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Facility Investigation

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# Phase IIB
# Summary Report

**Columbia Manufacturing Company**
**Westfield, Massachusetts**

**March 1998**

O'BRIEN & GERE
ENGINEERS, INC.

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Facility Investigation

# Phase IIB Summary Report

*Columbia Manufacturing Company*
*Westfield, Massachusetts*

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Vice President

March 1998

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# 1. Introduction

## 1.1. Overview

This Phase IIB RCRA Facility Investigation (RFI) report presents the results of the Phase IIB investigations at the Columbia Manufacturing Company (Columbia) facility in Westfield, Massachusetts (the site). This component of the investigation was conducted as a supplement to the Phase IIA program completed by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) in January 1997 and was developed to address additional data requirements identified following completion of the Phase IIA work.

The Phase IIB Scope of Work (SOW) for the field component of the program was submitted to the United States Environmental Protection Agency (USEPA) on March 28, 1997. Conditional approval of the Phase IIB SOW was provided in a letter from USEPA dated June 17, 1997. Conditions specified in USEPA's June 17 letter were addressed and included in a revised Phase IIB SOW transmitted to USEPA on September 19, 1997.

Work completed during the Phase IIB field program was conducted in accordance with the procedures and protocols described in the "*Facility Investigation Project Operations Plan*" (POP) prepared by O'Brien & Gere dated May 1996. To maintain consistency with approved procedures and since activities for the Phase IIB portion of the program were similar in nature to work undertaken during the Phase IIA effort, the Phase IIA POP, which contains a Health and Safety Plan (HASP), Laboratory Quality Assurance Plan, and Standard Operating Procedures was used for the field component of the program.

A soil gas survey was proposed following completion of the ground water screening program in the northern portion of the site as described in section 2.2.7 of the Phase IIB SOW. Proposed procedures for this effort were described in a letter to USEPA on October 6, 1997. The Agency's comments for these procedures were discussed at a meeting with USEPA on October 14,

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1997. The Agency's comments were then transmitted to O'Brien & (
October 22 and were addressed in a letter to USEPA dated October 23,

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# 2. Phase IIB field activities summary

Field sampling activities in support of the Phase IIB RCRA program were initiated with the ground water screening program on September 23, 1997 and were completed on November 19, 1997 following monitoring well sampling efforts. Environmental sample collection, handling , and documentation was performed in accordance with procedures described in the POP developed prior to implementation of the Phase IIA program as noted in section 1.1 of this report. Minor modifications were made during implementation of Phase IIB activities due to conditions encountered in the field and are described in the appropriate sections throughout this report.

## 2.1. Ground water screening program

Twenty-one point ground water screening program was completed at the site from September 23 to October 3, 1997 to further characterize ground water quality data not fully delineated during Phase IIA efforts. The data from the ground water screening program was then assessed to aid in the placement of soil gas sampling stations and additional ground water monitoring wells. This program was completed along the Northern portion of the site and in the residential area comprised by Cycle Street, Lozier Street, and Toledo Avenue as shown on Figure 1.

The ground water screening program included the collection of ground water samples from twenty-one screening points (GS-44 to GS-64) and two duplicate sample locations. Ground water samples at the twenty-one locations were collected with a KVA® water sampling kit following the advancement of temporary points into the saturated zone. Samples were collected in accordance with procedures described in Appendix D of the Phase IIA POP.

Ground water samples collected from the screening program were submitted to O'Brien & Gere Laboratories for analysis of halogenated volatile organic compounds (HVOCs) by EPA Method 8021. Laboratory results from this effort are discussed in Section 4 of this report. A laboratory data summary table for this program is provided in Appendix A.

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## 2.2. Private well sampling

During Phase IIA activities, a private well used for irrigation was identifi the Perkins property approximately 750 ft north of the site as shown by 1. This well was sampled during the Phase IIB program and analy HVOCs by EPA Method 8021. HVOCs were not detected and the re were transmitted to Dr. Perkins in a letter dated October 20, 1997. A the laboratory report and transmittal letter are presented in Appendix

## 2.3. Soil gas survey

A soil gas survey was initiated and completed within the study O'Brien & Gere on October 29, 1997 in accordance with proce submitted to USEPA on October 23, 1997. This seven point progr conducted to evaluate soil gas data near residential locations where ground water had exhibited the highest concentrations of site r constituents. Sampling locations were based on the ground water sc data and historical ground water quality data. The seven soil gas lc along with a replicate sample location, are shown on Figure 5 of this r USEPA's oversight contractor was on site to observe and docume activities.

Soil gas samples were collected by advancing a ⅞-inch steel shafted san system similar to the technique employed during the ground water program. The steel rods were advanced using a 20- pound hammer to corresponding to approximately two feet above the static water table ranged from six to nine feet below grade in the soil gas study area. point the assembly was fitted with a 1-foot installer attached to slotted aluminum shield point. The shield point was then approximately 6-inches further and the steel rods and installer slightly to allow the formation to collapse around the shield point. T point was connected to 3/16-inch Teflon® tubing prior to installation. the desired depth had been reached, the Teflon® tubing was connec sampling system at grade. Bread dough was used to seal the annul steel shaft and the tubing.

Following installation of the points and tubing, a hand pump wa evacuate approximately three times the volume of the annulus wl approximately 0.1 liters per foot of shaft. The soil gas was then a equilibrate for 5 to 7 minutes prior to sample collection. The sampli

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consisted of a six liter Summa canisters attached to a vacuum gauge and particulate filter. Soil gas samples were collected by slowly opening the fitting to the canister. The canister vacuum (28 to 30 inches Hg) provided the pressure differential necessary to draw soil gas from the area surrounding the slotted shield points. The samples were collected over a period of several minutes until a slight vacuum remained in the canisters. The canister vacuum was then noted at the laboratory to verify that the sample did not leak during shipment.

The initial and final vacuum of each canister was noted on the chain of custody included with the shipment of samples. Soil gas samples were analyzed by EPA Method TO-14 which is a GC/MS analyses by Air Toxics Ltd. of Folsom, California. The analyses targeted the primary constituents detected in ground water in the area. A copy of the laboratory report is presented in Appendix C.

## 2.4. Shallow soil sampling summary

A limited shallow soil sampling program was completed in the waste storage yard during Phase IIB activities. The purpose of this effort was to further characterize and delineate constituents in this suspected source area. Soil samples were collected from the same depths as during the Phase IIA program ( 0-2, 5-7, and 10-12 foot intervals) at MW-50I which was completed near the center of the waste storage yard as shown on Figure 1.

Soil samples were collected using conventional drilling techniques and a 2-inch split spoon sampler. Samples were submitted for HVOCs, metals, and polynuclear aromatic hydrocarbons (PAH) analysis. Laboratory results from this effort are presented in a data summary table in Appendix I.

Sampling and equipment decontamination procedures were performed in accordance with Appendix A of the Phase IIA POP. Drill cuttings from this effort were minimal due to the use of the drive and wash method and were spread around the borehole following completion.

## 2.5. Ground water monitoring well installations

A network of sixteen permanent ground water monitoring wells were installed within the study area during Phase IIB activities for subsequent ground water

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gauging and sampling efforts. Fifteen monitoring wells were distributed shallow, intermediate, and intermediate/deep zones to supplement the e: monitoring well array. One bedrock well was installed during this prog and is described in Section 2.4.4. Monitoring well drilling and insta" procedures were completed in a similar fashion to wells installed during IIA activities and adhered to protocols established in Appendices B and the Phase IIA POP. Boring logs from these efforts are provided in Ap D. Newly installed monitoring well locations are shown on Figure 1.

### 2.5.1. Shallow monitoring well installations

Of the thirteen newly installed monitoring wells, seven (MW-43S, MW- MW-45S, MW-46S, MW-47S, MW-48S, and MW-51S) were compl the shallow zone within the study area for the purpose of evaluating g water characteristics and quality. Additional shallow wells were install assess the extent of the northern plume into the residential area beyon Street and to assess the extent of the southern plume along South M Road.

Shallow monitoring wells were completed using conventional hollo auger drilling techniques. Drill cuttings generated from monitoring well M 51S were contained in a 55-gallon DOT drum due to elevated PID re and visual observations. This drum of cuttings along with drill cuttin two of the three product gauging wells described in Section 2.5.5, removed from the site under waste manifestation as described in Sect of this report.

The seven shallow monitoring wells were equipped with ten foot len 0.01 inch slotted screen and installed so that the screen interval brack water table. Seasonal variations in ground water fluctuations were revi from previous data in order to set the screened intervals at their opti depths.

### 2.5.2. Intermediate monitoring well installations

During implementation of Phase IIB drilling activities, three interme monitoring wells (MW-48I, MW-49I, and MW-50I) were installed wi study area to supplement the existing intermediate well network, to vertical migration of constituents, and to further delineate the down gra extent of the southern plume in the intermediate saturated zone.

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The three intermediate monitoring wells were set at 40 feet below grade (fbg) with a ten foot screened interval from 30-40 fbg. Monitoring well MW-48I was installed several hundred feet south of MW-22I, MW-49I was installed approximately 700 feet southeast of MW-26I and MW-50I was installed in the waste storage yard.

These wells were advanced by the drive and wash method utilizing 4-inch steel casing according to protocols developed in Appendix H of the Phase IIA POP. Drill cuttings generated from the three well installations were spread around each borehole at grade with the exception of a small amount of cuttings from MW-50I which exhibited elevated PID readings at the ground water interface. This material was contained in a 55 gallon drum temporarily stored in the waste storage yard and subsequently transported off-site as described in Section 2.9.

### 2.5.3. Intermediate/deep monitoring well installations

Two intermediate/deep monitoring wells were completed on-site during the Phase IIB drilling program. These two monitoring wells were installed for the purpose of evaluating ground water quality and the potential presence of constituents in the zone between the intermediate and deep wells within the two source areas.

The two intermediate/deep wells were completed at well nests in the MW-14 cluster (MW-14I/D) near the waste storage yard and the MW-24 cluster (MW-24I/D) between the facility and Cycle Street. The two wells were set at 55 fbg with a ten foot screened interval from 45-55 fbg. The two well clusters now have zones screened in the shallow, intermediate, intermediate/deep, and deep intervals allowing for water quality evaluations from the initial saturated zone at approximately 8 feet down to 70 fbg while also allowing for an assessment of the vertical ground water concentration profile from these two source areas on-site.

Monitoring wells MW-14/D and MW-24I/D were advanced by the drive and wash method utilizing 4-inch steel casing in accordance with procedures and protocols developed in Appendix H of the Phase IIA POP.

Soil sampling was conducted for classification purposes only. Soil samples for laboratory analysis were not collected from these two borings since samples had been collected from borings installed nearby during the Phase IIA program.

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### 2.5.4. Bedrock well installation

One bedrock monitoring well (MW-47BR) was installed near the MW-12 cluster during Phase IIB drilling efforts. MW-47BR was installed location for the purpose of evaluating water quality data in the s bedrock along the eastern edge of the southern plume near South Mea Road.

Monitoring well MW-47BR was advanced using the drive and wash me with 4-inch steel casing until bedrock was encountered. During insta procedures, split spoon samples for soil classification purposes were co every five feet below the depth of investigation at MW-12I. A soil boring describing subsurface conditions is provided in Appendix D.

A moderately weathered Arkosic sandstone was encountered at 147 ft noted from returns in wash during borehole reaming activities. Com bedrock was noted at approximately 149 fbg based on drillin observations made by the O'Brien & Gere geologist and the drilling fore A ten foot long NX size core barrel was then used to advance the boreho ft into bedrock for a final depth of 179 fbg. A 20 ft section of of 0.01 inch slotted PVC well screen attached to PVC riser pipe was installed in the borehole. Following installation, the monitoring well was packed, sealed with bentonite 5 feet into rock, and grouted to grad removing the 4-inch steel casing.

Rock quality designation (RQD) was performed on the 30 foot core se provide additional information relative to the characteristics of natu mechanical fractures in the rock core. RQD information, which incl coring rates, and percent recoveries is provided on the boring log for t in Appendix D.

### 2.5.5. Product gauging well installations

Three free phase product monitoring wells were completed on-site d Phase IIB drilling activities. These wells were installed for the pur evaluating the extent of free phase oil noted in the area of monitoring MW-18S during Phase IIA ground water sampling efforts. This well with MW-20S, have been monitored periodically for the presence of s phase product under an Immediate Response Action (IRA) in accordance the requirements in the Massachusetts Contingency Plan (MCP). The phase oil at MW-20S appears to be related to the petroleum storage f

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adjacent to this well, has been adequately characterized and was not investigated further during the Phase IIB program.

One of the three product gauging wells (PG-1) was completed with a skid mounted rig inside the "Rim Building", 15 feet to the southeast of MW-18S. The two other product gauging wells (PG-2 and PG-3) were installed approximately 25 feet to the northeast and northwest of MW-18S respectively. These two wells were installed with a conventional drill rig using hollow stem augers. The three wells were completed to 15 fbg with a ten foot screened section from 15 to 5 fbg.

Drill cuttings from this effort were contained in 55-gallon drums due to elevated PID readings and visual observations made during advancement of the augers. No free phase oil layer was observed in the soil profile from the three wells during installation procedures, although strong petroleum odors were noted. PID data is provided on soil boring logs for these three wells in Appendix H.

A fourth product gauging well was originally planned for this effort but was abandoned after refusal was encountered on several occasions with the skid rig prior to intercepting the water table. This well was originally planned to be set 15 feet to the southwest of MW-18S.

## 2.6. Monitoring well development

Following completion of the newly installed monitoring wells, a development program was implemented to remove fine-grained sediments which may have settled in the well during installation procedures and to also enhance the hydraulic conductivity between the screened interval and the surrounding formation.

Well development efforts were completed using dedicated Wattera® foot valves attached the appropriate length of Teflon® tubing. Field measurements for pH, temperature, conductivity, and turbidity were documented during development and are presented on well development logs provided in Appendix E. Purge water generated from this effort was dispersed around each well head with the exception of purge water from MW-50I and MW-51S which was contained in 55-gallon drums due to visual and olfactory observations which indicated impacts to ground water at these two locations.

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## 2.7. Ground water level monitoring

Ground water level measurements were completed at the 56 wells incl the Phase IIB sampling program. Newly installed monitoring wel gauged twice, once during development efforts, and a second time pri ground water sampling activities. This effort was completed to prov wide ground water level data for use in ground water flow calculation supplement Phase IIA contaminant migration calculations.

Ground water gauging efforts were completed with a Solinst® electron level meter accurate to 0.01 ft. Ground water level data is provide development and sampling logs provided in Appendices F and G.

## 2.8. Ground water sampling

A comprehensive ground water sampling event in support of the Phas program was initiated on October 31 and completed on November 1 A total of 56 monitoring wells, including Phase IIA, newly installed Phas wells, and the three product gauging wells were included in this sam round. Data from this effort was used to characterize ground wate within the study area as described in Section 4 of this report.

Ground water purging and sampling was completed for the most par low flow bladder pump which provides data most representative c conditions. This method minimizes disruption to colloidal and susp solids in the water column which has the potential to provide unrepre data particularly with respect to metal analyses. In some cases, c Teflon® bailers were used due to slow recharge rates in intermediate o wells. Each ground water sampling log indicates the sampling met at that specific location.

During purging efforts, field measurements for pH, specific con dissolved oxygen, temperature, and turbidity were documente stabilization was achieved for these parameters, ground water sample collected. Ground water sampling logs are presented in Appendix

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### 2.8.1. Split sampling event

USEPA's oversight contractor, TRC Environmental of Lowell, Massachusetts was on site November 13 and 14, 1997 to conduct ground water split sampling activities with O'Brien & Gere. The purpose of the split sampling program was to compare data generated from the low flow sampling and bailing techniques for QA/QC objectives.

Ten monitoring wells (MW-24I/D, MW-30S, MW-32S, MW-33S, MW-43S, MW-45S, MW-46S, MW-47BR, MW-48S, and MW-49I) were included in the split sampling program with TRC. This includes three wells installed during Phase IIA activities and seven wells installed during the current Phase IIB program. Laboratory results from the split sampling program are discussed in the data validation portion (Section 3) of this report.

## 2.9. Investigation derived waste

During implementation of the Phase IIB program five 55-gallon drums of Investigation derived waste (IDW) were generated. This included two drums of drill cuttings from newly installed wells, and three drums of purge water impacted by site related constituents from purging efforts prior to sampling.

These five drums were removed under waste manifestation from the site on December 18, 1997 by Clean Harbors of Braintree, Massachusetts. A copy of the hazardous waste manifest is presented in Appendix G.

## 2.10. Surveying

Following completion of the Phase IIB well installation and sampling efforts, a site survey was conducted for the purpose of tying in the newly installed monitoring wells to the existing well network. This effort was completed on January 23, 1998 by Dennis C. Drumm Associates of Pittsfield, Massachusetts and provided O'Brien & Gere with the vertical and horizontal datums for these new points.

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# 3. Data Quality/Validation Summary

## 3.1. Introduction

Data validation was performed for metals, HVOC, and PAH analytical data generated during the implementation of the Phase IIB program at the Columbia Manufacturing Company (Columbia) located in Westfield, Massachusetts. The following samples were collected by O'Brien & Gere Engineers, Inc:

- Three soil samples collected on October 16, 1997.
- Seven soil gas samples collected on October 29, 1997.
- Fifty-four ground water samples collected on November 3, 6, 7, 11, 12, 13, 14, 18, and 19, 1997.

Data validation was performed to assess the suitability of a measurement system for providing useful analytical data. Data from the ground water screening effort was used for qualitative purpose only and was not included in the data validation program. This report summarizes the results of the data validation effort and describes the excursions from the applicable quality control criteria outlined in the following United States Environmental Protection Agency (USEPA) approved scope of works and guidance documents:

*Project Operations Plan (POP), Facility Investigation, Columbia Manufacturing Company, Westfield, Massachusetts.* O'Brien & Gere Engineers, Inc. May 1996.

Correspondence to Frank Battaglia, USEPA Waste Management Division, dated October 23, 1997 regarding the Soil Gas Sampling Procedure.

*Test Methods for Evaluating Solid Wastes: Physical and Chemical Methods, (SW-846)*, Final Update II, USEPA, January 1995.

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*USEPA Method TO14 -Volatile Organics in Air using Summa Pas Canisters by Gas Chromatography/Mass Spectrometry.*

*Region I, EPA-New England Data Validation Functional Guideli Evaluating Environmental Analyses, Part II, Volatile/Semivolatil Validation Functional Guidelines,* USEPA Region I, December 1996.

*USEPA Region I Laboratory Data Validation Functional Guideli Evaluating Inorganic Analyses*, USEPA Region I, February 1988.

The first four sections of this document present the component validation process. Section 3.2 lists the analytical methodologies emp for sample analysis. Section 3.3 describes the data quality assurance control (QA/QC) protocols used to validate the sample data. QA/QC excursions and qualifications for sample data are discuss Section 3.4. The appropriateness of data for use in assessing site- risks and characterizing the areas of concern (AOCs) is presented in 3.5.

## 3.2. Analytical methods

Samples were analyzed by O'Brien & Gere Laboratories, Inc. loca Syracuse, New York for most analyses, low level polynuclear arc hydrocarbon (PAH) analyses in ground water were performed by A Environmental Network (formerly IEA) located in Schaumburg, Illin Massachusetts method Petroleum Hydrocarbon (EPH/VPH) analyse performed by ESS Laboratories of Cranston, Rhode Island.

Samples were analyzed utilizing the USEPA approved methods prese Table 3.1.

**Table 3.1.** *Analytical methods*

| Matrix | Parameter | Method |
|---|---|---|
| Soil Gas | Vinyl chloride<br>cis-1,2-Dichloroethene<br>Trichloroethene | TO-14 |
| Soil and Ground Water | Halogenated volatile organic compounds (HVOCs) | SW846 8021A |

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**Table 3.1.** *Analytical methods*

| Matrix | Parameter | Method |
|---|---|---|
| Soil | PAHs | SW846 8270B |
| Ground Water | Low level PAHs | SW846 8310 |
| Soil and Ground Water | Metals | SW846 6010A |
| Soil and Ground Water | EPH/VPH | MADEP Method (1) |

(1) *Method for the Determination of Volatile Petroleum Hydrocarbons (VPH) and Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), Massachusetts Department of Environmental Protection (MADEP)*, August 1995.

Source: O'Brien & Gere Engineers, Inc.

Tables of the analytical data with validation qualifiers are presented in Appendix K. The letters found immediately to the right of individual sample results serve to qualify the sample data. When the data validation process identified more than one quality control deficiency, the qualifier added to the sample result represents the cumulative effect of the individual QC excursions. Consistent with the referenced guidance documents, the following qualifiers were used during the data validation:

U Indicates that the compound was analyzed for, but was not detected. The quantitation limit is presented and adjusted for dilution. This qualifier is also used to qualify data when target compounds are detected above the practical quantitation limit (PQL) in laboratory, equipment, or trip blanks. When target compounds are detected in blanks, data are qualified based on a blank action level calculated at five times (ten times for common laboratory contaminants) the highest concentration detected in the associated blanks. Samples collected, shipped, prepared, or analyzed in conjunction with contaminated blanks, which contain compounds less than calculated blank action levels are flagged "U" signifying that the concentration detected is attributed to laboratory or field contamination.

J Indicates that the detected sample result should be considered approximate. This qualifier is used when the data validation process identifies an excursion from QA/QC requirements. Additionally, this qualifier is used when semivolatile compounds analyzed by GC/MS (EPA SW8270) meet GC/MS identification requirements at concentrations above the method detection limit (MDL) but below the PQL. Results below the PQL should be considered approximate since method accuracy and precision are not defined at these concentrations.

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UJ Indicates that the detection limit for the analyte in this sample be considered approximate. This qualifier is used when the validation process identifies an excursion from QA/QC requirem

R Indicates that the previously reported detection limit or sampl was rejected due to a major excursions from QA/QC requirem Rejected data are not recommended for qualitative or quan purposes.

## 3.3. Data validation protocols

Soil and ground water samples were validated in accordance with assurance/quality control (QA/QC) requirements established in the specific quality assurance project plan (QAPjP) presented as Section POP. Soil gas samples were validated in accordance with requirements outlined in the correspondence to USEPA dated Octobe 1997. Sample data affected by excursions from QA/QC requirements qualified based on guidance provided in USEPA's Region I va guidelines cited in Section 3.1. The following QA/QC parameters assessed;

**Metals analyses**

- Holding times and sample preservation
- Initial and continuing calibration
- Blank analysis
- Matrix spike/matrix spike duplicate (MS/MSD) analysis
- Field duplicate analysis
- LCS analysis
- Inductively Coupled Plama (ICP) interference check sample and dilution analyses
- Analyte quantitation (10% frequency)
- Instrument performance
- Documentation completeness
- Overall assessment.

**HVOC analyses**

- Holding times and sample preservation
- Initial and continuing calibration
- Blank analysis
- Surrogate recovery

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- Internal standard performance
- MS/MSD analysis
- Field duplicate analysis
- LCS analysis
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness
- Overall assessment.

**Soil PAH analyses**

- Holding times and sample preservation
- GC/MS tuning criteria
- Initial and continuing calibration
- Blank analysis
- Surrogate recovery
- MS/MSD analysis
- LCS analysis
- Internal standards performance
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness
- Overall assessment.

**Ground water low level PAH analyses**

- Holding times and sample preservation
- Initial and continuing calibration
- Standard and surrogate retention time windows
- Blank analysis
- Surrogate recovery
- MS/MSD analysis
- Field duplicate analysis
- LCS analysis
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness
- Overall assessment.

**Soil gas HVOC analyses**

- Holding times
- GC/MS tuning criteria
- Initial and continuing calibration
- Blank analysis
- Surrogate recovery

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- Field replicate or laboratory duplicate analysis
- Internal standards performance
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness
- Overall assessment.

Method requirements and corresponding laboratory corrective procedures for these QA/QC parameters were summarized in Tables 4 4-5B, 4-5C, and 4-5F of the POP and in Table 2 of the correspond USEPA dated October 23, 1997. When these requirements were n the analytical data were qualified based on validation actions describ EPA Region I's validation guidelines.

In accordance with the POP, laboratory control limits were used to a MS/MSD, LCS, surrogate, and field duplicate data. It should be note control limits tabulated in the POP for MS/MSD, LCS, and su recovery have been up-dated by the laboratories to include new data Based on guidance provided in EPA Region I's validation guide analytical data were qualified in the following manner when lab control limits were not met:

- If percent recoveries were less than laboratory control lin greater than ten percent, non-detected and detected resul approximated (UJ, J).

- If percent recoveries were greater than laboratory contr detected results were approximated (J).

- If percent recoveries less were less than ten percent, detecte were approximated (J) and non-detected results were rejected

- If relative percent differences (RPDs) for MSDs and field d were outside of laboratory control limits or the duplicate specified in the POP, detected results greater than the PQ approximated.

It should be noted that qualification of data for MS/MSD analyse performed only when both MS and MSD percent recoveries were o laboratory control limits. Qualification of data was not perfo MS/MSD or surrogate recoveries were outside of laboratory control due to sample dilution.

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## 3.4. Data quality evaluation

This section summarizes the QA/QC parameters which met method criteria and describes qualifications performed on sample data when QA/QC criteria were not met. Samples that required qualification were identified in the following sections by the sample location documented on the field chain of custody record. Equipment and trip blank data were used to assess if contamination had been introduced during sampling and shipment. Equipment and trip blank data were not qualified with respect to QA/QC excursions.

In accordance with the Section 4.4.3 of the POP, field duplicate (DUP), and MS/MSD samples were collected at frequency of five percent. As required, equipment blanks were collected per piece of sampling equipment used. Trip blanks were placed within coolers containing samples for volatile analyses. The laboratory provided temperature blanks which were used to record sample cooler temperatures upon receipt.

Field chain of custody records were accurate and complete. The laboratories verified sample preservation upon receipt; sample preservation for volatile organics was verified during sample analysis. Sample preservation requirements were met.

### 3.4.1. Metal analysis

Three soil samples and one MS/MSD sample were analyzed for antimony, cadmium, chromium, copper, lead, nickel, silver, and zinc. Fifty-four ground water samples, four field duplicates, three equipment blanks, and three MS/MSD samples were analyzed for the following metals: arsenic, cadmium, chromium, copper, lead, nickel, and zinc. The following QA/QC parameters met criteria or had minor excursions which did not require qualification of data:

- Holding times and sample preservation
- Initial and continuing calibration
- Blank analysis
- Field duplicate analysis
- LCS analysis
- ICP interference check sample and serial dilution analyses
- Analyte quantitation (10% frequency)

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- Instrument performance
- Documentation completeness

MS/MSD analysis - MS/MSD analyses were performed at the re frequency of five percent on samples MW-50I(0-2'), MW-44S, M MW-19I, and MW-30I. Percent recoveries were outside of labora control limits for antimony (54%, 51%) and RPDs were outside of limits for copper (RPD 144%) and zinc (RPD 125%) in MS/MSD MW-50I(0-2'). Results were approximated for antimony, copper, and in the soil samples. Laboratory corrective action was not required the associated LCS and matrix spike blank digested with this MS/M criteria.

Overall data assessment - The laboratory performed metals analyses procedures in accordance with the POP. Metals data are usable qualitative and quantitative purposes. Antimony, copper, and zinc were approximated in the soil samples based on minor excursion MS/MSD recovery and RPD criteria.

### 3.4.2. HVOC analysis

Three soil samples, fifty-four ground water samples, four field duplic three equipment blanks, ten trip blanks, and four MS/MSD sample analyzed for HVOCs. The following QA/QC parameters met crite

- Holding times and sample preservation
- Initial calibration
- Standard and surrogate retention time windows
- Surrogate recovery
- Internal standard performance
- Field duplicate analysis
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness

Continuing calibration - As described in the POP, continuing calibrati were assessed based on method performance requirements presente Table 3 of USEPA method 8010B. Calibration criteria were exceed several instances. Laboratory corrective actions were not implem required. Table 3.2 is a summary of the data that required qualificati

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**Table 3.2.** *Qualification of HVOC data : continuing calibration criteria.*

| Analysis Date | Compound | % Difference | Action | Samples Affected |
|---|---|---|---|---|
| 11/18/97 17:45 | chloromethane | 49 | UJ | MW-22I, MW-23I |
| 11/18/97 21:47 | 1,2-dichloroethane | 31 | UJ | MW-20B |
| | 1,1,2-trichloroethane | 25 | UJ | |
| | bromoform | 28 | UJ | |
| 11/19/97 15:59 | 2-chloroethylvinyl ether | 51 | UJ | MW-23S, MW-15S, MW-14C, DUP1(11/14/97) |
| | chloromethane | 96 | UJ | |
| 11/20/97 0942, 17:34, and 22:57 | 2-chloroethylvinyl ether | 57, 64, and 65 | UJ | MW-19I, MW-27S, MW-36S, MW-25BR, MW-25S, MW-35S, MW-38S, MW-39S, MW-37S, MW-35I |
| 11/21/97 09:19, 17:03, and 21:46 | 2-chloroethylvinyl ether | 64, 67, and 60 | UJ | MW-32S, MW-18A, MW-30S, MW-33S |
| 11/24/97 09:14 | chloromethane | 45 | UJ | MW-45S, MW-46S, MW-47BR, MW-43S, MW-24I/D |
| | 2-chloroethylvinyl ether | 68 | UJ | |
| 11/24/97 17:03 11/25/97 00:27 | 2-chloroethylvinyl ether | 42, 70 | UJ | MW-48S, MW-49I, DUP1(11/14/97) |
| 11/25/97 09:46, 17:34, and 11/26/97 00:58 | 2-chloroethylvinyl ether | 66, 63, and 59 | UJ | MW-41S, MW-24I, MW-34S |
| 11/26/97 08:47, 16:14, and 18:56 | 2-chloroethylvinyl ether | 72, 67, 68 | UJ | MW-50I, MW-28S, MW-51S, MW-24D, MW-33I, MW-32I |
| 12/197 11:16 and 14:27 | 2-chloroethylvinyl ether | 62, 68 | UJ | DUP1(11/18/97) |

Source: O'Brien & Gere Engineers, Inc.

Blank analyses - Methylene chloride was detected at 10 ug/L in the equipment blank collected on November 11, 1997. Trichlorofluoromethane was detected at 2 ug/L in trip blanks received on November 14 and 19, 1997. Methylene chloride results were qualified as non-detected ("U") in samples MW-14D and DUP1(11/7/97) since concentrations were less than ten times the corresponding equipment blank concentration. Data were not qualified for trichlorofluoromethane since this compound was not detected in samples received on November 14 and 19, 1997.

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MS/MSD analysis - MS/MSD analyses were performed at the re frequency on samples MW-50I(0-2'), MW-29I, MW-19I, and M'.. Control limits were exceeded for a minor number of compounds. Table 3 a summary of the data that required qualification. Laboratory cor actions were not required since associated LCS met criteria. It should b that 2-chloroethylvinyl ether is a reactive compound which breaks down u the acidic conditions used to preserve volatile organic samples.

**Table 3.3.** *Qualification of HVOC data : MS/MSD criteria.*

| MS/MSD ID | Compound | % Recovery | Action | Samples Affected |
|---|---|---|---|---|
| MW-50I(0-2') | bromomethane | 64, 56 | UJ | MW-50I(0-2') |
| MW-29I | 2-chloroethylvinyl ether | 0, 0 | R | MW-29I |
| MW-19I | 2-chloroethylvinyl ether | 0, 0 | R | MW-19I |
| MW-30I | 2-chloroethylvinyl ether | 0, 0 | R | MW-30I |

Source: O'Brien & Gere Engineers, Inc.

LCS Analyses - Percent recoveries were outside of laboratory control lim a minor number of compounds. With the exception of 2-chloroethylvinyl in LCS L112697W1, percent recoveries were biased high. Table summary of the data that required qualification. Laboratory corrective was not performed since either 90% of the compounds had recoveries w control limits or compounds which had recoveries that were biased hi not detected in the samples.

**Table 3.4.** *Qualification of HVOC data : LCS criteria.*

| LCS ID | Compound | % Recovery | Action | Samples Affected |
|---|---|---|---|---|
| L111997W1 | cis-1,2-dichloroethene | 108 | J | MW-14S, MW-14D, MW-14I/D, MW-1 |
| L112497W1 | trichloroethene | 116 | J | MW-45S, MW-46S, MW-47BR, MW-48S, W-49I, DUP1(11/14/97) |
| L112697W1 | 2-chloroethylvinyl ether | 31 | UJ | No additional, associated samples previou qualified as approximate based on continuing calibration excursion. |

Source: O'Brien & Gere Engineers, Inc.

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Overall Data Assessment - Overall, the laboratory performed HVOC analyses and QC procedures in accordance with the POP. Laboratory corrective actions were not routinely implemented when continuing calibration criteria were exceeded. The majority of HVOC data are usable for qualitative and quantitative purposes. Non-detected results were rejected for 2-chloroethylvinyl ether in ground water samples MW-29I, MW-19I, and MW-30I based on MS/MSD recoveries less than ten percent.

Results were approximated for bromomethane in soil sample MW-50I(0-2') based on minor excursions from MS/MSD recovery criteria. Excursions from continuing calibration criteria resulted in the approximation of results for 2-chloroethylvinyl ether in the majority of the ground water samples. Additional excursions from continuing calibration and LCS criteria also resulted in approximation for a small number of compounds and ground water samples.

Methylene chloride results were qualified as non-detected ("U") in ground water samples MW-14D and DUP1(11/7/97) based on the concentration observed for this compound in the associated equipment blank. Elevated PQLs were reported for twenty-two samples and one field duplicate sample due to sample dilutions required to obtain target compound concentrations within the linear calibration range.

### 3.4.3. Soil PAH analysis

Three soil samples and one MS/MSD sample were analyzed for target PAH compounds. The following QA/QC parameters met criteria or had minor excursions which did not result in qualification of data:

- Holding times and sample preservation
- GC/MS tuning criteria
- Initial and continuing calibration
- Blank analysis
- Surrogate recovery
- MS/MSD analysis
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness

LCS analysis - Percent recoveries were above laboratory control limits for chrysene in LCSs L10297S6 (122%) and L102197S2 (124%). Detected results were approximated for chrysene in samples MW-50I(0-2'), and MW-

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50I(5-7'). Laboratory corrective action was not required since more than recovery criteria were met for 90% of the target compounds.

Internal standard performance - Internal standard area criteria were no Samples were reanalyzed with similar results. Table 3.5 summarizes th that were qualified.

**Table 3.5.** *Qualification of PAH soil data: internal standard criteria.*

| Sample ID | Internal Standard | Area Recovery | Action | Compounds Affected |
|---|---|---|---|---|
| MW-50I(0-2') | chrysene-d12<br>perylene-d12 | 35%<br>20% | UJ, J | pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoroanthene, benzo(k)fluoranthen benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)peryl |
| MW-50I(5-7) | perylene-d12 | 27% | UJ, J | benzo(b)fluoroanthene, benzo(k)fluoranthen benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)peryl |

Source: O'Brien & Gere Engineers, Inc.

Overall Data Assessment - The laboratory performed soil PAH analyses QC procedures in accordance with the POP. The soil PAH data are usab qualitative and quantitative purposes. Minor excursions from LC internal standard criteria resulted in the approximation of data for eight to compounds in samples MW-50I(0-2') and MW-50I(5-7').

### 3.4.4. Ground water low level PAH analysis

Twenty-six ground water samples, one field duplicate, one equipment and one MS/MSD sample were analyzed for low level PAH analyses. following QA/QC parameters met criteria:

- Holding times and sample preservation
- Initial and continuing calibration
- Standard and surrogate retention time windows
- Blank analysis
- MS/MSD analysis
- Field duplicate analysis
- LCS analysis
- Compound identification and quantitation (10% frequency)
- System performance

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- Documentation completeness

Surrogate recovery - Surrogate recovery was biased high in sample MW-41S (240%). Detected PAH results were, therefore, approximated in sample MW-41S.

Overall Data Assessment - The laboratory performed ground water low level PAH analyses and QC procedures in accordance with the POP. Ground water PAH data are usable for qualitative and quantitative purposes. Detected PAH results were approximated in sample MW-41S since surrogate recovery was biased high in this sample.

### 3.4.5. Soil gas HVOC analysis

Seven soil gas samples and one replicate soil gas sample were analyzed for vinyl chloride, cis-1,2-dichloroethene, and trichloroethene. The following QA/QC parameters met criteria:

- Holding times
- GC/MS tuning criteria
- Initial and continuing calibration
- Blank analysis
- Surrogate recovery
- Field replicate analysis
- Internal standards performance
- Compound identification and quantitation (10% frequency)
- System performance
- Documentation completeness

Overall Data Assessment - The laboratory performed soil gas analyses and QA/QC procedures in accordance with scope of work presented in correspondence to USEPA dated October 23, 1997. Soil gas data are usable for qualitative and quantitative purposes without further qualification.

## 3.5. Data useability

Analytical data were validated for soil gas, soil and ground water samples collected during the Phase IIB program. Samples were collected by O'Brien & Gere Engineers between October 16 and November 19, 1997. Data validation was performed in accordance with Section 4 of the POP and the USEPA correspondence dated October 23, 1997. Tables of the analytical

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data with validation qualifiers are presented in Appendix K. Projec data exceeded the data quality objective of 95% established in the r More than 95% of the data were determined to meet the data quality cri for qualitative and quantitative use.

Analytical data were rejected when major excursions from QA/QC cri were identified or when percent recoveries of less than ten percen observed. Minor excursions from QA/QC criteria resulted in approxi of some sample data. Approximation of a data point indicate uncertain the reported concentration of the analyte, but not its assigned identity conservative assumptions used in the development of conclusions ba the analytical data verified that approximated analytical data adhered t project data quality objectives, and therefore can be used to assess and ecological risk and to develop corrective action measures. approach to the use of analytical data was consistent with the guid presented in the US EPA *Risk Assessment Guidance for Superfund, V I, Human Health Evaluation Manual (Part A)*, 540/1-89/002, Dec 1989.

This section summarizes the adherence of the analytical data to th quality objectives (DQOs) established in Section 4.3 of the PO precision, accuracy, representativeness, comparability, completeness sensitivity. A detailed discussion of the analyses and samples whic qualified is presented in Section 3.4 of this report.

Data quality objectives were evaluated based on the percentage of results that were determined to be usable (percent usability). usability was calculated with respect to analytical parameter and by sa matrix.

*Precision* was assessed from laboratory MSD and field duplicate anal Data usability based on precision criteria were calculated as 100%. were approximated for copper and zinc in the soil samples based o excursions from MSD RPD criteria. Corrective actions were not req for approximated data points since the POP data quality object precision was met. More than 90% of target analyses had RPDs control limits established in the POP for MSD and field duplicate anal

*Accuracy* was assessed from surrogate, MS/MSD and LCS data. In a accuracy was assessed based on the following method specific Q requirements when applicable:

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- Calibration
- GC/MS tuning and internal standards criteria
- Metals ICP and furnace criteria

Results for 2-chloroethylvinyl ether were rejected in ground water samples MW-29I, MW-19I, and MW-30I based on MS/MSD recoveries that were less than ten percent. Table 3.6 is a summary of the data that were qualified as approximate when accuracy criteria were not met. Summary tables which identify the specific analyses and samples that were approximated are shown in parenthesis. Corrective actions were not required for approximated data points, since the POP data quality objective for accuracy was met. More than 90% of target analyses had percent recoveries within control limits established in the POP for surrogate, MS/MSD, and LCS analyses. In addition, more than 90% of target analyses met method specific QA/QC requirements.

**Table 3.6.** ***Data Approximated based on excursions from accuracy criteria.***

| Matrix | Parameter | Excursion | Qualifier | Summary of compounds and samples affected |
|---|---|---|---|---|
| Soil | Metals | MS/MSD | UJ | Antimony results in the three soil samples. |
| Soil | HVOC | MS/MSD | UJ | Bromomethane result in sample MW-50I(0-2'). |
| Ground Water | HVOC | CCV (Table 4.1.) | UJ | Chloromethane in ten samples and one field duplicate. |
| | | | UJ | Three compounds in sample MW-20B. |
| | | | UJ | 2-Chloroethylvinyl ether in thirty-three samples and three field duplicates. |
| | | LCS (Table 4.3.) | J | cis-1,2-Dichloroethene in four samples. |
| | | | J | Trichloroethene in five samples and one field duplicate. |
| Soil | PAH | LCS | J | Chrysene in samples MW-50I(0-2') and MW-50I(5-7'). |
| | | Internal Standard (Table 4.4.) | UJ, J | Six compounds in sample MW-50I(5-7'). |
| | | | UJ, J | Nine compounds in sample MW-50I(0-2'). |
| GW | PAH | Surrogate | J | Detected PAH compounds in MW-41S. |

Source: O'Brien & Gere Engineers, Inc.

***Representativeness*** was assessed from holding times, sample preservation, blank analysis instrument performance, compound identification confirmation, and quantitation, sampling and analytical methodologies used.

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Data usability based on representativeness criteria was calculated as 1( Methylene chloride results were qualified as non-detected in ground ·.. samples MW-14D and DUP1(11/7/97) based on the concentration obser in the associated equipment blank. Corrective actions were not req only one excursion was observed which impacted on two data points.

*Comparability* is a generally a qualitative measure based on the u standard analytical methods, reporting units, reference materials, anc deliverables. Comparability was quantitatively measured by the collectio split samples. Split samples were collected by USEPA at ten monitorin locations and analyzed for halogenated volatile organic compounds. usability based on comparability of split sample data was calculated as 10 RPDs were calculated for the compounds which had concentrations gre than five times the laboratory reporting limits. Calculated RPDs rangec 0% to 33%, meeting RPD criteria established for field duplicates.

*Sensitivity* is established by the laboratory in the form of PQLs. Over PQLs established in the QAPP were met. PQLs were elevated for twen ground water samples and one field duplicate due to sample dilutions requ to obtain target compound concentrations within the instrument's calibration range.

Project-wide data completeness exceeded the data quality objective o established in the POP. More than 95% of the analytical data were deter to be usable for qualitative and quantitative purpose.

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# 4. Ground water quality evaluation

## 4.1. Ground water screening program

The extent of impacted shallow ground water in the northern portion of the site was not fully characterized by the monitoring well network completed during the Phase IIA program. Additional site sampling efforts were proposed during the Phase IIB investigation including a ground water screening program, additional monitoring well installations and a soil gas survey.

The objective of the ground water screening program was to provide the data necessary to locate supplemental monitoring wells and soil gas sampling stations. As described in section 2.1, twenty-one ground water screening points were installed in the northern portion of the site and into the residential neighborhood along Cycle Street, Lozier Street, and Toledo Avenue as shown on Figure 1.

