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REPORTS

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**OIL CONSERVATION DIV.
SANTA FE**

**SITE ASSESSMENT AND PROPOSED ACTION PLAN
FOR THE BLOOMFIELD CRUDE STATION
BLOOMFIELD, NEW MEXICO**

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JAN 17 1995

**OIL CONSERVATION DIV.
SANTA FE**

January 1995

Prepared for:

**Giant Industries Arizona Inc.
Bloomfield, New Mexico**

Project 13023

**BURLINGTON ENVIRONMENTAL INC.
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Site Assessment for the Bloomfield Crude Station Bloomfield, New Mexico

1.0 INTRODUCTION

On September 14, 1994, Giant Industries Arizona, Inc. (Giant) contracted Burlington Environmental Inc. (Burlington) to provide a site assessment at the Bloomfield Crude Station in Bloomfield, New Mexico. During the week starting September 19, 1994, Burlington supervised the installation of four monitoring wells and eight exploratory soil borings. Soil samples were collected from the soil borings, and groundwater samples were collected from the monitoring wells. This report presents the results of this investigation and recommends possible further action.

1.1 Site Location

Giant's Bloomfield Crude Station (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, as shown in Figure 1.

1.2 Site Description

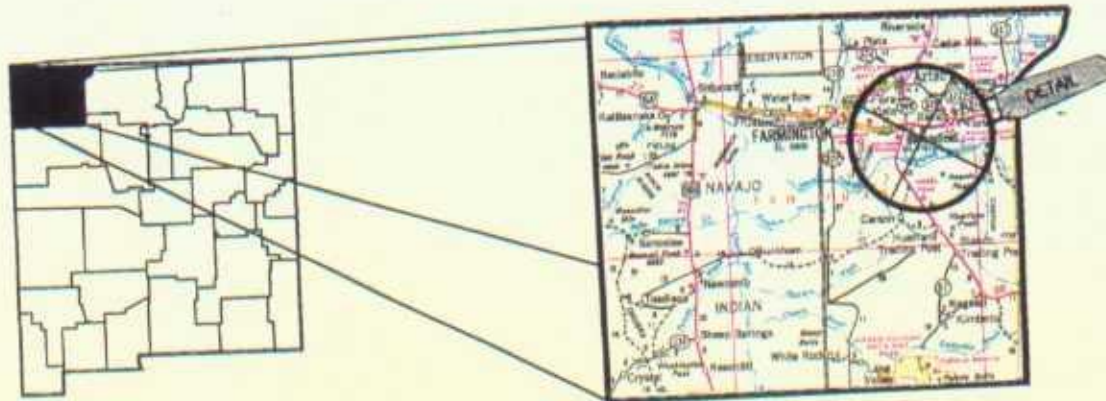
The site covers an area approximately 5.5 acres in size. The site contains several tanks and buildings (see Figure 2). This investigation is centered on Tank 967-D, a 55,000-barrel crude oil storage tank that was constructed in 1956. This tank is not presently in use. Tank 967-D (the tank) is located in the western half of the Bloomfield Crude Station site within a bermed area that is approximately 340 feet by 280 feet.

1.3 Background

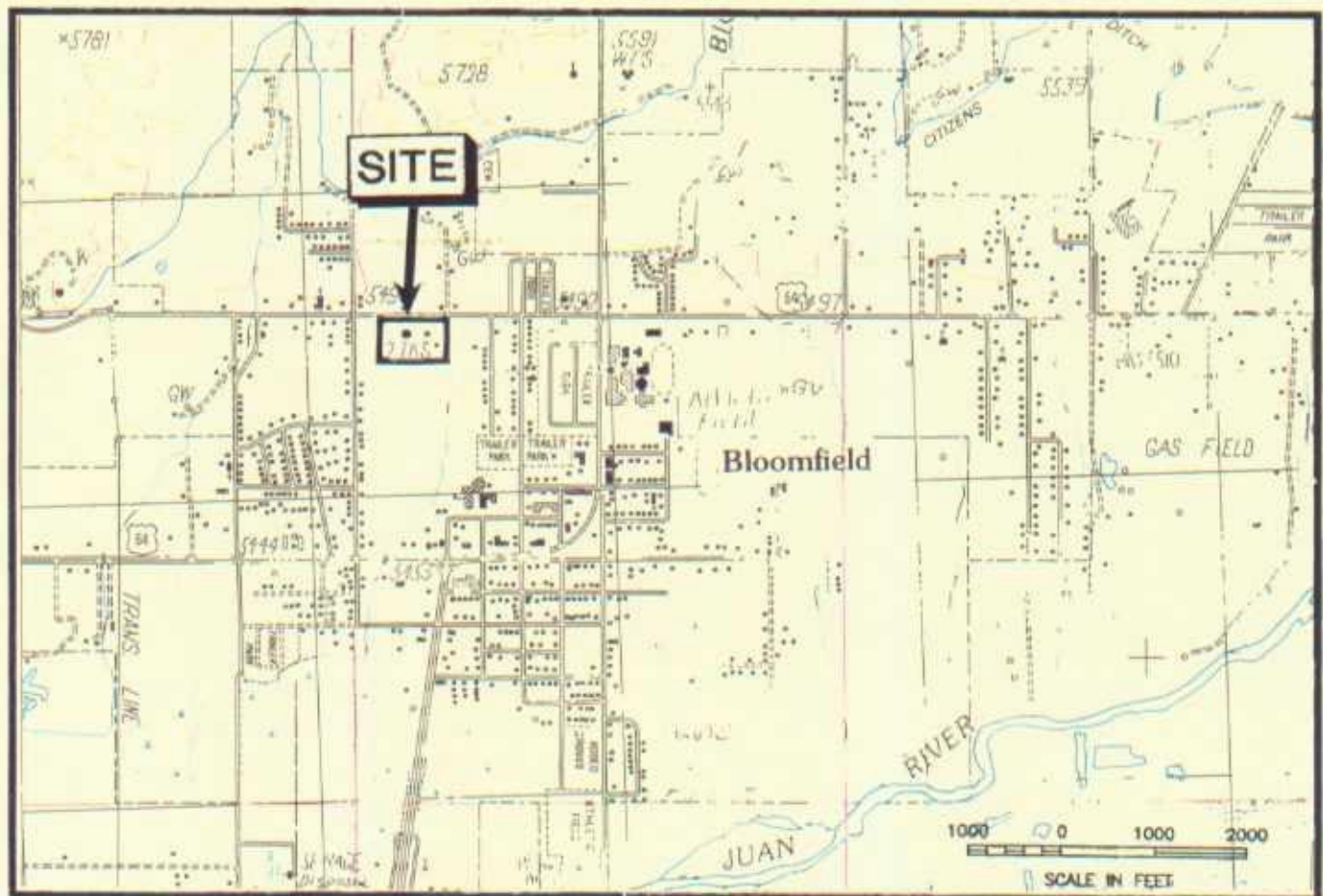
In mid-March, 1994, an excavation was made by backhoe on the east side of the tank to a depth of approximately 12 feet to check for the presence of hydrocarbons in the soil. Soil samples were taken and analyzed by Environmental Protection Agency (EPA) Method 8015 for total petroleum hydrocarbons (TPH) 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 a hydrocarbon release had occurred at the site. The results of this sampling are discussed in a report titled "Initial Site Assessment and Characterization Plan" for the Giant Bloomfield Station that was prepared by Giant and submitted to the NMOCD in May 1994. A letter dated June 23, 1994, from Giant to the NMOCD further clarified the site characterization work plan described in the March 15 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 "Initial Site Assessment and Characterization Plan".

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



COL 13023C-001



BURLINGTON ENVIRONMENTAL
— A Philip Morris Company —

TITLE:

Regional Site Location Map
Bloomfield Crude Station

DWN:

JEN

CHKD:

DES:

APPD:

DATE:

11/11/94

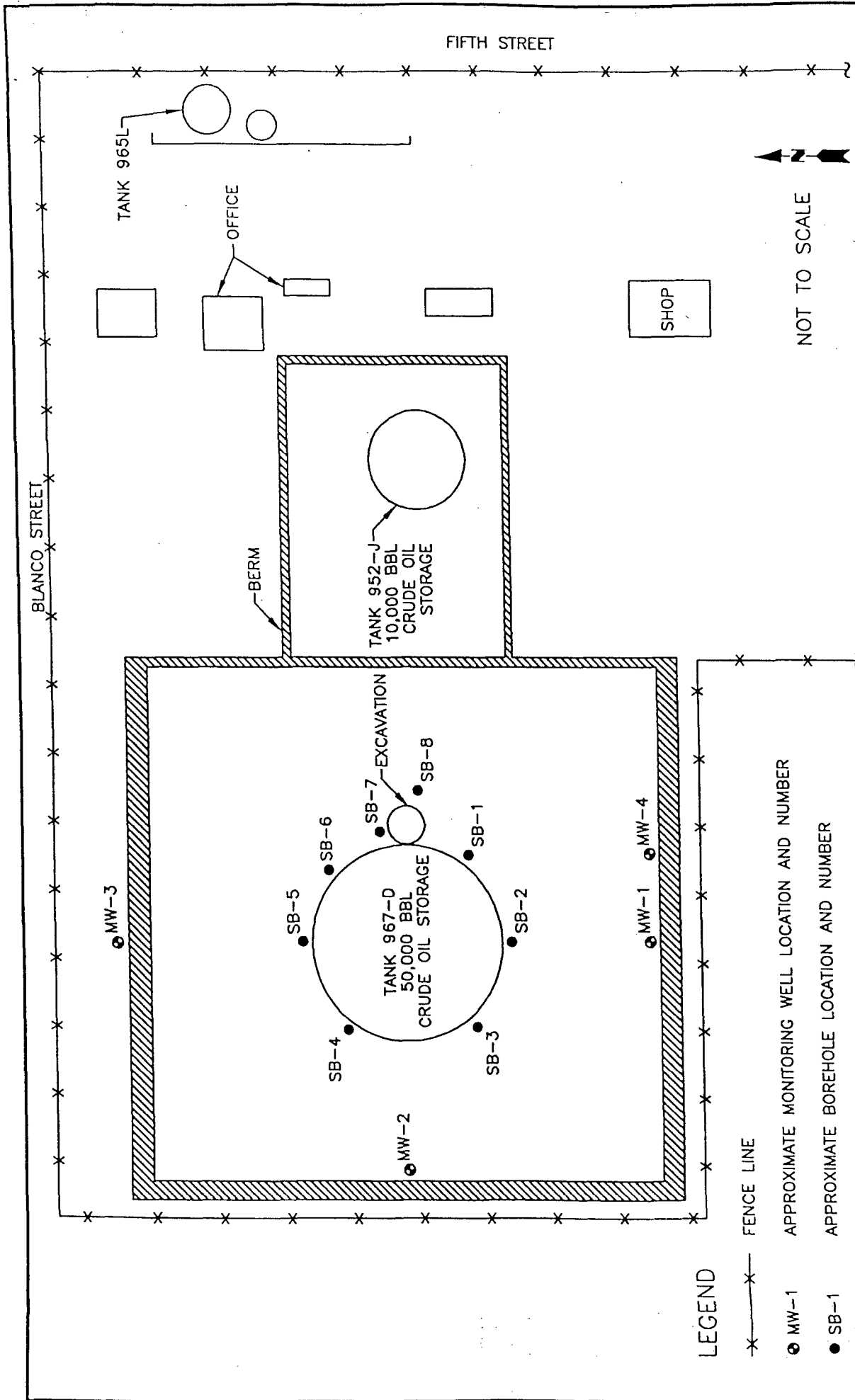
REV:

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13023

GIANT INDUSTRIES
BLOOMFIELD, NM

Figure 1

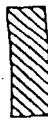


LEGEND

—x— FENCE LINE

● MW-1

● SB-1



BERMS

● APPROXIMATE MONITORING WELL LOCATION AND NUMBER

● APPROXIMATE BOREHOLE LOCATION AND NUMBER

TITLE

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

BURLINGTON
ENVIRONMENTAL

- A Philip Environmental Company -

PROJECT NO.: 13023

GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 2

DES.: JEN

APPD:

DATE: 11/3/94

1.4 Geography

The site is located at the northern edge of the San Juan River flood plain, approximately 1 1/4 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 or during summer thunderstorms.

1.5 Regional Hydrogeology and Geology

The San Juan River Valley and its associated flood plain are relatively narrow, approximately 1 1/2 to 2 miles wide, in the vicinity of Bloomfield. The Tertiary Nacimiento Formation forms the mesas on the north side of the river valley. These mesas rise up from the valley floor approximately 1/2 to 3/4 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 by this investigation, will be described in this report.

1.6 Site Characterization

The soil from eight boring locations was sampled and screened in the field for ionizable constituents. The samples with the highest field screening results were shipped off-site for laboratory analyses. In addition, four groundwater monitoring wells were installed and developed. Groundwater samples were collected and shipped off-site for laboratory analyses. The methods used to collect and analyze soil samples and groundwater are described below. Monitoring well installation procedures are also included.

2.0 METHODS OF INVESTIGATION

The following methods of investigation were used for completing soil boring, sampling and analyses, monitoring well installation and development, and groundwater sampling and analyses.

2.1 Borehole Drilling and Sampling Methodologies

The following methods were used at the locations marked as "SB" (soil boring) on Figure 2. Soil borings were completed using a CME 75 drill rig equipped with 6-1/4-inch inside diameter, hollow-stem augers. These borings were continuously cored using a 5-foot-long, 4-inch-diameter, split-barrel sampler. Burlington's field geologist recorded the lithologic description of the soils at each boring location on individual "Record of Subsurface Exploration" forms, included in Appendix A.

The soil cores were tested with a photoionization detector (PID) at 5-foot intervals or at points where staining or a hydrocarbon odor was noted. Headspace readings were taken at these intervals by putting a portion of the core into a sealable plastic bag. The plastic bag was then sealed and left in the sun for 10 to 20 minutes in order to volatilize any hydrocarbons present. After letting the samples 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 drilling equipment with an Alconox™ soap solution followed by a potable water rinse.

At each of the PID screening points, the core was split lengthwise with half of the core going into the plastic bag and half going 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 8015 Modified 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. in Albuquerque, New Mexico under strict chain-of-custody procedures.

2.2 Monitoring Well Installation

Four monitoring wells were installed within, or directly adjacent to, the bermed area around the tank. The locations of these wells are shown in Figures 2 and 3.

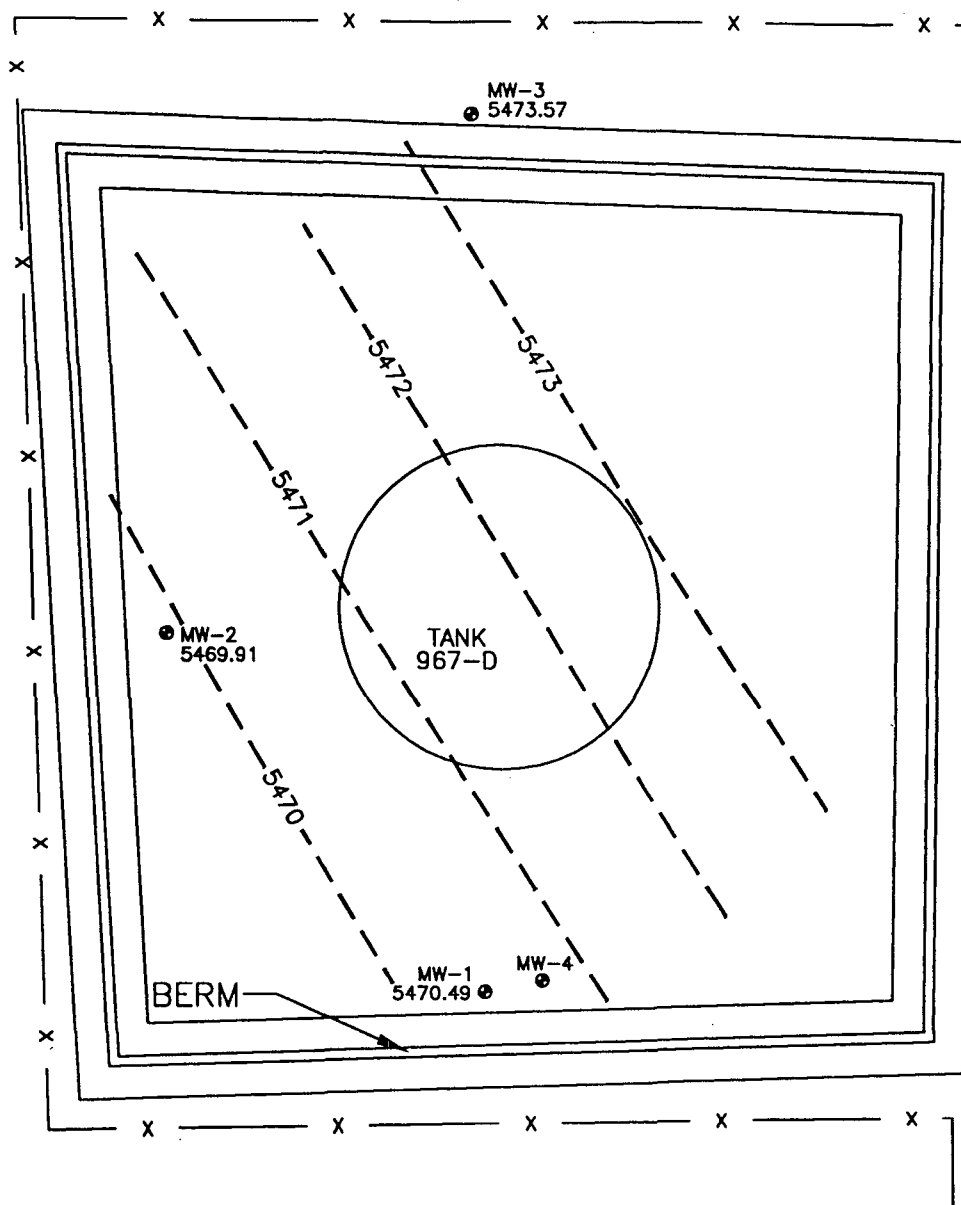
Monitoring well borings were advanced using the methods described in Section 2.1. Field screening was completed, but no soil samples from these borings were sent to a laboratory for analysis. The borings were advanced beyond the water table until a clean, competent clay unit was encountered. The wells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

MW-1, MW-2, and MW-3 are screened in approximately the same interval. MW-1 is screened in the shallowest interval, from 5,470.73 feet to 5,480.73 feet. These monitoring wells were completed so as not to screen across a clay layer that may confine hydrocarbons to the shallow soils. MW-2 is screened from 5,464.36 to 5,479.36 feet. MW-3 is screened from 5,467.49 to 5,482.49 feet. Monitoring Well MW-4 was screened in a sand unit approximately 10 feet beneath the screened interval of MW-1. This screened interval was chosen to determine if hydrocarbons had impacted water-bearing units beneath the clays between the completion depths of MW-1 and MW-4. MW-4 is screened at a deeper interval, from 5,457.58 to 5,462.58 feet.

