3R - 258

# REPORTS

# DATE:

May 1995

# SITE ASSESSMENT
# FOR THE BLOOMFIELD CRUDE STATION
# BLOOMFIELD, NEW MEXICO

## MAY 1995

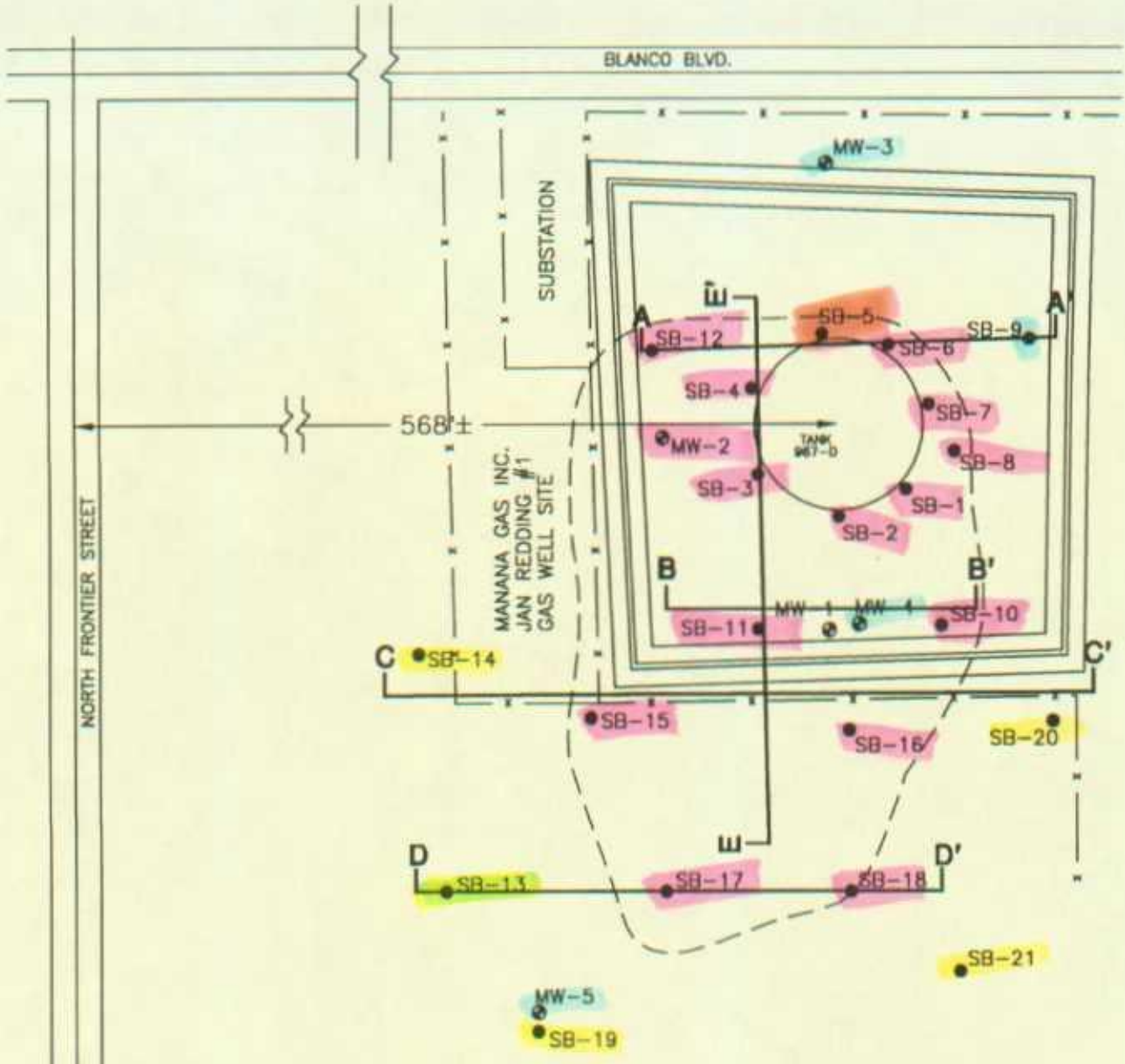
**Prepared for:**

## GIANT INDUSTRIES ARIZONA, INC.

**Project 13023**



PHILIP ENVIRONMENTAL




LEGEND

- FENCE LINE
- MW-1 APPROXIMATE MONITORING WELL LOCATION AND NUMBER
- SB-1 APPROXIMATE BOREHOLE LOCATION AND NUMBER
- ESTIMATED BOUNDARY OF IMPACTED SOILS
- A A' CROSS SECTION LOCATION

0 100 FEET

N

PHILIP ENVIRONMENTAL

TITLE:
Giant Industries Arizona, Inc.
Bloomfield, New Mexico
Impacted Soils

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| DWN: | TMM | | GIANT INDUSTRIES BLOOMFIELD, |
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| CHKD: | | | FIGURE |
| APPD: | | | |

COL. 130230-003

# SITE ASSESSMENT
# FOR THE BLOOMFIELD CRUDE STATION
# BLOOMFIELD, NEW MEXICO

**MAY 1995**



**Prepared for:**

## GIANT INDUSTRIES ARIZONA, INC.

**Project 13023**

PHILIP ENVIRONMENTAL

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June, 1995

Giant Industries Arizona, Inc.
Bloomfield, New Mexico

# EXECUTIVE SUMMARY

This report summarizes the data collected in two phases of a site investigation at Giant Industries Arizona, Inc.'s Bloomfield Crude Station. This investigation is centered on Tank 967-D (the tank) on the western side of the station. In March of 1994, Giant discovered hydrocarbons in the vicinity of the tank. Giant contracted Philip Environmental Services Corporation to conduct a more extensive site investigation.

This investigation was completed in two phases: the first in September of 1994 and the second in April of 1995. Data collected during these two phases indicate that soil and groundwater beneath the tank have been impacted by hydrocarbons. First phase soil sampling analytical results found hydrocarbons in the C6 through C34 range. An interval of contaminated soil, approximately 200 feet wide, extends southwest from the tank approximately 275 feet. The top of the impacted layer is approximately 8 to 12 feet below ground surface. This area of impacted soil appears to extend southwest off of Giant's property into an empty lot. Soil borings indicate that the impacted layer is approximately 12 feet thick below the edge of the tank, and gets progressively thinner until it tapers out to the southwest on the adjacent empty lot.

Monitoring wells were installed in both phases of the investigation. Samples collected from these wells indicate that groundwater has been impacted in one well (MW-2) located 110 feet west from the center of the tank. In the first sampling event completed in September 1994, groundwater samples collected were analyzed for general chemistry, purgeable halocarbons and aromatics, polynuclear-aromatic hydrocarbons, the 13 priority pollutant metals, and total petroleum hydrocarbons (TPH). Only TPH, benzene, toluene, ethylbenzene, and xylenes (BTEX), and small quantities of polynuclear aromatic hydrocarbons were detected. The TPH analyses found hydrocarbons in the C6 through C18 range. In the April 1995 sampling event, samples collected were analyzed for BTEX and TPH. In this sampling event, only MW-2 appeared to be impacted. Free-phase hydrocarbons were detected in MW-2 in both sampling events. This suggests that there is a free-phase hydrocarbon plume beneath the tank that may extend to the southwest, the apparent direction of groundwater flow. Off-site soil borings indicate that the free-phase plume does not extend off-site.

In general, the groundwater at the site is unsuitable for domestic supply, due to high concentrations of both sulfate and total dissolved solids (TDS). The general chemistry analytical results indicate TDS concentrations above New Mexico Water Quality Control Commission (NMWQCC) standards at all well locations, including upgradient well MW-3. Sulfate concentrations are also above the NMWQCC standard at all locations, with the exception of MW-2.

The groundwater data collected indicates that the shallowest saturated layers have been impacted by the hydrocarbons. These sandy, saturated layers appear to be relatively thin and discontinuous. Less permeable clay layers beneath the shallow saturated intervals may have slowed or prevented the downward movement of the hydrocarbons.

There are no known users, either domestic or industrial, of the shallow water at or downgradient of the site. Low anticipated well yield, poor chemical quality, and other existing sources are the probable reasons for the lack of production; possible future use of this water is unlikely.

# 1.0 INTRODUCTION

This report summarizes the information gathered in two phases of field investigation at the Bloomfield Crude Station in Bloomfield, New Mexico. The first phase was completed during the week beginning September 19, 1994. Eight soil borings were completed on the western side of the Bloomfield Crude Station (the site) around and directly adjacent to Tank 967-D (the tank). In the first phase, four monitoring wells were also installed in the vicinity of the tank.

The second phase took place during the week beginning April 24, 1995. Thirteen additional soil borings were completed to estimate the extent of the contaminated soil on the western side of the site and on the property adjacent to the site located to the south and the west. One monitoring well was installed outside the southwest boundary of the site, to monitor the estimated leading edge of the plume. This report compiles all of the information gathered to date.

## 1.1 SITE LOCATION

The site is located on the southwest corner of Blanco Boulevard and Fifth Street in the City of Bloomfield, San Juan County, New Mexico. The site is within the N1/2, NW1/4, NW1/4 of Section 22, Township 29 North, Range 11 West. A regional site location map is shown in Figure 1.

## 1.2 GEOGRAPHY

The site is located at the northern edge of the San Juan River flood plain, approximately 1.25 miles north of the San Juan River. The elevation at the site is approximately 5,480 feet above sea level. Average annual precipitation is 7 to 9 inches, with most of the precipitation falling in the winter months and during summer thunderstorms.

## 1.3 REGIONAL HYDROGEOLOGY AND GEOLOGY

The San Juan River Valley and its associated flood plain are relatively narrow, approximately 1.5 to 2 miles wide, in the vicinity of Bloomfield, New Mexico. The Tertiary Nacimiento Formation forms mesas on the north side of the river valley. These mesas rise up from the valley floor approximately one-half to three-quarters of a mile north of the site. A more complete description of the general geology and hydrogeology of the Bloomfield area is given in Giant's "Initial Site Assessment and Characterization Plan". The site-specific geologic and hydrogeologic conditions, as clarified in this investigation, will be described in this report.

## 1.4 SITE DESCRIPTION

The site covers an area of approximately 5.5 acres. Several tanks and buildings are present on the site, as shown on Figure 2. This investigation is centered on Tank 967-D, a 55,000-barrel storage tank that was constructed in 1956. This tank is not presently in

use. The tank is located in the western half of the site within a bermed area that is approximately 340 feet by 280 feet.

## 1.5 BACKGROUND

In March 1994 an excavation was made on the east side of the tank, to a depth of approximately 12 feet, using a backhoe. Soil samples were taken from the excavation and analyzed by Environmental Protection Agency (EPA) Method 8015 for total petroleum hydrocarbons (TPH) and by EPA Method 8020 for benzene, toluene, ethylbenzene, and total xylenes (BTEX). On March 15, 1994, the New Mexico Oil Conservation Division (NMOCD) was notified that hydrocarbons were found in the subsurface soil at the site. The results of this sampling are discussed in a report dated May 9, 1994, titled "Initial Site Assessment and Characterization Plan" for the Giant Bloomfield Station, that was prepared by Giant Industries Arizona, Inc. (Giant) and submitted to the NMOCD in May 1994. A letter dated June 23, 1994, from Giant to the NMOCD, clarified the site characterization work plan described in the May 9, 1995, report. In a letter dated August 19, 1994, NMOCD approved the work plan submitted by Giant. A more detailed account of the site's history is given in Giant's May 1994 "Initial Site Assessment and Characterization Plan".

On September 14, 1994, Giant contracted Philip Environmental Services Corporation (Philip) (*formerly* Burlington Environmental Inc.) to provide the first phase of a site investigation. During the week beginning September 19, 1994, Philip supervised the installation of four monitoring wells, MW-1 through MW-4, and eight exploratory soil borings, SB-1 through SB-8. Soil samples were collected from the soil borings, and groundwater samples were collected from the monitoring wells. A report titled "Site Assessment and Proposed Action Plan for the Bloomfield Crude Station, Bloomfield, New Mexico", dated January 1995, was generated from the information gathered in this phase of the site investigation. This report was submitted to the NMOCD. The January 1995 report included recommendations for a second phase of investigation. In a letter dated March 13, 1995, the NMOCD approved the recommendations for further investigation as described in the January 1995 report. During the week beginning April 24, 1995, Philip completed 13 soil borings, SB-9 through SB-21, and installed one monitoring well off-site, MW-5. Field headspace readings were taken with a photoionization detector (PID) on soil samples collected from all of the borings. Groundwater samples were collected from the newly installed well and from three of the four existing on-site wells.

The methods used to collect and analyze soil samples and groundwater are described in Section 2.1 of this report. Monitoring well installation procedures are described in Section 2.2 of this report. Monitoring well development and sampling methodology are described in Section 2.3 of this report.

# 2.0 METHODS OF INVESTIGATION

## 2.1 BOREHOLE DRILLING AND SAMPLING METHODOLOGIES

Soil borings SB-1 through SB-8, shown on Figures 2 and 3, were completed using a CME 75 drill rig equipped with 6.25-inch inside-diameter, hollow-stem augers. These borings were continuously cored using a 5-foot-long, 4-inch-diameter, split-barrel sampler. Soil borings SB-9 through SB-21 were completed using a CME 75 drill rig equipped with 4.25-inch inside-diameter, hollow-stem augers. These borings were continuously cored using 2-foot-long, 1.5-inch- diameter split spoons. Philip's field geologist described the lithology of the soil at each boring location on individual "Record of Subsurface Exploration" forms, included in Appendix A.

The soil cores from borings SB-1 through SB-8 were tested with a PID at 5-foot intervals, or at points where staining or hydrocarbon odor was noted. Soil cores from borings SB-9 through SB-21 were tested with a PID at 2-foot intervals, or at points as described above. Headspace readings were taken at these intervals by putting a portion of the core into a sealable plastic bag. The plastic bag was sealed and left in the sun for 10 to 20 minutes to volatilize any hydrocarbons present. After allowing the samples to sit in the sun, the PID was inserted into the bag and a headspace reading was taken. Drilling and sampling were discontinued when groundwater was encountered, when a clean soil interval was noted, or where a competent clay layer was encountered.

Drilling equipment and sampling tools were decontaminated prior to use at each boring location. Decontamination included cleaning the drilling equipment with an Alconox™ soap solution followed by a potable water rinse. In the second phase of field investigation, the augers were steam cleaned between holes.

In the borings completed in the first phase, at each PID screening point, the core was split lengthwise; half of the core was placed into the plastic bag, and half was placed into a four-ounce glass sample jar with a Teflon™-lined lid. At each boring, the sample with the highest corresponding headspace reading was sent to the laboratory for analysis by EPA Method Modified 8015 for TPH, including quantification of both gasoline and diesel range hydrocarbons. Samples were preserved on ice for transport to the laboratory. Each sample collected was labeled with the boring number, sample interval depth, date, time of collection, and required laboratory analysis.

All soil samples collected were submitted to Analytical Technologies, Inc. (ATI) in Albuquerque, New Mexico, under strict chain-of-custody procedures.

## 2.2 MONITORING WELL INSTALLATION

The four monitoring wells completed in the first phase were installed within, or directly adjacent to, the bermed area around the tank. The monitoring well installed in the second

phase was completed outside the boundaries of the site, approximately two hundred feet southwest. The locations of these wells are shown on Figure 3.

Monitoring-well borings were advanced using the methods described in Section 2.1 of this report. Field screening was completed, but no soil samples from these borings were sent to a laboratory for analysis. The borings were advanced beyond the water table until a clean, competent clay unit was encountered. The wells were screened above the top of the clay. Details of well construction are given on the Well Installation Records included in Appendix B. Detailed lithologic information was recorded on "Record of Subsurface Exploration" forms also included in Appendix B.

The wells were screened in the following intervals:

- MW-1 from 5,470.73 feet to 5,480.73 feet
- MW-2 from 5,464.36 to 5,479.36 feet
- MW-3 from 5,467.49 to 5,482.49 feet
- MW-4 from 5,457.58 to 5,462.58 feet
- MW-5 from 5,453.96 to 5,468.96 feet

MW-1 was completed so as not to screen across a clay layer present at 15 feet that may confine hydrocarbons to the shallow soils. MW-4 was screened in a sand unit approximately 10 feet beneath the screened interval of MW-1. This screened interval was chosen to assess whether hydrocarbons had impacted water-bearing units beneath the clay between the completion depths of MW-1 and MW-4.

## 2.3 Monitoring Well Development and Sampling Methodology

In the first phase, MW-1, MW-2, MW-3, and MW-4 were developed by raising and dropping a Teflon™ bailer inside the well to surge water back and forth through the screen. At least three casing volumes were removed by bailing from MW-2, MW-3, and MW-4. Due to the lack of water in MW-1, following installation it was hoped that by vigorous development with distilled water, the well would produce water sufficient to sample. On September 22, 1994, 17 gallons of distilled water was introduced into the well. The distilled water was surged for approximately 30 minutes using a Teflon™ bailer before being bailed out. Enough water was present in the well on September 23, 1994 to take a water-level reading with an electronic indicator. Groundwater samples were not collected from MW-1, due to the insufficient volume of water and the slow recovery of the well.

MW-5 was developed in the same manner described for MW-2, MW-3, and MW-4. Well development information for all wells was recorded on "Well Development and Purging Data" forms, included in Appendix C.

In both phases of the investigation groundwater samples were collected when the water being bailed from the wells was no longer silty and the temperature, pH, and conductivity readings stabilized. In the first phase, groundwater samples were collected at MW-2,

MW-3, and MW-4 in pre-preserved, 40-milliliter (ml) glass vials with Teflon™-lined caps (VOA vials) for analysis by EPA Methods 601 and 602 for purgeable halocarbons and aromatics. Two additional pre-preserved, VOA vials were filled for analysis for TPH by EPA Method Modified 8015. Two 1,000-ml glass bottles with Teflon™-lined lids were filled for analysis by EPA Method 610 for polynuclear aromatic hydrocarbons (PAHs). A pre-preserved, 1,000-ml plastic bottle was filled for analysis for the 13 priority pollutant metals by various EPA methods. These samples were stored on ice and transported for analysis to ATI.

Second phase groundwater sampling at MW-2, MW-3, MW-4, and MW-5 included collecting samples in pre-preserved, VOA vials for analysis by EPA Method 8020 for BTEX, and by EPA Method Modified 8015, for TPH. These samples were also stored on ice and transported for analysis to ATI.

In both phases, groundwater samples for general chemistry analysis were collected from all producing wells in 1,000-ml plastic bottles. These samples were stored on ice and transported for analysis to Inter-Mountain Laboratories, Inc. in Farmington, New Mexico.

All samples collected were submitted to the laboratories under strict chain-of-custody procedures. Water sampling data were recorded on "Water Sampling Data" forms included in Appendix D.

# 3.0 RESULTS

## 3.1 SITE LITHOLOGY

In the bermed area around the tank, a coarse to very coarse sand unit is present that extends from the surface to depths ranging from 4 feet beneath ground surface (bgs) to 11 feet bgs. This sand is well graded, angular to subangular, and is dry and loose. The surface sand unit grades into clayey sand or sandy clays. Information from the second phase of the investigation indicates that the surficial sand layer is also present in the empty lot to the south and the west of the site. Outside of the bermed area, the sand appears to thicken, extending to depths of 10 to 14 feet bgs.

Below the surface sand, it is more difficult to differentiate distinct layers. The clayey sand units grade into sandy clays over several inches. These fine-grained layers contain fine to medium sand and clay of low plasticity. They are medium-dense or stiff, and are usually moist.

Within the fine-grained layers are occasional coarse to very coarse, well-graded sand layers. These sand layers range from approximately 2 inches to 8 inches thick and are usually saturated. The thinner sand layers often occur in groups separated by 2-to 4-inch thick clayey layers. It appears that these sand layers transport the groundwater beneath the site. These sand layers cannot be definitively traced between holes and may be discontinuous.

A sandy clay or clay layer appears at depths ranging from 8 to 19 feet bgs. This layer is usually of low plasticity, stiff, and moist or damp. This layer appears to retard the downward movement of water and contaminants.

In the empty lot located to the south and the west, the lithology found in the soil borings is generally the same as that described above for the borings inside the berm. Most of the borings done outside the bermed area indicate a medium grained sand layer, approximately 0.5 to 2.5 feet thick, at depths ranging from 21 to 23 feet bgs. This layer is saturated and appears to carry water. A silty clay usually underlies this layer. The only boring with a notable difference in lithology is SB-20, which appears to contain more sand and have fewer and smaller clay-rich layers than the other borings.

## 3.2 SOIL SAMPLING RESULTS

Hydrocarbons were detected in all of the first phase borings. The PID headspace readings were recorded on the "Record of Subsurface Exploration" forms included in Appendix A. The laboratory analyses of the soil samples collected from borings SB-1 through SB-8 verify the presence of hydrocarbons in the subsurface. The laboratory analytical reports are included in Appendix E and are summarized in Table 1. The data from the soil borings indicate that the soil has been impacted on all sides of the tank. The locations of the first phase soil borings, SB-1 through SB-8, are shown in Figure 2; SB-9 through

SB12 are also shown on Figure 2. These soil borings were all located within 5 feet of the tank's wall, with the exception of SB-8, which was approximately 30 feet from the tank.

**TABLE 1 - SOIL SAMPLING TPH ANALYSIS RESULTS AND FIELD SCREENING RESULTS**

| Sample ID (Location-Depth) | C6 - C18 Range mg/kg | C12 - C36 Range mg/kg | Field Screening NDU |
|---|---|---|---|
| SB-1-9.0 | 15 | 33 | 465 |
| SB-2-12.5 | 1,300 | 1,300 | 432 |
| SB-3-11.0 | 490 | 830 | 383 |
| SB-4-16.5 | 4,900 | 3,200 | 305 |
| SB-5-17.0 | 3,400 | 2,200 | 187 |
| SB-6-5.0 | 180 | 78 | 236 |
| SB-7-12.3 | 2,000 | 1,500 | 176 |
| SB-8-12.0 | 550 | 410 | 202 |

- mg/kg - milligrams per kilogram
- NDU- Needle Deflection Unit on HNu photoionization detector is approximately equivalent to parts per million

The locations of the soil borings completed in phase two, SB-9 through SB-21, are shown on Figure 4. In borings SB-9, SB-13, SB-14, SB-19, SB-20, and SB-21 no hydrocarbons were indicated in any of the samples' headspace readings. The information from the soil borings was used to delineate the approximate areal boundary of impacted soil shown in Figure 4. Although hydrocarbons were detected with the PID in SB-18, they were only visibly present in an interval approximately 1/3-foot thick at 17 feet bgs. For this reason, SB-18 is shown on the estimated boundary of impacted soil on Figure 4. Figure 5 includes cross sections showing the approximate vertical extent of the impacted soil.

In SB-1, SB-2, SB-6, and SB-7 the PID headspace readings suggest that soil not impacted by hydrocarbons is encountered at 14 to 15 feet bgs. SB-4 and SB-5 headspace readings indicate impacted soils extend to approximately 17 feet bgs. Headspace readings of samples taken from the MW-1 boring indicate impacted soils are present from 10 to 15 feet bgs (approximately 5,474 to 5,469 feet in elevation). MW-2 headspace readings indicate impacted soils are present from 9 to 15 feet bgs (approximately 5,474 to 5,468 feet in elevation). MW-3 headspace readings indicate that the soil in that boring was not impacted. At MW-4, no headspace readings were taken.

Information collected in the second phase of the field investigation further constrains the vertical extent of the impacted soil. The cross sections presented in Figure 5 use the information collected in the second phase to show the estimated extent of off-site impacted soil.

## 3.3 SITE HYDROGEOLOGY

On October 31, 1994, the depth to groundwater in MW-1 was measured with an ORS oil/water interface probe. The ORS probe indicated approximately 4 inches of water standing in the well. MW-2, MW-3, and MW-4 were also checked with the ORS probe on that date and only MW-2 had a measurable product layer. On April 27, 1995, depth to groundwater measurements were again taken with the ORS probe; as before, only MW-2 had a measurable product layer. It was noted that the water level in MW-1 had changed less than 1 inch since the measurement taken in October 1994. In MW-2, MW-3, and MW-4, water levels varied from 3 to 7 inches. This indicates that the water level measured in MW-1 does not reflect the elevation of the potentiometric surface, but is more likely standing water that has accumulated in the bottom of the well. For this reason MW-1 was not used to estimate the configuration of the potentiometric surface, shown on Figure 6 of this report. Water table elevations measured in both phases are shown in Table 2.

**TABLE 2 - WATER LEVEL ELEVATIONS**

| Well | 10/31/94 Water Level | 04/27/95 Water Level | 10/31/94 Product Thickness | 04/27/95 Product Thickness |
|---|---|---|---|---|
| MW-1 | 5470.49 | 5470.45 | None | None |
| MW-2 | 2469.99 | 2469.50 | 0.11 | 0.47 |
| MW-3 | 5473.57 | 5472.98 | None | None |
| MW-4 | 5469.49 | 2469.77 | None | None |
| MW-5 | N/A | 2464.58 | None | None |

Water level elevation is given in feet above mean sea level

MW-2 water level is not corrected for product thickness

Product thickness is given in feet

In light of the relatively similar lithologies noted in all of the borings, it is assumed that all of the wells are hydraulically connected. It is expected that the various clay and clayey sand layers will cause significant variations in the vertical and horizontal hydraulic conductivity. It is assumed that MW-1 is completed above the potentiometric surface. Figure 6 is a potentiometric surface map of the site, created using water level measurements taken with the ORS probe in MW-2, MW-3, MW-4, and MW-5. These four wells were used together, because they are screened in approximately the same interval — the shallow saturated zone. The water level in MW-2 for this figure was corrected for the influence of the product thickness.

The direction of groundwater flow in the shallow saturated zone is toward the southwest. The approximate hydraulic gradient is 0.020 ft/ft. Based on the gradient and flow direction of the saturated unit, as shown on Figure 6, MW-3 is upgradient of the site.

## 3.4 GROUNDWATER QUALITY

The results of the groundwater analytical testing are summarized in Tables 3, 4, 5, 6, 7, and 8. The laboratory analytical reports and quality assurance/quality control information are included in Appendix F.

- **September 1994, Groundwater Sampling Results**

  The only compounds detected in the purgeable halocarbon and aromatic analyses (EPA Method 601/602) were BTEX. In the MW-2 sample all of the BTEX components were detected, but only benzene and total xylenes exceed the New Mexico Water Quality Control Commission (NMWQCC) standards. The MW-4 sample contained small quantities of benzene and total xylenes. The quantities detected in the MW-4 sample are well below the NMWQCC standards. None of the other purgeable halocarbons or aromatics were detected in any of the samples. These results, along with the NMWQCC standards, are summarized in Table 3.

  The PAH analyses (EPA Method 610) detected PAHs only in the MW-2 sample. In this sample, the total of naphthalene plus monomethylnaphthalenes is 20.6 micrograms per liter (µg/L). This is below the NMWQCC standard of 30 µg/L for the sum of those parameters. Low levels of fluorene, phenanthrene, fluoranthene, and chrysene were also reported in the sample from MW-2; NMWQCC lists no standards for these parameters. These results are summarized in Table 4.

**TABLE 3 - GROUNDWATER SAMPLING SEPTEMBER, 1994, BTEX ANALYTICAL RESULTS**

| Well | Benzene µg/L | Toluene µg/L | Ethylbenzene µg/L | Total Xylenes µg/L |
|---|---|---|---|---|
| MW-3 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-2 | 640 | 600 | 82 | 690 |
| MW-4 | 2.1 | <0.5 | <0.5 | 1.2 |
| NMWQCC Standards | 10 | 750 | 750 | 620 |

µg/L = micrograms per liter
NMWQCC = New Mexico Water Quality Control Commission
None of the other purgeable halocarbons/aromatics were detected in any of the samples.

| TABLE 4 - GROUNDWATER SAMPLING RESULTS, SEPTEMBER 1994, POLYNUCLEAR AROMATIC HYDROCARBONS (EPA 610) | | | |
|---|---|---|---|
| Units: µg/L | MW-3 | MW-2 | MW-4 |
| Naphthalene | <0.50 | 8.9 | <0.50 |
| Acenaphthylene | <1.0 | <1.0 | <1.0 |
| Acenaphthene | <0.50 | <0.50 | <0.50 |
| Fluorene | <0.10 | 1.2 | <0.10 |
| Phenanthrene | <0.05 | 1.8 | <0.05 |
| Anthracene | <0.05 | <0.05 | <0.05 |
| Fluoranthene | <0.10 | 1.2 | <0.10 |
| Pyrene | <0.10 | <0.10 | <0.10 |
| Benzo(a)Anthracene | <0.10 | <0.10 | <0.10 |
| Chrysene | <0.10 | 0.17 | <0.10 |
| Benzo(b)Fluoranthene | <0.10 | <0.10 | <0.10 |
| Benzo(k)Fluoranthene | <0.10 | <0.10 | <0.10 |
| Benzo(a)Pyrene | <0.10 | <0.10 | <0.10 |
| Dibenzo(a,h)Anthracene | <0.20 | <0.20 | <0.20 |
| Benzo(g,h,i)Perylene | <0.10 | <0.10 | <0.10 |
| Indeno(1,2,3-CD)Pyrene | <0.10 | <0.10 | <0.10 |
| 1-Methylnaphthalene | <0.30 | 5.9 | <0.30 |
| 2-Methylnaphthalene | <0.30 | 5.8 | <0.30 |
| µg/L = micrograms per liter | | | |

The TPH analysis of the MW-2 sample found 5 milligrams per liter (mg/L) of fuel hydrocarbons in the C6 through C18-hydrocarbon range. No hydrocarbons were detected in the MW-3 or MW-4 samples with this analysis. These results are summarized in Table 5.

The analyses of the 13 priority pollutant metals reported these constituents above detection limits only in the MW-2 sample. Chromium, copper, and zinc were detected in this sample. None of these parameters exceed the NMWQCC standards. These results are summarized in Table 6.

The general chemistry analysis results indicate high conductivity (4,250 microhms per centimeter [µmhos/cm] to 5,420 µmhos/cm) in all of the samples. Total dissolved solids (TDS) were also found to be high (3,020 mg/L to 4,710 mg/L) in samples from MW-2, MW-3 (upgradient), and MW-4. The NMWQCC standard for TDS in a domestic water supply is 1,000 mg/L. These results indicate a poor quality of groundwater for potable use. The samples from MW-3 and MW-4 exceed the NMWQCC domestic water supply standard for sulfate. The standard for sulfate is 600 mg/L, the MW-3 (upgradient) and MW-4 samples contained 1,920 mg/L and 2,470 mg/L, respectively. The sample taken from MW-2 contained 1,050 mg/L chloride, which exceeds the NMWQCC domestic water supply standard for chloride of 250 mg/L. These results are shown in Table 7 and on the laboratory analytical reports in Appendix F.

**TABLE 5 - GROUNDWATER SAMPLING RESULTS FOR TOTAL PETROLEUM HYDROCARBONS (EPA 8015, MODIFIED) SEPTEMBER 1994 AND APRIL 1995**

| Well | September 1994 mg/L | April 1995 mg/L |
|---|---|---|
| MW-3 | <1 | <1 |
| MW-2 | 5 | 3 |
| MW-4 | <1 | <1 |
| NMWQCC Standard | None | None |

TPH = Total Petroleum Hydrocarbons
mg/L = milligrams per liter

**TABLE 6 - GROUNDWATER SAMPLING RESULTS FOR PRIORITY POLLUTANT METALS SEPTEMBER 1994**

| Well | Silver mg/L | Arsenic mg/L | Beryllium mg/L | Cadmium mg/L | Chromium mg/L |
|---|---|---|---|---|---|
| MW-3 | <0.01 | <0.005 | <0.004 | <0.0005 | <0.01 |
| MW-2 | <0.01 | <0.005 | <0.004 | <0.0005 | 0.010 |
| MW-4 | <0.01 | <0.005 | <0.004 | <0.0005 | <0.01 |
| NMWQCC Standard | 0.05 | 0.1 | No std. | 0.01 | 0.05 |
| | Copper mg/L | Mercury mg/L | Nickel mg/L | Lead mg/L | Antimony mg/L |
| MW-3 | <0.01 | <0.0002 | <0.02 | <0.002 | <0.05 |
| MW-2 | 0.012 | <0.0002 | <0.02 | <0.002 | <0.05 |
| MW-4 | <0.01 | <0.0002 | <0.02 | <0.002 | <0.05 |
| NMWQCC Standard | 1 | 0.002 | 0.2 | <0.05 | No std. |
| | Selenium mg/L | | Thallium mg/L | | Zinc mg/L |
| MW-3 | <0.005 | | <0.005 | | 0.023 |
| MW-2 | <0.005 | | <0.005 | | 0.032 |
| MW-4 | <0.005 | | <0.005 | | 0.026 |
| NMWQCC Standard | 0.05 | | No std. | | 10 |

mg/L = milligrams per liter

NMWQCC = New Mexico Water Quality Control Commission

No std. = No NMWQCC standard

**TABLE 7 - GROUNDWATER SAMPLING GENERAL CHEMISTRY ANALYTICAL RESULTS SEPTEMBER 1994, MW-5 ARE APRIL 1995 RESULTS**

| Analyte | Units | MW-2 | MW-3 | MW-4 | MW-5 | WQCC |
|---|---|---|---|---|---|---|
| Lab pH | s.u. | 6.6 | 7.1 | 7.0 | 6.9 | 6-9 |
| Conductivity | µmhos/cm | 4,920 | 4,250 | 5,420 | 6,000 | No Std. |
| TDS | mg/L | 3,049 | 3,413 | 4,389 | 4,410 | 1,000 |
| Alkalinity as $CaCO_3$ | mg/L | 957 | 521 | 576 | 775 | No Std. |
| Sodium Absorption Ratio | ratio | 11.785 | 8.147 | 10.886 | 8.84 | No Std. |
| Bicarbonate as $HCO_3$ | mg/L | 1,170 | 635 | 703 | 945 | No Std. |
| Carbonate as $CO_3$ | mg/L | 0 | 0 | 0 | 0 | No Std. |
| Hydroxide | mg/L | 0 | 0 | 0 | 0 | No Std. |
| Chloride | mg/L | 1,050 | 48 | 175 | 996 | 250 |
| Sulfate | mg/L | 245 | 1,920 | 2,470 | 1,390 | 600 |
| Calcium | mg/L | 325 | 439 | 439 | 634 | No Std. |
| Magnesium | mg/L | 30 | 37 | 53 | 51 | No Std. |
| Potassium | mg/L | 1.4 | 1.4 | 3.5 | 6.6 | No Std. |
| Sodium | mg/L | 828 | 661 | 907 | 861 | No Std. |

s.u. = standard units
µmhos/cm = micromhos per centimeter
mg/L = milligrams per liter
WQCC = New Mexico Water Quality Control Commission Standard
No Std. = No Standard

- **April 1995, Groundwater Sampling Results**

  Samples from MW-2, MW-3, MW-4, and MW-5 were analyzed by EPA Method 8020 for BTEX. A duplicate sample was collected for this analysis from MW-2 and designated MW-52. These results are summarized in Table 8. In the MW-2 sample and duplicate, all of the BTEX components were detected. No BTEX components were detected in any of the other samples.

**TABLE 8 - GROUNDWATER SAMPLING, BTEX ANALYTICAL RESULTS, APRIL 1995**

| Well | Benzene µg/L | Toluene µg/L | Ethylbenzene µg/L | Total Xylenes µg/L |
|---|---|---|---|---|
| MW-3 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-2 | 220 | 280 | 53 | 430 |
| MW-52 (MW-2 duplicate) | 380 | 550 | 93 | 830 |
| MW-4 | <0.5 | <0.5 | <0.5 | <0.5 |
| MW-5 | <0.5 | <0.5 | <0.5 | <0.5 |
| NMWQCC Standards | 10 | 750 | 750 | 620 |

µg/L = micrograms per liter
NMWQCC = New Mexico Water quality Control Commission

The TPH analyses reported 3 mg/L in the MW-2 sample and 5 mg/L in the MW-52 (MW-2 duplicate) sample. No hydrocarbons were detected in the MW-3, MW-4, or MW-5 analyses. These results are summarized in Table 5.

The general chemistry analysis indicates that the water quality of samples collected from MW-2, MW-3, and MW-4 are essentially the same as the water quality of the samples collected in September 1994. The general chemistry of the sample collected from MW-5 indicates concentrations of TDS and chloride above NMWQCC standards.

The laboratory analytical reports for the April 1995 sampling event are included in Appendix F.

# 4.0 CONCLUSIONS

## 4.1 SOILS INVESTIGATION CONCLUSIONS

The field screening data from the soil borings indicate that hydrocarbons are concentrated in the sandy clays or clayey sands beneath the dry, loose, surface-sand layer. Borings directly adjacent to the tank indicate that impacted soils extend to a depth of approximately 14 to 17 feet bgs. The average thickness of the impacted soils within the bermed area around the tank is approximately 9 feet. The top of this impacted layer is approximately 8 to 12 feet bgs. Headspace readings from all of the borings indicate that the hydrocarbons in the soil extend south and west from the tank. The direction of groundwater migration inferred from measured water levels in the monitoring wells (Figure 6), corroborates this direction of hydrocarbon migration. Figures 4 and 5 illustrate the estimated areal and vertical extent of the impacted soils, as indicated by the borings done to date.