Ground water samples collected from the twenty-one points and two duplicate locations were submitted for analyses of halogenated volatile organic compounds (HVOCs) by EPA Method 8021. The primary HVOCs detected in ground water at the screening locations were trichloroethene (TCE), cis 1,2-dichloroethene (DCE), vinyl chloride (VC), and tetrachlorethene (PCE). The concentrations of these constituents are summarized in Table 4-1 and depicted on Figures 2 through 4.

*Table 4-1. Ground water screening data.*

| Sampling Location | Target compound concentrations in ug/L (MADEP GW-2 Criteria in ug/L) | | | |
|---|---|---|---|---|
| | TCE (300) | DCE (30,000) | VC (2) | PCE (3000) |
| GS-44 | 450 | 90 | <10 | 19 |
| GS-45 | 79 | <5 | <5 | <5 |
| GS-46 | 140 | 33 | <5 | 8 |
| GS-47 | 110 | 52 | <5 | 25 |

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*Table 4-1. Ground water screening data.*

| Sampling Location | Target compound concentrations in ug/L (MADEP GW-2 Criteria in ug/L) | | | |
|---|---|---|---|---|
| | TCE (300) | DCE (30,000) | VC (2) | PCE (3000) |
| GS-48 | 40 | 10 | <1 | 1 |
| GS-49 | 440 | 93 | <10 | 19 |
| GS-50 | 2600 | 600 | 120 | 120 |
| GS-51 | 4400 | 680 | 200 | 220 |
| GS-52 | 160 | 68 | <10 | <10 |
| GS-53 | 43 | 16 | <1 | 3 |
| GS-54 | 43 | 51 | 3 | <1 |
| GS-55 | 460 | 120 | <10 | <10 |
| GS-56 | 95 | 110 | <10 | <10 |
| GS-57 | 33 | 51 | <1 | <1 |
| GS-58 | 140 | 170 | 24 | <10 |
| GS-59 | 15 | 19 | <1 | <1 |
| GS-60 | 2 | 3 | <1 | <1 |
| GS-61 | 93 | 250 | 79 | 31 |
| GS-62 | 13 | 130 | <5 | <5 |
| GS-63 | 14 | 140 | <10 | <10 |
| DUP1 (GS-63) | 16 | 140 | <10 | <10 |
| GS-64 | 81 | 32 | <10 | <10 |
| DUP2 (GS-64) | 140 | 56 | <10 | <10 |
| PERKINS | <1 | <1 | <1 | <1 |

Source: O'Brien & Gere Engineers Inc.

The ground water screening data indicated two areas of impacted ground water migration. Impacted ground water in the area of monitor MW-24S appears to be migrating to the northeast, consistent with the inf ground water flow direction, and as indicated by constituent concentrati GS-49 through 51.

Ground water data also indicated an area of elevated consti concentrations near monitoring well MW-20C. Impacted shallow water migration in this area appears to be towards the north, pos influenced by utility lines in the area, and as indicated by consti concentrations at GS-55, GS-61 and MW-32S.

The ground water data was also compared to the GW-2 criteria i Massachusetts Contingency Plan (MCP) which is related to the poter

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posed by vapor migration from impacted shallow ground water to residential dwellings. Exceedances of the criteria are highlighted on Figures 2 through 4. The comparison was performed to provide guidance for locating soil gas sampling stations in areas corresponding to the highest potential risk and also to locate supplemental monitoring wells.

The ground water screening program provided the requisite data to select soil gas sampling locations and supplemental monitoring well locations. An assessment of the data was provided to USEPA in the October 23, 1997 submittal which also identifies these proposed sampling locations. Further assessment of the screening data for those purposes is discussed in sections 4.2.1 and 5.

## 4.2. Phase IIB ground water sampling summary

A summary of detected HVOCs and metal results are presented on tables in Appendix J.

### 4.2.1. Shallow ground water

Northern Plume

Four additional shallow monitoring wells were originally proposed in the Phase IIB SOW for additional characterization of the northern plume. Preliminary ground water screening data was provided to USEPA and based on assessment of this data an additional monitoring well was requested in the northern area of the site. The five monitoring well locations were proposed in a letter to the USEPA dated October 23, 1997.

The Phase IIB monitoring wells were installed at the following locations:

- MW-43S, MW-44S, and MW-45S - Installed along South Meadow Road to further assess the width of the plume and down gradient constituent concentrations between MW-40S and MW-33S.

- MW-46S - Installed on Lozier Street to assess ground water quality beyond MW-32S into the residential neighborhood where constituent migration may be influenced by utility lines in the area.

- MW-51S - Installed on Cycle Street to assess ground water quality towards the west where constituents migration may be influenced by utility lines in the area.

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Concentrations of TCE, DCE, and VC observed during the Phase IIB g water sampling event are presented in the shallow ground water quality in Figures 6 through 8. Concentrations of these HVOCs are also summar in Table 4-2.

As shown by Figures 6 through 8, the extent of the ground water plume established to concentrations less than 10 ug/L for the portion of the nc plume extending to the east towards South Meadow Road and the Little

The limits of the northern plume extending in a northerly direction par Lozier Street was established to concentrations of approximately 100 u less for TCE and DCE and less than 10 ug/L for vinyl chloride.

Southern Plume

Two additional shallow monitoring wells (MW-47S and MW-48S) installed in the area of the southern plume to further characterize the exte ground water quality in the nearby tobacco fields. Concentrations o DCE and VC observed during the Phase IIB sampling event are prese Figures 6 through 8. Concentrations of these HVOCs are also summariz Table 4-2.

As shown by these figures, the extent of the southern shallow ground v plume has been established to concentrations of approximately 10 u these constituents in the tobacco field property.

*Table 4-2. Summary of TCE, DCE, and VC concentrations*

| ***Previously installed wells*** | | | |
|---|---|---|---|
| **Well Number** | **Compound Concentrations (ug/L)** | | |
| | VC | DCE | TCE |
| MW-32S | 610 | 120 | <10 |
| MW-45S | <1 | 5 | 1 |
| MW-46S | <2 | 55 | 110 |
| MW-47BR | 13 | 47 | 53 |
| MW-43S | <1 | <1 | <1 |
| MW-24I/D | <1 | <1 | <1 |
| MW-18A | 140 | 1900 | <50 |

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*Table 4-2. Summary of TCE, DCE, and VC concentrations*

| ***Previously installed wells*** | | | |
|---|---|---|---|
| **Well Number** | **Compound Concentrations (ug/L)** | | |
| | VC | DCE | TCE |
| MW-48S | <1 | 12 | 12 |
| MW-30S | <1 | 4 | 3 |
| MW-49I | <1 | <1 | 5 |
| MW-33S | <1 | <1 | 4 |
| MW-41S | <1 | 15 | <1 |
| MW-50I | 8 | 40 | 21 |
| MW-28S | <1 | 1 | <1 |
| MW-51S | 2 | 63 | 40 |
| MW-24I | <100 | 270 | 5300 |
| MW-24D | <1 | <1 | <1 |
| MW-30I | <1 | 9 | 1 |
| MW-33I | <1 | <1 | 2 |
| MW-32I | <1 | 3 | <1 |
| MW-34S | <10 | 70 | 510 |
| MW-48I | <1 | 6 | 2 |
| MW-44S | <2 | 20 | 120 |
| MW-47S | <2 | 33 | 76 |
| MW-2S | 2 | 30 | 18 |
| MW-40S | <20 | 180 | 840 |
| MW-40I | <1 | <1 | <1 |
| MW-29I | <1 | <1 | 2 |
| MW-29S | <1 | <1 | 2 |
| MW-3S | 8 | 29 | 180 |
| MW-31S | <1 | 3 | 2 |
| MW-4S | <50 | 170 | 2100 |

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*Table 4-2. Summary of TCE, DCE, and VC concentrations*

| *Previously installed wells* | | | |
|---|---|---|---|
| **Well Number** | **Compound Concentrations (ug/L)** | | |
| | VC | DCE | TCE |
| MW-4D | <1 | <1 | 6 |
| MW-14S | <50 | 100 | 1600 |
| MW-14D | <2 | 12 | 71 |
| MW-14I/D | <1 | 14 | 39 |
| MW-22I | <5 | 97 | 210 |
| MW-23S | <1 | <1 | <1 |
| MW-23I | <1 | <1 | <1 |
| MW-15S | 100 | 300 | 39 |
| MW-14C | <1 | <1 | <1 |
| MW-20B | 78 | 150 | 100 |
| MW-25BR | <1 | <1 | <1 |
| MW-25S | <1 | <1 | <1 |
| MW-35S | <1 | <1 | <1 |
| MW-38S | 4 | 88 | 14 |
| MW-39S | <1 | <1 | <1 |
| MW-37S | <20 | 100 | 620 |
| MW-35I | <1 | 33 | 25 |
| MW-42S | <1 | <1 | <1 |
| MW-19I | 7 | 10 | 37 |
| MW-27S | <1 | <1 | 3 |
| MW-36S | 45 | 140 | <5 |

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| *Newly Installed Wells* | | | | |
|---|---|---|---|---|
| **Well Location** | | **Compound Concentrations (ug/L)** | | |
| Well Information | Number | VC | DCE | TCE |
| South Meadow Road (North) | MW-43S | <1 | <1 | <1 |
| | MW-44S | <1 | 20 | 120 |
| Neighborhood | MW-45S | <1 | 5 | 1 |
| | MW-46S | <2 | 55 | 110 |
| | MW-51S | 2 | 63 | 40 |
| South Meadow Road (South) | MW-47S | <1 | 33 | 76 |
| | MW-48S | <1 | 12 | 12 |
| Bedrock Well | MW-47BR | 13 | 47 | 53 |
| Intermediate Well | MW-48I | <1 | 6 | 2 |
| | MW-49I | <1 | <1 | 5 |
| | MW-50I | 8 | 40 | 21 |
| Intermediate/ Deep Well | MW-14I/D | <1 | 14 | 39 |
| | MW-24I/D | <1 | <1 | <1 |

Source O'Brien & Gere Engineers, Inc.

### 4.2.2. Intermediate ground water

Three additional intermediate ground water monitoring wells were installed during the Phase IIB program at the following locations:

- MW-50I - In the waste storage yard to assess intermediate ground water quality in the source area.
- MW-49I - Proximate to the down gradient southeastern edge of the northern plume.
- MW-48I - Proximate to the down gradient southwestern edge of the southern plume.

HVOCs were detected at concentrations less than 100 ug/L in MW-50I during the Phase IIB sampling event. The concentrations of these constituents were

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similar to or less than those detected at other intermediate wells in th such as MW-4I and MW-14I. Based on this data, the extent of HVOCs intermediate ground water at this suspected source area appears to be defi

HVOCs were detected at concentrations less than 10 ug/L in the MW-4 MW-49I. The concentrations of TCE, DCE, and VC that were obse during the Phase IIB sampling event are presented on Figures 9 throu Concentrations of these HVOCs are also summarized in Table 4-2.

As shown by these figures, the extent of the northern and so intermediate ground water plumes has been well established to concent of approximately 10 ug/L of less for these constituents.

### 4.2.3. Intermediate/Deep ground water

Two intermediate/deep ground water monitoring wells were installed at nests 14 and 24 which were the two locations on site that exhibited the l concentrations of HVOCs in ground water. The objective intermediate/deep wells was to further characterize the vertical concentr profile for HVOCs in these impact areas and to assess wheth intermediate/deep ground water unit is represented a potential mi pathway; and to investigate the possibility of dense non-aqueous phase li (DNAPL).

Monitoring well MW-24I/D was installed in the northern portion of the and screened at a depth between MW-24I and MW-24D. Phase IIB water sampling results for TCE, DCE, and VC in Table 4-3.

*Table 4-3. Well nest 24 HVOC data summary*

| Well number | Compound Concentrations (ug/L) | | |
|---|---|---|---|
| | TCE | DCE | VC |
| MW-24I | 5,300 | <70 | <100 |
| MW-24I/D | <1 | <1 | <1 |
| MW-24D | <1 | <1 | <1 |

Source: O'Brien & Gere Engineers, Inc.

The data at the monitoring well nest indicates that HVOCs in ground wat this location are likely to extend to a depth of 45 feet or less.

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Monitoring well 14I/D was installed in the waste storage yard and screened at a depth between the screened intervals of MW-14I and MW-14D. Ground water results for TCE, DCE, and VC are summarized in Table 4-4.

*Table 4-4. Well nest 14 HVOC data summary*

| Well number | Compound Concentrations (ug/L) | | |
|---|---|---|---|
| | TCE | DCE | VC |
| MW-14I | 4,400 | <1 | <1 |
| MW-14I/D | 39 | 14 | <1 |
| MW-14D | 71 | 12 | <2 |
| Notes: Phase IIA data presented for MW-14I | | | |

Source: O'Brien & Gere Engineers, Inc.

The ground water data indicates that these HVOCs are present at concentrations that are an order of magnitude less in the intermediate/deep and the intermediate ground water units. Concentrations of HVOCs were less than 100 ug/L and similar in magnitude at monitoring wells MW-14I/D and MW-14D. Concentrations greater than 100 ug/L appear to be limited to a depth of 45 feet or less.

### 4.2.4. Bedrock water

Bedrock monitoring well MW-47BR was installed off the southeast corner of the main shipping building. The well was installed approximately 30 feet into bedrock as described in section 2.2.4.

Ground water sampling results for TCE, DCE, and VC are summarized in Table 4-5.

*Table 4-5. Bedrock well HVOC data summary*

| Well number | Compound Concentrations (ug/L) | | |
|---|---|---|---|
| | TCE | DCE | VC |
| MW-47BR | 53 | 47 | 13 |

Source: O'Brien & Gere Engineers, Inc.

Close File



## 4.3. Private irrigation well

On September 25, 1997, a water sample was collected from the P irrigation well located to the north as shown by Figure 2. This well is r to be shallow, approximately 15 feet deep, and is used for gardening occasionally fill a swimming pool. The water sample was analyz HVOCs be EPA Method 8021. HVOCs were not detected in the san detection limits ranged from 0.5 ug/L to 10 ug/L. Detection limits of were reported for TCE, DCE, and VC.

Based on the results of this sampling event, site related constituent appear to have impacted the Perkins Well. This finding is consistent w shallow ground water characterization described in Section 4.2.1 radius of influence (50 feet) which was estimated using cons assumptions during the Phase IIA Program.

The data from the sampling event was transmitted to Dr. John Steele on October 20, 1997. Copies of the transmittal letter and laboratory rep provided in Appendix B.

## 4.4. Free phase product investigation

### 4.4.1. Product gauging well installations

Three monitoring wells (PG-1, PG-2, and PG-3) were installed at l near monitoring well MW-18S. Monitoring well MW-18S had his exhibited approximately six inches of free phase product. The additiona were completed to assess the extent of free phase oil in this area.

Oil sheens were observed on the ground water at these additional mon well locations, however, free phase oil was not observed during the P program or during subsequent gauging events.

### 4.4.2. Immediate response action (IRA) summary

Based on the presence of free phase oil at the site, the Massac Department of Environmental Protection (MADEP) requi implementation of an IRA to comply with the requirements in the M IRA has been on-going at the site since July 1996.

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Status reports on the IRA are complied on a six month schedule and the USEPA has been copied on the submittals made to the MADEP. The IRA has consisted primarily of the bail down and recovery of product from monitoring wells MW-18S and MW-20S and the gauging for product in nearby monitoring wells.

Figure 12 presents the graphical representation of product thickness at MW-18S and MW-20S. As shown by the figure, product thickness at both wells decreased following initial bailing efforts and have stabilized to approximately 1-2 inches at MW-20S and 6-8 inches at MW-18S. The long term monitoring data indicates that on-going sources of the free phase oil are not present and that the free phase oil is likely related to historical releases at the above-ground oil storage tank farm (MW-20S) and a rolling press machine formerly located in the Rim Room (MW-18S).

### 4.4.3. Extent of free phase oil

Figure 13 depicts the aerial extent of free phase oil at the site. Data from the Phase IIB program, on-going product gauging events, and previous investigations has been used to depict the extent of free phase oil. As shown by the figure, the extent of free phase oil at MW-20S appears to be limited to an area down gradient of the above-ground storage tank farm that had also exhibited petroleum impacted soil. The extent of the free phase oil at MW-18S appears to be limited to an area beneath the Rim Room. The extent of free phase has been characterized by the investigations performed at the site.

## 4.5. Ground water fate and transport modeling

Section 6.4 of the Phase IIA Investigation presented the results of a stochastic ground water solute transport model to estimate possible constituent concentrations in ground water. The model was used to estimate TCE concentrations in shallow ground water at MW-33S and a location next to the Little River. Estimates of TCE concentrations were made for current conditions and at 30 years.

The modeled TCE concentrations were then used in a calculation to estimate potential current and future mass loading of TCE to the Little River. The potential concentration of TCE in the Little River was estimated to be 0.001 ug/L.

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The results of the stochastic model were qualitatively assessed based consideration of the ground water data collected during the Phase IIB Progr The model was calibrated based on the TCE concentration at MW-33S, wl was 8 ug/L, during the Phase IIA Program. The calibration simu provided estimated concentrations of TCE at probability values of 75 . ug/L), 95% (29 ug/L) and 99% (41 ug/L). Estimated mass loading rates TCE were based on data from the 99% probability

TCE was detected in MW-33S at a lower concentration (4 ug/L verus 8 u during the Phase IIB Program. The Phase IIB data indicates that th concentrations provided during the Phase IIA modeling effort rep conservative estimates that reflect the high range of potential concentrat for current and future concentrations of TCE at MW-33S and the Little

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# 5. Soil gas survey and soil sampling results summary

## 5.1. Basis for sampling locations

A soil gas survey was performed during the Phase IIB program in accordance the methods described in section 2.3 and information presented in a proposed procedure transmittal to USEPA on October 25, 1997.

Seven soil gas sampling stations were located based on an assessment of ground water screening data, that was described in section 4.1, and historical ground water quality data. The locations were selected to correspond to areas where elevated constituents were detected in ground water next to residential dwellings. The objective of the survey was to provide soil gas data indicative of a potential "worst case" exposure scenario. Soil gas samples were collected approximately two feet above the static water table.

Five soil gas samples (SG-32, SG-51, SG-55, SG-61, and SG-62) were collected from residential properties along Cycle Street and two samples (SG-50 and SG-54) were collected beyond Toledo Avenue in an area along the migration pathway of the plume emanating from the area of well nest 24. A duplicate sample was collected near SG-32 since monitoring well MW-32S in this area had exhibited the highest concentrations of VC during the Phase IIA program. The actual locations sampled during the Phase IIB program correspond to the locations proposed in the procedure transmittal to USEPA on October 27, 1997.

## 5.2. Sampling results summary and risk screening

Soil gas samples were analyzed for TCE, DCE, and VC. TCE was detected at all seven sampling locations at concentrations ranging from approximately 6 parts per billion per volume (ppbv) to 2,300 ppbv. DCE was detected at all seven sampling locations at concentrations ranging from 14 ppbv to 280 ppbv. Vinyl chloride was detected at 1.6 ppbv at SG-51 and at 6.4 ppbv at SG-32.

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Sampling results are summarized in Table 5-1 and compared to the resic volatilization criteria for soil vapor listed in the Connecticut Departm Environmental Protection's (CDEP) remedial standards. As shown by T 5-1, the volatilization criteria were not exceeded for TCE and VC; DC not have an established criterion.

*Table 5-1. Soil gas results.*

| Sample ID | Compound Concentrations (ppbv) | | |
|---|---|---|---|
| | VC (1000*) | DCE | TCE (7000*) |
| SG-55 | <14 | 130 | 2300 |
| SG-32 | 6.4 | 280 | 61 |
| DUP1 (SG-32) | 6.1 | 200 | 58 |
| SG-61 | <3.4 | 54 | 710 |
| SG-62 | <1.2 | 14 | 6.3 |
| SG-64 | <1.1 | 79 | 340 |
| SG-50 | 1.6 | 92 | 400 |
| SG-51 | <1.4 | 18 | 25 |
| Lab Blank | <0.5 | <0.5 | <0.5 |

Notes:

* *"Residential Volatilization Criteria for Soil Vapor established for the Connec DEP's Remedial Standards"*, January 30, 1996.

Residential Volatilization criteria not established for cis-1,2-Dichloroethene.

Source: O'Brien & Gere Companies

## 5.3. Soil sampling evaluation

Soil samples collected from depths of 0-2 ft, 5-7 ft, and 10-12 ft fror boring installed at MW-50I were submitted for laboratory analy HVOCs, metals, and PAHs. Constituents detected were compared to Region III risk based concentrations (RBCs) for industrial and resid receptors which was consistent with the method employed during th

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IIA Program. Soil sampling results are summarized on tables presented in Appendix I.

**Metals.** Metals were detected at concentrations below RBCs with the exception of lead in the 0-2 ft sample. Lead was detected at 650 mg/kg which exceeded the criteria for industrial and residential receptors (based on MCP Method 1 criteria due to the absence of USEPA Region III standards for lead). The lead concentrations were below industrial and residential criteria for the 5-7 ft and 10-12 ft samples.

The exceedance of lead at this location is consistent with the Phase IIA Program data that identified exceedances of industrial RBCs in the general area as shown in Figure 12A of the Phase IIA Report.

**PAHs.** PAHs were detected in the 0-2 ft and 5-7 ft samples and were not detected in the 10-12 ft sample. Industrial RBCs were not exceeded in these samples. Residential RBCs were exceeded for benzo(a)pyrene (0-2 ft and 5-7 ft) and benzo(b)fluoranthene (0-2 ft). The detection of PAHs in the sampling location is consistent with the Phase IIA Data which identifies exceedances of industrial RBCs in the Waste Storage Yard as shown by Figure 12.

**HVOCs.** Trichloroethene was detected at 10 mg/kg in 0-2 ft, 0.004 mg/kg in the 10-12 ft sample, and was not detected in the 5-7 ft sample. The TCE concentrations were less than the industrial RBCs. Chloroform was detected at 0.002 mg/kg in the 10-12 ft sample.

The soil sampling data collected from MW-50I were similar in nature to the soil data collected to characterize the Waste Storage Yard during the Phase IIA Program. The exceedances of RBCs in the 0-2 ft sample for PAHs and lead were consistent with maps depicting the presence of the constituents in the Phase IIA Report. TCE was detected at a concentration of 10 mg/kg in the 0-2 ft samples at MW-50I which was higher than the TCE concentrations observed during the Phase IIA Program.

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# 6. Conclusions

The following subsections provide a summary of the findings developed from the Phase IIB Program. The objective of the Program was to collect the information required to address data gaps identified following completion of the Phase IIA Program. As described in the previous sections the field sampling program was undertaken in accordance with the Scope of Work that was conditionally approved by the USEPA.

## 6.1. Data quality summary

Analytical data were evaluated through a data validation process described in Section 3 of this report. Data collected during the Phase IIB Program exceeded the data quality objective of 95% established in the Project Operations Plan (POP) and less than 1% of the data were rejected.

Split samples were collected by USEPA's contractor from ten monitoring wells during the Phase IIB Program. Data usability was estimated to be 100% based on relative percent difference (RPDs ranged from 0% to 33%) which met RPD criteria for field duplicates.

## 6.2. Ground water quality summary

Additional ground water monitoring wells were installed during the Phase IIB Program to further characterize the nature and extent of constituents in ground water at the site. A ground water sampling round was performed for wells installed during the Phase IIA and Phase IIB Program.

### 6.2.1. Shallow ground water

<u>Northern Plume</u>
The limits of the northern ground water plume, extending towards South Meadow Road and the Little River, have been characterized to HVOC

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concentrations of 10 ug/L or less. The limits of the northern plu appear to be influenced by utility lines in the area of Cycle Street and Street have been characterized to concentrations of 100 ug/L or less for and DCE and 10 ug/L or less for vinyl chloride.

Southern Plume

The extent of the southern plume extending onto the nearby tobac property has been characterized to concentrations of approximately or less for HVOCs.

### 6.2.2. Intermediate ground water

The additional intermediate monitoring wells installed during the Ph Program provided data for characterize the limits of the northern and intermediate ground water plumes has been characterized to concentrati approximately 10 ug/L or less for HVOCs. The intermediate monitor installed in the Waste Storage Yard (MW-50I) identified HVOC conc which were less than 100 ug/L.

These HVOC concentrations were similar to conditions observed at and MW-14I. HVOC concentrations in the intermediate ground wat Waste Storage Yard did not suggest the presence of dense non-aqueous liquid (DNAPL) in this unit.

### 6.2.3. Intermediate/deep ground water

The intermediate/deep (I/D) ground water monitoring wells were ins well nests 14 and 24 to vertically profile HVOCs in the suspected areas. The I/D well at nest 24 did not contain HVOCs which indic HVOCs in the source area extend to a depth of 45 feet or less. The at nest 14 exhibited HVOC concentrations less than 100 ug/L whic similar in magnitude to those detected in the D well at this location. this data, concentrations of HVOCs greater than 100 ug/L appear to b to ground water located at a depth of 45 feet or less.

Data collected from the I/D wells did not suggest the presence of D this unit.

### 6.2.4. Bedrock water

A bedrock well was installed on the down gradient portion of the sc plume. HVOCs were detected in MW-47BR at concentrations less

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ug/L. The HVOC concentrations were similar in magnitude to those observed in the deep monitoring wells in the area such as MW-14D and MW-9D.

## 6.4. Free phase product

The extent of free phase product near the Rim Room and Above Ground Storage Tank Farm has been characterized by the site investigations completed during the Phase IIA and Phase IIB Programs.

On-going product gauging and bailing efforts at the site have shown that product thickness in these wells have stabilized and that there does not appear to be on-going source(s) of release in these areas.

## 6.5. Soil gas survey

A soil gas survey was performed near residential properties along Cycle Street. The objective of the soil gas survey was to provide soil gas data representative of a potential "worst case" exposure scenario.

Soil gas data was compared to risk criteria developed by the Connecticut Department of Environmental Protection (DEP) to assess the risk associated with residential exposure. The soil gas concentrations detected were below these risk criteria.

## 6.6. Soil sampling data

Soil samples were collected for laboratory analyses from boring MW-50I installed in the Waste Storage Yard. The soil sample collected from 0-2 ft depth exhibited PAHs and lead at concentrations greater than the RBCs and TCE was detected a 10 mg/kg. PAHs and metals were observed at concentrations exceeding RBCs at locations in and around the Waste Storage Yard during the Phase IIA Program. The Phase IIB data at MW-50I is consistent with the historic data.

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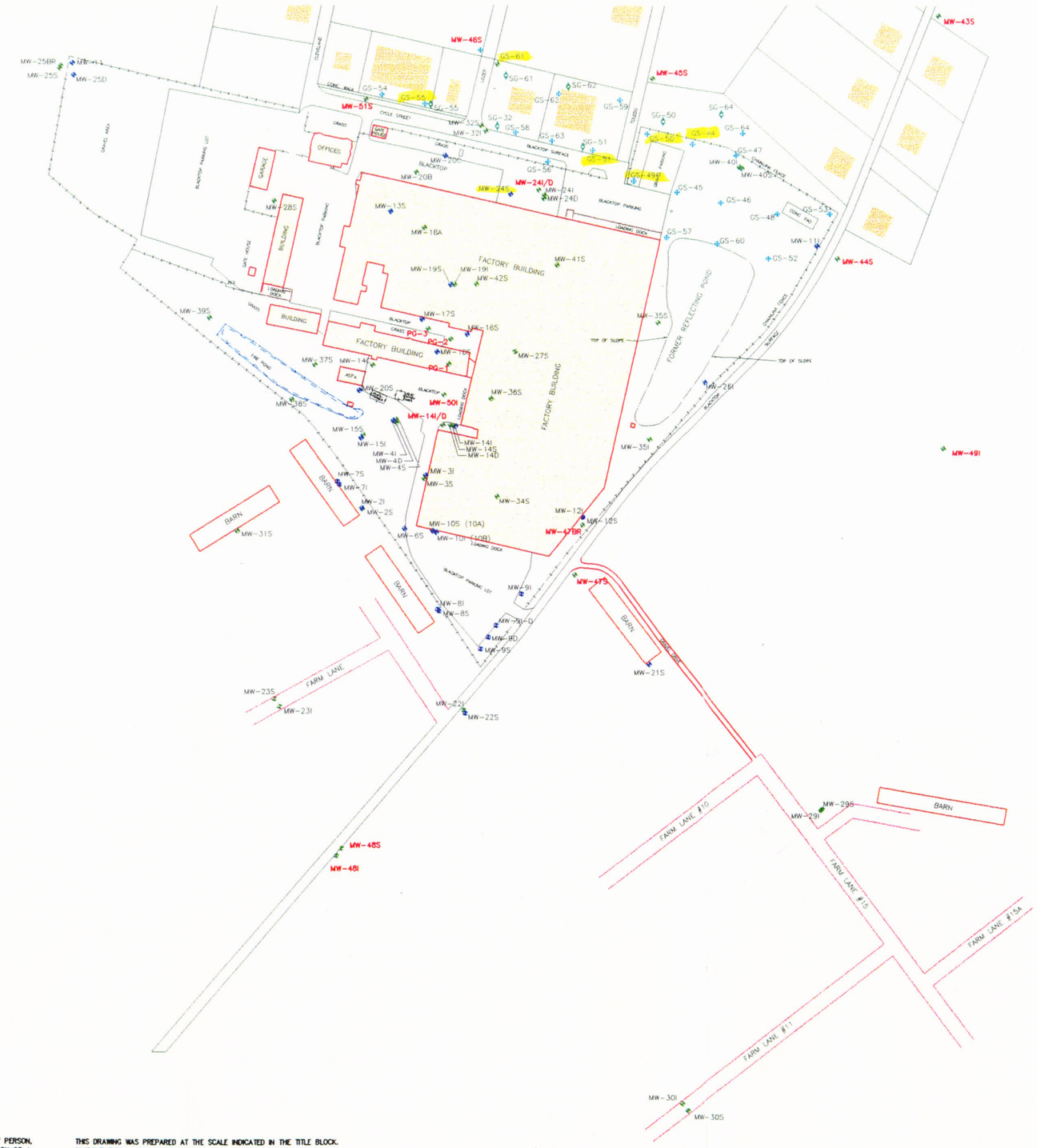


## LEGEND

| | |
|---|---|
| MW-41S | EXHISTING MONITORING WELL LOCATION |
| MW-42S | MONITORING WELL SAMPLED DURING PHASE IIB EFFORTS |
| MW-42S | NEWLY INSTALLED MONITORING WELL LOCATION |
| GS-64 | GROUND WATER SCREENING LOCATION |
| SG-32 | SOIL GAS SAMPLING LOCATION |
| MW-47BR | BEDROCK MONITORING WELL |

Horizontal Datum: Massachusetts Coordinates, NAD83
Vertical Datum: City of Westfield, DPW
BM: Southwest corner of concrete pad for sewer manhole on south side of Cycle Street opposite the intersection with Lozier Avenue. Elev. = 89.48 feet

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O'BRIEN & GERE ENGINEERS INC.

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WESTFIELD, MASSACHUSETTS

# SAMPLING LOCATION MAP

FILE NO. 6378.002-800
DATE February 1998

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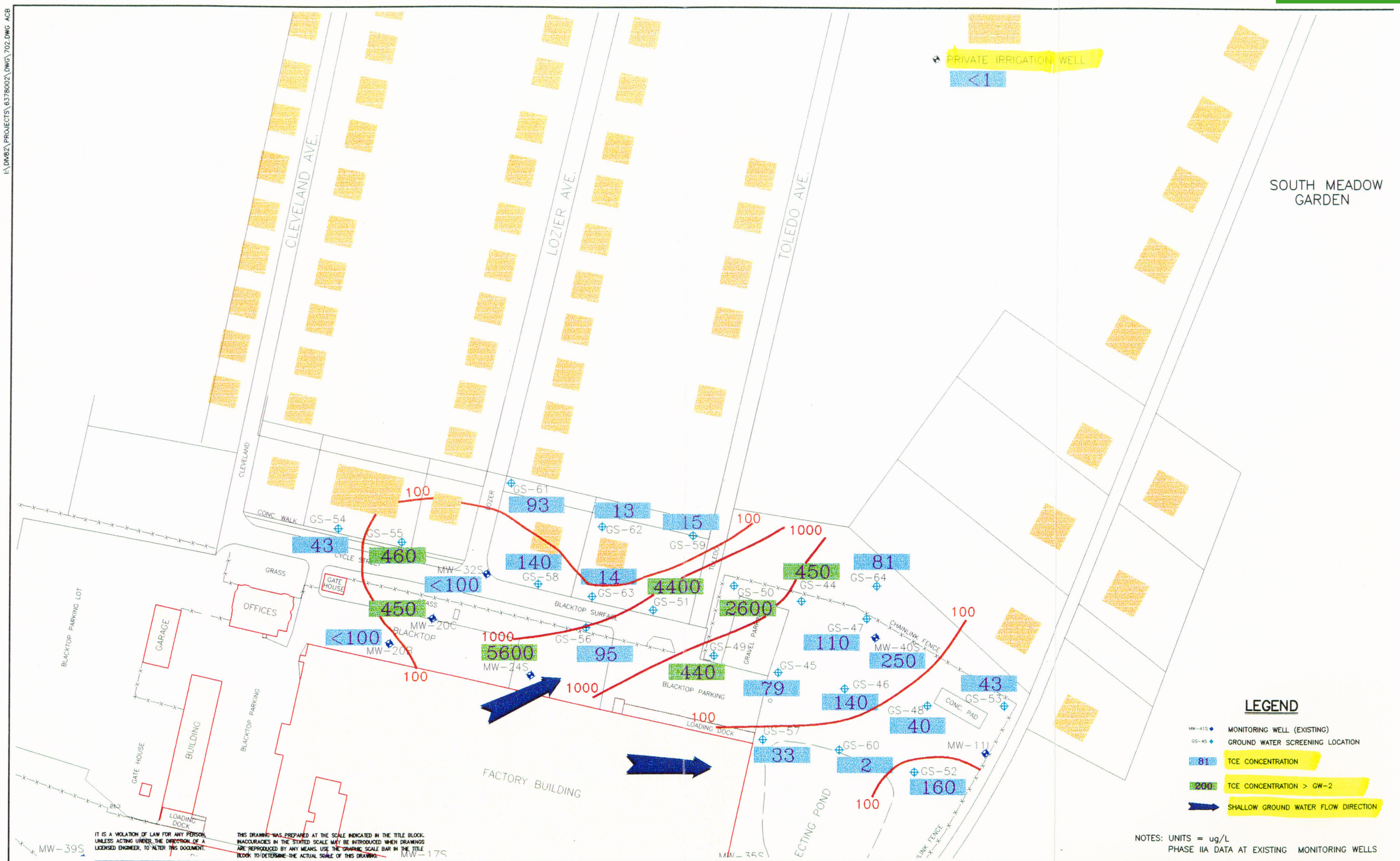


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## LEGEND

- MW-41S — MONITORING WELL (EXISTING)
- GS-45 — GROUND WATER SCREENING LOCATION
- 81 — TCE CONCENTRATION
- 200 — TCE CONCENTRATION > GW-2
- SHALLOW GROUND WATER FLOW DIRECTION

NOTES: UNITS = ug/L
PHASE IIA DATA AT EXISTING MONITORING WELLS

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WESTFIELD, MASSACHUSETTS

GROUND WATER SCREENING
OCTOBER 1997

# TCE CONCENTRATIONS IN SHALLOW GROUND WATER

FILE NO. 6378.002-702
DATE Oct 1997

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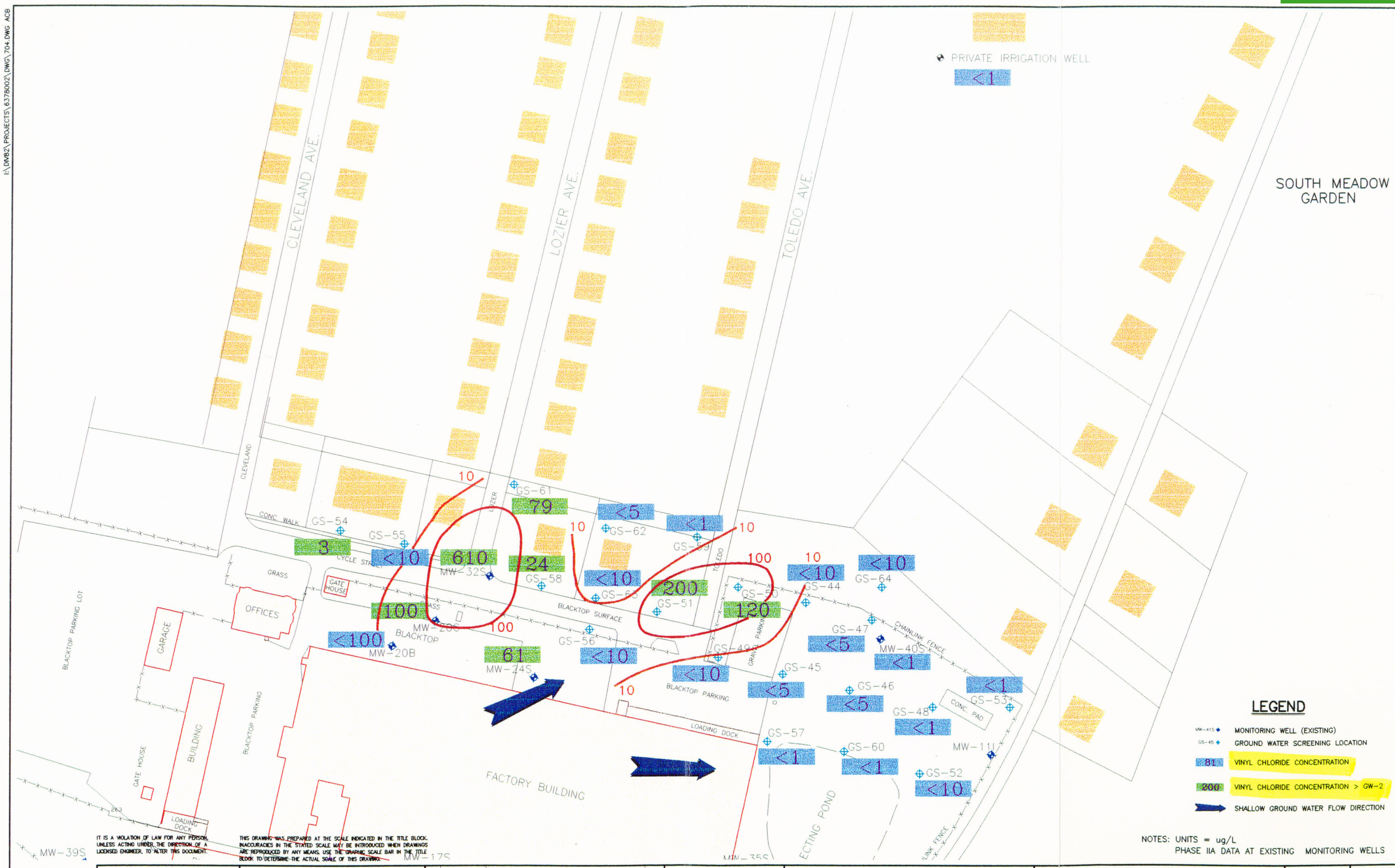


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GROUND WATER SCREENING
OCTOBER 1997

VINYL CHLORIDE CONCENTRATIONS IN SHALLOW GROUND WATER

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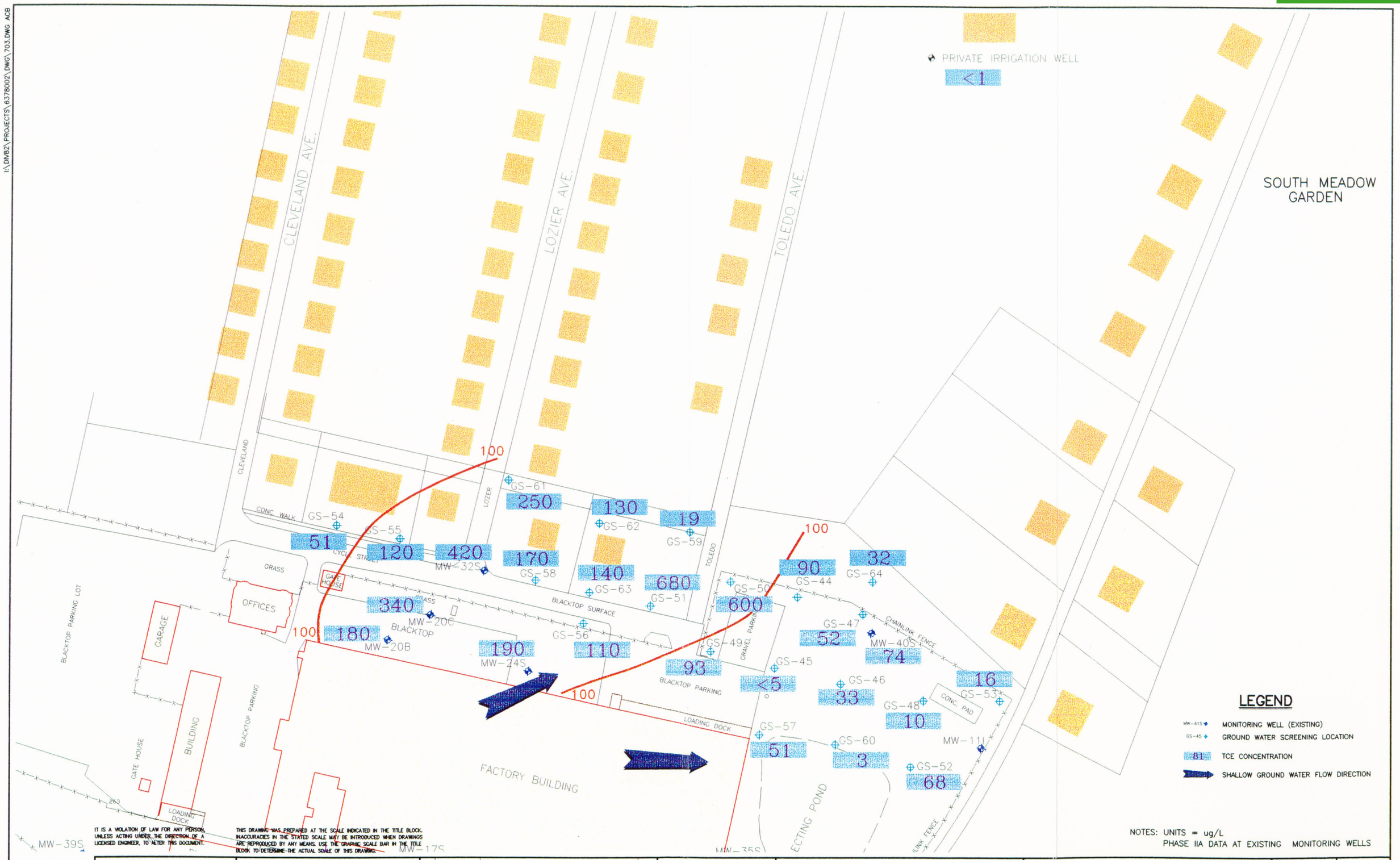