2.3 Monitoring Well Development and Sampling Methodology

All four monitoring wells 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 absence 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. Well development information was recorded on "Well Development and Purging Data" forms, included in Appendix C.

BLANCO STREET



LEGEND

—X—X— FENCE LINE

● MW-1 5470.49 APPROXIMATE MONITORING WELL LOCATION AND NUMBER WITH WATER LEVEL ELEVATION

----- CONTOUR LINES

NOTE: MW-2 water level corrected for product thickness. MW-4 is not used to determine the potentiometric surface because it is screened in a lower saturated unit.

0 60
FEET



COL 13023B-001



**BURLINGTON
ENVIRONMENTAL**
— A Public Environmental Company —

TITLE:

Giant Industries Arizona, Inc.
Bloomfield, New Mexico
Approximate Potentiometric Surface,
October 27, 1994

DWN:

JEN

CHKD:

DATE:

11/3/94

DES.:

APPD:

REV.:

PROJECT NO.:

13023

GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 3

BURLINGTON

When the water being bailed from the wells was no longer silty and the temperature, pH, and conductivity readings stabilized, groundwater samples were collected. At MW-2, MW-3, and MW-4, groundwater samples were collected in pre-preserved, 40-milliliter (ml) glass vials with Teflon™-lined caps for analysis by EPA Methods 601 and 602 for purgeable halocarbons and aromatics. Two additional pre-preserved, 40-ml glass vials with Teflon™-lined lids were filled to be analyzed for TPH by EPA Method 8015, Modified. 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 to be analyzed for the 13 priority pollutant metals by various EPA methods. These samples were stored on ice for transport to Analytical Technologies, Inc. in Albuquerque, New Mexico, for analyses.

Groundwater samples for general chemistry analysis were collected in 1,000-ml plastic bottles. These samples were stored on ice for transport 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 AND CONCLUSIONS

The site geology, soils, site hydrogeology, and groundwater quality were assessed based on Burlington's field work.

3.1 Site Geology

At the surface, within the bermed area around the tank, is a coarse to very coarse sand unit that extends 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 sands or sandy clays.

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 clays of low plasticity. They are medium dense or stiff and were 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 of the 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.

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.

3.2 Soils

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

The lithologic information indicates that the hydrocarbons are concentrated in the sandy clays or clayey sands beneath the dry, loose surface sand layer. In SB-1, SB-2, SB-6, and SB-7 the PID headspace readings suggest that uncontaminated soil is encountered at 14 to 15 feet bgs. SB-4 and SB-5 headspace readings indicate contamination extends to approximately 17 feet bgs. Headspace readings taken at the MW-1 boring indicate contaminated soils from 10 to 15 feet bgs (approximately 5,474 to 5,469 feet in elevation.) MW-2 headspace readings indicate contaminated soils from

BURLINGTON

9 to 15 feet bgs (approximately 5,474 to 5,468 feet in elevation.) MW-3 headspace readings indicate that the soils in that boring were not contaminated. At MW-4, no headspace readings were taken.

Based on the headspace readings taken from the monitoring well borings, it can be assumed that the hydrocarbons in the soil extend west, southwest, and south from the tank. The direction of groundwater flow, as shown in Figure 3, corroborates this direction of hydrocarbon travel. A comparison of the laboratory results for TPH and the field-screening data for those samples are presented in Table 2.

Table 1
Soil Sampling Field Screening Results

Location	Depth	NDU
SB-1	3.5	84
	8.0	446
	9.0	465
	11.5	266
	14.0	1
SB-2	5.0	17
	8.0	228
	12.5	432
	14.0	8
SB -3	4.5	17
	10.0	227
	11.0	383
	14.0	114
SB-4	4.1	53
	8.2	229
	10.0	177
	14.7	166
	16.5	305
	20.0	5
SB-5	5.0	14
	8.5	142
	12.0	51
	15.0	81
	14.0	187
	20.0	62
SB-6	5.0	236
	10.0	53
	12.5	12
	15.0	1

NDU = Needle Deflection Unit (on HNu photoionization detector is approximately equivalent to parts per million)

Table 1
Soil Sampling Field Screening Results
cont.

Location	Depth	NDU
SB-7	4.5	43
	10.0	150
	12.3	176
	15.0	11
SB-8	5.0	4
	8.0	159
	12.0	202
	15.0	96
MW-1	5.0	2.0
	10.0	239.0
	13.0	180.0
	15.0	78.0
	18.0	4.0
	20.0	42.0
	20.5	24.0
	22.0	14.0
MW-2	5.0	1.0
	9.5	535.0
	15.0	112.0
	19.0	10.0
	20.0	9.0
MW-3	5.0	0.5
	10.0	0.7
	15.0	1.0
	20.0	1.0

NDU = Needle Deflection Unit (on HNu photoionization detector is approximately equivalent to parts per million)

Table 2

Soil Sampling TPH and Field Screening Results

Sample ID (Location-Depth)	Gasoline Range mg/kg	Diesel Range mg/kg	Field Screening NDU
SB-1-9.0	15	33	465
SB-2-12.5	1300	1300	432
SB-3-11.0	490	830	383
SB-4-16.5	4900	3200	305
SB-5-17.0	3400	2200	187
SB-6-5.0	180	78	236
SB-7-12.3	2000	1500	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)

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 October 31, 1994. Only MW-2 had a measurable product layer. 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. Figure 3 is a potentiometric surface map of the site created using water level measurements taken with the ORS probe in MW-1, MW-2, and MW-3. These three 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. MW-4 was not used to determine the potentiometric surface in this figure because it is screened in a lower saturated unit. The direction of groundwater flow in the shallow saturated zone is to the southwest. The approximate hydraulic gradient is 0.020

3.4 Groundwater Quality

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

The only compounds detected in the purgeable halocarbons and aromatics analyses (EPA Method 601/602) were BTEX. In the MW-2 sample all of the BTEX were detected. 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 xyleness. 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 analysis (EPA Method 610) detected PAHs only in the MW-2 sample. The total naphthalene plus monomethylnaphthalenes in the MW-2 sample is 20.6 µg/L. This is below the NMWQCC standard of 30 µg/L for the sum of those parameters. These results are summarized in Table 4.

Table 3
Groundwater Sampling
BTEX Analytical Results

	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xyleness 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
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 found 5 mg/L of fuel hydrocarbons in the gasoline hydrocarbon range in the MW-2 sample. 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 detected metals 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 μ mhos/cm to 5,420 μ mhos/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 the samples from all three wells. The NMWQCC standard for TDS for domestic water supply is 1,000 mg/L. These results indicate a generally poor quality of groundwater. 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 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.

The results of the groundwater sampling indicate that the groundwater quality in the saturated unit sampled by these three wells is not suitable for use as a domestic water supply.

The purgeable halocarbons and aromatics analysis indicates that MW-2 has been impacted by a hydrocarbon release. The presence of a 1-inch-thick layer of product in MW-2 is further evidence that the groundwater at this site is impacted by hydrocarbons. The groundwater samples from MW-3 indicate that the groundwater at that location has not been impacted. The results from the MW-4 samples indicate that the groundwater at that location may be slightly impacted.

If a release has occurred from Tank 967-D, the direction of groundwater flow, suggested by the potentiometric surface map (Figure 2) would indicate that the contaminant plume should travel to the southwest. The results of the groundwater sampling suggest that MW-2 is in a hydrocarbon plume, while both MW-3 and MW-4 are either outside, or at the edge of, such a plume.

Table 5
Groundwater Sampling
Total Petroleum Hydrocarbons (EPA 8015, Modified)

	TPH mg/L
MW-3	<1
MW-2	5
MW-4	<1

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

Table 6

Groundwater Sampling
Priority Pollutant Metals

	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	0.01
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

Analyte	Units	MW-2	MW-3	MW-4	WQCC
Lab pH	s.u.	6.6	7.1	7.0	6-9
Conductivity	µmhos/cm	4,920	4,250	5,420	
TDS	mg/L	3,049	3,413	4,389	1,000
Alkalinity as CaCO ₃	mg/L	957	521	576	
Sodium Absorption Ratio	ratio	11.785	8.147	10.886	
Bicarbonate as HCO ₃	mg/L	1,170	635	703	
Carbonate as CO ₃	mg/L	0	0	0	
Hydroxide	mg/L	0	0	0	
Chloride	mg/L	1,050	48	175	250
Sulfate	mg/L	245	1,920	2,470	600
Calcium	mg/L	325	439	439	
Magnesium	mg/L	30	37	53	
Potassium	mg/L	1.4	1.4	3.5	
Sodium	mg/L	828	661	907	

s.u. = standard units

µmhos/cm = micromhos per centimeter

mg/L = milligrams per liter

WQCC = New Mexico Water Quality Control Commission Standard

4.0 RECOMMENDATIONS

Based on the results of this investigation, Burlington recommends that Giant further delineate the extent of the hydrocarbon-impacted soil by soil boring and sampling and subsequent field screening.

4.1 Soil Borings and Sampling

Initially, borings will be completed along the west and south fences to determine if hydrocarbons have migrated off-site, and to determine the configuration of the hydrocarbon plume at the property boundaries. Based on the information obtained from the property boundary borings an estimate of the location of the leading edge of the plume will be made and soil borings completed there. Additional step-in or step-out borings will be completed to determine the geometry of the plume. Soil borings will be completed to the east of the tank, as necessary, to delineate that edge of the impacted soil. Soil borings will be completed using a hand auger, auger-drill rig, or other methods acceptable to the NMOCD. All of the downhole drilling equipment will be decontaminated prior to use at each boring location. Borings will be advanced until groundwater is encountered or clean soil is encountered beneath any hydrocarbon-impacted soil intervals. Soil samples from hydrocarbon-impacted soil will be collected and screened in the field for ionizable constituents using a PID.

4.2 Groundwater Sampling and Monitor Well Installation

One groundwater monitoring well will be installed downgradient of the leading edge of the hydrocarbon plume. Well installation procedures will be the same as those used for the wells previously installed at the site. Following well development, the groundwater from the new well and the existing wells will be sampled and shipped to ATI in Albuquerque for analysis by USEPA Method 602 for volatile organic hydrocarbons and for TPH by USEPA Method 8015. Water samples will also be shipped to IML in Farmington for general chemistry analysis. The samples will be cooled, preserved, and shipped on ice under strict chain-of-custody procedures. Depth-to-water and product thickness data will be collected at all of the wells.

4.3 Reporting

Following completion of the field operations and receipt of the laboratory analytical results, a comprehensive report will be prepared to present the results of the investigation and a proposed remedial action plan.

APPENDIX A

"Record of Subsurface Exploration" Forms

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. 588
Well No.

PROJECT NAME: <u>Giant-Bloomfield</u>				PROJECT NO: <u>13023</u>						
ELEVATION: _____				BOREHOLE LOCATION/COORDINATES: <u>588</u>						
LOGGED BY: <u>SK</u>				GWL: depth <u>11.1 dry</u> date/time <u>9/19/94 1750</u>						
DRILLED BY: <u>Rodgers</u>				GWL: depth _____ date/time _____						
DRILLING/RIG METHODS: <u>HSA</u>										
DATE/TIME STARTED: <u>9/19/94 1715</u>				DATE/TIME COMPLETION (S): <u>9/19/94 1800</u>						
AIR MONITORING TYPE: <u>PID</u>				BZ = Breathing Zone; BH = Borehole; S = Sample						
DEPTH (feet)	SAMPLE NUMBER	SAMPLE INTERVAL	SAMP TYPE RECOV. (in)	SAMPLE DESCRIPTION CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
				SAND, coarse to very coarse, loose, damp, light brown, well graded.	SW					
5				SK 9/19/94 clayey SAND, fine to med. sand to med. dense, grey to black SK 9/19/94	SC	4.4	5.0	4		Grey material has hydrocarbon odor.
10				sandy CLAY, fine to med. sand 10%, stiff, grey	CL	8.3	8.0	159		This layer has occasional layers of coarse sand 4"-8" thick.
15				15.0 B0H			12.0	202		
							15.0	96		

COMMENTS: _____

GEOLOGIST SIGNATURE _____

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. 58
Well No.

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

COMMENTS:

GEOLOGIST SIGNATURE



**BURLINGTON
ENVIRONMENTAL**

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. **5BZ**
Well No.

PROJECT NAME: Giant Bloom Field PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: 5B-Z
LOGGED BY: SK GWL: depth 9.4 ft 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 CLASSIFICATION SYSTEM: _____	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
3.0	SK 9/19/94	1.8 3.7	1.8	SAND, coarse 60% - very coarse 40% loose, dry, light brown well graded.	SW					
5										(17) 5.0
10				CLAY, soft low plasticity med. grey, moist.	CL	11.0				8.0 228 Hydrocarbon odor SK 9/19/94
15				12.1 SAND - 90% med. sand, trace fines med. dense, moist, mottled black & grey	SW	12.1 13.2				12.5 432
				13.2 CLAY, stiff, low plasticity dk. tan, moist. trace med. sand.	CL	14.0				14.0 8 Hydrocarbon odor
				14.0 - BOH						

COMMENTS: _____

GEOLOGIST SIGNATURE _____



**BURLINGTON
ENVIRONMENTAL**

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. 5B3
Well No. _____

PROJECT NAME: Giant - Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: 5B-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 CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
				SAND, coarse, loose, dry light brown, well graded.	SW					At 3.4 ft, color changes to light grey
5				4.5 Clayey SAND, loose, damp, light grey,	SP- SC	4.5		4.5	17	Hydrocarbon odor in grey material
				7.2 Sandy CLAY, med sand-10%, stiff low plasticity, grey, moist	CL	7.2				
10				Clayey SAND, med. firm, damp grey w/ black mottling	SC	9.5		100	272	Clayey sand has 11-2" layers of coarse to very coarse sand.
				10-30% sand	SC	11.3		11.0	383	
15				14.5 BOH		14.5		14.0	114	At 12.7 ft. color changes from grey to light brown.

COMMENTS: _____

GEOLOGIST SIGNATURE _____



**BURLINGTON
ENVIRONMENTAL**

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. **5B 4**
Well No.

PROJECT NAME: Giant Bloom Field PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: 5B-4
LOGGED BY: SK GWL: depth 15 T.O. 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 CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CNG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
				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					Hydrocarbon odor in grey material
						8.2		8.2	209	
10				Sandy CLAY, 10% fine to med sand stiff, low plasticity, are damp grey	CL			10.0	177	Occasional layers of very coarse sand in this unit 1" - 4" thick. Scarce gravel - fine to med. near 15'.
						15.0		14.7	116	
15				SAND, coarse to very coarse loose, wet, grey, oily sheen, well graded	SW			16.5	305	Strong hydrocarbon odor.
						19.2				
20				Sandy CLAY, 10% med to coarse sand, soft, low plasticity, damp light brown	CL			20.0	5	
				200 BOH						

COMMENTS: _____

GEOLOGIST SIGNATURE _____

515
1050

BURLINGTON
ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. 585
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: 585
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: PIED BZ = Breathing Zone; BH = Borehole; S = Sample

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

COMMENTS: _____

GEOLOGIST SIGNATURE _____

BURLINGTON ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
Borehole No. **SB-6**
Well No.

PROJECT NAME: Giant Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: SB-6
LOGGED BY: SK GWL: depth 80 ft. 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: RID BZ = Breathing Zone; BH = Borehole; S = Sample

DEPTH (feet)	SAMPLE NUMBER	SAMPLE INTERVAL	SAMP TYPE RECOV. (in)	SAMPLE DESCRIPTION CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
				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		5.0	236		Hydrocarbon odor in grey material.
						7.5				
				sandy CLAY, fine to med. sand 10% soft, med. plasticity, damp, grey	CL	9.4				
10				clayey SAND, same as above.	SC		10.0	53		
							12.5	12		
15							15.0	1		
				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		USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>dpm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
				CLASSIFICATION SYSTEM: <u>USCS</u>				BZ	BH	S	
5				SAND, coarse to very coarse, loose, damp, lgt brown well graded.		SW					color turns to grey at 3.6 ft. grey material has hydrocarbon odor. occasional layers of coarse sand 4"-8" thick Hydrocarbon odor
				clayey SAND, fine and med. sand 10%, soft, low plasticity, med dense, lgt grey to grey		SC	4.5	4.5	43		
								10.0	150		
							123	123	176		
15				same as above, but light brown in color		SC					No Hydrocarbon odor
				15.0 BOT				15.0	11		

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-4

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 9/21/94 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

MONITORING WELL INSTALLATION RECORD

Burlington Environmental Inc.

