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REPORTS

DATE:
3/2005

Lodestar Services, Incorporated PO Box 3861 Farmington, NM 87499-3861 Office (505) 334-2791

3R0258

March 28, 2005

Mr. Roger Anderson
New Mexico Oil Conservation Division
1220 South Francis Drive
Santa Fe, New Mexico 87505

RE: Annual Report for Giant's Bloomfield Crude Station

Dear Mr. Anderson:

Lodestar Services, Incorporated is pleased to submit the enclosed copy of *Annual Report, Bloomfield Crude Station, Bloomfield, New Mexico, March 2005* on behalf of Giant Industries Arizona, Inc.

Please call Mr. Tim Kinney of Giant at (505) 632-4001 or myself at (505) 334-2791 with any questions regarding this submittal.

Respectfully Submitted,
Lodestar Services, Inc.

Martin Nee

Cc. Mr. Tim Kinney, Giant
Mr. David Kirby, Giant
Mr. Denny Foust, OCD Aztec

Annual Report
Bloomfield Crude Station
Bloomfield, New Mexico

March 2005

Prepared For

Giant Industries Arizona, Inc.
Bloomfield, New Mexico

Project 30003

Lodestar Services, Incorporated
PO Box 3861 Farmington, NM 87499-3861 Office (505) 334-2791

TABLE OF CONTENTS

INTRODUCTION 2

METHODOLOGY 3

BIOVENTING 3
GROUND WATER SAMPLING 4
PRODUCT RECOVERY 5

RESULTS 6

BIOVENTING 6

TABLE 1 BIOVENTING HEADSPACE RESULTS 6

TABLE 2 BIOVENTING LABORATORY RESULTS 7

TABLE 3 RESULTS OF AIR MONITORING 8

GROUND WATER SAMPLING 9

TABLE 4: GROUND WATER ELEVATION DATA 10

TABLE 5: GROUND WATER ANALYTICAL RESULTS 10

TABLE 6: GROUND WATER GENERAL CHEMISTRY RESULTS 12

PRODUCT RECOVERY MW-2 13

TABLE 7: PRODUCT RECOVERY DATA MW-2 13

CONCLUSIONS 14

BIOVENTING 14
GROUND WATER SAMPLING 14
PRODUCT RECOVERY 14

RECOMMENDATIONS 15

FIGURE 1: SITE LOCATION MAP 16

FIGURE 2: SITE MAP 17

FIGURE 3 BIOVENTING LAYOUT MAP 18

FIGURE 4: GROUND WATER ELEVATION CONTOUR MAP JANUARY 2005 19

LIST OF APPENDICES

APPENDIX A: ANALYTICAL LABORATORY REPORTS

APPENDIX B: COMPREHENSIVE SUMMARY OF GROUND WATER ANALYSES

Introduction

This annual report describes the work completed at Giant Industries Arizona, Inc.'s (Giant's) former Crude Station in Bloomfield, New Mexico since the previous annual report submitted during March 2004. This report includes data collected through January 2005 including:

- Bioventing quarterly carbon dioxide and oxygen monitoring measurements during 2004.
- Bioventing soil sampling in October 2004
- Groundwater sampling results from all wells on January 13, 2004
- Product removal from MW-2 during 2004.

The former Bloomfield Crude Station is located on the southwest corner of Blanco Boulevard and Fifth Street in the city of Bloomfield, San Juan County, New Mexico. The site occupies approximately 5.5 acres within the N ½, NW ¼, NW ¼ of Section 22, Township 29 North, Range 11 West. A regional location map is shown in Figure 1.

A 55,000 barrel crude oil storage tank was previously located at the site within an earthen berm, which occupied approximately 100,000 square feet on the west side of the former crude station. Tank 967-D and berms were removed between late 1995 and early 1996. Approximately 12,924 cubic yards of hydrocarbon impacted soil was removed and treated at Giant's Bisti land-farm. The excavation was backfilled and graded. Currently, the site is an unoccupied, open space. A site map presented as Figure 2 shows the boundary of the former excavation. West of the former tank site is a City of Bloomfield Electrical Substation and two well sites (Jan Redding #1 and Cook #1E) owned and operated by Manana Gas. To the west of the electric substation and Manana well sites, a vacant lot exists. What appears to be a monument may indicate a previous well site that has been plugged and abandoned. Historical research of this area indicate that several oil and possibly gas wells, may have once been operational on this lot, such as Bishop #1, Bishop #3, Hare #1 and Kittell #1 (Figure 2).

The former crude station has been the focus of a subsurface investigation where activities have included numerous soil borings and sampling, installation of seven ground water monitoring wells, excavation and offsite land farming of hydrocarbon impacted soil, and ground water sampling. The area of focused investigation is where the former crude oil storage tank numbered 967-D was located. A more detailed historical account can be found in a report previously submitted to the New Mexico Oil Conservation Division (NMOCD) titled *Comprehensive Report for the Bloomfield Crude Station*, dated January 2000. A chronology of site operations and investigations is found in the Golden Environmental Management report *Monitoring Well Installation, Ground Water Sampling and Bioventing Pilot Test Bloomfield Crude Station, Bloomfield, New Mexico*, dated July 2001.

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Methodology

Bioventing continues as described in the *March 2004 Annual Report* and according to *Bioventing Plan, July 2002* submitted to the New Mexico Oil Conservation Division during July 2002. Groundwater sampling at all monitoring wells followed accepted industry practices. Product (free phase crude oil) recovery was completed by measuring product thickness followed by hand bailing product and groundwater and storing it onsite in a 55 gallon drum.

Bioventing

Bioventing is the process of supplying air to indigenous microorganisms to enhance natural mineralization of hydrocarbons to carbon dioxide and water. Following a successful bioventing pilot test on June 20, 2001 bioventing was initiated on February 17, 2003.

System installation during 2003 included hand boring three inch holes with a hand auger, collecting soil samples at three-foot intervals and screening the samples using headspace techniques. Eight soil samples with the highest headspace readings were submitted to Pinnacle Laboratories in Albuquerque, NM for benzene, toluene, ethylbenzene, xylenes (BTEX), and total petroleum hydrocarbon (THP) analyses by United States Environmental Protection Agency (USEPA) methods 8021 and 8015, respectively. Samples were collected in one quart plastic bags and split for headspace and laboratory analysis. Samples for laboratory analyses were immediately placed in four ounce glass jars, sealed, labeled, stored on ice, and shipped to the laboratory under strict chain-of-custody procedures.

Following sampling, one foot of one-inch diameter polyvinyl chloride .01 inch slotted well screen was set in each hole at approximately twelve feet beneath ground surface at thirty nine locations. Eighteen points are used for monitoring subsurface gasses and twenty one points are used to inject air. Monitoring and Injection point locations are shown on Figure 3.

Injection air is supplied by a Gast™ oil-less rotary vane compressor that supplies approximately 90 standard cubic feet per minute air. The compressor is housed in an existing office building on-site and travels through 1-1/2 inch PVC pipe to each injection point. Valves are located on each injection and monitoring point. The air is injected where field screening and laboratory analyses indicate elevated concentrations of hydrocarbons in the subsurface. Operations and maintenance are performed routinely to ensure the system is operational.

The compressor operates from 0000 hours to 1600 hours Monday through Fridays. Subsurface airflow and oxygen/carbon dioxide concentrations are monitored quarterly. Oxygen and carbon dioxide are measured using a GEM 500 ™ gas monitor. Each point is evacuated until the gas reading stable stable.

Comparative soil samples were collected following approximately eight months of system operations during October 2003 and then during October 2004. Soil samples were collected from a location approximately two feet from where initial eight soil samples were collected and

at the same depth as the original. These samples were also screened in the field using headspace techniques and submitted for laboratory analysis for BTEX and TPH by USEPA methods 8021 and 8015, respectively.

Ground Water Sampling

On January 13, 2005 ground water samples and depth-to-ground water measurements were collected from monitoring wells MW-2 through MW-7. Each well was checked for the presence of free phase crude oil. Samples were collected from the six monitor wells. Giant abandoned monitoring well MW-1 during excavation of the tank pad. Samples were not previously collected from MW-2 due to presence of free phase crude oil. MW-7 was sampled at the request of the NMOCD though Giant believes groundwater impact at this location is not related to their operations as discussed in previous reports.

Using the previous quarter's analytical results, sampling began at the cleanest well and progressed to those containing higher concentrations of contaminants. Prior to sampling, depth to ground water and total depth of each well were measured with a Keck oil/water interface probe. Presence of any free phase crude oil was also investigated using the interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with de-ionized water prior to each measurement. The volume of water in the wells was calculated, and a minimum of three casing volumes of water was purged from each well using a disposable bailer. As water was extracted, pH, electric conductivity and temperature were monitored. The wells were purged until these properties had stabilized, indicating that the purge water was representative of aquifer conditions. These data were recorded within a bound field notebook.

Once each monitoring well was purged, ground water samples were collected by filling two 40-milliliter (ml) glass vials. The pre-cleaned and pre-preserved vials were filled and capped with no air inside to prevent degradation of the sample. Samples were labeled with the time and date of collection, as well as the origin of the sample. They were immediately sealed and packed on ice. The samples were shipped to Pinnacle Laboratories, Inc. (Pinnacle) in Albuquerque, New Mexico in a sealed cooler via Commercial Bus Lines. Proper chain-of-custody procedures were followed with logs documenting the project name and number, sampling point, location, field ID number, date, time, sample type, number of containers, analyses required and sampler's signatures (Appendix A). Pinnacle analyzed the samples for benzene, toluene, ethylbenzene and total xylenes (BTEX) by USEPA Method 8021.

Two 500 milliliter plastic bottles were filled with ground water for analysis of major cations and anions, total dissolved solids (TDS) and an ion balance by various EPA methods. These samples were labeled, stored on ice and transported to Inter-Mountain Laboratories in Farmington, New Mexico for analysis. The January 2005 samples were submitted to Pinnacle Laboratories. The samples were labeled with the project name, sampling location, field identification number, date, time, sample type, analysis required. Strict chain-of-custody procedures were followed.

Product Recovery

Free phase crude oil was intermittently present in MW-2 during 2004. An on-going effort to remove the floating product has involved manual bailing of product from the monitoring well using a disposable bailer. Any product removed from the well is collected in a 55-gallon drum on the site. Product and some water are bailed from the well until there is no measurable amount of free phase product in the well. Once the product has been removed, water depth is measured a second time. This process is carried out periodically based on the presence of product.

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Results

Bioventing

The results from headspace field screening using a PhotoVac photo ionization detector (PID) during monitoring and injection point installation in October, 2002 were as follows.

Table 1 Bioventing Headspace Results

Location	DEPTH (feet)	PID (ppm)	Location	DEPTH (feet)	PID (ppm)	Location	DEPTH (feet)	PID (ppm)
IP-1	6	57.5	IP-21	6	3.5	MP-12	6	6.2
IP-1	9	57.5	IP-21	9	0.2	MP-12	9	8.9
IP-1	12	594	IP-21	12	4.8	MP-12	12	700
IP-10	6	756	IP-22		no PIDs	MP-13	6	6
IP-10	9	724	IP-23	6	0.3	MP-13	9	4.9
IP-10	12	212	Ip-23	9.5	1.3	MP-13	13	650
IP-11	6	262	IP-3	9	240	MP-14	6	1.5
IP-11	9	543	IP-3	12	738	MP-14	9	6.9
IP-11	12.5	59.2	IP-4	6	102	MP-14	12	1.8
IP-12	6	2.9	IP-4	9	415	MP-15	6	0.4
IP-12	9	5.1	IP-4	12	618	MP-16	6	4.2
IP-12	13	616	IP-5	6	1.8	mp-16	9	no PIDs
IP-13	6	5.6	IP-5	9	768	mp-16	10.5	no PIDs
IP-13	9	2	IP-5	13	20.3	MP-2	6	69
IP-13	12	7.5	IP-6	6	187	MP-2	9	697
IP-14	6	0	IP-6	9	1005	MP-2	12	793
IP-14	9	0	IP-6	13	200	MP-3	6	777
IP-14	13.5	25.7	IP-7	3	2.2	MP-3	9	146
IP-15		no PIDs	IP-7	6	19	MP-3	12	23.8
IP-16	6	1.6	IP-7	9	655	MP-4	6	410
IP-16	9	728	IP-7	12	676	MP-4	9	122
IP-16	13	675	IP-8	3	29.2	MP-4	12	632
IP-17		no PIDs	IP-8	6	106	MP-5	6	37.6
IP-18	3	24.2	IP-8	9	439	MP-5	9	757
IP-18	6	106	IP-8	13	76	MP-5	12	865
IP-18	9	439	IP-9	3	102	MP-6	3	2.6
IP-18	12	10.3	IP-9	6	503	MP-6	6	2.1
IP-18	13	76	IP-9	9	74	MP-6	12	616
IP-19		no PIDs	IP-9	12	627	MP-7	3	224
IP-2	6	13.5	MP-1	6	2.3	MP-7	6	872
IP-2	9	786	MP-1	9	602	MP-7	9	708
IP-2	12.5	562	MP-1	13	203	MP-7	11	70.7
IP-20	3	1.5	MP-10	6	49.1	MP-8	6	30.3
IP-20	6	1.2	MP-10	9	733	MP-8	9	772
IP-20	9	1	MP-10	12	738	MP-8	12	602
IP-20	12	0.7	MP-11	6	0	MP-12	6	6.2
IP-21	3	0.4	MP-11	9	0	MP-12	9	8.9
MP-9		no PIDs	MP-11	12	732	MP-12	12	700

Headspace readings were recorded where there was physical evidence of impacted soil. The results of laboratory analyses from eight of the highest headspace reading locations are shown in Table 2. Also included in Table 2 are the results of sampling from the same locations collected one and two years later at the same depth approximately two and three feet from the original samples.

Table 2 Bioventing Laboratory Results

Location (Oct 02)	Depth (feet)	PID (ppm)	Lab TPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)
NMOCD Standard			**100**	**10**				**50**
MP-11	12	732	1290	2.9	nd	5.8	36	44.7
IP-16	9	728	5690	0.85	0.78	7.7	58	67.33
MP-8	9	772	nd	nd	nd	nd	nd	0
IP-12	12	616	2470	nd	nd	2.1	16	18.1
IP-7	12	676	4720	2.9	nd	7.6	51	61.5
MP-3	6	777	750	2	0.3	3.2	23	28.5
MP-7	6	872	2830	2	3.3	8.6	56	69.9
IP-10	6	756	1470	0.42	0.14	0.11	1.1	1.77

Location (Oct 03)	Depth (feet)	PID (ppm)	Lab TPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)
NMOCD Standard			**100**	**10**				**50**
MP-11	12	191	157	nd	nd	nd	nd	0
IP-16	9	110	2600	nd	nd	nd	nd	0
MP-8	9	149	nd	nd	nd	nd	nd	0
IP-12	12	190	720	nd	nd	nd	nd	0
IP-7	12	287	1299	nd	nd	nd	0.29	0.29
MP-3	6	314	400	nd	nd	nd	nd	0
MP-7	6	3964	4700	3.5	nd	10	89	102.5
IP-10	6	311	21	nd	nd	nd	nd	0

Location (Oct 04)	Depth (feet)	PID (ppm)	Lab TPH (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl benzene (mg/kg)	Xylenes (mg/kg)	Total BTEX (mg/kg)
NMOCD Standard			**100**	**10**				**50**
MP-11	12	0.0	nd	nd	nd	nd	nd	0
IP-16	9	0.0	540	nd	nd	nd	nd	0
MP-8	9	149	nd	nd	0.027	nd	nd	0.027
IP-12	12	253	nd	nd	nd	nd	nd	0
IP-7	12	123	139	nd	nd	nd	nd	0
MP-3	6	0.0	nd	nd	nd	nd	nd	0
MP-7	6	994	2330	3.5	nd	2.7	35	41.2
IP-10	6	262	nd	nd	nd	nd	0.083	0.083

Comparison of Laboratory Results Between Oct-02,Oct-03 Results					
		2002-2003		2003-2004	
Hole	Depth (feet)	% Change Lab TPH mg/kg	% Change Total BTEX mg/kg	% Change Lab TPH mg/kg	% Change Total BTEX mg/kg
MP-11	12	-88%	-100%	nc	nc
IP-16	9	-54%	-100%	-79%	nc
MP-8	9	nc	nc	nc	nc
IP-12	12	-71%	-100%	nc	nc
IP-7	12	-72%	-99.5%	-89%	-100%
MP-3	6	-47%	-100%	nc	nc
MP-7	6	66%	47%	-50%	-60%
IP-10	6	-99%	-100%	nc	nc
Ave.		-52%	-79%	-73.0%	-79.9%

nc: no change; nd: not detected; the results from MP-8 were not used in average change calculations

As shown on the above Table 2, Laboratory reports indicate a consistent decrease of the BTEX constituents and TPH constituents since bioventing operations began. TPH and BTEX were not detected in five of eight samples. BTEX concentrations were below NMOCD's *Guidelines for Remediation of Leaks, Spills and Releases* in the three locations where BTEX was detected. THP was reported greater than NMOCD's 100 ppm standard in three locations.

Laboratory analytical reports and chain-of-custody documentation are included in Appendix A.

The results of carbon dioxide and oxygen measurements during bioventing are as follows:

Table 3 Results of Air Monitoring

Monitoring Point	Oxygen Percentage at Monitoring Points			Carbon Dioxide Percentage at Monitoring Points		
	Pretest	2003 ave.	2004 ave.	Pretest	2003 ave.	2004 ave.
IP10	17.20	3.15	12.38	1.8	6.52	10.95
IP11	20.90	9.51	8.63	0	1.03	11.90
IP13	20.90	8.62	18.95	0.2	1.74	1.38
IP14	19.90	5.77	4.50	1	6.84	10.05
IP15	20.90	0.07	19.93	0.8	1.21	0.33
IP17	20.90	0.44	19.20	1	1.10	1.25
IP19	20.90	9.27	16.20	0.4	1.24	3.50
IP20	20.50	5.88	7.18	0.6	6.36	8.40
IP21	20.90	8.33	18.10	1.4	1.20	2.20
IP22	20.90	0.14	17.50	0.4	0.94	1.85
IP23	20.90	0.69	19.33	0.6	0.66	0.77
IP8	20.20	3.25	4.80	0.8	13.43	10.58

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Monitoring Point	Oxygen Percentage at Monitoring Points			Carbon Dioxide Percentage at Monitoring Points		
MP14	19.20	14.20	8.30	1	3.34	7.98
MP15	20.90	18.40	14.88	0.6	1.82	3.68
MP16	20.90	20.11	18.95	0.06	0.97	1.40
MP4	19.00	1.94	6.15	1.2	12.05	14.45
MP7	18.60	6.56	7.85	1.4	5.60	8.25
MP9	20.50	13.13	18.88	1	1.89	0.98
Average	20.23	13.86	13.43	0.79	3.77	5.55

Data from 2003 includes data from 2/03,3/03,10/03 and 1/04. Data from 2004 includes quarterly data from 4/04,7/04,10/04 and 1/05.

Measurements at individual monitoring points are shown on the Bioventing Data tables in Appendix B. Air monitoring points were, for the most part, installed away from the injection points that were installed in the areas of highest hydrocarbon concentrations. Because these points were away from hydrocarbons and hence biologic activity, initial oxygen concentrations were typically higher and carbon dioxide concentrations typically lower than readings in areas of higher hydrocarbon concentrations. The average oxygen concentration during 2003 at all monitoring points was sixty nine percent of pretest concentrations and sixty six percent of pretest concentrations during 2004. The average of all carbon dioxide concentrations at all monitoring points was four hundred and seventy seven percent of pretest concentrations during 2003 and seven hundred and percent of pretest concentrations during 2004.

Ground Water Sampling

Depth-to-water measurements taken during January 2005 are shown in Table 4. During January 2005, water depth ranged from 22.50 feet beneath the top of the well casing (BTOC) in MW-7 to 14.52 feet BTOC in MW-2. Product was found in MW-2 during January 2004 through August 2004 and absent September 2004 to date. Free phase crude oil has never been found in any of the other wells. Ground water elevations were calculated, and inferred ground water elevation contour map is presented as Figure 4. Based on the contours, ground water movement appears to be to the southwest and the hydraulic gradient is 0.017 feet per feet.

Table 4: Ground Water Elevation Data

Well Number	Casing Elevation (ft)	Date	Depth to Water (ft)	Depth to Product (ft)	Product Thickness (ft)	Groundwater Elevation (ft)
MW-2	5485.33	1/13/05	14.52	np	np	5470.81
MW-3	5488.61	1/13/05	15.89	np	np	5472.72
MW-4	5486.18	1/13/05	15.62	np	np	5470.56
MW-5	5481.61	1/13/05	15.91	np	np	5465.70
MW-6	5486.18	1/13/05	17.67	np	np	5468.51
MW-7†	5491.86	1/13/05	22.50	np	np	5469.36

Notes:
Measuring points are marked by a notch in top of well casing
na: not applicable
np: indicates there was no free phase product present
Groundwater Elevation = (Surveyed Well Casing Elevation) - (Depth to Water)
Water level elevation is given in feet above mean sea level
* MW-1 was abandoned by Giant in 2000

Laboratory analytical results for BTEX are presented in Table 5. Complete reports from Pinnacle Laboratories are included in Appendix A. During January 2005, BTEX was not detected in the groundwater from MW-3, MW-4, MW-5, and MW-6. The concentrations of Benzene in MW-2 and MW-7 were over New Mexico Water Quality Control Commission (NMWQCC) standards at 430 µg/L and 1600 µg/L, respectively. Toluene was not detected in these wells. Ethylbenzene concentrations were 360 µg/L in MW-2 and 220 µg/L in MW-7, beneath NMWQCC standards. Xylenes in MW-2 and MW-7 were over NMWQCC standards at 1000 µg/L and 1500 µg/L, respectively.