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GROUND WATER SCREENING
OCTOBER 1997

DCE CONCENTRATIONS IN SHALLOW GROUND WATER

FILE NO. 6378.002-703
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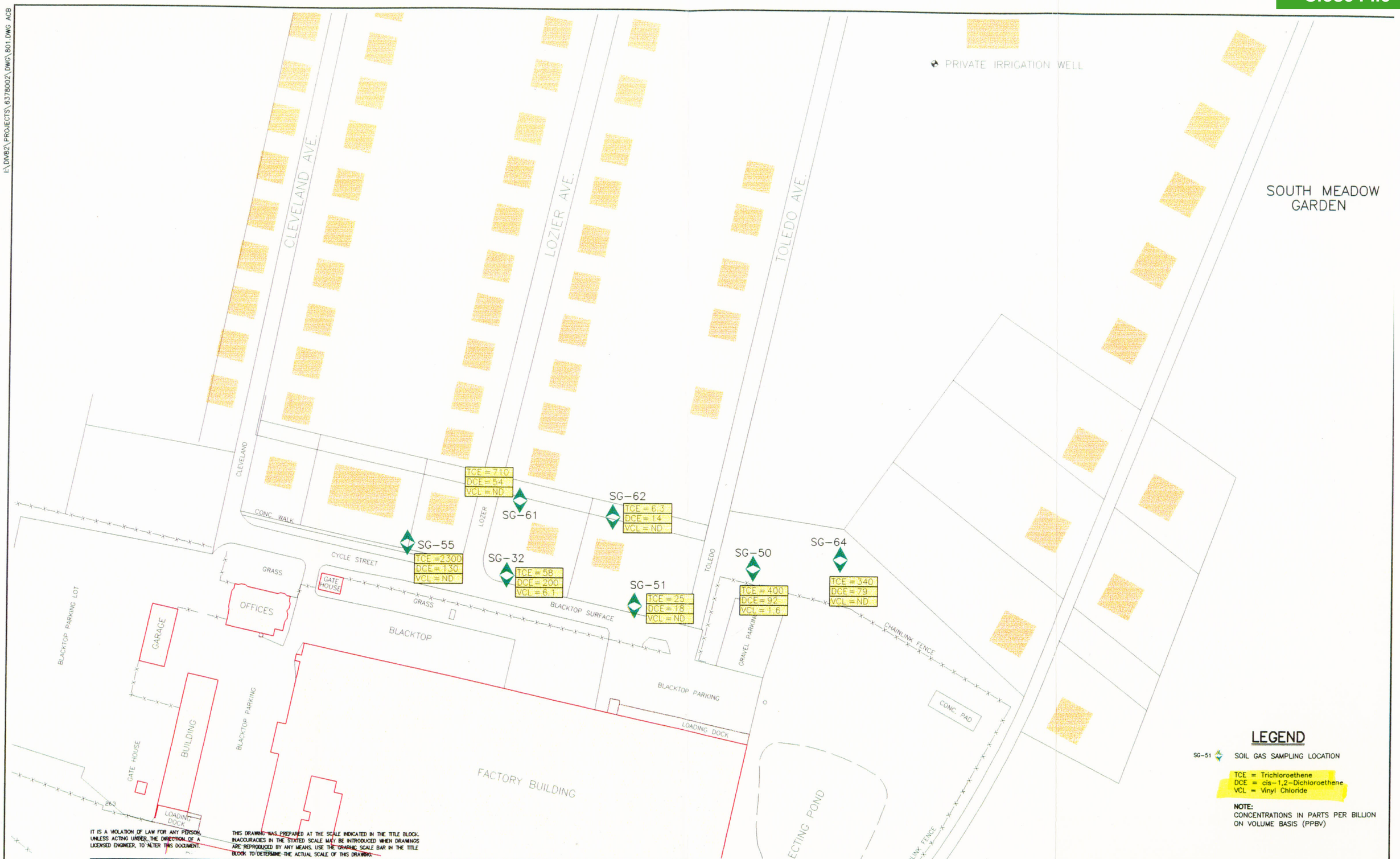


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SOIL GAS DATA SUMMARY MAP

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DATE February 1997

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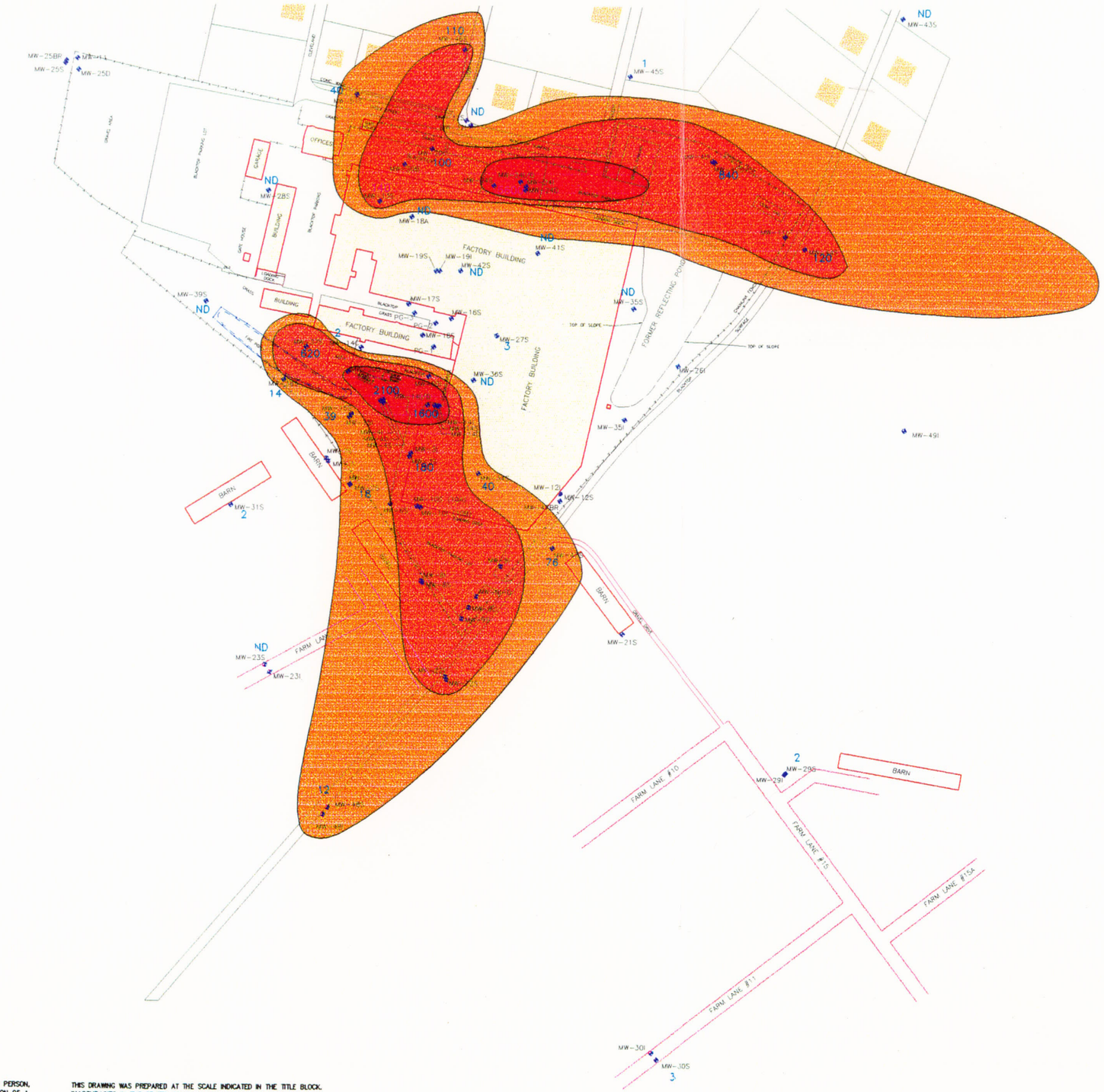


## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | TRICHLOROETHENE (TCE) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| 140 | TRICHLOROETHENE (TCE) CONCENTRATION (PPB) DATA IS FROM THE PHASE IIA PROGRAM |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |
| | PLUME CONCENTRATION 1000ppb |

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SHALLOW ZONE
# TRICHLOROETHENE (TCE) PLUME MAP

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DATE February 1998

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## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | cis-1,2-DICHLOROETHENE (DCE) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |
| | PLUME CONCENTRATION 1000ppb |

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SHALLOW ZONE
cis-1,2-DICHLOROETHENE (DCE)
PLUME MAP

FILE NO. 6378.002-802
DATE February 1998

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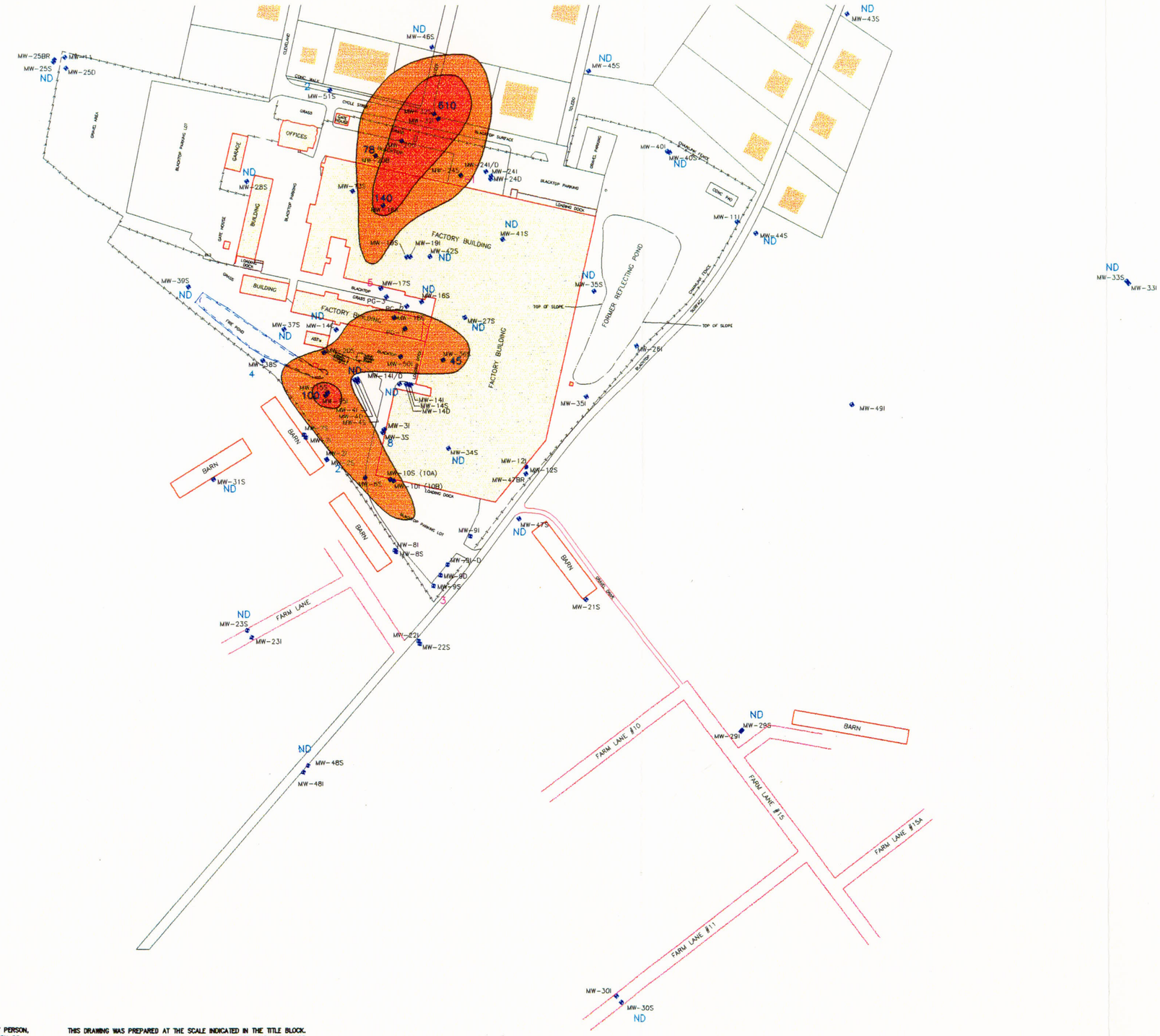


## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | VINYL CHLORIDE (VCL) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| 45 | VINYL CHLORIDE CONCENTRATION (PPB) DATA IS FROM THE PHASE IIA PROGRAM |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |

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IN CHARGE OF _____

DESIGNED BY _____ CHECKED BY _____

DRAWN BY _____

125 0 125 250

1" = 250'

| NO. | DATE | REVISION | INIT. |
|---|---|---|---|

O'BRIEN & GERE ENGINEERS INC.

MANUFACTURING COMPANY
WESTFIELD, MASSACHUSETTS

SHALLOW ZONE

# VINYL CHLORIDE (VCL) PLUME MAP

FILE NO. 6378.002-804

DATE February 1998

8

Close File

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## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | TRICHLOROETHENE (TCE) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| 140 | TRICHLOROETHENE CONCENTRATION (PPB) DATA IS FROM THE PHASE IIA PROGRAM |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |
| | PLUME CONCENTRATION 1000ppb |

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IN CHARGE OF _____
DESIGNED BY _____ CHECKED BY _____
DRAWN BY _____

125 0 125 250
1" = 250'

| NO. | DATE | REVISION | INIT. |
|---|---|---|---|

O'BRIEN & GERE ENGINEERS INC.

MANUFACTURING COMPANY
WESTFIELD, MASSACHUSETTS

INTERMEDIATE ZONE
# TRICHLOROETHENE (TCE) PLUME MAP

FILE NO. 6378.002-807
DATE February 1998

9

2/98

Close File

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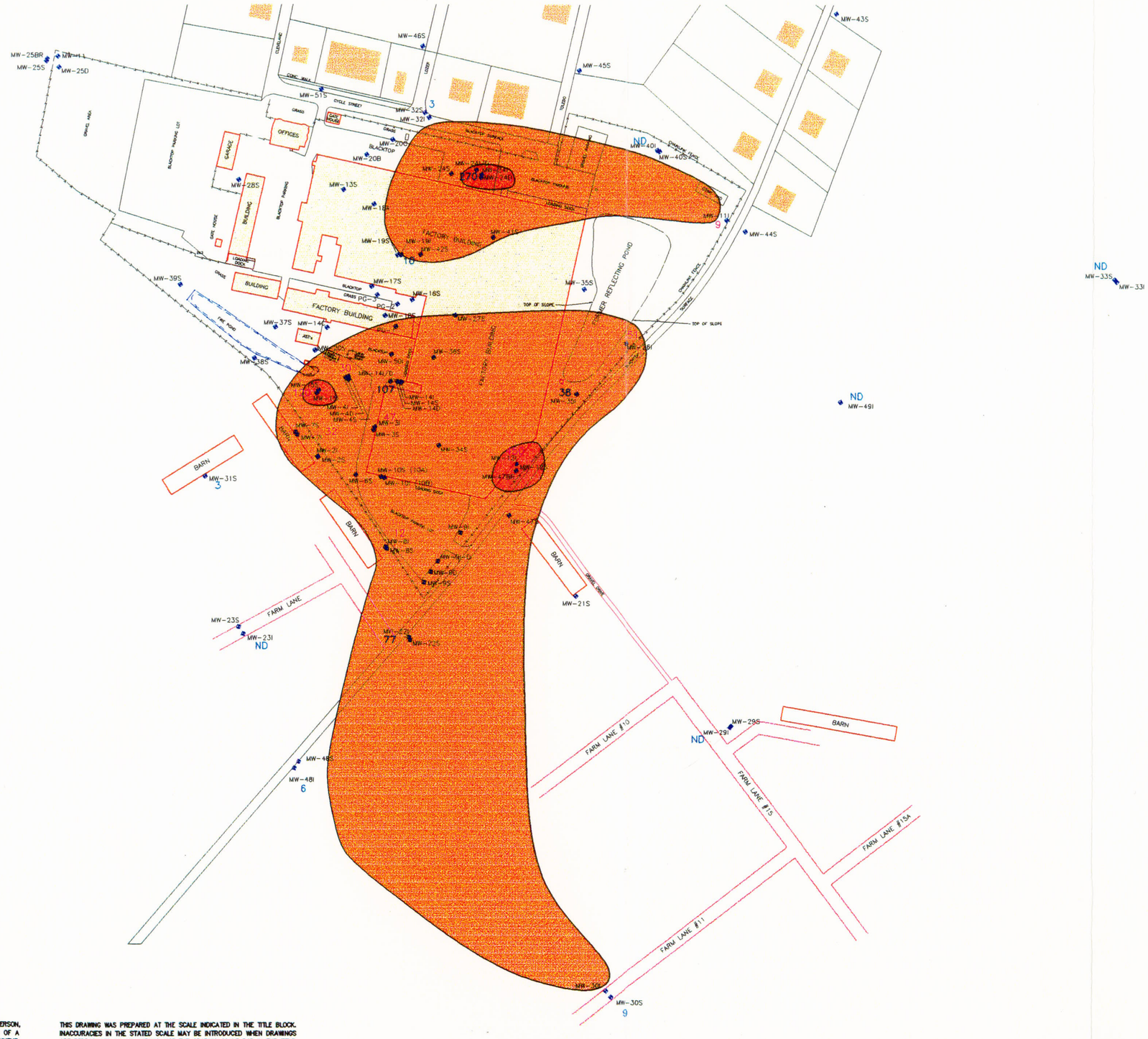


## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | Trichloroethene (TCE) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| 140 | cis-1,2-DICHLOROETHENE (DCE) CONCENTRATION (PPB) DATA IS FROM THE PHASE IIA PROGRAM |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |

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IN CHARGE OF _____

DESIGNED BY _____ CHECKED BY _____

DRAWN BY _____

125 0 125 250

1" = 250'

| NO. | DATE | REVISION | INIT. |
|---|---|---|---|

O'BRIEN & GERE ENGINEERS INC.

MANUFACTURING COMPANY
WESTFIELD, MASSACHUSETTS

INTERMEDIATE ZONE

# cis-1,2-DICHLOROETHENE (DCE) PLUME MAP

FILE NO. 6378.002-805

DATE February 1998

10

2/98

Close File

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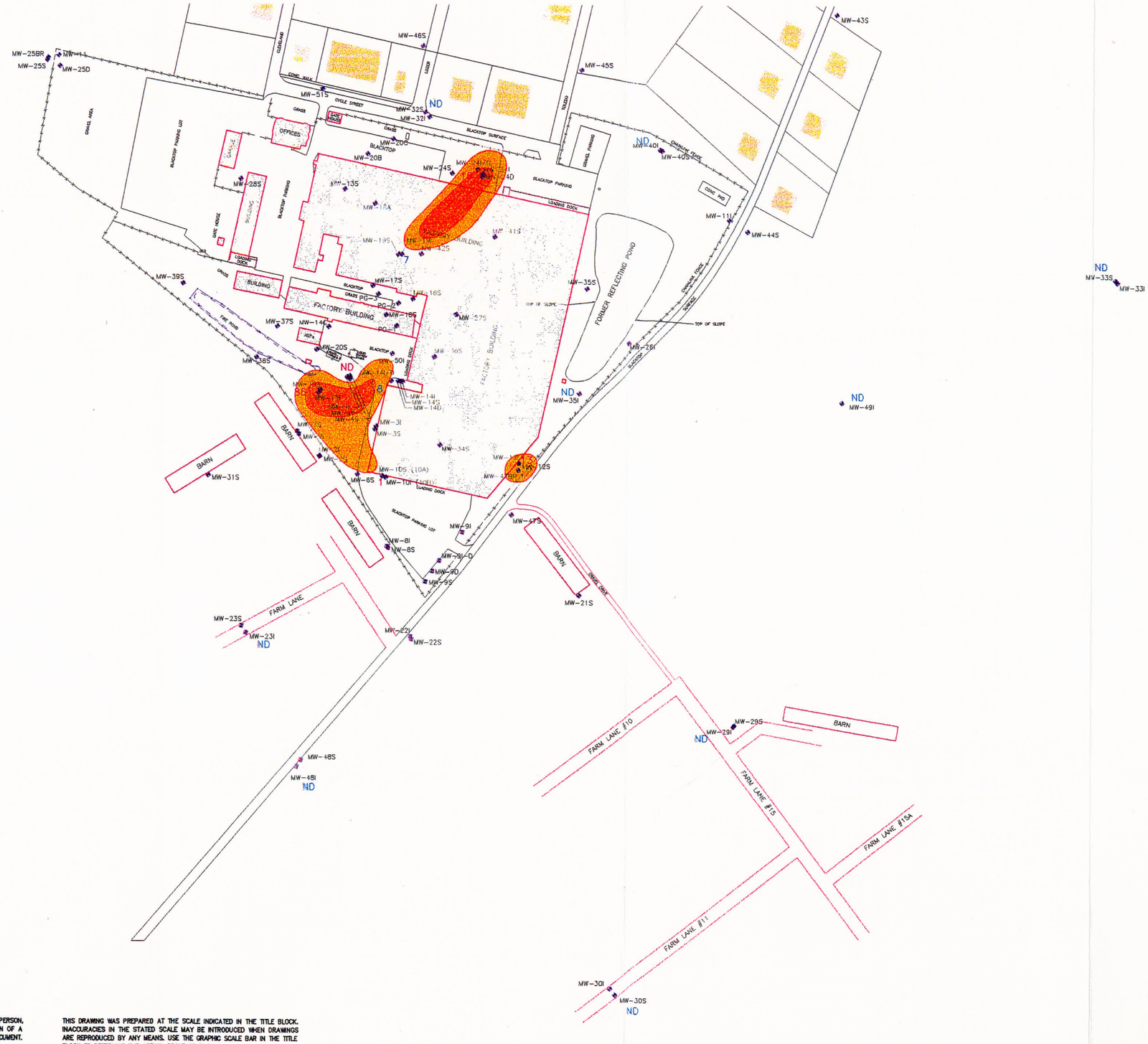


## LEGEND

| | |
|---|---|
| MW-41S | MONITORING WELL LOCATION |
| 55 | VINYL CHLORIDE (VCL) CONCENTRATION (PPB) |
| ND | NOT DETECTED |
| 140 | VINYL CHLORIDE (VCL) CONCENTRATION (PPB) DATA IS FROM THE PHASE IIA PROGRAM |
| | PLUME CONCENTRATION 10ppb |
| | PLUME CONCENTRATION 100ppb |

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IN CHARGE OF _____
DESIGNED BY _____ CHECKED BY _____
DRAWN BY _____

125 0 125 250
1"=250'

| NO. | DATE | REVISION | INIT. |
|---|---|---|---|

O'BRIEN & GERE ENGINEERS INC.

MANUFACTURING COMPANY
WESTFIELD, MASSACHUSETTS

INTERMEDIATE ZONE
VINYL CHLORIDE (VCL) PLUME MAP

FILE NO. 6378.002-806
DATE February 1998

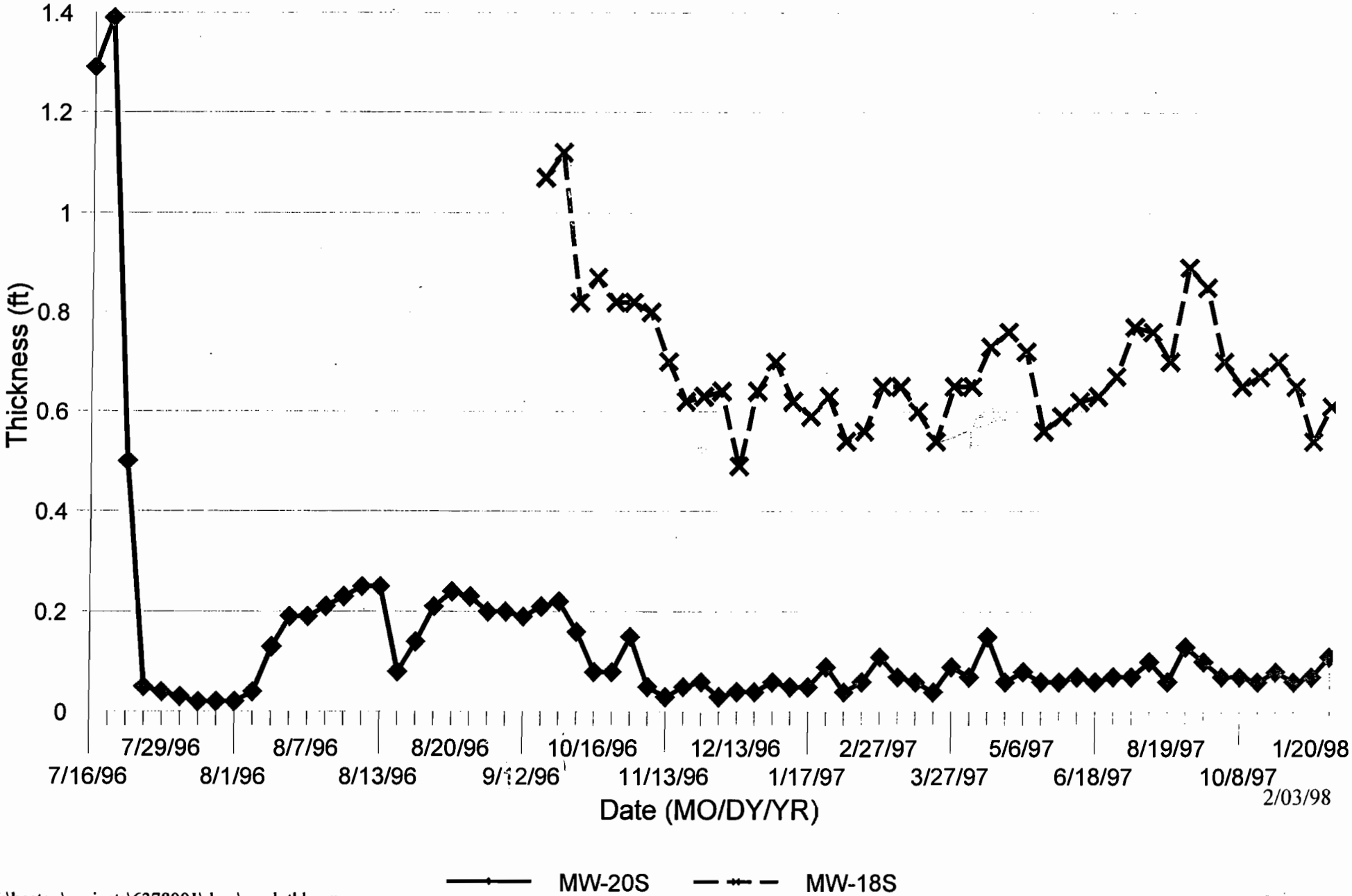
11

2/98

Close File

# Figure 12

## Product Thickness Monitoring Results (MW-18S and MW-20S)

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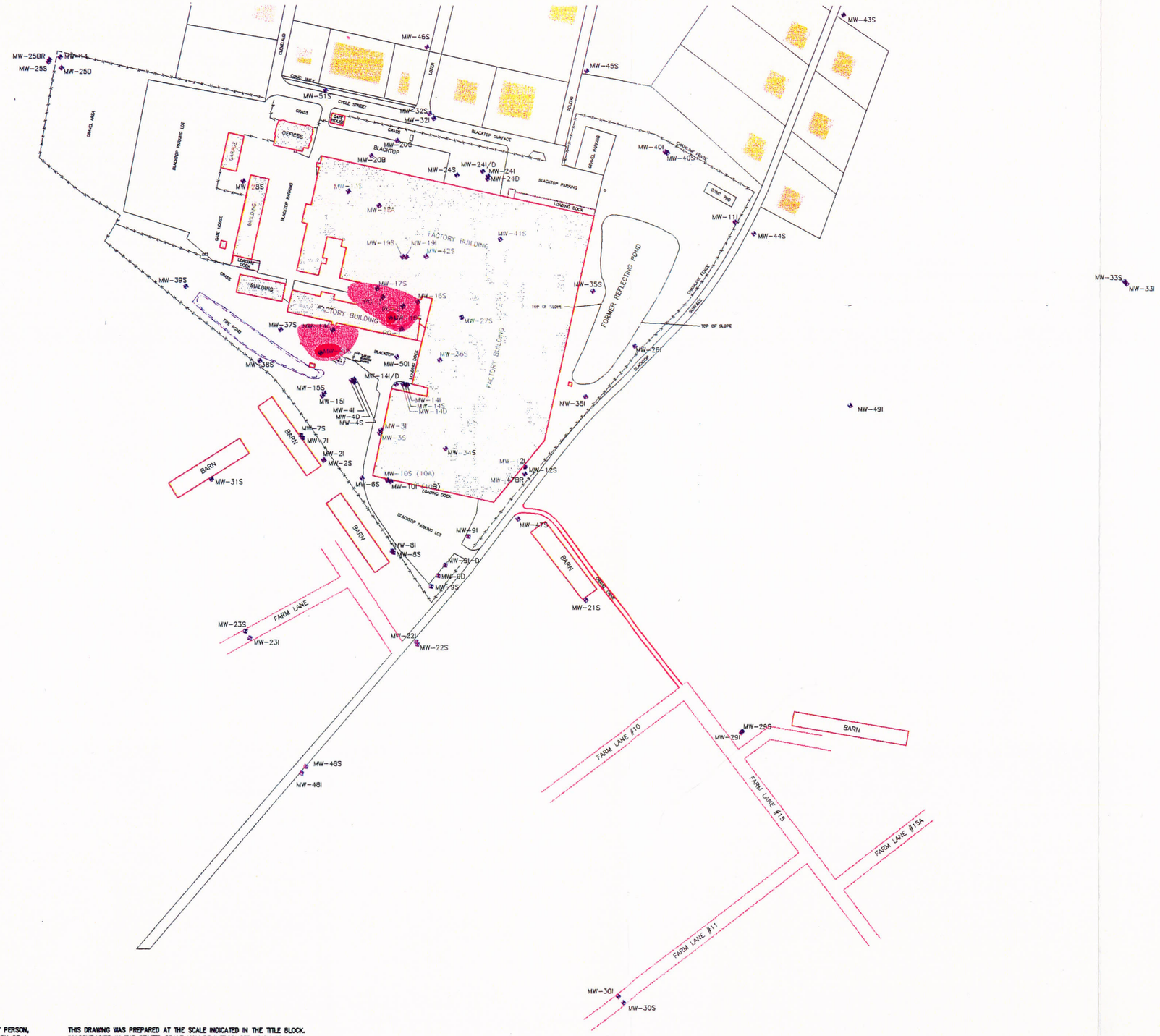


## LEGEND

MW-41S MONITORING WELL LOCATION

APPROXIMATE LIMITS OF FREE PHASE PETROLEUM

APPROXIMATE LIMITS OF SOIL/GROUND WATER WITH VISIBLE PETROLEUM SHEEN.

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IN CHARGE OF _____

DESIGNED BY _____ CHECKED BY _____

DRAWN BY _____

125 0 125 250

1" =250'

| NO. | DATE | REVISION | INIT. |
|---|---|---|---|

O'BRIEN & GERE ENGINEERS INC.

COLUMBIA MANUFACTURING COMPANY
WESTFIELD, MASSACHUSETTS

PETROLEUM
FREE PHASE & VISIBLE SHEEN PLUME MAP

FILE NO. 6378.002-808

DATE February 1998

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2/98

Close File

# Appendix A

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: ~~3802.003.517~~ 6378.002
Certification MA No.: NY034

Sample: G2208
Samp. Description: GS-62
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <5. | 1 | | |
| Bromodichloromethane | <5. | 1 | | |
| Bromoform | <25. | 1 | | |
| Bromomethane | <50. | 1 | | |
| Carbon tetrachloride | <5. | 1 | | |
| Chlorobenzene | <5. | 1 | | |
| Chloroethane | <5. | 1 | | |
| 2-Chloroethylvinyl ether | <50. | 1 | | |
| Chloroform | <5. | 1 | | |
| Chloromethane | <50. | 1 | | |
| Dibromochloromethane | <5. | 1 | | |
| 1,2-Dichlorobenzene | <25. | 1 | | |
| 1,3-Dichlorobenzene | <25. | 1 | | |
| 1,4-Dichlorobenzene | <25. | 1 | | |
| 1,1-Dichloroethane | 8. | 1 | | |
| 1,2-Dichloroethane | <5. | 1 | | |
| 1,1-Dichloroethylene | <5. | 1 | | |
| cis-1,2-Dichloroethylene | 130. | 1 | | |
| trans-1,2-Dichloroethylene | <5. | 1 | | |
| Dichloromethane | <5. | 1 | | |
| 1,2-Dichloropropane | <5. | 1 | | |
| cis-1,3-Dichloropropylene | <2. | 1 | | |
| trans-1,3-Dichloropropylene | <2. | 1 | | |
| Ethylbenzene | <5. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <5. | 1 | | |
| Tetrachloroethylene | <5. | 1 | | |
| Toluene | <5. | 1 | | |
| 1,1,1-Trichloroethane | <5. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2208
Samp. Description: GS-62
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <5. | 1 | | |
| Trichloroethylene | 13. | 1 | | |
| Trichlorofluoromethane | <5. | 1 | | |
| Vinyl Chloride | <5. | 1 | | |
| Xylenes (total) | <15. | 1 | | |
| 2-Chloropropane (surrogate) | 84.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2209
Samp. Description: GS-63
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 140. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2209
Samp. Description: GS-63
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 14. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 80.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2210
Samp. Description: GS-64
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 32. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2210
Samp. Description: GS-64
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 81. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 80.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2211
Samp. Description: DUP #1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 140. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2211
Samp. Description: DUP #1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 16. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 81.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2212
Samp. Description: DUP #2
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 56. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2212
Samp. Description: DUP #2
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 140. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 74.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2213
Samp. Description: EB-1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | <1. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2213
Samp. Description: EB-1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 10/07/97
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | <1. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 109.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2214
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected:
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | <1. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2214
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected:
Received: 10/08/97
Prepared:
Analyzed: 10/08/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | <1. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 86.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

¥ - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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Close File

# CHAIN OF CUSTODY RECORD

O'BRIEN & GERE LABORATORIES, INC.

5603

TAT - PER PAUL STEINBERG

3802-003-517

SURVEY: COLUMBIA MFG (MTO PRODUCTS)

SAMPLED BY: FJ FERREIRA / PC SAVAGE JR

LOCATION: WESTFIELD, MA

ORGANIZATION: O'BRIEN & GERE ENGINEERS

| STATION NUMBER | SAMPLE LOCATION | DATE COLLECTED | TIME COLLECTED | SAMPLE MATRIX | COMP. OR GRAB | NO. OF CONTAINERS | ANALYSIS REQUIRED |
|---|---|---|---|---|---|---|---|
| | GS-62 | 10-07-97 | 1300 | WG | GRAB | 2 | VOCs (8021) |
| | GS-63 | ↓ | 1125 | ↓ | ↓ | ↓ | ↓ |
| | GS-64 | ↓ | 1400 | ↓ | ↓ | ↓ | ↓ |
| | DUP #1 | ↓ | — | ↓ | ↓ | ↓ | ↓ |
| | DUP #2 | ↓ | — | ↓ | ↓ | ↓ | ↓ |
| | EB-1 | ↓ | — | AQ | — | ↓ | ↓ |
| | TRIP BLANK | — | — | WQ | — | 1 | ↓ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
|---|---|---|---|---|---|
| Pat Savage | 10-07-97 | 1800 | | | |
| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
| | | | | | |
| Relinquished By: | DATE | TIME | Received by Laboratory: Marla F. Jackson | DATE 10/8/97 | TIME 09:30 |

COMMENTS:

GS = GROUND WATER SCREENING

Rush turnaround time per Paul Steinberg - MS

Cooler temp - 4°C

METHOD OF SHIPMENT: AIRBORNE EXPRESS AIRBILL # 7787002145

CUSTODY SEAL # 96COL-074

O'BRIEN & GERE LABORATORIES, INC. an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1242
Samp. Description: GS-44
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 90. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | 19. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

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OCT 2 1997
O'BRIEN & GERE ENGINEERS, INC.
BOSTON, MASS.

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1242
Samp. Description: GS-44
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 450. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 91.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1243
Samp. Description: GS-45
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <5. | 1 | | |
| Bromodichloromethane | <5. | 1 | | |
| Bromoform | <25. | 1 | | |
| Bromomethane | <50. | 1 | | |
| Carbon tetrachloride | <5. | 1 | | |
| Chlorobenzene | <5. | 1 | | |
| Chloroethane | <5. | 1 | | |
| 2-Chloroethylvinyl ether | <50. | 1 | | |
| Chloroform | <5. | 1 | | |
| Chloromethane | <50. | 1 | | |
| Dibromochloromethane | <5. | 1 | | |
| 1,2-Dichlorobenzene | <25. | 1 | | |
| 1,3-Dichlorobenzene | <25. | 1 | | |
| 1,4-Dichlorobenzene | <25. | 1 | | |
| 1,1-Dichloroethane | <5. | 1 | | |
| 1,2-Dichloroethane | <5. | 1 | | |
| 1,1-Dichloroethylene | <5. | 1 | | |
| cis-1,2-Dichloroethylene | <5. | 1 | | |
| trans-1,2-Dichloroethylene | <5. | 1 | | |
| Dichloromethane | <5. | 1 | | |
| 1,2-Dichloropropane | <5. | 1 | | |
| cis-1,3-Dichloropropylene | <2. | 1 | | |
| trans-1,3-Dichloropropylene | <2. | 1 | | |
| Ethylbenzene | <5. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <5. | 1 | | |
| Tetrachloroethylene | <5. | 1 | | |
| Toluene | <5. | 1 | | |
| 1,1,1-Trichloroethane | <5. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1243
Samp. Description: GS-45
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <5. | 1 | | |
| Trichloroethylene | 79. | 1 | | |
| Trichlorofluoromethane | <5. | 1 | | |
| Vinyl Chloride | <5. | 1 | | |
| Xylenes (total) | <15. | 1 | | |
| 2-Chloropropane (surrogate) | 90.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1244
Samp. Description: GS-46
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <5. | 1 | | |
| Bromodichloromethane | <5. | 1 | | |
| Bromoform | <25. | 1 | | |
| Bromomethane | <50. | 1 | | |
| Carbon tetrachloride | <5. | 1 | | |
| Chlorobenzene | <5. | 1 | | |
| Chloroethane | <5. | 1 | | |
| 2-Chloroethylvinyl ether | <50. | 1 | | |
| Chloroform | <5. | 1 | | |
| Chloromethane | <50. | 1 | | |
| Dibromochloromethane | <5. | 1 | | |
| 1,2-Dichlorobenzene | <25. | 1 | | |
| 1,3-Dichlorobenzene | <25. | 1 | | |
| 1,4-Dichlorobenzene | <25. | 1 | | |
| 1,1-Dichloroethane | <5. | 1 | | |
| 1,2-Dichloroethane | <5. | 1 | | |
| 1,1-Dichloroethylene | <5. | 1 | | |
| cis-1,2-Dichloroethylene | 33. | 1 | | |
| trans-1,2-Dichloroethylene | <5. | 1 | | |
| Dichloromethane | <5. | 1 | | |
| 1,2-Dichloropropane | <5. | 1 | | |
| cis-1,3-Dichloropropylene | <2. | 1 | | |
| trans-1,3-Dichloropropylene | <2. | 1 | | |
| Ethylbenzene | <5. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <5. | 1 | | |
| Tetrachloroethylene | 8. | 1 | | |
| Toluene | <5. | 1 | | |
| 1,1,1-Trichloroethane | <5. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1244
Samp. Description: GS-46
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <5. | 1 | | |
| Trichloroethylene | 140. | 1 | | |
| Trichlorofluoromethane | <5. | 1 | | |
| Vinyl Chloride | <5. | 1 | | |
| Xylenes (total) | <15. | 1 | | |
| 2-Chloropropane (surrogate) | 87.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1245
Samp. Description: GS-47
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <5. | 1 | | |
| Bromodichloromethane | <5. | 1 | | |
| Bromoform | <25. | 1 | | |
| Bromomethane | <50. | 1 | | |
| Carbon tetrachloride | <5. | 1 | | |
| Chlorobenzene | <5. | 1 | | |
| Chloroethane | <5. | 1 | | |
| 2-Chloroethylvinyl ether | <50. | 1 | | |
| Chloroform | <5. | 1 | | |
| Chloromethane | <50. | 1 | | |
| Dibromochloromethane | <5. | 1 | | |
| 1,2-Dichlorobenzene | <25. | 1 | | |
| 1,3-Dichlorobenzene | <25. | 1 | | |
| 1,4-Dichlorobenzene | <25. | 1 | | |
| 1,1-Dichloroethane | <5. | 1 | | |
| 1,2-Dichloroethane | <5. | 1 | | |
| 1,1-Dichloroethylene | <5. | 1 | | |
| cis-1,2-Dichloroethylene | 52. | 1 | | |
| trans-1,2-Dichloroethylene | <5. | 1 | | |
| Dichloromethane | <5. | 1 | | |
| 1,2-Dichloropropane | <5. | 1 | | |
| cis-1,3-Dichloropropylene | <2. | 1 | | |
| trans-1,3-Dichloropropylene | <2. | 1 | | |
| Ethylbenzene | <5. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <5. | 1 | | |
| Tetrachloroethylene | <5. | 1 | | |
| Toluene | <5. | 1 | | |
| 1,1,1-Trichloroethane | <5. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1245
Samp. Description: GS-47
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 5 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <5. | 1 | | |
| Trichloroethylene | 110. | 1 | | |
| Trichlorofluoromethane | <5. | 1 | | |
| Vinyl Chloride | <5. | 1 | | |
| Xylenes (total) | <15. | 1 | | |
| 2-Chloropropane (surrogate) | 86.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1246
Samp. Description: GS-48
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 10. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | 1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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# O'Brien & Gere Laboratories, Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1246
Samp. Description: GS-48
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 09/24/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 40. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 93.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 101.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1897
Samp. Description: GS-49
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 93. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | 19. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1897
Samp. Description: GS-49
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 440. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 98.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 107.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1898
Samp. Description: GS-50
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/04/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <100. | 1 | | |
| Bromodichloromethane | <100. | 1 | | |
| Bromoform | <500. | 1 | | |
| Bromomethane | <1000. | 1 | | |
| Carbon tetrachloride | <100. | 1 | | |
| Chlorobenzene | <100. | 1 | | |
| Chloroethane | <100. | 1 | | |
| 2-Chloroethylvinyl ether | <1000. | 1 | | |
| Chloroform | <100. | 1 | | |
| Chloromethane | <1000. | 1 | | |
| Dibromochloromethane | <100. | 1 | | |
| 1,2-Dichlorobenzene | <500. | 1 | | |
| 1,3-Dichlorobenzene | <500. | 1 | | |
| 1,4-Dichlorobenzene | <500. | 1 | | |
| 1,1-Dichloroethane | <100. | 1 | | |
| 1,2-Dichloroethane | <100. | 1 | | |
| 1,1-Dichloroethylene | <100. | 1 | | |
| cis-1,2-Dichloroethylene | 600. | 1 | | |
| trans-1,2-Dichloroethylene | <100. | 1 | | |
| Dichloromethane | <100. | 1 | | |
| 1,2-Dichloropropane | <100. | 1 | | |
| cis-1,3-Dichloropropylene | <50. | 1 | | |
| trans-1,3-Dichloropropylene | <50. | 1 | | |
| Ethylbenzene | <100. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <100. | 1 | | |
| Tetrachloroethylene | 120. | 1 | | |
| Toluene | <100. | 1 | | |
| 1,1,1-Trichloroethane | <100. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1898
Samp. Description: GS-50
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/04/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <100. | 1 | | |
| Trichloroethylene | 2600. | 1 | | |
| Trichlorofluoromethane | <100. | 1 | | |
| Vinyl Chloride | 120. | 1 | | |
| Xylenes (total) | <300. | 1 | | |
| 2-Chloropropane (surrogate) | 95.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 98.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1899
Samp. Description: GS-51
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/06/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <100. | 1 | | |
| Bromodichloromethane | <100. | 1 | | |
| Bromoform | <500. | 1 | | |
| Bromomethane | <1000. | 1 | | |
| Carbon tetrachloride | <100. | 1 | | |
| Chlorobenzene | <100. | 1 | | |
| Chloroethane | <100. | 1 | | |
| 2-Chloroethylvinyl ether | <1000. | 1 | | |
| Chloroform | <100. | 1 | | |
| Chloromethane | <1000. | 1 | | |
| Dibromochloromethane | <100. | 1 | | |
| 1,2-Dichlorobenzene | <500. | 1 | | |
| 1,3-Dichlorobenzene | <500. | 1 | | |
| 1,4-Dichlorobenzene | <500. | 1 | | |
| 1,1-Dichloroethane | <100. | 1 | | |
| 1,2-Dichloroethane | <100. | 1 | | |
| 1,1-Dichloroethylene | <100. | 1 | | |
| cis-1,2-Dichloroethylene | 680. | 1 | | |
| trans-1,2-Dichloroethylene | <100. | 1 | | |
| Dichloromethane | <100. | 1 | | |
| 1,2-Dichloropropane | <100. | 1 | | |
| cis-1,3-Dichloropropylene | <50. | 1 | | |
| trans-1,3-Dichloropropylene | <50. | 1 | | |
| Ethylbenzene | <100. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <100. | 1 | | |
| Tetrachloroethylene | 220. | 1 | | |
| Toluene | <100. | 1 | | |
| 1,1,1-Trichloroethane | <100. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1899
Samp. Description: GS-51
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 09/30/97
Received: 10/02/97
Prepared:
Analyzed: 10/06/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <100. | 1 | | |
| Trichloroethylene | 4400. | 1 | | |
| Trichlorofluoromethane | <100. | 1 | | |
| Vinyl Chloride | 200. | 1 | | |
| Xylenes (total) | <300. | 1 | | |
| 2-Chloropropane (surrogate) | 93.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 104.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1900
Samp. Description: GS-52
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 68. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1900
Samp. Description: GS-52
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 160. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 92.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 103.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1901
Samp. Description: GS-53
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 16. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | 3. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1901
Samp. Description: GS-53
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 43. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 89.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

* - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1902
Samp. Description: GS-54
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/06/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 51. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1902
Samp. Description: GS-54
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/06/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 43. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | 3. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 85.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 103.% | 1 | 60-140 | |

Notes:

! - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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O'BRIEN & GERE
LABORATORIES, INC.