## 4.2 GROUNDWATER SAMPLING CONCLUSIONS

The sampling events in September 1994 and April 1995 indicate that MW-2 has been impacted by hydrocarbons. The presence of a layer of product in MW-2 is further evidence that the groundwater at this site is impacted by hydrocarbons. All of the groundwater samples from MW-3, upgradient, indicate that the groundwater at that location has not been impacted. The results from the MW-4 sample collected in September 1994 indicated that the groundwater at that location may be slightly impacted, although the results were not reconfirmed in the April 1995 sample. It is possible that the BTEX detected at MW-4 in September 1994 was due to small amounts of hydrocarbons carried into the screened water-bearing zone during drilling or well installation, statistical variability, natural variations, or attenuation. The results obtained from MW-5 indicate that the effects of the hydrocarbon impact do not extend to MW-5's location.

If the tank is the source of the hydrocarbons, the direction of groundwater flow suggested by the potentiometric surface map (Figure 6) would indicate that the contaminant plume should migrate to the southwest. The results of the groundwater sampling suggest that MW-2 is in a free-phase hydrocarbon plume; MW-3, MW-4, and MW-5 appear to be outside this plume (Figure 6). In addition, dissolved-phase hydrocarbons were only confirmed in MW-2. This suggests that any dissolved-phase plume is also of limited areal extent.

The shallow water at the site appears to be perched, separated from underlying groundwater by clay units. Recharge to this perched zone is most likely from direct infiltration of rainfall from within the bermed area surrounding the tank, or from seasonal irrigation upgradient. The results of the groundwater sampling indicate that the groundwater quality in the saturated unit sampled by these four wells is not

suitable for use as a domestic water supply, based upon high naturally occurring TDS and sulfate contents. There are no known users, either domestic or industrial, of the shallow water at or downgradient of the site. Low anticipated well yield, poor chemical quality, and other existing sources are the probable reasons for the lack of production; possible future use of this water is unlikely. Deeper groundwater resources, as seen in MW-4, do not appear impacted.

# LIST OF FIGURES


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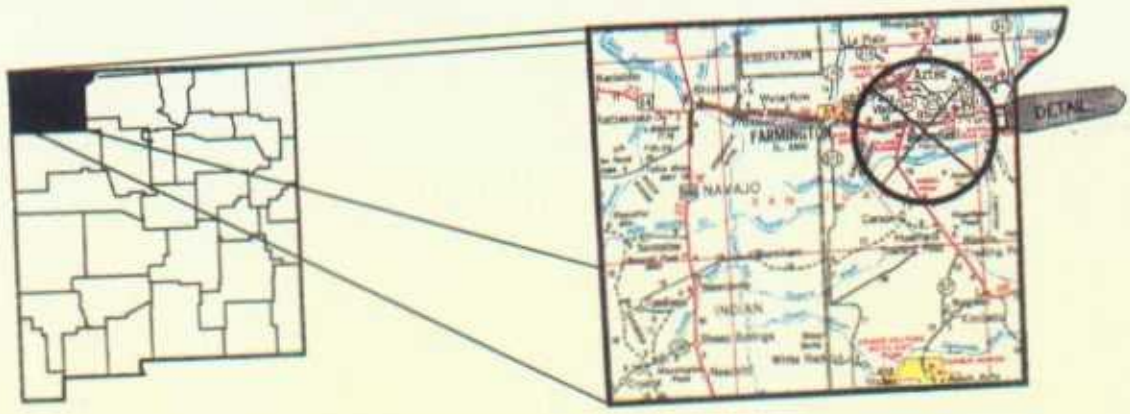
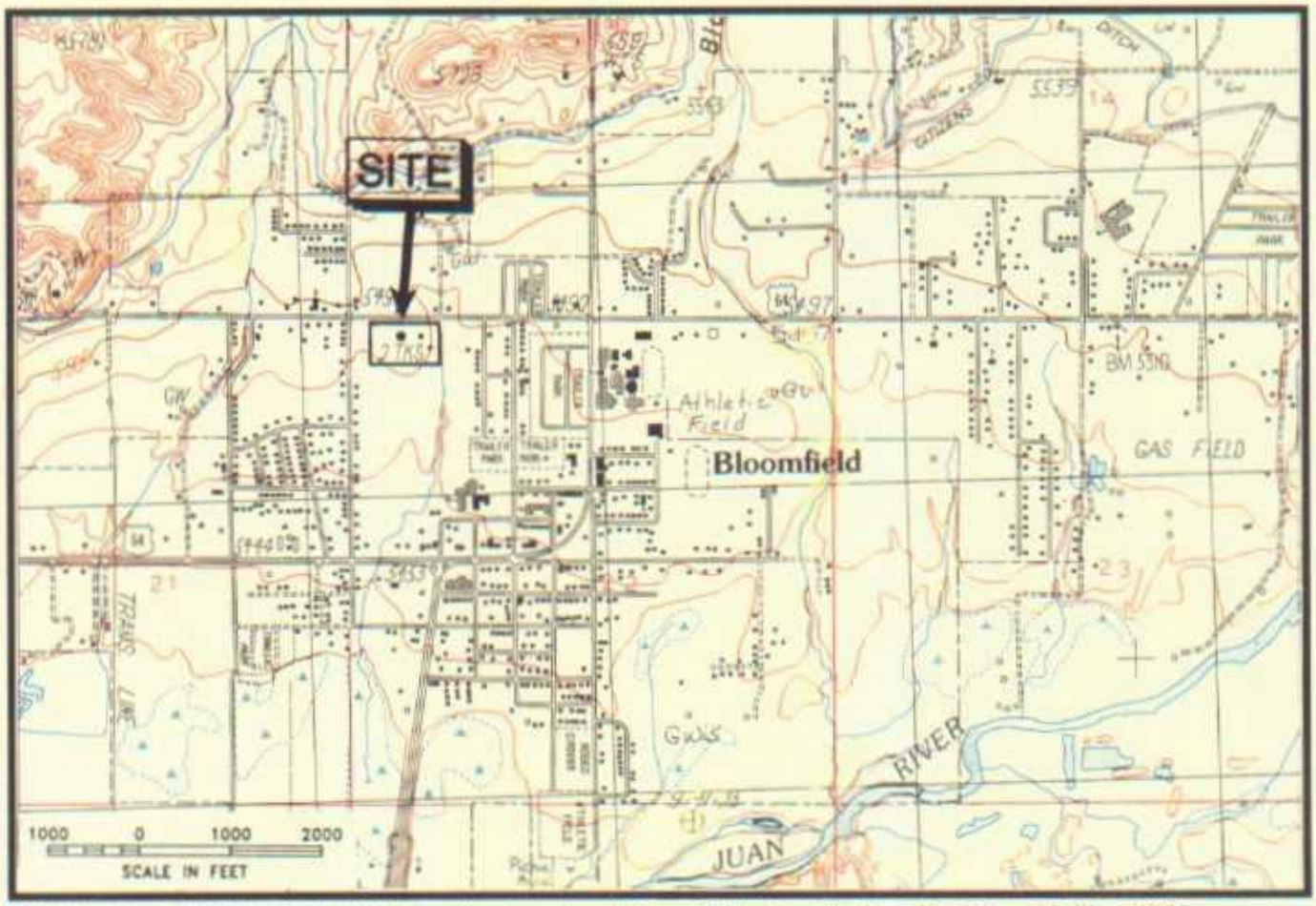
NEW MEXICO

SAN JUAN COUNTY




DETAIL OF SITE VICINITY




Modified from U.S. Geological Survey Quadrangle of Bloomfield, New Mexico, Provisional Edition 1985.

SCALE IS VARIABLE

N

PHILIP ENVIRONMENTAL

TITLE:
Regional Site Location Map
Bloomfield Crude Station

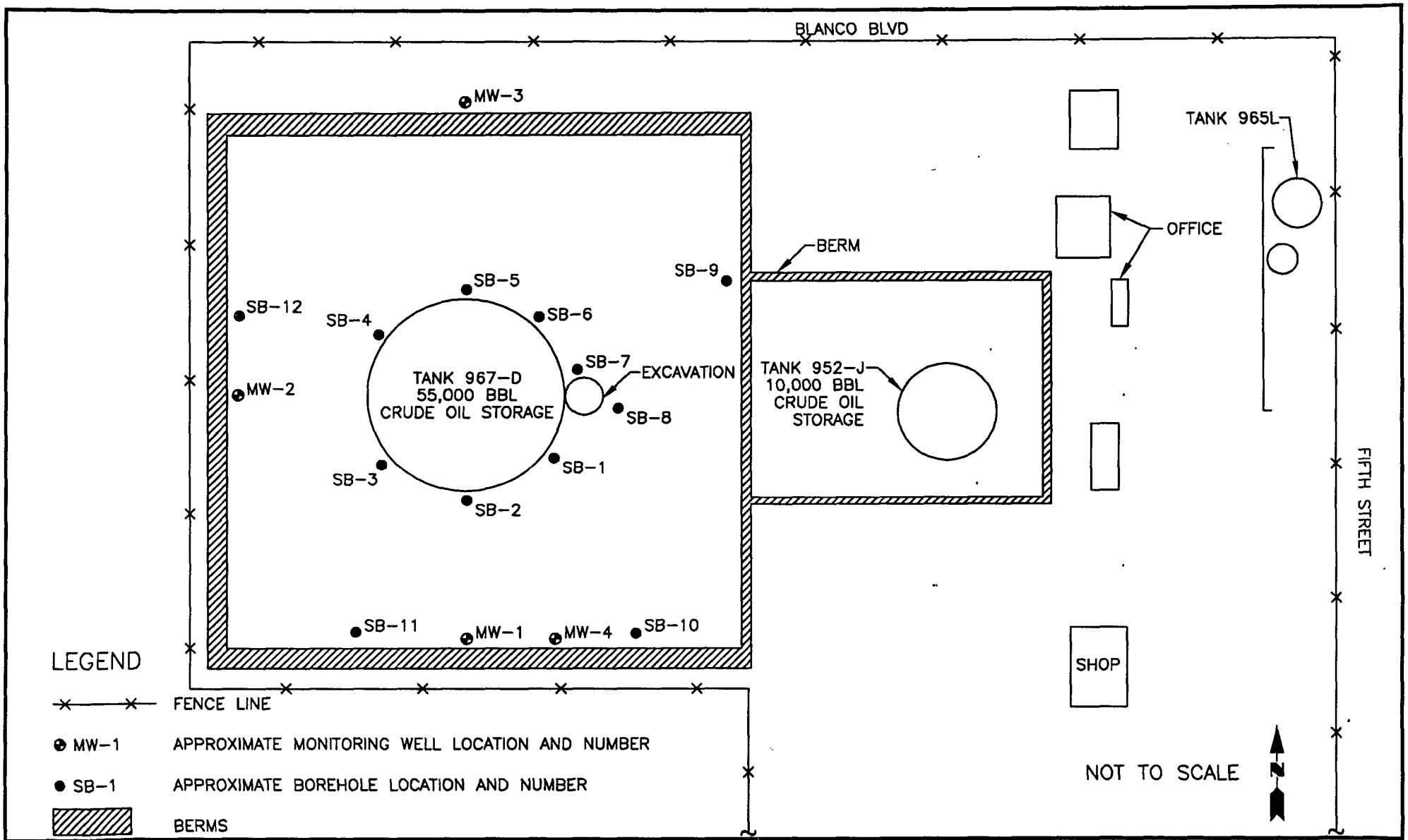
| | | |
|---|---|---|
| SCALE | VARIABLE | DATE |
| DWN: | TMM | 6/5/95 |
| DES: | | |
| CHKD: | | |
| APPD: | | |

PROJECT NO: 13023
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 1

REV:

COL 13023e-002




PHILIP ENVIRONMENTAL

TITLE:
Giant Industries Arizona, Inc.
Bloomfield, New Mexico
Site and Sampling Location Map

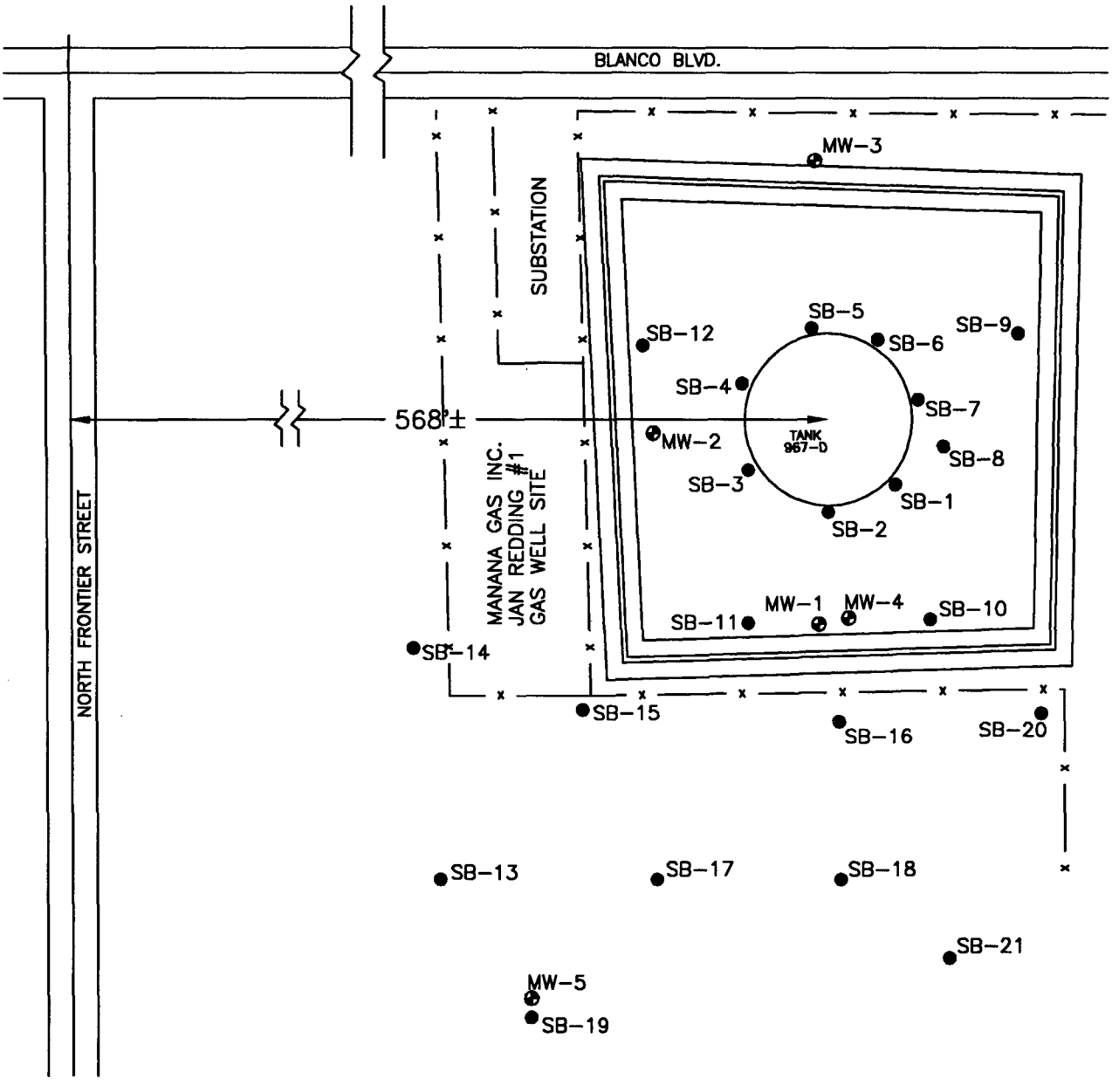
| | | | |
|---|---|---|---|
| SCALE | NONE | DATE | |
| DWN: | TMM | | |
| DES: | | | |
| CHKD: | | | |
| APPD: | | | |

PROJECT NO: 13023
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 2

REV:

COL 13023F-001




LEGEND

- FENCE LINE
- MW-1 APPROXIMATE MONITORING WELL LOCATION AND NUMBER
- SB-1 APPROXIMATE BOREHOLE LOCATION AND NUMBER

0 100
FEET

N

PHILIP ENVIRONMENTAL

TITLE: Expanded Site and Sampling Location Map

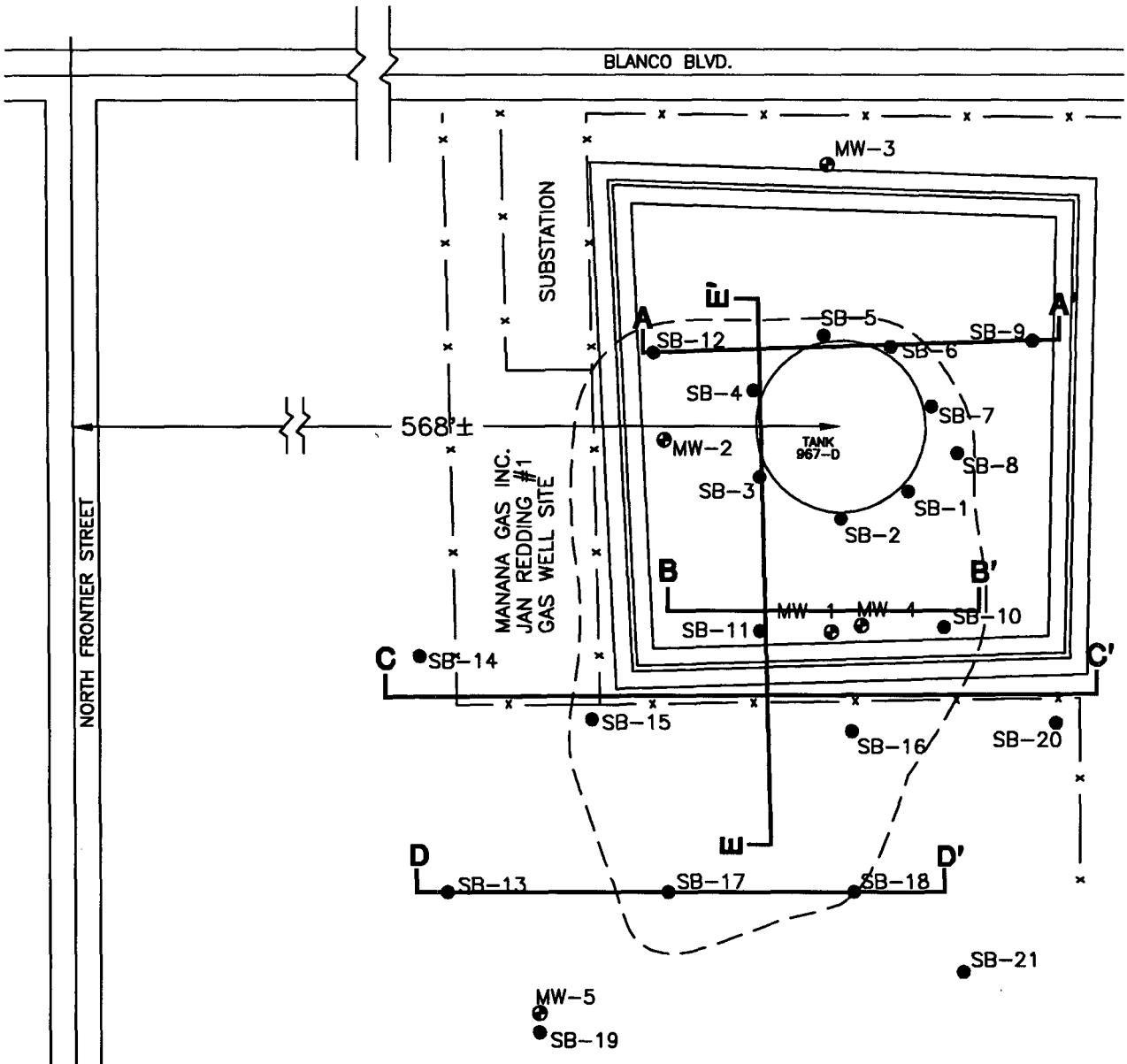
| | | | |
|---|---|---|---|
| SCALE | 1=100 | DATE | |
| DWN: | TMM | | |
| DES: | | | |
| CHKD: | | | |
| APPD: | | | |

PROJECT NO: 13023
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 3

REV:

COL 13023D-002




## LEGEND

| | |
|---|---|
| ×——× | FENCE LINE |
| ⊕ MW-1 | APPROXIMATE MONITORING WELL LOCATION AND NUMBER |
| ● SB-1 | APPROXIMATE BOREHOLE LOCATION AND NUMBER |
| — — — — | ESTIMATED BOUNDARY OF IMPACTED SOILS |
| A A' | CROSS SECTION LOCATION |

0 100
FEET

N

PHILIP ENVIRONMENTAL

TITLE:
Giant Industries Arizona, Inc.
Bloomfield, New Mexico
Impacted Soils

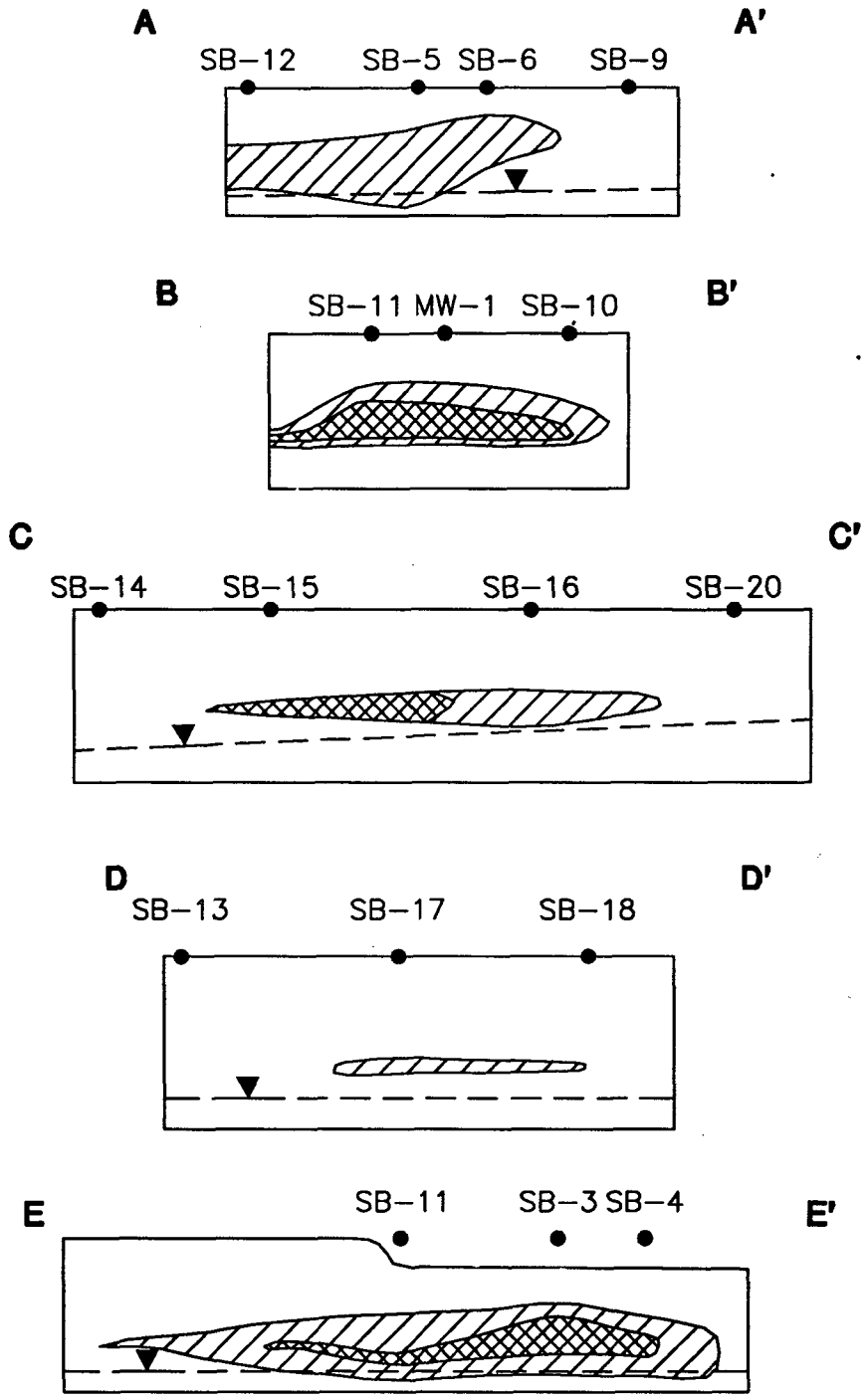
| | | | |
|---|---|---|---|
| SCALE | 1=100 | DATE | |
| DWN: | TMM | | |
| DES: | | | |
| CHKD: | | | |
| APPD: | | | |

PROJECT NO: 13023
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 4

REV:

COL 13023D-003




LEGEND

IMPACTED SOIL, OILY SHEEN

IMPACTED SOIL, DARK GREY OR MOTTLED GREY AND BROWN

APPROXIMATE POTENTIOMETRIC SURFACE

NOTE: All boundaries are inferred.

HORIZONTAL SCALE IN FEET
0 100
0 30
VERTICAL SCALE IN FEET

PHILIP ENVIRONMENTAL

TITLE:
Impacted Soil
Cross Sections

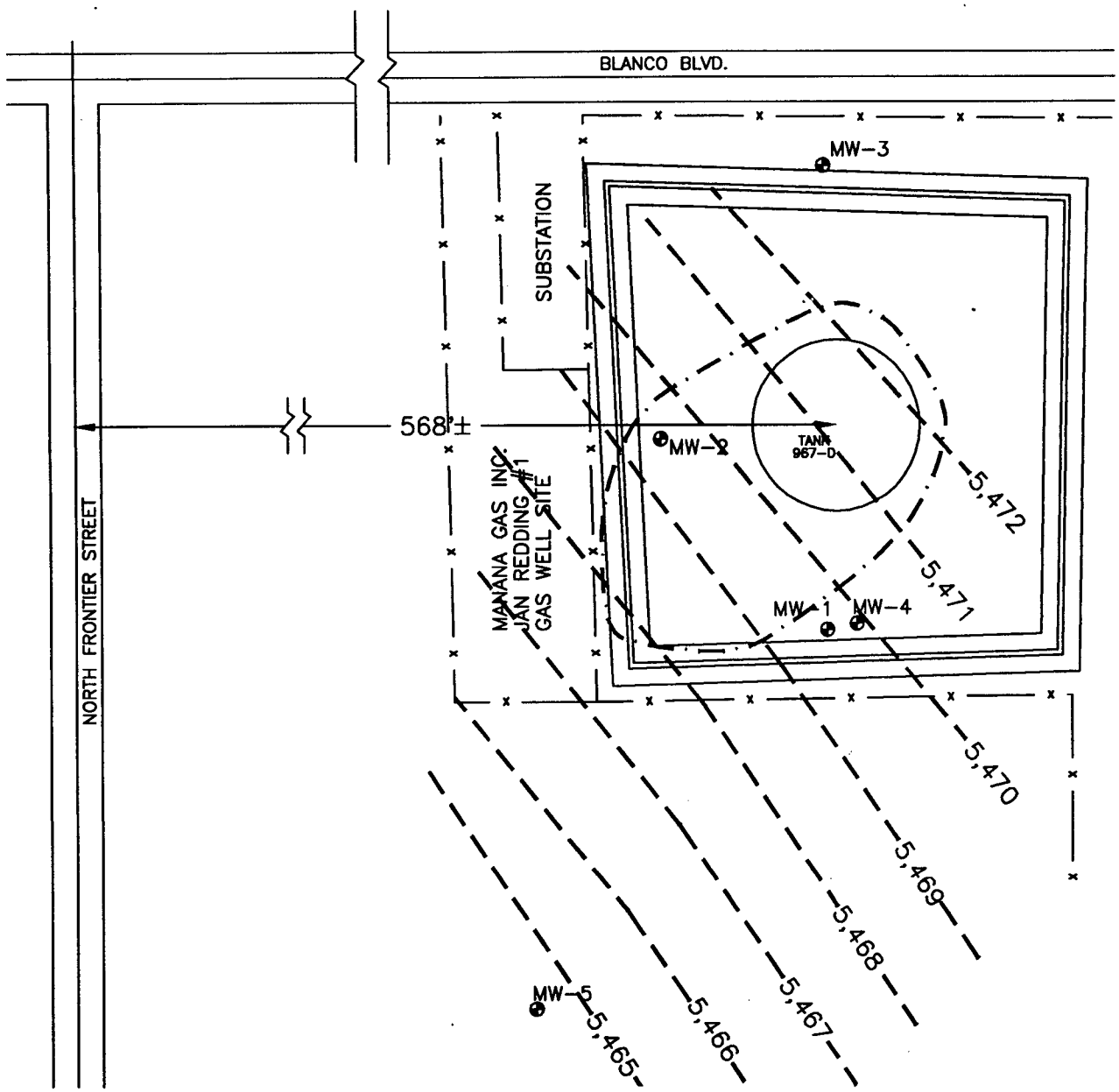
| SCALE | DATE |
|---|---|
| DWN: TMM | |
| DES: | |
| CHKD: | |
| APPD: | |

PROJECT NO: 13023
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 5

REV:

COL 13023E-001




## LEGEND

| | |
|---|---|
| ×——× | FENCE LINE |
| ⊕ MW-1 | APPROXIMATE MONITORING WELL LOCATION AND NUMBER |
| — · — · — | POTENTIAL FREE PHASE HYDROCARBON PLUME |
| – – 5,470 – – | APPROXIMATE EQUIPOTENTIAL LINE |

NOTE: MW-2 water level corrected for product thickness.

0 100
FEET

N

| | | | | |
|---|---|---|---|---|
| PHILIP ENVIRONMENTAL | TITLE: Approximate Potentiometric Surface April 27, 1995 | SCALE 1=100 | DATE | PROJECT NO: 13023 GIANT INDUSTRIES BLOOMFIELD, NM |
| | | DWN: TMM | | |
| | | DES: | | |
| | | CHKD: | | FIGURE 6 REV: |
| | | APPD: | | |

COL 13023D-004

# APPENDIX A

## "RECORD OF SUBSURFACE EXPLORATION" FORMS

BURLINGTON ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION


Borehole No. SB1
Well No.

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB1
LOGGED BY: S.K. GWL: depth 10.55 date/time 9/19/94 11:10
DRILLED BY: Rodgers & Co GWL: depth 9.60 date/time 9/19/94 1752
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94, 1000. DATE/TIME COMPLETION(S): 9/19/94, 1100
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ / BH / S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|
| - | | | 1.5/50 | SAND, SW, fine 30%, coarse 70% sand, loose, dry, light brown well graded | SW | | | |
| | 3.5 | | | | | | 84 | hydrocarbon odor |
| 5 | | | 3.2/50 | | | | | |
| 8.0 | 8.0 | | | | | 8.0 | 446 | |
| | 9.0 | | | CLAY, soft, low plasticity medium grey, moist | CL | | 465 | hydrocarbon odor |
| 10 | | | | 10.5 very coarse SAND, loose, wet olive-grey, well graded | SW | 10.5 | | |
| | 11.5 | | 4.5/50 | 11.4 SAND, coarse, loose, wet, grey | SW | 11.4 | 266 | |
| | | | | CLAY, stiff, low plasticity tomed dk tan, moist | CL | 12.5 | 1 | |
| 14.0 | | | | 14.0 B.O.H. | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. SBZ
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-Z
LOGGED BY: SK GWL: depth 9.4 T.D. dry date/time 9/19/94 1754
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 1100 DATE/TIME COMPLETION(S): 9/19/94, 1200
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | SK 9/19/94 | | 8 / 4.0 | SAND, coarse 60% - very coarse 40%, loose, dry, light brown well graded. | SW | | | | | |
| | | | 3.7 | | | | | | (17) | 5.0 |
| 5 | | | | | | | | | | |
| | | | | | | | | 8.0 | 228 | Hydrocarbon odor SK 9/19 |
| | | | | 11.0 | | 11.0 | | | | |
| 10 | | | | CLAY, soft low plasticity med-grey, moist. | CL | | | | | Hydrocarbon odor |
| | | | | 12.1 | | 12.1 | | | | |
| | | | | SAND - 80% med. sand, trace fines med. dense, moist, mottled black & grey | SW | 13.2 | | 12.5 | 432 | |
| | | | 13.2 | CLAY, stiff, low plasticity dk. tan, moist. trace med. sand. | CL | | | 14.0 | 8 | |
| 15 | | | | | | 14.0 | | | | |
| | | | | 14.0 - BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. SB3
Well No.

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-3
LOGGED BY: SK GWL: depth 13.5 T.D. dry date/time 9/19/94 1757
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94, 1230 DATE/TIME COMPLETION (S): 9/19/94 1315
AIR MONITORING TYPE: PID. BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAND, coarse, loose, dry, light brown, well graded. | SW | | | | | At 3.4 ft, color changes to lt grey |
| | | | | 4.5 | | 4.5 | | 4.5 | 17 | Hydrocarbon odor in grey material |
| 5 | | | | clayey SAND, loose, damp, light grey, | SP-SC | | | | | |
| | | | | 7.2 | | 7.2 | | | | |
| | | | | Sandy CLAY, med sand-10%, stiff low plasticity, grey, moist | CL | | | | | |
| | | | | | | 9.5 | | 10.0 | 212 | Clayey sand has 1"-2" layers of coarse to very coarse sand. |
| 10 | | | | clayey SAND, med. firm, m damp grey w/ black mottling- | SC | | | 11.0 | 393 | |
| | | | | 10-30% sand | | 11.3 | | | | |
| | | | | | SC | | | 14.0 | 114 | At 12.7 ft. color changes from grey to light brown. |
| | | | | | | 14.6 | | | | |
| | | | | 14.5 BOH | | | | | | |
| 15 | | | | | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. SB 4
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-4
LOGGED BY: SK GWL: depth 15 T.D. dry date/time 9/19/94 1759
DRILLED BY: Rodgers GWL: depth _____ date/time 9/19/94
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 1330 DATE/TIME COMPLETION (S): 9/19/94 1420
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAND, coarse to very coarse, loose, dry, light brown, well graded. | SW | 4.1 | | 4.0 | 53 | At 2.0 ft color change from light brown to light grey. |
| 5 | | | | clayey SAND, fine and med. sand, loose, damp, light grey to olive | SW SC | 8.2 | | 8.2 | 209 | Hydrocarbon odor in grey material |
| 10 | | | | Sandy CLAY, 10% fine to med sand stiff, low plasticity, ~~to~~ damp grey | CL | 15.0 | | 10.0<br>14.7 | 177<br>116 | Occasional Layers of very coarse sand in this units 1"-4" thick. Scarce gravel - fine to med. near 15'. |
| 15 | | | | SAND, coarse to very coarse loose, wet, grey, oily sheen, well graded | SW | 18.2 | | 16.5 | 305 | Strong hydrocarbon odor. |
| 20 | | | | sandy CLAY, 10% med to coarse sand, soft, low plasticity, damp light brown | CL | | | 20.0 | 5 | |
| | | | | 20.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. SB5
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-5
LOGGED BY: SK GWL: depth 14.5 date/time 9/19/94 1802
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 1430 DATE/TIME COMPLETION(S): 9/19/94 1530
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION (CLASSIFICATION SYSTEM: USCS) | USCS SYMBOL | DEPTH CHANG (feet) | AIR MONITORING UNITS ppm BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAND, coarse to very coarse loose, moist, lght brwn, well graded. | SW | | | 5.0 | 14 | 3.2 color changes from lght brown to grey. Grey material smells like hydrocarbon. |
| 5.0 | | | | | | 6.5 | | | | |
| | | | | sandy CLAY, Fine to med sand 10%, soft, med plasticity, damp, grey some plant material | CL | | | 8.5 | 142 | |
| 10.0 | | | | | | | | 12.0 | 51 | |
| | | | | | | 14.8 | | 15.0 | 81 | |
| 15.0 | | | | SAND, coarse to very coarse loose, wet, dk grey, well graded | SW | | | 17.0 | 187 | |
| | | | | | | 18.3 | | | | |
| | | | | sandy CLAY, 10% med. to coarse sand, firm, low plasticity, damp light brown | CL | | | 20.0 | 62 | |
| | | | | 20.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

A 1400
L 1410

# RECORD OF SUBSURFACE EXPLORATION



PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-6
LOGGED BY: SK GWL: depth 8.0 T.D. dry date/time 9/19/94 1803
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/ 1540 DATE/TIME COMPLETION (S): 9/19/94 1615
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | SAND, coarse to very coarse, loose, damp, light brown, well graded | SW | 4.0 | | | | |
| 5 | | | | clayey SAND, fine and med. sand med. dense, light grey to grey | SC | 7.5 | | 5.0 | 236 | Hydrocarbon odor in grey material. |
| | | | | sandy CLAY, fine to med. sand 10% soft, med. plasticity, damp, grey | CL | 9.4 | | 10.0 | 53 | |
| 10 | | | | clayey SAND, same as above. | SC | | | 12.5 | 12 | |
| | | | | | | | | 150 | 1 | |
| 15 | | | | 15.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. SB-7
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-7
LOGGED BY: S.K. GWL: depth dry date/time 9/19/94 1748
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 1615 DATE/TIME COMPLETION(S): 9/19/94 1715
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| - | | | | SAND, coarse to very coarse, loose, damp, light brown well graded. | SW | 4.5 | | 4.5 | 43 | color turns to grey at 3.6 ft. grey material has hydrocarbon odor. |
| 5 | | | | clayey SAND, fine and med. sand 10%, soft, low plasticity, med dense, light grey to grey | SC | | | 10.0 | 150 | Occasional Layers of coarse sand 4"-8" thick<br>Hydrocarbon odor |
| 10 | | | | | | 12.3 | | 12.3 | 176 | |
| | | | | same as above, but light brown in color | SC | | | 15.0 | 11 | No Hydrocarbon odor |
| 15 | | | | 15.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION


Borehole No. SB8
Well No.