Table 5: Ground Water Analytical Results

NMWQCC Standards		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
		10	**750**	**750**	**620**
MW-2	Sep-94	**640**	600	82	**690**
	Apr-95	**220**	280	53	430
	Sep-99	NSP	NSP	NSP	NSP
	Dec-99	NSP	NSP	NSP	NSP
	May-01	NSP	NSP	NSP	NSP
	May-02	NSP	NSP	NSP	NSP
	Jan-03	**1700**	ND	650	**3200**
	Jan-04	**1100**	ND	340	**1800**
	Jan-05	**430**	ND	360	**1000**
MW-3	Sep-94	ND	ND	ND	ND
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND

NMWQCC Standards		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
		10	**750**	**750**	**620**
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	ND
	Jan-05	ND	ND	ND	ND
MW-4	Sep-94	2.1	ND	ND	1.2
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	ND
	Jan-05	ND	ND	ND	ND
MW-5	Sep-94	NS	NS	NS	NS
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	1.1
	Jan-05	ND	ND	ND	ND
MW-6	May-01	**12**	15	13	83
	May-02	ND	ND	0.53	1.4
	Oct -02	ND	ND	ND	3.2
	Jan-03	6.0	20	87	350
	Jul-03	ND	2.7	3.2	16
	Sept-03	0.8	3.7	4.0	24
	Jan-04	0.9	1.6	2.9	16
	Jan-05	ND	ND	ND	ND
MW-7	May-01	**2,400**	ND	380	**2,800**
	June-02	**2,000**	ND	140	**1,100**
	Oct-02	**1100**	ND	79	490
	Jan-03	**3200**	ND	400	**3100**
	Jan-04	**3300**	ND	460	**3300**
	Jan-05	**1600**	ND	220	**1500**

The results of general chemistry analyses for January 2005 are shown in Table 6. Results indicate high conductivity in all of the samples, ranging from 6800 micromhos per centimeter (µmhos/cm) to 1500 µmhos/cm. Total dissolved salts (TDS) are also high, with levels between 930 milligram per liter (mg/L) in MW-7 and 4800 mg/L in MW-5. All of the samples have concentrations greater than the New Mexico Water Quality Control Commission (NMWQCC)

domestic water supply standard for TDS of 1000 mg/L except the sample from MW-7. These results indicate a poor quality for potable use. The samples from wells MW-3, MW-4, MW-5, and MW-6 exceed the NMWQCC domestic water standard for sulfate at 2100 mg/L, 2200 mg/L, 1200 mg/L, and 940 mg/L, respectively. The standard for sulfate is 600 mg/L. The sample taken from MW-5 contained 1100 mg/L of chloride. The standard for chloride is 250 mg/L. The elevated levels of these parameters are indicators of the typically poor quality of shallow ground water at the site. The complete laboratory analytical reports are included in Appendix A. Historical general chemistry of ground water sampled at the Bloomfield Crude Station is included in Appendix B.

Table 6: Ground Water General Chemistry Results

Analyte	Units	Date	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	NMWQCC Standard
Lab pH	s.u.	1/13/05	7.6	7.4	7.3	7.0	7.2	7.0	6-9
Conductivity	µmhos/cm	1/13/05	3000	4700	4900	6800	4100	1500	
TDS	mg/L	1/13/05	**2000**	**3900**	**4000**	**4800**	**3000**	930	1000
Alkalinity as CaCO3	mg/L	1/13/05	1300	650	420	870	1100	740	No Std.
Bicarbonate as CaCO3	mg/L	1/13/05	1300	560	420	870	1100	740	No Std.
Carbonate as CO3	mg/L	1/13/05	7	1	1	<1	2	1	No Std.
Hydroxide	mg/L	1/13/05	<1	<1	<1	<1	<1	<1	No Std.
Chloride	mg/L	1/13/05	110	37	30	**1100**	93	15	250
Sulfate	mg/L	1/13/05	58	**2100**	**2200**	**1200**	**940**	190	600
Calcium	mg/L	1/13/05	140	450	450	670	220	180	No Std.
Magnesium	mg/L	1/13/05	19	47	49	60	28	20	No Std.
Potassium	mg/L	1/13/05	3.8	3.9	10	10	6.7	3.3	No Std.
Sodium	mg/L	1/13/05	620	690	740	910	670	150	No Std.
Iron	mg/L	1/13/05	11	3.9	18	4.3	23	27	No Std.
Manganese	mg/L	1/13/05	1.3	.79		11	4.0	0.3	No Std.
Nitrate/Nitrite	mg/L	1/13/05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	10
Dissolved Oxygen (field)	mg/L	1/13/05	0.50	2.89	3.40	2.21	1.54	1.10	No Std.

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

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Product Recovery MW-2

During 2004, product thickness ranged from 0.13 feet in May 2004 to 0.0 feet in September 2004. Product has not been found since August, 2004. A comprehensive summary of product monitoring and recovery is presented in Table 7. The product and water is stored on-site in a 55 gallon drum.

Table 7: Product Recovery Data MW-2

Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Volume Removed (gal) (includes purge water)
May 4, 1995	NA	NA	NA	9
Sept 30, 1999	15.00	17.48	2.47	2.75
Nov 16, 1999	14.65	17.00	2.35	2.0
Dec 14, 1999	14.66	16.76	2.10	5.0
May 11, 2001	14.69	16.77	1.96	2.5
May 21, 2001	15.10	15.65	0.55	0
May 23, 2001	15.13	15.69	0.56	0
July 3, 2001	15.48	16.32	0.84	0
July 9, 2001	15.54	16.43	0.89	1.1
May 13, 2002	14.70	15.51	0.81	1.4
May 22, 2002	14.64	15.29	0.65	1.2
May 30, 2002	14.70	15.14	0.44	1.1
June 5, 2002	14.76	15.00	0.24	1.1
June 13, 2002	14.75	14.91	0.15	0.6
June 19, 2002	14.70	14.78	0.08	0.6
June 26, 2002	14.68	14.73	0.05	0.3
July 5, 2002	14.63	14.69	0.05	0.2
July 12, 2002	14.56	14.61	0.05	0.2
July 18, 2002	14.53	14.59	0.06	0.2
July 25, 2002	14.51	14.56	0.05	0.2
July 31, 2002	14.43	14.47	0.04	0.1
August 16, 2002	14.25	14.32	0.06	0.2
September 6, 2002	14.18	14.30	0.12	0.1
September 19, 2002	14.22	14.38	0.16	0.2
October 21, 2002	-	13.87	0.00	0
January 30, 2003	-	12.53	0.00	0
March 26, 2003	-	13.75	0.00	0
May 16, 2003	-	14.30	0.00	0
July 27, 2003	14.06	14.08	0.02	2.0
August 18, 2003	-	14.07	0.00	0
September 15, 2003	-	14.08	0.00	0
January 20, 2004	14.2	14.24	0.04	2.5
April 29, 2004	15.04	15.1	0.06	2
May 27, 2004	15.38	15.51	0.13	2
June 24, 2004	15.6	15.65	0.05	2

Date	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Volume Removed (gal) (includes purge water)
July 26, 2004	15.50	15.54	0.04	1
August 25, 2004	15.12	15.13	0.01	1
September 30, 2004	-	14.72	0	1
October 19, 2004	-	14.58	0	-
November 16, 2004	-	14.4	0	0.5
December 14, 2004	-	14.38	0	-
January 13, 2005	-	14.52	0	-
Total Gallons of Product and Purge Water Removed Since 1995				44.05

Conclusions

Bioventing

Based on the decreased in concentrations of TPH and BTEX following approximately twenty months of operations, bioventing is effectively reducing the concentrations of hydrocarbons in the subsurface. Prior to bioventing in 2002 seven of eight soil samples were over NMOCD standards for TPH, none for benzene and four were over for total BTEX. One year later following eight months of bioventing, six samples were over NMOCD standards for TPH, none for benzene and one was over standards for total BTEX. Two years later following twenty months of bioventing three of eight samples were over NMOCD standards for TPH, none for benzene and no samples were over standards for total BTEX. The concentrations of oxygen and carbon dioxide recorded through January 2005 indicate sustained biologic activity at the site.

Ground Water Sampling

Laboratory analyses of ground water samples from MW-3 , MW-4, MW-5, and MW-6 did not identify any BTEX constituents. This is the first time BTEX has not been detected in the ground water sample from MW-6. The reduction in the concentrations of BTEX in the ground water and the continued absence of product in MW-2 is a significant milestone indicating that all of the product has been removed from the site. The ground water form MW-7 contains concentrations of benzene, and xylenes that are above NMWQCC standards and are not related to Giant's activities at the site do to the wells proximity to former oil and gas wells and it's offsite cross-gradient location.

The NMWQCC domestic use standards for total dissolved solids in ground water are exceeded at all monitoring wells including up-gradient well MW-3, except MW-7, indicating that the ground water is not suitable for domestic use. That the ground water from MW-7 is significantly lower in TDS also indicates that the problems at MW-7 are not related to Giant's operations.

The potentiometric surface elevation has risen since last year probably due to increased precipitation. The general direction and flow gradient remain static. Ground water flow is to the southwest at 0.017 ft/ft.

Product Recovery

Product recovery at MW-2 has resulted in the removal of the free phase product from the well.

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Recommendations

After compiling the most recent analytical results and comparing these with historical results, the following remedial action and monitoring plan is recommended:

- Continue bioventing at the site to reduce the hydrocarbon concentrations in soil to below NMWQCC standards. Increase airflows where necessary to enhance degradation.
- Collect soil samples during October 2005 to monitor progress of remediation.
- Also during October 2005, turn off the bioventing system for one week and measure the concentrations of hydrocarbons in the soil gas at all monitoring and injection points.
- Monitor MW-2 monthly for product.
- Conduct annual ground water sampling for BTEX at all monitoring wells during January 2006.
- Prepare an annual report in March 2006.

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Figure 1: Site Location Map

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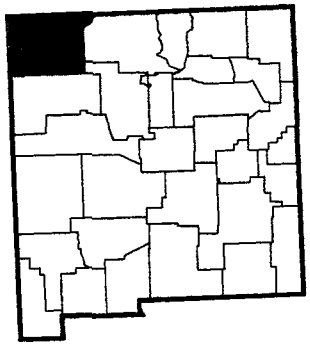
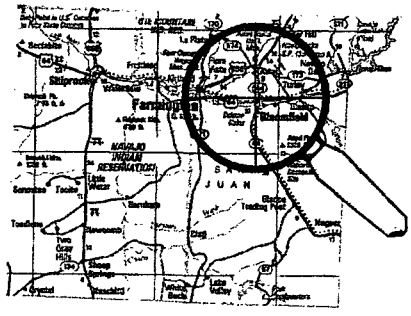
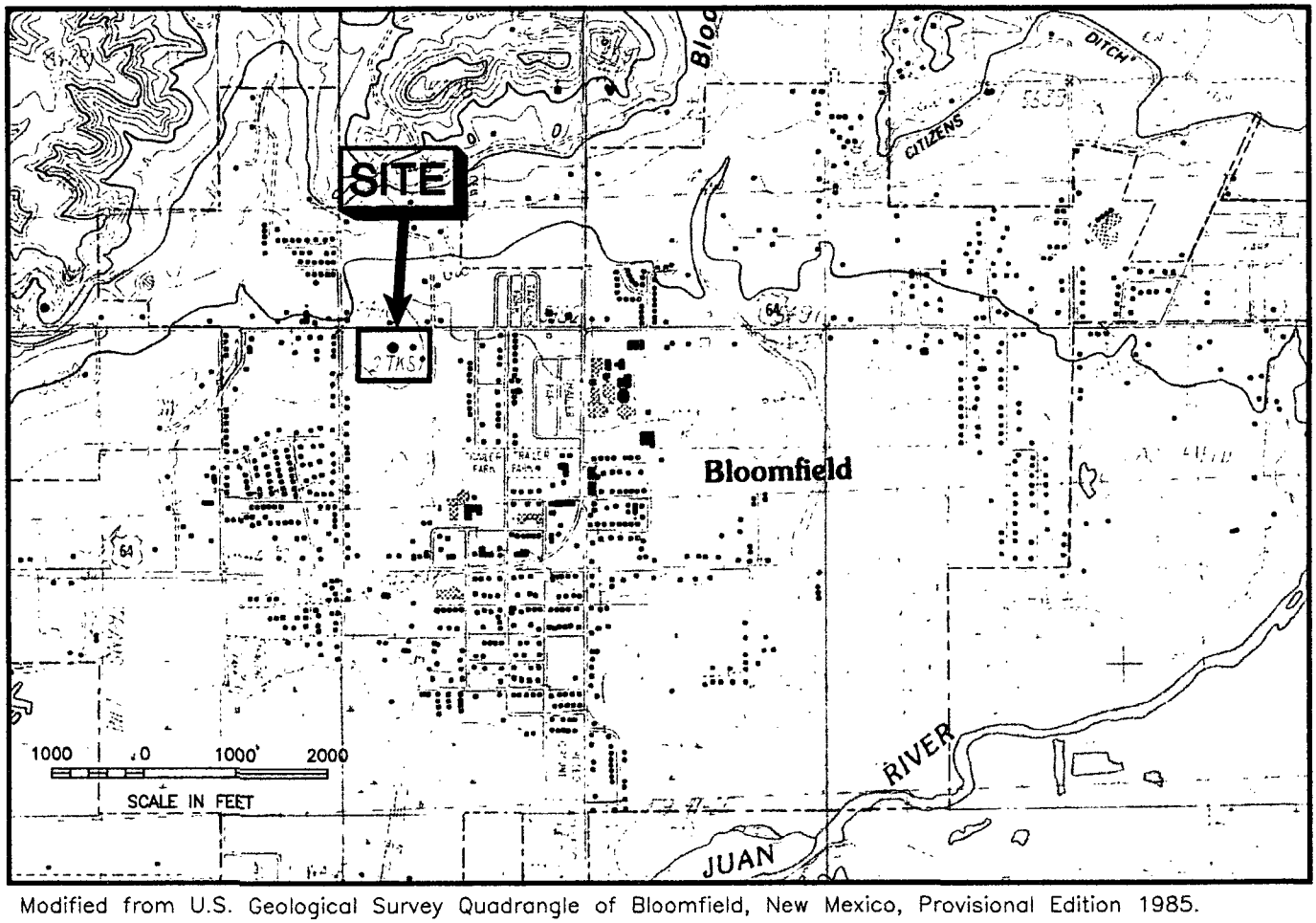
NEW MEXICO



SAN JUAN COUNTY



AREA IN DETAIL



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

SCALE IS VARIABLE

N

D:\DRAW\MARTIN\6171A

Lodestar Services, Incorporated PO Box 3861, Farmington, NM 87499 (505) 334-2791	TITLE: GIANT INDUSTRIES ARIZONA, INC. BLOOMFIELD, NEW MEXICO SITE LOCATION MAP	DWN: CJG / DES.:	PROJECT NO.: 30002 GIANT INDUSTRIES BLOOMFIELD, NM
		CHKD: / APPD:	
		DATE: 03/21/05 / REV.: 0	FIGURE 1

Figure 2: Site Map

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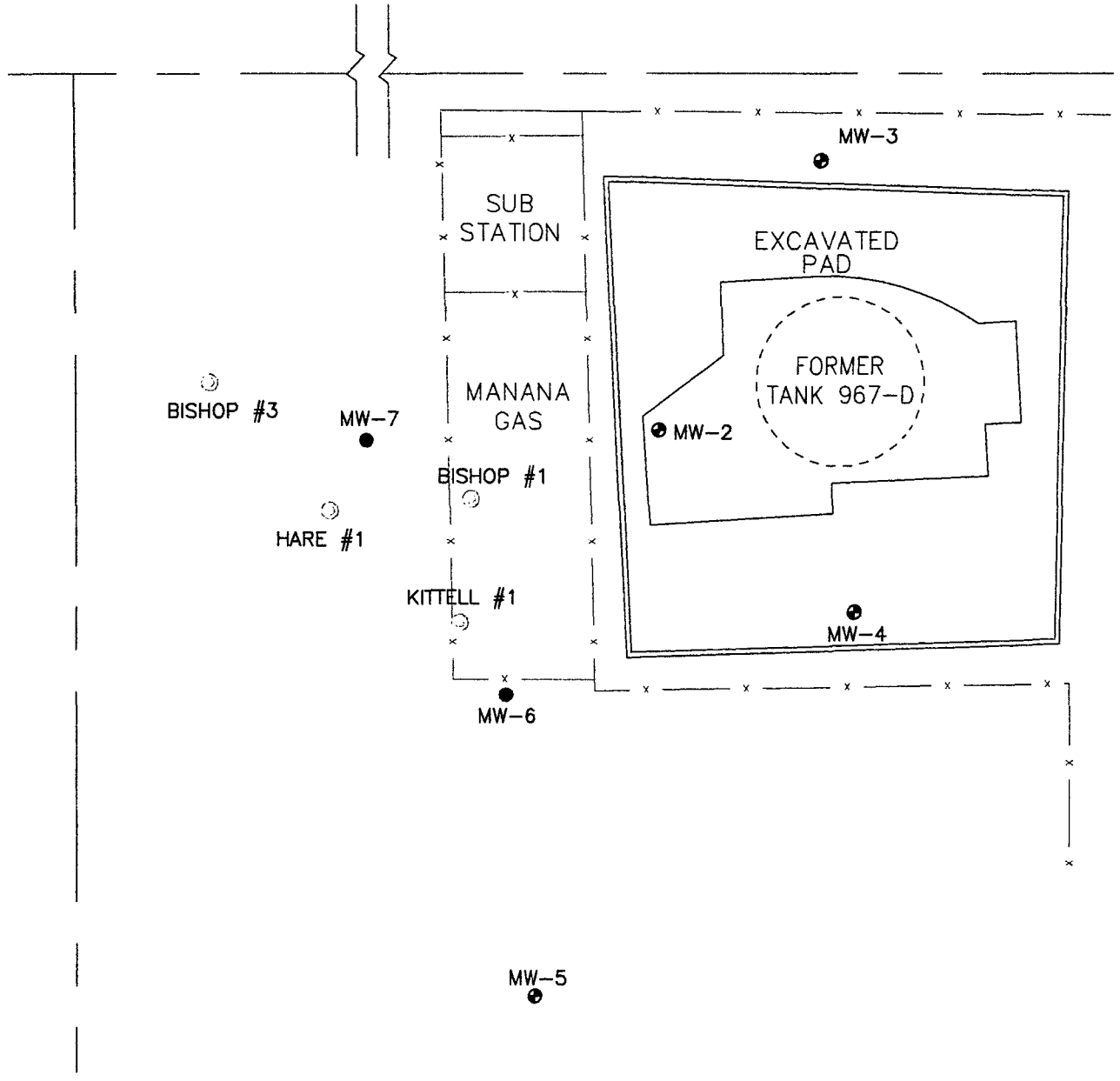

LEGEND

- FENCE LINE
- MW-1 APPROXIMATE LOCATION OF MONITOR WELL & NUMBER
- NEW GROUND WATER MONITOR WELLS INSTALLED
- APPROXIMATE LOCATION OF HISTORICAL OIL & GAS WELLS
- EARTHEN BERM

0 100 FEET

N

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(505) 334-2791

TITLE:
GIANT INDUSTRIES ARIZONA, INC.
BLOOMFIELD, NEW MEXICO
SITE MAP

DWN:	DES.:
CJG	
CHKD:	APPD:
DATE: 03/21/05	REV.: 1

PROJECT NO.: 30002
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 2

D:\DRAW\MARTIN\6171B

Figure 3 Bioventing Layout Map

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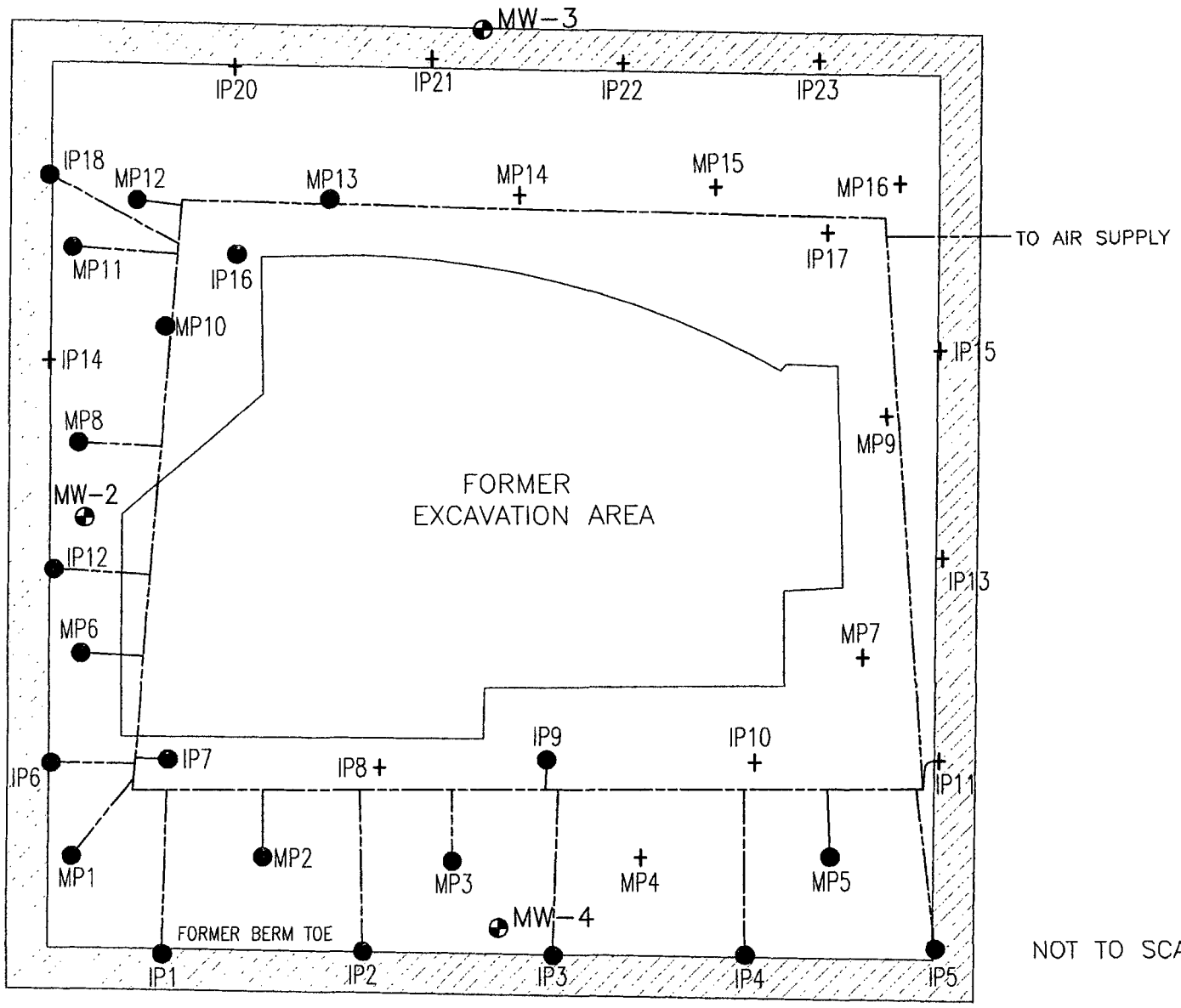