October 9, 1997

Mr. Paul Steinberg
O'Brien & Gere Engineers, Inc.
1200 Crown Colony Drive
Quincy, MA 02169

Re: Columbia Manufacturing - Westfield, MA

File: 3802.003.517

Dear Paul:

The purpose of this letter is to submit the revised copies of the sample result form for Volatile Organics by method 8021 for the above referenced project.

The result forms have been revised to reflect a lower detection limit.

| Sample Desc. | Lab ID |
|---|---|
| GS-55 | G1903 |

Should you have any questions regarding the above please feel free to contact me at your convenience. We apologize for any inconvenience this may have caused.

Very truly yours,

O'BRIEN & GERE LABORATORIES, INC.

Monika Santucci

Monika Santucci
Supervisor

Enclosure

VPM:vpm/C:\WPWIN60\WPDOCS\3802-3-0.LT1

RECEIVED
OCT 13 1997
O'BRIEN & GERE ENGINEERS, INC.
BOSTON, MASS.

O'Brien & Gere Laboratories, Inc., an O'Brien & Gere company
5000 Brittonfield Parkway, P.O. Box 4942, Syracuse, New York 13221
(315) 437-0200 / FAX (315) 463-7554 • http:// www.obg.com
. . . and offices in major U.S. cities

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1903
Samp. Description: GS-55
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 120. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories, Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1903
Samp. Description: GS-55
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 10 Instrument: 9001

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/09/97

Matrix: Water
QC Batch: 100897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 580. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 89.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 9,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1903
Samp. Description: GS-55
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <100. | 1 | | |
| Bromodichloromethane | <100. | 1 | | |
| Bromoform | <500. | 1 | | |
| Bromomethane | <1000. | 1 | | |
| Carbon tetrachloride | <100. | 1 | | |
| Chlorobenzene | <100. | 1 | | |
| Chloroethane | <100. | 1 | | |
| 2-Chloroethylvinyl ether | <1000. | 1 | | |
| Chloroform | <100. | 1 | | |
| Chloromethane | <1000. | 1 | | |
| Dibromochloromethane | <100. | 1 | | |
| 1,2-Dichlorobenzene | <500. | 1 | | |
| 1,3-Dichlorobenzene | <500. | 1 | | |
| 1,4-Dichlorobenzene | <500. | 1 | | |
| 1,1-Dichloroethane | <100. | 1 | | |
| 1,2-Dichloroethane | <100. | 1 | | |
| 1,1-Dichloroethylene | <100. | 1 | | |
| cis-1,2-Dichloroethylene | <100. | 1 | | |
| trans-1,2-Dichloroethylene | <100. | 1 | | |
| Dichloromethane | <100. | 1 | | |
| 1,2-Dichloropropane | <100. | 1 | | |
| cis-1,3-Dichloropropylene | <50. | 1 | | |
| trans-1,3-Dichloropropylene | <50. | 1 | | |
| Ethylbenzene | <100. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <100. | 1 | | |
| Tetrachloroethylene | <100. | 1 | | |
| Toluene | <100. | 1 | | |
| 1,1,1-Trichloroethane | <100. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1903
Samp. Description: GS-55
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 100 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <100. | 1 | | |
| Trichloroethylene | 460. | 1 | | |
| Trichlorofluoromethane | <100. | 1 | | |
| Vinyl Chloride | <100. | 1 | | |
| Xylenes (total) | <300. | 1 | | |
| 2-Chloropropane (surrogate) | 84.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 102.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1904
Samp. Description: GS-56
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 110. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1904
Samp. Description: GS-56
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 95. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | <10. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 90.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 102.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1905
Samp. Description: GS-57
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 51. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1905
Samp. Description: GS-57
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/01/97
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 33. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 85.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 103.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1906
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected:
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | <1. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1906
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected:
Received: 10/02/97
Prepared:
Analyzed: 10/03/97

Matrix: Water
QC Batch: 100397W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | <1. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 92.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 100.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 7,1997 Monika Santucci

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# CHAIN OF CUSTODY RECORD

O'BRIEN & GERE LABORATORIES, INC.

5543

TAT - PER PAUL STEINBERG

3802.603.517

SURVEY: COLUMBIA MFG

SAMPLED BY: PETER SAVAGE JR + SEAN LAMBERT

LOCATION: WESTFIELD, MA

ORGANIZATION: O'BRIEN & GERE ENGINEERS, INC.

| STATION NUMBER | SAMPLE LOCATION | DATE COLLECTED | TIME COLLECTED | SAMPLE MATRIX | COMP. OR GRAB | NO. OF CONTAINERS | ANALYSIS REQUIRED |
|---|---|---|---|---|---|---|---|
| | GS-49 | 9.30.97 | 13:35 | GW | GRAB | 2 | VOL 8021 |
| | GS-50 | ↓ | 15:40 | ↓ | ↓ | ↓ | ↓ |
| | GS-51 | ↓ | 17:30 | ↓ | ↓ | ↓ | ↓ |
| | GS-52 | 10.01.97 | 10:20 | ↓ | ↓ | ↓ | ↓ |
| | GS-53 | ↓ | 12:00 | ↓ | ↓ | ↓ | ↓ |
| | GS-54 | ↓ | 14:30 | ↓ | ↓ | ↓ | ↓ |
| | GS-55 | ↓ | 14:00 | ↓ | ↓ | ↓ | ↓ |
| | GS-56 | ↓ | 15:20 | ↓ | ↓ | ↓ | ↓ |
| | GS-57 | ↓ | 16:00 | ↓ | ↓ | ↓ | ↓ |
| | TRIP BLANK | — | — | WQ | — | 1 | ↓ |
| | | | | | | | |
| | | | | | | | |

| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
|---|---|---|---|---|---|
| Pete Savage Jr | 10.01.97 | 18:00 | | | |
| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
| | | | | | |
| Relinquished By: | DATE | TIME | Received by Laboratory: Marla F. Jacobsen | DATE 10/3/97 | TIME 07:30 |

COMMENTS: GS = GROUND WATER SCREENING

Cooler Temp 5°

METHOD OF SHIPMENT: AIRBORNE EXPRESS AIRBILL # 7786998446

CUSTODY SEAL#: 96COL-076

O'BRIEN & GERE LABORATORIES, INC. an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

Close File

CASE FILE FORM

O'BRIEN & GERE LABORATORIES, INC.

## PROGRAM INFORMATION

Client : Columbia Manufacturing Div. 01 Job No. 3802·003·517

Program :

Custody Seal : X Intact ____ Not Intact ____ NA

## AFTER HOURS CUSTODY

| RELINQUISHED BY: | DATE | TIME | RECEIVED BY SECURITY GUARD: | DATE: | TME: |
|---|---|---|---|---|---|
| Ain Horne | 10/2/97 | 7:58/p | Dan Loope | 10/2/97 | 1951 |
| RELINQUISHED BY SECURITY GUARD TO COOLER: | DATE | TIME | RECEIVED BY SAMPLE CUSTODIAN: | DATE: | TME: |
| Dan Loope | 10/2/97 | 1956 | Mark F. Jackson | 10/3/97 | 07:30 |

## COMMENTS/DISCREPANCY:

Cooler found intact in a secured walkin cooler

Cooler temp 5°C

## RESOLUTION/CLIENT COMMENT:

Signed: Mark F. Jackson

Date: 10/3/97

QA/QC Approval: CB

Signed: Monika Fantucci

Date: 10/9/97

O'BRIEN & GERE LABORATORIES, INC. an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2023
Samp. Description: GS-58
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 170. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | <10. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2023
Samp. Description: GS-58
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 140. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | 24. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 94.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 108.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2024
Samp. Description: GS-59
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 19. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2024
Samp. Description: GS-59
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 15. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 104.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 106.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

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Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2025
Samp. Description: GS-60
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | 3. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2025
Samp. Description: GS-60
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100697W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | 2. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 93.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 95.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2026
Samp. Description: GS-61
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <10. | 1 | | |
| Bromodichloromethane | <10. | 1 | | |
| Bromoform | <50. | 1 | | |
| Bromomethane | <100. | 1 | | |
| Carbon tetrachloride | <10. | 1 | | |
| Chlorobenzene | <10. | 1 | | |
| Chloroethane | <10. | 1 | | |
| 2-Chloroethylvinyl ether | <100. | 1 | | |
| Chloroform | <10. | 1 | | |
| Chloromethane | <100. | 1 | | |
| Dibromochloromethane | <10. | 1 | | |
| 1,2-Dichlorobenzene | <50. | 1 | | |
| 1,3-Dichlorobenzene | <50. | 1 | | |
| 1,4-Dichlorobenzene | <50. | 1 | | |
| 1,1-Dichloroethane | <10. | 1 | | |
| 1,2-Dichloroethane | <10. | 1 | | |
| 1,1-Dichloroethylene | <10. | 1 | | |
| cis-1,2-Dichloroethylene | 250. | 1 | | |
| trans-1,2-Dichloroethylene | <10. | 1 | | |
| Dichloromethane | <10. | 1 | | |
| 1,2-Dichloropropane | <10. | 1 | | |
| cis-1,3-Dichloropropylene | <5. | 1 | | |
| trans-1,3-Dichloropropylene | <5. | 1 | | |
| Ethylbenzene | <10. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <10. | 1 | | |
| Tetrachloroethylene | 31. | 1 | | |
| Toluene | <10. | 1 | | |
| 1,1,1-Trichloroethane | <10. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2026
Samp. Description: GS-61
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 10 Instrument: Tracor540#4

Collected: 10/02/97
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <10. | 1 | | |
| Trichloroethylene | 93. | 1 | | |
| Trichlorofluoromethane | <10. | 1 | | |
| Vinyl Chloride | 79. | 1 | | |
| Xylenes (total) | <30. | 1 | | |
| 2-Chloropropane (surrogate) | 85.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 105.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2027
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected:
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | <1. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G2027
Samp. Description: QC Trip Blank
Primary column: Y
Units: ug/L
Column: RTX502.2 105m x 0.53mmI.D.
Dilution: 1 Instrument: Tracor540#4

Collected:
Received: 10/04/97
Prepared:
Analyzed: 10/07/97

Matrix: Water
QC Batch: 100797W4
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | <1. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 81.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 104.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: October 8,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# CHAIN OF CUSTODY RECORD

O'BRIEN & GERE LABORATORIES, INC.

TAT - PER PD STEINBERG

5569

SURVEY: COLUMBIA MFG

SAMPLED BY: PC SAVAGE / FJ FERREIRA

LOCATION: WESTFIELD, MA

ORGANIZATION: O'BRIEN & GERE ENGINEERS

| STATION NUMBER | SAMPLE LOCATION | DATE COLLECTED | TIME COLLECTED | SAMPLE MATRIX | COMP. OR GRAB | NO. OF CONTAINERS | ANALYSIS REQUIRED |
|---|---|---|---|---|---|---|---|
| | GS-58 | 10.02.97 | 1000 | GW | GRAB | 2 | VOC 8021 |
| | GS-59 | ↓ | 1145 | GW | ↓ | ↓ | ↓ |
| | GS-60 | ↓ | 1330 | GW | ↓ | ↓ | ↓ |
| | GS-61 | ↓ | 1530 | GW | ↓ | ↓ | ↓ |
| | TRIP BLANK | — | — | WQ | — | 1 | ↓ |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
|---|---|---|---|---|---|
| Pat Savage | 10.03.97 | 1500 | | | |
| Relinquished By: | DATE | TIME | Received By: | DATE | TIME |
| | | | | | |
| Relinquished By: | DATE | TIME | Received by Laboratory: Marla F. Jackson | DATE 10/6/97 | TIME 07:30 |

COMMENTS:

GS - GROUNDWATER SCREENING

Cooler Temp 5°C

METHOD OF SHIPMENT: AIRBORNE AIRBILL # 7786997142

CUSTODY SEAL # 96COL-189

72 hour Work per Paul Steinberg (PDS)

O'BRIEN & GERE LABORATORIES, INC. an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

Close File

(2 COOLERS)

O'BRIEN & GERE LABORATORIES, INC.

CASE FILE FORM

## PROGRAM INFORMATION

Client : Columbia Div. 01 Job No. 3802.003.517

Program :

Custody Seal : _____ Intact _____ Not Intact X NA

## AFTER HOURS CUSTODY

| RELINQUISHED BY: | DATE | TIME | RECEIVED BY SECURITY GUARD: | DATE: | TIME: |
|---|---|---|---|---|---|
| AIRBORNE EXPRESS | 10-4-97 | 0925 | S/O ARCHIE D'EREDITA | 10-4-97 | 0925 |
| **RELINQUISHED BY SECURITY GUARD TO COOLER:** | **DATE** | **TIME** | **RECEIVED BY SAMPLE CUSTODIAN:** | **DATE:** | **TIME:** |
| ARCHIE D'EREDITA | 10-4-97 | 0936 | Mark F. Jackson | 10/6/97 | 07:30 |

## COMMENTS/DISCREPANCY:

Cooler found intact in a secured walkin cooler.

Cooler temp 5°C

## RESOLUTION/CLIENT COMMENT:

Signed: Mark F. Jackson

Date: 10/6/97

QA/QC Approval: CB

Signed: Monika Fontucci

Date: 10/9/97

O'BRIEN & GERE LABORATORIES, INC. an O'Brien & Gere Company
5000 Brittonfield Parkway / P.O. Box 4942 / Syracuse, NY 13221 / (315) 437-0200 FAX (315) 463-7554

Close File

O'BRIEN & GERE LABORATORIES, INC.

| SUBJECT | SHEET | BY | DATE | JOB NO. |
|---|---|---|---|---|
| Columbia | | [illegible] | 10/6/97 | 3802.003.517 |

Preprint Format No. 3633561 | Origin NEU | Airbill Number 7786997142

Method of Payment: [X] Bill Sender; [ ] Bill Receiver; [ ] Bill 3rd Party; [ ] Paid in Advance

Assumed sender unless otherwise noted

AIRBORNE EXPRESS.

EXP (Letter - 150 lbs) X

NAS (Letter - 5 lbs)

SDS (Letter - 150 lbs)

Billing Reference will appear on invoice: 6378.002.840

NO. OF PACKAGES: 1 | WEIGHT (LBS.) | CHECK IF: [ ] LETTER EXPRESS [ ] EXP. PACK

Special Instructions: [X] SAT [ ] HAA [ ] LAB

10/6/97

778 699 7142

CNYA 172

FROM
O BRIEN & GERE
1200 CROWN COLONY DR
QUINCY MA 02169
PC Savage Jr (617) 479-1313

TO
O BRIEN & GERE ~~LABORATORIES~~ LABORATORIES
5000 BRITTONFIELD PKY
EAST SYRACUSE NY 13057
Monika Santucci (315) 437-0200

* 7786997142 *

001 (5/97) S-05 PACKAGE LABEL

PLEASE TYPE OR PRINT — U.S. ONLY

Close File

# Appendix B

O'BRIEN & GERE
ENGINEERS, INC.

Close File

O'BRIEN & GERE
ENGINEERS, INC.

October 20, 1997

Dr. John Steel Perkins
81 East Silver Street
Westfield, MA 01085

Re: Well Sampling Results

File: 6378.002

Dear Dr. Perkins:

Enclosed is a laboratory report for the sample of water collected from the well located on your property. The chemicals that were analyzed were not detected in the water. The numbers shown on the report are the detection limits of the analyses which ranged from .5 to 10 parts per billion. The constituents that were analyzed were not detected at these very low concentrations.

We appreciate your cooperation by allowing us to collect this sample. If you have any questions, please call me.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Paul D. Steinberg, PE, LSP
Project Associate

cc: Frank Battaglia — USEPA
Ken Howard — Columbia Manufacturing Inc.


O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
1200 Crown Colony Drive / Quincy, MA 02169 / (617) 479-1313 FAX (617) 479-1397
...and offices in major U.S. cities

Close File

# O'Brien & Gere Laboratories, Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1247
Samp. Description: Perkins-1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 09/25/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| Benzene | <1. | 1 | | |
| Bromodichloromethane | <1. | 1 | | |
| Bromoform | <5. | 1 | | |
| Bromomethane | <10. | 1 | | |
| Carbon tetrachloride | <1. | 1 | | |
| Chlorobenzene | <1. | 1 | | |
| Chloroethane | <1. | 1 | | |
| 2-Chloroethylvinyl ether | <10. | 1 | | |
| Chloroform | <1. | 1 | | |
| Chloromethane | <10. | 1 | | |
| Dibromochloromethane | <1. | 1 | | |
| 1,2-Dichlorobenzene | <5. | 1 | | |
| 1,3-Dichlorobenzene | <5. | 1 | | |
| 1,4-Dichlorobenzene | <5. | 1 | | |
| 1,1-Dichloroethane | <1. | 1 | | |
| 1,2-Dichloroethane | <1. | 1 | | |
| 1,1-Dichloroethylene | <1. | 1 | | |
| cis-1,2-Dichloroethylene | <1. | 1 | | |
| trans-1,2-Dichloroethylene | <1. | 1 | | |
| Dichloromethane | <1. | 1 | | |
| 1,2-Dichloropropane | <1. | 1 | | |
| cis-1,3-Dichloropropylene | <.5 | 1 | | |
| trans-1,3-Dichloropropylene | <.5 | 1 | | |
| Ethylbenzene | <1. | 1 | | |
| 1,1,2,2-Tetrachloroethane | <1. | 1 | | |
| Tetrachloroethylene | <1. | 1 | | |
| Toluene | <1. | 1 | | |
| 1,1,1-Trichloroethane | <1. | 1 | | |

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# O'Brien & Gere Laboratories,Inc.

# Analytical Results Method: 8021

Client: Columbia Manufacturing Facility
Project: Westfield, MA
Proj. Desc: GW Screening

Job No.: 3802.003.517
Certification MA No.: NY034

Sample: G1247
Samp. Description: Perkins-1
Primary column: Y
Units: ug/L
Column: DB-VRX 75m X .45mm ID
Dilution: 1 Instrument: 9001

Collected: 09/25/97
Received: 09/26/97
Prepared:
Analyzed: 09/28/97

Matrix: Water
QC Batch: 092897W1
%Solids:
Purge volume: 5 ml

Number of analytes: 35

| Parameter | Result | Col | Surrog Limits | Notes |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | <1. | 1 | | |
| Trichloroethylene | <1. | 1 | | |
| Trichlorofluoromethane | <1. | 1 | | |
| Vinyl Chloride | <1. | 1 | | |
| Xylenes (total) | <3. | 1 | | |
| 2-Chloropropane (surrogate) | 92.% | 1 | 60-140 | |
| Fluorobenzene (surrogate) | 99.% | 1 | 60-140 | |

Notes:

# - Outside control limits J-Estimated value

Authorized: Monika Santucci
Date: September 29,1997 Monika Santucci

5000 Brittonfield Parkway / Suite 300, Box 4942 / Syracuse, NY 13221 / (315) 437-0200

Close File

# Appendix C

O'BRIEN & GERE
ENGINEERS, INC.

Close File

# @AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

## WORK ORDER #: 9710447

Work Order Summary

**CLIENT:** Mr. Paul Steinburg
O'Brien & Gere
222 Forbes Road
Braintree, MA 02184

**BILL TO:** Same

**PHONE:** 781-849-1311
**FAX:** 781-849-2949
**DATE RECEIVED:** 10/30/97
**DATE COMPLETED:** 11/26/97

**P.O. #** 6378.002
**PROJECT #** Columbia

| FRACTION # | NAME | TEST | RECEIPT VAC./PRES. |
|---|---|---|---|
| 01A | SG - 55 | TO-14 | 2.0 "Hg |
| 02A | SG -32 | TO-14 | 8.5 "Hg |
| 03A | Dup 1 | TO-14 | 10.0 "Hg |
| 04A | SG - 61 | TO-14 | 10.0 "Hg |
| 05A | SG - 62 | TO-14 | 8.0 "Hg |
| 06A | SG - 64 | TO-14 | 5.0 "Hg |
| 07A | SG - 50 | TO-14 | 10.0 "Hg |
| 08A | SG - 51 | TO-14 | 6.0 "Hg |
| 09A | Lab Blank | TO-14 | NA |

CERTIFIED BY: R. Robert Roemer
Laboratory Director

DATE: 11/26/97

Certification numbers: CA ELAP - 1149, NY ELAP - 11291, UT ELAP - E-217

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA 95630
(916) 985-1000 • (800) 985-5955 • FAX (916) 985-1020

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 55**

**ID#: 9710447-01A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | **5110512** | **Date of Collection:** | **10/29/97** |
| **Dil. Factor:** | **28.8** | **Date of Analysis:** | **11/ 5/97** |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 14 | Not Detected |
| cis-1,2-Dichloroethene | 14 | 130 |
| Trichloroethene | 14 | 2300 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 99 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 89 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 32**

**ID#: 9710447-02A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| File Name: | 5110513 | Date of Collection: | 10/29/97 |
| Dil. Factor: | 4.41 | Date of Analysis: | 11/ 5/97 |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 2.2 | 6.4 |
| cis-1,2-Dichloroethene | 2.2 | 280 |
| Trichloroethene | 2.2 | 61 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 104 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 91 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : Dup 1**

**ID#: 9710447-03A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| File Name: | 5110514 | Date of Collection: | 10/29/97 |
| Dil. Factor: | 4.02 | Date of Analysis: | 11/ 5/97 |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 2.0 | 6.1 |
| cis-1,2-Dichloroethene | 2.0 | 200 |
| Trichloroethene | 2.0 | 58 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 106 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 90 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 61**

**ID#: 9710447-04A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | **5110516** | **Date of Collection:** | **10/29/97** |
| **Dil. Factor:** | **6.70** | **Date of Analysis:** | **11/ 5/97** |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 3.4 | Not Detected |
| cis-1,2-Dichloroethene | 3.4 | 54 |
| Trichloroethene | 3.4 | 710 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 101 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 90 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 62**

**ID#: 9710447-05A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| File Name: | 5110517 | Date of Collection: | 10/29/97 |
| Dil. Factor: | 2.49 | Date of Analysis: | 11/ 5/97 |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 1.2 | Not Detected |
| cis-1,2-Dichloroethene | 1.2 | 14 |
| Trichloroethene | 1.2 | 6.3 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 94 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 98 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 64**

**ID#: 9710447-06A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | 5110509 | **Date of Collection:** | 10/29/97 |
| **Dil. Factor:** | 2.16 | **Date of Analysis:** | 11/ 5/97 |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 1.1 | Not Detected |
| cis-1,2-Dichloroethene | 1.1 | 79 |
| Trichloroethene | 1.1 | 340 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 86 | 70-130 |
| Toluene-d8 | 99 | 70-130 |
| 4-Bromofluorobenzene | 100 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 50**

**ID#: 9710447-07A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | **5110518** | **Date of Collection:** | **10/29/97** |
| **Dil. Factor:** | **2.68** | **Date of Analysis:** | **11/ 5/97** |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 1.3 | 1.6 |
| cis-1,2-Dichloroethene | 1.3 | 92 |
| Trichloroethene | 1.3 | 400 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 105 | 70-130 |
| Toluene-d8 | 100 | 70-130 |
| 4-Bromofluorobenzene | 96 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : SG - 51**

**ID#: 9710447-08A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | 5110519 | **Date of Collection:** | 10/29/97 |
| **Dil. Factor:** | 2.88 | **Date of Analysis:** | 11/ 5/97 |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 1.4 | Not Detected |
| cis-1,2-Dichloroethene | 1.4 | 18 |
| Trichloroethene | 1.4 | 25 |

**Container Type: 6 Liter Summa Canister**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 102 | 70-130 |
| Toluene-d8 | 102 | 70-130 |
| 4-Bromofluorobenzene | 110 | 70-130 |

Close File

# AIR TOXICS LTD.

**SAMPLE NAME : Lab Blank**

**ID#: 9710447-09A**

**EPA METHOD TO-14 GC/MS Full Scan**

| | | | |
|---|---|---|---|
| **File Name:** | **5110506** | **Date of Collection: NA** | |
| **Dil. Factor:** | **1.00** | **Date of Analysis: 11/ 5/97** | |

| Compound | Rpt. Limit (ppbv) | Amount (ppbv) |
|---|---|---|
| Vinyl Chloride | 0.50 | Not Detected |
| cis-1,2-Dichloroethene | 0.50 | Not Detected |
| Trichloroethene | 0.50 | Not Detected |

**Container Type: NA**

| Surrogates | % Recovery | Method Limits |
|---|---|---|
| Octafluorotoluene | 99 | 70-130 |
| Toluene-d8 | 99 | 70-130 |
| 4-Bromofluorobenzene | 90 | 70-130 |

Close File

# AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX: (916) 985-1020

# CHAIN-OF-CUSTODY RECORD

№ 013002

Page 1 of 1

Contact Person: PAUL STEINBERG
Company: O'BRIEN & GERE ENGINEERS
Address: 1200 CROWN COLONY City: QUINCY State: MA Zip: 02169
Phone: (617) 479-1313 FAX: (617) 479-1397
**Collected By:** Signature: Peter C Savage Jr

**Project info:**
P.O. #: 6378.002
Project #:
Project Name: COLUMBIA

**Turn Around Time:**
☐ Normal
☐ Rush _____ Specify

| Lab I.D. | Field Sample I.D. | Date & Time | Analyses Requested | Canister Pressure / Vacuum Initial | Final | Receipt |
|---|---|---|---|---|---|---|
| 01A | SG-55 | 10·29·97/10:45 | USEPA METHOD TO-14 | 27.8" Hg | 3.8" Hg | 2.0 Hg |
| 02A | SG-32 | 10·29·97/12:00 | ↓ | 27.5" Hg | 8.6" Hg | 8.5 Hg |
| 03A | DUP 1 | 10·29·97/ — | ↓ | 27.8" Hg | 10.5" Hg | 10.1 Hg |
| 04A | SG-61 | 10·29·97/13:20 | ↓ | 27.8" Hg | 9.5" Hg | 10.1 Hg |
| 05A | SG-62 | 10·29·97/1400 | ↓ | 27.9" Hg | 9.0" Hg | ~~10.1 Hg~~ 10/31 |
| 06A | SG-64 | 10·29·97/1500 | ↓ | 27.9" Hg | 5.0" Hg | 5.0 Hg |
| 07A | SG-50 | 10·29·97/1650 | ↓ | 28.0" Hg | 9.5" Hg | 10.0 Hg |
| 08A | SG-51 | 10·29·97/1730 | ↓ | 27.9" Hg | 7.5" Hg | 6.0 Hg |
| | | | | | Todd Summer | |

**Relinquished By:** (Signature) Peter C Savage Jr Date/Time 10·29·97/1900 Print Name: PETER C. SAVAGE JR
Relinquished By: (Signature) Date/Time Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time Received By: (Signature) Date/Time Kathryn Schuelo, ATL 10/30/97 0930

Notes: CUSTODY SEAL #s: ① 427 ② 438 ③ 449
AS OF NOVEMBER 1, 1997, THE PHONE NUMBER WILL BE (781)-849-1311 FAX (781)-849-2949
ANALYSIS: TARGETING TCE, DCE and VINYL CHLORIDE.
SG: SOIL GAS SAMPLE

| Lab Use Only | Shipper Name | Air Bill # | Opened By: | Date/Time | Temp. (°C) | Condition | Custody Seals Intact? | Work Order # |
|---|---|---|---|---|---|---|---|---|
| | FIRBORNE | 2648472441 | KS | 10/30/97 0930 | AMBIENT | GOOD | Yes No None N/A | 971047 |

Form 1293 rev. 06

Close File

# Appendix D

O'BRIEN & GERE
ENGINEERS, INC.

Close File

| O'BRIEN & GERE ENGINEERS, INC. | SOIL BORING LOG | LOG NUMBER PG-1 |
|---|---|---|
| | | SHEET 1 OF 1 |
| CLIENT: MTD Products Inc. | GROUNDWATER LEVELS | FILE No.: 6378.002 |
| PROJECT LOCATION: Columbia Mfg., Westfield, MA | DATE DEPTH ELEV. | DRILLING METHOD: 4 1/4" Hollow Stem Augers |
| | | SAMPLER TYPE: 2" ID Splitspoon |
| | | HAMMER: 140lb FALL: 30" |
| O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG | BORING LOCATION: inside rim bldg. | LEGEND: Grout/Bentonite; Sand Packing; Natural Mater. |
| BORING CO.: Seaboard Drilling | GROUND ELEVATION: | ORH; Steel |
| FOREMAN: Frank Harrington | DATES: STARTED: 10/16/97 ENDED: 10/16/97 | |

| SAMPLE No. | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | 5" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | FLUSH | | | | |
| | | | | | | | 1' | SAND | | | |
| | | | | | | | | NATIVE MAT. | | | |
| | | | | | | | 3' | SEAL | | | |
| | | | | | | | 5' | | | | |
| | | | | | | | | SAND PACK | | | |
| | | | | | Monitoring well PG-1 installed for product gauging efforts. Split spoon samples for classification purposes not collected | | | | | | |
| | | | | | | | 15' | | | | |

Note:

1. Product gauging well PG-1 set @ 15fbg; 10' of screen, 5' of riser.
   Sand pack from 14-3 fbg, bentonite seal from 3-1 fbg, sand from 1fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.
3. Drill cuttings impacted with petroleum from approx. 7-12'. Cuttings from this interval drummed.

Close File

| O'BRIEN & GERE ENGINEERS, INC. | SOIL BORING LOG | LOG NUMBER PG-2 |
|---|---|---|
| | | SHEET 1 OF 1 |
| CLIENT: MTD Products Inc. | GROUNDWATER LEVELS | FILE No.: 6378.002 |
| PROJECT LOCATION: Columbia Mfg., Westfield, MA | DATE DEPTH ELEV. | DRILLING METHOD: 4 1/4" Hollow Stem Augers<br>SAMPLER TYPE: 2" ID Splitspoon<br>HAMMER: 140lb FALL: 30" |
| O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG<br>BORING CO.: Seaboard Drilling<br>FOREMAN: Frank Harrington | BORING LOCATION: outside rim bldg.<br>GROUND ELEVATION:<br>DATES: STARTED: 10/20/97 ENDED: 10/20/97 | LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel |

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | 5" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | FLUSH | | | | |
| | | | | | | | 1' | SAND | | | |
| | | | | | | | | NATIVE MAT. | | | |
| | | | | | | | 3' | SEAL | | | |
| | | | | | | | 5' | | | | |
| | | | | | | | | SAND PACK | | | |
| | | | | | Monitoring well PG-2 installed for product gauging efforts. Split spoon samples for classification purposes not collected | | 15' | | | | |

Note:

1. Product gauging well PG-2 set @ 15fbg; 10' of screen, 5' of riser.
   Sand pack from 14-3 fbg, bentonite seal from 3-1 fbg, sand from 1fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.
3. Drill cuttings impacted with petroleum from approx. 7-12'. Cuttings from this interval drummed.

Close File

| O'BRIEN & GERE ENGINEERS, INC. | SOIL BORING LOG | LOG NUMBER PG-3<br>SHEET 1 OF 1 |
|---|---|---|
| CLIENT: MTD Products Inc.<br>PROJECT LOCATION: Columbia Mfg., Westfield, MA | GROUNDWATER LEVELS<br>DATE DEPTH ELEV. | FILE No.: 6378.002<br>DRILLING METHOD: 4 1/4" Hollow Stem Augers<br>SAMPLER TYPE: 2" ID Splitspoon<br>HAMMER: 140lb FALL: 30" |
| O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG<br>BORING CO.: Seaboard Drilling<br>FOREMAN: Frank Harrington | BORING LOCATION: outside rim bldg.<br>GROUND ELEVATION:<br>DATES: STARTED: 10/20/97 ENDED: 10/20/97 | LEGEND: Grout/Bentonite, Sand Packing, Natural Mater., ORH, Steel |

| SAMPLE No. | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED FLUSH | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Monitoring well PG-3 installed for product gauging efforts. Split spoon samples for classification purposes not collected | | 1' SAND; NATIVE MAT.; 3' SEAL; 5' SAND PACK; 15' | | | | |

Note:

1. Product gauging well PG-3 set @ 15fbg; 10' of screen, 5' of riser.
   Sand pack from 14-3 fbg, bentonite seal from 3-1 fbg, sand from 1fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.
3. Drill cuttings impacted with petroleum from approx. 7-12'. Cuttings from this interval drummed.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **SOIL BORING LOG** — **LOG NUMBER MW-14I/D**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE / DEPTH / ELEV.

FILE No.: 6378.002

DRILLING METHOD: Drive and wash

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION: At nest with 14S,I & D

GROUND ELEVATION:

DATES: STARTED: 10/2/97 ENDED: 10/2/97

LEGEND: Bentonite, Sand Packing, Grout, ORH, Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (Inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED STKUP | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2" Asphalt | | grade | | | | |
| 1 | 0-2' | 7-13-14-12 | 24"/18" | 27 | Light brown/tan, dry, med. dense, F-M SAND, some cs-sand, trace silt (EOLIAN). | 3' | | | | 2 | |
| 2 | 5-7' | 7-14-21-15 | 24"/18" | 35 | Lt. brown, damp, med. dense, M-CS SAND some GRAVEL and F-M pebbles, trace F-M cobbles (ALLUVIUM) | | | | | 4 | |
| 3 | 10-12' | 10-14-17-23 | 24"/24" | 31 | Lt Brown, wet, med. dense, M-CS SAND SAND, some med gravel, some M pebbles and cobbles (ALLUVIUM) | | | | | 8 | |
| 4 | 15-17' | 18-16-19-16 | 24"/20" | 35 | Lt Brown to greenish/gray, wet, med. dense, F-M SAND, some med gravel with med pebble and cobbles (ALLUVIUM) | 22' | PVC Riser | Grout | | 8 | |
| 5 | 20-22' | 8-6-6-4 | 24"/24" | 12 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | | | | 0 | |
| 6 | 25-27' | 5-6-5-7 | 24"/24" | 11 | Same as above | | | | | 0 | |
| 7 | 30-32' | 6-4-4-6 | 24"/22" | 8 | Same as above | | | | | 0 | |
| 8 | 35-37' | 4-7-5-6 | 24"/20" | 12 | Same as above | | 42' 43' 45' | SEAL | | 0 | |
| 9 | 40-42' | 8-5-6-5 | 24"/20" | 11 | Same as above | | | | | 0 | |
| 10 | 50-52' | 4-8-6-5 | 24"/22" | 14 | same as above | | | SAND PACK | | | |
| | | | | | Bottom of exploration @ 55' | | 55' | | | | |

Note:

1. Monitoring well MW-14I/D set @ 55fbg; 10' of screen, 45' of riser.
   Sand pack from 55-43 fbg, bentonite seal from 43-42 fbg, grout from 42-2 fbg.
2. Well set flush mount .

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **SOIL BORING LOG** — **LOG NUMBER MW-24I/D**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE | DEPTH | ELEV.

FILE No.: 6378.002

DRILLING METHOD: Drive and wash

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION: At nest with 24I & 24D

GROUND ELEVATION:

DATES: STARTED: 10/1/97 ENDED: 10/1/97

LEGEND: Bentonite, Sand Packing, Grout, ORH, Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED STKUP | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | grade | | | | |
| 1 | 0-2' | 6-12-9-11 | 24"/18" | 22 | Light brown/tan, dry, med. dense, F-M SAND, some cs-sand, trace silt (EOLIAN). | 3' | | | | 0 | |
| 2 | 5-7' | 7-18-22-16 | 24"/20" | 40 | Lt. brown, damp, med. dense, M-CS SAND some GRAVEL and M-CS pebbles, trace F-M cobbles (ALLUVIUM) | | | | | 2 | |
| 3 | 10-12' | 10-18-15-21 | 24"/22" | 33 | Brown, wet, med. dense, M-CS SAND SAND, some med gravel, some M pebbles and cobbles (ALLUVIUM) | | | Grout | | 6 | |
| 4 | 15-17' | 8-13-19-18 | 24"/20" | 32 | Lt-dk Brown to greenish/gray, wet, med. dense, F-M SAND, some med gravel with med pebble and cobbles (ALLUVIUM) | 20' | PVC Riser | | | 8 | |
| 5 | 20-22' | 6-4-5-5 | 24"/22" | 10 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | | | | 0 | |
| 6 | 25-27' | 5-6-7-6 | 24"/24" | 13 | Same as above | | | | | 0 | |
| 7 | 30-32' | 6-5-8-6 | 24"/22" | 13 | Same as above | | | | | 0 | |
| 8 | 35-37' | 4-4-5-6 | 24"/20" | 9 | Same as above | | 45' 48' 50' | SEAL | | 0 | |
| 9 | 40-42' | 11-5-8-5 | 24"/20" | 13 | Same as above | | | SAND PACK | | 0 | |
| | | | | | Same material from 42 to 60 fbg | | | | | | |
| | | | | | Bottom of exploration at 60' | | 60' | | | | |

Note:

1. Monitoring well MW-24I/D set @ 60fbg; 10' of screen, 53' of riser with 3' stickup. Sand pack from 60-48 fbg, bentonite seal from 48-45 fbg, grout from 45-2 fbg.
2. Well set as 3 ft stickup with into 2'x2' concrete pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-43S**

SHEET 1 OF 1

**CLIENT:** MTD Products Inc.

**PROJECT LOCATION:** Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS

| DATE | DEPTH | ELEV. |
|---|---|---|

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/23/97 ENDED: 10/23/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel; –

| SAMPLE No | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL 0/00 | H/S | PID (ppm) | S' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| | | | | | | | | SAND | | | |
| 1 | 4"-2' | 4-5-6-4 | 24" 24" | 11 | Light Brown Tan, Dry, Med dense, F-M SAN some cs-sand, trace silt (EOLIAN) | 2' | | | | | |
| 2 | 5-7' | 6-8-14-12 | 24"/24" | 22 | Brown to tan, dry, med dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | NATIVE MAT | | 0 | |
| 3 | 10-12' | 7-7-15-14 | 24" 18" | 22 | Brown/Dk. brown, Moist, Med dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 5' 10' | SEAL | | 0 | |
| 4 | 15-17' | 7-7-5-7 | 24"/20" | 12 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | 18" | | SAND PACK | | 0 | |
| 5 | 20-22' | 5-6-4-5 | 24"/22" | 10 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | 20' | | | 0 | |
| | | | | | Bottom of exploration @ 22' | | | | | | |

Note:

1. Monitoring well MW-43S set @ 20fbg; 10' of screen, 10' of riser.
   Sand pack from 20-8 fbg, bentonite seal from 8-6 fbg, native material from 6-2 fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **SOIL BORING LOG** — **LOG NUMBER MW-44S**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE | DEPTH | ELEV.