4000 Monroe Road

Farmington, New Mexico 87401

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

Borehole # _____

Well # MW-3

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 1600

Date/Time Completed 9/20/94 1820

Depths in Reference to Ground Surface				
Item	Material	Depth (feet)		
Top of Protective Casing		-0.0	Top of Protective Casing <u>0.0</u>	
Bottom of Protective Casing			Top of Riser <u>-0.2</u>	
Top of Permanent Borehole Casing			Ground Surface <u>0.0</u>	
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 Seal <u>-2.0</u>	
Top of Peltonite Seal	BENTONITE PELLETS	-2.0		
Bottom of Peltonite Seal	BENTONITE PELLETS	-2.5	Top of Gravel Pack <u>-2.5</u>	
Top of Gravel Pack	CSSI 10-20 SAND	-2.5	Top of Screen <u>-21.3</u>	
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	Bottom of Screen <u>-26.3</u>	
Total Depth of Borehole		-19.0	Bottom of Borehole <u>-26.5</u>	

Comments: _____

Geologist Signature _____

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 - 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

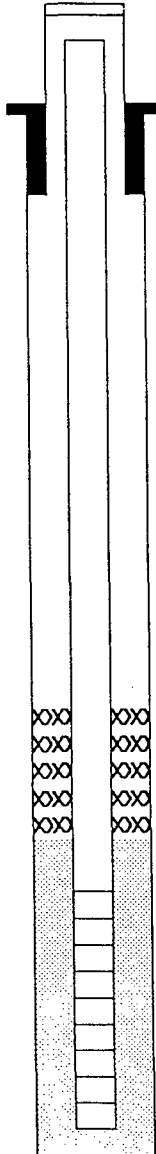
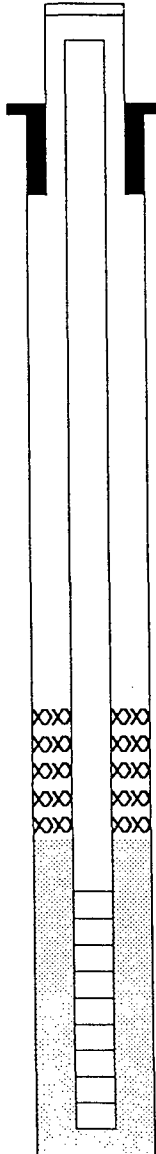
Personnel On-Site _____

Contractors On-Site RODGERS

Client Personnel On-Site _____

Date/Time Started 9/20/94 1250

Date/Time Completed 9/20/94 1530

Depths in Reference to Ground Surface				
Item	Material	Depth (feet)		
Top of Protective Casing		-0.0		Top of Protective Casing <u>0.0</u>
Bottom of Protective Casing				Top of Riser <u>-0.2</u>
Top of Permanent Borehole Casing				Ground Surface <u>0.0</u>
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		Top of Seal <u>-2.0</u>
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 <u>-2.5</u>
Top of Gravel Pack	CSSI 10-20 SAND	-2.5		Top of Screen <u>-3.7</u>
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		Bottom of Screen <u>-18.7</u> Bottom of Borehole <u>-19.0</u>

Comments: _____

Geologist Signature _____

4000 Monroe Road
Farmington, New Mexico 87401
(505) 326-2262 FAX (505) 326-2388

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

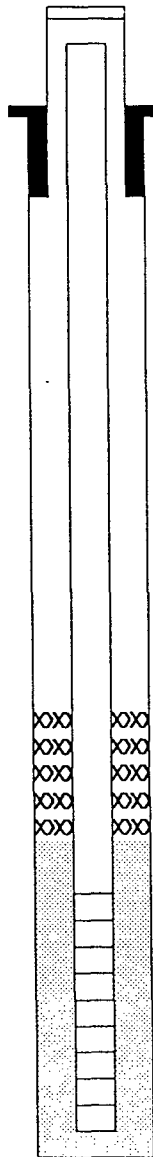
Project Name GIANT - BLOOMFIELD
Project Number 13023 Phase 0077
Project Location 5TH AND BLANCO STREETS

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 _____

BURLINGTON
ENVIRONMENTAL

Well Installation Record

Well Number MW-1Serial No. WIR-

Borehole Number (if different) _____

Project Name Giant - BloomfieldProject No. 13023Client Company Giant Inc.Phase/Task No. 0077.77

Site Name _____

Site Address 5th and Blanco St, Bloomfield, NMWell Diameter 4" inches

Conductor Casing

(To seal off upper water-bearing zones)

☒ None

Well Type

- ☒ Monitoring Well
☐ Piezometer
☐ Recovery Well
☐ Other _____

Diameter _____ inches

Material _____

Length _____ feet

Depth to Bottom of Casing _____ feet

Seal Material _____

Permit

Number _____

Date _____

Well Construction Details

Well Component	Material (specify type)				Length (feet)	Depth Below Grade (feet)	
	PVC	Stainless Steel	Teflon	Other		Bottom	Top
Borehole						13.6	
Bottom Cap/Plug	<u>1/2"</u>					13.6	
Sump (Tailpipe below screen)							Same as bottom of screen
Screen [Slot Size: _____ in.]	<u>10'</u>					13.5	3.5
Riser (Blank Casing above Screen)	<u>3.5'</u>					Same as top of screen	0

Annular Fill Materials

Use minus sign if top of riser is above ground. ✓

Component	Material Name/Description	Quantity (No. of Bags/ Volume per Bag)	Tremied		Depth Below Grade (feet)	
			Yes	No	Bottom	Top
Plug beneath sand pack	<u>bentonite pellets</u>	<u>1 bucket</u>		X	20'	19'
Sand Pack	<u>CSSI 10-20 sand</u>	<u>5-100#</u>			13.5	2.5
Bentonite Seal	<u>Pellets</u>	<u>1 bucket</u>			2.5	1.2
Grout Seal						
Backfill (if any)	<u>auger cuttings</u>	<u>SK 9/21/94</u>			19'	15'
Surface Seal	<u>neat cement, 5% bentonite</u>	<u>7 bags</u>			1.2'	surface

Well Cover

Finish

- ☐ Stick-up
☒ Flush
☐ Vault

Material

- ☐ Steel
☐ Aluminum

Lock

- ☒ Yes
☐ No
 Lock Number _____

Measuring Point

- ☐ Top of Riser
☐ Top of Cover

Well Collision

Protectors Installed?

- ☐ Yes
☐ No
 Quantity _____

Comments Bentonite pellets from 15' to 14'. Clean CSSI 10-20 from 14' to 13.5'
2.5'. Bentonite pellet seal from 2.5' to 1.2'.

Recorded by (print name) Sarah KellySignature Sarah Kelly Date 9/20/94 Reviewer _____ Date _____

BURLINGTON
ENVIRONMENTAL

Well Installation Record

Well Number MW-2

Serial No. WIR- _____

Borehole Number (if different) _____

Project Name Giant-BloomfieldProject No. SK9/20194
120 13023Client Company Giant Inc.Phase/Task No. 0077.77

Site Name _____

Site Address 5th and Blanco St, Bloomfield N.M.Well Diameter 4" inches

Conductor Casing

☒ None

(To seal off upper water-bearing zones)

Well Type

- ☒ Monitoring Well
☐ Piezometer
☐ Recovery Well
☐ Other _____

Diameter _____ inches

Material _____

Length _____ feet

Depth to Bottom of Casing _____ feet

Seal Material _____

Permit

Number _____

Date _____

Well Construction Details

Well Component	Material (specify type)				Length (feet)	Depth Below Grade (feet)	
	PVC	Stainless Steel	Teflon	Other		Bottom	Top
Borehole						19'	
Bottom Cap/Plug	2"						
Sump (Tailpipe below screen)							Same as bottom of screen
Screen [Slot Size: _____ in.]	15"					18.7	3.7
Riser (Blank Casing above Screen)	3'6"					Same as top of screen	.2

Annular Fill Materials

(3.5)

Use minus sign if top of riser is above ground. ✓

Component	Material Name/Description	Quantity (No. of Bags/ Volume per Bag)	Tremied		Depth Below Grade (feet)	
			Yes	No	Bottom	Top
Plug beneath sand pack	bentonite pellets	.5 bucket	X		20'	19'
Sand Pack	CSSI 10-20 sand	7 ⁶³²⁵ 100#	X		19'	2.5'
Bentonite Seal	bentonite pellets	.5 bucket	X		2.5'	2.0'
Grout Seal						
Backfill (if any)		9 SK 9/20/194				
Surface Seal	neorecment, 5% bentonite	804 3 bags	X		2.0	surface

Well Cover

- Finish
☐ Stick-up
☒ Flush
☐ Vault

- Material
☐ Steel
☐ Aluminum

Lock

- ☒ Yes
 Lock Number _____
☐ No

Measuring Point

- ☐ Top of Riser
☐ Top of Cover

Well Collision

Protectors Installed?

- ☐ Yes
 Quantity _____
☒ No

Comments _____

Recorded by (print name) Sarah KellySignature Sarah Kelly Date 9/20/94 Reviewer _____ Date _____



BURLINGTON
ENVIRONMENTAL

Well Installation Record

Well Number MW-3

Serial No. WIR-

Borehole Number (if different) _____

Project Name Giant-Bloomfield

Project No. 13023

Client Company Giant Inc.

Phase/Task No. 007777

Site Name _____

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

Well Diameter 4" inches

Conductor Casing ☒ None
(To seal off upper water-bearing zones)

Well Type

- ☒ Monitoring Well
☐ Piezometer
☐ Recovery Well
☐ Other _____

Diameter _____ inches

Material _____

Length _____ feet

Depth to Bottom of Casing _____ feet

Seal Material _____

Permit

Number _____

Date _____

Well Construction Details

Well Component	Material (specify type)				Length (feet)	Depth Below Grade (feet)	
	PVC	Stainless Steel	Teflon	Other		Bottom	Top
Borehole							
Bottom Cap/Plug	<u>2"</u>					<u>19'</u>	
Sump (Tailpipe below screen)							Same as bottom of screen
Screen [Slot Size: _____ in.]	<u>15'</u>					<u>18.7'</u>	<u>3.7'</u>
Riser (Blank Casing above Screen)	<u>6.6'</u>					Same as top of screen	<u>2.9' above grade</u>

Annular Fill Materials

Use minus sign if top of riser is above ground. ✓

Component	Material Name/Description	Quantity (No. of Bags/ Volume per Bag)	Tremied		Depth Below Grade (feet)	
			Yes	No	Bottom	Top
Plug beneath sand pack	<u>bentonite pellets</u>	<u>.5 55# bucket</u>		<u>X</u>	<u>20'</u>	<u>19'</u>
Sand Pack	<u>CSSI 10-20 sand</u>	<u>100#</u>		<u>X</u>	<u>19'</u>	<u>2.5'</u>
Bentonite Seal	<u>bentonite pellets</u>	<u>.5 55# bucket</u>		<u>X</u>	<u>2.5'</u>	<u>2.0'</u>
Grout Seal						
Backfill (if any)						
Surface Seal	<u>neat cement, 5% bentonite</u>	<u>8 80# bags</u>		<u>X</u>	<u>2.0'</u>	<u>surface</u>

Well Cover

- Finish
☐ Stick-up
☒ Flush
☐ Vault

- Material
☐ Steel
☐ Aluminum

Lock

- ☒ Yes
Lock Number _____
☐ No

Measuring Point

- ☐ Top of Riser
☐ Top of Cover

Well Collision

Protectors Installed?

- ☐ Yes
☒ No
Quantity _____

Comments _____

Recorded by (print name) _____

Signature Sarah Kelly Date 9/20/94 Reviewer _____ Date _____



BURLINGTON
ENVIRONMENTAL

Well Installation Record

Well Number MW-4

Serial No. WIR-

Borehole Number (if different) _____

Project Name Giant-Bloomfield

Project No. 13023

Client Company Giant Inc.

Phase/Task No. 0077.77

Site Name _____

Site Address Fifth and Blanco St's, in Bloomfield

Well Diameter 4" inches

Conductor Casing

☒ None

(To seal off upper water-bearing zones)

Well Type

- ☒ Monitoring Well
☐ Piezometer
☐ Recovery Well
☐ Other _____

Diameter _____ inches

Material _____

Length _____ feet

Depth to Bottom of Casing _____ feet

Seal Material _____

Permit

Number _____

Date _____

Well Construction Details

Well Component	Material (specify type)				Length (feet)	Depth Below Grade (feet)	
	PVC	Stainless Steel	Teflon	Other		Bottom	Top
Borehole							
Bottom Cap/Plug	<u>2"</u>					<u>26.5</u>	
Sump (Tailpipe below screen)							Same as bottom of screen
Screen (Slot Size: _____ in.)	<u>5'</u>					<u>26.3</u>	<u>21.3</u>
Riser (Blank Casing above Screen)	<u>21.05</u>					Same as top of screen	<u>21.3</u>

Annular Fill Materials

Use minus sign if top of riser is above ground. ↗

Component	Material Name/Description	Quantity (No. of Bags/ Volume per Bag)	Tremied		Depth Below Grade (feet)	
			Yes	No	Bottom	Top
Plug beneath sand pack	<u>none</u>			☒		<u>21.0</u>
Sand Pack	<u>CSST 10-20 sand</u>	<u>4 6895/100#</u>		☒	<u>26.5</u>	<u>20.8</u>
Bentonite Seal	<u>bentonite pellets</u>	<u>2 5981/50#</u>		☒	<u>21.0</u>	<u>14.0</u>
Grout Seal	<u>Hydrogel-bentonite powder</u>	<u>2 6895/50#</u>		☒	<u>14.0</u>	<u>6.0</u>
Backfill (if any)						
Surface Seal	<u>neat cement, 5% bentonite</u>	<u>9 80# bags</u>		☒	<u>6.0</u>	<u>surface</u>

SK
9/21/94
sand
settle
as aug
withdrew

Well Cover

Finish

- ☐ Stick-up
☒ Flush
☐ Vault

Material

- ☐ Steel
☐ Aluminum

Lock

☒ Yes

Lock Number _____
☐ No

Measuring Point

- ☐ Top of Riser
☐ Top of Cover

Well Collision

Protectors Installed?

- ☐ Yes
☒ No
Quantity _____

Comments _____

Recorded by (print name) Sarah Kelly

Signature Sarah Kelly

Date 9/21/94

Reviewer _____ Date _____



RECORD OF SUBSURFACE EXPLORATION

Page 1 of 1
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
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: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
5		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	
10		2.5 5.0		clayey SAND, 25% fines, fine to med. sand, soft, damp, light grey,	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?
15		3.2 5.0		same as above, still grey.	SC	0.0	0.0	152	12	Layer with coarse sand from 15.0 to 14.8. Hydrocarbon odor.
20				sandy CLAY, 20% fine sand, soft, damp, olive, low plasticity	CL	19.0	19.0	200	10 9	
				20.0 BOH						

COMMENTS: _____

GEOLOGIST SIGNATURE

Josh Kelly



RECORD OF SUBSURFACE EXPLORATION

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

PROJECT NAME: Giant Bloom Field 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 CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u>			DRILLING CONDITIONS AND (BLOW COUNTS)
							BZ	BH	S	
			<u>3.8</u> <u>5.0</u>	<u>SAND, 20% very coarse, 80% fine to med, loose, light brown, dry, poorly graded, angular</u>	<u>SP</u>					
						<u>4.2</u>	<u>0.0</u>	<u>0.0</u>	<u>.5</u>	
5			<u>3.5</u> <u>5.0</u>	<u>clayey SAND, fine to med sand 25% fines, soft, light brown, poorly graded, damp.</u>	<u>SC</u>					
							<u>0.0</u>	<u>0.0</u>	<u>+++</u>	
10			<u>3.9</u> <u>5.0</u>	<u>sandy CLAY, 20% fine to med sand, soft to stiff, light olive, damp, med. plasticity.</u>	<u>CL</u>	<u>11.5</u>		<u>16.0</u>	<u>.7</u>	
				<u>clayey SAND, same as above moist.</u>	<u>SC</u>	<u>13.5</u>				
15			<u>3.8</u> <u>5.0</u>	<u>same as above, but with 40% coarse to very coarse sand, angular. wet</u>	<u>SC</u>	<u>16.6</u>		<u>15.0</u>	<u>1.0</u>	
				<u>sandy CLAY, same as above</u>	<u>CL</u>	<u>19.7</u>				
20				<u>B.O.H. at 20.0</u>			<u>20.0</u>	<u>1.0</u>		

COMMENTS: _____

GEOLOGIST SIGNATURE David Kelly



BURLINGTON
ENVIRONMENTAL

4000 Monroe Road
Farmington, NM 87401

RECORD OF SUBSURFACE EXPLORATION

SK 9/21/94

Page 1 of 2
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: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>ppm</u> BZ BH S	DRILLING CONDITIONS AND (BLOW COUNTS)
				<u>SAND</u> - med-30%, very coarse 70% loose dry to damp, light brown, well graded, angular to sub-angular (description from MW-1 log.)	<u>SW</u>			<u>Augering to 20.0'</u>
5							0 0	
10				<u>Approx.</u> sandy <u>CLAY</u> , 20% fine to med. sand, soft, med. plasticity, light brown turning to grey, damp (description taken from MW-1 log.)	<u>CL</u>	10		
15				<u>Approx.</u> clayey <u>SAND</u> , 60% fine to med, 40% coarse, trace fines, loose, damp, light brown, poorly graded, angular to sub-angular (description taken from MW-1 log.)	<u>SC</u>	14.5		
20			18.5 2.4 5.0	<u>Approx.</u> clayey <u>SAND</u> and sandy <u>CLAY</u> as described above.	<u>CL</u> & <u>SC</u>	18.0 21.0	60	<u>Sample recovery poor. Driller says he feels a change at 21.0</u>
25			23.5 3.2 5.0	<u>SAND</u> , coarse to very coarse, 5% fines, loose to medium dense, wet, light brown, well graded, angular.	<u>SW</u>	26.5 26.0	SK 9/21/94	<u>At 25.5', 26' driller felt a change.</u>
30			28.5	<u>26.5 BOTT</u> (sample barrel driven to 28.5')				

COMMENTS: Had to stop drilling at 0730 so driller could make an appointment.
Resumed drilling at 1330.