LEGEND

- MONITORING WELL NUMBER AND LOCATION
- MONITORING POINT
- INJECTION POINT
- LIMITS OF EXCAVATION
- BERMS

D:\DRAW\MARTIN\6171-FIG3

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PO Box 3861, Farmington, NM 87499
(505) 334-2791

TITLE:
GIANT INDUSTRIES ARIZONA, INC.
BLOOMFIELD, NEW MEXICO
BIOVENT PILOT TEST

DWN:	DES.:	PROJECT NO.: 30002
CJG		GIANT INDUSTRIES BLOOMFIELD, NM
CHKD:	APPD:	
DATE: 03/21/05	REV.: 1	FIGURE 3

Figure 4: Ground Water Elevation Contour Map January 2005

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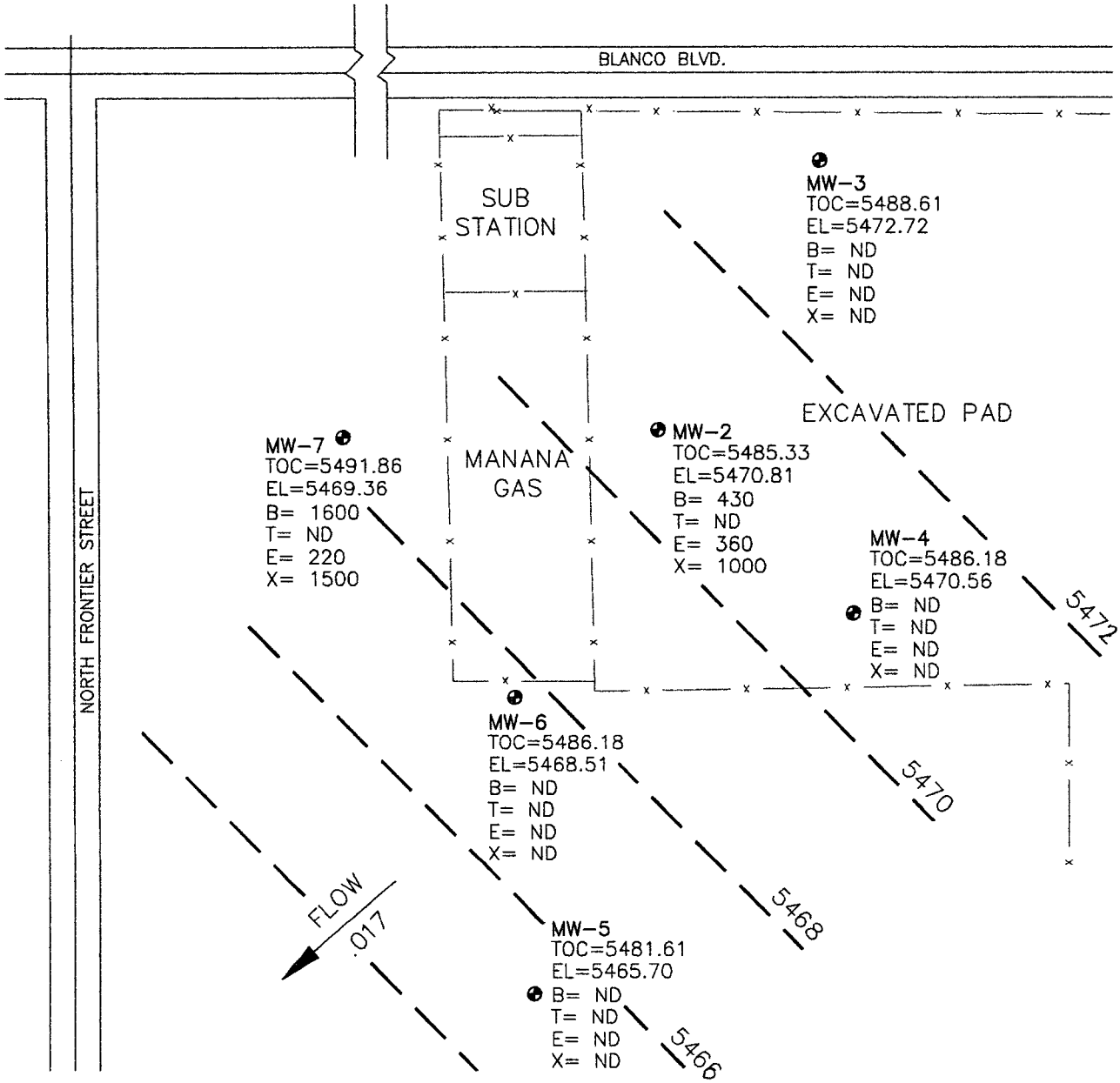

LEGEND

×——×	FENCE LINE
MW-2 5467.99	APPROXIMATE LOCATION OF MONITOR WELL AND NUMBER
	APPROXIMATE GROUND WATER GRADIENT
	POTENTIOMETRIC SURFACE OF GROUND WATER
TOC	TOP OF CASING ELEVATION
EL	GROUND WATER ELEVATION
B	BENZENE IN ug/L
T	TOLUENE IN ug/L
E	ETHYLBENZENE IN ug/L
X	TOTAL XYLENES IN ug/L

0 100 FEET N

D:\DRAW\MARTIN\6171-FIG4

Lodestar Services, Incorporated
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(505) 334-2791

TITLE:
GROUND WATER GRADIENT MAP
JANUARY 13 2005

DWN:	DES.:
CJG	
CHKD:	APPD:
DATE:	REV.:
03/21/05	1

PROJECT NO.: 30002
GIANT INDUSTRIES
BLOOMFIELD, NM

FIGURE 4

Appendix A

Analytical Laboratory Reports

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Phone (505) 344-3777
Fax (505) 344-4413

PINNACLE
LABORATORIES

Pinnacle Lab ID number **410262**
November 04, 2004

LODESTAR
26 CR 3500
FLORA VISTA, NM 87415

GIANT INDUSTRIES, INC.
111 CR 4990
BLOOMFIELD, NM 87413

Project Name BLOOMFIELD CRUDE STATION
Project Number (NONE)

Attention: MARTIN NEE/TIM KINNEY

On 10/21/2004 Pinnacle Laboratories Inc., (ADHS License No. AZ0643), received a request to analyze **non-aq** 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.

H. Mitchell Rubenstein, Ph.D.
General Manager, Pinnacle Laboratories, Inc.

MR: jt

Enclosure

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Fax (505) 344-4413

PINNACLE LABORATORIES

CLIENT	: LODESTAR	PINNACLE ID	: 410262
PROJECT #	: (NONE)	DATE RECEIVED	: 10/21/2004
PROJECT NAME	: BLOOMFIELD CRUDE STATION	REPORT DATE	: 11/04/2004

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
410262 - 01	MP 11 12'	NON-AQ	10/19/2004
410262 - 02	IP 16 9'	NON-AQ	10/19/2004
410262 - 03	MP 8 9'	NON-AQ	10/19/2004
410262 - 04	IP 12 12'	NON-AQ	10/19/2004
410262 - 05	IP 7 12'	NON-AQ	10/19/2004
410262 - 06	MP 3 6'	NON-AQ	10/19/2004
410262 - 07	IP 10 6'	NON-AQ	10/19/2004
410262 - 08	MP 7 6'	NON-AQ	10/19/2004

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
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Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021B / 8015B GRO
CLIENT : LODESTAR
PROJECT # : (NONE)
PROJECT NAME : BLOOMFIELD CRUDE STATION

PINNACLE I.D. : 410262
ANALYST : BP

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MP 11 12'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1
02	IP 16 9'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1
03	MP 8 9'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1

PARAMETER	DET. LIMIT	UNITS	MP 11 12'	IP 16 9'	MP 8 9'
FUEL HYDROCARBONS	10	MG/KG	< 10	< 10	< 10
HYDROCARBON RANGE			C6-C10	C6-C10	C6-C10
HYDROCARBONS QUANTITATED USING			GASOLINE	GASOLINE	GASOLINE
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	**0.025**	**MG/KG**	< 0.025	< 0.025	**0.027**
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.050	MG/KG	< 0.050	< 0.050	< 0.050
SURROGATE:					
BROMOFLUOROBENZENE (%)			86	85	86
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021B / 8015B GRO
CLIENT : LODESTAR
PROJECT # : (NONE)
PROJECT NAME : BLOOMFIELD CRUDE STATION

PINNACLE I.D. : 410262
ANALYST : BP

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
4	IP 12 12'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1
5	IP 7 12'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1
06	MP 3 6'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1

PARAMETER	DET. LIMIT	UNITS	IP 12 12'	IP 7 12'	MP 3 6'
FUEL HYDROCARBONS	10	MG/KG	< 10	< 10	< 10
HYDROCARBON RANGE			C6-C10	C6-C10	C6-C10
HYDROCARBONS QUANTITATED USING			GASOLINE	GASOLINE	GASOLINE
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.050	MG/KG	< 0.050	< 0.050	< 0.050
SURROGATE:					
BROMOFLUOROBENZENE (%)			82	82	65
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

PINNACLE
LABORATORIES

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Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021B / 8015B GRO
CLIENT : LODESTAR
PROJECT # : (NONE)
PROJECT NAME : BLOOMFIELD CRUDE STATION

PINNACLE I.D. : 410262
ANALYST : BP

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	IP 10 6'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	1
08	MP 7 6'	NON-AQ	10/19/2004	10/27/2004	10/30/2004	5

PARAMETER	DET. LIMIT	UNITS	IP 10 6'	MP 7 6'
FUEL HYDROCARBONS	**10**	**MG/KG**	< 10	**530**
HYDROCARBON RANGE			C6-C10	**C6-C10**
HYDROCARBONS QUANTITATED USING			GASOLINE	**GASOLINE**
BENZENE	0.025	MG/KG	< 0.025	< 0.13
TOLUENE	0.025	MG/KG	< 0.025	< 0.13
ETHYLBENZENE	**0.025**	**MG/KG**	< 0.025	**2.7**
TOTAL XYLENES	**0.050**	**MG/KG**	**0.083**	**35**
SURROGATE:				
BROMOFLUOROBENZENE (%)			88	**S3**
SURROGATE LIMITS	(65 - 120)			

CHEMIST NOTES:
S3 = Surrogate was diluted out.

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY RESULTS
EXTRACTION BLANK

TEST	: EPA 8021B / 8015B GRO	PINNACLE I.D.	: 410262
BLANK I.D.	: 102704A	DATE EXTRACTED	: 10/27/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/30/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	ANALYST	: BP

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/KG	<10
HYDROCARBON RANGE		C6-C10
HYDROCARBONS QUANTITATED USING		GASOLINE
BENZENE	MG/KG	<0.025
TOLUENE	MG/KG	<0.025
ETHYLBENZENE	MG/KG	<0.025
TOTAL XYLENES	MG/KG	<0.050
METHYL-t-BUTYL ETHER	MG/KG	<0.13
SURROGATE:		
BROMOFLUOROBENZENE (%)		96
SURROGATE LIMITS (80 - 120)		

CHEMIST NOTES:
NA

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

TEST	: EPA 8015B GRO	PINNACLE I.D.	: 410262
BATCH #	: 102704A	DATE EXTRACTED	: 10/27/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/30/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<10	50.0	45.8	92	44.4	89	3	(70 - 130)	20
HYDROCARBON RANGE		C6-C10							

HYDROCARBONS QUANTITATED USINGGASOLINE

CHEMIST NOTES:
N/A

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

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

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

TEST	: EPA 8015B GRO	PINNACLE I.D.	: 410262
MSMSD #	: 410262-02	DATE EXTRACTED	: 10/27/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/30/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<10	50.0	42.0	84	41.0	82	2	(70 - 130)	20
HYDROCARBON RANGE		C6-C10							
HYDROCARBONS QUANTITATED USING		GASOLINE							

CHEMIST NOTES:
NA

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

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

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GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

TEST	: EPA 8021B	PINNACLE I.D.	: 410262
BATCH #	: 102704A	DATE EXTRACTED	: 10/27/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/30/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.025	1.00	1.04	104	1.07	107	3	(68 - 120)	20
TOLUENE	<0.025	1.00	1.03	103	1.06	106	3	(64 - 120)	20
ETHYLBENZENE	<0.025	1.00	1.03	103	1.06	106	3	(49 - 127)	20
TOTAL XYLENES	<0.050	3.00	3.09	103	3.18	106	3	(58 - 120)	20
METHYL-t-BUTYL ETHER	<0.13	1.00	1.01	101	1.06	106	5	(66 - 120)	20

CHEMIST NOTES:
N/A

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

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

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

TEST	: EPA 8021B	PINNACLE I.D.	: 410262
MSMSD #	: 410262-02	DATE EXTRACTED	: 10/27/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/30/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.025	1.00	0.959	96	0.988	99	3	(68 - 120)	20
TOLUENE	<0.025	1.00	0.960	96	0.999	100	4	(64 - 120)	20
ETHYLBENZENE	<0.025	1.00	0.958	96	0.998	100	4	(49 - 127)	20
TOTAL XYLENES	<0.050	3.00	2.87	96	3.00	100	4	(58 - 120)	20
METHYL-t-BUTYL ETHER	<0.13	1.00	0.919	92	0.957	96	4	(66 - 120)	20

CHEMIST NOTES:
N/A

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

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

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : LODESTAR
PROJECT # : (NONE)
PROJECT NAME : BLOOMFIELD CRUDE STATION

PINNACLE I.D. : 410262
ANALYST : DSR

SAMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	MP 11 12'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1
02	IP 16 9'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1
	MP 8 9'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1

PARAMETER	DET. LIMIT	UNITS	MP 11 12'	IP 16 9'	MP 8 9'
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
FUEL HYDROCARBONS, C10-C22	10	MG/KG	< 10	**220**	< 10
FUEL HYDROCARBONS, C22-C36	10	MG/KG	< 10	**320**	< 10
CALCULATED SUM:				**540**	
SURROGATE:					
O-TERPHENYL (%)			87	87	79
SURROGATE LIMITS	(70-130)				

CHEMIST NOTES:
N/A

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : LODESTAR — PINNACLE I.D. : 410262
PROJECT # : (NONE) — ANALYST : DSR
PROJECT NAME : BLOOMFIELD CRUDE STATION

SAMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	IP 12 12'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1
05	IP 7 12'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1
	MP 3 6'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1

PARAMETER	DET. LIMIT	UNITS	IP 12 12'	IP 7 12'	MP 3 6'
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
DIESEL HYDROCARBONS, C10-C22	10	MG/KG	< 10	**55**	< 10
DIESEL HYDROCARBONS, C22-C36	10	MG/KG	< 10	**84**	< 10
CALCULATED SUM:				**139**	
SURROGATE:					
O-TERPHENYL (%)			84	94	87
SURROGATE LIMITS	(70-130)				

CHEMIST NOTES:
N/A

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : LODESTAR — PINNACLE I.D. : 410262
PROJECT # : (NONE) — ANALYST : DSR
PROJECT NAME : BLOOMFIELD CRUDE STATION

SAMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
07	IP 10 6'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1
08	MP 7 6'	NON-AQ	10/19/2004	10/25/2004	10/26/2004	1

PARAMETER	DET. LIMIT	UNITS	IP 10 6'	MP 7 6'
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	**830**
FUEL HYDROCARBONS, C10-C22	10	MG/KG	< 10	**890**
FUEL HYDROCARBONS, C22-C36	10	MG/KG	< 10	**610**
CALCULATED SUM:				**2330**
SURROGATE:				
TERPHENYL (%)			92	92
SURROGATE LIMITS	(70-130)			

CHEMIST NOTES:
A

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS
EXTRACTION BLANK

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)	PINNACLE I.D.	: 410262
BLANK I.D.	: 102504	DATE EXTRACTED	: 10/25/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/26/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	ANALYST	: DSR

PARAMETER	UNITS	
FUEL HYDROCARBONS, C6-C10	MG/KG	< 10
FUEL HYDROCARBONS, C10-C22	MG/KG	< 10
FUEL HYDROCARBONS, C22-C36	MG/KG	< 10

SURROGATE:		
P-TERPHENYL (%)		95
SURROGATE LIMITS	(70-130)	

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)	PINNACLE I.D.	: 410262
LCS/LCSD #	: 102504	DATE EXTRACTED	: 10/25/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/26/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<10	200	184	92	174	87	6	(70-130)	20

CHEMIST NOTES:
N/A

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

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

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GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)	PINNACLE I.D.	: 410262
MS/MSD #	: 410262-01	DATE EXTRACTED	: 10/25/2004
CLIENT	: LODESTAR	DATE ANALYZED	: 10/26/2004
PROJECT #	: (NONE)	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BLOOMFIELD CRUDE STATION	UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<10	200	191	96	162	81	16	(70-130)	20

CHEMIST NOTES:
N/A

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

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

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 10-19-04 PAGE: 1 OF 1

PLI Accession #: 410262

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: M NEE

COMPANY: LODESTAR
ADDRESS: 26 CR3500
FLORA VISTA NM 87415
PHONE: 505 334 2791
FAX:
BILL TO: Tim Kinney
COMPANY: Giant
ADDRESS: 111 CR 4990
Bloomfield NM 87413

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject		(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) ~~MTBE~~	8021 (BTEX) ☐MTBE ☐TMB ☐PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB ☐/DBCP ☐		8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics ☐PBMS	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides/PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry:		Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method1311)	Metals:		NUMBER OF CONTAINERS
MP 11 12'	10/19/04	1320	Soil	01		X			X																								1
IP 16 9'	10/19/04	1345	Soil	02		X			X																								1
MP 8 9'	10/19/04	1400	Soil	03		X			X																								1
IP 12 12'	10/19/04	1415	Soil	04		X			X																								1
IP 7 12'	10/19/04	1432	Soil	05		X			X																								1
MP 3 6'	10/19/04	1447	Soil	06		X			X																								1
IP 10 6'	10/19/04	1505	Soil	07		X			X																								1
MP 7 6'	10/19/04	1525	Soil	08		X			X																								1

WEEKEND ANALYSES MAY RESULT IN AN ADDITIONAL SURCHARGE - PLEASE INQUIRE.