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/21/97 ENDED: 10/21/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3" TOPSOIL | | | | | | |
| 1 | 3"-2' | 4-4-7-5 | 24" 18" | 11 | Light Brown, Dry, Med dense, F-M SAND, some cs-sand, trace silt (EOLIAN) | 2 | | SAND | | | |
| 2 | 5-7' | 8-11-15-10 | 24"/20" | 26 | Brown to tan, dry, med dense, M-CS SAND and GRAVEL, some M pebbles and F-M cobbles (ALLUVIUM) | | | NATIVE MAT | | 0 | |
| 3 | 10-12' | 9-11-11-17 | 24"/20" | 22 | Brown/Dk. brown, damp, med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 13' 15' | SEAL | | 0 | |
| 4 | 15-17' | 8-7-6-10 | 24"/20" | 13 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | 18' | | SAND PACK | | 0 | |
| 5 | 20-22' | 5-6-6-5 | 24"/22" | 12 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | 25' | | | 0 | |

Bottom of exploration @ 25'

Note:

1. Monitoring well MW-44S set @ 25fbg; 10' of screen, 15' of riser.
   Sand pack from 25-13 fbg, bentonite seal from 13-11 fbg, native material from 11-2 fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-45S**

SHEET 1 OF 1

**CLIENT:** MTD Products Inc.

**PROJECT LOCATION:** Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS

| DATE | DEPTH | ELEV. |
|---|---|---|

**FILE No.:** 6378.002

**DRILLING METHOD:** 4 1/4" Hollow Stem Augers

**SAMPLER TYPE:** 2" ID Splitspoon

**HAMMER:** 140lb FALL: 30"

**O'BRIEN & GERE GEOLOGIST:** F.J. Ferreira, CPG

**BORING CO.:** Seaboard Drilling

**FOREMAN:** Frank Harrington

**BORING LOCATION:**

**GROUND ELEVATION:**

**DATES: STARTED:** 10/23/97 **ENDED:** 10/23/97

**LEGEND:** Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S' |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 3" TOPSOIL | | | | | | |
| | | | | | | | | SAND | | | |
| 1 | 3"-2' | 2-4-8-5 | 24" 15" | 12 | Light Brown, Dry, Med dense, F-M SAND, some cs-sand, trace silt (EOLIAN) | 2' | | | | | |
| 2 | 5-7' | 8-11-13-10 | 24"/20" | 24 | Brown to tan, dry, med. dense, M-CS SAND and GRAVEL, some M pebbles and F-M cobbles (ALLUVIUM) | | | | | 0 | |
| 3 | 10-12' | 10-11-14-17 | 24".20" | 25 | Brown/Dk brown, wet, med dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | FLUSH 3' 5' | SEAL. | | 2 | |
| 4 | 15-17' | 8-10-8-7 | 24"/20" | 18 | Lt-Dk Brown, wet, med. dense, F-M SAND some F-CS gravel, some F silty sand (ALLUVIUM) | 17 | | SAND PACK | | 0 | |
| | | | | | Bottom of exploration @ 17' | | 15' | | | | |

Note:

1. Monitoring well MW-45S set @ 15fbg; 10' of screen, 5' of riser.
   Sand pack from 15-3 fbg, bentonite seal from 3-1 fbg, sand to grade.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-46S**

SHEET 1 OF 1

**CLIENT:** MTD Products Inc.

**PROJECT LOCATION:** Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS

| DATE | DEPTH | ELEV. |
|---|---|---|

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION: In frt. of 27 Lozier

GROUND ELEVATION:

DATES: STARTED: 10/23/97 ENDED: 10/23/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| SAMPLE No. | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | FIELD TESTING SAL 0/00 | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | FLUSH | | | | |
| | | | | | | | 1.5 | SAND | | | |
| 1 | 4"-2' | 4-7-3-8 | 24"/24" | 10 | Light Brown/Tan, Dry, Med dense, M SAND, some cs-sand, trace silt (EOLIAN) | 2' | | | | 0 | |
| 2 | 5-7' | 6-6-10-11 | 24"/24" | 16 | Lt Brown, damp to moist, med. dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | | | 0 | |
| 3 | 10-12' | 7-9-7-12 | 24"/20" | 16 | Brown/Dk brown, Moist, Med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 3' 4' | SEAL | | 0 | |
| 4 | 15-17' | 5-9-7-5 | 24"/22" | 16 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | | | SAND PACK | | 0 | |
| | | | | | Bottom of exploration @ 17' | | 14' | | | 0 | |

Note:

1. Monitoring well MW-46S set @ 14fbg; 10' of screen, 4' of riser.
   Sand pack from 14-3 fbg, bentonite seal from 3-1.5 fbg, sand from 1.5-.5 fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.
3. Well set in grassy area between sidewalk and street at 27 Lozier.

Close File

| O'BRIEN & GERE ENGINEERS, INC. | SOIL BORING LOG | LOG NUMBER MW-47S<br>SHEET 1 OF 1 |
|---|---|---|
| CLIENT: MTD Products Inc.<br>PROJECT LOCATION: Columbia Mfg., Westfield, MA | GROUNDWATER LEVELS<br>DATE DEPTH ELEV. | FILE No.: 6378.002<br>DRILLING METHOD: 4 1/4" Hollow Stem Augers<br>SAMPLER TYPE: 2" ID Splitspoon<br>HAMMER: 140lb FALL: 30" |
| O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG<br>BORING CO.: Seaboard Drilling<br>FOREMAN: Frank Harrington | BORING LOCATION:<br>GROUND ELEVATION:<br>DATES: STARTED: 10/21/97 ENDED: 10/21/97 | LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel; – |

| SAMPLE No. | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED FLUSH | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| | | | | | | | 2' | SAND | | | |
| 1 | 4"-2' | 4-5-6-4 | 24"/24" | 11 | Light Brown/Tan, Dry, Med. dense, F-M SAN some cs-sand, trace silt (EOLIAN). | 2' | | | | 0 | |
| 2 | 5-7' | 6-8-10-11 | 24"/24" | 18 | Brown to tan, dry, med. dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | NATIVE MAT. | | 0 | |
| 3 | 10-12' | 11-9-11-10 | 24"/15" | 20 | Brown/Dk. brown, Moist, Med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 13'<br>15' | SEAL | | 0 | |
| 4 | 15-17' | 8-4-9-12 | 24"/20" | 13 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | 18' | | SAND PACK | | 0 | |
| 5 | 20-22' | 5-6-4-5 | 24"/22" | 10 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | 25' | | | 0 | |
| 6 | 25-27' | 4-5-4-6 | 24"/20" | 9 | Greenish/gray, wet, med. stiff, SILTY CLAY, some silty sand, trace med. sand (LACUSTRIN | | | | | | |
| | | | | | Bottom of exploration @ 27' | | | | | | |

Note:

1. Monitoring well MW-47S set @ 25fbg; 10' of screen, 15' of riser.
   Sand pack from 25-13 fbg, bentonite seal from 13-11 fbg, native material from 11-2 fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-47BR**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS

| DATE | DEPTH | ELEV. |
|---|---|---|

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION: @ nest with MW-12S & I

GROUND ELEVATION:

DATES: STARTED: 10/6/97 ENDED: 10/16/97

LEGEND: Grout/Bentonite; Sand Packing; grout; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED | STKUP | FIELD TESTING SAL. | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Sand | | | |
| | | | | | See borings from MW-35I and MW-12S for soil classification purposes | | | | GROUT | | | |
| | | | | | | Bedrock @149' | | | Bedrock | | | |
| | | | | | | | | | SEAL | | | |
| | | | | | | | | 159' | | | | |
| | | | | | | | | | SAND PACK | | | |
| | | | | | | | | 179' | | | | |

Note:

1. Monitoring well MW-47BR set @ 179fbg; 20' of screen, 159' of riser. Sand pack from 179-157bg, bentonite seal from 157-154, grout from 154-2 fbg.
2. Well set as stickup with 2.5ft protective casing set into 2'x2' pad.

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **SOIL BORING LOG** — **LOG NUMBER MW-48S**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE | DEPTH | ELEV.

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/20/97 ENDED: 10/20/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED FLUSH | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| | | | | | | | 2' | SAND | | | |
| 1 | 4"-2' | 3-4-6-5 | 24"/20" | 10 | Light Brown/Tan, Dry, Med. dense, F-M SAN some cs-sand, trace silt (EOLIAN). | 2' | | | | 0 | |
| 2 | 5-7' | 6-10-10-12 | 24"/24" | 20 | Brown to tan, dry, med. dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | NATIVE MAT. | | 0 | |
| 3 | 10-12' | 10-11-13-17 | 24"/20" | 24 | Brown/Dk. brown, Moist, Med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 10' 12' | SEAL | | 0 | |
| 4 | 15-17' | 8-15-7-12 | 24"/20" | 22 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | | | SAND PACK | | 0 | |
| 5 | 20-22' | 5-8-9-5 | 24"/22" | 17 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | 20' | 22' | | | 0 | |
| | | | | | Bottom of exploration @ 22' | | | | | | |

Note:

1. Monitoring well MW-48S set @ 22fbg; 10' of screen, 12' of riser.
   Sand pack from 22-10 fbg, bentonite seal from 10-8 fbg, native material from 8-2 fbg.
2. Well set as stickup with 2.5 ft. protective casing

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-48I**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS

| DATE | DEPTH | ELEV. |
|---|---|---|

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/20/97 ENDED: 10/20/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel; –

| No. | DEPTH | SAMPLE DRIVER BLOWS | SAMPLE PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED STKUP | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | 5" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| | | | | | | | | Sand | | | |
| 1 | 4"-2' | 3-4-6-5 | 24"/20" | 10 | Light Brown/Tan, Dry, Med. dense, F-M SAN some cs-sand, trace silt (EOLIAN). | 2' | 2' | | | 0 | |
| 2 | 5-7' | 6-10-10-12 | 24"/24" | 20 | Brown to tan, dry, med. dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | | | 0 | |
| 3 | 10-12' | 10-11-13-17 | 24"/20" | 24 | Brown/Dk. brown, Moist, Med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | | | | 0 | |
| | | | | | | | | Grout | | | |
| 4 | 15-17' | 8-15-7-12 | 24"/20" | 22 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | 20' | | | | 0 | |
| 5 | 20-22' | 5-8-9-5 | 24"/22" | 17 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | | | | 0 | |
| 6 | 25-27' | 4-4-5-4 | 24"/24" | 9 | Same as above | | | | | 0 | |
| 7 | 30-32' | 6-7-6-10 | 24"/20" | 13 | Same as above | | 28' | SEAL | | 0 | |
| | | | | | | | 30' | | | | |
| 8 | 35-37' | 7-4-4-6 | 24"/18" | 8 | Same as above | | | SAND PACK | | 0 | |
| 9 | 40-42' | 9-7-7-5 | 24"/20" | 14 | Same as above | | 40' | | | 0 | |
| | | | | | Bottom of exploration @ 42' | | | | | | |

Note:

1. Monitoring well MW-48I set @ 40fbg; 10' of screen, 30' of riser.
   Sand pack from 40-28 fbg, bentonite seal from 28-26 fbg, grout from 26-3 fbg.
2. Well set as stickup with 2.5 ft. protective casing

Close File

**O'BRIEN & GERE ENGINEERS, INC.** | **SOIL BORING LOG** | **LOG NUMBER MW-49I**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE | DEPTH | ELEV.

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/22/97 ENDED: 10/22/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED STKUP | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| 1 | 4"-2' | 3-7-6-4 | 24"/20" | 13 | Light brown/tan, dry, med. dense, F-M SAND, some cs-sand, trace silt (EOLIAN). | 2' | 2' | Sand | | 0 | |
| 2 | 5-7' | 7-10-12-12 | 24"/24" | 22 | Tan to lt. brown, dry, med. dense, M-CS SAND some GRAVEL and M-CS pebbles, trace F-M cobbles (ALLUVIUM) | | | | | 0 | |
| 3 | 10-12' | 10-16-13-18 | 24"/20" | 29 | Brown/dk. brown, damp, med. dense, M-CS SAND, some med gravel, some M pebbles and cobbles (ALLUVIUM) | | | | | 0 | |
| 4 | 15-17' | 8-15-17-18 | 24"/24" | 32 | Lt-dk Brown to greenish/gray, wet, med. dense, F-M SAND, some med gravel with med pebble and cobbles (ALLUVIUM) | 20' | | Grout | | 0 | |
| 5 | 20-22' | 6-4-9-5 | 24"/22" | 13 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | | | | 0 | |
| 6 | 25-27' | 4-3-5-6 | 24"/24" | 8 | Same as above some fine sand lenses | | | | | 0 | |
| 7 | 30-32' | 6-7-5-4 | 24"/20" | 12 | Same as above | | 28' 30' | SEAL | | 0 | |
| 8 | 35-37' | 6-4-5-6 | 24"/24" | 9 | Same as above | | | SAND PACK | | 0 | |
| 9 | 40-42' | 9-5-7-4 | 24"/20" | 12 | Same as above | | 40' | | | 0 | |
| | | | | | Bottom of exploration @ 42' | | | | | | |

Note:

1. Monitoring well MW-49I set @ 40fbg; 10' of screen, 30' of riser.
   Sand pack from 40-28 fbg, bentonite seal from 28-26 fbg, grout from 26-3 fbg.
2. Well set as stickup with 2.5 ft. protective casing

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **SOIL BORING LOG** — **LOG NUMBER MW-501**

SHEET 1 OF 1

CLIENT: MTD Products Inc.

PROJECT LOCATION: Columbia Mfg., Westfield, MA

GROUNDWATER LEVELS — DATE | DEPTH | ELEV.

FILE No.: 6378.002

DRILLING METHOD: 4 1/4" Hollow Stem Augers

SAMPLER TYPE: 2" ID Splitspoon

HAMMER: 140lb FALL: 30"

O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG

BORING CO.: Seaboard Drilling

FOREMAN: Frank Harrington

BORING LOCATION:

GROUND ELEVATION:

DATES: STARTED: 10/16/97 ENDED: 10/16/97

LEGEND: Grout/Bentonite; Sand Packing; Natural Mater.; ORH; Steel

| No. | DEPTH | SAMPLE DRIVER BLOWS | PENETRATION RECOVERY (inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED STKUP | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 4" TOPSOIL | | | | | | |
| | | | | | | | | Sand | | | |
| 1 | 4"-2' | 6-10-9-12 | 24"/15" | 19 | Light brown/tan, dry, med. dense, F-M SAND, some cs-sand, trace silt (EOLIAN). | 3' | 2' | | | 4 | |
| 2 | 5-7' | 7-20-22-12 | 24"/20" | 42 | Lt. brown, damp, med. dense, M-CS SAND some GRAVEL and M-CS pebbles, trace F-M cobbles (ALLUVIUM) | | | | | 6 | |
| 3 | 10-12' | 10-18-19-18 | 24"/20" | 37 | Brown/dk. brown, wet, med. dense, M-CS SAND, some med gravel, some M pebbles and cobbles (ALLUVIUM) | | | | | 80 | |
| | | | | | | | | Grout | | | |
| 4 | 15-17' | 8-15-17-18 | 24"/24" | 32 | Lt-dk Brown to greenish/gray, wet, med. dense, F-M SAND, some med gravel with med pebble and cobbles (ALLUVIUM) | 20' | | | | 10 | |
| 5 | 20-22' | 6-4-7-5 | 24"/22" | 11 | Greenish/gray, wet, med stiff, SILTY CLAY, some silty sand, trace M sand (LACUSTRINE) | | | | | 1 | |
| 6 | 25-27' | 4-5-5-6 | 24"/24" | 10 | Same as above | | | | | 0 | |
| 7 | 30-32' | 6-5-7-5 | 24"/22" | 12 | Same as above | | 28' | SEAL | | 0 | |
| | | | | | | | 30' | | | | |
| 8 | 35-37' | 4-4-5-6 | 24"/20" | 9 | Same as above | | | SAND PACK | | 0 | |
| 9 | 40-42' | 11-5-8-5 | 24"/20" | 13 | Same as above | | 40' | | | 0 | |
| | | | | | Bottom of exploration @ 42' | | | | | | |

Note:

1. Monitoring well MW-501 set @ 40fbg; 10' of screen, 30' of riser.
   Sand pack from 40-28 fbg, bentonite seal from 28-26 fbg, grout from 26-3 fbg.
2. Well set as flush mount with 6 inch road box cemented into 1'x1' pad.

Close File

| O'BRIEN & GERE ENGINEERS, INC. | SOIL BORING LOG | LOG NUMBER MW-51S<br>SHEET 1 OF 1 |
|---|---|---|
| CLIENT: MTD Products Inc.<br>PROJECT LOCATION: Columbia Mfg., Westfield, MA | GROUNDWATER LEVELS<br>DATE DEPTH ELEV. | FILE No.: 6378.002<br>DRILLING METHOD: 4 1/4" Hollow Stem Augers<br>SAMPLER TYPE: 2" ID Splitspoon<br>HAMMER: 140lb FALL: 30" |
| O'BRIEN & GERE GEOLOGIST: F.J. Ferreira, CPG<br>BORING CO.: Seaboard Drilling<br>FOREMAN: Frank Harrington | BORING LOCATION:<br>GROUND ELEVATION:<br>DATES: STARTED: 10/22/97 ENDED: 10/22/97 | LEGEND: Grout/Bentonite<br>Sand Packing<br>Natural Mater.<br>ORH<br>Steel |

| SAMPLE No. | DEPTH | DRIVER BLOWS | PENETRATION RECOVERY (Inches) | "N" VALUE | SAMPLE DESCRIPTION | STRATUM CHANGE DEPTH | EQUIPMENT INSTALLED FLUSH | FIELD TESTING SAL. 0/00 | H/S | PID (ppm) | S" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2" TOPSOIL | | | | | | |
| | | | | | | | 1' | SAND | | | |
| 1 | 4"-2' | 4-9-6-4 | 24"/24" | 15 | Light Brown/Tan, Dry, Med. dense, F-M SAN some cs-sand, trace silt (EOLIAN). | 2' | | | | 0 | |
| 2 | 5-7' | 6-9-13-11 | 24"/24" | 19 | Brown to tan, moist, med. dense, M-CS SAND and GRAVEL, some M-CS pebbles and F-M cobbles (ALLUVIUM) | | | NATIVE MAT. | | 20 | |
| 3 | 10-12' | 11-14-11-10 | 24"/15" | 25 | Brown/dk. brown, wet, med. dense, M-CS SAND some M gravel, some M pebbles and cobbles (ALLUVIUM) | | 2'<br>4' | SEAL | | 40 | |
| 4 | 15-17' | 8-4-9-12 | 24"/20" | 13 | Lt-Dk Brown to greenish/gray, wet, med. dense F-M SAND, some F-CS gravel, some F silty sand (ALLUVIUM) | | | SAND PACK | | 10 | |
| | | | | | Bottom of exploration @ 17' | | 14' | | | 10 | |

Note:

1. Monitoring well MW-51S set @ 14fbg; 10' of screen, 4' of riser.
   Sand pack from 14-3 fbg, bentonite seal from 3-1 fbg, sand from 1fbg.
2. Well set flush mount with 6 inch road box cemented into 1'x1' concrete pad.
3. Drill cuttings drummed.

Close File

# Appendix E

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10·23·97 | Weather | |
| Site Name | COLUMBIA MFG. | Well # | MW-43S |
| Site Location | WESTFIELD MA | Project # | 6378.002 |
| Personnel | FJF/PCS | Excavation Method | WATERRA |

| | | |
|---|---|---|
| Depth of Well * | 19.84 ft. | |
| Depth of Water * | 8.38 ft. | |
| Length of Water Column | 11.46 ft. | |
| Volume of Water in Well | 1.9 gal.(s) | |
| 3X Volume of Water in Well | 6.0 gal.(s) | |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: DEV. ONLY gal.(s)

Did well go dry? NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | |
|---|---|---|
| | | Initial 13.7°C |
| after | 2.0 (gal.) | 13.9° |
| after | 4.0 (gal.) | 14.4 |
| after | 6.0 (gal.) | 14.1 |
| after | 8.0 (gal.) | 14.0 |
| after | (gal.) | |

| pH Readings | | |
|---|---|---|
| 4.0 Standard | | |
| 7.0 Standard | | |
| 10.0 Standard | | |
| | | Initial 6.60 |
| after | 2.0 (gal.) | 6.49 |
| after | 4.0 (gal.) | 6.43 |
| after | 6.0 (gal.) | 6.44 |
| after | 8.0 (gal.) | 6.42 |
| after | (gal.) | |

| Conductivity Readings | | |
|---|---|---|
| 84 S Standard | | |
| 1413 S Standard | | |
| | | Initial 228 |
| after | 2.0 (gal.) | 226 |
| after | 4.0 (gal.) | 216 |
| after | 6.0 (gal.) | 218 |
| after | 8.0 (gal.) | 220 |
| after | (gal.) | |

## Water Sample:

Time Collected: Devel. ONLY

Physical Appearance

| | |
|---|---|
| Color | CLEAR TO LT. BROWN |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

NOTES: PURGE WATER DISPERSED AROUND WELLHEAD

Close File

**O'BRIEN & GERE ENGINEERS, INC.** — **Well Development Log**

| | | | |
|---|---|---|---|
| Date | 10.21.97 | Weather | SUNNY (MILD) |
| Site Name | COLUMBIA MFG. | Well # | MW-44S |
| Site Location | WESTFIELD MA | Project # | 6378.002 |
| Personnel | FJE/PCS | Excavation Method | Waterra |

| | | |
|---|---|---|
| Depth of Well * | 24.48 ft. | |
| Depth of Water * | 13.39 ft. | |
| Length of Water Column | 11.09 ft. | |
| Volume of Water in Well | 1.8 gal.(s) | |
| 3X Volume of Water in Well | ~6.0 gal.(s) | |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: DEV. ONLY gal.(s)
Did well go dry? NO

* Measurements taken from [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

**Water parameters:**

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | 84 S Standard | | |
| | | | 7.0 Standard | | | 1413 S Standard | | |
| | | | 10.0 Standard | | | | | |
| | | Initial 15.1°C | | | Initial 7.09 | | | Initial 368 |
| after 2.0 | (gal.) | 14.8° | after 2.0 | (gal.) | 7.21 | after 2.0 | (gal.) | 360 |
| after 4.0 | (gal.) | 14.5° | after 4.0 | (gal.) | 7.29 | after 4.0 | (gal.) | 362 |
| after 6.0 | (gal.) | 14.6° | after 6.0 | (gal.) | 7.38 | after 6.0 | (gal.) | 364 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

**Water Sample:**

Time Collected: Devel. ONLY

Physical Appearance

| | |
|---|---|
| Color | CLEAR TO LT. BROWN |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

**Parameters of Samples:**

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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NOTES:
Development water dispersed around wellhead

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Well Development Log

Date: 10/23/97
Site Name: COLUMBIA MFG.
Site Location: Westfield MA
Personnel: FTF/PCS
Weather: SUNNY (COLD)
Well #: MW-455
Project #: 6378.002
Excavation Method: Waterra

Depth of Well *: 14.90 ft.
Depth of Water *: 6.28 ft.
Length of Water Column: 8.62 ft.
Volume of Water in Well: 1.4 gal.(s)
3X Volume of Water in Well: 5.0 gal.(s)

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: _____ gal.(s)
Did well go dry? _____

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| | Temperature Readings | | pH Readings | | Conductivity Readings |
|---|---|---|---|---|---|
| | | 4.0 Standard | | | 84 S Standard |
| | | 7.0 Standard | | | 1413 S Standard |
| | | 10.0 Standard | | | |
| | | initial | 10.6 °C | initial | 7.30 | initial | 160 |
| after | 2.0 (gal.) | | 10.8° | after 2.0 (gal.) | 7.15 | after 2.0 (gal.) | 148 |
| after | 4.0 (gal.) | | 10.9° | after 4.0 (gal.) | 7.08 | after 4.0 (gal.) | 145 |
| after | 5.0 (gal.) | | 11.1° | after 5.0 (gal.) | 7.01 | after 5.0 (gal.) | 144 |
| after | (gal.) | | | after (gal.) | | after (gal.) | |
| after | (gal.) | | | after (gal.) | | after (gal.) | |

## Water Sample:

Time Collected: Devel. only

Physical Appearance

Color: LT. BROWN
Odor: NONE
Turbidity (> 100 NTUs): >100
Sheen/Free Product: NONE

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

NOTES:
Development water dispersed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

Date: 10/23/97
Site Name: COLUMBIA MFG.
Site Location: Westfield, MA
Personnel: FTE/PCS

Weather: SUNNY
Well #: MW-46S
Project #: 6378.002
Excavation Method: Waterra

Depth of Well *: 12.60 ft.
Depth of Water *: 6.50 ft.
Length of Water Column: 6.10 ft.
Volume of Water in Well: 1.0 gal.(s)
3X Volume of Water in Well: 3.0 gal.(s)

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry?: NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | |
|---|---|---|
| | | Initial 13.0 °C |
| after 1.0 | (gal.) | 13.54 |
| after 2.0 | (gal.) | 13.8° |
| after 3.0 | (gal.) | 14.0 |
| after | (gal.) | |
| after | (gal.) | |

| pH Readings | | |
|---|---|---|
| | | 4.0 Standard |
| | | 7.0 Standard |
| | | 10.0 Standard |
| | | Initial 6.66 |
| after 1.0 | (gal.) | 6.50 |
| after 2.0 | (gal.) | 6.52 |
| after 3.0 | (gal.) | 6.49 |
| after | (gal.) | |
| after | (gal.) | |

| Conductivity Readings | | |
|---|---|---|
| | | 84 S Standard |
| | | 1413 S Standard |
| | | Initial 150 |
| after 1.0 | (gal.) | 144 |
| after 2.0 | (gal.) | 140 |
| after 3.0 | (gal.) | 139 |
| after | (gal.) | |
| after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

Color: LT Brown
Odor: NONE
Turbidity (> 100 NTUs): >100
Sheen/Free Product: NONE

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES:
Development water spread around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10/21/97 | Weather | SUNNY |
| Site Name | CM | Well # | MW-47S |
| Site Location | Westfield, MA | Project # | 6378.002 |
| Personnel | FTF/PCS | Excavation Method | Waterra |

| | | |
|---|---|---|
| Depth of Well * | 24.48 | ft. |
| Depth of Water * | 13.03 | ft. |
| Length of Water Column | 11.45 | ft. |
| Volume of Water in Well | 1.9 | gal.(s) |
| 3X Volume of Water in Well | 6.0 | gal.(s) |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)

Did well go dry? NO

* Measurements taken from [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | |
|---|---|---|
| | | initial 15.8° |
| after 2.0 | (gal.) | 15.2° |
| after 4.0 | (gal.) | 15.0° |
| after 6.0 | (gal.) | 14.9° |
| after | (gal.) | |
| after | (gal.) | |

| pH Readings | | |
|---|---|---|
| 4.0 Standard | | |
| 7.0 Standard | | |
| 10.0 Standard | | |
| | | initial 7.20 |
| after 2.0 | (gal.) | 7.02 |
| after 4.0 | (gal.) | 6.95 |
| after 6.0 | (gal.) | 6.98 |
| after | (gal.) | |
| after | (gal.) | |

| Conductivity Readings | | |
|---|---|---|
| 84 S Standard | | |
| 1413 S Standard | | |
| | | initial 260 |
| after 2.0 | (gal.) | 240 |
| after 4.0 | (gal.) | 248 |
| after 6.0 | (gal.) | 242 |
| after | (gal.) | |
| after | (gal.) | |

## Water Sample:

Time Collected Dev. only

Physical Appearance

| | |
|---|---|
| Color | Brown |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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NOTES:

Development water dispersed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

Date: 10/20/97
Site Name: CM
Site Location: West field, MA
Personnel: MF/PCS
Weather:
Well #: MW-48S
Project #: 6378.002
Excavation Method: Waterra

Depth of Well *: 24.70 ft.
Depth of Water *: 16.80 ft.
Length of Water Column: 7.90 ft.
Volume of Water in Well: 1.25 gal.(s)
3X Volume of Water in Well: 4.0 gal.(s)

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry?: NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | |
|---|---|---|
| | | Initial 12.9°C |
| after 1.50 | (gal.) | 13.3° |
| after 3.00 | (gal.) | 13.6° |
| after 4.00 | (gal.) | 13.5° |
| after | (gal.) | |
| after | (gal.) | |

| pH Readings | | |
|---|---|---|
| 4.0 Standard | | |
| 7.0 Standard | | |
| 10.0 Standard | | |
| | | Initial 7.00 |
| after 1.50 | (gal.) | 6.82 |
| after 3.00 | (gal.) | 6.90 |
| after 4.00 | (gal.) | 6.88 |
| after | (gal.) | |
| after | (gal.) | |

| Conductivity Readings | | |
|---|---|---|
| 84 S Standard | | |
| 1413 S Standard | | |
| | | Initial 322 |
| after 1.50 | (gal.) | 310 |
| after 3.00 | (gal.) | 306 |
| after 4.00 | (gal.) | 308 |
| after | (gal.) | |
| after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

Color: LT Brown
Odor: None
Turbidity (> 100 NTUs): >100
Sheen/Free Product: None

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
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NOTES:
Development water dispersed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10/20/97 | Weather | |
| Site Name | CMF | Well # | MW-48I |
| Site Location | Westfield, MA | Project # | 6378.002 |
| Personnel | FTF/PCS | Excavation Method | waterra |

| | | |
|---|---|---|
| Depth of Well * | 41.76 ft. | |
| Depth of Water * | 17.50 ft. | |
| Length of Water Column | 24.26 ft. | |
| Volume of Water in Well | 4.0 gal.(s) | |
| 3X Volume of Water in Well | 12.0 gal.(s) | |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry? NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | 84 S Standard | | |
| | | | 7.0 Standard | | | 1413 S Standard | | |
| | | | 10.0 Standard | | | | | |
| | Initial | 10.8°C | Initial | 7.05 | | Initial | 230 | |
| after 4.0 | (gal.) | 11.2° | after 4.0 | (gal.) | 6.85 | after 4.0 | (gal.) | 220 |
| after 8.0 | (gal.) | 12.1° | after 8.0 | (gal.) | 6.80 | after 8.0 | (gal.) | 228 |
| after 12.0 | (gal.) | 12.8° | after 12.0 | (gal.) | 6.82 | after 12.0 | (gal.) | 208 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

| | |
|---|---|
| Color | CLEAR/LT. BROWN |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES:

Development water disposed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

Date: 10/20/97
Site Name: COLUMBIA MFG.
Site Location: Westfield, MA
Personnel: FAF/PCS
Weather:
Well #: MW-49I
Project #: 6378-002
Excavation Method: Waterra

Depth of Well *: 39.50 ft.
Depth of Water *: 14.50 ft.
Length of Water Column: 25.00 ft.
Volume of Water in Well: 4.0 gal.(s)
3X Volume of Water in Well: 12.0 gal.(s)

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry?: NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| | Temperature Readings | pH Readings | Conductivity Readings |
|---|---|---|---|
| 4.0 Standard | | | |
| 7.0 Standard | | | |
| 10.0 Standard | | | |
| 84 S Standard | | | |
| 1413 S Standard | | | |
| Initial | 9.8°C | 7.38 | 118 |
| after 4.0 (gal.) | 9.2°C | 7.46 | 126 |
| after 8.0 (gal.) | 9.4°C | 7.49 | 128 |
| after 12.0 (gal.) | 9.6°C | 7.42 | 128 |
| after (gal.) | | | |
| after (gal.) | | | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

Color: CLEAR
Odor: NONE
Turbidity (> 100 NTUs): >100
Sheen/Free Product: NONE

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

NOTES:

Dev. water dispersed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10/16/97 | Weather | |
| Site Name | COLUMBIA MFG. | Well # | MW-5DI |
| Site Location | West field, MA | Project # | 6378.002 |
| Personnel | RAF/PCS | Excavation Method | Waterra |

| | | |
|---|---|---|
| Depth of Well * | 40.0 ft. | |
| Depth of Water * | 10.8 ft. | |
| Length of Water Column | 29.2 ft. | |
| Volume of Water in Well | 4.75 gal.(s) | |
| 3X Volume of Water in Well | 15.0 gal.(s) | |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry? NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | 84 S Standard | | |
| | | | 7.0 Standard | | | 1413 S Standard | | |
| | | | 10.0 Standard | | | | | |
| | | Initial 14.9°C | | | Initial 7.82 | | | Initial 208 |
| after | 5.0 (gal.) | 14.1°C | after | 5.0 (gal.) | 7.89 | after | 5.0 (gal.) | 282 |
| after | 10.0 (gal.) | 13.8°C | after | 10.0 (gal.) | 7.91 | after | 10.0 (gal.) | 288 |
| after | 15.0 (gal.) | 13.9°C | after | 15.0 (gal.) | 7.92 | after | 15.0 (gal.) | 289 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

| | |
|---|---|
| Color | LT. BROWN |
| Odor | Petroleum ODOR |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES:

Development water contained in drum

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10/22/97 | Weather | |
| Site Name | CMF | Well # | MW-515 |
| Site Location | Westfield MA | Project # | 6378.002 |
| Personnel | FTF/PCS | Excavation Method | water rig |

| | | |
|---|---|---|
| Depth of Well * | 15.60 ft. | |
| Depth of Water * | 6.0 ft. | |
| Length of Water Column | 9.60 ft. | |
| Volume of Water in Well | 1.5 gal.(s) | |
| 3X Volume of Water in Well | 4.5 gal.(s) | |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: dev. only gal.(s)
Did well go dry? X

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | 84 S Standard | | |
| | | | 7.0 Standard | | | 1413 S Standard | | |
| | | | 10.0 Standard | | | | | |
| | | initial 14.4 | | | initial 6.60 | | | initial 148 |
| after 1.5 | (gal.) | 14.1 | after 1.5 | (gal.) | 6.85 | after 1.5 | (gal.) | 146 |
| after 3.0 | (gal.) | 13.8 | after 3.0 | (gal.) | 6.88 | after 3.0 | (gal.) | 150 |
| after 4.5 | (gal.) | 13.7 | after 4.5 | (gal.) | 6.93 | after 4.5 | (gal.) | 152 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

| | |
|---|---|
| Color | LT. BROWN |
| Odor | Petroleum |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | Sheen |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES:
Development water contained in drum

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10.1.97 | Weather | |
| Site Name | COLUMBIA MFG. | Well # | MW-24I/D |
| Site Location | Westfield MA | Project # | 6378.002 |
| Personnel | FF/PCS | Excavation Method | waterra |

| | |
|---|---|
| Depth of Well * | 63.65 ft. |
| Depth of Water * | 18.80 ft. |
| Length of Water Column | 44.85 ft. |
| Volume of Water in Well | ~7.0 gal.(s) |
| 3X Volume of Water in Well | ~20.0 gal.(s) |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry? No

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | 84 S Standard | | |
| | | | 7.0 Standard | | | 1413 S Standard | | |
| | | | 10.0 Standard | | | | | |
| | | Initial 10.9°C | | | Initial 7.05 | | | Initial 190 |
| after | 7.0 (gal.) | 16.1° | after | 7.0 (gal.) | 7.10 | after | 7.0 (gal.) | 181 |
| after | 14.0 (gal.) | 11.3° | after | 14.0 (gal.) | 7.12 | after | 14.0 (gal.) | 156 |
| after | 21.0 (gal.) | 11.5° | after | 21.0 (gal.) | 7.35 | after | 21.0 (gal.) | 168 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

| | |
|---|---|
| Color | LT. GRAY |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | None |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES: Development water disposed around wellhead

Close File

**O'BRIEN & GERE ENGINEERS, INC.**

# Well Development Log

| | | | |
|---|---|---|---|
| Date | 10.2.97 | Weather | |
| Site Name | COLUMBIA MFG. | Well # | MW-14 S/D |
| Site Location | Westfield MA | Project # | 6378.002 |
| Personnel | GE/PCS | Excavation Method | water rc |

| | |
|---|---|
| Depth of Well * | 52.55 ft. |
| Depth of Water * | 14.24 ft. |
| Length of Water Column | 38.30 ft. |
| Volume of Water in Well | 6.0 gal.(s) |
| 3X Volume of Water in Well | 18.0 gal.(s) |

Water Volume /ft. for:
2" Diameter Well = 0.163 X LWC
4" Diameter Well = 0.653 X LWC
6" Diameter Well = 1.469 X LWC

Volume removed before sampling: Dev. only gal.(s)
Did well go dry? NO

* Measurements taken from: [X] Top of Well Casing [ ] Top of Protective Casing [ ] (Other, Specify)

## Water parameters:

| Temperature Readings | | | pH Readings | | | Conductivity Readings | | |
|---|---|---|---|---|---|---|---|---|
| | | | 4.0 Standard | | | | | |
| | | | 7.0 Standard | | | 84 S Standard | | |
| | | | 10.0 Standard | | | 1413 S Standard | | |
| | | Initial 13.8°C | | | Initial 9.60 | | | Initial 500 |
| after | 6.0 (gal.) | 13.3° | after | 6.0 (gal.) | 9.51 | after | 6.0 (gal.) | 484 |
| after | 12.0 (gal.) | 13.1 | after | 12.0 (gal.) | 9.38 | after | 12.0 (gal.) | 482 |
| after | 18.0 (gal.) | 13.0 | after | 18.0 (gal.) | 9.18 | after | 18.0 (gal.) | 480 |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |
| after | (gal.) | | after | (gal.) | | after | (gal.) | |

## Water Sample:

Time Collected: Dev. only

Physical Appearance

| | |
|---|---|
| Color | LT. BROWN |
| Odor | NONE |
| Turbidity (> 100 NTUs) | >100 |
| Sheen/Free Product | NONE |

## Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH | Temp. | Conductuctivity |
|---|---|---|---|---|---|---|---|
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NOTES:
Development water dispersed around wellhead

Close File

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurge Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 10·31·97 | Personnel | PC Sprague & FJ Ferreira | Weather | 60° Sunny |
| Site Name | Columbia MFG | | | Well # | MW-25 |
| Site Location | Westfield, Mo | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 16.42 | ft. |
| Initial Depth to Water | 12.18 | ft. |
| Length of Water Column | 4.24 | ft. |

* Measurements taken from

- [✓] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 12.18 | 14.0 | 7.02 | .358 | | 9.25 | 272 | |
| | | 14.2 | 6.99 | 346 | | 9.21 | 260 | |
| | | 13.9 | 7.05 | 328 | | 9.41 | 184 | |
| | | 13.7 | 7.11 | 326 | | 9.16 | 142 | |
| | | 14.1 | 7.08 | 320 | | 9.26 | 108 | |
| | | 14.2 | 7.01 | 326 | | 9.71 | 96 | |

Water Sample:

Time Collected: 14:30

Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: Clear / Lt Brown
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling

Color: clear
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (METALS) | 1 | YES | $HNO_3$ | |
| 40 ml | VOAs (HVOCs) | 2 | NO | HCl | |

NOTES: Purge water dispersed around wellhead

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.03.97 | Personnel | PCS/RPC | Weather | Sunny 60° |
| Site Name | Columbia MFG | | | Well # | MW-3S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 15.17 ft. | * Measurements taken from |
| Initial Depth to Water | 10.80 ft. | ✓ Top of Well Casing (PVC) |
| Length of Water Column | 4.37 ft. | Top of Protective Casing |
| | | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 10.80 | 17.6 | 6.35 | .185 | | 7.22 | 6 | |
| | | 17.2 | 6.17 | .234 | | 5.04 | 122 | |
| | | 17.1 | 6.15 | .235 | | 5.25 | 76 | |
| | | 17.1 | 6.12 | .241 | | 5.40 | 145 | |
| | | 17.0 | 6.10 | .249 | | 5.66 | 122 | |

Water Sample:
Time Collected: 15:00 — Total Volume Of Purged Water Removed: 12 gal

Physical Appearance at Start
Color: Clear
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Clear
Odor: None
Sheen/Free Product: None

Parameters of Samples: Metals - As, Cd, Cr, Cu, Pb, Ni, Zn

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (METALS) | 1 | | $HNO_3$ | |
| 40 ml | VOA (8010B) | 2 | | HCl | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-4S |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 18.73 | ft. |
| Initial Depth to Water | 10.03 | ft. |
| Length of Water Column | 8.70 | ft. |

* Measurements taken from

- [x] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 10.90 | 12.4°C | 6.89 | ~~369~~ 45 | | 6.04 | 557 | 0.5 L/ |
| 3 | 11.31 | 12.8 | 6.25 | 343 | | 6.72 | 180 | ↓ |
| 6 | 11.58 | 13.2 | 6.21 | 336 | | 6.73 | 130 | ↓ |
| 9 | 12.21 | 13.5 | 6.19 | 329 | | 6.74 | 49 | ↓ |
| 12 | 12.38 | 13.4 | 6.20 | 330 | | 6.73 | 46 | ↓ |

Water Sample:
Time Collected: 0900
Total Volume Of Purged Water Removed: ~

Physical Appearance at Start

| | |
|---|---|
| Color | CLEAR |
| Odor | NONE |
| Sheen/Free Product | NONE |

Physical Appearance at Sampling

| | |
|---|---|
| Color | CLEAR/LT TINGE |
| Odor | NONE |
| Sheen/Free Product | NONE |

Parameters of Samples: VOCs (8010B), metals, PAHs (8310)

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: metals not filtered (Turbidity - 46 NTU's)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PGS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-4D |
| Site Location | Westfield, MA | Evacuation Method | Disposable Bailer | Project # | 6378.002 |

Initial Depth of Well 64.21 ft.
Initial Depth to Water 19.05 ft.
Length of Water Column 45.16 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | 19.05 | 12.3 | 14.05 | ~~[illegible]~~ 903 | | 6.94 | 138 | |
| 6 | 20.25 | 12.5 | 14.12 | ~~[illegible]~~ 944 | | 7.09 | 49 | |
| 9 | 23.10 | 13.0 | 12.22 | 830 | | 7.11 | 46 | |
| 12 | 23.90 | 13.2 | 12.28 | 848 | | 7.16 | 48 | |
| 15 | 24.15 | 13.1 | 12.20 | 840 | | 7.11 | 52 | |

Water Sample:
Time Collected: 0945
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: clear
Odor: SLIGHT ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: clear
Odor: V. SLIGHT ODOR
Sheen/Free Product: NONE

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Very slow recharge during Phase IIA Sampling. Bailer used for Sampling.