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB8
LOGGED BY: SK GWL: depth 11.1 dry date/time 9/19/94 1750
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 1715 DATE/TIME COMPLETION (S): 9/19/94 1800
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| - | | | | SAND, coarse to very coarse, loose, damp, light brown, well graded. | SW | | | | | |
| | | | | SK 9/19/94 | | 4.4 | | 5.0 | 4 | Grey material has hydrocarbon odor. |
| 5 | | | | clayey ~~SAND~~, fine to med. sand ~~10%~~, med. dense, grey to black SK 9/19/94 | SC | | | | | |
| | | | | | | 9.3 | | 8.0 | 159 | |
| | | | | sandy CLAY, fine to med. sand 10%, stiff, grey | CL | | | | | This layer has occasional layers of coarse sand 4"-8" thick. |
| 10 | | | | | | | | 12.0 | 202 | |
| | | | | | | | | | | |
| | | | | | | | | 15.0 | 96 | |
| 15 | | | | 15.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE _____

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-9
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: ####
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/24/95, 0845
Date/Time Completed: 4/24/95, 1000

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to coarse, loose, light brown, damp, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| | | 6.5 - 8.5 | .5/2.0 | | | 7.5 | | | | |
| 10 | | 8.5 - 10.5 | .7/2.0 | silty CLAY, soft, med. plasticity, light brown, damp, some fine organics- roots | CL | 10 | | | 0 | at 8.5 |
| | | 10.5 - 12.5 | 1.1/ 2 | sandy CLAY, med to fine sand - 30%, soft light brown, some fine organics, damp | CL | | | | 0 | at 10.5 |
| | | 12.5 - 14.5 | .5/2.0 | | | | | | 0 | at 12.5 |
| 15 | | 14.5 - 16.5 | .5/2.0 | | | 15 | | | 0 | at 14.5 |
| | | | | SAND, med to coarse, loose, light brown trace clay to some clay, wet, well graded | SW | | | | 0 | at 16.5 |
| | | | | BOH at 16.5 | | | | | | Water at 13.7' in augers after drilling. |
| 20 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

Geologist Signature

5/4/95\SB9LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-10
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: ####
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/24/95, 1045
Date/Time Completed: 4/24/95, 1130

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to coarse, loose, light brown, damp, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| | | 7.0 - 8 | .4/2.0 | | | | | | | |
| 10 | | 9.0 - 11 | 1.3/ 2 | | | 9.9 | | | 6 | at 9.0 |
| | | 11.0 - 13 | 1.2/ 2 | Silty CLAY, 25% silt, soft, grey, damp, hydrocarbon odor | CL | 10.5 | | | 508 | at 11.0 |
| | | 13.0 - 15 | .8/2.0 | Clayey SAND, fine to med sand, grey, damp, hydrocarbon odor | SW-SC | 11.9 | | | 23 | at 13.0 |
| 15 | | 15.0 - 17 | | Silty CLAY, same as above, but firm, hydrocarbon odor, with some sandy intervals .1' to .2' thick | CL | 16.5 | | | 2788 | at 15.0 |
| | | | | SAND, fine to med, loose, olive grey, wet, hydrocarbon odor | SW | | | | 3703 | at 17.0 PID reads "overrange" at 15.0 and 17.0. |
| 20 | | | | BOH at 17.0 | | | | | | Water encountered at approx. 16.5 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

5/4/95\SB10LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-11
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3001
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/24/95, 1245
Date/Time Completed: 4/24/95, 1330

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to coarse, loose, light brown, damp, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| | | 6.5 - 8.5 | .5/2.0 | | | 8 | | | | |
| | | | | clayey SAND, fine sand, med density | SP-SC | | | | | |
| 10 | | 8.5 - 11 | .75/ 2 | damp, grey-olive, less clay toward 11.0. Hydrocarbon odor | | | | | 66 | at 9.0 |
| | | 10.5 - 12.5 | 0.35 2 | | | | | | 4526 | at 11.0 |
| | | 12.5 - 14.5 | | | | | | | 3871 | at 13.0 |
| 15 | | 14.5 - 16.5 | .2/2.0 | | | 16 | | | | |
| | | | | SAND, med to fine, loose, wet, olive grey | SW | | | | | |
| | | 16.5 - 18.5 | 1.4/ 2 | strong hydrocarbon odor, oily sheen, has some clay rich layers | | | | | 2000 | at 16.5 |
| 20 | | | | BOH at 18.5 | | | | | 21 | at 18.5 |
| | | | | | | | | | | PID reads "overrange" at 11.0, 13.0 and 16.5. |
| 25 | | | | | | | | | | At apprx. 17.0', color turns to light brown. |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

*Geologist Signature*

5/4/95\SB11LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-12
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3000
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/24/95, 1415
Date/Time Completed: 4/24/95, 1500

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to coarse, loose, light brown, damp, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| | | 7.0 - 9 | .7/2.0 | | | 8.5 | | | | |
| 10 | | 9.0 - 11 | .7/2.0 | *same as above, with hydrocarbon odor, more fines* | | 9.5 | | | 909 | at 9.0 |
| | | 11.0 - 13 | .9/2.0 | sandy CLAY, 25% fine sand, soft, low plasticity, olive grey, damp, hydrocarbon odor | CL | 12.5 | | | 2066 | at 11.0 |
| 15 | | 14.0 - 16 | | SAND, fine, 15% silt, loose, olive grey, damp, hydrocarbon odor | SW | 15 | | | 2624 | at 13.0 |
| | | | | same as above with more clay, olive brown | | | | | | |
| | | | | BOH at 16.0' | | | | | 4 | at 16.0 |
| 20 | | | | | | | | | | |
| | | | | | | | | | | PID reads "overrange" at 11.0, 13.0 and 16.5. |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

Geologist Signature

5/4/95\SB12LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-13
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield Tank
Project Number 13023 Phase 3001
Project Location 5th St. and Blanco Blvd, Bloomfield, NM

Elevation
Borehole Location
GWL Depth
Logged By S.Kelly
Drilled By M. Donohue
Date/Time Started 4/25/95, 0850
Date/Time Completed 4/25/95, 1015

Well Logged By S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site
Client Personnel On-Site

Drilling Method HSA
Air Monitoring Method PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | silty SAND, med to fine sand, 5% silt loose, light brown, damp, well graded | SW | | | | | |
| 5 | | | | | | | | | 0 | at 5.0 |
| | | 6.5 - 8.5 | .95/ 2 | | | | | | 0 | at 8.5 |
| 10 | | 8.5 - 10.5 | .4/2.0 | becomes richer in clay - approx. 10% at 10.5' | | | | | 0 | at 10.5 |
| | | 10.5 - 12.5 | .65/ 2 | Has some intervals richer in clay, some | | | | | | |
| | | 12.5 - 14.5 | No rec. | richer in sand, difficult to see due to poor recovery. | | | | | | |
| 15 | | 14.5 - 16.5 | .7/2.0 | | | | | | 1 | at 16.5 |
| | | 16.5 - 18.5 | .6/2.0 | | | 19 | | | 3 | at 18.5 |
| 20 | | 19.0 - 21 | .8/2.0 | CLAY, soft, med plasticity, light brown damp, grading to sandy clay at 21.0 with 25% fine sand | CL | | | | 3 | at 21.0 |
| | | 21.0 - 23 | | silty SAND, fine to med sand, loose, light brown, wet, well graded | SP-SM | 22 | | | | Water at approx. 21.5. |
| 25 | | | | BOH at 23.0 | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

5/4/95\SB13LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-14
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3000
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/25/95, 1110
Date/Time Completed: 4/25/95, 1210

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
*Client Personnel On-Site:*

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded occasionally includes some clay | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9.5 - 12 | .4/2.0 | | | | | | | |
| | | 11.5 - 13.5 | .65/ 2 | | | 13 | | | 3 | at 11.5 |
| | | 13.5 - 15.5 | .35/ 2 | silty CLAY, 15% silt, firm, low plasticity, light brown, moist | CL | | | | 3 | at 13.5 |
| 15 | | 15.5 - 17.5 | .8/2.0 | | | 17 | | | 4 | at 15.5 |
| | | 17.5 - 19.5 | .65/ 2 | clayey SAND, 10% clay, loose, light brown, moist, well graded | SC | 18.5 | | | 4 | at 17.5 |
| 20 | | 19.5 - 21.5 | | silty CLAY, same as above | CL | | | | 3 | at 19.5 |
| | | 21.5 - 23.5 | 1.3/ 2 | | | 22.5 | | | 3 | at 21.5 Med. sand layer at |
| | | 23.5 - 25.5 | 1.0/ 2 | silty CLAY, 15% silt, 5% fine sand, firm, non-plastic, light olive grey, moist | CL | 23.5 | | | 4 | at 23.5 apprx. 21.5 |
| 25 | | | | SAND, fine to med sand, 15% silt, loose, light brown, wet, poorly graded | SW-SM | | | | | to 22.5, wet |
| | | | | BOH at 25.5 | | | | | | Water at approx. 21.5 |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-15
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3000
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/25/95, 1330
Date/Time Completed: 4/25/95, 1430

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9.5 - 12 | .4/2.0 | increasing clay content toward 11.5' to approx. 5% | | | | | | |
| | | 11.5 - 13.5 | .65/ 2 | | | 13 | | | 6 | at 11.5 |
| 15 | | 13.5 - 15.5 | .35/ 2 | silty CLAY, 15% silt, 5% fine sand, soft non plastic, light brown, moist | CL | 15.5 | | | 3 | at 13.5 |
| | | 15.5 - 17.5 | .8/2.0 | silty SAND, med to fine sand, 5% silt, loose, dark olive grey, wet with oily sheen | SW-SM | | | | 3 | at 15.5 |
| | | 17.5 - 19.5 | .65/ 2 | hydrocarbon odor | | 17.3 | | | 382 | at 17.5 |
| 20 | | | | sandy SILT, 10% fine sand, 5% clay,soft, light brown, moist | ML | | | | 3 | at 19.5 |
| | | | | BOH at 19.5 | | | | | | |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

5/4/95\SB15LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-16
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3001
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/25/95, 1515
Date/Time Completed: 4/25/95, 1600

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9.5 - 12 | .4/2.0 | | | 11 | | | | |
| | | 11.5 - 13.5 | .65/ 2 | silty CLAY, 15% silt, soft, light brown, moist | CL | 13.4 | | | 1 | at 11.5 |
| | | 13.5 - 15.5 | .35/ 2 | same as above but dark grey color, in 15.5 to 17.5 sample, color appears to be mottled brown/grey. | CL | | | | 1142 | at 13.5 |
| 15 | | 15.5 - 17.5 | .8/2.0 | | | | | | 586 | at 15.5 |
| | | 17.5 - 19.5 | .65/ 2 | | | | | | 231 | at 17.5 |
| 20 | | | | | | 21 | | | 134 | at 19.5 |
| | | 21.5 - 23.5 | | SAND, med to fine sand, 5% silt, loose, light brown, wet, well graded | SW | | | | | |
| | | | | BOH at 23.5 | | | | | 4 | at 23.5 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-17
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield Tank
Project Number 13023 Phase 3001
Project Location 5th St. and Blanco Blvd, Bloomfield, NM

Elevation
Borehole Location
GWL Depth
Logged By S.Kelly
Drilled By M. Donohue
Date/Time Started 4/26/95, 0900
Date/Time Completed 4/26/95, 1030

Well Logged By S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site
Client Personnel On-Site

Drilling Method HSA
Air Monitoring Method PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9 11 | .35/ 2 | | | | | | | |
| | | 11.0 - 13 | .25/ 2 | | | 13 | | | 1 | at 11.0 |
| | | 13.0 - 15 | .3/2.0 | silty CLAY, 25% silt, stiff, low plasticity, light brown, moist, some small pockets of | CL | | | | 1 | at 13.0 |
| 15 | | 15.0 - 17 | .7/2.0 | med sand | | 16.5 | | | 4 | at 15.0 |
| | | 17.0 - 19 | .8/2.0 | silty SAND, fine to med sand, loose, dark olive grey, moist, well graded, hydrocarbon odor | SW-SM | 18.5 | | | 1601 | at 17.0 |
| 20 | | 19.0 - 21 | .5/2.0 | silty CLAY, same as above, but with 20% fine sand | CL | | | | 19 | at 19.0 |
| | | 21.0 - 23 | .5/2.0 | | | 22 | | | 5 | at 21.0 |
| | | 23.0 - 25 | 2.0/ 2 | silty SAND, fine sand, 15% silt, 5% clay, dense, light greyish brown, moist | SW-SM | 24.4 | | | 4 | at 23.0 Water at |
| 25 | | | | silty CLAY, same as above | CL | | | | 2 | at 24.0 apprx 22.5' |
| | | | | BOH at 25.0 | | | | | 2 | at 25.0 grades to med sand toward 25.0' |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

Geologist Signature

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-18
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield Tank
Project Number 13023 Phase 3000
Project Location 5th St. and Blanco Blvd, Bloomfield, NM

Elevation
Borehole Location
GWL Depth
Logged By S.Kelly
Drilled By M. Donohue
Date/Time Started 4/26/95, 1040
Date/Time Completed 4/26/95, 1130

Well Logged By S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site
Client Personnel On-Site

Drilling Method HSA
Air Monitoring Method PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9 11 | .2/2.0 | | | 11 | | | | |
| | | 11.0 - 13 | .4/2.0 | same as above, but with 10% clay | | | | | 1 | at 11.0 |
| | | 13.0 - 15 | .4/2.0 | | | 14.5 | | | 1 | at 13.0 |
| 15 | | 15.0 - 17 | .55/ 2 | silty CLAY, 20% silt, stiff, low plasticity, light brown, moist | | 17 | | | 1 | at 15.0 |
| | | 17.0 - 19 | .9/2.0 | clayey SAND, same as silty CLAY above, but with med sand | | | | | 435 | at 17.0 |
| 20 | | 19.0 - 21 | .85/ 2 | | | | | | 4 | at 19.0 |
| | | | | BOH at 21.0 | | | | | 1 | at 21.0 |
| 25 | | | | | | | | | | organic matter present at 17.0', also .25" to.5" black beds have hydrocarbon odor, black beds are present over a .3' interval down from 17' |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

Geologist Signature

5/4/95\SB18LOG.XLS

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-19
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield Tank
Project Number 13023 Phase 3000
Project Location 5th St. and Blanco Blvd, Bloomfield, NM

Elevation
Borehole Location
GWL Depth
Logged By S.Kelly
Drilled By M. Donohue
Date/Time Started 4/26/95, 1230
Date/Time Completed 4/26/95, 1330

Well Logged By S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site
Client Personnel On-Site

Drilling Method HSA
Air Monitoring Method PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | | |
| 5 | | | | | | | | | | | |
| 10 | | 9 11 | .4/2.0 | | | 10.5 | | | | | |
| | | 11.0 - 13 | .5/2.0 | silty CLAY, 10% silt, firm, non-plastic, light brown, moist | CL | 13 | | | 2 | at 11.0 | |
| | | 13.0 - 15 | .2/2.0 | silty SAND, fine to med sand, 5% silt, loose, light brown, moist, well graded | SW-SM | | | | 2 | at 13.0 | |
| 15 | | 15.0 - 17 | .7/2.0 | | | 17 | | | 4 | at 15.0 | med sand layer at aprx 16.0, aprx 1.0' thick |
| | | 17.0 - 19 | .85/ 2 | silty CLAY, same as above | CL | | | | 2 | at 17.0 | |
| 20 | | 19.0 - 21 | .9/2.0 | | | 20.8 | | | 2 | at 19.0 | some grey mottling at aprx 17.0' |
| | | 21.0 - 23 | 2.0/ 2 | silty SAND, same as above | SW-S | 22.3 | | | 2 | at 21.0 | |
| | | | | silty CLAY, same as above | CL | | | | | | |
| | | | | BOH at 23.0 | | | | | 2 | at 23.0 | med to coarse sand layer from 21' to 22.4'. 5% silt, well graded, photo 12 |
| 25 | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |

**Comments:**

**Geologist Signature**

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-20
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3000
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/27/95, 0900
Date/Time Completed: 4/27/95, 1000

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9 ### | .4/2.0 | | | | | | | |
| | | 11.0 - 13 | .75/ 2 | | | | | | 0 | at 11.0 |
| | | 13.0 - 15 | .9/2.0 | | | 14.2 | | | 1 | at 13.0 |
| 15 | | 15.0 - 17 | .7/2.0 | silty CLAY, 20% silt, firm, non-plastic, light brown, moist. | | 16.8 | | | 1 | at 15.0 |
| | | 17.0 - 19 | .9/2.0 | SAND, same as above, moist, turning to wet | | | | | 1 | at 17.0 |
| 20 | | 19.0 - 21 | | BOH at 21.0 | | | | | 1 | at 19.0 coarse to med sand layer, wet, from approx. 17.0' to 18.5 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

# RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-21
Well #
Page 1 of 1

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name: Giant Bloomfield Tank
Project Number: 13023 Phase: 3000
Project Location: 5th St. and Blanco Blvd, Bloomfield, NM

Elevation:
Borehole Location:
GWL Depth:
Logged By: S.Kelly
Drilled By: M. Donohue
Date/Time Started: 4/27/95, 1015
Date/Time Completed: 4/27/95, 1115

Well Logged By: S. Kelly
Personnel On-Site: M. Donohue, K. Padilla
Contractors On-Site:
Client Personnel On-Site:

Drilling Method: HSA
Air Monitoring Method: PID, CGI

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med to fine sand, loose light brown, dry, well graded | SW | | | | | |
| 5 | | | | | | | | | | |
| 10 | | 9 11 | .5/2.0 | | | 10.7 | | | | |
| | | 11.0 - 13 | .8/2.0 | silty CLAY, 20% silt, soft, low plasticity, light brown, moist | CL | | | | 3 | at 11.0 |
| | | 13.0 - 15 | .9/2.0 | | | | | | 3 | at 13.0 |
| 15 | | 15.0 - 17 | .4/2.0 | 14.4 to 14.8 is a layer with 10% med sand with some organic matter | | | | | 1 | at 15.0 |
| | | 17.0 - 19 | .6/2.0 | | | 19 | | | 3 | at 17.0 |
| 20 | | 19.0 - 21 | 1.1/ 2 | SAND, med to fine sand, 10% silt, loose, light brown, wet, well graded | SW | | | | 3 | at 19.0 |
| | | | | BOH at 21 | | | | | 1 | at 21.0 |
| 25 | | | | | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

**Comments:**

**Geologist Signature**

# APPENDIX B

## "MONITORING WELL INSTALLATION RECORD" AND "RECORD OF SUBSURFACE EXPLORATION" FORMS

# MONITORING WELL INSTALLATION RECORD

**Burlington Environmental Inc.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Borehole # _____
Well # MW-1
Page 1 of 1

Project Name GIANT - BLOOMFIELD
Project Number 13023 Phase 0077
Project Location 5TH AND BLANCO STREETS

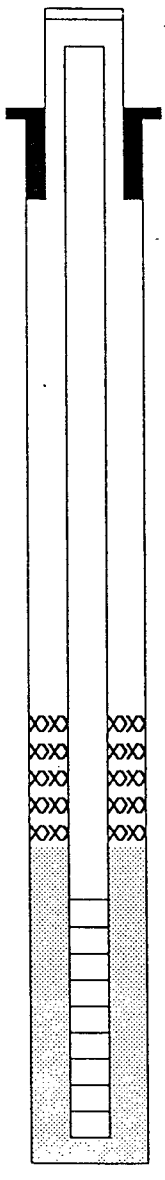
Elevation _____
Well Location _____
GWL Depth _____
Installed By RODGERS DRILLING

On-Site Geologist SARAH KELLY
Personnel On-Site _____
Contractors On-Site RODGERS
Client Personnel On-Site _____

Date/Time Started 9/20/94 0730
Date/Time Completed 9/20/94 1130

Depths in Reference to Ground Surface

| Item | Material | Depth (feet) |
|---|---|---|
| Top of Protective Casing | | 0.0 |
| Bottom of Protective Casing | | |
| Top of Permanent Borehole Casing | | |
| Bottom of Permanent Borehole Casing | | |
| Top of Concrete | NEAT CEMENT WITH 5% BENTONITE | 0.0 |
| Bottom of Concrete | | -1.2 |
| Top of Grout | | |
| Bottom of Grout | | |
| Top of Well Riser | PVC | -0.0 |
| Bottom of Well Riser | PVC | -3.5 |
| Top of Well Screen | PVC | -3.5 |
| Bottom of Well Screen | PVC | -13.5 |
| Top of Peltonite Seal | BENTONITE PELLETS | -1.2 |
| Bottom of Peltonite Seal | BENTONITE PELLETS | -2.5 |
| Top of Gravel Pack | CSSI, 10-20 SAND | -2.5 |
| Bottom of Gravel Pack | CSSI, 10-20 SAND | -14.0 |
| Top of Natural Cave-In | | |
| Bottom of Natural Cave-In | | |
| Top of Groundwater | | DRY |
| Total Depth of Borehole | | -14.0 |



Top of Protective Casing 0.0
Top of Riser -0.2
Ground Surface 0.0
Top of Seal -1.2
Top of Gravel Pack -1.2
Top of Screen -3.5
Bottom of Screen -13.5
Bottom of Borehole -14.0

Comments: _____

Geologist Signature _____

JAL_MW2.WK1

# MONITORING WELL INSTALLATION RECORD

**Burlington Environmental Inc.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Borehole # _____
Well # MW-2
Page 1 of 1

Project Name GIANT - BLOOMRIELD
Project Number 13023 Phase 0077
Project Location 5TH AND BLANCO STREETS

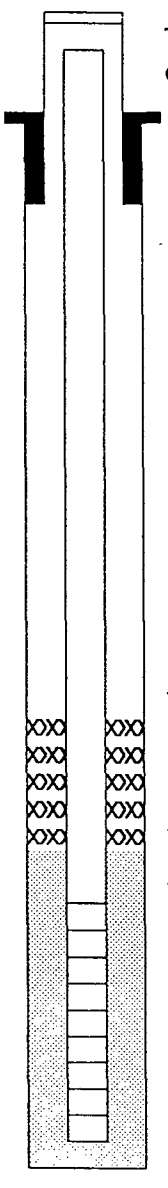
Elevation _____
Well Location _____
GWL Depth _____
Installed By RODGERS DRILLING

Date/Time Started 9/20/94 1250
Date/Time Completed 9/20/94 1530

On-Site Geologist SARAH KELLY
Personnel On-Site _____
Contractors On-Site RODGERS
Client Personnel On-Site _____

## Depths in Reference to Ground Surface

| Item | Material | Depth (feet) |
|---|---|---|
| Top of Protective Casing | | -0.0 |
| Bottom of Protective Casing | | |
| Top of Permanent Borehole Casing | | |
| Bottom of Permanent Borehole Casing | | |
| Top of Concrete | NEAT CEMENT WITH 5% BENTONITE | -0.0 |
| Bottom of Concrete | NEAT CEMENT WITH 5% BENTONITE | -2.0 |
| Top of Grout | | |
| Bottom of Grout | | |
| Top of Well Riser | PVC | -0.2 |
| Bottom of Well Riser | PVC | -3.7 |
| Top of Well Screen | PVC | -3.7 |
| Bottom of Well Screen | PVC | -18.7 |
| Top of Peltonite Seal | BENTONITE PELLETS | -2.0 |
| Bottom of Peltonite Seal | BENTONITE PELLETS | -2.5 |
| Top of Gravel Pack | CSSI 10-20 SAND | -2.5 |
| Bottom of Gravel Pack | CSSI 10-20 SAND | -19.0 |
| Top of Natural Cave-In | | |
| Bottom of Natural Cave-In | | |
| Top of Groundwater | | -13.35 |
| Total Depth of Borehole | | -19.0 |



Top of Protective Casing 0.0
Top of Riser -0.2
Ground Surface 0.0
Top of Seal -2.0
Top of Gravel Pack -2.5
Top of Screen -3.7
Bottom of Screen -18.7
Bottom of Borehole -19.0

Comments: _____

Geologist Signature _____

JAL_MW2.WK1

# MONITORING WELL INSTALLATION RECORD

Borehole # _____
Well # MW-3
Page 1 of 1

**Burlington Environmental Inc.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name GIANT - BLOOMFIELD
Project Number 13023 Phase 0077
Project Location 5TH AND BLANCO STREETS

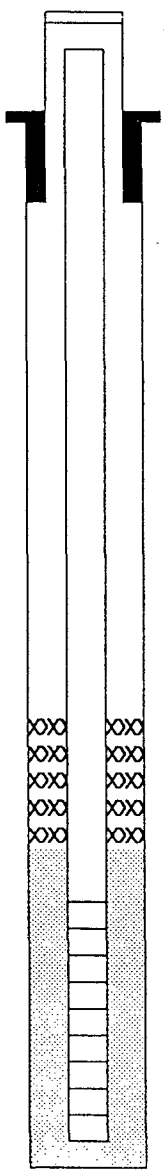
Elevation _____
Well Location _____
GWL Depth _____
Installed By RODGERS DRILLING

On-Site Geologist SARAH KELLY
Personnel On-Site _____
Contractors On-Site RODGERS
Client Personnel On-Site _____

Date/Time Started 9/20/94 1600
Date/Time Completed 9/20/94 1820

## Depths in Reference to Ground Surface

| Item | Material | Depth (feet) |
|---|---|---|
| Top of Protective Casing | | -0.0 |
| Bottom of Protective Casing | | |
| Top of Permanent Borehole Casing | | |
| Bottom of Permanent Borehole Casing | | |
| Top of Concrete | NEAT CEMENT WITH 5% BENTONITE | -0.0 |
| Bottom of Concrete | NEAT CEMENT WITH 5% BENTONITE | -2.0 |
| Top of Grout | | |
| Bottom of Grout | | |
| Top of Well Riser | PVC | -0.2 |
| Bottom of Well Riser | PVC | -3.7 |
| Top of Well Screen | PVC | -3.7 |
| Bottom of Well Screen | PVC | -18.7 |
| Top of Peltonite Seal | BENTONITE PELLETS | -2.0 |
| Bottom of Peltonite Seal | BENTONITE PELLETS | -2.5 |
| Top of Gravel Pack | CSSI 10-20 SAND | -2.5 |
| Bottom of Gravel Pack | CSSI 10-20 SAND | -19.0 |
| Top of Natural Cave-In | | |
| Bottom of Natural Cave-In | | |
| Top of Groundwater | | -14.39 |
| Total Depth of Borehole | | -19.0 |



Top of Protective Casing 0.0
Top of Riser -0.2
Ground Surface 0.0
Top of Seal -2.0
Top of Gravel Pack -2.5
Top of Screen -21.3
Bottom of Screen -26.3
Bottom of Borehole -26.5

Comments: _____

Geologist Signature _____

JAL_MW2.WK1

# MONITORING WELL INSTALLATION RECORD

Borehole # _____
Well # MW-4
Page 1 of 1

**Burlington Environmental Inc.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name GIANT - BLOOMFIELD
Project Number 13023 Phase 0077
Project Location 5TH AND BLANCO STREETS

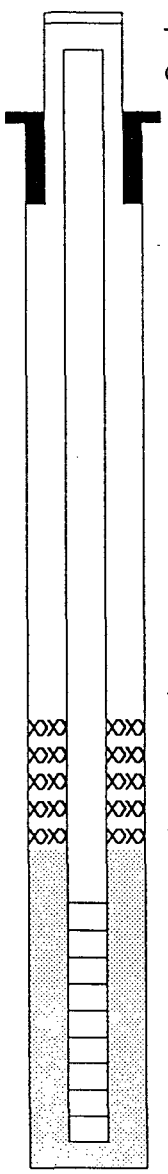
Elevation _____
Well Location _____
GWL Depth _____
Installed By RODGERS DRILLING

On-Site Geologist SARAH KELLY
Personnel On-Site _____
Contractors On-Site RODGERS
Client Personnel On-Site _____

Date/Time Started 9/21/94 0730
Date/Time Completed 9/21/94 1600

## Depths in Reference to Ground Surface

| Item | Material | Depth (feet) |
|---|---|---|
| Top of Protective Casing | | 0.0 |
| Bottom of Protective Casing | | |
| Top of Permanent Borehole Casing | | |
| Bottom of Permanent Borehole Casing | | |
| Top of Concrete | NEAT CEMENT WITH 5% BENTONITE | 0.0 |
| Bottom of Concrete | NEAT CEMENT WITH 5% BENTONITE | -6.0 |
| Top of Grout | | |
| Bottom of Grout | | |
| Top of Well Riser | PVC | -0.2 |
| Bottom of Well Riser | PVC | -21.3 |
| Top of Well Screen | PVC | -21.3 |
| Bottom of Well Screen | PBC | -26.3 |
| Top of Peltonite Seal | BENTONITE PELLETS AND POWDER | -6.0 |
| Bottom of Peltonite Seal | BENTONITE PELLETS AND POWDER | -21.0 |
| Top of Gravel Pack | CSSI, 10-20 SAND | -21.0 |
| Bottom of Gravel Pack | CSSI, 10-20 SAND | -26.5 |
| Top of Natural Cave-In | | |
| Bottom of Natural Cave-In | | |
| Top of Groundwater | | -13.28 |
| Total Depth of Borehole | | -26.5 |



Top of Protective Casing 0.0
Top of Riser -0.2
Ground Surface 0.0
Top of Seal -6.0
Top of Gravel Pack -21.0
Top of Screen -21.3
Bottom of Screen -26.3
Bottom of Borehole -26.5

Comments: _____

Geologist Signature _____

JAL_MW2.WK1

# MONITORING WELL INSTALLATION RECORD

Borehole # _____
Well # MW-5
Page 1 of 1

**Philip Environmental Services Corporation**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield
Project Number 13023 Phase 3000
Project Location _____

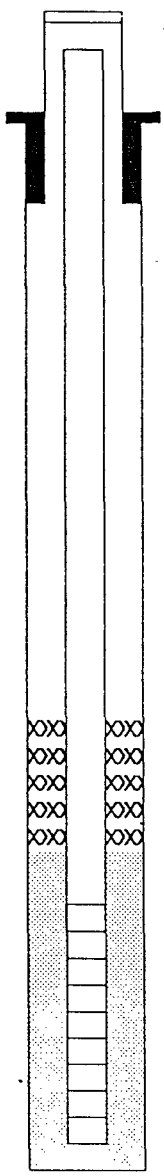
Elevation _____
Well Location _____
GWL Depth _____
Installed By _____

On-Site Geologist S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site _____
Client Personnel On-Site _____

Date/Time Started 5/2/95, 1000
Date/Time Completed 5/2/95, 1120

Depths in Reference to Ground Surface

| Item | Material | Depth (feet) |
|---|---|---|
| Top of Protective Casing | | 0.0 |
| Bottom of Protective Casing | | -1.0 |
| Top of Permanent Borehole Casing | | |
| Bottom of Permanent Borehole Casing | | |
| Top of Concrete | | |
| Bottom of Concrete | | |
| Top of Grout | 3.94# sacks Zia type-II cement | 0.0 |
| Bottom of Grout | " " | 6.0 |
| Top of Well Riser | | |
| Bottom of Well Riser | | 10.0 |
| Top of Well Screen | PVC sch. 40 .010 slot | 10.0 |
| Bottom of Well Screen | " " | 25.0 |
| Bentonite Top of ~~Peltonite~~ Seal | 2 50# bucket 1/4 bent. pellets | 6.0 |
| Bentonite Bottom of ~~Peltonite~~ Seal | " " | 7.8 |
| Top of Gravel Pack | 19 50# sacks 10-20 CSSI Sand | 7.8 |
| Bottom of Gravel Pack | " " | 23.5 |
| Top of Natural Cave-In | | 23.5 |
| Bottom of Natural Cave-In | | 25.0 |
| Top of Groundwater | | |
| Total Depth of Borehole | | 25.0 |



Top of Protective Casing 0.0
Top of Riser -.45
Ground Surface 0.0
Top of Seal -6.0
Top of Gravel Pack -7.8
Top of Screen -100
Bottom of Screen -25.0
Bottom of Borehole -25.0

Comments: Well end cap - PVC is .53' from bottom of end cap to beginning of slotting.

Geologist Signature Sarah Kelly

JAL_MW2.WK1

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No.
Well No. MW-1

PROJECT NAME: Giant - Bloomfield PROJECT NO: 1302 3
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: _____
LOGGED BY: SK GWL: depth _____ date/time _____
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/BIG METHODS: HSA
DATE/TIME STARTED: SK 9/20/94 9/19/94 0730 DATE/TIME COMPLETION (S): 9/20/94 0930
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION (CLASSIFICATION SYSTEM: USCS) | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med. - 30% to very coarse 70%, loose, damp, light brown, well graded, angular to sub-angular. | SW | | | 5.0 | Z | |
| 5 | | | 3.2/5.0 | | | | | | | |
| | | | | 9.7 | | 9.7 | | 10.0 | 239 | |
| 10 | | | 3.2/5.0 | sandy CLAY, 20% fine to med. sand soft, med plasticity, light brown damp. | CL | 12.0 | | 13.0 | 180 | 5 Hydrocarbon odor 13.7 to 14.6 - med. to coarse sand. subangular 10% clay. SP. |
| | | | | same as above but dk. grey | CL | 14.5 | | 15.0 | 78 | |
| 15 | | | | same as above but light brown | | 15.0 | | 18.0 | 4 | |
| | | | 3.1/5.0 | clayey SAND, fine to med 60%, coarse 40%, trace fines, loose damp, light brown, poorly graded angular to subangular. | SC | 18.0 | | 20.0 | 42 | |
| 20 | | | | sandy CLAY, 10% fine sand, stiff, low plasticity, light brown, damp | | 21.0 | | 20.5 | 24 | |
| | | | | SAND, 40% coarse, 60% fine to med. loose moist, light brown, poorly graded, subang. | SP | 22.0 | | 22.0 | 14 | |
| | | | | B.O.H. at 20.00 (drove sampler to 22.0 ft.) | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE Mark Kelley

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION


Borehole No.
Well No. MW-2

PROJECT NAME: Giant-Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: _____
LOGGED BY: S.K. GWL: depth 13.35 date/time 9/20/94 1800.
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/19/94 9/20/94 1255 DATE/TIME COMPLETION (S): 9/20/94 1430
SK 9/20/94
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHANG (feet) | AIR MONITORING UNITS ppm<br>BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | 3.9/5.0 | | SAND, very coarse 30%, med and fine 70%, trace fine gravel, loose, damp, light brown w/some rust staining, poorly graded, sub angular | SP | | 0.0 | 5.0 | 1 | |
| 5 | | | | SK 9/20/94 | | 7.8 9.8 | | 9.5 | 535 | Hydrocarbon odor coarse sand layer from 9.2' to 9.8' contains same material as 1st layer. Clay rich layer for lost core? |
| 10 | | 2.5/5.0 | | clayey SAND, 25% fines, fine to med. sand, soft, damp, light grey, | | | | | | |
| | | | | same as above, still grey. | SC | | 0.0 | 0.0<br>15.0 | 112 | Layer with coarse sand from 15.0 to 14.8. Hydrocarbon odor. |
| 15 | | 3.2/5.0 | | | | | | | | |
| | | | | sandy CLAY, 20% fine sand, soft, damp, olive, low plasticity | CL | 19.0 | | 19.0<br>20.0 | 10<br>9 | |
| 20 | | | | 20.0 BOH | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE Sarah Kelly

BURLINGTON ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

# RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No.
Well No. MW-3

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: _____
LOGGED BY: S.K. GWL: depth ~~13.35~~ TOC date/time 9/20/94 1800.
DRILLED BY: Rodgers GWL: depth 14.39' TOC date/time _____
DRILLING/RIG METHODS: HSA SK 9/20/94
DATE/TIME STARTED: 9/20/94 1600 DATE/TIME COMPLETION(S): 9/20/94 1730.
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION<br>CLASSIFICATION SYSTEM: USCS | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3.8/5.0 | SAND, 20% very coarse, 80% fine to med, loose, light brown, dry, poorly graded, angular | SP | 4.7 | 0.0 | 0.0<br>5.0 | .5 | |
| 5 | | | 3.5/5.0 | clayey SAND, fine to med. sand 25% fines, soft, light brown, poorly graded, damp. | SC | | 0.0 | 0.0 | | |
| 10 | | | 3.9/5.0 | sandy CLAY, 20% fine to med sand, soft to stiff, light olive, damp, med. plasticity. | CL | 11.5<br>13.5 | | 10.0 | .7 | |
| 15 | | | 3.8/5.0 | clayey SAND, same as above moist. | SC | 16.6 | | 15.0 | 1.0 | |
| | | | | same as above, but with 40% coarse to very coarse sand, angular. wet | SC | 19.7 | | | | |
| 20 | | | | sandy CLAY, same as above | CL | | | 20.0 | 1.0 | |
| | | | | B.O.H. at 20.0 | | | | | | |

COMMENTS: _____

GEOLOGIST SIGNATURE Sarah Kelly

BURLINGTON ENVIRONMENTAL
4000 Monroe Road
Farmington, NM 87401

SK 9/21/9

# RECORD OF SUBSURFACE EXPLORATION


Borehole No.
Well No. MW-4

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: _____
LOGGED BY: SK GWL: depth 13.28' date/time 9/23/94
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/RIG METHODS: HSA
DATE/TIME STARTED: 9/21/94 0730 DATE/TIME COMPLETION (S): 9/21/94 1330
AIR MONITORING TYPE: PID BZ = Breathing Zone; BH = Borehole; S = Sample

| DEPTH (feet) | SAMPLE NUMBER | SAMPLE INTERVAL | SAMP TYPE RECOV. (in) | SAMPLE DESCRIPTION (CLASSIFICATION SYSTEM: USCS) | USCS SYMBOL | DEPTH CHNG (feet) | AIR MONITORING UNITS ppm BZ | BH | S | DRILLING CONDITIONS AND (BLOW COUNTS) |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND - med-30%, very coarse 70% loose dry to damp, light brown, well graded, angular to sub-angular (description from MW-1 log.) | SW | | | | | Augering to 20.0' |
| 5 | | | | | | | 0 | 0 | | |
| 10 | | | | Approx. sandy CLAY, 20% fine to med. sand, soft, med. plasticity, light brown turning to grey, damp (description taken from MW-1 log.) | CL | 10 | | | | |
| 15 | | | | Approx. clayey SAND, 60% fine to med., 40% coarse, trace fines, loose, damp, light brown, poorly graded, angular to sub-angular (description taken from MW-1 log.) | SC | 14.5 | | | | |
| | | | 19.5 | Approx. clayey SAND and sandy CLAY as described above. | CL & SC | 18.0 | | 60 | | Sample recovery poor. Driller says he feels a change at 21.0 |
| 20 | | | 2.4/5.0 | | | 21.0 | | | | |
| | | | | SAND, coarse to very coarse, 5% fines, loose to medium dense, wet, light brown, well graded, angular. | SW | | | | | |
| | | | 23.5 | | | | | | | |
| 25 | | | 3.2/5.0 | | | 26.5 26.0 | SK 9/21/94 | | | At 25.5, or 26 driller felt a change. |
| | | | | sandy CLAY, 30% fine sand, stiff, med plasticity, brown, damp, some plant material. | CL | | | | | |
| | | | 28.5 | 26.5 BOH (sample barrel driven to 28.5.) | | | | | | |
| 30 | | | | | | | | | | |

COMMENTS: Had to stop drilling at 0830 so driller could make an appointment. Resumed drilling at 1330.