PROJECT INFORMATION

PROJ. NO.:
PROJ. NAME: Bloomfield Crude Station
P.O. NO.:
SHIPPED VIA: TNM&O

SAMPLE RECEIPT

NO CONTAINERS	8
CUSTODY SEALS	(Y) / N / NA
RECEIVED INTACT	yes
(BLUE ICE)/ICE	15.9°

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐24hr* ☐48hr* ☐72hr* ☐ 1 WEEK (NORMAL) ☒
*NOT AVAILABLE ON ALL ANALYSES

CERTIFICATION REQUIRED ☐ NM ☐ SDWA ☐ AZ ☐ OTHER

METHANOL PRESERVATION ☐ METALS ☐ TOTAL ☐ DISSOLVED

COMMENTS:

No MTBE

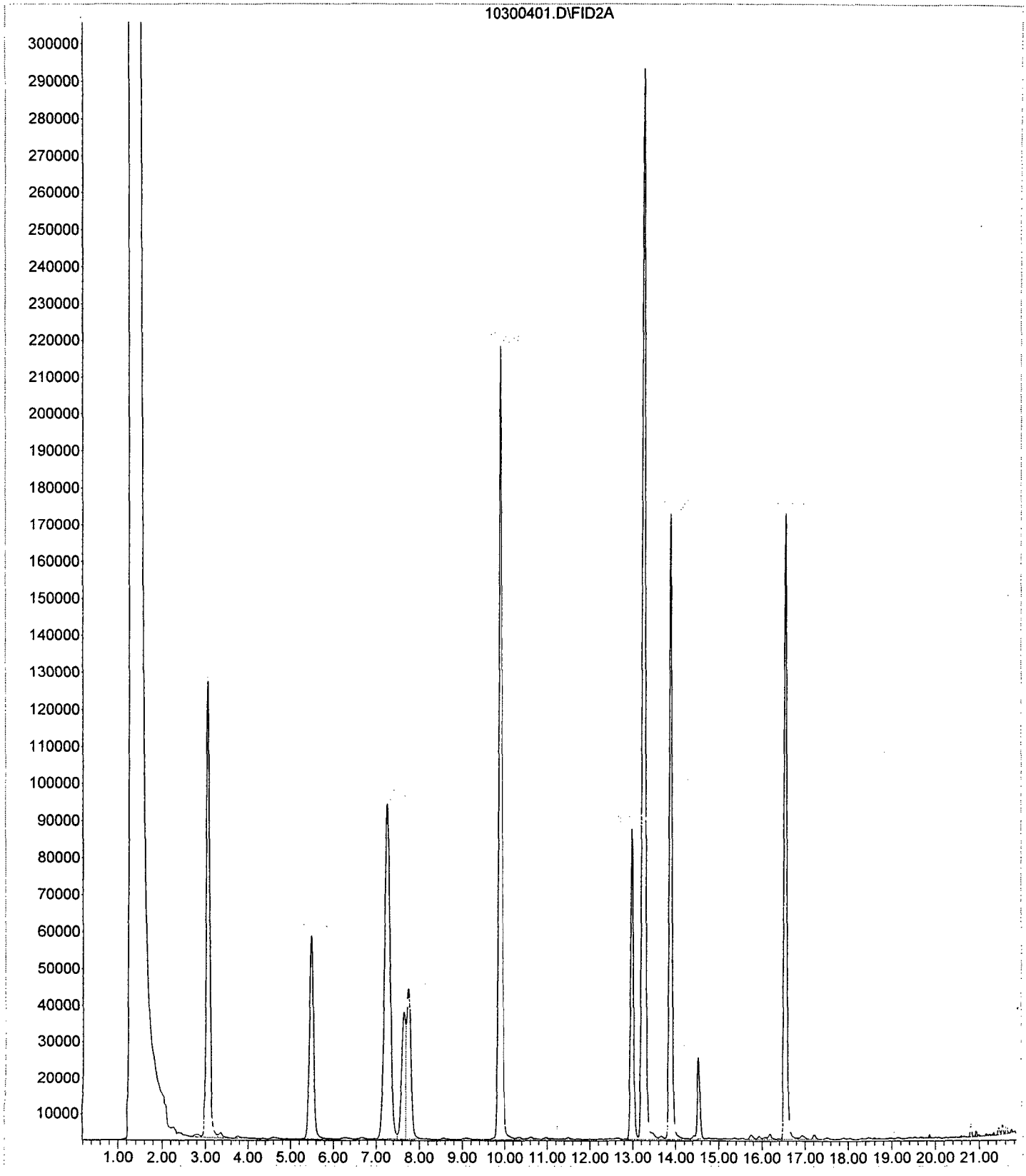
RELINQUISHED BY: 1.
Signature: Nee Time: 1700
Printed Name: NEE Date: 10/19/04
Company: LODESTAR
See Reverse side (Force Majeure)

RECEIVED BY: 1.
Signature: Time:
Printed Name: Date:
Company:

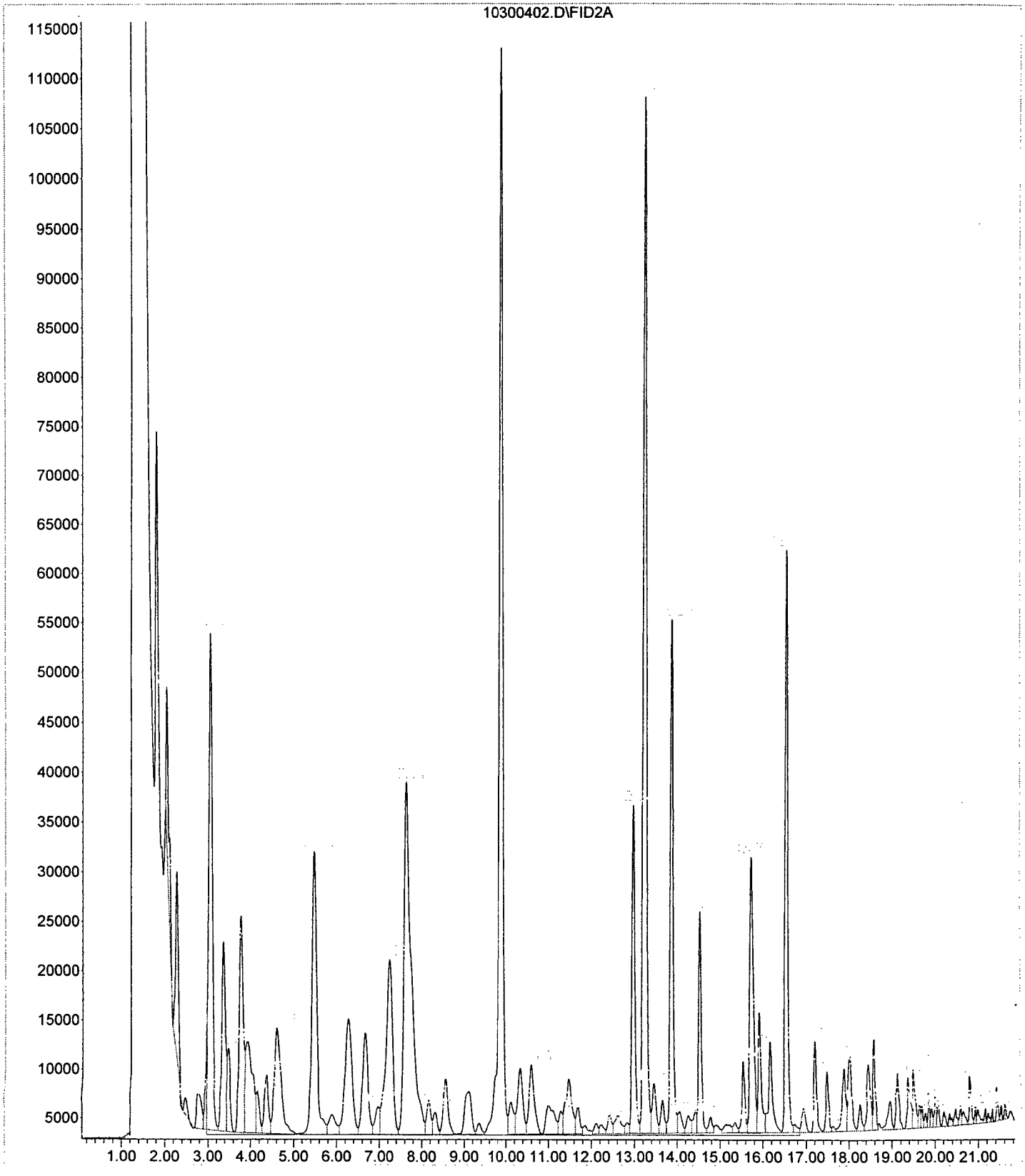
RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 2.
Signature: Francine Trujillo Time: 1600
Printed Name: Francine Trujillo Date: 10/21/04
Pinnacle Laboratories Inc.

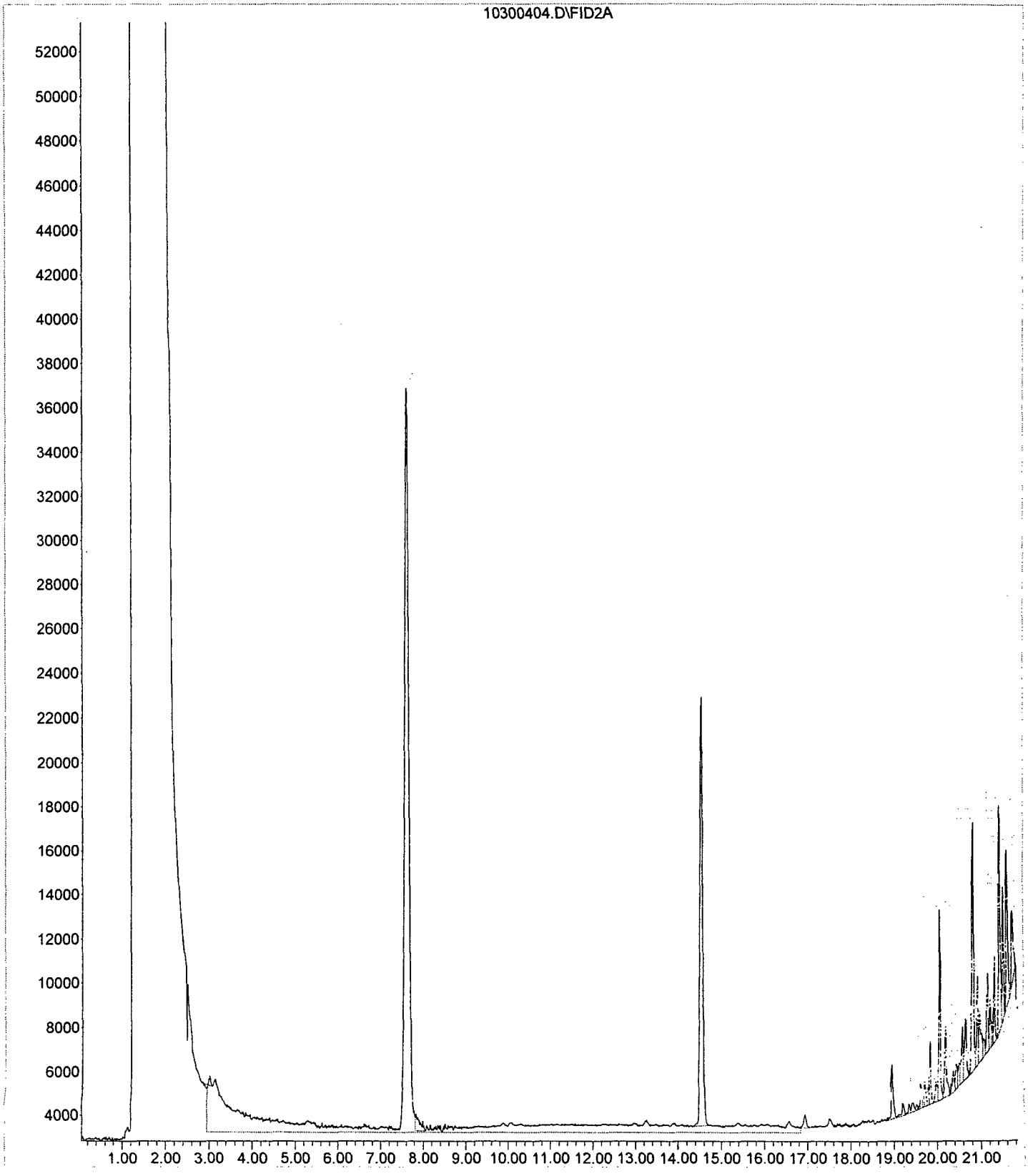
File : C:\HPCHEM\1\DATA\103004\10300401.D
Operator : BP
Acquired : 30 Oct 2004 9:27 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: GRO RT STD
Misc Info : 10uL MS3-50-14
Vial Number: 1



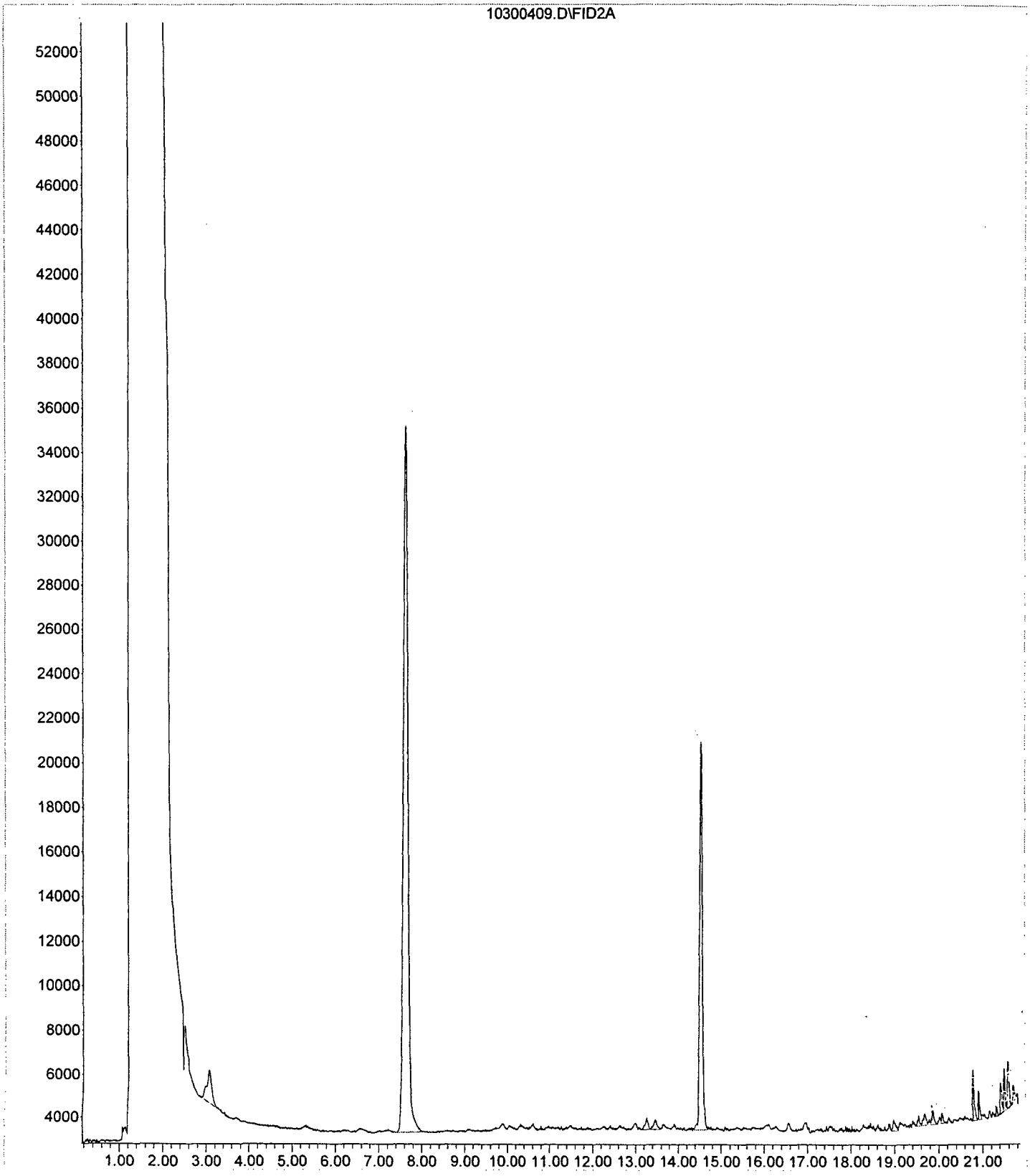
File : C:\HPCHEM\1\DATA\103004\10300402.D
Operator : BP
Acquired : 30 Oct 2004 9:58 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: GRO CCV 1000ppb
Misc Info : 10uL MS4-05-01
Vial Number: 2



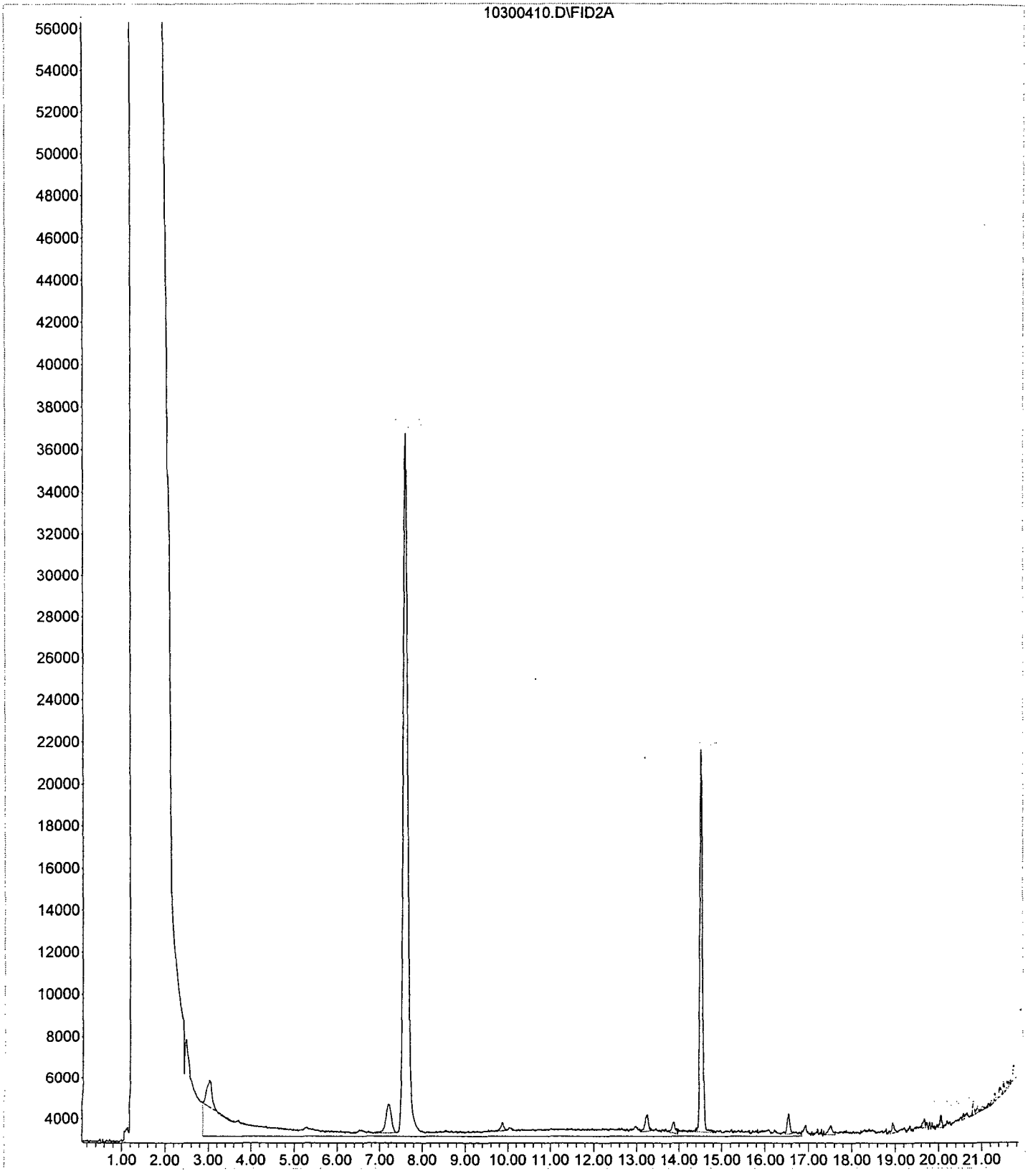
File : C:\HPCHEM\1\DATA\103004\10300404.D
Operator : BP
Acquired : 30 Oct 2004 10:59 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: SRB-102704A
Misc Info : 100uL SOIL
Vial Number: 4



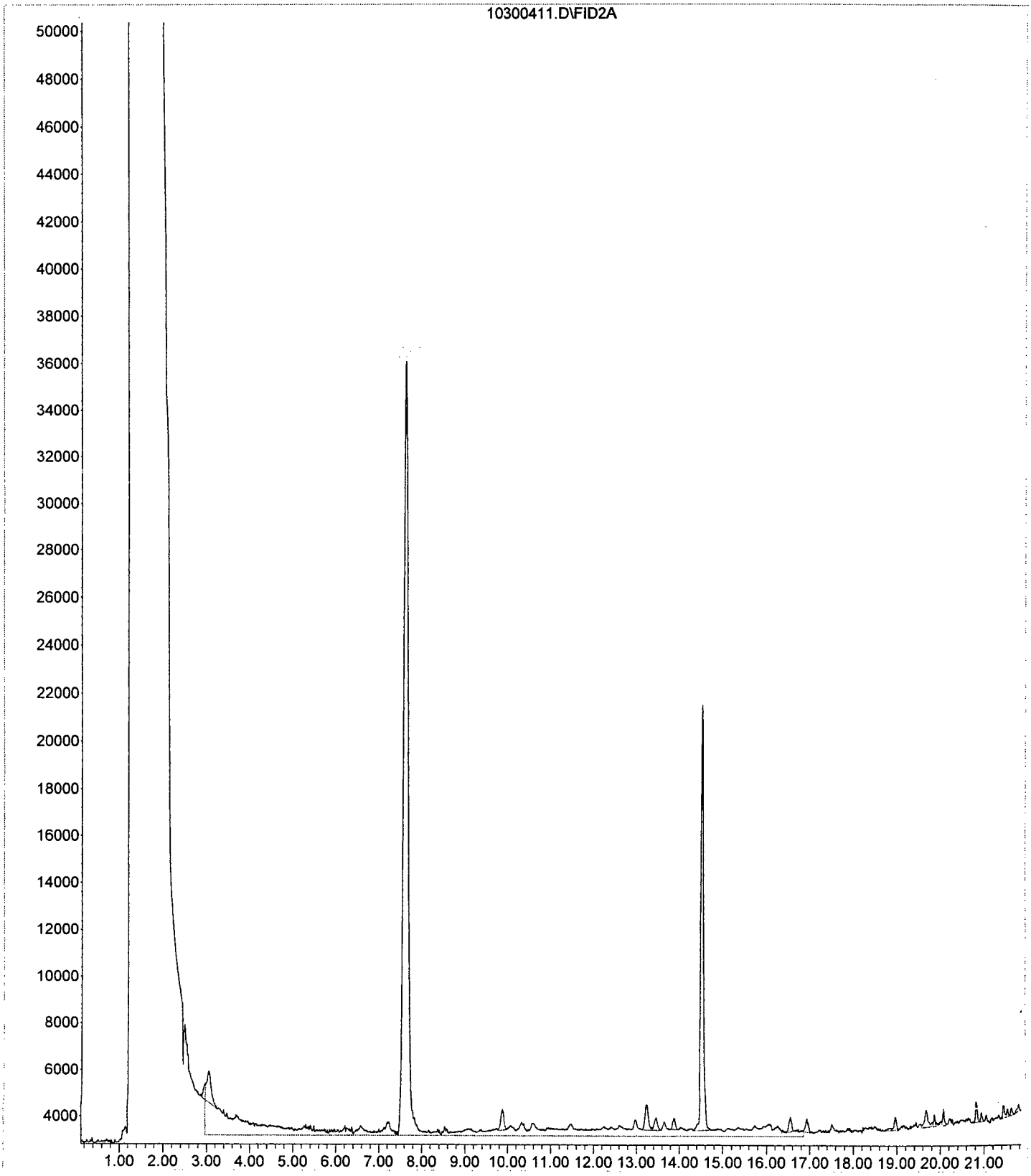
File : C:\HPCHEM\1\DATA\103004\10300409.D
Operator : BP
Acquired : 30 Oct 2004 13:34 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-01 1X
Misc Info : 100uL SOIL
Vial Number: 9