GEOLOGIST SIGNATURE

Paul Kelly

RECORD OF SUBSURFACE EXPLORATION

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

PROJECT NAME: Giant-Bloomfield PROJECT NO: 13023
ELEVATION: _____ BOREHOLE LOCATION/COORDINATES: _____
LOGGED BY: SK GWL: depth _____ date/time _____
DRILLED BY: Rodgers GWL: depth _____ date/time _____
DRILLING/BIG METHODS: HSM
DATE/TIME STARTED: 9/20/94 0730 DATE/TIME COMPLETION (S): 9/20/94 0930
AIR MONITORING TYPE: PLD BZ = Breathing Zone; BH = Borehole; S = Sample

DEPTH (feet)	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE RECOV. (in)	SAMPLE DESCRIPTION CLASSIFICATION SYSTEM: <u>USCS</u>	USCS SYMBOL	DEPTH CHG (feet)	AIR MONITORING UNITS <u>RPM</u> BZ BH S	DRILLING CONDITIONS AND (BLOW COUNTS)
5			3.2 5.0	SAND, med. - 30% to very coarse 70% loose, damp, light brown, well graded, angular to sub- angular.	SW		50	2
10			3.2 5.0	9.7 sandy CLAY, 20% fine to med. sand soft, med plasticity, light brown damp.	CL	9.7 120	10.0	239
15			3.1 5.0	Same as above but dk. grey	CL	14.5 15.0	13.0	180
				Same as above but light brown		14.5 15.0	15.0	78
			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	18.0	4
20				sandy CLAY, 10% fine sand, stiff, low plasticity, light brown, damp		21.0	20.0 20.5	42 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

Josh Kelly

APPENDIX C

"Well Development and Purging Data" Forms



**BURLINGTON
ENVIRONMENTAL**

Serial No. WDPD-

Project Name Giant-Bloomfield

Project Manager Martin Lee

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

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"

Methods of Development

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

Instruments

Serial No. (If applicable)

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

Water Disposal

into dress on site

I well volume

Water Removal Data

[illegible]

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

Comments Well does not produce sufficient water for sampling.

Developer's Signature(s)

Jack Kelly

Date 9/22/94 Reviewer _____

Date _____



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 Lee

Project No.

13023

Client Company

Giant Inc.

Phase/Task No.

007777

Site Name

Site Address

Development Criteria

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

Methods of Development

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

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		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing		3.4	3.4
Gravel Pack		10.2	10.2
Drilling Fluids			
Total			13.6

Instruments

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

Water Disposal

Into 55 gal. drum
= 1 well vol.

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (umhos/cm)	Dissolved Oxygen (mg/L)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					
9/22/94	1750		X				5	5							very cloudy
	1335		X				10	15							very cloudy
	1350		X				5	20			67.0	6.08	4410		clearer, still brown
9/22/94	1400		X				5	25							clearer, mostly
	1437		X				5	30			65.1	6.33	4300		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



Well Development and Purging Data

BURLINGTON ENVIRONMENTAL Serial No. WDPD- Well Number MW-4 Page 1 of 1

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

Client Company Giant Inc. Site Address 5th & Blanco St, Bloomfield Phase Task No. 0077777

Site Name

Development Criteria

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

Methods of Development

- Pump ☐ 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		<u>7.6</u>	<u>7.6</u>
Gravel Pack		<u>14.0</u>	<u>14.0</u>
Drilling Fluids			
Total			<u>21.6</u>

Water Disposal

Into drum on site

= 1 well volume

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (umhos/cm)	Dissolved Oxygen (mg/L)	Comments
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					
9/23/94	0915	X					10	16							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) [Signature]

[Signature]

Date 9/23/94

Reviewer

Date

APPENDIX D

"Water Sampling Data" Forms

BURLINGTON
ENVIRONMENTAL

Water Sampling Data

Location No. MW-3Serial No. WSD-Group List Number Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other Date 9/23/94Project Name Giant-Bloomfield Project No. 13023Project Manager Martin Nee Phase/Task No. 0077.77Site Name 5th and Blanco St., Bloomfield, N.M.

Sampling Specifications

Requested Sampling
Depth Interval (feet) NARequested Wait Following
Development/Purging (hours) None

Initial Measurements

Time Elapsed From Final Development/Purging (hours) 0Initial 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				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)	
9/23/94	1455	SK	70.4	7.15	X	3390	18	X	X	✓	X	
	1500	SK	67.5	7.16	X	3320	20	X	X	✓	X	
	1515	SK	66.4	7.24	X	3280	22	X	X	✓	X	
	1550	SK									15.15'	

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

Preservatives: H = HCl; N = HNO₃; S = H₂SO₄; 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	
Priority Poll. Metals	1	P	1000		X	HNO ₃	X		sent to ATI, Albuquerque
610	2	A	1000		X	None	X		
Met 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		" "

Filter Type Chain-of-Custody Form Number 1866Comments Signature Dan Kelly Date 9/24/94 Reviewer Date

BURLINGTON
ENVIRONMENTAL

Water Sampling Data

Serial No. WSD-Location No. MW-2

Group List Number _____

Sample Type: ☒ Groundwater ☐ Surface Water ☐ Other _____Date 9/22/94Project Name Giant-BloomfieldProject No. 13023Project Manager Martin NeePhase/Task No. 0077.77Site 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) 0Initial 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				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)	
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 = HNO₃; S = H₂SO₄; 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	
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		

Filter Type _____

Chain-of-Custody Form Number 1866 & 1867

Comments _____

Signature Sarah KellyDate 9/24/94

Reviewer _____

Date _____

BURLINGTON
ENVIRONMENTAL

Water Sampling Data

Serial No. WSD-Location No. MW-4

Group List Number

Sample Type: ☒ Groundwater ☐ Surface Water ☐ OtherDate 9/23/94Project Name Giant-BloomfieldProject No. 13023Project Manager Martin NeePhase/Task No. 0077.77Site Name 54th & 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) 0Initial 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				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)	
9/23/94	1030	SK	61.9	6.84	X	4030	45	X	X	✓		
	1045		64.5	6.94	X	4020	50	X	X	✓		
	1100		66.1	7.07	X	4140	55	X	X	✓		
	1120		67.5	7.14	X	4120	60	X	X	✓		
↓	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 = HNO₃; S = H₂SO₄; 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	
Priority Poll. Metals	1	P	1000		X	HNO ₃	X		sent to AT&T, 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		

Filter Type

Chain-of-Custody Form Number 1866

Comments

Signature

Sarah Kelley

Date

9/24/94

Reviewer

Date

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---

<u>MATRIX</u>	<u>#SAMPLES</u>
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
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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

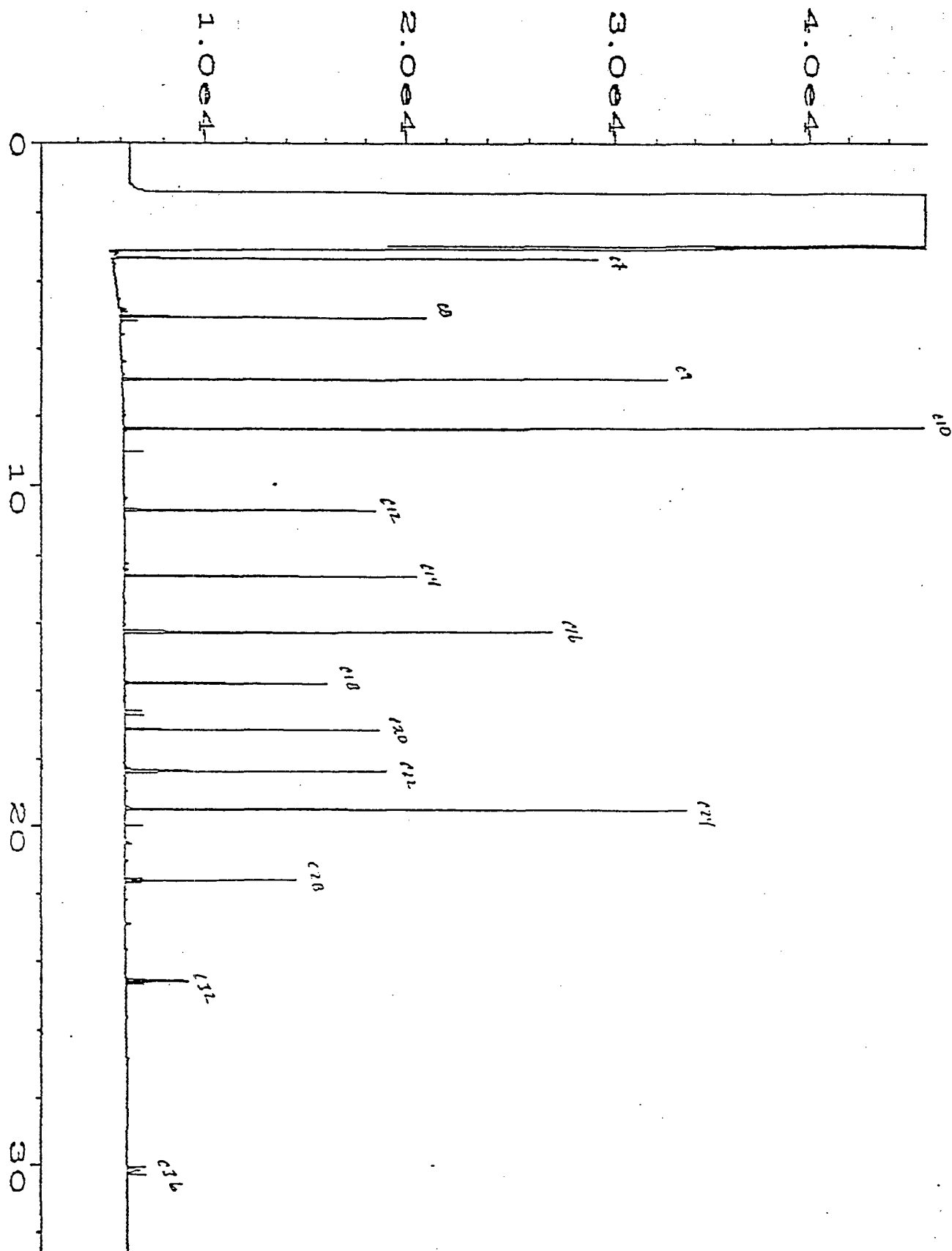
(505) 326-2262 Phone
(505) 326-2388 FAX

Access# 409397
COC Serial No. C 1864

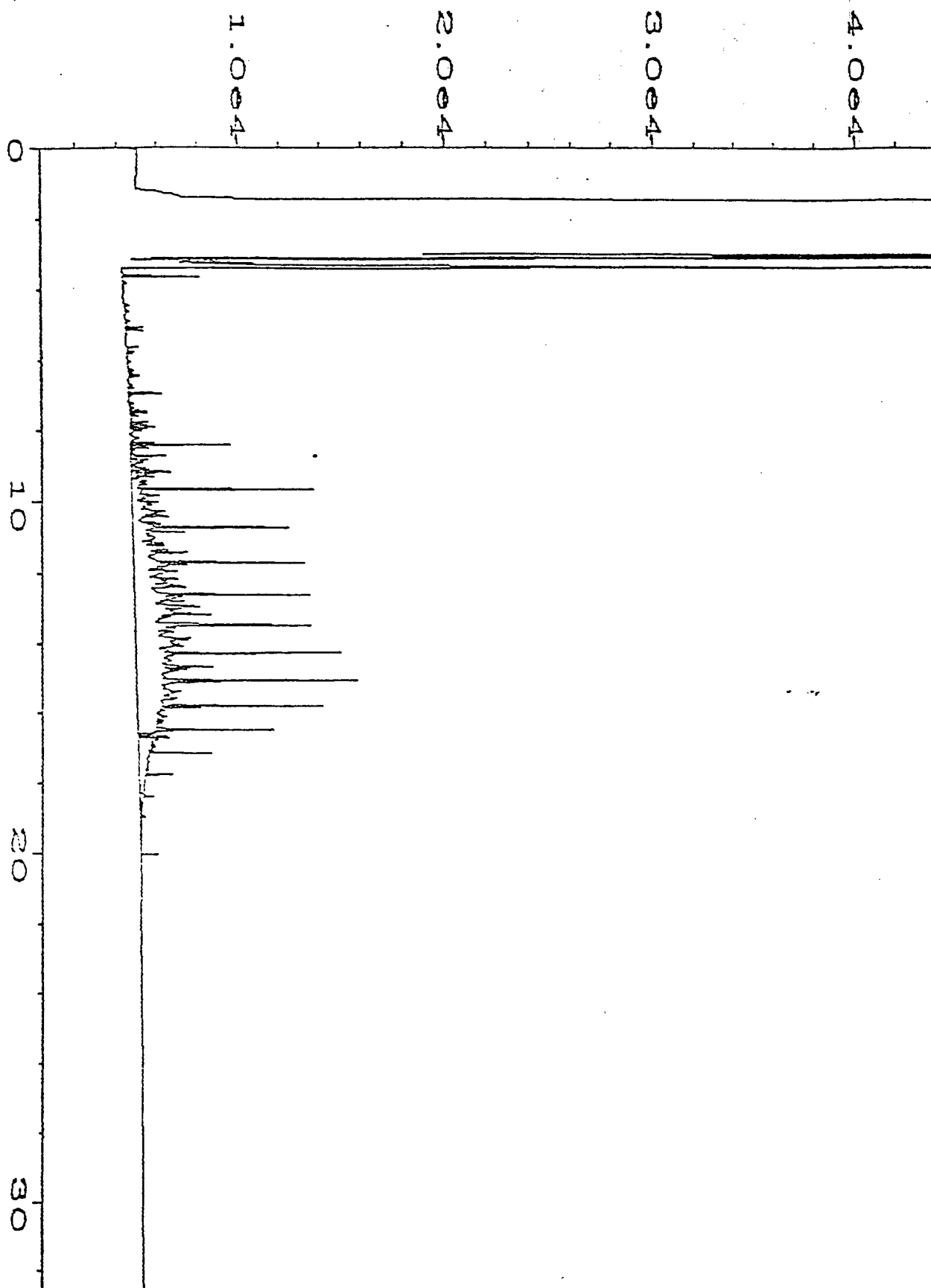
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Project Name		Project Number		Phase . Task		Project Date		Project Time		Project Location		Project Matrix		Project Date		Project Time		Project Location		Project Matrix	
Project Name		Project Number		Phase . Task		Project Date		Project Time		Project Location		Project Matrix		Project Date		Project Time		Project Location		Project Matrix	
Giant Bloomfield		13023		0077.77		9/19/94		1100		Soil		1		01							
S. Kelly		13023		0077.77		9/19/94		1200		Soil		1		02							
Analytical Technologies, Inc.		13023		0077.77		9/19/94		1315		Soil		1		03							
Albuquerque, NM		13023		0077.77		9/19/94		1430		Soil		1		04							
S. Kelly		13023		0077.77		9/19/94		1530		Soil		1		05							
Analytical Technologies, Inc.		13023		0077.77		9/19/94		1615		Soil		1		06							
Albuquerque, NM		13023		0077.77		9/19/94		1704		Soil		1		07							
S. Kelly		13023		0077.77		9/19/94		1740		Soil		1		08							

Relinquished by:		Received By:	
Signature	Date	Signature	Date
S. Kelly	9/21/94	D. Little	9/22/94