GEOLOGIST SIGNATURE Sarah Kelly

# RECORD OF SUBSURFACE EXPLORATION

Borehole # MW-5
Well #
Page of

**Philip Environmental Services Corp.**
4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

Project Name Giant Bloomfield
Project Number 13023 Phase 3000.77
Project Location

Elevation
Borehole Location
GWL Depth
Logged By
Drilled By
Date/Time Started 5/2/95, 0915
Date/Time Completed 5/2/95, 0940.

Well Logged By S. Kelly
Personnel On-Site M. Donohue, K. Padilla
Contractors On-Site
Client Personnel On-Site

Drilling Method HSA
Air Monitoring Method PID

| Depth (Feet) | Sample Number | Sample Interval | Sample Type & Recovery (inches) | Sample Description Classification System: USCS | USCS Symbol | Depth Lithology Change (feet) | Air Monitoring Units: NDU BZ | BH | S | Drilling Conditions & Blow Counts |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | SAND, med. to coarse, loose, light brown, damp well graded. | | | | | | |
| 5 | | | | | | 8.0 | | | | |
| 10 | | | | silty CLAY, non-plastic 15% silt, light brown, damp. | | | | | | At approx 12.0' begins to contain 5% med. sand. |
| 15 | | 15.5-17.3 | 1.8/2.0 | | | | | | 2 | at 17.3 |
| | | | | | | 19.0 | | | 2 | at 19.0 |
| 20 | | 19.0-21.0 | 1.0/2.0 | silty SAND, 5% silt fine sand, loose, light brown, damp, well-graded. Turns to wet. | | | | | | |
| | 23.0 | RTC-25.0 | 1.1/2.0 | | | 24.0 | | | 2 | at 25.0 |
| 25 | | | | silty CLAY, as same as above | | | | | | |
| | | | | BOH 25.0 | | | | | | |
| 30 | | | | | | | | | | |
| 35 | | | | | | | | | | |
| 40 | | | | | | | | | | |

Comments:

Geologist Signature

# APPENDIX C

## "WELL DEVELOPMENT AND PURGING DATA" FORMS

# Well Development and Purging Data

BURLINGTON ENVIRONMENTAL Serial No. WDPD-

☒ Development ☐ Purging

Well Number MW-1

Page 1 of 1

Project Name Giant-Bloomfield | Project Manager Martin Nee | Project No. 13023

Client Company Giant Inc. | Phase.Task No. 0077.77

Site Name | Site Address 5th and Blanco St., Bloomfield

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other

## Water Volume Calculation

Initial Depth of Well (feet) 13.6'

Initial Depth to Water (feet) 13.28'

Height of Water Column in Well (feet) .32'

Diameter (inches): Well 4" Gravel Pack 8"

| Item | Water Volume in Well: Cubic Feet | Water Volume in Well: Gallons | Gallons to be Removed |
|---|---|---|---|
| Well Casing | | .2 | .2 |
| Gravel Pack | | .2 | .2 |
| Drilling Fluids | | | |
| Total | | | .4 |

1 well volume

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | |
| ☒ Temperature Meter | |
| ☐ Other | |

## Water Disposal

into drum on site.

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/23/94 | | | X | | | | 1 gt. | | | | X | X | X | X | Slight hydrocarbon odor. |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Well does not produce sufficient water for sampling.

Developer's Signature(s) Sarah Kelly Date 9/22/94 Reviewer _____ Date _____

Form A0101 Rev. 03/21/94

# Well Development and Purging Data

BURLINGTON ENVIRONMENTAL Serial No. WDPD-

☒ Development ☐ Purging

Well Number MW-2

Page 1 of 1

Project Name Giant-Bloomfield | Project Manager Martin Nee | Project No. 13023

Client Company Giant Inc. | Phase.Task No. 0077.77

Site Name | Site Address

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other

## Water Volume Calculation

Initial Depth of Well (feet) 18.50'

Initial Depth to Water (feet) 13.28'

Height of Water Column in Well (feet) 5.22'

Diameter (inches): Well 4" Gravel Pack 8"

| Item | Water Volume in Well: Cubic Feet | Water Volume in Well: Gallons | Gallons to be Removed |
|---|---|---|---|
| Well Casing | | 3.4 | 3.4 |
| Gravel Pack | | 10.2 | 10.2 |
| Drilling Fluids | | | |
| Total | | | 13.6 |

= 1 well vol.

## Instruments

Serial No. (If applicable)

- ☒ pH Meter — Hydac
- ☐ DO Monitor
- ☒ Conductivity Meter
- ☒ Temperature Meter
- ☐ Other

## Water Disposal

Into 55 gal. drum

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/22/94 | 1250 | | X | | | | 5 | 5 | | | — | — | — | — | very cloudy, brown |
| | 1335 | | X | | | | 10 | 15 | | | — | — | — | — | very cloudy, brown |
| | 1350 | | X | | | | 5 | 20 | | | 67.0 | 6.08 | 4410 | | clearing up, still brown |
| 5K gal 9/22/94 | 1400 | | X | | | | 5 | 25 | | | ↓ | ↓ | ↓ | | ↓ |
| | 1437 | | X | | | | 5 | 30 | | | 65.1 | 6.33 | 4300 | | clear - mostly slightly brown |
| | 1457 | | X | | | | 5 | 35 | | | 65.2 | 6.52 | 4430 | | slightly brown |
| | 1515 | | X | | | | 5 | 40 | | | 64.9 | 6.61 | 4370 | | slightly brown |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments

Developer's Signature(s) Sarah Kelly Date 9/22/94 Reviewer Date

Form A0101 Rev. 03/21/94

# Well Development and Purging Data

BURLINGTON ENVIRONMENTAL Serial No. WDPD-

☒ Development ☒ Purging Well Number MW-3

Page 1 of 1

Project Name Giant - Bloomfield Project Manager Martin Nee Project No. 13023

Client Company Giant Inc. Phase.Task No. 007.77

Site Name _____ Site Address 5th and Blanco St, Bloomfield

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other _____

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other _____

## Water Volume Calculation

Initial Depth of Well (feet) 18.50'

Initial Depth to Water (feet) 13.02'

Height of Water Column in Well (feet) 5.48'

Diameter (inches): Well 4" Gravel Pack 8"

| Item | Water Volume in Well: Cubic Feet | Water Volume in Well: Gallons | Gallons to be Removed |
|---|---|---|---|
| Well Casing | | 3.6 | 3.6 |
| Gravel Pack | 1.4 | 10.7 | 10.7 |
| Drilling Fluids | | | |
| Total | | | 14.3 = 1 well volume |

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | " |
| ☒ Temperature Meter | " |
| ☐ Other _____ | |

## Water Disposal

Into drum on site.

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/23/94 | 1340 | | X | | | | 10 | 10 | | | — | — | — | — | and silty very cloudy |
| | 1415 | | X | | | | 5 | 15 | | | — | — | — | — | cloudy, brown |
| | 1455 | | X | | | | 3 | 18 | | | 70.4 | 7.15 | 3390 | | clearing, |
| | 1506 | | X | | | | 2 | 20 | | | 67.5 | 7.16 | 3320 | SK 9/23 | clear |
| | 1515 | | X | | | | 2 | 22 | | | 66.4 | 7.24 | 3280 | SK 9/23 | " " |
| | 1550 | | | | | 15.15' | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Well bails almost dry after 2 or 3 gals. are removed.

Developer's Signature(s) Daniel Kelley Date 9/23/94 Reviewer _____ Date _____

Form A0101 Rev. 03/21/94

# Well Development and Purging Data

BURLINGTON ENVIRONMENTAL Serial No. WDPD-

☒ Development ☐ Purging

Well Number MW-4

Page 1 of 1

Project Name Giant-Bloomfield | Project Manager Martin Nee | Project No. 13023

Client Company Giant Inc. | Phase.Task No. 0077.77

Site Name | Site Address 5th & Blanco St, Bloomfield

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other

## Water Volume Calculation

Initial Depth of Well (feet) 26.00'

Initial Depth to Water (feet) 14.38'

Height of Water Column in Well (feet) 11.62'

Diameter (inches): Well 4" Gravel Pack 8"

| Item | Water Volume in Well | | Gallons to be Removed |
|---|---|---|---|
| | Cubic Feet | Gallons | |
| Well Casing | | 7.6 | 7.6 |
| Gravel Pack | | 14.0 | 14.0 |
| Drilling Fluids | | | |
| Total | | | 21.6 = 1 well volume |

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | |
| ☒ Temperature Meter | |
| ☐ Other | |

## Water Disposal

Into drum on site

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/23/94 | 0915 | | X | | | | 10 | 10 | | | — | — | — | — | brown, silty |
| | 0930 | | X | | | | 10 | 20 | | | — | — | — | — | brown, silty |
| | 0940 | | X | | | | 5 | 25 | | | 59.1 | 6.31 | 4210 | | " " |
| | 1000 | | X | | | | 10 | 35 | | | 59.9 | 6.60 | 4250 | | " " |
| | 1030 | | X | | | | 10 | 45 | | | 61.9 | 6.84 | 4030 | | clearing up slightly brown |
| | 1045 | | X | | | | 5 | 50 | | | 64.5 | 6.94 | 4020 | | slightly brown |
| | 1100 | | X | | | | 5 | 55 | | | 66.1 | 7.07 | 4140 | | " " |
| | 1120 | | X | | | | 5 | 60 | | | 67.5 | 7.14 | 4120 | | " " |
| ↓ | 1230 | | | | | 17.15 | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Air temperature increased 10°-15° F from 0900 to 1100.

Developer's Signature(s) Sarah Kelly | Date 9/23/94 | Reviewer | Date

Form A0101 Rev. 03/21/94

Took sample using a clean bailer and tape (to decrease the amount of product in the sample) after purging 15 gal

# PHILIP ENVIRONMENTAL Well Development and Purging Data

☐ Development ☒ Purging

Well Number MW-2

Serial No. WDPD-

Page 1 of 1

Project Name Giant - Bloomfield Tank Project Manager Martin Nee

Project No. 13023

Client Company Giant

Phase.Task No. 3000.77

Site Name _____ Site Address _____

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other _____

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other _____

## Water Volume Calculation

Initial Depth of Well (feet) 18.84'

Initial Depth to Water (feet) 13.15' ($H_2O$)

Height of Water Column in Well (feet) 5.69

Diameter (inches): Well 4" Gravel Pack _____

| Item | Water Volume in Well | | Gallons to be Removed |
|---|---|---|---|
| | Cubic Feet | Gallons | |
| Well Casing | | 3.75 | 11.25 |
| Gravel Pack | | | |
| Drilling Fluids | | | |
| Total | | | 12.0 |

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | " " |
| ☒ Temperature Meter | " " |
| ☐ Other _____ | |

## Water Disposal

Into drum onsite.

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/2/95 | 1715 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Depth to water does not include product thickness of
Did not take water quality measurements, water is too oily. After approx.
9 gal. were moved, the water in the bailer ~~did not~~ no longer
had a layer of product on it, but bailer is still very "oily."

Developer's Signature(s) Sarah Kelly Date 5/4/95 Reviewer _____ Date _____

Form A0101 Rev. 03/21/94

# PHILIP ENVIRONMENTAL Well Development and Purging Data

☐ Development ☒ Purging  Well Number MW-3

Serial No. WDPD-

Page 1 of 1

Project Name Giant-Bloomfield Tank  Project Manager Martin Nee  Project No. 13023

Client Company Giant  Phase.Task No. 3000.77

Site Name  Site Address

## Development Criteria

☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other

## Water Volume Calculation

$3, AK

Initial Depth of Well (feet) 18.80'
Initial Depth to Water (feet) 12.68'
Height of Water Column in Well (feet) 6.15'
Diameter (inches): Well 4"  Gravel Pack

| Item | Water Volume in Well: Cubic Feet | Water Volume in Well: Gallons | Gallons to be Removed |
|---|---|---|---|
| Well Casing | | 4.06 | 12.2 |
| Gravel Pack | | | |
| Drilling Fluids | | | |
| Total | | | 12.2 |

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | " " |
| ☒ Temperature Meter | " " |
| ☐ Other | |

## Water Disposal

Into drums.

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/2/95 | 1254 | | X | | | | 5 | 5 | | | 68.5 | 6.71 | 4720 | | Clear |
| | 1303 | | X | | | | 3 | 8 | | | 61.7 | 6.89 | 4260 | | " " |
| | 1309 | | X | | | | 2 | 10 | | | 59.4 | 6.96 | 4230 | | " " |
| AK→ | 1317 | | X | | | | 2 | 12 | | | 60.1 | 7.00 | 4270 | | " " |
| | 1327 | | X | | | | 2 | 14 | | | 59.7 | | 4250 | | " " |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments When water collects in white 5 gal. bucket it appears slightly brown and cloudy.

Developer's Signature(s) Mark Kelly  Date 5/4/95  Reviewer  Date

Form A0101 Rev. 03/21/94

# PHILIP ENVIRONMENTAL Well Development and Purging Data

☐ Development ☒ Purging  Well Number MW-4

Serial No. WDPD-  Page 1 of 1

Project Name Giant - Bloomfield Tank  Project Manager Martin Nee  Project No. 13023

Client Company Giant  Phase.Task No. 3000.77

Site Name _____  Site Address _____

## Development Criteria

- ☒ 3 to 5 Casing Volumes of Water Removal
- ☒ Stabilization of Indicator Parameters
- ☐ Other _____

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other _____

## Water Volume Calculation

Initial Depth of Well (feet) 26.32'

Initial Depth to Water (feet) 13.67'

Height of Water Column in Well (feet) 12.65'

Diameter (inches): Well 4"  Gravel Pack _____

| Item | Water Volume in Well | | Gallons to be Removed |
|---|---|---|---|
| | Cubic Feet | Gallons | |
| Well Casing | | 8.35 | 25 |
| Gravel Pack | | | |
| Drilling Fluids | | | |
| Total | | | 25 |

## Instruments

Serial No. (If applicable)

- ☒ pH Meter — Hydac
- ☐ DO Monitor
- ☒ Conductivity Meter — 〃
- ☒ Temperature Meter — 〃
- ☐ Other _____

## Water Disposal

Into drums onsite.

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/2/95 | 1454 | | X | | | | 10 | 10 | | | 63.7 | 6.97 | 6200 | | Clear |
| | 1510 | | X | | | | 5 | 15 | | | 60.7 | 6.94 | 5780 | | 〃 〃 |
| ↓ | 1520 | | X | | | | 5 | 20 | | | 61.4 | 6.94 | 5730 | | 〃 〃 |
| | 1532 | | X | | | | 5 | 25 | | | 62.4 | 7.01 | 5590 | | 〃 〃 |
| | 1540 | | X | | | | 2 | 27 | | | 61.8 | 7.12 | 5430 | | 〃 〃 |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Sampled at 1555.

Developer's Signature(s) Mark Kelly  Date 5/4/95  Reviewer _____  Date _____

Form A0101 Rev. 03/21/94

# PHILIP ENVIRONMENTAL Well Development and Purging Data

☒ Development ☐ Purging  Well Number MW-5

Serial No. WDPD-  Page 1 of 1

Project Name Giant-Bloomfield Tank  Project Manager Martin Nee  Project No. 13023

Client Company Giant  Phase.Task No. 3000.77

Site Name _____  Site Address _____

## Development Criteria

☒ 3 to 5 Casing Volumes of Water Removal
☒ Stabilization of Indicator Parameters
☐ Other _____

## Methods of Development

| Pump | Bailer |
|---|---|
| ☐ Centrifugal | ☒ Bottom Valve |
| ☐ Submersible | ☐ Double Check Valve |
| ☐ Peristaltic | ☐ Stainless-steel Kemmerer |

☐ Other _____

## Water Volume Calculation

Initial Depth of Well (feet) 24.78
Initial Depth to Water (feet) 14.38
Height of Water Column in Well (feet) 10.4'
Diameter (inches): Well 4" Gravel Pack _____

| Item | Water Volume in Well: Cubic Feet | Water Volume in Well: Gallons | Gallons to be Removed |
|---|---|---|---|
| Well Casing | | 6.8 | 34 |
| Gravel Pack | | | |
| Drilling Fluids | | | |
| Total | | | 34 |

## Instruments

| | Serial No. (If applicable) |
|---|---|
| ☒ pH Meter | Hydac |
| ☐ DO Monitor | |
| ☒ Conductivity Meter | " " |
| ☒ Temperature Meter | " " |
| ☐ Other _____ | |

## Water Disposal

Into drum onsite

## Water Removal Data

| Date | Time | Development Method: Pump | Development Method: Bailer | Removal Rate (gal/min) | Intake Depth (feet) | Ending Water Depth (feet) | Water Volume Removed (gallons): Increment | Water Volume Removed (gallons): Cumulative | Product Volume Removed (gallons): Increment | Product Volume Removed (gallons): Cumulative | Temperature (°C) | pH | Conductivity (µmhos/cm) | Dissolved Oxygen (mg/L) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5/3/95 | 1425 | | X | | | | 20 | 20 | | | 67.9 | 6.56 | 6480 | | brown, silty |
| | 1454 | | X | | | | 20 | 40 | | | 65.0 | 6.78 | 6330 | | " " |
| | 1513 | | X | | | | 10 | 50 | | | 64.7 | 7.35 | 7000 | | less silt, still brown |
| | 1530 | | X | | | | 10 | 60 | | | 64.4 | 6.95 | 6270 | | " |
| | 1540 | | X | | | | 10 | 70 | | | 62.7 | 6.96 | 6130 | | clearing up |
| | 1550 | | X | | | | 5 | 75 | | | 61.4 | 6.99 | 6050 | | slightly cloudy |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

*Circle the date and time that the development criteria are met.*

Comments Sampled at 1600. Disposed of 15 gal. on ground at site. PID readings from this boring ~~were~~ are indicated no contamination

Developer's Signature(s) Sarah Kelly  Date 5/4/95  Reviewer _____  Date _____

Form A0101 Rev. 03/21/94

# APPENDIX D

## "WATER SAMPLING DATA" FORMS

# Water Sampling Data

BURLINGTON ENVIRONMENTAL

Location No. MW-2

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other _____ Date 9/22/94

Project Name Giant-Bloomfield Project No. 13023

Project Manager Martin Nee Phase.Task No. 0077.77

Site Name 5th and Blanco St., Bloomfield N.M.

## Sampling Specifications

Requested Sampling Depth Interval (feet) NA

Requested Wait Following Development/Purging (hours) None

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet) 13.28'

Nonaqueous Liquids Present (Describe) None

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings: Temp °C | pH | DO (mg/L) | Cond. (µmhos/cm) | Water Collection Data: Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/22/94 | 1400 | SK | 67.0 | 6.08 | X | 4410 | 25 | X | X | ✓ | — | |
| ↓ | 1437 | ↓ | 65.1 | 6.33 | X | 4300 | 30 | X | X | ✓ | — | |
| | 1457 | | 65.2 | 6.52 | X | 4430 | 35 | X | X | ✓ | — | |
| ✓ | 1515 | ✓ | 64.9 | 6.61 | X | 4370 | 40 | X | X | ✓ | — | |
| | | | | | | | | | | | | |

## Sample Containers

Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify ); — = None

| Analytical Parameter List | Container: Number | Type | Volume (mL) | Field Filtered: Yes | No | Preserved | Cooled During Collection: Yes | No | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Priority Poll. Metals | 1 | Plastic | 1000 | | X | $HNO_3$ | X | | sent to ATI, Albuquerque |
| 610 | 2 | Amber Glass | 1000 | | X | None | X | | ↓ |
| Mod 8015 | 2 | V | 40 | | X | HCL | X | | |
| 601/602 | 2 | V | 40 | | X | HCL | X | | |
| Gen. Chem | 1 | P | | | X | None | X | | sent to IML, Farmington. |
| " " | 1 | P | | | X | None | X | | " " |
| | | | | | | | | | |
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Filter Type _____ Chain-of-Custody Form Number 1866 & 1867

Comments _____

Signature Sarah Kelley Date 9/24/94 Reviewer _____ Date _____

Form A0202 Rev. 02/24/94

# Water Sampling Data

BURLINGTON ENVIRONMENTAL

Location No. MW-3

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other Date 9/23/94

Project Name Giant-Bloomfield Project No. 13023

Project Manager Martin Nee Phase.Task No. 0077.77

Site Name 5th and Blanco St., Bloomfield, N.M.

## Sampling Specifications

Requested Sampling Depth Interval (feet) NA

Requested Wait Following Development/Purging (hours) None

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet) 13.02'

Nonaqueous Liquids Present (Describe) None

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings: Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Water Collection Data: Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/23/94 | 1455 | SK | 70.4 | 7.15 | X | 3390 | 18 | X | X | V | X | |
| ↓ | 1500 | SK | 67.5 | 7.16 | X | 3320 | 20 | X | X | V | X | |
| ↓ | 1515 | SK | 66.4 | 7.24 | X | 3280 | 22 | X | X | V | X | |
| | 1550 | SK | | | | | | | | | 15.15' | |
| | | | | | | | | | | | | |

## Sample Containers

Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify ); — = None

| Analytical Parameter List | Container: Number | Type | Volume (mL) | Field Filtered: Yes | No | Preserved | Cooled During Collection: Yes | No | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Priority Poll. Metals | 1 | P | 1000 | | X | $HNO_3$ | X | | sent to ATI, Albuquerque |
| 610 | 2 | A | 1000 | | X | None | X | | ↓ |
| Mod 8015 | 2 | V | 40 | | X | HCL | X | | |
| 601/602 | 2 | V | 40 | | X | HCL | X | | ↓ |
| Gen. Chem. | 1 | P | | | X | None | X | | sent to IML, Farmington |
| " " | 1 | P | | | X | None | X | | " " |
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Filter Type

Chain-of-Custody Form Number 1866

Comments

Signature Sarah Kelly Date 9/24/94 Reviewer Date

Form A0202 Rev. 02/24/94

# Water Sampling Data

BURLINGTON ENVIRONMENTAL

Location No. MW-4

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other Date 9/23/94

Project Name Giant-Bloomfield Project No. 13023

Project Manager Martin Nee Phase.Task No. 0077.77

Site Name 54h & Blanco St., Bloomfield, N.M.

## Sampling Specifications

Requested Sampling Depth Interval (feet) NA

Requested Wait Following Development/Purging (hours) None

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet) 14.38'

Nonaqueous Liquids Present (Describe) None

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings: Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Water Collection Data: Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9/23/94 | 1030 | SK | 61.9 | 6.84 | X | 4030 | 45 | X | X | V | | |
| ↓ | 1045 | ↓ | 64.5 | 6.94 | X | 4020 | 50 | X | X | V | | |
| | 1100 | | 66.1 | 7.07 | X | 4140 | 55 | X | X | V | | |
| | 1120 | | 67.5 | 7.14 | X | 4120 | 60 | X | X | V | | |
| ↓ | 1230 | ↓ | | | | | | | | | 17.15' | |

## Sample Containers

Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify ); — = None

| Analytical Parameter List | Container: Number | Type | Volume (mL) | Field Filtered: Yes | No | Preserved | Cooled During Collection: Yes | No | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Priority Poll. Metals | 1 | P | 1000 | | X | $HNO_3$ | X | | sent to ATI, Albuquerque |
| 610 | 2 | A | 1000 | | X | None | X | | ↓ |
| Mod 8015 | 2 | V | 40 | | X | HCL | X | | |
| 601/602 | 2 | V | 40 | | X | HCL | X | | |
| Gen. Chem | 1 | P | | | X | None | X | | sent to IML, Farmington |
| " " | 1 | P | | | X | None | X | | " " |
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Filter Type

Chain-of-Custody Form Number 1866

Comments

Signature Sarah Kelley Date 9/24/94 Reviewer Date

Form A0202 Rev. 02/24/94

PHILIP ENVIRONMENTAL

# Water Sampling Data

Location No. MW-2

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other Date 5/2/95

Project Name Giant-Bloomfield Tank Project No. 13023

Project Manager Martin Nee Phase.Task No. 3000.77

Site Name

## Sampling Specifications

Requested Sampling Depth Interval (feet)

Requested Wait Following Development/Purging (hours)

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 6

Initial Water Depth (feet)

Nonaqueous Liquids Present (Describe)

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings | | | | Water Collection Data | | | | | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | |
| See "Well Development and Purging Data" Form | | | | | | | | | | | | |
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## Sample Containers

Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify); — = None

| Analytical Parameter List | Container | | | Field Filtered | | Preserved | Cooled During Collection | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Type | Volume (mL) | Yes | No | | Yes | No | |
| BTEX, 8020 | 2 | V | 40 | | X | 4°C | X | | to ATI |
| TPH, 8015 | 2 | V | 40 | | X | 4°C | X | | to ATI |
| Gen. chem | AK 2 1 | AK P | | | X | 4°C | X | | to TML |
| | | | | | | | | | |
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Filter Type

Chain-of-Custody Form Number TML-C3075, ATI-C3076

Comments Sampled at 1745. Took a dup. here and labelled it MW-52, time 1640.

Signature Sarah Kelly Date 5/4/95 Reviewer Date

Form A0202 Rev. 02/24/94

# PHILIP ENVIRONMENTAL Water Sampling Data

Location No. MW-3

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other Date 5/2/95

Project Name Giant - Bloomfield Tank Project No. 13023

Project Manager Martin Nee Phase.Task No. 3000.77

Site Name

## Sampling Specifications

Requested Sampling Depth Interval (feet)

Requested Wait Following Development/Purging (hours)

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet)

Nonaqueous Liquids Present (Describe)

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings | | | | Water Collection Data | | | | | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | |
| See "Well Development and Purging Data" Forms | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify); – = None

## Sample Containers

| Analytical Parameter List | Container | | | Field Filtered | | Preserved | Cooled During Collection | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Type | Volume (mL) | Yes | No | | Yes | No | |
| BTEX | 2 | V | 40 | | X | 4°C | X | | Meth. 602 |
| TPH | 2 | V | 40 | | X | 4°C | X | | Meth Mod. 8015 |
| Gen. chem | 1 | P | ½ l | | X | 4°C | X | | IML. |
| | | | | | | | | | |
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Filter Type

Chain-of-Custody Form Number IML-C3075, ATI-C3076

Comments Sent to ATI, Albuquerque and IML, Farmington

Sampled at 1345.

Signature Linda Kelly Date 5/4/95 Reviewer Date

Form A0202 Rev. 02/24/94

PHILIP ENVIRONMENTAL

# Water Sampling Data

Location No. MW-4

Serial No. WSD-

Group List Number

Sample Type: [X] Groundwater [ ] Surface Water [ ] Other _____ Date 5/2/95

Project Name Giant- Bloomfield Tank Project No. 13023

Project Manager Martin Nee Phase.Task No. 3000.77

Site Name

## Sampling Specifications

Requested Sampling Depth Interval (feet) _____

Requested Wait Following Development/Purging (hours) _____

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet) _____

Nonaqueous Liquids Present (Describe) _____

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings | | | | Water Collection Data | | | | | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | |
| See "Well Development and Purging Data" Form | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify); — = None

## Sample Containers

| Analytical Parameter List | Container | | | Field Filtered | | Preserved | Cooled During Collection | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Type | Volume (mL) | Yes | No | | Yes | No | |
| BTEX, 8020 | 2 | V | 40 | | X | 4°C | X | | to ATI |
| TPH, 8015 | 2 | V | 40 | | X | 4°C | X | | to ATI |
| Genchem | 2 | V | 40 | | X | 4°C | X | | to TML |
| | | | | | | | | | |
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Filter Type _____ Chain-of-Custody Form Number TML-C3075, ATI C306

Comments Sampled at 1555

Signature Derek Kelley Date 5/4/95 Reviewer _____ Date _____

Form A0202 Rev. 02/24/94

# PHILIP ENVIRONMENTAL Water Sampling Data

Location No. MW-5

Serial No. WSD-

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other

Date 5/3/95

Project Name Giant-Bloomfield Tank

Project No. 13023

Project Manager Martin Nee

Phase.Task No. 3000.77

Site Name

## Sampling Specifications

Requested Sampling Depth Interval (feet)

Requested Wait Following Development/Purging (hours)

## Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0

Initial Water Depth (feet)

Nonaqueous Liquids Present (Describe)

## Water Quality/Water Collection

DO = Dissolved Oxygen; Cond. = Conductivity

| Date | Time | Sampler Initials | Water Quality Readings | | | | Water Collection Data | | | | | Notes (Explain in Comments Below) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Temp. (°C) | pH | DO (mg/L) | Cond. (µmhos/cm) | Volume Removed (gallons) | Removal Rate (gal/min) | Pump Intake Depth (feet) | Bail | Final Water Depth (feet) | |
| See "Well Development and Purging Data" Forms | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |

Container Type: G = Clear Glass; A = Amber Glass; P = Plastic; V = VOA Vial (Glass); O = Other (Specify)

Preservatives: H = HCl; N = $HNO_3$; S = $H_2SO_4$; A = NaOH; O = Other (Specify); — = None

## Sample Containers

| Analytical Parameter List | Container | | | Field Filtered | | Preserved | Cooled During Collection | | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | Number | Type | Volume (mL) | Yes | No | | Yes | No | |
| BTEX, 8020 | 2 | V | 40 | | X | 4°C | X | | to ATI |
| TPH, 8015 | 2 | V | 40 | | X | 4°C | X | | to ~~IML~~ ATI AK |
| Gen. chem | 1 | P | | | X | 4°C | X | | to IML |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

Filter Type

Chain-of-Custody Form Number C3075-IML, C3076-AT

Comments Sampled at 1600.