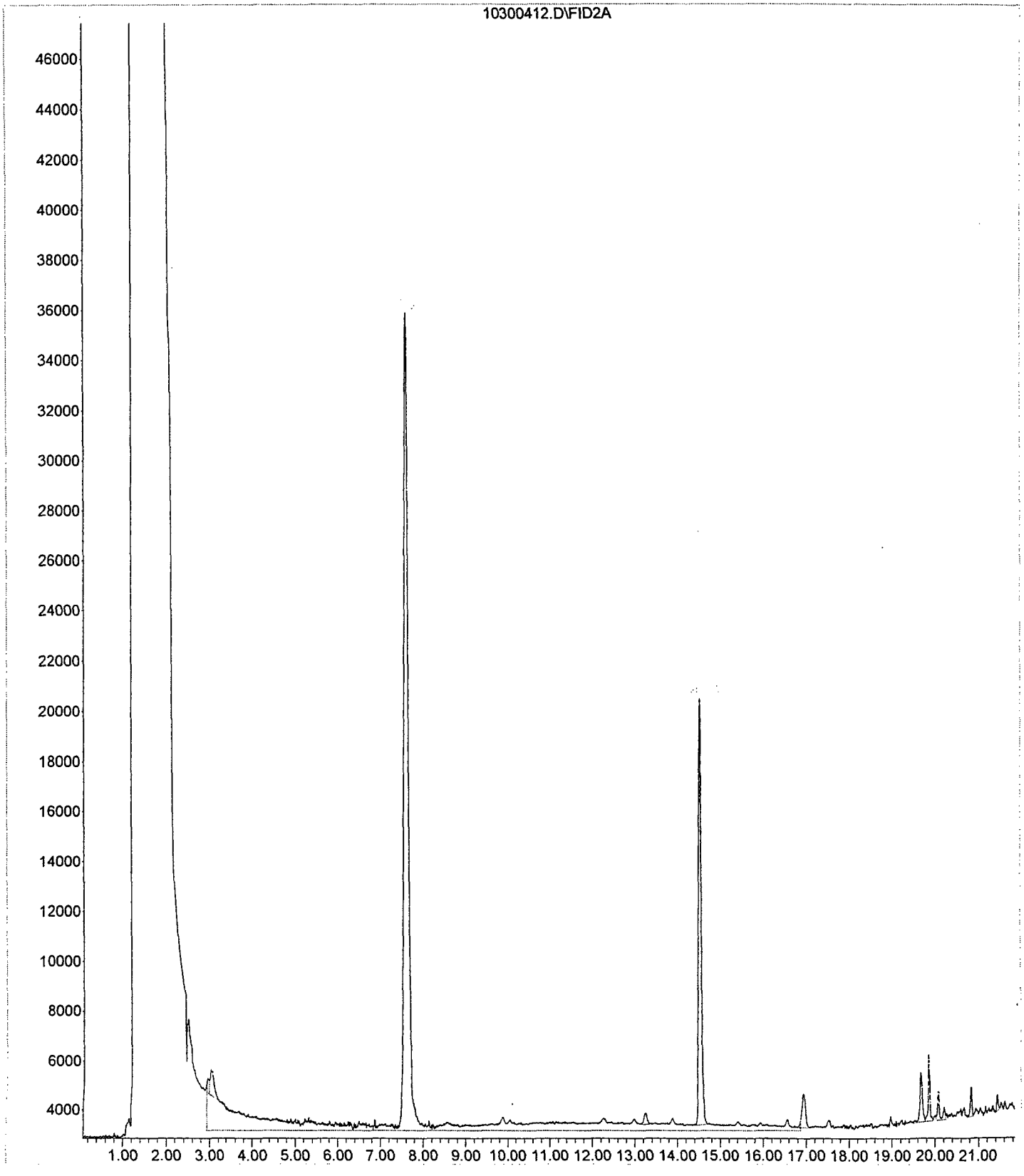
File : C:\HPCHEM\1\DATA\103004\10300410.D
Operator : BP
Acquired : 30 Oct 2004 14:05 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-02 1X
Misc Info : 100uL SOIL
Vial Number: 10



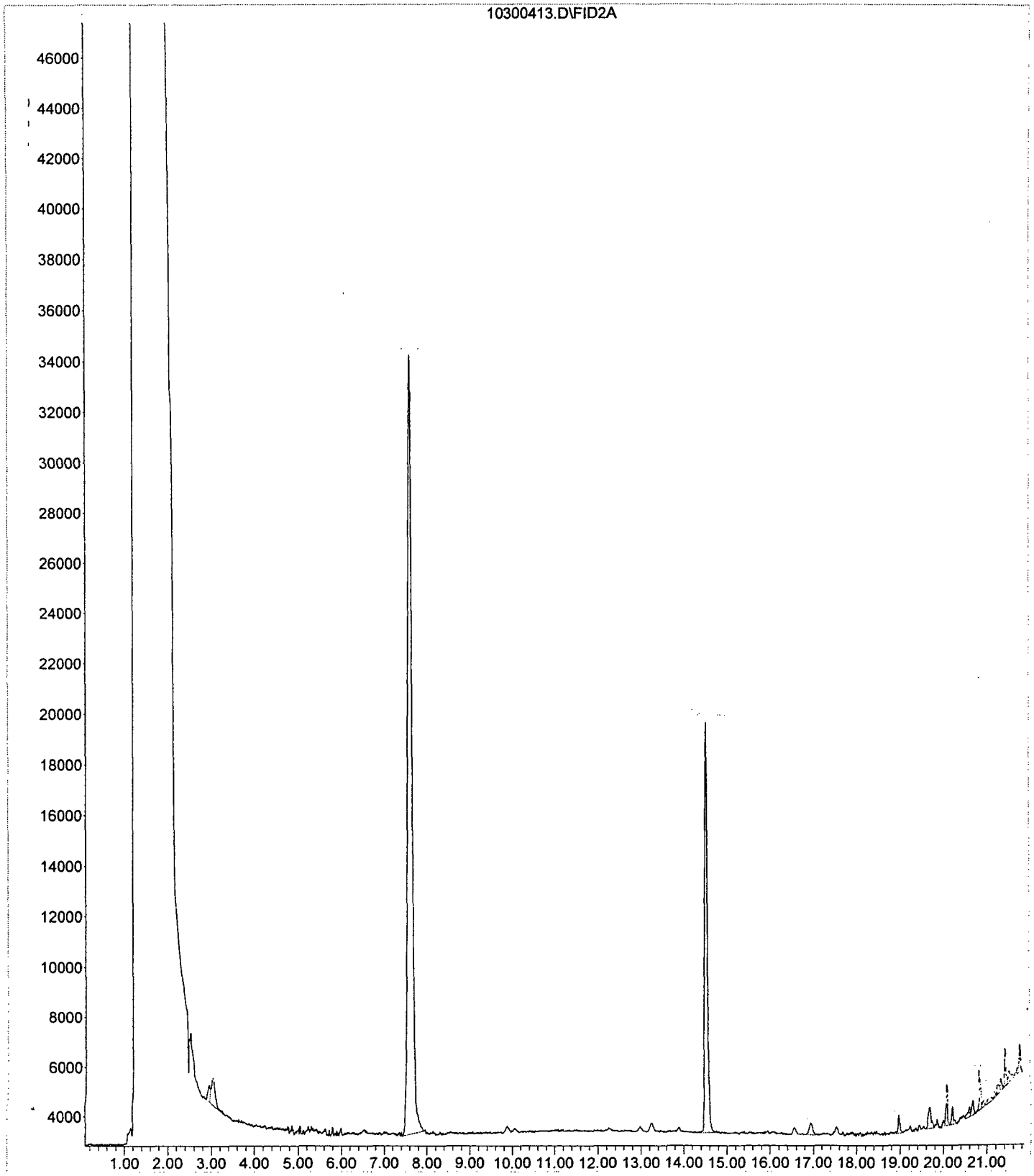
File : C:\HPCHEM\1\DATA\103004\10300411.D
Operator : BP
Acquired : 30 Oct 2004 14:36 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-03 1X
Misc Info : 100uL SOIL
Vial Number: 11



File : C:\HPCHEM\1\DATA\103004\10300412.D
Operator : BP
Acquired : 30 Oct 2004 15:07 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-04 1X
Misc Info : 100uL SOIL
Vial Number: 12

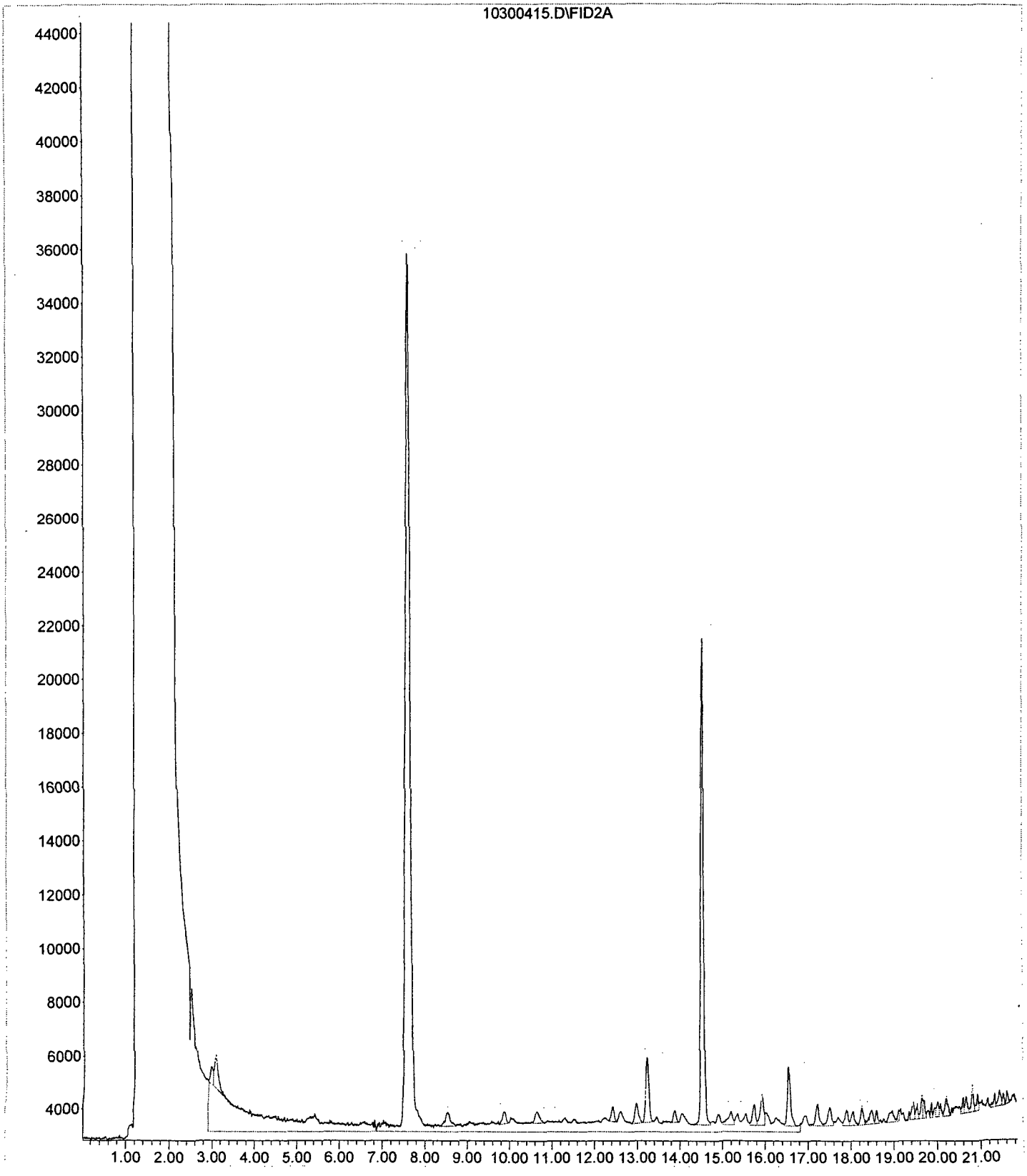


File : C:\HPCHEM\1\DATA\103004\10300413.D
Operator : BP
Acquired : 30 Oct 2004 15:39 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-05 1X
Misc Info : 100uL SOIL
Vial Number: 13

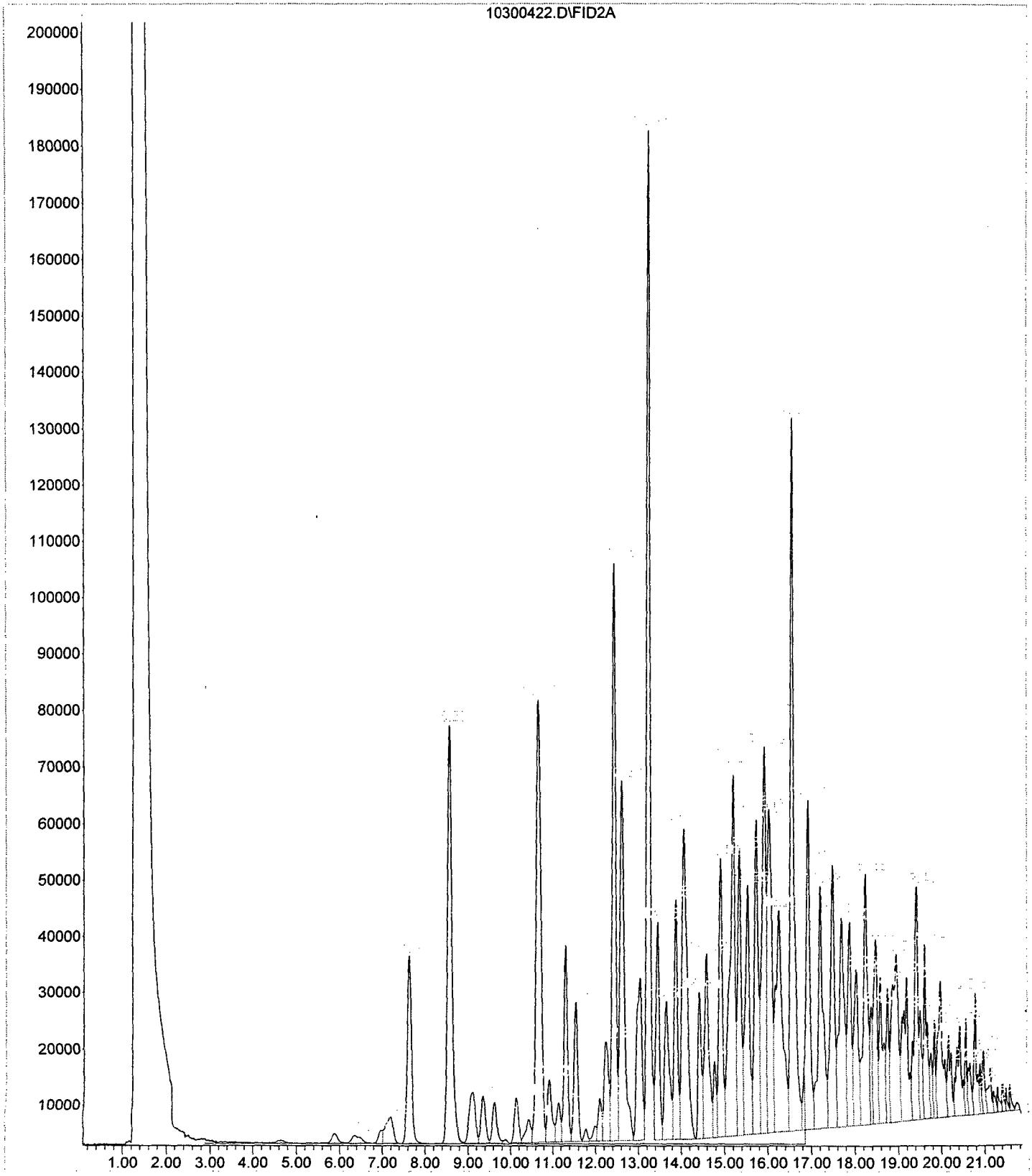


File : C:\HPCHEM\1\DATA\103004\10300414.D
Operator : BP
Acquired : 30 Oct 2004 16:10 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-06 1X
Misc Info : 100uL SOIL
Vial Number: 14

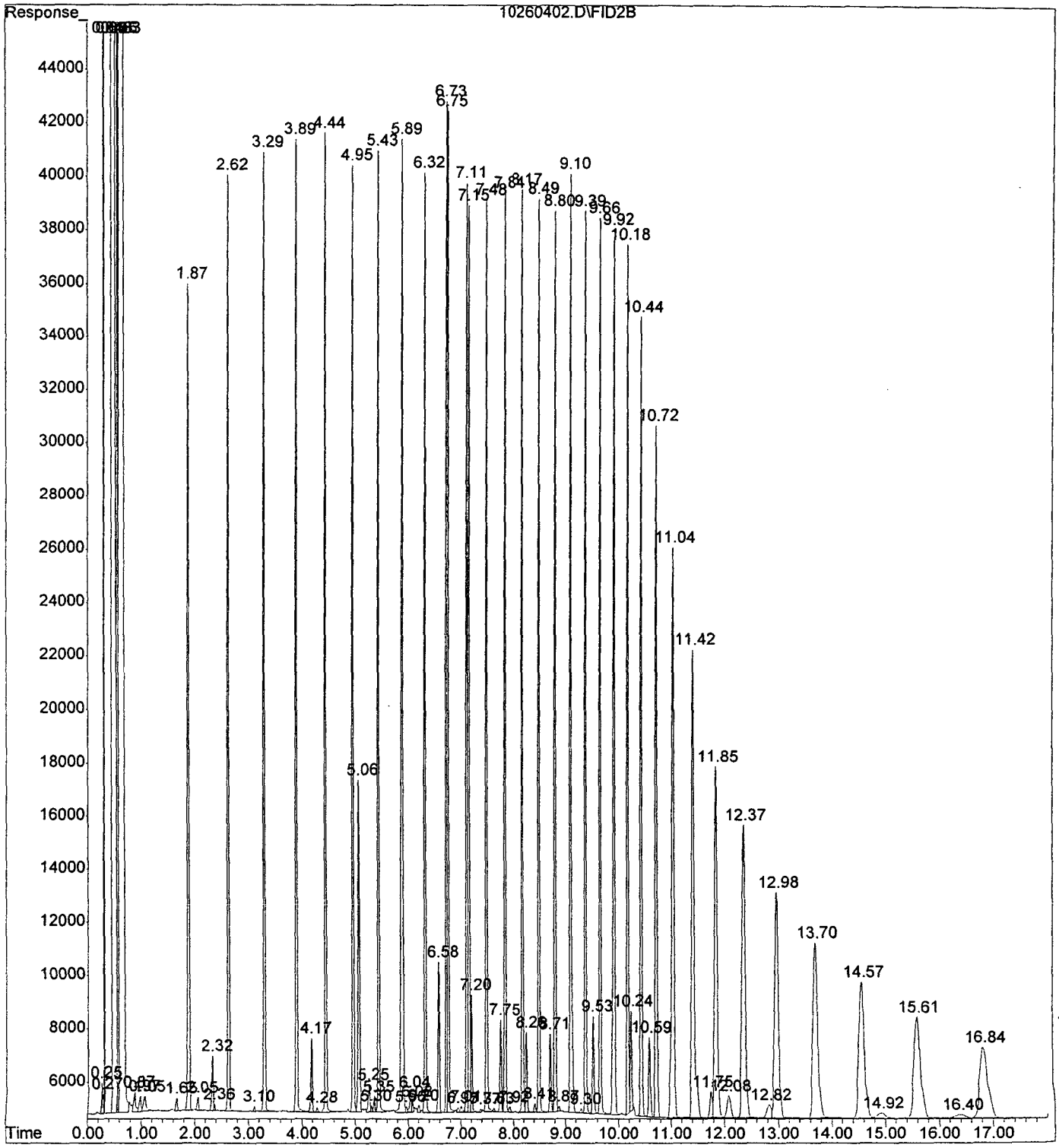
File : C:\HPCHEM\1\DATA\103004\10300415.D
Operator : BP
Acquired : 30 Oct 2004 16:41 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-07 1X
Misc Info : 100uL SOIL
Vial Number: 15



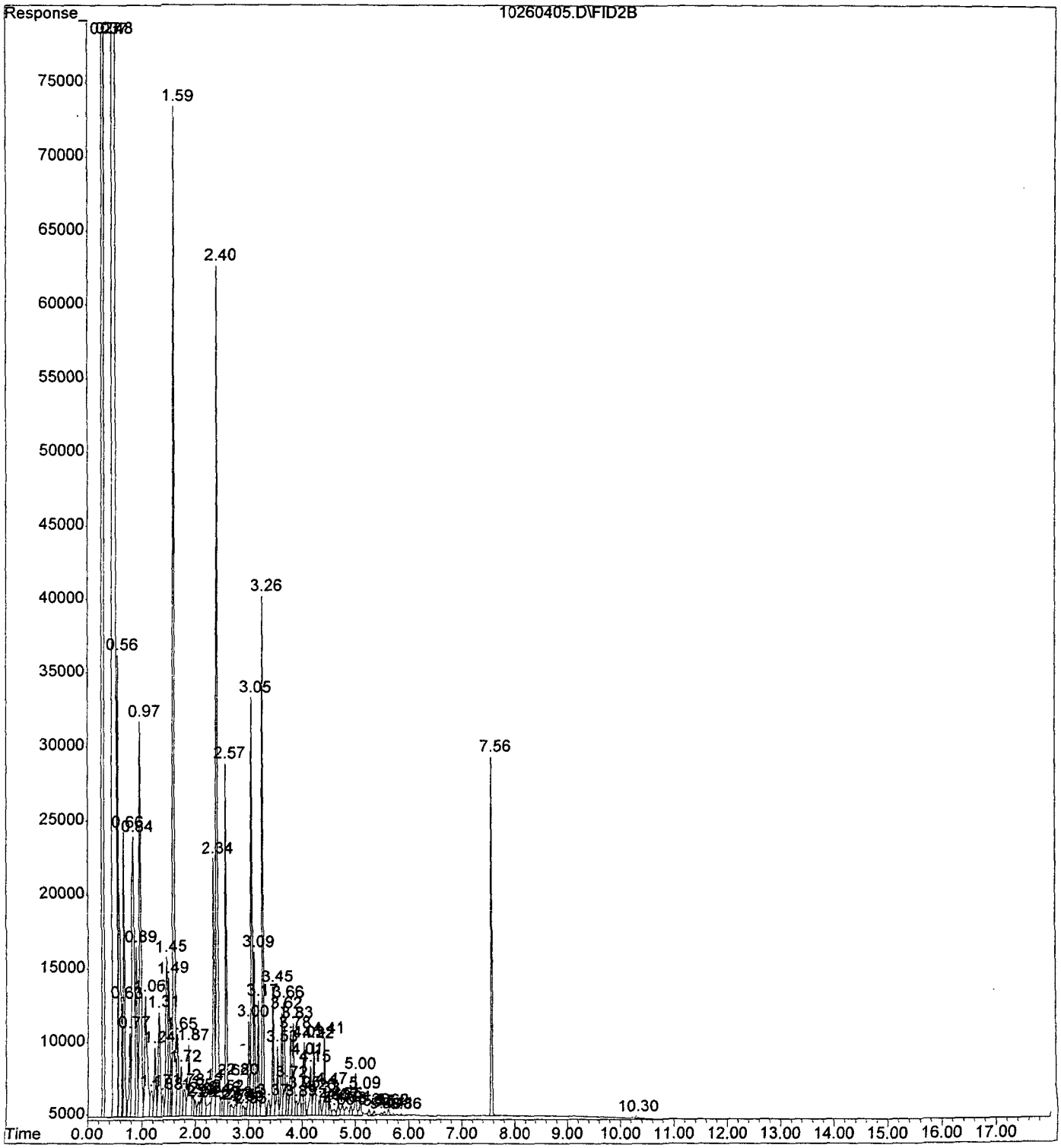
File : C:\HPCHEM\1\DATA\103004\10300422.D
Operator : BP
Acquired : 30 Oct 2004 20:21 using AcqMethod BG100704.M
Instrument : GC-2
Sample Name: 410262-08 5X
Misc Info : 20uL SOIL
Vial Number: 6



