L (ppm) as measured by EPA Method 8020 and 8270.

All requirements were met for this discharge throughout the project duration.

A PE&V permit application was filed with the NYSDEC Division of Air Resources in December, 1992. The issued permit allowed discharges of ozone up to 0.33 lbs/hr. Granular activated carbon (GAC) treatment was approved as an emission control device. Monitoring of the discharge indicated that the discharge limitations were met throughout the project duration.

2.0 FEASIBILITY STUDY INSTALLATION

The following sections describe the installation of the subsurface well network and above grade equipment installation details required to conduct the Ozone Injection Feasibility Study. Once the installation was completed, field pilot testing was conducted prior to beginning the ozone injection feasibility study. The objectives and methods for conducting these field pilot tests are also described in the following sections.

As previously described, soils with total adsorbed PAHs above 473 ppm existed in two areas of the site. Because Area 1 PAHs existed in the unsaturated zone, while PAHs existed primarily in the saturated zone in Area 2, the two areas were treated as individual feasibility studies. As such, for the remainder of the report, the study installation, pilot testing procedures and results will be presented independently.

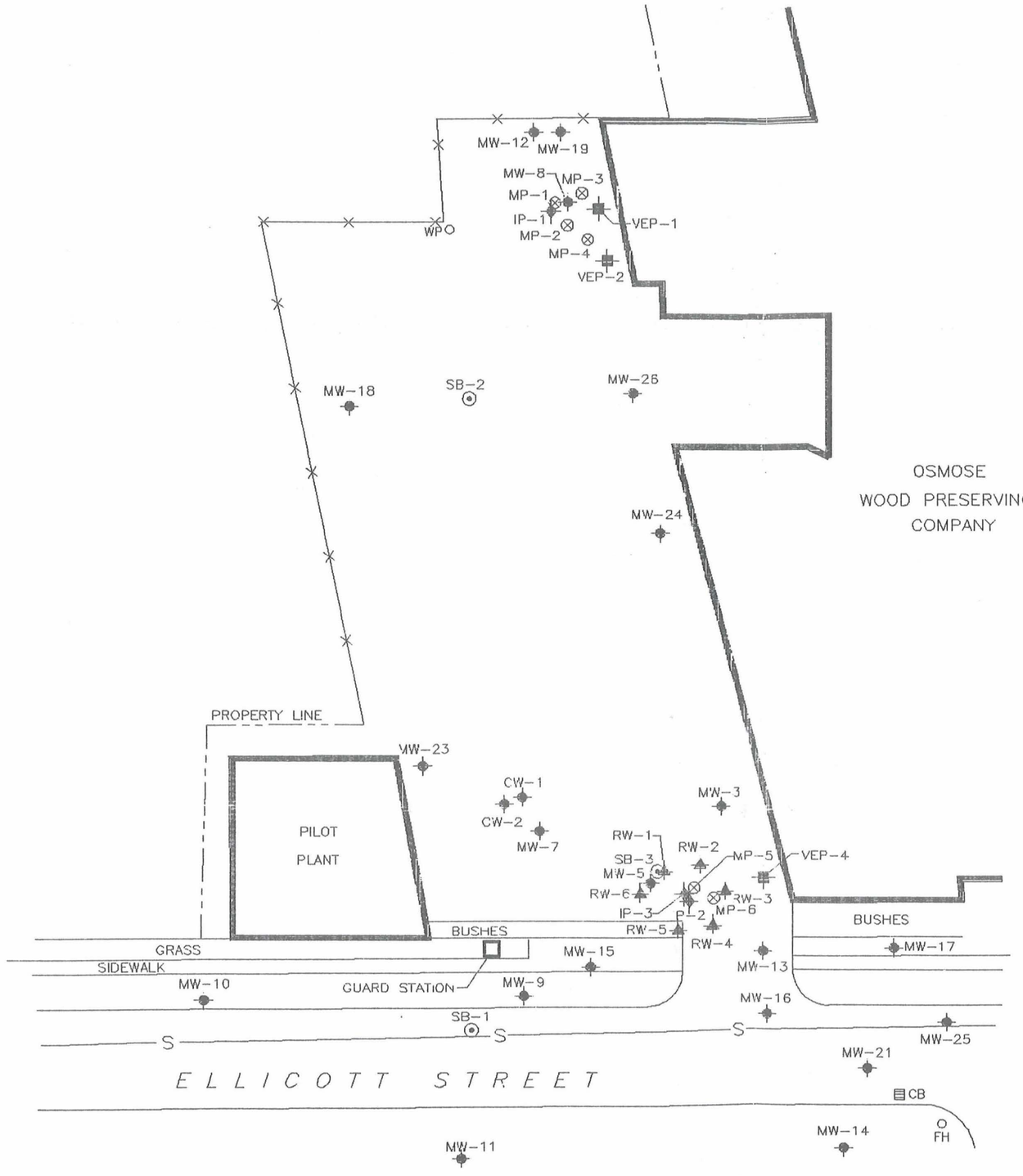
2.1 Subsurface Well Installation

2.1.1 Area 1

During the period of November 16 to November 20, 1992, seven wells were installed within Area 1. They consisted of one ozone injection point (IP-1), four monitoring points (MP-1, MP-2, MP-3, MP-4), and two vapor extraction points (VEP-1, VEP-2). The four monitoring points, along with pre-existing monitoring well MW-8, provided five locations at various distances from the injection point at which to monitor both soil vapors and vacuum during the field pilot tests and the feasibility study. The two vapor extraction points were placed between the ozone injection point IP-1 and the Osmose building to act as a barrier to prevent unreacted ozone from entering the building foundation during the study. The well locations are depicted on the Well Location Map (Figure 2-1). The exact distance of each monitoring point from the injection point IP-1 is presented in Table 2-1, below.

TABLE 2-1
DISTANCES FROM INJECTION POINT IP-1

LOCATION	DISTANCE FROM IP-1
IP-1	-
MP-1	3'-0"
MP-2	5'-11"
MP-3	10'-1"
MP-4	13'-2"



LEGEND

- MONITORING WELL
- RECOVERY WELL
- INJECTION POINT
- MONITORING POINT
- VAPOR EXTRACTION POINT
- SOIL BORING
- MH MANHOLE
- FH FIRE HYDRANT
- FENCE
- —S— SEWER LINE

0 35 70
SCALE FEET

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(518) 370-5631

REV. NO.:	DRAWING DATE: 7/30/93	ACAD FILE: 5307-STE

WELL LOCATION MAP

CLIENT: OSMOSE WOOD PRESERVING COMPANY			PM: BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK			PE/RG: JOG
DESIGNED: JOG	DETAILED: DEO	PROJECT NO.: 01110-5307	FIGURE: 2-1

Well installation at each location was completed with a hollow-stem auger drill rig. Each vapor extraction well in Area 1 was installed to a depth of four feet, with the screened interval extending from two to four feet below grade. The monitoring points and vapor extraction points were constructed of two-inch diameter PVC, while the ozone injection point was constructed of one-inch diameter 304 stainless steel (for compatibility with high concentrations of ozone). All Area 1 wells were constructed with 0.040"-slotted screens. Morie #1 well gravel, or equivalent, was placed around the screened portion of each well, and a bentonite seal was installed above the well gravel. After all piping was connected (Section 2.2), each well was finished off at the surface with a protective cover. Well construction details are included on the well logs included in Appendix A.

2.1.2 Area 2

During the period of November 30 to December 2, 1992, four wells were installed within Area 2 utilizing a hollow-stem auger drill rig. These wells consisted of one ozone injection point (IP-2), two monitoring points (MP-5, MP-6), and one vapor extraction point (VEP-4). The two monitoring points, along with pre-existing monitoring wells MW-3, MW-5, MW-7, and MW-13, provided six locations at various distances from the injection point at which to monitor soil vapors during the pilot test. The newly installed vapor extraction point (VEP-4) along with existing monitoring well MW-3 (which was converted into a VEP), was placed between the ozone injection point and the building to act as a barrier to prevent ozone from entering the building foundation during the test.

Because one of the objectives of the feasibility study was to determine the feasibility of injecting ozone into the (unsaturated) clay layer which exists on site, wells IP-2, MP-5, and MP-6 each consisted of two well points installed within the same borehole. Injection point IP-2 was constructed of one-inch diameter 304 stainless steel, with a deep point screened below the clay from 12.5 to 13.5 feet below grade (IP-2d) and a shallow point screened within the clay from 5.5 to 6.5 feet below grade (IP-2s). These points were constructed with 0.040"-slotted screen surrounded with Morie #1 well gravel (or equivalent). Monitoring points MP-5 and MP-6 were constructed of two-inch diameter PVC, with the deep points screened from 11.5 to 13.5 feet below grade (MP-5d, MP-6d) and shallow points screened from 4.5 to 6.5 feet below grade (MP-5s, MP-6s). They were constructed with 0.020"-slotted screen, surrounded with Morie #0 well gravel (or equivalent). The deep and shallow screened intervals were confirmed during installation and separated by a bentonite seal, and each dual point was sealed at the surface with a second bentonite seal.

Vapor extraction point VEP-4 was installed to a depth of eight feet, with the screened interval extending from two to eight feet below grade. It was constructed of two-inch diameter PVC with 0.040"-slotted screen. Morie #1 well gravel, or equivalent, was placed around the screened portion of the well, and a bentonite seal was installed above the well gravel. All wells in Area 2 were finished off at the surface with protective covers.

Well construction details of wells installed in Area 2 are included on the well logs in Appendix A.

On July 23, 1993, a new ozone injection point (IP-3) was installed in Area 2 due to changes in the work scope made after completion of field pilot testing (see Section 2.3). Injection point IP-3 was installed to a depth of 22.5 feet, with the screened interval extending from 20 to 22.5 feet below grade. This point was constructed of 1¼-inch diameter 304 stainless steel with 0.010"-slotted screen. Morie #0 well gravel was placed around the screened portion of the well, and a bentonite seal was installed above the well gravel. The remainder of the borehole was backfilled with drill cuttings. Well construction details are also included in the well logs in Appendix A. The former injection point (IP-2) was then utilized as a monitoring point.

Presented below in Table 2-2 are the distances each monitoring point is located from to injection point IP-3.

TABLE 2-2

DISTANCES FROM INJECTION POINT IP-3

LOCATION	DISTANCE FROM IP-3
IP-3	--
IP-2	3'-10"
MP-5	3'-6"
MP-6	8'-11"
SB-3	8'-10"

2.2 Above Grade Installation

All equipment and piping required for the feasibility studies were installed above grade proximate to the two test areas. The sections below describe the equipment and associated piping.

2.2.1 Ozone Generation/Injection System

A temporary wooden shed 10 feet wide x 20 feet long x 9 feet in height was constructed on the southern end of the parking area to house, protect, and secure the ozone generator and associated equipment. The ozone generation/injection equipment consisted of:

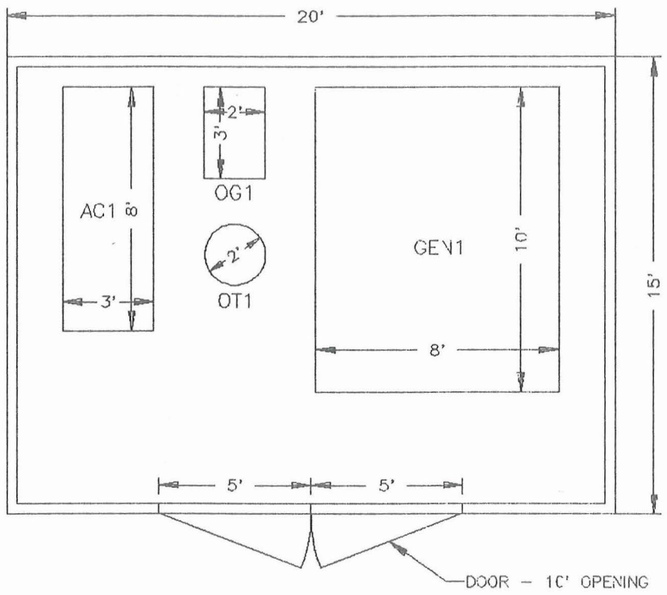
- 15 Hp Bauer Company Rotary Screw Air Compressor (44 scfm @ 100 psig)
- XORBOX X-200 Oxygen Concentrator (44 scfm)
- Oxygen Storage Tank (100 gallons)
- Capital Controls Company model 26 PPD Megos Pilot Plant ozone generator (26 lbs ozone per day)

Equipment specification for each of these units is included in Appendix B.

The equipment was installed by Capital Controls Company (the equipment vendor) technicians from May 12 to May 15, 1993. Two separate electric services (460 volt, 15 amps and 208 volt, 100 amps) were temporarily installed inside the shed by a licensed electrician to power the ozone generator, associated equipment, receptacles, and lights. Figure 2-2 details the construction and layout of the equipment shed.

A potable water supply was piped via ½" copper conduit from Osmose's on-site pilot plant building. This water supply was for non-contact cooling water used at approximately 4 gpm to cool the ozone generator during its operation. This cooling water was discharged via 2" schedule 40 PVC pipe to an on-site storm sewer connected to the BSA's combined sewer system under verbal authorization (Section 1.6).

Ozone was piped from the generator via 1" diameter 304 Stainless Steel pipe installed above grade to the injection points. At the entrance gate areas, the pipe was buried in a shallow (6" deep) trench to maintain parking lot access for product delivery vehicles and employee parking. All stainless steel piping was installed by Osmose pipe fitting subcontractors, and pressure tested for leaks prior to use. Results



EQUIPMENT ENCLOSURE LAYOUT

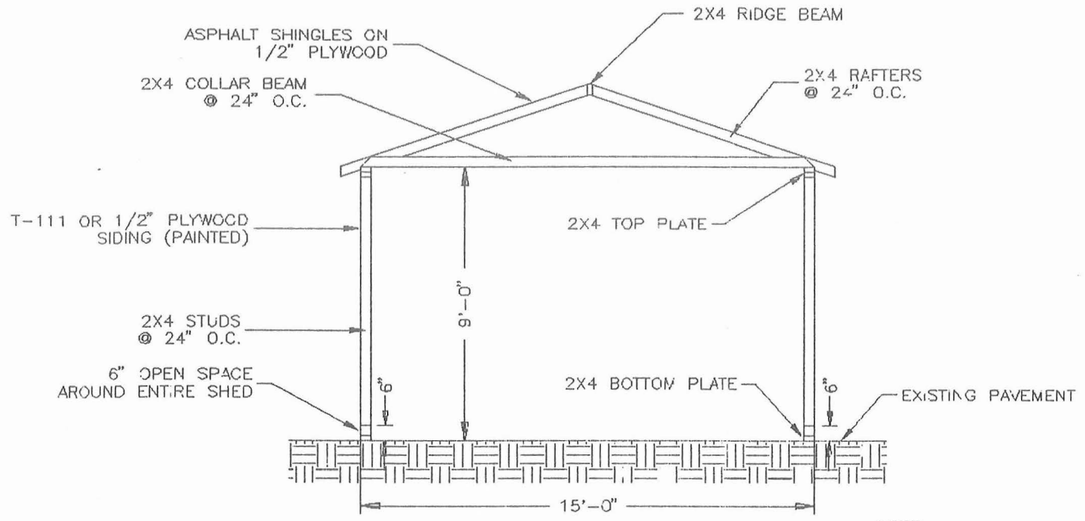
DIMENSIONS

OZONE GENERATOR (GEN1)
8'W X 10'D X 8'H

AIR COMPRESSOR (AC1)
8'W X 3'D X 3'H

OXYGEN GENERATOR (OG1)
3'W X 2'D X 6'H

OXYGEN TANK (OT1)
2'ø



EQUIPMENT ENCLOSURE

CONSTRUCTION CROSS SECTION

NOTE:

ENCLOSURE SHOULD BE SECURED TO THE EXISTING PAVEMENT.

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1245 KINGS ROAD
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(518) 370-5631

REV. NO.:	DRAWING DATE: 3/21/94	ACAD FILE: 0109-SHD

FEASIBILITY STUDY EQUIPMENT LAYOUT

CLIENT: OSMOSE WOOD PRESERVING COMPANY			PM: BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK			SM: JOG
DESIGNED: MPS	DETAILED: DEO	PROJECT NO.: 00530-0109	FIGURE: 2-2

of the pressure test concluded that all pipe and associated fittings were tight and would not leak ozone to the parking lot area. Photographs of the shed, equipment and piping are presented in Appendix C.

2.2.2 Soil Vapor Extraction System

The soil vapor extraction (SVE) system consisted of two components:

- 1.5 Hp Rotron regenerative Soil Vapor Extraction Blower (90 cfm @ 33" w.c. vacuum)
- Two (2) - 175 lb Vapor Phase Carbon Services Corporation granular activated carbon (GAC) Units (Model #175)

The SVE motor and blower was set up in a small shed located midway between the two feasibility study areas in the middle of the parking area. The SVE system was connected to two vapor extraction wells (VEP-1 and VEP-2) via schedule 40 PVC piping during the Area 1 feasibility study. Each vapor extraction well was controlled via a PVC ball value.

During the Area 2 study, each of the recovery wells (RW-1 through RW-6) were plumbed to be capable of extracting vapors. Schedule 40 PVC was selected for use in all plumbing applications associated with the SVE system based upon the anticipated low concentration of ozone in the extracted soil gas and manufacturers compatibility recommendations.

At both study locations, discharge from the SVE system was directed through two-175 pound vapor GAC canisters piped in series with PVC piping. Discharge from the vapor GAC units was monitored and discharged under PE&V permit (Section 1.6, Permits).

Manufacturer's specifications of the motor, blower, and carbon units are presented in Appendix D. Photographs of the SVE set-up are presented in the Site Photographic Logs, included in Appendix C.

2.3 Field Pilot Testing

Several field pilot tests were completed in the two feasibility study areas to determine soil and groundwater characteristics and to insure safety during the studies. These pilot tests included:

Area 1:

- SVE Radius of Influence (ROI) Test
- Combined Air Injection and SVE test

Area 2:

- SVE ROI Test
- Air/Helium Injection Test
- Combined air/helium sparge and SVE test
- Aquifer Pump Test
- Combined Ozone sparge and SVE test

The following sections describe each of the field pilot tests.

2.3.1 SVE ROI Field Testing

SVE ROI tests were performed at each area to insure and document that unreacted ozone vapors would not migrate to areas outside of the test locations. The following paragraphs briefly describe the ROI test set-up and test procedures and results for both the Area 1 and Area 2 ROI field tests.

2.3.1.1 Area 1

The SVE ROI tests were conducted on VEP-1 and VEP-2 (see Figure 2-1) from May 11-13, 1993. The objective of the SVE test was to determine an areal radius of influence of the VEPs under two operating conditions:

- Prior to injection of air through IP-1
- During injection of air through IP-1

The ROI test prior to injection was conducted on May 11, 1990 by temporarily connecting VEP-1 to the 1.5 Hp Rotron blower via 2-inch schedule 40 PVC pipe. Stainless steel vapor monitoring probes (¼-inch diameter, 3' long) were temporarily installed into the subsurface to measure vacuum at approximate distances of 3, 8, 9, 10, 11, 12, 18, and 20 feet from the VEP-1 in a radial pattern. Vacuum monitoring was also performed at monitoring well MW-20. A magnehelic vacuum gauge was used to measure vacuum influence once the SVE blower was deployed. Vacuum reading were recorded at approximately 30 minute time intervals until equilibrium was obtained (approximately one hour).

The vacuum blower was operated at 3 vacuum levels (13, 22, and 33 inches of water column) to determine the optimal operating range. The test indicated that operating the vacuum blower at 33 inches of water column vacuum resulted in a radius of influence zone which is graphically depicted on Figure 2-3, Area 1 SVE ROI Test Results; Without Injection.

The second phase of the SVE ROI test was to inject air at similar pressures and flow rates as anticipated during the feasibility study. This was completed on May 14, 1993. Vacuum monitoring points (either wells or temporary stainless steel probes) were set up at varying distances from the extraction well VEP-1. Vacuum was applied to both vapor points VEP-1, and VEP-2 using the vacuum regenerative blower operating at 30 inches of water column. Oxygen from the ozone generator was injected into IP-1 at a rate of 6 cfm. Vacuum measurements were collected at each of the monitoring points for approximately 1 hour after full operation (injection and vapor extraction).

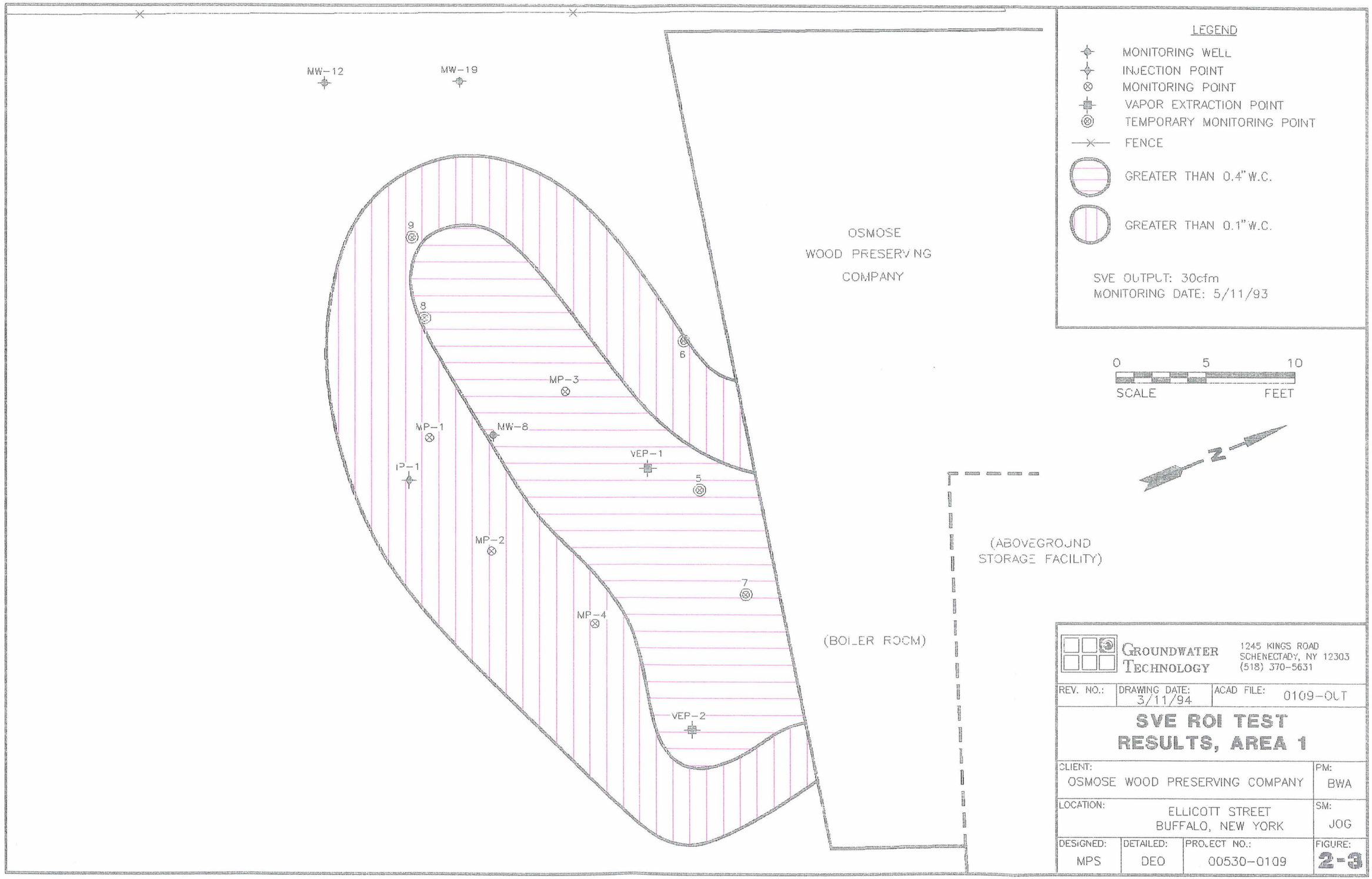
The SVE ROI test with injection indicated that the two vapor extraction points (VEP-1 and VEP-2) provided adequate vacuum influence to insure that all unreacted ozone was captured. The results of the test are shown in Figure 2-4, Area 1 SVE ROI Test Results; With Injection.

2.3.1.2 Area 2

As described above, the Area 2 feasibility study originally consisted of three stages, including:

- Stage I: SVE ROI Test
- Stage II: air/helium sparge test
- Stage III: combined air/helium sparge and SVE test

An SVE ROI field test was conducted in the unsaturated clay zone on May 12 and 13, 1993, using a 1.5 Hp Rotron blower. The test was conducted by exerting vacuum up to 45 inches of water column on VEP-4. Vapor extraction was required to recover any migrant ozone vapors to insure no exposure to workers or underground utilities located near Ellicott Street. The blower was connected to the vent well via a 2" PVC pipe. Stainless steel vapor monitoring probes were installed to a depths from 2-3 feet at various distances from VEP-4. No measurable influence could be detected at any of the monitoring points.



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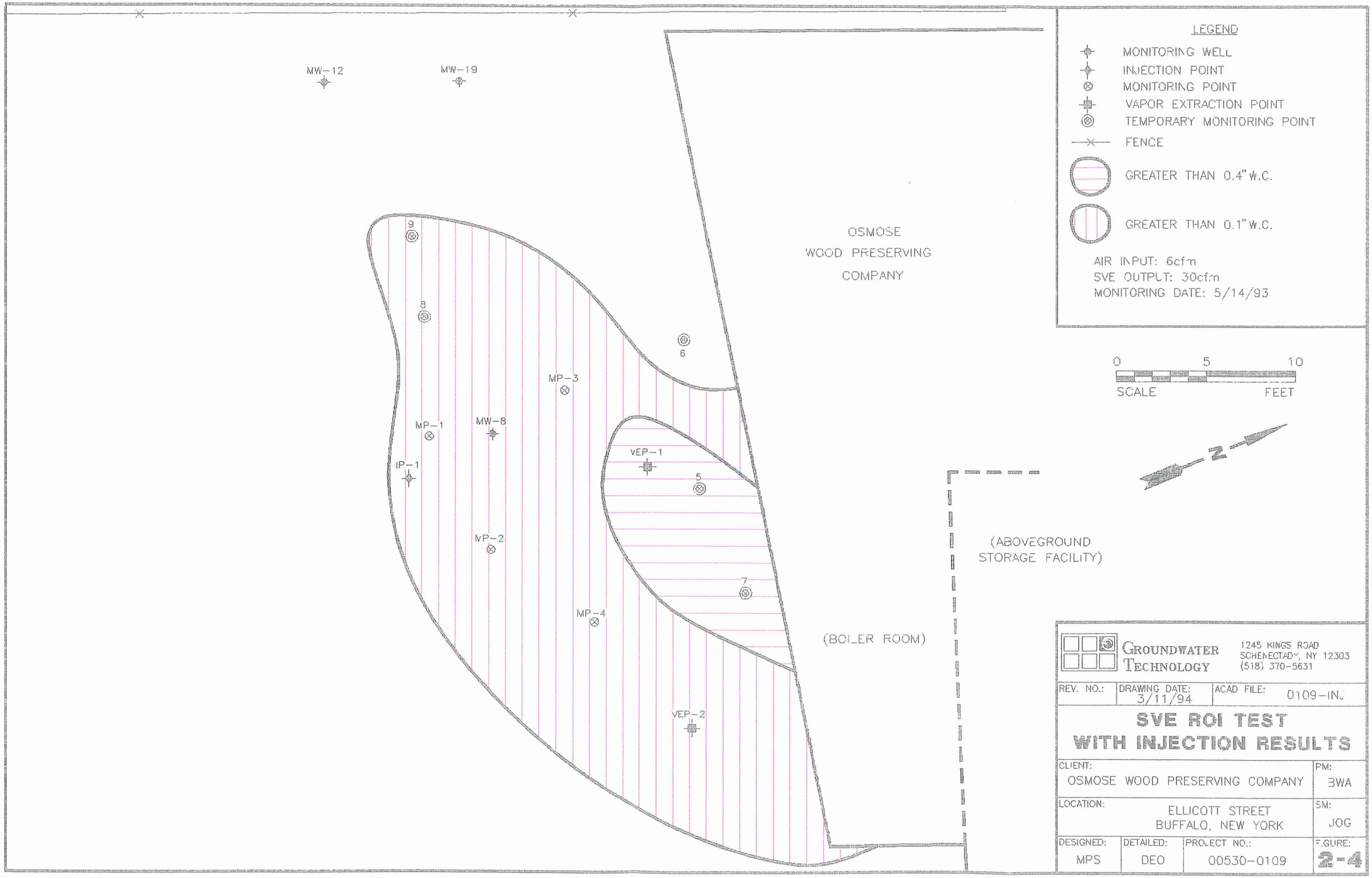
REV. NO.:	DRAWING DATE: 3/11/94	ACAD FILE: 0109-OUT

SVE ROI TEST RESULTS, AREA 1

CLIENT:	PM:
OSMOSE WOOD PRESERVING COMPANY	BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK	SM: JOG

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
MPS	DEO	00530-0109	2-3



GROUNDWATER TECHNOLOGY
1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

REV. NO.:	DRAWING DATE: 3/11/94	ACAD FILE: 0109-INJ

SVE ROI TEST WITH INJECTION RESULTS

CLIENT:	PM:
OSMOSE WOOD PRESERVING COMPANY	BWA
LOCATION: ELLICOTT STREET, BUFFALO, NEW YORK	SM: JOG

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
MPS	DEO	00530-0109	2-4

Various alternative options for recovering ozone vapors were evaluated which included:

- Liquid ring high-vacuum pumping to extract vapors and water at a vacuum up to 40 inches of mercury ("Hg)
- Dewatering below the clay layer and venting from the newly created unsaturated zone
- Fracturing of the clay with high pressure air
- Trenching to dewater and collect vapors
- High pressure air injection into VEP-3 and VEP-4 to create a positive pressure migration barrier

The option to repeat the SVE ROI test using a high-vacuum liquid ring pump capable of producing 40 "Hg was chosen. The test was conducted on June 11 and 12, 1993. Again, unsatisfactory influence at the monitoring points within the clay were obtained.

A decision to conduct a groundwater pumping test to collect aquifer information needed to consider the next feasible option (dewatering below the clay layer and venting from the newly created saturated zone) was made. A six inch diameter FRE recovery well (RW-1) was installed on June 21, 1993 in the vicinity of the front (Ellicott Street) gate, approximately four feet from existing well MW-5. Well development was completed on June 23rd, step tests and a 48 hour pump test was completed from June 24-26, 1993 Section 2.3.2.2b below). Site information was modeled utilizing CAPZONE software (Section 2.3.2.3). Various pumping scenarios were simulated to determine the required number and spacing of pumping wells to dewater the Area 2 test area (12 foot radius around the injection point IP-2) below the clay layer.

The modeling indicated that five additional recovery wells would be required to effectively lower the groundwater table 3.5 feet across the study area. The decision was made by Osmose and Groundwater Technology to proceed with the recovery well installation, dewatering activities, pilot testing, and ozone injection. Recovery well installation and dewatering activities are described in Sections 2.3.2.1 and 2.3.2.2, respectively.

2.3.1.3 Air/Helium Test

Once the soils in the study area were dewatered (see Section 2.3.2, below) a helium injection pilot test was conducted. Helium was selected because it is an inert gas which can simulate ozone in the subsurface. Helium was injected at through IP-3 prior to introducing ozone through the injection point. A hand held helium detector was used to detect the travel patterns of the helium. Several measurements were collected at areas of concern (utility trenches and first floor of building) to confirm that injected vapors (i.e. helium) were collected in the SVE system. These measurements indicated that

no helium was detected outside the test area with the SVE operating. The test measurements concluded that the SVE system would collect ozone vapors when operated in conjunction with groundwater extraction.

2.3.2 Aquifer Testing/Dewatering Design

2.3.2.1 Recovery Well Installation

As mentioned above, a soil vapor extraction radius of influence test was performed in the clay layer at Area 2 on May 12 and 13, 1993 (Section 2.3.1.2). The results indicated that an alternative strategy consisting of venting any unreacted ozone from beneath the clay layer would require the creation of a dewatered zone beneath the clay.

As previously described in Section 2.3.1.2, on June 21, 1993, a groundwater recovery well (RW-1) was installed in Area 2 to allow testing of aquifer parameters for the purposes of designing a pumping system to dewater beneath the clay (Figure SMP). A hollow-stem auger drill rig was used to install recovery well RW-1 to a depth of 23 feet, with the screened interval extending from 3 to 23 feet below grade. It was constructed of six-inch diameter FRE with 0.020"-slotted screen. Morie #1 well gravel was placed around the screened portion of the well, and a bentonite seal was installed at the surface. Well construction details are included on the well log in Appendix A. After installation the well was developed on June 23 to remove fine sediments from the well bore in order to improve well efficiency.

2.3.2.2 Aquifer Pump Testing

Aquifer testing performed in Area 2 consisted of a step test, a 24 hour drawdown test and a recovery test. These tests were completed from June 24-26, 1993. The step test was performed to determine the sustainable flow rate for the longer duration pump test. A flow rate of 0.15 gallons per minute (gpm) was determined to be the flow rate which could be sustained for the 24 hour test without dewatering the well. An initial baseline groundwater gauging was performed on June 25, 1993 prior to initiation of the 24 hour drawdown test . During the test, water levels were monitored in all surrounding wells and in several wells outside the area to determine background water level trends. At the conclusion of the drawdown test, the pump was shut off and water level recovery in RW-1 and surrounding monitor wells was recorded.

Maximum drawdowns observed during the aquifer pump test were 7.83 feet in RW-1 and 1.2 feet in MW-5 (located 4.3 feet from RW-1). Drawdowns were recorded in the six monitoring wells closest to RW-1 (MW-3, MW-7, MP-5, MP-6, MW-15, and MW-23). The time drawdown data, distance drawdown data

and recovery data were analyzed by the Cooper Jacob Straight Line Method to determine aquifer transmissivity and storativity. The average transmissivity was calculated to be 45 gallons per day per foot and the average storativity was 0.02.

2.3.2.3 Dewatering Design

The results of the aquifer testing were utilized to model the combined drawdown of numerous pumping wells in order to determine the required number of wells, spacing and flow rates which could adequately dewater the sediments below the clay in Area 2 to allow for vapor collection. The required drawdown to ensure vapor collection was determined to be 3.5 feet. The model CAPZONE was utilized for the simulations. The drawdown response from the RW-1 pump test was utilized to calibrate the model prior to performing simulations with multiple wells. Numerous simulations were performed varying well number, spacing and flow rates. The selected configuration consisted of six wells situated in a radial pattern around the ozone injection point IP-3.

The five additional recovery wells (RW-2, RW-3, RW-4, RW-5, RW-6) were installed on site during the period of July 26 to July 28, 1993, following completion of the dewatering design. The location of the recovery wells are included on Figure 2-1. Each recovery well was installed to a depth of 25 feet, with the screened portion extending from 3 to 25 feet below grade. Each well was constructed of four-inch diameter FRE with 0.020"-slotted screen. Morie #1 well gravel was placed around the screened portion of each well, and a bentonite seal was installed at the surface. Well construction details are included on the well logs in Appendix A.

3.0 OZONE FEASIBILITY STUDY OPERATION

3.1 Area 1

The following sections discusses the ozone injection system start-up procedures, presents a summary of the daily operation and maintenance tasks performed during the feasibility study, including H&S monitoring, and discusses the soil sampling performed in Area 1.

3.1.1 Start Up

The start up procedure for initiating the injection of ozone in Area 1 was as follows:

- Start SVE blower: 90 cfm at 33" H2O as determined by the ROI test (Section 2.3.1.1).
- Inject oxygen from ozone generation unit at maximum pressure (12 psi).
- Record vacuum at monitoring wells (MP-1, MP-2, MP-3, MP-4, and MW-8) and stainless steel monitoring probes. Oxygen was injected prior to ozone to insure a vacuum barrier was maintained between injection point and Osmose building (Section 2.3.1.1).
- Inject ozone at low flow, pressure and concentration, while continually monitoring. Flow, pressure, and concentration were gradually increased during the first week of operation until maximum (operational) levels existed.
- Record ambient air monitoring inside the Osmose facility and in the outdoor work area.

The ozone injection at Area 1 started on May 24, 1993. The injection stream consisted of 5.25% ozone at a pressure of pressure of 8 psi and a flow rate of 2.82 cfm into IP-2. Monitoring of the boiler room and areas around the parking lot with the portable ozone monitor on May 25, 1993 indicated apparent elevated levels of ambient ozone. Upon measuring the ozone in these work areas the generator was adjusted to an injection gas concentration of 0.103% ozone at a pressure of 11 psi and flow of 1.53 cfm. The adjusted injection gas allowed for continuous operation without elevated ozone recorded in the ambient air. Subsequent monitoring performed with ozone gas detector tubes revealed that the portable ozone monitor was susceptible to fluctuations in temperature and humidity, and had yielded false positive readings. Following that discovery, ozone concentrations and flowrates were gradually increased from the start up levels as the feasibility study progressed.

During start up period (May 24 through May 29, 1993) the SVE system operated at 36-40 inches of water column vacuum and 77-85 cfm extracted soil gas rates.

Data sheets associated with the start up period May 24 - May 29, 1993 are presented in Appendix E, Monitoring Logs.

3.1.2 Daily Operation and Maintenance

For the duration of the Area 1 pilot test (May 24 to June 21, 1993), daily operation and maintenance visits were performed to monitor operational parameters of the ozone generator and SVE equipment and collect data to track the progress of the feasibility study. The daily visits consisted of four main tasks:

- ozone monitoring inside the Osmose facility,
- work area atmospheric monitoring,
- ozone generator injection system monitoring, and
- SVE system monitoring.

The monitoring conducted inside the Osmose facility and the monitoring in the outdoor work area for health and safety purposes is discussed below in Section 3.1.3.

The ozone injection system monitoring consisted of daily inspection of the ozone generator and recording the injection gas flow rate, the pressure at which the injection gas was introduced into the subsurface, percent ozone in the injection gas, and the cooling water temperature.

Work area monitoring performed for the purpose of collecting feasibility study operational data consisted of O_2/LEL measurements at the injection point well head (IP-1), vacuum and headspace ozone measurements at the six monitoring wells (MP-1, MP-2, MP-3, MP-4, MW-8, and MW-12), and vacuum measurements at the four stainless steel vapor monitoring probes (VMP-1, VMP-2, VMP-3, and VMP-4).

Soil vent system monitoring consisted of recording vacuum, ozone, CO_2, and LEL measurements at each extraction point (VEP-1 and VEP-2), as well as air flow rate, pressure, ozone, PID, CO_2, and LEL measurements for the total vent system effluent both before and after the GAC treatment canisters.

Monitoring log forms were developed for daily use to record all of the above data. The completed logs are included in Appendix E. A discussion of the operational data is presented in Section 4.0.

3.1.3 H&S Monitoring

As described in the Site HSP, for the duration of the Area 1 pilot test (May 24 to June 21, 1993), daily health and safety monitoring was performed to ensure that no health hazards existed from ozone or from the oxidation byproducts of hydrocarbon compounds. The daily monitoring consisted of ozone

monitoring inside the Osmose facility where unreacted migrant vapors might infiltrate and outdoor work area monitoring.

A portable ozone detector was used to continuously monitor the air inside the Osmose facility adjacent to Area 1. The ozone monitor was equipped with an audible alarm and was inspected by a responsible individual at least four times per 8 hour work day. The alarm sensor was capable of detecting ozone at 0.05 ppm (above ambient levels). Monitoring logs were developed and kept next to the instrument to record inspections and measurements. These monitoring logs are also included as Appendix E.

In the outdoor work area, the portable ozone detector, or ozone gas detector tubes, were used to monitor ozone concentrations outside the equipment shed, inside the equipment shed, above IP-1, above cracks in the asphalt in Area 1, and in the soil vent system effluent. In addition, ambient air monitoring was performed with a PID at five locations in the work area.

In the event that ozone concentrations inside the building or in the outdoor work area, or VOC concentrations in the work area, exceeded the action levels, the injection system was shut down until corrective action could be taken. Draeger type tubes were used on a daily basis to verify that the ozone monitoring instrument was working properly.

3.1.4 Soil Sampling

Baseline, midpoint, and endpoint soil sampling was performed during the Area 1 feasibility study to monitor changes in the concentration of adsorbed PAH compounds, VOCs, and total organic carbon (TOC) in the soil. Samples were taken from two to four feet below grade at five locations: IP-1, MP-1, MP-2, MP-3, and MP-4. Analysis was performed for PAHs by EPA Method 8310 and for TOC at all five locations; analysis was performed for VOCs by EPA Method 8020 at two of the five locations (IP-1 and MP-3). Duplicate samples from selected locations were analyzed for PAHs and organic carbon. Table 3-1, Field Sampling Plan; Area 1, summarizes the analyses performed at each monitoring location.

Baseline soil samples were collected during the period of November 16 to November 20, 1992, during the initial installation of the well points. The pilot test commenced on May 24, 1993. Midpoint soil samples were collected on June 3 and 4, 1993, after 10 days of operation. Endpoint soil samples were collected on June 21, 1993, after 28 days of operation. Soil samples were collected using a hollow-stem auger drill rig and a split-spoon sampler. All sampling equipment was decontaminated between samples.

TABLE 3-1
OSMOSE OZONE FEASIBILITY STUDY
FIELD SAMPLING PLAN

Area 1

Sample Event	Sample Location					Field Blank	Equip Blank
	IP-1	MP-1	MP-2	MP-3	MP-4		
Baseline	EPA 8310 TOC EPA 8020	EPA 8310 TOC	EPA 8310 TOC	EPA 8310 TOC EPA 8020	EPA 8310 TOC		
Midpoint	EPA 8310 TOC EPA 8020	EPA 8310 TOC	EPA 8310 TOC	EPA 8310 TOC EPA 8020 TOC (Dup)	EPA 8310 TOC		
Endpoint	EPA 8310 TOC EPA 8020	EPA 8310 TOC	EPA 8310 TOC 8310 (Dup) TOC (Dup)	EPA 8310 TOC EPA 8020	EPA 8310 TOC	EPA 8310	EPA 8310

3.2 Area 2

Similar to Section 3.1, this section discusses the ozone injection system start-up procedures, daily operation and maintenance tasks, H&S monitoring and soil sampling performed during the Area 2 feasibility study. In addition, gauging of monitoring wells to verify dewatering of soils and groundwater sampling was conducted in this area.

3.2.1 Start up

The start up procedures for injecting ozone in Area 2 were as follows:

- Initiate pumping of groundwater from recovery wells RW-1, RW-2, RW-3, RW-4, RW-5, and RW-6.
- Continue pumping for 24 hours to insure a sufficient cone of depression and a dewatered area for ozone collection beneath the confining clay layer.
- Start up SVE blower. Operate blower at 80 cfm and 34" w.c. vacuum.
- Inject oxygen through injection point IP-3 at 12 psi and 6 cfm.
- Confirm through pressure measurements in the subsurface that all injected oxygen is being recovered by SVE.
- Begin injecting ozone into injection point IP-3 at 12 psi, 6 cfm, and 1% ozone.
- Monitor all monitoring points for ozone concentrations.
- Continue ozone injection, incrementally increasing ozone concentrations and flow rates until maximum (operational) conditions are met.

Ozone injection at Area 2 started on September 3, 1993. The injection stream consisted of a concentration of 4.29% ozone, pressure of 7 psi and flow rate of 3 cfm into injection point IP-3. Ozone injection concentrations remained at the start up levels as the testing progressed.

During the start up period, (September 3 through September 7, 1993) ozone concentrations detected in the SVE system prior to GAC treatments ranged form 3 ppm to 150 ppm. The SVE System operated from 75-81 cfm extracted soil gas rates.

Results of the ozone injection start up for Area 2 are included with the monitoring sheets for Area 1 in Appendix E.

3.2.2 Daily Operation and Maintenance

For the duration of the Area 2 pilot test (September 3 to October 22, 1993), daily operation and maintenance visits were performed to check the equipment and collect data to track the progress of the feasibility study. The daily visits consisted primarily of six tasks:

- ozone monitoring inside the Osmose facility,
- work area atmospheric monitoring,
- pump and treat system monitoring,
- ozone generator injection system monitoring,
- soil vapor extraction system monitoring, and
- groundwater gauging.

The monitoring inside the Osmose facility and the monitoring in the work area for health and safety purposes and is discussed below in Section 3.2.4.

Ozone generator injection system monitoring consisted of recording the flowrate of the injection gas, the pressure at which the injection gas was introduced into the subsurface, percent ozone in the injection gas, and cooling water temperature.

Work area monitoring performed for the purpose of collecting feasibility study operational data was performed weekly and consisted of:

- pressure measurements at the injection point well head;
- ozone, PID, and CO_2 headspace measurements at 14 monitoring wells (MW-3, MW-5, MW-7, MW-13, MW-15, MW-16, MP-5s, MP-5d, MP-6s, MP-6d, VEP-4, RW-3, RW-4, and RW-5) and seven, temporarily installed, stainless steel vapor monitoring probes (VMP-1 through VMP-7); and
- pressure/vacuum measurements at nine monitoring wells (MW-3, MW-5, MW-15, MP-5d, MP-6d, VEP-4, RW-3, RW-4, and RW-5) and the seven stainless steel vapor probes (VMP-1 through VMP-7).

Soil vapor extraction was performed during the pilot test from all six recovery wells. Soil vent system monitoring consisted of air flow, percent ozone, CO_2, and PID measurements for the total vent system effluent both before and after the carbon vessel.

Monitoring log forms were developed to record all of the above data. Completed logs are also included in Appendix E. A discussion of these results is included in Section 4.0.

As described above, in order to vent excess ozone from beneath the clay layer present on site during the Area 2 pilot test, creation of a dewatered zone beneath the clay layer was required. It was important to create a dewatered "pocket" beneath the clay layer without lowering the water table below the depth of the bottom of the combined sewer system lateral beneath Ellicott Street. Previous assessments have shown the sewer to act as a barrier to LNAPL migration.

Six recovery wells were installed on site for dewatering (Section 2.3.2.1). Actual aquifer pumping indicated that pumping from four of the recovery wells would achieve adequate drawdown of the water table in the test area. After several days of operation, it was determined that pumping from three wells produced an adequate amount of water table depression. Pumping for the remainder of the Area 2 feasibility study was performed utilizing recovery wells RW-1, RW-2, and RW-6.

Daily monitoring of the pumping system was performed as part of the feasibility study monitoring program. This monitoring consisted of checking the operation of the total fluids pumps and the transfer pump, and completing adjustments and repairs as necessary.

Groundwater gauging of 12 monitoring wells (MW-3, MW-5, MW-7, MW-13, MW-15, MW-16, MW-17, MP-5d, MP-6d, RW-3, RW-4, and RW-5) was performed weekly to ensure that the groundwater cone of depression was being maintained within the constraints described above. Based on the gauging data, adjustments were made to the pump settings as needed.

3.2.3 H&S Monitoring

For the duration of the Area 2 pilot test, daily health and safety monitoring was performed to ensure that no health hazards existed from ozone or from the oxidation byproducts of hydrocarbon compounds. The daily monitoring consisted of ozone monitoring inside the Osmose facility prior to the arrival of office workers and feasibility study work area monitoring.

A portable ozone detector was used to continuously monitor the air inside the Osmose facility adjacent to Area 2. In the feasibility study work area, the portable ozone detector or ozone gas detector tubes were used to monitor ozone concentrations at the following locations:

- outside the equipment shed,
- inside the equipment shed,
- above the injection point (IP-3),
- above cracks in the asphalt in Area 2,
- at the storm sewer grate near Area 2,
- at the storm sewer cleanout pipe in the sidewalk,

- at the telephone conduit road box, and
- in the soil vapor extraction system effluent.

In addition, as required in the HSP, ambient air monitoring was performed with a PID at five locations in the work area.

In the event that ozone concentrations inside the building or in the feasibility study work area, or VOC concentrations in the work area, exceeded the action levels, ozone concentrations in the injection gas were reduced. If ambient or work area ozone levels did not immediately return to background concentrations, the injection system was shut down until corrective action could be taken.

The daily H&S Monitoring Logs are also included with the Area 1 logs in Appendix E.

3.2.4 Groundwater Sampling

Baseline, midpoint, and endpoint groundwater sampling was performed during the Area 2 pilot test to monitor changes in the concentration of PAH compounds, volatile organic compounds, total organic carbon (TOC), and chemical oxygen demand (COD) in the groundwater. Samples were collected from six locations: MW-5, MP-5d, MP-6d, RW-1, RW-3, and RW-5. Analysis was performed on the collected samples for PAHs by EPA Method 8310, VOCs by EPA Method 8020, TOC by EPA Method 9060, and COD by EPA Method 410.1. Duplicate samples from selected locations were analyzed for all parameters.

Weekly groundwater monitoring was performed in the field for pH, temperature, and conductivity. Dissolved oxygen and dissolved ozone measurements were attempted initially but could not be obtained due to interference with the field test equipment from the high hydrocarbon concentrations in the wells. Measurements were taken from 11 monitoring wells (MW-3, MW-5, MW-7, MW-13, MW-15, MW-16, MP-5d, MP-6d, RW-3, RW-4, and RW-5).

Baseline groundwater samples were collected on August 16, 1993. The pilot test commenced on September 3, 1993. Midpoint samples were collected on September 29, 1993, after 26 days of operation. The pilot test was terminated on October 22, 1993. Endpoint samples were collected on October 29, 1993, after 49 days of operation.

3.2.5 Soil Sampling

Baseline, midpoint, and endpoint soil sampling was performed during the Area 2 pilot test to monitor changes in the concentration of PAH compounds, VOCs, and TOC. Samples were taken from 10 to 12 feet below grade at four locations: IP-2, MW-5, MP-5, and MP-6. Analysis was performed for PAHs by EPA Method 8310, VOCs by EPA Method 8020, and TOC by CFA Method S-18.0 at all four locations (analysis for VOCs was performed only at MP-6 during the baseline sampling event). Duplicate samples from selected locations were analyzed for all parameters.

Baseline soil samples in Area 2 were collected during the period of November 30 to December 2, 1992, during the installation of the well points. The feasibility study commenced on September 3, 1993. Midpoint samples were collected on September 28, 1993, after 25 days of operation. The pilot test was terminated on October 22, 1993. Endpoint samples were collected on October 23, 1993, after 49 days of operation. Soil samples were collected using a hollow-stem auger drill rig and a split-spoon sampler. All sampling equipment was decontaminated between samples.

Table 3-2, Field Sampling Plan; Area 2, summarizes the analyses performed at each monitoring location.

TABLE 3-2
FIELD SAMPLING PLAN
AREA 2

EVENT	ANALYSIS	IP-2	MP-5d	MP-6d	MW-5	DUPLICATE
Baseline	TOC	X	X	X	X	IP-2
	EPA 8310	X	X	X	X	
	EPA 8020			X		
Midpoint	TOC	X	X	X	X	MP-6d
	EPA 8310	X	X	X	X	
	EPA 8020	X	X	X	X	
Endpoint	TOC	X	X	X	X	MP-5d
	EPA 8310	X	X	X	X	IP-2
	EPA 8020	X	X	X	X	

4.0 FEASIBILITY STUDY RESULTS

In this section the results of the Area 1 and Area 2 ozone injection feasibility studies are each discussed. The Area 1 feasibility study, which was conducted in the shallow, unsaturated soils, is discussed first in Section 2.1. The results of the feasibility study conducted in Area 2 in the saturated zone are presented in Section 2.2. The ozone generator, SVE system and the groundwater pump and treat system operational data is also discussed in these sections.

4.1 Area 1

4.1.1 Health and Safety Monitoring Results

Monitoring of ozone and VOC vapor concentrations for health and safety purposes was performed throughout the duration of the Area 1 pilot test, as described above in Sections 1.3 (Health and Safety Planning and 3.1.3 (Area 1 Health and Safety Monitoring). The results are summarized below, and on the field monitoring logs which, as previously mentioned, are included in Appendix E.

4.1.1.1 Ozone Monitoring

At the start of the Area 1 pilot test, before any ozone injection was performed, ambient ozone concentrations were measured at all monitoring locations to determine background concentrations. Background concentrations ranged up to 0.02 ppm. The action level for ozone in the Osmose building or in the breathing zone in the work area was therefore set at 0.07 ppm (0.05 ppm above background).

A portable ozone monitor equipped with an alarm was continuously operated inside the boiler room directly adjacent to Area 1. Daily work area monitoring was performed primarily with ozone gas detector tubes. Detector tubes were also used within the boiler room to verify the accuracy of the ozone monitor, which occasionally experienced fluctuations due to changes in temperature or humidity.

The ozone monitor registered concentrations above the action level within the boiler room on several occasions during the pilot test. However, these can be attributed to drift in the ozone monitor circuitry due to temperature and humidity variations as described above. On each occasion, confirmatory measurements taken with the gas detector tubes indicated that ozone concentrations were below the

action level, and recalibration of the ozone monitor circuitry was performed. Ozone concentrations in the breathing zone in the work area never exceeded action levels.

On two occasions during the Area 1 pilot test (June 7 and June 12), monitoring of the SVE effluent indicated that ozone breakthrough of the activated carbon filters was beginning to occur. The ozone generator was shut down on both occasions to allow repacking of the GAC canisters. Ozone concentrations in the breathing zone never exceeded action levels.

4.1.1.2 VOC Monitoring

Daily monitoring for VOC vapors was performed with a PID at five locations in the work area. The results confirmed that VOC concentrations remained below actions levels throughout the Area 1 pilot test.

4.1.2 Soil Sampling Results

The following three sections discuss the results of the baseline, midpoint and endpoint soil sampling events in Area 1. Results of the VOC, and PAH and TOC analyses are discussed independently.

4.1.2.1 Volatile Organic Compounds

The results of the baseline, midpoint, and endpoint soil sampling events at IP-1 and MP-3 are summarized in Table 4-1, below. As indicated in the table, no VOCs were detected in the soils by EPA Method 8020 during the baseline sampling event. After the baseline sampling results were reviewed, it was determined that soil samples during the midpoint and endpoint sampling events would still be analyzed for VOCs both to verify the baseline results and to verify that none of these volatile compounds were determined to be breakdown products of the ozonation of PAHs. The results of the midpoint and endpoint soil sampling also did not detect the presence of any VOCs.

TABLE 4-1
VOCS IN SOILS - AREA 1
EPA METHOD 8020 (ug/kg)

ANALYTE	IP-1			MP-3		
	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT
Benzene	<0.15	<0.05	<3.0	<1.2	<0.05	<0.05
Toluene	<0.38	<0.05	<5.0	<2.0	<0.05	<0.05
Ethylbenzene	<0.60	<0.10	<3.0	<1.2	<0.10	<0.10
Xylene (total)	<1.3	<0.20	<5.9	<2.4	<0.20	<0.20
Chlorobenzene	<0.15	<0.10	<3.0	<1.2	<0.10	<0.10
1,2-Dichlorobenzene	<0.30	<0.10	<5.0	<2.0	<0.10	<0.10
1,3-Dichlorobenzene	<0.30	<0.10	<5.0	<2.0	<0.10	<0.10
1,4-Dichlorobenzene	<0.30	<0.10	<5.0	<2.0	<0.10	<0.10
TOTAL VOLATILE	ND	ND	ND	ND	ND	ND

4.1.2.2 Polynuclear Aromatic Hydrocarbons

For the purposes of further discussion, the individual PAH analyses will be grouped into three categories:

- low complexity (C10 - C13)
- condensed (C-14 - C16)
- highly condensed (C18 - C22)

The laboratory analytical reports for the soil sampling events are included in Appendix F and are summarized in Table 4-2 below. As can be seen on the table, low concentrations of PAHs (i.e. below 473 ppm total PAHs) were detected during the baseline soil sampling event at all five locations (62.4 ppm at IP-1; 10.3 ppm at MP-1; 7.0 ppm at MP-2; 1.1 ppm at MP-3; and 6.6 ppm at MP-4) . The pilot test was continued to gain information on the ozonation process in unsaturated soils with favorable soil conditions.

Although some sampling variability did occur (which is attributed to composite sampling in a variable geology), locations IP-1, MP-1, MP-2 and MP-4 all showed a decrease in total PAHs. The average reduction in total PAHs was > 94% at these locations. At location MP-3, the results of the baseline sampling event appear to be anomalous i.e. they were the lowest of the three sampling events at that location. If the midpoint sampling results are used for calculations, a 94% reduction in total PAHs was measured a this location.

TABLE 4-2

PAHs IN SOILS

AREA 1

EPA Method 8310 (ug/kg)

	IP-1			MP-1			MP-2			MP-3			MP-4		
ANALYTE	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT
Naphthalene	<1500	<8700	<71	<1400	<8600	<740	<1500	<4600	<710	<1400	<8300	<770	140	<4400	<760
Acenaphthylene	<1900	<11200	<91	<1800	<11000	<950	<2000	<5900	<920	<1800	<10600	<990	<96	<5700	<980
1-Methylnaphthalene	16000	<8700	<71	2000	<8600	<740	<1500	<4600	<710	<1400	<8300	<770	<75	<4400	<760
2-Methylnaphthalene	28000	<8700	<71	3400	<8600	<740	<1500	<4600	<710	<1400	<8300	<770	<75	<4400	<760
Acenapthene	<1500	<8700	<71	<1400	<8600	<740	<1500	<4600	<710	<1400	<8300	<770	<75	<4400	<760
Fluorene	1700	<1000	<8.3	260	1200	<87	180	<540	<83	<170	<970	<90	87	<520	<89
Phenanthrene	12000	4200	<25	2700	9500	<260	1100	<1600	<250	<500	4800	330	230	<1500	<270
Anthracene	3300	<3200	<26	720	3400	<270	<560	<1700	<260	<520	5400	<280	910	<1600	<280
Fluoranthene	600	4500	9.0	400	5900	115	1600	1000	<83	290	7200	480	1100	1000	260
Pyrene	<220	2400	<11	<220	2800	<110	770	<690	<110	<210	5500	210	450	<660	140
Benzo{a}anthracene	160	1300	5.1	120	1600	42	610	280	22	130	2400	200	430	310	110
Chrysene	<120	1300	12	140	2000	64	580	420	<60	160	2100	220	620	<370	120
Benzo{b}fluoranthene	140	1100	5.0	150	1400	44	550	330	28	150	2200	240	610	360	130
Benzo{k}fluoranthene	48	520	2.1	53	640	19	230	130	12	69	960	99	280	160	53
Benzo{a}pyrene	120	930	4.2	130	1300	34	550	290	22	160	2300	240	590	270	130
Dibenzo{a,h}anthracene	<24	240	<1.2	<24	310	<12	54	<77	<12	<24	<140	24	56	<74	<13
Benzo{g,h,i}perylene	240	1300	7.1	170	1800	65	290	380	<30	<60	3500	190	530	420	170
Indeno{1,2,3-cd}pyrene	97	1500	7.3	74	1900	<17	480	450	<17	190	3100	<18	620	530	<18
TOTAL PAHs	62,405	19,290	51.8	10,317	33,750	383	6,994	3,280	84	1,149	39,460	2,233	6,653	3,050	1,113

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In Area 1, the low complexity PAHs that were detected consisted of:

- Naphthalene (C10),
- 1-Methylnaphthalene (C11),
- 2-Methylnaphthalene (C11), and
- Fluorene (C13).

A 100% reduction of low complexity PAHs was measured between the baseline and endpoint sampling events at all five sampling locations.

The condensed PAHs detected at Area 1 consisted of:

- Phenanthrene (C14),
- Anthracene (C14),
- Fluoranthene (C16), and
- Pyrene (C16).

At injection point IP-1 these condensed PAHs were reduced by >99%, at monitoring points MP-1, MP-2, MP-3 and MP-4 they were reduced by 96%, 100%, 95% and 86%, respectively. The combined average reduction of condensed PAHs for Area 1 was >95%.

The highly condensed PAHs which were detected in this area of the feasibility study included:

- Benzo{a}anthracene (C18),
- Chrysene (C18),
- Benzo{b}fluoranthene (C20),
- Benzo{k}fluoranthene (C20),
- Benzo{a}pyrene (C20),
- Dibenzo{a,h}anthracene (C22),
- Benzo{g,h,i}perylene, and
- Indeno{1,2,3-c,d}pyrene (C22).

At the injection point IP-1, as with the low and condensed PAHs, the highly condensed PAHs were reduced by >99%. Monitoring point MP-1 showed approximately 96% reduction of the highly condensed PAHs, while MP-2 showed a reduction of approximately 98%. Monitoring points MP-3 and MP-4 showed reductions of approximately 86% and 83%, respectively. The combined average reduction of the highly condensed PAHs at all the monitoring points in Area 1 was approximately 92%.

As can be seen on Table 4-3 below, distance from the IP did have an effect on the percent reduction of PAHs, however, an 83.3% reduction was measured at the furthest monitoring point. Areal distribution of

the monitoring points and the % reduction of PAHs is presented in Figure 4-1, Area 1 Percent Reduction of PAHs.

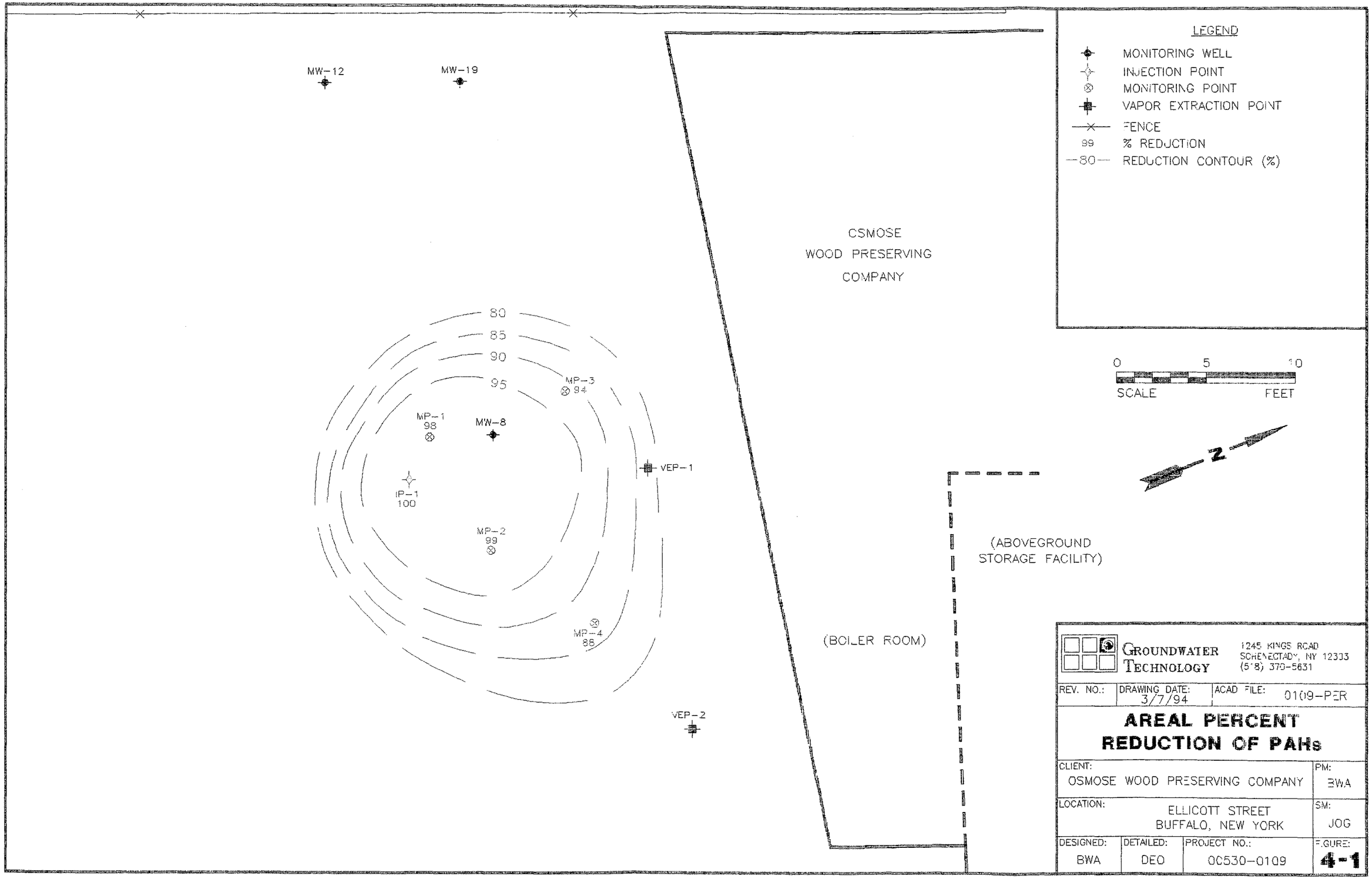
TABLE 4-3
PERCENT PAH REDUCTION VERSUS DISTANCE

LOCATION	DISTANCE FROM IP (feet)	%REDUCTION
IP-1	-----	99.9
MP-1	3'-0"	97.6
MP-2	5'-11"	98.8
MP-3	10'-1"	94.3
MP-4	13'-2"	83.3

At the monitoring points which showed a reduction in total PAHs between the baseline and midpoint sampling events (IP-1, MP-2, and MP-4) the average reduction was 59%. At these same three points, an average reduction in total PAHs of approximately 87% was seen between the midpoint and endpoint events. All five locations, however, showed a decrease in total PAHs between the midpoint and endpoint sampling events. The average reduction when all five locations are considered was 94%.

4.1.2.3 Total Organic Carbon

Presented in Table 4-4 below is a summary of the TOC in soils data collected during the Area 1 feasibility study. The results are graphically displaced on Figure 4-2. As can be seen, TOC in soils increased at all five locations between the baseline and midpoint sampling events. At three of these points (MP-1, MP-3, and MP-4) the TOC in soils continued to increase between the midpoint and endpoint sampling events. At the remaining two points, (IP-1 and MP-2) the TOC decreased between the midpoint and endpoint events. If the results from each monitoring point for each sampling event are averaged, the TOC increases over the three events (0.80, 1.66, 2.03).



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1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

REV. NO.:	DRAWING DATE: 3/7/94	ACAD FILE: 0109-PER

AREAL PERCENT REDUCTION OF PAHs

CLIENT: OSMOSE WOOD PRESERVING COMPANY			PM: BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK			SM: JOG
DESIGNED: BWA	DETAILED: DEO	PROJECT NO.: 00530-0109	FIGURE: 4-1

A high degree of variability is associated with TOC analysis of soils. The analysis, simply stated, combusts the organic materials in the soil and measures the amount of carbon dioxide in the off gas. Natural soil organic compounds can complicate TOC measurements by producing a response that can overwhelm the response due to anthropogenic compounds. A typical trend expected would be a decrease in TOC over time as the remediation progresses. The observed increase, although within the range of variability for the analysis, could have been the result of natural soil organic compounds which did not combust during the baseline analysis, but which after treatment with ozone were altered and were able to combust at the same temperature.

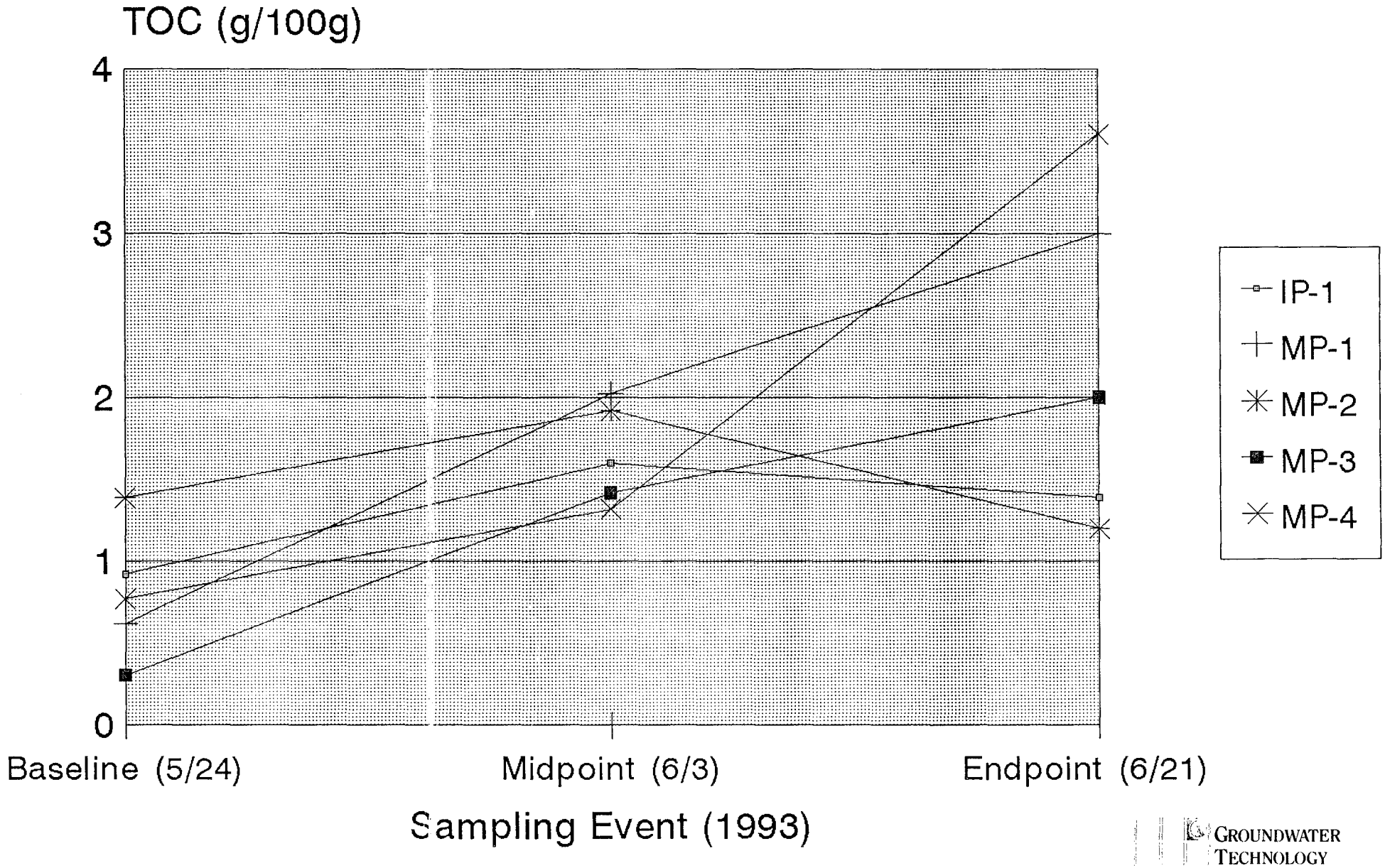
TABLE 4-4
TOC IN SOILS - AREA 1
(g/100g)

LOCATION	TOC		
	BASELINE	MIDPOINT	ENDPOINT
IP-1	0.92	1.60	0.35
MP-1	0.62	2.02	3.0
MP-2	1.39	1.92	1.2
MP-3	0.31	1.42	2.0
MP-4	0.77	1.32	3.6
METHOD BLANK		<0.03	
MP-3 DUP		1.38	
MP-2 DUP	3.70		
Range	0.31 - 3.70	1.32 - 2.02	0.35 - 3.6
Mean and Variability	1.3 +/- 1.1	1.6 +/- 0.27	2.0 +/- 1.2

4.1.3 Ozone Generator Operational Data

Presented in Table 4-5 below are the results of the daily monitoring of the ozone generator and injection system which are summarized from the daily Monitoring Forms included as Appendix E. Startup and optimization of the system occurred during the week of May 24- 28, 1993. During that time, both the flow rate and % ozone of the injection stream were increased incrementally, while monitoring occurred, until the generator was at maximum production.