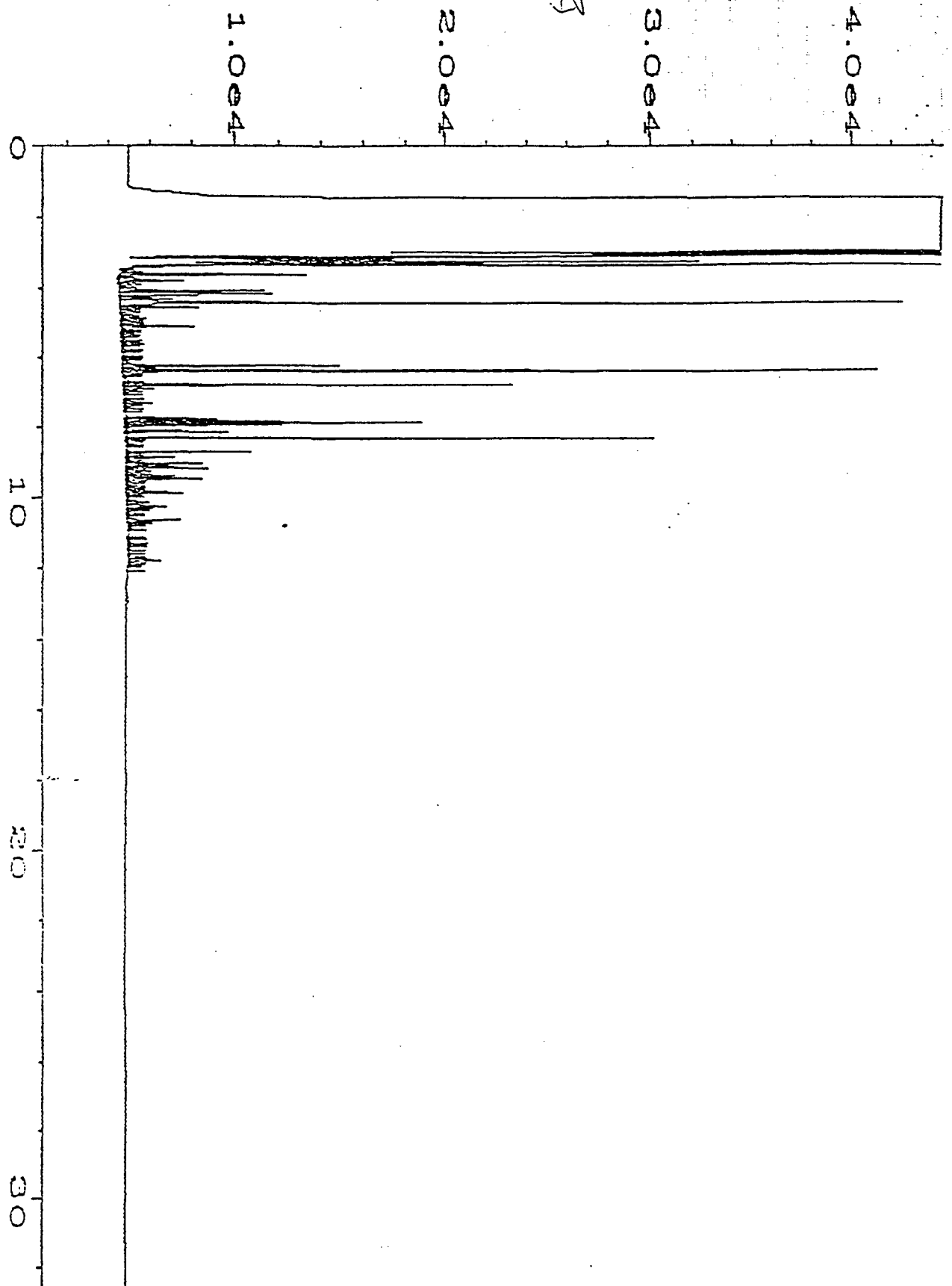
Samples Iced:		Carrier:		Airbill No.	
Yes	No	Fed Ex.		1389025691	
Preservatives (ONLY for Water Samples)					
☐ Cyanide Sodium hydroxide (NaOH)					
☐ Volatile Organic Analysis Hydrochloric acid (HCl)					
☐ Metals Nitric acid (HNO ₃)					
☐ TPH (418.1) Sulfuric acid (H ₂ SO ₄)					
☐ Other (Specify) _____					
☐ Other (Specify) _____					



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

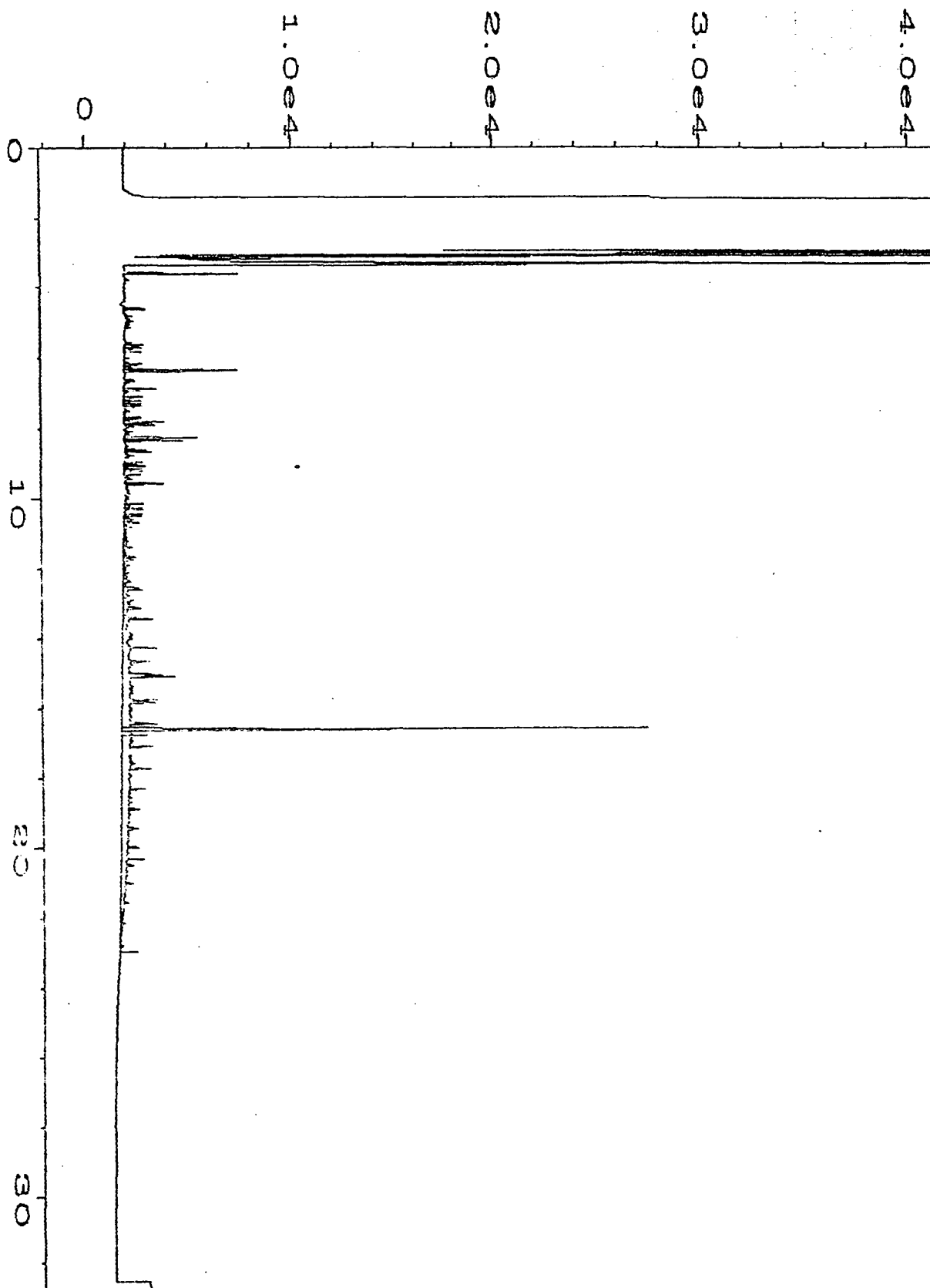


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Operator	: CFF	Vial Number	: 3
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: DSL DAILY	Sequence Line	: 1
Run Time Bar Code:		Instrument Method:	SDF0531.MTH
Acquired on	: 26 Jun 94 09:55 AM	Analysis Method	: SDF0531.MTH
Report Created on:	26 Jun 94 10:30 AM		

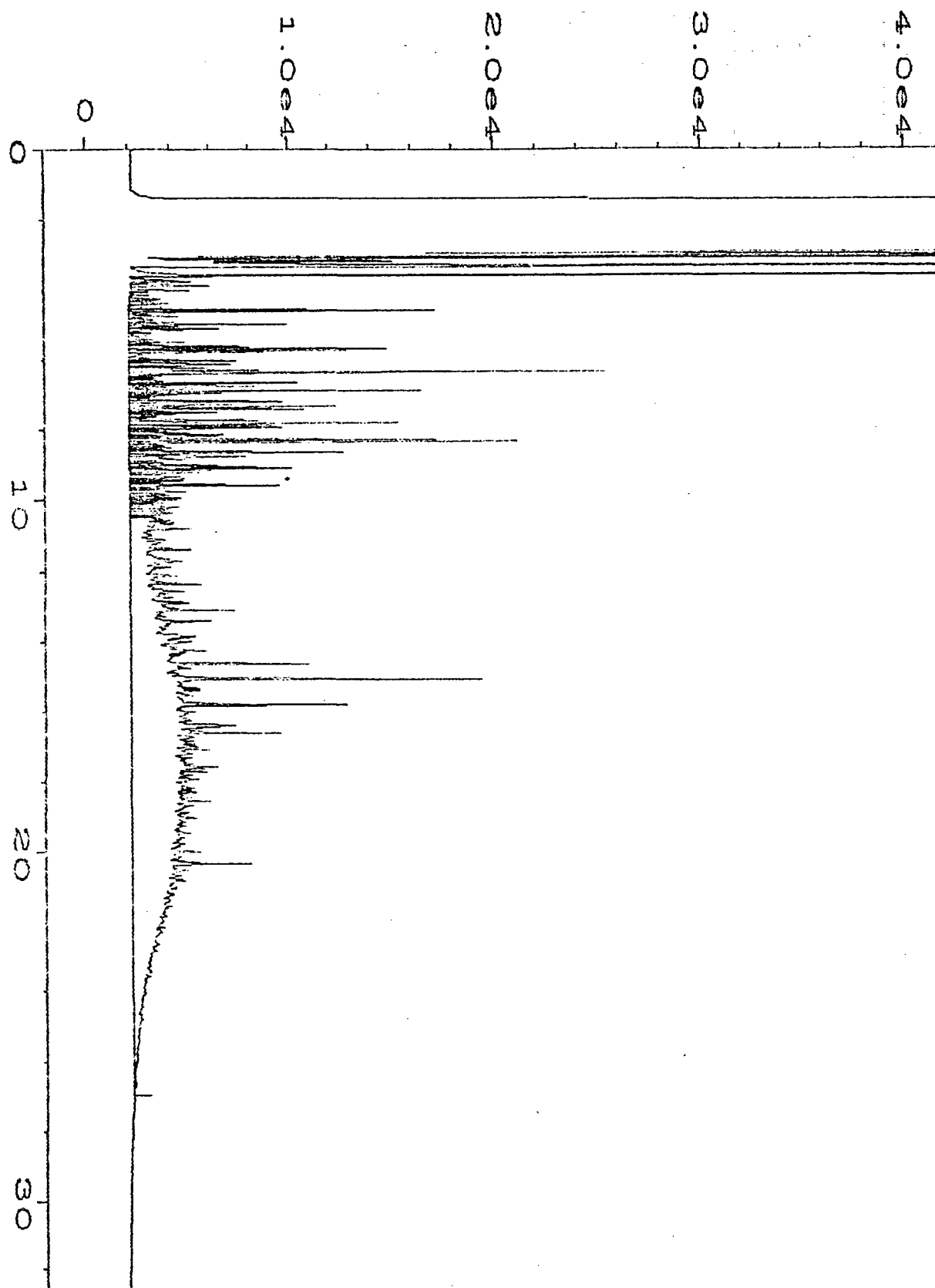


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Operator	: MNT	Vial Number	: 2
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: GAS & KYS LCS GAS STD	Sequence Line	: 1
Run Time Bar Code		Instrument Method	: SGF0601.MTH
Acquired on	: 02 Jun 94 11:31 AM	Analysis Method	: SGF0601.MTH
Report Created on	: 02 Jun 94 12:18 PM		
Sample Info	: GC3-30-11		

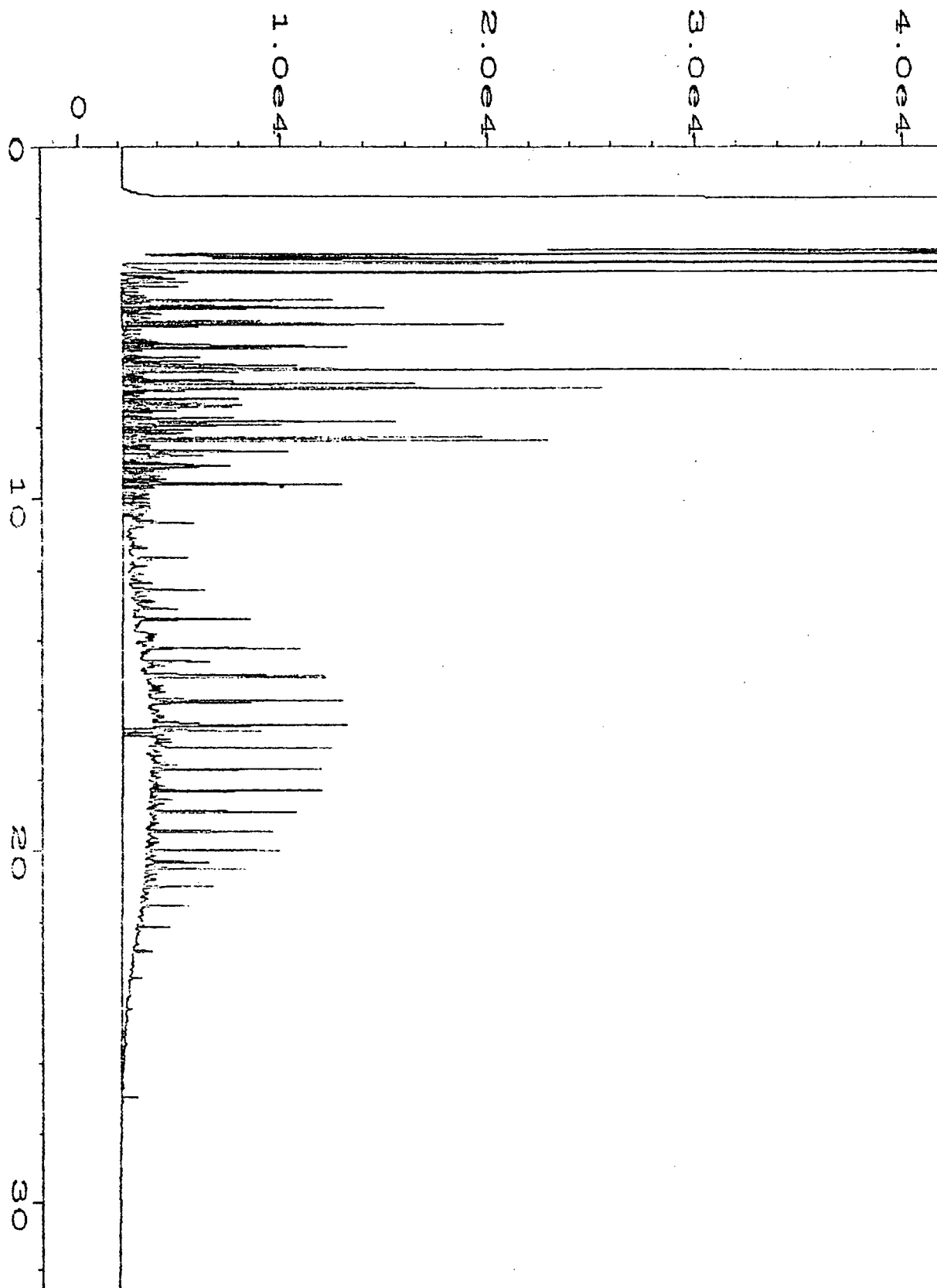
Handwritten signature



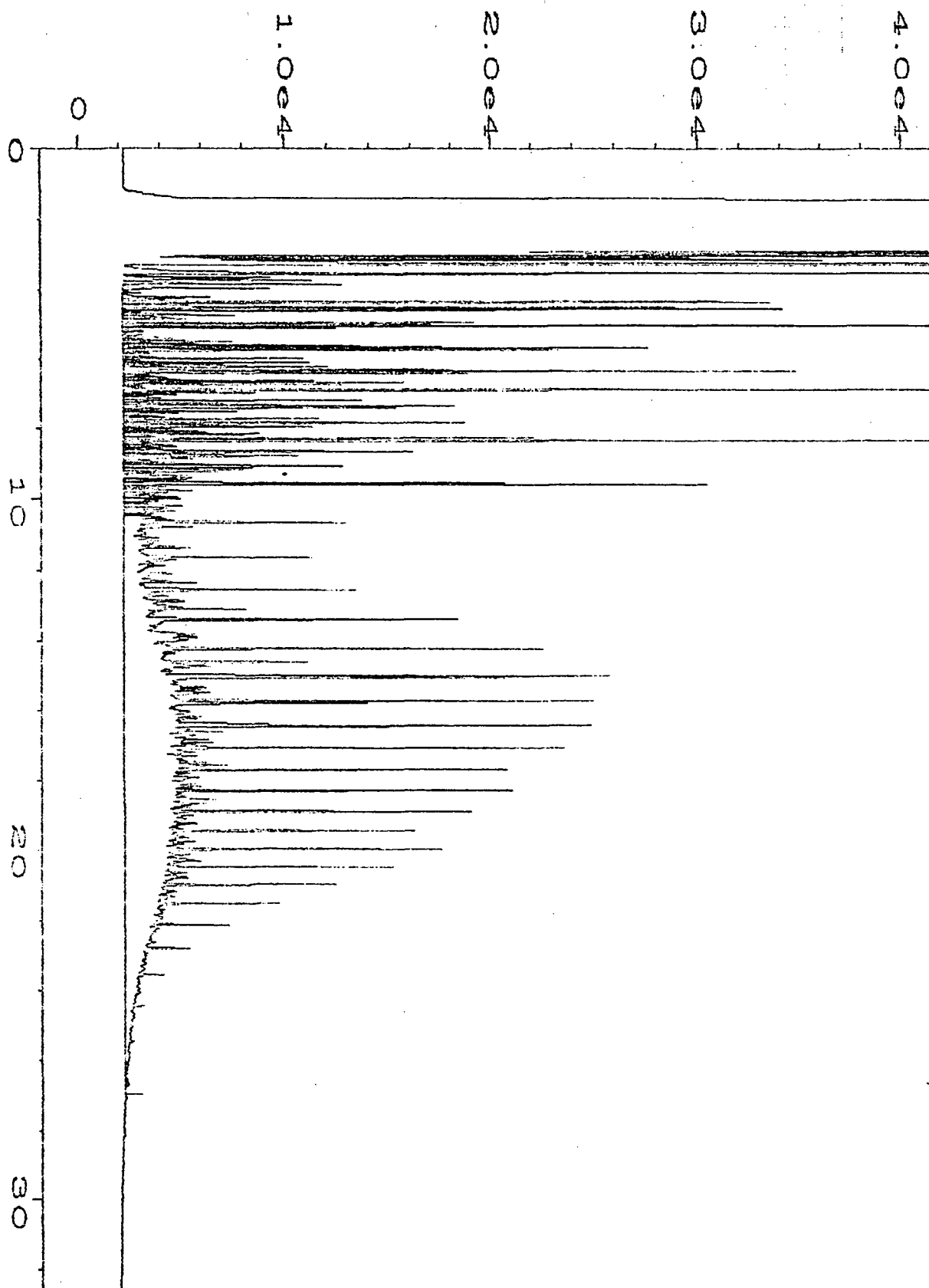
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Operator	: cff & je	Vial Number	: 6
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409397-01	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 23 Sep 94 03:05 PM	Analysis Method	: SDF0822.MTH
Report Created on:	27 Sep 94 09:47 AM		