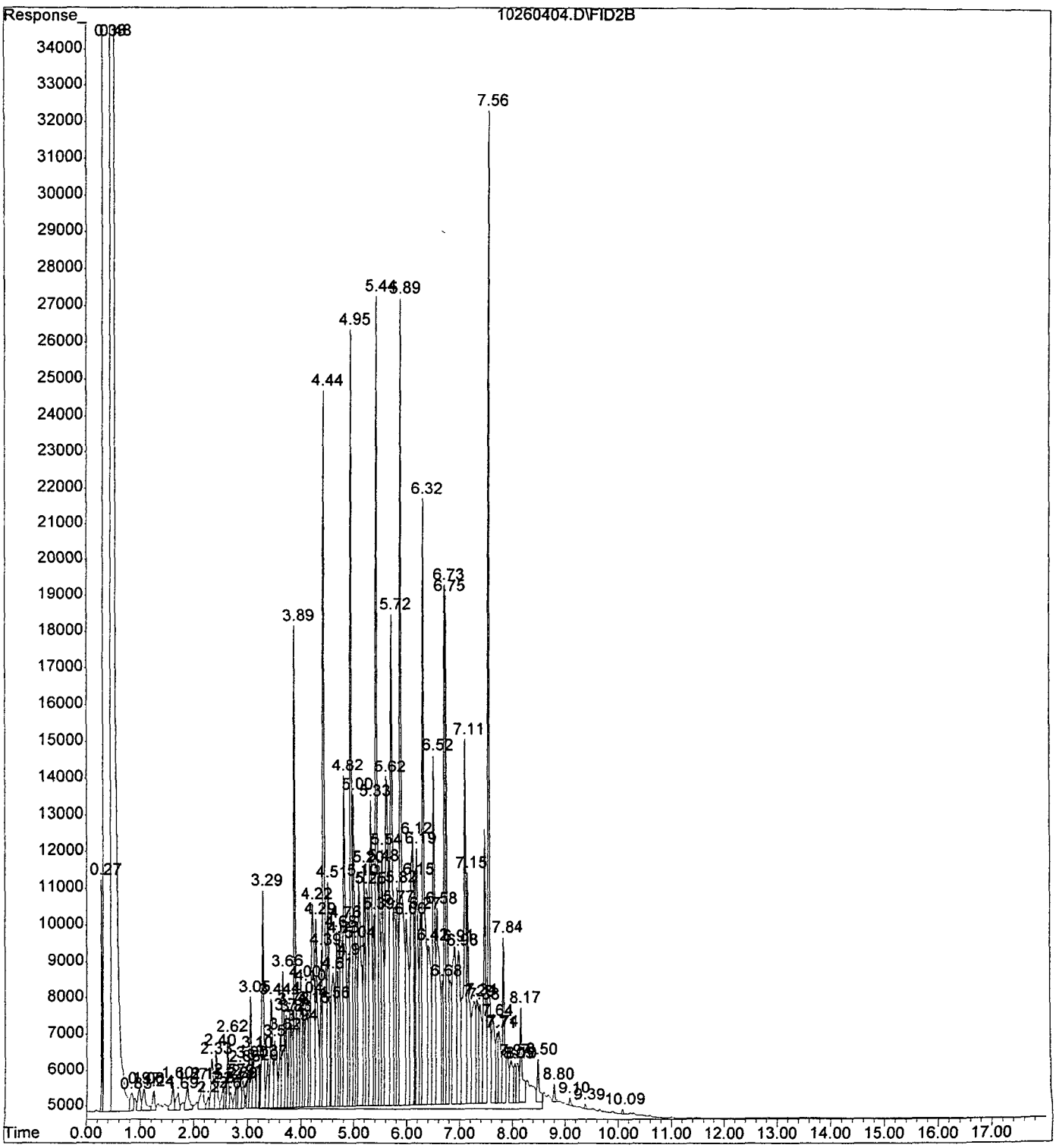
File : C:\HPCHEM\2\DATA\102604F\10260402.D
Operator : DSR
Acquired : 26 Oct 2004 9:05 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: RT
Misc Info : GC5-06-05
Vial Number: 2



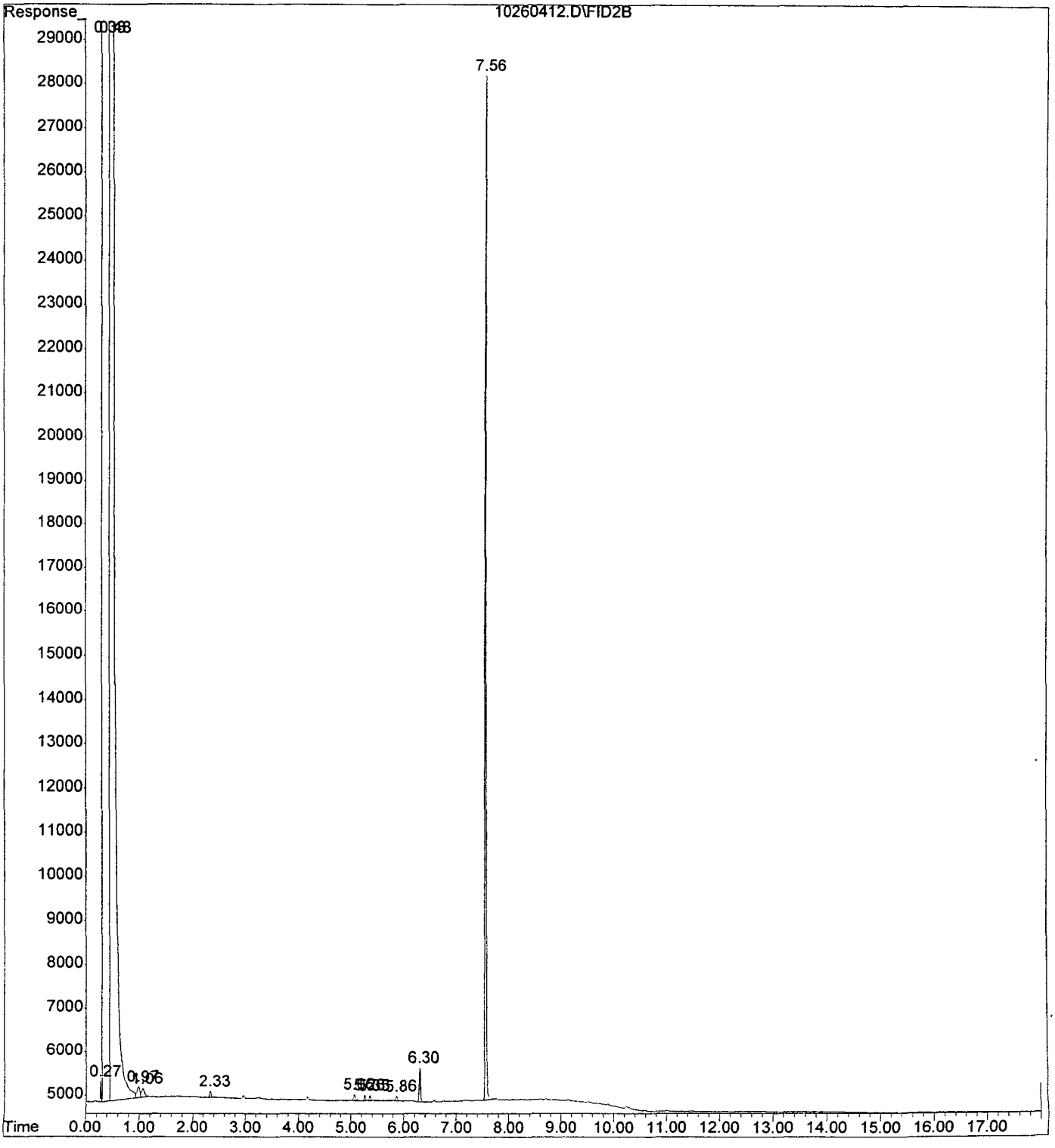
File : C:\HPCHEM\2\DATA\102604F\10260405.D
Operator : DSR
Acquired : 26 Oct 2004 10:30 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: GRO CCV 200PPB
Misc Info : GC5-08-12
Vial Number: 3



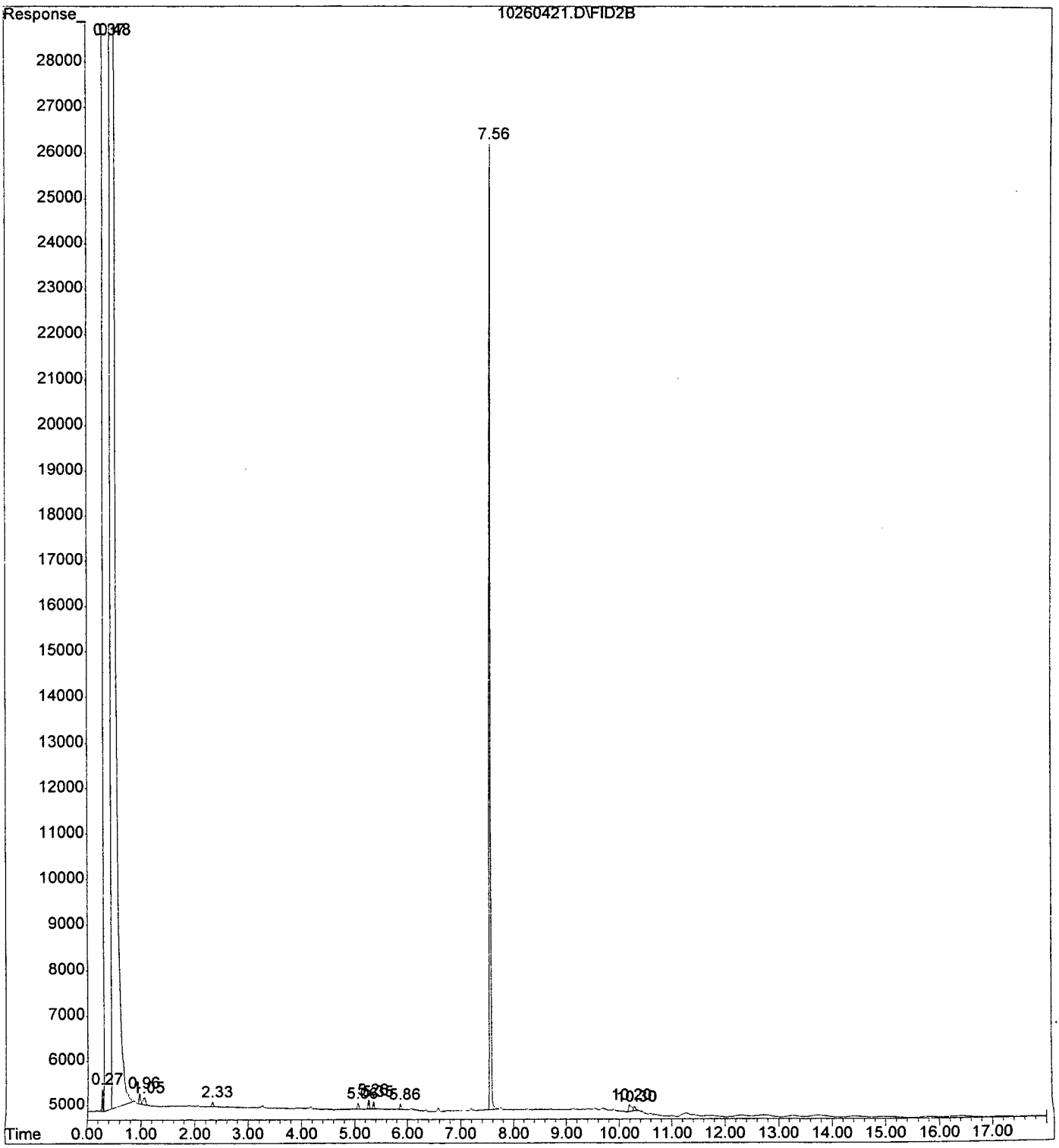
File : C:\HPCHEM\2\DATA\102604F\10260404.D
Operator : DSR
Acquired : 26 Oct 2004 10:02 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: DRO CCV 200PPB
Misc Info : GC5-08-15
Vial Number: 4



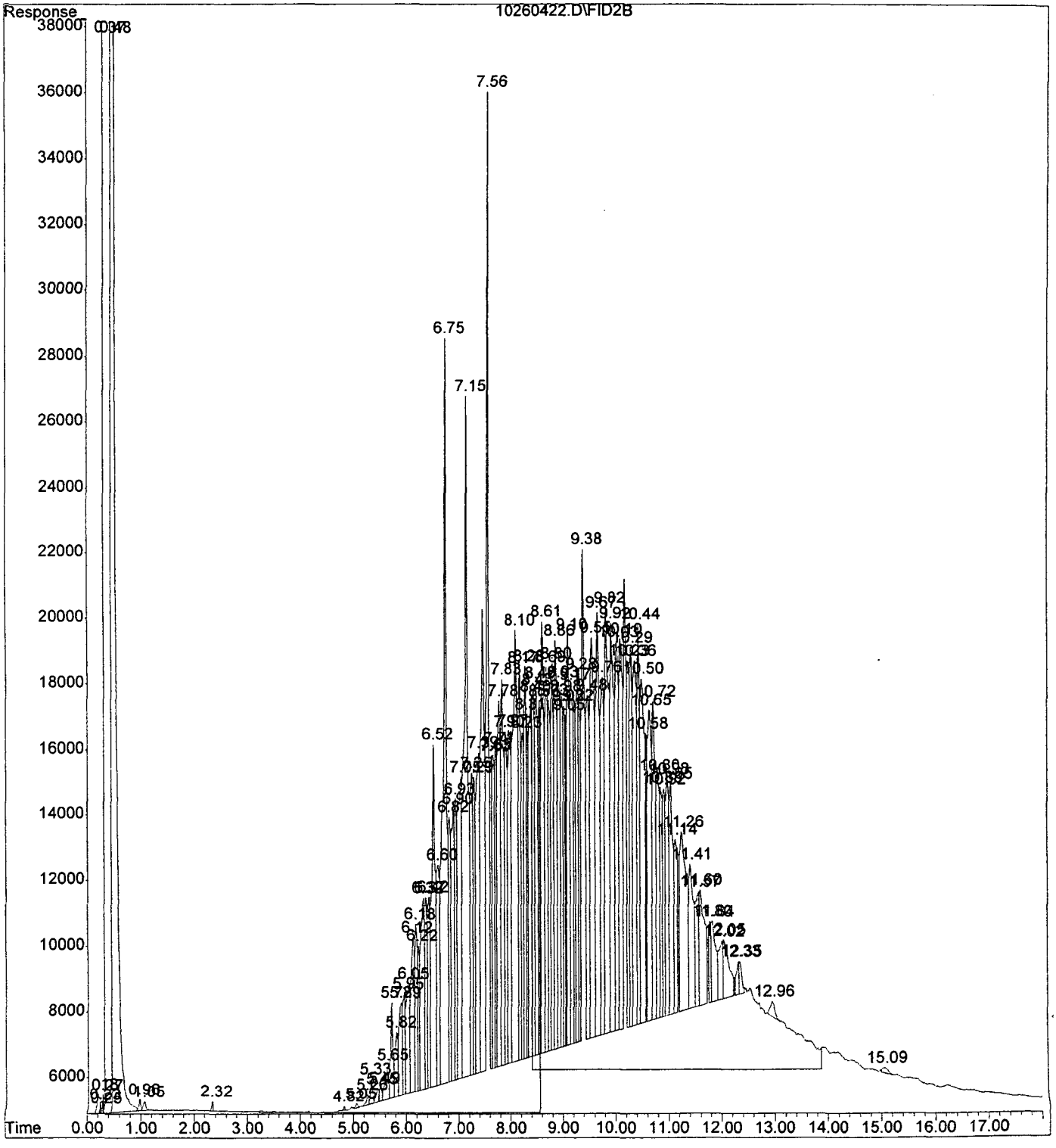
File : C:\HPCHEM\2\DATA\102604F\10260412.D
Operator : DSR
Acquired : 26 Oct 2004 13:44 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: SRB 102504
Misc Info : 10G/10ML 10/25/04
Vial Number: 10



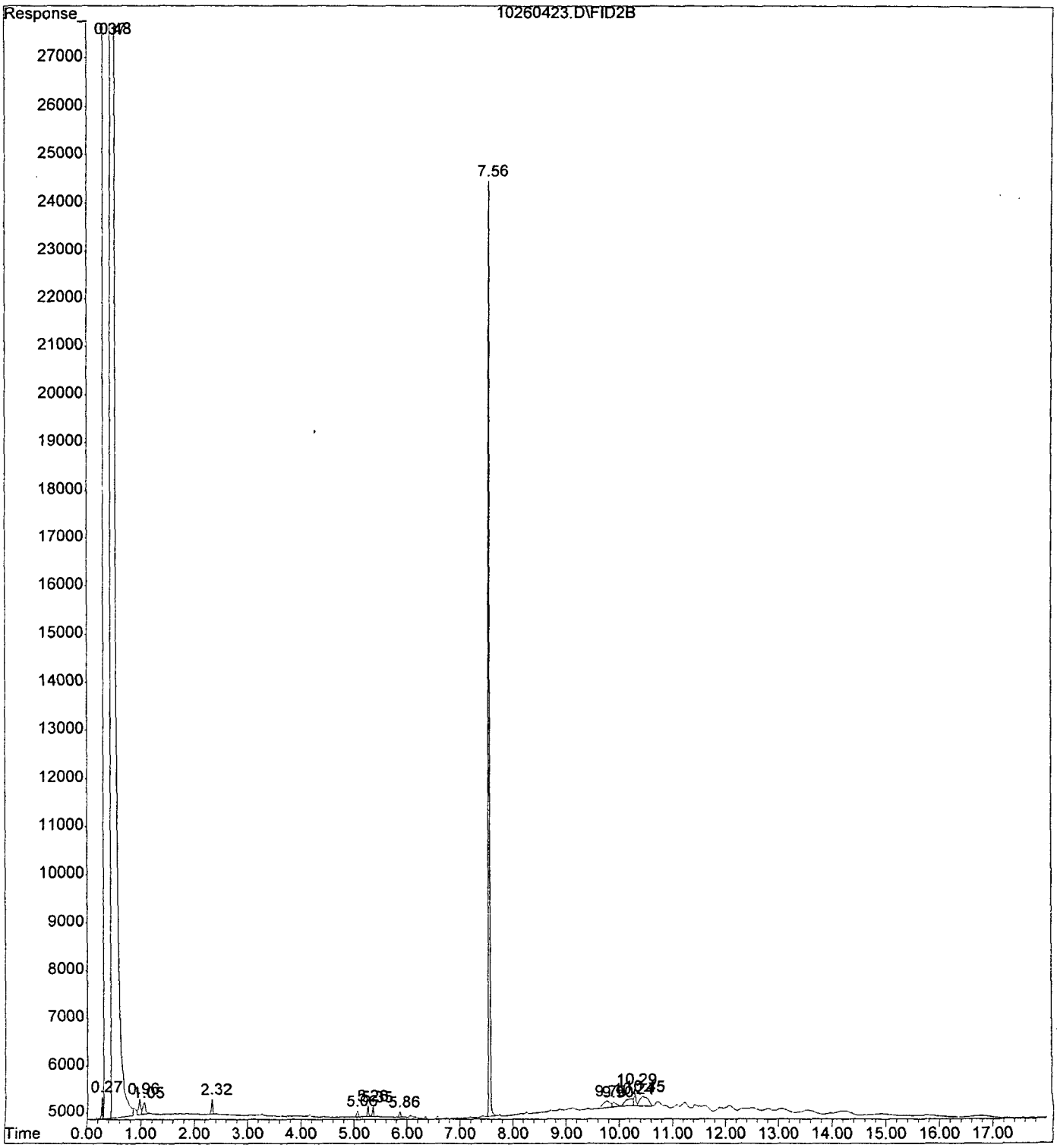
File : C:\HPCHEM\2\DATA\102604F\10260421.D
Operator : DSR
Acquired : 26 Oct 2004 17:52 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-01
Misc Info : 10G/10ML 10/25/04
Vial Number: 18