Signature Sarah Kelley Date 5/4/95 Reviewer Date

Form A0202 Rev. 02/24/94

# APPENDIX E

## LABORATORY ANALYTICAL REPORTS FOR SOIL ANALYSES

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **409397**

September 29, 1994

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401

Project Name/Number: GIANT BLOOMFIELD 13023

Attention: S. Kelly

On **09/22/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **non-aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE RECEIVED | : 09/22/94 |
| PROJECT # | : 13023 | | |
| PROJECT NAME | : GIANT BLOOMFIELD | REPORT DATE | : 09/29/94 |

ATI ID: 409397

| ATI # | CLIENT DESCRIPTION | MATRIX | DATE COLLECTED |
|---|---|---|---|
| 01 | SB1-9.0 | NON-AQ | 09/19/94 |
| 02 | SB2-12.5 | NON-AQ | 09/19/94 |
| 03 | SB3-11.0 | NON-AQ | 09/19/94 |
| 04 | SB4-16.5 | NON-AQ | 09/19/94 |
| 05 | SB5-17.0 | NON-AQ | 09/19/94 |
| 06 | SB6-5.0 | NON-AQ | 09/19/94 |
| 07 | SB7-12.3 | NON-AQ | 09/19/94 |
| 08 | SB8-12.0 | NON-AQ | 09/19/94 |

---TOTALS---

| MATRIX | #SAMPLES |
|---|---|
| NON-AQ | 8 |

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409397

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 01 | SB1-9.0 | NON-AQ | 09/19/94 | 09/22/94 | 09/23/94 | 1 |
| 02 | SB2-12.5 | NON-AQ | 09/19/94 | 09/22/94 | 09/26/94 | 5 |
| 03 | SB3-11.0 | NON-AQ | 09/19/94 | 09/22/94 | 09/26/94 | 5 |

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| FUEL HYDROCARBONS | MG/KG | 15 | 1300 | 490 |
| HYDROCARBON RANGE | | C6-C12 | C6-C12 | C6-C12 |
| HYDROCARBONS QUANTITATED USING | | GASOLINE | GASOLINE | GASOLINE |
| | | | | |
| FUEL HYDROCARBONS | MG/KG | 33 | 1300 | 830 |
| HYDROCARBON RANGE | | C12-C30 | C12-C34 | C12-C32 |
| HYDROCARBONS QUANTITATED USING | | DIESEL | DIESEL | DIESEL |
| | | | | |
| SURROGATE: | | | | |
| O-TERPHENYL (%) | | 100 | 85 | 99 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409397

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 04 | SB4-16.5 | NON-AQ | 09/19/94 | 09/22/94 | 09/26/94 | 10 |
| 05 | SB5-17.0 | NON-AQ | 09/19/94 | 09/22/94 | 09/26/94 | 10 |
| 06 | SB6-5.0 | NON-AQ | 09/19/94 | 09/22/94 | 09/23/94 | 1 |

| PARAMETER | UNITS | 04 | 05 | 06 |
|---|---|---|---|---|
| FUEL HYDROCARBONS | MG/KG | 4900 | 3400 | 180 |
| HYDROCARBON RANGE | | C6-C12 | C6-C12 | C6-C12 |
| HYDROCARBONS QUANTITATED USING | | GASOLINE | GASOLINE | GASOLINE |
| | | | | |
| FUEL HYDROCARBONS | MG/KG | 3200 | 2200 | 78 |
| HYDROCARBON RANGE | | C12-C32 | C12-C32 | C12-C30 |
| HYDROCARBONS QUANTITATED USING | | DIESEL | DIESEL | DIESEL |
| | | | | |
| SURROGATE: | | | | |
| O-TERPHENYL (%) | | NA | NA | 97 |

NA=SURROGATE RECOVERY NOT OBTAINABLE DUE TO SAMPLE DILUTION

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409397

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 07 | SB7-12.3 | NON-AQ | 09/19/94 | 09/27/94 | 09/28/94 | 10 |
| 08 | SB8-12.0 | NON-AQ | 09/19/94 | 09/22/94 | 09/23/94 | 1 |

| PARAMETER | UNITS | 07 | 08 |
|---|---|---|---|
| FUEL HYDROCARBONS | MG/KG | 2000 | 550 |
| HYDROCARBON RANGE | | C6-C14 | C6-C12 |
| HYDROCARBONS QUANTITATED USING | | GASOLINE | GASOLINE |
| | | | |
| FUEL HYDROCARBONS | MG/KG | 1500 | 410 |
| HYDROCARBON RANGE | | C12-C32 | C12-C34 |
| HYDROCARBONS QUANTITATED USING | | DIESEL | DIESEL |
| | | | |
| SURROGATE: | | | |
| O-TERPHENYL (%) | | 94 | 97 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | ATI I.D. | : 409397 |
| BLANK I.D. | : 092294B | MATRIX | : NON-AQ |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/22/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/23/94 |
| PROJECT NAME | : GIANT BLOOMFIELD | DILUTION FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| FUEL HYDROCARBONS | MG/KG | <5 |
| HYDROCARBON RANGE | | - |
| HYDROCARBONS QUANTITATED USING | | - |
| | | |
| SURROGATE: | | |
| O-TERPHENYL (%) | | 107 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | ATI I.D. | : 409397 |
| BLANK I.D. | : 092794 | MATRIX | : NON-AQ |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/27/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/28/94 |
| PROJECT NAME | : GIANT BLOOMFIELD | DILUTION FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| FUEL HYDROCARBONS | MG/KG | <5 |
| HYDROCARBON RANGE | | - |
| HYDROCARBONS QUANTITATED USING | | - |
| | | |
| SURROGATE: | | |
| O-TERPHENYL (%) | | 99 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - QUALITY CONTROL

## MSMSD

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | | |
| MSMSD # | : 092294B | ATI I.D. | : 409397 |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/22/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/23/94 |
| PROJECT NAME | : GIANT BLOOMFIELD | SAMPLE MATRIX | : NON-AQ |
| REF. I.D. | : 092294B | UNITS | : MG/KG |

| PARAMETER | SAMPLE RESULT | CONC SPIKE | SPIKED SAMPLE | % REC | DUP SPIKE | DUP % REC | RPD |
|---|---|---|---|---|---|---|---|
| FUEL HYDROCARBONS | <5 | 100 | 100 | 100 | 100 | 100 | 0 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - QUALITY CONTROL

## MSMSD

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | | |
| MSMSD # | : 40941102 | ATI I.D. | : 409397 |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/27/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/28/94 |
| PROJECT NAME | : GIANT BLOOMFIELD | SAMPLE MATRIX | : NON-AQ |
| REF. I.D. | : 40941102 | UNITS | : MG/KG |

| PARAMETER | SAMPLE RESULT | CONC SPIKE | SPIKED SAMPLE | % REC | DUP SPIKE | DUP % REC | RPD |
|---|---|---|---|---|---|---|---|
| FUEL HYDROCARBONS | <5 | 100 | 120 | 120 | 120 | 120 | 0 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

BURLINGTON ENVIRONMENTAL
*A Philip Environmental Company*

# Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

(505) 326-2262 Phone
(505) 326-2388 FAX

Access# 409397

COC Serial No. C 1864

Project Name: Giant Bloomfield
Project Number: 13023 Phase . Task: 0077.77
Samplers: S. Kelly
Laboratory Name: Analytical Technologies, Inc.
Laboratory Location: Albuquerque, NM

| Sample Number (and depth) | Date | Time | Matrix | Total Number of Bottles | Type of Analysis and Bottle: 40z glass jar TPH-Method 8015 | LAB ID | Comments |
|---|---|---|---|---|---|---|---|
| SB1-9.0 | 9/19/94 | 1100 | Soil | 1 | X | 01 | |
| SB2-12.5 | 9/19/94 | 1200 | | 1 | X | 02 | |
| SB3-11.0 | 9/19/94 | 1315 | | 1 | X | 03 | |
| SB4-16.5 | 9/19/94 | 1430 | | 1 | X | 04 | |
| SB5-17.0 | 9/19/94 | 1530 | | 1 | X | 05 | |
| SB6-5.0 | 9/19/94 | 1615 | | 1 | X | 06 | |
| SB7-12.3 | 9/19/94 | 1704 | | 1 | X | 07 | |
| SB8-12.0 | 9/19/94 | 1740 | | 1 | X | 08 | |

**Relinquished by:**

| Signature | Date | Time |
|---|---|---|
| Sarah Kelly | 9/21/94 | 0620 |

**Received By:**

| Signature | Date | Time |
|---|---|---|
| D. Hitte | 9/22/94 | 0915 |

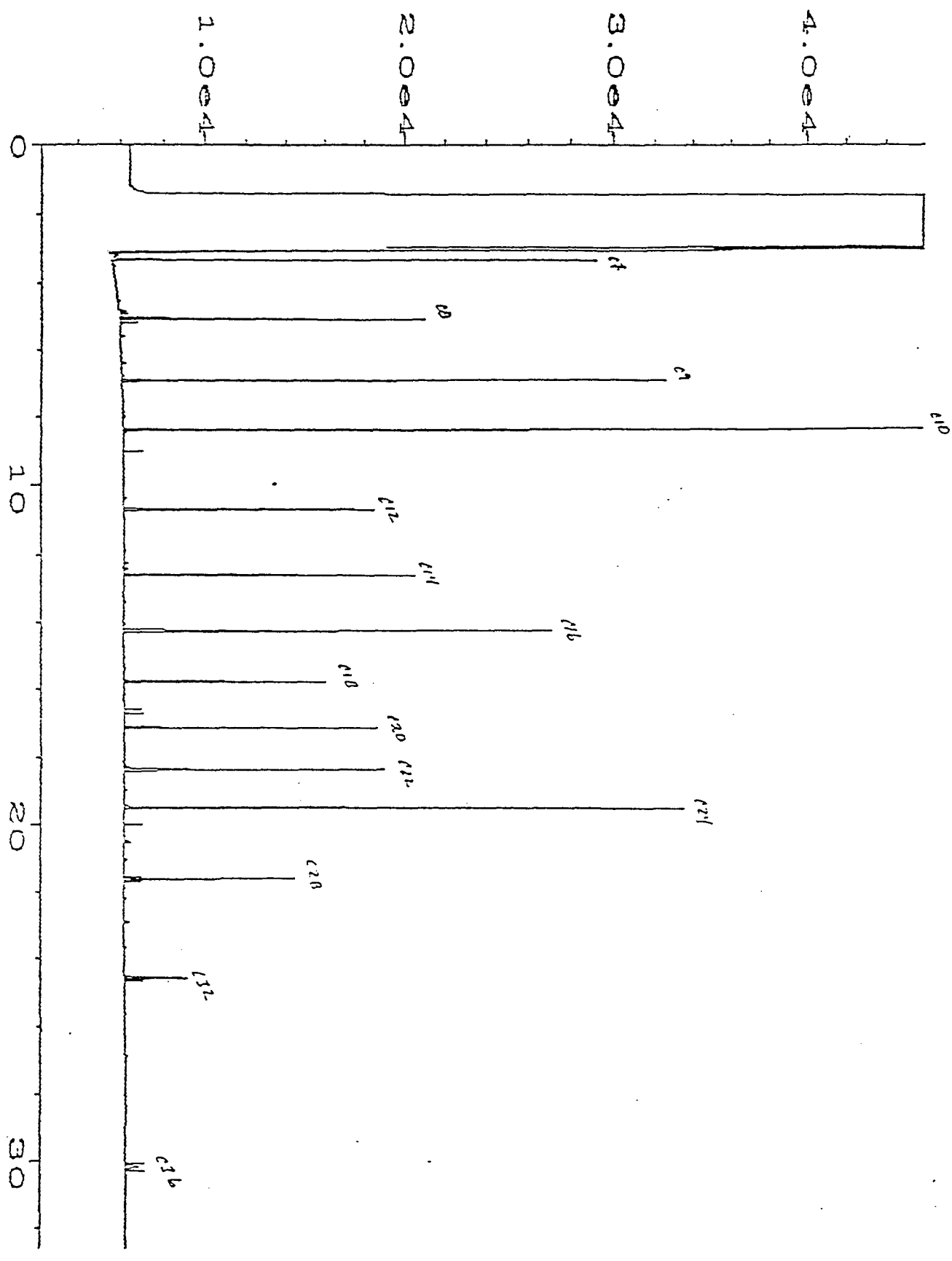
**Samples Iced:** ☒ Yes ☐ No

**Preservatives (ONLY for Water Samples)**

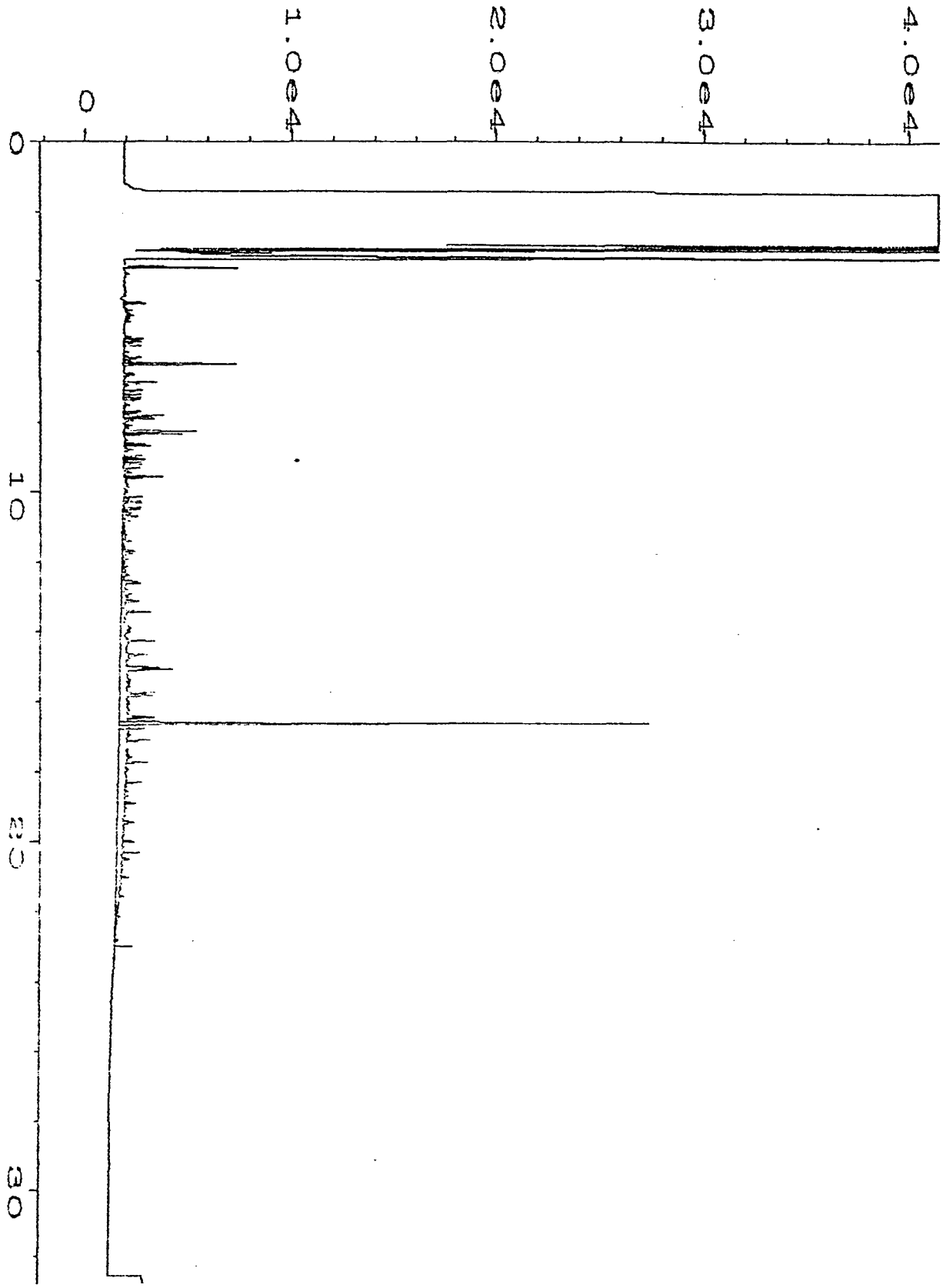
- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☐ Metals ..... Nitric acid ($HNO_3$)
- ☐ TPH (418.1) ..... Sulfuric acid ($H_2SO_4$)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

Carrier: Fed Ex. Airbill No. 138902569 1

Shipping and Lab Notes:

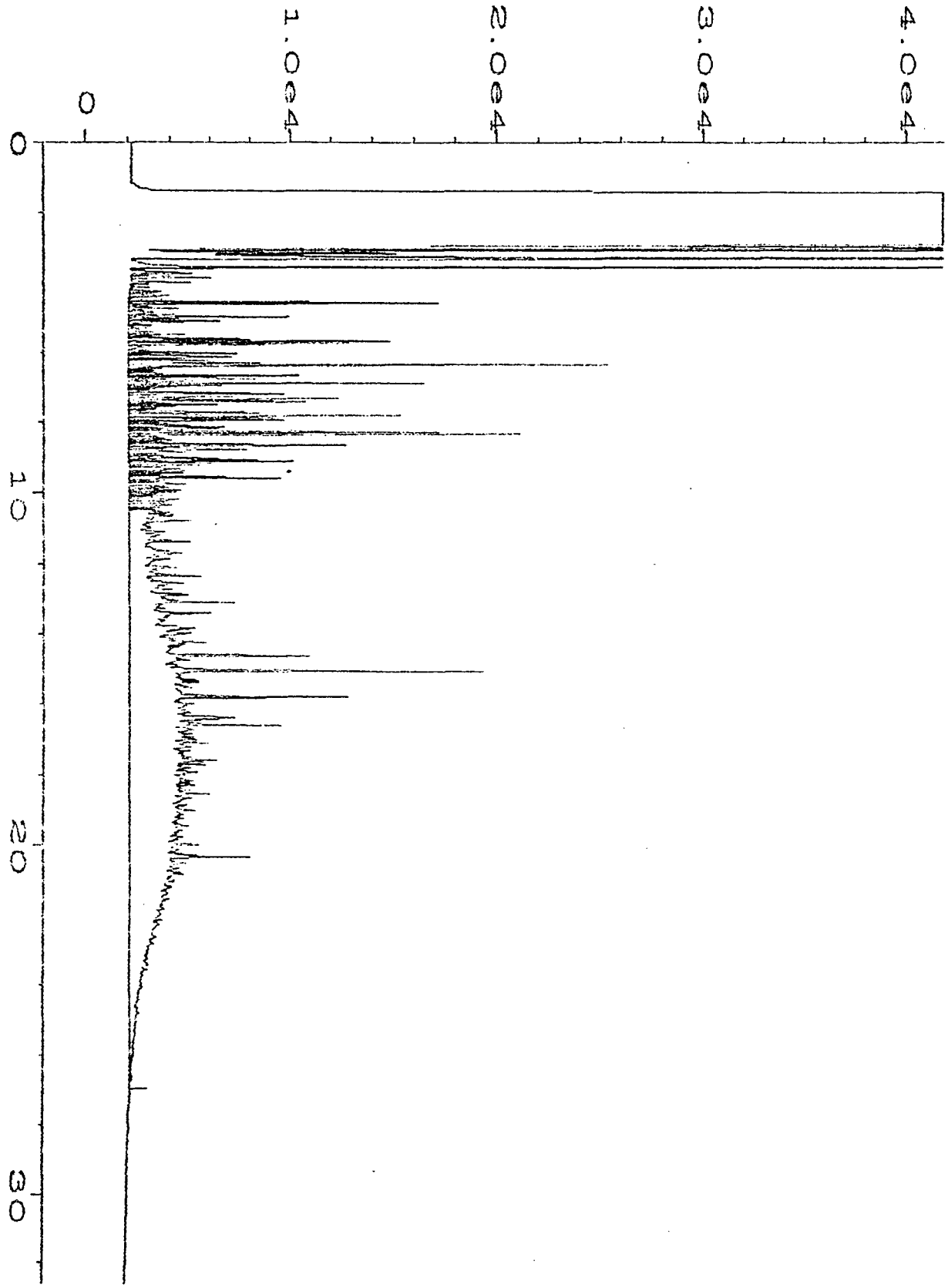



| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\01APR94\011F0701.D | | |
| Operator | : CFF | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 11 |
| Sample Name | : RT STD C7 TO C36 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 7 |
| Acquired on | : 01 Apr 94 06:19 PM | Instrument Method | : SDF0301.MTH |
| Report Created on | : 01 Apr 94 07:03 PM | Analysis Method | : SDF0301.MTH |
| Sample Info | : | | |

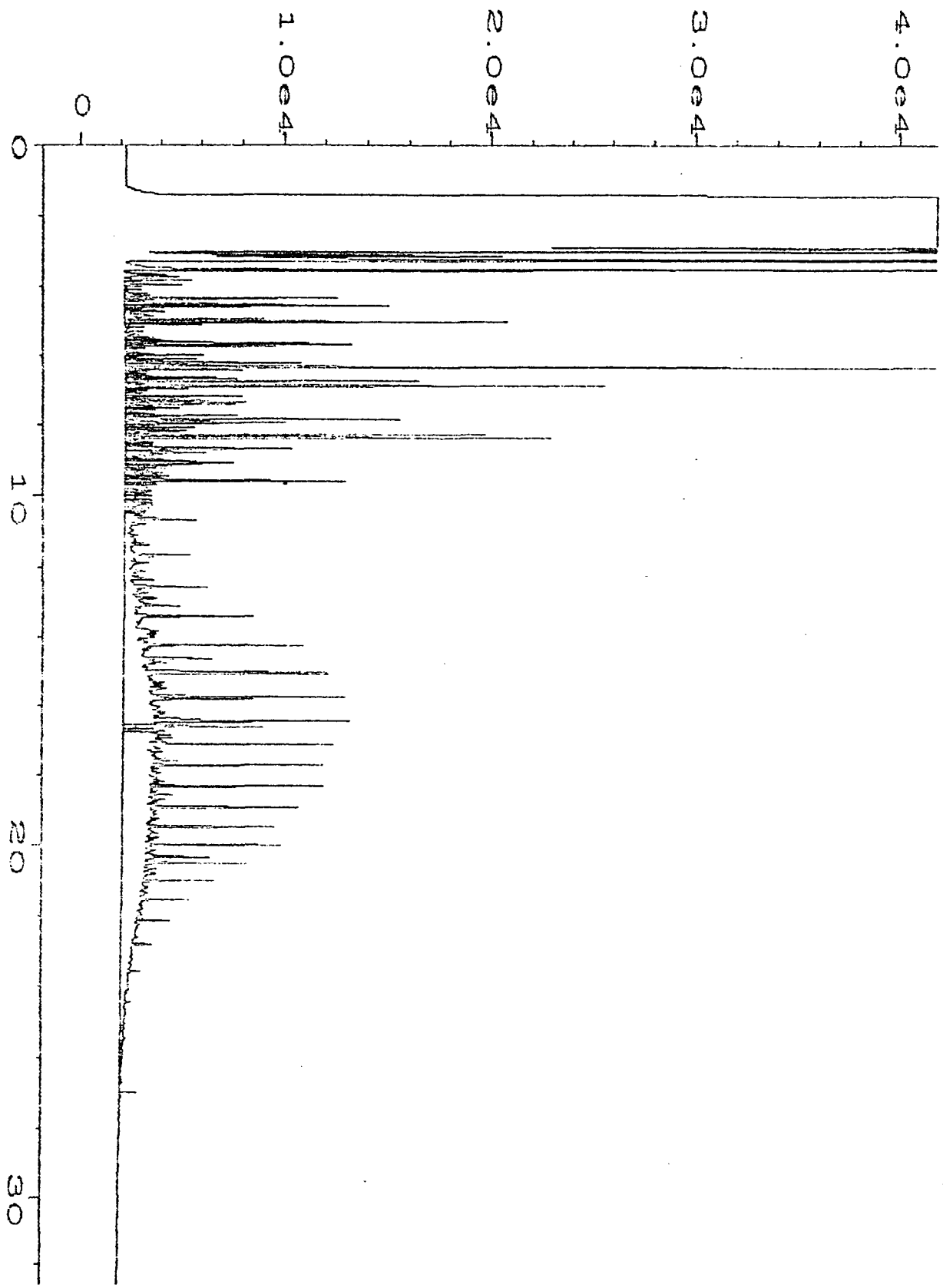



Data File Name : C:\HPCHEM\1\DATA\23SEP94\006F0301.D
Operator : cff & je
Instrument : GC#1 5890
Sample Name : 409397-01
Run Time Bar Code:
Acquired on : 23 Sep 94 03:05 PM
Report Created on: 27 Sep 94 09:47 AM

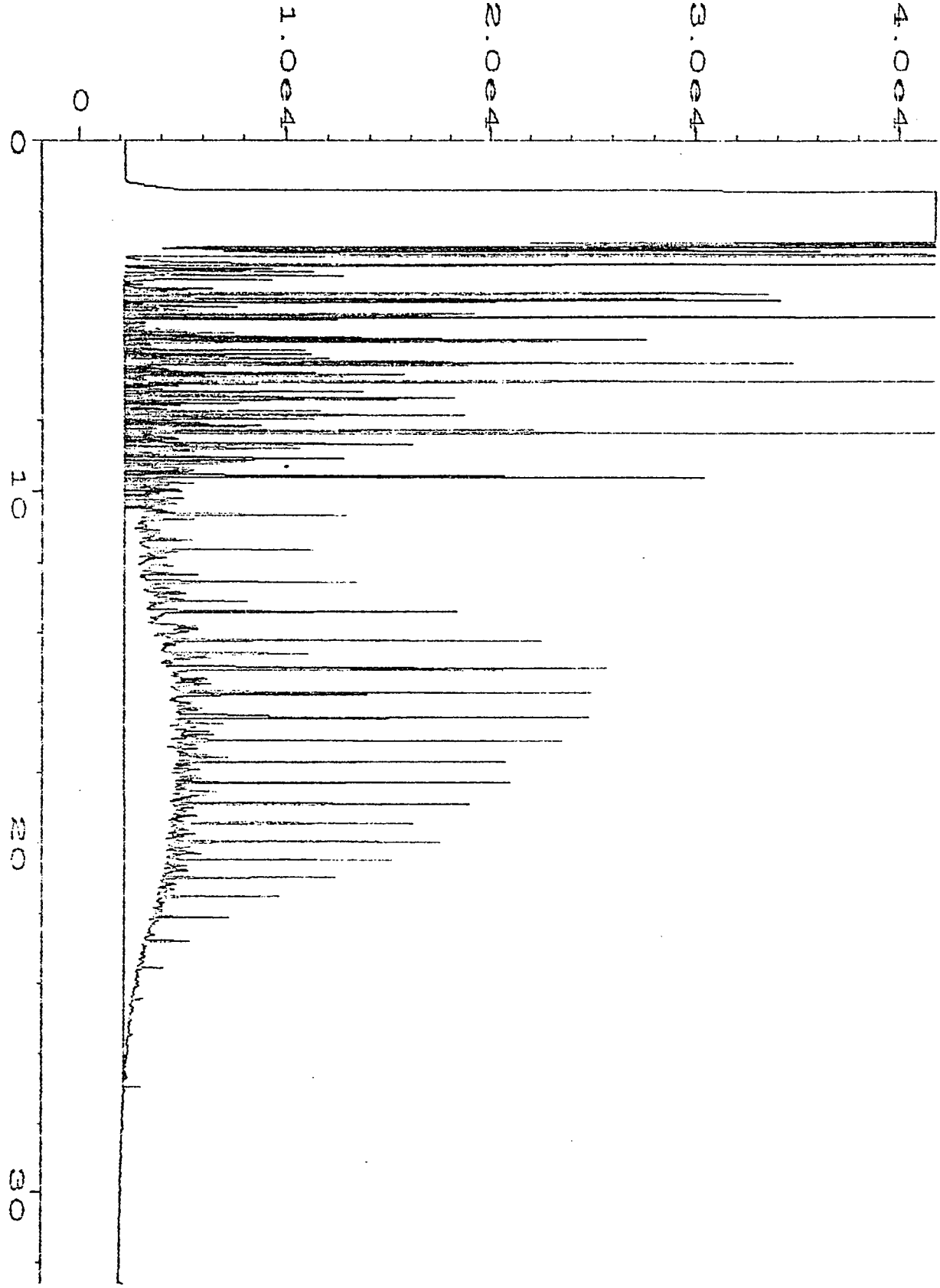
Page Number : 1
Vial Number : 6
Injection Number : 1
Sequence Line : 3
Instrument Method: SDF0822.MTH
Analysis Method : SDF0822.MTH



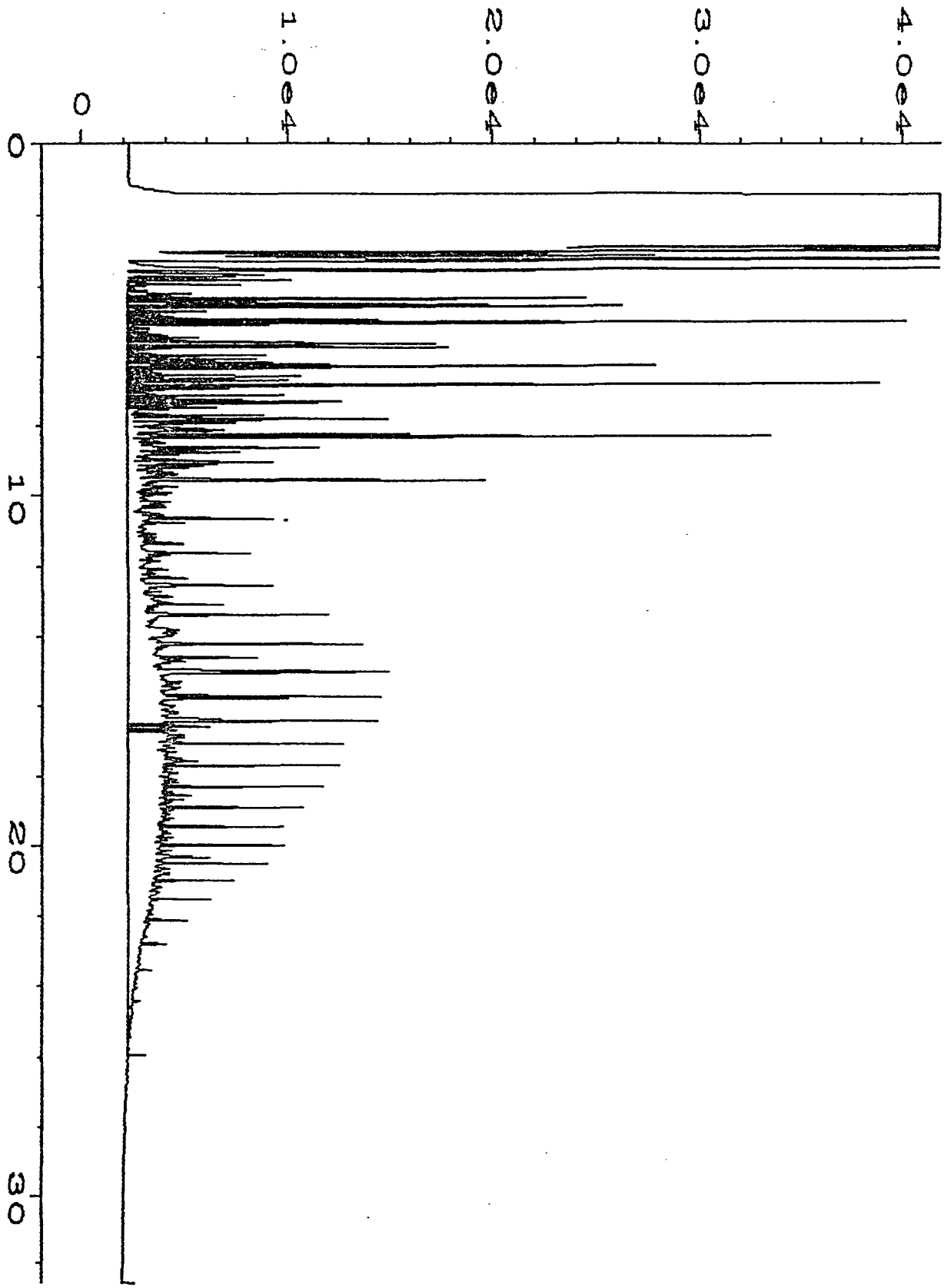

| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\26SEP94\013F0301.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 13 |
| Sample Name | : 409397-02*5 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 3 |
| Acquired on | : 26 Sep 94 09:16 PM | Instrument Method | : SDF0822.MTH |
| Report Created on | : 27 Sep 94 12:00 PM | Analysis Method | : SDF0926.MTH |



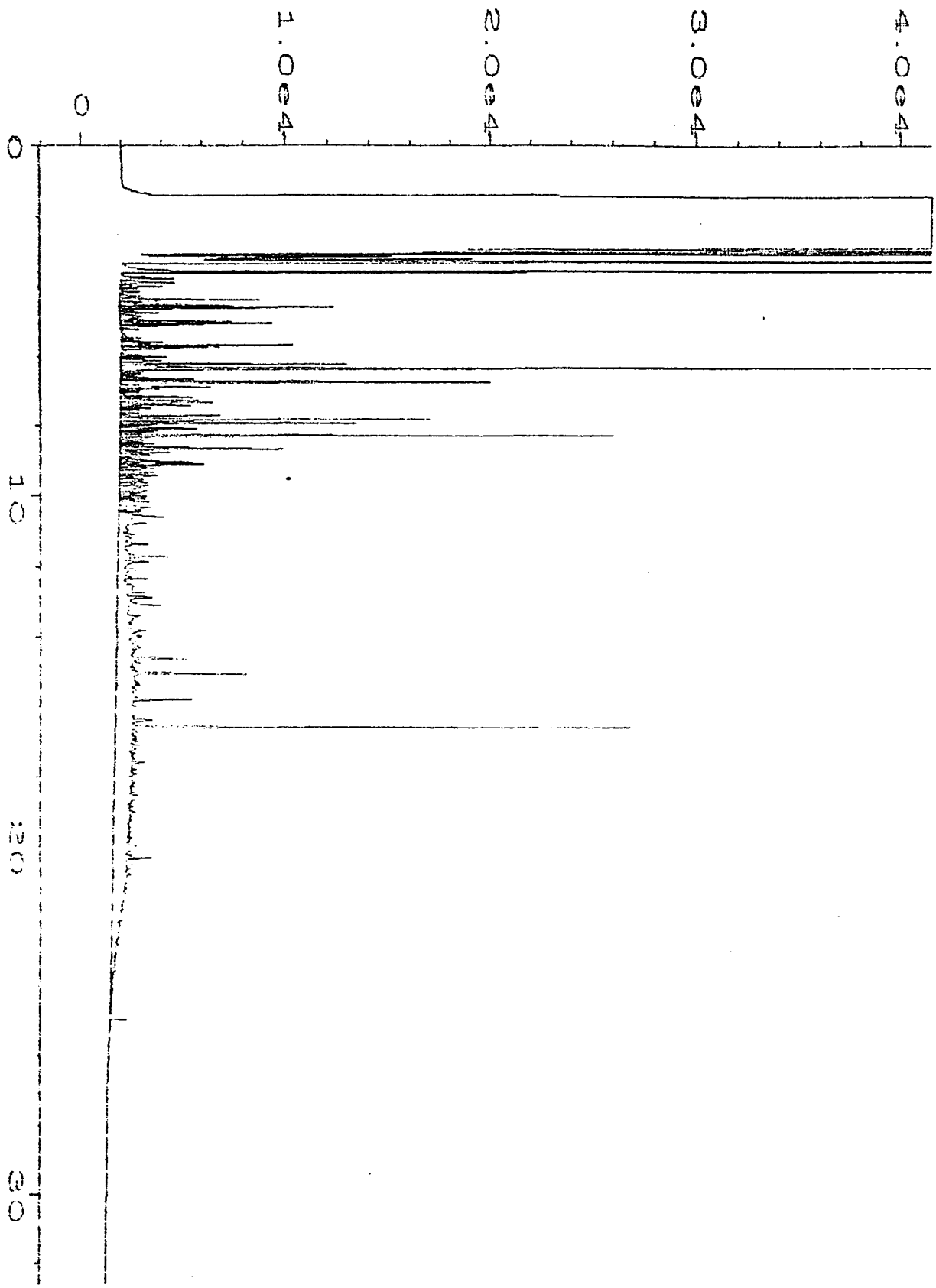

| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\26SEP94\014F0301.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 14 |
| Sample Name | : 409397-03*5 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 3 |
| Acquired on | : 26 Sep 94 10:06 PM | Instrument Method | : SDF0822.MTH |
| Report Created on | : 27 Sep 94 12:04 PM | Analysis Method | : SDF0926.MTH |




| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\26SEP94\015F0301.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 15 |
| Sample Name | : 409397-04*10 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 3 |
| Acquired on | : 26 Sep 94 11:02 PM | Instrument Method | : SDF0822.MTH |
| Report Created on | : 27 Sep 94 12:08 PM | Analysis Method | : SDF0926.MTH |

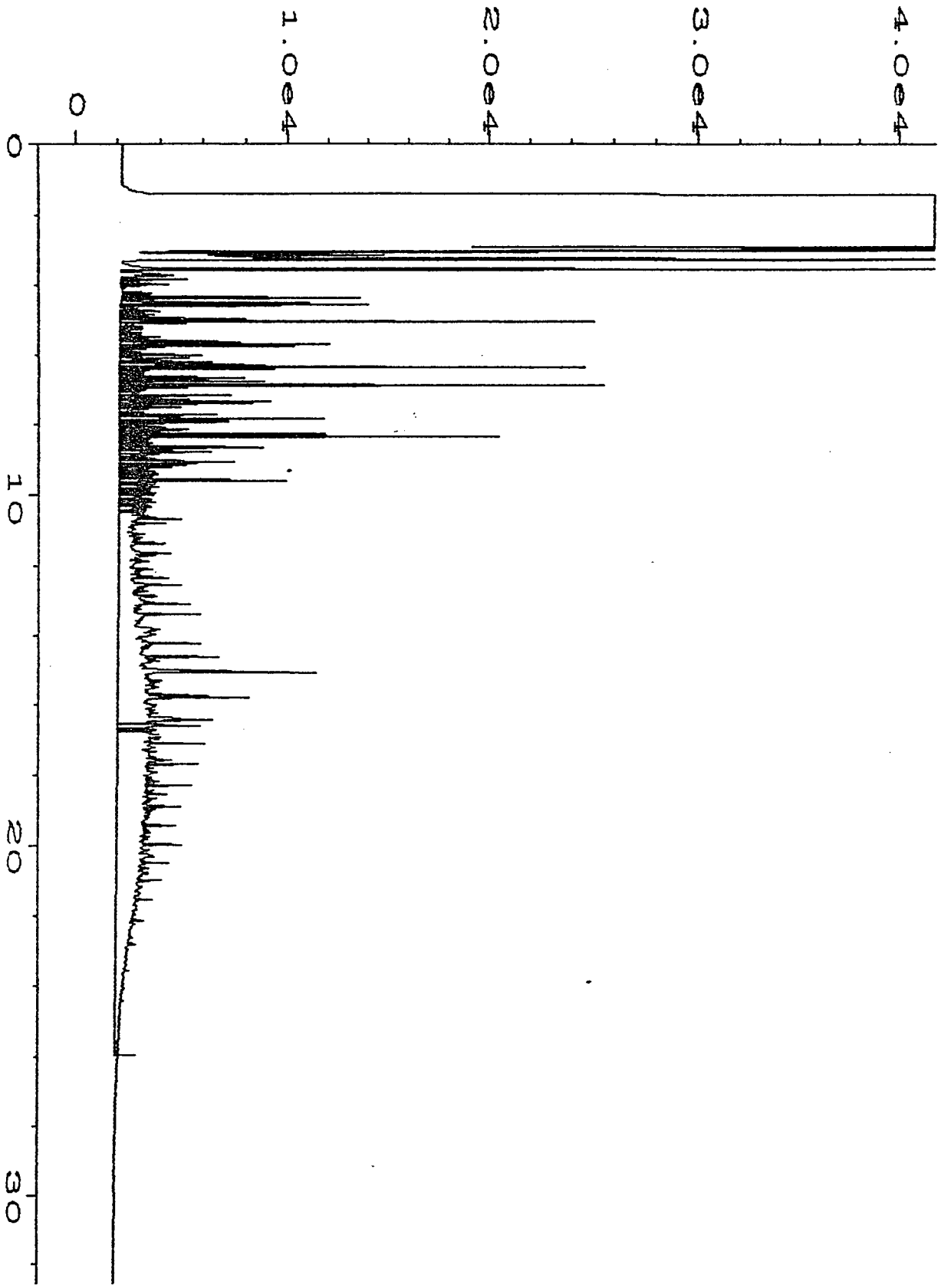



| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\26SEP94\016F0301.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 16 |
| Sample Name | : 409397-05*10 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 3 |
| Acquired on | : 27 Sep 94 00:02 AM | Instrument Method | : SDF0822.MTH |
| Report Created on | : 28 Sep 94 09:29 AM | Analysis Method | : SDF0822.MTH |