Figure 4-2
TOC in Soils; Area 1



GROUNDWATER TECHNOLOGY

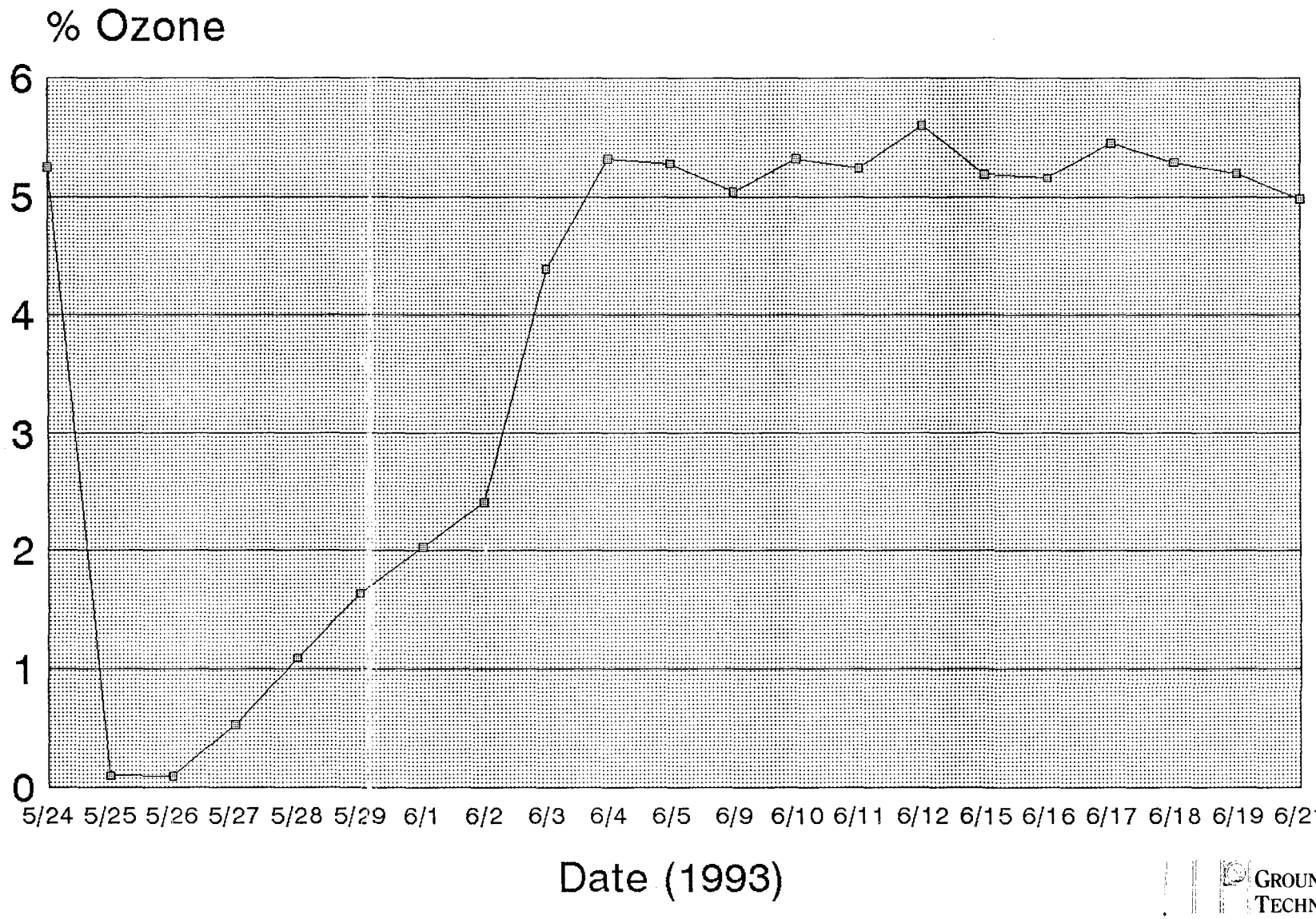
TABLE 4-5
OZONE INJECTION SYSTEM MONITORING DATA
AREA 1

DATE	AIR FLOW (cfm)	% OZONE	PRESSURE (psi)
05/24/93	2.52	5.25	8
05/25/93	1.53	0.1	11
05/26/93	1.47	0.094	11.5
05/27/93	1.47	0.53	11.5
05/28/93	1.88	1.09	9.5
05/29/93	3.18	1.63	10
06/01/93	3.12	2.03	7
06/02/93	3.1	2.41	7
06/03/93	2.82	4.39	8
06/04/93	3.06	5.32	7.5
06/05/93	2.94	5.28	8
06/09/93	3.06	5.04	6
06/10/93	3.06	5.32	7
06/11/93	3	5.24	7
06/12/93	2.94	5.6	8
06/15/93	3.12	5.19	8
06/16/93	3.06	5.16	8
06/17/93	3.12	5.45	8.5
06/18/93	3.12	5.29	7
06/19/93	2.94	5.2	9
06/21/93	2.94	4.98	9

The average injection flow rate during the entire feasibility study was 2.74 cfm with an average of 3.84% ozone in the injection gas. The injection pressure of the ozone gas typically ranged between 6-8 psi during the feasibility study.

Included as Figure 4-3, % Ozone Injected -vs- Time; Area 1, is a graph of the concentration of ozone injected during the Area 1 study. As the graph shows, by June 3, 1993 the injection system was incremental optimized and the ozone was maintained at approximately 5% in the injection gas.

Figure 4-3
% Ozone Injected vs. Time
Area 1



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The flow rate of the injection gas versus time is graphically depicted in Figure 4-4. Again, the graph shows that once the system was optimized an average injection rate was maintained at approximately 3 cfm.

Based upon the measured flow rates and % ozone readings, a total of approximately 394 lbs of ozone was injected into the subsurface during the Area 1 feasibility study. Of this total, approximately 72.5 lbs. was injected from start-up to the midpoint sampling, and 321.5 lbs. were injected between the midpoint and endpoint sampling events. This increase in ozone injected during the second half of the Area 1 feasibility study may account for the increase in percent reduction of total PAHs during the same time period when compared to the first half of the study (baseline to midpoint sampling events).

4.1.4 SVE System Operational Data

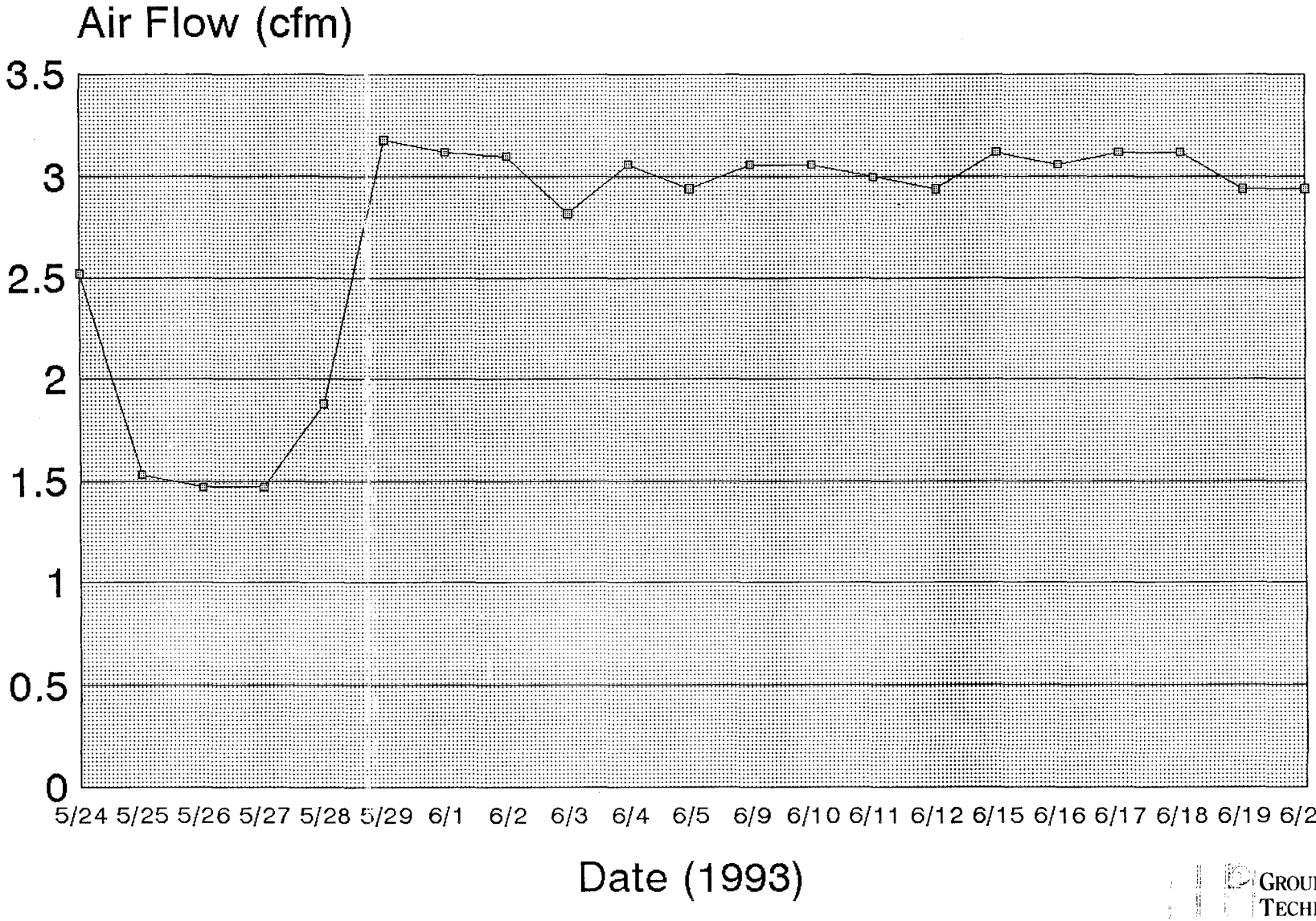
Presented in Table 4-6 below are the results of the daily monitoring of the SVE system which has been summarized from the Monitoring Forms. As previously mentioned, the forms are included in Appendix E.

Startup of the SVE system occurred on May 24, 1993, prior to the startup of the ozone generator. The SVE system was operated at an average flow rate of approximately 85 cfm at a vacuum of 33 inches of water ("H_2O) during the duration of the Area 1 feasibility study. Vacuum reading at the four monitoring points (MP-1, MP-2, MP-3, and MP-4) and four stainless steel vapor monitoring probes (VMP-5, VMP-6, VMP-7 and VMP-8) were recorded daily on the monitoring logs. Review of these forms show that the flow rate and pressure was sufficient to maintain a vacuum in the subsurface at these points ranging from 0.005 to 0.06 "H_2O. This insured that all unreacted ozone vapors were captured by the SVE system and treated with vapor phase GAC.

Included below is Figure 4-5, Ozone Removed by SVE; Area 1, which graphically summarizes the monitoring results from the daily SVE influent monitoring. It can be seen that once the ozone injection system was optimized (after the first week of operation), the study area was flooded with ozone until an excess of ozone existed. Maintaining an excess of ozone insured that optimum conditions existed for oxidation to occur. This condition existed primarily during the second half of the Area 1 feasibility study.

Based upon mass balance calculations, approximately 43 pounds of ozone was removed by the SVE system during the Area 1 feasibility study; primarily during the second half of the study once injection rates and % ozone were maximized.

Figure 4-4
Injection Flow Rate vs. Time
Area 1



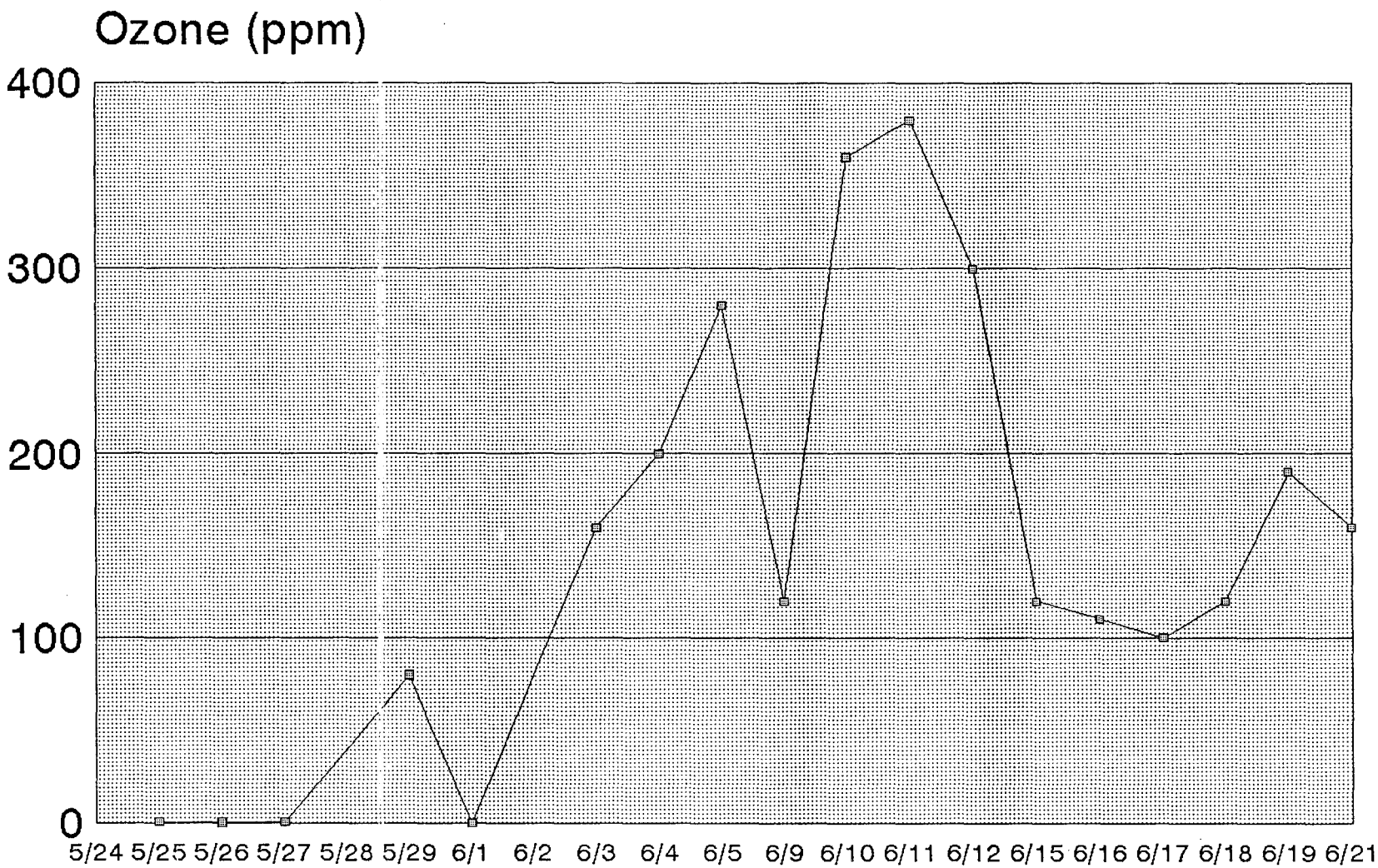
GROUNDWATER TECHNOLOGY

TABLE 4-6
SVE SYSTEM OPERATIONAL DATA
AREA 1

Date	Total Flow Rate (cfm)	Ozone (ppm)		PID (ppm)		CO_2 (ppm)	
		Before GAC	After GAC	Before GAC	After GAC	Before GAC	After GAC
5/24/93	85	--	--	--	0	--	--
5/25/93	87	0.6	0	0	0	--	--
5/26/93	80	0.5	0	--	0	--	--
5/27/93	80	>0.7	0	--	0	--	--
5/28/93	85	--	--	--	4	--	--
5/29/93	77	80	0	170	0	150	150
6/1/93	77	0	0	110	0	200	200
6/2/93	76	--	0	110	0	300	300
6/3/93	76	160	0	30	0	300	300
6/4/93	76	200	0	70	0	300	300
6/5/93	76	280	0	10	0	800	1000
6/9/93	100	120	0	--	--	800	800
6/10/93	95	360	0	3	0	900	900
6/11/93	99	380	0	0	0	800	800
6/12/93	99	300	240	0	0	300	240
6/15/93	87	120	0	3	0	300	300
6/16/93	85	110	0	12	0	150	150
6/17/93	87	100	0	0	0	150	150
6/18/93	90	120	0	20	0	150	150
6/19/93	90	190	0	15	0	300	300
6/21/93	86	160	50	20	0	250	250

As seen in Table 4-6, the vapor phase GAC was successful at destructing the ozone vapors in the SVE system stream prior to discharge. During the 21 day feasibility study, the GAC removed ozone levels in the air stream to non-detectable levels during all but two monitoring events. When measurable concentrations were detected, ozone injection was temporarily suspended and the vapor GAC canister was immediately repacked.

Figure 4-5
Ozone Removed by SVE
Area 1



GROUNDWATER TECHNOLOGY

PID readings were also recorded for both the air influent to the SVE system and in the effluent after the vapor GAC treatment. Figure 4-6, VOCs In SVE System; Before GAC, presents a summary of the monitoring results in graphic form. VOCs were not detected in the influent during the initial monitoring event prior to maximizing the ozone injection rates. The absence of VOCs during initial startup is consistent with the laboratory results (EPA Method 8020) from the baseline soil sampling in the Area 1 study area.

The measured concentrations of VOCs increased during the beginning of the second week of the feasibility study, tapering off through the week and remaining low to non-detectable for the remainder of the study. Given that the laboratory data from soils for Area 1 did not detect any adsorbed volatiles during any of the feasibility study sampling events, and the initial non-detectable VOC readings in the SVE influent, the increase in VOCs can be attributed to either:

- The injected ozone liberated existing adsorbed volatile compounds associated with the low distillation end of the brushing grade creosote or fuel oil which were either not target analytes or were not detected by the EPA Method 8020 analysis performed on any of the soil samples during the study;
- Volatile analytes not included on the EPA Method 8020 list were breakdown products of the PAHs and were detected in the SVE influent stream by the field PID; or
- The SVE captured vapors from outside the area where the soil samples were obtained. As can be seen from Figure 2-4, the SVE ROI extended beyond the soil sampling locations.

A composite soil sample collected during the installation of monitoring wells MW-2, MW-3 and MW-4 during the initial site assessment and analyzed on July 6, 1989 for the expanded list of VOCs by EPA Method 8240 did not detect any VOCs which would not appear on the EPA Method 8020 reports, with the exception of Styrene, which was considered a laboratory artifact. During the subsequent installation of monitoring well MW-8, however in October, 1990, miscellaneous aromatic hydrocarbons (C8-C10) were reported at 49 ppm in the soil sample collected from 2-4 feet below grade.

Figure 4-6
VOCs in SVE; Before GAC
Area 1

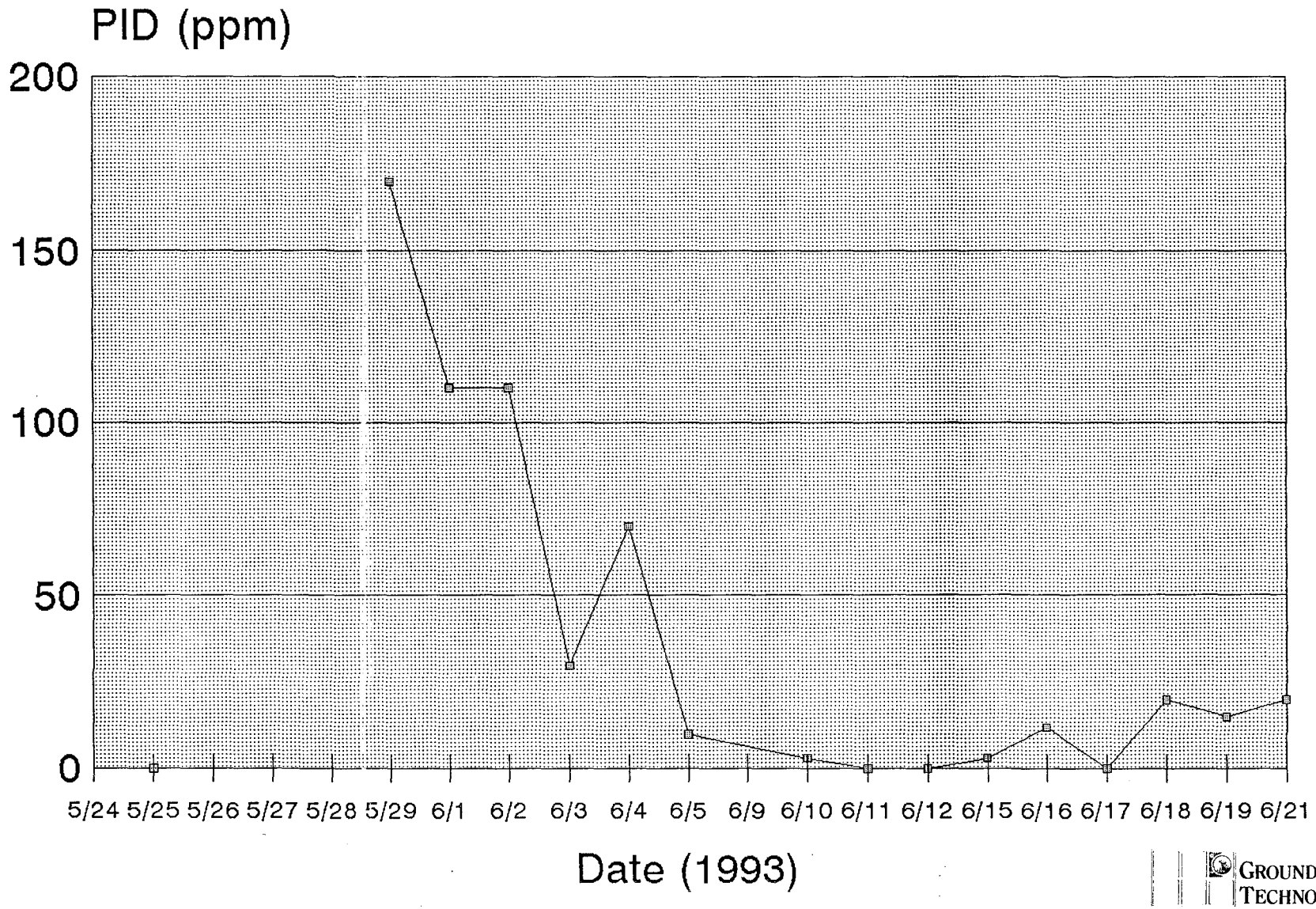


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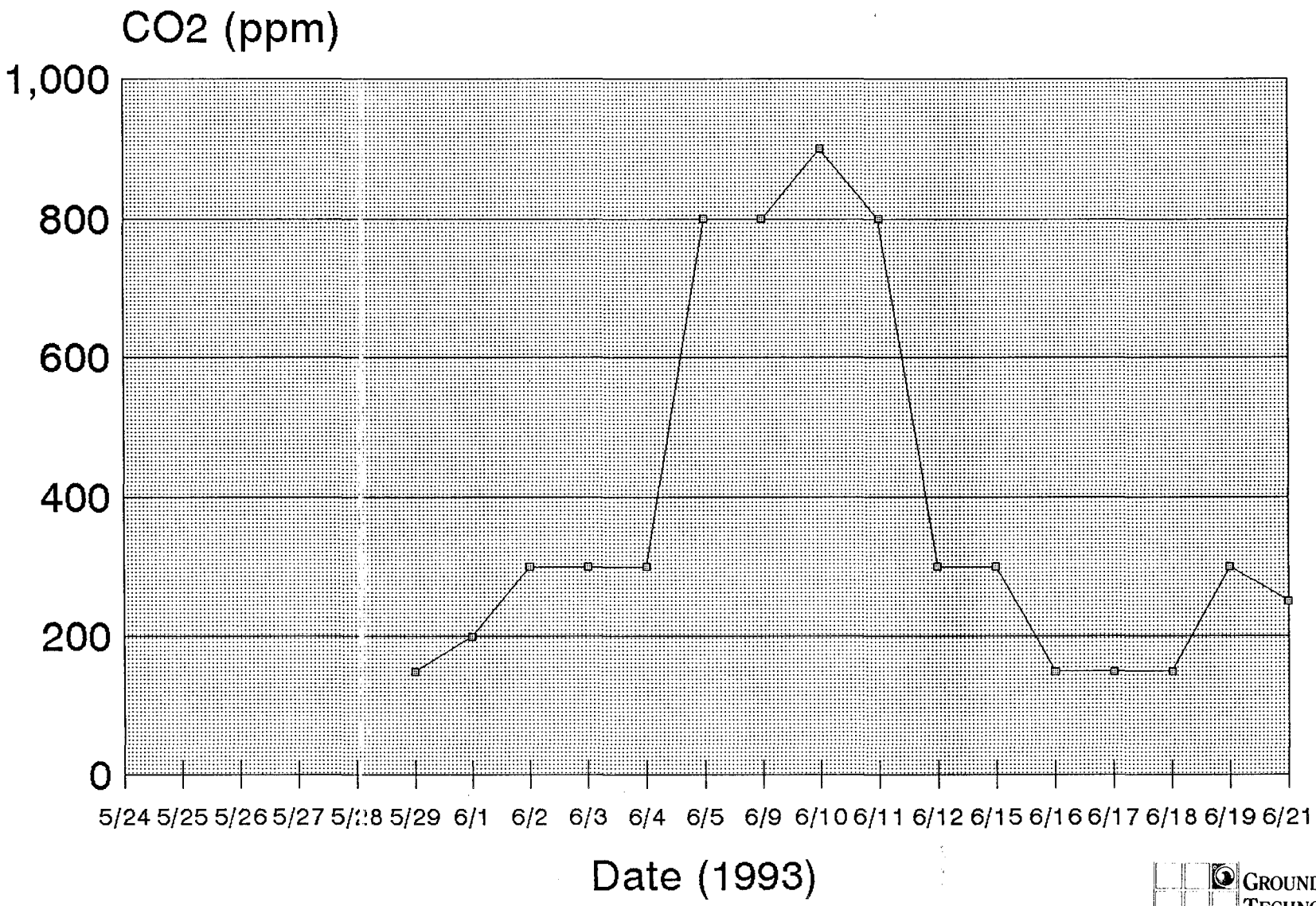
Figure 4-7
Carbon Dioxide in SVE; Before GAC
Area 1



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Carbon dioxide (CO_2) concentrations were also collected during the Area 1 feasibility study in the influent to the SVE system and in the effluent after the vapor GAC treatment. Figure 4-7, Carbon Dioxide in SVE System; Before GAC, presents a summary of the monitoring results in graphic form. As can be seen, the CO_2 concentrations in the extracted soil gas increased at the same time the ozone and PID reading increased.

Carbon dioxide data does not exist for the first week of operation, however, it is expected that the CO_2 would oxidize the natural organic material in the soils first (easiest to oxidize). The increase in the CO_2 measured in the SVE influent is therefore due both to the increase in ozone injected into the subsurface and the subsequent increased oxidation rates of the natural organics and PAHs. After the natural organics are oxidized, it would be expected that both the rate of reaction, and therefore CO_2 measured, would decrease. Also, based upon the PAH soil data presented in Table 4-2, it appears that the decrease in CO_2 during the second half of the Area 1 study was also related to the reduction of PAHs remaining in the soils to be oxidized.

4.1.5 PAH Destruction Kinetics

The ozone dose required to treat the impacted soil was estimated conservatively by assuming the ozone will mineralize both PAHs and humic acid in the soil. Ozone requirements for mineralization are 2.96 lb/lb PAH and 1.52 lb/lb humic acid, assuming empirical formulas for PAH and humic acid of $CH_{0.7}$ and $CHO_{0.5}$ respectively. Soil concentrations of 0.1% PAH (x_{PAH}) and 0.5% humic acid ($x_{humic\ acid}$) and a dry soil bulk density (p_b) of 120 lb/ft^3 are assumed. It was estimated that enough ozone would be injected to achieve remediation over a 5 foot radius (r) cylinder of height (h) 4 feet within a treatment time (t) of 30 days.

Based upon the ozone injection rates (Section 4.1.3) a total of 394 pounds of ozone was injected into the subsurface in Area 1. The SVS system extracted approximately 43 pounds of ozone (Section 4.1.4), therefore, approximately 351 pounds of ozone reacted in the subsurface.

Initial soil sampling results indicated that approximately 5 to 25 lbs of PAHs were associated with Area 1 soils prior to ozone injection, along with approximately 150 to 1000 lbs of natural soil organic compounds. Midpoint sampling results indicated that similar amounts of PAHs were still present in Area 1 at that time. Endpoint sampling results concluded that approximately 0.25 to 1.5 lbs of PAHs were remaining in Area 1 at the conclusion of the ozone injection period.

During the first half of the Area 1 injection testing, mass balance calculations estimated 72.5 lbs of ozone was injected and 6 lbs of ozone was extracted through the SVE system. Based on the sampling results indicating little reduction in PAHs during this period, it is assumed that most of the 66.5 lbs of ozone injected but not recovered were utilized by naturally occurring organic compounds (other than PAHs) within the soils. If 10% of the soil organic compounds were consumed by ozone during the first half of the test (representing the portion most easily degraded by ozone), that would mean 15 to 100 pounds of soil organics were destroyed.

During the second half of the Area 1 injection testing, 321.5 lbs of ozone was injected and 37 lbs of ozone was extracted through the SVE system. Based on the 4 to 24 lb reduction in PAH mass from Area 1 during this period, it is assumed that a significant portion of the 284.5 lbs of ozone was utilized to destroy the PAHs.

When the mass of both soil organic compounds and PAHs which were consumed is considered, an overall ozone efficiency of between 15% and 70% is obtained. It is clear that the ability of the ozone to attack PAH compounds is highly dependent on the concentration and composition of the natural soil organic compounds, which represent a substantial sink for injected ozone. Once the reactive soil organics have been consumed, the rate of destruction of the PAH compounds increases significantly.

4.2 Area 2

4.2.1 Health and Safety Monitoring Results

Monitoring of ozone and VOC vapor concentrations for health and safety was performed throughout the duration of the Area 2 pilot test, as described above in Sections 1.3 (Health and Safety Planning) and 3.2.3 (Health and Safety Monitoring; Area 2). The results are summarized below, and the detailed results are contained on the field logs in Appendix E.

4.2.1.1 Ozone Monitoring

At the start of the Area 2 pilot test, before any ozone injection was performed, ambient ozone concentrations were measured at all monitoring locations to determine background concentrations. Background concentrations ranged up to 0.02 ppm. The action level for ozone in the Osmose building or in the breathing zone in the work area was therefore set at 0.07 ppm (0.05 ppm above background).

A portable ozone monitor equipped with an alarm was continuously operated inside the lower level of the Osmose building directly adjacent to Area 2. Daily work area monitoring was performed primarily

with ozone gas detector tubes. Detector tubes were also used within the Osmose building to verify the accuracy of the ozone monitor.

The ozone monitor did not register any concentrations above the action level within the Osmose building during the Area 2 pilot test. The calibration problems experienced during the Area 1 pilot test were not observed during the Area 2 test, a fact which can be attributed to the controlled environment within the portion of the Osmose building adjacent to Area 2.

On September 17, an ozone concentration of 0.2 ppm was measured in the work area following adjustments to the SVE system. The ozone generator was shut down until readjustments could be made to restore the SVE system to full effectiveness. The ozone generator was restarted on September 21.

On two occasions during the Area 2 pilot test (September 8 and September 22), monitoring of the SVE effluent indicated that ozone breakthrough of the activated carbon filters was beginning to occur. The ozone generator was shut down on September 8 to allow repacking of the carbon drums, then restarted. Repacking was not effective on September 22, so the ozone influent concentration was reduced until effluent levels were below the action level. The ozone influent concentration was raised back to normal levels on September 29, after the installation of a second carbon filter on the effluent.

Ozone monitoring performed at the storm sewer grate, the sewer line cleanout, and the telephone conduit road box confirmed that those utilities were not impacted by ozone vapors during the Area 2 pilot test.

4.2.1.2 VOC Monitoring

Daily monitoring for VOC vapors was performed with a PID at five locations in the work area. The results confirmed that VOC concentrations remained below action levels throughout the Area 2 pilot test.

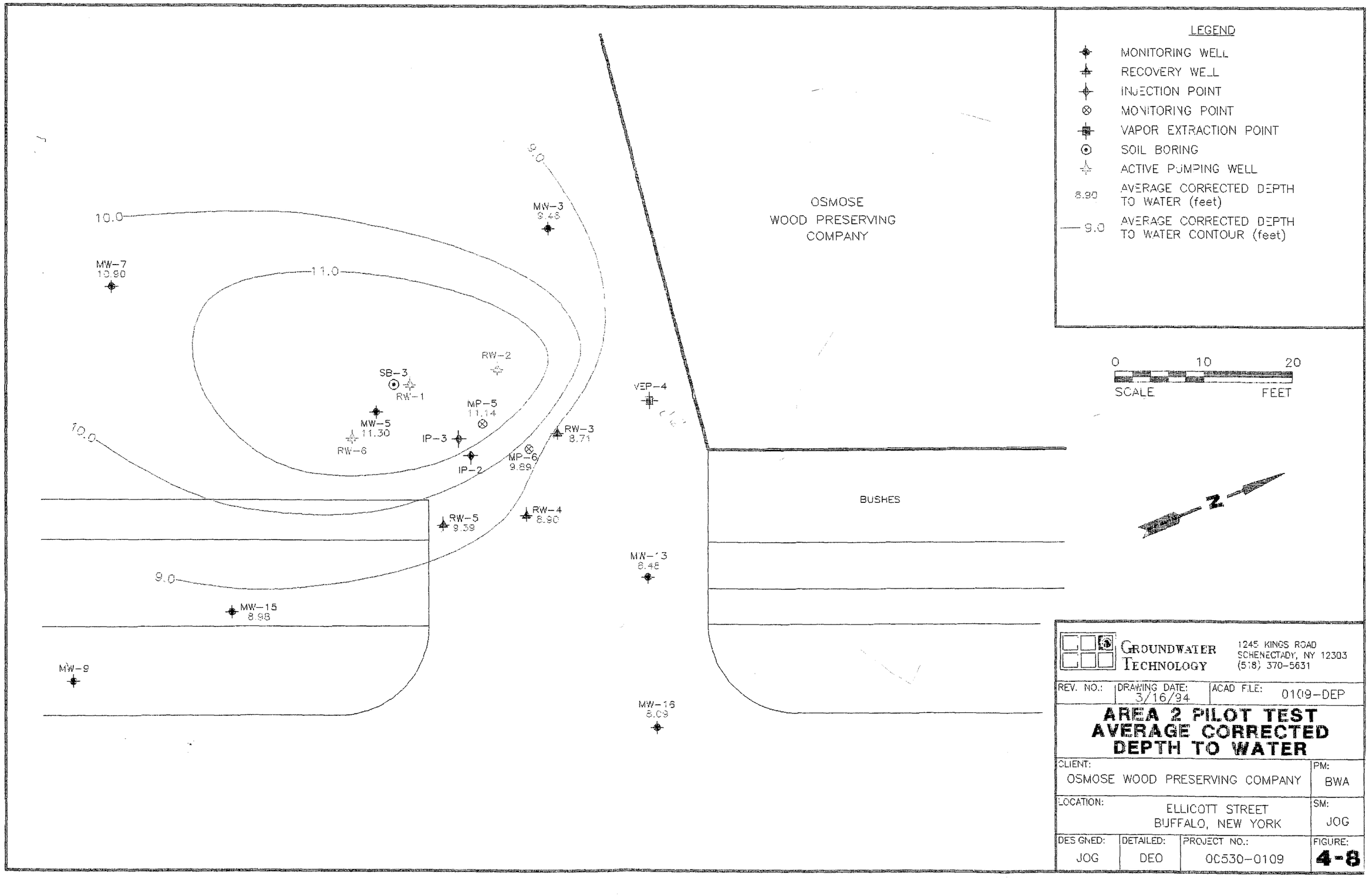
4.2.2 Aquifer Dewatering

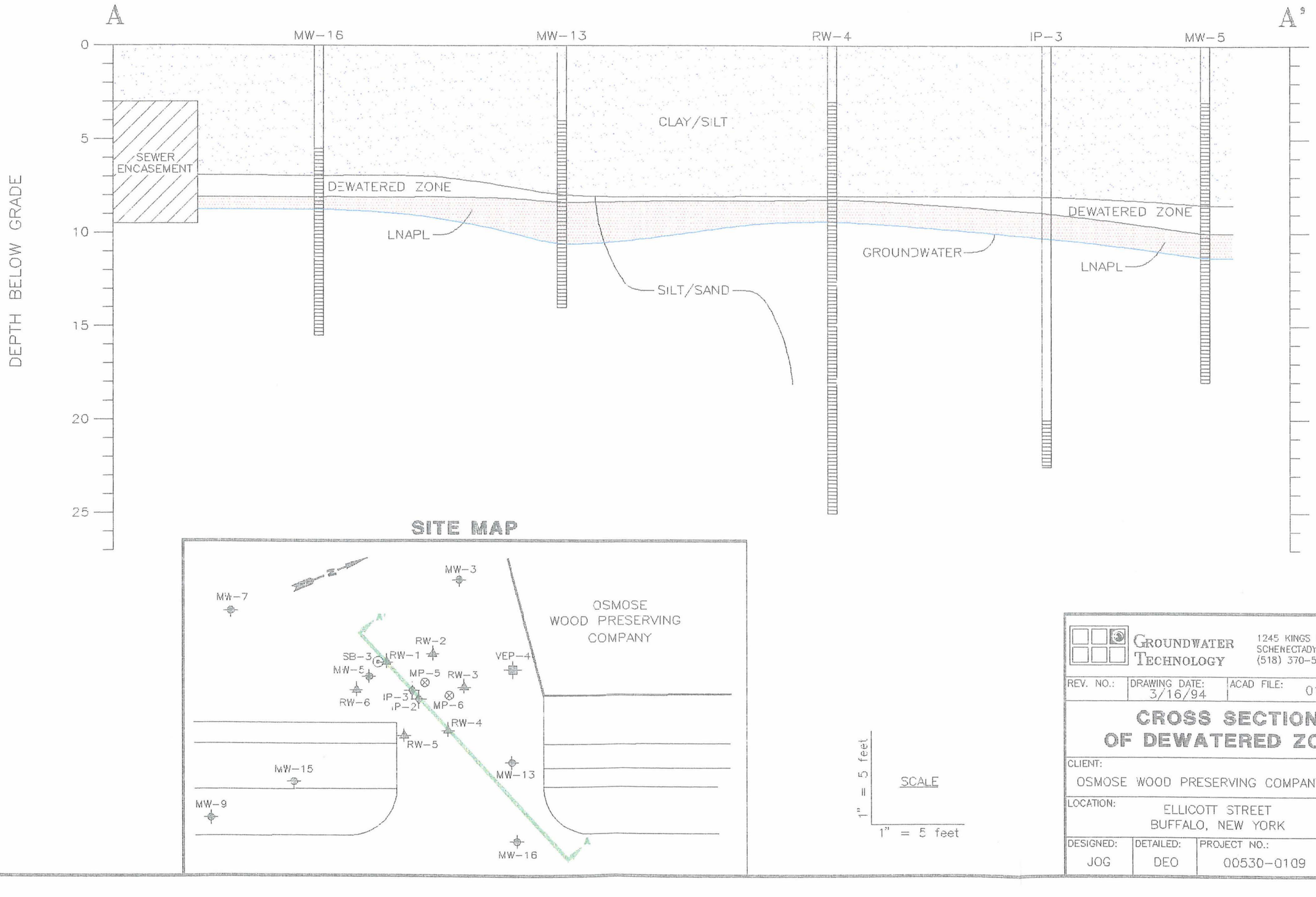
4.2.2.1 Water Table Depression

Dewatering of the Area 2 test site was performed as described above in Section 3.2.3, in order to create a pocket beneath the clay layer from which to ventilate excess ozone that might accumulate in the subsurface. Weekly groundwater gauging was performed to verify that the water table depression

created by the pumping system was adequate to sustain a dewatered pocket, but not so great as to allow LNAPL to migrate beneath the sewer system along Ellicott Street.

The groundwater gauging data from the Monitoring Logs has been summarized in the Groundwater Gauging Data Summary Table which is included in Appendix G. The historical depth to water of approximately 8 feet in Area 2 was lowered by more than three feet across the test area. Figure 4-8, Average Corrected Depth to Groundwater, depicts the average corrected depth to water in Area 2 during the pilot test.


LEGEND
MONITORING WELL
RECOVERY WELL
INJECTION POINT
MONITORING POINT
VAPOR EXTRACTION POINT
SOIL BORING
ACTIVE PUMPING WELL
8.90 AVERAGE CORRECTED DEPTH TO WATER (feet)
9.0 AVERAGE CORRECTED DEPTH TO WATER CONTOUR (feet)
OSMOSE
WOOD PRESERVING
COMPANY
BUSHES
0 10 20
SCALE FEET
MW-3 9.45
MW-7 10.90
MW-5 11.30
RW-6
SB-3
RW-1
RW-2
MP-5 11.14
IP-3
IP-2
MP-6 9.89
RW-3 8.71
VEP-4
RW-5 9.39
RW-4 8.90
MW-13 8.46
MW-15 8.98
MW-9
MW-16 8.09
10.0
11.0
9.0
GROUNDWATER TECHNOLOGY
1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631
REV. NO.:
DRAWING DATE: 3/16/94
ACAD FILE: 0109-DEP
AREA 2 PILOT TEST
AVERAGE CORRECTED
DEPTH TO WATER
CLIENT: OSMOSE WOOD PRESERVING COMPANY
PM: BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK
SM: JOG
DESIGNED: JOG
DETAILED: DEO
PROJECT NO.: 0C530-0109
FIGURE: 4-8



SITE MAP

GROUNDWATER TECHNOLOGY
1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

REV. NO.:	DRAWING DATE:	ACAD FILE:
	3/16/94	0109-XA

CROSS SECTION OF DEWATERED ZONE

CLIENT:	PM:
OSMOSE WOOD PRESERVING COMPANY	BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK	SM: JOG

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
JOG	DEO	00530-0109	4-9

The average drawdown at each location was calculated and used to create a cross section depicting the dewatered zone beneath the clay layer, as well as the location of the sewer line and the average LNAPL thickness. This is included as Figure 4-9. As can be seen in the cross section, a dewatered pocket was maintained beneath the clay layer without lowering the groundwater/LNAPL interface below the bottom of the sewer line.

4.2.2.2 LNAPL Hydrocarbons

The need to lower the water table to create a dewatered zone had the side effect of attracting LNAPL into the test area. The influx of LNAPL created a number of complications for the Area 2 study which are discussed throughout the following sections.

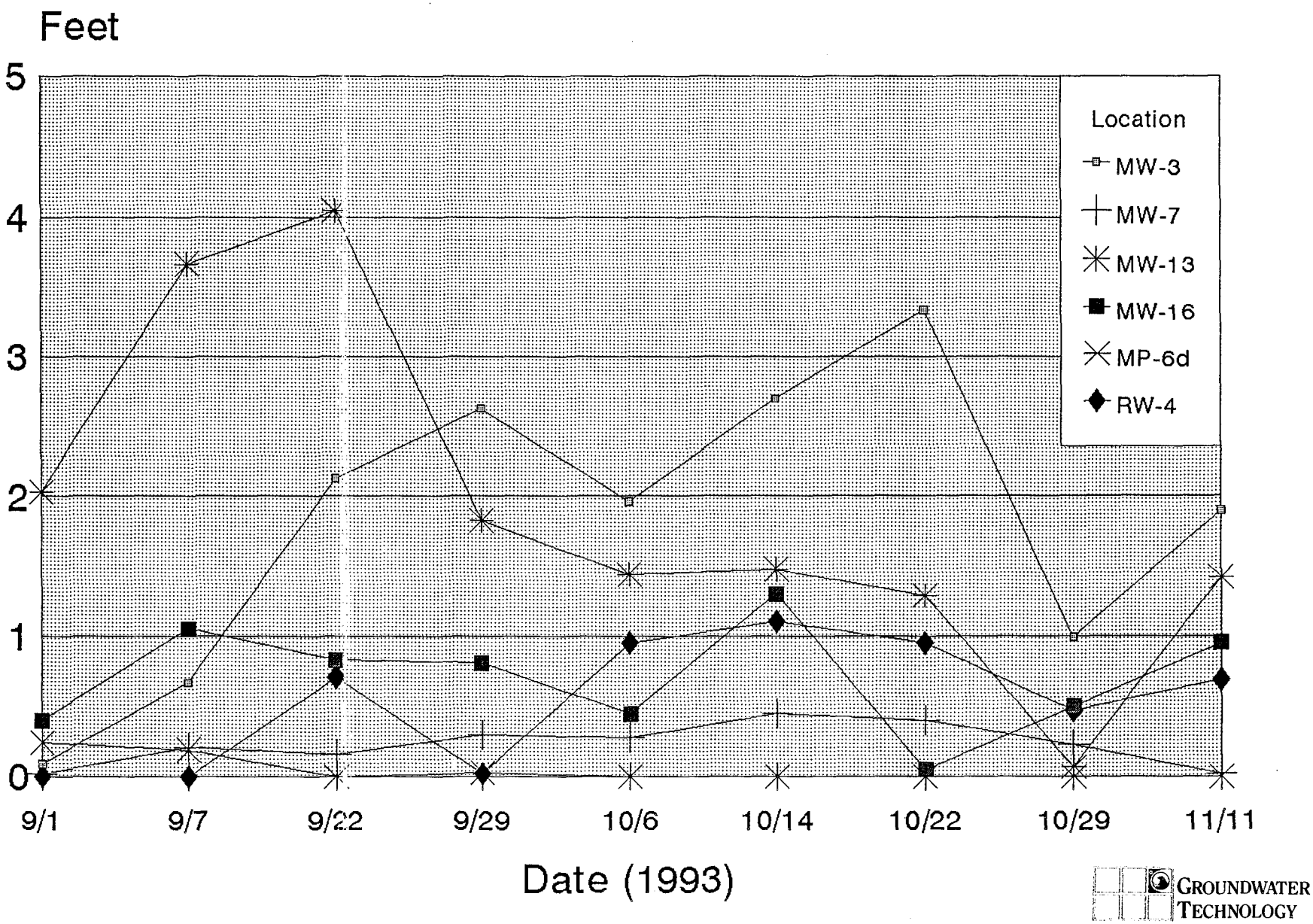
During the weekly groundwater gauging which was performed for the duration of the Area 2 pilot test, floating sheens to measurable LNAPL thicknesses were recorded at each well within Area 2 (Appendix E, Monitoring Logs). All twelve of the Area 2 monitoring wells which were part of the gauging program contained at least an LNAPL sheen at some point during the pilot test. Included in Appendix G, along with the gauging data, is a Product Thickness Summary Table. The trends at six selected monitoring wells during the Area 2 pilot test are presented below in Figure 4-10.

Monitoring well MW-15 possessed a petroleum sheen only once during the study, indicating that the area to the southeast of the test area was relatively free of residual LNAPL. The presence of a petroleum sheen was not verified by the use of an acrylic bailor. Monitoring well MW-7, located southwest of the test area, slowly developed greater thicknesses of LNAPL during the pilot test, but thicknesses remained less than 0.5 feet.

Monitoring well MW-5 also remained virtually free of LNAPL during the pilot test (here again, only one day where a sheen was detected with the electric interface probe but not confirmed with an acrylic bailor), which was expected since it was located between two of the pumping wells (RW-1 and RW-6). The cones of depression created by the adjacent pumping wells would have drawn any nearby LNAPL away from MW-5.

The majority of the LNAPL measured during the Area 2 pilot test was contained in monitoring wells MW-3, MW-13, MW-16, RW-4, and RW-5, all of which are located north and east of the test area. Early in the Area 2 pilot test, the greatest thicknesses were found in MW-13 and MW-16, located in the driveway connecting the parking lot to Ellicott Street. Nearby wells RW-4 and RW-5 were free of LNAPL for the first two to three weeks of pumping. Subsequently, significant thickness of more than a foot developed

Figure 4-10
LNAPL Thicknesses



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in RW-4 and RW-5, indicating that the LNAPL was migrating toward the test area from the direction of Ellicott Street. LNAPL thicknesses also increased significantly during the Area 2 pilot test within MW-3, located northwest of the test area near the southern edge of the Osmose building. The maximum LNAPL thickness measured at each monitoring well in this area over the entire duration of the feasibility study is presented in Appendix H. The figure supports the statement that LNAPL was probably migrating into the study area from the direction of Ellicott Street, or in the direction of the Osmose facility.

Despite the data described above that indicate an influx of LNAPL into the test area from the direction of Ellicott Street as the pilot test progressed, monitoring wells MP-5d and MP-6d never developed significant LNAPL thicknesses. In fact, the LNAPL that was initially present in MP-6d had dissipated by the sixth week of the test. Since both these wells were within 9 feet of the injection point, this suggests that the ozone process appears to mitigate the LNAPL in the vicinity of the injection point. This may be the result of oxidation or physical displacement due to groundwater mounding in the vicinity of the ozone injection point.

After the weekly gaugings were conducted, LNAPL was removed from the wells possessing measurable thicknesses. A total of 18 gallons of LNAPL was removed from the subsurface during the Area 2 pilot test.

4.2.3 Pumping System Operational Data

The groundwater pumping system consisted of pneumatic pumps deployed in three recovery wells, as described in Section 3.2.3. Groundwater was pumped into a holding tank, which acted as an oil/water separator, then pumped by a transfer pump through two activated carbon units before discharge into the sewer system under permit with the BSA (Section 1.6). Daily monitoring of the pumping system was performed to ensure that all components were operating properly. From system start up on August 21 through shut down on October 22, approximately 32,500 gallons of groundwater were extracted and treated, corresponding to an average total flow rate of 0.36 gpm.

4.2.4 Ozone Generator Operational Data

Presented in Table 4-7 below are the results of the daily monitoring of the ozone generator and injection system which are summarized from the daily Monitoring Forms included as Appendix E. Start-up of the system occurred on September 3, 1993.

TABLE 4-7
OZONE INJECTION SYSTEM MONITORING DATA
AREA 2

DATE	AIR FLOW (cfm)	% OZONE	PRESSURE (psi)
9/3/93	3.0	4.29	7
9/4/93	2.8	5.1	7
9/7/93	3.0	5.5	8
9/8/93	3.1	5.2	7.5
9/9/93	3.1	5.4	7.5
9/10/93	2.9	5.1	8
9/11/93	2.9	5.4	8
9/13/93	3.0	4.9	8
9/14/93	3.1	4.9	7.5
9/15/93	2.9	4.7	7.5
9/16/93	2.9	5.2	8
9/17/93	3.0	5.2	8
9/21/93	3.1	0.07	8
9/22/93	2.9	0.07	8
9/23/93	3.1	0.09	8
9/24/93	2.9	0.09	8
9/25/93	2.9	0.1	8
9/27/93	3.1	0.1	8
9/28/93	3.2	0.09	8
9/29/93	2.9	5.1	8
9/30/93	3.1	5.4	8
10/1/93	3.0	4.7	8
10/2/93	3.0	5.1	8
10/4/93	2.9	4.8	8.5
10/5/93	2.9	4.8	8
10/6/93	3.1	5.1	8
10/7/93	3.1	4.6	8
10/8/93	3.0	4.7	8.5
10/9/93	2.9	4.9	8
10/11/93	3.1	5.1	8
10/12/93	3.2	4.9	8.5
10/13/93	2.9	5.1	9
10/14/93	2.9	5.4	8
10/15/93	2.9	5.1	8
10/16/93	2.9	4.8	8
10/18/93	2.9	5.3	9
10/19/93	3.0	4.9	9
10/20/93	2.9	5.3	9
10/21/93	2.9	4.6	9.5
10/22/93	2.9	5.1	9

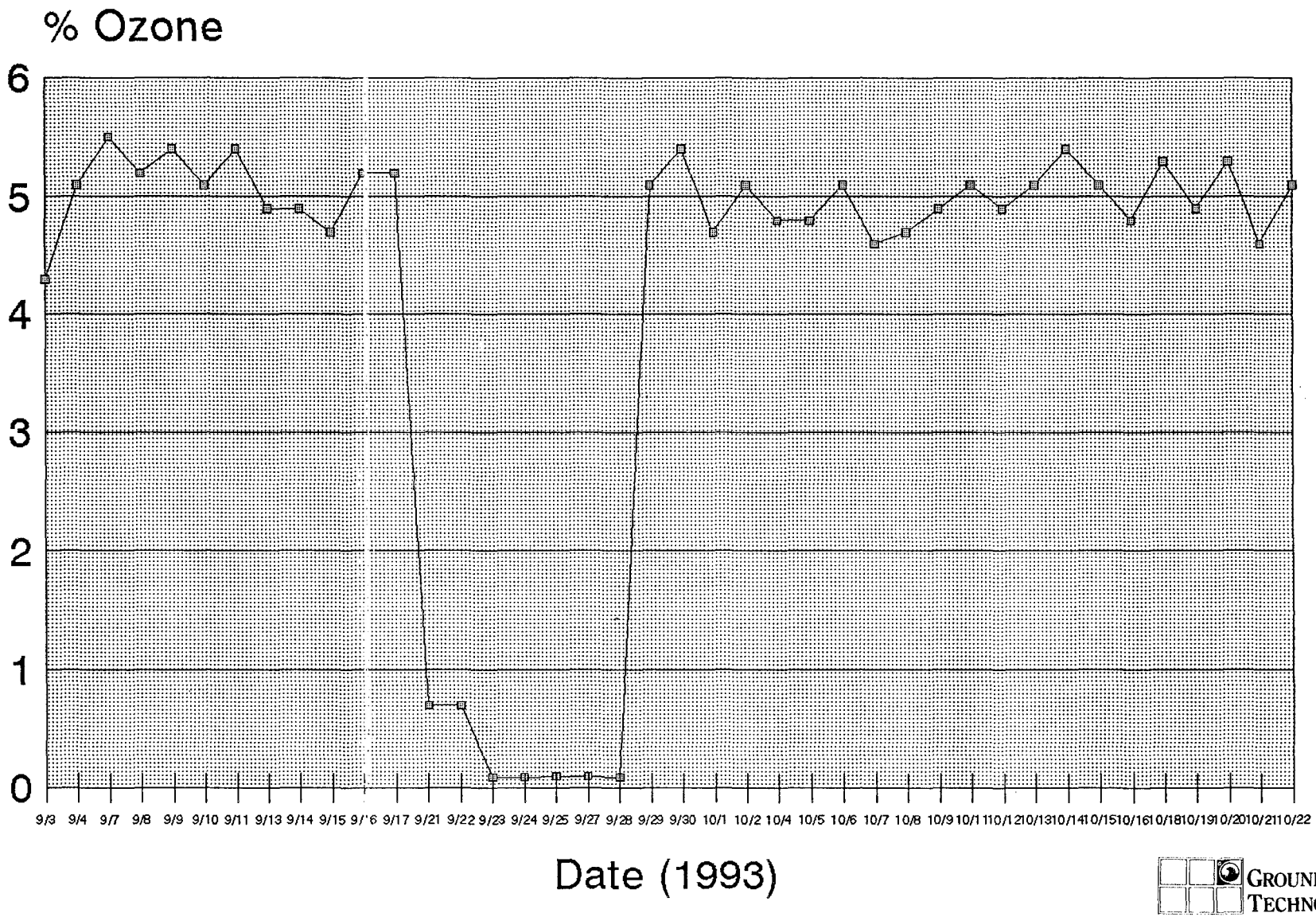
The average injection flow rate during the entire feasibility study in Area 2 was 2.98 cfm with an average of 3.90% ozone in the injection gas. The injection pressure of the ozone gas typically ranged between 8-9 psi during the feasibility study.

Included as Figure 4-11, % Ozone Injected-vs-Time; Area 2, is a graph of the concentration of ozone injected during the Area 2 study.

The flow rate of the injection gas versus time is graphically depicted in Figure 4-12.

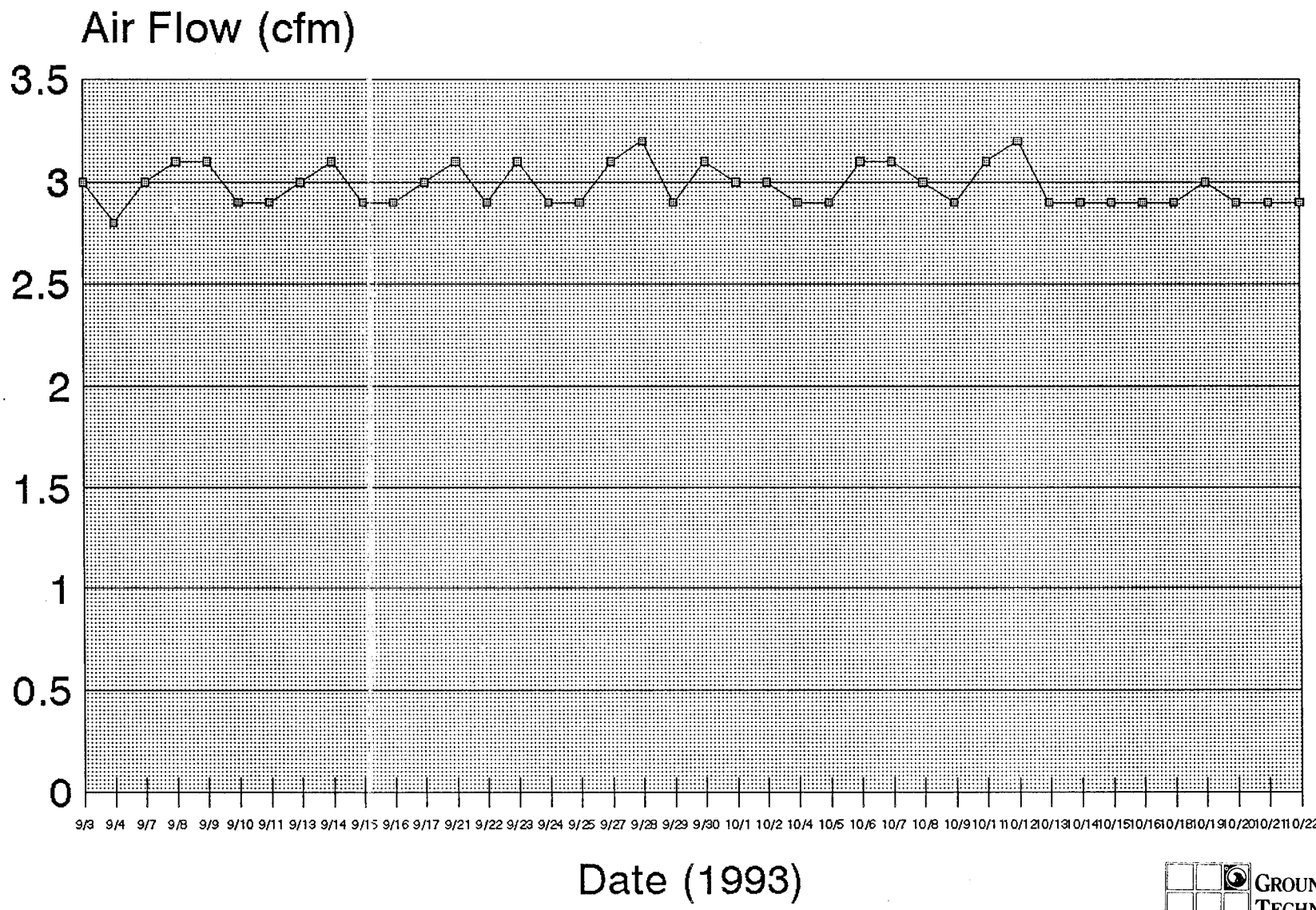
Based upon the measured flow rates and % ozone readings, a total of 674 lbs of ozone was injected into the subsurface during the Area 2 feasibility study.

Figure 4-11
% Ozone Injected vs. Time
Area 2



GROUNDWATER TECHNOLOGY

Figure 4-12
Injection Flow Rate vs. Time
Area 2



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Based upon daily monitoring, the SVE System extracted ozone during the pilot study. Measurements of ozone concentrations and SVE flowrates were collected during the daily monitoring activities. Based on theses measurements a total of 115 lbs of ozone were removed by the SVE System during the Area 2 feasibility study.

Based on injection rates and SVE removal rates a total of 674 lbs of ozone reacted in the subsurface during the Area 2 feasibility study. Of this total, approximately 258 lbs reacted from start-up to the midpoint sampling, and 416 lbs reacted between the midpoint and endpoint sampling events.

4.2.5 Soil Sampling Results

The following three sections discuss the results of the baseline, midpoint and endpoint soil sampling events in Area 2. As with Area 1, the results of the VOC, PAH and TOC analyses are discussed independently.

4.2.5.1 Volatile Organic Compounds

The results of the soil sampling events for VOCs at IP-2, SB-3, MP-5 and MP-6 are summarized below in Table 4-8. The laboratory analytical reports are included in Appendix F. As previously mentioned with respect to the Area 1 Field Sampling Plan, the Ozone Pilot Test Work Plan did not specify VOC analysis for soils. VOCs were, however, analyzed at monitoring point location MP-6 during the baseline event, and at all four monitoring locations during the midpoint and endpoint events.

TABLE 4–8
VOCs IN SOILS
AREA 2

EPA Method 8020 (micrograms per kilogram)

	IP–2 (10–12')			MW–5 (10–12')			MP–5 (10–12')			MP–6 (10–12')		
ANALYTE	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT
Benzene	–	60	<50	–	<50	<50	–	<50	70	<140	<120	70
Toluene	–	270	<50	–	60	150	–	250	790	<360	470	200
Ethylbenzene	–	290	150	–	210	230	–	330	1100	<580	490	180
Xylenes (total)	–	2500	1400	–	1800	1900	–	2600	12000	1500	4500	2100
Chlorobenzene	–	<100	<100	–	<100	<100	–	<100	<100	<140	<240	<100
1,2–Dichlorobenzene	–	<100	<100	–	<100	<100	–	<100	<100	<290	<240	<100
1,3–Dichlorobenzene	–	<100	<100	–	<100	<100	–	<100	<100	<290	<240	<100
1,4–Dichlorobenzene	–	<100	<100	–	<100	<100	–	<100	<100	<290	<240	<100
TOTAL VOLATILES	–	3,120	1,550	–	2,070	2,280	–	3,180	13,960	1,500	5,460	2,550

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As anticipated, no chlorinated compounds which are reported on the EPA 8020 analysis were detected. At all four monitoring locations, xylenes were the volatile analyte detected in the highest concentrations.

As previously described in Sections 2.1.2 and 2.3.2, ozone was injected into the subsurface through IP-3. Injection point IP-2 was then able to be used as a monitoring point. From the midpoint to the endpoint sampling events at this location, VOCs were reduced from 3120 ppb to 1550 ppb, or approximately 59%.

At monitoring location SB-3, within the variability of composite sampling, no changes in VOC levels occurred between the two (midpoint and endpoint) sampling events. Monitoring point MP-5, however showed a dramatic increase between the same two sampling events. At monitoring location MP-6, which VOCs were analyzed during all three sampling events, the detected VOC levels increased between the baseline and midpoint events, then decreased at the endpoint sampling event.

The most probable explanation for the variability in the results is due to the increased quantities of LNAPL which was brought into the study area by the required dewatering. As shown by the summary table of gauging events, included in Appendix G, recovery wells RW-4 & RW-5 did not possess LNAPL during the feasibility study until September 22 (September 1 - 22, 1993 gaugings events showed that no LNAPL existed). Based upon the locations of monitoring points MP-5 and MP-6 (Figure 2-1, Well Location Map) and the measured thicknesses of LNAPL in surrounding monitoring wells MW-3 and MW-13, this may explain why MP-6 concentrations had gone up by the midpoint sampling event, while MP-5 had not increased yet (but did show an increase at the endpoint sampling event).

4.2.5.2 Polynuclear Aromatic Hydrocarbons

A summary of the results from the three soil sampling events for PAHs in Area 2 are presented below in Table 4-9, PAHs in Soils; Area 2. The laboratory analytical reports are also included in Appendix F.

Results for the PAHs are similar to the VOCs results. At IP-2, PAHs decreased during the three sampling events from approximately 811,000 ppb to 332,000 ppb; a reduction of approximately 59%. During the baseline sampling event, the low complexity PAHs comprised approximately 72% of the total PAHs detected at this location, while the medium and high complexity PAHs comprised approximately 25% and 3% respectively. The subsequent sampling events showed that the low complexity PAHs were reduced by approximately 57%, while the medium and high complexity PAHs were reduced by 63% and 76%, respectively.

TABLE 4-9
PAHs IN SOILS
AREA 2

EPA Method 8310 (micrograms per kilogram)

	IP-2 (10-12')			MW-5 (10-12')			MP-5 (10-12')			MP-6 (10-12')		
ANALYTE	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT	BASELINE	MIDPOINT	ENDPOINT
Naphthalene	130000	66000	51000	39000	68000	130000	25000	21000	350000	18000	120000	160000
Acenaphthylene	<3500	<18000	<18000	1200	<18000	<89000	740	<8900	<93000	96	<18000	<88000
1-Methylnaphthalene	40000	27000	24000	16000	29000	83000	7600	11000	130000	3000	55000	<68000
2-Methylnaphthalene	270000	130000	110000	120000	130000	360000	63000	51000	610000	22000	240000	270000
Acenapthene	94000	54000	45000	39000	51000	150000	22000	21000	260000	7300	95000	110000
Fluorene	54000	25000	23000	21000	30000	73000	13000	11000	130000	5400	52000	62000
Phenanthrene	110000	36000	33000	35000	54000	110000	23000	14000	200000	12000	68000	110000
Anthracene	30000	<5100	1500	11000	16000	<25000	6400	2600	62000	3500	9100	<25000
Fluoranthene	43000	13000	13000	12000	21000	40000	8500	5200	72000	4600	27000	41000
Pyrene	20000	31000	27000	6800	15000	67000	9800	7300	140000	3000	20000	71000
Benzo{a}anthracene	6200	270	1900	1400	3200	6700	1100	810	11000	580	4500	6200
Chrysene	6800	<1200	1200	3000	4100	12000	2900	650	6600	680	5000	<5700
Benzo{b}fluoranthene	2300	720	740	570	1400	2800	460	320	4200	250	2100	2500
Benzo{k}fluoranthene	1200	390	380	350	860	1300	200	150	2100	120	1100	1100
Benzo{a}pyrene	2300	560	510	440	1200	2100	400	270	3100	210	1900	1700
Dibenzo{a,h}anthracene	110	<230	<230	85	<230	<1200	66	<115	<1200	11	<230	<1100
Benzo{g,h,i}perylene	500	<580	<580	190	660	<2900	140	<290	<3000	68	<580	<2900
Indeno{1,2,3-cd}pyrene	690	<320	<320	270	480	<1600	200	<160	<1700	92	880	<1600
TOTAL PAHs	811,100	383,940	332,230	307,305	425,900	1,037,900	184,506	146,300	1,981,000	80,907	701,580	835,500

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The final distribution of PAHs, based upon the endpoint sampling results, was similar to the distribution during the baseline sampling. Low complexity PAHs comprised approximately 76% of the total PAHs remaining, while the medium and high complexity PAHs comprised approximately 22% and 2%, respectively. This would suggest that no preferential oxidation of PAHs occurred at this location.

Of the Area 2 monitoring points, only IP-2 did not seem to be significantly affected by the influx of LNAPL into the test area. As a result, IP-2 may be the best indicator of the effectiveness of ozone injection under the conditions present in Area 2. An increase in the water table elevation occurred between the midpoint and endpoint sampling events at IP-2. This may have prevented further reduction in PAH concentrations by changing the ozone migration pathways, possibly limiting the soil surface area available for contact with the ozone following the midpoint sampling event. The positive results obtained at IP-2 indicate that ozone oxidation is feasible for PAH concentrations substantially higher than those found in Area 1.

As shown on Table 4-9, at sampling location MP-5 a decrease in PAHs was measured from the baseline to the midpoint sampling (184,505 to 146,300 ppb), however, a substantial increase was detected in the endpoint event. The laboratory analyses indicates that the relative distribution of PAHs did not change between the three sampling events; the low complexity PAHs comprised approximately 75% of the total, the condensed comprised approximately 23%, and the highly condensed comprised approximately 2% of the total. As described above, the location of MP-5 and its proximity to the LNAPL on site, may explain why the PAHs did not increase until the endpoint sampling event (i.e. LNAPL had not been drawn into the area of well yet).

At sampling locations SB-3 and MP-6, the concentrations of PAHs in soils increased from the baseline through the endpoint events. Here again, the relative distribution of PAHs remained consistent through the three sampling events.

As discussed above in Section 4.2.4.1, the most probable explanation for the variability in the results is due to the increased quantities of LNAPL which was brought into the study area by the required dewatering.