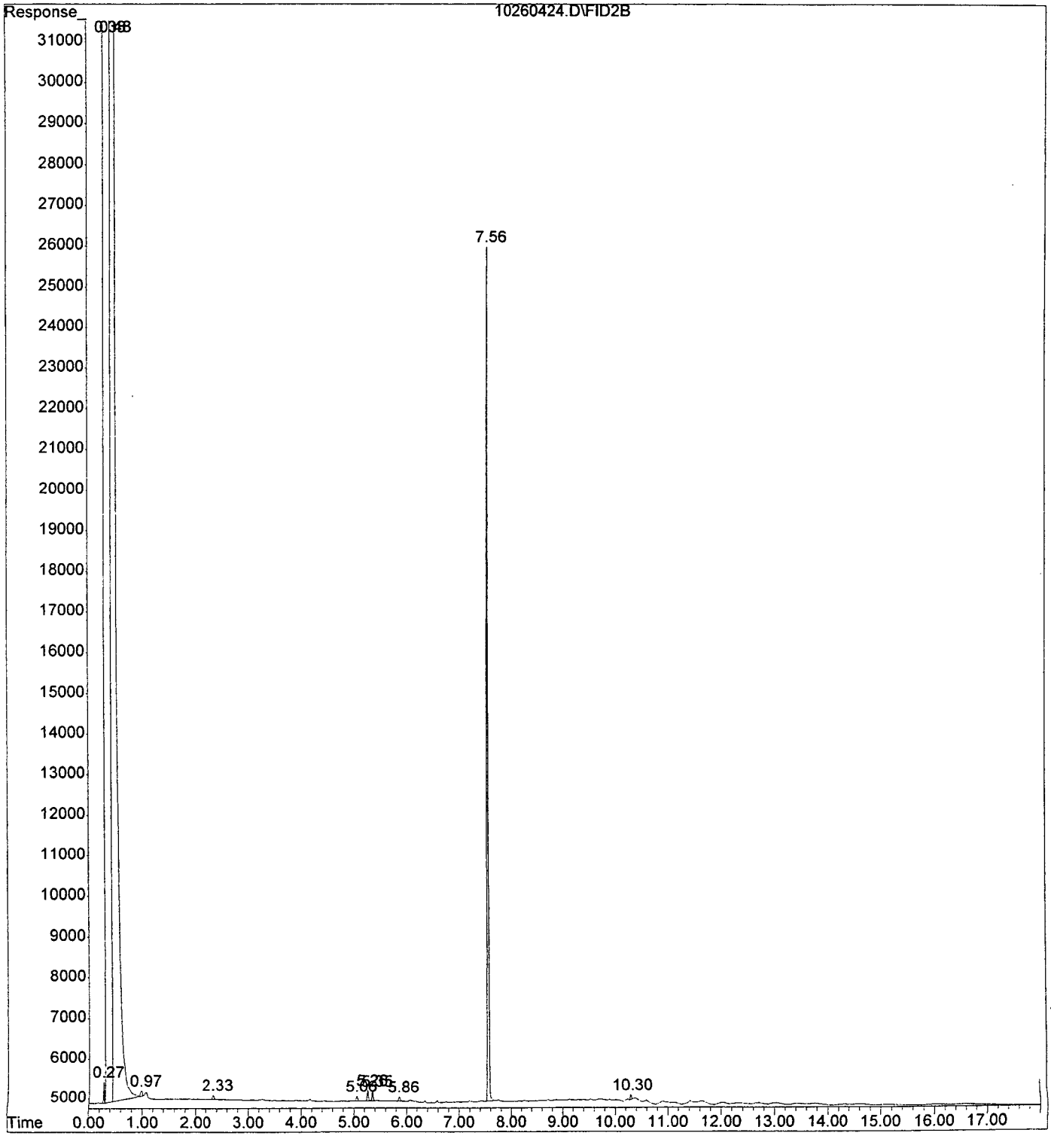
File : C:\HPCHEM\2\DATA\102604F\10260422.D
Operator : DSR
Acquired : 26 Oct 2004 18:20 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-02
Misc Info : 10G/10ML 10/25/04
Vial Number: 19



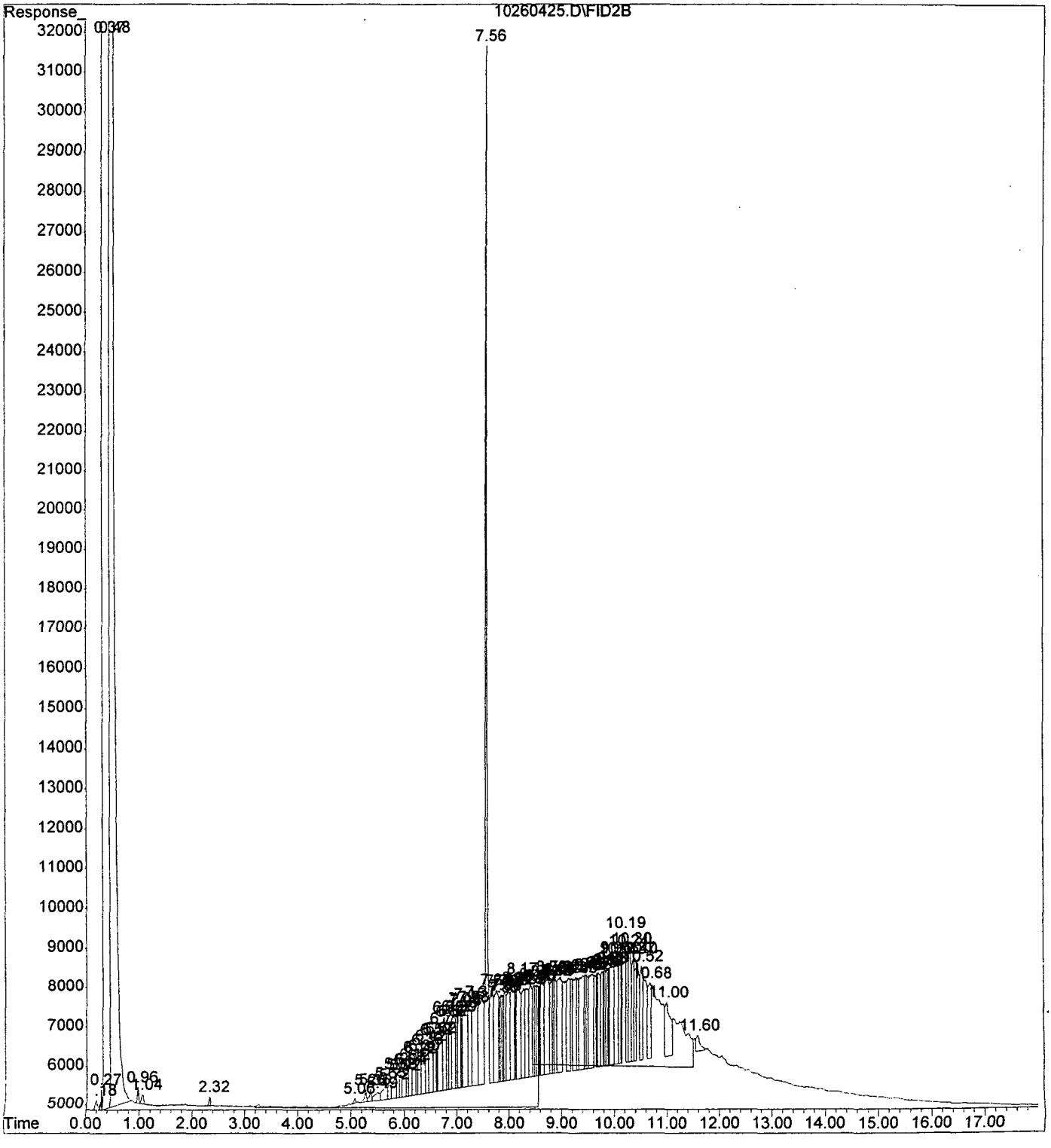
File : C:\HPCHEM\2\DATA\102604F\10260423.D
Operator : DSR
Acquired : 26 Oct 2004 18:47 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-03
Misc Info : 10G/10ML 10/25/04
Vial Number: 20



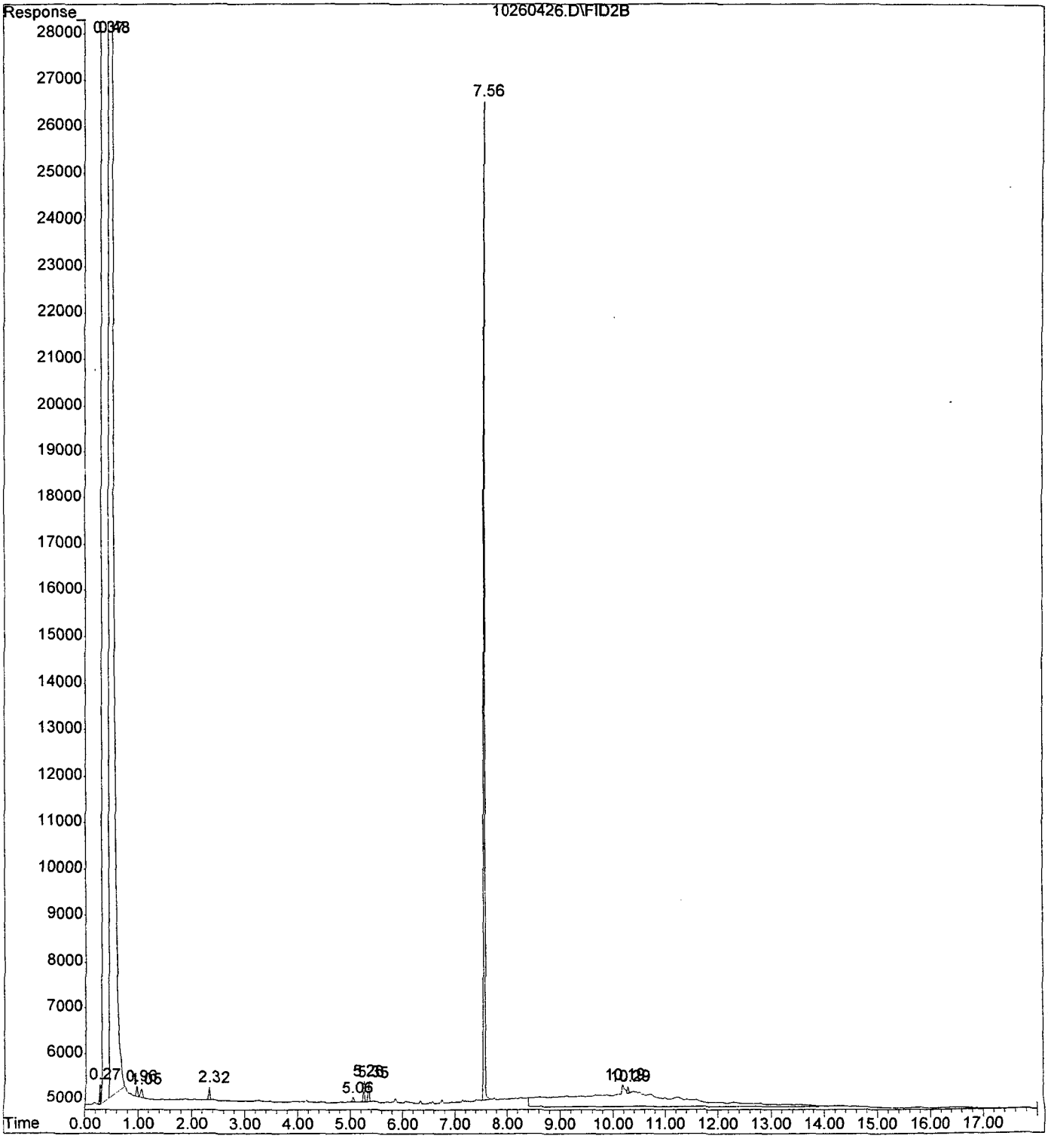
File : C:\HPCHEM\2\DATA\102604F\10260424.D
Operator : DSR
Acquired : 26 Oct 2004 19:15 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-04
Misc Info : 10G/10ML 10/25/04
Vial Number: 21



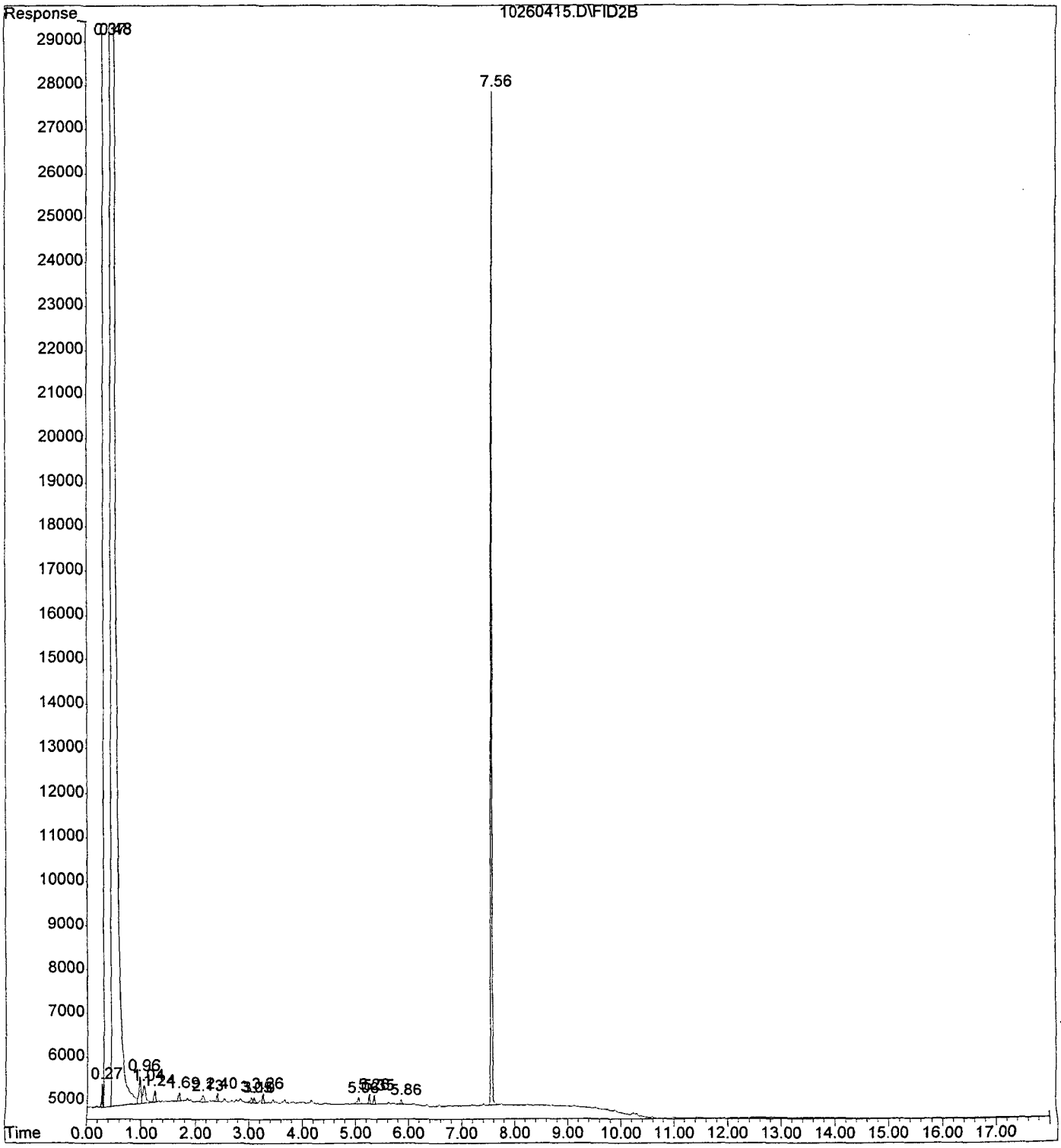
File : C:\HPCHEM\2\DATA\102604F\10260425.D
Operator : DSR
Acquired : 26 Oct 2004 19:42 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-05
Misc Info : 10G/10ML 10/25/04
Vial Number: 22



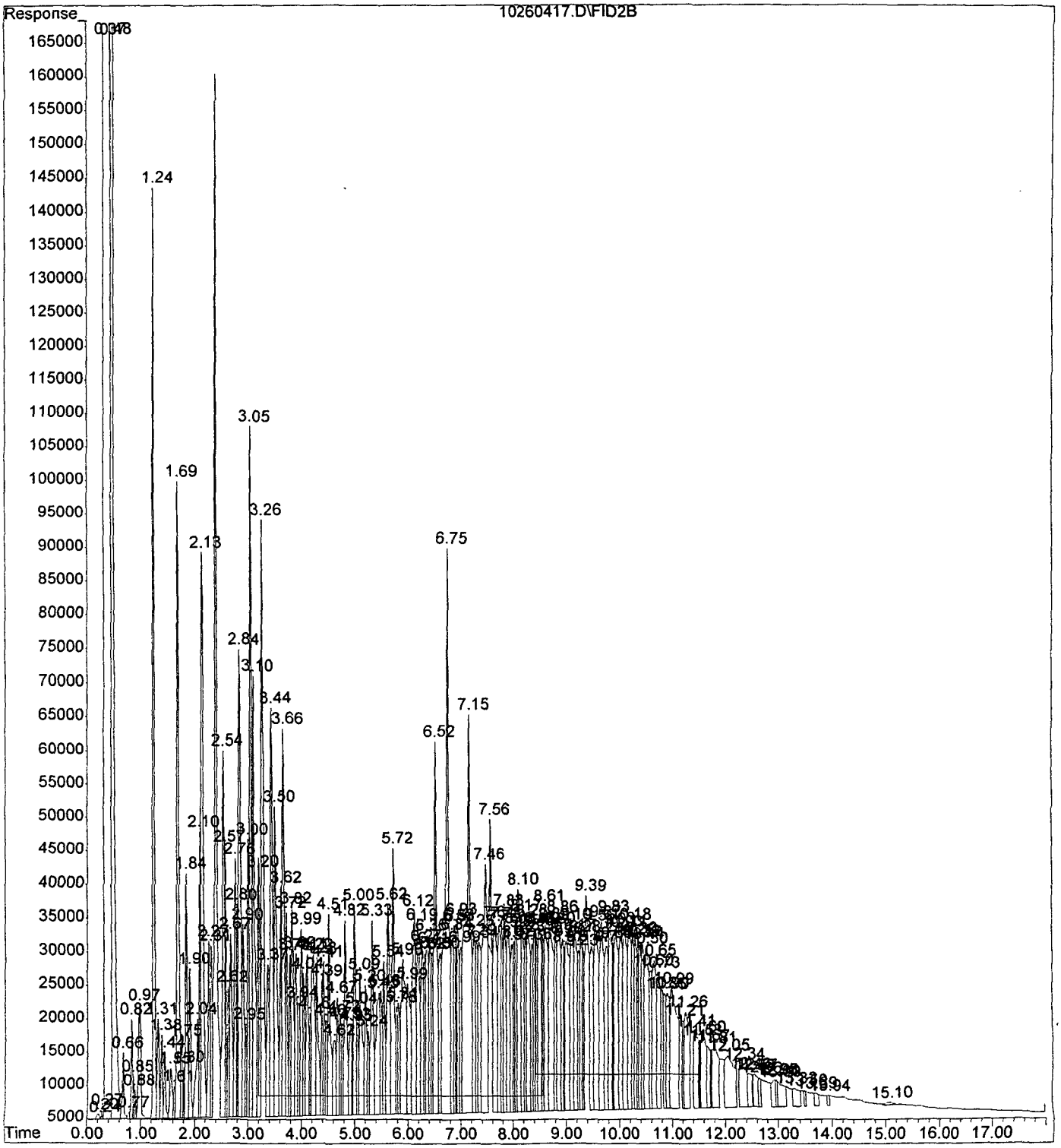
File : C:\HPCHEM\2\DATA\102604F\10260426.D
Operator : DSR
Acquired : 26 Oct 2004 20:10 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-06
Misc Info : 10G/10ML 10/25/04
Vial Number: 23



File : C:\HPCHEM\2\DATA\102604F\10260415.D
Operator : DSR
Acquired : 26 Oct 2004 15:07 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-07
Misc Info : 10G/10ML 10/25/04
Vial Number: 13



File : C:\HPCHEM\2\DATA\102604F\10260417.D
Operator : DSR
Acquired : 26 Oct 2004 16:02 using AcqMethod TPH0802.M
Instrument : FID-1
Sample Name: 410262-08
Misc Info : 10G/10ML 10/25/04
Vial Number: 15



2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

PINNACLE LABORATORIES

Pinnacle Lab ID number **501099**
February 04, 2005

LODESTAR
26 CR 3500
FLORA VISTA, NM 87415

GIANT INDUSTRIES
111 COUNTY ROAD 4990
BLOOMFIELD, NM 87413

Project Name GIANT CRUDE
Project Number 30002-1

Attention: MARTIN NEE/TIM KINNEY

On 01/15/2005 Pinnacle Laboratories Inc., (ADHS License No. AZ0643), 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.

EPA Method 8021 was performed by Pinnacle Laboratories, Inc., Albuquerque, NM.

All other analyses were performed by Severn Trent Services, Pensacola, FL.