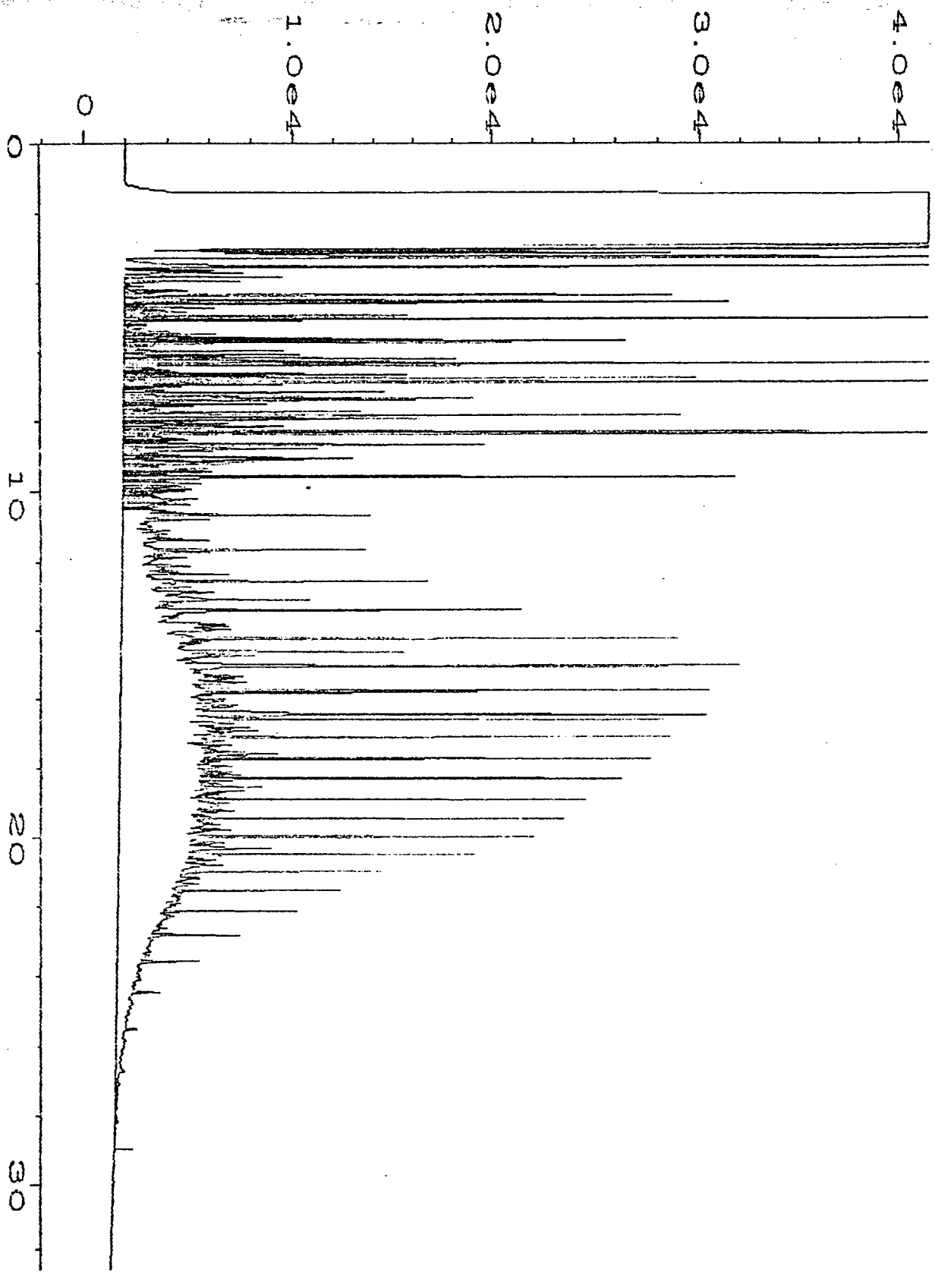



Data File Name : C:\HPCHEM\1\DATA\233SEP94\014F0301.D
Operator : cff & je
Instrument : GC#1 5890
Sample Name : 409397-06
Run Time Bar Code:
Acquired on : 23 Sep 94 10:06 PM
Report Created on: 27 Sep 94 02:28 PM

Page Number : 1
Vial Number : 14
Injection Number : 1
Sequence Line : 3
Instrument Method: SDF0822.MTH
Analysis Method : SDF0926.MTH




| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\27SEP94\028F0701.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 28 |
| Sample Name | : 409397-07*10 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 7 |
| Acquired on | : 28 Sep 94 09:50 AM | Instrument Method | : SDF0926.MTH |
| Report Created on | : 28 Sep 94 01:41 PM | Analysis Method | : SDF0926.MTH |



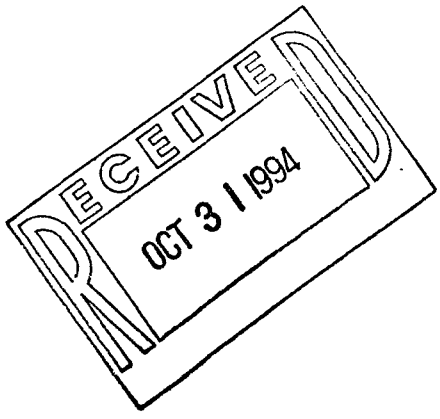

| | | | |
|---|---|---|---|
| ata File Name | : C:\HPCHEM\1\DATA\23SEP94\016F0301.D | | |
| perator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 16 |
| Sample Name | : 409397-08 | Injection Number | : 1 |
| un Time Bar Code: | | Sequence Line | : 3 |
| cquired on | : 23 Sep 94 11:51 PM | Instrument Method | : SDF0822.MTH |
| Report Created on | : 27 Sep 94 10:04 AM | Analysis Method | : SDF0822.MTH |

# APPENDIX F

## LABORATORY ANALYTICAL REPORTS FOR GROUNDWATER ANALYSES

imi
Inter-Mountain
Laboratories, Inc.

2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737




Sarah Kelly
Giant - Bloomfield
P. O. Box 256
Farmington, NM 87499

October 13, 1994

Dear Sarah:

Enclosed please find the results for water samples received at Inter-Mountain Laboratories, Farmington on September 23, 1994. The Project was identified as "Bloomfield." Analyses for General Chemistry parameters were performed as specified on the accompanying Chain of Custody document.

Tests were performed in accordance with 40 CFR 136, "Guidelines Establishing Test Procedures for Analysis," as amended.

If you have any questions or comments about the analysis, please call me at your convenience.

Sincerely,

Marlon E. Hopper
Lab Manager
Inter-Mountain Laboratories

Enclosures: Analytical Report

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Giant Bloomfield** | | |
| Project: | Bloomfield | Date Reported: | 10/11/94 |
| Sample ID: | MW2-1 | Date Sampled: | 09/22/94 |
| Laboratory ID: | W01627 | Time Sampled: | 1630 |
| Sample Matrix: | Water | Date Received: | 09/23/94 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 6.6 | s.u. | | |
| Lab Conductivity @ 25° C | 4,920 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 3,020 | mg/L | | |
| Total Dissolved Solids (Calc) | 3049 | mg/L | | |
| Total Alkalinity as CaCO3 | 957 | mg/L | | |
| SAR | 11.785 | ratio | | |
| Bicarbonate as HCO3 | 1,170 | mg/L | 19.14 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide | 0 | mg/L | 0.00 | meq/L |
| Chloride | 1,050 | mg/L | 29.50 | meq/L |
| Sulfate | 245 | mg/L | 5.10 | meq/L |
| Calcium | 325 | mg/L | 16.20 | meq/L |
| Magnesium | 30 | mg/L | 2.48 | meq/L |
| Potassium | 1.4 | mg/L | 0.04 | meq/L |
| Sodium | 828 | mg/L | 36.02 | meq/L |
| Cations | | | 54.73 | meq/L |
| Anions | | | 53.74 | meq/L |
| Cation/Anion Difference | | | 0.91 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 17th ed., 1989.

Reported by mh

Reviewed by

nter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Giant Bloomfield** | | |
| Project: | Bloomfield | Date Reported: | 10/11/94 |
| Sample ID: | MW4-1 | Date Sampled: | 09/23/94 |
| Laboratory ID: | W01628 | Time Sampled: | 1200 |
| Sample Matrix: | Water | Date Received: | 09/23/94 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 7.0 | s.u. | | |
| Lab Conductivity @ 25° C | 5,420 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 4,710 | mg/L | | |
| Total Dissolved Solids (Calc) | 4,389 | mg/L | | |
| Total Alkalinity as CaCO3 | 576 | mg/L | | |
| SAR | 10.886 | ratio | | |
| Bicarbonate as HCO3 | 703 | mg/L | 11.53 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide | 0 | mg/L | 0.00 | meq/L |
| Chloride | 175 | mg/L | 4.93 | meq/L |
| Sulfate | 2,470 | mg/L | 51.38 | meq/L |
| Calcium | 439 | mg/L | 21.90 | meq/L |
| Magnesium | 53 | mg/L | 4.37 | meq/L |
| Potassium | 3.5 | mg/L | 0.09 | meq/L |
| Sodium | 907 | mg/L | 39.45 | meq/L |
| Cations | | | 65.81 | meq/L |
| Anions | | | 67.83 | meq/L |
| Cation/Anion Difference | | | 1.51 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 17th ed., 1989.

Reported by mh

Reviewed by

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Giant Bloomfield** | | |
| Project: | Bloomfield | Date Reported: | 10/11/94 |
| Sample ID: | MW3-1 | Date Sampled: | 09/23/94 |
| Laboratory ID: | W01629 | Time Sampled: | 1530 |
| Sample Matrix: | Water | Date Received: | 09/23/94 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 7.1 | s.u. | | |
| Lab Conductivity @ 25° C | 4,250 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 3,660 | mg/L | | |
| Total Dissolved Solids (Calc) | 3,413 | mg/L | | |
| Total Alkalinity as CaCO3 | 521 | mg/L | | |
| SAR | 8.147 | ratio | | |
| Bicarbonate as HCO3 | 635 | mg/L | 10.41 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide | 0 | mg/L | 0.00 | meq/L |
| Chloride | 48 | mg/L | 1.36 | meq/L |
| Sulfate | 1,920 | mg/L | 39.90 | meq/L |
| Calcium | 439 | mg/L | 21.90 | meq/L |
| Magnesium | 37 | mg/L | 3.01 | meq/L |
| Potassium | 1.4 | mg/L | 0.04 | meq/L |
| Sodium | 661 | mg/L | 28.75 | meq/L |
| Cations | | | 53.70 | meq/L |
| Anions | | | 51.66 | meq/L |
| Cation/Anion Difference | | | 1.93 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 17th ed., 1989.

Reported by mh

Reviewed by dr

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. **409415**

October 26, 1994

Burlington Environmental
4000 Monroe Road
Farmington, NM 87401

Project Name/Number: GIANT-BLOOMFIELD 13023

Attention: S. Kelly

On **09/26/94**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

D indicates the compound was analyzed at a greater dilution.

Due to matrix interferences, cadmium and lead spike analyses were performed using the Method of Standard Additions (MSA). The spike results given are the correlation coefficients (CC), which are $\geq 0.995$.

For EPA Method 601/602 Toluene was found in the water reagent blank associated with the MS/MSD (09/27/94). Toluene was also found in the water reagent blank, at 0.7 ug/l, associated with all of the client's samples. Toluene was found only in client sample "MW2-1" at 600 ug/l.

EPA Method 8015 and 601/602 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE RECEIVED | : 09/26/94 |
| PROJECT # | : 13023 | | |
| PROJECT NAME | : GIANT-BLOOMFIELD | REPORT DATE | : 10/26/94 |

ATI ID: 409415

| ATI # | CLIENT DESCRIPTION | MATRIX | DATE COLLECTED |
|---|---|---|---|
| 01 | MW3-1 | AQUEOUS | 09/23/94 |
| 02 | MW2-1 | AQUEOUS | 09/22/94 |
| 03 | MW4-1 | AQUEOUS | 09/23/94 |
| 04 | TRIP BLANK | AQUEOUS | 09/14/94 |

---TOTALS---

| MATRIX | #SAMPLES |
|---|---|
| AQUEOUS | 4 |

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

# METALS RESULTS

ATI I.D. : 409415

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD

DATE RECEIVED : 09/26/94
REPORT DATE : 10/26/94

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| SILVER (EPA 200.7/6010) | MG/L | <0.010 | <0.010 | <0.010 |
| ARSENIC (EPA 206.2/7060) | MG/L | <0.005 | <0.005 | <0.005 |
| BERYLLIUM (EPA 200.7/6010) | MG/L | <0.004 | <0.004 | <0.004 |
| CADMIUM (EPA 213.2/7131) | MG/L | <0.0005 | <0.0005 | <0.0005 |
| CHROMIUM (EPA 200.7/6010) | MG/L | <0.010 | 0.010 | <0.010 |
| COPPER (EPA 200.7/6010) | MG/L | <0.010 | 0.012 | <0.010 |
| MERCURY (EPA 245.1/7470) | MG/L | <0.0002 | <0.0002 | <0.0002 |
| NICKEL (EPA 200.7/6010) | MG/L | <0.020 | <0.020 | <0.020 |
| LEAD (EPA 239.2/7421) | MG/L | <0.002 | <0.002 | <0.002 |
| ANTIMONY (EPA 200.7/6010) | MG/L | <0.05 | <0.05 | <0.05 |
| SELENIUM (EPA 270.2/7740) | MG/L | <0.005 | <0.005 | <0.005 |
| THALLIUM (EPA 279.2/7841) | MG/L | <0.005 | <0.005 | <0.005 |
| ZINC (EPA 200.7/6010) | MG/L | 0.023 | 0.032 | 0.026 |

Analytical Technologies, Inc.

# METALS - QUALITY CONTROL

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD ATI I.D. : 409415

| PARAMETER | UNITS | ATI I.D. | SAMPLE RESULT | DUP. RESULT | RPD | SPIKED SAMPLE | SPIKE CONC | % REC |
|---|---|---|---|---|---|---|---|---|
| SILVER | MG/L | 40941503 | <0.010 | <0.010 | NA | 0.426 | 0.500 | 85 |
| ARSENIC | MG/L | 40941501 | <0.005 | <0.005 | NA | 0.041 | 0.050 | 82 |
| BERYLLIUM | MG/L | 40941503 | <0.004 | <0.004 | NA | 0.451 | 0.500 | 90 |
| CADMIUM | MG/L | 40941501 | <0.0005 | <0.0005 | NA | MSA | CC= | .9976 |
| CHROMIUM | MG/L | 40941503 | <0.010 | <0.010 | NA | 0.886 | 1.00 | 89 |
| COPPER | MG/L | 40941503 | <0.010 | <0.010 | NA | 0.454 | 0.500 | 91 |
| MERCURY | MG/L | 40941502 | <0.0002 | <0.0002 | NA | 0.0047 | 0.0050 | 94 |
| NICKEL | MG/L | 40941503 | <0.020 | <0.020 | NA | 0.889 | 1.00 | 89 |
| LEAD | MG/L | 40941501 | <0.002 | <0.002 | NA | MSA | CC= | .9998 |
| ANTIMONY | MG/L | 40941503 | <0.05 | <0.05 | NA | 0.88 | 1.00 | 88 |
| SELENIUM | MG/L | 40941501 | <0.005 | <0.005 | NA | 0.031 | 0.050 | 62 |
| THALLIUM | MG/L | 40941501 | <0.005 | <0.005 | NA | 0.048 | 0.050 | 96 |
| ZINC | MG/L | 40941503 | 0.026 | 0.027 | 4 | 0.502 | 0.500 | 95 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS/AROMATICS (EPA 601/602)
CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409415
PROJECT # : 13023
PROJECT NAME : GIANT-BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 01 | MW3-1 | AQUEOUS | 09/23/94 | NA | 09/28/94 | 1 |
| 02 | MW2-1 | AQUEOUS | 09/22/94 | NA | 09/28/94 | 1 |
| 03 | MW4-1 | AQUEOUS | 09/23/94 | NA | 09/28/94 | 1 |

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| BENZENE | UG/L | <0.5 | 640 D(10) | 2.1 |
| BROMODICHLOROMETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| BROMOFORM | UG/L | <0.5 | <0.5 | <0.5 |
| BROMOMETHANE | UG/L | <1.0 | <1.0 | <1.0 |
| CARBON TETRACHLORIDE | UG/L | <0.2 | <0.2 | <0.2 |
| CHLOROBENZENE | UG/L | <0.5 | <0.5 | <0.5 |
| CHLOROETHANE | UG/L | <0.5 | <0.5 | <0.5 |
| CHLOROFORM | UG/L | <0.5 | <0.5 | <0.5 |
| CHLOROMETHANE | UG/L | <1.0 | <1.0 | <1.0 |
| DIBROMOCHLOROMETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| 1,2-DIBROMOETHANE (EDB) | UG/L | <0.2 | <0.2 | <0.2 |
| 1,2-DICHLOROBENZENE | UG/L | <0.5 | <0.5 | <0.5 |
| 1,3-DICHLOROBENZENE | UG/L | <0.5 | <0.5 | <0.5 |
| 1,4-DICHLOROBENZENE | UG/L | <0.5 | <0.5 | <0.5 |
| 1,1-DICHLOROETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| 1,2-DICHLOROETHANE (EDC) | UG/L | <0.5 | <0.5 | <0.5 |
| 1,1-DICHLOROETHENE | UG/L | <0.2 | <0.2 | <0.2 |
| CIS-1,2-DICHLOROETHENE | UG/L | <0.2 | <0.2 | <0.2 |
| TRANS-1,2-DICHLOROETHENE | UG/L | <1.0 | <1.0 | <1.0 |
| 1,2-DICHLOROPROPANE | UG/L | <0.2 | <0.2 | <0.2 |
| CIS-1,3-DICHLOROPROPENE | UG/L | <0.2 | <0.2 | <0.2 |
| TRANS-1,3-DICHLOROPROPENE | UG/L | <0.2 | <0.2 | <0.2 |
| ETHYLBENZENE | UG/L | <0.5 | 82 D(10) | <0.5 |
| METHYLENE CHLORIDE | UG/L | <2.0 | <2.0 | <2.0 |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| TETRACHLOROETHENE | UG/L | <0.5 | <0.5 | <0.5 |
| TOLUENE | UG/L | <0.5 | 600 D(10)B | <0.5 |
| 1,1,1-TRICHLOROETHANE | UG/L | <1.0 | <1.0 | <1.0 |
| 1,1,2-TRICHLOROETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| TRICHLOROETHENE | UG/L | <0.2 | <0.2 | <0.2 |
| TRICHLOROFLUOROMETHANE | UG/L | <0.2 | <0.2 | <0.2 |
| VINYL CHLORIDE | UG/L | <0.5 | <0.5 | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 | 690 D(10) | 1.2 |
| SURROGATES: | | | | |
| BROMOCHLOROMETHANE (%) | | 106 | 98 | 99 |
| TRIFLUOROTOLUENE (%) | | 103 | 94 D(10) | 101 |

D(10)=DILUTED 10X, ANALYZED 09/28/94
B=FOUND IN ASSOCIATED WATER REAGENT BLANK

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : PURGEABLE HALOCARBONS/AROMATICS (EPA 601/602)
CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409415
PROJECT # : 13023
PROJECT NAME : GIANT-BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 04 | TRIP BLANK | AQUEOUS | 09/14/94 | NA | 09/28/94 | 1 |

| PARAMETER | UNITS | 04 |
|---|---|---|
| BENZENE | UG/L | <0.5 |
| BROMODICHLOROMETHANE | UG/L | <0.2 |
| BROMOFORM | UG/L | <0.5 |
| BROMOMETHANE | UG/L | <1.0 |
| CARBON TETRACHLORIDE | UG/L | <0.2 |
| CHLOROBENZENE | UG/L | <0.5 |
| CHLOROETHANE | UG/L | <0.5 |
| CHLOROFORM | UG/L | <0.5 |
| CHLOROMETHANE | UG/L | <1.0 |
| DIBROMOCHLOROMETHANE | UG/L | <0.2 |
| 1,2-DIBROMOETHANE (EDB) | UG/L | <0.2 |
| 1,2-DICHLOROBENZENE | UG/L | <0.5 |
| 1,3-DICHLOROBENZENE | UG/L | <0.5 |
| 1,4-DICHLOROBENZENE | UG/L | <0.5 |
| 1,1-DICHLOROETHANE | UG/L | <0.2 |
| 1,2-DICHLOROETHANE (EDC) | UG/L | <0.5 |
| 1,1-DICHLOROETHENE | UG/L | <0.2 |
| CIS-1,2-DICHLOROETHENE | UG/L | <0.2 |
| TRANS-1,2-DICHLOROETHENE | UG/L | <1.0 |
| 1,2-DICHLOROPROPANE | UG/L | <0.2 |
| CIS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| TRANS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| ETHYLBENZENE | UG/L | <0.5 |
| METHYLENE CHLORIDE | UG/L | <2.0 |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | <0.2 |
| TETRACHLOROETHENE | UG/L | <0.5 |
| TOLUENE | UG/L | <0.5 |
| 1,1,1-TRICHLOROETHANE | UG/L | <1.0 |
| 1,1,2-TRICHLOROETHANE | UG/L | <0.2 |
| TRICHLOROETHENE | UG/L | <0.2 |
| TRICHLOROFLUOROMETHANE | UG/L | <0.2 |
| VINYL CHLORIDE | UG/L | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 |
| SURROGATES: | | |
| BROMOCHLOROMETHANE (%) | | 98 |
| TRIFLUOROTOLUENE (%) | | 101 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS - QUALITY CONTROL

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 601/602 | ATI I.D. | : 409415 |
| BLANK I.D. | : 092794 | MATRIX | : AQUEOUS |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : NA |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/27/94 |
| PROJECT NAME | : GIANT-BLOOMFIELD | DIL. FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| BENZENE | UG/L | <0.5 |
| BROMODICHLOROMETHANE | UG/L | <0.2 |
| BROMOFORM | UG/L | <0.5 |
| BROMOMETHANE | UG/L | <1.0 |
| CARBON TETRACHLORIDE | UG/L | <0.2 |
| CHLOROBENZENE | UG/L | <0.5 |
| CHLOROETHANE | UG/L | <0.5 |
| CHLOROFORM | UG/L | <0.5 |
| CHLOROMETHANE | UG/L | <1.0 |
| DIBROMOCHLOROMETHANE | UG/L | <0.2 |
| 1,2-DIBROMOETHANE (EDB) | UG/L | <0.2 |
| 1,2-DICHLOROBENZENE | UG/L | <0.5 |
| 1,3-DICHLOROBENZENE | UG/L | <0.5 |
| 1,4-DICHLOROBENZENE | UG/L | <0.5 |
| 1,1-DICHLOROETHANE | UG/L | <0.2 |
| 1,2-DICHLOROETHANE (EDC) | UG/L | <0.5 |
| 1,1-DICHLOROETHENE | UG/L | <0.2 |
| CIS-1,2-DICHLOROETHENE | UG/L | <0.2 |
| TRANS-1,2-DICHLOROETHENE | UG/L | <1.0 |
| 1,2-DICHLOROPROPANE | UG/L | <0.2 |
| CIS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| TRANS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| ETHYLBENZENE | UG/L | <0.5 |
| METHYLENE CHLORIDE | UG/L | <2.0 |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | <0.2 |
| TETRACHLOROETHENE | UG/L | <0.5 |
| TOLUENE | UG/L | 0.7 |
| 1,1,1-TRICHLOROETHANE | UG/L | <1.0 |
| 1,1,2-TRICHLOROETHANE | UG/L | <0.2 |
| TRICHLOROETHENE | UG/L | <0.2 |
| TRICHLOROFLUOROMETHANE | UG/L | <0.2 |
| VINYL CHLORIDE | UG/L | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 |
| | | |
| SURROGATES: | | |
| BROMOCHLOROMETHANE (%) | | 101 |
| TRIFLUOROTOLUENE (%) | | 107 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS - QUALITY CONTROL

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 601/602 | ATI I.D. | : 409415 |
| BLANK I.D. | : 092794B | MATRIX | : AQUEOUS |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : NA |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/28/94 |
| PROJECT NAME | : GIANT-BLOOMFIELD | DIL. FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| BENZENE | UG/L | <0.5 |
| BROMODICHLOROMETHANE | UG/L | <0.2 |
| BROMOFORM | UG/L | <0.5 |
| BROMOMETHANE | UG/L | <1.0 |
| CARBON TETRACHLORIDE | UG/L | <0.2 |
| CHLOROBENZENE | UG/L | <0.5 |
| CHLOROETHANE | UG/L | <0.5 |
| CHLOROFORM | UG/L | <0.5 |
| CHLOROMETHANE | UG/L | <1.0 |
| DIBROMOCHLOROMETHANE | UG/L | <0.2 |
| 1,2-DIBROMOETHANE (EDB) | UG/L | <0.2 |
| 1,2-DICHLOROBENZENE | UG/L | <0.5 |
| 1,3-DICHLOROBENZENE | UG/L | <0.5 |
| 1,4-DICHLOROBENZENE | UG/L | <0.5 |
| 1,1-DICHLOROETHANE | UG/L | <0.2 |
| 1,2-DICHLOROETHANE (EDC) | UG/L | <0.5 |
| 1,1-DICHLOROETHENE | UG/L | <0.2 |
| CIS-1,2-DICHLOROETHENE | UG/L | <0.2 |
| TRANS-1,2-DICHLOROETHENE | UG/L | <1.0 |
| 1,2-DICHLOROPROPANE | UG/L | <0.2 |
| CIS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| TRANS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| ETHYLBENZENE | UG/L | <0.5 |
| METHYLENE CHLORIDE | UG/L | <2.0 |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | <0.2 |
| TETRACHLOROETHENE | UG/L | <0.5 |
| TOLUENE | UG/L | 0.6 |
| 1,1,1-TRICHLOROETHANE | UG/L | <1.0 |
| 1,1,2-TRICHLOROETHANE | UG/L | <0.2 |
| TRICHLOROETHENE | UG/L | <0.2 |
| TRICHLOROFLUOROMETHANE | UG/L | <0.2 |
| VINYL CHLORIDE | UG/L | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 |
| | | |
| SURROGATES: | | |
| *BROMOCHLOROMETHANE* (%) | | 106 |
| TRIFLUOROTOLUENE (%) | | 110 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS - QUALITY CONTROL

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 601/602 | ATI I.D. | : 409415 |
| BLANK I.D. | : 092894 | MATRIX | : AQUEOUS |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : NA |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/28/94 |
| PROJECT NAME | : GIANT-BLOOMFIELD | DIL. FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| BENZENE | UG/L | <0.5 |
| BROMODICHLOROMETHANE | UG/L | <0.2 |
| BROMOFORM | UG/L | <0.5 |
| BROMOMETHANE | UG/L | <1.0 |
| CARBON TETRACHLORIDE | UG/L | <0.2 |
| CHLOROBENZENE | UG/L | <0.5 |
| CHLOROETHANE | UG/L | <0.5 |
| CHLOROFORM | UG/L | <0.5 |
| CHLOROMETHANE | UG/L | <1.0 |
| DIBROMOCHLOROMETHANE | UG/L | <0.2 |
| 1,2-DIBROMOETHANE (EDB) | UG/L | <0.2 |
| 1,2-DICHLOROBENZENE | UG/L | <0.5 |
| 1,3-DICHLOROBENZENE | UG/L | <0.5 |
| 1,4-DICHLOROBENZENE | UG/L | <0.5 |
| 1,1-DICHLOROETHANE | UG/L | <0.2 |
| 1,2-DICHLOROETHANE (EDC) | UG/L | <0.5 |
| 1,1-DICHLOROETHENE | UG/L | <0.2 |
| CIS-1,2-DICHLOROETHENE | UG/L | <0.2 |
| TRANS-1,2-DICHLOROETHENE | UG/L | <1.0 |
| 1,2-DICHLOROPROPANE | UG/L | <0.2 |
| CIS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| TRANS-1,3-DICHLOROPROPENE | UG/L | <0.2 |
| ETHYLBENZENE | UG/L | <0.5 |
| METHYLENE CHLORIDE | UG/L | <2.0 |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | <0.2 |
| TETRACHLOROETHENE | UG/L | <0.5 |
| TOLUENE | UG/L | <0.5 |
| 1,1,1-TRICHLOROETHANE | UG/L | <1.0 |
| 1,1,2-TRICHLOROETHANE | UG/L | <0.2 |
| TRICHLOROETHENE | UG/L | <0.2 |
| TRICHLOROFLUOROMETHANE | UG/L | <0.2 |
| VINYL CHLORIDE | UG/L | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 |
| SURROGATES: | | |
| BROMOCHLOROMETHANE (%) | | 95 |
| TRIFLUOROTOLUENE (%) | | 102 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941501

TEST : POLYNUCLEAR AROMATICS (EPA 610)

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE SAMPLED | : 09/23/94 |
| PROJECT # | : 13023 | DATE RECEIVED | : 09/26/94 |
| PROJECT NAME | : BLOOMFIELD | DATE EXTRACTED | : 09/27/94 |
| CLIENT I.D. | : MW3-1 | DATE ANALYZED | : 10/03/94 |
| SAMPLE MATRIX | : AQUEOUS | UNITS | : UG/L |
| | | DILUTION FACTOR | : 1 |

| COMPOUNDS | RESULTS |
|---|---|
| NAPHTHALENE | <0.50 |
| ACENAPHTHYLENE | <1.0 |
| ACENAPHTHENE | <0.50 |
| FLUORENE | <0.10 |
| PHENANTHRENE | <0.05 |
| ANTHRACENE | <0.05 |
| FLUORANTHENE | <0.10 |
| PYRENE | <0.10 |
| BENZO(A)ANTHRACENE | <0.10 |
| CHRYSENE | <0.10 |
| BENZO(B)FLUORANTHENE | <0.10 |
| BENZO(K)FLUORANTHENE | <0.10 |
| BENZO(A)PYRENE | <0.10 |
| DIBENZO(a,h)ANTHRACENE | <0.20 |
| BENZO(g,h,i)PERYLENE | <0.10 |
| INDENO(1,2,3-CD)PYRENE | <0.10 |
| 1-METHYLNAPHTHALENE | <0.30 |
| 2-METHYLNAPHTHALENE | <0.30 |
| SURROGATE PERCENT RECOVERIES | |
| 2-CHLOROANTHRACENE (%) | 81 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941502

TEST : POLYNUCLEAR AROMATICS (EPA 610)

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE SAMPLED | : 09/23/94 |
| PROJECT # | : 13023 | DATE RECEIVED | : 09/26/94 |
| PROJECT NAME | : BLOOMFIELD | DATE EXTRACTED | : 09/27/94 |
| CLIENT I.D. | : MW2-1 | DATE ANALYZED | : 10/11/94 |
| SAMPLE MATRIX | : AQUEOUS | UNITS | : UG/L |
| | | DILUTION FACTOR | : 1 |

| COMPOUNDS | RESULTS |
|---|---|
| NAPHTHALENE | 8.9 |
| ACENAPHTHYLENE | <1.0 |
| ACENAPHTHENE | <0.50 |
| FLUORENE | 1.2 |
| PHENANTHRENE | 1.8 D |
| ANTHRACENE | <0.05 |
| FLUORANTHENE | 1.2 |
| PYRENE | <0.10 |
| BENZO(A)ANTHRACENE | <0.10 |
| CHRYSENE | 0.17 |
| BENZO(B)FLUORANTHENE | <0.10 |
| BENZO(K)FLUORANTHENE | <0.10 |
| BENZO(A)PYRENE | <0.10 |
| DIBENZO(a,h)ANTHRACENE | <0.20 |
| BENZO(g,h,i)PERYLENE | <0.10 |
| INDENO(1,2,3-CD)PYRENE | <0.10 |
| 1-METHYLNAPHTHALENE | 5.9 |
| 2-METHYLNAPHTHALENE | 5.8 |
| SURROGATE PERCENT RECOVERIES | |
| 2-CHLOROANTHRACENE (%) | 86 |

Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941503

TEST : POLYNUCLEAR AROMATICS (EPA 610)

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE SAMPLED | : 09/23/94 |
| PROJECT # | : 13023 | DATE RECEIVED | : 09/26/94 |
| PROJECT NAME | : BLOOMFIELD | DATE EXTRACTED | : 09/27/94 |
| CLIENT I.D. | : MW4-1 | DATE ANALYZED | : 10/03/94 |
| SAMPLE MATRIX | : AQUEOUS | UNITS | : UG/L |
| | | DILUTION FACTOR | : 1 |

| COMPOUNDS | RESULTS |
|---|---|
| NAPHTHALENE | <0.50 |
| ACENAPHTHYLENE | <1.0 |
| ACENAPHTHENE | <0.50 |
| FLUORENE | <0.10 |
| PHENANTHRENE | <0.05 |
| ANTHRACENE | <0.05 |
| FLUORANTHENE | <0.10 |
| PYRENE | <0.10 |
| BENZO(A)ANTHRACENE | <0.10 |
| CHRYSENE | <0.10 |
| BENZO(B)FLUORANTHENE | <0.10 |
| BENZO(K)FLUORANTHENE | <0.10 |
| BENZO(A)PYRENE | <0.10 |
| DIBENZO(a,h)ANTHRACENE | <0.20 |
| BENZO(g,h,i)PERYLENE | <0.10 |
| INDENO(1,2,3-CD)PYRENE | <0.10 |
| 1-METHYLNAPHTHALENE | <0.30 |
| 2-METHYLNAPHTHALENE | <0.30 |
| SURROGATE PERCENT RECOVERIES | |
| 2-CHLOROANTHRACENE (%) | 83 |

Analytical Technologies, Inc. GAS CHROMATOGRAPHY - RESULTS

REAGENT BLANK

TEST : POLYNUCLEAR AROMATICS (EPA 610)

| | | | |
|---|---|---|---|
| CLIENT | : BURLINGTON ENVIRONMENTAL | ATI I.D. | : 409415 |
| PROJECT # | : 13023 | DATE EXTRACTED | : 09/27/94 |
| PROJECT NAME | : BLOOMFIELD | DATE ANALYZED | : 10/14/94 |
| CLIENT I.D. | : REAGENT BLANK | UNITS | : UG/L |
| | | DILUTION FACTOR | : N/A |

| COMPOUNDS | RESULTS |
|---|---|
| NAPHTHALENE | <0.50 |
| ACENAPHTHYLENE | <1.0 |
| ACENAPHTHENE | <0.50 |
| FLUORENE | <0.10 |
| PHENANTHRENE | <0.05 |
| ANTHRACENE | <0.05 |
| FLUORANTHENE | <0.10 |
| PYRENE | <0.10 |
| BENZO(A)ANTHRACENE | <0.10 |
| CHRYSENE | <0.10 |
| BENZO(B)FLUORANTHENE | <0.10 |
| BENZO(K)FLUORANTHENE | <0.10 |
| BENZO(A)PYRENE | <0.10 |
| DIBENZO(a,h)ANTHRACENE | <0.20 |
| BENZO(g,h,i)PERYLENE | <0.10 |
| INDENO(1,2,3-CD)PYRENE | <0.10 |
| 1-METHYLNAPHTHALENE | <0.30 |
| 2-METHYLNAPHTHALENE | <0.30 |

SURROGATE PERCENT RECOVERIES

| | |
|---|---|
| 2-CHLOROANTHRACENE (%) | 76 |

Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 409415

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD
REF I.D. : 40941501

DATE ANALYZED : 10/03/94
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

| COMPOUNDS | SAMPLE RESULT | CONC. SPIKED | SPIKED SAMPLE | % REC. | DUP. SPIKED SAMPLE | DUP. % REC. | RPD |
|---|---|---|---|---|---|---|---|
| ACENAPHTHYLENE | <1.0 | 20 | 16 | 80 | 18 | 90 | 12 |
| PHENANTHRENE | <0.05 | 2.5 | 2.1 | 84 | 2.3 | 92 | 9 |
| PYRENE | <0.10 | 2.5 | 2.1 | 84 | 2.3 | 92 | 9 |
| DIBENZO(a,h)ANTHRACENE | <0.20 | 5.0 | 3.8 | 76 | 4.1 | 82 | 8 |
| BENZO(k)FLUORANTHENE | <0.10 | 2.5 | 2.1 | 84 | 2.2 | 88 | 5 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : BURLINGTON ENVIRONMENTAL ATI I.D.: 409415

PROJECT # : 13023

PROJECT NAME : GIANT-BLOOMFIELD

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 01 | MW3-1 | AQUEOUS | 09/23/94 | 09/27/94 | 09/28/94 | 1 |
| 02 | MW2-1 | AQUEOUS | 09/22/94 | 09/27/94 | 09/28/94 | 1 |
| 03 | MW4-1 | AQUEOUS | 09/23/94 | 09/27/94 | 09/28/94 | 1 |