4.2.5.3 Total Organic Carbon

Presented in Table 4-10 below is a summary of the TOC data collected during the Area 2 soil sampling events. No significant trends emerged from the Area 2 TOC data. The influx of LNAPL into the test area over the course of the Area 2 test significantly impacted the TOC measurements.

TABLE 4-10
TOC IN SOILS
AREA 2

Location	Total Organic Carbon (g/100g)		
	Baseline	Midpoint	Endpoint
IP-2	0.38	0.23	0.71
MP-5	0.55	0.34	0.46
MP-6	0.22	0.22	0.31
MW-5	0.97	0.45	0.38
MW-5 (Dup)		0.23	
MP-5 (Dup)			0.85

4.2.6 Groundwater Sampling Results

Groundwater monitoring and sampling was performed during the Area 2 pilot test as described above in Sections 3.2.2 (Daily Operation and Maintenance) and 3.5.5 (Groundwater Sampling). The results are summarized below, and the complete data is contained in Appendix E (Field Monitoring Logs) and Appendix F (Laboratory Analytical Reports).

4.2.6.1 VOCs in Groundwater

Baseline, midpoint, and endpoint groundwater samples were collected for VOC analysis as described above in Section 3.2.4. The results of the sampling events are summarized below in Table 4-11. The analytical reports from the contract laboratory are also contained in Appendix F. In general, the influx of LNAPL into the test area which has been previously discussed in Section 4.2.2.2 was the factor controlling VOC concentrations.

At three of the six sampling locations (MW-5, RW-3, and RW-5), the presence of LNAPL in the samples caused the analytical detection limits to rise by a factor of 50 to 100 for the midpoint and endpoint analyses. This was due to high degree of sample dilution dictated by the high hydrocarbon concentrations. This was also the case for the RW-1 endpoint sample. Consequently, although no volatile compounds were detected in those samples, it cannot be determined whether concentrations increased or decreased.

At monitoring well MP-5d, volatile concentrations declined steadily throughout the pilot test. The soils data collected at location MP-5 (10-12 feet below grade) showed an increase in adsorbed VOCs between the midpoint and endpoint sampling events (Section 4.2.5.1). Volatile concentrations at RW-1 and

TABLE 4–11
VOCs IN GROUNDWATER
EPA Method 8020
(micrograms per liter)

	RW–1		
ANALYTE	BASELINE	MIDPOINT	ENDPOINT*
Benzene	56	150	<500
Toluene	99	170	<1,000
Ethylbenzene	21	47	<1,000
Xylene	260	470	<2,000
Chlorobenzene	<0.2	<10	<1,000
1,2–Dichlorobenzene	<0.4	<20	<1,000
1,3–Dichlorobenzene	<0.4	<20	<1,000
1,4–Dichlorobenzene	<0.3	<15	<1,000
TOTAL VOLATILES	436	837	0

	RW–3		
BASELINE	MIDPOINT	ENDPOINT*	
100	<200	<500	
150	<500	<1,000	
23	<800	<1,000	
370	<1700	<2,000	
<0.4	<200	<1,000	
<0.8	<400	<1,000	
<0.8	<400	<1,000	
<0.6	<300	<1,000	
643	0	0	

	RW–5	
BASELINE	MIDPOINT	ENDPOINT*
130	<200	<500
250	<500	<1,000
70	<800	<1,000
930	<1700	<2,000
<2.0	<200	<1,000
<4.0	<400	<1,000
<4.0	<400	<1,000
<3.0	<300	<1,000
1,380	0	0

	MP–5D	
ANALYTE	BASELINE	MIDPOINT	ENDPOINT*
Benzene	210	16	25
Toluene	250	60	74
Ethylbenzene	160	<40	<50
Xylenes (total)	830	350	310
Chlorobenzene	<0.4	<10	<50
1,2–Dichlorobenzene	<0.8	<20	<50
1,3–Dichlorobenzene	<0.8	<20	<50
1,4–Dichlorobenzene	<0.6	<15	<50
TOTAL VOLATILES	1,450	426	409

	MP–6D	
BASELINE	MIDPOINT	ENDPOINT*
73	<200	120
120	<500	190
61	<800	55
470	1,900	510
<0.4	<200	<10
<0.8	<400	<10
<0.8	<400	<10
<0.6	<300	<10
724	1,900	675

	MW–5	
BASELINE	MIDPOINT	ENDPOINT*
6	<200	<500
8	<500	<1,000
2	<800	<1,000
26	<1700	<2,000
<0.2	<200	<1,000
<0.4	<400	<1,000
<0.4	<400	<1,000
<0.3	<300	<1,000
42	0	0

MP-6d increased between the baseline and midpoint sampling events. From the midpoint to the endpoint sampling, volatile concentrations at MP-6d decreased. This is consistent with the adsorbed VOC data discussed in Section 4.2.5.1, above.

4.2.6.2 PAHs in Groundwater

As described above in Section 3.2.4, baseline, midpoint, and endpoint groundwater samples were collected from six wells (MW-5, MP-5d, MP-6d, RW-1, RW-3, and RW-5) for laboratory analysis of dissolved PAHs during the Area 2 feasibility study. Analysis for PAHs was performed by EPA Method 8310 for the baseline and midpoint samples, and by EPA Method 8270 for the endpoint samples (see explanation below). Baseline groundwater samples were collected on August 16, 1993. The pilot test commenced on September 3, 1993. Midpoint samples were collected on September 29, 1993, after 26 days of operation. The pilot test terminated on October 22, 1993, and endpoint samples were collected on October 29, 1993, after 49 days of operation. The results are summarized below in Table 4-12. The laboratory analytical reports are also contained in Appendix F.

The results of groundwater sampling were complicated by the influx of LNAPL into the test area over the course of the pilot test, as described above in Section 4.2.2.2. All six wells exhibited significant increases in PAH concentrations from the baseline sampling to the midpoint sampling. Four of the six wells contained LNAPL on the midpoint sampling date (MW-5, MP-6d, RW-3, and RW-5), and one had contained LNAPL just one week prior to the midpoint sampling date (MP-5d).

The endpoint samples were analyzed by EPA Method 8270 (Base/Neutrals only) due to the quantity of emulsified LNAPL present in several samples. Wells RW-3 and RW-5 contained LNAPL on the sampling date, and wells MW-5, MP-5d, and RW-1 contained LNAPL sheens. Monitoring well MP-6d did not contain an LNAPL sheen; however, a sheen was observed on the sample during sample preparation in the laboratory. PAH concentrations were high in wells MW-5, MP-6d, RW-3, and RW-5, ranging from 3.3% to 24.7%. PAH concentrations in MP-5d and RW-1 decreased from the midpoint event, but remained higher than the baseline concentrations.

The relatively lower concentrations measured during endpoint sampling at MP-5d and RW-1 may be due in part to sample preparation factors. The samples from MP-5d and RW-1 contained little or no LNAPL sheen when they arrived at the laboratory, and therefore were analyzed as water samples using a solvent extraction technique. The samples from MW-5, MP-6d, RW-3, and RW-5 contained enough LNAPL when they arrived at the laboratory to be analyzed as non-aqueous waste, using a waste dilution technique.

TABLE 4–12
PAHs IN GROUNDWATER
EPA Method 8310
(micrograms per liter)

	RW–1		
ANALYTE	BASELINE	MIDPOINT	ENDPOINT*
Naphthalene	5,900	23,000	13,000
Acenaphthylene	<230	<3300	<1,200
1–Methylnaphthalene	2,000	7,700	
2–Methylnaphthalene	7,900	34,000	7,300
Acenapthene	3,100	13,000	6,900
Fluorene	1,400	7,300	8,500
Phenanthrene	1,900	19,000	6,400
Anthracene	390	3,900	610
Fluoranthene	640	4,700	3,000
Pyrene	400	4,000	1,400
Benzo{a}anthracene	100	720	290
Chrysene	110	1,300	350
Benzo{b}fluoranthene	47	340	160
Benzo{k}fluoranthene	25	180	180
Benzo{a}pyrene	49	240	<1,200
Dibenzo{a,h}anthracene	14	<43	<1,200
Benzo{g,h,i}perylene	21	<110	<1,200
Indeno{1,2,3–cd}pyrene	<4.3	<61	<1,200
TOTAL PAHs	23,996	119,380	48,090

	RW–3		
BASELINE	MIDPOINT	ENDPOINT*	
3,100	99,000	63,000,000	
<230	<5700	660,000	
390	31,000		
930	130,000	35,000,000	
510	50,000	32,000,000	
130	28,000	21,000,000	
69	96,000	38,000,000	
<66	17,000	4,400,000	
<21	22,000	18,000,000	
<27	66,000	9,900,000	
<1.3	3,700	2,000,000	
<15	6,600	2,300,000	
<1.8	1,700	1,300,000	
<1.7	910	720,000	
<2.3	1,300	570,000	
<3.0	<74	<3,800,000	
<7.6	2,600	<3,800,000	
<4.3	1,100	<3,800,000	
5,129	556,910	228,850,000	

	RW–5	
BASELINE	MIDPOINT	ENDPOINT*
4,100	170,000	59,000,000
<230	<5800	1,100,000
<180	53,000	
230	230,000	35,000,000
<180	93,000	36,000,000
36	63,000	23,000,000
<64	120,000	43,000,000
<66	27,000	7,400,000
<21	52,000	21,000,000
<27	34,000	12,000,000
<1.3	7,000	3,200,000
<15	13,000	2,600,000
<1.8	3,200	1,500,000
<1.7	1,700	810,000
<2.3	2,400	1,100,000
<3.0	<75	<4,000,000
<7.6	4,700	<4,000,000
<4.3	2,000	<4,000,000
4,366	876,000	246,710,000

	MP–5D	
ANALYTE	BASELINE	MIDPOINT	ENDPOINT*
Naphthalene	8,900	64,000	26,000
Acenaphthylene	<230	<5200	790
1–Methylnaphthalene	560	25,000	
2–Methylnaphthalene	1,400	110,000	16,000
Acenapthene	490	45,000	17,000
Fluorene	140	24,000	12,000
Phenanthrene	74	28,000	15,000
Anthracene	<66	13,000	2,600
Fluoranthene	<21	14,000	7,100
Pyrene	<27	13,000	3,700
Benzo{a}anthracene	<1.3	2,400	760
Chrysene	<15	4,700	<2,200
Benzo{b}fluoranthene	<1.8	1,200	330
Benzo{k}fluoranthene	<1.7	630	700
Benzo{a}pyrene	<2.3	890	340
Dibenzo{a,h}anthracene	<3.0	<67	<2,200
Benzo{g,h,i}perylene	<7.6	1,800	<2,200
Indeno{1,2,3–cd}pyrene	<4.3	840	<2,200
TOTAL PAHs	11,564	348,460	102,320

	MP–6D	
BASELINE	MIDPOINT	ENDPOINT*
5,300	220,000	10,000,000
<290	<6200	180,000
940	80,000	
3,200	260,000	5,600,000
1,200	110,000	6,000,000
480	55,000	3,600,000
670	100,000	5,000,000
110	28,000	850,000
270	39,000	2,500,000
130	24,000	1,100,000
44	8,000	280,000
37	15,000	280,000
28	3,600	150,000
13	2,000	<960,000
17	2,800	100,000
4	<81	<960,000
<9.4	5,200	<960,000
<5.3	2,200	<960,000
12,443	954,800	35,640,000

	MW–5	
BASELINE	MIDPOINT	ENDPOINT*
350	310,000	7,700,000
<240	<25000	180,000
330	150,000	
1,400	670,000	5,200,000
910	270,000	6,100,000
410	140,000	3,500,000
510	310,000	5,000,000
<68	85,000	770,000
270	93,000	2,300,000
120	170,000	1,200,000
38	16,000	260,000
33	32,000	260,000
25	7,100	170,000
11	3,900	100,000
21	5,500	110,000
4	<330	<980,000
<7.8	11,000	<980,000
<4.4	4,500	<980,000
4,432	2,278,000	32,850,000

* endpoint samples by EPA Method 8270 instead of 8310

4.2.6.3 Weekly Groundwater Monitoring

Groundwater field measurements were collected on a weekly basis from monitoring wells in Area 2, as described above in Section 3.2.2. The pH, dissolved oxygen, and conductivity measurements are summarized in Table 4-13. Trend graphs for selected wells were developed for these three parameters and are included in Appendix H.

Of note among the field measurements is the dissolved oxygen data, which revealed the following trends:

- Monitoring wells MW-5 and MP-5d exhibited the highest DO readings, over 20 mg/L (above the range of the instrument). The readings at both locations increased dramatically part way into the pilot test, then tapered off toward the end of the test, first at MW-5, then at MP-5d.
- Wells RW-4 and RW-5 both exhibited increasing DO concentrations during the study.
- DO levels showed little fluxuation and remained low throughout the pilot test in monitoring wells MP-6d and MW-13. Slight increases were measured in both wells at the end of the feasibility study.
- DO levels in all monitoring wells converge toward the same value at the end of the pilot test. In the week following system shut down, DO levels in all wells rapidly returned to between 3.5 and 8 mg/L.

Weekly monitoring of the groundwater in Area 2 was also performed for pH. Overall, pH measurements remained within the same range throughout the duration of the feasibility study, generally between 7.9 and 9.1. Monitoring wells MW-13, MW-15, MP-5d, MP-6d, RW-2, RW-4, and RW-5 each had one or two readings below that range, while monitoring wells MW-5 and RW-1 each had one reading above that range. Exhibiting the widest range of values were MP-5d (7.2 to 9.1) and RW-4 (6.2 to 8.5).

Initial efforts to monitor groundwater conductivity during the Area 2 test were hampered by fouling of the conductivity probe by LNAPL. Weekly monitoring was performed from October 19 to November 11 (four events). During that time, conductivity levels remained in the range of 15 to 25 mS at most locations. Several locations (MW-5, MW-7, MP-6d, RW-4) exhibited fluctuations in conductivity from below 10 mS up to 15 to 20 mS. Conductivity levels at MP-5d remained between 8.8 and 11.2 mS throughout the four-week period.

The complete field measurements are included on the field Monitoring Forms in Appendix E.

TABLE 4-13
GROUNDWATER FIELD MEASUREMENTS

pH	MW-3	MW-5	MW-7	MW-13	MW-15	MW-16	MP-5D	MP-6D	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6
08-Sep-93	8.4	8.5		8.2	8.2	8.2	8.5	8.6				8.4	8.2	
13-Sep-93	8.4	9.3	8.6	8.2	8.2	8.2		8.6				8.0	7.9	
22-Sep-93		8.6		7.5	7.5	8.3	7.3	7.8					7.5	
29-Sep-93	8.9	8.8	8.6	8.6	8.6	8.4	7.2	8.8				8.3	8.4	
06-Oct-93	8.3	8.2	8.0	8.0	8.4	8.1	8.5	8.4				8.0	8.6	
14-Oct-93	9.1	8.4	8.2	8.5	8.4	8.6	9.1	8.9				8.4	8.2	
22-Oct-93	8.6	8.4	8.6	8.2	8.4	8.4	8.9	8.5			8.2	6.2	8.6	
29-Oct-93	8.1	8.4	8.0	7.9	8.4	8.2	9.1	8.9	8.6	7.8	8.2	6.2	8.0	8.2
11-Nov-93	8.5	8.4	8.6	8.4	8.6	8.6	8.8	8.9	9.3	8.4	8.6	8.5	8.7	8.7

Dissolved Oxygen	MW-3	MW-5	MW-7	MW-13	MW-15	MW-16	MP-5D	MP-6D	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6
08-Sep-93	1.60	9.00		1.50	1.50	1.50	7.90	1.60				1.25	1.75	
13-Sep-93	1.75	20.00	1.75	2.50	1.75	1.70		2.10				8.10	2.40	
22-Sep-93		20.00		2.50	1.25	2.20	7.50	1.50				2.50	4.00	
29-Sep-93	2.50	15.50	2.50	2.00	1.70	2.30	20.00	3.00				4.50	3.20	
06-Oct-93	2.20	18.00	1.50	1.70	2.10	1.70	20.00	1.70				8.00	4.00	
14-Oct-93	2.50	7.50	2.50	2.00	1.50	2.50	19.00	2.50				12.00	6.00	
22-Oct-93	2.50	2.75	16.00	2.50	2.25	1.75	16.00	3.00			17.00	2.00	9.50	
29-Oct-93	4.50	4.50	4.50	5.00	3.50	5.20	7.50	7.00	7.00	5.00	8.00	4.50	4.50	4.50

Units: milligrams per liter

Conductivity	MW-3	MW-5	MW-7	MW-13	MW-15	MW-16	MP-5D	MP-6D	RW-1	RW-2	RW-3	RW-4	RW-5	RW-6
19-Oct-93	16.80	7.27	17.20	17.33	19.67	18.80	8.80	8.00			19.67	16.27	14.93	
22-Oct-93	16.53	18.40	8.67	21.80	20.87	19.33	9.97	7.47			21.20	3.87	15.53	
29-Oct-93	17.13	12.25	17.93	24.29	23.07	22.93	11.20	14.60	15.27	16.53	24.00	3.80	14.60	15.07
11-Nov-93	15.13	5.40	18.07	24.53	20.93	22.40	10.80	1.20	13.20	16.87	22.00	13.93		

Units: millisiemens

4.2.6.4 TOC and COD in Groundwater

Groundwater samples were collected weekly from six monitoring wells for TOC and COD analysis throughout the pilot test. The results are summarized in Tables 4-14 and 4-15. The laboratory analytical reports are also contained in Appendix F. Both TOC and COD are sensitive to the presence of liquid-phase hydrocarbons. A comparison of Tables 4-12, 4-14, and 4-15 reveals that, in general, the locations which were impacted the most by LNAPL (as measured by increasing soil PAH concentrations) also exhibited the highest TOC and COD concentrations.

TOC trend graphs were developed from the analytical data, and are included in Appendix J. The TOC concentrations exhibited an overall increasing trend during the test. Levels were lowest at monitoring well MP-6d, where the maximum TOC concentration detected during the pilot test was 87 ppm, and the trend was fairly flat. Well MW-5 maintained relatively low concentrations for much of the pilot test as well, exhibiting levels over 100 ppm on only two occasions, and overall showing a slight increasing trend. Wells MP-5d, RW-1, and RW-5 exhibited intermediate concentrations with an increasing trend. The highest concentrations were found in well RW-3, which reached a maximum of 650 ppm toward the end of the pilot test. RW-3 also showed an increasing trend.

TABLE 4-14
TOC IN GROUNDWATER
AREA 2
(mg/l)

DATE	LOCATION						
	RW-1	RW-3	RW-5	MW-5	MW-5 (Duplicate)	MP-5d	MP-6d
08/16/93	35	28	21	28	29	45	23
09/13/93	*	81	61	36	*	89	26
09/17/93	*	150	39	49	*	120	42
09/22/93	*	48	58	19	*	120	37
09/29/93	100	52	100	29	41	21	44
10/06/93	*	420	45	38	*	75	42
10/14/93	*	150	53	180	*	120	82
10/22/93	*	650	130	200	*	*	87
10/29/93	260	560	88	81	170	190	44
11/11/93	*	250	410	91	*	360	22

* - not sampled

TABLE 4-15
COD IN GROUNDWATER
AREA 2
(mg/l)

DATE	LOCATION							
	RW-1	RW-1 (Duplicate)	RW-3	RW-5	MP-5d	MP-6d	MW-5 (Duplicate)	MW-5
08/16/93	180	150	200	150	450	3000	370	*
09/13/93	*	*	2300	33000	4500	1500	*	1400
09/17/93	*	*	300	140	350	290	*	200
09/22/93	*	*	580	320	420	140	*	3200
09/29/93	640	620	210	6900	350	8000	1300	10000
10/06/93	*	*	7100	190	260	120	*	890
10/14/93	*	*	580	1000	920	400	*	2500
10/22/93	*	*	8700	2000	*	5500	*	1900
10/29/93	660	600	9900	2000	580	240	*	1900
11/11/93	*	*	3000	2500	730	30	*	360

* - not sampled

COD is a measure of the oxygen equivalent to the organic content of a sample which is susceptible to oxidation by a strong chemical oxidant (i.e. a measure of the amount of oxygen required to stabilize the waste completely). The COD sampling results were more variable, with several wells (MW-5, MP-5d, MP-6d, RW-3, and RW-5) exhibiting a relatively flat trend interrupted by sudden spikes in the concentration. Concentrations in well RW-1 increased initially and then leveled off, with good correlation between the samples and the duplicates. COD trend graphs were developed and are also included in Appendix J.

4.2.7 Soil Vapor Extraction System Operational Data

Presented in Table 4-16 below are the results of the daily monitoring of the SVE system which has been summarized from the Monitoring Forms. As previously mentioned, the forms are included in Appendix D.

Startup of the SVE system occurred on September 15, 1993, prior to the startup of the ozone generator. The SVE system was operated at an average flow rate of approximately 77 cfm at a vacuum of 34 inches of water ("H_2O) during the duration of the Area 2 feasibility study. Vacuum readings at the monitoring points were recorded daily on the monitoring logs. Review of these forms show that the flow

rate and pressure was sufficient to maintain a vacuum in the subsurface at these points ranging from 0.005 to 0.06"H_2O. This insured that all unreacted ozone vapors were captured by the SVE system and treated with vapor phase GAC.

TABLE 4-16
SVE SYSTEM OPERATIONAL DATA, AREA 2

Date	Total Flow Rate (cfm)	Ozone (ppm)		PID (ppm)		CO_2 (ppm)
		Before GAC	After GAC	Before GAC	After GAC	Before GAC
9/3/93	82	50	0	3	0	300
9/4/93	80	120	0	0	0	250
9/7/93	82	150	--	0	0	100
9/8/93	82	140	1	0	0	100
9/9/93	80	70	1	0	0	100
9/10/93	75	140	0	0	0	100
9/11/93	75	120	1	0	0	100
9/13/93	75	120	2	1	0	150
9/14/93	82	300	0	0	0	100
9/15/93	81	300	10	0	0	100
9/16/93	81	300	1	0	0	100
9/17/93	75	600	1	0	0	100
9/21/93	75	20	0	0	0	100
9/22/93	81	125	1	0	0	50
9/23/93	85	20	0	0	0	200
9/24/93	85	20	1	0	0	150
9/25/93	85	20	0	0	0	100
9/27/93	85	30	0	0	0	100
9/28/93	85	20	0	0	0	100
9/29/93	85	600	0	0	0	300
9/30/93	81	600	0	0	0	100
10/1/93	79	425	0	0	0	500
10/2/93	77	425	0	0	0	500
10/4/93	79	425	0	0	0	500
10/5/93	73	425	0	0	0	500
10/6/93	73	425	0	0	0	500
10/7/93	75	425	0	0	0	200
10/8/93	77	425	0	0	0	500
10/9/93	75	425	0	0	0	500
10/11/93	71	425	0	0	0	500
10/12/93	71	425	0	0	0	--
10/13/93	71	250	0	0	0	200

Date	Total Flow Rate (cfm)	Ozone (ppm)		PID (ppm)		CO_2 (ppm)
10/14/93	71	700	0	0	0	200
10/15/93	71	600	0	0	0	200
10/16/93	75	600	0	0	0	200
10/18/93	75	600	0	0	0	200
10/19/93	75	600	0	0	0	200
10/20/93	75	600	--	0	0	--
10/21/93	81	600	0	0	0	200
10/22/93	75	600	0	0	0	150

Included below is Figure 4-13, Ozone Removed by SVE System, which graphically summarizes the monitoring results from the daily SVE influent monitoring. When compared to Figure 4-12, <Ozone Injected Into The Subsurface> it can be seen that once the ozone injection system flooded the study area with ozone until an excess of ozone existed. This condition is witnessed by the measured ozone (20-600 ppm) in the SVE system influent, and was considered optimum.

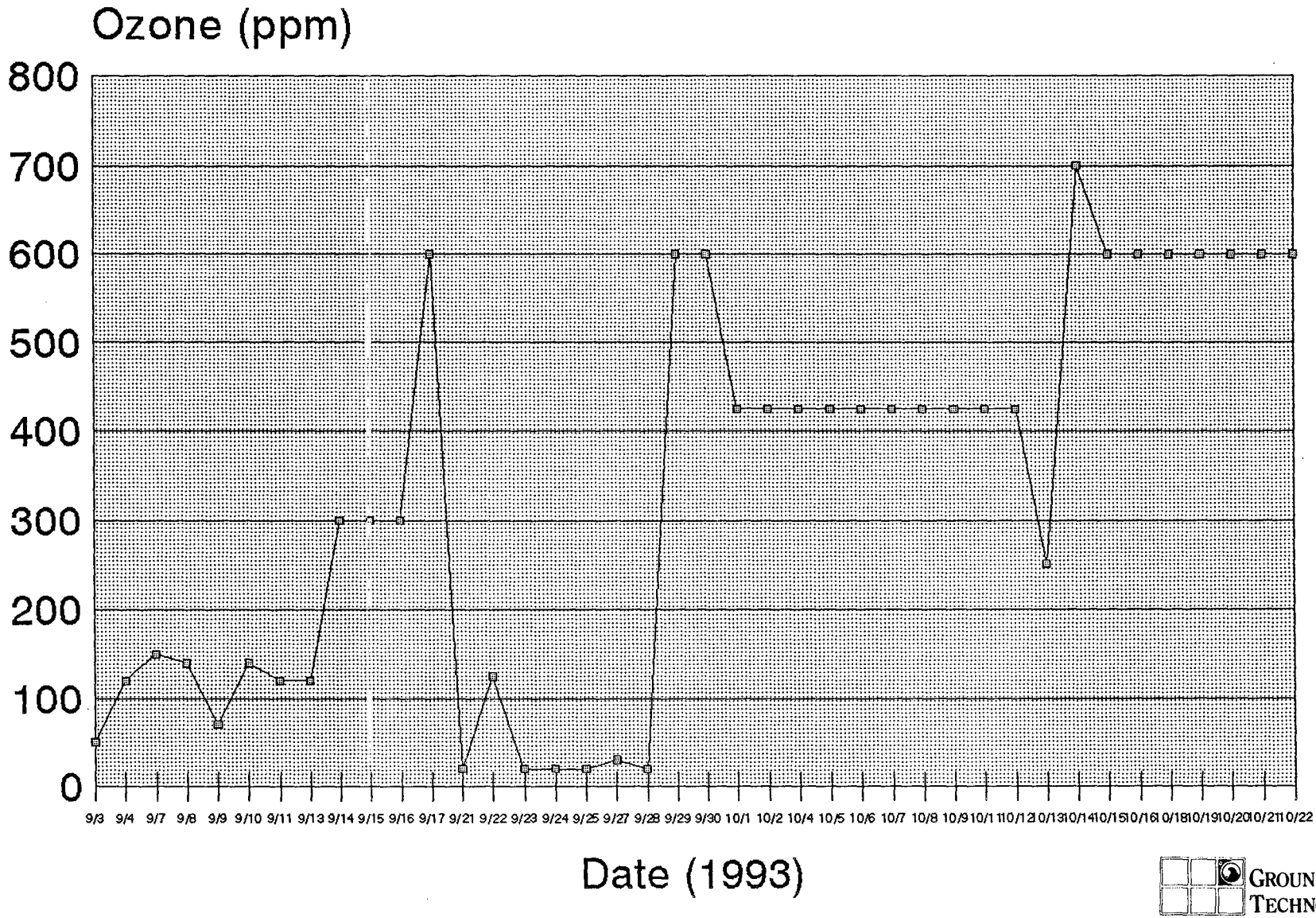
Based upon mass balance calculations, approximately 135 pounds of ozone was removed by the SVE system during the Area 2 feasibility study.

As seen in Table 4-16, the vapor phase GAC was successful at destructing the ozone vapors in the SVE system stream prior to discharge. During the 50 - day feasibility study, the GAC removed ozone levels in the air stream to non-detectable levels during all but seven monitoring events. When measurable concentrations were detected, ozone injection was temporarily suspended and the vapor GAC canister was immediately repacked.

PID readings were also recorded for both the air influent to the SVE system and in the effluent after the vapor GAC treatment. VOCs were not detected at any time in the influent during the Area 2 testing.

Carbon dioxide (CO_2) concentrations were also collected during the Area 2 feasibility study in the influent to the SVE system and in the effluent after the vapor GAC treatment. Figure 4-14, Carbon Dioxide in SVE System; Before GAC, presents a summary of the monitoring results in graphic form. As can be seen, the CO_2 concentrations in the extracted soil gas increased to a peak of 500 ppm after 28 days of operation.

Figure 4-13
Ozone Removed by SVE
Area 2



GROUNDWATER TECHNOLOGY

The increase in the CO_2 measured in the SVE influent is therefore due to the increased oxidation rates of the natural organics and PAHs. After the natural organics are oxidized, it would be expected that both the rate of reaction, and therefore CO_2 measured, would decrease. It appears that the decrease in CO_2 during the final weeks of the Area 2 study was related to the lack of natural organics remaining in the soils to be oxidized.

4.2.8 PAH Removal Kinetics

The ozone dose required to treat the contaminated soil was estimated conservatively by assuming the ozone will mineralize both PAHs and humic acid in the soil. Ozone requirements are 2.96 lb/lb PAH and 1.52 lb/lb humic acid, assuming empirical formulas for PAH and humic acid of $CH_{0.7}$ and $CHO_{0.5}$ respectively. Soil concentrations of 0.1% PHA (x_{PAH}) and 0.5% humic acid ($x_{humic\ acid}$) and a dry soil bulk density (p_b) of 120 lb/ft^3 are assumed. It was estimated that enough ozone was injected to achieve remediation over a 5 foot radius (r) cylinder of height (h) 4 feet within a treatment time (t) of 30 days.

The ozone requirement for each area was

$$O_3,\ \text{requirement} = (2.96x_{PAH} + 1.52x_{humic\ acid})Pb\pi r^2 h/t = 0.55\ \text{lb/hr}$$

In Area 1, the ozone efficiency was estimated to be between 15% and 70%. In Area 2, the influx of LNAPL precludes calculation of the ozone efficiency, since the mass of LNAPL which entered the test area during the test is unknown. In general, it was observed that the areas which did not experience a large influx of LNAPL did exhibit a reduction in PAH concentrations.

5.0 DISCUSSION

5.1 Applicability of Ozone Injection for Site Remediation

The technical feasibility of using ozone injection as a remedial strategy at the Osmose site is discussed below. Consistent with the previous sections of the report, Area 1 and Area 2 will be discussed independently.

5.1.1 Area 1

As supported by the analytical data presented in Section 4.1, the feasibility study has concluded that ozone injection into the subsurface can feasibly oxidize low concentrations of PAHs adsorbed to soils in the unsaturated zone. A 94% reduction in PAHs was measured in Area 1. The study also showed that the highly reactive ozone can both be controlled in the subsurface and be captured and extracted if unreacted. The study also verified that vapor phase GAC is an effective treatment technology for ozone in the SVE off gas stream.

The Area 1 test revealed that the presence and reactivity of natural soil organics is a complicating factor. It appears that a significant portion of the injected ozone reacted with soil organics concurrent with or before the PAH compounds. Any design of an ozone injection system will need to incorporate this factor.

A key factor in the success of the Area 1 feasibility study was the favorable soil permeability conditions. These conditions allowed both the injection and recovery of unreacted ozone to occur with no modifications to the feasibility study work plan.

5.1.2 Area 2

The analytical data presented in Section 4.2 indicates that two competitive processes were occurring during the Area 2 feasibility study: oxidation of adsorbed PAHs, and LNAPL migrating into the study area and re-impacting soils.

Even with the migration of LNAPL into the study area, two zones of effect appeared to exist. At injection point IP-2 (approximately 4 feet from IP-3) the total PAHs were successfully reduced during the entire

study period from 811 ppm to 332 ppm (below the 473 ppm closure criteria). In this Area the rate of PAH removal was greater than the rate of LNAPL migrating into the area. Monitoring point MP-6 (8 feet from IP-3) appeared to be outside the transition point where the rate of PAH removal was less than the rate of LNAPL migrating into the area.

Based upon the results observed at IP-2, it appears that ozone sparging to remove high residual concentrations of PAHs in the saturated zone is feasible provided the LNAPL has been previously removed/recovered.

Tab A

Well I.D.: IP-1

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Page 1 of 1

Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/19/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing – Dia.: 1" Length: 2' Type: SS
Screen – Dia.: 1" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	10%	3.0		1	0 – 2' 0 – 0.5' asphalt 0.5' – 2.0' dry, black, FINE SAND with some silt and gravel
2						2	
3		2	50%	36.0		3	2' – 4' moist, brown, SAND and GRAVEL (contains slag) with some silt
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

Well I.D.: IP-2

GROUNDWATER TECHNOLOGY, INC.

Page 1 of 1

Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/30/92
T.O.C. Elev.: Well Depth: 13.5'
Explor. Depth: 14' Hole Dia.: 13"
Casing – Dia.: 1" Length: 12'/5' Type: SS
Screen – Dia.: 1" Length: 1'/1' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Grout | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	40%		107	1	0 – 2' 0 – 0.5' asphalt 0.5' – 1.0' moist, brown, FINE SAND and SILT with some gravel 1.0' – 2.0' moist, brown, SILT and CLAY with little fine sand
2						2	
3		2	60%		48.1	3	2' – 4' brown, moist, SILT and CLAY
4						4	
5		3	80%		288	5	4' – 6' brown, moist, CLAY with some silt, trace coarse sand
6						6	
7		4	100%		432	7	6' – 8' brown, moist, CLAY with some silt
8						8	▼
9		5	100%		138	9	8' – 10' brown, saturated, SILT with some clay
10						10	
11		6	100%		179	11	10' – 12' brown, saturated, SILT and CLAY
12						12	
13		7	100%		92.7	13	12' – 14' brown, saturated, SILT with some clay, trace gravel
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

Well I.D.: MP-1

GROUNDWATER TECHNOLOGY, INC.

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/18/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing - Dia.: 2" Length: 2' Type: PVC
Screen - Dia.: 2" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	50%	11.7		1	0 – 2' 0 – 0.5' asphalt 0.5' – 2.0' dry gray-black, FINE SAND with some silt and gravel
2						2	
3		2	60%	110		3	2' – 4' moist, brown, SAND and GRAVEL (some slag) with some silt
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

Well I.D.: MP-2

GROUNDWATER TECHNOLOGY, INC.

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/18/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing – Dia.: 2" Length: 2' Type: PVC
Screen – Dia.: 2" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	20%		2.0	1	0 – 2' 0 – 0.5' dry, black, FINE SAND with some gravel, little silt
2						2	2.0' – 3.7' moist, gray-brown, SAND and
3		2	80%		2.1	3	2' – 4' GRAVEL (some slag) with some silt
4						4	3.7' – 4' moist, black, CLAY
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

Well I.D.: MP-3

GROUNDWATER TECHNOLOGY, INC.

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Project: OSMOSE OZONE

Location: BUFFALO, NEW YORK

Project No.: 01110-5306 Date: 11/18/92

T.O.C. Elev.: Well Depth: 4'

Explor. Depth: 4' Hole Dia.: 6 1/2"

Casing – Dia.: 2" Length: 2' Type: PVC

Screen – Dia.: 2" Length: 2' Slot Size: 0.040"

Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.

Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON

Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	15%		4.0	1	0 – 0.5' asphalt
2						2	0 – 2' 0.5' – 2.0' saturated, black, GRAVEL with some sand and silt
3		2	60%		1.9	3	2' – 4' moist, brown, SAME (contains some slag) bottom 2" moist, red-brown, CLAY
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

Well I.D.: MP-4

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/16/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing – Dia.: 2" Length: 2' Type: PVC
Screen – Dia.: 2" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	20%			1	0 – 0.5' asphalt
2						2	0.5' – 2' dry, brown and black, SILT and SAND with some gravel
3		2	10%			3	2' – 4' moist, brown, SAME
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

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Well I.D.: MP-5

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 12/1/92
T.O.C. Elev.: Well Depth: 13.5
Explor. Depth: 14' Hole Dia.: 13"
Casing – Dia.: 2" Length: 11'/4' Type: PVC
Screen – Dia.: 2" Length: 2'/2' Slot Size: 0.020"
Drilling Co.: EDI Driller: S. GINGRICH Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #2 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Grout | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	60%		96.0	1	0 – 2' 0 – 0.5' asphalt 0.5' – 1.5' dry, gray, SILT and GRAVEL with some sand 1.5' – 2.0' moist, black, SILT with some clay, little coarse sand
2						2	
3		2	60%		81.1	3	2' – 4' 2.0' – 3.0' moist, black, SAME 3.0' – 4.0' moist, brown, CLAY with some silt, little sand
4						4	
5		3	10%		126	5	4' – 6' SAME
6						6	
7		4	100%		640	7	6' – 8' moist, brown, CLAY with little silt grading toward SILT and CLAY
8						8	▼
9		5	70%		246	9	8' – 10' 8.0' – 9.0' saturated, brown, SAME 9.0' – 10.0' saturated, brown, SILT with some clay
10						10	
11		6	100%		54.5	11	10' – 12' SAME
12						12	
13		7	60%		46.9	13	12' – 14' saturated, brown, SILT with some clay, trace coarse sand
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

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Well I.D.: MP-6

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Project: OSMOSE OZONE

Location: BUFFALO, NEW YORK

Project No.: 01110-5306 Date: 11/30/92

T.O.C. Elev.: Well Depth: 13.5

Explor. Depth: 14' Hole Dia.: 13"

Casing – Dia.: 2" Length: 11'/4' Type: PVC

Screen – Dia.: 2" Length: 2'/2' Slot Size: 0.020"

Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.

Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON

Notes: FILTER PACK MATERIAL: #2 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Grout | Sand/Gravel Pack | Well Screen | ▼ Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	40%		11.1	1	0 – 2' 0 – .5' asphalt 0.5' – 1.0' moist, gray, SAND and SILT with some gravel 1.0' – 2.0' moist, gray, SILT and CLAY with little fine sand
2						2	
3		2	60%		11.6	3	2' – 4' 2.0' – 3.0' moist, gray, SILT and CLAY with little fine sand 3.0' – 4.0' moist, brown, CLAY with some silt
4						4	
5		3	80%		16.4	5	4' – 6' moist, brown, CLAY with little silt
6						6	
7		4	100%		440	7	6' – 8' 6.0' – 7.5' SAME ▼ 7.5' – 8.0' saturated, brown, SILT with some clay
8						8	
9		5	90%		48.8	9	8' – 10' SAME
10						10	
11		6	100%		30.7	11	10' – 12' SAME
12						12	
13		7	80%		31.5	13	12' – 14' SAME
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

GROUNDWATER TECHNOLOGY, INC.

Well I.D.: VEP-1

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/17/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing - Dia.: 2" Length: 2' Type: PVC
Screen - Dia.: 2" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete, Bentonite, Native Backfill, Sand/Gravel Pack, Well Screen, Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	10%		0.0	1	0 - 2' 0 - 0.5' asphalt 0.5' - 2.0' moist, gray, SILT and FINE SAND with some gravel
2						2	
3		2	TR		0.0	3	2' - 4' SAME
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

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Well I.D.: VEP-2

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/17/92
T.O.C. Elev.: Well Depth: 4'
Explor. Depth: 4' Hole Dia.: 6 1/2"
Casing – Dia.: 2" Length: 2' Type: PVC
Screen – Dia.: 2" Length: 2' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: SPLIT-SPOON
Notes: FILTER PACK MATERIAL: #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	15%		0.0	1	0 – 0.5' ASPHALT
2						2	0 – 2' 0.5' – 2' moist, brown, FINE SAND and SILT with some gravel
3		2	TR		–	3	2' – 4' SAME
4						4	
5						5	
6						6	
7						7	
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

GROUNDWATER TECHNOLOGY, INC.

Well I.D.: VEP-4

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 11/20/92
T.O.C. Elev.: Well Depth: 8'
Explor. Depth: 8' Hole Dia.: 6 1/2"
Casing - Dia.: 2" Length: 2' Type: PVC
Screen - Dia.: 2" Length: 6' Slot Size: 0.040"
Drilling Co.: EDI Driller: D. GRAMZA Logged by: J.O.G.
Drilling Method: HSA Sampling Method: SPLIT-SPOON
Notes: FILTER PACK MATERIAL : #4 SAND

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	20%		5.2	1	0 - 0.5' asphalt 0 - 2' 0.5' - 1.5' dry, black, SAND and GRAVEL (including slag) with some silt
2						2	1.5' - 2' moist, brown SILT with some clay, trace medium sand
3		2	80%		1.5	3	2' - 4' moist, brown CLAY with little silt, trace coarse sand
4						4	
5		3	70%		1.2	5	4' - 6' moist, gray-brown, CLAY with some silt, trace coarse sand
6						6	
7		4	70%		258	7	6' - 8' moist, brown, CLAY with little silt ▼ bottom 2" saturated
8						8	
9						9	
10						10	
11						11	
12						12	
13						13	
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

GROUNDWATER TECHNOLOGY, INC.

Well I.D.: SB-3

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Project: OSMOSE OZONE
Location: BUFFALO, NEW YORK
Project No.: 01110-5306 Date: 12/2/92
T.O.C. Elev.: Well Depth: NA
Explor. Depth: 14' Hole Dia.: 6 1/2"
Casing – Dia.: NA Length: NA Type: NA
Screen – Dia.: NA Length: NA Slot Size: NA
Drilling Co.: EDI Driller: S. GINGRICH Logged by: J.O.G.
Drilling Method: HSA Sampling Method: 3" SPLIT-SPOON
Notes:

Sketch Map: SEE SITE MAP FOR LOCATION

Key: Concrete | Bentonite | Native Backfill | Sand/Gravel Pack | Well Screen | Water Table

Depth (feet)	Well Construction	Sample No.	% Rec.	Blows/ Density	PID Rdg. (ppm)	Depth (feet)	Soils/Lithology
0						0	
1		1	40%		7.9	1	0 – 2' 0 – 0.5' asphalt 0.5' – 1.5' moist, gray, SILT and GRAVEL with some sand 1.5' – 2.0' moist, black SILT with some clay, little coarse sand
2						2	
3		2	70%		6.4	3	2' – 4' 2.0' – 2.5' same 2.5' – 4.0' moist, brown, CLAY with some silt, trace coarse sand
4						4	
5		3	70%		44.3	5	4' – 6' SAME bottom 2" SILT and CLAY
6						6	
7		4	70%		555	7	6' – 8' moist, brown, CLAY with little silt, trace sand
8						8	▼
9		5	80%		313	9	8' – 10' 8.0' – 8.5' saturated, brown, SAME 8.5' – 10.0' saturated, gray, SILT and CLAY with trace sand
10						10	
11		6	100%		81.5	11	10' – 12' saturated, brown, SILT with some clay, trace sand
12						12	
13		7	100%		38.2	13	12' – 14' SAME
14						14	
15						15	
16						16	
17						17	
18						18	
19						19	
20						20	
21						21	
22						22	
23						23	
24						24	
25						25	

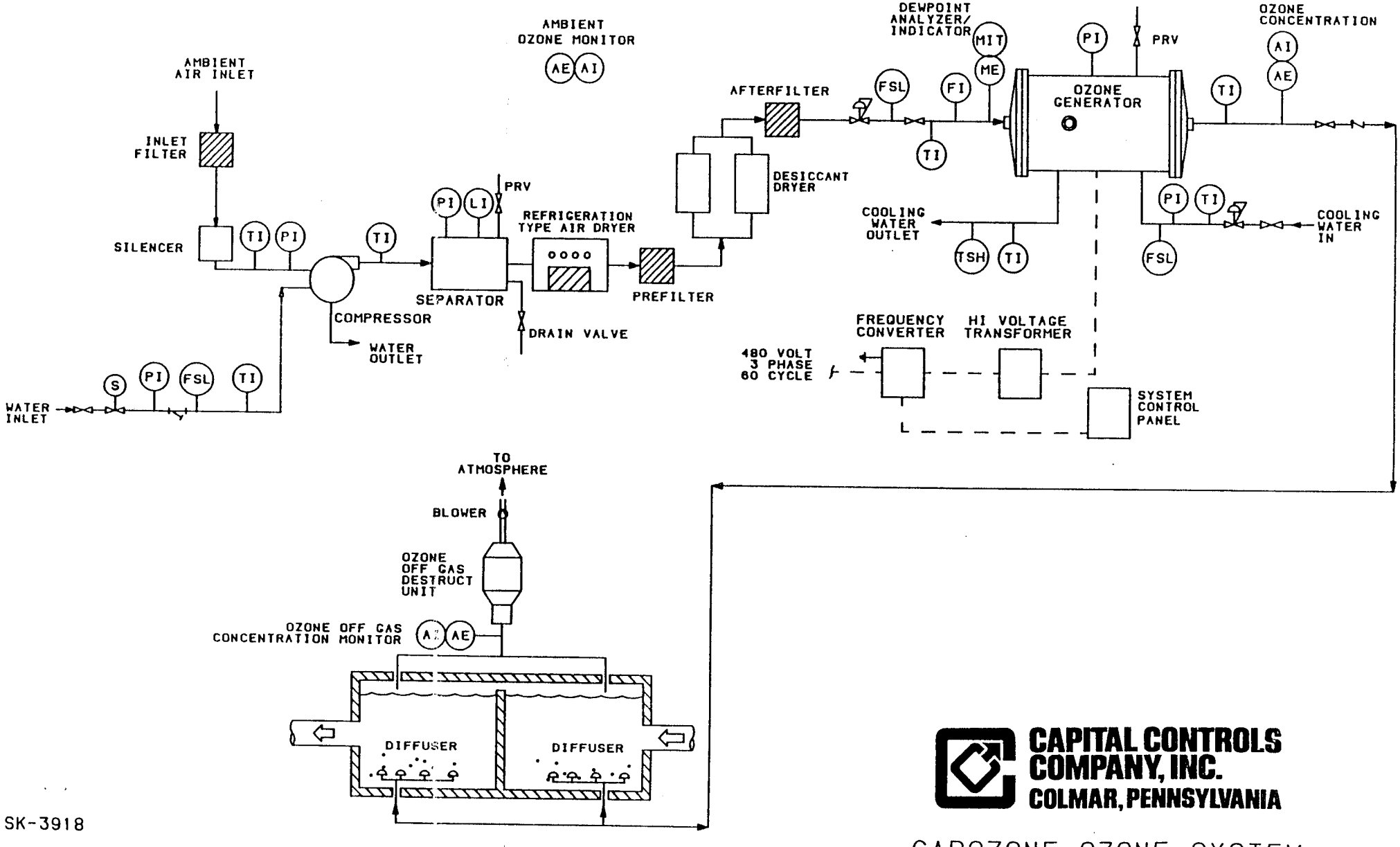
Tab B

CAPITAL CONTROLS COMPANY, INC.

MEGOS PILOT OZONE GENERATOR
EQUIPMENT LIST

Item	Quantity	Description
A	1	Capital Controls 26 PPD Megos Pilot Plant.
		The Megos generator is a horizontal tube, water cooled, corona discharge ozone generator with the advanced Megos dielectrics.
		The plant is designed to produce 26 pounds per day of ozone at a concentration of 7.5% O_3 by weight (100 g/Nm^3).
		System includes:
	1	Medium frequency power supply with: - On/off push buttons - Power on indicator - Standby indicator - Voltage indicator - Voltage regulator, manual, 200-500 volts output - Frequency indicator - Frequency regulator, manual, 200-700 Hz output - Malfunction indicator - Reset push button
	1	High voltage transformer (20:1)
	1	Pressure reducing valve (for gaseous oxygen service)
	1	Control valve for adjusting ozone/oxygen flow
	1	Flow meter for ozone/oxygen mixture
	1	Ozone concentration monitor
	1	Dew point monitor
		Dimensions: 95" (W) x 59" (D) x 79" (H)
		Note: Generator is mounted inside a shipping container with dimensions of 8' x 10' x 8'.
		Shipping Weight: 4500 pounds
		Utilities Required (to be supplied by customer):
		Electricity Ozone Generator: 480V, 3 phase, 60 cycle, 35 amperes
		Auxiliary Instruments: 120V, single phase, 60 cycle, 10 amperes, duplex receptacle

Item	Quantity	Description
		Cooling Water 4 GPM, potable water quality, 60-75^{O}F., 1/2" NPT female connection (once through system, cooling water exit should be piped to drain via flexible hose), 1/2" tubing barb fitting.
B	1	Static mixer with 316L stainless steel diffuser. Komax multiple element static mixer, 4 inches diameter.
C	1	Installation and start up of Megos plant by factory personnel.
D	1	Operator training for Megos plant by factory personnel.
E	1	Compressor, 15 HP rotary screw type, tank mounted, rated 100 PSIG @ 44 SCFM.
F	1	On site pressure swing oxygen generator. Designed to produce oxygen from above air compressor.

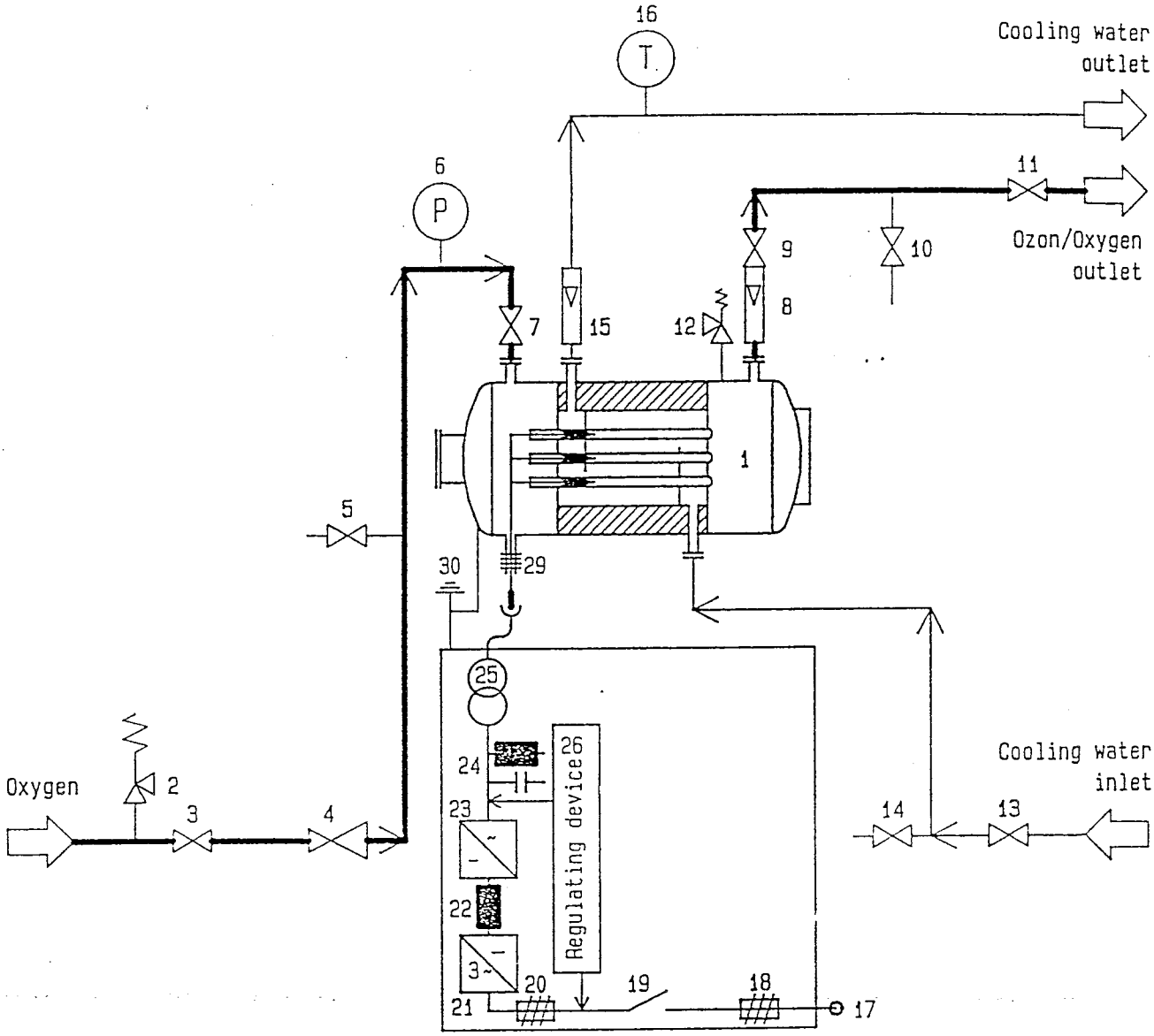


SK-3918

CAPITAL CONTROLS COMPANY, INC.
COLMAR, PENNSYLVANIA

CAPOZONE OZONE SYSTEM (TYPICAL)

SCHMIDDING WERKE KÖLN UND HANNOVER	Funktiondiagram and delivery from an Ozone Plant with Medium Frequency	Oxygen



1	Ozon Generator	16	Thermometer
2	Safety valve	17	Power-line current
3	Shut off valve	18	Pre-fastening
4	Pressure reducing valve	19	Switch
5	Sampling	20	Semi-conductor fastening
6	Pressure gauge	21	Rectifier
7	Shut off valve	22	Direct current-intermediate circuit
8	Flow metering	23	Inverted converter
9	Regulation valve	24	Auxiliary-oscillating circuit
10	Sampling	25	High voltage Transformer
11	Shut off valve	26	Regulating device
12	Safety valve		
13	Shut off valve		
14	Coolant water discharge valve	29	High voltage passage
15	Flow-monitor	30	Connect to earth

Gerneral remarks

The ozone inverter is a static frequency converter, which is used for the supply of an ozone-production system.

Ozone can be produced in a gas-discharge tube with glass as dielectric. This process has the same effect on the converter, as an ohm-capacitive load applied on it.

Through variation of its electrical output signals, the converter can regulate the ozone production.

Contents

1. Sytem components
1.1 Power unit
1.1.1 Block diagram
1.2 Regulation principle
1.2.1 Voltage control
1.2.2 Current control
1.2.3 Frequency generation
1.2.4 Diagram of functions

2. Control functions
2.1 Electronic control unit
2.2 Additional control circuit

3. Operation
3.1 Main connections
3.2 Converter operation
3.3 System protection functions
3.4 Ventilation

4. Service-Maintenance

5. Spare parts
5.1 Control circuit plug-in unit
5.2 Control circuit plug-in cards
5.3 Electronic circuit protection
5.4 Power unit
5.5 Type description of spare parts

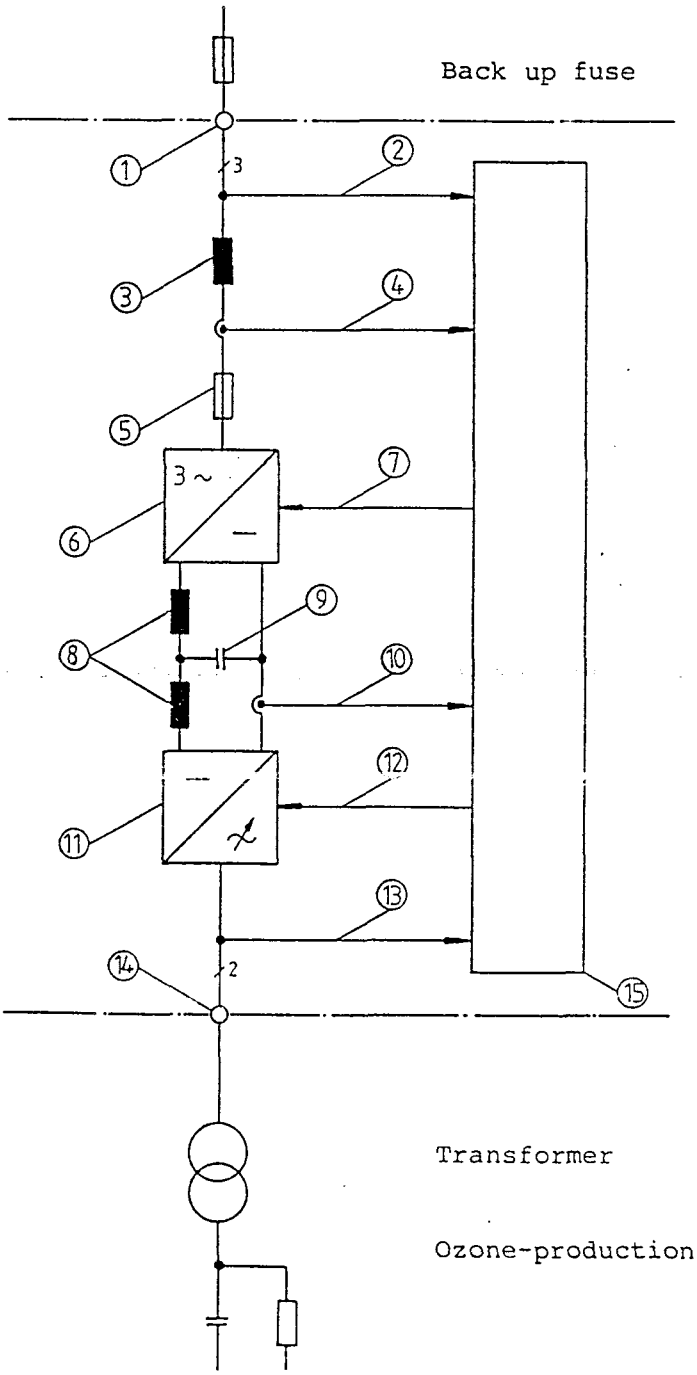
For control circuit and electronic control unit description, see separate manual.

1. System components

1.1 Power unit

The converter is supplied with a 3 phase AC voltage with constant frequency. A 3 phase bridge rectifier forms a controllable direct current, which can be smoothed with the use of an inductor. With the introduction a load driven 2 phase inverter the direct current is converted into an alternative output current with variable frequency. The load voltage depends directly on the load impedance.

1.1.1 Block diagramm



1 3 phase AC supply

2 Synchronisation voltage

3 3 phase smoothing inductor

4 Network current actual value

5 Semiconductor fuse

6 Rectifier

7 Thyristor triggering

8 Filter inductance

9 Capacitor

10 Direct current actual value

11 Inverter

12 Thyristor triggering

13 Output voltage actual value

14 Load connection

15 Electronic control unit

1.2 Regulation principle

The functions of the electronic control unit are shown in the respective Signal-flow Diagram. All input signals and commands are directed to the right and all output signals and commands are directed to the left. The listed relays provide the external connection terminals with operating messages via voltage free contacts.

The numbers on the flow chart correspond to the respective plug-in cards on which the switching operations take place.

1.2.1 Voltage control

The set voltage is driven via an integrator and then compared with the actual output voltage. The voltage controller forms in his output the set value for the current control.

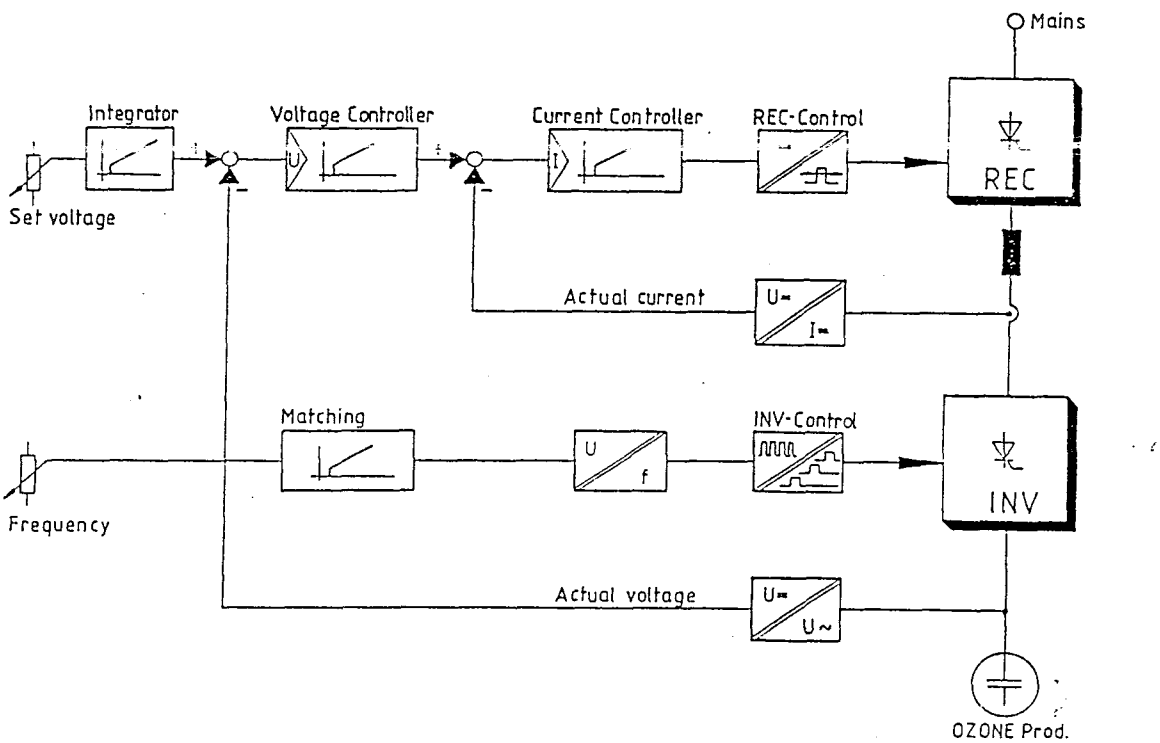
1.2.2 Current control

The signal obtained from the comparison of the set value, formed by the voltage controller, and the DC actual current value, is driven via the current controller to the Rectifier Control-Pulse Circuit (RCPC)

1.2.3 Frequency generation

The set frequency is being driven via an integrator and a matching amplifier and then converted to a certain frequency value. A divider circuit forms the respective pulse-pattern for the inverter.

1.2.4 Diagram of functions



2.2 Additional control circuit

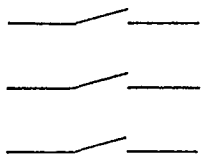
Within the additional control circuit further user-functions are available:

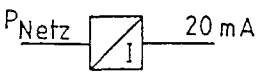
Control circuit

Set value options

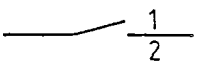
1 Internal/ 2 External

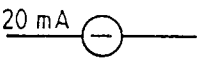
The set output voltage as I-signal





External terminals





Message Ready

System On

System Malfunction

Network active power

3. Operation

3.1 Main connections

The converter is switched on and off by the electronic control unit. Using of a switch to control the operation (on/off) of the converter must be avoided.

The input terminals L1/L2/13 must be connected with a clockwise rotating field.

For the synchronsisation of the rectifier, a neutral point conductor N or PEN (wattless) is appropriate. For unearthed supply networks an artificial neutral point is foreseen.

The ozone inverter is not operative when its output terminals U1/V1 are open. A short circuit during the converter operation leads to switching off due to overcurrent.

The current controller functions can be checked, if the converter is switched on with its output terminals U1/V1 short circuited.

3.2 Converter operation

Depending on the version, the ozone inverter can be switched on

a) by means of a push-button on the cabinet door

b) by means of continuous contact making via terminals

The control process begins principally with the internally set starting frequency.

Continuous increase of the network current results eventually to the activation of the "starting threshold". The formation of the output frequency is then switched over to the potentiometer for the set output frequency, which is on the cabinet door.

The desired frequency can be adjusted.

The adjustment of the output voltage depends on the options "Internal/ External" and results:

a) Internally by means of a potentiometer on the cabinet door

b) Externally by means of a current signal via terminals

The working values of frequency and voltage can be free adjusted within the given min/max limits. The current can be controlled in the same way.

If, however, the system exceeds the current limit (rated current), the output voltage must automatically drop (overload). The error can be canceled if frequency is brought down.

3.3 System protection functions

For cable and in instrument protection, special protection organs are within the OZI-system available:

Semiconductor fuse	Protects the converter's power unit: against faulty activation (triggering) against thryristor fault
Motor protection switch	Fuse protection of the actual voltage acquisition system Protection of the electronic circuit-supply unit against shortcircuit or overload of the 24 V supply circuit.
Temperature-sensing device	Monitoring of the thyristor-cooling attachment concerning max operating temperature.
Electronic monitoring	Protective switching off with indication, storage and message: on instruments overvoltage on output overvoltage on network voltage break on short break down of the network voltage
Control of functions	The converter is switched off, when the output voltage deviates from the min. voltage for a time longer than a specified time: due to commutation fault due to control deviation due to line interruption
Ventilation	The adequate ventilation of the switch cabinet should not be disturbed.

4. Service-Maintenance

All parts of the converter belonging to the categories which are foreseen by the VDE 0100/part 750 or VBG 4 regulations, are cover protected against touching by accident.

The converter must be switched off before any maintenance work begins. Protection covers should only temporarily be removed, i.e. during parts replacement.

Attention: There is a residual voltage on the link capacitor C7 after the disconnection (main switch is off) from the supply voltage. The link capacitors must be discharged, after switching off the inverter through the main switch, if works within the inverter power-until-circuit must take place.

Discharge process: For the discharge of the link capacitors a wire resistor 100-500 Ohm / 25 Watt must be used. For this purpose, the resistor must be connected with both terminals of the capacitor C7 for about 20 sec, by using insulated wires. Before touching any part of the power unit-circuit, it must be checked with the use of a voltmeter, if the capacitors are free of voltage.

The inverter system must be disconnected from the supply voltage before removing the electronic circuit plug-in cards.

The voltage level for the electronic control cirquit is 24 V.
The reference potential 0 V is earthed. The electronic control circuit must be protected against noise. In order to avoid disturbances , externally supplied signals must be free of potential.

The air filters must be regularly tested for transmissivity. Dirty air filters must be replaced.

The fan motors have a theoretical life-time of about 20,000 hours of operation.

5. Spare parts

5.1 Control circuit plug-in unit

A complete electronic control circuit in the form of a plug-in unit, can be foreseen as a function-tested spare part (under consideration of the important operation-specific settings).

5.2 Control circuit plug-in cards

The following control circuit plug-in cards are standard parts and can be installed without any modification:

- Supply unit
- Rectifier-triggering circuit
- Inverter-triggering circuit
- Scaling circuit (counter)
- Regulating circuit
- Actual value circuit
- Indication circuit (Frequency indication signal is necessary)

The operation-specific plug-in cards must be aligned before their insertion, during the putting into operation procedure. This includes:

- Adjusting circuit card
- OZI-Plug-in card

5.3 Electronic circuit protection

The 24 VDC-auxiliary supply output is fuse protected within the control plug-unit. The fuse is on the electronic circuit wiring board.

Fuse type: 1,25 A flink/250 V
IEC 127 - 11/D 5mm x L 20mm

5.4 Power unit

Recommended basic equipment of spare parts for the components of the power unit:

- Fuses
- Semiconductor fuses
- Fans
- Air filters
- Thyristors
- Gate circuit units
- Voltage transformers
- Current transformers

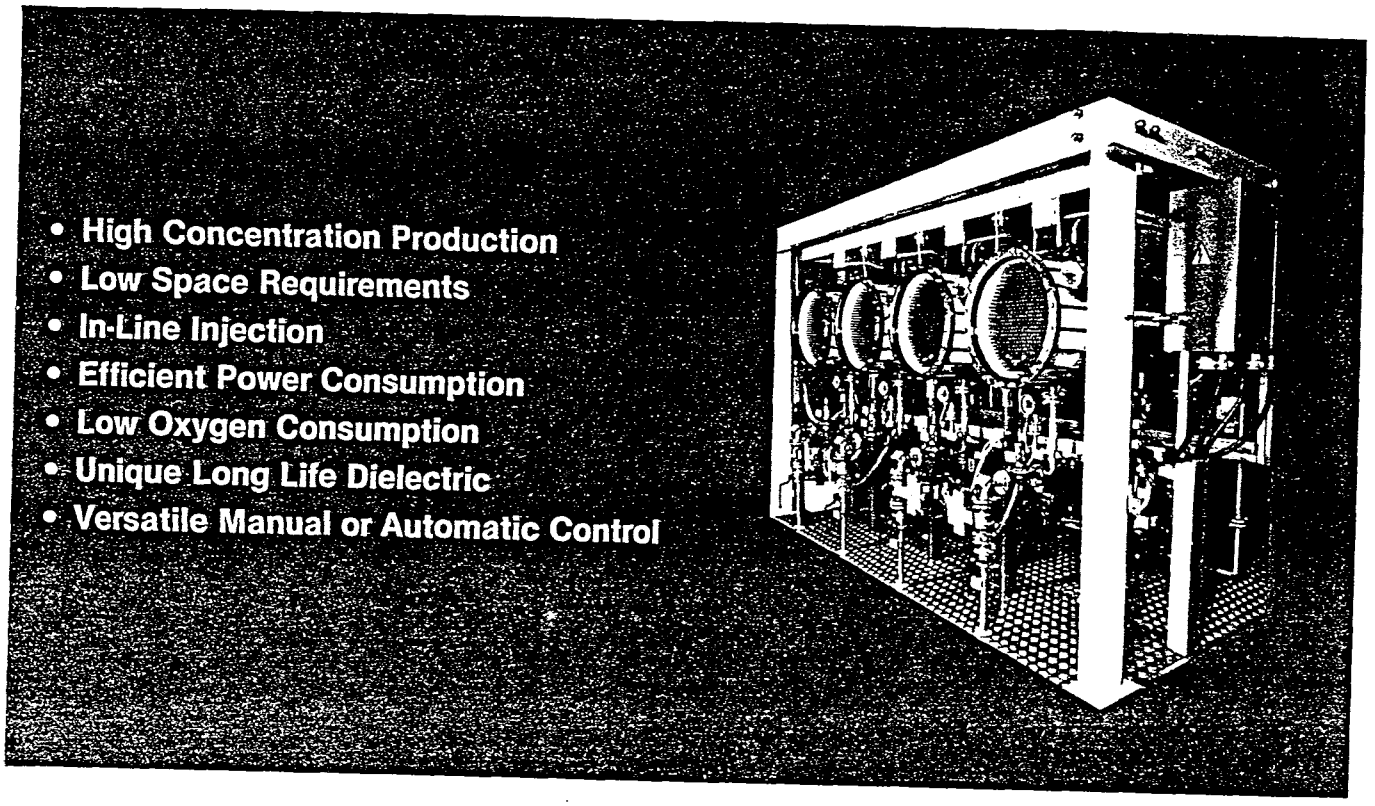
5.5 Type description of the spare parts

The exact type-description of the parts, can be taken from the project-related parts list.