VERY HIGH pH, 14.0±, SITUATED ON PERIMETER OF FORMER SLUDGE LAGOON

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/7/97 | Personnel | FTF/PCS | Weather | CLOUDY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-14C |
| Site Location | Westfield MA | Evacuation Method | Bailer | Project # | 6378.002 |

Initial Depth of Well 13.19 ft.
Initial Depth to Water 4.14 ft.
Length of Water Column 9.05 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 15.1°C | 7.04 | 325 | | 6.95 | 347 | |
| | | 15.0 | 6.81 | 330 | | 7.35 | 132 | |
| | | 15.1 | 6.60 | 314 | | 7.28 | 368 | |
| | | 15.2 | 6.58 | 326 | | 7.42 | 220 | |
| | | 15.0 | 6.61 | 330 | | 7.41 | 240 | |
| | | 15.0 | 6.60 | 332 | | 7.36 | 195 | |

Water Sample:
Time Collected: 1030
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: cloudy/orange tinge
Odor: Petroleum odor
Sheen/Free Product: SHEEN

Physical Appearance at Sampling
Color: cloudy
Odor: Petroleum
Sheen/Free Product: sheen

Parameters of Samples: HVOCs, Metals, PAH's, TPH Dup. #1 collected

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Dup #1 11/7/97 collected at this location
Metals Filtered, strong petroleum odor / sheen, purge water contained

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PCS | Weather | SUNNY 45°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-14S |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | | |
|---|---|---|---|
| Initial Depth of Well | 13.65 ft. | * Measurements taken from | |
| Initial Depth to Water | 7.30 ft. | [X] | Top of Well Casing |
| Length of Water Column | 6.35 ft. | [ ] | Top of Protective Casing |
| | | [ ] | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | |
| 3 | | 15.7°C | 9.75 | 1180 | | 6.39 | >999 | |
| 6 | | 16.0 | 8.83 | 1160 | | 6.36 | 750 | |
| 9 | | 15.8 | 6.54 | 1160 | | 5.85 | 590 | |
| 12 | | 15.6 | 6.58 | 1158 | | 5.88 | 535 | |

Water Sample:
Time Collected: 10:30 — Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT. BROWN
Odor: SLIGHT ODOR (UNKNOWN)
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: V. LT. BROWN
Odor: SLIGHT ODOR (UNKNOWN)
Sheen/Free Product: NONE

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Wells 14S, 14I, 14D Reset at grade in April 1997 due to ramp construction
metals sample to be filtered (NTU's at > 500)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PCS | Weather | |
| Site Name | COLUMBIA MFG | | | Well # | MW-MI/D |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378-002 |

Initial Depth of Well: 52.55 ft.
Initial Depth to Water: 14.25 ft.
Length of Water Column: 38.30 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 14.25 | 13.5 | 10.61 | 542 | | 7.59 | >999 | |
| 3 | 15.05 | 13.6 | 9.81 | 585 | | 7.51 | >999 | |
| 6 | 15.17 | 12.7 | 9.59 | 600 | | 7.48 | 615 | |
| 9 | 15.50 | 12.8 | 9.28 | 634 | | 7.65 | 315 | |
| 12 | 16.10 | 13.1 | 9.26 | 632 | | 7.68 | 310 | |

Water Sample:
Time Collected: 1215
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: LT. BROWN / TURBID
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: LT. BROWN
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: PAHs (8310), VOCs (8010B), metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals need to be filtered (NTUs at 2300)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PCS | Weather | SUNNY 50°F |
| Site Name | COLUMBIA MFG - | | | Well # | MW-14D |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well: 69.90 ft.
Initial Depth to Water: 14.58 ft.
Length of Water Column: ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 15.1°C | 12.76 | 174 | | 7.15 | 134 | |
| 6 | | 15.1 | 11.88 | 180 | | 7.07 | 115 | |
| 9 | | 13.9 | 11.85 | 181 | | 7.11 | 125 | |
| 12 | | 13.8 | 11.80 | 180 | | 7.19 | 110 | |
| 15 | | 14.0 | 11.82 | 176 | | 7.21 | 118 | |
| 18 | | 13.8 | 11.85 | 170 | | 7.22 | 110 | |
| 21 | | 13.7 | 11.83 | 172 | | 7.22 | 128 | |

Water Sample:
Time Collected: 11:30
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR / LT. TINGE
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: VOCs (8010B), PAHs (8310), metals (Filtered, NTU's at 120)

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/7/97 | Personnel | FJF/PCS | Weather | CLOUDY 40°F |
| Site Name | COLUMBIA MFG | | | Well # | MW-155 |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 21.69 ft.
Initial Depth to Water 15.45 ft.
Length of Water Column 6.24 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | 15.05 | 11.2°C | 7.18 | 429 | | 7.05 | 703 | |
| 6 | 15.79 | 11.6° | 7.14 | 450 | | 7.15 | 345 | |
| 9 | 16.11 | 11.8° | 7.13 | 436 | | 7.16 | 200 | |
| 12 | 16.98 | 11.3° | 7.17 | 444 | | 7.62 | 140 | |
| 15 | 17.45 | 11.2° | 7.25 | 442 | | 7.59 | 92 | |
| 18 | 18.01 | 11.2° | 7.23 | 444 | | 7.61 | 61 | |
| 21 | 19.29 | 11.2 | 7.23 | 442 | | 7.61 | 48 | |

Water Sample:
Time Collected: 0900
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT. ORANGE TINGE/RED
Odor: MUSKY SULFUR ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: LT. orange tinge
Odor: musky ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAHs (8310), METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & G...E ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/12/97 | Personnel | FJF/PCS | Weather | CLOUDY 45°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-18A |
| Site Location | Westfield MA | Evacuation Method | Bailer | Project # | 6378.002 |

| | | | |
|---|---|---|---|
| Initial Depth of Well | 9.21 ft. | * Measurements taken from | |
| Initial Depth to Water | 6.08 ft. | X | Top of Well Casing |
| Length of Water Column | 3.13 ft. | | Top of Protective Casing |
| | | | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | 6.08 | 17.2°C | 6.92 | 130 | | 5.89 | 97 | |
| | | 17.0° | 6.96 | 142 | | 5.91 | 118 | |
| | | 16.8° | 6.92 | 140 | | 5.79 | 126 | |
| | 7.91 | 17.0° | 6.99 | 138 | | 5.72 | 146 | |

Water Sample:
Time Collected: 1515
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: LT Brown
Odor: Petroleum odor
Sheen/Free Product: Sheen

Physical Appearance at Sampling
Color: LT Brown
Odor: Pet. odor
Sheen/Free Product: sheen

Parameters of Samples: HVOC's, PAH's, TPH, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals field filtered, purge water contained

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/12/97 | Personnel | FJF/PCS | Weather | P. CLOUDY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-19I (INDOORS) |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 39.45 ft.
Initial Depth to Water 12.18 ft.
Length of Water Column 27.27 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 mins | | 17.9°C | 7.30 | 127 | | 7.12 | 155 | |
| 6 | | 17.6° | 7.55 | 131 | | 7.42 | 146 | |
| 9 | | 17.6 | 7.48 | 137 | | 7.54 | 142 | |
| 12 | | 17.1 | 7.51 | 134 | | 7.47 | 136 | |
| 15 | | 16.8 | 7.46 | 132 | | 7.42 | 140 | |

Water Sample:
Time Collected: 1000
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR / LT. GRAY tinge
Odor: SL. Petroleum odor
Sheen/Free Product: ~~Slight sheen~~ None

Physical Appearance at Sampling
Color: Very light. Gray
Odor: V. SLIGHT ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAHs, TPH, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: MS/MSD for all parameters collected at this location.

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/7/97 | Personnel | FJF/PCS | Weather | CLOUDY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-20B |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 12.80 ft.
Initial Depth to Water 9.46 ft.
Length of Water Column 3.34 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 17.5°C | 6.06 | 420 | | 12.9 | 140 | |
| | | 17.3° | 6.01 | 346 | | 12.1 | 128 | |
| | | 17.1 | 5.94 | 352 | | 11.6 | 116 | |
| | | 17.4 | 5.99 | 350 | | 12.1 | 120 | |
| | | 17.2 | 6.07 | 348 | | 11.8 | 132 | |
| | | 16.9 | 6.04 | 351 | | 11.9 | 106 | |

Water Sample:
Time Collected 1215
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color LT BROWN
Odor Pet. ODOR
Sheen/Free Product Sheen

Physical Appearance at Sampling
Color LT. Brown
Odor STRONG Pet. ODOR
Sheen/Free Product Heavy sheen

Parameters of Samples: HVOCs, PAHs, metals, TPH

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Purge water contained, heavy sheen noted

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/91 | Personnel | FJF/PCS | Weather | SUNNY 50°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-22I |
| Site Location | Westfield | Evacuation Method | BLADDER PUMP | Project # | 6826-002 |

Initial Depth of Well 38.47 ft.
Initial Depth to Water 16.66 ft.
Length of Water Column 21.81 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 16.66 | 13.5°C | 8.35 | 375 | | 6.79 | 74 | |
| 3 | 16.91 | 12.7 | 7.82 | 393 | | 7.65 | 61 | |
| 6 | 17.02 | 12.5 | 7.49 | 394 | | 7.71 | 53 | |
| 9 | 17.29 | 12.4 | 6.94 | 393 | | 7.78 | 72 | |
| 12 | 17.35 | 12.4 | 6.94 | 394 | | 7.75 | 81 | |

Water Sample:
Time Collected: ~~1415~~ 1315

Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR/LT. TINGE
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs (8020), Metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals to be filtered (NTU's > 50)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | FJF/PCS | Weather | SUNNY 50°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-23S |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378.001 |

| | | | |
|---|---|---|---|
| Initial Depth of Well | 25.29 ft. | * Measurements taken from | |
| Initial Depth to Water | 16.56 ft. | X | Top of Well Casing |
| Length of Water Column | 8.73 ft. | | Top of Protective Casing |
| | | | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | | 12.1 °C | 7.54 | 172 | | 8.79 | 134 | |
| 3 | | 11.5 | 7.40 | 170 | | 8.91 | 133 | |
| 6 | | 11.4 | 7.29 | 172 | | 8.85 | 127 | |
| 9 | | 11.2 | 7.41 | 173 | | 8.86 | 165 | |
| 12 | | 11.2 | 7.40 | 172 | | 8.83 | 167 | |
| 15 | | 11.3 | 7.42 | 173 | | 8.85 | 160 | |
| 18 | | 11.3 | 7.43 | 171 | | 8.81 | 167 | |
| 21 | | 11.2 | 7.41 | 172 | | 8.83 | 165 | |

Water Sample:
Time Collected: 1415
Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling

Color: CLEAR/SL. TINGE
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: VOCs (8010), Metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals filtered (NTU's ~160)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/6/97 | Personnel | EJF/PCS | Weather | SUNNY 50°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-23I |
| Site Location | | Evacuation Method | Bladder Pump | Project # | 6378-002 |

| | | |
|---|---|---|
| Initial Depth of Well | 40.78 | ft. |
| Initial Depth to Water | 16.98 | ft. |
| Length of Water Column | 23.80 | ft. |

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | | 11.6° C | 7.55 | 183 µs | | 6.66 | 263 | |
| 3 | | 11.3°C | 7.30 | 180 | | 7.63 | 181 | |
| 6 | | 11.2° | 7.26 | 182 | | 7.71 | 157 | |
| 9 | | 11.2° | 7.13 | 180 | | 7.81 | 140 | |
| 12 | | 11.3° | 7.15 | 180 | | 7.79 | 131 | |
| 15 | | 11.2° | 7.13 | 182 | | 7.80 | 120 | |

Water Sample:
Time Collected: 1515
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: LT. Brown / Clear
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: Clear, slight tan tinge
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/11/97 | Personnel | FJF/PCS | Weather | P. cloudy 45°F |
| Site Name | Columbia Mfg. | | | Well # | MW-25S |
| Site Location | Westfield | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 14.90 ft.
Initial Depth to Water 8.65 ~~14.90~~ ft.
Length of Water Column 6.25 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 10.9° C | 8.37 | 118 | | 8.70 | 30 | |
| 6 | | 11.2° | 7.46 | 116 | | 8.21 | 131 | |
| 9 | | 11.2° | 7.57 | 118 | | 8.39 | 142 | |
| 12 | | 11.3° | ~~7.59~~ 7.59 | 120 | | 8.38 | 126 | |
| 15 | | 11.1° | 7.51 | 118 | | 8.40 | 105 | |
| 18 | | 11.2° | 7.49 | 118 | | 8.39 | 110 | |

Water Sample:
Time Collected 0945
Total Volume Of Purged Water Removed

Physical Appearance at Start
Color CLEAR
Odor NONE
Sheen/Free Product NONE

Physical Appearance at Sampling
Color CLEAR/SLIGHTY Turbid
Odor SLIGHT ORGANIC ODOR
Sheen/Free Product None

Parameters of Samples: HVOCs, METALS, PAHs

| Container Size | Container Type | | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|---|
| 40 mL | VOA | (HVOC) | 2 | NO | HCl | |
| 500 mL | PE | (METALS) | 1 | YES | $HNO_3$ | |
| 1 L | AMBER | (PAH) | 1 | NO | None | |

NOTES: metals sample field filtered

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.11.97 | Personnel | PC SAVAGE + FJ FERREIRA | Weather | P. CLOUDY 45°F |
| Site Name | COLUMBIA MFG | | | Well # | MW-25BR |
| Site Location | WESTFIELD, MA | Evacuation Method | BLADDER PUMP | Project # | 6378.002 |

Initial Depth of Well ____ ft.
Initial Depth to Water 21.91 ft.
Length of Water Column ____ ft.

* Measurements taken from
- [X] Top of Well ~~Casing~~ PVC
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 9.5°C | 8.21 | 138 | | 9.19 | 35 | |
| 6 | | 9.9°C | 8.29 | 140 | | 7.02 | 75 | |
| 9 | | 9.9°C | 8.61 | 130 | | 6.70 | 84 | |
| 12 | | 9.8°C | 8.73 | 129 | | 6.81 | 93 | |
| 15 | | 9.9°C | 8.64 | 130 | | 6.87 | 86 | |
| 18 | | 10.0°C | 8.67 | 130 | | 6.85 | 78 | |
| 21 | | 10.0°C | 8.66 | 130 | | 6.91 | 82 | |

Water Sample:
Time Collected: 0900
Total Volume Of Purged Water Removed: ____

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR/VERY SLIGHT TINGE
Odor: SLIGHT ORGANIC ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, Metals

| Container Size | Container Type | | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|---|
| 40ml | VOA | (HVOC) | 2 | NO | HCl | |
| 500ml | PE | (METALS) | 1 | YES | $HNO_3$ | |
| 1L | AMBER | (PAH) | 1 | NO | NONE | |

NOTES: Metals filtered (NTU's > 50)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/12/97 | Personnel | FJF/PCS | Weather | CLOUDY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-27S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 14.66 ft.
Initial Depth to Water 8.89 ft.
Length of Water Column 5.77 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | 9.23 | 17.3° | 4.92 | 244 | | 7.77 | 147 | |
| 6 | 10.92 | 17.4° | 5.62 | 277 | | 7.59 | 138 | |
| 9 | 11.62 | 17.1° | 5.41 | 205 | | 7.31 | 135 | |
| 12 | 11.81 | 17.0° | 5.61 | 202 | | 7.39 | 128 | |

Water Sample:
Time Collected: 1230
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT GRAY
Odor: Petroleum ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: LT GRAY
Odor: Petroleum ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAH's, TPH, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: metals field filtered
Petroleum odor, no sheen

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | FJF/PCS | Weather | SUNNY 40° F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-28S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 14.79 ft.
Initial Depth to Water 7.15 ft.
Length of Water Column 7.64 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 14.7°C | 7.19 | 188 | | 5.55 | 159 | |
| 6 | | 15.3° | 7.08 | 202 | | 5.84 | 420 | |
| 9 | | 15.5° | 6.96 | 204 | | 6.13 | 310 | |
| 12 | | 15.6° | 6.92 | 204 | | 5.96 | 281 | |
| 15 | | 15.6° | 6.91 | 202 | | 5.93 | 202 | |

Water Sample:
Time Collected 1200
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color LT. TAN
Odor V. Slight Gasoline ODOR
Sheen/Free Product NONE

Physical Appearance at Sampling
Color LT. TAN
Odor V. SLIGHT GASOLINE ODOR
Sheen/Free Product NONE

Parameters of Samples: HVOC, Metals, PAH's, TPH

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Very Slight Gasoline ODOR NOTED, No Sheen OBSERVED
Metals Field filtered

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | FJF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG | | | Well # | MW-24I |
| Site Location | WESTFIELD MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 42.57 ft.
Initial Depth to Water 12.86 ft.
Length of Water Column 29.71 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 12.6°C | 9.12 | 799 | | 8.01 | 197 | .5 L/M |
| 6 | | 12.9°C | 9.01 | 811 | | 7.71 | 167 | |
| 9 | | 13.0°C | 9.17 | 790 | | 7.81 | 181 | |
| 12 | | 13.1°C | 9.07 | 792 | | 7.80 | 170 | |
| 15 | | 13.0° | 9.01 | 790 | | 7.78 | 170 | |
| 18 | | 13.1°C | 9.03 | 792 | | 7.81 | 145 | |
| 21 | | 13.3°C | 8.98 | 791 | | 7.85 | 151 | |

Water Sample:
Time Collected: 1430
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR
Odor: NONE (SL. ORGANIC)
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: MUSKY
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: DUPLICATE #1 collected at this location
Metals sample field filtered (NTU's > 50)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/PCS | Weather | P. Sunny 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-24I/D |
| Site Location | Westfield MA | Evacuation Method | BLADDER PUMP | Project # | |

Initial Depth of Well 63.65 ft.
Initial Depth to Water 18.81 ft.
Length of Water Column 44.84 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 3 | | 10.58° | 6.96 | 184 | | 8.44 | 145 | |
| 6 | | 11.9° | 7.17 | 181 | | 7.63 | 183 | |
| 9 | | 11.7° | 7.44 | 186 | | 5.60 | 145 | |
| 12 | | 12.1° | 7.73 | 185 | | 6.18 | 206 | |
| 15 | | 12.4 | 7.94 | 185 | | 5.84 | 195 | |
| 18 | | 12.2° | 8.03 | 185 | | 5.80 | 216 | |
| 21 | | 12.5° | 8.05 | 183 | | 6.02 | 296 | |
| 24 | | 12.5° | 8.05 | 183 | | 6.48 | 626 | |

Water Sample:
Time Collected: 1345
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR / LT. GRAY TINGE
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: V. LT. GRAY TINT
Odor: V. SLIGHT MUSKY ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOC's, PAH's, metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | [redacted] FOF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-24D |
| Site Location | Westfield MA | Evacuation Method | [redacted] Bailer | Project # | 6378.002 |

Initial Depth of Well 66.27 ft.
Initial Depth to Water 19.39 ft.
Length of Water Column 46.88 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 12.5°C | 9.37 | 168 | | 7.18 | 175 | |
| | | 12.8 | 9.17 | 148 | | 6.09 | 135 | |
| | | 12.7°C | 8.98 | 145 | | 7.12 | 95 | |
| | | 12.9°C | 8.95 | 143 | | 7.61 | 40 | |
| | | 12.8° | 8.93 | 145 | | 7.14 | 47 | |
| | | 12.8° | 8.97 | 145 | | 7.15 | 38 | |

Water Sample:
Time Collected: 1530
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Bailer used, well does not recharge, set in clayey unit
Metals not field filtered NTU's @ 38

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.03.97 | Personnel | PCS + RPK | Weather | Sunny 60° |
| Site Name | Columbia MFG | | | Well # | MW-29S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well: 22.00 ft.
Initial Depth to Water: 17.62 ft.
Length of Water Column: 4.38 ft.

* Measurements taken from
- [✓] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 17.62 | 13.1 | 6.78 | .151 | | 9.77 | >999 | |
| | | | | | | | | |
| | | 12.9 | 6.45 | .161 | | 10.36 | 183 | |
| | | 12.5 | 6.32 | .160 | | 10.60 | >999 | |
| | | | | | | | | |
| | | 12.4 | 6.36 | .158 | | 10.69 | >999 | |

Water Sample:
Time Collected: 13:30
Total Volume Of Purged Water Removed: 6 gal

Physical Appearance at Start
Color: Red/Brown
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Red/Brown Clouds
Odor: None
Sheen/Free Product: None

Parameters of Samples: Metals (As, Cd, Cr, Cu, Pb, Ni, Zn)

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (Metals) | 1 | YES | $HNO_3$ | |
| 40 ml | VOA (8010B) | 2 | NO | HCl | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 10-03-97 | Personnel | PCS + RPL | Weather | Sunny 60° |
| Site Name | COLUMBIA MFG | | | Well # | MW-29I |
| Site Location | WESTFIELD, MA | Evacuation Method | BLADDER Pump | Project # | 6378.002 |

Initial Depth of Well 42.09 ft.
Initial Depth to Water 17.67 ft.
Length of Water Column 24.42 ft.

* Measurements taken from
- [✓] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 17.67 | 12.1 | 6.77 | .210 | | 10.88 | 182 | |
| | | 12.0 | 6.68 | .210 | | 11.11 | 176 | |
| | | | | | | | | |
| | | | | | | | | |
| | | 11.4 | 6.74 | .209 | | 11.27 | 100 90 | |
| | 17.72 | 11.2 | 6.74 | .205 | | 11.19 | 83 | |

Water Sample:
Time Collected: 12:30
Total Volume Of Purged Water Removed: 12 gal

Physical Appearance at Start
Color: Brown - Red - cloudy
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Clear w/ red/Brown tint
Odor: None
Sheen/Free Product: None

Parameters of Samples: METALS - (As, Cd, Cr, Cu, Pb, Ni, Zn)

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (METALS) | 1 | NO | $HNO_3$ | |
| 40 ml | VOA (8010B) | 2 | NO | HCL | |

NOTES: MS + MSD

Close File

O'BRIEN & GERE ENGINEERS NO: MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.14.97 | Personnel | PC Savage Jr / FJ Ferreira | Weather | 25°, Ice + Snow |
| Site Name | Columbia MFG | | | Well # | MW-305 |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 24.48 ft. | |
| Initial Depth to Water | 15.25 ft. | |
| Length of Water Column | 9.23 ft. | |

* Measurements taken from

- [✓] Top of Well ~~Casing~~ (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 9.7 °C | 6.87 | ~~444~~ 412 | | 7.71 | 140 | |
| 3 | | 9.6 | 7.51 | 415 | | 7.47 | 149 | |
| 6 | | 10.0 | 7.44 | 425 | | 7.61 | 136 | |
| 9 | | 10.2 | 7.12 | 426 | | 7.41 | 999 | |
| 12 | | 10.0 | 7.06 | 426 | | 7.51 | 145 | |
| 15 | | 10.2 | 6.96 | 424 | | 7.49 | 141 | |
| 18 | | 10.2 | 6.94 | 425 | | 7.39 | 181 | |
| 21 | | | | | | | | |

Water Sample:

Time Collected: 10:15

Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: Lt. Brown
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling

Color: Lt. Brown tinge
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: EPA split location

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.19.97 | Personnel | FJ Ferreira / PC Savage | Weather | Sunny - 25° |
| Site Name | Columbia MFG | | | Well # | MW-30I |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 39.65 ft.
Initial Depth to Water 15.24 ft.
Length of Water Column 24.41 ft.

* Measurements taken from
- [✓] Top of Well ~~Casing~~ (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 9.6°C | 7.76 | 447 | | 4.50 | 115 | |
| 6 | | 9.4 | 7.80 | 453 | | 5.12 | 32 | |
| 9 | | 9.5 | 7.66 | 453 | | 5.36 | 52 | |
| 12 | | 9.6 | 7.45 | 453 | | 5.49 | 43 | |
| 15 | | 9.5 | 7.45 | 444 | | 5.72 | 41 | |
| 18 | | 9.6 | 7.41 | 447 | | 5.71 | 52 | |
| 21 | | 9.5 | 7.43 | 445 | | 5.69 | 35 | |

Water Sample:
Time Collected 0900
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color clear
Odor NONE
Sheen/Free Product NONE

Physical Appearance at Sampling
Color CLEAR
Odor NONE
Sheen/Free Product NONE

Parameters of Samples: HVOC, METALS ([redacted]) NOT FILTERED

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: metals not field filtered (NTU's < 50)
MS/MSD collected at this location

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.03.97 | Personnel | PC Savage + RP Lagueux | Weather | Sunny, 60° |
| Site Name | Columbia MFG | | | Well # | MW-315 |
| Site Location | Westfield, Ma | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 19.53 ft.
Initial Depth to Water 13.08 ft.
Length of Water Column 6.45 ft.

* Measurements taken from
- [x] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 13.08 | 13.9 | 7.12 | .277 | | 8.94 | 634 | |
| | | 13.6 | 7.21 | .277 | | 8.30 | >999 | |
| | | | | | | | | |
| | | | | | | | | |
| | | 13.5 | 7.35 | .281 | | 7.10 | 438 | |
| | | | | | | | | |
| | | 13.4 | 7.34 | .287 | | 7.77 | 314 | |

Water Sample:
Time Collected: 1630
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: Clear / Brown
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: clear w/ Brown tint
Odor: None
Sheen/Free Product: None

Parameters of Samples: Metals: As, Cd, Cr, Cu, Pb, Ni, Zn

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (Metals) | 1 | Yes | $HNO_3$ | |
| 40 ml | VOA (8010B) | 2 | NO | HCl | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/PCS | Weather | SUNNY 35°C |
| Site Name | COLUMBIA MFG. | | | Well # | MW-32S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 13.71 | ft. |
| Initial Depth to Water | 5.25 | ft. |
| Length of Water Column | 8.46 | ft. |

* Measurements taken from

- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 14.6°C | 6.76 | 194 | | 5.33 | 329 | |
| 6 | | 14.7°C | 6.59 | 198 | | 5.20 | 165 | |
| 9 | | 14.7°C | 6.41 | 196 | | 5.25 | 65 | |
| 12 | | 15.3°C | 6.38 | 196 | | 5.72 | 48 | |
| 15 | | 15.4°C | 6.34 | 192 | | 5.35 | 43 | |

Water Sample:
Time Collected: 0900
Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: CLEAR/LT. ORANGE
Odor: Petroleum ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling

Color: CLEAR
Odor: Petroleum
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAHs, TPH, metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: · EPA SPLIT LOCATION
· No Field Filtering (NTUs 43)

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/19/97 | Personnel | FJF/PCS | Weather | SUNNY 25°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-32I |
| Site Location | Westfield, MA | Evacuation Method | BAILER | Project # | 6378.002 |

Initial Depth of Well 39.75 ft.
Initial Depth to Water 10.06 ft.
Length of Water Column 29.69 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 12.3° | 9.87 | 354 | | 5.70 | 20 | |
| | | 13.3° | | 370 | | 5.48 | 26 | |
| | | 13.9° | | 377 | | 5.66 | 18 | |
| | | 14.1° | | 375 | | 5.71 | 21 | |

Water Sample:
Time Collected: 1145
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: clear
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, Metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Bailer used (very slow recharge rates during IIA Sampling)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.14.97 | Personnel | PCS + VAGG / FT FERREIRA | Weather | Hail (25°) |
| Site Name | COLUMBIA MFG | | | Well # | MW-335 |
| Site Location | WESTFIELD, MA | Evacuation Method | BLADDER PUMP | Project # | 6378.002 |

Initial Depth of Well 28.90 ft.
Initial Depth to Water 10.87 ft.
Length of Water Column 17.43 ft.

* Measurements taken from
- [✓] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 10.1°C | 7.51 | 127 | | 6.80 | 324 | |
| 3 | | 10.7 | 7.36 | 108 | | 6.72 | 259 | |
| 6 | | 10.9 | 7.28 | 108 | | 6.78 | 624 | |
| 9 | | 10.9 | 7.19 | 110 | | 6.54 | 146 | |
| 12 | | 11.0 | 7.09 | 114 | | 6.42 | 108 | |
| 15 | | 11.1 | 6.99 | 116 | | 6.52 | 111 | |
| 18 | | 11.1 | 6.96 | 118 | | 6.49 | 97 | |
| 21 | | 11.0 | 6.94 | 118 | | 6.46 | 140 | |

Water Sample:
Time Collected: 12:30
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: Clear / LT GRAY Tinge
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: LT GRAY Tinge
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/19/97 | Personnel | FJF / PCS | Weather | SUNNY - 25° F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-33I |
| Site Location | WESTFIELD MA | Evacuation Method | BLADDER PUMP | Project # | 6378.002 |

Initial Depth of Well 42.75 ft.
Initial Depth to Water 11.33 ft.
Length of Water Column 31.42 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 10.2°C | 7.55 | 225 | | 6.35 | 23 | |
| 6 | | 10.8 | 7.44 | 229 | | 6.34 | 19 | |
| 9 | | 11.1 | 7.39 | 227 | | 6.41 | 12 | |
| 12 | | 11.0 | 7.44 | 225 | | 6.36 | 26 | |
| 15 | | 11.0 | 7.37 | 224 | | 6.29 | 28 | |
| 18 | | 11.1 | 7.39 | 226 | | 6.43 | 18 | |

Water Sample:
Time Collected 1030
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color CLEAR
Odor NONE
Sheen/Free Product NONE

Physical Appearance at Sampling
Color CLEAR
Odor NONE
Sheen/Free Product NONE

Parameters of Samples: HVOCs, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals not field filtered (NTU's < 50)

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/19/97 | Personnel | FJF/PCS | Weather | SUNNY 25°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-34S (INDOORS) |
| Site Location | Westfield MA | Evacuation Method | Bailer | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 17.97 | ft. |
| Initial Depth to Water | 11.32 | ft. |
| Length of Water Column | 6.65 | ft. |

* Measurements taken from

- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 11.32 | 17.1° C | 7.90 | 515 | | 5.36 | 276 | |
| | | 18.0° | 7.47 | 540 | | 5.42 | 160 | |
| | | 18.2° | 7.16 | 567 | | 5.50 | 204 | |
| | | 18.3° | 6.89 | 570 | | 5.59 | 315 | |
| | | 18.2° | 6.90 | 570 | | 5.55 | 240 | |
| | 13.09' | 18.2° | 6.92 | 562 | | 5.60 | 226 | |

Water Sample:

Time Collected: 1300

Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: CLEAR/LT. BROWN TINGE
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling

Color: LT. BROWN/BROWN
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, Metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Purge water contained

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.11.97 | Personnel | PCSavage / FJ Ferreira | Weather | 50°, Sunny |
| Site Name | Columbia MFG | | | Well # | MW-35S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 15.08 | ft. |
| Initial Depth to Water | 5.05 | ft. |
| Length of Water Column | 10.03 | ft. |

* Measurements taken from
- [✓] Top of Well ~~Casing~~ (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 13.0 | 8.23 | 39 | | 5.78 | 215 | |
| | | 12.8 | 6.95 | 32 | | 7.42 | 566 | |
| | | 12.8 | 6.60 | 33 | | | 210 | |

Water Sample:
Time Collected: 11:30
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: Lt. Brownish White (Turbid)
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Milky Brown (Turbid)
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40ml | VOA (HAOC) | 2 | NO | HCl | |
| 500ml | PE (METALS) | 1 | YES | $HNO_3$ | |
| 1L | Amber (PAH) | 1 | NO | None | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11·11·97 | Personnel | PC Smyres / FJ Ferreira | Weather | Sunny, 50° |
| Site Name | Columbia MFG | | | Well # | MW-35I |
| Site Location | Westfield, MA | Evacuation Method | Bailer (slow Recharge) | Project # | 6378.002 |

Initial Depth of Well 42.75 ft.
Initial Depth to Water 16.08 ft.
Length of Water Column 26.67 ft.

* Measurements taken from
- [✓] Top of Well ~~Casing~~ (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 13.7 °C | 6.87 | 398 | | 7.54 | 175 | |
| | | 13.8 °C | 7.37 | 407 | | 7.44 | 116 | |
| | | 13.4 | 7.67 | 409 | | 7.70 | 134 | |
| | | 13.2 | 7.81 | 409 | | 7.69 | 95 | |
| | | 13.2 | 7.84 | 406 | | 7.71 | 27 | |
| | | 13.2 | 7.85 | 405 | | 7.70 | 42 | |
| | | 13.2 | 7.82 | 407 | | 7.70 | 29 | |

Water Sample:
Time Collected: 10:45
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: Clear
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Clear
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40mL | VOA (VOC 8010) | 2 | NO | HCL | |
| 500ml | PE (Metals) | 1 | ~~YES~~ NO (RS) | $HNO_3$ | |
| 1L | Amber Glass | 1 | NO | None | |

NOTES: Extremely Clear, No Filtering

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/12/97 | Personnel | FJF/PCS | Weather | CLOUDY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-365 (INDOORS) |
| Site Location | Westfield, MA | Evacuation Method | Bailer | Project # | 637F.002 |

Initial Depth of Well 15.51 ft.
Initial Depth to Water 8.92 ft.
Length of Water Column 6.59 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 16.8°C | 6.47 | 164 | | 7.23 | 40 | |
| | | 16.5° | 7.00 | 162 | | 7.17 | 139 | |
| | | 16.3° | 7.03 | 160 | | 7.15 | 120 | |
| | | 16.5° | 7.10 | 164 | | 7.29 | 121 | |

Water Sample:
Time Collected 1345
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color clear
Odor SLIGHT Petroleum odor
Sheen/Free Product NONE

Physical Appearance at Sampling
Color Clear
Odor slight Petroleum
Sheen/Free Product NONE

Parameters of Samples: HVOCs, PAH's, TPH, metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.11.97 | Personnel | PC Sawyer Jr / FJ Ferreira | Weather | Sunny 45 |
| Site Name | Columbia MFG | | | Well # | MW-37S |
| Site Location | Westfield, Ma | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 12.10 | ft. |
| Initial Depth to Water | 5.10 | ft. |
| Length of Water Column | 7.00 | ft. |

* Measurements taken from
- [✓] Top of Well ~~Casing~~ (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0.33L |
| 3 | 6.30 | 12.8°C | 7.74 | 197 | | 8.03 | >999 | |
| 6 | 6.81 | 12.9°C | 7.63 | 190 | | 8.61 | 423 | |
| 9 | | 13.1°C | 7.79 | 194 | | 8.54 | 216 | |
| 12 | | 13.0 | 7.84 | 194 | | 8.81 | 190 | |
| 15 | | 13.0 | 7.81 | 192 | | 8.76 | 190 | |
| 18 | | 13.0 | 7.80 | 190 | | 8.71 | 178 | |

Water Sample:
Time Collected: 14:45

Total Volume Of Purged Water Removed:

Physical Appearance at Start
- Color: clear / orange
- Odor: slight organic
- Sheen/Free Product: none

Physical Appearance at Sampling
- Color: orange tinge
- Odor: slight organic
- Sheen/Free Product: none

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40ml | VOA (HOC) | 2 | ~~HCl~~ NO | HCl | |
| 500ml | PE (Metals) | 1 | ~~HNO3~~ YES | $HNO_3$ | |
| 1 L | Amber (PAH) | 1 | ~~None~~ NO | None | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/11/97 | Personnel | FJF/PCS | Weather | P. SUNNY 50°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-38S |
| Site Location | Westfield MA | Evacuation Method | BAILER | Project # | 6378.002 |

Initial Depth of Well: 17.88 ft.
Initial Depth to Water: 8.75 ft.
Length of Water Column: 9.13 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 13.2°C | 6.88 | 395 | | 7.03 | 183 | |
| 6 | | 13.3 | 6.95 | 400 | | 6.18 | 125 | |
| 9 | | 13.4 | 6.97 | 396 | | 6.28 | 114 | |
| 12 | | 13.3 | 6.95 | 398 | | 6.31 | 122 | |
| 15 | | 13.3 | 6.97 | 400 | | 6.31 | 120 | |

Water Sample:
Time Collected: 1300
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: clear
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: clear/grey tinge
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals field filtered

Close File

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS MATERIALS
One Winter Street Boston, Massachusetts 02108

6378-002

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**UNIFORM HAZARDOUS WASTE MANIFEST**

1. Generator's US EPA ID No.: MAD001115609
Manifest Document No.: J 6785

2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number: MA J 636785

B. State Gen. ID: SAME

C. State Trans. ID: MA 13376

D. Transporter's Phone ( 617 849-1800

E. State Trans. ID:

F. Transporter's Phone ( )

G. State Facility's ID: NOT REQUIRED

H. Facility's Phone ( 781 849-1807

3. Generator's Name and Mailing Address:
Columbia Manufacturing Company
1 Cycle Street
Westfield, MA 01085

4. Generator's Phone ( 413 562-3664

5. Transporter 1 Company Name: Clean Harbors Env.Services,Inc
6. US EPA ID Number: MAD039322250

7. Transporter 2 Company Name:
8. US EPA ID Number:

9. Designated Facility Name and Site Address:
Clean Harbors of Braintree Inc
385 Quincy Ave
Braintree, MA 02184

10. US EPA ID Number: MAD053452637

| 11. US DOT Description (Including Proper Shipping Name, Hazard Class and ID Number) | 12. Containers NO. | Type | 13. Total Quantity | 14. Unit Wt/Vol | I. Waste No. |
|---|---|---|---|---|---|
| a. NON DOT REGULATED OIL & WATER , NON DOT HAZARDOUS, NONE, NONE | 003 | DM | 0140 | G | MA01 |
| b. NON DOT REGULATED OIL & SOIL , NON DOT HAZARDOUS, NONE, NONE | 002 | DM | 0900 | P | MA01 |
| c. | | | | | |
| d. | | | | | |

J. Additional Descriptions for Materials Listed Above (include physical state and hazard code.)
a. (L),(T)
b. (S),(T)
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
11a CH036581
11b CH045381

IN EMERGENCY, CALL CHES 1-800-645-8265
WO# NB87816

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DAVID P. WILLIAMS
Signature: David P Williams
Date: Month 12 Day 18 Year 97

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: John Banny
Signature: John Banny
Date: Month 12 Day 18 Year 97

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name:
Signature:
Date: Month Day Year

GENERATOR — TRANSPORTER — FACILITY

In case of emergency or spill, immediately call the National Response Center (800) 424-8802.

Form Approved OMB No. 2050-0039. Expires 9-30-96
EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

Clean Harbors has appropriate permits for & will accept the waste the generator is shipping.