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| FUEL HYDROCARBONS | MG/L | <1 | 5 | <1 |
| HYDROCARBON RANGE | | - | C6-C12 | - |
| HYDROCARBONS QUANTITATED USING | | - | GASOLINE | - |
| SURROGATE: | | | | |
| O-TERPHENYL (%) | | 97 | 95 | 98 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | ATI I.D. | : 409415 |
| BLANK I.D. | : 092794 | MATRIX | : AQUEOUS |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/27/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/27/94 |
| PROJECT NAME | : GIANT-BLOOMFIELD | DILUTION FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| FUEL HYDROCARBONS | MG/L | <1 |
| HYDROCARBON RANGE | | - |
| HYDROCARBONS QUANTITATED USING | | - |
| | | |
| SURROGATE: | | |
| O-TERPHENYL (%) | | 98 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - QUALITY CONTROL

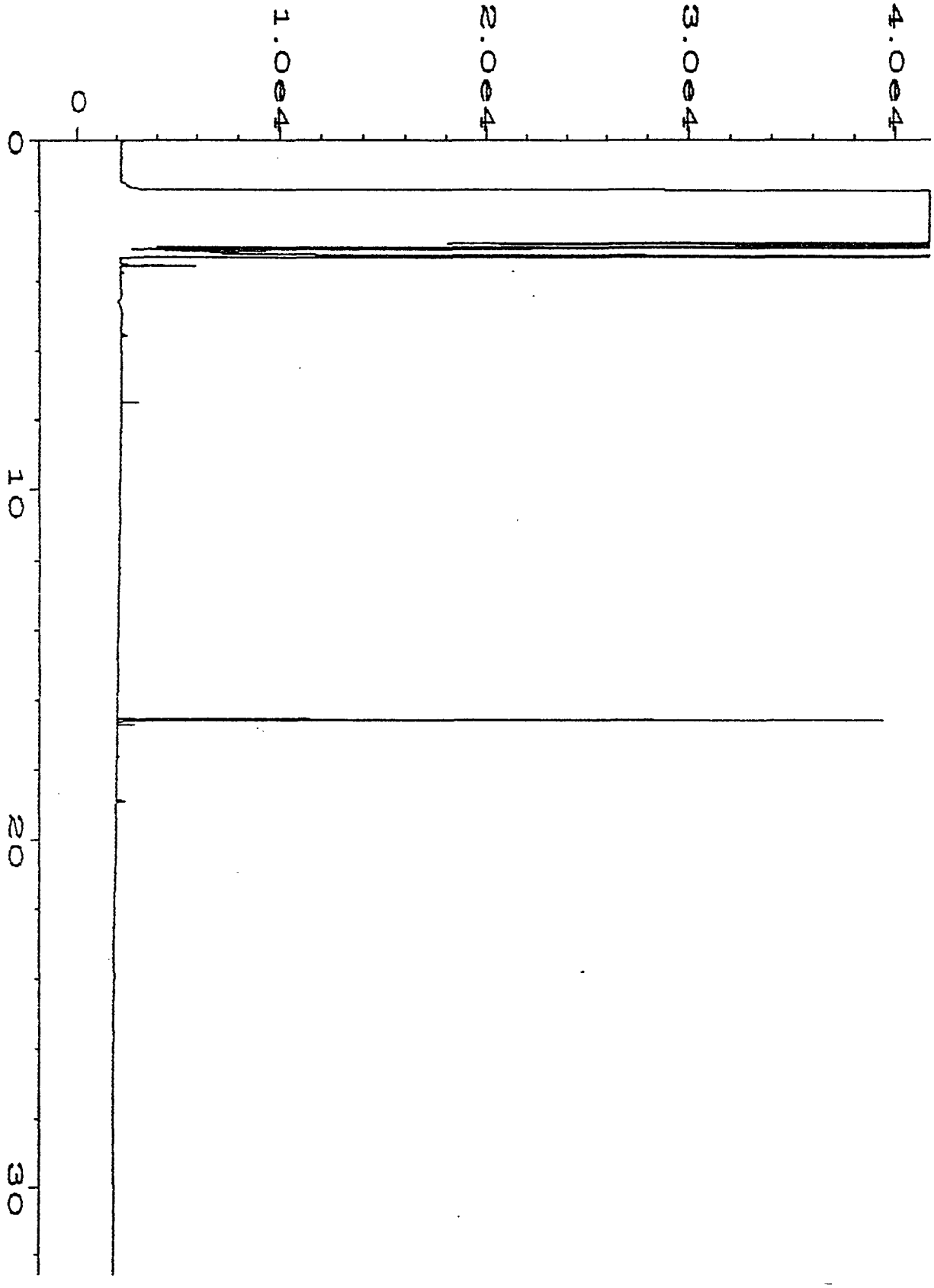
## MSMSD

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | | |
| MSMSD # | : 092794 | ATI I.D. | : 409415 |
| CLIENT | : BURLINGTON ENVIRONMENTAL | DATE EXTRACTED | : 09/27/94 |
| PROJECT # | : 13023 | DATE ANALYZED | : 09/27/94 |
| PROJECT NAME | : GIANT-BLOOMFIELD | SAMPLE MATRIX | : AQUEOUS |
| REF. I.D. | : 092794 | UNITS | : MG/L |

| PARAMETER | SAMPLE RESULT | CONC SPIKE | SPIKED SAMPLE | % REC | DUP SPIKE | DUP % REC | RPD |
|---|---|---|---|---|---|---|---|
| FUEL HYDROCARBONS | <1 | 35 | 35 | 100 | 36 | 103 | 3 |

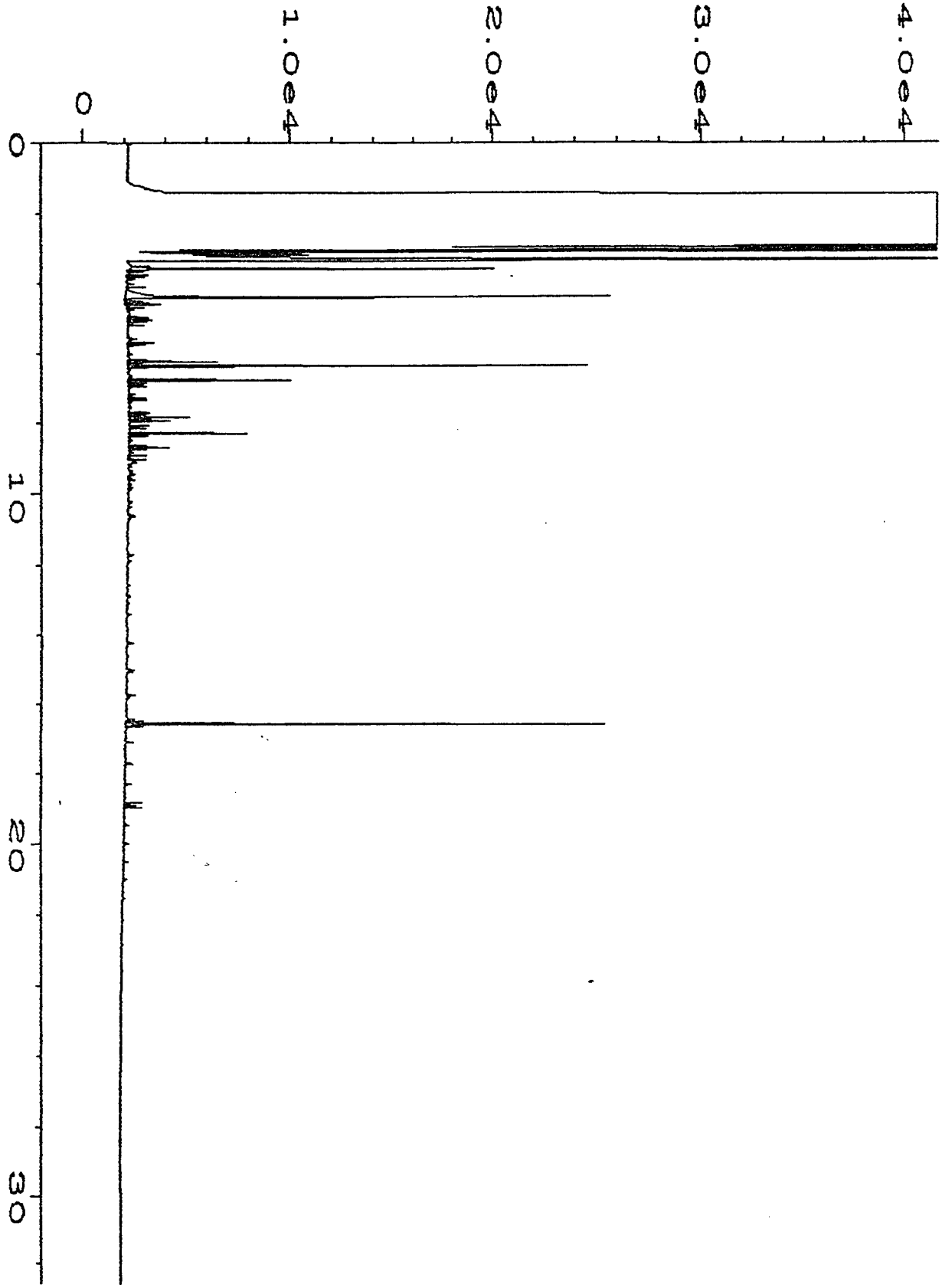
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

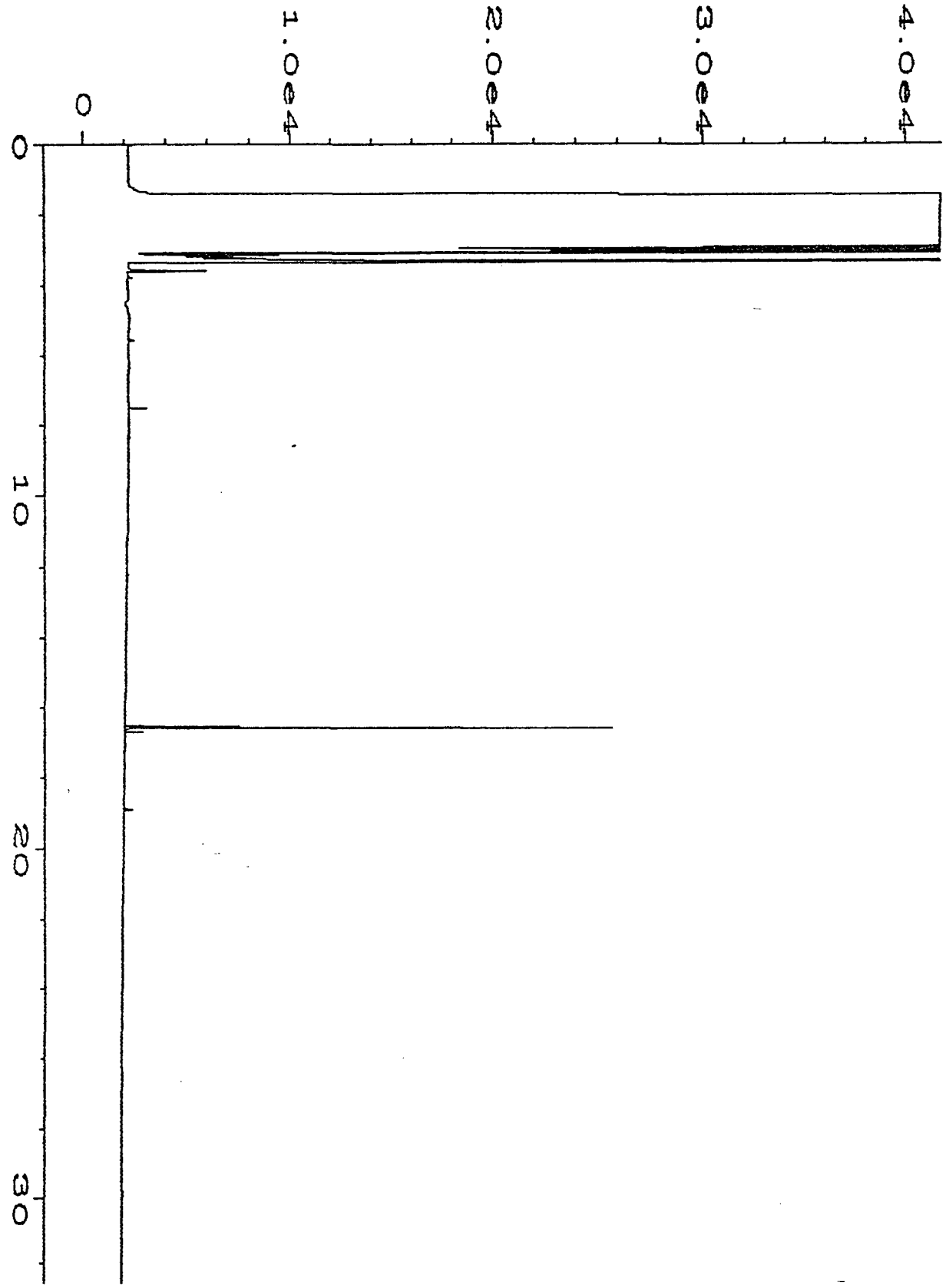



Data File Name : C:\HPCHEM\1\DATA\27SEP94\021F0701.D
Operator : cff & je
Instrument : GC#1 5890
Sample Name : 409415-01
Run Time Bar Code:
Acquired on : 28 Sep 94 03:55 AM
Report Created on: 28 Sep 94 11:06 AM

Page Number : 1
Vial Number : 21
Injection Number : 1
Sequence Line : 7
Instrument Method: SDF0926.MTH
Analysis Method : SDF0926.MTH

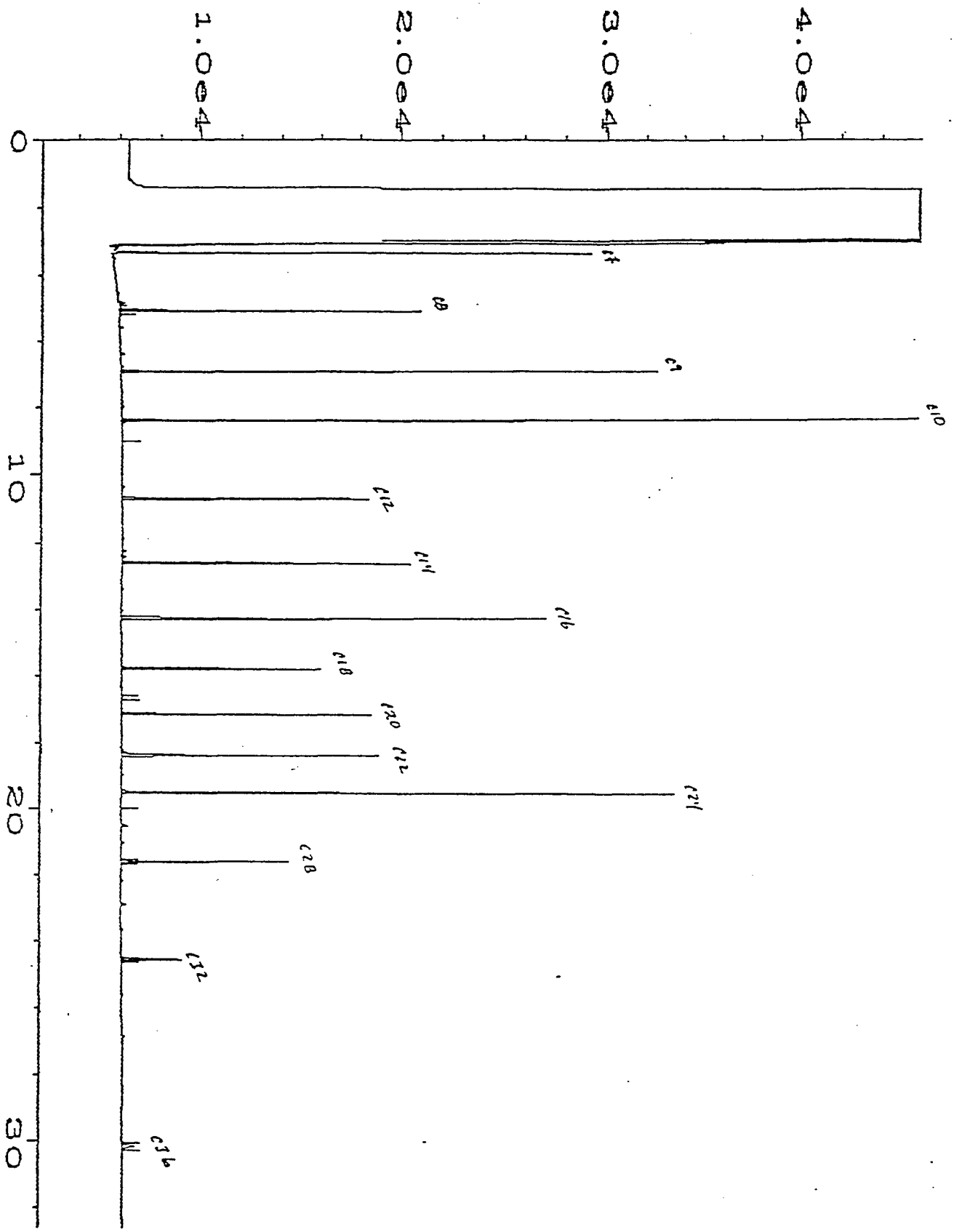



| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\27SEP94\022F0701.D | | |
| Operator | : cff & je | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 22 |
| Sample Name | : 409415-02 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 7 |
| Acquired on | : 28 Sep 94 04:47 AM | Instrument Method | : SDF0926.MTH |
| Report Created on | : 28 Sep 94 11:48 AM | Analysis Method | : SGF0927.MTH |

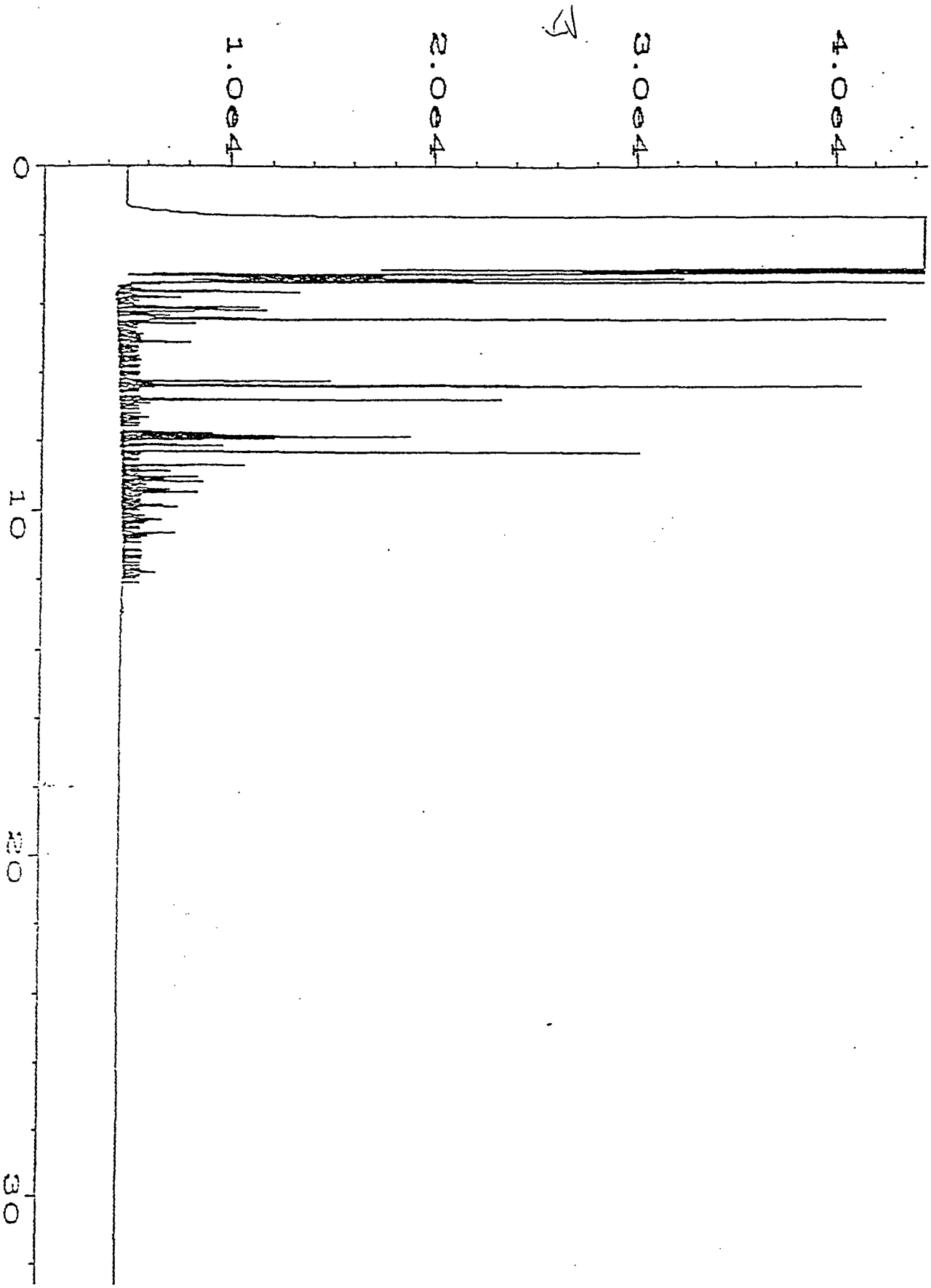



Data File Name : C:\HPCHEM\1\DATA\27SEP94\023F0701.D
Operator : cff & je
Instrument : GC#1 5890
Sample Name : 409415-03
Run Time Bar Code:
Acquired on : 28 Sep 94 05:36 AM
Report Created on: 28 Sep 94 11:51 AM

Page Number : 1
Vial Number : 23
Injection Number : 1
Sequence Line : 7
Instrument Method: SDF0926.MTH
Analysis Method : SDF0926.MTH



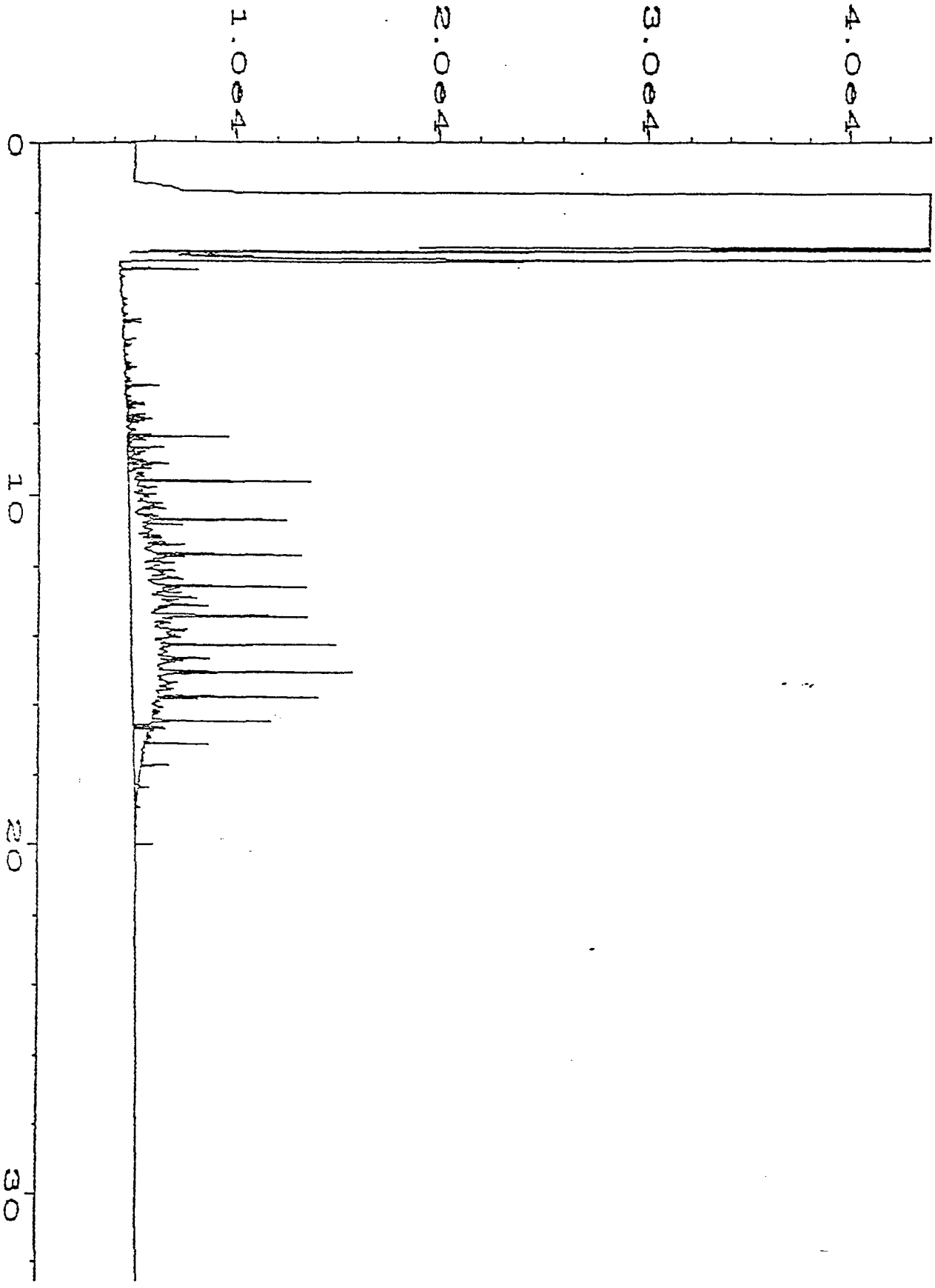

| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\01APR94\011F0701.D | | |
| Operator | : CFF | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 11 |
| Sample Name | : RT STD C7 TO C36 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 7 |
| Acquired on | : 01 Apr 94 06:19 PM | Instrument Method | : SDF0301.MTH |
| Report Created on | : 01 Apr 94 07:03 PM | Analysis Method | : SDF0301.MTH |
| Sample Info | : | | |




Data File Name : C:\HPCHEM\1\DATA\02jun94\002F0101.D
Operator : MNT
Instrument : GC#1 5890
Sample Name : ~~GAS & HVS LCS~~ GAS STD
Run Time Bar Code:
Acquired on : 02 Jun 94 11:31 AM
Report Created on: 02 Jun 94 12:18 PM
Sample Info : GC3-30-11

Page Number : 1
Vial Number : 2
Injection Number : 1
Sequence Line : 1
Instrument Method: SGF0601.MT
Analysis Method : SGF0601.MT

6/15/94




| | | | |
|---|---|---|---|
| ta File Name | : C:\HPCHEM\1\DATA\27jun94\003F0101.D | | |
| erator | : CFF | Page Number | : 1 |
| strument | : GC#1 5890 | Vial Number | : 3 |
| mple Name | : DSL DAILY | Injection Number | : 1 |
| a Time Bar Code: | | Sequence Line | : 1 |
| quired on | : 26 Jun 94 09:55 AM | Instrument Method | : SDF0531.MTH |
| port Created on | : 26 Jun 94 10:30 AM | Analysis Method | : SDF0531.MTH |

BURLINGTON ENVIRONMENTAL
*A Philip Environmental Company*

# Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

(505) 326-2262 Phone
(505) 326-2388 FAX

ATT# 40945

COC Serial No. C 1866

Project Name Giant-Bloomfield
Project Number 13023 Phase . Task 00 77.77
Samplers S. Kelly
Laboratory Name Analytical Technologies, Inc.
Location Albuquerque, N.M.

| | Sample Number (and depth) | Date | Time | Matrix | Total Number of Bottles | Type of Analysis and Bottle: 601/602, 40ml VOA | Mod. 8015, 40ml VOA | 610, 1L Amber | Priority Poll. Metals, 1L Plastic | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 01 | MW3-1 | 9/23/94 | 1530 | H2O | 2 | X | | | | |
| 01 | MW3-1 | 9/23/94 | 1530 | H2O | 2 | | X | | | |
| 02 | MW2-1 | 9/22/94 | 1630 | H2O | 2 | X | | | | |
| 02 | MW2-1 | 9/22/94 | 1630 | H2O | 2 | | X | | | |
| 03 | MW4-1 | 9/23/94 | 1200 | H2O | 2 | X | | | | |
| 03 | MW4-1 | 9/23/94 | 1200 | H2O | 2 | | X | | | |
| 03 | MW4-1 | 9/23/94 | 1200 | H2O | 2 | | | X | | |
| 01 | MW3-1 | 9/23/94 | 1530 | H2O | 2 | | | X | | |
| 02 | MW2-1 (-02) | 9/22/94 | 1630 | H2O | 2 | | | X | | |
| 01 | MW3-1 | 9/23/94 | 1530 | H2O | ~~2~~ 1 | SK 9/23/94 | | | X | |
| 03 | MW4-1 | 9/23/94 | 1200 | H2O | 1 | | | | X | |

**Relinquished by:**

| Signature | Date | Time |
|---|---|---|
| Sarah Kelly | 9/23/94 | 1900 |
| Sarah Kelly | 9/26/94 | 0837 |

**Received By:**

| Signature | Date | Time |
|---|---|---|
| | 9/26/94 | 0837 |

Samples Iced: ☒ Yes ☐ No

Preservatives (ONLY for Water Samples)

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☒ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☒ Metals ..... Nitric acid ($HNO_3$)
- ☐ TPH (418.1) ..... Sulfuric acid ($H_2SO_4$)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

Carrier:

Airbill No.

Shipping and Lab Notes:

Hand Carried to Lab.

BURLINGTON ENVIRONMENTAL
*A Philip Environmental Company*

# Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

(505) 326-2262 Phone
(505) 326-2388 FAX

ATT# 409415

COC Serial No. C 1867

Project Name Giant-Bloomfield
Project Number 13023 Phase . Task 00777
Samplers S. Kelly
Laboratory Name Analytical Technologies, Inc.
Location Albuquerque, NM

| | Sample Number (and depth) | Date | Time | Matrix | Total Number of Bottles | Type of Analysis and Bottle: Priority Poll. Metals, 1L Plastic | Comments |
|---|---|---|---|---|---|---|---|
| 02 | MW2-1 | 9/22/94 | 1630 | $H_2O$ | 1 | X | |
| 04 | ~~TRIP~~ BLANK | 9/14/94 | 1017 | $H_2O$ | | | |

**Relinquished by:**

| Signature | Date | Time |
|---|---|---|
| Sarah Kelly | 9/23/94 | 1900 |
| Sarah Kelly | 9/26/94 | 0837 |

**Received By:**

| Signature | Date | Time |
|---|---|---|
| | 9/26/94 | 0837 |

**Samples Iced:** ☒ Yes ☐ No

**Preservatives (ONLY for Water Samples)**

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☒ Metals ..... Nitric acid ($HNO_3$)
- ☐ TPH (418.1) ..... Sulfuric acid ($H_2SO_4$)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

Carrier: Airbill No.

Shipping and Lab Notes:
Hand Carried to Lab.

Analytical Technologies, Inc. Albuquerque, NM

# Chain of Custody

DATE 9/26 PAGE 1 OF 1

NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI

COMPANY: **Analytical Technologies, Inc.**

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

**ANALYSIS REQUEST**

| SAMPLE ID | DATE | TIME | MATRIX | LAB ID | TOX | TOC | ORGANIC LEAD | SULFIDE | SURFACTANTS (MBAS) | 632/632 MOD | 619/619 MOD | 610/8310 | 8 RCRA metals | 8240 /TCLP 1311) ZHE | Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020) | Volatile Organics GC/MS (624/8240) | NACE | ASBESTOS | BOD | TOTAL COLIFORM | FECAL COLIFORM | GROSS ALPHA/BETA | RADIUM 226/228 | AIR - O2, CO2, METHANE | AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020) | NUMBER OF CONTAINERS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 409415-01 | 9/23 | 1530 | AQ | 1 | | | | | | | | X | X | | | | | | | | | | | | | 3 |
| -02 | 9/22 | 1630 | | 2 | | | | | | | | X | X | | | | | | | | | | | | | |
| -03 | 9/23 | 1200 | | 3 | | | | | | | | X | X | | | | | | | | | | | | | |

**PROJECT INFORMATION**

PROJECT NUMBER: 409415
PROJECT NAME: RE
QC LEVEL: ~~STD.~~ IV
QC REQUIRED: ~~MS MSD BLANK~~
TAT: ~~STANDARD~~ RUSH!

**SAMPLE RECEIPT**

| | |
|---|---|
| TOTAL NUMBER OF CONTAINERS | 9 |
| CHAIN OF CUSTODY SEALS | Y |
| INTACT? | Y |
| RECEIVED GOOD COND./COLD | Y |
| LAB NUMBER | 409415 |

DUE DATE: 10/10
RUSH SURCHARGE: ____
CLIENT DISCOUNT: 10 %

WO# 4C1007

WATCH HOLD TIMES ON 8310'S

SAMPLES SENT TO:
- SAN DIEGO
- FT. COLLINS
- RENTON
- PENSACOLA
- PORTLAND
- PHOENIX
- FIBERQUANT

**RELINQUISHED BY: 1.**
Signature: [signature] Time: 1000
Printed Name: [signature] Date: 9/26/96
Analytical Technologies, Inc.
Albuquerque

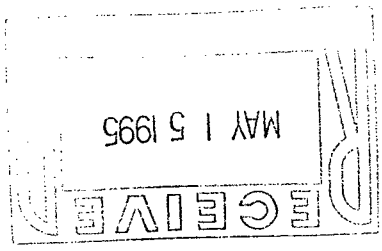
**RECEIVED BY: (LAB) 1.**
Signature: Time:
Printed Name: Date:
Company:

**RELINQUISHED BY: 2.**
Signature: Time:
Printed Name: Date:
Company:

**RECEIVED BY: (LAB) 2.**
Signature: Rosella Vidal 1013
Printed Name: Rosella Vidal Date: 9/27/96
Company: ATI

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR

Inter·Mountain
Laboratories, Inc.




2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

May 11, 1995

Ms. Sarah Kelly
Philip Environmental
4000 Monroe Road
Farmington, NM 87401

Dear Ms. Kelly:

Enclosed are the analytical results for water samples submitted for analyses to Inter-Mountain Labs - Farmington, New Mexico, on May 4, 1995. The samples were analyzed for General Chemistry Parameters, as specified on the accompanying Chain of Custody document.

Tests were performed in accordance with 40 CFR 136, "Guidelines Establishing Test Procedures for Analysis, " as amended.

Please call me if you have any questions or comments concerning the analyses.

Sincerely,

Melissa Klute

Melissa Klute
Water Lab Supervisor
IML - Farmington

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Philip Environmental** | | |
| Project: | Giant-Bloomfield Tank | Date Reported: | 05/10/95 |
| Sample ID: | MW-2 | Date Sampled: | 05/02/95 |
| Laboratory ID: | W00370 | Time Sampled: | 1745 |
| Sample Matrix: | Water | Date Received: | 05/04/95 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 6.7 | s.u. | | |
| Lab Conductivity @ 25° C | 5,010 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 3,180 | mg/L | | |
| Total Dissolved Solids (Calc) | 3,200 | mg/L | | |
| Sodium Absorption Ratio | 12.4 | ratio | | |
| Total Alkalinity as CaCO3 | 910 | mg/L | | |
| Total Hardness as CaCO3 | 885 | mg/L | | |
| Bicarbonate as HCO3 | 1,110 | mg/L | 18.20 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide as OH | 0 | mg/L | 0.00 | meq/L |
| Chloride | 884 | mg/L | 24.93 | meq/L |
| Sulfate | 591 | mg/L | 12.31 | meq/L |
| Calcium | 305 | mg/L | 15.20 | meq/L |
| Magnesium | 30 | mg/L | 2.50 | meq/L |
| Potassium | 2.0 | mg/L | 0.05 | meq/L |
| Sodium | 846 | mg/L | 36.79 | meq/L |
| Cations | | | 54.54 | meq/L |
| Anions | | | 55.45 | meq/L |
| Cation/Anion Difference | | | 0.83 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 18th ed., 1992.

Reported By M. Klute

Reviewed By

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Philip Environmental** | | |
| Project: | Giant-Bloomfield Tank | Date Reported: | 05/10/95 |
| Sample ID: | MW-3 | Date Sampled: | 05/02/95 |
| Laboratory ID: | W00368 | Time Sampled: | 1345 |
| Sample Matrix: | Water | Date Received: | 05/04/95 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 7.2 | s.u. | | |
| Lab Conductivity @ 25° C | 4,420 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 3,860 | mg/L | | |
| Total Dissolved Solids (Calc) | 3,680 | mg/L | | |
| Sodium Absorption Ratio | 7.36 | ratio | | |
| Total Alkalinity as CaCO3 | 523 | mg/L | | |
| Total Hardness as CaCO3 | 1,480 | mg/L | | |
| Bicarbonate as HCO3 | 638 | mg/L | 10.46 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide as OH | 0 | mg/L | 0.00 | meq/L |
| Chloride | 56 | mg/L | 1.58 | meq/L |
| Sulfate | 2,060 | mg/L | 42.96 | meq/L |
| Calcium | 523 | mg/L | 26.10 | meq/L |
| Magnesium | 43 | mg/L | 3.57 | meq/L |
| Potassium | 3.1 | mg/L | 0.08 | meq/L |
| Sodium | 652 | mg/L | 28.36 | meq/L |
| Cations | | | 58.11 | meq/L |
| Anions | | | 56.55 | meq/L |
| Cation/Anion Difference | | | 1.36 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 18th ed., 1992.