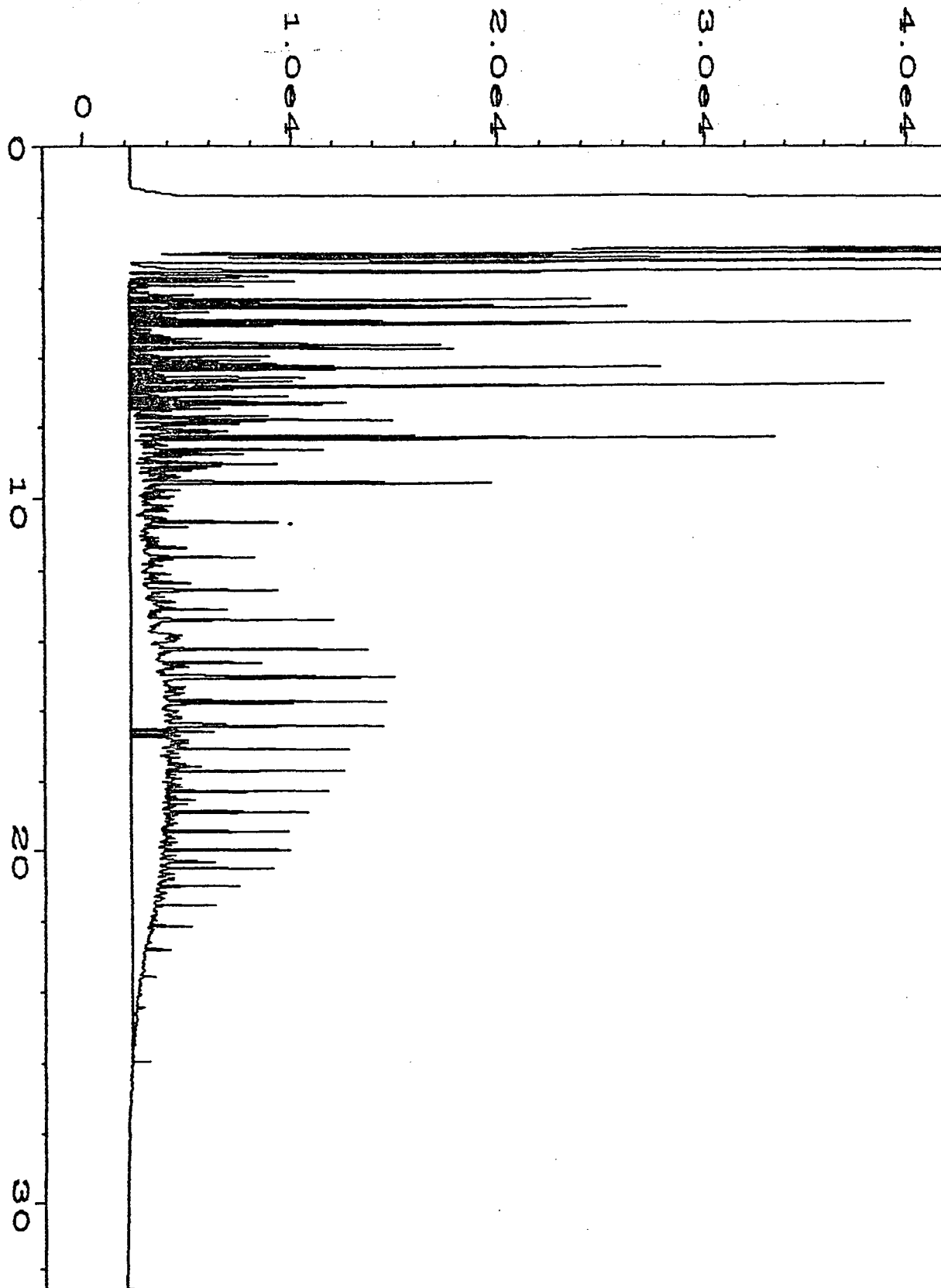
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Operator	: cff & ja	Vial Number	: 13
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409397-02*5	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 26 Sep 94 09:16 PM	Analysis Method	: SDF0926.MTH
Report Created on:	27 Sep 94 12:00 PM		



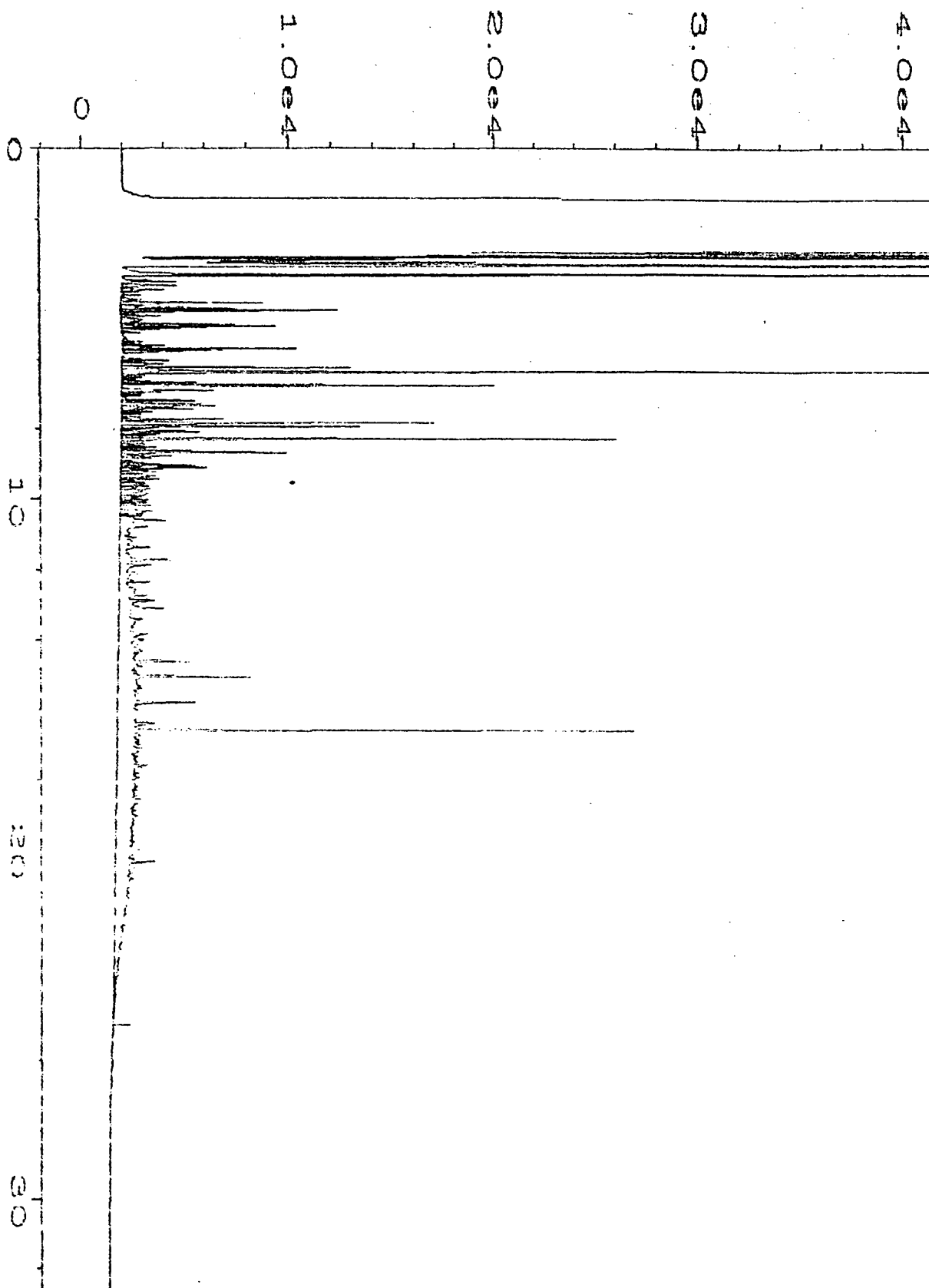
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Operator	: off & je	Vial Number	: 14
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409297-03*5	Sequence Line	: 3
Run Time Bar Code:		Instrument Method	: SDF0822.MTH
Acquired on	: 26 Sep 94 10:06 PM	Analysis Method	: SDF0926.MTH
Report Created on:	27 Sep 94 12:04 PM		



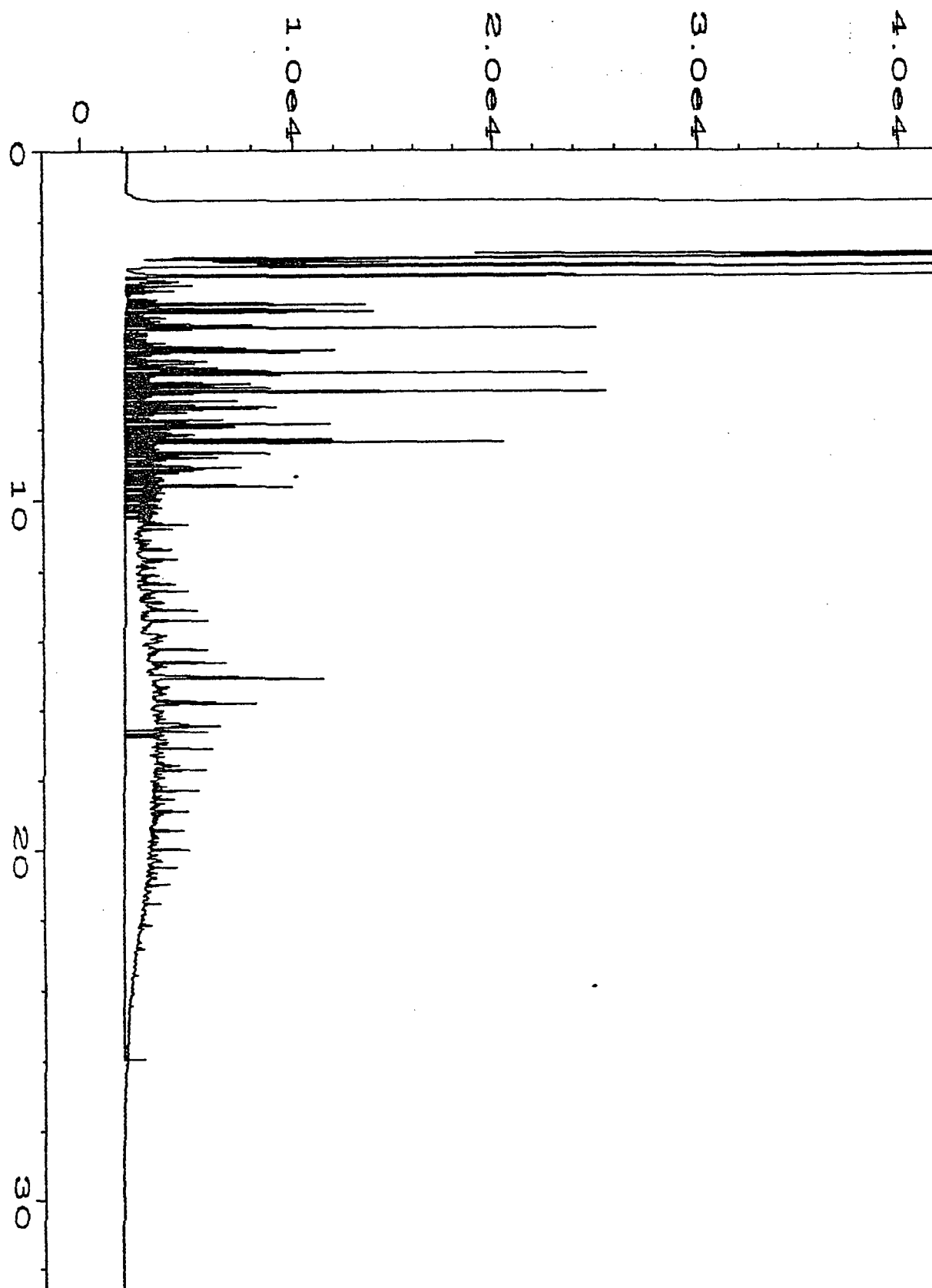
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Operator	: off & je	Vial Number	: 15
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409397-04*10	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 26 Sep 94 11:02 PM	Analysis Method	: SDF0926.MTH
Report Created on:	27 Sep 94 12:08 PM		



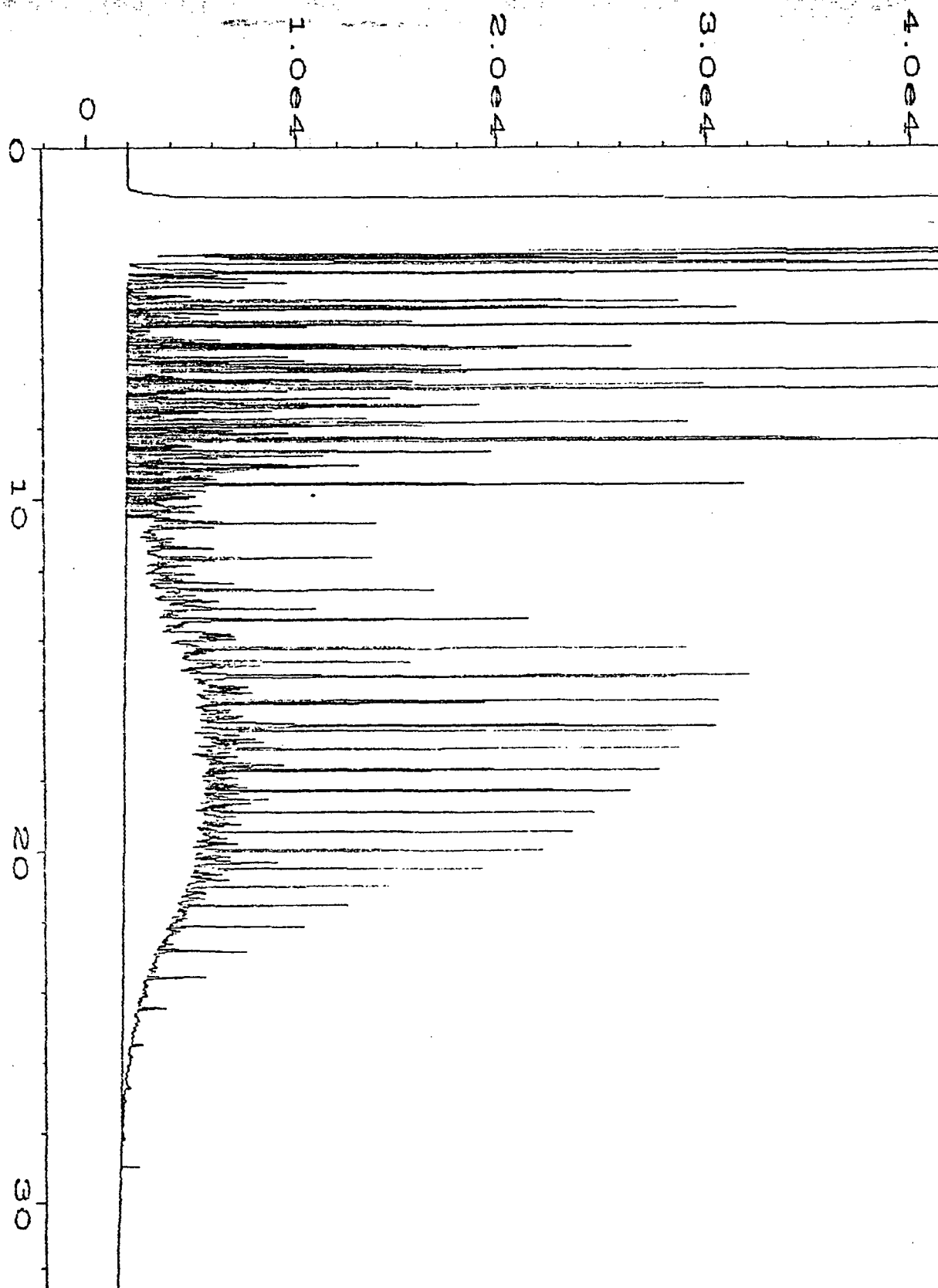
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Operator	: cff & je	Vial Number	: 16
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409397-05*10	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 27 Sep 94 00:02 AM	Analysis Method	: SDF0822.MTH
Report Created on:	28 Sep 94 09:29 AM		



Data File Name	: C:\NHPCHEM\1\DATA\23SEP94\014F0301.D	Page Number	: 1
Operator	: cff & j	Vial Number	: 14
Instrument	: GC#1 5990	Injection Number	: 1
Sample Name	: 429397-06	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 23 Sep 94 10:06 PM	Analysis Method	: SDF0926.MTH
Report Created on:	27 Sep 94 02:28 PM		



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



Data File Name	: C:\HPCHEM\1\DATA\23SEP94\015F0301.D	Page Number	: 1
Operator	: cff & je	Vial Number	: 16
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409397-08	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	SDF0822.MTH
Acquired on	: 23 Sep 94 11:51 PM	Analysis Method	: SDF0822.MTH
Report Created on:	27 Sep 94 10:04 AM		