COPY 6: GENERATOR MAILS TO DESTINATION STATE

Close File

Close File

**Appendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| **MW20S** | | | | |
| 07/16/96 | 9.50 | 10.79 | 1.29 | — |
| 07/23/96 | 9.51 | 10.90 | 1.39 | 2.00 |
| 07/26/96 | 9.60 | 10.10 | 0.50 | 5.00 |
| 07/29/96 | 9.60 | 9.65 | 0.05 | — |
| 07/29/96 | 9.62 | 9.66 | 0.04 | — |
| 07/30/96 | 9.82 | 9.85 | 0.03 | — |
| 07/31/96 | 9.78 | 9.80 | 0.02 | — |
| 07/31/96 | 9.76 | 9.78 | 0.02 | — |
| 08/01/96 | 9.79 | 9.81 | 0.02 | — |
| 08/02/96 | 9.91 | 9.95 | 0.04 | — |
| 08/05/96 | 10.07 | 10.20 | 0.13 | — |
| 08/06/96 | 10.11 | 10.30 | 0.19 | — |
| 08/07/96 | 10.18 | 10.37 | 0.19 | — |
| 08/08/96 | 10.20 | 10.41 | 0.21 | — |
| 08/09/96 | 10.25 | 10.48 | 0.23 | — |
| 08/12/96 | 10.43 | 10.68 | 0.25 | — |
| 08/13/96 | 10.48 | 10.73 | 0.25 | 1.00 |
| 08/14/96 | 10.63 | 10.71 | 0.08 | — |
| 08/15/96 | 10.65 | 10.79 | 0.14 | — |
| 08/16/96 | 10.69 | 10.90 | 0.21 | — |
| 08/20/96 | 10.70 | 10.94 | 0.24 | — |
| 08/26/96 | 10.71 | 10.94 | 0.23 | — |
| 08/30/96 | 10.42 | 10.62 | 0.20 | — |
| 09/05/96 | 10.74 | 10.94 | 0.20 | — |
| 09/12/96 | 10.72 | 10.91 | 0.19 | — |
| 09/13/96 | 10.72 | 10.93 | 0.21 | — |
| 09/23/96 | 10.73 | 10.95 | 0.22 | — |
| 10/08/96 | 9.85 | 10.01 | 0.16 | 1.00 |
| 10/16/96 | 9.55 | 9.63 | 0.08 | 1.00 |
| 10/24/96 | 9.16 | 9.24 | 0.08 | 2.00 |
| 10/31/96 | 9.51 | 9.66 | 0.15 | 1.00 |
| 11/07/96 | 9.79 | 9.84 | 0.05 | 1.00 |
| 11/13/96 | 9.33 | 9.36 | 0.03 | 1.00 |
| 11/22/96 | 9.64 | 9.69 | 0.05 | 1.50 |
| 11/27/96 | 9.50 | 9.56 | 0.06 | 0.50 |
| 12/06/96 | 8.79 | 8.82 | 0.03 | 1.00 |
| 12/13/96 | 8.22 | 8.26 | 0.04 | 1.00 |
| 12/18/96 | 7.72 | 7.76 | 0.04 | 1.00 |
| 12/31/96 | 8.33 | 8.39 | 0.06 | 1.00 |
| 01/09/97 | 8.6 | 8.65 | 0.05 | 0.50 |
| 01/17/97 | 8.51 | 8.56 | 0.05 | 0.50 |
| 02/06/97 | 8.62 | 8.66 | 0.04 | 1.00 |
| 02/12/97 | 8.54 | 8.6 | 0.06 | 0.50 |
| 02/27/97 | 8.59 | 8.7 | 0.11 | 1.00 |
| 03/05/97 | 8.45 | 8.52 | 0.07 | 1.00 |
| 03/14/97 | 8.51 | 8.57 | 0.06 | 0.50 |
| 03/20/97 | 8.5 | 8.54 | 0.04 | 1.00 |
| 03/27/97 | 8.54 | 8.63 | 0.09 | 1.00 |
| 04/03/97 | 7.63 | 7.7 | 0.07 | 0.50 |
| 04/14/97 | 8.25 | 8.4 | 0.15 | 1.00 |
| 04/24/97 | 8.46 | 8.52 | 0.06 | 0.50 |
| 05/06/97 | 8.48 | 8.56 | 0.08 | 0.50 |
| 05/21/97 | 9.3 | 9.36 | 0.06 | 0.50 |
| 05/28/97 | 9.28 | 9.34 | 0.06 | 0.50 |
| 06/03/97 | 9.53 | 9.6 | 0.07 | 0.50 |
| 06/18/97 | 10.15 | 10.21 | 0.06 | 0.50 |
| 07/01/97 | 10.53 | 10.6 | 0.07 | 0.50 |
| 07/23/97 | 10.65 | 10.72 | 0.07 | 1.00 |
| 08/05/97 | 11.03 | 11.13 | 0.10 | 0.50 |
| 08/19/97 | 10.93 | 10.99 | 0.06 | 0.50 |
| 09/03/97 | 10.92 | 11.05 | 0.13 | 5.00 |
| 09/23/97 | 10.97 | 11.07 | 0.10 | 1.00 |
| 10/01/97 | 10.88 | 10.95 | 0.07 | 1.00 |
| 10/08/97 | 10.98 | 11.05 | 0.07 | 1.00 |
| 10/17/97 | 10.9 | 10.96 | 0.06 | 1.00 |
| 12/04/97 | 9.84 | 9.92 | 0.08 | 1.00 |
| 12/18/97 | 10.09 | 10.15 | 0.06 | 1.00 |
| 01/20/98 | 9.63 | 9.7 | 0.07 | 1.00 |
| 02/03/98 | 9.49 | 9.6 | 0.11 | 1.00 |
| 02-24-98 | 9.43 | 9.53 | 0.10 | 1.00 |

Close File

**Appendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| **MW18S** | | | | |
| 09/17/96 | 6.18 | 7.25 | 1.07 | --- |
| 09/18/96 | 6.17 | 7.29 | 1.12 | --- |
| 10/08/96 | 5.95 | 6.77 | 0.82 | 2.00 |
| 10/16/96 | 5.83 | 6.70 | 0.87 | 2.00 |
| 10/24/96 | 5.62 | 6.44 | 0.82 | 4.00 |
| 10/31/96 | 5.65 | 6.47 | 0.82 | 1.00 |
| 11/07/96 | 6.04 | 6.84 | 0.80 | 3.50 |
| 11/13/96 | 5.78 | 6.48 | 0.70 | 2.50 |
| 11/22/96 | 6.06 | 6.68 | 0.62 | 3.00 |
| 11/27/96 | 6.03 | 6.66 | 0.63 | 2.00 |
| 12/06/96 | 5.57 | 6.21 | 0.64 | 2.50 |
| 12/13/96 | 5.02 | 5.51 | 0.49 | 2.50 |
| 12/18/96 | 5.00 | 5.64 | 0.64 | 2.50 |
| 12/31/96 | 5.42 | 6.12 | 0.70 | 2.00 |
| 01/09/97 | 5.52 | 6.14 | 0.62 | 2.50 |
| 01/17/97 | 5.42 | 6.01 | 0.59 | 1.50 |
| 01/24/97 | 5.52 | 6.15 | 0.63 | 1.50 |
| 02/06/97 | 5.51 | 6.05 | 0.54 | 2.00 |
| 02/12/97 | 5.46 | 6.02 | 0.56 | 1.00 |
| 02/27/97 | 5.72 | 6.37 | 0.65 | 2.00 |
| 03/05/97 | 5.4 | 6.05 | 0.65 | 2.00 |
| 03/14/97 | 5.45 | 6.05 | 0.60 | 1.50 |
| 03/20/97 | 5.43 | 5.97 | 0.54 | 2.00 |
| 03/27/97 | 5.53 | 6.18 | 0.65 | 2.00 |
| 04/03/97 | 4.95 | 5.6 | 0.65 | 2.00 |
| 04/14/97 | 5.35 | 6.18 | 0.83 | 2.00 |
| 04/24/97 | 5.49 | 6.25 | 0.76 | 1.50 |
| 05/06/97 | 5.5 | 6.22 | 0.72 | 2.00 |
| 05/21/97 | 5.72 | 6.28 | 0.56 | 1.50 |
| 05/28/97 | 5.68 | 6.27 | 0.59 | 1.00 |
| 06/03/97 | 6.09 | 6.71 | 0.62 | 1.50 |
| 06/18/97 | 6.25 | 6.88 | 0.63 | 1.50 |
| 07/01/97 | 6.35 | 7.02 | 0.67 | 1.50 |
| 07/23/97 | 6.45 | 7.22 | 0.77 | 1.50 |
| 08/05/97 | 7.06 | 7.82 | 0.76 | 1.50 |
| 08/19/97 | 6.92 | 7.62 | 0.70 | 1.00 |
| 09/03/97 | 7.09 | 7.98 | 0.89 | 5.00 |
| 09/23/97 | 7.14 | 7.99 | 0.85 | 0.50 |
| 10/01/97 | 7.02 | 7.72 | 0.70 | 0.50 |
| 10/08/97 | 7.1 | 7.75 | 0.65 | 0.50 |
| 10/17/97 | 7.05 | 7.72 | 0.67 | 0.50 |
| 12/04/97 | 6.02 | 6.72 | 0.70 | 1.00 |
| 12/18/97 | 6.33 | 6.98 | 0.65 | 1.00 |
| 01/20/98 | 5.85 | 6.39 | 0.54 | 1.00 |
| 02/03/98 | 5.65 | 6.26 | 0.61 | 1.00 |
| 02-24-98 | 5.83 | 6.30 | 0.47 | 2.0 |

Close File

**Appendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| PG-1 | | | | |
| 10-16-97 | --- | 7.56 | --- | --- |
| 11-05-97 | --- | 7.16 | --- | --- |
| 12-04-98 | --- | 7.02 | --- | --- |
| 12-18-97 | --- | 6.98 | --- | --- |
| 01-20-98 | --- | 6.95 | --- | --- |
| 02-03-98 | --- | 6.96 | --- | --- |
| 02-24-98 | 5.94 | 5.945 | 0.005 | --- |

Close File

**Appendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| PG-2 | | | | |
| 10-20-97 | --- | 5.93 | --- | --- |
| 11-05-97 | --- | 5.71 | --- | --- |
| 12-04-98 | --- | 5.39 | --- | --- |
| 12-18-97 | --- | 5.35 | --- | --- |
| 01-20-98 | --- | 5.31 | --- | --- |
| 02-03-98 | --- | 5.28 | --- | --- |
| 02-24-98 | 4.85 | 4.8505 | 0.005 | --- |

Close File

**Appendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| PG-3 | | | | |
| 10-20-97 | --- | 5.81 | --- | --- |
| 11-05-97 | --- | 5.42 | --- | --- |
| 12-04-98 | --- | 5.39 | --- | --- |
| 12-18-97 | --- | 5.32 | --- | --- |
| 01-20-98 | --- | 5.28 | --- | --- |
| 02-03-98 | --- | 5.25 | --- | --- |
| 02-24-98 | --- | 5.23 | --- | --- |

Close File

**Apendix H**
IRA Status Report
Free Product Monitoring Activities at Columbia Mfg., Westfield, MA
Phase IIB

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|

| Date | Depth to Product (ft) | Depth to Water (ft) | Product Thickness (ft) | Volume Purged (gal) |
|---|---|---|---|---|
| MW-20C | | | | |
| 11-07-97 | 4.77 | 4.79 | 0.02 | --- |
| 12-04-98 | 4.79 | 4.8 | 0.01 | --- |
| 12-18-97 | 4.75 | 4.77 | 0.02 | --- |
| 01-20-98 | 4.72 | 4.73 | 0.01 | --- |
| 02-03-98 | 4.73 | 4.74 | 0.01 | --- |
| 02-24-98 | 4.63 | 4.64 | 0.01 | --- |

Close File

Close File

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# Appendix I
## Columbia Manufacturing
## Soil
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | Residential Soil Ingestion Criteria | Industrial Soil Ingestion Criteria | MW-50I 10/16/97 0 - 2 ft ug/Kg | MW-50I 10/16/97 10 - 12 ft ug/Kg |
|---|---|---|---|---|
| Chloroform | NC | NC | --- | 2 |
| Trichloroethene | 58000 | 520000 | 10000 | 4 |

NOTES: --- - Not detected, J - approximated.
[ ] -Exceeds Residentail Soil Ingestion Criteria. ( ) - Exceeds Industrial Soil Ingestion Criteria.



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FXP File: E:\6378002\8021SH.FXP

File Number: 6378.002

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix I
## Columbia Manufacturing
## Soil
## SW8270 Semivolatile Organic Compound Data
## Detection Summary

| Analyte | Residential Soil Ingestion Criteria mg/Kg | Industrial Soil Ingestion Criteria mg/Kg | MW-501 10/16/97 0 - 2 ft mg/Kg | MW-501 10/16/97 5 - 7 ft mg/Kg |
|---|---|---|---|---|
| Acenaphthene | 4700 | 12000 | 0.040 J | --- |
| Anthracene | 23000 | 610000 | 0.073 J | --- |
| Benzo(a)anthracene | 0.88 | 7.8 | 0.53 J | 0.16 J |
| Benzo[a]pyrene | 0.09 | 0.78 | [0.59 J] | [0.17 J] |
| Benzo(b)fluoranthene | 0.88 | 7.8 | [0.97 J] | 0.28 J |
| Benzo(ghi)perylene | 100 | 100 | 0.59 J | 0.13 J |
| Benzo(k)fluoranthene | 8.8 | 78 | 0.32 J | 0.11 J |
| Chrysene | 88 | 780 | 0.92 J | 0.25 J |
| Fluoranthene | 3100 | 82000 | 0.86 | 0.32 J |
| Fluorene | 3100 | 82000 | 0.044 J | --- |
| Indeno(1,2,3-cd)pyrene | 0.88 | 7.8 | 0.45 J | 0.10 J |
| Naphthalene | 3100 | 82000 | 0.055 J | --- |
| Phenanthrene | 100 | 100 | 0.83 | 0.24 J |
| Pyrene | 2300 | 61000 | 2.3 J | 0.51 |

NOTES: --- - Not detected, J - approximated.
[ ] -Exceeds Residentail Soil Ingestion Criteria. ( ) - Exceeds Industrial Soil Ingestion Criteria.



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# Appendix I
## Columbia Manufacturing
## Soil
## SW6010A Metals Data
## Detection Summary

| Analyte | Residential Soil Ingestion Criteria | Industrial Soil Ingestion Criteria | MW-50I 10/16/97 0 - 2 ft mg/Kg | MW-50I 10/16/97 10 - 12 ft mg/Kg | MW-50I 10/16/97 5 - 7 ft mg/Kg |
|---|---|---|---|---|---|
| Percent solids (%) | NC | NC | 85.1 | 91.7 | 94.4 |
| Cadmium | 39 | 1000 | 1 | --- | 3 |
| Chromium, filtered | 390 | 10000 | 170 | 91 | 69 |
| Copper | 3100 | 82000 | 710 J | 17 J | 640 J |
| Lead | 300 | 600 | ([650 ]) | 13 | 110 |
| Nickel | 1600 | 4100 | 190 | 60 | 74 |
| Zinc | 23000 | 610000 | 570 J | 39 J | 780 J |

NOTES: --- - Not detected, J - approximated.
[ ] -Exceeds Residentail Soil Ingestion Criteria. ( ) - Exceeds Industrial Soil Ingestion Criteria.
MCP Method I Criteria utilized in the absence of Region III Standards.

Close File

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-14C Field Filtered 11/07/97 mg/L | MW-14C (DUP) Field Filtered 11/07/97 mg/L | MW-14D Field Filtered 11/06/97 mg/L | MW-14I/D Field Filtered 11/06/97 mg/L | MW-15S Field Filtered 11/07/97 mg/L | MW-18A Field Filtered 11/13/97 mg/L | MW-19I Field Filtered 11/12/97 mg/L | MW-20B Field Filtered 11/07/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | 0.005 | --- | --- | --- | --- |
| Cadmium | --- | --- | --- | --- | --- | --- | --- | --- |
| Chromium, filtered | --- | --- | 0.16 | --- | --- | --- | --- | --- |
| Copper | --- | --- | --- | --- | --- | --- | --- | --- |
| Nickel | 0.07 | 0.07 | 0.07 | --- | --- | --- | 0.49 | 0.11 |
| Zinc | --- | 0.01 | --- | --- | 0.02 | 0.01 | 0.01 | 0.01 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-22I Field Filtered 11/06/97 mg/L | MW-23I Field Filtered 11/06/97 mg/L | MW-23S Field Filtered 11/06/97 mg/L | MW-24D 11/18/97 mg/L | MW-24I Field Filtered 11/18/97 mg/L | MW-24I (DUP) Field Filtered 11/18/97 mg/L | MW-25S Field Filtered 11/11/97 mg/L | MW-27S Field Filtered 11/12/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | --- | --- | --- | --- | --- |
| Cadmium | --- | --- | --- | --- | --- | --- | 0.006 | --- |
| Chromium, filtered | 0.39 | --- | --- | --- | --- | --- | --- | 1.5 |
| Copper | --- | --- | --- | --- | --- | --- | --- | 0.07 |
| Nickel | 4.7 | --- | --- | --- | 0.05 | 0.05 | --- | 290 |
| Zinc | 0.01 | 0.02 | 0.01 | 0.03 | 0.02 | 0.02 | 0.22 | 1.6 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-28S Field Filtered 11/18/97 mg/L | MW-29I 11/03/97 mg/L | MW-29S Field Filtered 11/03/97 mg/L | MW-2S Field Filtered 10/31/97 mg/L | MW-30I 11/19/97 mg/L | MW-30S Field Filtered 11/14/97 mg/L | MW-31S Field Filtered 11/03/97 mg/L | MW-32I 11/19/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | --- | --- | --- | --- | 0.009 |
| Cadmium | --- | --- | --- | 0.005 | --- | --- | --- | --- |
| Chromium, filtered | --- | --- | --- | 0.05 | --- | --- | --- | --- |
| Copper | --- | --- | --- | --- | --- | --- | --- | --- |
| Nickel | --- | --- | --- | 1.6 | --- | --- | --- | --- |
| Zinc | 0.01 | 0.02 | 0.01 | 0.06 | 0.02 | 0.01 | 0.01 | 0.02 |

NOTES: --- - Not detected, J - approximated.



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O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-32S 11/13/97 mg/L | MW-33I 11/19/97 mg/L | MW-33S Field Filtered 11/14/97 mg/L | MW-34S Field Filtered 11/19/97 mg/L | MW-35I 11/11/97 mg/L | MW-35S Field Filtered 11/11/97 mg/L | MW-36S Field Filtered 11/12/97 mg/L | MW-37S Field Filtered 11/11/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | --- | 0.006 | --- | --- | --- |
| Cadmium | --- | --- | --- | --- | --- | --- | --- | --- |
| Chromium, filtered | --- | --- | --- | 1.6 | --- | --- | --- | --- |
| Copper | --- | --- | --- | --- | --- | --- | --- | --- |
| Nickel | --- | --- | 0.08 | 0.81 | --- | 0.07 | 0.46 | --- |
| Zinc | 0.02 | 0.01 | 0.01 | 0.03 | --- | 0.03 | 0.01 | 0.02 |

NOTES: --- - Not detected, J - approximated.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-38S Field Filtered 11/11/97 mg/L | MW-39S Field Filtered 11/11/97 mg/L | MW-3S Field Filtered 11/03/97 mg/L | MW-40I Field Filtered 11/03/97 mg/L | MW-40S Field Filtered 11/03/97 mg/L | MW-41S Field Filtered 11/18/97 mg/L | MW-42S Field Filtered 11/12/97 mg/L | MW-44S Field Filtered 10/31/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | 0.007 | --- | 0.009 | --- | --- |
| Cadmium | --- | --- | --- | --- | --- | --- | --- | --- |
| Chromium, filtered | --- | --- | 0.76 | --- | --- | --- | 0.02 | --- |
| Copper | --- | --- | --- | --- | --- | --- | --- | --- |
| Nickel | 0.08 | --- | 1.5 | --- | --- | 0.12 | 4.0 | --- |
| Zinc | 0.01 | 0.01 | 0.08 | 0.01 | 0.03 | 0.02 | 0.02 | 0.02 |

NOTES: --- - Not detected, J - approximated.



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O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-46S 11/13/97 mg/L | MW-47BR 11/13/97 mg/L | MW-47S Field Filtered 10/31/97 mg/L | MW-48I Field Filtered 10/31/97 mg/L | MW-48S Field Filtered 11/14/97 mg/L | MW-49I Field Filtered 11/14/97 mg/L | MW-4D 11/06/97 mg/L | MW-4S 11/06/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | --- | --- | --- | --- | --- | --- | --- | --- |
| Cadmium | --- | --- | --- | --- | --- | --- | --- | --- |
| Chromium, filtered | --- | --- | --- | --- | --- | --- | --- | --- |
| Copper | --- | --- | --- | --- | --- | --- | --- | --- |
| Nickel | 0.62 | 1.1 | 2.2 | --- | --- | 0.09 | --- | 0.84 |
| Zinc | 0.01 | 0.02 | 0.03 | 0.03 | 0.01 | 0.01 | 0.05 | 0.02 |

NOTES: --- - Not detected, J - approximated.



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Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/11/97 | Personnel | EJF/PCS | Weather | P. Sunny |
| Site Name | COLUMBIA MFG. | | | Well # | MW-39S |
| Site Location | Westfield | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 13.24 ft.
Initial Depth to Water 7.79 ft.
Length of Water Column 5.45 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 12.4° C | 6.97 | 185 | | 6.58 | 141 | |
| 6 | | 12.6° C | 6.65 | 186 | | 7.61 | 149 | |
| 9 | | 12.5° | 6.59 | 184 | | 7.63 | 164 | |
| 12 | | 12.6° | 6.66 | 184 | | 7.66 | 140 | |
| 15 | | 12.6° | 6.67 | 182 | | 7.68 | 124 | |

Water Sample:
Time Collected: 1345
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR TO Red/ORANGE FLOC.
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: Red/orange
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: metals field filtered

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.03.97 | Personnel | PC Savage + RP Lagueux | Weather | Sunny |
| Site Name | Columbia MFG | | | Well # | MW.40S |
| Site Location | Westfield, Mo | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 15.18 ft.
Initial Depth to Water 9.12 ft.
Length of Water Column 6.06 ft.

* Measurements taken from
- [✓] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 9.12 | 13.8°C | 7.66 | .206 | | 8.7 mg/L | 657 | |
| | | 13.9 | 7.06 | .198 | | 8.78 | 153 | |
| | | 13.7 | 6.64 | .196 | | 8.82 | 320 | |
| | | | | .1° | | | | |
| | | | | | | | | |
| | | 14.0 | 6.35 | .198 | | 8.75 | 172 | |
| | | 13.9 | 6.40 | .198 | | 8.80 | 134 | |

Water Sample:
Time Collected: 09:30
Total Volume Of Purged Water Removed: 12 gal

Physical Appearance at Start
Color: Clear w/some Particulate
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Clear w/ lt Brown tint
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (Metals) | 1 | Yes | $HNO_3$ | |
| 40 ml | VOA (8010B) | 2 | No | HCl | |

NOTES: Dup 1 Colected Here

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.03.97 | Personnel | PCSavage RPLaqueux | Weather | Sunny |
| Site Name | Columbia MFG | | | Well # | MW-40I |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002. |

| | | |
|---|---|---|
| Initial Depth of Well | 40.18 | ft. |
| Initial Depth to Water | 12.30 | ft. |
| Length of Water Column | 27.82 | ft. |

* Measurements taken from
- [✓] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 12.30 | 12.4 | 6.81 | .159 | | 9.33 | 30 | |
| | | 11.5 | 7.05 | .156 | | 9.95 | 165 | |
| | | | | | | | | |
| | | | | | | | | |
| | | 11.5 | 7.12 | .149 | | 9.98 | >999 | |

Water Sample:
Time Collected: 10:30 — Total Volume Of Purged Water Removed: 10 gal

Physical Appearance at Start
Color: Clear
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Grey - cloudy
Odor: None
Sheen/Free Product: None

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 ml | PE (METALS) | 1 | Yes | $HNO_3$ | |
| 40 ml | VOA (8010 B) | 2 | NO | HCl | |

NOTES: Sample Colected B/C water getting cloudy + Not Clearing up.
Drawdown

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | FJF/PCS | Weather | Sunny 35°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-415 |
| Site Location | Westfield, MA | Evacuation Method | Bailer | Project # | 6378.002 |

Initial Depth of Well: 14.82 ft.
Initial Depth to Water: 8.56 ft.
Length of Water Column: 6.26 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 8.56 | 17.0 °C | 5.89 | 134 | | 5.37 | 106 | — |
| | | 16.8 °C | 5.96 | 138 | | 5.39 | 92 | |
| | | 16.5° | 6.03 | 142 | | 5.42 | 108 | |
| | | 16.8° | 6.13 | 140 | | 5.51 | 112 | |
| | 9.21 | 17.1 | 6.08 | 142 | | 5.42 | 106 | |

Water Sample:
Time Collected: 0930
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT GRAY
Odor: PETROLEUM ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: LT GRAY/GREEN TINGE
Odor: Petroleum odor
Sheen/Free Product: V. SL. Sheen

Parameters of Samples: HVOCs, METALS, PAHs, TPH

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Petroleum ODOR Noted, purge water contained
Metals field filtered (NTU's > 50)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/12/97 | Personnel | FJF/PCS | Weather | P. CLOUDY 40°F |
| Site Name | COLUMBIA MFG | | | Well # | MW-42S |
| Site Location | Westfield, MA | Evacuation Method | | Project # | 6378.002 |

| | | | |
|---|---|---|---|
| Initial Depth of Well | ft. | * Measurements taken from | |
| Initial Depth to Water | 5.98 ft. | ✓ | Top of Well ~~Casing~~ (PCS) |
| Length of Water Column | ft. | | Top of Protective Casing |
| | | | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 5.98 | 17.5°C | 6.75 | 350 | | 5.20 | 194 | |
| 3 | | 18.6° | 6.66 | 360 | | 5.43 | 127 | |
| 6 | | 18.9° | 6.66 | 365 | | 6.00 | 111 | |
| 9 | | 18.7° | 6.71 | 363 | | 6.12 | 132 | |
| 12 | | 18.6° | 6.69 | 362 | | 6.10 | 124 | |
| 15 | | 18.7° | 6.70 | 362 | | 6.06 | 98 | |
| 18 | | 18.7 | 6.72 | 364 | | 6.09 | 101 | |

Water Sample:
Time Collected: 0900 — Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT GRAY
Odor: Heavy Petroleum ODOR
Sheen/Free Product: SHEEN

Physical Appearance at Sampling
Color: LT. GRAY
Odor: Heavy Petroleum ODOR
Sheen/Free Product: SHEEN

Parameters of Samples: HVOCs, METALS, PAHs, TPH

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40 ml | VOA - (HIOC + VPH) | 4 | NO | HCl + | |
| 500 ml | PE (METALS) | | | | |
| 1L | | | | | |
| 1L | | | | | |

NOTES: Heavy Petroleum odor w/SHEEN VISIBLE (DIESEL Fuel odor)
metals sample field filtered

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-435 |
| Site Location | Westfield MA | Evacuation Method | BLADDER PUMP | Project # | 6378.002 |

Initial Depth of Well 19.86 ft.
Initial Depth to Water 8.31 ft.
Length of Water Column 11.55 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 13.5°C | 6.55 | 215 | | 6.80 | 900 | |
| 6 | | 13.9° | 6.56 | 216 | | 6.51 | 645 | |
| 9 | | 14.3° | 6.54 | 218 | | 6.43 | 520 | |
| 12 | | 14.6° | 6.51 | 216 | | 6.69 | 330 | |
| 15 | | 14.2° | 6.30 | 214 | | 7.19 | 235 | |
| 18 | | 14.1° | 6.34 | 204 | | 6.78 | 134 | |
| 21 | | 14.4° | 6.43 | 213 | | 6.81 | 88 | |
| 22 | | 14.2° | 6.34 | 203 | | 6.66 | 63 | |

Water Sample:
Time Collected: 1145
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: BROWN
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: clear
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, Metals

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 10.31.97 | Personnel | PC Savage + FJ Ferraro | Weather | 60° Sunny |
| Site Name | Columbia MFG | | | Well # | MW-445 |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump. | Project # | 6378.002 |

Initial Depth of Well 24.52 ft.
Initial Depth to Water 13.33 ft.
Length of Water Column 11.19 ft.

* Measurements taken from
- [X] Top of ~~Well Casing~~ PVC.
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 13.33 | 15.3°C | 7.29 | .367 | | 9.57 | 170 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 14.2 | 7.61 | .368 | | 9.38 | 160 | |
| | | 14.1 | 7.62 | .362 | | 9.42 | 217 | |
| | | | | | | | | |
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| | | | | | | | | |

Water Sample:
Time Collected: 11:30
Total Volume Of Purged Water Removed: 9.0 gal

Physical Appearance at Start
Color: Clear / Grey
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling
Color:
Odor:
Sheen/Free Product:

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 mL | PE - Metals | 1 | Yes | $HNO_3$ | |
| 40 mL | Glass - VOA | 2 | NO | HCL | |
| | | | | | |
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NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA | | | Well # | MW-45S |
| Site Location | | Evacuation Method | BLADDER PUMP | Project # | 6378.002 |

Initial Depth of Well 14.92 ft.
Initial Depth to Water 6.22 ft.
Length of Water Column 8.70 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 3 | | 10.3 | 7.47 | 157 uS/cm | | 7.66 | 85 | |
| 6 | | 10.5° C | 7.16 | 150 | | 7.45 | 210 | |
| 9 | | 11.1° C | 6.68 | 143 | | 7.39 | 113 | |
| 12 | | 11.2° C | 6.66 | 142 | | 7.41 | 85 | |
| 15 | | 11.3° C | 6.65 | 143 | | 6.65 | 82 | |
| 18 | | 11.3° C | 6.54 | 144 | | 6.68 | 125 | |
| 21 | | 11.2° C | 6.47 | 139 | | 6.71 | 14 | |

Water Sample:
Time Collected: 1000
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR/LT. TINGE
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, METALS, PAHs

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-46S |
| Site Location | Westfield MA | Evacuation Method | BLADDER Pump | Project # | 6378.002 |

Initial Depth of Well 12.62 ft.
Initial Depth to Water 6.63 ft.
Length of Water Column 5.99 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 13.5° C | 6.47 | 137 | | 7.05 | 365 | |
| 6 | | 13.8° | 6.37 | 143 | | 6.82 | 100 | |
| 9 | | 14.2° | 6.43 | 141 | | 6.76 | 130 | |
| 12 | | 14.1° | 6.44 | 141 | | 6.55 | 133 | |
| 15 | | 14.1 | 6.45 | 140 | | 6.59 | 138 | |

Water Sample:
Time Collected: 1045
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAHs, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 10.31.97 | Personnel | PC Savage + FJ Ferreira | Weather | 60° Sunny |
| Site Name | Columbia MFG | | | Well # | MW-47S |
| Site Location | Westfield, MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 24.50 ft. | |
| Initial Depth to Water | 12.98 ft. | |
| Length of Water Column | 11.52 ft. | |

* Measurements taken from
- [✓] Top of Well Casing (PVC)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 12.98 | 15.6 | 6.95 | .248 mS/cm | | 9.03 mg/L | >999 | |
| | | 15.2 | 6.67 | .248 | | 8.92 | >999 | |
| | | 15.0 | 6.81 | 252 | | 8.81 | 280 | |
| | | 14.8 | 6.83 | 250 | | 8.79 | 160 | |

Water Sample:
Time Collected: 13:00
Total Volume Of Purged Water Removed:

Physical Appearance at Start

| | |
|---|---|
| Color | LT. BROWN |
| Odor | NONE |
| Sheen/Free Product | NONE |

Physical Appearance at Sampling

| | |
|---|---|
| Color | Clear/LT BROWN |
| Odor | NONE |
| Sheen/Free Product | NONE |

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/13/97 | Personnel | FJF/DCS | Weather | P. Sunny 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-47BR |
| Site Location | Westfield | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well: >100.00 ft.
Initial Depth to Water: 28.56 ft.
Length of Water Column: ____ ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 13.0°C | 7.40 | 390 | | 6.95 | 26 | |
| 6 | | 13.3° | 7.37 | 393 | | 6.89 | 90 | |
| 9 | | 13.2° | 7.24 | 397 | | 6.95 | 68 | |
| 12 | | 13.1 | 7.44 | 396 | | 6.95 | 32 | |
| 15 | | 13.3 | 7.36 | 397 | | 6.86 | 46 | |
| 18 | | 13.2 | 7.50 | 397 | | 6.81 | 32 | |
| 21 | | 12.9 | 7.51 | 397 | | 6.89 | 31 | |

Water Sample:
Time Collected: 1445
Total Volume Of Purged Water Removed: ____

Physical Appearance at Start
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOCs, PAH's, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/14/97 | Personnel | FJF/PCS | Weather | ICE STORM 28°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-48S |
| Site Location | Westfield | Evacuation Method | Bladder Pump | Project # | |

Initial Depth of Well: 24.72 ft.
Initial Depth to Water: 16.79 ft.
Length of Water Column: ____ ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 12.3° C | 6.90 | 308 | | 5.80 | 153 | |
| 6 | | 13.0 | 6.63 | 312 | | 5.72 | 580 | |
| 9 | | 13.3° | 6.50 | 314 | | 5.76 | 108 | |
| 12 | | 13.2° | 6.38 | 313 | | 5.81 | 46 | |
| 15 | | 13.2° | 6.34 | 313 | | 6.06 | 89 | |
| 18 | | 13.5° | 6.30 | 311 | | 5.95 | | |

Water Sample:
Time Collected: 0900
Total Volume Of Purged Water Removed: ____

Physical Appearance at Start
Color: CLEAR/V. LT. BROWN
Odor: NONE
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: CLEAR
Odor: NONE
Sheen/Free Product: NONE

Parameters of Samples: HVOC, METALS

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Metals - Field filtered
DUPLICATE COLLECTED AT THIS LOCATION (metals, HVOCs)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 10·31·97 | Personnel | PC Savage + FJ Ferreira | Weather | 60° |
| Site Name | Columbia MFG | | | Well # | MW-48I |
| Site Location | Westfield, Ma | Evacuation Method | Develop - Waterra + Surge Block; Sample - Bladder pump | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 41.80 | ft. |
| Initial Depth to Water | 17.45 | ft. |
| Length of Water Column | 24.35 | ft. |

* Measurements taken from PVC

- [x] Top of ~~Well Casing~~
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 0 | 17.45 | 10.6°C | 7.17 | .303 | | 8.69 mg/L | 245 | |
| | | 11.4°C | 6.18 | .214 | | 8.76 mg/L | >999 | |
| | | 11.7°C | 6.01 | .226 | | 8.77 | >999 | |
| | | 11.7 | 6.28 | .173 | | 9.03 | >999 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | 13.1 | 6.91 | .014 | | ~~5.55~~ 8.98 | 565 | |
| | | | | | | | 155 | |
| | | | | | | | 85 | |
| | 22.5' | 13.7 | 6.89 | .156 | | 9.47 | 89 | |
| | | 14.1 | 6.75 | .176 | | 10.02 | 92 | |
| | | | | | | | | |
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| | | | | | | | | |

Water Sample:

Time Collected: 10:15

Total Volume Of Purged Water Removed: 9.0 gal

Physical Appearance at Start

Color: Clear/Brown
Odor: None
Sheen/Free Product: None

Physical Appearance at Sampling

Color:
Odor:
Sheen/Free Product:

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 500 mL PE | 500 mL PE Metals | 1 | Yes | $HNO_3$ | |
| 40 mL Glass | 40 mL Glass HVOCs | 2 | NO | HCl | |
| | | | | | |
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NOTES: Developed on 10·20·97

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.14.97 | Personnel | PC Savage Jr / FJ Ferreira | Weather | 20° Snow |
| Site Name | Columbia MFG | | | Well # | MW-49T |
| Site Location | Westfield, Ma | Evacuation Method | Bladder Pump | Project # | 6378.008 |

Initial Depth of Well 39.48 ft.
Initial Depth to Water 14.53 ft.
Length of Water Column 24.95 ft.

* Measurements taken from
- [X] Top of Well Casing (P.C)
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 9.4 | 7.43 | 112 | | 5.65 | 81 | |
| 3 | | 9.3 | 7.37 | 133 | | 6.35 | >999 | |
| 6 | | 9.2 | 7.37 | 143 | | 6.72 | 144 | |
| 9 | | 9.1 | 7.37 | 144 | | 6.71 | 121 | |
| 12 | | 9.0 | 7.35 | 144 | | 6.39 | 118 | |
| 15 | | 9.1 | 7.34 | 146 | | 6.35 | 158 | |
| 18 | | 9.1 | 7.37 | 147 | | 6.36 | 152 | |
| 21 | | 9.0 | 7.36 | 147 | | 6.31 | 188 | |
| ~~24~~ | | | | | | | | |

Water Sample:
Time Collected 11:30
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color CLEAR
Odor NONE
Sheen/Free Product NONE

Physical Appearance at Sampling
Color CLEAR / LT. BROWN TINGE
Odor NONE
Sheen/Free Product NONE

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Developed on 10.20.97 after installation

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | FTF/PCS | Weather | SUNNY - 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-50I |
| Site Location | WESTFIELD MA | Evacuation Method | Bladder Pump | Project # | 6378.002 |

Initial Depth of Well 39.95 ft.
Initial Depth to Water 10.55 ft.
Length of Water Column 29.40 ft.

* Measurements taken from
- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| 3 | | 15.8°C | 7.60 | 182 | | 6.68 | 173 | .5 L/m |
| 6 | | 14.8 | 8.70 | 182 | | 7.13 | 115 | |
| 9 | | 13.9 | 8.93 | 307 | | 7.40 | 125 | |
| 12 | | 13.5 | 8.31 | 311 | | 7.38 | 181 | |
| 15 | | 13.4 | 8.30 | 302 | | 7.49 | 160 | |
| 18 | | 13.3 | 8.40 | 303 | | 7.40 | 650 | |
| 21 | | 13.3 | 8.29 | 300 | | 7.42 | 135 | |

Water Sample:
Time Collected: 1045
Total Volume Of Purged Water Removed:

Physical Appearance at Start
Color: LT. GRAY
Odor: Petroleum ODOR
Sheen/Free Product: NONE

Physical Appearance at Sampling
Color: V. LT. GRAY
Odor: Petroleum ODOR
Sheen/Free Product: NONE

Parameters of Samples: HVOC, METALS, PAH's

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Petroleum odor
Purge water contained
metals field filtered (NTU's > 50)

Close File

| | | | | | |
|---|---|---|---|---|---|
| Date | 11/18/97 | Personnel | FTF/PCS | Weather | SUNNY 40°F |
| Site Name | COLUMBIA MFG. | | | Well # | MW-61S |
| Site Location | Westfield MA | Evacuation Method | Bladder Pump | Project # | 6378-002 |

| | | |
|---|---|---|
| Initial Depth of Well | 15.63 | ft. |
| Initial Depth to Water | 6.06 | ft. |
| Length of Water Column | 9.57 | ft. |

* Measurements taken from

- [X] Top of Well Casing
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | 14.1 | 6.65 | 148 | | 6.83 | 163 | |
| | | 14.0 | 6.60 | 142 | | 8.05 | 167 | |
| | | 13.7 | 7.10 | 155 | | 7.88 | 112 | |
| | | 13.3 | 7.03 | 157 | | 7.93 | 220 | |
| | | 13.2 | 6.97 | 155 | | 7.85 | 190 | |
| | | 13.5 | 7.01 | 155 | | 7.83 | 170 | |

Water Sample:

Time Collected: 1315

Total Volume Of Purged Water Removed:

Physical Appearance at Start

Color: BROWN
Odor: PETROLEUM
Sheen/Free Product: Sheen

Physical Appearance at Sampling

Color: LT. BROWN
Odor: Petroleum
Sheen/Free Product: sheen

Parameters of Samples: HVOC's, METALS, PAH's

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| | | | | | |

NOTES: Petroleum odor noted w/sheen
Metals field filtered (NTU's > 50)

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.05.97 | Personnel | PL Savage + FJ Ferreira | Weather | Indoor |
| Site Name | Columbia MFG | | | Well # | PG-1 |
| Site Location | Westfield, MA | Evacuation Method | Disposable Bailer | Project # | 6378.002 |

Initial Depth of Well 13.70 ft.
Initial Depth to Water 7.16 ft.
Length of Water Column 6.54 ft.

* Measurements taken from
- [✓] Top of Well ~~Casing~~ PVC
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 7.16 | | | | | | | |
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~~SUSPECTED FREE PHASE~~
~~NO SAMPLES TAKEN~~

Water Sample:
Time Collected: 1230
Total Volume Of Purged Water Removed: 5 gal * went Dry

Physical Appearance at Start
Color: Clear w/ Brown Suspended
Odor: SL[redacted] Petroleum Odor
Sheen/Free Product: None

Physical Appearance at Sampling
Color: Brown + Cloudy
Odor: Slight Petroleum odor
Sheen/Free Product: Slight Sheen

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40 ml | VOA (VPH) (AMBER) | 2 | NO | | |
| 1 L | AMBER GLASS (EPH) | 1 | NO | HCl | |
| | | | | | |
| | | | | | |
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NOTES:

Close File

O'BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.05.97 | Personnel | PC Stokes + FJ Ferreira | Weather | Sunny 55° |
| Site Name | Columbia MFG | | | Well # | PG-2 |
| Site Location | West Feeld, MA | Evacuation Method | Disposable Bailer | Project # | 6378.002 |

| | | |
|---|---|---|
| Initial Depth of Well | 14.75 | ft. |
| Initial Depth to Water | 5.71 | ft. |
| Length of Water Column | 9.04 | ft. |

* Measurements taken from
- [✓] Top of Well Casing PVC
- [ ] Top of Protective Casing
- [ ] (Other, Specify)

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | 5.71 | | | | | | | |

Water Sample:
Time Collected: 1300
Total Volume Of Purged Water Removed: ~5.0 gal

Physical Appearance at Start
Color: Grey
Odor: Slight Petroleum Odor
Sheen/Free Product: Slight Sheen

Physical Appearance at Sampling
Color: Brown/cloudy
Odor: Slight Petroleum odor
Sheen/Free Product: Slight Sheen

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40 mL | VOA (VPH) | 2 | NO | | |
| 1 L | Amber | 1 | NO | HCl | |

NOTES:

Close File

BRIEN & GERE ENGINEERS, INC. — MicroPurging Ground Water Sampling Log

| | | | | | |
|---|---|---|---|---|---|
| Date | 11.05.97 | Personnel | PC Savage + FJ Ferreira | Weather | Sunny 50° |
| Site Name | Columbia MFG | | | Well # | PG-3 |
| Site Location | Westfield, MA | Evacuation Method | Disposable Bailer | Project # | 6878.002 |

| | | | |
|---|---|---|---|
| Initial Depth of Well | 14.68 ft. | * Measurements taken from | |
| Initial Depth to Water | 5.42 ft. | ✓ | Top of Well ~~Casing~~ PVC |
| Length of Water Column | 9.26 ft. | | Top of Protective Casing |
| | | | (Other, Specify) |

Water parameters: Lower Submersible Pump Slowly Through Stagnant Water Column
Position Pump In Center Of Screened Interval & Maximum Pumping Rate Is 0.5 Liters/Minute
Collect Readings At Every Three Minute Intervals

| Elapsed Time | Depth To Water | Temperature | pH | Conductivity | Oxidation Reduction Potential | Dissolved Oxygen | Turbidity | Flow Rate |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

Water Sample:
Time Collected: 1530 — Total Volume Of Purged Water Removed: 7 gal

Physical Appearance at Start
Color: Clear w/Brown suspended
Odor: Slight Petroleum Odor
Sheen/Free Product: Slight Sheen

Physical Appearance at Sampling
Color: Brown/cloudy
Odor: Slight Petroleum Odor
Sheen/Free Product: Slight Sheen

Parameters of Samples:

| Container Size | Container Type | # Collected | Filtered | Preservative | pH |
|---|---|---|---|---|---|
| 40 mL | VOA (VPH) | 2 | NO | | |
| 1 L | Amber (EPH) | 1 | NO | HCl | |

NOTES:

Appendix K
Columbia Manufacturing
Validated Data Table
Ground Water PAH Data (page 1 of 3)

| Sample ID<br>Date Collected | MW-4S<br>11/06/97 | MW-4D<br>11/06/07 | MW-14S<br>11/06/97 | MW-14D<br>11/06/97 | MW-14I/D<br>11/06/97 | MW-23I<br>11/06/97 | MW-15S<br>11/07/97 | MW-14C<br>11/07/97 | DUP1<br>11/07/97 | MW-20B<br>11/07/97 |
|---|---|---|---|---|---|---|---|---|---|---|
| Napthalene | 10 | 0.20 U | 12 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Methylnaphthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Chloronaphthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acenaphthylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acenapthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Fluorene | 1.1 | 0.20 U | 0.72 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.81 | 0.95 | 0.20 U |
| Phenanthrene | 0.73 | 0.20 U | 0.44 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.24 | 0.25 | 0.44 |
| Anthracene | 0.34 | 0.20 U | 0.34 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Fluoranthene | 0.54 | 0.20 U | 1.4 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.44 | 0.50 | 3.1 |
| Pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.69 | 0.64 | 0.73 |
| Benzo(a)anthracene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Chyrsene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.75 |
| Benzo(b)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(k)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(a)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Indeno(1,2,3-cd)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Dibenzo(a,h)anthracen | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(g,h,i)perylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |

Notes: Units ug/L
DUP1=MW-14C
U = Not detected
J = Estimated Result

Appendix K
Columbia Manufacturing
Validated Data Table
Ground Water PAH Data (page 2 of 3)

| Sample ID<br>Date Collected | MW-25S<br>11/11/97 | MW-35I<br>11/11/97 | MW-35S<br>11/11/97 | MW-37S<br>11/11/97 | EQBLK<br>11/11/97 | MW-42S<br>11/12/97 | MW-19I<br>11/12/97 | MW-27S<br>11/12/97 | MW-36S<br>11/12/97 | MW-32S<br>11/13/97 |
|---|---|---|---|---|---|---|---|---|---|---|
| Napthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 49 | 0.20 U | 10 | 20 | 0.20 U |
| 2-Methylnaphthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 3.4 |
| 2-Chloronaphthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acenaphthylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 13 | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acenapthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 10 | 0.20 U | 0.20 U | 2.7 | 0.20 U |
| Fluorene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 27 | 0.20 U | 5.1 | 10 | 0.46 |
| Phenanthrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 14 | 0.20 U | 4.3 | 3.4 | 0.27 |
| Anthracene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 13 | 0.20 U | 3.6 | 1.7 | 0.20 U |
| Pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 12 | 0.20 U | 2.5 | 0.87 | 0.20 U |
| Benzo(a)anthracene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 1.0 | 0.20 U | 0.54 | 0.20 U | 0.20 U |
| Chyrsene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.83 | 0.20 U | 0.59 | 0.20 U | 0.20 U |
| Benzo(b)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(k)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(a)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.28 | 0.20 U | 0.20 U |
| Indeno(1,2,3-cd)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Dibenzo(a,h)anthracen | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(g,h,i)perylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.26 | 0.20 U | 0.20 U |