Reported By M. Kluta

Reviewed By

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Philip Environmental** | | |
| Project: | Giant-Bloomfield Tank | Date Reported: | 05/10/95 |
| Sample ID: | MW-4 | Date Sampled: | 05/02/95 |
| Laboratory ID: | W00369 | Time Sampled: | 1555 |
| Sample Matrix: | Water | Date Received: | 05/04/95 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 7.2 | s.u. | | |
| Lab Conductivity @ 25° C | 5,360 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 4,530 | mg/L | | |
| Total Dissolved Solids (Calc) | 4,420 | mg/L | | |
| Sodium Absorption Ratio | 10.1 | ratio | | |
| Total Alkalinity as CaCO3 | 577 | mg/L | | |
| Total Hardness as CaCO3 | 1,520 | mg/L | | |
| Bicarbonate as HCO3 | 704 | mg/L | 11.54 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide as OH | 0 | mg/L | 0.00 | meq/L |
| Chloride | 163 | mg/L | 4.61 | meq/L |
| Sulfate | 2,420 | mg/L | 50.49 | meq/L |
| Calcium | 523 | mg/L | 26.10 | meq/L |
| Magnesium | 53 | mg/L | 4.33 | meq/L |
| Potassium | 4.3 | mg/L | 0.11 | meq/L |
| Sodium | 907 | mg/L | 39.47 | meq/L |
| Cations | | | 70.01 | meq/L |
| Anions | | | 66.66 | meq/L |
| Cation/Anion Difference | | | 2.45 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 18th ed., 1992.

Reported By M. Kluta

Reviewed By

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

| | | | |
|---|---|---|---|
| Client: | **Philip Environmental** | | |
| Project: | Giant-Bloomfield Tank | Date Reported: | 05/11/95 |
| Sample ID: | MW-5 | Date Sampled: | 05/03/95 |
| Laboratory ID: | W00367 | Time Sampled: | 1600 |
| Sample Matrix: | Water | Date Received: | 05/04/95 |
| Condition: | Cool/Intact | | |

| Parameter | Analytical Result | Units | | Units |
|---|---|---|---|---|
| Lab pH | 6.9 | s.u. | | |
| Lab Conductivity @ 25° C | 6,000 | umhos/cm | | |
| Total Dissolved Solids @ 180°C | 4,440 | mg/L | | |
| Total Dissolved Solids (Calc) | 4,410 | mg/L | | |
| Sodium Absorption Ratio | 8.84 | ratio | | |
| Total Alkalinity as CaCO3 | 775 | mg/L | | |
| Total Hardness as CaCO3 | 1,790 | mg/L | | |
| Bicarbonate as HCO3 | 945 | mg/L | 15.50 | meq/L |
| Carbonate as CO3 | 0 | mg/L | 0.00 | meq/L |
| Hydroxide as OH | 0 | mg/L | 0.00 | meq/L |
| Chloride | 996 | mg/L | 28.10 | meq/L |
| Sulfate | 1,390 | mg/L | 29.02 | meq/L |
| Calcium | 634 | mg/L | 31.62 | meq/L |
| Magnesium | 51 | mg/L | 4.23 | meq/L |
| Potassium | 6.6 | mg/L | 0.17 | meq/L |
| Sodium | 861 | mg/L | 37.44 | meq/L |
| Cations | | | 73.46 | meq/L |
| Anions | | | 72.62 | meq/L |
| Cation/Anion Difference | | | 0.57 | % |

**Reference:** U.S.E.P.A. 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983.
"Standard Methods For The Examination Of Water And Waste Water", 18th ed., 1992.

Reported By M. Kluth

Reviewed By

# Chain of Custody Record

PHILIP ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401
(505) 326-2262 Phone
(505) 326-2388 FAX

COC Serial No. C 3075

Project Name: Giant-Bloomfield Tank
Project Number: 13023 Phase . Task: 3000 . 77
Samplers: S. Kelly
Laboratory Name: IML
Laboratory Location: Farmington, NM

| Sample Number (and depth) | Date | Time | Matrix | Total Number of Bottles | Type of Analysis and Bottle: General Chemistry | Comments |
|---|---|---|---|---|---|---|
| MW-5 | 5/3/95 | 1000 | H2O | 1 | ✓ | |
| MW-3 | 5/2/95 | 1345 | H2O | 1 | ✓ | |
| MW-4 | 5/2/95 | 1555 | H2O | 1 | ✓ | |
| MW-2 | 5/2/95 | 1745 | H2O | 1 | ✓ | |

**Relinquished by:**

| Signature | Date | Time |
|---|---|---|
| Sarah Kelly | 5/3/95 | 1734 |
| Sarah Kelly | 5/4/95 | 8:02 |

**Received By:**

| Signature | Date | Time |
|---|---|---|
| Dan Comstock | 5/4/95 | 8:02 |

**Samples Iced:** ☒ Yes ☐ No

**Preservatives (ONLY for Water Samples)**

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☐ Metals ..... Nitric acid ($HNO_3$)
- ☐ TPH (418.1) ..... Sulfuric acid ($H_2SO_4$)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

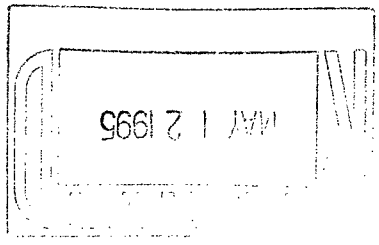
Carrier: Airbill No.

**Shipping and Lab Notes:**

Bill Giant Industries Arizona
Report results to Philip Environmental.

Analytical Technologies, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413




ATI I.D. **505318**

May 11, 1995

Philip Environmental
4000 Monroe Road
Farmington, NM 87401

Project Name/Number: GIANT BLOOMFIELD TANK 13023

Attention: Sarah Kelly

On **05/05/95**, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jt

Enclosure

Analytical Technologies, Inc.

| | | | |
|---|---|---|---|
| CLIENT | : PHILIP ENVIRONMENTAL | DATE RECEIVED | : 05/05/95 |
| PROJECT # | : 13023 | | |
| PROJECT NAME | : GIANT BLOOMFIELD TANK | REPORT DATE | : 05/11/95 |

ATI ID: 505318

| ATI # | CLIENT DESCRIPTION | MATRIX | DATE COLLECTED |
|---|---|---|---|
| 01 | MW-4 | AQUEOUS | 05/02/95 |
| 02 | MW-3 | AQUEOUS | 05/02/95 |
| 03 | MW-52 | AQUEOUS | 05/02/95 |
| 04 | MW-2 | AQUEOUS | 05/02/95 |
| 05 | MW-5 | AQUEOUS | 05/03/95 |
| 06 | TRIP BLANK | AQUEOUS | 04/20/95 |

---TOTALS---

| MATRIX | #SAMPLES |
|---|---|
| AQUEOUS | 6 |

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : PHILIP ENVIRONMENTAL ATI I.D.: 505318

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD TANK

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 01 | MW-4 | AQUEOUS | 05/02/95 | 05/05/95 | 05/05/95 | 1 |
| 02 | MW-3 | AQUEOUS | 05/02/95 | 05/05/95 | 05/05/95 | 1 |
| 03 | MW-52 | AQUEOUS | 05/02/95 | 05/05/95 | 05/05/95 | 1 |

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| FUEL HYDROCARBONS | MG/L | <1 | <1 | 5 |
| HYDROCARBON RANGE | | - | - | C6-C12 |
| HYDROCARBONS QUANTITATED USING | | - | - | GASOLINE |
| SURROGATE: | | | | |
| O-TERPHENYL (%) | | 91 | 91 | 95 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED

CLIENT : PHILIP ENVIRONMENTAL ATI I.D.: 505318

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD TANK

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 04 | MW-2 | AQUEOUS | 05/02/95 | 05/05/95 | 05/05/95 | 1 |
| 05 | MW-5 | AQUEOUS | 05/03/95 | 05/05/95 | 05/05/95 | 1 |

| PARAMETER | UNITS | 04 | 05 |
|---|---|---|---|
| FUEL HYDROCARBONS | MG/L | 3 | <1 |
| HYDROCARBON RANGE | | C6-C10 | - |
| HYDROCARBONS QUANTITATED USING | | GASOLINE | - |
| SURROGATE: | | | |
| O-TERPHENYL (%) | | 98 | 86 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | ATI I.D. | : 505318 |
| BLANK I.D. | : 050595 | MATRIX | : AQUEOUS |
| CLIENT | : PHILIP ENVIRONMENTAL | DATE EXTRACTED | : 05/05/95 |
| PROJECT # | : 13023 | DATE ANALYZED | : 05/05/95 |
| PROJECT NAME | : GIANT BLOOMFIELD TANK | DILUTION FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| FUEL HYDROCARBONS | MG/L | <1 |
| HYDROCARBON RANGE | | - |
| HYDROCARBONS QUANTITATED USING | | - |
| | | |
| SURROGATE: | | |
| O-TERPHENYL (%) | | 97 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - QUALITY CONTROL

## MSMSD

| | | | |
|---|---|---|---|
| TEST | : EPA 8015 MODIFIED | | |
| MSMSD # | : 050595 | ATI I.D. | : 505318 |
| CLIENT | : PHILIP ENVIRONMENTAL | DATE EXTRACTED | : 05/05/95 |
| PROJECT # | : 13023 | DATE ANALYZED | : 05/05/95 |
| PROJECT NAME | : GIANT BLOOMFIELD TANK | SAMPLE MATRIX | : AQUEOUS |
| REF. I.D. | : 050595 | UNITS | : MG/L |

| PARAMETER | SAMPLE RESULT | CONC SPIKE | SPIKED SAMPLE | % REC | DUP SPIKE | DUP % REC | RPD |
|---|---|---|---|---|---|---|---|
| FUEL HYDROCARBONS | <1 | 34 | 30 | 88 | 29 | 85 | 3 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)

CLIENT : PHILIP ENVIRONMENTAL ATI I.D.: 505318

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD TANK

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 01 | MW-4 | AQUEOUS | 05/02/95 | NA | 05/05/95 | 1 |
| 02 | MW-3 | AQUEOUS | 05/02/95 | NA | 05/05/95 | 1 |
| 03 | MW-52 | AQUEOUS | 05/02/95 | NA | 05/05/95 | 5 |

| PARAMETER | UNITS | 01 | 02 | 03 |
|---|---|---|---|---|
| BENZENE | UG/L | <0.5 | <0.5 | 380 |
| TOLUENE | UG/L | <0.5 | <0.5 | 550 |
| ETHYLBENZENE | UG/L | <0.5 | <0.5 | 93 |
| TOTAL XYLENES | UG/L | <0.5 | <0.5 | 830 |
| METHYL-t-BUTYL ETHER | UG/L | <2.5 | <2.5 | <13 |
| SURROGATE: | | | | |
| BROMOFLUOROBENZENE (%) | | 95 | 93 | 104 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)

CLIENT : PHILIP ENVIRONMENTAL ATI I.D.: 505318

PROJECT # : 13023

PROJECT NAME : GIANT BLOOMFIELD TANK

| SAMPLE ID. # | CLIENT I.D. | MATRIX | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | DIL. FACTOR |
|---|---|---|---|---|---|---|
| 04 | MW-2 | AQUEOUS | 05/02/95 | NA | 05/05/95 | 1 |
| 05 | MW-5 | AQUEOUS | 05/03/95 | NA | 05/05/95 | 1 |
| 06 | TRIP BLANK | AQUEOUS | 04/20/95 | NA | 05/05/95 | 1 |

| PARAMETER | UNITS | 04 | 05 | 06 |
|---|---|---|---|---|
| BENZENE | UG/L | 220 | <0.5 | <0.5 |
| TOLUENE | UG/L | 280 | <0.5 | <0.5 |
| ETHYLBENZENE | UG/L | 53 | <0.5 | <0.5 |
| TOTAL XYLENES | UG/L | 430 | <0.5 | <0.5 |
| METHYL-t-BUTYL ETHER | UG/L | <2.5 | <2.5 | <2.5 |
| SURROGATE: | | | | |
| BROMOFLUOROBENZENE (%) | | 82 | 83 | 96 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY RESULTS

## REAGENT BLANK

| | | | |
|---|---|---|---|
| TEST | : BTEX, MTBE (EPA 8020) | ATI I.D. | : 505318 |
| BLANK I.D. | : 050595 | MATRIX | : AQUEOUS |
| CLIENT | : PHILIP ENVIRONMENTAL | DATE EXTRACTED | : NA |
| PROJECT # | : 13023 | DATE ANALYZED | : 05/05/95 |
| PROJECT NAME | : GIANT BLOOMFIELD TANK | DILUTION FACTOR | : 1 |

| PARAMETER | UNITS | |
|---|---|---|
| BENZENE | UG/L | <0.5 |
| TOLUENE | UG/L | <0.5 |
| ETHYLBENZENE | UG/L | <0.5 |
| TOTAL XYLENES | UG/L | <0.5 |
| METHYL-t-BUTYL ETHER | UG/L | <2.5 |
| | | |
| SURROGATE: | | |
| BROMOFLUOROBENZENE (%) | | 95 |

Analytical Technologies, Inc.

# GAS CHROMATOGRAPHY - QUALITY CONTROL

## MSMSD

| | | | |
|---|---|---|---|
| TEST | : BTEX, MTBE (EPA 8020) | | |
| MSMSD # | : 50531805 | ATI I.D. | : 505318 |
| CLIENT | : PHILIP ENVIRONMENTAL | DATE EXTRACTED | : NA |
| PROJECT # | : 13023 | DATE ANALYZED | : 05/05/95 |
| PROJECT NAME | : GIANT BLOOMFIELD TANK | SAMPLE MATRIX | : AQUEOUS |
| REF. I.D. | : 50531805 | UNITS | : UG/L |

| PARAMETER | SAMPLE RESULT | CONC SPIKE | SPIKED SAMPLE | % REC | DUP SPIKE | DUP % REC | RPD |
|---|---|---|---|---|---|---|---|
| BENZENE | <0.5 | 10 | 9.7 | 97 | 10 | 100 | 3 |
| TOLUENE | <0.5 | 10 | 9.8 | 98 | 9.7 | 97 | 1 |
| ETHYLBENZENE | <0.5 | 10 | 9.7 | 97 | 10 | 100 | 3 |
| TOTAL XYLENES | <0.5 | 30 | 30 | 100 | 30 | 100 | 0 |
| METHYL-t-BUTYL ETHER | <2.5 | 20 | 22 | 110 | 22 | 110 | 0 |

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

PHILIP ENVIRONMENTAL

# Chain of Custody Record

AII #505318

4000 Monroe Road
Farmington, NM 87401
(505) 326-2262 Phone
(505) 326-2388 FAX

COC Serial No. C 3076

Project Name Giant-Bloomfield Tank
Project Number 13023 Phase . Task 3000.77
Samplers S. Kelly
Laboratory Name Analytical Technologies, Inc
Location Albuquerque, NM

| Sample Number (and depth) | Date | Time | Matrix | Total Number of Bottles | Type of Analysis and Bottle: BTEX 8020, 40ml VOA | TPH, mod 8015, 40ml VOA | Comments |
|---|---|---|---|---|---|---|---|
| MW-4 | 5/2/95 | 1555 | H2O | 2 | ✓ | | |
| MW-4 | 5/2/95 | 1555 | H2O | 2 | | ✓ | |
| MW-3 | 5/2/95 | 1345 | H2O | 4 | 2 | 2 | |
| MW-5R | 5/2/95 | 1640 | H2O | 4 | 2 | 2 | |
| MW-2 | 5/3/95 | 1745 | H2O | 4 | 2 | 2 | |
| MW-5 | 5/3/95 | 1600 | H2O | 4 | 2 | 2 | |
| Trip Blank | 4-20 | — | AQ | 1 | X | | |

**Relinquished by:**

| Signature | Date | Time |
|---|---|---|
| Mark Kelly | 5/3/95 | 1723 |

**Received By:**

| Signature | Date | Time |
|---|---|---|
| P. Lutes | 5/5/95 | 0955 |

**Samples Iced:** ☒ Yes ☐ No

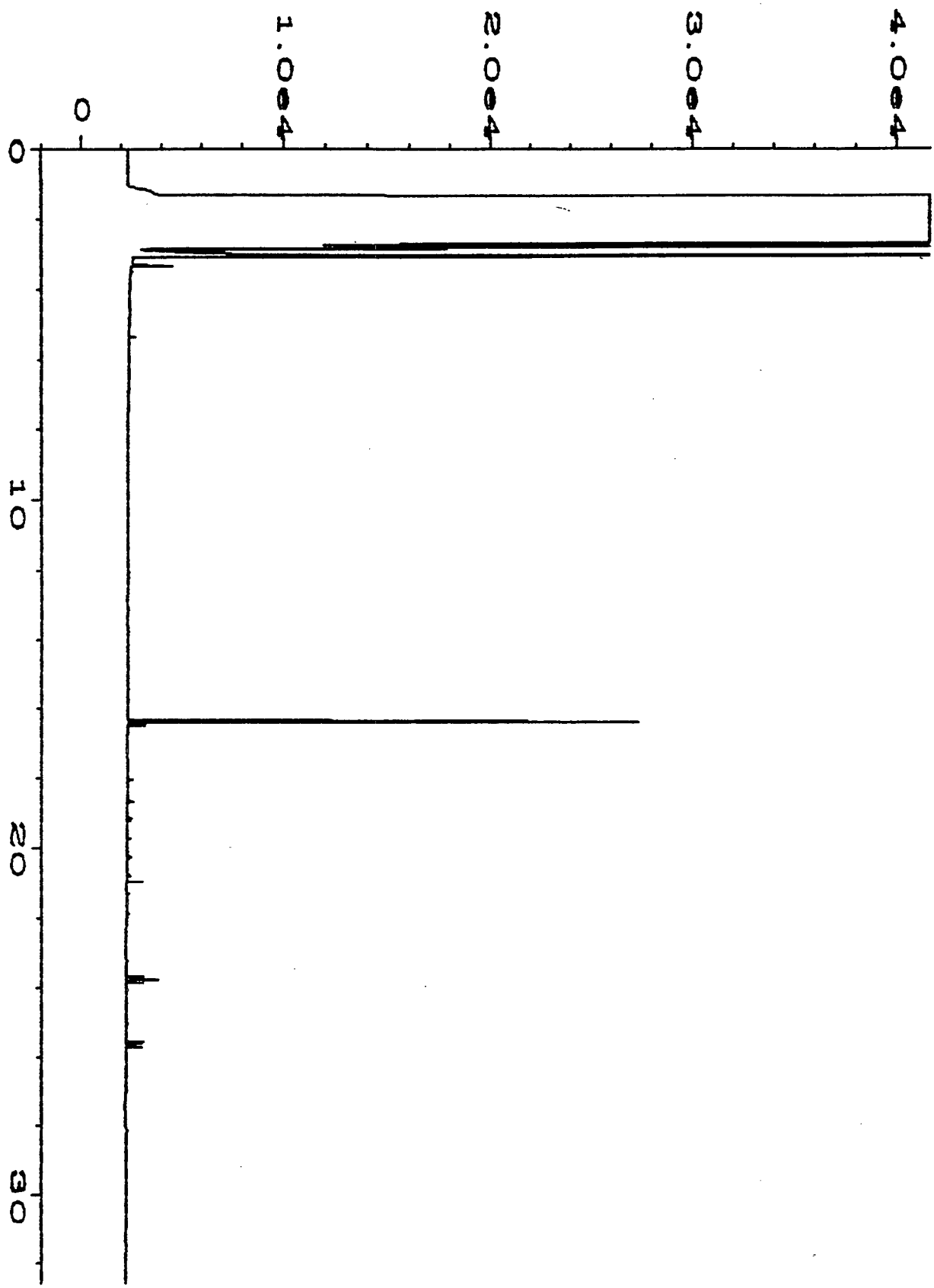
**Preservatives (ONLY for Water Samples)**

- ☐ Cyanide ..... Sodium hyroxide (NaOH)
- ☒ Volatile Organic Analysis ..... Hydrochloric acid (HCl)
- ☐ Metals ..... Nitric acid ($HNO_3$)
- ☐ TPH (418.1) ..... Sulfuric acid ($H_2SO_4$)
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

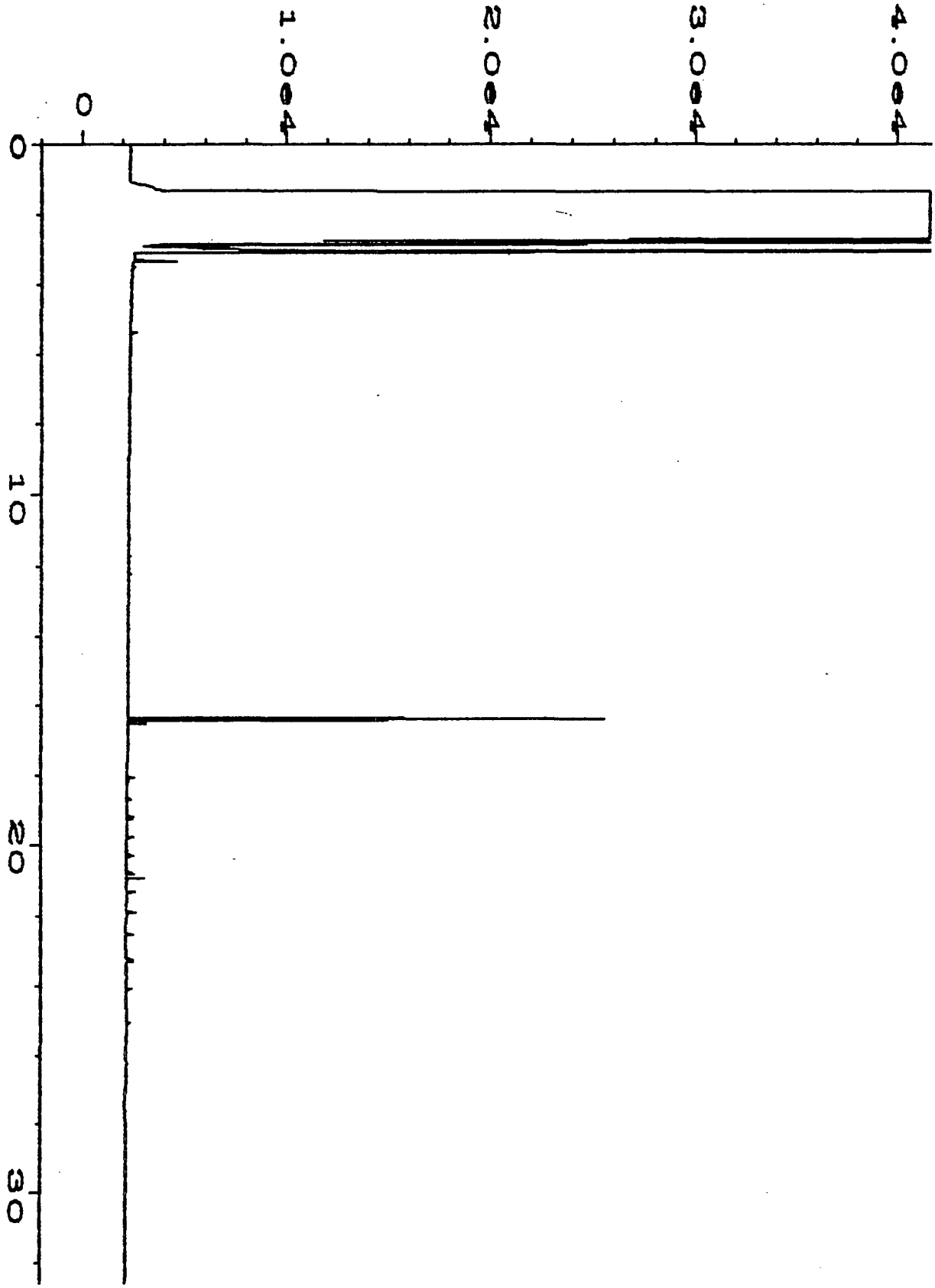
Carrier: Airbill No.

Shipping and Lab Notes: Bill Giant Industries Arizona
Report Results to Philip Environmental.

E-176 4/95




| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\05MAY95\008F0101.D | | |
| Operator | : CF & JE & KM | Page Number | : 1 |
| Instrument | : GC#1 5890 | Vial Number | : 8 |
| Sample Name | : 505318-01 | Injection Number | : 1 |
| Run Time Bar Code: | | Sequence Line | : 1 |
| Acquired on | : 05 May 95 07:47 PM | Instrument Method | : SDF1219.MTH |
| Report Created on | : 05 May 95 08:33 PM | Analysis Method | : SDF1219.MTH |




| | | | |
|---|---|---|---|
| Data File Name | : C:\HPCHEM\1\DATA\05MAY95\009F0101.D | | |
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| Instrument | : GC#1 5890 | Vial Number | : 9 |
| Sample Name | : 505318-02 | Injection Number | : 1 |
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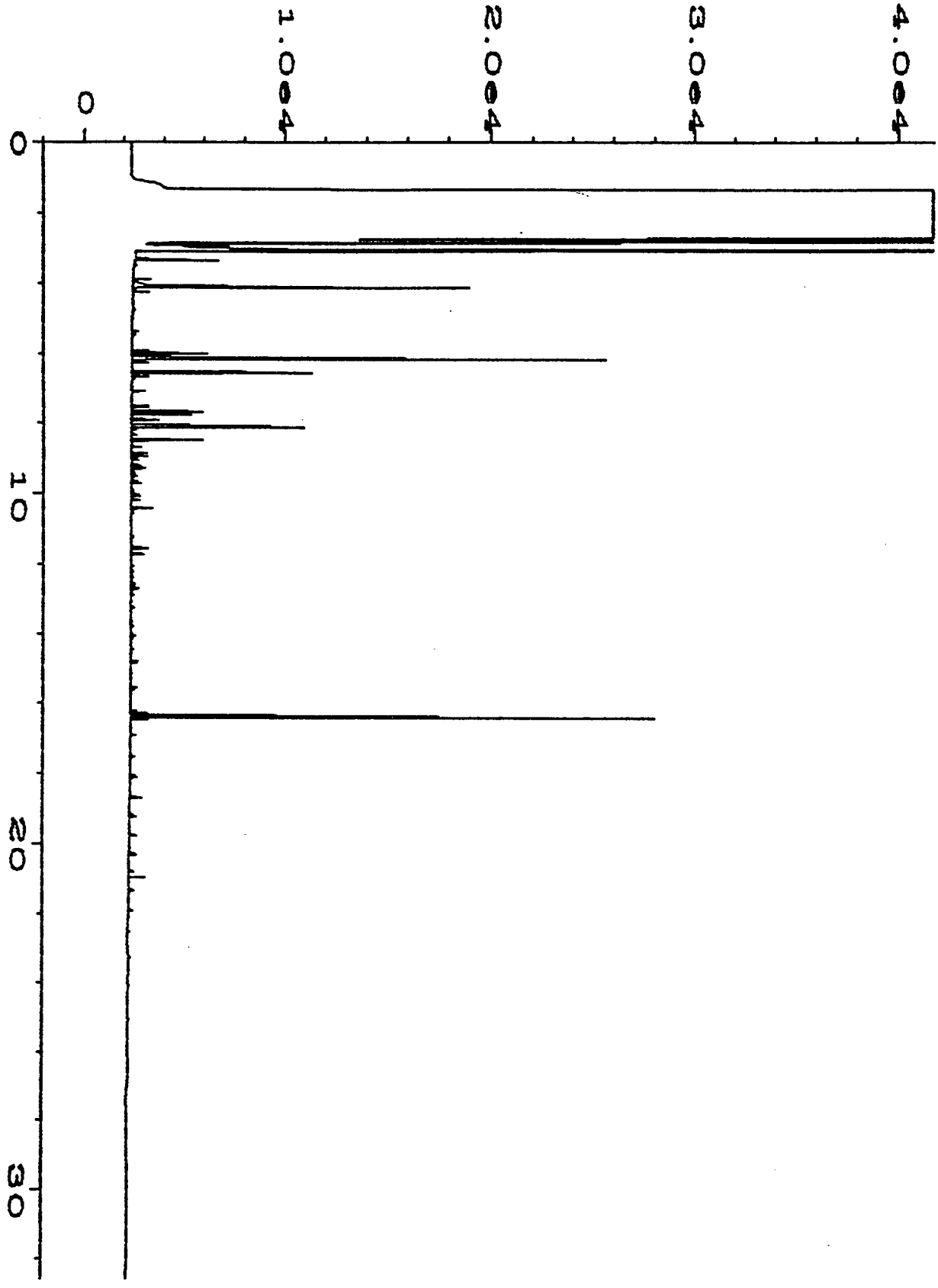


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Instrument : GC#1 5890
Sample Name : 505318-03
Run Time Bar Code:
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Report Created on: 05 May 95 10:03 PM

Page Number : 1
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Sequence Line : 1
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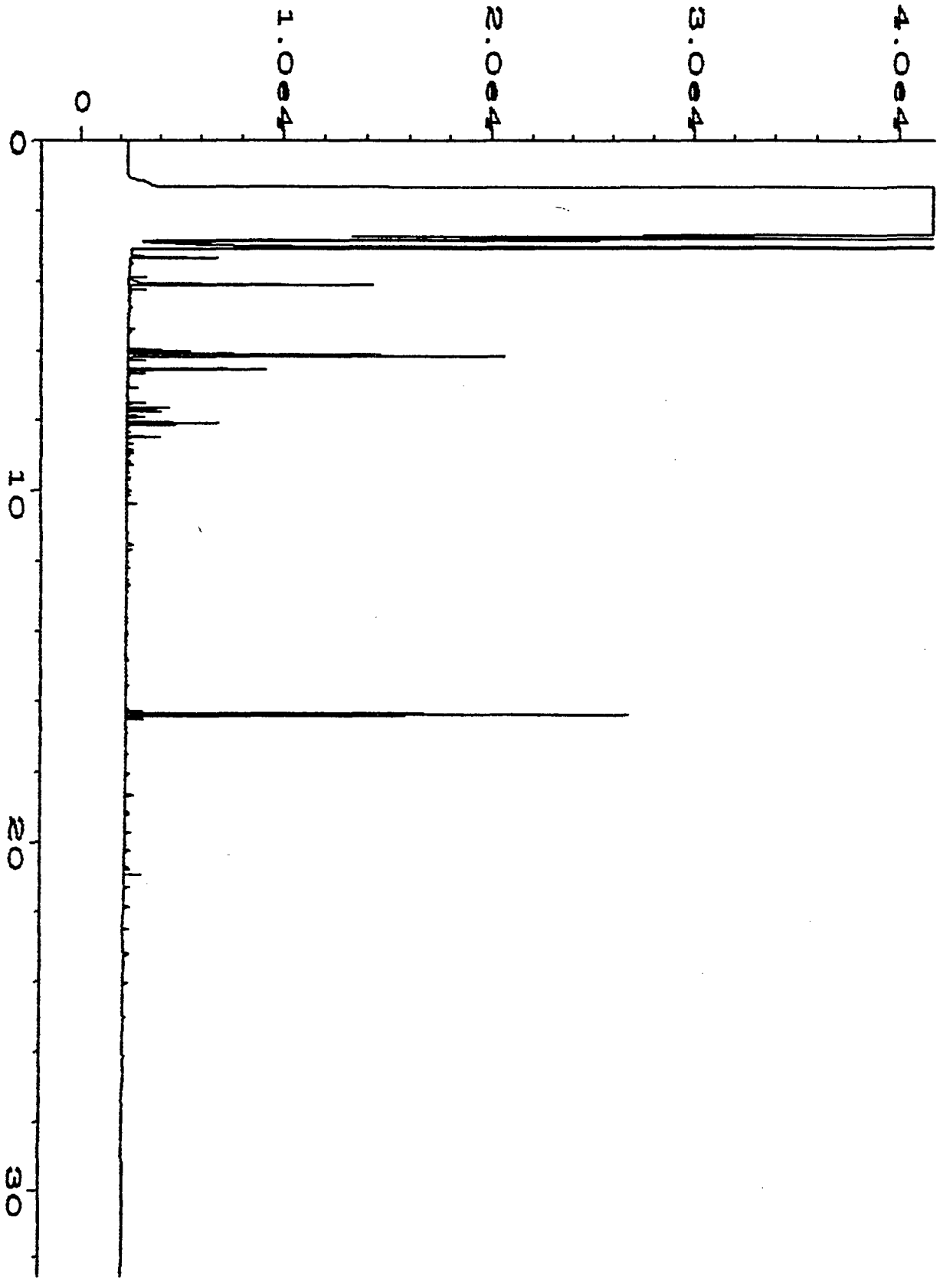


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| Sample Name | : 505318-04 | Injection Number | : 1 |
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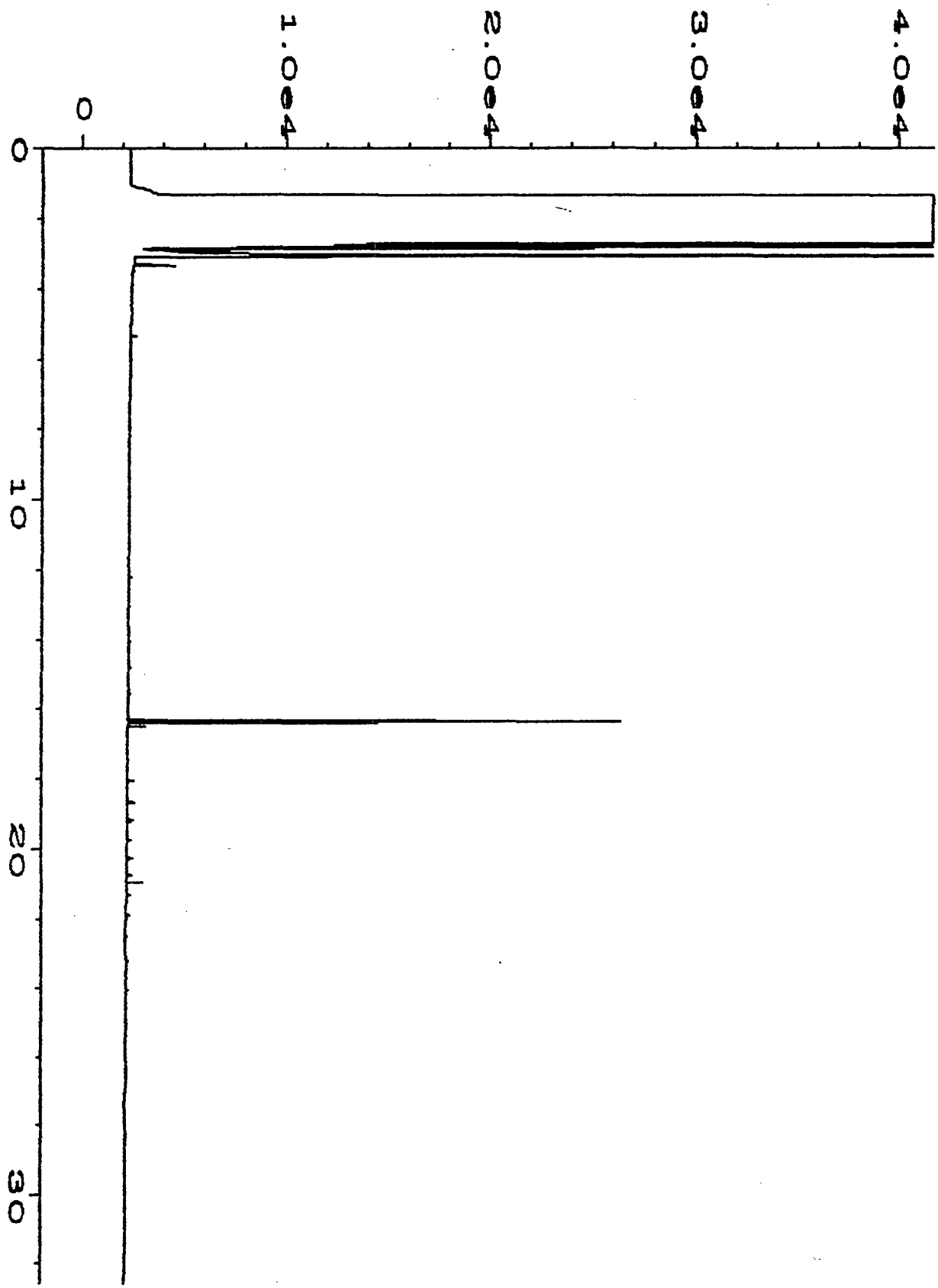


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| Sample Name | : 505318-05 | Injection Number | : 1 |
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| Report Created on | : 05 May 95 11:37 PM | Analysis Method | : SDF1219.MTH |