SERIES 7200

MEGOS® OZONE GENERATORS

CAPITAL CONTROLS COMPANY, INC



The importance of ozone as an oxidizing agent has increased considerably because it is one of the most effective means of meeting tougher drinking water standards. Ozone is also being implemented for pulp bleaching.

Hundreds of drinking water plants throughout the world use ozone technology. Effective treatment of both industrial and municipal wastewater with ozone has been achieved in several areas. Additional ozone applications include cooling water treatment, chemical oxidation processes, gas scrubbing and other disinfection processes.

The MEGOS®[1] Ozone Generator represents one of the most cost-efficient means of ozone production. It is designed to produce a high concentration of ozone up to 10% by weight, 150 gm/m^3) in less space by using smaller-than-conventional glass dielectric tubes and advanced electronics for energy conservation.

The skid-mounted system is pre-wired and pre-piped, requiring only field connection of oxygen inlet, ozone/oxygen outlet, cooling water inlet and outlet, and power supply.

Glass viewing ports are provided at each end of the stainless steel generator for internal inspection during operation.

The open glass tubes allow feed-gas (oxygen) to flow both inside and outside of the dielectric, increasing the ozone producing area and enhancing cooling of the high-voltage electrode.

The smaller dielectric reduces the total equipment space requirements, resulting in smaller than conventional ozone generator construction and lower installation costs.

A frequency converter controls the concentration and rate of ozone production by varying the voltage and frequency output to the high voltage transformer.

Medium (200 to 650 Hz) frequency capacities range from 26 to 1600 pounds per day (.5 to 30 kilograms per hour). Larger systems are readily configured by using multiple units.

[1]Fabricated under license from Schmidding-Werke

Principal of Operation

The MEGOS® generator is configured similar to a shell and tube heat exchanger with a number of stainless steel tubes mounted in the generator. The number of tubes depends on the capacity of ozone production desired. The generator operates on the principal of a corona or silent electric discharge. The small diameter (less than 10 mm) dielectric glass tubes, hollow and open on each end, are mounted in the stainless steel tubes. An electrode, made of four small diameter stainless steel rods, is positioned within the glass tubes. These rods have a small radius of curvature which enables a high-density electrical field to be produced at a lower power consumption (typically at approximately 4.5 kWh/lb. ozone at 7.5% by wt. [100 g/m³] concentration). Oxygen flows in the annular space between the tube and the dielectric, as well as the hollow space inside the dielectric. On exposure to the high voltage discharge, diatomic oxygen disassociates, and ozone is formed. Cooling water is used on the shell side to remove excess heat, and minimize ozone thermal decomposition.

High-concentration ozone production allows economical oxygen consumption. At 100 g/m³ concentration, approximately 160 SCF of oxygen is required per pound of ozone produced (10 Nm³ of oxygen/kg ozone). In addition to attractive economics of reduced oxygen consumption, high ozone concentrations reduce mass transfer requirements, reduce contactor size, and minimiize off-gas quantity.

Ozone contact systems are designed to maximize ozone utilization into a process stream. Contactor types include fine bubble diffuser chambers, packed columns, venturi injectors, static mixers, and turbine agitators. Contact tanks are custom designed for each location's hydraulics and mass transfer requirements.

The use of an injector for ozone addition in pressurized water lines eliminates the need for a contact chamber and provides complete mixing. The MEGOS® generator design has the potential to eliminate ozone off-gas and provide full utilization of the ozone produced. Each application must be individually evaluated.

Off-gas destruct units are compact, low temperature, catalytic units designed to destroy ozone from maximum concentrations present to below the EPA ambient limit of 0.12 ppm by volume.

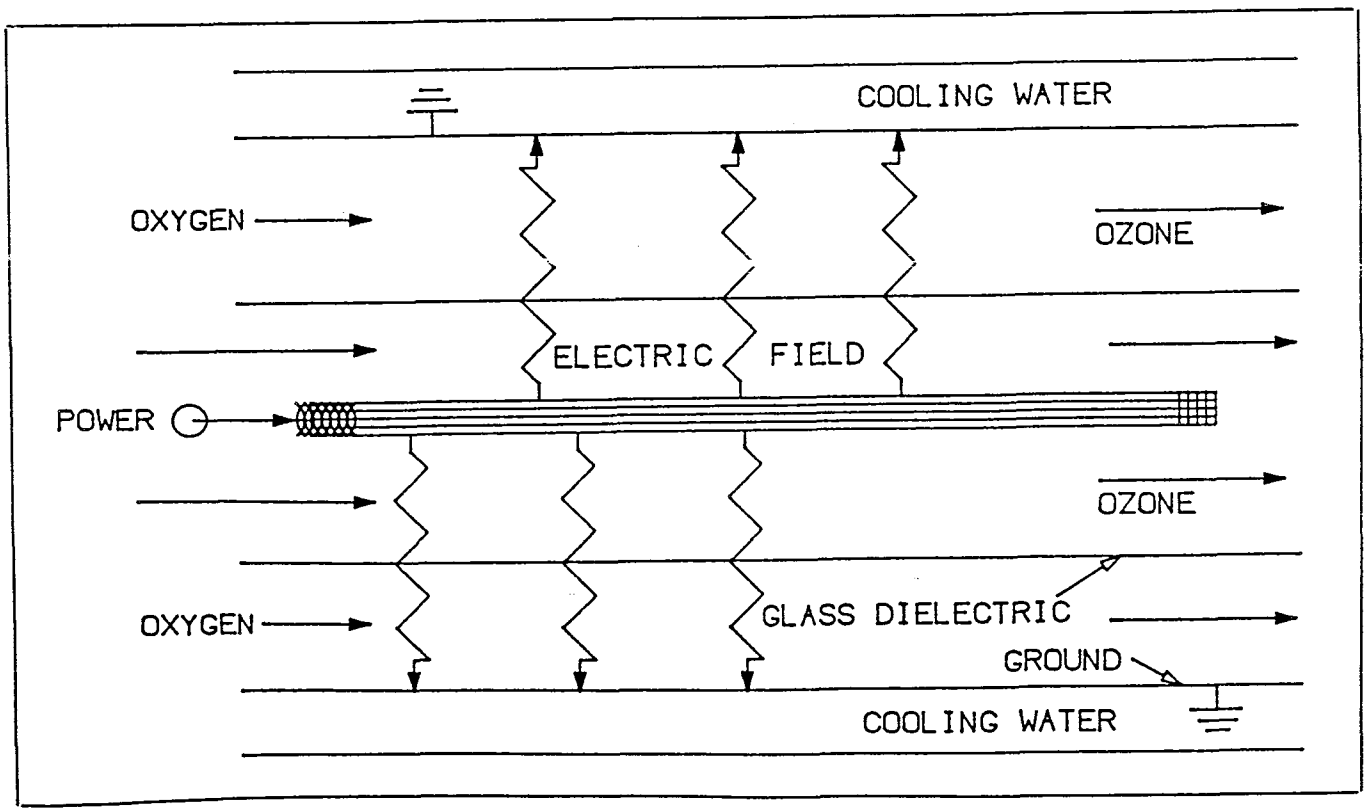
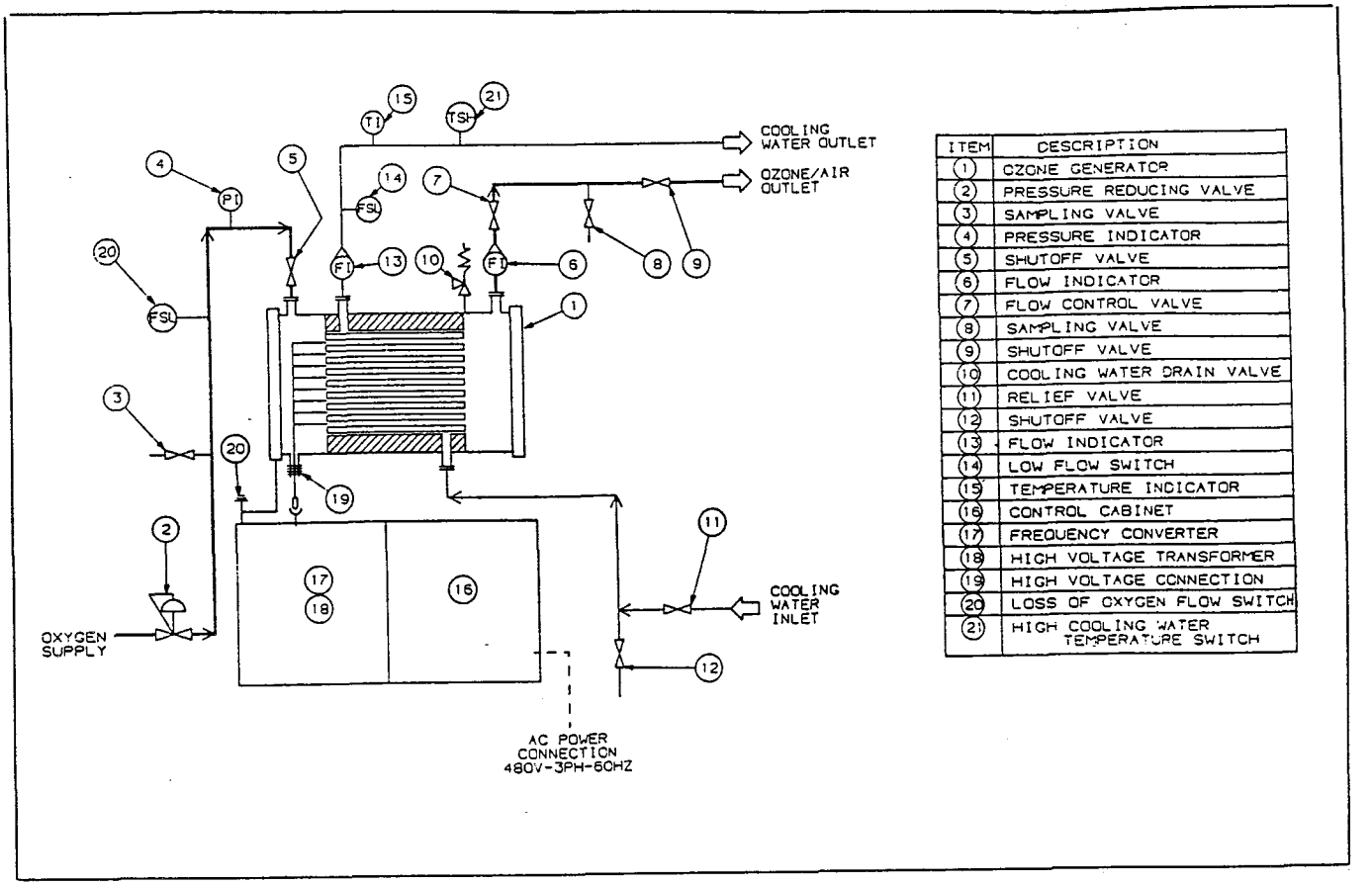


Figure 1—**MEGOS® Tube**



ITEM	DESCRIPTION
1	OZONE GENERATOR
2	PRESSURE REDUCING VALVE
3	SAMPLING VALVE
4	PRESSURE INDICATOR
5	SHUTOFF VALVE
6	FLOW INDICATOR
7	FLOW CONTROL VALVE
8	SAMPLING VALVE
9	SHUTOFF VALVE
10	COOLING WATER DRAIN VALVE
11	RELIEF VALVE
12	SHUTOFF VALVE
13	FLOW INDICATOR
14	LOW FLOW SWITCH
15	TEMPERATURE INDICATOR
16	CONTROL CABINET
17	FREQUENCY CONVERTER
18	HIGH VOLTAGE TRANSFORMER
19	HIGH VOLTAGE CONNECTION
20	LOSS OF OXYGEN FLOW SWITCH
21	HIGH COOLING WATER TEMPERATURE SWITCH

Figure 2—**MEGOS® Ozone Generator**

General Specifications

Capacity: up to 1600 PPD (30 kg/h)
Larger feed requirements incorporate multiple units.

Concentration: Generators can be designed to produce up to 10% ozone by weight (150 g/Nm³).[1]

Utilities Required:

Electricity: 480 Volt, 3 phase, 60 Hz (typical) Other voltages available.

Oxygen: (flow dependant on production/concentration)[1]
Example: 160 SCF oxygen required for 1 lb ozone @ 7.5% ozone by weight.

Approximate Cooling Water: 180 gallons/lb ozone produced[1].

[1]Subject to operating parameters.

Standard Equipment

Stainless Steel MEGOS® Ozone Generator

Small Diameter Glass Dielectrics

Medium Frequency Advanced Electronics

Feed-gas Flowmeter

Pressure Reducing Valve

Pressure Gauge

Cooling Water Flow Meter

Temperature Indicator

Isolation Valves

Safety Relief Valves

Control Panel:
- Voltage Controller
- Voltmeter
- Ammeter
- Frequency Indicator
- Main Power Switch with Indicating Light
- High Voltage Switch with Indicating Light
- Cooling Water Indicating Light

Optional Equipment

Ozone Concentration Monitor

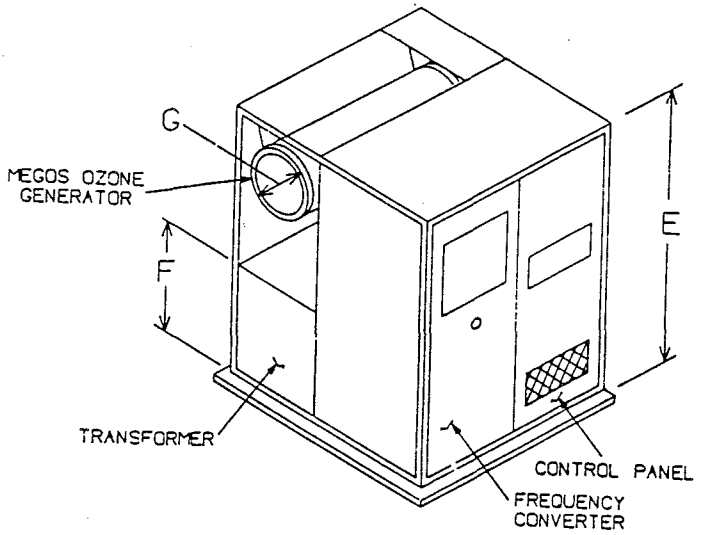
Ambient Ozone Monitor

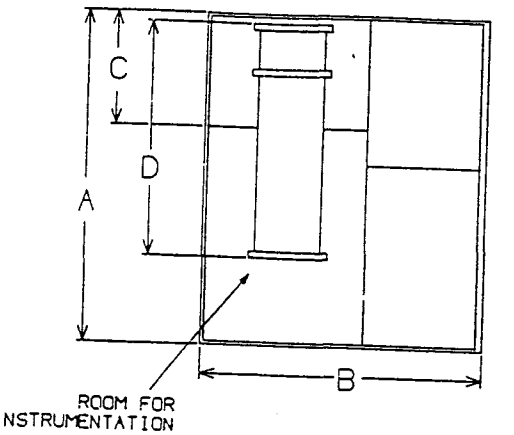
Dew Point Monitor

Process Monitoring Instruments

Design and Fabrication of:
- Contact Systems
- Ozone Off-gas Destruct Units

Dimensions





PLAN VIEW

Capacity gm/hr-PPD	A m/FT	B m/FT	C m/FT	D m/FT	E m/FT	F m/FT	G m/FT	Weight approx. kg/LBS[1]
750-40	1.75/5.74	1.5/4.92	0.6/1.97	1.72/5.64	2.1/6.89	0.5/1.64	0.200/.66	1.900/4.19
1000/53	1.75/5.74	1.5/4.92	0.6/1.97	1.72/5.64	2.1/6.89	0.5/1.64	0.250/.82	2.000/4.41
1500/80	1.75/5.74	1.5/4.92	0.6/1.97	1.72/5.64	2.1/6.89	0.5/1.64	0.300/.98	2.100/4.63
2000/105	1.75/5.74	1.5/4.92	0.7/2.30	1.72/5.64	2.1/6.89	0.6/1.97	0.400/1.31	2.150/4.74
2500/135	1.75/5.74	1.5/4.92	0.7/2.30	1.72/5.64	2.1/6.89	0.6/1.97	0.450/1.48	2.200/4.85
3000/160	2.00/6.56	1.5/4.92	0.8/2.62	1.72/5.64	2.1/6.89	0.7/2.30	0.500/1.64	2.250/4.96
3500/185	2.00/6.56	1.5/4.92	0.8/2.62	1.72/5.64	2.1/6.89	0.7/2.30	0.500/1.64	2.500/5.51
4000/210	2.00/6.56	1.5/4.92	0.8/2.62	1.72/5.64	2.1/6.89	0.7/2.30	0.500/1.64	2.750/6.06
4500/238	2.00/6.56	1.5/4.92	0.9/3.00	1.72/5.64	2.1/6.89	0.8/2.60	0.550/1.80	3.100/6.8
6000/316	2.00/6.56	2.0/6.56	0.9/3.00	1.72/5.64	2.1/6.89	0.8/2.60	0.620/2.00	4.000/8.8
7500/396	2.00/6.56	2.0/6.56	0.9/3.00	1.72/5.64	2.1/6.89	0.8/2.60	0.700/2.30	4.500/9.9

APPROXIMATE DIMENSIONS OF A SINGLE GENERATOR SKID.

Larger capacity skids are available, consult factory.
[1]Weight in thousands of kilograms/pounds.
Design improvements may be made without notice.

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Pub No 588-4 12/92 4M

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Low concentration and high concentration

OZONE MONITORS

LC-12
EPA DESIGNATED
EQUIVALENT
METHOD

PCI OZONE & CONTROL SYSTEMS, INC.®

A Subsidiary of PCI, Inc.

Low concentration and high concentration ozone measurement

Ozone measurements in air are made primarily at two concentration levels, each requiring a specifically designed meter. Low concentration measurements, usually in the range of 0-2 ppm (parts per million) by volume, are used for ambient atmospheric monitoring and process control. High concentration measurements, usually in the range of 0-5 percent by weight, are used mainly to determine the ozone production rate from an ozone generator.

Four principal methods for measuring ozone

Ozone measurements may be made by either manual-wet-chemical or instrumental methods. Most manual-wet-chemical methods are based on the oxidation of potassium iodide by ozone and its subsequent reduction by titration with sodium thiosulfate. The most common instrumentation methods for measuring ozone are based upon amperometric, chemiluminescent or ultraviolet absorption techniques.

Buffered alkaline potassium iodide

The buffered alkaline potassium iodide method was once the reference method for measuring ozone in air, but its use has caused much controversy. The method is not specific to ozone; it responds to other oxidants or gases that are also in air. There are doubts about its accuracy and precision, even when the tests are performed by skilled laboratory technicians. It cannot be used for operations that require automatic control and continuous recording.

Amperometric

The crudest instrumental method is the amperometric ozone monitor. It operates on the same principle as the buffered alkaline potassium iodide method and has all of its drawbacks. It is not specific to ozone, and therefore, its accuracy is questionable. The amperometric ozone monitor requires the use of corrosive chemicals which are often spilled inside the monitor. Experience has shown that the acid in the sensing solution often leads to self-destruction of the meter.

Chemiluminescent

During the 1970s, the most commonly used instruments for ambient atmospheric monitoring were "Chemiluminescent" monitors. They operate on the principle that the chemical reaction between ozone and ethylene produces a small amount of measurable light. This method is not subject to interference by other gases commonly found in the atmosphere, but it does have several operational problems. The monitors have a complicated flow system required to maintain exact flows of the two gases. Because of its many operating parts, this system is susceptible to breakdown. It also requires the use of ethylene which is a highly flammable gas.

For safe operation of a chemiluminescent monitor, it is mandatory that all ethylene cylinders be stored outdoors or in a room specially made for handling and storing. In some cases, a diluted version of ethylene gas has been used. This gas can be stored indoors but the flow rate of this gas must be many times greater than pure ethylene. Furthermore, the operating cost is prohibitively high. Chemiluminescent analyzers often require considerable maintenance and because they also use a costly gas, they are very costly to operate.

Ultraviolet light absorption

The most reliable method for measuring ozone in air is based on the ozone absorption of ultraviolet light in accordance with the Beer-Lambert Law. This method eliminates messy chemicals or expensive gases. It is also the only instrumentation method that easily makes both high and low ozone concentration measurements.

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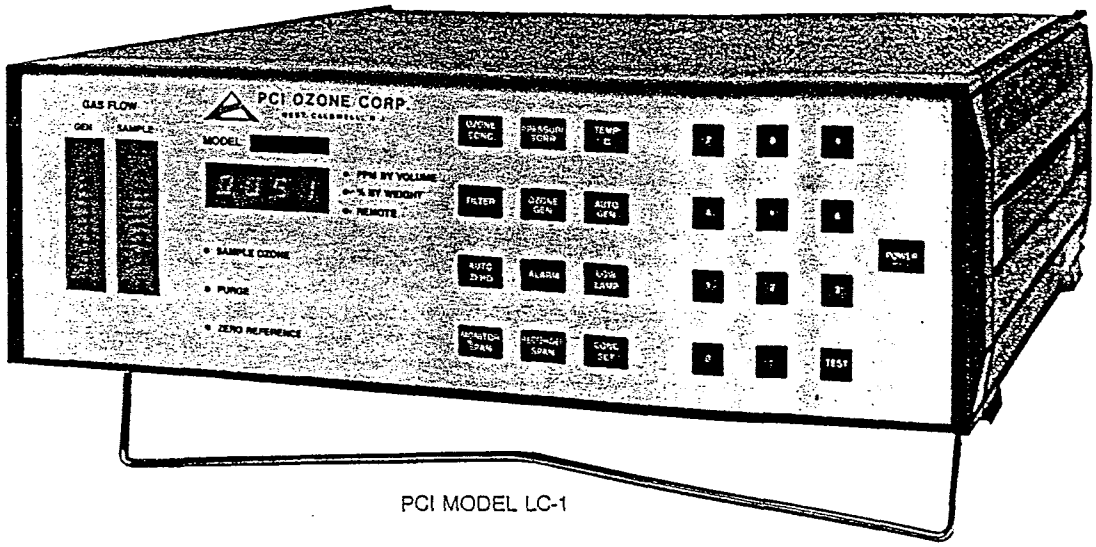
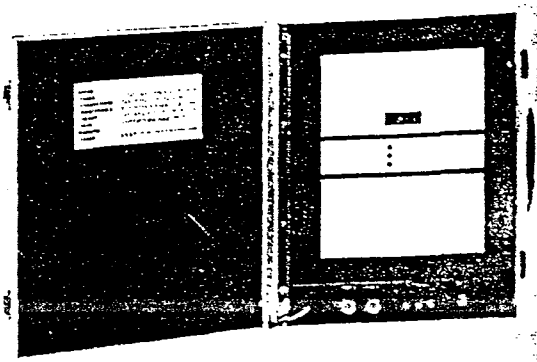
Low concentration and high concentration
OZONE MONITORS



PCI MODEL LC-1

Model HC-P portable suitcase enclosure



Enclosures available for PCI Models HC and LC are:
- SUITCASE
- NEMA 1 rack-mount
- NEMA 4 (water-tight and dust-tight)
- NEMA 12
  (dust-tight and drip-tight, non-ventilated)

PCI Models LC (low concentration) and HC (high concentration) Ozone Monitors utilize the ultraviolet absorption technique for measuring ozone concentration. By comparison they offer several distinct advantages over other ultraviolet ozone monitors.

Most ozone monitors are intended for use as laboratory instruments. When laboratory type instruments are employed in treatment plants or industrial environments, they often do not function as designed. Experience has shown that when wiring and plumbing corrode, and dust accumulates, premature failure occurs.

Laboratory ozone monitors are often too complicated for plant operators and maintenance personnel not trained in use of complicated laboratory instrumentation. After several monitor failures, the instrument is often left inoperative.

For applications in harsh environments, PCI Ozone Monitors are manufactured in a NEMA 12 enclosure to prevent corrosion. Only the most reliable components are used in the instrument, but if maintenance or repair is required, any part may be removed and replaced by a person without any special technical expertise in thirty minutes or less. There are no mechanical adjustments on the optical assemblies. The instrument is self-adjusting. Ruggedness, careful design, ease of operation and ease of maintenance ensure continued, trouble-free operation.

The PCI Ozone Monitor utilizes an advanced microcomputer design. Because of the microcomputer system, the unit makes precise calculations throughout the entire range of the instrument and performs important self-diagnostic functions. This feature allows PCI Ozone Monitors to meet or exceed the performance specifications of laboratory ozone monitors at a lower first cost. Since PCI Ozone Monitors do not require chemicals or gases, operating and maintenance costs are considerably lower.

LC OZONE MONITOR

Standard Range	0.000 to 9.999 PPM by volume (digital readout, one range)
Available Ranges	0-100, 0-1000, 0-10,000 PPM by volume
Accuracy	3% (based on the Beer-Lambert Law)
Zero Drift	Less than 0.001 PPM per day
Span Drift	Less than 0.5% per day Less than 1.0% per week
Incremental Sensitivity	0.001 PPM
Precision (Repeatability)	1% or 2 digits, whichever is greater
Cycle Time	20 seconds nominal
Rise Time	Less than 2 minutes
Fall Time	Less than 2 minutes
Linearity	Better than 1% from 0.000 to 9.999 PPM
Temperature Range	5°C to 45°C
Sample Gas Flow Rate	1 liter/minute, nominal (by internal pump)
Power Input	115 Volts ± 10% AC, 50 to 60 Hz, 25 watts
Recorder Output Ranges	NEMA 12: Rotary switch selects: 0.2 PPM; 0.5 PPM; 1.0 PPM; 5.0 PPM; 10.0 PPM NEMA 1: Recorder span may be set to any value up to 9.999 PPM
Recorder Output	0-0.1V (min. load 9K Ohms), 0-1V (min. load 20K Ohms) Optional 4-20 ma (max. load 550 Ohms)
Alarm Output	NEMA 12: 4 PDT, dry contacts, 2 Amps max. @ 120 VAC NEMA 1: SPDT, dry contacts, 2 Amps max @ 250 VAC
Enclosures Available	NEMA 12, NEMA 4: H-16", W-14", D-6", 25 lbs. (LC-12, LC-4) NEMA 1: H - 5¼", W - 16¾", D - 16⅞", 15 lbs. (LC-1) Portable: H - 15½", W - 18½", D - 9½", 20 lbs. (LC-P)
Temperature & Pressure Compensation	LC-1: Temperature compensation standard; pressure compensation optional

HC OZONE MONITOR

Range	0.000 to 9.999% by weight (digital readout, one range)
Accuracy	3% (based on the Beer-Lambert Law)
Zero Drift	Less than 0.001% by weight per day
Span Drift	Less than 0.5% per day Less than 1.0% per week
Incremental Sensitivity	0.001% by weight
Precision (Repeatability)	1% or 1 digit, whichever is greater
Cycle Time	20 seconds nominal
Rise Time	Less than 30 seconds
Fall Time	Less than 30 seconds
Linearity	Better than 1% from 0.000 to 9.999% by weight
Temperature Range	5°C to 45°C
Sample Gas Flow Rate	1 liter/minute, nominal
Power Input	115 Volts ± 10% AC, 50 to 60 Hz, 15 Watts
Recorder Output Ranges	NEMA 12: Rotary switch selects: 0.2%, 0.5%, 1.0%, 5.0%, 10.0% by weight NEMA 1: Recorder span may be set to any value up to 9.999% by weight
Recorder Output	0-0.1V (min. load 9K Ohms), 0-1V (min. load 20K Ohms) Optional 4-20 ma (max. load 550 Ohms)
Alarm Output	NEMA 12: 4 PDT, dry contacts, 2 Amps max. @ 120 VAC NEMA 1: SPDT, dry contacts, 2 Amps max. @ 250 VAC
Enclosures Available	NEMA 12, NEMA 4: H-16", W 14", D-6", 25 lbs. (HC-12, HC-4) NEMA 1: H - 5 1/4", W - 16 3/4", D - 16 7/8"; 15 lbs. (HC-1) Portable: H - 15 1/2", W - 18 1/2", D - 9 1/2"; 20 lbs. (HC-P)
Temperature and Pressure Compensation	HC-1: Temperature compensation standard; pressure compensation optional

RMANCE ▲ COMMITMENT ▲ INTEGRITY

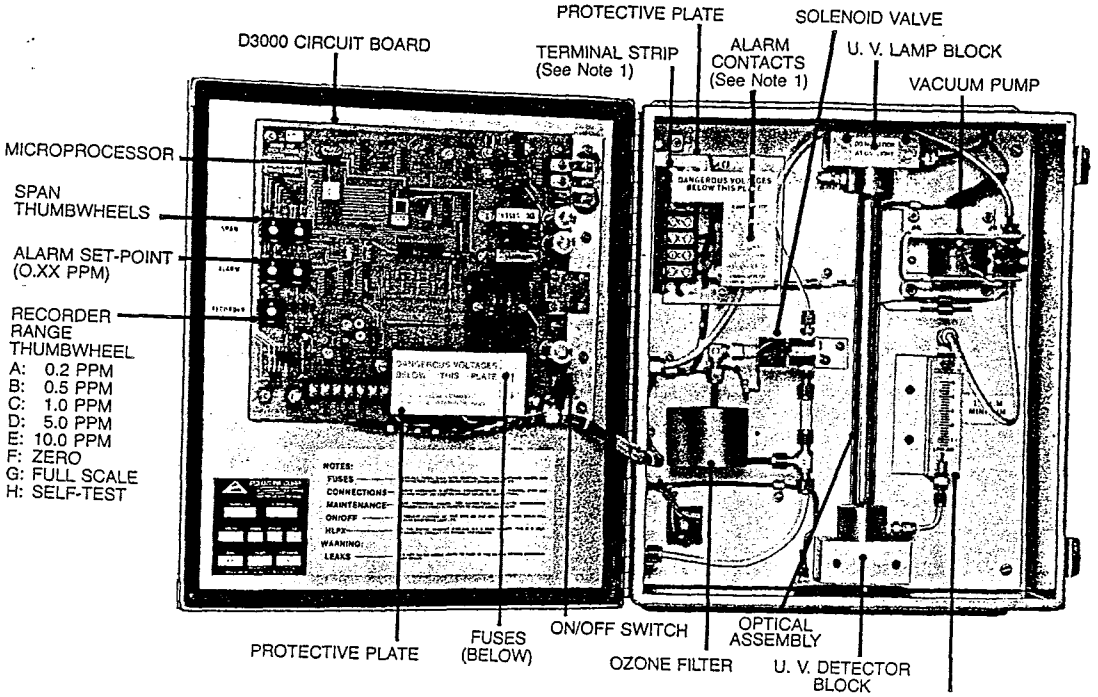
PCI OZONE & CONTROL SYSTEMS, INC.

A Subsidiary of PCI, Inc.

ONE FAIRFIELD CRESCENT, WEST CALDWELL, NEW JERSEY 07006

(201) 575-7052 • FAX (201) 575-8941

PCI Ozone also manufactures a dissolved ozone monitor (brochure available) along with ozone generators in 23 different sizes, capable of producing a range of 1 pound up to 3,640 pounds of ozone per day for water and waste water treatment, odor control and chemical processing applications.



Ultraviolet photometric principle of operation

A gas sample and zero reference gas, which is identical to the gas sample except that it contains no ozone, are alternately passed through a sample chamber. A low pressure cold cathode mercury vapor lamp whose maximum emission line is at 254 nanometers, beams ultraviolet light through the sample chamber. A cesium telluride vacuum diode detects the ultraviolet light that passes through the chamber. When there is ozone in the sample gas, the amount of light that passes through a chamber is exponentially attenuated in accordance with the Beer-Lambert Law as follows:

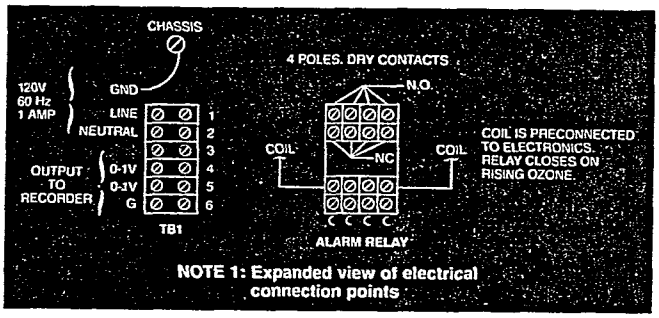
$$I = I_o\, e^{(-XLC)}$$

I_o = Light intensity at zero ozone concentration
I = Light intensity at sample ozone concentration
X = Specific absorption coefficient
L = Length of sample chamber
C = Ozone concentration of sample

In each "Ozone Sample" and "Zero Reference" cycle, the intensity of the light passing through a sample chamber is measured and a ratio of the intensities is determined. The microcomputer processes this information and displays the concentration by digital readouts.

Throughout the entire range of the monitor, 0-10 ppm by volume for the Model LC and 0-10 percent by weight for the Model HC, the error between the displayed concentration and actual concentration is less than 1%. This error is low because the microprocessor calculates the display concentration using the actual Beer-Lambert formula.

PCI Models LC and HC Ozone Monitors use an advanced microprocessor based circuit. This design has numerous advantages. The number of parts is fewer which decreases cost and increases reliability. The microprocessor is programmed to solve the Beer-Lambert Law exactly. No gross approximations are employed. Self diagnostics are programmed in so that help is saved in diagnosing problems, should they



NOTE 1: Expanded view of electrical connection points

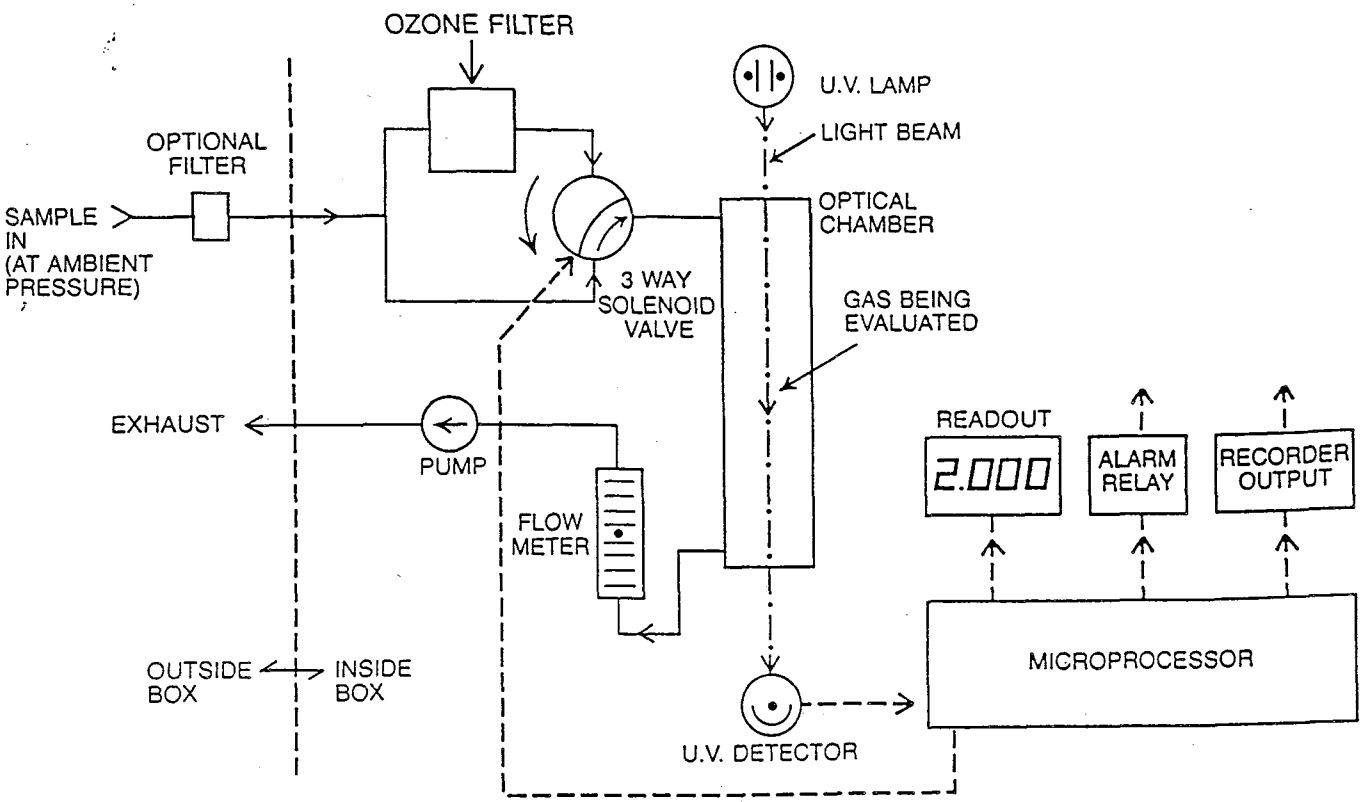
Recorder Output

For the many instances when an ozone concentration signal must be transmitted to an external location, the PCI Monitors have an external recorder output as standard. This recorder output is commonly used for process feedback applications in addition to recording applications. The output consists of simultaneous 0-1 volt and 0-0.1 volt analog outputs. An optional 4-20 ma analog output is also available. The full scale range of the recorder output is easily set with the Recorder Range thumb wheel or the Recorder Span Control depending on the model.

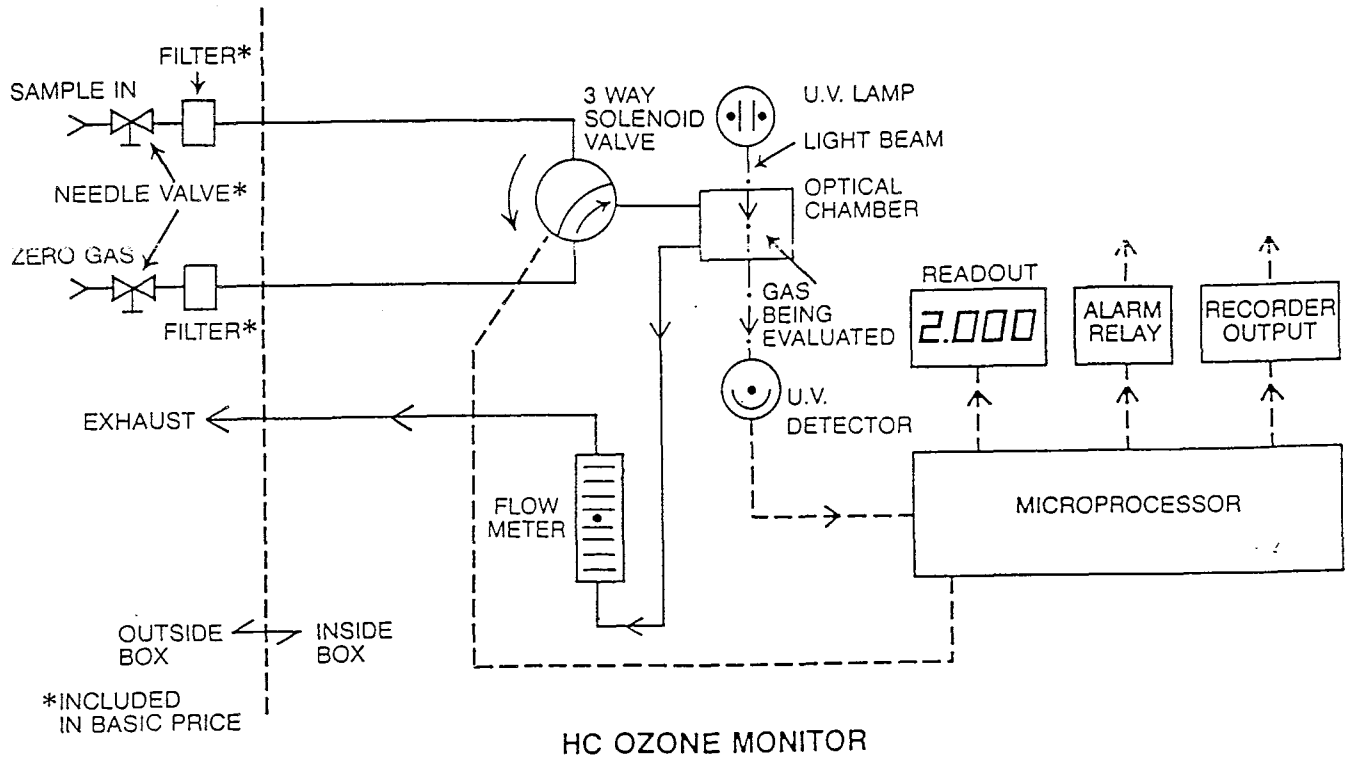
Alarm Output

Another standard of both the LC and HC monitor is the Alarm Output. This consists of a set of four-pole, double-throw relay contacts on the NEMA 12 unit or a set of single-pole double-throw relay contacts on the NEMA 1 unit. The relay is activated when the alarm set point is exceeded.

The PCI Model LC and HC Ozone Monitors are designed for continuous use under adverse conditions and for the laboratory. PCI Ozone Monitors are welcomed by people in a wide variety of disciplines who share the need for a simple, accurate and reliable ozone monitor.



LC OZONE MONITOR



HC OZONE MONITOR

Tab C

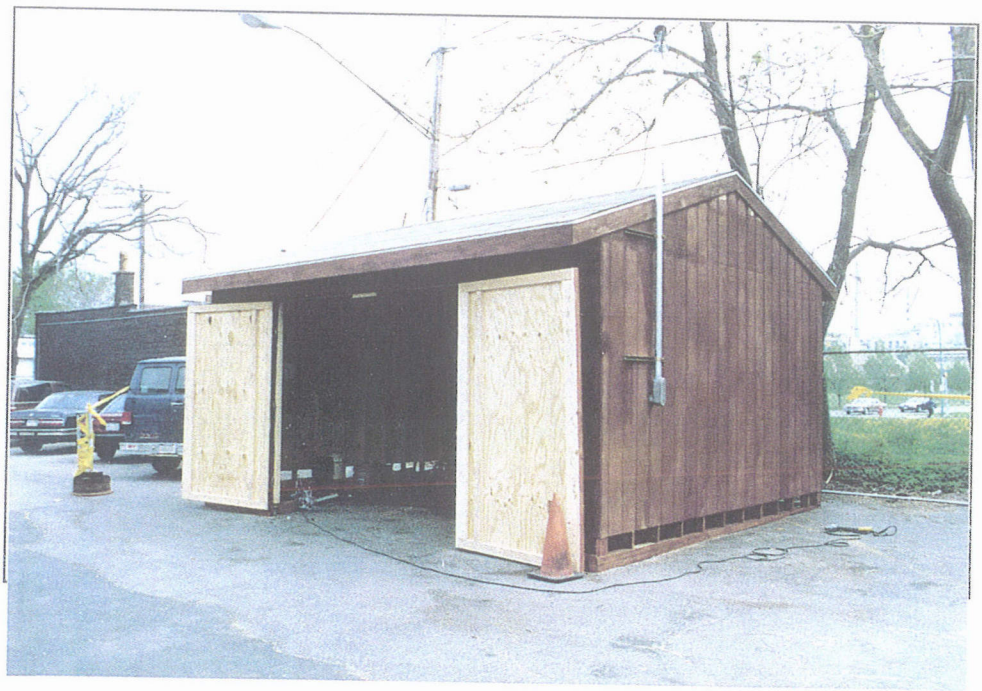
PHOTOGRAPHIC LOG

SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: OZONE GENERATOR SHIPPING CONTAINER

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 1 OF 8

SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: EQUIPMENT SHED FOR ALL EQUIPMENT

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 2 OF 8

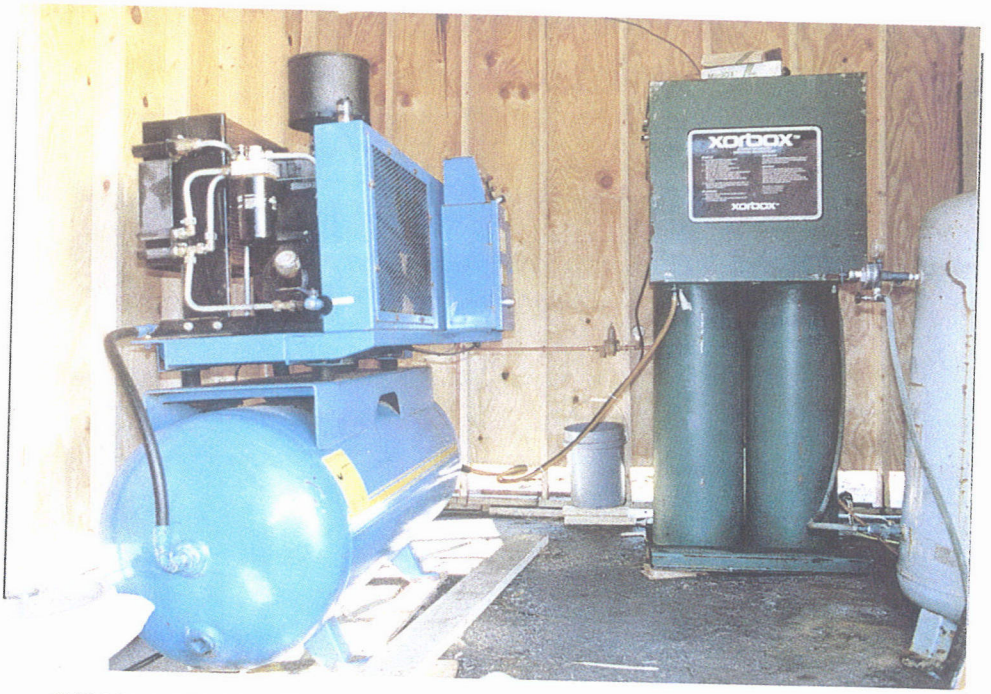


GROUNDWATER TECHNOLOGY

PHOTOGRAPHIC LOG

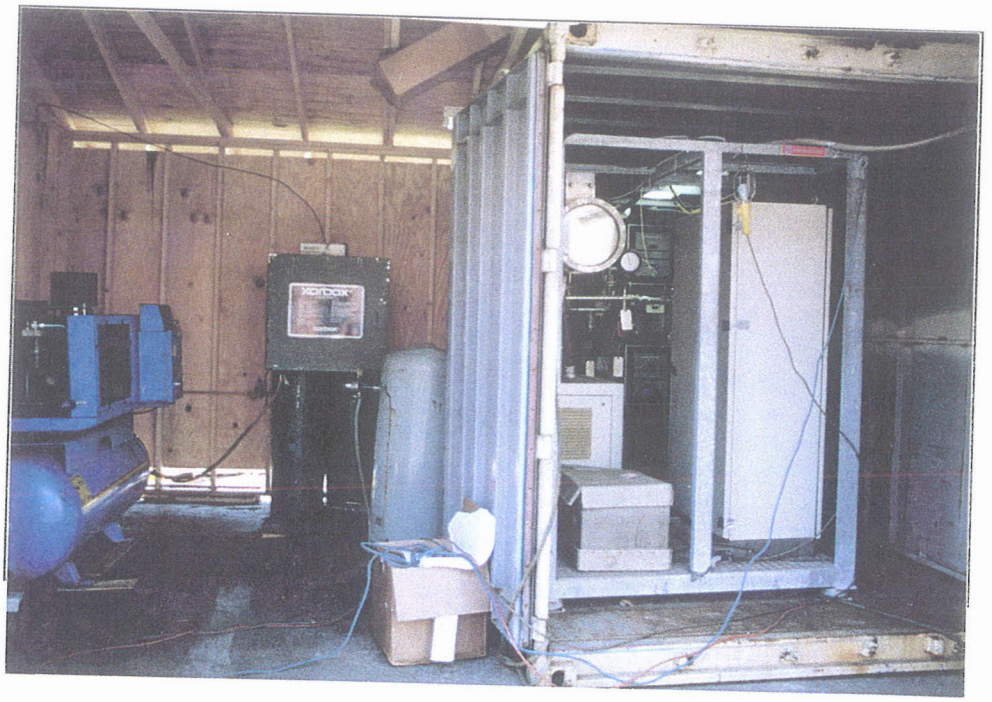
SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: AIR COMP. & OXYGEN GENERATOR

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 3 OF 8



SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: OZONE GENERATOR IN EQUIPMENT SHED

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 4 OF 8



GROUNDWATER TECHNOLOGY

PHOTOGRAPHIC LOG

SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: AREA 1 SVE PILOT TEST

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 5 OF 8

SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: AREA 2 SVE PILOT TEST

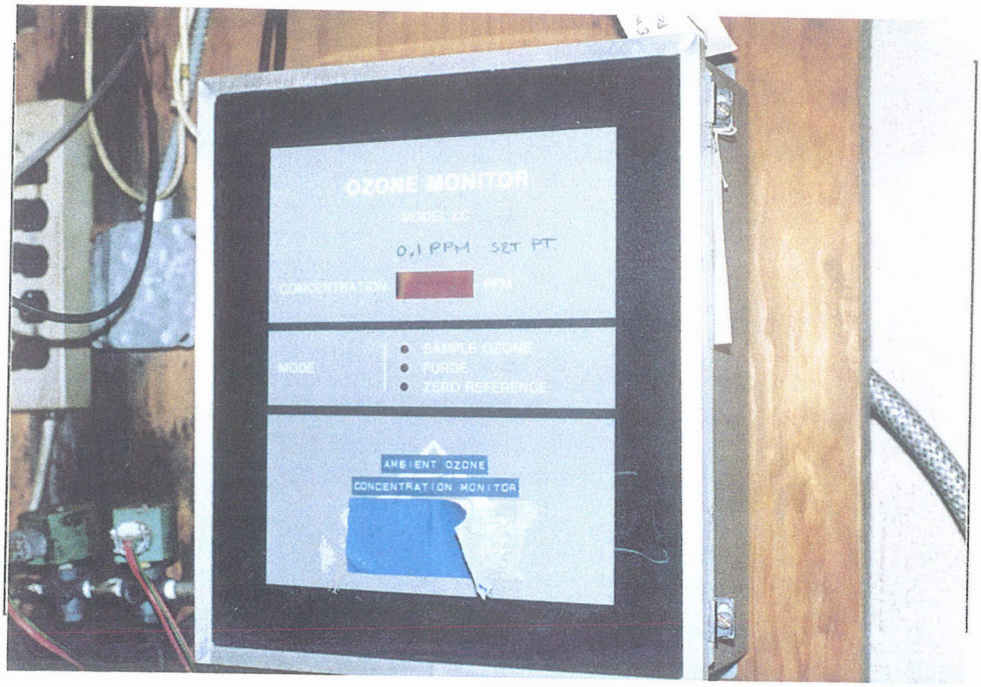
PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 6 OF 8

GROUNDWATER TECHNOLOGY

PHOTOGRAPHIC LOG

SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: OZONE MONITOR INSIDE EQUIPMENT SHED

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 7 OF 8



SITE NAME: OSMOSE WOOD PRESERVING
DESCRIPTION: OZONE GENERATOR CONTROL PANEL

PHOTOGRAPH DATE: MAY, 1993
PHOTOGRAPH #: 8 OF 8

GROUNDWATER TECHNOLOGY

Tab D

DR 454
Regenerative Blower

FEATURES

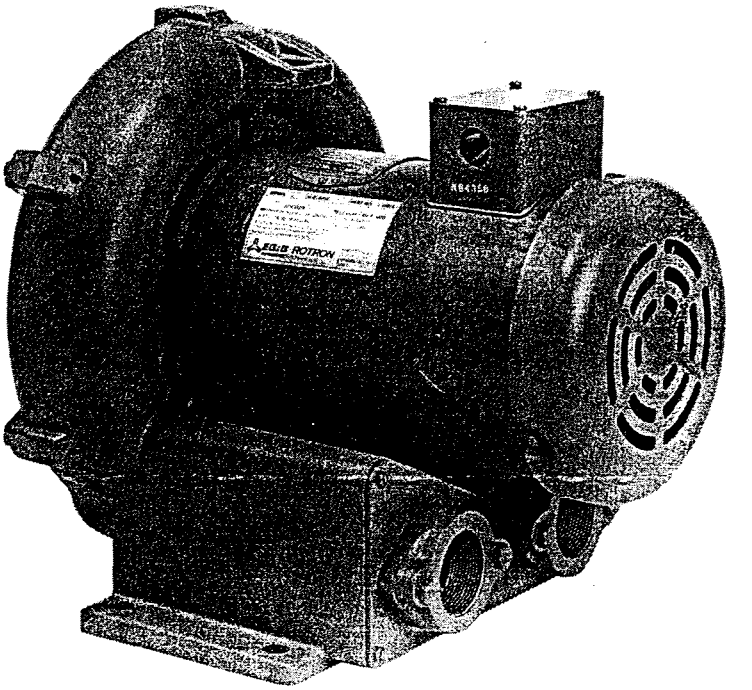
- Manufactured in the USA
- Maximum flow 127 SCFM
- Maximum pressure 65" WG
- Maximum vacuum 4.3" Hg
- 1.5 HP standard
- Blower construction—cast aluminum housing, impeller and cover
- Inlet and outlet internal muffling
- Noise level within OSHA standards
- Weight: 73 lbs. (33 Kg)

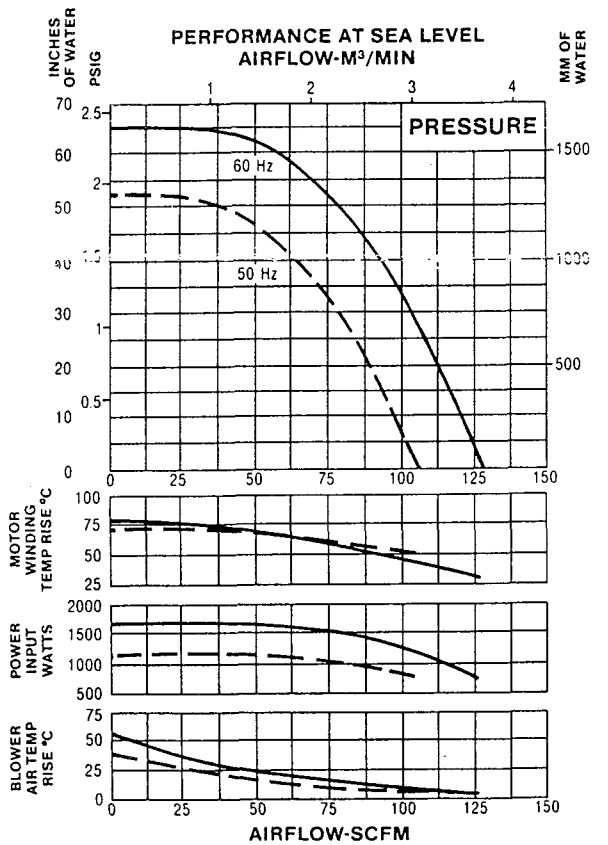
ACCESSORIES

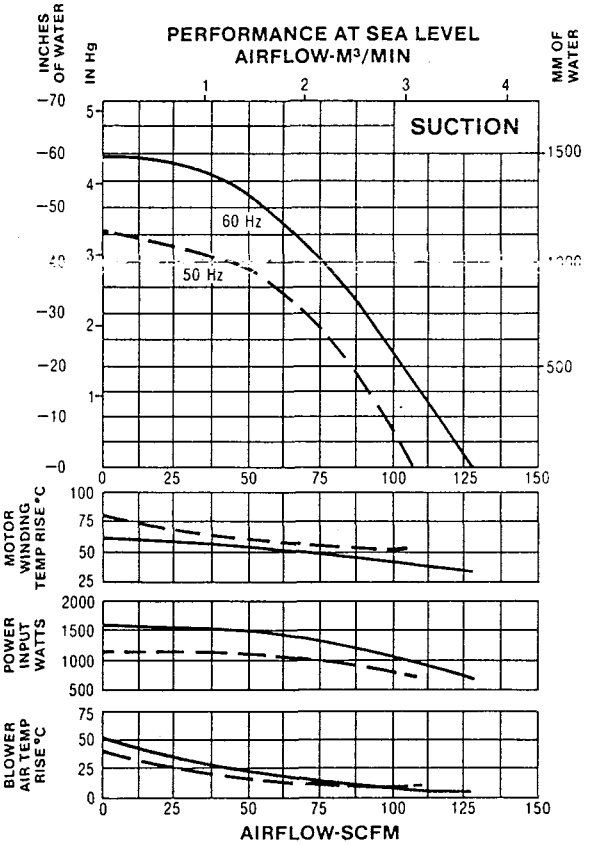
- External mufflers
- Slip-on flanges
- Inlet and/or Inline filters
- For details see Accessories Section

OPTIONS

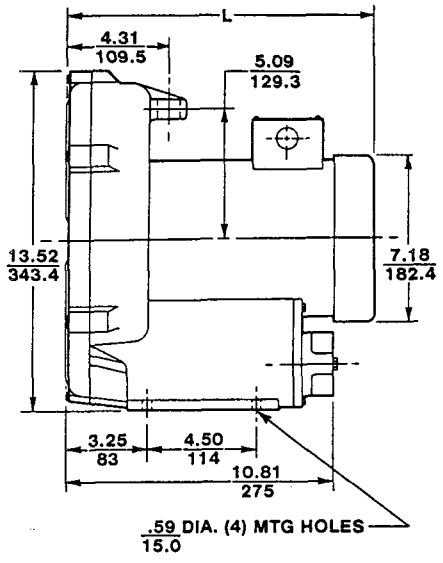
- Smaller horsepower motors
- 575-volt and XP motors
- Surface treatment or plating
- Single or three phase motors
- Gas tight sealing
- Belt drive (motorless) model; for detail see Remote Drive Section

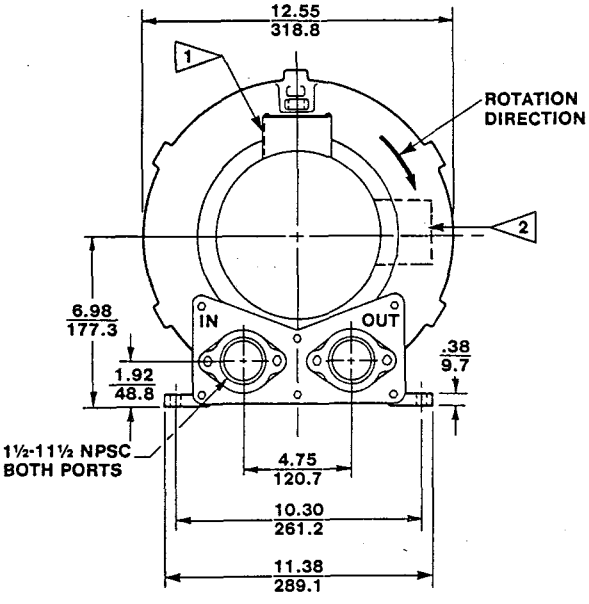






DR 454
Regenerative Blower





Model	L (IN)	L (MM)
DR454R58	14.59	370.6
DR454W58	17.51	444.8
DR454R72	13.59	345.2
DR454W72	16.63	422.4
DR454R86	13.59	345.2

1 T'BOX CONNECTION .87" DIA. ON TEFC MOTORS, .75 NPT ON XP MOTORS

2 LOCATION OF CAPACITOR ON SINGLE PHASE MOTORS. LOCATION OF TERMINAL BOX ON XP MODELS

DIMENSIONS: IN / MM
TOLERANCE: .XX ± .06 / 1.5

Specifications Subject To Change Without Notice.

SPECIFICATIONS

MODEL	DR454R58	DR454W58	DR454R72	DR454W72	DR454R86
Part No.	036856	036858	036855	036857	036949
Motor Enclosure Type	TEFC	XP	TEFC	XP	TEFC
Motor Horsepower	1.5	1.5	1.5	1.5	1.5
Voltage[1]	115/230	115/230	230/460	230/460	575
Phase	1	1	3	3	3
Frequency[1] (Hz)	60	60	60	60	60
Insulation Class[2]	F	B	F	B	F
NEMA Rated Motor Amps	17.7/8.85	17.7/8.85	4.5/2.25	4.5/2.25	1.8
Service Factor	1.15	1.0	1.15	1.0	1.15
Locked Rotor Amps	96/48	96/48	32/16	32/16	12.8
Max. Blower Amps	19.0/9.5	19.0/9.5	4.8/2.4	4.8/2.4	2.0
Recommended NEMA Starter Size	1/0	1/0	00/00	00/00	00
Weight (lbs/Kg)	87/39	103/47	73/33	92/42	73/33
Blower Limitations for Continuous					
Duty (60 Hz/50 Hz)					
Max. Pressure-In. of water	65/52	65/52	65/52	65/52	65
Max. Suction-In. of water	59/45	59/45	59/45	59/45	59
Min. Flow-Pressure-SCFM	0/0	0/0	0/0	0/0	0
Min. Flow-Suction-SCFM	0/0	0/0	0/0	0/0	0

[1]All 3 phase motors are factory tested and certified to operate on 200-230/460 VAC-3 ph-60 Hz and 220-240/380-415 VAC-3 ph-50 Hz. All 1 phase motors are factory tested and certified to operate on 115/230 VAC-1 ph-60 Hz and 220-240 VAC-1 ph-50 Hz.

[2]Maximum operating temperatures: Motor winding temperature (winding rise plus ambient) should not exceed 140°C for Class F insulation or 110°C for Class B insulation. Blower outlet air temperature should not exceed 140°C (air temperature rise plus ambient).