Notes: Units ug/L
DUP1=MW-14C
U = Not detected
J = Estimated Result

Appendix K
Columbia Manufacturing
Validated Data Table
Ground Water PAH Data (page 3 of 3)

| Sample ID<br>Date Collected | MW-45S<br>11/13/97 | MW-24I/D<br>11/13/97 | MW-47BR<br>11/13/97 | MW-18A<br>11/13/97 | MW-41S<br>11/18/97 | MW-50I<br>11/18/97 | MW-28S<br>11/18/98 | MW-51S<br>11/18/97 |
|---|---|---|---|---|---|---|---|---|
| Napthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 8.2 J | 0.20 U | 0.20 U | 0.20 U |
| 2-Methylnaphthalene | 0.20 U | 0.20 U | 0.56 | 0.20 U | 2.0 J | 0.20 U | 0.20 U | 0.20 U |
| 2-Chloronaphthalene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 8.0 J | 0.20 U | 0.20 U | 0.20 U |
| Acenaphthylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acenapthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 3.5 J | 0.20 U | 0.20 U | 0.20 U |
| Fluorene | 0.20 U | 0.20 U | 0.20 U | 2.8 | 12 J | 0.20 U | 0.20 U | 0.20 U |
| Phenanthrene | 0.20 U | 0.20 U | 0.20 U | 0.80 | 4.3 J | 0.20 U | 0.20 U | 0.20 U |
| Anthracene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 1.0 J | 0.20 U | 0.20 U | 0.20 U |
| Fluoranthene | 0.20 U | 0.20 U | 0.20 U | 2.8 | 2.7 J | 0.20 U | 0.20 U | 0.43 |
| Pyrene | 0.20 U | 0.20 U | 0.20 U | 1.1 | 0.83 J | 0.20 U | 0.20 U | 0.20 U |
| Benzo(a)anthracene | 0.20 U | 0.20 U | 0.20 U | 1.6 | 0.31 J | 0.20 U | 0.20 U | 0.20 U |
| Chyrsene | 0.20 U | 0.20 U | 0.20 U | 0.55 | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(b)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(k)fluoranthene | 0.20 U | 0.20 U | 0.20 U | 0.26 | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(a)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Indeno(1,2,3-cd)pyrene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Dibenzo(a,h)anthracen | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzo(g,h,i)perylene | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |

Notes: Units ug/L
DUP1=MW-14C
U = Not detected
J = Estimated Result

Close File

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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-14C Field Filtered 11/07/97 mg/L | MW-14C (DUP) Field Filtered 11/07/97 mg/L | MW-14D Field Filtered 11/06/97 mg/L | MW-14I/D Field Filtered 11/06/97 mg/L | MW-14S Field Filtered 11/06/97 mg/L | MW-15S Field Filtered 11/07/97 mg/L | MW-18A Field Filtered 11/13/97 mg/L | MW-19I Field Filtered 11/12/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.16 | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.07 | 0.07 | 0.07 | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.49 |
| Zinc | 0.01 U | 0.01 | 0.01 U | 0.01 U | 0.01 U | 0.02 | 0.01 | 0.01 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-20B Field Filtered 11/07/97 mg/L | MW-22I Field Filtered 11/06/97 mg/L | MW-23I Field Filtered 11/06/97 mg/L | MW-23S Field Filtered 11/06/97 mg/L | MW-24D 11/18/97 mg/L | MW-24I Field Filtered 11/18/97 mg/L | MW-24I (DUP) Field Filtered 11/18/97 mg/L | MW-24I/D Field Filtered 11/13/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.39 | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.11 | 4.7 | 0.05 U | 0.05 U | 0.05 U | 0.05 | 0.05 | 0.05 U |
| Zinc | 0.01 | 0.01 | 0.02 | 0.01 | 0.03 | 0.02 | 0.02 | 0.01 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-25BR Field Filtered 11/11/97 mg/L | MW-25S Field Filtered 11/11/97 mg/L | MW-27S Field Filtered 11/12/97 mg/L | MW-28S Field Filtered 11/18/97 mg/L | MW-29I 11/03/97 mg/L | MW-29S Field Filtered 11/03/97 mg/L | MW-2S Field Filtered 10/31/97 mg/L | MW-30I 11/19/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.006 | 0.05 U | 0.005 U | 0.005 U | 0.005 U | 0.005 | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 1.5 | 0.01 U | 0.01 U | 0.01 U | 0.05 | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.07 | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.05 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.05 U | 0.05 U | 290 | 0.05 U | 0.05 U | 0.05 U | 1.6 | 0.05 U |
| Zinc | 0.01 U | 0.22 | 1.6 | 0.01 | 0.02 | 0.01 | 0.06 | 0.02 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-30S Field Filtered 11/14/97 mg/L | MW-31S Field Filtered 11/03/97 mg/L | MW-32I 11/19/97 mg/L | MW-32S 11/13/97 mg/L | MW-33I 11/19/97 mg/L | MW-33S Field Filtered 11/14/97 mg/L | MW-34S Field Filtered 11/19/97 mg/L | MW-35I 11/11/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.009 | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.006 |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 1.6 | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.05 U | 0.08 | 0.81 | 0.05 U |
| Zinc | 0.01 | 0.01 | 0.02 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 U |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-35S Field Filtered 11/11/97 mg/L | MW-36S Field Filtered 11/12/97 mg/L | MW-37S Field Filtered 11/11/97 mg/L | MW-38S Field Filtered 11/11/97 mg/L | MW-39S Field Filtered 11/11/97 mg/L | MW-3S Field Filtered 11/03/97 mg/L | MW-40I Field Filtered 11/03/97 mg/L | MW-40S Field Filtered 11/03/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.007 | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.76 | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.07 | 0.46 | 0.05 U | 0.08 | 0.05 U | 1.5 | 0.05 U | 0.05 U |
| Zinc | 0.03 | 0.01 | 0.02 | 0.01 | 0.01 | 0.08 | 0.01 | 0.03 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-40S (DUP) Field Filtered 11/03/97 mg/L | MW-41S Field Filtered 11/18/97 mg/L | MW-42S Field Filtered 11/12/97 mg/L | MW-43S Field Filtered 11/13/97 mg/L | MW-44S Field Filtered 10/31/97 mg/L | MW-45S 11/13/97 mg/L | MW-46S 11/13/97 mg/L | MW-47BR 11/13/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.009 | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.02 | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.05 U | 0.12 | 4.0 | 0.05 U | 0.05 U | 0.05 U | 0.62 | 1.1 |
| Zinc | 0.01 U | 0.02 | 0.02 | 0.01 U | 0.02 | 0.01 U | 0.01 | 0.02 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-47S Field Filtered 10/31/97 mg/L | MW-48I Field Filtered 10/31/97 mg/L | MW-48S Field Filtered 11/14/97 mg/L | MW-48S (DUP) Field Filtered 11/14/97 mg/L | MW-49I Field Filtered 11/14/97 mg/L | MW-4D 11/06/97 mg/L | MW-4S 11/06/97 mg/L | MW-50I Field Filtered 11/18/97 mg/L |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 2.2 | 0.05 U | 0.05 U | 0.05 U | 0.09 | 0.05 U | 0.84 | 0.05 U |
| Zinc | 0.03 | 0.03 | 0.01 | 0.01 U | 0.01 | 0.05 | 0.02 | 0.01 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW6010A Metals Data

| Analyte | MW-51S Field Filtered 11/18/97 mg/L | QC Equip. Blank 11/11/97 mg/L | QC Equip. Blank 11/14/97 mg/L | QC Equip. Blank 11/18/97 mg/L |
|---|---|---|---|---|
| Arsenic | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Cadmium | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Chromium, filtered | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Copper | 0.01 U | 0.01 U | 0.01 U | 0.01 U |
| Lead | 0.005 U | 0.005 U | 0.005 U | 0.005 U |
| Nickel | 0.25 | 0.05 U | 0.05 U | 0.05 U |
| Zinc | 0.01 | 0.01 U | 0.01 U | 0.01 U |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-14C 11/07/97 ug/L | MW-14C (DUP) 11/07/97 ug/L | MW-14D 11/06/97 ug/L | MW-14I/D 11/06/97 ug/L | MW-14S 11/06/97 ug/L | MW-15S 11/07/97 ug/L | MW-18A 11/13/97 ug/L | MW-19I 11/12/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,1,2,2-Tetrachloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,1,2-Trichloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,1-Dichloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,1-Dichloroethene | 1 U | 1 U | 2 U | 1 U | 50 U | 23 | 50 U | 2 U |
| 1,2-Dichlorobenzene | 5 U | 5 U | 10 U | 5 U | 250 U | 50 U | 250 U | 10 U |
| 1,2-Dichloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,2-Dichloropropane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| 1,3-Dichlorobenzene | 5 U | 5 U | 10 U | 5 U | 250 U | 50 U | 250 U | 10 U |
| 1,4-Dichlorobenzene | 5 U | 5 U | 10 U | 5 U | 250 U | 50 U | 250 U | 10 U |
| 2-Chloroethylvinylether | 10 UJ | 10 UJ | 20 U | 10 U | 500 U | 100 UJ | 500 UJ | 20 UJ |
| Bromodichloromethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Bromoform | 5 U | 5 U | 10 U | 5 U | 250 U | 50 U | 250 U | 10 U |
| Bromomethane | 10 U | 10 U | 20 U | 10 U | 500 U | 100 U | 500 U | 20 U |
| Carbon tetrachloride | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Chlorobenzene | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Chloroethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Chloroform | 1 U | 1 U | 2 U | 3 | 50 U | 10 U | 50 U | 2 U |
| Chloromethane | 10 UJ | 10 UJ | 20 U | 10 U | 500 U | 100 UJ | 500 U | 20 U |
| Dibromochloromethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Methylene chloride | 1 U | 1 U | 25 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Tetrachloroethene | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 55 |
| Trichloroethene | 1 U | 2 | 71 | 39 | 1600 | 39 | 50 U | 37 |
| Trichlorofluoromethane | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| Vinyl chloride | 1 U | 1 U | 2 U | 1 U | 50 U | 100 | 140 | 7 |

NOTES: U - Not detected, J - approximated, R - unusable.



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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-14C 11/07/97 ug/L | MW-14C (DUP) 11/07/97 ug/L | MW-14D 11/06/97 ug/L | MW-14I/D 11/06/97 ug/L | MW-14S 11/06/97 ug/L | MW-15S 11/07/97 ug/L | MW-18A 11/13/97 ug/L | MW-19I 11/12/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1 U | 1 U | 12 J | 14 J | 100 J | 300 J | 1900 | 10 |
| cis-1,3-Dichloropropylene | 0.5 U | 0.5 U | 1 U | 0.5 U | 25 U | 5 U | 25 U | 1 U |
| trans-1,2-Dichloroethene | 1 U | 1 U | 2 U | 1 U | 50 U | 10 U | 50 U | 2 U |
| trans-1,3-Dichloropropene | 0.5 U | 0.5 U | 1 U | 0.5 U | 25 U | 5 U | 25 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water Detection Summary
## Ground Water
## SW6010A Metals Data
## Detection Summary

| Analyte | MW-50I Field Filtered 11/18/97 mg/L | MW-51S Field Filtered 11/18/97 mg/L |
|---|---|---|
| Arsenic | --- | --- |
| Cadmium | --- | --- |
| Chromium, filtered | --- | --- |
| Copper | --- | --- |
| Nickel | --- | 0.25 |
| Zinc | 0.01 | 0.01 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-14C (DUP) 11/07/97 ug/L | MW-14D 11/06/97 ug/L | MW-14I/D 11/06/97 ug/L | MW-14S 11/06/97 ug/L | MW-15S 11/07/97 ug/L | MW-18A 11/13/97 ug/L | MW-19I 11/12/97 ug/L | MW-20B 11/07/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethene | --- | --- | --- | --- | 23 | --- | --- | --- |
| 1,2-Dichloropropane | --- | --- | --- | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloroform | --- | --- | 3 | --- | --- | --- | --- | --- |
| Methylene chloride | --- | --- | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | --- | --- | --- | --- | --- | --- | 55 | 100 |
| Trichloroethene | 2 | 71 | 39 | 1600 | 39 | --- | 37 | 100 |
| Trichlorofluoromethane | --- | --- | --- | --- | --- | --- | --- | --- |
| Vinyl chloride | --- | --- | --- | --- | 100 | 140 | 7 | 78 |
| cis-1,2-Dichloroethene | --- | 12 J | 14 J | 100 J | 300 J | 1900 | 10 | 150 |

NOTES: --- - Not detected, J - approximated.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-22I 11/06/97 ug/L | MW-24I 11/18/97 ug/L | MW-24I (DUP) 11/18/97 ug/L | MW-27S 11/12/97 ug/L | MW-28S 11/18/97 ug/L | MW-29I 11/03/97 ug/L | MW-29S 11/03/97 ug/L | MW-2S 10/31/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethene | --- | --- | --- | --- | --- | --- | --- | 3 |
| 1,2-Dichloropropane | --- | --- | --- | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | --- | --- | --- | --- | --- | R | --- | --- |
| Chloroform | --- | --- | --- | 8 | --- | --- | --- | --- |
| Methylene chloride | --- | --- | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | 89 | 130 | --- | 3 | --- | --- | --- | --- |
| Trichloroethene | 210 | 5300 | 6000 | 3 | --- | 2 | 2 | 18 |
| Trichlorofluoromethane | --- | --- | --- | --- | --- | --- | --- | --- |
| Vinyl chloride | --- | --- | --- | --- | --- | --- | --- | 2 |
| cis-1,2-Dichloroethene | 97 | 270 | 250 | --- | 1 | --- | --- | 30 |

NOTES: --- - Not detected, J - approximated.

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# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-30I 11/19/97 ug/L | MW-30S 11/14/97 ug/L | MW-31S 11/03/97 ug/L | MW-32I 11/19/97 ug/L | MW-32S 11/13/97 ug/L | MW-33I 11/19/97 ug/L | MW-33S 11/14/97 ug/L | MW-34S 11/19/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2 | 2 | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | 6 | 4 | --- | --- | 29 | --- | --- | --- |
| 1,1-Dichloroethene | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,2-Dichloropropane | --- | --- | --- | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | R | --- | --- | --- | --- | --- | --- | --- |
| Chloroform | --- | --- | --- | --- | --- | --- | --- | --- |
| Methylene chloride | --- | --- | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | --- | --- | --- | --- | --- | --- | --- | 40 |
| Trichloroethene | 1 | 3 | 2 | --- | --- | 2 | 4 | 510 |
| Trichlorofluoromethane | --- | 2 | --- | --- | --- | --- | --- | --- |
| Vinyl chloride | --- | --- | --- | --- | 610 | --- | --- | --- |
| cis-1,2-Dichloroethene | 9 | 4 | 3 | 3 | 120 | --- | --- | 70 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-35I 11/11/97 ug/L | MW-36S 11/12/97 ug/L | MW-37S 11/11/97 ug/L | MW-38S 11/11/97 ug/L | MW-3S 11/03/97 ug/L | MW-40S 11/03/97 ug/L | MW-40S (DUP) 11/03/97 ug/L | MW-41S 11/18/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | --- | --- | --- | --- | --- | --- | --- | 1 |
| 1,1-Dichloroethene | --- | --- | --- | 3 | --- | --- | --- | --- |
| 1,2-Dichloropropane | --- | --- | --- | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloroform | --- | --- | --- | --- | --- | --- | --- | --- |
| Methylene chloride | --- | --- | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | 1 | --- | --- | --- | --- | 37 | 40 | 1 |
| Trichloroethene | 25 | --- | 620 | 14 | 180 | 840 | 850 | --- |
| Trichlorofluoromethane | --- | --- | --- | --- | --- | --- | --- | --- |
| Vinyl chloride | --- | 45 | --- | 4 | 8 | --- | --- | --- |
| cis-1,2-Dichloroethene | 33 | 140 | 100 | 88 | 29 | 180 | 180 | 15 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-42S 11/12/97 ug/L | MW-44S 10/31/97 ug/L | MW-45S 11/13/97 ug/L | MW-46S 11/13/97 ug/L | MW-47BR 11/13/97 ug/L | MW-47S 10/31/97 ug/L | MW-48I 10/31/97 ug/L | MW-48S 11/14/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | --- | --- | --- | --- | --- | --- | --- | 7 |
| 1,1-Dichloroethane | --- | --- | --- | --- | --- | --- | 2 | 11 |
| 1,1-Dichloroethene | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,2-Dichloropropane | --- | --- | --- | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | R | --- | --- | --- | --- | --- | --- | --- |
| Chloroform | --- | --- | --- | --- | 5 | --- | 2 | --- |
| Methylene chloride | --- | --- | --- | --- | --- | --- | --- | --- |
| Tetrachloroethene | --- | 34 | --- | 4 | 27 | 31 | --- | --- |
| Trichloroethene | --- | 120 | 1 J | 110 J | 53 J | 76 | 2 | 12 J |
| Trichlorofluoromethane | --- | --- | --- | --- | --- | --- | 2 | 5 |
| Vinyl chloride | --- | --- | --- | --- | 13 | --- | --- | --- |
| cis-1,2-Dichloroethene | --- | 20 | 5 | 55 | 47 | 33 | 6 | 12 |

NOTES: --- - Not detected, J - approximated.



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# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | MW-48S (DUP) 11/14/97 ug/L | MW-49I 11/14/97 ug/L | MW-4D 11/06/97 ug/L | MW-4S 11/06/97 ug/L | MW-50I 11/18/97 ug/L | MW-51S 11/18/97 ug/L | QC Equip. Blank 11/11/97 ug/L | QC Trip Blank 11/04/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 7 | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethane | 11 | --- | --- | --- | --- | --- | --- | --- |
| 1,1-Dichloroethene | --- | --- | --- | --- | --- | --- | --- | --- |
| 1,2-Dichloropropane | --- | --- | 1 | --- | --- | --- | --- | --- |
| 2-Chloroethylvinylether | --- | --- | --- | --- | --- | --- | --- | --- |
| Chloroform | --- | --- | --- | --- | 3 | --- | --- | --- |
| Methylene chloride | --- | --- | --- | --- | 5 | --- | 10 | --- |
| Tetrachloroethene | --- | --- | --- | --- | --- | --- | --- | --- |
| Trichloroethene | 12 J | 5 J | 6 | 2100 | 21 | 40 | --- | --- |
| Trichlorofluoromethane | 6 | --- | --- | --- | --- | --- | --- | 2 |
| Vinyl chloride | --- | --- | --- | --- | 8 | 2 | --- | --- |
| cis-1,2-Dichloroethene | 12 | --- | --- | 170 | 40 | 63 | --- | --- |

NOTES: --- - Not detected, J - approximated.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix J
## Columbia Manufacturing
## Ground Water
## Ground Water Detection Summary
## SW8021 Volatile Organic Compound Data
## Detection Summary

| Analyte | QC Trip Blank<br>11/19/97<br>ug/L |
|---|---|
| 1,1,1-Trichloroethane | --- |
| 1,1-Dichloroethane | --- |
| 1,1-Dichloroethene | --- |
| 1,2-Dichloropropane | --- |
| 2-Chloroethylvinylether | --- |
| Chloroform | --- |
| Methylene chloride | --- |
| Tetrachloroethene | --- |
| Trichloroethene | --- |
| Trichlorofluoromethane | 2 |
| Vinyl chloride | --- |
| cis-1,2-Dichloroethene | --- |

NOTES: --- - Not detected, J - approximated.



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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-20B 11/07/97 ug/L | MW-22I 11/06/97 ug/L | MW-23I 11/06/97 ug/L | MW-23S 11/06/97 ug/L | MW-24D 11/18/97 ug/L | MW-24I 11/18/97 ug/L | MW-24I (DUP) 11/18/97 ug/L | MW-24I/D 11/13/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 5 UJ | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,1,2-Trichloroethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,1-Dichloroethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,1-Dichloroethene | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,2-Dichlorobenzene | 25 U | 25 U | 5 U | 5 U | 5 U | 500 U | 1000 U | 5 U |
| 1,2-Dichloroethane | 5 UJ | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,2-Dichloropropane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| 1,3-Dichlorobenzene | 25 U | 25 U | 5 U | 5 U | 5 U | 500 U | 1000 U | 5 U |
| 1,4-Dichlorobenzene | 25 U | 25 U | 5 U | 5 U | 5 U | 500 U | 1000 U | 5 U |
| 2-Chloroethylvinylether | 50 U | 50 U | 10 U | 10 UJ | 10 UJ | 1000 UJ | 2000 UJ | 10 UJ |
| Bromodichloromethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Bromoform | 25 UJ | 25 U | 5 U | 5 U | 5 U | 500 U | 1000 U | 5 U |
| Bromomethane | 50 U | 50 U | 10 U | 10 U | 10 U | 1000 U | 2000 U | 10 U |
| Carbon tetrachloride | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Chlorobenzene | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Chloroethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Chloroform | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Chloromethane | 50 U | 50 UJ | 10 UJ | 10 UJ | 10 U | 1000 U | 2000 U | 10 UJ |
| Dibromochloromethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Methylene chloride | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Tetrachloroethene | 100 | 89 | 1 U | 1 U | 1 U | 130 | 200 U | 1 U |
| Trichloroethene | 100 | 210 | 1 U | 1 U | 1 U | 5300 | 6000 | 1 U |
| Trichlorofluoromethane | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| Vinyl chloride | 78 | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.



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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-20B 11/07/97 ug/L | MW-22I 11/06/97 ug/L | MW-23I 11/06/97 ug/L | MW-23S 11/06/97 ug/L | MW-24D 11/18/97 ug/L | MW-24I 11/18/97 ug/L | MW-24I (DUP) 11/18/97 ug/L | MW-24I/D 11/13/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 150 | 97 | 1 U | 1 U | 1 U | 270 | 250 | 1 U |
| cis-1,3-Dichloropropylene | 2 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 50 U | 100 U | 0.5 U |
| trans-1,2-Dichloroethene | 5 U | 5 U | 1 U | 1 U | 1 U | 100 U | 200 U | 1 U |
| trans-1,3-Dichloropropene | 2 U | 2 U | 0.5 U | 0.5 U | 0.5 U | 50 U | 100 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-25BR 11/11/97 ug/L | MW-25S 11/11/97 ug/L | MW-27S 11/12/97 ug/L | MW-28S 11/18/97 ug/L | MW-29I 11/03/97 ug/L | MW-29S 11/03/97 ug/L | MW-2S 10/31/97 ug/L | MW-30I 11/19/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 2 |
| 1,1,2,2-Tetrachloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 6 |
| 1,1-Dichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 3 | 1 U |
| 1,2-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloropropane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,3-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 2-Chloroethylvinylether | 10 UJ | 10 UJ | 10 UJ | 10 UJ | R | 10 U | 10 U | R |
| Bromodichloromethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromoform | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromomethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon tetrachloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorobenzene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroform | 1 U | 1 U | 8 | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloromethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibromochloromethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Methylene chloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tetrachloroethene | 1 U | 1 U | 3 | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichloroethene | 1 U | 1 U | 3 | 1 U | 2 | 2 | 18 | 1 |
| Trichlorofluoromethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Vinyl chloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 2 | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.



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File Number: 6378.002

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-25BR 11/11/97 ug/L | MW-25S 11/11/97 ug/L | MW-27S 11/12/97 ug/L | MW-28S 11/18/97 ug/L | MW-29I 11/03/97 ug/L | MW-29S 11/03/97 ug/L | MW-2S 10/31/97 ug/L | MW-30I 11/19/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1 U | 1 U | 1 U | 1 | 1 U | 1 U | 30 | 9 |
| cis-1,3-Dichloropropylene | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| trans-1,2-Dichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-30S 11/14/97 ug/L | MW-31S 11/03/97 ug/L | MW-32I 11/19/97 ug/L | MW-32S 11/13/97 ug/L | MW-33I 11/19/97 ug/L | MW-33S 11/14/97 ug/L | MW-34S 11/19/97 ug/L | MW-35I 11/11/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2 | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,1,2-Trichloroethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,1-Dichloroethane | 4 | 1 U | 1 U | 29 | 1 U | 1 U | 10 U | 1 U |
| 1,1-Dichloroethene | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,2-Dichlorobenzene | 5 U | 5 U | 5 U | 50 U | 5 U | 5 U | 50 U | 5 U |
| 1,2-Dichloroethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,2-Dichloropropane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| 1,3-Dichlorobenzene | 5 U | 5 U | 5 U | 50 U | 5 U | 5 U | 50 U | 5 U |
| 1,4-Dichlorobenzene | 5 U | 5 U | 5 U | 50 U | 5 U | 5 U | 50 U | 5 U |
| 2-Chloroethylvinylether | 10 UJ | 10 U | 10 UJ | 100 UJ | 10 UJ | 10 UJ | 100 UJ | 10 UJ |
| Bromodichloromethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Bromoform | 5 U | 5 U | 5 U | 50 U | 5 U | 5 U | 50 U | 5 U |
| Bromomethane | 10 U | 10 U | 10 U | 100 U | 10 U | 10 U | 100 U | 10 U |
| Carbon tetrachloride | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Chlorobenzene | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Chloroethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Chloroform | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Chloromethane | 10 U | 10 U | 10 U | 100 U | 10 U | 10 U | 100 U | 10 U |
| Dibromochloromethane | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Methylene chloride | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Tetrachloroethene | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 40 | 1 |
| Trichloroethene | 3 | 2 | 1 U | 10 U | 2 | 4 | 510 | 25 |
| Trichlorofluoromethane | 2 | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| Vinyl chloride | 1 U | 1 U | 1 U | 610 | 1 U | 1 U | 10 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-30S 11/14/97 ug/L | MW-31S 11/03/97 ug/L | MW-32I 11/19/97 ug/L | MW-32S 11/13/97 ug/L | MW-33I 11/19/97 ug/L | MW-33S 11/14/97 ug/L | MW-34S 11/19/97 ug/L | MW-35I 11/11/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 4 | 3 | 3 | 120 | 1 U | 1 U | 70 | 33 |
| cis-1,3-Dichloropropylene | 0.5 U | 0.5 U | 0.5 U | 5 U | 0.5 U | 0.5 U | 5 U | 0.5 U |
| trans-1,2-Dichloroethene | 1 U | 1 U | 1 U | 10 U | 1 U | 1 U | 10 U | 1 U |
| trans-1,3-Dichloropropene | 0.5 U | 0.5 U | 0.5 U | 5 U | 0.5 U | 0.5 U | 5 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-35S 11/11/97 ug/L | MW-36S 11/12/97 ug/L | MW-37S 11/11/97 ug/L | MW-38S 11/11/97 ug/L | MW-39S 11/11/97 ug/L | MW-3S 11/03/97 ug/L | MW-40I 11/03/97 ug/L | MW-40S 11/03/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,1,2,2-Tetrachloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,1,2-Trichloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,1-Dichloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,1-Dichloroethene | 1 U | 5 U | 20 U | 3 | 1 U | 5 U | 1 U | 20 U |
| 1,2-Dichlorobenzene | 5 U | 25 U | 100 U | 10 U | 5 U | 25 U | 5 U | 100 U |
| 1,2-Dichloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,2-Dichloropropane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| 1,3-Dichlorobenzene | 5 U | 25 U | 100 U | 10 U | 5 U | 25 U | 5 U | 100 U |
| 1,4-Dichlorobenzene | 5 U | 25 U | 100 U | 10 U | 5 U | 25 U | 5 U | 100 U |
| 2-Chloroethylvinylether | 10 UJ | 50 UJ | 200 UJ | 20 UJ | 10 UJ | 50 U | 10 U | 200 U |
| Bromodichloromethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Bromoform | 5 U | 25 U | 100 U | 10 U | 5 U | 25 U | 5 U | 100 U |
| Bromomethane | 10 U | 50 U | 200 U | 20 U | 10 U | 50 U | 10 U | 200 U |
| Carbon tetrachloride | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Chlorobenzene | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Chloroethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Chloroform | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Chloromethane | 10 U | 50 U | 200 U | 20 U | 10 U | 50 U | 10 U | 200 U |
| Dibromochloromethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Methylene chloride | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Tetrachloroethene | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 37 |
| Trichloroethene | 1 U | 5 U | 620 | 14 | 1 U | 180 | 1 U | 840 |
| Trichlorofluoromethane | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| Vinyl chloride | 1 U | 45 | 20 U | 4 | 1 U | 8 | 1 U | 20 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-35S 11/11/97 ug/L | MW-36S 11/12/97 ug/L | MW-37S 11/11/97 ug/L | MW-38S 11/11/97 ug/L | MW-39S 11/11/97 ug/L | MW-3S 11/03/97 ug/L | MW-40I 11/03/97 ug/L | MW-40S 11/03/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1 U | 140 | 100 | 88 | 1 U | 29 | 1 U | 180 |
| cis-1,3-Dichloropropylene | 0.5 U | 2 U | 10 U | 1 U | 0.5 U | 2 U | 0.5 U | 10 U |
| trans-1,2-Dichloroethene | 1 U | 5 U | 20 U | 2 U | 1 U | 5 U | 1 U | 20 U |
| trans-1,3-Dichloropropene | 0.5 U | 2 U | 10 U | 1 U | 0.5 U | 2 U | 0.5 U | 10 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-40S (DUP) 11/03/97 ug/L | MW-41S 11/18/97 ug/L | MW-42S 11/12/97 ug/L | MW-43S 11/13/97 ug/L | MW-44S 10/31/97 ug/L | MW-45S 11/13/97 ug/L | MW-46S 11/13/97 ug/L | MW-47BR 11/13/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,1,2,2-Tetrachloroethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,1,2-Trichloroethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,1-Dichloroethane | 20 U | 1 | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,1-Dichloroethene | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,2-Dichlorobenzene | 100 U | 5 U | 5 U | 5 U | 10 U | 5 U | 10 U | 10 U |
| 1,2-Dichloroethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,2-Dichloropropane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| 1,3-Dichlorobenzene | 100 U | 5 U | 5 U | 5 U | 10 U | 5 U | 10 U | 10 U |
| 1,4-Dichlorobenzene | 100 U | 5 U | 5 U | 5 U | 10 U | 5 U | 10 U | 10 U |
| 2-Chloroethylvinylether | 200 U | 10 UJ | R | 10 UJ | 20 U | 10 UJ | 20 UJ | 20 UJ |
| Bromodichloromethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Bromoform | 100 U | 5 U | 5 U | 5 U | 10 U | 5 U | 10 U | 10 U |
| Bromomethane | 200 U | 10 U | 10 U | 10 U | 20 U | 10 U | 20 U | 20 U |
| Carbon tetrachloride | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Chlorobenzene | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Chloroethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Chloroform | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 5 |
| Chloromethane | 200 U | 10 U | 10 U | 10 UJ | 20 U | 10 UJ | 20 UJ | 20 UJ |
| Dibromochloromethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Methylene chloride | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Tetrachloroethene | 40 | 1 | 1 U | 1 U | 34 | 1 U | 4 | 27 |
| Trichloroethene | 850 | 1 U | 1 U | 1 U | 120 | 1 J | 110 J | 53 J |
| Trichlorofluoromethane | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| Vinyl chloride | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 13 |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-40S (DUP) 11/03/97 ug/L | MW-41S 11/18/97 ug/L | MW-42S 11/12/97 ug/L | MW-43S 11/13/97 ug/L | MW-44S 10/31/97 ug/L | MW-45S 11/13/97 ug/L | MW-46S 11/13/97 ug/L | MW-47BR 11/13/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 180 | 15 | 1 U | 1 U | 20 | 5 | 55 | 47 |
| cis-1,3-Dichloropropylene | 10 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 0.5 U | 1 U | 1 U |
| trans-1,2-Dichloroethene | 20 U | 1 U | 1 U | 1 U | 2 U | 1 U | 2 U | 2 U |
| trans-1,3-Dichloropropene | 10 U | 0.5 U | 0.5 U | 0.5 U | 1 U | 0.5 U | 1 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-47S 10/31/97 ug/L | MW-48I 10/31/97 ug/L | MW-48S 11/14/97 ug/L | MW-48S (DUP) 11/14/97 ug/L | MW-49I 11/14/97 ug/L | MW-4D 11/06/97 ug/L | MW-4S 11/06/97 ug/L | MW-50I 11/18/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2 U | 1 U | 7 | 7 | 1 U | 1 U | 50 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| 1,1,2-Trichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| 1,1-Dichloroethane | 2 U | 2 | 11 | 11 | 1 U | 1 U | 50 U | 1 U |
| 1,1-Dichloroethene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| 1,2-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 250 U | 5 U |
| 1,2-Dichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| 1,2-Dichloropropane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 | 50 U | 1 U |
| 1,3-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 250 U | 5 U |
| 1,4-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 250 U | 5 U |
| 2-Chloroethylvinylether | 20 U | 10 U | 10 UJ | 10 UJ | 10 UJ | 10 U | 500 U | 10 UJ |
| Bromodichloromethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Bromoform | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 250 U | 5 U |
| Bromomethane | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 500 U | 10 U |
| Carbon tetrachloride | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Chlorobenzene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Chloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Chloroform | 2 U | 2 | 1 U | 1 U | 1 U | 1 U | 50 U | 3 |
| Chloromethane | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 500 U | 10 U |
| Dibromochloromethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Methylene chloride | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 5 |
| Tetrachloroethene | 31 | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| Trichloroethene | 76 | 2 | 12 J | 12 J | 5 J | 6 | 2100 | 21 |
| Trichlorofluoromethane | 2 U | 2 | 5 | 6 | 1 U | 1 U | 50 U | 1 U |
| Vinyl chloride | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 8 |

NOTES: U - Not detected, J - approximated, R - unusable.



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FXP File: E:\6378002\8021GW.FXP

File Number: 6378.002

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-47S 10/31/97 ug/L | MW-48I 10/31/97 ug/L | MW-48S 11/14/97 ug/L | MW-48S (DUP) 11/14/97 ug/L | MW-49I 11/14/97 ug/L | MW-4D 11/06/97 ug/L | MW-4S 11/06/97 ug/L | MW-50I 11/18/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 33 | 6 | 12 | 12 | 1 U | 1 U | 170 | 40 |
| cis-1,3-Dichloropropylene | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 25 U | 0.5 U |
| trans-1,2-Dichloroethene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 50 U | 1 U |
| trans-1,3-Dichloropropene | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 25 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-51S 11/18/97 ug/L | QC Equip. Blank 11/11/97 ug/L | QC Equip. Blank 11/14/97 ug/L | QC Equip. Blank 11/18/97 ug/L | QC Trip Blank 10/31/97 ug/L | QC Trip Blank 11/03/97 ug/L | QC Trip Blank 11/04/97 ug/L | QC Trip Blank 11/06/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloropropane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,3-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 2-Chloroethylvinylether | 20 UJ | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bromodichloromethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromoform | 10 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromomethane | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon tetrachloride | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorobenzene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroform | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloromethane | 20 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibromochloromethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Methylene chloride | 2 U | 10 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tetrachloroethene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichloroethene | 40 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichlorofluoromethane | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 2 | 1 U |
| Vinyl chloride | 2 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | MW-51S 11/18/97 ug/L | QC Equip. Blank 11/11/97 ug/L | QC Equip. Blank 11/14/97 ug/L | QC Equip. Blank 11/18/97 ug/L | QC Trip Blank 10/31/97 ug/L | QC Trip Blank 11/03/97 ug/L | QC Trip Blank 11/04/97 ug/L | QC Trip Blank 11/06/97 ug/L |
|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 63 | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| cis-1,3-Dichloropropylene | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| trans-1,2-Dichloroethene | 2 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 1 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

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O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | QC Trip Blank 11/08/97 ug/L | QC Trip Blank 11/12/97 ug/L | QC Trip Blank 11/13/97 ug/L | QC Trip Blank 11/14/97 ug/L | QC Trip Blank 11/19/97 ug/L | QC Trip Blank 11/20/97 ug/L |
|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,1-Dichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,2-Dichloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,2-Dichloropropane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| 1,3-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| 2-Chloroethylvinylether | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Bromodichloromethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Bromoform | 5 U | 5 U | 5 U | 5 U | 5 U | 5 U |
| Bromomethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Carbon tetrachloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chlorobenzene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloroform | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Chloromethane | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| Dibromochloromethane | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Methylene chloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Tetrachloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| Trichlorofluoromethane | 1 U | 1 U | 1 U | 1 U | 2 | 1 U |
| Vinyl chloride | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Ground Water
## SW8021 Volatile Organic Compound Data

| Analyte | QC Trip Blank 11/08/97 ug/L | QC Trip Blank 11/12/97 ug/L | QC Trip Blank 11/13/97 ug/L | QC Trip Blank 11/14/97 ug/L | QC Trip Blank 11/19/97 ug/L | QC Trip Blank 11/20/97 ug/L |
|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| cis-1,3-Dichloropropylene | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| trans-1,2-Dichloroethene | 1 U | 1 U | 1 U | 1 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Soil
## SW6010A Metals Data

| Analyte | MW-50I<br>10/16/97<br>0 - 2 ft<br>mg/Kg | MW-50I<br>10/16/97<br>10 - 12 ft<br>mg/Kg | MW-50I<br>10/16/97<br>5 - 7 ft<br>mg/Kg |
|---|---|---|---|
| Antimony | 7 UJ | 7 UJ | 6 UJ |
| Cadmium | 1 | 1 U | 3 |
| Chromium, filtered | 170 | 91 | 69 |
| Copper | 710 J | 17 J | 640 J |
| Lead | 650 | 13 | 110 |
| Nickel | 190 | 60 | 74 |
| Silver | 1 U | 1 U | 1 U |
| Zinc | 570 J | 39 J | 780 J |
| Percent solids (%) | 85.1 | 91.7 | 94.4 |

NOTES: U - Not detected, J - approximated, R - unusable.



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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Soil
## SW8021 Volatile Organic Compound Data

| Analyte | MW-50I 10/16/97 0 - 2 ft ug/Kg | MW-50I 10/16/97 10 - 12 ft ug/Kg | MW-50I 10/16/97 5 - 7 ft ug/Kg |
|---|---|---|---|
| 1,1,1-Trichloroethane | 290 U | 1 U | 1 U |
| 1,1,2,2-Tetrachloroethane | 290 U | 1 U | 1 U |
| 1,1,2-Trichloroethane | 290 U | 1 U | 1 U |
| 1,1-Dichloroethane | 290 U | 1 U | 1 U |
| 1,1-Dichloroethene | 290 U | 1 U | 1 U |
| 1,2-Dichlorobenzene | 1500 U | 5 U | 5 U |
| 1,2-Dichloroethane | 290 U | 1 U | 1 U |
| 1,2-Dichloropropane | 290 U | 1 U | 1 U |
| 1,3-Dichlorobenzene | 1500 U | 5 U | 5 U |
| 1,4-Dichlorobenzene | 1500 U | 5 U | 5 U |
| 2-Chloroethylvinylether | 2900 U | 11 U | 11 U |
| Bromodichloromethane | 290 U | 1 U | 1 U |
| Bromoform | 2900 U | 11 U | 11 U |
| Bromomethane | 2900 UJ | 11 U | 11 U |
| Carbon tetrachloride | 290 U | 1 U | 1 U |
| Chlorobenzene | 290 U | 1 U | 1 U |
| Chloroethane | 290 U | 1 U | 1 U |
| Chloroform | 290 U | 2 | 1 U |
| Chloromethane | 2900 U | 11 U | 11 U |
| Dibromochloromethane | 290 U | 1 U | 1 U |
| Methylene chloride | 290 U | 1 U | 1 U |
| Tetrachloroethene | 290 U | 1 U | 1 U |
| Trichloroethene | 10000 | 4 | 1 U |
| Trichlorofluoromethane | 290 U | 1 U | 1 U |
| Vinyl chloride | 290 U | 1 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

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# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Soil
## SW8021 Volatile Organic Compound Data

| Analyte | MW-50I 10/16/97 0 - 2 ft ug/Kg | MW-50I 10/16/97 10 - 12 ft ug/Kg | MW-50I 10/16/97 5 - 7 ft ug/Kg |
|---|---|---|---|
| cis-1,2-Dichloroethene | 290 U | 1 U | 1 U |
| cis-1,3-Dichloropropylene | 290 U | 1 U | 1 U |
| trans-1,2-Dichloroethene | 290 U | 1 U | 1 U |
| trans-1,3-Dichloropropene | 290 U | 1 U | 1 U |

NOTES: U - Not detected, J - approximated, R - unusable.

Close File

O'BRIEN & GERE ENGINEERS, INC.

# Appendix K
## Columbia Manufacturing
## Validated Data Summary
## Soil
## SW8270 Semivolatile Organic Compound Data

| Analyte | MW-50I 10/16/97 0 - 2 ft mg/Kg | MW-50I 10/16/97 10 - 12 ft mg/Kg | MW-50I 10/16/97 5 - 7 ft mg/Kg |
|---|---|---|---|
| 2-Chloronaphthalene | 0.39 U | 0.36 U | 0.35 U |
| 2-Methylnaphthalene | 0.39 U | 0.36 U | 0.35 U |
| Acenaphthene | 0.040 J | 0.36 U | 0.35 U |
| Acenaphthylene | 0.39 U | 0.36 U | 0.35 U |
| Anthracene | 0.073 J | 0.36 U | 0.35 U |
| Benzo(a)anthracene | 0.53 J | 0.36 U | 0.16 J |
| Benzo[a]pyrene | 0.59 J | 0.36 U | 0.17 J |
| Benzo(b)fluoranthene | 0.97 J | 0.36 U | 0.28 J |
| Benzo(ghi)perylene | 0.59 J | 0.36 U | 0.13 J |
| Benzo(k)fluoranthene | 0.32 J | 0.36 U | 0.11 J |
| Chrysene | 0.92 J | 0.36 U | 0.25 J |
| Dibenzo(a,h)anthracene | 0.39 UJ | 0.36 U | 0.35 UJ |
| Fluoranthene | 0.86 | 0.36 U | 0.32 J |
| Fluorene | 0.044 J | 0.36 U | 0.35 U |
| Indeno(1,2,3-cd)pyrene | 0.45 J | 0.36 U | 0.10 J |
| Naphthalene | 0.055 J | 0.36 U | 0.35 U |
| Phenanthrene | 0.83 | 0.36 U | 0.24 J |
| Pyrene | 2.3 J | 0.36 U | 0.51 |

NOTES: U - Not detected, J - approximated, R - unusable.



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