APPENDIX F

Laboratory Analytical Reports for Groundwater Analyses



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 ≥ 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---

<u>MATRIX</u>	<u>#SAMPLES</u>
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

DATE RECEIVED : 09/26/94

PROJECT # : 13023

PROJECT NAME : BLOOMFIELD

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			DATE	DATE	DATE	DIL.
ID. #	CLIENT I.D.	MATRIX	SAMPLED	EXTRACTED	ANALYZED	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 - QUALITY CONTROL

MSMSD

TEST : PURGEABLE HALOCARBONS/AROMATICS (EPA 601/602)
MSMSD # : 40940001 ATI I.D. : 409415
CLIENT : BURLINGTON ENVIRONMENTAL DATE EXTRACTED : NA
PROJECT # : 13023 DATE ANALYZED : 09/28/94
PROJECT NAME : GIANT-BLOOMFIELD SAMPLE MATRIX : AQUEOUS
REF. I.D. : 40940001 UNITS : UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.3	93	9.9	99	6
CHLOROBENZENE	<0.5	10	9.5	95	9.8	98	3
1,1-DICHLOROETHENE	<0.2	10	11	110	12	120	9
TOLUENE	<0.5	10	9.7	97	11	110	13
TRICHLOROETHENE	<0.2	10	9.9	99	10	100	1

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

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



Analytical Technologies, GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941501

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD
CLIENT I.D. : MW3-1
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 09/23/94
DATE RECEIVED : 09/26/94
DATE EXTRACTED : 09/27/94
DATE ANALYZED : 10/03/94
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
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941502

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD
CLIENT I.D. : MW2-1
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 09/23/94
DATE RECEIVED : 09/26/94
DATE EXTRACTED : 09/27/94
DATE ANALYZED : 10/11/94
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
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Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 40941503

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : BURLINGTON ENVIRONMENTAL
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD
CLIENT I.D. : MW4-1
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 09/23/94
DATE RECEIVED : 09/26/94
DATE EXTRACTED : 09/27/94
DATE ANALYZED : 10/03/94
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
PROJECT # : 13023
PROJECT NAME : BLOOMFIELD
CLIENT I.D. : REAGENT BLANK

ATI I.D. : 409415
DATE EXTRACTED : 09/27/94
DATE ANALYZED : 10/14/94
UNITS : UG/L
DILUTION FACTOR : N/A

COMPOUNDS	RESULTS
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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
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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 CONC.		SPIKED SAMPLE	% REC.	DUP.	DUP.	RPD
	RESULT	SPIKED			SPIKED SAMPLE	% REC.	
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
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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

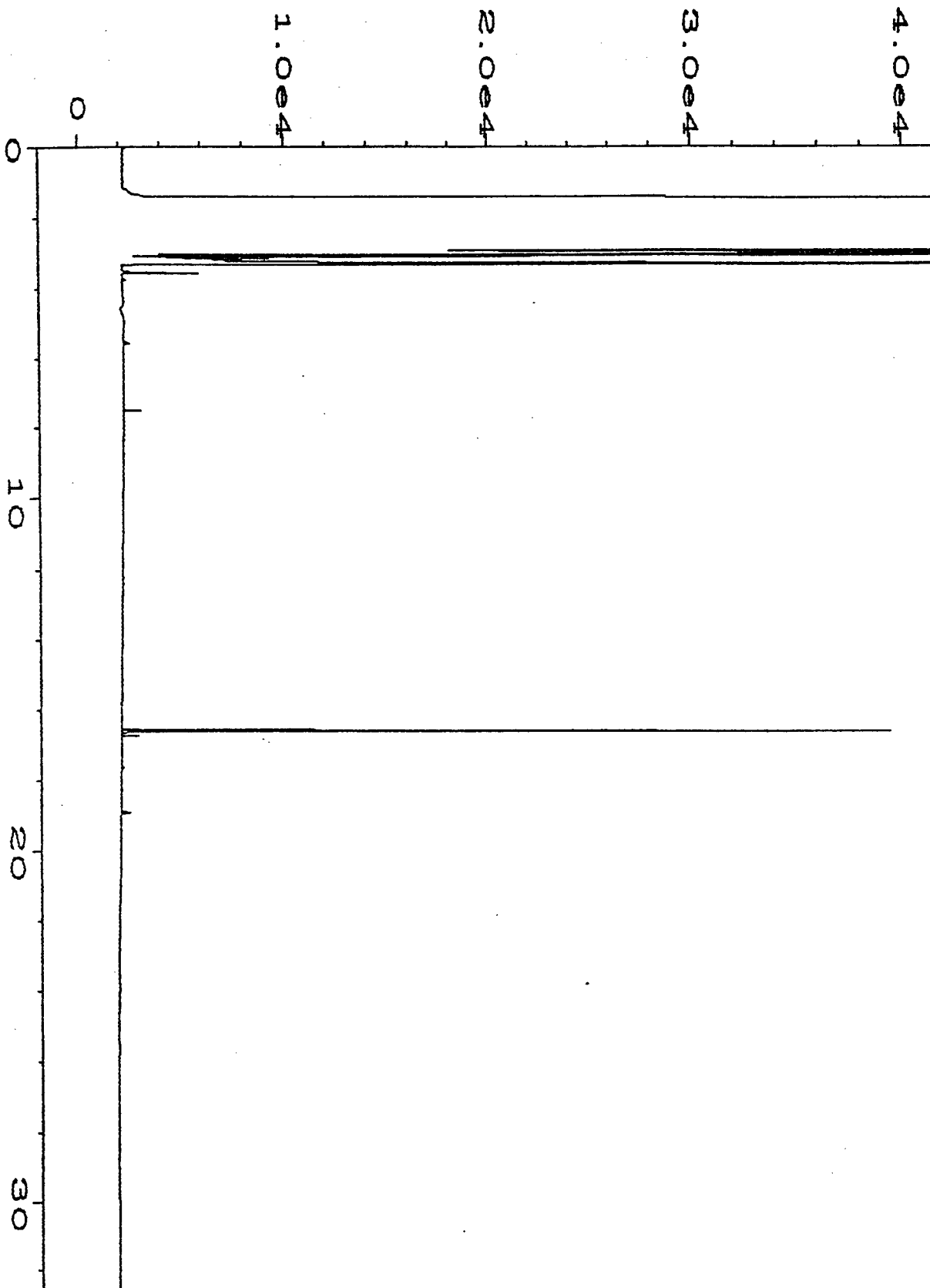
MSMSD

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

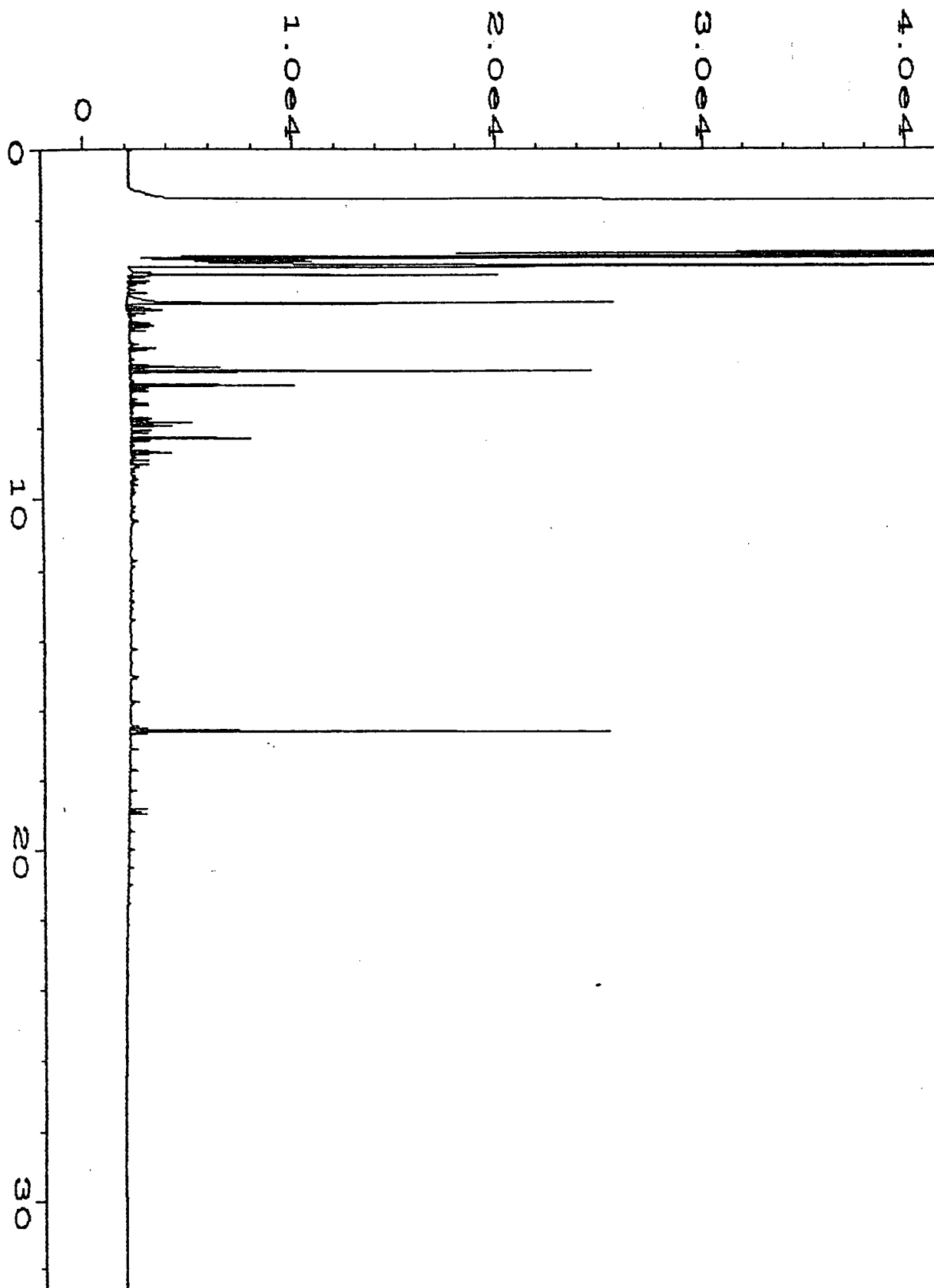
PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
FUEL HYDROCARBONS	<1	35	35	100	36	103	3

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

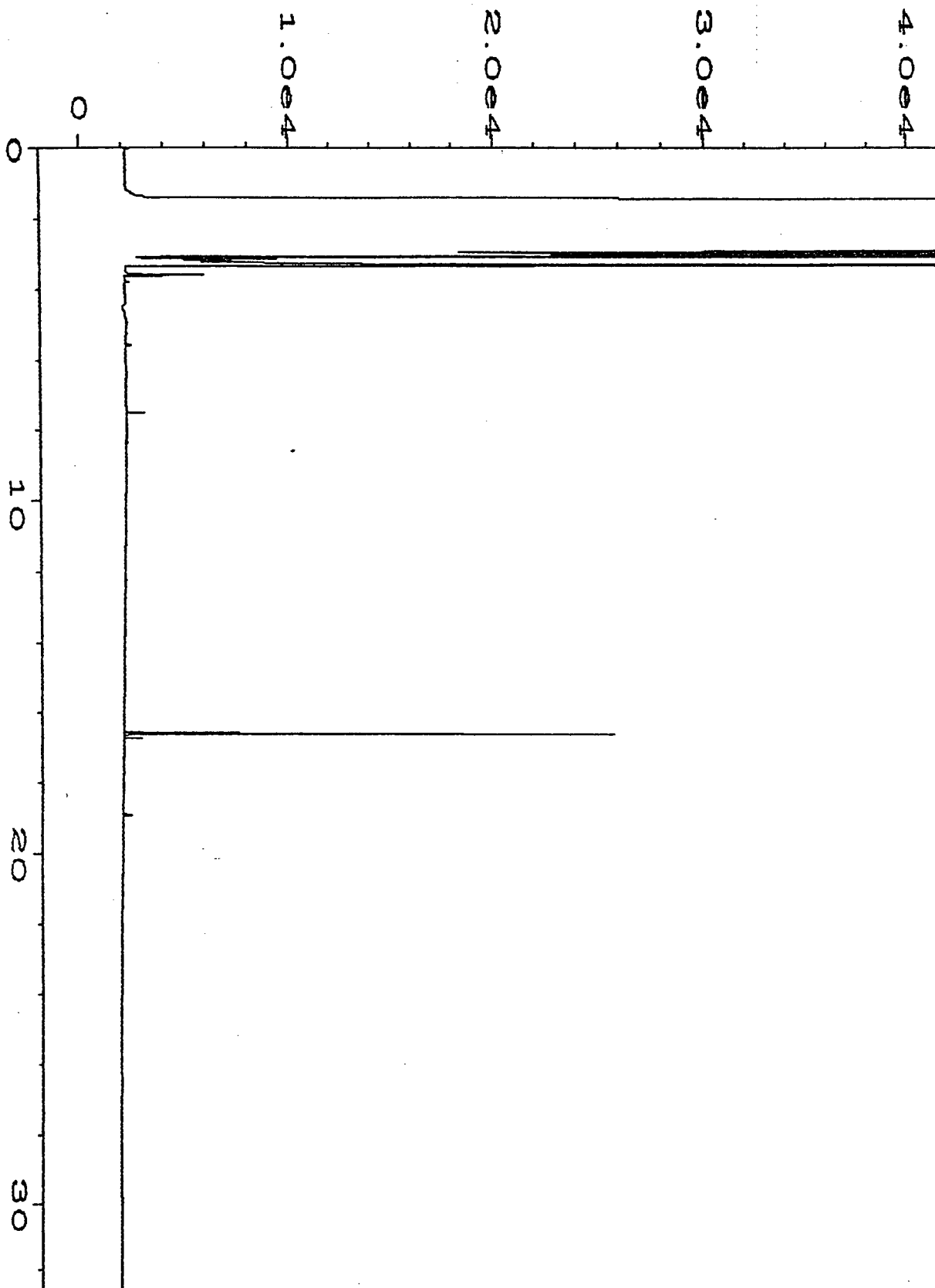
$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



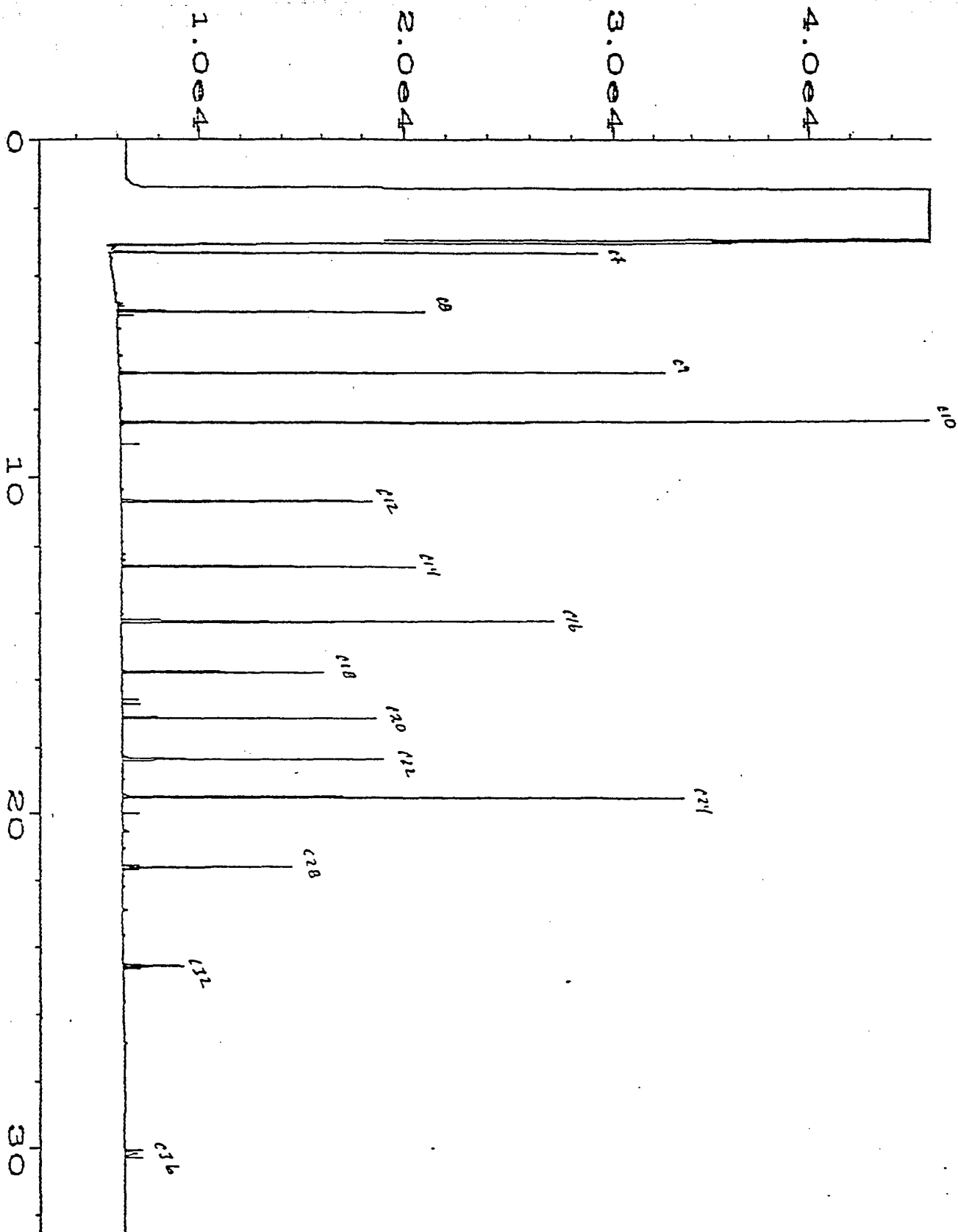
Data File Name	: C:\HPCHEM\1\DATA\27SEP94\021F0701.D	Page Number	: 1
Operator	: cff & je	Vial Number	: 21
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409415-01	Sequence Line	: 7
Run Time Bar Code:		Instrument Method:	SDF0926.MTH
Acquired on	: 28 Sep 94 03:55 AM	Analysis Method	: SDF0926.MTH
Report Created on:	28 Sep 94 11:06 AM		