Tab E

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 9-28-93 TIME 7:00 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .007 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.2 cfm pressure: 8 psi
% ozone: 0.09 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	55 cfm	20 ppm	0 ppm	100 ppm
after carbon:	55 cfm	0.05 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 9-29-93 TIME 8:45 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .07 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2-9 cfm pressure: 8 psi
% ozone: 5-1 % temperature: 19 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	55 cfm	000 ppm	0 ppm	300 ppm
after carbon:	55 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 9-30-93 TIME 7:00 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .09 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.1 cfm pressure: 8 psi
% ozone: 5.4 % temperature: 19 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	81 cfm	600 ppm	0 ppm	100 ppm
after carbon:	81 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-1-93 TIME 7:30 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .12 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.0 cfm pressure: 8 psi
% ozone: 4.7 % temperature: 19 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	79 cfm	— ppm	0 ppm	500 ppm
after carbon:	79 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-2-93 TIME 7:30 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .06 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 30 cfm pressure: 8 psi
% ozone: 5.1 % temperature: 20 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	77 cfm	— ppm	0 ppm	500 ppm
after carbon:	77 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-4-93 TIME 7:30 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .07 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.4 cfm pressure: 8.5 psi
% ozone: 4.8 % temperature: 19 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	79 cfm	— ppm	0 ppm	5000 ppm
after carbon:	79 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-5-93 TIME 7:45 AM WEATHER RAIN

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: ~10 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2-4 cfm pressure: 8 psi
% ozone: 4-8 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	73 cfm	-- ppm	0 ppm	500 ppm
after carbon:	73 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-6-93 TIME 7:45 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: ~10 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 31 cfm pressure: 8 psi
% ozone: 51 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	73 cfm	~ ppm	0 ppm	500 ppm
after carbon:	73 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-7-93 TIME 7:20AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .06 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.1 cfm pressure: 8 psi
% ozone: 4.6 % temperature: 16 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	— ppm	0 ppm	200 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-8-93 TIME 7:25 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .04 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.0 cfm pressure: 8.5 psi
% ozone: 4.7 % temperature: 20 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	77 cfm	~ ppm	0 ppm	500 ppm
after carbon:	77 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-9-93 TIME 6:45 AM WEATHER RAIN

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: — ppm (record on log sheet also)
ozone level with Draeger tube: — ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 4.5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 8 psi
% ozone: 4.9 % temperature: 20 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	— ppm	0 ppm	500 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME DAN KEENE

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-11-93 TIME 6:45 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .06 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.1 cfm pressure: 8 psi
% ozone: 5.1 % temperature: 17 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	71 cfm	~ ppm	0 ppm	500 ppm
after carbon:	71 cfm	0 ppm	0 ppm	

NAME DAN KEENE

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-12-93 TIME 7:30 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .06 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.2 cfm pressure: 8.5 psi
% ozone: 4.9 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	71 cfm	— ppm	0 ppm	— ppm
after carbon:	71 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-13-93 TIME 7:15 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: ~10 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2-9 cfm pressure: 9 psi
% ozone: 5-1 % temperature: 16 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	71 cfm	250 ppm	0 ppm	200 ppm
after carbon:	71 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-14-93 TIME 7:30 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: -.11 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 8 psi
% ozone: 5.4 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	71 cfm	700 ppm	0 ppm	200 ppm
after carbon:	71 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-15-93 TIME 7:15 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .08 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 8 psi
% ozone: 5.1 % temperature: 17 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	71 cfm	600 ppm	0 ppm	200 ppm
after carbon:	71 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-16-93 TIME 7:00 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .07 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 5 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 8 psi
% ozone: 4-8 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	600 ppm	0 ppm	200 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-18-93 TIME 7:00 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .05 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 9 psi
% ozone: 5.3 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	600 ppm	0 ppm	200 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-19-93 TIME 7:00 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .07 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 3.0 cfm pressure: 9 psi
% ozone: 4.9 % temperature: 16 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	600 ppm	0 ppm	200 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-20-93 TIME 7:00 AM WEATHER CLEAR

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: -.06 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 9 psi
% ozone: 5.3 % temperature: 17 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	— ppm	— ppm	— ppm
after carbon:	75 cfm	— ppm	— ppm	

NAME BRIAN CARET

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-21-93 TIME 7:15 AM WEATHER RAIN

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .03 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 9.5 psi
% ozone: 4.6 % temperature: 18 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	81 cfm	600 ppm	0 ppm	200 ppm
after carbon:	81 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE 10-22-93 TIME 7:15 AM WEATHER CLOUDY

I. CHECK OZONE METER INSIDE OSMOSE FACILITY

ozone level on meter: .08 ppm (record on log sheet also)
ozone level with Draeger tube: 0 ppm

II. MONITOR WORK AREA FOR OZONE

1) Equipment Shed

level outside shed: 0 level inside shed: 0

2) Area 2

ozone level in breathing zone (above IP-3): 0 ppm

IP-3 pressure at well head: 6 psi

ozone level at:

cracks in asphalt in Area 2:	0 ppm	MW-03:	0 ppm
storm sewer grate:	0 ppm	MW-05:	0 ppm
sewer cleanout in sidewalk:	0 ppm	MW-13:	0 ppm
telephone conduit roadbox:	0 ppm	MW-15:	0 ppm
IP-3 roadbox:	0 ppm	MP-5d:	0 ppm
		VEP-4:	0 ppm

PID levels in breathing zone (5 locations): (1) 0 ppm (2) 0 ppm (3) 0 ppm (4) 0 ppm (5) 0 ppm

III. CHECK INJECTION SYSTEM OPERATION

air flow: 2.9 cfm pressure: 9 psi
% ozone: 5.1 % temperature: 16 °C

IV. CHECK SVE OPERATION

	air flow	ozone level	PID level	CO_2 level
before carbon:	75 cfm	600 ppm	0 ppm	150 ppm
after carbon:	75 cfm	0 ppm	0 ppm	

NAME BRIAN CAREY

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-1-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	10.48	10.57	—								
MW-5	—	16.33	—								
MW-7	13.11	13.13	—								
MW-13	9.26	11.29	—								
MW-15	—	9.64	—								
MW-16	8.65	9.05	—								
MW-17	8.63	8.82	—								
MP-5S											
MP-5D	—	11.14	—								
MP-6S											
MP-6D	10.96	11.20	—								
VEP-4											
RW-3	—	11.00	—								
RW-4	—	12.00	—								
RW-5											
VMP-2											
VMP-4											

MW-21 — 7.94 —
MW-23 — 9.75 —
MW-24 — 8.50 —
MW-25 7.86 8.15 (BOTTOM)

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-3-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3				35	100	0	0				
MW-5				35	100	0	0				
MW-7				25	300		0				
MW-13				70	700		0				
MW-15				15	30	0	0				
MW-16				130	75000		0				
MW-17											
MP-5S				7	2000		0				
MP-5D				32	2500	+.06	0				
MP-6S				—	—		0				
MP-6D				—	—	—	0				
VEP-4				50	4200	0	0				
RW-3				—	—	—	—				
RW-4				—	—	—	—				
RW-5				—	—	—	—				
VMP-2				0	50	-.025	0				
VMP-4				6	200	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-4-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3						0					
MW-5						0					
MW-7											
MW-13											
MW-15						0					
MW-16											
MW-17											
MP-5S											
MP-5D						+.055					
MP-6S											
MP-6D						0					
VEP-4						0					
RW-3						—					
RW-4						—					
RW-5						—					
VMP-2						0					
VMP-4						0					

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-7-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	9.87	10.54	1 GAL	45	100	0	—				
MW-5	—	11.90	—	5	2500	+.005	—				
MW-7	10.56	10.77	1 GAL	17	600		—				
MW-13	8.62	12.29	1½ GAL	65	1000		—				
MW-15	—	9.45	—	9	200	0	—				
MW-16	8.32	9.37	1 GAL	90	>5000		—				
MW-17	8.40	8.80	¼ GAL								
MP-5S				60	500		—				
MP-5D	—	11.17	—	20	1500	+10	—				
MP-6S				7	300		—				
MP-6D	10.16	10.35	¼ GAL	30	100	+.03	—				
VEP-4				70	2000	0	—				
RW-3	—	—	—	—	—	—	—				
RW-4	—	10.13	—	—	—	—	—				
RW-5	—	11.25	—	—	—	—	—				
VMP-2				0	0	-.03	—				
VMP-4				0	0	0	—				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-8-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3						0	0	8.4	17	1.6	—
MW-5						0	0	8.5	16	9.0	—
MW-7							0	—	—	—	—
MW-13							0	8.2	17	1.5	—
MW-15						0	0	8.2	17	1.5	—
MW-16							0	8.2	17	1.5	—
MW-17											
MP-5S							0				
MP-5D						+5.0	0	8.5	17	7.9	—
MP-6S							0				
MP-6D						0	0	8.6	17	1.6	—
VEP-4						0	0				
RW-3						—	—	—	—	—	—
RW-4						—	—	8.4	17	1.25	—
RW-5						—	—	8.2	16	1.75	—
VMP-2						-.03	0				
VMP-4						0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-13-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3				30	100	0	0	8.4	20	1.75	—
MW-5	FILM			30	3000	0	0	9.3	18	7.20	—
MW-7			2 GAL	80	300		0	8.6	18	1.75	—
MW-13			½ GAL	100	50		0	8.2	20	2.5	—
MW-15	—	9.23	—	5	50	0	0	8.2	19	1.75	—
MW-16			½ GAL	110	400		0	8.2	22	1.7	—
MW-17			½ GAL								
MP-5S				25	200		0				
MP-5D				50	800	+5	0	—	—	—	—
MP-6S				0	100		0				
MP-6D	10.64	10.65	—	3	100	0	0	8.6	18	2.1	—
VEP-4				70	1500	0	0				
RW-3				—	—	—	—	—	—	—	—
RW-4			½ GAL	—	50	—	—	8.0	20	8.1	—
RW-5			½ GAL	—	400	—	—	7.9	19	2.4	—
VMP-2				0	50	-.05	0				
VMP-4				0	100	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-22-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	9.87	12 (Bottom)	1/2 GAL	80	50	0	0	—	—	—	—
MW-5	—	10.77	—	50	5000	0	0	8.6	17	720	—
MW-7	11.67	11.83	1/4 GAL	80	100		0	—	—	—	—
MW-13	8.85	12.9 (Bottom)	1/2 GAL	190	300		0	7.5	18	2.5	—
MW-15	9.31	9.32	—	12	150	0	0	7.5	18	1.25	—
MW-16	8.47	9.30	1/8 GAL	300	2000		0	8.3	21	2.2	—
MW-17	8.45	8.87	TRACE								
MP-5S				130	200		0				
MP-5D	12.52	12.53	—	30	500	>15"	0	7.3	18	7.5	—
MP-6S				50	1000		0				
MP-6D	—	10.32	—	120	100	0	0	7.8	18	1.5	—
VEP-4				110	1500	0	0				
RW-3	9.49	9.50	—	—	—	-10	—	8.2	17	720	—
RW-4	10.25	10.96	—	—	—	-5	0	—	18	2.5	—
RW-5	9.50	9.80	1/4 GAL	—	—	-8	0	7.5	18	4	—
VMP-2				0	—	-.015	0				
VMP-4				0	—	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 9-29-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	8.92	11.55	½ GAL	90	100	0	0	8.9	16	2.5	—
MW-5	10.01	10.02	—	50	6000	+.02	0	8.8	15	15.5	—
MW-7	10.82	11.12	½ GAL	60	1500		0	8.6	14	2.5	—
MW-13	8.04	9.87	½ GAL	130	500		0	8.6	16	2.0	—
MW-15	—	8.63	—	3	200	0	0	8.6	16	1.7	—
MW-16	7.90	7.71	TRACE	180	4000		0	8.4	18	2.3	—
MW-17	8.10	8.37	TRACE								
MP-5S				4	700		0				
MP-5D	—	9.70	—	40	1500	7+5	0	9.2	15	>20	—
MP-6S				2	1000		0				
MP-6D	9.69	9.72	—	60	300	0	0	8.8	15	3	—
VEP-4				120	4000	0	0				
RW-3	8.79	8.90	TRACE	—	—	-14	0	9.1	15	19	—
RW-4	7.90	7.92	—	—	—	-19	0	8.3	16	4.5	—
RW-5	8.36	8.40	—	—	—	-12	0	8.4	15	3.2	—
VMP-2				0	100	-.03	0				
VMP-4				0	500	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-6-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	9.09	11.05	½ GAL	–	100	0	0	8.3	18	2.2	–
MW-5	10.16	10.17	–	–	8000	+.02	0	8.2	17	18	–
MW-7	10.40	10.68	½ GAL	–	7500		0	8.0	16	1.5	–
MW-13	8.11	9.55	½ GAL	–	15000		0	8.0	16	1.7	–
MW-15	–	8.72	–	–	200	0	0	8.4	17	2.1	–
MW-16	7.77	8.22	TRACE	–	30000		0	8.1	17	1.7	–
MW-17	7.80	8.11	TRACE								
MP-5S				–	300		0				
MP-5D	–	11.05	–	–	2500	7 +5	0	8.5	17	>20	–
MP-6S				–	8000		0				
MP-6D	–	9.59	–	–	400	0	0	8.4	17	1.7	–
VEP-4				–	2000	0	0				
RW-3	–	7.54	–	–	–	-20	–	7.9	17	>20	–
RW-4	7.60	8.55	¼ GAL	–	–	-20	–	8.0	17	8.0	–
RW-5	8.38	9.38	¼ GAL	–	–	-12	–	8.6	17	4	–
VMP-2				–	100	-.03	0				
VMP-4				–	500	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-14-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	9.30	12.10 (BOTTOM)	1/2 GAL	75	100	0	0	9.1	17	2.5	—
MW-5	10.43	10.44	—	70	10000	+.02	0	8.4	17	7.5	—
MW-7	10.05	10.50	TRACE	45	500		0	8.2	17	2.5	—
MW-13	8.45	9.93	1/2 GAL	90	1200		0	8.5	17	2.0	—
MW-15	8.94	8.95	—	1	200	0	0	8.4	17	1.5	—
MW-16	8.10	9.40	1/4 GAL	230	12000		0	8.6	19	2.5	—
MW-17	8.17	8.73	TRACE								
MP-5S				50	800		0				
MP-5D	—	11.23	—	35	2000	>+5	0	9.1	18	19	—
MP-6S				1	400		0				
MP-6D	9.89	9.90	—	90	100	0	0	8.9	18	2.5	—
VEP-4				150	10000	0	0				
RW-3	—	8.83	—	—	—	-.22	—	7.8	18	20	—
RW-4	8.00	9.10	1/2 GAL	—	—	-.24	—	8.4	17	12	—
RW-5	8.50	9.55	1/4 GAL	—	—	-16	—	8.2	17	6	—
VMP-2				0	200	-.03	0				
VMP-4				1	300	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-19-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3											16.80
MW-5											7.27
MW-7											17.20
MW-13											17.33
MW-15											19.67
MW-16											18.80
MW-17											
MP-5S											
MP-5D											8.80
MP-6S											
MP-6D											8.00
VEP-4											
RW-3											19.67
RW-4											16.27
RW-5											14.93
VMP-2											
VMP-4											

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-22-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	8.15	11.49	1 GAL	150	50	0	0	8.6	15	2.5	16.53
MW-5	9.44	9.45	–	15	800	+.04	0	8.4	15	2.75	18.40
MW-7	9.59	9.99	1/4 GAL	25	100		0	8.6	15	16	8.67
MW-13	7.41	8.70	1/4 GAL	180	500		0	8.2	16	2.5	21.80
MW-15	–	8.17	–	50	100	0	0	8.4	16	2.25	20.87
MW-16	7.25	7.30	–	130	1400		0	8.4	16	1.75	19.33
MW-17	7.58	7.59	–								
MP-5S				30	200		0				
MP-5D	–	12.00 DRY	–	35	600	7+5	0	8.9	16	16	9.67
MP-6S				3	1000		0				
MP-6D	8.59	8.60	–	40	500	0	0	8.5	16	3	7.47
VEP-4				25	3000	0	0				
RW-3	–	8.90	–	–	–	-18	–	8.2	16	17	21.2
RW-4	7.25	8.20	1/2 GAL	–	–	-20	0	6.2	15	2.0	3.87
RW-5	7.60	8.35	1/2 GAL	–	–	-14	0	8.6	15	9.5	15.53
VMP-2				–	100	-.02	0				
VMP-4				–	100	0	0				

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-29-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	7.63	8.62	–	80	0	–	–	8.1	16	4.5	17.13
MW-5	12.79	12.80	–	17	100	–	–	8.4	15	4.5	12.27
MW-7	9.09	9.32	–	70	400		–	8.0	15	4.5	17.93
MW-13	7.86	7.93	–	134	300		–	7.9	15	5.0	24.27
MW-15	7.50	7.51	–	7	50	–	–	8.4	15	3.5	23.07
MW-16	6.83	7.33	–	304	400		–	8.2	15	5.2	22.93
MW-17	–	7.42	–								
MP-5S				15	100		–				
MP-5D	7.63	7.64	–	70	150	–	–	9.1	16	7.5	11.20
MP-6S				3	100		–				
MP-6D	–	7.54	–	10	100	–	–	8.9	16	7.0	14.60
VEP-4				30	200	–	–				
RW-3	7.73	8.63	–	76	50	–	–	8.2	16	8	24.00
RW-4	7.60	8.07	–	27	100	–	–	6.2	15	4.5	3.80
RW-5	7.66	7.88	–	71	100	–	–	8.0	15	4.5	14.60
VMP-2				–	–	–	–				
VMP-4				–	–	–	–				
RW-1	7.85	7.85	–	6	100	–	–	8.6	16	7	15.27
RW-2	–	7.83	–	3	50	–	–	7.8	15	5	16.53
RW-6	8.23	9.20	–	16	100	–	–	8.2	15	4.5	15.07

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 10-29-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3											
MW-5											
MW-7											
MW-13											
MW-15											
MW-16											
MW-17											
MP-5S											
MP-5D											
MP-6S											
MP-6D											
VEP-4											
RW-3											
RW-4											
RW-5											
VMP-2											
VMP-4											

MW-23 — 8.67 —

MW-24 — 7.67 —

MW-25 7.25 7.28 —

OSMOSE WOOD PRESERVING, INC.
OZONE PILOT TEST
AREA 2 MONITORING FORM

DATE: 11-11-93

WELL	DTP (feet)	DTW (feet)	AMT BAILED	HEADSPACE READINGS				GROUNDWATER READINGS			
				PID (ppm)	CO2 (ppm)	PRESSURE (in. water)	OZONE (ppm)	pH	TEMP (degrees C)	diss. O2 (mg/L)	CONDUCTIVITY (mS)
MW-3	7.13	9.03	—	62	50	—	—	8.5	—	—	15.13
MW-5	—	7.62	—	42	100	—	—	8.4	—	—	5.4
MW-7	7.69	7.71	—	55	200		—	8.6	—	—	18.07
MW-13	6.48	7.90	—	195	200		—	8.4	—	—	24.53
MW-15	7.31	7.32	—	16	100	—	—	8.6	—	—	20.93
MW-16	6.67	7.62	—	329	1500		—	8.6	—	—	22.40
MW-17	6.94	7.22	—								
MP-5S				23	150		—				
MP-5D	—	7.14	—	79	1000	—	—	8.8	—	—	10.80
MP-6S				7.5	200		—				
MP-6D	—	7.02	—	8	50	—	—	8.9	—	—	1.20
VEP-4				276	1000	—	—				
RW-3	7.23	8.25	—	116	1500	—	—	8.6	—	—	22.00
RW-4	7.18	7.87	—	145	5000	—	—	8.5	—	—	13.93
RW-5	7.23	7.82	—	219	200	—	—	8.7	—	—	16.33
VMP-2				—	—	—	—				
VMP-4				—	—	—	—				
RW-1	7.28	7.29	—	130	800	—	—	9.3	—	—	13.20
RW-2	7.41	7.42	—	26	2000	—	—	8.4	—	—	16.87
RW-6	7.77	8.95	—	180	600	—	—	8.7	—	—	14.47

Tab F

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose Wood Preserving
Login Number: M3-06-0161

RECEIVED
JUN 21 1993

June 17, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 06/05/93 under chain-of-custody record 51857.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: Osmose Wood Preserving
Login Number: M3-06-0161

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		060161-01	060161-03	--	--
Client Identification		MP-3	IP-1	--	--
Date Sampled		06/04/93	06/04/93	--	--
Date Analyzed		06/10/93	06/09/93	--	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.05	< 0.05	--	--
Toluene	0.05	< 0.05	< 0.05	--	--
Ethylbenzene	0.10	< 0.10	< 0.10	--	--
Xylenes (total)	0.20	< 0.20	< 0.20	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.10	< 0.10	< 0.10	--	--
1,2-Dichlorobenzene	0.10	< 0.10	< 0.10	--	--
1,3-Dichlorobenzene	0.10	< 0.10	< 0.10	--	--
1,4-Dichlorobenzene	0.10	< 0.10	< 0.10	--	--
Sample Dilution Factor[b]		1.12	1.19	--	--
Percent Solids		87.1	82.8	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose Wood Preserving
Login Number: M3-06-0161

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		060161-01	060161-02	060161-03	--
Client Identification		MP-3	MP-1	IP-1	--
Date Sampled		06/04/93	06/04/93	06/04/93	--
Date Extracted		06/10/93	06/10/93	06/10/93	--
Date Analyzed		06/14/93	06/14/93	06/14/93	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 8300	< 8600	< 8700	--
Acenaphthylene	77	< 10600	< 11000	< 11200	--
1-Methylnaphthalene	60	< 8300	< 8600	< 8700	--
2-Methylnaphthalene	60	< 8300	< 8600	< 8700	--
Acenaphthene	60	< 8300	< 8600	< 8700	--
Fluorene	7.0	< 970	**1200**	< 1000	--
Phenanthrene	21	**4800**	**9500**	**4200**	--
Anthracene	22	**5400**	**3400**	< 3200	--
Fluoranthene	7.0	**7200**	**5900**	**4500**	--
Pyrene	9.0	**5500**	**2800**	**2400**	--
Benzo[a]anthracene	0.43	**2400**	**1600**	**1300**	--
Chrysene	5.0	**2100**	**2000**	**1300**	--
Benzo[b]fluoranthene	0.60	**2200**	**1400**	**1100**	--
Benzo[k]fluoranthene	0.57	**960**	**640**	**520**	--
Benzo[a]pyrene	0.77	**2300**	**1300**	**930**	--
Dibenzo[a,h]anthracene	1.0	< 140	**310**	**240**	--
Benzo[g,h,i]perylene	2.5	**3500**	**1800**	**1300**	--
Indeno[1,2,3-cd]pyrene	1.4	**3100**	**1900**	**1500**	--
Detection Limit Multiplier[b]		138	143	145	--
Percent Solids, %		87.0	84.2	82.8	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] ADO[redacted]OO[redacted]DUS[redacted]L PA[redacted]
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

[redacted] N-O[redacted] STO[redacted] REC[redacted] [redacted]
AND ANALYSIS REQUEST

51857

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS ROAD
Site location: BUFFALO, NY
Project Manager: BRUCE AMPENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE WOOD PRESERVING
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	1-4-EPA-8240
MP-3		5		5								X			6/4	930									3				22						
MP-1		2		2								X			6/4	10:00													22						
IT-1		5		5								X			6/4	1045									3				2						

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS R&D JOB #

Lab Use Only Lot # Storage Location: 23RD (W)

Work Order #

CUSTODY RECORD

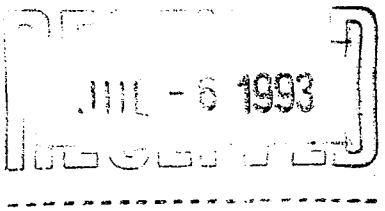
	Date	Time	
Relinquished by Sampler: Brian Carey	6-4-93	5:00 PM	Received by:
Relinquished by:			Received by:
Relinquished by:			Received by Laboratory:

Waybill # 492715390

Rev. 7'91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose Wood Preserving
Login Number: M3-06-0111



July 1, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

This report, previously dated 06/18/93, is a reissue.

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 06/04/93 under chain-of-custody record 51854.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: Osmose Wood Preserving
Login Number: M3-06-0111

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		060111-01	060111-02	--	--
Client Identification		MP-4	MP-2	--	--
Date Sampled		06/03/93	06/03/93	--	--
Date Extracted		06/10/93	06/10/93	--	--
Date Analyzed		06/14/93	06/14/93	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 4400	< 4600	--	--
Acenaphthylene	77	< 5700	< 5900	--	--
1-Methylnaphthalene	60	< 4400	< 4600	--	--
2-Methylnaphthalene	60	< 4400	< 4600	--	--
Acenaphthene	60	< 4400	< 4600	--	--
Fluorene	7.0	< 520	< 540	--	--
Phenanthrene	21	< 1500	< 1600	--	--
Anthracene	22	< 1600	< 1700	--	--
Fluoranthene	7.0	**1000**	**1000**	--	--
Pyrene	9.0	< 660	< 690	--	--
Benzo[*a*]anthracene	0.43	**310**	**280**	--	--
Chrysene	5.0	< 370	**420**	--	--
Benzo[*b*]fluoranthene	0.60	**360**	**330**	--	--
Benzo[*k*]fluoranthene	0.57	**160**	**130**	--	--
Benzo[*a*]pyrene	0.77	**270**	**290**	--	--
Dibenzo[*a,h*]anthracene	1.0	< 74	< 77	--	--
Benzo[*g,h,i*]perylene	2.5	**420**	**380**	--	--
Indeno[1,2,3-*cd*]pyrene	1.4	**530**	**450**	--	--
Detection Limit Multiplier[b]		73.8	76.8	--	--
Percent Solids, %		81.5	78.1	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

51854

Company Name: GROUNDWATER TECHNOLOGY

Phone #: 800 437 8740

FAX #: (518) 370-5864

Company Address: 1245 KINGS ROAD

Site location: BUFFALO, NY

Project Manager: BRUCE AHRENS

Client Project ID: (#) 00530-0109

(NAME) OSMOSE WOOD PRESERVING

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
MP-4	1	2		2								X			6/3	10 00													2						
MP-2	2	2		2								X			6/3	1230													2						

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____
- Business Days ☐

Special Handling

- GTEL Contact _____
- Quote/Contract # _____
- Confirmation # _____
- PO # _____

QA / QC LEVEL

BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS

FAX ☐

REMARKS: THIS IS AN R&D JOB NUMBER

Lab Use Only Lot #

Storage Location: WG-B

Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	6/3/93	6:00PM	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date 6/4/93	Time 0915	Received by Laboratory: Mike Bass

Waybill # 692778092 3

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

July 27, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

This report, previously dated 07/09/93, is a reissue.

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 06/23/93 under chain-of-custody record 52717.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

CONFORMANCE/NONCONFORMANCE SUMMARY

(X = Requirements Met * = See Comments NA = Not Applicable)

#	Conformance Item	VOA GC	VOA GC/MS	SV GC	SV GC/MS	Metals	Wet Chem
1	GC/MS Tune	NA	--	NA	--	NA	NA
2	Initial Calibration	X	--	X	--	--	--
3	Continuing Calibration	X	--	X	--	--	--
4	Surrogate Recovery	X	--	X	--	NA	NA
5	Holding Time	X	--	X	--	--	--
6	Method Accuracy	X	--	X	--	--	--
7	Method Precision	X	--	X	--	--	--

8 Blank Contamination - List/ND (None Detected)/*(See Comments)
VOA: ND
SV: ND
Metals: --
Wet Chem: --

9 Comments: --

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil - Low Level
Modified EPA Method 8020[a]

GTEL Sample Number		060646-01	--	--	--
Client Identification		IP-1	--	--	--
Date Sampled		06/21/93	--	--	--
Date Analyzed		07/02/93	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg (dry)			
Benzene	1.0	< 3.0	--	--	--
Toluene	1.7	< 5.0	--	--	--
Ethylbenzene	1.0	< 3.0	--	--	--
Xylenes (total)	2.0	< 5.9	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	1.0	< 3.0	--	--	--
1,2-Dichlorobenzene	1.7	< 5.0	--	--	--
1,3-Dichlorobenzene	1.7	< 5.0	--	--	--
1,4-Dichlorobenzene	1.7	< 5.0	--	--	--
Detection Limit Multiplier[b]		2.96	--	--	--
Percent Solids		84.8	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; sample prepared by EPA Method 5030. Method modified to include additional compounds. Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil - Low Level
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BL07029314B	95.2	82.6
060646-01	95.2	100.9
MS060708-02	95.2	99.3
MD060708-02	95.2	98.9

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
EPA Method 8020

Sample Spiked:	060708-02	Client ID:	BATCH QC
Date(s) of Analysis:	07/02/93	Standard ID:	BX93QC0274

Analyte	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery	Acceptability Limits, % Rec.[a]
Benzene	24.65	< 1.23	24.99	101	40-160
Toluene	24.65	< 2.09	25.95	105	40-160
Ethylbenzene	24.65	< 1.23	25.84	105	40-160
Total Xylenes	73.96	< 2.46	75.68	102	40-160

Analyte	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
Benzene	25.26	25.35	100	1	40	40-160
Toluene	25.26	26.21	104	1	40	40-160
Ethylbenzene	25.26	26.06	103	2	40	40-160
Total Xylenes	75.78	76.56	101	1	40	40-160

* Indicates values outside of acceptability limits.
a Acceptability limits as per laboratory practice.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil - Low Level
Modified EPA Method 8020[a]

GTEL Sample Number		BL070293-14B	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		07/02/93	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg (dry)			
Benzene	1.0	< 1.0	--	--	--
Toluene	1.7	< 1.7	--	--	--
Ethylbenzene	1.0	< 1.0	--	--	--
Xylenes (total)	2.0	< 2.0	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	1.0	< 1.0	--	--	--
1,2-Dichlorobenzene	1.7	< 1.7	--	--	--
1,3-Dichlorobenzene	1.7	< 1.7	--	--	--
1,4-Dichlorobenzene	1.7	< 1.7	--	--	--
Methyl tert-Butyl Ether	1.0	< 1.0	--	--	--
Detection Limit Multiplier[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; sample prepared by EPA Method 5030. Method modified to include additional compounds. Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		060646-04[c]	--	--	--
Client Identification		MP-3	--	--	--
Date Sampled		06/21/93	--	--	--
Date Analyzed		06/26/93	--	--	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.05	--	--	--
Toluene	0.05	< 0.05	--	--	--
Ethylbenzene	0.10	< 0.10	--	--	--
Xylenes (total)	0.20	< 0.20	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.10	< 0.10	--	--	--
1,2-Dichlorobenzene	0.10	< 0.10	--	--	--
1,3-Dichlorobenzene	0.10	< 0.10	--	--	--
1,4-Dichlorobenzene	0.10	< 0.10	--	--	--
Methyl tert-Butyl Ether	1.0	< 1.0	--	--	--
Sample Dilution Factor[b]		1.27	--	--	--
Percent Solids		78.1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

c Sample not analyzed low level due to the interference of non-target compounds.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BS06249320A	95.2	66.6
060646-04	95.2	60.6
MS060631-01	95.2	62.2
MD060631-01	95.2	61.4

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
EPA Method 8020

Sample Spiked: 060631-01 Client ID: BATCH QC

Date(s) of Analysis: 06/26/93 Standard ID: BX93SM0309

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, % Rec.[a]
Benzene	62.42	< 0.05	50.95	82	40-160
Toluene	66.94	< 0.05	51.54	77	40-160
Ethylbenzene	67.07	< 0.10	57.93	86	40-160
Total Xylenes	202.10	< 0.20	171.60	85	40-160

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
Benzene	60.90	50.28	83	1	40	40-160
Toluene	65.31	50.84	78	1	40	40-160
Ethylbenzene	65.43	56.82	87	0	40	40-160
Total Xylenes	197.17	168.24	85	0	40	40-160

* Indicates values outside of acceptability limits.
a Acceptability limits as per laboratory practice.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		BS062493-20A	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		06/25/93	--	--	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.05	--	--	--
Toluene	0.05	< 0.05	--	--	--
Ethylbenzene	0.10	< 0.10	--	--	--
Xylenes (total)	0.20	< 0.20	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.10	< 0.10	--	--	--
1,2-Dichlorobenzene	0.10	< 0.10	--	--	--
1,3-Dichlorobenzene	0.10	< 0.10	--	--	--
1,4-Dichlorobenzene	0.10	< 0.10	--	--	--
Sample Dilution Factor[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		060646-01	060646-02	060646-03	060646-04
Client Identification		IP-1	MP-1	MP-2	MP-3
Date Sampled		06/21/93	06/21/93	06/21/93	06/21/93
Date Extracted		06/28/93	06/28/93	06/28/93	06/28/93
Date Analyzed		07/08/93	06/30/93	06/30/93	06/30/93
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 71	< 740	< 710	< 770
Acenaphthylene	77	< 91	< 950	< 920	< 990
1-Methylnaphthalene	60	< 71	< 740	< 710	< 770
2-Methylnaphthalene	60	< 71	< 740	< 710	< 770
Acenaphthene	60	< 71	< 740	< 710	< 770
Fluorene	7.0	< 8.3	< 87	< 83	< 90
Phenanthrene	21	< 25	< 260	< 250	**330**
Anthracene	22	< 26	< 270	< 260	< 280
Fluoranthene	7.0	**9.0**	**115**	< 83	**480**
Pyrene	9.0	< 11	< 110	< 110	**210**
Benzo[*a*]anthracene	0.43	**5.1**	**42**	**22**	**200**
Chrysene	5.0	**12**	**64**	< 60	**220**
Benzo[*b*]fluoranthene	0.60	**5.0**	**44**	**28**	**240**
Benzo[*k*]fluoranthene	0.57	**2.1**	**19**	**12**	**99**
Benzo[*a*]pyrene	0.77	**4.2**	**34**	**22**	**240**
Dibenzo[*a,h*]anthracene	1.0	< 1.2	< 12	< 12	**24**
Benzo[*g,h,i*]perylene	2.5	**7.1**	**65**	< 30	**190**
Indeno[1,2,3-*cd*]pyrene	1.4	**7.3**	< 17	< 17	< 18
Detection Limit Multiplier[b]		1.18	12.4	11.9	12.6
Percent Solids, %		84.8	80.8	84.1	78.1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		060646-05	060646-06	--	--
Client Identification		MP-4	DUP	--	--
Date Sampled		06/21/93	06/21/93	--	--
Date Extracted		06/28/93	06/28/93	--	--
Date Analyzed		06/30/93	06/30/93	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 760	< 740	--	--
Acenaphthylene	77	< 980	< 950	--	--
1-Methylnaphthalene	60	< 760	< 740	--	--
2-Methylnaphthalene	60	< 760	< 740	--	--
Acenaphthene	60	< 760	< 740	--	--
Fluorene	7.0	< 89	< 87	--	--
Phenanthrene	21	< 270	< 260	--	--
Anthracene	22	< 280	< 270	--	--
Fluoranthene	7.0	**260**	**260**	--	--
Pyrene	9.0	**140**	**130**	--	--
Benzo[*a*]anthracene	0.43	**110**	**97**	--	--
Chrysene	5.0	**120**	**98**	--	--
Benzo[*b*]fluoranthene	0.60	**130**	**110**	--	--
Benzo[*k*]fluoranthene	0.57	**53**	**47**	--	--
Benzo[*a*]pyrene	0.77	**130**	**110**	--	--
Dibenzo[*a,h*]anthracene	1.0	< 13	< 12	--	--
Benzo[*g,h,i*]perylene	2.5	**170**	**67**	--	--
Indeno[1,2,3-*cd*]pyrene	1.4	< 18	< 17	--	--
Detection Limit Multiplier[b]		12.7	12.4	--	--
Percent Solids, %		78.4	80.3	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

SURROGATE RECOVERY SUMMARY

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310

GTEL Sample ID	Percent Recovery, %	
	S1 (NBZ)	S2 (TPH)
BS0628-1	59	78
060646-01	94	114
060646-02	65	74
060646-03	78	95
060646-04	61	72
060646-05	48	67
060646-06	71	90
060728-04MS	76.2	83.2
060728-04MSD	74.8	86.1

	Surrogates		Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	33-141%
S2	TPH	Terphenyl-d14	33-141%

D Surrogate diluted out. % Recovery not calculated when surrogate diluted out.
* Indicates values outside of acceptability limits.
a Recovery limits as per laboratory practice.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

MATRIX SPIKE (MS) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 060728-04 Client ID: BATCH QC

Date Analyzed: 07/12/93 Standard ID: H93MS065A

Compound	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery, %	Acceptability Limits, %
Naphthalene	430	< 77	314	73	D-122
Acenaphthylene	859	< 99	656	76	D-139
Acenaphthene	430	< 77	356	83	D-124
Fluorene	85.9	< 9	72.0	84	D-142
Phenanthrene	43.0	< 27	38.7	90	D-155
Anthracene	43.0	< 28	32.6	76	D-126
Fluoranthene	85.9	< 9	75.7	88	D-142
Pyrene	43.0	< 12	54.7	127	D-140
Benzo[*a*]anthracene	43.0	< 0.55	38.3	89	12-135
Chrysene	43.0	< 6.5	33.4	78	D-199
Benzo[*b*]fluoranthene	85.9	< 0.77	81.0	94	6-150
Benzo[*k*]fluoranthene	43.0	< 0.74	40.7	95	D-159
Benzo[*a*]pyrene	43.0	< 0.99	36.4	85	D-128
Dibenzo[*a,h*]anthracene	85.9	< 1.3	78.0	91	D-110
Benzo[*g,h,i*]perylene	85.9	< 3.2	72.5	84	D-116
Indeno[1,2,3-*cd*]pyrene	43.0	< 1.8	39.9	93	D-116

* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

MATRIX SPIKE DUPLICATE (MSD) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 060728-04 Client ID: BATCH QC

Date Analyzed: 07/12/93 Standard ID: H93MS065A

Compound	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery, %	RPD, %	Acceptability Limits: RPD, %
Naphthalene	430	330	77	5	60
Acenaphthylene	861	683	79	4	60
Acenaphthene	430	371	86	4	60
Fluorene	86.1	76.5	89	6	60
Phenanthrene	43.0	39.6	92	2	60
Anthracene	43.0	35.2	82	7	60
Fluoranthene	86.1	78.3	91	3	60
Pyrene	43.0	52.5	122	4	60
Benzo[*a*]anthracene	43.0	38.8	90	1	60
Chrysene	43.0	36.3	84	8	60
Benzo[*b*]Fluoranthene	86.1	81.7	95	1	60
Benzo[*k*]fluoranthene	43.0	41.1	96	1	60
Benzo[*a*]pyrene	43.0	35.7	83	2	60
Dibenzo[*a,h*]anthracene	86.1	78.4	91	0	60
Benzo[*g,h,i*]perylene	86.1	72.8	85	0	60
Indeno[1,2,3-*cd*]pyrene	43.0	40.0	93	0	60

* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

METHOD BLANK RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

	GTEL Blank ID	BS0628-1
	GTEL File ID	BS0628-1
	Date Extracted	06/28/93
	Date Analyzed	06/30/93
Analyte	Detection Limit, ug/kg	Concentration, ug/kg
Naphthalene	60	< 60
Acenaphthylene	77	< 77
1-Methylnaphthalene	60	< 60
2-Methylnaphthalene	60	< 60
Acenaphthene	60	< 60
Fluorene	7.0	< 7.0
Phenanthrene	21	< 21
Anthracene	22	< 22
Fluoranthene	7.0	< 7.0
Pyrene	9.0	< 9.0
Benzo[*a*]anthracene	0.43	< 0.43
Chrysene	5.0	< 5.0
Benzo[*b*]fluoranthene	0.60	< 0.60
Benzo[*k*]fluoranthene	0.57	< 0.57
Benzo[*a*]pyrene	0.77	< 0.77
Dibenzo[*a,h*]anthracene	1.0	< 1.0
Benzo[*g,h,i*]perylene	2.5	< 2.5
Indeno[1,2,3-*cd*]pyrene	1.4	< 1.4
Detection Limit Multiplier[b]		0.998

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		060646-07	060646-08	--	--
Client Identification		FIELD BLANK	EQUIP BLANK	--	--
Date Sampled		06/21/93	06/21/93	--	--
Date Extracted		06/28/93	06/28/93	--	--
Date Analyzed		07/01/93	07/01/93	--	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	< 1.8	< 1.8	--	--
Acenaphthylene	2.3	< 2.3	< 2.3	--	--
1-Methylnaphthalene	1.8	< 1.8	< 1.8	--	--
2-Methylnaphthalene	1.8	< 1.8	< 1.8	--	--
Acenaphthene	1.8	< 1.8	< 1.8	--	--
Fluorene	0.21	< 0.21	< 0.21	--	--
Phenanthrene	0.64	< 0.64	< 0.64	--	--
Anthracene	0.66	< 0.66	< 0.66	--	--
Fluoranthene	0.21	< 0.21	< 0.21	--	--
Pyrene	0.27	< 0.27	< 0.27	--	--
Benzo[*a*]anthracene	0.013	< 0.013	**0.049**	--	--
Chrysene	0.15	< 0.15	< 0.15	--	--
Benzo[*b*]fluoranthene	0.018	< 0.018	**0.093**	--	--
Benzo[*k*]fluoranthene	0.017	< 0.017	**0.041**	--	--
Benzo[*a*]pyrene	0.023	< 0.023	**0.069**	--	--
Dibenzo[*a,h*]anthracene	0.030	< 0.030	< 0.030	--	--
Benzo[*g,h,i*]perylene	0.076	< 0.076	**0.082**	--	--
Indeno[1,2,3-*cd*]pyrene	0.043	< 0.043	< 0.043	--	--
Detection Limit Multiplier[b]		1.00	1.00	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-06-0646

SURROGATE RECOVERY SUMMARY

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310

GTEL Sample ID	Percent Recovery, %	
	S1 (NBZ)	S2 (TPH)
BW0628-01	94	86
060646-07	95	94
060646-08	98	97

	Surrogates		Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	33-141%
S2	TPH	Terphenyl-d14	33-141%

D Surrogate diluted out. % Recovery not calculated when surrogate diluted out.
* Indicates values outside of acceptability limits.
a Recovery limits as per laboratory practice.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-06-0080

June 14, 1993

RECEIVED
JUN 16 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 06/04/93, under chain of custody record 51856.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certificate numbers 194 and 1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 51856

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 800 937 8740
FAX #: (518) 370-5864
Company Address: 1245 KINGS ROAD
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE WOOD PRESERVING
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MP-4	01	1		-								X			6/3	10:00
MP-2 (RTL)	C3060081 02	2		2								X			6/3	12:30

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 3010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: 1 - TOC; 1 - PNA - (RTL)

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS

FAX ☐

REMARKS THIS IS AN R&D BILLING JOB #. SEE ROD V.
PNA FOR RTL

Lab Use Only Lot # Storage Location:
SEALS INTACT ON ICE AT 7°C
BEC 6/4
Work Order # C3060080

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	6/3/93	6:00PM	Received by: C3060081 (RTL)
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory: Brian E. Cipp
	6/4	0915	

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-06-0105

June 18, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Colonie, NY 12205

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 06/05/93, under chain of custody record 52714.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen

Eileen F. Bullen
Laboratory Director

RECEIVED
JUN 21 1993

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-06-0105

ANALYTICAL RESULTS

Matrix: Soil

				Sample Number	061093 TOC			
				Sample Identification	METHOD BLANK			
				Date Sampled	--			
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
TOC	g/100g	0.03	CFA S:18.0	06/14/93	<0.03			

Note: California Fertilizer Association, "California Soil Testing Procedures".

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

52714

pany Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
pany Address: 45 KINGS ROAD
Site location: BUFFALO, NY
ct Manager: BRUCE AMRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE WOOD PRESERVING
st that the proper field sampling dures were used during the collection se samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MP-3	01,02	2		2								X			6/4	9:30
MP-1	03 (01 RT)	2		2								X			6/4	10:00
IP-1	02 (02 RT)	2		2								X			6/4	10:45

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐
1 - PNA - (RTL)
1 - TOC
- TOC-DUPLICATE

TAT
ity (24 hr) ☐
dited (48 hr) ☐
siness Days ☐
r _____
ness Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

SPECIAL DETECTION LIMITS

REMARKS R&D JOB # SEE ROD V.
PNA TO GO TO RTL

QA / QC LEVEL
E ☐ CLP ☐
OTHER _____

SPECIAL REPORTING REQUIREMENTS
FAX ☐

Lab Use Only Lot #
Storage Location: 8°C Soils Intact
(01,02) Work Order # C3060104-RTL
C3060105-GTEL

USTODY RECORD

Relinquished by:	Date	Time	Received by:
Brian Carey	6-4-93	5:00 PM	
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	6/4/93	11:00	Waybill #

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

JUL - 7 1993

Client Number: 00530-0109
Project ID: Buffalo, NY
Work Order Number: C3-06-0433

July 6, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 06/23/93, under chain of custody record 52716.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen

Eileen F. Bullen
Laboratory Director

Client Number: 00530-0109
Project ID: Buffalo, NY
Work Order Number: C3-06-0433

ANALYTICAL RESULTS

Matrix: Soil

				Sample Number	01	02	03	04
				Sample Identification	IP-1	MP-1	MP-2	MP-3
				Date Sampled	06/21/93	06/21/93	06/21/93	06/21/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	g/100g	0.03	CFA S:18.0	07/01/93	0.35	3.0	1.2	2.0

Note: California Fertilizer Association, "California Soil Testing Procedures".

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 00530-0109
Project ID: Buffalo, NY
Work Order Number: C3-06-0433

ANALYTICAL RESULTS

Matrix: Soil

				Sample Number	05	06	062993	
				Sample Identification	MP-4	DUP	METHOD BLANK	
				Date Sampled	06/21/93	06/21/93	--	
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	g/100g	0.03	CFA S:18.0	07/01/93	3.6	0.81	<0.03	

Note: California Fertilizer Association, "California Soil Testing Procedures".

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

~~MEADOWBROOK INDUSTRIAL PARK~~
~~MILFORD, NH 03055~~ Concord, CA
~~(603) 672-1835~~
~~(800) LAB GTEL~~

CHAIN OF CUSTODY AND ANALYSIS REQUEST

52716

Company Name: GTI Geneseo NY
Company Address: 625 Kings Rd, Schen. NY 12303
Project Manager: Bruce Ahrens
I attest that the proper field sampling procedures were used during the collection of these samples.

Phone #: (518) 370-5631
FAX #: (518) 370-5864
Site location: Buffalo NY
Client Project ID: (#) 00530-0109
(NAME) Osmose
Sampler Name (Print): Mark Colmerauer

Field Sample ID	GTEL Lab # (Lab use only)	RTL	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
IP-1	01	01	2		X								X			6/01	4:30pm
MP-1	02	02	2														5:15pm
MP-2	03	03	2														5:50pm
MP-3	04		1														6:15pm
MP-4	05		1														6:30pm
Dup	06	04	2														6:45pm

BTEX/602 ☐ 3020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TOC - by GTEL (RTL)
GTEL 8100 (RTL) ph/A by RTL
1 1 1 1 1 1

GTEL 8100 → RTL

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
R&D job # 00530-0109
see Rod V. about invoicing

GTEL # CB060433-01-06
RTL # C3060434

Lab Use Only Lot #
Storage Location: Iced, Temp. 8°C
Seal Intact 6/23/93
Work Order #
Received by:

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: Mark Colmerauer	6/22/93	12:00pm
Relinquished by:		
Relinquished by:	6/23/93	9:15

Received by:
Received by Laboratory: Kathy Blair

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

RECEIVED
DEC 28 1992

December 22, 1992

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 12/05/92 under chain-of-custody record 51612.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Lynn Sullivan for SU

Susan C. Uhler
Laboratory Director

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

CONFORMANCE/NONCONFORMANCE SUMMARY

(X = Requirements Met * = See Comments NA = Not Applicable)

#	Conformance Item	VOA GC	VOA GC/MS	SV GC	SV GC/MS	Metals	Wet Chem
1	GC/MS Tune	NA	--	NA	--	NA	NA
2	Initial Calibration	X	--	X	--	--	--
3	Continuing Calibration	X	--	X	--	--	--
4	Surrogate Recovery	X	--	*	--	NA	NA
5	Holding Time	X	--	X	--	--	--
6	Method Accuracy	X	--	X	--	--	--
7	Method Precision	X	--	X	--	--	--

8 Blank Contamination - List/ND (None Detected)/*(See Comments)

VOA:	ND
SV:	ND
Metals:	--
Wet Chem:	--

9 Comments: **Method 8310:** The recovery limits were exceeded for one surrogate compound in five samples (120168-01, -04 and -01 MS and MSD) and two surrogate compounds in three samples (120168-03,-05 and -08). The presence of large amounts of target and non-target compounds in the samples inflated the concentration of the surrogates. The data which have been flagged should be considered maximum concentrations found in the samples.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		120168-02	120168-05	--	--
Client Identification		IP-2 6-8;	MP-6 10-12'	--	--
Date Sampled		11/30/92	11/30/92	--	--
Date Analyzed		12/08/92	12/09/92	--	--
Analyte	Detection Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.12	**0.18**	< 0.14	--	--
Toluene	0.31	**0.62**	< 0.36	--	--
Ethylbenzene	0.50	**0.62**	< 0.58	--	--
Xylenes (total)	1.1	**6.6**	**1.5**	--	--
BTEX (total)	--	**8.0**	**1.5**	--	--
Chlorobenzene	0.12	< 0.14	< 0.14	--	--
1,2-Dichlorobenzene	0.25	< 0.30	< 0.29	--	--
1,3-Dichlorobenzene	0.25	< 0.30	< 0.29	--	--
1,4-Dichlorobenzene	0.25	< 0.30	< 0.29	--	--
Detection Limit Multiplier[b]		1.20	1.16	--	--
Percent Solids		83.6	86.3	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BS12079220B	95.2	64.1
120168-02	95.2	64.7
120168-02 MS	95.2	63.6
120168-02 DUP	95.2	64.0
120168-05	95.2	61.3

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
EPA Method 8020

Sample Spiked: 120168-02 Client ID: BATCH QC

Date(s) of Analysis: 12/09/92 Standard ID: BX92QC0289

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, % Rec.[a]
Benzene	57.50	0.18	61.69	107	40-160
Toluene	61.70	0.62	65.24	105	40-160
Ethylbenzene	61.81	0.62	72.54	116	40-160
Total Xylenes	186.26	0.56	224.71	117	40-160

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
Benzene	57.73	65.49	113	5	40	40-160
Toluene	61.95	69.34	111	6	40	40-160
Ethylbenzene	62.06	77.26	124	6	40	40-160
Total Xylenes	187.01	236.25	123	5	40	40-160

* Indicates values outside of acceptability limits.
a Acceptability limits as per laboratory practice.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		BS120792-20B	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		12/08/92	--	--	--
Analyte	Detection Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.12	< 0.12	--	--	--
Toluene	0.31	< 0.31	--	--	--
Ethylbenzene	0.50	< 0.50	--	--	--
Xylenes (total)	1.1	< 1.1	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.12	< 0.12	--	--	--
1,2-Dichlorobenzene	0.25	< 0.25	--	--	--
1,3-Dichlorobenzene	0.25	< 0.25	--	--	--
1,4-Dichlorobenzene	0.25	< 0.25	--	--	--
Detection Limit Multiplier[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		120168-01	120168-02	120168-03	120168-04
Client Identification		SB-3 6-8'	IP-2 6-8'	IP-2 10-12'	MP-6 6-8'
Date Sampled		12/02/92	11/30/92	11/30/92	11/30/92
Date Extracted		12/08/92	12/08/92	12/08/92	12/08/92
Date Analyzed		12/15/92[c]	12/15/92[d]	12/15/92[e]	12/15/92[f]
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	15000	200000	130000[e] X	80000[f]
Acenaphthylene	77	< 1800	< 9200	< 3500 X	3000
1-Methylnaphthalene	60	3200	21000	40000 X	35000
2-Methylnaphthalene	60	32000	200000	270000[e] X	210000[f]
Acenaphthene	60	12000	69000	94000 X	72000[f]
Fluorene	7.0	9400	58000	54000[e] X	42000[f]
Phenanthrene	21	31000[c] X	150000[d]	110000[e] X	85000[f] X
Anthracene	22	13000[c] X	24000	30000[e] X	23000[f] X
Fluoranthene	7.0	16000[c] X	57000	43000[e] X	34000[f] X
Pyrene	9.0	9300[c] X	38000[d]	20000[e] X	21000[f] X
Benzo[*a*]anthracene	0.43	2700 X	7500	6200 X	5100 X
Chrysene	5.0	3500 X	8900	6800 X	5700 X
Benzo[*b*]fluoranthene	0.60	960 X	2600	2300 X	1900 X
Benzo[*k*]fluoranthene	0.57	510 X	1400	1200 X	1000 X
Benzo[*a*]pyrene	0.77	890 X	2400	2300 X	1900 X
Dibenzo[*a,h*]anthracene	1.0	53 X	140	110 X	100 X
Benzo[*g,h,i*]perylene	2.5	260 X	590	500 X	460 X
Indeno[1,2,3-*cd*]pyrene	1.4	220 X	790	690 X	550 X
Detection Limit Multiplier[b]		23.8[c]	120[d]	46.0[e]	23.0[f]
Percent Solids, %		84.1	83.6	86.9	86.8

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
c Detection Limit Multiplier for analytes noted = 238. Date Analyzed: 12/17/92.
d Detection Limit Multiplier for analytes noted = 1200. Date Analyzed: 12/17/92.
e Detection Limit Multiplier for analytes noted = 920. Date Analyzed: 12/17/92.
f Detection Limit Multiplier for analytes noted = 920. Date Analyzed: 12/17/92.
X Estimated Concentration. Surrogate recovery demonstrated sample specific matrix effect.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		120168-05	120168-06	120168-07	120168-08
Client Identification		MP-6 10-12'	MP-5 6-8'	MP-5 10-12'	SB-3 10-12'
Date Sampled		11/30/92	12/01/92	12/01/92	12/02/92
Date Extracted		12/08/92	12/08/92	12/08/92	12/08/92
Date Analyzed		12/15/92[g]	12/15/92[h]	12/15/92[i]	12/15/92[j]
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	18000[g] X	93000[h]	25000[i]	39000[j] X
Acenaphthylene	77	96 X	3200	740	1200 X
1-Methylnaphthalene	60	3000 X	30000	7600[i]	16000[j] X
2-Methylnaphthalene	60	22000[g] X	190000[h]	63000[i]	120000[j] X
Acenaphthene	60	7300[g] X	67000[h]	22000[i]	39000[j] X
Fluorene	7.0	5400[g] X	44000[h]	13000[i]	21000[j] X
Phenanthrene	21	12000[g] X	89000[h] X	23000[i]	35000[j] X
Anthracene	22	3500[g] X	25000[h] X	6400[i]	11000[j] X
Fluoranthene	7.0	4600[g] X	37000[h] X	8500[i]	12000[j] X
Pyrene	9.0	3000[g] X	21000[h] X	9800[i]	6800[j] X
Benzo[*a*]anthracene	0.43	580[g] X	5700 X	1100[i]	1400[j] X
Chrysene	5.0	680[g] X	7400[h] X	2900[i]	3000[j] X
Benzo[*b*]fluoranthene	0.60	250 X	2400 X	460[i]	570[j] X
Benzo[*k*]fluoranthene	0.57	120 X	1100 X	200[i]	350[j] X
Benzo[*a*]pyrene	0.77	210 X	2100 X	400[i]	440[j] X
Dibenzo[*a,h*]anthracene	1.0	11 X	250 X	66	85 X
Benzo[*g,h,i*]perylene	2.5	68 X	670 X	140	190
Indeno[1,2,3-*cd*]pyrene	1.4	92 X	750 X	200	270
Detection Limit Multiplier[b]		1.16[g]	23.2[h]	1.22[i]	1.18[j]
Percent Solids, %		86.3	86.1	83.1	84.1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
g Detection Limit Multiplier for analytes noted = 116. Date Analyzed: 12/17/92.
h Detection Limit Multiplier for analytes noted = 928. Date Analyzed: 12/17/92.
i Detection Limit Multiplier for analytes noted = 976. Date Analyzed: 12/17/92.
j Detection Limit Multiplier for analytes noted = 944. Date Analyzed: 12/17/92.
X Estimated Concentration. Surrogate recovery demonstrated sample specific matrix effect.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

SURROGATE RECOVERY SUMMARY

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310

GTEL Sample ID	Percent Recovery, %	
	S1 (NBZ)	S2 (TPH)
BS1208-1	91	109
120168-01 12/15/92	65	272*
120168-01 12/17/92	D	D
120168-02 12/15/92	D	D
120168-02 12/17/92	D	D
120168-03 12/15/92	179*	407*
120168-03 12/17/92	D	D
120168-04 12/15/92	72	441*
120168-04 12/17/92	D	D
120168-05 12/15/92	172*	159*
120168-05 12/17/92	D	D
120168-06 12/15/92	69	491*
120168-06 12/17/92	D	D
120168-07 12/15/92	104	111
120168-07 02/17/92	D	D
120168-08 12/15/92	149*	179*
120168-08 12/17/92	D	D
120168-01 MS 12/15/92	76	297*
120168-01 MS 12/17/92	D	D
120168-01 MSD 12/15/92	82	360*
120168-01 MSD 12/17/92	D	D
LS1208-1	87	98

	Surrogates		Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	33-141%
S2	TPH	Terphenyl-d14	33-141%

D Surrogate diluted out. % Recovery not calculated when surrogate diluted out.
* Indicates values outside of acceptability limits.
a Recovery limits as per laboratory practice.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

MATRIX SPIKE/DUPLICATE RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 120168-01 Client ID: BATCH QC

Date Analyzed: 12/15/92 Standard ID: H92MS005D

Compound	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery, %	Acceptability Limits, %
Naphthalene	397	14600	18300	NA	D-122
Acenaphthylene	397	< 1830	415	D	D-139
Fluorene	79.3	9420	12700	NA	D-142
Phenanthrene	39.7	31400[b]	42000[c]	NA	D-155
Anthracene	39.7	13000[b]	3070	NA	D-126
Benzo[*k*]fluoranthene	39.7	512	611	NA	D-159
Indeno[1,2,3-*cd*]pyrene	39.7	220	404	NA	D-116

Compound	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery, %	RPD, %	Acceptability Limits: RPD, %
Naphthalene	397	25100	NA	31[a]	60
Acenaphthylene	397	654	D	45[a]	60
Fluorene	79.3	14100[c]	NA	10[a]	60
Phenanthrene	39.7	47600[c]	NA	13[a]	60
Anthracene	39.7	4580	NA	39[a]	60
Benzo[*k*]fluoranthene	39.7	708	NA	15[a]	60
Indeno[1,2,3-*cd*]pyrene	39.7	404	NA	0[a]	60

a RPD Calculation is based on concentration.
b Detection Limit Multiplier = 238 for this analyte only; Date Analyzed = 12/17/92.
c Detection Limit Multiplier = 237 for this analyte only; Date analyzed is 12/17/92.
* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

LABORATORY CONTROL SAMPLE (LCS) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: LS1208-1 Date Analyzed: 12/15/92

Standard ID: H92NS005D

Compound	Spike Added, ug/kg	LCS Concentration, ug/kg	LCS Percent Recovery, %
Naphthalene	334	334	100
Acenaphthylene	334	332	99
Fluorene	66.9	63.2	94
Phenanthrene	33.4	30.2	90
Anthracene	33.4	27.4	82
Benzo[*k*]fluoranthene	33.4	32.2	96
Indeno[1,2,3-*cd*]pyrene	33.4	31.4	94

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105306
Project ID: Osmose Ozone
Login Number: M2-12-0168

METHOD BLANK RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

	GTEL Blank ID	BS1208-1
	GTEL File ID	BS12081
	Date Extracted	12/08/92
	Date Analyzed	12/14/92
Analyte	Detection Limit, ug/kg	Concentration, ug/kg
Naphthalene	60	< 61
Acenaphthylene	77	< 78
1-Methylnaphthalene	60	< 61
2-Methylnaphthalene	60	< 61
Acenaphthene	60	< 61
Fluorene	7.0	< 7.1
Phenanthrene	21	< 21
Anthracene	22	< 22
Fluoranthene	7.0	< 7.1
Pyrene	9.0	< 9.1
Benzo[*a*]anthracene	0.43	< 0.43
Chrysene	5.0	< 5.1
Benzo[*b*]fluoranthene	0.60	< 0.61
Benzo[*k*]fluoranthene	0.57	< 0.58
Benzo[*a*]pyrene	0.77	< 0.78
Dibenzo[*a,h*]anthracene	1.0	< 1.0
Benzo[*g,h,i*]perylene	2.5	< 2.5
Indeno[1,2,3-*cd*]pyrene	1.4	< 1.4

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

51612

Company Name: GTI Schenectady
Phone #:
FAX #:
Company Address:
Site location: Buffalo
Project Manager: Bruce Ahrens
Client Project ID: (#) 01110530C 650339
(NAME) Osmose Ozone
Sampler Name (Print): J. Olaf Gustafson

I attest that the proper field sampling procedures were used during the collection of these samples.

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
SB-3 6-8'	1	2		X								X			12/2	3:30
IP-2 6-8'	2	3		X								X			11/30	10:30
"	1	2		X								X			↓	↓
IP-2 10-12'	3	2		X								X				12:00
mp-6 6-8'	4	2		X								X				4:00
mp-6 10-12'	5	3		X								X				4:30
"	1	2		X								X			↓	↓
mp-5 6-8'	6	2		X								X			12/1	2:15
mp-5 10-12'	7	2		X								X			↓	2:45
SB-3 10-12'	8	2		X								X			12/2	4:00

Analysis	
BTEX/602 ☐ 8020 ☐ with MTBE ☐	
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	
Hydrocarbon Profile (SIMDIS) ☐	
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	
TPH/IR 418.1 ☐ SM 503 ☐	
EDB by 504 ☐ DBCP by 504 ☐	
EPA 503.1 ☐ EPA 502.2 ☐	
EPA 601 ☐ EPA 8010 ☐	
EPA 602 ☐ EPA 8020 ☒	X
EPA 608 ☐ 8080 ☐ PCB only ☐	
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	
EPA 610 ☐ 8310 ☒	X
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	
CAM Metals TTLC ☐ STLC ☐	
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	
Organic Lead ☐	
Corrosivity ☐ Flash Point ☐ Reactivity ☐	

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ☐
Business Days ☐
Project-specific
BLUE ☒ CLP ☐

Special Handling
GTEL Contact
Quote/Contract # QM920306
Confirmation #
PO #

QA / QC LEVEL
OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS

Lab Use Only Lot #
Storage Location: W2B
Work Order #

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: J. Olaf Gustafson	12/4/92	7:00
Relinquished by:	Date	Time
	12/5/92	11:35
Relinquished by:	Date	Time

Received by:
Received by: Guy McCadden
Received by Laboratory:
Waybill #

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0790

RECEIVED
OCT 25 1993

October 18, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 09/29/93 under chain-of-custody record 52737.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Lynn Sullivan for SU

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0790

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		090790-01[c]	090790-02[c]	090790-03[c]	090790-04[c]
Client Identification		MP-6B	DUPLICATE	IP-2B	MW-5B
Date Sampled		09/28/93	09/28/93	09/28/93	09/28/93
Date Analyzed		10/05/93	10/05/93	10/05/93	10/05/93
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.12	< 0.24	**0.06**	< 0.05
Toluene	0.05	**0.47**	**0.27**	**0.27**	**0.06**
Ethylbenzene	0.10	**0.49**	< 0.47	**0.29**	**0.21**
Xylenes (total)	0.20	**4.5**	**3.7**	**2.5**	**1.8**
BTEX (total)	--	**5.5**	**4.0**	**3.1**	**2.1**
Chlorobenzene	0.10	< 0.24	< 0.47	< 0.10	< 0.10
1,2-Dichlorobenzene	0.10	< 0.24	< 0.47	< 0.10	< 0.10
1,3-Dichlorobenzene	0.10	< 0.24	< 0.47	< 0.10	< 0.10
1,4-Dichlorobenzene	0.10	< 0.24	< 0.47	< 0.10	< 0.10
Sample Dilution Factor[b]		2.40	4.72	1.14	1.18
Percent Solids		86.5	87.0	85.5	86.5

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

c Sample was analyzed diluted due to the interference of non-target compounds.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0790

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		090790-05[c]	--	--	--
Client Identification		MP-5B	--	--	--
Date Sampled		09/28/93	--	--	--
Date Analyzed		10/05/93	--	--	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.05	--	--	--
Toluene	0.05	**0.25**	--	--	--
Ethylbenzene	0.10	**0.33**	--	--	--
Xylenes (total)	0.20	**2.6**	--	--	--
BTEX (total)	--	**3.2**	--	--	--
Chlorobenzene	0.10	< 0.10	--	--	--
1,2-Dichlorobenzene	0.10	< 0.10	--	--	--
1,3-Dichlorobenzene	0.10	< 0.10	--	--	--
1,4-Dichlorobenzene	0.10	< 0.10	--	--	--
Sample Dilution Factor[b]		1.18	--	--	--
Percent Solids		86.4	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

c Sample was analyzed diluted due to the interference of non-target compounds.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0790

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		090790-01	090790-02	090790-03	090790-04
Client Identification		MP-6B	DUPLICATE	IP-2B	MW-5B
Date Sampled		09/28/93	09/28/93	09/28/93	09/28/93
Date Extracted		09/30/93	09/30/93	09/30/93	09/30/93
Date Analyzed		10/08/93[c]	10/08/93[d]	10/08/93	10/08/93
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	**120000**	**130000**	**66000**	**68000**
Acenaphthylene	77	< 18000	< 18000	< 18000	< 18000
1-Methylnaphthalene	60	**55000**	**33000**	**27000**	**29000**
2-Methylnaphthalene	60	**240000**	**150000**	**130000**	**130000**
Acenaphthene	60	**95000**	**64000**	**54000**	**51000**
Fluorene	7.0	**52000**	**41000**	**25000**	**30000**
Phenanthrene	21	**68000**[c]	**84000**[d]	**36000**	**54000**
Anthracene	22	**9100**	**9800**	< 5100	**16000**
Fluoranthene	7.0	**27000**	**32000**	**13000**	**21000**
Pyrene	9.0	**20000**	**24000**	**31000**	**15000**
Benzo[*a*]anthracene	0.43	**4500**	**5200**	**270**	**3200**
Chrysene	5.0	**5000**	**6500**	< 1200	**4100**
Benzo[*b*]fluoranthene	0.60	**2100**	**2200**	**720**	**1400**
Benzo[*k*]fluoranthene	0.57	**1100**	**1200**	**390**	**860**
Benzo[*a*]pyrene	0.77	**1900**	**1800**	**560**	**1200**
Dibenzo[*a,h*]anthracene	1.0	< 230	**300**	< 230	< 230
Benzo[*g,h,i*]perylene	2.5	< 580	< 570	< 580	**660**
Indeno[1,2,3-*cd*]pyrene	1.4	**880**	**660**	< 320	**480**
Detection Limit Multiplier[b]		230[c]	228[d]	232	230
Percent Solids, %		86.5	87.0	85.5	86.5

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
c Detection Limit Multiplier for analyte noted = 460, Date Analyzed = 10/12/93.
d Detection Limit Multiplier for analyte noted = 456, Date Analyzed = 10/11/93.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0790

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		090790-05	--	--	--
Client Identification		MP-5B	--	--	--
Date Sampled		09/28/93	--	--	--
Date Extracted		09/30/93	--	--	--
Date Analyzed		10/08/93	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	**21000**	--	--	--
Acenaphthylene	77	< 8900	--	--	--
1-Methylnaphthalene	60	**11000**	--	--	--
2-Methylnaphthalene	60	**51000**	--	--	--
Acenaphthene	60	**21000**	--	--	--
Fluorene	7.0	**11000**	--	--	--
Phenanthrene	21	**14000**	--	--	--
Anthracene	22	**2600**	--	--	--
Fluoranthene	7.0	**5200**	--	--	--
Pyrene	9.0	**7300**	--	--	--
Benzo[a]anthracene	0.43	**810**	--	--	--
Chrysene	5.0	**650**	--	--	--
Benzo[*b*]fluoranthene	0.60	**320**	--	--	--
Benzo[*k*]fluoranthene	0.57	**150**	--	--	--
Benzo[a]pyrene	0.77	**270**	--	--	--
Dibenzo[*a,h*]anthracene	1.0	< 115	--	--	--
Benzo[*g,h,i*]perylene	2.5	< 290	--	--	--
Indeno[1,2,3-*cd*]pyrene	1.4	< 160	--	--	--
Detection Limit Multiplier[b]		115	--	--	--
Percent Solids, %		86.4	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52737

Company Name: GTI- Schenectady
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 Kings Rd
Site location: Buffalo NY (Dumore)
Project Manager: Bruce Ahrens
Client Project ID: (#) (NAME) 00530-0109 (Dumore)
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): Michael Gerber

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MP-6b	1	5		X								X			9-28-93	9:45
Duplicate	2	5		X								X			9-28-93	9:55
IP-2b	3	5		X								X			9-28-93	11:00
MW-5b	4	5		X								X			9-28-93	12:45
MP-5b	5	5		X								X			9-28-93	1:15

Field Sample ID	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
MP-6b										3				2						
Duplicate										3				2						
IP-2b										3				2						
MW-5b										3				2						
MP-5b										3				2						

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

REMARKS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

Lab Use Only Lot #

Storage Location: 23-M-A, W-7-B

Work Order # M3090790

CUSTODY RECORD

	Relinquished by Sampler:	Date	Time	Received by:
	Michael Gerber	9/28/93	5:20	
	Relinquished by:	Date	Time	Received by:
	Relinquished by:	Date	Time	Received by Laboratory: 23 MA Dave Fitch
		9/29/93	11:45	Waybill # FEDEX 4922475930

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

RECEIVED
DEC - 3 1993

November 29, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 10/25/93 under chain-of-custody records 53228 and 53229

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

CONFORMANCE/NONCONFORMANCE SUMMARY

(X = Requirements Met * = See Comments NA = Not Applicable)

#	Conformance Item	VOA GC	VOA GC/MS	SV GC	SV GC/MS	Metals	Wet Chem
1	GC/MS Tune	NA	--	NA	--	NA	NA
2	Initial Calibration	X	--	X	--	--	--
3	Continuing Calibration	X	--	X	--	--	--
4	Surrogate Recovery	X	--	X	--	NA	NA
5	Holding Time	X	--	X	--	--	--
6	Method Accuracy	X	--	*	--	--	--
7	Method Precision	X	--	X	--	--	--

8 Blank Contamination - List/ND (None Detected)/*(See Comments)

VOA:	ND
SV:	ND
Metals:	--
Wet Chem:	--

9 Comments:

Method 8310:
Batch Matrix Spike MS100758-01 and Matrix Spike Duplicate MD100758-01 demonstrated high native concentrations of several target analytes. Therefore, method accuracy could not be evaluated from these samples. Method precision was demonstrated to be in control based upon concentrations. Method and spike solution accuracy are supported by the Laboratory Control Sample LS110593A provided for this purpose. The data is not impacted.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		100758-01	100758-02	100758-03	100758-04
Client Identification		IP-2 (10-12')	MP-5 (10-12')	MP-6 (10-12')	MW-5 (10-12')
Date Sampled		10/23/93	10/23/93	10/23/93	10/23/93
Date Analyzed		10/30/93	10/30/93	10/30/93	10/30/93
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg			
Benzene	0.05	< 0.05	**0.07**	**0.07**	< 0.05
Toluene	0.10	< 0.05	**0.79**	**0.20**	**0.15**
Ethylbenzene	0.10	**0.15**	**1.1**	**0.18**	**0.23**
Xylenes (total)	0.20	**1.4**	**12**	**2.1**	**1.9**
Chlorobenzene	0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,2-Dichlorobenzene	0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,3-Dichlorobenzene	0.10	< 0.10	< 0.10	< 0.10	< 0.10
1,4-Dichlorobenzene	0.10	< 0.10	< 0.10	< 0.10	< 0.10
Sample Dilution Factor[b]		1.00	1.00	1.00	1.00
Percent Solids		85.9	82.7	86.1	86.2

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data as a result of dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BS10289319A	95.2	59.9
100758-01	95.2	49.8
MS100758-01	95.2	50.2
MD100758-01	95.2	60.6

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
Modified EPA Method 8020

Sample Spiked: 100758-01 Client ID: BATCH QC

Date of Analysis: 10/30/93 Standard ID: BX93SM0590

Analyte	Spike Amount, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, % Rec.
Benzene	25.05	< 0.05	17.89	71	40-150
Toluene	26.87	< 0.05	18.42	69	46-148
Ethylbenzene	26.92	0.13	20.19	75	40-160
Total Xylenes	81.11	1.20	64.67	78	40-160

Analyte	Spike Amount, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD, %	Acceptability Limits	
					RPD	% Recovery
Benzene	24.79	20.99	84	17	40	40-150
Toluene	26.59	20.84	78	13	40	46-148
Ethylbenzene	26.64	22.28	83	11	40	40-160
Total Xylenes	80.28	70.62	87	10	40	40-160

* Indicates values outside of acceptability limits.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		BS10289319A	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		10/30/93	--	--	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg			
Benzene	0.05	< 0.5	--	--	--
Toluene	0.10	< 0.10	--	--	--
Ethylbenzene	0.10	< 0.10	--	--	--
Xylenes (total)	0.20	< 0.20	--	--	--
Chlorobenzene	0.10	< 0.10	--	--	--
1,2-Dichlorobenzene	0.10	< 0.10	--	--	--
1,3-Dichlorobenzene	0.10	< 0.10	--	--	--
1,4-Dichlorobenzene	0.10	< 0.10	--	--	--
Sample Dilution Factor[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data as a result of dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		100758-01	100758-02	100758-03	100758-04
Client Identification		IP-2 (10-12')	MP-5 (10-12')	MP-6 (10-12')	MW-5 (10-12')
Date Sampled		10/23/93	10/23/93	10/23/93	10/23/93
Date Extracted		11/05/93	11/05/93	11/05/93	11/05/93
Date Analyzed		11/10/93	11/10/93	11/10/93	11/10/93
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	**51000**	**350000**	**160000**	**130000**
Acenaphthylene	77	< 18000	< 93000	< 88000	< 89000
1-Methylnaphthalene	60	**24000**	**130000**	< 68000	**83000**
2-Methylnaphthalene	60	**110000**	**610000**	**270000**	**360000**
Acenaphthene	60	**45000**	**260000**	**110000**	**150000**
Fluorene	7.0	**23000**	**130000**	**62000**	**73000**
Phenanthrene	21	**33000**	**200000**	**110000**	**110000**
Anthracene	22	**1500**	**62000**	< 25000	< 25000
Fluoranthene	7.0	**13000**	**72000**	**41000**	**40000**
Pyrene	9.0	**27000**	**140000**	**71000**	**67000**
Benzo[*a*]anthracene	0.43	**1900**	**11000**	**6200**	**6700**
Chrysene	5.0	**1200**	**6600**	< 5700	**12000**
Benzo[*b*]fluoranthene	0.60	**740**	**4200**	**2500**	**2800**
Benzo[*k*]fluoranthene	0.57	**380**	**2100**	**1100**	**1300**
Benzo[*a*]pyrene	0.77	**510**	**3100**	**1700**	**2100**
Dibenzo[*a,h*]anthracene	1.0	< 230	< 1200	< 1100	< 1200
Benzo[*g,h,i*]perylene	2.5	< 580	< 3000	< 2900	< 2900
Indeno[1.2.3-*cd*]pyrene	1.4	< 320	< 1700	< 1600	< 1600
Detection Limit Multiplier[b]		232	1210	1140	1150
Percent Solids, %		85.8	82.6	86.1	86.2

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		100758-05	--	--	--
Client Identification		DUPLICATE	--	--	--
Date Sampled		10/23/93	--	--	--
Date Extracted		11/05/93	--	--	--
Date Analyzed		11/10/93[c]	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	**240000**	--	--	--
Acenaphthylene	77	< 8900	--	--	--
1-Methylnaphthalene	60	**100000**	--	--	--
2-Methylnaphthalene	60	**360000[c]**	--	--	--
Acenaphthene	60	**180000**	--	--	--
Fluorene	7.0	**76000[c]**	--	--	--
Phenanthrene	21	**110000[c]**	--	--	--
Anthracene	22	**9000[c]**	--	--	--
Fluoranthene	7.0	**50000**	--	--	--
Pyrene	9.0	**83000[c]**	--	--	--
Benzo[a]anthracene	0.43	**7800**	--	--	--
Chrysene	5.0	**6400**	--	--	--
Benzo[*b*]fluoranthene	0.60	**3000**	--	--	--
Benzo[*k*]fluoranthene	0.57	**1500**	--	--	--
Benzo[a]pyrene	0.77	**3900**	--	--	--
Dibenzo[*a,h*]anthracene	1.0	**290**	--	--	--
Benzo[*g,h,i*]perylene	2.5	**2200**	--	--	--
Indeno[1,2,3-*cd*]pyrene	1.4	**1200**	--	--	--
Detection Limit Multiplier[b]		116[c]	--	--	--
Percent Solids, %		85.4	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
c Detection Limit Multiplier for analytes noted = 1160, Date Analyzed = 11/11/93.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

SURROGATE RECOVERY SUMMARY

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310

GTEL Sample ID	Percent Recovery, %	
	S1 (NBZ)	S2 (TPH)
BS110593A	34	66
LS110593A	112	75
100758-01	D	D
MS100758-01	D	D
MD100758-01	D	D
100758-02	D	D
100758-03	D	D
100758-04	D	D
100758-05	D	D

	Surrogates		Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	33-141%
S2	TPH	Terphenyl-d14	33-141%

D Surrogate diluted out. % Recovery not calculated when surrogate diluted out.
* Indicates values outside of acceptability limits.
a Recovery limits as per laboratory practice.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

MATRIX SPIKE (MS) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 100758-01 Client ID: BATCH QC

Date Analyzed: 10/10/93 Standard ID: H93MS107

Compound	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery, %	Acceptability Limits, %
Naphthalene	388	51400	84800	D	Det.-122
Acenaphthylene	775	< 17900	D	D	Det.-139
Acenaphthene	388	44500	70000	D	Det.-124
Fluorene	77.5	23500	35200	D	Det.-142
Phenanthrene	38.8	33400	54300	D	Det.-155
Anthracene	38.8	1490	12600	D	Det.-126
Fluoranthene	77.5	12600	20000	D	Det.-142
Pyrene	38.8	27500	52300	D	Det.-140
Benzo[*a*]anthracene	38.8	1850	2940	D	12-135
Chrysene	38.8	1190	2010	D	Det.-199
Benzo[*b*]fluoranthene	77.5	736	1190	D	6-150
Benzo[*k*]fluoranthene	38.8	380	582	D	Det.-159
Benzo[*a*]pyrene	38.8	513	1630	D	Det.-128
Dibenzo[*a,h*]anthracene	77.5	< 232	385	D	Det.-110
Benzo[*g,h,i*]perylene	77.5	< 580	860	D	Det.-116
Indeno[1,2,3-*cd*]pyrene	38.8	< 325	568	D	Det.-116

* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

MATRIX SPIKE DUPLICATE (MSD) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 100758-01 Client ID: BATCH QC

Date Analyzed: 10/11/93 Standard ID: H93MS107

Compound	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery, %	RPD, %	Acceptability Limits: RPD, %
Naphthalene	387	101000	D	17[a]	60
Acenaphthylene	773	D	D	D	60
Acenaphthene	387	82900	D	17[a]	60
Fluorene	77.3	42700	D	19[a]	60
Phenanthrene	38.7	63900	D	16[a]	60
Anthracene	38.7	21600	D	53[a]	60
Fluoranthene	77.3	24400	D	20[a]	60
Pyrene	38.7	58400	D	11[a]	60
Benzo[*a*]anthracene	38.7	3580	D	20[a]	60
Chrysene	38.7	1900	D	6[a]	60
Benzo[*b*]Fluoranthene	77.3	1475	D	21[a]	60
Benzo[*k*]fluoranthene	38.7	812	D	33[a]	60
Benzo[*a*]pyrene	38.7	1940	D	17[a]	60
Dibenzo[*a,h*]anthracene	77.3	241	D	46[a]	60
Benzo[*g,h,i*]perylene	77.3	1290	D	40[a]	60
Indeno[1,2,3-*cd*]pyrene	38.7	582	D	2[a]	60

* Values outside of QC limits.
a RPD calculation is based on concentration.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

LABORATORY CONTROL SAMPLE (LCS) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: LS110593A Client ID: BATCH QC

Standard ID: 11/05/93

Compound	Spike Added, ug/kg	LCS Concentration, ug/kg	LCS Percent Recovery, %
Naphthalene	330	327	99
Acenaphthylene	659	634	96
Acenaphthene	330	337	102
Fluorene	65.9	63.6	96
Phenanthrene	33.0	42.4	129
Anthracene	33.0	32.8	99
Fluoranthene	65.9	72.7	110
Pyrene	33.0	41.5	126
Benzo[*a*]anthracene	33.0	32.5	99
Chrysene	33.0	28.9	88
Benzo[*b*]fluoranthene	65.9	59.5	90
Benzo[*k*]fluoranthene	33.0	30.5	93
Benzo[*a*]pyrene	33.0	30.7	93
Dibenzo[*a,h*]anthracene	65.9	62.0	94
Benzo{*g,h,i*]perylene	65.9	62.7	95
Indeno[1,2,3-*cd*]pyrene	33.0	27.4	83

* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE OZONE
Login Number: M3-10-0758

METHOD BLANK RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

	GTEL Blank ID	BS110593A
	GTEL File ID	BS1105
	Date Extracted	11/05/93
	Date Analyzed	11/09/93
Analyte	Detection Limit, ug/kg	Concentration, ug/kg
Naphthalene	60	< 59
Acenaphthylene	77	< 76
1-Methylnaphthalene	60	< 59
2-Methylnaphthalene	60	< 59
Acenaphthene	60	< 59
Fluorene	7.0	< 6.9
Phenanthrene	21	< 21
Anthracene	22	< 22
Fluoranthene	7.0	< 6.9
Pyrene	9.0	< 8.9
Benzo[*a*]anthracene	0.43	< 0.43
Chrysene	5.0	< 4.9
Benzo[*b*]fluoranthene	0.60	< 0.59
Benzo[*k*]fluoranthene	0.57	< 0.56
Benzo[*a*]pyrene	0.77	< 0.76
Dibenzo[*a,h*]anthracene	1.0	< 0.99
Benzo[*g,h,i*]perylene	2.5	< 2.5
Indeno[1,2,3-*cd*]pyrene	1.4	< 1.4
Detection Limit Multiplier[b]		0.989

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

RECEIVED
JAN - 5 1993

December 30, 1992

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 11/20/92 and 11/21/92 under chain-of-custody records 05181, 05182, 47174, 51627 and 51833.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

GTEL ENVIRONMENTAL LABORATORIES, INC

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

53228

Company Name: GTI

Phone #:

FAX #:

Company Address: Schenectady

Site location: Buffalo, NY

Project Manager: Bruce Ahrens

Client Project ID: (#) 005300109 650339

(NAME) Osmose Ozone

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
TP-2 (10-12')	1	5		X								X			10/23	9:00
MP-5 (10-12')	2	2		X								X				11:00
MP-6 (10-12')	3	2		X								X				10:00
MW-5 (10-12')	4	2		X								X				12:00
Duplicate	5	2		X								X				9:00

Field Sample ID	BTEX/602 ☐ 8020 ☒ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
TP-2 (10-12')										3				2						
MP-5 (10-12')														2						
MP-6 (10-12')														2						
MW-5 (10-12')														2						
Duplicate														2						

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____
- Business Days ☐

Special Handling

- GTEL Contact _____
- Quote/Contract # _____
- Confirmation # _____
- PO # _____

QA / QC LEVEL

BLUE ☒ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

REMARKS

SPECIAL REPORTING REQUIREMENTS

FAX ☒

Lab Use Only Lot #

Storage Location: W-6-B 23-RC

Work Order # M3100758

CUSTODY RECORD

	Relinquished by Sampler:	Date	Time	Received by:
	J. Olaf Gustafson	10/23/93	1:00	
	Relinquished by:	Date	Time	Received by:
	Relinquished by:	Date	Time	Received by Laboratory:
		10/25/93	1210	

Waybill # 477961788 3

rev. 7/91

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] DOW[redacted] OK [redacted] UST [redacted] PA[redacted]
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-[redacted] TODY [redacted] ECO[redacted] AND ANALYSIS REQUEST 53229

Company Name: GTI

Phone #:

FAX #:

Company Address: Schenectady

Site location: Buffalo, NY

Project Manager: Bruce Ahrens

Client Project ID: (#) 005300109 650339

(NAME) Osmose Ozone

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MP-5 (10-12')	2	3		X								X			10/23	11:07
MP-6 (10-12')	3	3		X								X				10:10
MW-5 (10-12')	4	3		X								X				12:00
	MW 10293															

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
									3										
									3										
									3										

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____ Business Days ☐

Special Handling

- GTEL Contact _____
- Quote/Contract # _____
- Confirmation # _____
- PO # _____

QA / QC LEVEL

BLUE ☐ CLP ☐ OTHER Standard

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS

FAX ☒

REMARKS

Lab Use Only Lot #

Storage Location: W-6-B 23-R-c

Work Order # M3100759

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Olaf Gustafson	10/23/93	1:00	Received by:
Relinquished by:			Received by:
Relinquished by:			Received by Laboratory:

Waybill # 477961760 3

rev. 7/91

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

CONFORMANCE/NONCONFORMANCE SUMMARY

(X = Requirements Met * = See Comments NA = Not Applicable)

#	Conformance Item	VOA GC	VOA GC/MS	SV HPLC	SV GC/MS	Metals	Wet Chem
1	GC/MS Tune	NA	--	NA	--	NA	NA
2	Initial Calibration	X	--	X	--	--	--
3	Continuing Calibration	X	--	X	--	--	--
4	Surrogate Recovery	X	--	*	--	NA	NA
5	Holding Time	X	--	X	--	--	--
6	Method Accuracy	X	--	X	--	--	--
7	Method Precision	X	--	X	--	--	--

8 Blank Contamination - List/ND (None Detected)/*(See Comments)

VOA:	*
SV:	ND
Metals:	--
Wet Chem:	--

9 Comments:

Method 8020 Medium Level:
Contamination was demonstrated to be isolated to the methanol blank which appears to be carryover from the rinse methanol. The instrument blank (BW11309220B) prepped and analyzed on 11/30/92 support that the instrument and methanol are free of contamination. Data not impacted.

Method 8310:
Percent Recovery limits were exceeded for one surrogate in three samples due to the presence of interfering non-target compounds and high concentrations of target analytes. However, this type of contamination typically impacts this surrogate's recoveries only by contributing and interfering with the peak's integration. Data reported for the targets detected is not believed to be adversely impacted.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil - Low Level
Modified EPA Method 8020[a]

GTEL Sample Number		110512-02	110513-01	110513-02	110513-03
Client Identification		MP-3	MW-18 2-4'	MW-18 39-41'	MW-18 57-58'
Date Sampled		11/18/92	11/17/92	11/17/92	11/17/92
Date Analyzed		12/01/92	12/01/92	12/01/92	12/01/92
Analyte	Detection Limit, ug/kg	Concentration, ug/kg (dry)			
Benzene	1.0	< 1.2	< 3.0	< 2.6	< 2.6
Toluene	1.7	< 2.0	< 5.0	< 4.5	< 4.5
Ethylbenzene	1.0	< 1.2	< 3.0	< 2.6	< 2.6
Xylenes (total)	2.0	< 2.4	< 5.9	< 5.3	< 5.3
BTEX (total)	--	--	--	--	--
Chlorobenzene	1.0	< 1.2	< 3.0	< 2.6	< 2.6
1,2-Dichlorobenzene	1.7	< 2.0	< 5.0	< 4.5	< 4.5
1,3-Dichlorobenzene	1.7	< 2.0	< 5.0	< 4.5	< 4.5
1,4-Dichlorobenzene	1.7	< 2.0	< 5.0	< 4.5	< 4.5
Detection Limit Multiplier[b]		1.20	2.95	2.65	2.64
Percent Solids		82.7	85.1	92.6	92.3

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; sample prepared by EPA Method 5030. Method modified to include additional compounds. Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil - Low Level
Modified EPA Method 8020[a]

GTEL Sample Number		110552-04	--	--	--
Client Identification		DUP-2	--	--	--
Date Sampled		11/20/92	--	--	--
Date Analyzed		12/01/92	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg (dry)			
Benzene	1.0	< 1.2	--	--	--
Toluene	1.7	< 2.0	--	--	--
Ethylbenzene	1.0	< 1.2	--	--	--
Xylenes (total)	2.0	< 2.4	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	1.0	< 1.2	--	--	--
1,2-Dichlorobenzene	1.7	< 2.0	--	--	--
1,3-Dichlorobenzene	1.7	< 2.0	--	--	--
1,4-Dichlorobenzene	1.7	< 2.0	--	--	--
Detection Limit Multiplier[b]		1.20	--	--	--
Percent Solids		84.1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; sample prepared by EPA Method 5030. Method modified to include additional compounds. Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil - Low Level
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BS12019214B	95.2	96.7
110552-04 MS	95.2	87.6
110552-04 MSD	95.2	83.7
110513-01	95.2	94.1
110513-02	95.2	107.9
110513-03	95.2	104.0
110552-04	95.2	72.9
110512-02	95.2	86.7

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
EPA Method 8020

Sample Spiked: 110552-04 Client ID: BATCH QC

Date(s) of Analysis: 12/01/92 Standard ID: BX92QC0260

Analyte	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery	Acceptability Limits, % Rec.[a]
Benzene	23.78	< 1.20	13.58	57	40-160
Toluene	23.78	< 2.04	15.92	67	40-160
Ethylbenzene	23.78	< 1.20	16.31	69	40-160
Total Xylenes	71.35	< 2.40	50.39	71	40-160

Analyte	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
Benzene	24.02	13.55	56	1	40	40-160
Toluene	24.02	15.51	65	4	40	40-160
Ethylbenzene	24.02	16.27	68	1	40	40-160
Total Xylenes	72.07	50.40	70	1	40	40-160

* Indicates values outside of acceptability limits.
a Acceptability limits as per laboratory practice.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil - Low Level
Modified EPA Method 8020[a]

GTEL Sample Number		BS12019214B	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		12/01/92	--	--	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg (dry)			
Benzene	1.0	< 1.0	--	--	--
Toluene	1.7	< 1.7	--	--	--
Ethylbenzene	1.0	< 1.0	--	--	--
Xylenes (total)	2.0	< 2.0	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	1.0	< 1.0	--	--	--
1,2-Dichlorobenzene	1.7	< 1.7	--	--	--
1,3-Dichlorobenzene	1.7	< 1.7	--	--	--
1,4-Dichlorobenzene	1.7	< 1.7	--	--	--
Detection Limit Multiplier[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; sample prepared by EPA Method 5030. Method modified to include additional compounds. Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		110552-01	110552-02	110552-03	--
Client Identification		IP-1	MW-19 2-4'	MW-19 54-55'	--
Date Sampled		11/19/92	11/19/92	11/19/92	--
Date Analyzed		11/30/92	11/30/92	11/30/92	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	< 0.15	< 0.14	< 0.13	--
Toluene	0.05	< 0.38	< 0.37	< 0.33	--
Ethylbenzene	0.10	< 0.60	< 0.59	< 0.54	--
Xylenes (total)	0.20	< 1.3	< 1.3	< 1.2	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.12	< 0.15	< 0.14	< 0.13	--
1,2-Dichlorobenzene	0.25	< 0.30	< 0.30	< 0.27	--
1,3-Dichlorobenzene	0.25	< 0.30	< 0.30	< 0.27	--
1,4-Dichlorobenzene	0.25	< 0.30	< 0.30	< 0.27	--
Sample Dilution Factor[b]		1.21[c]	1.18[c]	1.08[c]	--
Percent Solids		82.2	84.6	93.0	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

c Sample was not analyzed low level due to the interference of non-target compounds.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

SURROGATE RECOVERY RESULTS

Volatile Organics in Soil
(Trifluorotoluene)
EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BW11309220B	95.2	90.1
BS11309220A	95.2	88.6
110552-04 MS	95.2	86.4
110552-04 MSD	95.2	85.5
110552-01	95.2	85.2
110552-02	95.2	82.4
110552-03	95.2	82.6
BS11309220C	95.2	73.8

Acceptability Limits[a] 26-125%

a Laboratory generated acceptability limits updated 05/28/92.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MSD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Volatile Organics in Soil
EPA Method 8020

Sample Spiked: 110552-04 Client ID: BATCH QC

Date(s) of Analysis: 11/30/92 Standard ID: BX92QC0289

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, % Rec.[a]
Benzene	57.73	< 0.14	53.09	92	40-160
Toluene	61.95	< 0.37	54.27	88	40-160
Ethylbenzene	62.06	< 0.59	59.40	96	40-160
Total Xylenes	187.02	< 1.31	179.76	96	40-160

Analyte	Spike Added, mg/kg	MSD Concentration, mg/kg	MSD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
Benzene	57.38	54.08	94	2	40	40-160
Toluene	61.58	55.47	90	2	40	40-160
Ethylbenzene	61.69	60.85	98	2	40	40-160
Total Xylenes	185.90	183.96	98	2	40	40-160

* Indicates values outside of acceptability limits.
a Acceptability limits as per laboratory practice.
NA Not Applicable. % Recovery is not calculated when sample results exceed five times the spike concentration.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

METHOD BLANK RESULTS

Aromatic Volatile Organics in Soil
Modified EPA Method 8020[a]

GTEL Sample Number		BS11309220A	BW11309220B	BS11309220C	--
Client Identification		METHOD BLANK	METHOD BLANK	METHOD BLANK	--
Date Analyzed		11/30/92	11/30/92	11/30/92	--
Analyte	Reporting Limit, mg/kg	Concentration, mg/kg (dry)			
Benzene	0.05	**88***	< 0.05	< 0.05	--
Toluene	0.05	**89***	< 0.05	< 0.05	--
Ethylbenzene	0.10	**98***	< 0.10	< 0.10	--
Xylenes (total)	0.20	**300***	< 0.20	< 0.20	--
BTEX (total)	--	**580***	--	--	--
Chlorobenzene	0.12	< 0.12	< 0.12	< 0.12	--
1,2-Dichlorobenzene	0.25	< 0.25	< 0.25	< 0.25	---
1,3-Dichlorobenzene	0.25	< 0.25	< 0.25	< 0.25	--
1,4-Dichlorobenzene	0.25	< 0.25	< 0.25	< 0.25	--
Methyl tert-Butyl Ether	1.0	< 1.0	< 1.0	< 1.0	--
Sample Dilution Factor[b]		1	1	1	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Methanolic extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The sample dilution factor indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

* See Nonconformance Summary.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Aromatic Volatile Organics in Water
Modified EPA Method 8020[a]

GTEL Sample Number		110552-05	110552-06	110552-07	--
Client Identification		FIELD BLANK	EQUIP BLANK	TRIP BLANK	--
Date Sampled		11/20/92	11/20/92	11/20/92	--
Date Analyzed		11/25/92	11/25/92	11/25/92	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.2	< 0.2	< 0.2	< 0.2	--
Toluene	0.5	< 0.5	< 0.5	< 0.5	--
Ethyl Benzene	0.8	< 0.8	< 0.8	< 0.8	--
Xylenes (total)	1.7	< 1.7	< 1.7	< 1.7	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.2	< 0.2	< 0.2	< 0.2	--
1,2-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	--
1,3-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	--
1,4-Dichlorobenzene	0.3	< 0.3	< 0.3	< 0.3	--
Detection Limit Multiplier[b]		1	1	1	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

SURROGATE RECOVERY RESULTS

Aromatic Volatile Organics in Water
(Trifluorotoluene)
Modified EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BW11259219C	95.2	73.7
110552-05	95.2	64.3
110552-06	95.2	61.8
110552-07	95.2	60.5

Acceptability Limits[a] 45-125%

a Laboratory generated acceptability limits updated 07/11/91.
MS Matrix Spike.
DUP Sample Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

METHOD BLANK RESULTS

Aromatic Volatile Organics in Water
Modified EPA Method 8020[a]

GTEL Sample Number		BW11259219C	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		11-25-92	--	--	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.2	< 0.2	--	--	--
Toluene	0.5	< 0.5	--	--	--
Ethyl Benzene	0.8	< 0.8	--	--	--
Xylenes (total)	1.7	< 1.7	--	--	--
BTEX (total)	--	--	--	--	--
Chlorobenzene	0.2	< 0.2	--	--	--
1,2-Dichlorobenzene	0.4	< 0.4	--	--	--
1,3-Dichlorobenzene	0.4	< 0.4	--	--	--
1,4-Dichlorobenzene	0.3	< 0.3	--	--	--
Detection Limit Multiplier[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		110512-01	110512-02	110512-03	110512-04
Client Identification		MP-4	MP-3	MP-2	MP-1
Date Sampled		11/16/92	11/18/92	11/18/92	11/18/92
Date Extracted		11/30/92	11/30/92	11/30/92	11/30/92
Date Analyzed		12/03/92	12/03/92	12/03/92	12/03/92
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	**140**	< 1400	< 1500	< 1400
Acenaphthylene	77	< 96	< 1800	< 2000	< 1800
1-Methylnaphthalene	60	< 75	< 1400	< 1500	**2000**
2-Methylnaphthalene	60	< 75	< 1400	< 1500	**3400**
Acenaphthene	60	< 75	< 1400	< 1500	< 1400
Fluorene	7.0	**87**	< 170	**180**	**260**
Phenanthrene	21	**230**[c]	< 500	**1100**	**2700**
Anthracene	22	**910**[c]	< 520	< 560	**720**
Fluoranthene	7.0	**1100**[c]	**290**	**1600**	**400**
Pyrene	9.0	**450**[c]	< 210	**770**	< 220
Benzo[*a*]anthracene	0.43	**430**[c]	**130**	**610**	**120**
Chrysene	5.0	**620**[c]	**160**	**580**	**140**
Benzo[*b*]fluoranthene	0.60	**610**[c]	**150**	**550**	**150**
Benzo[*k*]fluoranthene	0.57	**280**[c]	**69**	**230**	**53**
Benzo[*a*]pyrene	0.77	**590**[c]	**160**	**530**	**130**
Dibenzo[*a,h*]anthracene	1.0	**56**	< 24	**54**	< 24
Benzo[*g,h,i*]perylene	2.5	**530**	< 60	**290**	**170**
Indeno[1,2,3-*cd*]pyrene	1.4	**620**[c]	**190**	**480**	**74**
Detection Limit Multiplier[b]		1.25[c]	23.8	25.6	24.0
Percent Solids, %		78.7	82.6	77.4	81.4

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
c Detection Limit Multiplier for analyte noted = 25.0; Date Analyzed = 12/05/92.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		110513-01	110513-02	110513-03	--
Client Identification		MW-18 2-4'	MW-18 39-41'	MW-18 57-58'	--
Date Sampled		11/17/92	11/17/92	11/17/92	--
Date Extracted		11/30/92	11/30/92	11/30/92	--
Date Analyzed		12/03/92	12/03/92	12/03/92	--
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 1400	< 64	< 64	--
Acenaphthylene	77	< 1800	< 82	< 82	--
1-Methylnaphthalene	60	< 1400	< 64	< 64	--
2-Methylnaphthalene	60	< 1400	< 64	< 64	--
Acenaphthene	60	< 1400	< 64	< 64	--
Fluorene	7.0	< 160	< 7.4	< 7.5	--
Phenanthrene	21	**800**	< 22	**32**	--
Anthracene	22	**1100**	< 23	**40**	--
Fluoranthene	7.0	**1000**	< 7.4	**31**	--
Pyrene	9.0	**800**	< 9.5	**10**	--
Benzo[*a*]anthracene	0.43	**400**	**1.3**	**9.9**	--
Chrysene	5.0	**380**	< 5.3	**16**	--
Benzo[*b*]fluoranthene	0.60	**370**	**1.8**	**11**	--
Benzo[*k*]fluoranthene	0.57	**180**	**1.0**	**6.3**	--
Benzo[*a*]pyrene	0.77	**400**	**1.7**	**11**	--
Dibenzo[*a,h*]anthracene	1.0	**65**	< 1.1	**2.4**	--
Benzo[*g,h,i*]perylene	2.5	**210**	< 2.7	**6.3**	--
Indeno[1,2,3-*cd*]pyrene	1.4	**360**	< 1.5	**7.7**	--
Detection Limit Multiplier[b]		23.0	1.06	1.07	--
Percent Solids, %		85.1	92.6	92.3	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

GTEL Sample Number		110552-01	110552-02	110552-03	110552-04
Client Identification		IP-1	MW-19 2-4'	MW-19 54-55'	DUP-2
Date Sampled		11/19/92	11/19/92	11/19/92	11/21/92
Date Extracted		11/30/92	11/30/92	11/30/92	11/30/92
Date Analyzed		12/05/92[c]	12/05/92	12/05/92	12/05/92
Analyte	Detection Limit, ug/kg	Concentration, ug/kg			
Naphthalene	60	< 1500	< 7000	< 63	< 1400
Acenaphthylene	77	< 1900	< 8900	< 81	< 1800
1-Methylnaphthalene	60	**16000**	< 7000	< 63	< 1400
2-Methylnaphthalene	60	**28000**	< 7000	< 63	< 1400
Acenaphthene	60	< 1500	< 7000	< 63	< 1400
Fluorene	7.0	**1700**	**3100**	< 7.4	< 160
Phenanthrene	21	**12000[c]**	**14000**	< 22	< 490
Anthracene	22	**3300**	**19000**	< 23	< 510
Fluoranthene	7.0	**600**	**19000**	< 7.4	**490**
Pyrene	9.0	< 220	**8800**	< 9.5	< 210
Benzo[*a*]anthracene	0.43	**160**	**7000**	< 0.45	**230**
Chrysene	5.0	< 120	**7000**	< 5.2	< 120
Benzo[*b*]fluoranthene	0.60	**140**	**6100**	< 0.63	**220**
Benzo[*k*]fluoranthene	0.57	**48**	**2900**	< 0.60	**93**
Benzo[*a*]pyrene	0.77	**120**	**6400**	< 0.81	**220**
Dibenzo[*a,h*]anthracene	1.0	< 24	**700**	< 1.0	< 23
Benzo[*g,h,i*]perylene	2.5	**240**	**3600**	< 2.6	**140**
Indeno[1,2,3-*cd*]pyrene	1.4	**97**	< 160	< 1.5	**180**
Detection Limit Multiplier[b]		24.0[c]	116	1.05	23.2
Percent Solids, %		82.2	84.6	93.0	84.1

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.
b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.
c Detection Limit Multiplier for analyte noted = 242; Date Analyzed = 12/08/92.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		110552-05	110552-06	--	--
Client Identification		FIELD BLANK	EQUIP BLANK	--	--
Date Sampled		11/20/92	11/20/92	--	--
Date Extracted		11/24/92	11/24/92	--	--
Date Analyzed		12/05/92	12/05/92	--	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	< 1.8	< 1.8	--	--
Acenaphthylene	2.3	< 2.3	< 2.3	--	--
1-Methylnaphthalene	1.8	< 1.8	< 1.8	--	--
2-Methylnaphthalene	1.8	< 1.8	< 1.8	--	--
Acenaphthene	1.8	< 1.8	< 1.8	--	--
Fluorene	0.21	< 0.21	< 0.21	--	--
Phenanthrene	0.64	< 0.64	< 0.64	--	--
Anthracene	0.66	< 0.66	< 0.66	--	--
Fluoranthene	0.21	< 0.21	< 0.21	--	--
Pyrene	0.27	< 0.27	< 0.27	--	--
Benzo[*a*]anthracene	0.013	< 0.013	< 0.013	--	--
Chrysene	0.15	< 0.15	< 0.15	--	--
Benzo[*b*]fluoranthene	0.018	< 0.018	< 0.018	--	--
Benzo[*k*]fluoranthene	0.017	< 0.017	< 0.017	--	--
Benzo[*a*]pyrene	0.023	< 0.023	< 0.023	--	--
Dibenzo[*a,h*]anthracene	0.030	< 0.030	< 0.030	--	--
Benzo[*g,h,i*]perylene	0.076	< 0.076	< 0.076	--	--
Indeno[1,2,3-*cd*]pyrene	0.043	< 0.043	< 0.043	--	--
Detection Limit Multiplier[b]		1.00	1.00	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

SURROGATE RECOVERY SUMMARY

Polynuclear Aromatic Hydrocarbons in Water/Soil
EPA Method 8310

GTEL Sample ID	Percent Recovery, %	
	S1 (NBZ)	S2 (TPH)
BS1130-1	80	95
110512-01 MS	83	137
110512-01 MSD	87	135
110513-01	71	115
110513-02	71	83
110513-03	76	93
110512-01 MS	76	126
110512-01 MSD	81	126
110552-01 (12/05/92)	92	190*
110552-02	D	D
110552-03	88	99
110552-04	77	119
110552-05	94	90
110552-06	87	60
110552-01 (12/08/92)	D	D
BW1124-1	93.9	93.7
110512-01	76	137
110512-02	73	102
110512-03	75	177*
110512-04	77	121
LS1130-1	84	97

Surrogates

			Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	33-141%
S2	TPH	Terphenyl-d14	33-141%

D Surrogate diluted out. % Recovery not calculated when surrogate diluted out.
* Indicates values outside of acceptability limits. See Nonconformance Summary,
a Recovery limits as per laboratory practice.
MS Matrix Spike.
MSD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

MATRIX SPIKE/DUPLICATE RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: 110512-01 Client ID: BATCH QC

Standard ID: 12/03/92 and 12/05/92

Compound	Spike Added, ug/kg	Sample Concentration, ug/kg	MS Concentration, ug/kg	MS Percent Recovery, %	Acceptability Limits, %
Naphthalene	417	135	473	81	Det-122
Acenaphthylene	417	< 80.9	377	90	Det-139
Fluorene	83.5	86.5	138	62	Det-142
Phenanthrene	41.7	229	189	NA	Det-155
Anthracene	41.7	913	641	NA	Det-126
Benzo[*k*]fluoranthene	41.7	277	192	NA	Det-159
Indeno[1,2,3-*cd*]pyrene	41.7	621	387	NA	Det-116

Compound	Spike Added, ug/kg	MSD Concentration, ug/kg	MSD Percent Recovery, %	RPD, %	Acceptability Limits: RPD, %
Naphthalene	413	452	77	5	60
Acenaphthylene	413	399	97	7	60
Fluorene	82.7	129	51	18	60
Phenanthrene	41.3	257	NA	30	60
Anthracene	41.3	543	NA	17	60
Benzo[*k*]fluoranthene	41.3	178	NA	8	60
Indeno[1,2,3-*cd*]pyrene	41.3	342	NA	12	60

* Values outside of QC limits.
Det Detection Limit
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

LABORATORY CONTROL SAMPLE (LCS) RECOVERY

Polynuclear Aromatic Hydrocarbons
EPA Method 8310

Sample Spiked: LS1130-1

Date Analyzed: 12/03/92 Standard ID: H92MS0050

Compound	Spike Added, ug/kg	LCS Concentration, ug/kg	LCS Percent Recovery, %
Naphthalene	328	322	98
Acenaphthylene	328	316	96
Fluorene	65.6	63.0	96
Phenanthrene	32.8	33.6	102
Anthracene	32.8	36.4	111
Benzo[*k*]fluoranthene	32.8	33.2	101
Indeno[1,2,3-*cd*]pyrene	32.8	27.8	85

* Values outside of QC limits.
D Diluted out.
NA Not Applicable. Percent Recovery is not calculated when concentration of sample is more than four times that of spike.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 011105307
Project ID: Osmose Phase II
Login Number: M2-11-0512
M2-11-0513
M2-11-0552

METHOD BLANK RESULTS

Polynuclear Aromatic Hydrocarbons in Soil
EPA Method 8310[a]

	GTEL Blank ID	BS1130-1
	GTEL File ID	BS11301
	Date Extracted	11/30/92
	Date Analyzed	12/01/92
Analyte	Detection Limit, ug/kg	Concentration, ug/kg
Naphthalene	60	< 59
Acenaphthylene	77	< 76
1-Methylnaphthalene	60	< 59
2-Methylnaphthalene	60	< 59
Acenaphthene	60	< 59
Fluorene	7.0	< 6.9
Phenanthrene	21	< 21
Anthracene	22	< 22
Fluoranthene	7.0	< 6.9
Pyrene	9.0	< 8.9
Benzo[*a*]anthracene	0.43	< 0.42
Chrysene	5.0	< 4.9
Benzo[*b*]fluoranthene	0.60	< 0.59
Benzo[*k*]fluoranthene	0.57	< 0.56
Benzo[*a*]pyrene	0.77	< 0.76
Dibenzo[*a,h*]anthracene	1.0	< 0.99
Benzo[*g,h,i*]perylene	2.5	< 2.5
Indeno[1,2,3-*cd*]pyrene	1.4	< 1 4
Detection Limit Multiplier		0.988

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3550 (low level sonication). Results are reported on a dry weight basis.

b The detection limit multiplier indicates the adjustments made to the data and detection limits as a result of dilutions and percent solids.

GTEL ENVIRONMENTAL LABORATORIES, INC.

METHOD BLANK RESULTS

Polynuclear Aromatic Hydrocarbons in [illegible]
EPA Method 610[a]

	GTEL Blank I:	[illegible]
	GTEL File I:	[illegible]
	Date Extracte	[illegible]
	Date Analyze	[illegible]
Analyte	Detection Limit, ug/L	[illegible]
Naphthalene	1.8	[illegible]
Acenaphthylene	2.3	[illegible]
1-Methylnaphthalene	1.8	[illegible]
2-Methylnaphthalene	1.8	[illegible]
Acenaphthene	1.8	[illegible]
Fluorene	0.21	[illegible]
Phenanthrene	0.64	[illegible]
Anthracene	0.66	[illegible]
Fluoranthene	0.21	[illegible]
Pyrene	0.27	[illegible]
Benzo[*a*]anthracene	0.013	[illegible]
Chrysene	0.15	[illegible]
Benzo[*b*]fluoranthene	0.018	[illegible]
Benzo[*k*]fluoranthene	0.017	[illegible]
Benzo[*a*]pyrene	0.023	[illegible]
Dibenzo[*a,h*]anthracene	0.030	[illegible]
Benzo[*g,h,i*]perylene	0.076	[illegible]
Indeno[1,2,3-*cd*]pyrene	0.043	[illegible]
Detection Limit Multiplier		[illegible]

a Federal Register, Vol. 49, October 26, 1984. Sample preparation [illegible]
b The detection limit multiplier indicates the adjustments made to the [illegible] dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

51627

Company Name: ETI Albany

Phone #:

FAX #:

Company Address:

Site location: Buffalo

Project Manager: Kevin Akrons

Client Project ID: (#) 011105306 650339

(NAME) Osmose Ogun

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
[illegible]	1	1		X											11/16	2:30
[illegible]	2	2		X											11/18	1:30
[illegible]	3	2		X											11/18	2:30
[illegible]	4	2		X											11/18	3:15
[illegible]	5	3		X											11/18	1:30

Field Sample ID	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
[illegible]														X						
[illegible]														X						
[illegible]														X						
[illegible]														X						
[illegible]										X										

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____
- Business Days ☐

Special Handling

GTEL Contact _____
Quote/Contract # QM920306
Confirmation # _____
PO # _____

SPECIAL DETECTION LIMITS

REMARKS

SPECIAL REPORTING REQUIREMENTS

Lab Use Only Lot #

Storage Location: [illegible]

QA / QC LEVEL

BLUE ☒ CLP ☐

OTHER _____

FAX ☐

Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: J. Olaf Gustafson	11/19/93	6:00	Received by:
Relinquished by:			Received by:
Relinquished by:	11/20/93	12:30	Received by Laboratory: [illegible]

rev. 7/91

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) 441-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 47174

Company Name: G.I. Albany
Phone #:
FAX #:
Company Address:
Site location: Buffalo, NY
Project Manager: Bruce Ahrens
Client Project ID: (#) 011105307 6309
(NAME) Osmose Phase II
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
[illegible] 8' 3-4'	1	3		X											11/17	12:00									X				X					
"		2		X												12:00													X					
[illegible] 4' 3-4'	2	#1		X												3:00									X									
"		1		X												3:00													X					
[illegible] 9 [illegible] 58'	3	3		X												4:45									X									
"		2		X												4:45													X					

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ☐
Business Days ☐
Next-Specific
BLUE ☐ CLP ☐

Special Handling
GTEL Contact
Quote/Contract # QM920306
Confirmation #
PO #

QA / QC LEVEL
OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS

Lab Use Only Lot #
Storage Location: LRE
Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: J. Olaf Gustafson	11/19/92	6:00	Received by:
Relinquished by:			Received by:
Relinquished by:			Received by Laboratory:

Rev. 7/[illegible]

GTEL ENVIRONMENTAL LABORATORIES, INC.
MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) 441-4835

MOBIL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

05182

Company Name: GTI Albany
Phone #:
FAX #:
Company Address:
Site location: (City, State) Buffalo, ny
Project Manager: Bruce Ahrens
Client Project ID: (#) 01110 S 307
(NAME) Osmose Phase II
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐
IP-1		1		X								X			11/19	9:00													X						
IP-1		3		X								X				9:00									X										
MW-1 2-4'		3		X								X				11:00									X										
"		2		X								X				11:00													X						
MW-1 54-55'		3		X								X				4:00									X										
"		2		X								X			↓	4:00													X						
MW-2		1		X								X			11/20	12:30									X										
MW-2		2		X								X			↓	12:30													X						

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐
project-specific
BLUE ☒ CLP ☐

Special Handling
QM920306
GTEL Contact ____
Confirmation # ____
THIS DOCUMENT SERVES AS AN AUTHORIZATION TO CONDUCT THE ABOVE OUTLINED TESTS IN ACCORDANCE WITH MOBIL CONTRACT # UC90-0619 DATED APRIL 15, 1990.

QA / QC LEVEL
OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
MOBIL ENV. ENG.:
MOBIL SSN:

Lab Use Only Lot #
Storage Location: 4WC
Work Order #

CUSTODY RECORD

	Relinquished by Sampler:	Date	Time	Received by:
	J. Olaf Gustafson	11/20/92	4:00	
	Relinquished by:	Date	Time	Received by:
	Relinquished by:	Date	Time	Received by Laboratory: Mary Ellen
		11/21/92	16:00	

Rev [redacted]

GTEL ENVIRONMENTAL LABORATORIES, INC.
MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) 441-4835

MOBIL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 05182

Company Name: GTI Albany
Phone #:
FAX #:
Company Address:
Site location: (City, State) Buffalo, NY
Project Manager: [illegible]
Client Project ID: (#) [illegible] 5307
(NAME) Osmose Phase II
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
[illegible]-1		1		X								Y			11/19	9:00
[illegible]-1		3		X								X				9:00
[illegible] 2-4'		3		X								Y				11:00
"		2		X								Y				11:00
[illegible] 5'-5.5'		3		X								X				4:00
"		2		X								Y				4:00
[illegible]-2		1		Y								X			11/20	12:30
[illegible]-2		2		X								Y				12:30

ANALYSIS REQUEST																												OTHER	
BTEX/602 ☐ 8020 ☐ with MT5E ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐				
									X																				
									X																				
									X																				
									X																				

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
QM920306
GTEL Contact _____
Confirmation # _____
THIS DOCUMENT SERVES AS AN AUTHORIZATION TO CONDUCT THE ABOVE OUTLINED TESTS IN ACCORDANCE WITH MOBIL CONTRACT # UC90-0619 DATED APRIL 15, 1990.

SPECIAL DETECTION LIMITS

REMARKS
MOBIL ENV. ENG.:
MOBIL SSN:

SPECIAL REPORTING REQUIREMENTS

Lab Use Only Lot # Storage Location: 9 WC

[illegible] specific
BLUE ☒ CLP ☐
QA / QC LEVEL
OTHER _____
FAX ☐
Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: [signature]	11/20/92	4:00	Received by:
Relinquished by: [signature]			Received by:
Relinquished by:	11/21/92	16:00	Received by Laboratory: [signature]

Airbill # [illegible]

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) 441-4835

MOBIL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

05181

Company Name: ETI Albany

Phone #:

FAX #:

Company Address:

Site location: (City, State) Buffalo, NY

Project Manager: Brian Abrams

Client Project ID: (#) 01110<307 6309

(NAME) Osmose

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
Trip Blank		2	X									X			11/20	11:00
Field Blank		3	X						X			X				11:00
Equip Blank		2	X									X				11:15
Equip Blank		3	X						X			X				11:15
Trip Blank		2	X													

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☒
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☒ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☒ NBS (+25) ☐
EPA 610 ☐ 8310 ☒
EP TOX Metals ☒ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐
project specific

Special Handling
QM 920306
GTEL Contact ____
Confirmation # ____
THIS DOCUMENT SERVES AS AN AUTHORIZATION TO CONDUCT THE ABOVE OUTLINED TESTS IN ACCORDANCE WITH MOBIL CONTRACT # UC90-0619 DATED APRIL 15, 1990.

QA / QC LEVEL
BLUE ☒ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
MOBIL ENV. ENG.:
MOBIL SSN:

Lab Use Only Lot # Storage Location: 21-4P
4WC
Work Order #

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: J. Olaf Gustafson	11/20/92	4:00
Relinquished by:		
Relinquished by:	11/21/92	1600

Received by:
Received by:
Received by Laboratory: Mam Kln

[redacted] Rev. 7/91 [redacted]

GTEL ENVIRONMENTAL LABORATORIES, INC.
MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) 441-4835

MOBIL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

05181

Company Name: GTI Albany
Company Address:
Phone #:
FAX #:
Site location: (City, State) Buffalo, NY
Project Manager: Henry Abrams
Client Project ID: (#) P1105307 6309
(NAME) Osmose
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): J. Olaf Gustafson

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
Field Blank		2	X									X			11/20	11:00
Field Blank		3	X						X			X				11:00
Equip Blank		2	X									X				11:15
Equip Blank		3	X						X			X				11:15
Trip Blank		2	X													

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☒ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☑ NBS (+25) ☐	EPA 610 ☐ 8310 ☒	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER
												X									
												X									
												X									
												X									
												X									

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ☐
Business Days ☐

Special Handling
OM 920306
GTEL Contact
Confirmation #
THIS DOCUMENT SERVES AS AN AUTHORIZATION TO CONDUCT THE ABOVE OUTLINED TESTS IN ACCORDANCE WITH MOBIL CONTRACT # UC90-0619 DATED APRIL 15, 1990.

Report Specific
QA / QC LEVEL
BLUE ☒ CLP ☐ OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
MOBIL ENV. ENG.:
MOBIL SSN:

Lab Use Only Lot #
Storage Location: 21-4D
TWC
Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: J. Olaf Gustafson	11/20/92	4:00	Received by:
Relinquished by:			Received by:
Relinquished by:			Received by Laboratory: Miam Kith
	11/21	16	Waybill # [redacted]

Rev. [redacted]

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

51833

Company Name: GTI

Phone #: 518-370-5831

FAX #:

Company Address: 1245 Kings Road Schenectady, NY

Site location: Buffalo, NY

Project Manager: Bruce Ahrens

Client Project ID: (#)

(NAME) OSMOSE Wood Preserving

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): J Vautour

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
Trip Blank		2	X												11/2/92	13:00
Field Blank		5	X													

Field Sample ID	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	
Trip Blank												X										
Field Blank												X									X	PAH by 8270

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____
- Business Days ☐

Special Handling

GTEL Contact D. WAGNER

Quote/Contract # QM920306

Confirmation # _____

PO # _____

SPECIAL DETECTION LIMITS

REMARKS

SPECIAL REPORTING REQUIREMENTS

FAX ☐

Lab Use Only Lot # Storage Location:

Work Order #

QA / QC LEVEL

BLUE ☒ CLP ☐ OTHER _____

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: J Vautour	11/2/92	13:10	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:

Rev. [redacted]

Remediation Technology Laboratory
4080 Pike Lane, Concord, CA 94520 510/685-7852

Osmose R&D: 005300109

Total Organic Carbon in Soil

Sample ID	Total Organic Carbon
Results (mg/kg)[3]	
IP-2 6-8'	11000
IP-2 10-12'	3800
MP-6 6-8'	10000
MP-6 10-12'	2200
DUP-3	12000
DUP-4	5100
MP-5 6-8'	7300
MP-5 10-12'	5500
SB-3 6-8'	4500
SB-3 10-12'	9700
DUP-5	7500

Rod T. Venterea
Manager, Remediation Technology Laboratory

[3]results reported on a dry weight basis.

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

Total Organic Carbon

Project Name:	Osmose	**Sampling Date:**	9/28/93
Client/Project#:	00530-0109	**Date Received:**	9/29/93
Site Location:	Buffalo, NY	**Date Completed:**	10/6/93
Project Manager:	Bruce Ahrens	**Report Date:**	10/13/93
GTI Office:	Schenectady, NY	**Login Number:**	C3100028
Matrix:	Soil		

Lab No.	Sample ID	g/100g Soil[1]
6439	MP-66	0.22
6440	Duplicate	0.23
6441	IP-2b	0.23
6442	MW-5b	0.45
6443	MP-5b	0.34

(1) Results on dry weight basis.

Rod T. Venterea - Manager
Remediation Technology Laboratory

b:comptables2\osmose2.toc

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose
Login Number: M3-08-0537

RECEIVED
SEP 14 1993

September 7, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 08/19/93 under chain-of-custody record 52726.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

GTEL Client ID: 005300109
Login Number: M3080537
Project ID (number): 005300109
Project ID (name): OSMOSE

ANALYTICAL RESULTS

Method: EPA 8020
Volatile Aromatics
Matrix: Aqueous

	GTEL Sample Number	M3080537-01	M3080537-02	M3080537-03	M3080537-04
	Client ID	RW-1	RW-3	RW-5	MP-5D
	Date Sampled	08/16/93	08/16/93	08/16/93	08/16/93
	Date Analyzed	08/23/93	08/23/93	08/23/93	08/23/93
	Dilution Factor	1.00	2.00	10.0	2.00
Analyte	Reporting Limit	Units	Concentration:			
Benzene	0.2	ug/L	56.	100	130	210
Toluene	0.5	ug/L	99.	150	250	250
Ethyl Benzene	0.8	ug/L	21.	23.	70.	160
Xylenes (total)	1.7	ug/L	260	370	930	830
BTEX (total)	--	ug/L	440	640	1400	1400
Chlorobenzene	0.2	ug/L	<0.2	<0.4	<2.0	<0.4
1,2-Dichlorobenzene	0.4	ug/L	<0.4	<0.8	<4.0	<0.8
1,3-Dichlorobenzene	0.4	ug/L	<0.4	<0.8	<4.0	<0.8
1,4-Dichlorobenzene	0.3	ug/L	<0.3	<0.6	<3.0	<0.6

Notes:

EPA 8020:

Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL Client ID: 005300109
Login Number: M3080537
Project ID (number): 005300109
Project ID (name): OSMOSE

ANALYTICAL RESULTS

Method: EPA 8020
Volatile Aromatics
Matrix: Aqueous

	GTEL Sample Number	M3080537-05	M3080537-06
	Client ID	MP-6D	MW-5
	Date Sampled	08/16/93	08/16/93
	Date Analyzed	08/23/93	08/23/93
	Dilution Factor	2.00	1.00
Analyte	Reporting Limit / Units	Concentration:	
Benzene	0.2 ug/L	73.	5.7
Toluene	0.5 ug/L	120	8.3
Ethyl Benzene	0.8 ug/L	61.	2.1
Xylenes (total)	1.7 ug/L	470	26.
BTEX (total)	-- ug/L	720	42.
Chlorobenzene	0.2 ug/L	<0.4	<0.2
1,2-Dichlorobenzene	0.4 ug/L	<0.8	<0.4
1,3-Dichlorobenzene	0.4 ug/L	<0.8	<0.4
1,4-Dichlorobenzene	0.3 ug/L	<0.6	<0.3

Notes:

EPA 8020:

"Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-08-0537

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		080537-01	080537-02	080537-03	080537-04
Client Identification		RW-1	RW-3	RW-5	MP-5D
Date Sampled		08/16/93	08/16/93	08/16/93	08/16/93
Date Extracted		08/23/93	08/23/93	08/23/93	08/23/93
Date Analyzed		08/31/93[c]	08/26/93	08/26/93	08/26/93
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	**5900**	**3100**	**4100**	**8900**
Acenaphthylene	2.3	< 230	< 230	< 230	< 230
1-Methylnaphthalene	1.8	**2000**	**390**	< 180	**560**
2-Methylnaphthalene	1.8	**7900**	**930**	**230**	**1400**
Acenaphthene	1.8	**3100**	**510**	< 180	**490**
Fluorene	0.21	**1400**	**130**	**36**	**140**
Phenanthrene	0.64	**1900**[c]	**69**	< 64	**74**
Anthracene	0.66	**390**	< 66	< 66	< 66
Fluoranthene	0.21	**640**	< 21	< 21	< 21
Pyrene	0.27	**400**	< 27	< 27	< 27
Benzo[*a*]anthracene	0.013	**100**	< 1.3	< 1.3	< 1.3
Chrysene	0.15	**110**	< 15	< 15	< 15
Benzo[*b*]fluoranthene	0.018	**47**	< 1.8	< 1.8	< 1.8
Benzo[*k*]fluoranthene	0.017	**25**	< 1.7	< 1.7	< 1.7
Benzo[*a*]pyrene	0.023	**49**	< 2.3	< 2.3	< 2.3
Dibenzo[*a,h*]anthracene	0.030	**14**	< 3.0	< 3.0	< 3.0
Benzo[*g,h,i*]perylene	0.076	**21**	< 7.6	< 7.6	< 7.6
Indeno[1,2,3-*cd*]pyrene	0.043	< 4.3	< 4.3	< 4.3	< 4.3
Detection Limit Multiplier[b]		100[c]	100	100	100

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
c Detection limit multiplier for analyte noted = 1000; Date Analyzed = 09/01/93.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-08-0537

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		080537-05	080537-06	--	--
Client Identification		MP-6D	MW-5	--	--
Date Sampled		08/16/93	08/16/93	--	--
Date Extracted		08/23/93	08/23/93	--	--
Date Analyzed		08/26/93	08/26/93	--	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	**5300**	**350**	--	--
Acenaphthylene	2.3	< 290	< 240	--	--
1-Methylnaphthalene	1.8	**940**	**330**	--	--
2-Methylnaphthalene	1.8	**3200**	**1400**	--	--
Acenaphthene	1.8	**1200**	**910**	--	--
Fluorene	0.21	**480**	**410**	--	--
Phenanthrene	0.64	**670**	**510**	--	--
Anthracene	0.66	**110**	< 68	--	--
Fluoranthene	0.21	**270**	**270**	--	--
Pyrene	0.27	**130**	**120**	--	--
Benzo[*a*]anthracene	0.013	**44**	**38**	--	--
Chrysene	0.15	**37**	**33**	--	--
Benzo[*b*]fluoranthene	0.018	**28**	**25**	--	--
Benzo[*k*]fluoranthene	0.017	**13**	**11**	--	--
Benzo[*a*]pyrene	0.023	**17**	**21**	--	--
Dibenzo[*a,h*]anthracene	0.030	**3.8**	**3.9**	--	--
Benzo[*g,h,i*]perylene	0.076	< 9.4	< 7.8	--	--
Indeno[1,2,3-*cd*]pyrene	0.043	< 5.3	< 4.4	--	--
Detection Limit Multiplier[b]		124	103	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52726

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS ROAD
Site location: 980 ELLICOTT ST BUFFALO NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
RW-1	1	6	6						4			X	2		8/16	1700
RW-3	2	5	5						3			X	2		8/16	1730
RW-5	3	5	5						3			X	2		8/16	1800
MP-5d	4	5 ~~4~~ 5							3			X	2		8/16	1830
MP-6d	5	4	4						3			X	1		8/16	1830
MW-5	6	4	4						3			X	1		8/16	1900

BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	
									4											2	EPA 8310
									3											2	TOC
									3											2	COD
									3											2	
									3											2	
									3											1	
									3											1	

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS

Lab Use Only Lot #
Storage Location: W-6-E
Work Order # 19-3-C

CUSTODY RECORD

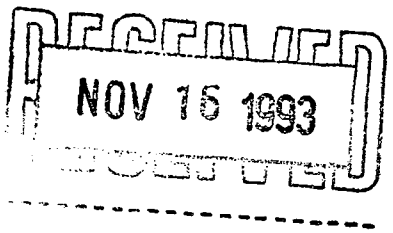
	Date	Time	
Relinquished by Sampler: Brian Carey	8-17-93	4:00PM	Received by:
Relinquished by:			Received by:
Relinquished by:	8-19-93	15:00	Received by Laboratory: Jane Lee

Waybill # 0192496661

7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0851



November 9, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Dear Mr. Ahrens:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 09/30/93 under chain-of-custody record 52744.

A formal Quality Assurance / Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified (approved) by the State of New York under number 10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0851

ANALYTICAL RESULTS

Aromatic Volatile Organics in Water
Modified EPA Method 8020[a]

GTEL Sample Number		090851-01	090851-02[c]	090851-03[c]	090851-04[c]
Client Identification		RW-1	RW-3	RW-5	MW-5
Date Sampled		09/29/93	09/29/93	09/29/93	09/29/93
Date Analyzed		10/11/93	10/07/93	10/07/93	10/07/93
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.2	**150**	< 200	< 200	< 200
Toluene	0.5	**170**	< 500	< 500	< 500
Ethyl Benzene	0.8	**47**	< 800	< 800	< 800
Xylenes (total)	1.7	**470**	< 1700	< 1700	< 1700
Chlorobenzene	0.2	< 10	< 200	< 200	< 200
1,2-Dichlorobenzene	0.4	< 20	< 400	< 400	< 400
1,3-Dichlorobenzene	0.4	< 20	< 400	< 400	< 400
1,4-Dichlorobenzene	0.3	< 15	< 300	< 300	< 300
Detection Limit Multiplier[b]		50	1000	1000	1000

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

c This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample type, reproducible results cannot be assured.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0851

ANALYTICAL RESULTS

Aromatic Volatile Organics in Water
Modified EPA Method 8020[a]

GTEL Sample Number		090851-05	090851-06[c]	090851-07	--
Client Identification		MP-5D	MP-6D	TOTAL EFFLUENT	--
Date Sampled		09/29/93	09/29/93	09/29/93	--
Date Analyzed		10/11/93	10/07/93	10/07/93	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Benzene	0.2	**16**	< 200	**83**	--
Toluene	0.5	**60**	< 500	**75**	--
Ethyl Benzene	0.8	< 40	< 800	**20**	--
Xylenes (total)	1.7	**350**	**1900**	**210**	--
Chlorobenzene	0.2	< 10	< 200	< 0.2	--
1,2-Dichlorobenzene	0.4	< 20	< 400	< 0.4	--
1,3-Dichlorobenzene	0.4	< 20	< 400	< 0.4	--
1,4-Dichlorobenzene	0.3	< 15	< 300	< 0.3	--
Detection Limit Multiplier[b]		50	1000	1	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.

c This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample type, reproducible results cannot be assured.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0851

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		090851-01	090851-02	090851-03	090851-04
Client Identification		RW-1	RW-3	RW-5	MW-5
Date Sampled		09/29/93	09/29/93	09/29/93	09/29/93
Date Extracted		10/04/93	10/04/93	10/04/93	10/04/93
Date Analyzed		10/12/93[c]	10/12/93[d]	10/12/93[e,f]	10/12/93[g]
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	23000	99000	170000	310000
Acenaphthylene	2.3	< 3300	< 5700	< 5800	< 25000
1-Methylnaphthalene	1.8	7700	31000	53000	150000
2-Methylnaphthalene	1.8	34000	130000	230000	670000
Acenaphthene	1.8	13000	50000	93000	270000
Fluorene	0.21	7300	28000	63000[e]	140000
Phenanthrene	0.64	19000[c]	96000[d]	120000[f]	310000[g]
Anthracene	0.66	3900	17000	27000[e]	85000
Fluoranthene	0.21	4700	22000	52000[e]	93000
Pyrene	0.27	4000	66000[d]	34000[e]	170000[g]
Benzo[*a*]anthracene	0.013	720	3700	7000	16000
Chrysene	0.15	1300	6600	13000	32000
Benzo[*b*]fluoranthene	0.018	340	1700	3200	7100
Benzo[*k*]fluoranthene	0.017	180	910	1700	3900
Benzo[*a*]pyrene	0.023	240	1300	2400	5500
Dibenzo[*a,h*]anthracene	0.030	< 43	< 74	< 75	< 330
Benzo[*g,h,i*]perylene	0.076	< 110	2600	4700	11000
Indeno[1,2,3-*cd*]pyrene	0.043	< 61	1100	2000	4500
Detection Limit Multiplier[b]		1430[c]	2460[d]	2500[e,f]	111000[g]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
c Detection Limit Multiplier for analyte noted = 2860; Date Analyzed = 10/22/93.
d Detection Limit Multiplier for analyte noted = 12300; Date Analyzed = 11/02/93.
e Detection Limit Multiplier for analyte noted = 12500; Date Analyzed = 10/23/93.
f Detection Limit Multiplier for analyte noted = 25000; Date Analyzed = 10/29/93.
g Detection Limit Multiplier for analyte noted = 55500; Date Analyzed = 11/02/93.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Osmose
Login Number: M3-09-0851

ANALYTICAL RESULTS

Polynuclear Aromatic Hydrocarbons in Water
EPA Method 8310[a]

GTEL Sample Number		090851-05	090851-06	090851-07	--
Client Identification		MP-5D	MP-6D	TOTAL EFFLUENT	--
Date Sampled		09/29/93	09/29/93	09/29/93	--
Date Extracted		10/04/93	10/04/93	10/04/93	--
Date Analyzed		10/12/93[h]	10/12/93[i]	10/12/93	--
Analyte	Detection Limit, ug/L	Concentration, ug/L			
Naphthalene	1.8	**64000**	**220000**	**7500**	--
Acenaphthylene	2.3	< 5200	< 6200	< 2400	--
1-Methylnaphthalene	1.8	**25000**	**80000**	**2700**	--
2-Methylnaphthalene	1.8	**110000**	**260000[i]**	**12000**	--
Acenaphthene	1.8	**45000**	**110000[i]**	**4500**	--
Fluorene	0.21	**24000**	**55000[i]**	**2500**	--
Phenanthrene	0.64	**28000[h]**	**100000[i]**	3900	--
Anthracene	0.66	**13000**	**28000[i]**	< 700	--
Fluoranthene	0.21	**14000**	**39000[i]**	**1500**	--
Pyrene	0.27	**13000**	**24000[i]**	**1200**	--
Benzo[*a*]anthracene	0.013	**2400**	**8000**	**220**	--
Chrysene	0.15	**4700**	**15000**	**250**	--
Benzo[*b*]fluoranthene	0.018	**1200**	**3600**	**95**	--
Benzo[*k*]fluoranthene	0.017	**630**	**2000**	**49**	--
Benzo[*a*]pyrene	0.023	**890**	**2800**	**76**	--
Dibenzo[*a,h*]anthracene	0.030	< 67	< 81	< 32	--
Benzo[*g,h,i*]perylene	0.076	**1800**	**5200**	**100**	
Indeno[1,2,3-*cd*]pyrene	0.043	**840**	**2200**	< 46	--
Detection Limit Multiplier[b]		2240[h]	2700[i]	1060	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; Extraction by EPA Method 3510 (liquid-liquid).
b The detection limit multiplier indicates the adjustments made to the data and detection limits for sample dilutions.
h Detection Limit Multiplier for analyte noted = 5600; Date Analyzed = 10/23/93.
i Detection Limit Multiplier for analyte noted = 13500; Date Analyzed = 10/29/93.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL P[illegible]
[illegible]FORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-[illegible]USTODY RECORD AND ANALYSIS REQUEST 52744

Company Name: GROUNDWATER TECH
Phone #: 518 370 5631
FAX #: 518 370 5864
Company Address: 1245 KINGS RD
Site location: BUFFALO, NY
Project Manager: BRUCE AMBENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☒	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	EPA 8310
RW-1	1	5	5						4			X	1		9/29	12:00										4										1
RW-3	2	4	4						3			X	1		9/29	12:00										3										1
RW-5	3	4	4						3			X	1		9/29	12:00										3										1
MW-5	4	4	4						3			X	1		9/29	12:00										3										1
MP-5D	5	4	4						3			X	1		9/29	12:00										3										1
MP-6D	6	4	4						3			X	1		9/29	12:00										3										1
TOTAL EFFLUENT	7	4	4						3			X	1		9/29	12:00										3										1

TAT
- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- Business Days ☐
- Other ☐
- Business Days ☐

Special Handling
GTEL Contact
Quote/Contract #
Confirmation #
PO #

QA / QC LEVEL
UE ☒ CLP ☐ OTHER

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
PROJECT SPECIFIC BLUE LEVEL
FAX ☐

REMARKS
8020 SAMPLES HAVE SEPARATE PHASE

Lab Use Only Lot # 113090851
Storage Location: 30-6-B W8B
Work Order #

CUSTODY RECORD

	Date	Time
Relinquished by Sampler:	9-29-93	7:00PM
Relinquished by:		
Relinquished by:	9/30/93	3:40

Received by:
Received by:
Received by Laboratory:
Waybill # 0412695764

7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

RECEIVED
JAN 04 1994

December 29, 1993

Bruce Aherns
Groundwater Technology
1245 Kings Road
Schenectady, NY 12303

RE: GTEL Client ID: 005300109
Login Number: M3110007
Project ID (number): 005300109
Project ID (name): OSMOSE

Dear Bruce Aherns:

Enclosed please find the analytical results for the samples received by GTEL Environmental Laboratories, Inc. on 10/30/93 under Chain-of-Custody Number(s) S2713.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria unless otherwise stated in the footnotes.

GTEL is certified by the State of New York under Lab ID #10599.

If you have any questions regarding this analysis, or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Susan C. Uhler
Laboratory Director

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CONFORMANCE/NONCONFORMANCE SUMMARY

(X = Requirements Met * = See Comments NA = Not Applicable)

#	Conformance Item	VOA GC/MS	VOA GC	SV GC/MS	SV GC	Metals	Wet Chem
1	GC/MS Tune	--	NA	X	NA	NA	NA
2	Initial Calibration	--	X	X	--	--	--
3	Continuing Calibration	--	X	X	--	--	--
4	Surrogate Recovery	--	X	X	--	NA	NA
5	Holding Time	--	X	X	--	--	--
6	Method Accuracy	--	X	*	--	--	--
7	Method Precision	--	X	*	--	--	--

8 Blank Contamination - List/ND (None Detected)/*(See Comments)

VOA: ND
SV: Method 8270: Tentatively Identified Compounds
Metals: --
Wet Chem: --

9 Comments:

Method 8270:

Percent Recovery acceptability criteria were exceeded for 1,4-Dichlorobenzene, 1,2,4-Trichlorobenzene, Acenaphthene and Pyrene in the batch Matrix Spike sample (MS110040-01) and for N-Nitroso-di-N-Propylamine, 1,2,4-Trichlorobenzene and Acenaphthene in the batch Matrix Spike Duplicate sample (MD110040-01) due to sample specific matrix effects. All RPD's were within acceptability limits. The Laboratory Control Sample (LW110593A) has been provided to demonstrate method and solution accuracy for all spiked analytes except Pyrene which even exceeded acceptability limits in this sample. Pyrene has been appropriately flagged in the reported sample because accuracy for this compound has not been demonstrated.

The batch Matrix Spike and Matrix Spike Duplicate samples (MS110007-02 and MD110007-02, respectively) required dilution prior to analysis, in effect diluting out the spiked compounds. The Laboratory Control Sample provided to support method accuracy shows acceptable recoveries for all analytes except 2,4-Dinitrotoluene which recovered low. This is due to the current use of method specific spike for solids on the product matrix which is being evaluated at this time. This analyte was not detected in any of the samples. The data is not impacted by this level of inaccuracy.

Precision data for the batch is provided by the RPD for Acenaphthene based upon concentration instead of Percent Recovery as this analyte was present in the original sample at greater than five times the spiked amount.

The reported result for Naphthalene in sample 110007-02 slightly exceeded the calibrated range of the instrument (< 10%) and this is flagged as estimated. However, the result correlates well with that of 110007-03, a client provided duplicate sample. The reported result for 110007-03 is within the calibrated range of the instrument and re-analysis of 110007-02 was not undertaken at this time.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL Client ID: 005300109
Login Number: M3110007
Project ID (number): 005300109
Project ID (name): OSMOSE

ANALYTICAL RESULTS

Volatile Organics
Method: EPA 8020
Matrix: Aqueous

	GTEL Sample Number	M3110007-01	M3110007-02	M3110007-04	M3110007-05
	Client ID	RW-1	RW-3	RW-5	RW-5 DUPLICATE
	Date Sampled	10/29/93	10/29/93	10/29/93	10/29/93
	Date Analyzed	11/04/93	11/04/93	11/04/93	11/04/93
	Dilution Factor	1000	1000	1000	1000
Analyte	Reporting Limit	Units	Concentration:			
Benzene	0.5	ug/L	< 500	< 500	< 500	< 500
Toluene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000
Ethylbenzene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000
Xylenes (total)	2.0	ug/L	< 2000	< 2000	< 2000	< 2000
Chlorobenzene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000
1,3-Dichlorobenzene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000
1,4-Dichlorobenzene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000
1,2-Dichlorobenzene	1.0	ug/L	< 1000	< 1000	< 1000	< 1000

Notes:

EPA 8020:

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, Revision 1, US EPA July 1992.

M3110007-01:

This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample, reproducible results cannot be assured.

M3110007-02:

This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample, reproducible results cannot be assured.

M3110007-04:

This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample, reproducible results cannot be assured.

M3110007-05:

This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample, reproducible results cannot be assured.

GTEL ENVIRONMENTAL LABORATORIES, INC

GTEL Client ID: 005300109
Login Number: M3110007
Project ID (number): 005300109
Project ID (name): OSMOSE

ANALYTICAL RESULTS

Volatile Organics
Method: EPA 8020
Matrix: Aqueous

	GTEL Sample Number	M3110007-06	M3110007-07	M3110007-08	--
	Client ID	MW-5	MP-5D	MP-6D	--
	Date Sampled	10/29/93	10/29/93	10/29/93	--
	Date Analyzed	11/04/93	11/04/93	11/04/93	--
	Dilution Factor	1000	50.0	10.0	--
Analyte	Reporting Limit	Units	Concentration:			
Benzene	0.5	ug/L	< 500	25.	120	--
Toluene	1.0	ug/L	< 1000	74.	190	--
Ethylbenzene	1.0	ug/L	< 1000	< 50.	55.	--
Xylenes (total)	2.0	ug/L	< 2000	310	510	--
Chlorobenzene	1.0	ug/L	< 1000	< 50.	< 10.	--
1,3-Dichlorobenzene	1.0	ug/L	< 1000	< 50.	< 10.	--
1,4-Dichlorobenzene	1.0	ug/L	< 1000	< 50.	< 10.	--
1,2-Dichlorobenzene	1.0	ug/L	< 1000	< 50.	< 10.	--

Notes:

EPA 8020:

"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, Revision 1, US EPA July 1992.

M3110007-06:

This sample contained light non-aqueous phase liquid (LNAPL). The LNAPL was removed prior to analysis and only the dissolved phase was analyzed. Due to the nature of this sample, reproducible results cannot be assured.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

SURROGATE RECOVERY RESULTS

Aromatic Volatile Organics in Water
(Trifluorotoluene)
Modified EPA Method 8020

Sample	Amount Added, ug/L	Surrogate Recovery, %
BW11039318D	95.2	72.8
MS110007-08	95.2	67.4
110007-08	95.2	63.2
110007-07	95.2	63.4
110007-06	95.2	62.7
110007-01	95.2	61.8
110007-02	95.2	60.2
110007-05	95.2	59.6
110007-04	95.2	59.6
MD110007-08	95.2	60.5

Acceptability Limits[a] 45-125%

a Laboratory generated acceptability limits updated 07/11/91.
MS Matrix Spike.
MD Matrix Spike Duplicate.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Summary
Percent Recovery and Relative Percent Difference (RPD)

Modified EPA Methods 602/8020/8015

Sample Spiked:	11000708	Client ID:	Batch QC
Date of Analysis:	11/04/93	Solution ID:	BX93QC0291AT
Matrix:	Water	Batch File:	110418B

Analyte	Spike Amount ug/L	Sample Concentration ug/L	MS Concentration ug/L	MS Percent Recovery	Acceptability limits % Recovery
Benzene	200.00	120.84	319.45	99	39–150
Toluene	200.00	187.73	379.39	96	46–148
Ethyl Benzene	200.00	55.49	264.14	104	32–160
Total Xylenes	600.00	509.97	1119.88	102	36–163

Analyte	Spike Amount ug/L	MSD Concentration ug/L	MSD Percent Recovery	RPD %	Acceptability limits Recovery %	Acceptability limits RPD %
Benzene	200.00	325.13	102	3	39–150	34
Toluene	200.00	385.01	99	3	46–148	31
Ethyl Benzene	200.00	276.82	111	6	32–160	38
Total Xylenes	600.00	1130.74	104	2	36–163	38

* Indicates values out of acceptability limits. See non–conformance summary.
D Diluted out. Percent Recovery and RPD are not calculated when spike compounds are diluted out.
NA Not Applicable . % recovery is not calculated when sample results exceed 5 times the spike concentration.