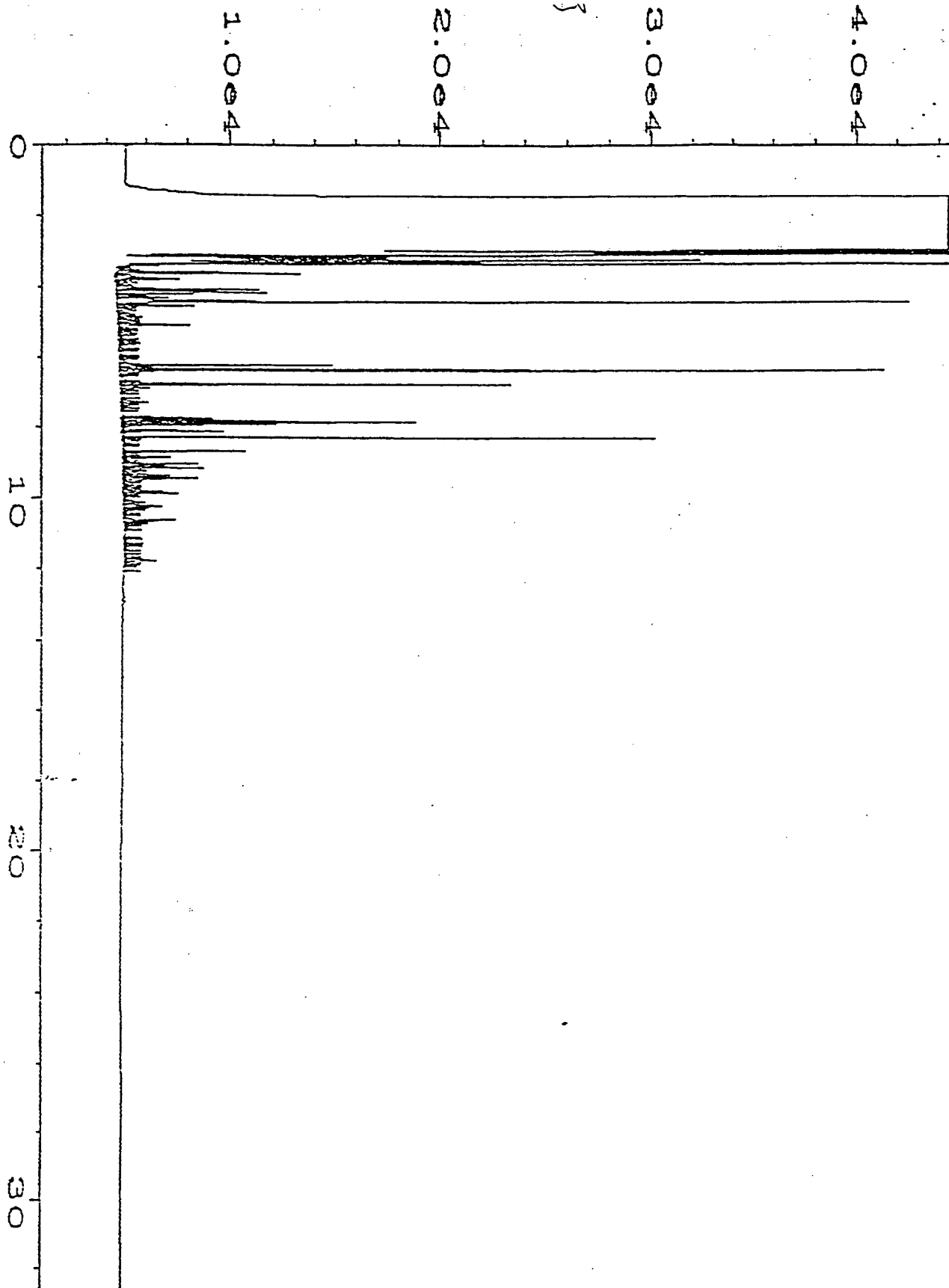
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Operator	: cff & je	Vial Number	: 22
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409415-02	Sequence Line	: 7
Run Time Bar Code:		Instrument Method	: SDF0926.MTH
Acquired on	: 28 Sep 94 04:47 AM	Analysis Method	: SGF0927.MTH
Report Created on:	28 Sep 94 11:48 AM		



Data File Name	: C:\HPCHEM\1\DATA\27SEP94\023F0701.D	Page Number	: 1
Operator	: cff & je	Vial Number	: 23
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: 409415-03	Sequence Line	: 7
Run Time Bar Code:		Instrument Method:	SDF0926.MTH
Acquired on	: 28 Sep 94 05:36 AM	Analysis Method	: SDF0926.MTH
Report Created on:	28 Sep 94 11:51 AM		

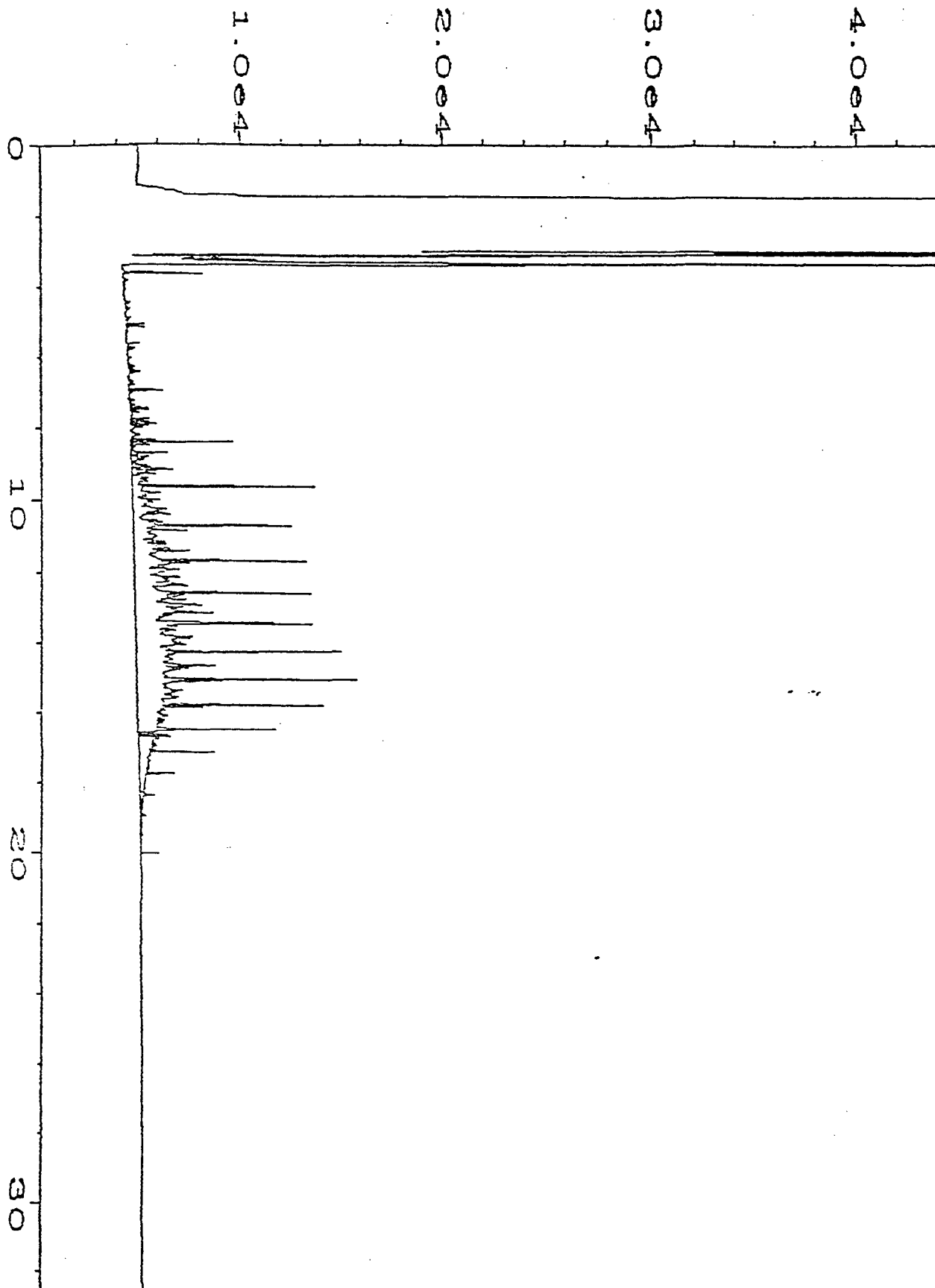


Data File Name	: C:\HPCHEM\1\DATA\01APR94\011F0701.D	Page Number	: 1
Operator	: CFF	Vial Number	: 11
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: RT STD C7 TO C36	Sequence Line	: 7
Run Time Bar Code:		Instrument Method:	SDF0301.MTH
Acquired on	: 01 Apr 94 06:19 PM	Analysis Method	: SDF0301.MTH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



Data File Name	: C:\HPCHEM\1\DATA\02jun94\002F0101.D	Page Number	: 1
Operator	: MNT	Vial Number	: 2
Instrument	: GC#1 5890	Injection Number	: 1
Sample Name	: GAS & HVS LCS GAS STD	Sequence Line	: 1
Run Time Bar Code:		Instrument Method	: SGF0601.MT
Acquired on	: 02 Jun 94 11:31 AM	Analysis Method	: SGF0601.MT
Report Created on:	02 Jun 94 12:18 PM		
Sample Info	: GC3-30-11		

Handwritten signature



Data File Name : C:\HPCHEM\1\DATA\27jun94\003F0101.D
Operator : CFF
Instrument : GC#1 5890
Sample Name : DSL DAILY
Time Bar Code :
Acquired on : 26 Jun 94 09:55 AM
Report Created on: 26 Jun 94 10:30 AM
Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 1
Instrument Method: SDF0531.MTH
Analysis Method : SDF0531.MTH



**BURLINGTON
ENVIRONMENTAL**
A Philip Environmental Company

4000 Monroe Road
Farmington, NM 87401

Chain-of Custody Record

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

ATTN: 40945

COC Serial No. C 1866

Project Name <u>Giant-Bloomfield</u>		Project Number <u>13023</u> Phase Task <u>0077.77</u>		Samplers <u>S. Kelly</u>		Laboratory Name <u>Analytical Technologies, Inc.</u> Location <u>Albuquerque, N.M.</u>		Total Number of Bottles		Type of Analysis and Bottle		Comments	
Sample Number	(and depth)	Date	Time	Matrix									
MW3-1		9/23/94	1530	H ₂ O				2		X			
MW3-1		9/23/94	1530	H ₂ O				2		X			
MW2-1		9/22/94	1630	H ₂ O				2		X			
MW2-1		9/22/94	1630	H ₂ O				2		X			
MW4-1		9/23/94	1200	H ₂ O				2		X			
MW4-1		9/23/94	1200	H ₂ O				2		X			
MW4-1		9/23/94	1200	H ₂ O				2		X			
MW3-1		9/23/94	1530	H ₂ O				2		X			
MW2-1 (02)		9/23/94	1630	H ₂ O				2		X			
MW3-1		9/23/94	1530	H ₂ O				2		X			
MW4-1		9/23/94	1200	H ₂ O				1		X			

Relinquished by:

Signature

Date

Time

Received By:

Signature

Date

Time

Samples Iced: ☒ Yes ☐ No

Preservatives (ONLY for Water Samples)

☐ Cyanide ☐ Sodium hydroxide (NaOH)

☒ Volatile Organic Analysis ☐ Hydrochloric acid (HCl)

☒ Metals ☐ Nitric acid (HNO₃)

☐ TPH (418.1) ☐ Sulfuric acid (H₂SO₄)

☐ Other (Specify) _____

☐ Other (Specify) _____

Carrier:

Shipping and Lab Notes:

Hand Carried to Lab.

Airbill No.



**BURLINGTON
ENVIRONMENTAL**
A Philip Environmental Company

Chain-of Custody Record

4000 Monroe Road
Farmington, NM 87401

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

ATTN: Waste

ATTN: 409415

COC Serial No. C 1867

Project Name		Phase . Task		Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	
Project Number	13023	Phase . Task	007777	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	
Samplers	S. Kelly	Name	Analytical Technologies, Inc.	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	
Laboratory	Location Albuquerque, NM	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments		Comments	
Sample Number (and depth)	9/22/94	1630	H ₂ O	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	
02 MWZ-1	9/22/94	1630	H ₂ O	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	
04 SHIP BLANK	9/14/94	1017	H ₂ O	Date		Time		Matrix		Total Number of Bottles		Type of Analysis and Bottle		Comments	

Relinquished by:

Signature

Date

Time

Received By:

Signature

Date

Time

Samples Iced: ☒ Yes ☐ No

Preservatives (ONLY for Water Samples)

- ☐ Cyanide Sodium hydroxide (NaOH)
☐ Volatile Organic Analysis Hydrochloric acid (HCl)
☒ Metals Nitric acid (HNO₃)
☐ TPH (418.1) Sulfuric acid (H₂SO₄)
☐ Other (Specify) _____
☐ Other (Specify) _____

Carrier:

Shipping and Lab Notes:

Hand Carried to Lab.

Airbill No.

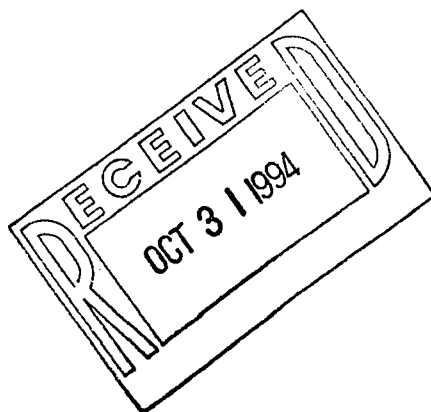
ANALYSIS REQUEST			
NETWORK PROJECT MANAGER: LETITIA KRAKOWSKI			
COMPANY: Analytical Technologies, Inc. ADDRESS: 2709-D Pan American Freeway, NE Albuquerque, NM 87107			
CLIENT PROJECT MANAGER:			
SAMPLE ID 409415-01 -02 -03	DATE 9/23 9/23 9/23	TIME 1530 1630 1700	MATRIX R2 7 2
LAB ID 1 2 3			
TOX			
TOC			
ORGANIC LEAD			
SULFIDE			
SURFACTANTS (MBAS)			
632/632 MOD			
619/619 MOD			
610/6310			
8240 (TCCLP 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			

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NUMBER: 409415		TOTAL NUMBER OF CONTAINERS	
PROJECT NAME: BE		CHAIN OF CUSTODY SEALS	
QC LEVEL: STD. IV		INTACT?	
QC REQUIRED: MS MSD BLANK		RECEIVED GOOD COND. COLD	
TAT: STANDARD RUSHI		LAB NUMBER 409415	
DUE DATE: 10/10		WOT# 4K1007	
RUSH SURCHARGE:		1174154 1000 TIMES ON 8310'S	
CLIENT DISCOUNT: 10 %			

SAMPLES SENT TO:		RELINQUISHED BY: 1.		RELINQUISHED BY: 2.	
SAN DIEGO	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>
FT. COLLINS	Date: 1000	Date: 1000	Date: 1000	Date: 1000	Date: 1000
RENTON	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>
PENSACOLA	Analytical Technologies, Inc.	Analytical Technologies, Inc.	Analytical Technologies, Inc.	Analytical Technologies, Inc.	Analytical Technologies, Inc.
PORTLAND	Albuquerque	Albuquerque	Albuquerque	Albuquerque	Albuquerque
PHOENIX	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.
FIBERQUANT	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>	Signature: <i>[Signature]</i>
	Date: <i>[Date]</i>	Date: <i>[Date]</i>	Date: <i>[Date]</i>	Date: <i>[Date]</i>	Date: <i>[Date]</i>
	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>	Printed Name: <i>[Name]</i>
	Company: <i>[Company]</i>	Company: <i>[Company]</i>	Company: <i>[Company]</i>	Company: <i>[Company]</i>	Company: <i>[Company]</i>



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,

A handwritten signature in dark ink, appearing to read 'Marlon Hopper', written in a cursive style.

Marlon E. Hopper
Lab Manager
Inter-Mountain Laboratories

Enclosures: Analytical Report

Client: **Giant Bloomfield**
Project: **Bloomfield**
Sample ID: **MW2-1**
Laboratory ID: **W01627**
Sample Matrix: **Water**
Condition: **Cool/Intact**

Date Reported: **10/11/94**
Date Sampled: **09/22/94**
Time Sampled: **1630**
Date Received: **09/23/94**

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

dr

Client: Giant Bloomfield
Project: Bloomfield
Sample ID: MW4-1
Laboratory ID: W01628
Sample Matrix: Water
Condition: Cool/Intact

Date Reported: 10/11/94
Date Sampled: 09/23/94
Time Sampled: 1200
Date Received: 09/23/94

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 dr

Client: **Giant Bloomfield**
Project: **Bloomfield**
Sample ID: **MW3-1**
Laboratory ID: **W01629**
Sample Matrix: **Water**
Condition: **Cool/Intact**

Date Reported: **10/11/94**
Date Sampled: **09/23/94**
Time Sampled: **1530**
Date Received: **09/23/94**

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