** %RPD based on concentration rather than % recovery due to high native concentration of analyte.

GTEL Milford, NH

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Aromatic Volatile Organics in Water
Modified EPA Method 8020[a]

GTEL Sample Number		BW11039318D	--	--	--
Client Identification		METHOD BLANK	--	--	--
Date Analyzed		11/03/93	--	--	--
Analyte	Reporting Limit, ug/L	Concentration, ug/L			
Benzene	0.5	< 0.5	--	--	--
Toluene	1.0	< 1.0	--	--	--
Ethylbenzene	1.0	< 1.0	--	--	--
Xylenes (total)	2.0	< 2.0	--	--	--
Chlorobenzene	1.0	< 1.0	--	--	--
1,2-Dichlorobenzene	1.0	< 1.0	--	--	--
1,3-Dichlorobenzene	1.0	< 1.0	--	--	--
1,4-Dichlorobenzene	1.0	< 1.0	--	--	--
Dilution Multiplier[b]		1	--	--	--

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, US EPA November 1986; extraction by EPA Method 5030 (purge and trap). Method modified to include additional compounds.

b The dilution multiplier indicates the adjustments made for sample dilutions.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CAS NUMBERS AND DETECTION LIMITS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

Analyte	CAS #	Method Detection Limit (MDL) mg/kg
N-Nitrosodimethylamine	62-75-9	100
bis(2-Chloroethyl) Ether	11-44-4	58
1,3-Dichlorobenzene	541-73-1	19
1,4-Dichlorobenzene	106-46-7	45
1,2-Dichlorobenzene	95-50-1	19
bis(2-Chloroisopropyl) Ether	39638-32-9	58
N-Nitroso-di-n-propylamine	621-64-7	52
Hexachloroethane	67-72-1	16
Nitrobenzene	98-95-3	19
Isophorone	78-59-1	22
bis(2-Chloroethoxy)methane	111-91-1	55
1,2,4-Trichlorobenzene	120-82-1	52
Naphthalene	91-20-3	16
4-Chloroaniline	106-47-8	52
Hexachlorobutadiene	87-68-3	9.1

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CAS NUMBERS AND DETECTION LIMITS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

Analyte	CAS #	Method Detection Limit (MDL) mg/kg
2-Methylnaphthalene	91-57-6	52
Hexachlorocyclopentadiene	77-47-4	52
2-Chloronaphthalene	91-58-7	19
2-Nitroaniline	88-74-4	250
Dimethylphthalate	131-11-3	16
Acenaphthylene	208-96-8	36
2,6-Dinitrotoluene	606-20-2	52
3-Nitroaniline	99-09-2	250
Acenaphthene	83-32-9	19
Dibenzofuran	132-64-9	52
2,4-Dinitrotoluene	121-14-2	58
Diethylphthalate	84-66-2	19
4-Chlorophenyl Phenyl Ether	7005-72-3	42
Fluorene	86-73-7	19
4-Nitroaniline	100-01-6	250
N-Nitrosodiphenylamine	86-30-6	19
4-Bromophenyl Phenyl Ether	101-55-3	19

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CAS NUMBERS AND DETECTION LIMITS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

Analyte	CAS #	Method Detection Limit (MDL) mg/kg
Hexachlorobenzene	118-74-1	19
Phenanthrene	85-01-8	55
Anthracene	120-12-7	19
Di-n-butylphthalate	84-74-2	25
Fluoranthene	206-44-0	22
Pyrene	129-00-0	19
Butylbenzylphthalate	85-68-7	25
3,3'-Dichlorobenzidine	91-94-1	170
Benz[*a*]anthracene	56-55-3	79
Chrysene	218-01-9	25
bis(2-Ethylhexyl)phthalate	117-81-7	25
Di-n-octylphthalate	117-84-0	25
Benzo[*b*]fluoranthene	205-99-2	48
Benzo[*k*]fluoranthene	207-08-9	25
Benzo[*a*]pyrene	50-32-8	25
Indeno[1,2,3-*c,d*]pyrene	193-39-5	36
Dibenz[*a,h*]anthracene	53-70-3	25
Benzo[*g,h,i*]perylene	191-24-2	42

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-02	110007-03	110007-04	110007-06
Client Identification		RW-3	RW-3 DUPLICATE	RW-5	MW-5
Date Sampled		10/29/93	10/29/93	10/29/93	10/29/93
Date Extracted		11/12/93	11/12/93	11/12/93	11/12/93
Date Analyzed		11/21/93	11/21/93	11/21/93	11/24/93
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
N-Nitrosodimethylamine	100	3800 U	4000 U	4000 U	980 U
bis(2-Chloroethyl) Ether	100	3800 U	4000 U	4000 U	980 U
1,3-Dichlorobenzene	100	3800 U	4000 U	4000 U	980 U
1,4-Dichlorobenzene	100	3800 U	4000 U	4000 U	980 U
1,2-Dichlorobenzene	100	3800 U	4000 U	4000 U	980 U
bis(2-Chloroisopropyl) Ether	100	3800 U	4000 U	4000 U	980 U
N-Nitroso-di-n-propylamine	100	3800 U	4000 U	4000 U	980 U
Hexachloroethane	100	3800 U	4000 U	4000 U	980 U
Nitrobenzene	100	3800 U	4000 U	4000 U	980 U
Isophorone	100	3800 U	4000 U	4000 U	980 U
bis(2-Chloroethoxy)methane	100	3800 U	4000 U	4000 U	980 U
1,2,4-Trichlorobenzene	100	3800 U	4000 U	4000 U	980 U
Naphthalene	100	**63000** X	**59000**	**59000**	**7700**
4-Chloroaniline	200	7600 U	7900 U	7900 U	2000 U
Hexachlorobutadiene	100	3800 U	4000 U	4000 U	980 U
Practical Quantitation Limit Multiplier[d]		38.1	39.6	39.6	9.80

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-02	110007-03	110007-04	110007-06
Client Identification		RW-3	RW-3 DUPLICATE	RW-5	MW-5
Date Sampled		10/29/93	10/29/93	10/29/93	10/29/93
Date Extracted		11/12/93	11/12/93	11/12/93	11/12/93
Date Analyzed		11/21/93	11/21/93	11/21/93	11/24/93
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
2-Methylnaphthalene	100	**35000**	**34000**	**35000**	**5200**
Hexachlorocyclopentadiene	100	3800 U	4000 U	4000 U	980 U
2-Chloronaphthalene	100	3800 U	4000 U	4000 U	980 U
2-Nitroaniline	480	18000 U	19000 U	19000 U	4700 U
Dimethylphthalate	100	3800 U	4000 U	4000 U	980 U
Acenaphthylene	100	**660 J**	**620 J**	**1100 J**	**180 J**
2,6-Dinitrotoluene	100	3800 U	4000 U	4000 U	980 U
3-Nitroaniline	480	18000 U	19000 U	19000 U	4700 U
Acenaphthene	100	**32000**	**30000**	**36000**	**6100**
Dibenzofuran	100	**22000**	**21000**	**24000**	**3600**
2,4-Dinitrotoluene	100	3800 U	4000 U	4000 U	980 U
Diethylphthalate	100	3800 U	4000 U	4000 U	980 U
4-Chlorophenyl Phenyl Ether	100	3800 U	4000 U	4000 U	980 U
Fluorene	100	**21000**	**20000**	**23000**	**3500**
4-Nitroaniline	480	18000 U	19000 U	19000 U	4700 U
N-Nitrosodiphenylamine[e]	100	3800 U	4000 U	**450 J**	980 U
4-Bromophenyl Phenyl Ether	100	3800 U	4000 U	4000 U	980 U
Practical Quantitation Limit Multiplier[d]		38.1	39.6	39.6	9.80

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-02	110007-03	110007-04	110007-06
Client Identification		RW-3	RW-3 DUPLICATE	RW-5	MW-5
Date Sampled		10/29/93	10/29/93	10/29/93	10/29/93
Date Extracted		11/12/93	11/12/93	11/12/93	11/12/93
Date Analyzed		11/21/93	11/21/93	11/21/93	11/24/93
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
Hexachlorobenzene	100	3800 U	4000 U	4000 U	980 U
Phenanthrene	100	**38000**	**36000**	**43000**	**5000**
Anthracene	100	**4400**	**4100**	**7400**	**770**
Di-n-butylphthalate	100	3800 U	4000 U	4000 U	980 U
Fluoranthene	100	**18000**	**16000**	**21000**	**2300**
Pyrene	100	**9900**	**8500**	**12000**	**1200**
Butylbenzylphthalate	100	3800 U	4000 U	4000 U	980 U
3,3'-Dichlorobenzidine	200	7600 U	7900 U	7900 U	2000 U
Benz[*a*]anthracene	100	**2000 J**	**2000 J**	**3200 J**	**260 J**
Chrysene	100	**2300 J**	**2000 J**	**2600 J**	**260 J**
bis(2-Ethylhexyl)phthalate	100	3800 U	4000 U	4000 U	980 U
Di-n-octylphthalate	100	3800 U	4000 U	4000 U	980 U
Benzo[*b*]fluoranthene	100	**1300 J**	**1200 J**	**1500 J**	**170 J**
Benzo[*k*]fluoranthene	100	**720 J**	**580 J**	**810 J**	**100 J**
Benzo[*a*]pyrene	100	**570 J**	**570 J**	**1100 J**	**110 J**
Indeno[1,2,3-*c,d*]pyrene	100	3800 U	4000 U	4000 U	980 U
Dibenz[*a,h*]anthracene	100	3800 U	4000 U	4000 U	980 U
Benzo[*g,h,i*]perylene	100	3800 U	4000 U	4000 U	980 U
Practical Quantitation Limit Multiplier[d]		38.1	39.6	39.6	9.80

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-08	--	--	--
Client Identification		MP-6D	--	--	--
Date Sampled		10/29/93	--	--	--
Date Extracted		11/12/93	--	--	--
Date Analyzed		11/24/93	--	--	--
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
N-Nitrosodimethylamine	100	960 U	--	--	--
bis(2-Chloroethyl) Ether	100	960 U	--	--	--
1,3-Dichlorobenzene	100	960 U	--	--	--
1,4-Dichlorobenzene	100	960 U	--	--	--
1,2-Dichlorobenzene	100	960 U	--	--	--
bis(2-Chloroisopropyl) Ether	100	960 U	--	--	--
N-Nitroso-di-n-propylamine	100	960 U	--	--	--
Hexachloroethane	100	960 U	--	--	--
Nitrobenzene	100	960 U	--	--	--
Isophorone	100	960 U	--	--	--
bis(2-Chloroethoxy)methane	100	960 U	--	--	--
1,2,4-Trichlorobenzene	100	960 U	--	--	--
Naphthalene	100	**10000**	--	--	--
4-Chloroaniline	200	1900 U	--	--	--
Hexachlorobutadiene	100	960 U	--	--	--
Practical Quantitation Limit Multiplier[d]		9.62	--	--	--

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-08	--	--	--
Client Identification		MP-6D	--	--	--
Date Sampled		10/29/93	--	--	--
Date Extracted		11/12/93	--	--	--
Date Analyzed		11/24/93	--	--	--
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
2-Methylnaphthalene	100	**5600**	--	--	--
Hexachlorocyclopentadiene	100	960 U	--	--	--
2-Chloronaphthalene	100	960 U	--	--	--
2-Nitroaniline	480	4600 U	--	--	--
Dimethylphthalate	100	960 U	--	--	--
Acenaphthylene	100	**180 J**	--	--	--
2,6-Dinitrotoluene	100	960 U	--	--	--
3-Nitroaniline	480	4600 U	--	--	--
Acenaphthene	100	**6000**	--	--	--
Dibenzofuran	100	**3600**	--	--	--
2,4-Dinitrotoluene	100	960 U	--	--	--
Diethylphthalate	100	960 U	--	--	--
4-Chlorophenyl Phenyl Ether	100	960 U	--	--	--
Fluorene	100	**3600**	--	--	--
4-Nitroaniline	480	4600 U	--	--	--
N-Nitrosodiphenylamine[e]	100	960 U	--	--	--
4-Bromophenyl Phenyl Ether	100	960 U	--	--	--
Practical Quantitation Limit Multiplier[d]		9.62	--	--	--

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

GTEL Sample Number		110007-08	--	--	--
Client Identification		MP-6D	--	--	--
Date Sampled		10/29/93	--	--	--
Date Extracted		11/12/93	--	--	--
Date Analyzed		11/24/93	--	--	--
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]			
Hexachlorobenzene	100	960 U	--	--	--
Phenanthrene	100	**5000**	--	--	--
Anthracene	100	**850 J**	--	--	--
Di-n-butylphthalate	100	960 U	--	--	--
Fluoranthene	100	**2500**	--	--	--
Pyrene	100	**1100**	--	--	--
Butylbenzylphthalate	100	960 U	--	--	--
3,3'-Dichlorobenzidine	200	1900 U	--	--	--
Benz[*a*]anthracene	100	**280 J**	--	--	--
Chrysene	100	**280 J**	--	--	--
bis(2-Ethylhexyl)phthalate	100	960 U	--	--	--
Di-n-octylphthalate	100	960 U	--	--	--
Benzo[*b*]fluoranthene	100	**150 J**	--	--	--
Benzo[*k*]fluoranthene	100	960 U	--	--	--
Benzo[*a*]pyrene	100	**100 J**	--	--	--
Indeno[1,2,3-*c,d*]pyrene	100	960 U	--	--	--
Dibenz[*a,h*]anthracene	100	960 U	--	--	--
Benzo[*g,h,i*]perylene	100	960 U	--	--	--
Practical Quantitation Limit Multiplier[d]		9.62	--	--	--

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; extraction by EPA Method 3580 (waste dilution).

b Practical quantitation limit.

c Data Flag Definitions

U Indicates compound was analyzed for but not detected.

J Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the quantitation limit, but greater than zero, or when reporting an estimated concentration for a tentatively identified compound.

B Indicates that the analyte was found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

X Estimated concentration. Result for this analyte exceeded the calibrated range of the instrument by < 10%. Re-analysis under more dilute conditions was not undertaken based on good correlation (within 10%) of this result with that in client provided duplicate (sample 110007-03). the result from sample 110007-03 is within the calibrated range of the instrument.

d The practical quantitation limit multiplier indicates the adjustments made to the data and PQLs for sample dilutions, percent solids and gel permeation cleanup.

e Cannot be separated from diphenylamine.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

SURROGATE RECOVERY SUMMARY

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

GTEL No.	Percent Recovery, %			
	S1 (NBZ)	S2 (FBP)	S3 (TPH)	TOT OUT
BO111293A	51.4	104	62.7	0
110007-02	D	D	D	0
110007-03	D	D	D	0
110007-04	D	D	D	0
110007-06	D	D	D	0
110007-08	D	D	D	0
MS110007-02	D	D	D	0
MD110007-02	D	D	D	0
LO111293A	67.0	114	63.6	0

	Surrogates		Amount Spiked, ug/L	Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	50	23-120
S2	FBP	2-Fluorobiphenyl	50	30-115
S3	TPH	Terphenyl-d14	50	18-137

* Indicates values outside of acceptability limits. See Nonconformance Summary.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) guidelines.
D Diluted out. Percent Recovery is not calculated when surrogate compound(s) are diluted out.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

Sample Spiked: 110007-02 Client ID: BATCH QC

Standard ID: N93MS089B Date Analyzed: 11/21/93

Analyte	Spike Added, mg/kg	Sample Concentration, mg/kg	MS Concentration, mg/kg	MS Percent Recovery	Acceptability Limits, %[a]
1,4-Dichlorobenzene	96.2	< 3800	D	D	28-104
N-Nitroso-di-n-propylamine	96.2	< 3800	D	D	41-126
1,2,4-Trichlorobenzene	96.2	< 3800	D	D	38-107
Acenaphthene	96.2	32000	29200	b	31-137
2,4-Dinitrotoluene	96.2	< 3800	D	D	28- 89
Pyrene	96.2	< 3800	D	D	35-142

Analyte	Spike Added, mg/kg	MD Concentration, mg/kg	MD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
1,4-Dichlorobenzene	94.3	D	D	D	27	28-104
N-Nitroso-di-n-propylamine	94.3	D	D	D	38	41-126
1,2,4-Trichlorobenzene	94.3	D	D	D	23	38-107
Acenaphthene	94.3	25300	b	14.3[b]	19	31-137
2,4-Dinitrotoluene	94.3	D	D	D	47	28- 89
Pyrene	94.3	D	D	D	36	35-142

* Indicates values outside of acceptability limits.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.
b RPD based upon concentration instead of Percent Recovery. See Nonconformance Summary.
D Diluted out. Percent Recovery and % RPD are not calculated when matrix spike compounds are diluted out.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

LABORATORY CONTROL SAMPLE (LS)
PERCENT RECOVERY SUMMARY

Base/Neutrals in Non-aqueous Waste
EPA Method 8270

LS ID: LO111293A Date Analyzed: 11/24/93

Standard ID: N93MS089B

Analyte	Spike Added, mg/kg	LS Concentration, mg/kg	LS Percent Recovery	Acceptability Limits, %[a]
1,4-Dichlorobenzene	100	103	103	28-104
N-Nitroso-di-n-propylamine	100	75.4	75.4	41-126
1,2,4-Trichlorobenzene	100	97.6	97.6	38-107
Acenaphthene	100	101	101	31-137
2,4-Dinitrotoluene	100	20.2	20.2*	28- 89
Pyrene	100	67.0	67.0	35-142

* Indicates values outside of acceptability limits. See Nonconformance Summary.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

	GTEL File ID	BO111293A	
	Date Extracted	11/12/93	
	Date Analyzed	11/24/93	
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]	
N-Nitrosodimethylamine	100	100	U
bis(2-Chloroethyl) Ether	100	100	U
1,3-Dichlorobenzene	100	100	U
1,4-Dichlorobenzene	100	100	U
1,2-Dichlorobenzene	100	100	U
bis(2-Chloroisopropyl) Ether	100	100	U
N-Nitroso-di-n-propylamine	100	100	U
Hexachloroethane	100	100	U
Nitrobenzene	100	100	U
Isophorone	100	100	U
bis(2-Chloroethoxy)methane	100	100	U
1,2,4-Trichlorobenzene	100	100	U
Naphthalene	100	100	U
4-Chloroaniline	200	200	U
Hexachlorobutadiene	100	100	U
Practical Quantitation Limit Multiplier[e]		1.00	

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

	GTEL File ID	BO111293A	
	Date Extracted	11/12/93	
	Date Analyzed	11/24/93	
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]	
2-Methylnaphthalene	100	100	U
Hexachlorocyclopentadiene	100	100	U
2-Chloronaphthalene	100	100	U
2-Nitroaniline	480	480	U
Dimethylphthalate	100	100	U
Acenaphthylene	100	100	U
2,6-Dinitrotoluene	100	100	U
3-Nitroaniline	480	480	U
Acenaphthene	100	100	U
Dibenzofuran	100	100	U
2,4-Dinitrotoluene	100	100	U
Diethylphthalate	100	100	U
4-Chlorophenyl Phenyl Ether	100	100	U
Fluorene	100	100	U
4-Nitroaniline	480	480	U
N-Nitrosodiphenylamine[d]	100	100	U
4-Bromophenyl Phenyl Ether	100	100	U
Practical Quantitation Limit Multiplier[e]		1.00	

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

	GTEL File ID	BO111293A	
	Date Extracted	11/12/93	
	Date Analyzed	11/24/93	
Analyte	PQL, mg/kg[b]	Concentration, mg/kg[c]	
Hexachlorobenzene	100	100	U
Phenanthrene	100	100	U
Anthracene	100	100	U
Di-n-butylphthalate	100	100	U
Fluoranthene	100	100	U
Pyrene	100	100	U
Butylbenzylphthalate	100	100	U
3,3'-Dichlorobenzidine	200	200	U
Benz[*a*]anthracene	100	100	U
Chrysene	100	100	U
bis(2-Ethylhexyl)phthalate	100	100	U
Di-n-octylphthalate	100	100	U
Benzo[*b*]fluoranthene	100	100	U
Benzo[*k*]fluoranthene	100	100	U
Benzo[*a*]pyrene	100	100	U
Indeno[1,2,3-*c,d*]pyrene	100	100	U
Dibenz[*a,h*]anthracene	100	100	U
Benzo[*g,h,i*]perylene	100	100	U
Practical Quantitation Limit Multiplier[e]		1.00	

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Non-aqueous Waste
EPA Method 8270[a]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; extraction by EPA Method 3580 (waste dilution).

b Practical quantitation limit.

c Data Flag Definitions

U Indicates compound was analyzed for but not detected.

J Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the quantitation limit, but greater than zero, or when reporting an estimated concentration for a tentatively identified compound.

d Cannot be separated from diphenylamine.

e The practical quantitation limit multiplier indicates the adjustments made to the data and PQL's for sample dilutions, percent solids and gel permeation cleanup.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CAS NUMBERS AND DETECTION LIMITS

Base/Neutrals in Water
EPA Method 8270

Analyte	CAS #	Method Detection Limit (MDL) ug/L
N-Nitrosodimethylamine	62-75-9	10
bis(2-Chloroethyl) Ether	11-44-4	5.7
1,3-Dichlorobenzene	541-73-1	1.9
1,4-Dichlorobenzene	106-46-7	4.4
1,2-Dichlorobenzene	95-50-1	1.9
bis(2-Chloroisopropyl) Ether	39638-32-9	5.7
N-Nitroso-di-n-propylamine	621-64-7	5.0
Hexachloroethane	67-72-1	1.6
Nitrobenzene	98-95-3	1.9
Isophorone	78-59-1	2.2
bis(2-Chloroethoxy)methane	111-91-1	5.3
1,2,4-Trichlorobenzene	120-82-1	5.0
Naphthalene	91-20-3	1.6
4-Chloroaniline	106-47-8	5.0
Hexachlorobutadiene	87-68-3	0.9
2-Methylnaphthalene	91-57-6	5.0
Hexachlorocyclopentadiene	77-47-4	5.0
2-Chloronaphthalene	91-58-7	1.9
2-Nitroaniline	88-74-4	25
Dimethylphthalate	131-11-3	1.6
Acenaphthylene	208-96-8	3.5
2,6-Dinitrotoluene	606-20-2	5.0
3-Nitroaniline	99-09-2	25
Acenaphthene	83-32-9	1.9
Dibenzofuran	132-64-9	5.0
2,4-Dinitrotoluene	121-14-2	5.7

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

CAS NUMBERS AND DETECTION LIMITS

Base/Neutrals in Water
EPA Method 8270

Analyte	CAS #	Method Detection Limit (MDL) ug/L
Diethylphthalate	84-66-2	1.9
4-Chlorophenyl Phenyl Ether	7005-72-3	4.2
Fluorene	86-73-7	1.9
4-Nitroaniline	100-01-6	25
N-Nitrosodiphenylamine	86-30-6	1.9
4-Bromophenyl Phenyl Ether	101-55-3	1.9
Hexachlorobenzene	118-74-1	1.9
Phenanthrene	85-01-8	5.4
Anthracene	120-12-7	1.9
Di-n-butylphthalate	84-74-2	2.5
Fluoranthene	206-44-0	2.2
Pyrene	129-00-0	1.9
Butylbenzylphthalate	85-68-7	2.5
3,3'-Dichlorobenzidine	91-94-1	17
Benz[*a*]anthracene	56-55-3	7.8
Chrysene	218-01-9	2.5
bis(2-Ethylhexyl)phthalate	117-81-7	2.5
Di-n-octylphthalate	117-84-0	2.5
Benzo[*b*]fluoranthene	205-99-2	4.8
Benzo[*k*]fluoranthene	207-08-9	2.5
Benzo[*a*]pyrene	50-32-8	2.5
Indeno[1,2,3-*c,d*]pyrene	193-39-5	3.7
Dibenz[*a,h*]anthracene	53-70-3	2.5
Benzo[*g,h,i*]perylene	191-24-2	4.1

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

GTEL Sample Number		110007-01	110007-07	--	--
Client Identification		RW-1	MP-5D	--	--
Date Sampled		10/29/93	10/29/93	--	--
Date Extracted		11/05/93	11/05/93	--	--
Date Analyzed		12/03/93	11/24/93	--	--
Analyte	PQL, ug/L[b]	Concentration, ug/L[c]			
N-Nitrosodimethylamine	10	1200 U	2200 U	--	--
bis(2-Chloroethyl) Ether	10	1200 U	2200 U	--	--
1,3-Dichlorobenzene	10	1200 U	2200 U	--	--
1,4-Dichlorobenzene	10	1200 U	2200 U	--	--
1,2-Dichlorobenzene	10	1200 U	2200 U	--	--
bis(2-Chloroisopropyl) Ether	10	1200 U	2200 U	--	--
N-Nitroso-di-n-propylamine	10	1200 U	2200 U	--	--
Hexachloroethane	10	1200 U	2200 U	--	--
Nitrobenzene	10	1200 U	2200 U	--	--
Isophorone	10	1200 U	2200 U	--	--
bis(2-Chloroethoxy)methane	10	1200 U	2200 U	--	--
1,2,4-Trichlorobenzene	10	1200 U	2200 U	--	--
Naphthalene	10	**13000**	**26000**	--	--
4-Chloroaniline	20	2300 U	4300 U	--	--
Hexachlorobutadiene	10	1200 U	2200 U	--	--
2-Methylnaphthalene	10	**7300**	**16000**	--	--
Hexachlorocyclopentadiene	10	1200 U	2200 U	--	--
2-Chloronaphthalene	10	1200 U	2200 U	--	--
2-Nitroaniline	50	5800 U	11000 U	--	--
Dimethylphthalate	10	1200 U	2200 U	--	--
Acenaphthylene	10	1200 U	**790 J**	--	--
2,6-Dinitrotoluene	10	1200 U	2200 U	--	--
3-Nitroaniline	50	5800 U	11000 U	--	--
Acenaphthene	10	**6900**	**17000**	--	--
Dibenzofuran	10	**8900**	**12000**	--	--
2,4-Dinitrotoluene	10	1200 U	2200 U	--	--
Practical Quantitation Limit Multiplier[d]		116	216	--	--

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

GTEL Sample Number		110007-01	110007-07	--	--
Client Identification		RW-1	MP-5D	--	--
Date Sampled		10/29/93	10/29/93	--	--
Date Extracted		11/05/93	11/05/93	--	--
Date Analyzed		12/03/93	11/24/93	--	--
Analyte	PQL, ug/L[b]	Concentration, ug/L[c]			
Diethylphthalate	10	1200 U	2200 U	--	--
4-Chlorophenyl Phenyl Ether	10	1200 U	2200 U	--	--
Fluorene	10	**8500**	**12000**	--	--
4-Nitroaniline	50	5800 U	11000 U	--	--
N-Nitrosodiphenylamine[e]	10	1200 U	2200 U	--	--
4-Bromophenyl Phenyl Ether	10	1200 U	2200 U	--	--
Hexachlorobenzene	10	1200 U	2200 U	--	--
Phenanthrene	10	**6400**	**15000**	--	--
Anthracene	10	**610 J**	**2600**	--	--
Di-n-butylphthalate	10	1200 U	2200 U	--	--
Fluoranthene	10	**3000**	**7100**	--	--
Pyrene	10	1400 X	3700 X	--	--
Butylbenzylphthalate	10	1200 U	**310 J**	--	--
3,3'-Dichlorobenzidine	20	2300 U	4300 U	--	--
Benz[*a*]anthracene	10	**290 J**	**760 J**	--	--
Chrysene	10	**350 J**	2200 U	--	--
bis(2-Ethylhexyl)phthalate	10	1200 U	2200 U	--	--
Di-n-octylphthalate	10	1200 U	2200 U	--	--
Benzo[*b*]fluoranthene	10	**180 J**	**330 J**	--	--
Benzo[*k*]fluoranthene	10	**180 J**	**700 J**	--	--
Benzo[*a*]pyrene	10	1200 U	**340 J**	--	--
Indeno[1,2,3-*c,d*]pyrene	10	1200 U	2200 U	--	--
Dibenz[*a,h*]anthracene	10	1200 U	2200 U	--	--
Benzo[*g,h,i*]perylene	10	1200 U	2200 U	--	--
Practical Quantitation Limit Multiplier[d]		116	216	--	--

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

ANALYTICAL RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

Base/Neutrals in Water
EPA Method 8270[a]

		GTEL Sample Number	110007-07
		Client Identification	MP-5D
		Date Sampled	10/29/93
		Date Extracted	11/05/93
		Date Analyzed	11/24/93
	CAS Number	Compound	SCAN	Estimated Concentration, ug/L[c]
1.	--	Unknown Sub. Benzene Isomer	384	**2200 J**
2.	--	Unknown Sub. Benzene Isomer	421	**4800 J**
3.	--	Unknown	426	**5800 J**
4.	--	Unknown Sub. Benzene Isomer	461	**2400 J**
5.	--	Unknown	479	**1900 J**
6.	--	Unknown Sub. Benzene Isomer	492	**16000 J**
7.	--	Unknown Sub. Benzene Isomer	805	**2500 J**
8.	--	Unknown	845	**1700 J**
9.	--	Unknown Aromatic	871	**3600 J**
10.	--	Unknown Hydrocarbon	880	**2800 J**
11.	--	Unknown Naphthalene Isomer	885	**2600 J**
12.	--	Unknown Dimethyl Naphthalene Isomer	896	**3200 J**
13.	--	Unknown Dimethyl Naphthalene Isomer	911	**4900 J**
14.	--	Unknown Dimethyl Naphthalene Isomer	929	**1500 J**
15.	--	Unknown	1076	**1500 J**
16.	--	Unknown	1092	**1300 J**
17.	--	Unknown	1103	**1300 J**
18.	--	Unknown Hydrocarbon	1139	**2800 J**
19.	--	Unknown Hydrocarbon	1143	**1400 J**
20.	--	Unknown	1327	**2100 J**
21.	--	Unknown Hydrocarbon	1360	**1700 J**
Practical Quantitation Limit Multiplier[d]				216

GTEL ENVIRONMENTAL LABORATORIES, INC.

ANALYTICAL RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; extraction by EPA Method 3510 (liquid/liquid).

b Practical quantitation limit.

c Data Flag Definitions

- U Indicates compound was analyzed for but not detected.
- J Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the quantitation limit, but greater than zero, or when reporting an estimated concentration for a tentatively identified compound.
- B Indicates that the analyte was found in the blank as well as a sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- X Estimated concentration. Accuracy for this analyte cannot be demonstrated due to laboratory error.

d The practical quantitation limit multiplier indicates the adjustments made to the data and PQLs for sample dilutions.

e Cannot be separated from diphenylamine.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

SURROGATE RECOVERY SUMMARY

Base/Neutrals in Water
EPA Method 8270

GTEL No.	Percent Recovery, %			
	S1 (NBZ)	S2 (FBP)	S3 (TPH)	TOT OUT
BW110593AR	84.0	99.4	98.5	0
LW110593A	93.5	104	149*	1
MS110040-01	107	156*	112	1
MD110040-01	111	163*	103	1
110007-01	D	D	D	0
110007-07	D	D	D	0

	Surrogates		Amount Spiked, ug/L	Recovery Limits[a]
S1	NBZ	Nitrobenzene-d5	50	35-114
S2	FBP	2-Fluorobiphenyl	50	43-116
S3	TPH	Terphenyl-d14	50	33-141

* Indicates values outside of acceptability limits. See Nonconformance Summary.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) guidelines.
D Diluted out. Percent Recovery is not calculated when surrogate compound(s) are diluted out.

GTEL ENVIRONMENTAL LABORATORIES, INC

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

MATRIX SPIKE (MS) AND MATRIX SPIKE DUPLICATE (MD) SUMMARY
PERCENT RECOVERY AND RELATIVE PERCENT DIFFERENCE (RPD)

Base/Neutrals in Water
EPA Method 8270

Sample Spiked: 110040-01 Client ID: BATCH QC

Standard ID: N93MS089B Date Analyzed: 11/27/93

Analyte	Spike Added, ug/L	Sample Concentration, ug/L	MS Concentration, ug/L	MS Percent Recovery	Acceptability Limits, %[a]
1,4-Dichlorobenzene	100	< 50	103	103*	36- 97
N-Nitroso-di-n-propylamine	100	< 50	112	112	41-116
1,2,4-Trichlorobenzene	100	< 50	116	116*	39- 98
Acenaphthene	100	< 50	139	139*	46-118
2,4-Dinitrotoluene	100	< 50	51.1	51.1	24- 96
Pyrene	100	< 50	132	132*	26-127

Analyte	Spike Added, ug/L	MD Concentration, ug/L	MD Percent Recovery	RPD, %	Acceptability Limits[a]	
					RPD	% Recovery
1,4-Dichlorobenzene	102	97.7	95.8	7.24	28	36- 97
N-Nitroso-di-n-propylamine	102	119	117*	4.37	38	41-116
1,2,4-Trichlorobenzene	102	122	120*	3.39	28	39- 98
Acenaphthene	102	151	148*	6.27	31	46-118
2,4-Dinitrotoluene	102	63.8	62.5	20.1	38	24- 96
Pyrene	102	130	127	3.86	31	26-127

* Indicates values outside of acceptability limits. See Nonconformance Summary.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

LABORATORY CONTROL SAMPLE (LS)
PERCENT RECOVERY SUMMARY

Base/Neutrals in Water
EPA Method 8270

Sample Spiked: LW110593A Date Analyzed: 12/03/93

Standard ID: N93MS089B

Analyte	Spike Added, ug/L	LCS Concentration, ug/L	LCS Percent Recovery	Acceptability Limits, %[a]
1,4-Dichlorobenzene	50	41.4	82.8	36- 97
N-Nitroso-di-n-propylamine	50	46.9	93.8	41-116
1,2,4-Trichlorobenzene	50	44.2	88.4	39- 98
Acenaphthene	50	56.4	113	46-118
2,4-Dinitrotoluene	50	39.0	78.0	24- 96
Pyrene	50	79.3	159*	26-127

* Indicates values outside of acceptability limits. See Nonconformance Summary.
a Acceptability limits are derived from USEPA Contract Laboratory Program (CLP) requirements.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

	GTEL File ID	BW110593AR	
	Date Extracted	11/05/93	
	Date Analyzed	11/23/93	
Analyte	PQL, ug/L[b]	Concentration, ug/L[c]	
N-Nitrosodimethylamine	10	10	U
bis(2-Chloroethyl) Ether	10	10	U
1,3-Dichlorobenzene	10	10	U
1,4-Dichlorobenzene	10	10	U
1,2-Dichlorobenzene	10	10	U
bis(2-Chloroisopropyl) Ether	10	10	U
N-Nitroso-di-n-propylamine	10	10	U
Hexachloroethane	10	10	U
Nitrobenzene	10	10	U
Isophorone	10	10	U
bis(2-Chloroethoxy)methane	10	10	U
1,2,4-Trichlorobenzene	10	10	U
Naphthalene	10	10	U
4-Chloroaniline	20	20	U
Hexachlorobutadiene	10	10	U
2-Methylnaphthalene	10	10	U
Hexachlorocyclopentadiene	10	10	U
2-Chloronaphthalene	10	10	U
2-Nitroaniline	50	50	U
Dimethylphthalate	10	10	U
Acenaphthylene	10	10	U
2,6-Dinitrotoluene	10	10	U
3-Nitroaniline	50	50	U
Acenaphthene	10	10	U
Dibenzofuran	10	10	U
2,4-Dinitrotoluene	10	10	U

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

	GTEL File ID	BW110593AR	
	Date Extracted	11/05/93	
	Date Analyzed	11/23/93	
Analyte	PQL, ug/L[b]	Concentration, ug/L[c]	
Diethylphthalate	10	10	U
4-Chlorophenyl Phenyl Ether	10	10	U
Fluorene	10	10	U
4-Nitroaniline	50	50	U
N-Nitrosodiphenylamine[d]	10	10	U
4-Bromophenyl Phenyl Ether	10	10	U
Hexachlorobenzene	10	10	U
Phenanthrene	10	10	U
Anthracene	10	10	U
Di-n-butylphthalate	10	10	U
Fluoranthene	10	10	U
Pyrene	10	10	U
Butylbenzylphthalate	10	10	U
3,3'-Dichlorobenzidine	20	20	U
Benz[*a*]anthracene	10	10	U
Chrysene	10	10	U
bis(2-Ethylhexyl)phthalate	10	10	U
Di-n-octylphthalate	10	10	U
Benzo[*b*]fluoranthene	10	10	U
Benzo[*k*]fluoranthene	10	10	U
Benzo[*a*]pyrene	10	10	U
Indeno[1,2,3-*c,d*]pyrene	10	10	U
Dibenz[*a,h*]anthracene	10	10	U
Benzo[*g,h,i*]perylene	10	10	U

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS
TENTATIVELY IDENTIFIED COMPOUNDS

Base/Neutrals in Water
EPA Method 8270[a]

			GTEL File ID	BW110593AR
			Date Extracted	11/05/93
			Date Analyzed	11/23/93
	CAS Number	Compound	SCAN	Estimated Concentration, ug/L[c]
1.	--	Unknown	200	**8.0 J**
2.	--	Unknown Hydrocarbon	1827	**5.0 J**

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Login Number: M3-11-0007

METHOD BLANK RESULTS

Base/Neutrals in Water
EPA Method 8270[a]

a Test Methods for Evaluating Solid Waste, SW-846, Third Edition, Revision 0, Table 2, US EPA November 1986; extraction by EPA Method 3510 (liquid/liquid).

b Practical quantitation limit.

c Data Flag Definitions

U Indicates compound was analyzed for but not detected.

J Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the quantitation limit, but greater than zero, or when reporting an estimated concentration for a tentatively identified compound.

d Cannot be separated from diphenylamine.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX: (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

NO.S 2713

Company Name: GROUNDWATER TECH Phone #: 518-370-5631
Address: 1245 KINAS ROAD Project Manager: BRUCE AHRENS
Project ID: OSMOSE Site Location: (City, State)
Project Number: 00530-0109 BUFFALO, NY
DUNS #: N/A SUN Env. Eng.: N/A
Release/Work Order #: N/A

I attest that the proper field sampling procedures were used during the collection of these samples. Sampler Name (Print): BRIAN CAREY

ANALYSIS REQUEST

Field Sample ID	DEPTH TO GROUNDWATER	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME
RW-1		1	4						3			X	1		10-29	12:00
RW-3		2	4						3			X	1		10-29	12:00
RW-3 DUPLICATE		3	4						3			X	1		10-29	1200
RW-5		4	4						3			X	1		10-29	1200
RW-5 DUPLICATE		5	3						3			X			10-29	1200
MW-5		6	4						3			X	1		1029	1200
MP-5D		7	4						3			X	1		1029	1200
MP-6D		8	5						4			X	1		10-29	1200

BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organo Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: EPA 8270 BASE/NEUTRALS + FORMIC ACID
									3					1						
									3					1						
									~~3~~					1						
									3					1						
									3											
									3					1						
									3					1						1
									4					1						

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____ Business Days ☐

Special Handling
GTEL Contact
Quote/Contract # 900-79-089
Confirmation #
P.O. #

SPECIAL DETECTION LIMITS (Specify)

REMARKS: 8020'S PROJECT SPECIFIC BLUE LEVEL HAVE SEPARATE REPORTING PACKAGE

SPECIAL REPORTING REQUIREMENTS (Specify)
SUN REPORT FORMAT (602/BTEX)
FAX ☐

Lab Use Only Lot #: Storage Location W-9-A 11-1-D
Work Order # M31-10007

QA/QC Level
Blue X CLP ☐ Other ☐

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	10-29-93	1600	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date 11-1-93	Time 1130	Received by Laboratory: Way bill # 049249913 3

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Suite C
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
FAX (510) 825-0720

Client Number: 005300109
Project ID: 980 Elliott St.
Buffalo, NY
Work Order Number: C3-08-0275

RECEIVED
SEP - 7 1993

September 1, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 13212

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 08/18/93, under chain of custody record 52728.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Ron Martino
Asst Lab Director for

Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: 980 Elliott St.
Buffalo, NY
Work Order Number: C3-08-0275

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	RW-1	RW-3	RW-5	MD-5D
				Date Sampled	08/16/93	08/16/93	08/16/93	08/16/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
TOC	mg/L	1	EPA 9060	08/23/93	35	28	21	45

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: 980 Elliott St.
Buffalo, NY
Work Order Number: C3-08-0275

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	06	07	082393
				Sample Identification	MD-6D	MW-5	MW-5 DUP	METHOD BLANK
				Date Sampled	08/16/93	08/16/93	08/16/93	--
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
TOC	mg/L	1	EPA 9060	08/23/93	23	28	29	<1

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080-C Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 *from inside California*
(800) 423-7143 *from outside California*
(510) 825-0720 (FAX)

RECEIVED
SEP 30 1993

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0286

September 29, 1993

Bruce Aherns
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 13212

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/15/93, under chain of custody record 52747.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Ron Martinez

Asst Lab Director for

Eileen F. Bullen
Laboratory Director

GTEL Concord, CA
C3090286.GEN

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0286

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	MW-5	MP-5D	MP-6D	RW-3
				Date Sampled	09/13/93	09/13/93	09/13/93	09/13/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
TOC	mg/L	1	EPA 9060	09/23/93	36	89	26	81

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0286

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	092393		
				Sample Identification	RW-5	METHOD BLANK		
				Date Sampled	09/13/93	--		
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
TOC	mg/L	1	EPA 9060	09/23/93	61	<1		

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

52747

Company Name: GROUNDWATER TECHNOLOGY

Phone #: 518-370-5631

FAX #: 518-370-5864

Company Address: 1245 KINGS RD SCHENECTADY NY

Site location: BUFFALO, NY

Project Manager: BRUCE AMRENS

Client Project ID: (#) 00530-0109

(NAME) OSMOSE

I attest that the proper field sampling procedures were used during the collection of these samples.

Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MW-5	01	2	2								2	X			9/13	11:00
MP-5D	02	2	2								2	X			9/13	11:00
MP-6D	03	2	2								2	X			9/13	11:00
RW-3	04	2	2								2	X			9/13	11:00
RW-5	05	2	2								2	X			9/13	11:00

ANALYSIS REQUEST

	TOTAL
BTEX/602 ☐ 8020 ☐ with MTBE ☐	
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	
Hydrocarbon Profile (SIMDIS) ☐	
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	
TPH/IR 418.1 ☐ SM 503 ☐	
EDB by 504 ☐ DBCP by 504 ☐	
EPA 503.1 ☐ EPA 502.2 ☐	
EPA 601 ☐ EPA 8010 ☐	
EPA 602 ☐ EPA 8020 ☐	
EPA 608 ☐ 8080 ☐ PCB only ☐	
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	
EPA 610 ☐ 8310 ☐	
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	
CAM Metals TTLC ☐ STLC ☐	
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	
Organic Lead ☐	
Corrosivity ☐ Flash Point ☐ Reactivity ☐	
TOC GTEL	1
COD RTL	1
	1
	1
	1
	1

9/23/93

TAT

- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other _____
- Business Days ☐

Special Handling

- GTEL Contact _____
- Quote/Contract # _____
- Confirmation # _____
- PO # _____

SPECIAL DETECTION LIMITS

REMARKS: SAMPLES TO RTL - ROD V.

SPECIAL REPORTING REQUIREMENTS

QA / QC LEVEL

BLUE ☐ CLP ☐ OTHER _____

FAX ☐

Lab Use Only Lot # GTEL: C3090286 RTL: C3090287

Storage Location

Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian J Carey	9-14-93	10:00	Received by:
Relinquished by:			Received by:
Relinquished by:	9/15/93	9:30am	Received by Laboratory: L. Prescott

Waybill #

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0487

October 8, 1993

RECEIVED
OCT 11 1993

Bruce Aurens
Groundwater Technology, Inc.
1245 Kings Rd.
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/22/93, under chain of custody record 52732.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen

Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0487

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	MW-5	MP-5D	MP-6D	RW-3
				Date Sampled	09/17/93	09/17/93	09/17/93	09/17/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/01/93	49	120	42	150

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0487

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	093093		
				Sample Identification	RW-5	METHOD BLANK		
				Date Sampled	09/17/93	--		
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/01/93	39	<1		

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52732

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 12415 KINGS RD SCHENECTADY NY
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC - 487	COD - 488
MW-5	01	2	X								2	X			9/17	10:00																			1	1
MP-5D	02	2	X								2	X			9/17	10:00																			1	1
MP-6D	03	2	X								2	X			9/17	10:00																			1	1
RW-3	04	2	X								2	X			9/17	10:00																			1	1
RW-5	05	2	X								2	X			9/17	10:00																			1	1

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES TO RTL
9/21/93

Lab Use Only Lot #
ON ICE AT 3°C 9/21/93
Storage Location:
Work Order # C3090487-GTEL

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	9/21/93	4:30	Received by: C3090488-RTL
Relinquished by:			Received by:
Relinquished by:	9/22/93	0917	Received by Laboratory:

Waybill #

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0679

October 22, 1993

RECEIVED
OCT 25 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Rd.
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 9/30/93, under chain of custody record 52742.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0679

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	RW-3	RW-5	MW-5	MP-5D
				Date Sampled	09/22/93	09/22/93	09/22/93	09/22/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/11/93	48	58	19	120

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0679

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	101193MET		
				Sample Identification	MP-6D	METHOD BLANK		
				Date Sampled	09/22/93	--		
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/11/93	37	<1		

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52742

Company Name: GROUNDWATER TECH
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS RD. Schenectady 12303
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
Sampler Name (Print): BRIAN CAREY

I attest that the proper field sampling procedures were used during the collection of these samples.

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC - GTEL	COD - RTL
RW-3	01	2	2								2	X			9-22	9:00																		1	1
RW-5	02	2	2								2	X			9-22	9:00																		1	1
MW-5	03	2	2								2	X			9-22	9:00																		1	1
MP-5D	04	2	2								2	X			9-22	9:00																		1	1
MP-6D	05	2	2								2	X			9-22	9:00																		1	1
																																		679	680

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES AT 4°C

Lab Use Only Lot # C3090679 GTEL-C3090679
Storage Location:
Work Order # C3090665 - RTL-C3090680

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	9-29-93	6:00 PM	Received by:
Relinquished by:			Received by:
Relinquished by:	9/30/93	10:00	Received by Laboratory: Ronda C. Jenson 9/30/93 10:00

Waybill #

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0682

October 22, 1993

OCT 25 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 09/30/93, under chain of custody record 52743.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0682

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	RW-1	RW-3	RW-5	MW-5
				Date Sampled	09/29/93	09/29/93	09/29/93	09/29/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/11/93	100	52	100	29

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-09-0682

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	06	07	101193
				Sample Identification	MW-5 DUP	MP-5D	MP-6D	METHOD BLANK
				Date Sampled	09/29/93	09/29/93	09/29/93	--
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 9060	10/11/93	41	21	44	<1

Note: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, Rev. O, U.S. EPA, November, 1986.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROCK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

52743

Company Name: GROUNDWATER TECH
Phone #: 518 370 5631
FAX #: 518 370 5864
Company Address: 1245 KINGS RD
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only) BTEL #	RTL #	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC 682-GTEL	COD 683-RTL
RW-1	01	01	2	2								2	X			9-29	12:00																		1	1
RW-1 DUP		02-RTL	1	1								1	X			9-29	12:00																			1
RW-3	02	03	2	2								2	X			9-29	12:00																		1	1
RW-5	03	04	2	2								2	X			9-29	12:00																		1	1
MW-5	04	05	2	2								2	X			9-29	12:00																		1	1
MW-5 DUP	05	~~06~~ BTEL	1	1								1	X			9-29	12:00																		1	1
MP-5D	06	~~07~~ 06	2	2								2	X			9-29	12:00																		1	
MP-6D	07	~~08~~ 07	2	2								2	X			9-29	12:00																		1	1
		10-1-93 RW																																		

10/11/93 QA

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
$ ANALYZE WATER PORTION SAMPLES AT 5°C ONLY

Lab Use Only Lot # Storage Location:

Work Order # C3090682-GTEL (TOC)
C3090683-RTL (COD)

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: Brian Carey	9-29-93	7:00PM
Relinquished by:		
Relinquished by:	9/30/93	10:00

Received by:
Received by:
Received by Laboratory: Ronald C. Jensen 9/30/93 10:00
Waybill #

Rev. 7/91

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-10-0348

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	MW-5	MP-5D	MP-6D	RW-3
				Date Sampled	10/06/93	10/06/93	10/06/93	10/06/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 451.1	10/20/93	38	75	42	420

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

52751

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 45 KINGS ROAD SCHENECTADY NY
Site location: BUFFALO NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC GTEL	COD RTL
MW-5	01	2	2								2	2			10/6	10:00																			1	1
MP-5D	02	2	2								2	2			10/6	10:00																			1	1
MP-6D	03	2	2								2	2			10/6	10:00																			1	1
RW-3	04	2	2								2	2			10/6	10:00																			1	1
RW-5	05	2	2								2	2			10/6	10:00																			1	1

TAT
- ☐ rity (24 hr)
- ☐ edited (48 hr)
- ☐ usiness Days
- er ____
- ☐ iness Days

Special Handling
- GTEL Contact ____
- Quote/Contract # ____
- Confirmation # ____
- PO # ____

QA / QC LEVEL
☐ JE ☐ CLP OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
RTL
GTEL
FAX ☐

REMARKS
10/12/93

Lab Use Only Lot # C3100347
C3100348
Work Order #
Storage Location: DR 2/1

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	10/12/93	17:00	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	10/13/93	10:00	Waybill # Airborne Express

7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northwest Region
4080 Pike Lane
Suite C
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
FAX (510) 825-0720

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-10-0387

October 29, 1993

RECEIVED
NOV - 3 1993

Bruce Aherns
Groundwater Technology, Inc.
1245 Kings Rd.
Schenectady, NY 13212

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 10/15/93, under chain of custody record 52754.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-10-0387

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	MW5	MP5D	MP6D	RW-3
				Date Sampled	10/14/93	10/14/93	10/14/93	10/14/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1	10/26/93	180	120	82	150

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

Note: Samples were received at 10°C

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-10-0387

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	102593		
				Sample Identification	RW-5	METHOD BLANK		
				Date Sampled	10/14/93	--		
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1	10/26/93	53	<1		

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

Note: Samples were received at 10°C

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52754

Company Name: GROUNDWATER TECH
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 125 KINGS RD SCHENECTADY NY
Site location: BUFFALO NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 60530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 6010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC - GTEL ✓	COD - RTL
MW5	01	2	2								2	X			10-14	16:00																		1	1
MP-5D	02	2	2								2	X			10-14	16:00																		1	1
MP-6D	03	2	2								2	X			10/14	16:00																		1	1
RW-3	04	2	2								2	X			10-14	16:00																		1	1
RW-5	05	2	2								2	X			10-14	16:00																		1	1

10/17/93

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS ON ICE AT 10°C

Lab Use Only Lot # Storage Location: DR 2/2

Work Order # C3100387-GTEL

Received by: C3100388-RTL

CUSTODY RECORD

	Date	Time
Relinquished by Sampler:	10/14/93	18:00
Relinquished by:		
Relinquished by:	10/15/93	0940

Received by:

Received by Laboratory:

Waybill #

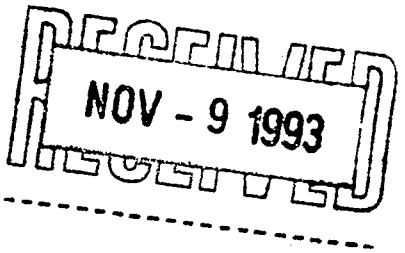
rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-10-0447

November 6, 1993



Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Road
Schenectady, NY 12301

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 10/23/93, under chain of custody record 52758.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Eileen F. Bullen
Laboratory Director

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52758

Company Name: GROUNDWATER TECH
Phone #: 518- 370 -5631
FAX #: 518- 370 -5864
Company Address: 1245 KINGS RD SCHENECTADY NY
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS (NAME)
Client Project ID: (#) 00530-0109 OSMOSE
Sampler Name (Print): BRIAN CAREY

I attest that the proper field sampling procedures were used during the collection of these samples.

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC	COD
MW5	01 ✓	2	2								2	X			10-22	9:00	✓																				1	1
MP-6D	02 ✓	2	2								2	X			10-22	9:00																					1	1
RW-3	03 ✓	2	2								2	X			10-22	9:00																					1	1
RW-5	04 ✓	2	2								2	X			10-22	9:00																					1	1

Kylene 11/1/93

TAT
- Priority (24 hr) ☐
- Expedited (48 hr) ☐
- 7 Business Days ☐
- Other ____
- Business Days ☐

Special Handling
- GTEL Contact ____
- Quote/Contract # ____
- Confirmation # ____
- PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
RECEIVED AT 3°C
SEAL INTACT

Lab Use Only Lot #
RTL: C3100479
GTEL: C3100447
Storage Location: DR 1/3 Green
Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	10-22-93	3:00PM	Received by:
Relinquished by:			Received by:
Relinquished by:	10/24/93 23	10:00 am	Received by Laboratory: Ronald C. Jensen

Waybill #

Rev. 7/91

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: OSMOSE
Buffalo, NY
Work Order Number: C3-11-0009

RECEIVED
NOV 17 1993

November 16, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Rd.
Schenectady, NY 12203

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 10/30/93, under chain of custody record 2712.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,
GTEL Environmental Laboratories, Inc.

Ron Martinez

SVOA Manager for
Eileen F. Bullen
Laboratory Director

Client Number: 005300109
Project ID: OSMOSE
Buffalo, NY
Work Order Number: C3-11-0009

ANALYTICAL RESULTS

Matrix: Air

				Sample Number	01	03	04	05
				Sample Identification	RW-1	RW-3	RW-5	MW-5
				Date Sampled	10/29/93	10/29/93	10/29/93	10/29/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1	11/01/93	260	560	88	81

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: OSMOSE
Buffalo, NY
Work Order Number: C3-11-0009

ANALYTICAL RESULTS

Matrix: Air

				Sample Number	06	07	08	110193
				Sample Identification	MW-5 DUP	MP-5D	MP-6D	METHOD BLANK
				Date Sampled	10/29/93	10/29/93	10/29/93	--
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1		170	190	44	<1

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX: (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

NO. S 2712

Company Name: GROUNDWATER TECH Phone #: 518-370-5631
Address: 1215 KINGS RD Project Manager: BRUCE AHRENS
Project ID: OSMOSE Site Location: (City, State)
Project Number: 00530-0109 BUFFALO, NY
DUNS #: N/A SUN Env. Eng.: N/A
Release/Work Order #: N/A

I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

ANALYSIS REQUEST

	Field Sample ID	DEPTH TO GROUNDWATER	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME
01	RW-1		6661	2	2	01						2	X			10-29	12:00
02	RW-1 DUPLICATE		6662	1	1	02						1	X			10-29	12:00
03	RW-3		6663	2	2	03						2	X			10-29	12:00
04	RW-5		6664	2	2	04						2	X			10-29	12:00
05	MW-5		6665	2	2	05						2	X			10-29	12:00
06	MW-5 DUPLICATE		6666	1	1	06						1	X			10-29	12:00
07	MP-5D		6667	2	2	07						2	X			10-29	12:00
08	MP-6D		6668	2	2	08						2	X			10-29	12:00

OTHER: TOC, COD RTL

BTEX 602 ☐ 8020 ☐ with MTBE ☐ | BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐ | Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐ | Hydrocarbon Profile (SIMDIS) ☐ | Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐ | TPH/IR 418.1 ☐ SM 503 ☐ | EDB by 504 ☐ DBCP by 504 ☐ | EPA 503.1 ☐ EPA 502.2 ☐ | EPA 601 ☐ EPA 8010 ☐ | EPA 602 ☐ EPA 8020 ☐ | EPA 608 ☐ 8080 ☐ PCB only ☐ | EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐ | EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐ | EPA 610 ☐ 8310 ☐ | EP TOX Metals ☐ Pesticides ☐ Herbicides ☐ | TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐ | EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐ | CAM Metals TTLC ☐ STLC ☐ | Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐ | Organo Lead ☐ | Corrosivity ☐ Flash Point ☐ Reactivity ☐

COD
BA
COD
Due 11/16
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact 800-79-089
Quote/Contract #
Confirmation #
P.O. #

QA/QC Level
Blue ☐ CLP ☐ Other ☐ _____

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
SUN REPORT FORMAT (602/BTEX)
FAX ☐

REMARKS: ON ICE AT 5°C
C311000 9 GTEL

Lab Use Only Lot #: Storage Location DR 1/2
Work Order #: C311000 4 RTL

CUSTODY RECORD

Relinquished by Sampler: Brian Carey	Date 10-29-93	Time 16:00	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date 10/30/93	Time 1000	Received by Laboratory: Way bill #

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

4080 Pike Lane
Concord, CA 94520
(510) 685-7852
(800) 544-3422 Inside CA
(800) 423-7143 Outside CA
(510) 825-0720 FAX

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-11-0265

RECEIVED
DEC - 2 1993

November 30, 1993

Bruce Ahrens
Groundwater Technology, Inc.
1245 Kings Rd.
Schenectady, NY 12303

Enclosed please find the analytical results for samples received by GTEL Environmental Laboratories, Inc. on 11/12/93, under chain of custody record 2715.

A formal Quality Assurance/Quality Control (QA/QC) program is maintained by GTEL, which is designed to meet or exceed the EPA requirements. Analytical work for this project met QA/QC criteria, unless otherwise stated in the footnotes.

GTEL is certified by the California State Department of Health Services, Laboratory certification number E1075, to perform analyses for drinking water, wastewater, and hazardous waste materials according to EPA protocols.

If you have any questions concerning this analysis or if we can be of further assistance, please call our Customer Service Representative.

Sincerely,

GTEL Environmental Laboratories, Inc.

Bill Svoboda
Project Manager
for
Eileen Bullen
Laboratory Director

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-11-0265

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	01	02	03	04
				Sample Identification	MW5	MP-5D	MP-6D	RW-3
				Date Sampled	11/11/93	11/11/93	11/11/93	11/11/93
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1	11/15/93	91	360	22	250

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

Note: Samples were received at 6°C.

GTEL ENVIRONMENTAL LABORATORIES, INC.

Client Number: 005300109
Project ID: Buffalo, NY
Work Order Number: C3-11-0265

ANALYTICAL RESULTS

Matrix: Water

				Sample Number	05	111593		
				Sample Identification	RW-5	METHOD BLANK		
				Date Sampled	11/11/93	--		
Test Description	Units	Detection Limit	Method	Date Analyzed	Test Result			
Total Organic Carbon	mg/L	1	EPA 415.1	11/15/93	410	<1		

Note: Test Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, March, 1983.

Note: Samples were received at 6°C.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX: (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

NO. S 2715

Company Name: GROUNDWATER TECH ✓ Phone #: 518-370-5631 ✓
Address: 1245 KINGS RD ✓ Project Manager: BRUCE AHRENS ✓
Project ID: OSMOSE ✓ Site Location: (City, State) BUFFALO, NY
Project Number: 00530-0109
DUNS #: N/A SUN Env. Eng.: N/A
Release/Work Order #: N/A

I attest that the proper field sampling procedures were used during the collection of these samples. Sampler Name (Print): BRIAN CAREY

Field Sample ID	DEPTH TO GROUNDWATER	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (Specify)	Sampling: DATE	TIME
MW5		01 ✓	2	2							2	X			11-11 ✓	10:00
MP-5D		02 ✓	2	2							2	X			11-11	10:00
MP-6D		03 ✓	2	2							2	X			11-11	10:00
RW-3		04 ✓	2	2							2	X			11-11	10:00
RW-5		05 ✓	2	2							2	X			11-11	10:00

ANALYSIS REQUEST

BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organo Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: TOC	COD
																				1	1
																				1	1
																				1	1
																				1	1
																				1	1

Jan Hahn 11/16/93

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____ Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # 800-79-089
Confirmation # ____
P.O. # ____

SPECIAL DETECTION LIMITS (Specify)

REMARKS: 6°C ✓

SPECIAL REPORTING REQUIREMENTS (Specify)
SUN REPORT FORMAT (602/BTEX)
FAX ☐

QA/QC Level
Blue ☐ CLP ☐ Other ☐ ____

Lab Use Only Lot #: Storage Location DR 2/)
Work Order #: C31/0265

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	11-11-93	14:00	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	11/12/93	11AM	Received by Laboratory: Way bill #

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose Wood	**Sampling Date:**	8/16/93
Project Number:	00530-0109	**Date Received:**	8/18/93
Site Location:	Buffalo, NY	**Date Completed:**	8/30/93
Project Manager:	Bruce Ahrens	**Report Date:**	8/31/93
Client Office:	GTI Schnectady, NY	**Login Number:**	C3080276
Matrix:	Water		

Lab No.	Sample ID	mg/L
6299	RW-1	180
6301	RW-1 (Duplicate)	150
6302	RW-3	200
6303	RW-5	150
6304	MD-5d	450
6305	MD-6d	3000
6306	MW-5 (Duplicate)	370

Results reported on a dry weight basis.

SEP - 8 19

Laurie A. Princiotto, Group Leader
Remediation Technology Laboratory

b:comptables2 osmose.cod

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST 52728

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS ROAD
Site location: 980 ELLICOTT ST BUFFALO NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	ANALYSIS REQUEST	OTHER: TOC	OTHER: COD RTL 50% DISCOUNT
RW-1	6299	2	2								2	X			8/16	1700		1	1
RW-1 DUPLICATE	6301	1	1								1	X			8/16	1700			1
RW-3	6302	2	2								2	X			8/16	1730		1	1
RW-5	6303	2	2								2	X			8/16	1800		1	1
MP-5d	6304	2	2								2	X			8/16	1830		1	1
MP-6d	6305	2	2								2	X			8/16	1830		1	1
MW-5	6306	2	2								2	X			8/16	1900		1	1
MW-5 DUPLICATE		1	1								1	X			8/16	1900		1	

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES TO RTL
SEE ROD

Lab Use Only Lot # ____ Storage Location: ____
Work Order # ____

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: [signature]	8-17-93	4:00PM	Received by:
Relinquished by:			Received by:
Relinquished by:	8/18/93	0900	Received by Laboratory: [signature]

Waybill # ____

rev 7/91

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

Chemical Oxygen Demand

(Re-issued)

Project Name:	Osmose	**Sampling Date:**	9/13/93
Client/Project:	00530-0109	**Date Received:**	9/14/93
Site Location:	Buffalo, NY	**Date Completed:**	9/16/93
Project Manager:	Bruce Ahrens	**Report Date:**	9/23/93
GTI Office:	Schenectady, NY	**Login Number:**	C3090287

Lab No.	Sample ID	mg/L Water
6374	MW-5	1,400
6375	MP-5D	4,500
6376	MP-6D	1,500
6377	RW-3	2,300
6378	RW-5	33,000

Laurie A. Princiotto, Group Leader
Remediation Technology Laboratory

b:comptables2 osmose4.cod

GTEL ENVIRONMENTAL LABORATORIES, INC.

[redacted] MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS RD SCHENECTADY NY
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME
MW-5	01	2	2								2	X			9/13	11:00
MP-5D	02	2	2								2	X			9/13	11:00
MP-6D	03	2	2								2	X			9/13	11:00
RW-3	04	2	2								2	X			9/13	11:00
RW-5	05	2	2								2	X			9/13	11:00

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC GTEL	COD RTL
																					1	1
																					1	1
																					1	1
																					1	1
																					1	1

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES TO RTL - ROD V.

Lab Use Only Lot # Storage Location
GTEL: C3090286
RTL: C3090287
Work Order #

CUSTODY RECORD

Relinquished by:	Date	Time	Received by:
Brian J Carey	9-14-93	10:00	
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by Laboratory:
	9/15/93	9:30am	L Prescott

Waybill #

ev. 7/91

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

Chemical Oxygen Demand

(Re-issued)

Project Name:	Osmose	Sampling Date:	9/17/93
Client/Project #:	00530-0109	Date Received:	9/22/93
Site Location:	Buffalo, NY	Date Completed:	9/28/93
Project Manager:	Bruce Ahrens	Report Date:	10/4/93
GTI Office:	Schenectady, NY	Login Number:	C3090488

Lab No.	Sample ID	mg/L
6404	MW-5	200
6405	MP-5D	350
6406	MP-6D	290
6407	RW-3	300
6408	RW-5	140

Laurie A. Princiotto, Group Leader
Remediation Technology Laboratory

b:comptables2 osmose1.cod

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

52732

Company Name: GROUNDWATER TECHNOLOGY
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS RD SCHENECTADY NY
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
Sampler Name (Print): BRIAN CAREY

I attest that the proper field sampling procedures were used during the collection of these samples.

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	TOC - 487	COD - 488
MW-5	01	2	2								2	X			9/17	10:00	1	1
MP-5D	02	2	2								2	X			9/17	10:00	1	1
MP-6D	03	2	2								2	X			9/17	10:00	1	1
RW-3	04	2	2								2	X			9/17	10:00	1	1
RW-5	05	2	2								2	X			9/17	10:00	1	1

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES TO RTL

Lab Use Only Lot #
ON ICE AT 3°C 9/22/93
Storage Location:
Work Order # C3090487-GTEL

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: BRIAN CAREY	9/21/93	4:30
Relinquished by:		
Relinquished by:	9/22/93	0917

Received by: C3090488-RTL
Received by:
Received by Laboratory:
Waybill #

Rev. 7/91

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

52742

Company Name: GROUND WATER TECH
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 1245 KINGS RD
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530 0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC - 6794-GTEL	COD - 6795-RTL
RW-3 6453	01	2	X								2	X			9-22	9:00																		1	1
RW-5 6454	02	2	X								2	X			9-22	9:00																		1	1
MW-5 6455	03	2	X								2	X			9-22	9:00																		1	1
MP-5D 6456	04	2	X								2	X			9-22	9:00																		1	1
MP-6D 6457	05	2	X								2	X			9-22	9:00																		1	1
																																		679	680

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
SAMPLES AT 4°C

Lab Use Only Lot # C3090679 GTEL-C3090679
Storage Location:
Work Order # C3090665-RTL-C3090680

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	9-29-93	6:00 PM	Received by:
Relinquished by:			Received by:
Relinquished by:	9/30/93	10:00	Received by Laboratory: Ronald C. Jenson 9/30/93 10:00

Waybill #

Rev. 7/91

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose Wood	**Sampling Date:**	9/29/93
Project Number:	00530-0109	**Date Received:**	9/30/93
Site Location:	Buffalo, NY	**Date Completed:**	10/18/93
Project Manager:	Bruce Ahrens	**Report Date:**	10/18/93
Client Office:	GTI Schnectady, NY	**Login Number:**	C3090683
Matrix:	Water		

Lab No.	Sample ID	mg/L
6458	RW-1	640
6458B	RW-1 DUP	620
6459	RW-3	210
6460	RW-5	6900
6461	MW-5	10,000
6462	MW-5 DUP	1300
6463	MP-5D	350
6464	MP-6D	8000

Laurie A. Princiotto, Group Leader
Remediation Technology Laboratory

b:comptables2 osmose3.cod

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

52743

Company Name: GROUNDWATER TECH
Phone #: 518 370 5631
FAX #: 518 370 5864
Company Address: 1245 KINGS RD
Site location: BUFFALO, NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only) GTEL	RTL	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	BTEX/602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organic Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	TOC 6082-GTEL	COD 6083-RTL
6458 RW-1	01	01	2	2								2	X			9-29	12:00																		1	1
6458B RW-1 DUP		02=RTL	1	1								1	X			9-29	12:00																			1
6459 RW-3	02	03	2	2								2	X			9-29	12:00																		1	1
6460 RW-5	03	04	2	2								2	X			9-29	12:00																		1	1
6461 MW-5	04	05	2	2								2	X			9-29	12:00																		1	1
6462 MW-5 DUP	05	~~06~~=GTEL	1	1								1	X			9-29	12:00																		1	
6463 MP-5D	06	~~07~~ 06	2	2								2	X			9-29	12:00																		1	1
6464 MP-6D	07	~~08~~ 07	2	2								2	X			9-29	12:00																		1	1
		10-1-93 RW																																	

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TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

SPECIAL DETECTION LIMITS

REMARKS
$ ANALYZE WATER PORTION
SAMPLES AT 5°C ONLY

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL REPORTING REQUIREMENTS
FAX ☐

Lab Use Only Lot # ____ Storage Location: ____

Work Order # C3090682-GTEL (TOC)

Received by: C3090683-RTL (COD)

CUSTODY RECORD

	Date	Time
Relinquished by Sampler: Brian Carey	9-29-93	7:00PM
Relinquished by:		
Relinquished by:	9/30/93	10:00

Received by:

Received by Laboratory: Ronald C. Jensen 9/30/93 10:00

Waybill #

E-Z-OUT®

Rev. 7/91

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose Wood	**Sampling Date:**	10/6/93
Project Number:	00530-0109	**Date Received:**	10/13/93
Site Location:	Buffalo, NY	**Date Completed:**	10/21/93
Project Manager:	Bruce Ahrens	**Report Date:**	10/27/93
Client Office:	GTI Schnectady, NY	**Login Number:**	C3100347
Matrix:	Water		

Lab No.	Sample ID	mg/L
6494	MW-5	890
6495	RP-5D	260
6496	RP-6D	120
6497	RW-3	7100
6498	RW-5	190

Rod T. Ventérea, Manager
Remediation Technology Laboratory

b:comptables2 osmose4.cod

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose	**Sampling Date:**	10/14/93
Project Number:	005300109	**Date Received:**	10/15/93
Site Location:	Buffalo, NY	**Date Completed:**	10/29/93
Project Manager:	Bruce Ahrens	**Report Date:**	11/4/93
Client Office:	Schenectady, NY	**Login Number:**	C3100388
Matrix:	Water		

Lab No.	Sample ID	mg/L
6528	MW5	2500
6529	MP-5D	920
6530	MP-6D	400
6531	RW-3	580
6532	RW-5	1000

Rod T. Venterea, Manager
Remediation Technology Laboratory

b:comptables2 osmose6.cod

GROUNDWATER TECHNOLOGY, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC.

MEADOWBROOK INDUSTRIAL PARK
MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

52754

Company Name: GROUNDWATER TECH
Phone #: 518-370-5631
FAX #: 518-370-5864
Company Address: 125 KINGS RD SCHENECTADY NY
Site location: BUFFALO NY
Project Manager: BRUCE AHRENS
Client Project ID: (#) 00530-0109
(NAME) OSMOSE
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	TOC - GTEL	COD - RTL
MW5 6528	01	2	2								2	X			10-14	16:00	1	1
MP-5D 29	02	2	2								2	X			10-14	16:00	1	1
MP-6D 30	03	2	2								2	X			10-14	16:00	1	1
RW-3 31	04	2	2								2	X			10-14	16:00	1	1
RW-5 32	05	2	2								2	X			10-14	16:00	1	1

ANALYSIS REQUEST

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other ____
Business Days ☐

Special Handling
GTEL Contact ____
Quote/Contract # ____
Confirmation # ____
PO # ____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER ____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS ON ICE AT 10°C

Lab Use Only Lot #
Storage Location: DR 2/3
Work Order # C3100387-GTEL

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler:	10/14/93	18:00	Received by: C3100388-RTL
Relinquished by:			Received by:
Relinquished by:	10/15/93	0940	Received by Laboratory:

Waybill #

Rev. 7/91

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REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose	**Sampling Date:**	10/22/93
Project Number:	005300109	**Date Received:**	10/23/93
Site Location:	Buffalo, NY	**Date Completed:**	10/29/93
Project Manager:	Bruce Ahrens	**Report Date:**	11/9/93
Client Office:	Schenectady, NY	**Login Number:**	C3100479
Matrix:	Water		

Lab No.	Sample ID	mg/L
6553	MW5	1900
6554	MP-6D	5500
6555	RW-3	8700
6556	RW-5	2000

RECEIVED
NOV 15 1993

Rod T. Venterea
Remediation Technology Laboratory

b:comptables2.osmose7.cod

GTEL ENVIRONMENTAL LABORATORIES, INC.

MILFORD, NH 03055
(603) 672-4835
(800) LAB-GTEL

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

52758

Company Name: GROUNDWATER TECH
Phone #: 518- 370 -5631
FAX #: 518- 370 -5864

Company Address: 1245 KINGS RD SCHENECTADY NY
Site location: BUFFALO, NY

Project Manager: BRUCE AHRENS (NAME)
Client Project ID: (#) 00530-0109 OSMOSE

I attest that the proper field sampling procedures were used during the collection of these samples.
Sample Name (Print): BRIAN CAREY

Field Sample ID	GTEL Lab # (Lab use only)	# Containers	Matrix: WATER	SOIL	AIR	SLUDGE	PRODUCT	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	UNPRESERVED	OTHER (SPECIFY)	Sampling: DATE	TIME	TOC	COD
MW5	01	2	2								2	X			10-22	9:00	1	1
MP-6D	02	2	2								2	X			10-22	9:00	1	1
RW-3	03	2	2								2	X			10-22	9:00	1	1
RW-5	04	2	2								2	X			10-22	9:00	1	1

BTEX/602 ☐ 8020 ☐ with MTBE ☐
BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐
Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐
Hydrocarbon Profile (SIMDIS) ☐
Oil and Grease 413.1 ☐ 413.2 ☐ SM 503 ☐
TPH/IR 418.1 ☐ SM 503 ☐
EDB by 504 ☐ DBCP by 504 ☐
EPA 503.1 ☐ EPA 502.2 ☐
EPA 601 ☐ EPA 8010 ☐
EPA 602 ☐ EPA 8020 ☐
EPA 608 ☐ 8080 ☐ PCB only ☐
EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐
EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐
EPA 610 ☐ 8310 ☐
EP TOX Metals ☐ Pesticides ☐ Herbicides ☐
TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐
EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐
CAM Metals TTLC ☐ STLC ☐
Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐
Organic Lead ☐
Corrosivity ☐ Flash Point ☐ Reactivity ☐

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____
Business Days ☐

Special Handling
GTEL Contact _____
Quote/Contract # _____
Confirmation # _____
PO # _____

QA / QC LEVEL
BLUE ☐ CLP ☐ OTHER _____

SPECIAL DETECTION LIMITS

SPECIAL REPORTING REQUIREMENTS
FAX ☐

REMARKS
RECEIVED AT 3°C
SEAL INTACT

Lab Use Only Lot #
RTL: C3100479
GTEL: C3100447
Storage Location: DR 113 Green
Work Order #

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler:	10-22-93	3:00PM	Received by:
Relinquished by:			Received by:
Relinquished by:	10/24/93 23	10:00 am	Received by Laboratory: Ronald C. Jensen

Waybill #

Rev. 7/91

CUSTOMER SURVEY / Remediation Technology Laboratory (RTL)

This questionnaire is designed to help us evaluate our performance and identify areas where we can improve our delivery of services. We would greatly appreciate your time in offering your responses to this inquiry. Please do not hesitate to call the RTL in Concord, CA (510-685-7852) if you would like to discuss any of your comments, or have any questions about our services.

SECTION I. Please rate this section by circling a number (1 - 5).

1-Excellent 2-Good 3-Average 4-Below Average 5-Poor

COMMUNICATION		Comments (if any)
Questions were answered to your satisfaction.	1 2 3 4 5	
Technical assistance available to help in solving your problem(s).	1 2 3 4 5	
Requests for service or help were responded to in a timely fashion.	1 2 3 4 5	
DATA QUALITY		
Data was useful or applicable to your needs.	1 2 3 4 5	
Reports were easy to read and understand.	1 2 3 4 5	
Lab procedures were well explained.	1 2 3 4 5	
SCHEDULE AND BUDGET		
Information was delivered within the requested schedule.	1 2 3 4 5	
Invoicing was clear and accurate.	1 2 3 4 5	
Costs were appropriate for value of information obtained.	1 2 3 4 5	

SECTION II. Please offer your responses to the following questions.

1. How can we improve our services to better assist you in evaluating and implementing remediation technologies?

2. List any tests or procedures that are presently not available which you would find valuable:

3. What aspects of our overall performance did you find most positive and helpful?

4. Would you recommend the RTL to colleagues involved in remediation work?

Providing your name is optional. However, we would welcome the opportunity to discuss your comments with you.

Name: _____ Title: _____

GTI Office: _____ Date: _____

Thank you for your cooperation. After completing form, fold in half, staple and forward through regular or interoffice mail.

FOM2/QUESTION.LAB

RECEIVED
NOV 24 1993

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose	Sampling Date:	10/29/93
Project Number:	005300109	Date Received:	10/30/93
Site Location:	Buffalo, NY	Date Completed:	11/03/93
Project Manager:	Bruce Ahrens	Report Date:	11/17/93
Client Office:	Schenectady, NY	Login Number:	C3110004
Matrix:	Water		

Lab No.	Sample ID	mg/L
6661	RW-1	660
6662	RW-1 DUP	600
6663	RW-3	9900
6664	RW-5	2000
6665	MW-5	1900
6667	MP-5D	580
6668	MP-6D	240

Rod T. Venterea, Manager
Remediation Technology Laboratory

b:comptables2 osmose8.cod

GROUNDWATER TECHNOLOGY, INC.

GTEL ENVIRONMENTAL LABORATORIES, INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX: (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

NO. S 2712

Company Name: GROUNDWATER TECH Phone #: 518-370-5631
Address: 1245 KINGS RD Project Manager: BRUCE AHRENS
Project ID: OSMOSE Site Location: (City, State)
Project Number: 00530-0109 BUFFALO, NY
DUNS #: N/A SUN Env. Eng.: N/A
Release/Work Order #: N/A

I attest that the proper field sampling procedures were used during the collection of these samples. Sampler Name (Print): BRIAN CAREY

ANALYSIS REQUEST

Field Sample ID	Depth to Groundwater	GTEL Lab # (Lab use only)	# Containers	Matrix: Water	Soil	Air	Sludge	Product	Method Preserved: HCl	HNO_3	H_2SO_4	Ice	Unpreserved	Other (Specify)	Sampling: Date	Time
RW-1		6661	2	2							2	X			10-29	12:00
RW-1 DUPLICATE		6662	1	1							1	X			10-29	12:00
RW-3		6663	2	2							2	X			10-29	12:00
RW-5		6664	2	2							2	X			10-29	12:00
MW-5		6665	2	2							2	X			10-29	12:00
MW-5 DUPLICATE		6666	1	1							1	X			10-29	12:00
MP-5D		6667	2	2							2	X			10-29	12:00
MP-6D		6668	2	2							2	X			10-29	12:00

BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organo Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: TOC	OTHER: COD RTL
																					1	1
																					1	1
																					1	1
																					1	1
																					1	1
																					1	
																					1	1
																					1	1

COD RA
Done 11/16

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____ Business Days ☐

Special Handling
GTEL Contact
Quote/Contract # 800-79-089
Confirmation #
P.O. #

QA/QC Level
Blue ☐ CLP ☐ Other ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
SUN REPORT FORMAT (602/BTEX)
FAX ☐

REMARKS: ON ICE AT 5°C

Lab Use Only Lot #: Storage Location DR1/2
Work Order #: C310004 RTL

CUSTODY RECORD

	Date	Time	
Relinquished by Sampler: Brian Carey	10-29-93	16:00	Received by:
Relinquished by:	Date	Time	Received by:
Relinquished by:	Date 10/30/93	Time 1000	Received by Laboratory: Way bill: #

RECEIVED
DEC - 7 1993

REMEDIATION TECHNOLOGY LABORATORY

4080 Pike Lane Concord, CA 94520 510-685-7852

CHEMICAL OXYGEN DEMAND

Project Name:	Osmose	**Sampling Date:**	11/11/93
Project Number:	005300109	**Date Received:**	11/12/93
Site Location:	Buffalo, NY	**Date Completed:**	11/24/93
Project Manager:	Bruce Ahrens	**Report Date:**	11/30/93
Client Office:	Schenectady, NY	**Login Number:**	C3110277
Matrix:	Water		

Lab No.	Sample ID	mg/L
6713	MW5	360
6714	MP-5D	730
6715	MP-6D	30
6716	RW-3	3000
6717	RW-5	2500

Rod T. Venterea, Manager
Remediation Technology Laboratory

b:comptables2 osmose9.cod

GROUNDWATER TECHNOLOGY, INC.

CUSTOMER SURVEY / Remediation Technology Laboratory (RTL)

This questionnaire is designed to help us evaluate our performance and identify areas where we can improve our delivery of services. We would greatly appreciate your time in offering your responses to this inquiry. Please do not hesitate to call the RTL in Concord, CA (510-685-7852) if you would like to discuss any of your comments, or have any questions about our services.

SECTION I. Please rate this section by circling a number (1 - 5).

1-Excellent 2-Good 3-Average 4-Below Average 5-Poor

COMMUNICATION		Comments (if any)
Questions were answered to your satisfaction.	1 2 3 4 5	
Technical assistance available to help in solving your problem(s).	1 2 3 4 5	
Requests for service or help were responded to in a timely fashion.	1 2 3 4 5	
DATA QUALITY		
Data was useful or applicable to your needs.	1 2 3 4 5	
Reports were easy to read and understand.	1 2 3 4 5	
Lab procedures were well explained.	1 2 3 4 5	
SCHEDULE AND BUDGET		
Information was delivered within the requested schedule.	1 2 3 4 5	
Invoicing was clear and accurate.	1 2 3 4 5	
Costs were appropriate for value of information obtained.	1 2 3 4 5	

SECTION II. Please offer your responses to the following questions.

1. How can we improve our services to better assist you in evaluating and implementing remediation technologies?

2. List any tests or procedures that are presently not available which you would find valuable:

3. What aspects of our overall performance did you find most positive and helpful?

4. Would you recommend the RTL to colleagues involved in remediation work?

Providing your name is optional. However, we would welcome the opportunity to discuss your comments with you.

Name: _____ Title: _____

GTI Office: _____ Date: _____

Thank you for your cooperation. After completing form, fold in half, staple and forward through regular or interoffice mail.

FOM2/QUESTION.LAB

GTEL ENVIRONMENTAL LABORATORIES, INC.

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835 / FAX: (603) 673-8105

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

NO. S 2715

Company Name: GROUNDWATER TECH. Phone #: 518-370-5631
Address: 1245 KINGS RD Project Manager: BRUCE AHRENS
Project ID: OSMOSE Site Location: (City, State)
Project Number: 00530-0109 BUFFALO, NY
DUNS #: N/A SUN Env. Eng.: N/A
Release/Work Order #: N/A
I attest that the proper field sampling procedures were used during the collection of these samples. Sampler Name (Print): BRIAN CAREY

Field Sample ID	Depth to Groundwater	GTEL Lab # (Lab use only)	# Containers	Matrix: Water	Soil	Air	Sludge	Product	Method Preserved: HCl	HNO_3	H_2SO_4	Ice	Unpreserved	Other (Specify)	Sampling: Date	Time
MW5	6.48	01	2	2		67	13				2	X			11-11	10:00
MP-5D	14.02		2	2			14				2	X			11-11	10:00
MP-6D	15.03		2	2			15				2	X			11-11	10:00
RW-3	16.04		2	2			16				2	X			11-11	10:00
RW-5	17.05		2	2			17				2	X			11-11	10:00

ANALYSIS REQUEST

BTEX 602 ☐ 8020 ☐ with MTBE ☐	BTEX/Gas Hydrocarbons PID/FID ☐ with MTBE ☐	Hydrocarbons GC/FID Gas ☐ Diesel ☐ Screen ☐	Hydrocarbon Profile (SIMDIS) ☐	Oil and Grease 413.1 ☐ 413.2 ☐ SM-503 ☐	TPH/IR 418.1 ☐ SM 503 ☐	EDB by 504 ☐ DBCP by 504 ☐	EPA 503.1 ☐ EPA 502.2 ☐	EPA 601 ☐ EPA 8010 ☐	EPA 602 ☐ EPA 8020 ☐	EPA 608 ☐ 8080 ☐ PCB only ☐	EPA 624/PPL ☐ 8240/TAL ☐ NBS (+15) ☐	EPA 625/PPL ☐ 8270/TAL ☐ NBS (+25) ☐	EPA 610 ☐ 8310 ☐	EP TOX Metals ☐ Pesticides ☐ Herbicides ☐	TCLP Metals ☐ VOA ☐ Semi-VOA ☐ Pest ☐ Herb ☐	EPA Metals - Priority Pollutant ☐ TAL ☐ RCRA ☐	CAM Metals TTLC ☐ STLC ☐	Lead 239.2 ☐ 200.7 ☐ 7420 ☐ 7421 ☐ 6010 ☐	Organo Lead ☐	Corrosivity ☐ Flash Point ☐ Reactivity ☐	OTHER: TOC, COD
				a																	1 X
																					1 1
																					1 1
																					1 1
				b																	1 1

TAT
Priority (24 hr) ☐
Expedited (48 hr) ☐
7 Business Days ☐
Other _____ Business Days ☐

Special Handling
GTEL Contact
Quote/Contract # 800-79-089
Confirmation #
P.O. #

QA/QC Level
Blue ☐ CLP ☐ Other ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
SUN REPORT FORMAT (602/BTEX)
FAX ☐

REMARKS: 6°C C3110277

Lab Use Only Lot #: Storage Location DR 2/)
Work Order #: C3110265

CUSTODY RECORD

	Date	Time
Relinquished by Sampler:	11-11-93	14:00
Relinquished by:		
Relinquished by:	11/12/93	11AM

Received by:
Received by:
Received by Laboratory:
Way bill #

Tab G

GROUNDWATER GAUGING DATA
Area 2 Treatability Study

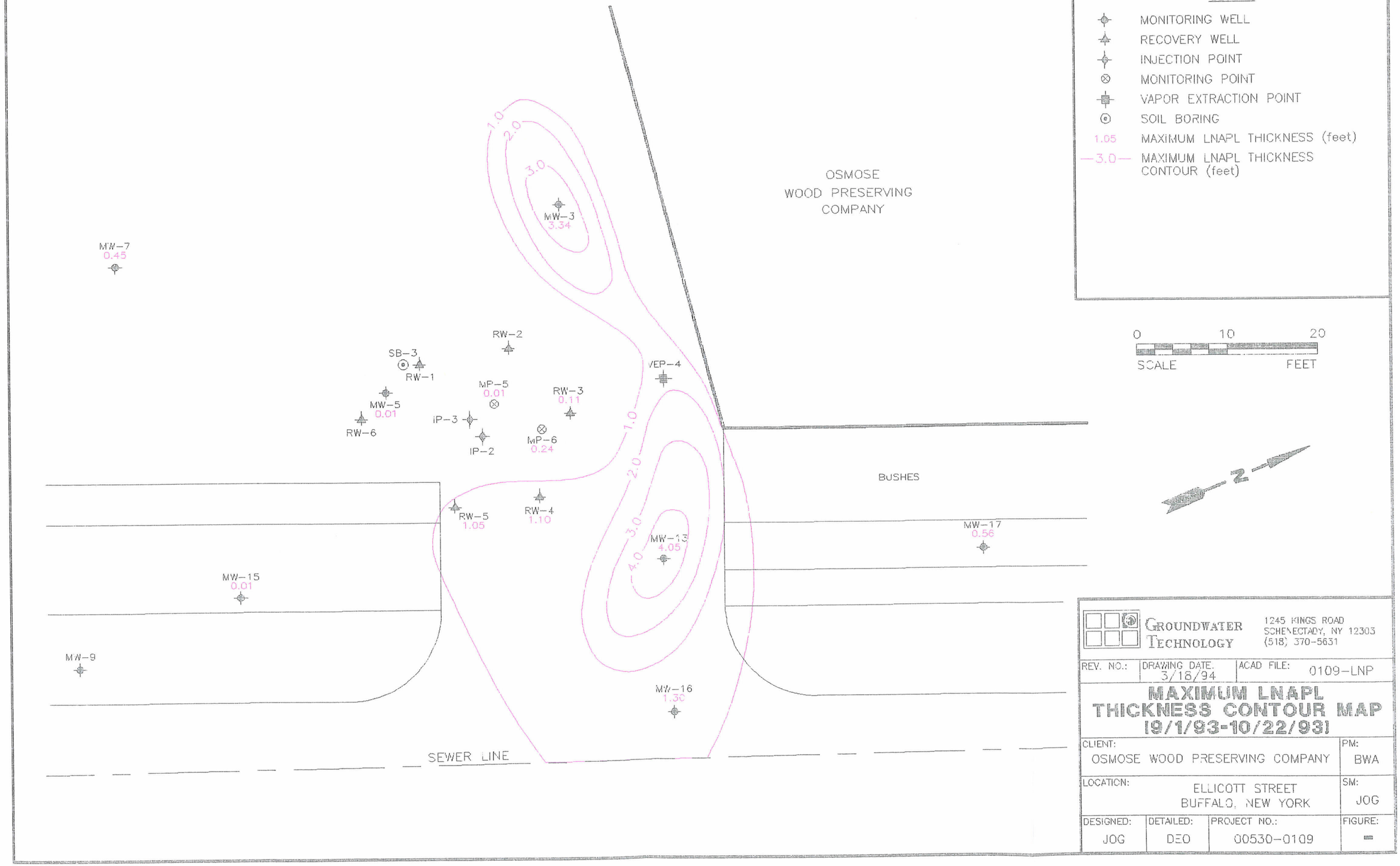
WELL ID:	MW-3		MW-5		MW-7		MW-13		MW-15		MW-16		MW-17		MP-5d		MP-6d		RW-3		RW-4		RW-5	
DATE	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW	DTP	DTW
01-Sep-93	10.48	10.57		16.33	13.11	13.13	9.26	11.29		9.66	8.65	9.05	8.63	8.82		11.14	10.96	11.20				11.00		12.00
07-Sep-93	9.87	10.54		11.90	10.56	10.77	8.62	12.29		9.45	8.32	9.37	8.40	8.80		11.17	10.16	10.35				10.13		11.25
22-Sep-93	9.87	12.00		10.77	11.67	11.83	8.85	12.90	9.31	9.32	8.47	9.30	8.45	8.87	12.52	12.53		10.32	9.49	9.50	10.25	10.96	9.50	9.80
29-Sep-93	8.92	11.55	10.01	10.02	10.82	11.12	8.04	9.87		8.63	7.90	8.71	8.10	8.37		9.70	9.69	9.72	8.79	8.90	7.90	7.92	8.36	8.40
06-Oct-93	9.09	11.05		10.17	10.40	10.68	8.11	9.55		8.72	7.77	8.22	7.80	8.11		11.05		9.59		7.54	7.60	8.55	8.38	9.38
14-Oct-93	9.30	12.00		10.44	10.05	10.50	8.45	9.93		8.95	8.10	9.40	8.17	8.73		11.23		9.90		8.83	8.00	9.10	8.50	9.55
22-Oct-93	8.15	11.49		9.45	9.59	9.99	7.41	8.70		8.17	7.25	7.30		7.59				8.60		8.90	7.25	8.20	7.60	8.35
29-Oct-93	7.63	8.62		12.80	9.09	9.32	7.86	7.93		7.51	6.83	7.33		7.42		7.64		7.54	7.73	8.63	7.60	8.07	7.66	7.88
11-Nov-93	7.13	9.03		7.62	7.69	7.71	6.48	7.90		7.32	6.67	7.62	6.94	7.22		7.14		7.02	7.23	8.25	7.18	7.87	7.23	7.82
Averages (9/1 - 10/22)	9.38	11.31	10.01	11.30	10.89	11.15	8.39	10.65	9.31	8.99	8.07	8.76	8.26	8.47	12.52	11.14	10.27	9.95	9.14	8.73	8.20	9.41	8.47	9.82

LNAPL THICKNESSES

	MW-3	MW-5	MW-7	MW-13	MW-15	MW-16	MW-17	MP-5d	MP-6d	RW-3	RW-4	RW-5
01-Sep-93	0.09	0.00	0.02	2.03	0.00	0.40	0.19	0.00	0.24		0.00	0.00
07-Sep-93	0.67	0.00	0.21	3.67	0.00	1.05	0.40	0.00	0.19		0.00	0.00
22-Sep-93	2.13	0.00	0.16	4.05	0.01	0.83	0.42	0.01	0.00	0.01	0.71	0.30
29-Sep-93	2.63	0.01	0.30	1.83	0.00	0.81	0.27	0.00	0.03	0.11	0.02	0.04
06-Oct-93	1.96	0.00	0.28	1.44	0.00	0.45	0.31	0.00	0.00	0.00	0.95	1.00
14-Oct-93	2.70	0.00	0.45	1.48	0.00	1.30	0.56	0.00	0.00	0.00	1.10	1.05
22-Oct-93	3.34	0.00	0.40	1.29	0.00	0.05	0.00		0.00	0.00	0.95	0.75
29-Oct-93	0.99	0.00	0.23	0.07	0.00	0.50	0.00	0.00	0.00	0.90	0.47	0.22
11-Nov-93	1.90	0.00	0.02	1.42	0.00	0.95	0.28	0.00	0.00	1.02	0.69	0.59
Average (9/1 - 10/22)	1.93	0.00	0.26	2.26	0.00	0.70	0.31	0.00	0.07	0.02	0.53	0.45

GROUNDWATER TECHNOLOGY

Tab H



GROUNDWATER TECHNOLOGY
1245 KINGS ROAD
SCHENECTADY, NY 12303
(518) 370-5631

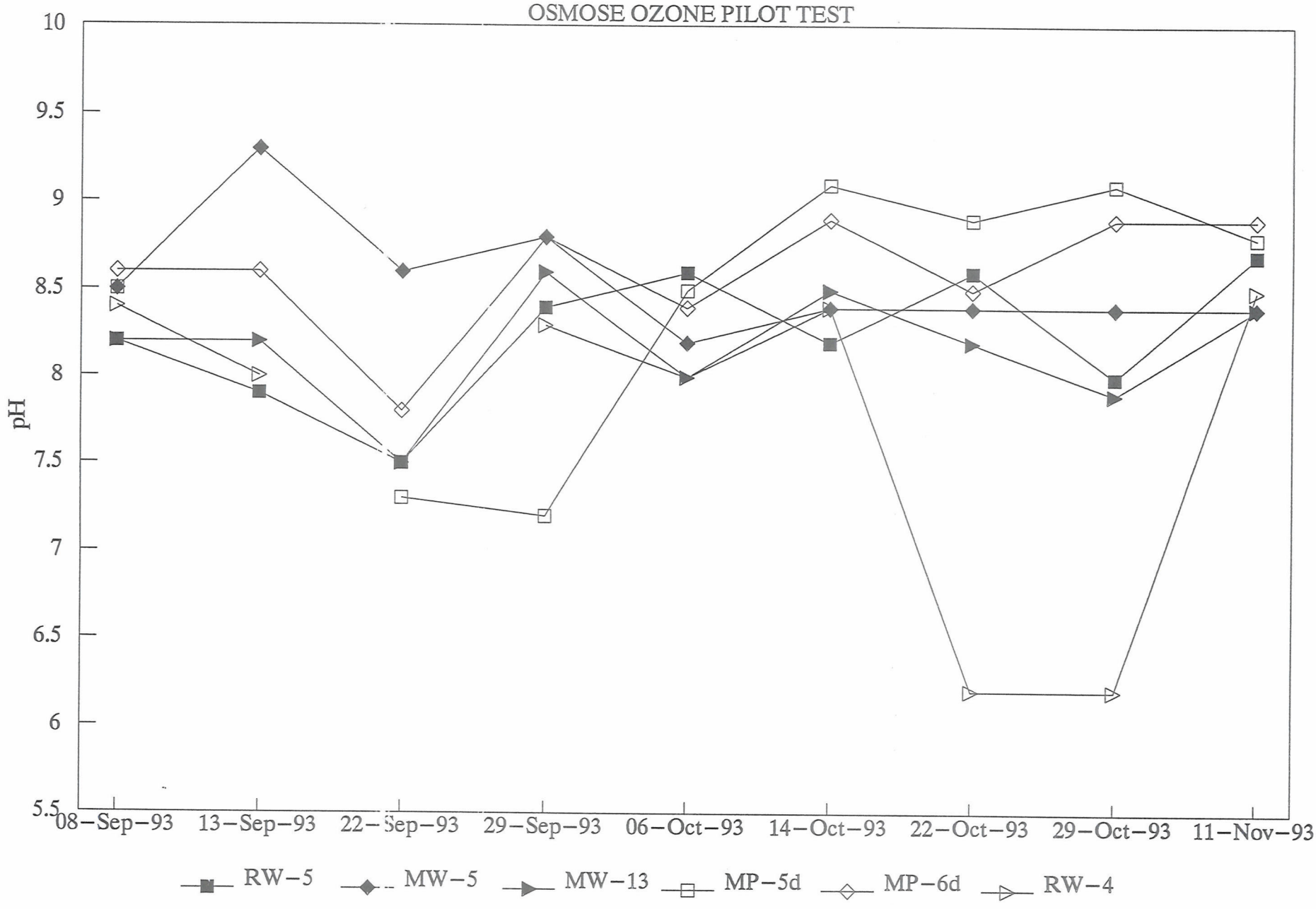
REV. NO.:	DRAWING DATE: 3/18/94	ACAD FILE: 0109-LNP

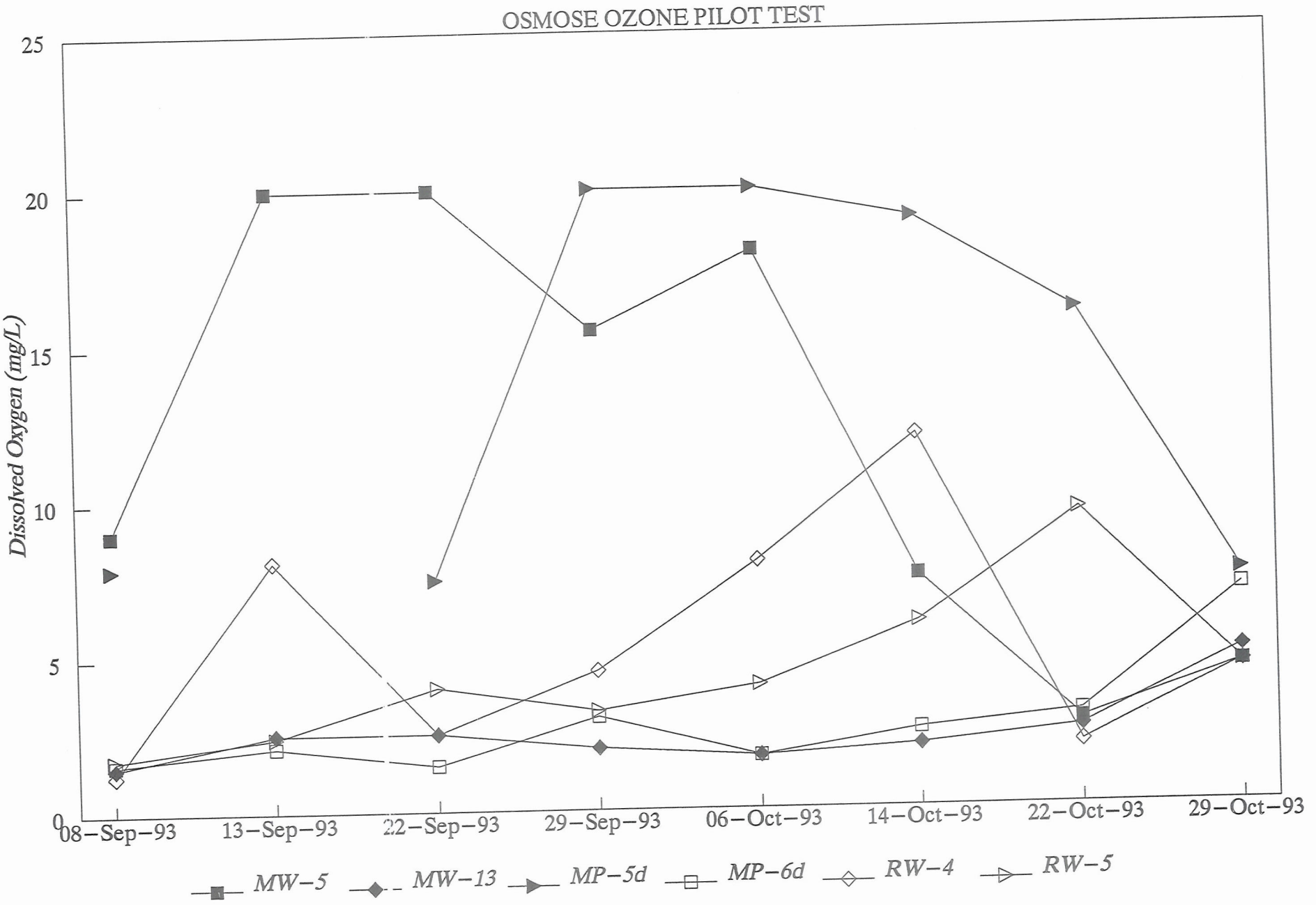
MAXIMUM LNAPL THICKNESS CONTOUR MAP (9/1/93-10/22/93)

CLIENT:	PM:
OSMOSE WOOD PRESERVING COMPANY	BWA
LOCATION: ELLICOTT STREET BUFFALO, NEW YORK	SM: JOG

DESIGNED:	DETAILED:	PROJECT NO.:	FIGURE:
JOG	DEO	00530-0109	—

Tab J

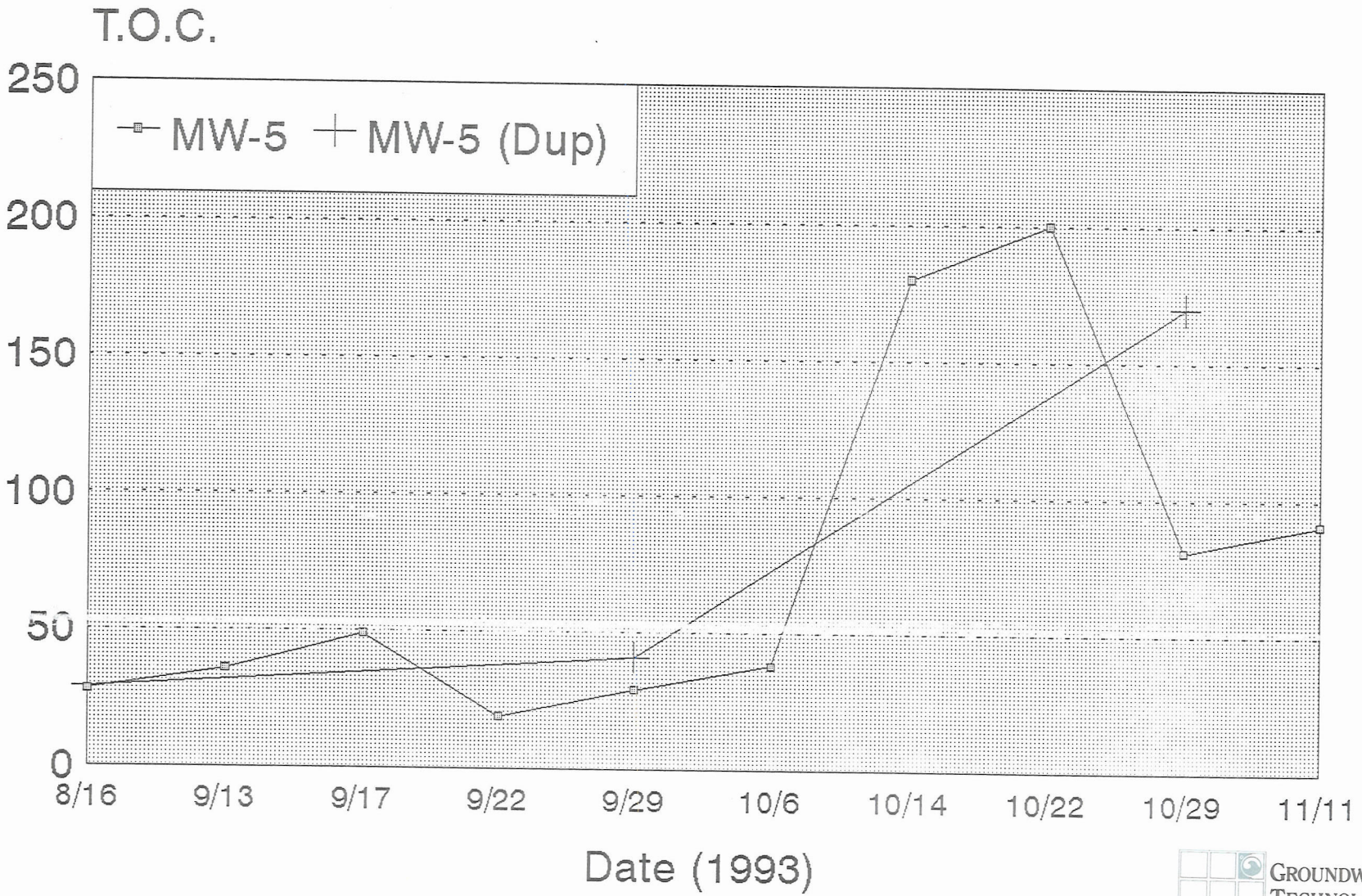

OSMOSE OZONE PILOT TEST
10
9.5
9
8.5
8
7.5
7
6.5
6
5.5
pH
08-Sep-93
13-Sep-93
22-Sep-93
29-Sep-93
06-Oct-93
14-Oct-93
22-Oct-93
29-Oct-93
11-Nov-93
RW-5
MW-5
MW-13
MP-5d
MP-6d
RW-4


OSMOSE OZONE PILOT TEST
Dissolved Oxygen (mg/L)
25
20
15
10
5
0
08-Sep-93
13-Sep-93
22-Sep-93
29-Sep-93
06-Oct-93
14-Oct-93
22-Oct-93
29-Oct-93
MW-5
MW-13
MP-5d
MP-6d
RW-4
RW-5

Tab K

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)
MW-5 & MW-5 (duplicate)

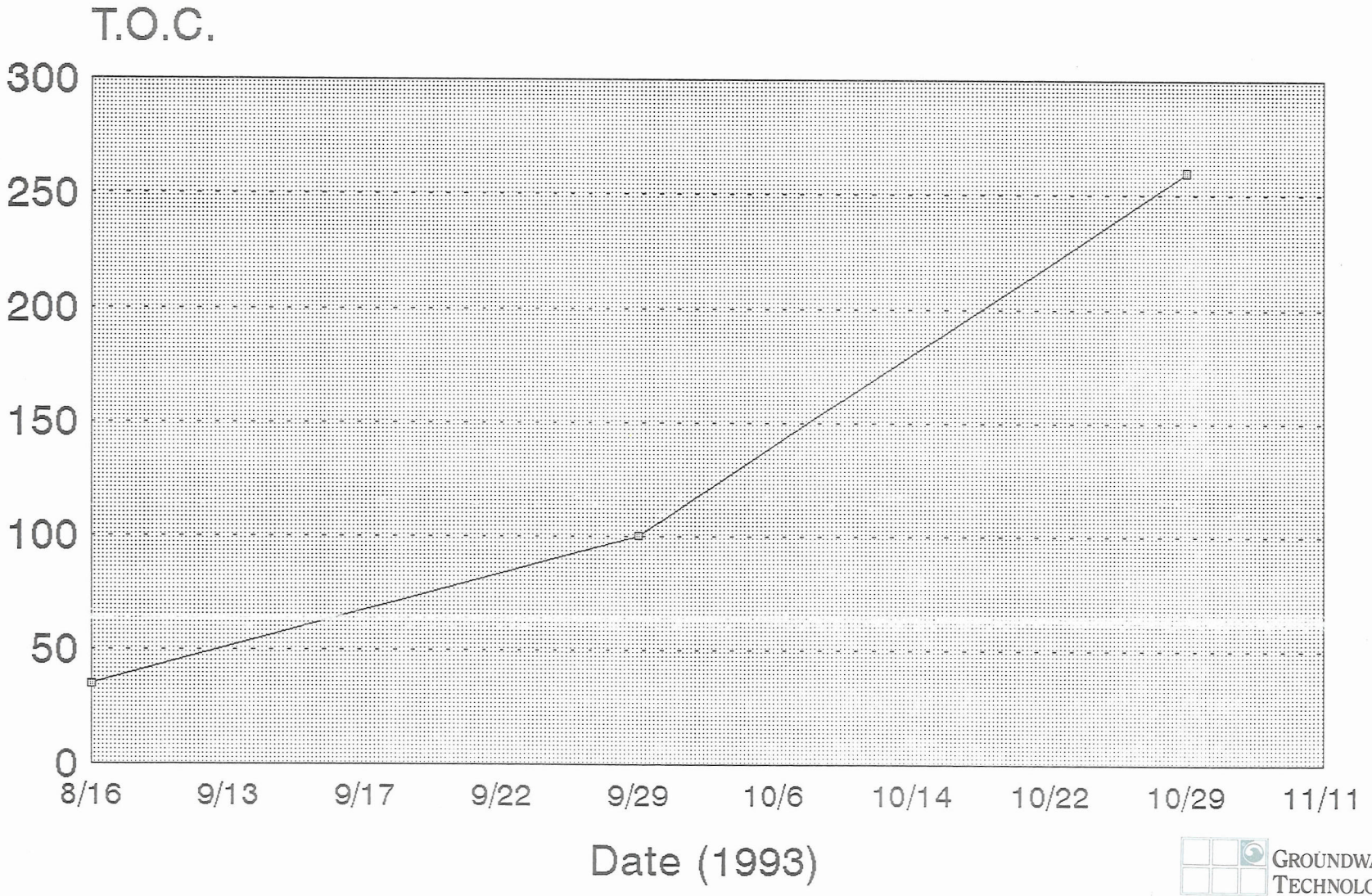


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)

RW-1

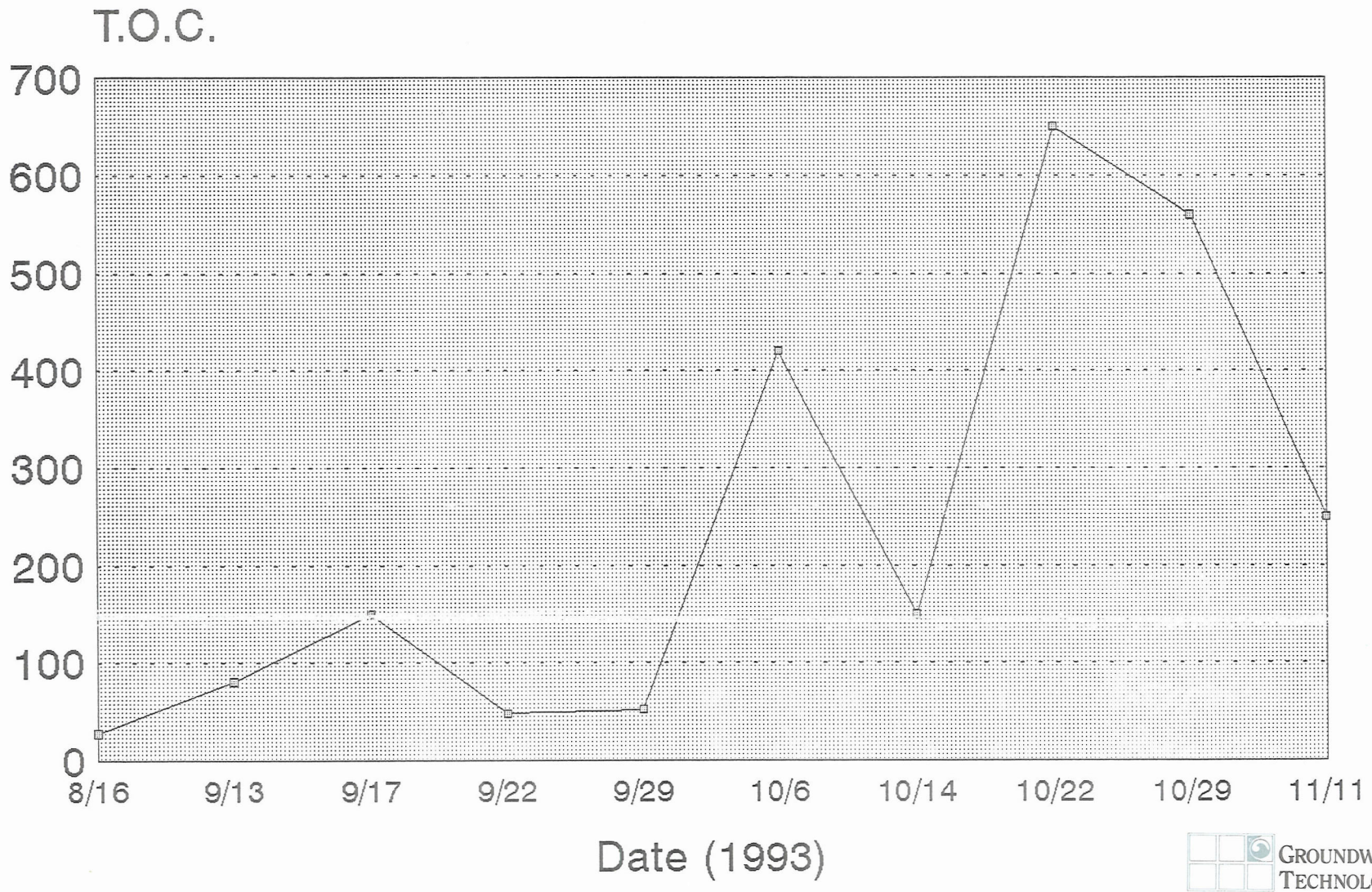


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)

RW-3

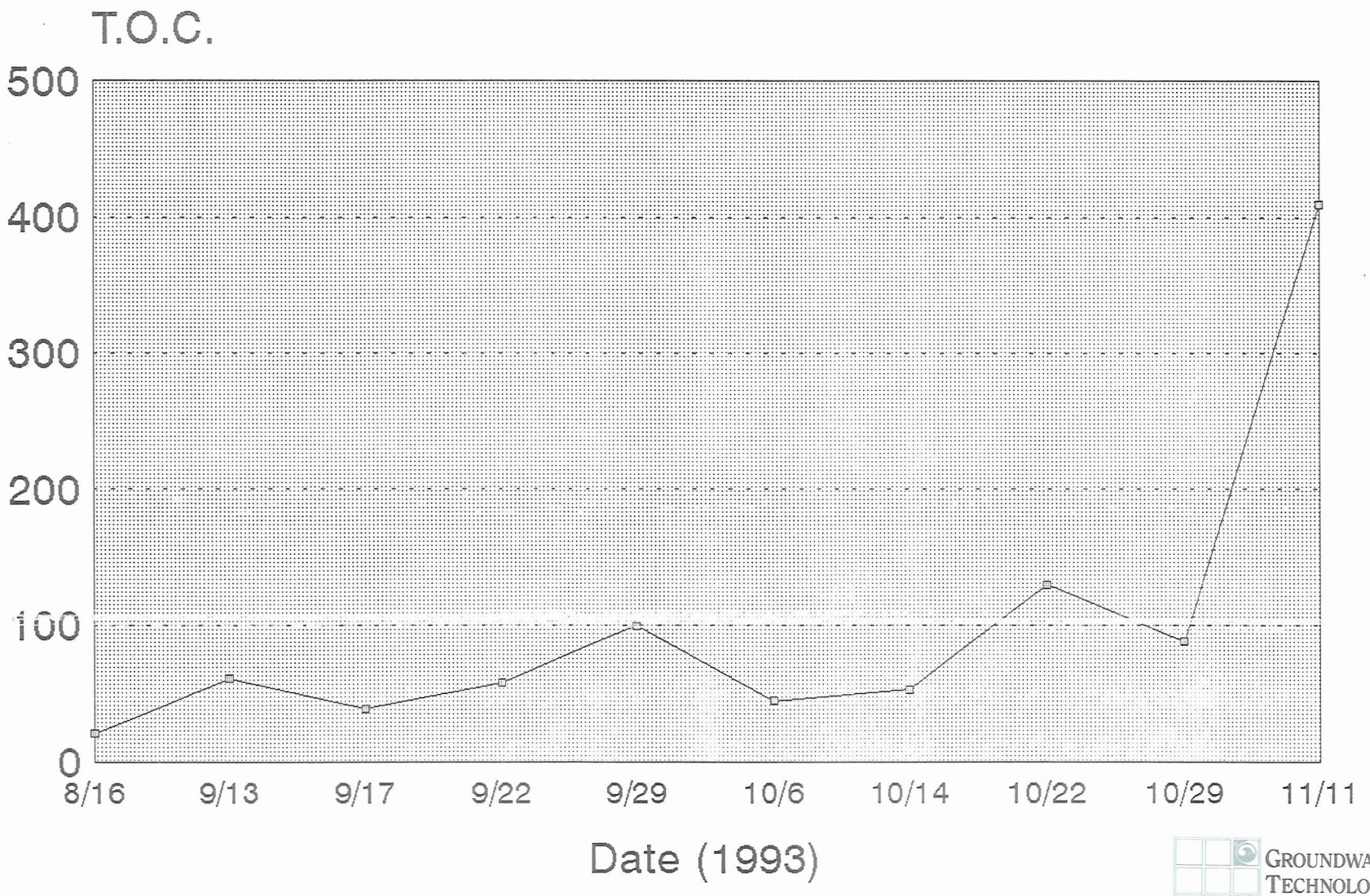


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)

RW-5

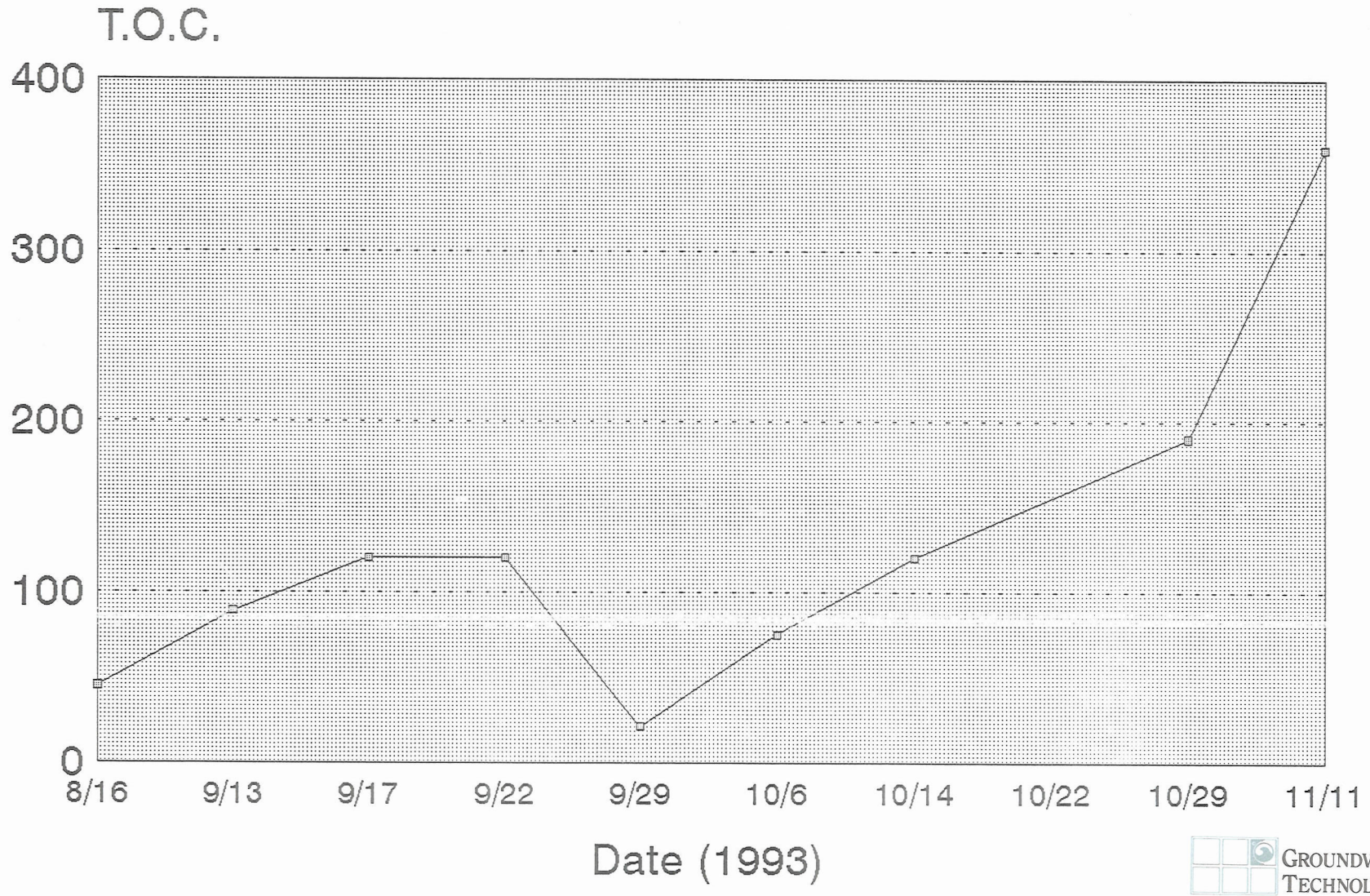


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)

MP-5d

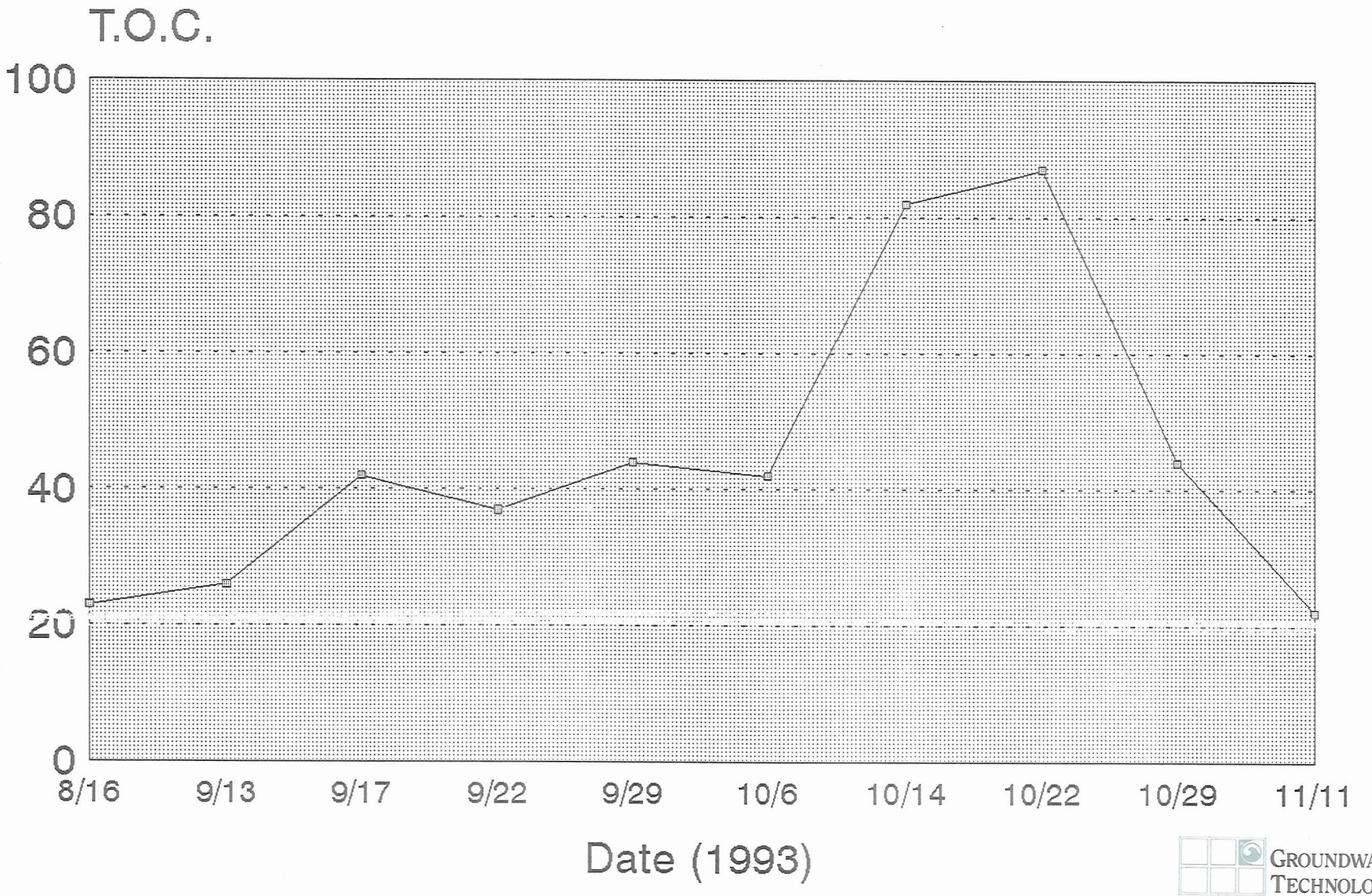


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Total Organic Carbon (mg/l)

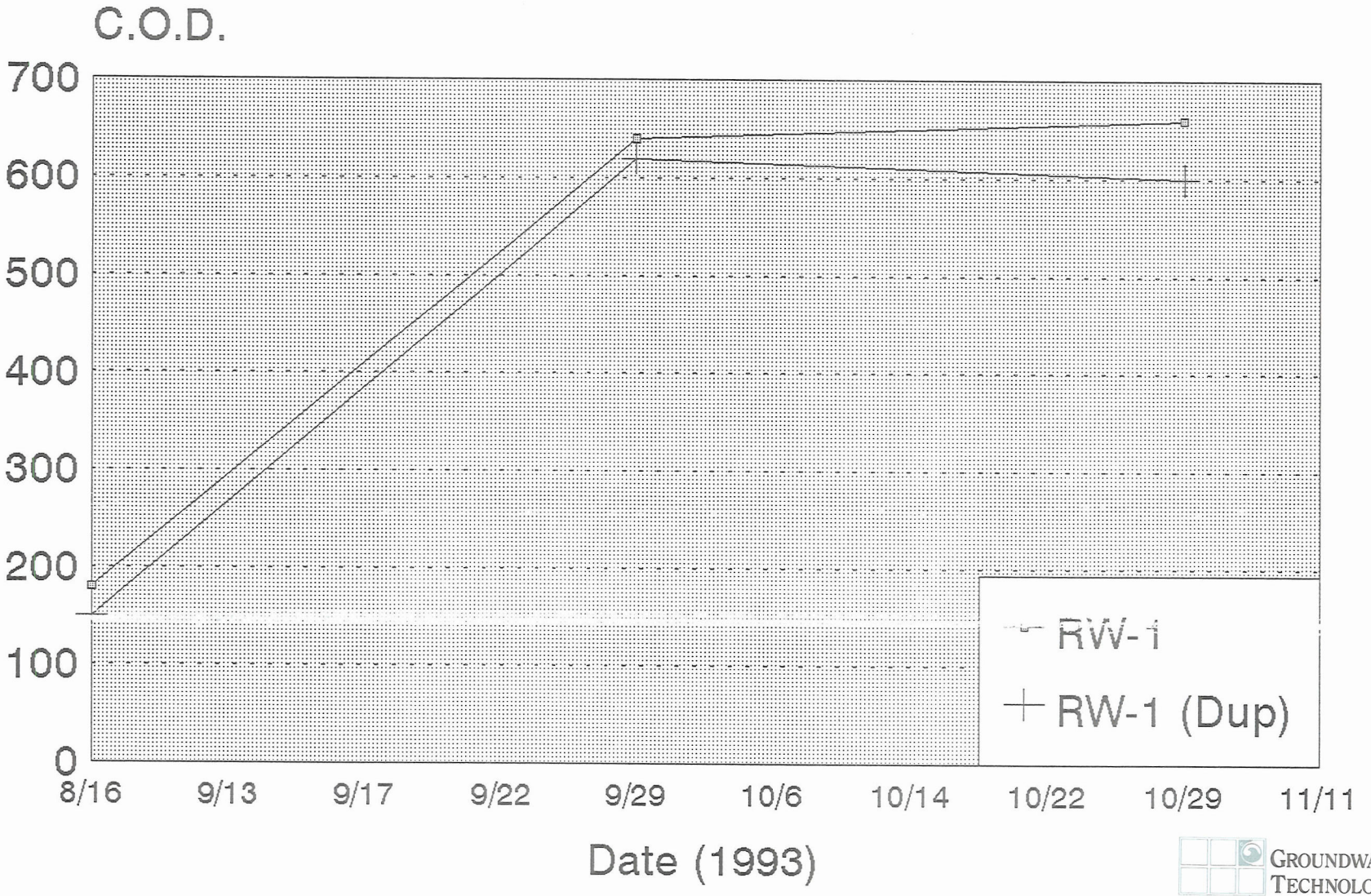
MP-6d



GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Chemical Oxygen Demand (mg/L)
RW-1 & RW-1 (duplicate)

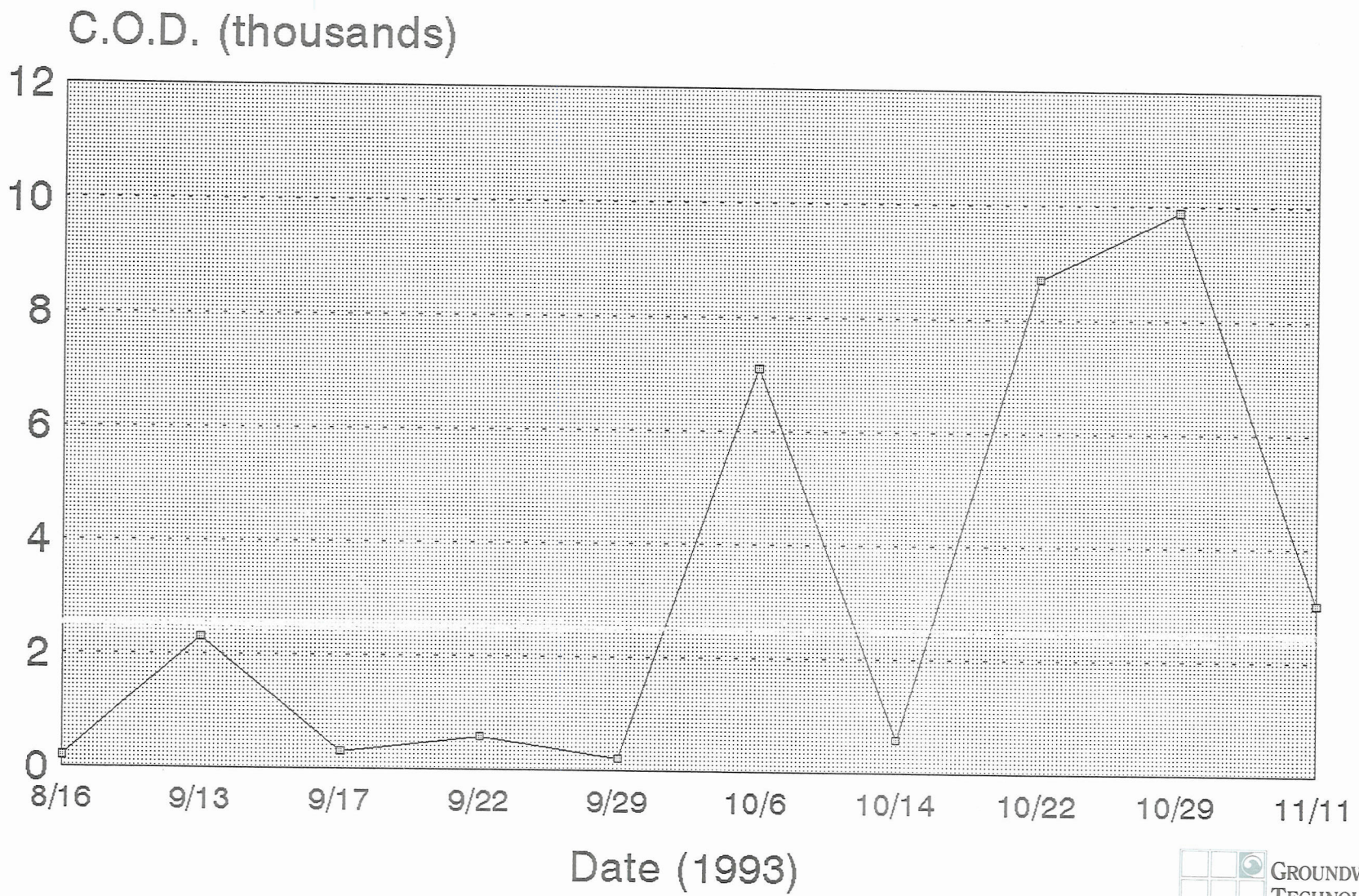


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Chemical Oxygen Demand (mg/L)

RW-3

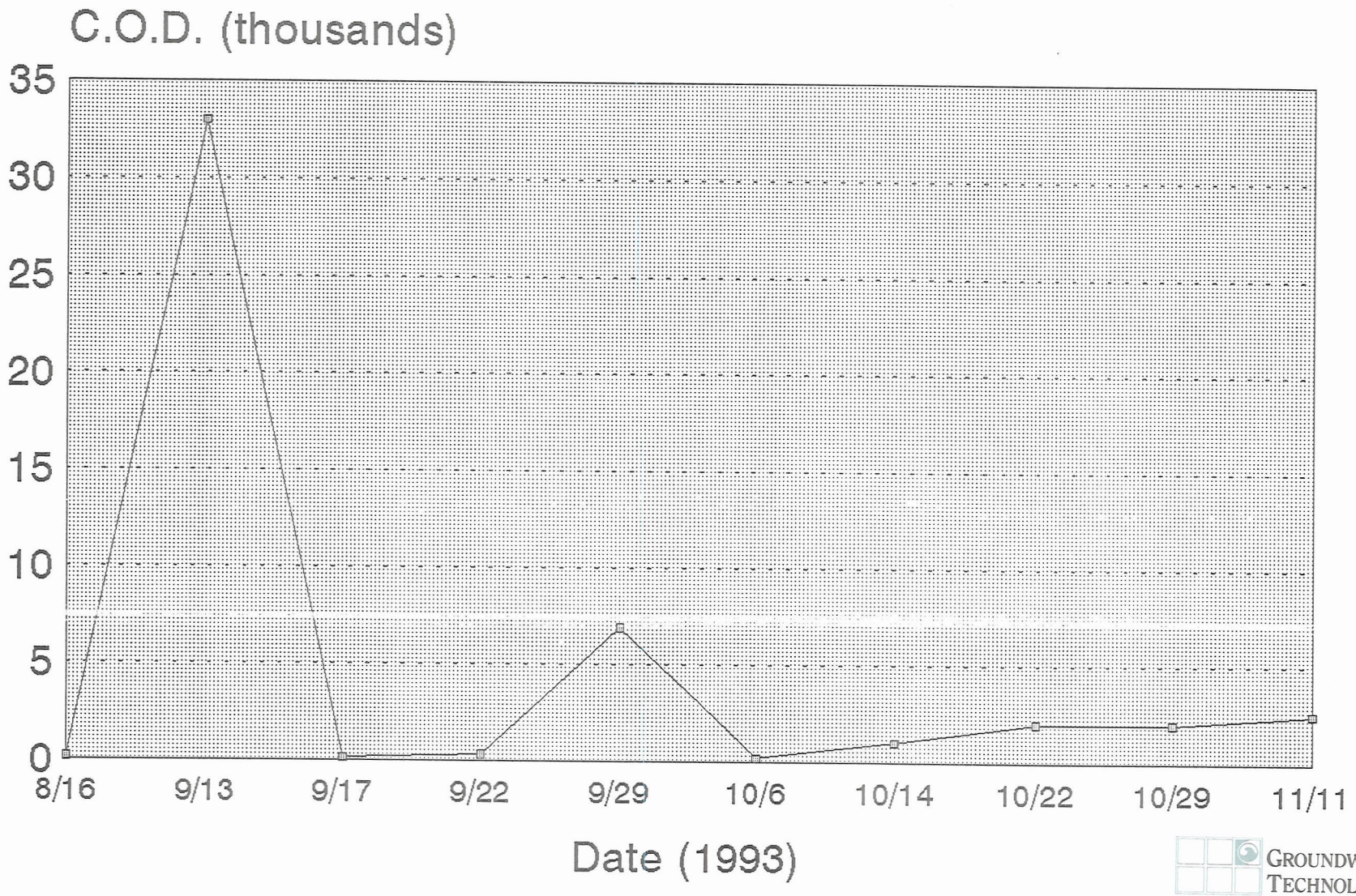


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Chemical Oxygen Demand (mg/L)

RW-5

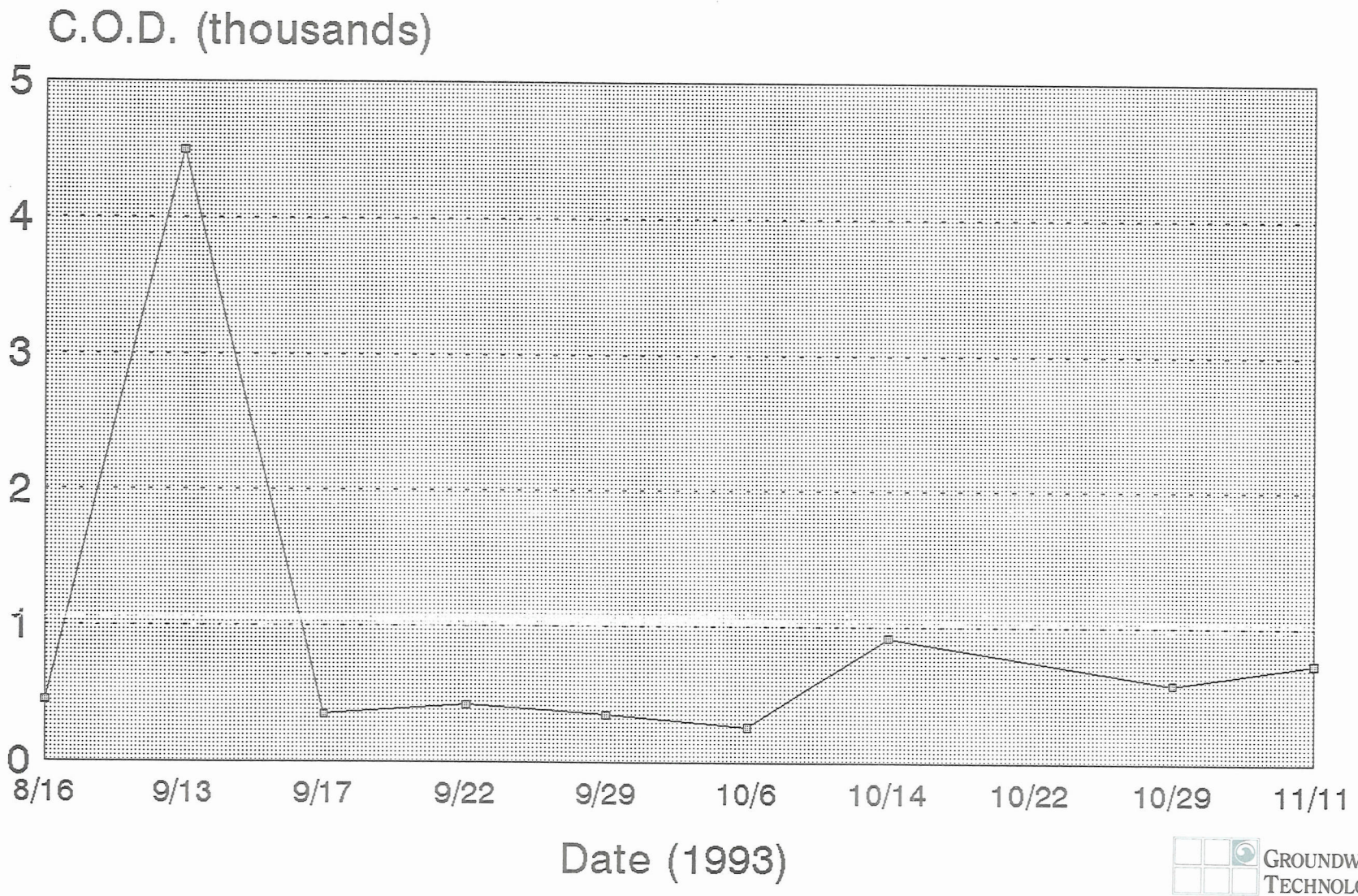


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Chemical Oxygen Demand (mg/L)

MP-5d

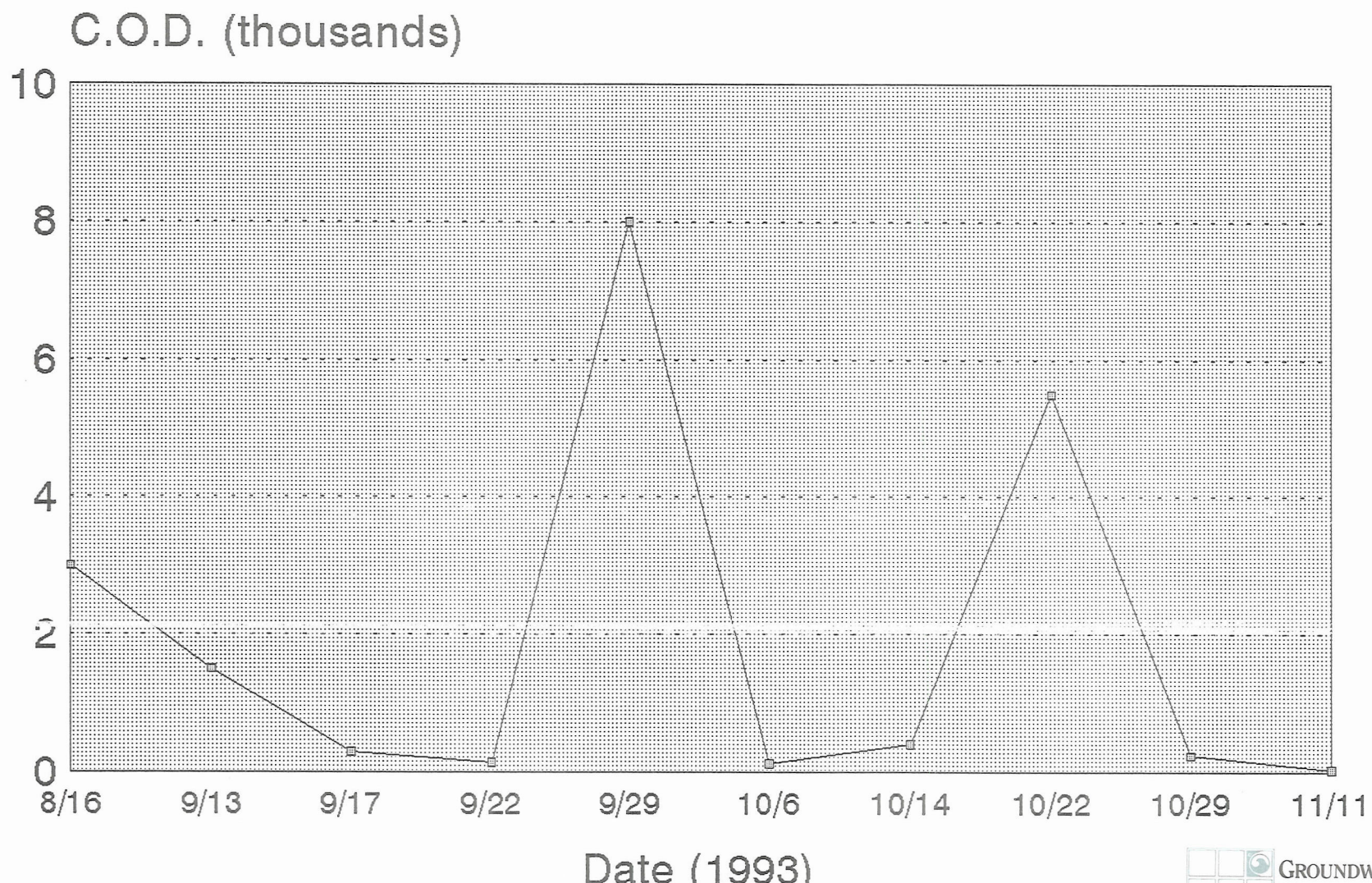


GROUNDWATER TECHNOLOGY

Osmose Ozone Pilot Test

Chemical Oxygen Demand (mg/L)

MP-6d



GROUNDWATER TECHNOLOGY