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

H. Mitchell Rubenstein, Ph.D.
General Manager, Pinnacle Laboratories, Inc.

MR: jt

Enclosure

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

CLIENT	: LODESTAR	PINNACLE ID	: 501099
PROJECT #	: 30002-1	DATE RECEIVED	: 01/15/2005
PROJECT NAME	: GIANT CRUDE	REPORT DATE	: 02/04/2005

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
501099 - 01	MW-5	AQUEOUS	01/13/2005
501099 - 02	MW-6	AQUEOUS	01/13/2005
501099 - 03	MW-7	AQUEOUS	01/13/2005
501099 - 04	MW-3	AQUEOUS	01/13/2005
501099 - 05	MW-2	AQUEOUS	01/13/2005
501099 - 06	MW-4	AQUEOUS	01/13/2005
501099 - 07	TRIP	AQUEOUS	01/07/2005

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PINNACLE LABORATORIES

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021B
CLIENT : LODESTAR
PROJECT # : 30002-1
PROJECT NAME : GIANT CRUDE

PINNACLE I.D. : 501099
ANALYST : BP

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	MW-3	AQUEOUS	01/13/2005	NA	01/17/2005	1
05	MW-2	AQUEOUS	01/13/2005	NA	01/17/2005	10
06	MW-4	AQUEOUS	01/13/2005	NA	01/17/2005	1

PARAMETER	DET. LIMIT	UNITS	MW-3	MW-2	MW-4
BENZENE	**0.5**	**UG/L**	< 0.5	**430**	< 0.5
TOLUENE	0.5	UG/L	< 0.5	< 5.0	< 0.5
ETHYLBENZENE	**0.5**	**UG/L**	< 0.5	**360**	< 0.5
TOTAL XYLENES	**1.0**	**UG/L**	< 1.0	**1000**	< 1.0
SURROGATE:					
BROMOFLUOROBENZENE (%)			98	115	98
SURROGATE LIMITS	(80 - 120)				

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY QUALITY CONTROL
LCS/LCSD

TEST	: EPA 8021B	PINNACLE I.D.	: 501099
BATCH #	: 011705	DATE EXTRACTED	: N/A
CLIENT	: LODESTAR	DATE ANALYZED	: 01/17/2005
PROJECT #	: 30002-1	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: GIANT CRUDE	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.5	20.0	20.6	103	20.6	103	0	(80 - 120)	20
TOLUENE	<0.5	20.0	20.7	104	20.7	104	0	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	20.6	103	20.7	104	0	(80 - 120)	20
TOTAL XYLENES	<1.0	60.0	61.8	103	62.2	104	1	(80 - 120)	20

CHEMIST NOTES:
N/A

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

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

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GAS CHROMATOGRAPHY QUALITY CONTROL
MS/MSD

TEST	: EPA 8021B	PINNACLE I.D.	: 501099
MSMSD #	: 501099-04	DATE EXTRACTED	: N/A
CLIENT	: LODESTAR	DATE ANALYZED	: 01/18/2005
PROJECT #	: 30002-1	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: GIANT CRUDE	UNITS	: UG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
BENZENE	<0.5	20.0	20.2	101	20.4	102	1	(80 - 120)	20
TOLUENE	<0.5	20.0	20.5	103	20.4	102	0	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	20.3	102	20.2	101	0	(80 - 120)	20
TOTAL XYLENES	<1.0	60.0	61.3	102	60.9	102	1	(80 - 120)	20

CHEMIST NOTES:
N/A

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

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

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Report

For: Ms. Jacinta Tenorio
Pinnacle Laboratories
2709-D Pan American Freeway Northeast
Albuquerque, NM 87107
CC:

Order Number: C501406
SDG Number:
Client Project ID:
Project: 501099:GI/GIANT CRUDE
Report Date: 01/28/2005
Sampled By: Client
Sample Received Date: 01/18/2005
Requisition Number:
Purchase Order:

Marty Edwards, Project Manager
medwards@stl-inc.com

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Sample Summary

Order: C501406
Date Received: 01/18/2005

Client: Pinnacle Laboratories
Project: 501099:GI/GIANT CRUDE

Client Sample ID	Lab Sample ID	Matrix	Date Sampled
MW-5/501099-01	C501406*1	Liquid	01/13/2005 08:51
MW-6/501099-02	C501406*2	Liquid	01/13/2005 09:25
MW-7/501099-03	C501406*3	Liquid	01/13/2005 10:25
MW-3/501099-04	C501406*4	Liquid	01/13/2005 11:02
MW-2/501099-05	C501406*5	Liquid	01/13/2005 11:47
MW-4/501099-06	C501406*6	Liquid	01/13/2005 12:52

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-1	MW-5/501099-01	Liquid	01/18/05	01/13/05 08:51	
01406-2	MW-6/501099-02	Liquid	01/18/05	01/13/05 09:25	
01406-3	MW-7/501099-03	Liquid	01/18/05	01/13/05 10:25	
01406-4	MW-3/501099-04	Liquid	01/18/05	01/13/05 11:02	
01406-5	MW-2/501099-05	Liquid	01/18/05	01/13/05 11:47	

Parameter	Units	Sample ID 01406-1 MW-5/501099-01	01406-2 MW-6/501099-02	01406-3 MW-7/501099-03	01406-4 MW-3/501099-04	01406-5 MW-2/501099-05
Total Dissolved Solids (160.1)						
Total Dissolved Solids	mg/l	4800	3000	930	3900	2000
Dilution Factor		1	1	1	1	1
Analysis Date		01/18/05	01/18/05	01/18/05	01/18/05	01/18/05
Batch ID		TDW006	TDW006	TDW006	TDW006	TDW006
Analyst		ST	ST	ST	ST	ST
CO2 and Forms of Alkalinity (4500D)						
Bicarbonate (2320/4500)	mg/l as CaCO3	870	1100	740	560	1300
Carbon Dioxide, Free	mg/l as CaCO3	320	120	110	51	47
Carbonate (2320/4500)	mg/l as CaCO3	<1.0	2.0	1.0	1.0	7.0
Hydroxide	mg/l as CaCO3	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Dioxide, Total	mg/l as CaCO3	1100	1100	760	540	1200
Dilution Factor		1	1	1	1	1
Analysis Date		01/20/05	01/20/05	01/20/05	01/20/05	01/20/05
Batch ID		AEW005	AEW005	AEW005	AEW005	AEW005
Analyst		ST	ST	ST	ST	ST
Alkalinity (to pH 4.5) as CaCO3 (2320B)						
Alkalinity (to pH 4.5) as CaCO3	mg/l	870	1100	740	560	1300
Dilution Factor		1	1	1	1	1
Analysis Date		01/20/05	01/20/05	01/20/05	01/20/05	01/20/05
Batch ID		AEW005	AEW005	AEW005	AEW005	AEW005
Analyst		ST	ST	ST	ST	ST

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-1	MW-5/501099-01	Liquid	01/18/05	01/13/05 08:51	
01406-2	MW-6/501099-02	Liquid	01/18/05	01/13/05 09:25	
01406-3	MW-7/501099-03	Liquid	01/18/05	01/13/05 10:25	
01406-4	MW-3/501099-04	Liquid	01/18/05	01/13/05 11:02	
01406-5	MW-2/501099-05	Liquid	01/18/05	01/13/05 11:47	

Parameter	Units	Sample ID 01406-1 MW-5/501099-01	01406-2 MW-6/501099-02	01406-3 MW-7/501099-03	01406-4 MW-3/501099-04	01406-5 MW-2/501099-05
pH (150.1)						
pH	units	7.0	7.2	7.0	7.4	7.6
Dilution Factor		1	1	1	1	1
Analysis Date		01/18/05	01/18/05	01/18/05	01/18/05	01/18/05
Batch ID		PHX008	PHX008	PHX008	PHX008	PHX008
Analyst		GK	GK	GK	GK	GK
Sulfate as SO4 (375.4)						
Sulfate as SO4	mg/l	1200	940	190	2100	58
Dilution Factor		40	40	6	75	5
Analysis Date		01/18/05	01/18/05	01/18/05	01/18/05	01/18/05
Batch ID		SEW006	SEW006	SEW006	SEW006	SEW006
Analyst		GK	GK	GK	GK	GK
Chloride (4500E)						
Chloride	mg/l	1100	93	15	37	110
Dilution Factor		20	3	1	1	3
Analysis Date		01/18/05	01/18/05	01/18/05	01/18/05	01/18/05
Batch ID		CKW007	CKW007	CKW007	CKW007	CKW007
Analyst		GK	GK	GK	GK	GK

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-1	MW-5/501099-01	Liquid	01/18/05	01/13/05 08:51	
01406-2	MW-6/501099-02	Liquid	01/18/05	01/13/05 09:25	
01406-3	MW-7/501099-03	Liquid	01/18/05	01/13/05 10:25	
01406-4	MW-3/501099-04	Liquid	01/18/05	01/13/05 11:02	
01406-5	MW-2/501099-05	Liquid	01/18/05	01/13/05 11:47	

Parameter	Units	Sample ID 01406-1 MW-5/501099-01	01406-2 MW-6/501099-02	01406-3 MW-7/501099-03	01406-4 MW-3/501099-04	01406-5 MW-2/501099-05
Specific Conductance (120.1)						
Specific Conductance	umhos/cm	6800	4100	1500	4700	3000
Dilution Factor		1	1	1	1	1
Analysis Date		01/19/05	01/19/05	01/19/05	01/19/05	01/19/05
Batch ID		CDW003	CDW003	CDW003	CDW003	CDW003
Analyst		ST	ST	ST	ST	ST
Nitrate-Nitrite, Nitrogen (353.2)						
Nitrate + Nitrite-N	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate-N	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10
Dilution Factor		1	1	1	1	1
Analysis Date		01/21/05	01/21/05	01/21/05	01/21/05	01/21/05
Batch ID		N3W008	N3W008	N3W008	N3W008	N3W008
Analyst		GK	GK	GK	GK	GK
Nitrite-N (354.1)						
Nitrite-N	mg/l	<0.10	<0.10	<0.10	<0.10	<0.10
Dilution Factor		1	1	1	1	1
Analysis Date		01/18/05	01/18/05	01/18/05	01/18/05	01/18/05
Batch ID		N2W010	N2W010	N2W010	N2W010	N2W010
Analyst		GK	GK	GK	GK	GK

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-1	MW-5/501099-01	Liquid	01/18/05	01/13/05 08:51	
01406-2	MW-6/501099-02	Liquid	01/18/05	01/13/05 09:25	
01406-3	MW-7/501099-03	Liquid	01/18/05	01/13/05 10:25	
01406-4	MW-3/501099-04	Liquid	01/18/05	01/13/05 11:02	
01406-5	MW-2/501099-05	Liquid	01/18/05	01/13/05 11:47	

Parameter	Units	Sample ID 01406-1 MW-5/501099-01	01406-2 MW-6/501099-02	01406-3 MW-7/501099-03	01406-4 MW-3/501099-04	01406-5 MW-2/501099-05
Metals (6010B)						
Calcium	mg/l	670	220	180	450	140
Iron	mg/l	4.3	23	27	3.9	11
Magnesium	mg/l	60	28	20	47	19
Manganese	mg/l	11	4.0	3.0	0.79	1.3
Potassium	mg/l	10	6.7	3.3	3.9	3.8
Sodium	mg/l	910	670	150	690	620
Dilution Factor		1	1	1	1	1
Prep Date		01/21/05	01/21/05	01/21/05	01/21/05	01/21/05
Analysis Date		01/21/05	01/21/05	01/21/05	01/21/05	01/21/05
Batch ID		PW027	PW027	PW027	PW027	PW027
Prep Method		3010A	3010A	3010A	3010A	3010A
Analyst		GSP	GSP	GSP	GSP	GSP
Quantitation Factor		1.000	1.000	5.000	1.000	1.000
Hardness by calculation (6010B)						
Hardness as CaC03	mg/l	1900	670	540	1400	430
Dilution Factor		5	1	1	5.0	1
Prep Date		01/21/05	01/21/05	01/21/05	01/21/05	01/21/05
Analysis Date		01/21/05	01/21/05	01/21/05	01/21/05	01/21/05
Batch ID		PW027	PW027	PW027	PW027	PW027
Prep Method		3010A	3010A	3010A	3010A	3010A
Analyst		GSP	GSP	GSP	GSP	GSP
Quantitation Factor		5.000	1.000	1.000	5.000	1.000

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-6	MW-4/501099-06	Liquid	01/18/05	01/13/05 12:52	

Parameter	Units	Sample ID: 01406-6 MW-4/501099-06
Total Dissolved Solids (160.1)		
Total Dissolved Solids	mg/l	4000
Dilution Factor		1
Analysis Date		01/18/05
Batch ID		TDW006
Analyst		ST
CO2 and Forms of Alkalinity (4500D)		
Bicarbonate (2320/4500)	mg/l as CaCO3	420
Carbon Dioxide, Free	mg/l as CaCO3	31
Carbonate (2320/4500)	mg/l as CaCO3	1.0
Hydroxide	mg/l as CaCO3	<1.0
Carbon Dioxide, Total	mg/l as CaCO3	400
Dilution Factor		1
Analysis Date		01/20/05
Batch ID		AEW005
Analyst		ST
Alkalinity (to pH 4.5) as CaCO3 (2320B)		
Alkalinity (to pH 4.5) as CaCO3	mg/l	420
Dilution Factor		1
Analysis Date		01/20/05
Batch ID		AEW005
Analyst		ST

SEVERN TRENT STL

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-6	MW-4/501099-06	Liquid	01/18/05	01/13/05 12:52	

Parameter	Units	Sample ID 01406-6 MW-4/501099-06
pH (150.1)		
pH	units	7.3
Dilution Factor		1
Analysis Date		01/18/05
Batch ID		PHX008
Analyst		GK
Sulfate as SO4 (375.4)		
Sulfate as SO4	mg/l	2200
Dilution Factor		75
Analysis Date		01/18/05
Batch ID		SEW006
Analyst		GK
Chloride (4500E)		
Chloride	mg/l	30
Dilution Factor		1
Analysis Date		01/18/05
Batch ID		CKW007
Analyst		GK
Specific Conductance (120.1)		
Specific Conductance	umhos/cm	4900
Dilution Factor		1
Analysis Date		01/19/05
Batch ID		CDW003
Analyst		ST

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-6	MW-4/501099-06	Liquid	01/18/05	01/13/05 12:52	

Parameter	Units	Sample ID 01406-6 MW-4/501099-06
Nitrate-Nitrite, Nitrogen (353.2)		
Nitrate + Nitrite-N	mg/l	<0.10
Nitrate-N	mg/l	<0.10
Dilution Factor		1
Analysis Date		01/21/05
Batch ID		N3W008
Analyst		GK
Nitrite-N (354.1)		
Nitrite-N	mg/l	<0.10
Dilution Factor		1
Analysis Date		01/18/05
Batch ID		N2W010
Analyst		GK
Metals (6010B)		
Calcium	mg/l	450
Iron	mg/l	18
Magnesium	mg/l	49
Manganese	mg/l	5.2
Potassium	mg/l	10
Sodium	mg/l	740
Dilution Factor		1
Prep Date		01/21/05
Analysis Date		01/21/05
Batch ID		PW027
Prep Method		3010A
Analyst		GSP
Quantitation Factor		1.000

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Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-6	MW-4/501099-06	Liquid	01/18/05	01/13/05 12:52	

Parameter	Units	Sample ID: 01406-6 MW-4/501099-06
Hardness by calculation (6010B)		
Hardness as CaCO3	mg/l	1300
Dilution Factor		5
Prep Date		01/21/05
Analysis Date		01/21/05
Batch ID		PW027
Prep Method		3010A
Analyst		GSP
Quantitation Factor		5.000

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-7	Method Blank	Liquid	01/18/05		
01406-8	Lab Control Standard % Recovery	Liquid	01/18/05		
01406-9	LCS Accuracy Control Limit (%R)	Liquid	01/18/05		
01406-10	Precision (%RPD) MS/MSD	Liquid	01/18/05		
01406-11	MS Precision Advisory Limit (%RPD)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-7 Method Blank	01406-8 Lab Control	01406-9 StanLCS Accuracy Con	01406-10 Precision (%RPD)	01406-11 MS Precision Ad
Total Dissolved Solids (160.1)						
Total Dissolved Solids	mg/l	<5.0	93 %	68-120	N/A	N/A
Dilution Factor		1				
Analysis Date		01/18/05				
Batch ID		TDW006	TDW006			
Analyst		ST				
CO2 and Forms of Alkalinity (4500D)						
Bicarbonate (2320/4500)	mg/l as CaCO3	N/A	N/A	N/A	N/A	N/A
Alkalinity (to pH 4.5) as CaCO3 (2320B)						
Alkalinity (to pH 4.5) as CaCO3	mg/l	<1.0	100 %	90-110	5	20
Dilution Factor		1				
Analysis Date		01/20/05				
Batch ID		AEW005	AEW005		AEW005	
Analyst		ST				
Sulfate as SO4 (375.4)						
Sulfate as SO4	mg/l	<5.0	101 %	90-110	7	19
Dilution Factor		1				
Analysis Date		01/18/05				
Batch ID		SEW006	SEW006		SEW006	
Analyst		GK				

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-7	Method Blank	Liquid	01/18/05		
01406-8	Lab Control Standard % Recovery	Liquid	01/18/05		
01406-9	LCS Accuracy Control Limit (%R)	Liquid	01/18/05		
01406-10	Precision (%RPD) MS/MSD	Liquid	01/18/05		
01406-11	MS Precision Advisory Limit (%RPD)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-7 Method Blank	01406-8 Lab Control	01406-9 StanLCS Accuracy Con	01406-10 Precision (%RPD)	01406-11 MS Precision Ad
Chloride (4500E)						
Chloride	mg/l	<2.0	95 %	90-110	1	20
Dilution Factor		1				
Analysis Date		01/18/05				
Batch ID		CKW007	CKW007		CKW007	
Analyst		GK				
Specific Conductance (120.1)						
Specific Conductance	umhos/cm	<1.0	100 %	98-102	N/A	N/A
Dilution Factor		1				
Analysis Date		01/19/05				
Batch ID		CDW003	CDW003			
Analyst		ST				
Nitrate-Nitrite, Nitrogen (353.2)						
Nitrate + Nitrite-N	mg/l	<0.10	108 %	90-110	2	6
Dilution Factor		1				
Analysis Date		01/21/05				
Batch ID		N3W008	N3W008		N3W008	
Analyst		GK				

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-7	Method Blank	Liquid	01/18/05		
01406-8	Lab Control Standard % Recovery	Liquid	01/18/05		
01406-9	LCS Accuracy Control Limit (%R)	Liquid	01/18/05		
01406-10	Precision (%RPD) MS/MSD	Liquid	01/18/05		
01406-11	MS Precision Advisory Limit (%RPD)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-7 Method Blank	01406-8 Lab Control	01406-9 StanLCS Accuracy Con	01406-10 Precision (%RPD)	01406-11 MS Precision Ad
Nitrite-N (354.1)						
Nitrite-N	mg/l	<0.10	98 %	90-110	0	10
Dilution Factor		1				
Analysis Date		01/18/05				
Batch ID		N2W010	N2W010		N2W010	
Analyst		GK				
Metals (6010B)						
Calcium	mg/l	<0.50	100 %	80-120	6 %	20
Iron	mg/l	<0.10	106 %	80-120	2 %	20
Magnesium	mg/l	<0.50	104 %	80-120	2 %	20
Manganese	mg/l	<0.010	104 %	80-120	2 %	20
Potassium	mg/l	<1.0	103 %	80-120	5 %	20
Sodium	mg/l	<1.0	100 %	80-120	0 %	20
Dilution Factor		1				
Prep Date		01/21/05				
Analysis Date		01/21/05				
Batch ID		PW027	PW027		PW027	
Prep Method		3010A				
Analyst		GSP				
Quantitation Factor		1.000				

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-7	Method Blank	Liquid	01/18/05		
01406-8	Lab Control Standard % Recovery	Liquid	01/18/05		
01406-9	LCS Accuracy Control Limit (%R)	Liquid	01/18/05		
01406-10	Precision (%RPD) MS/MSD	Liquid	01/18/05		
01406-11	MS Precision Advisory Limit (%RPD)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-7 Method Blank	01406-8 Lab Control	01406-9 StanLCS Accuracy Con	01406-10 Precision (%RPD)	01406-11 MS Precision Ad
Hardness by calculation (6010B)						
Hardness as CaCO3	mg/l	<3.3	N/A	N/A	N/A	N/A
Dilution Factor		1				
Prep Date		01/21/05				
Analysis Date		01/21/05				
Batch ID		PW027	PW027		PW027	
Prep Method		3010A				
Analyst		GSP				
Quantitation Factor		1.000				

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-12	Reporting Limit (RL)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-12 Reporting Limit
Total Dissolved Solids (160.1)		
Total Dissolved Solids	mg/l	5.0
CO2 and Forms of Alkalinity (4500D)		
Bicarbonate (2320/4500)	mg/l as CaCO3	1.0
Carbon Dioxide, Free	mg/l as CaCO3	1.0
Carbonate (2320/4500)	mg/l as CaCO3	1.0
Hydroxide	mg/l as CaCO3	1.0
Carbon Dioxide, Total	mg/l as CaCO3	1.0
Alkalinity (to pH 4.5) as CaCO3 (2320B)		
Alkalinity (to pH 4.5) as CaCO3	mg/l	1.0
Sulfate as SO4 (375.4)		
Sulfate as SO4	mg/l	5.0
Chloride (4500E)		
Chloride	mg/l	2.0
Specific Conductance (120.1)		
Specific Conductance	umhos/cm	1.0

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Analytical Data Report

Lab Sample ID	Description	Matrix	Date Received	Date Sampled	SDG#
01406-12	Reporting Limit (RL)	Liquid	01/18/05		

Parameter	Units	Sample ID 01406-12 Reporting Limit
Nitrate-Nitrite, Nitrogen (353.2)		
Nitrate + Nitrite-N	mg/l	0.10
Nitrite-N (354.1)		
Nitrite-N	mg/l	0.10
Metals (6010B)		
Calcium	mg/l	0.50
Iron	mg/l	0.10
Magnesium	mg/l	0.50
Manganese	mg/l	0.010
Potassium	mg/l	1.0
Sodium	mg/l	1.0
Hardness by calculation (6010B)		
Hardness as CaCO3	mg/l	3.3

SEVERN TRENT STL

STL Pensacola 3355 McLemore Drive - Pensacola FL 32514 Telephone:(850) 474-1001 Fax:(850) 478-2671

Order Number: C501406

These test results meet all the requirements of NELAC. All questions regarding this test report should be directed to the STL Project Manager who signed this test report.

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-1

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	1100	0.02821	31.03100
Sulfate	1200	0.02082	24.98400
Carbonate	0	0.03333	0.00000
Bi-Carbonate	870	0.01639	14.25930
	Total Anions =		**70.2743**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	670	0.04990	33.43300
Potassium	10	0.02558	0.25580
Magnesium	60	0.08229	4.93740
Sodium	910	0.04350	39.58500
	Total Cations =		**78.2112**

Anion/Cation Balance (% difference) =	5.3%		
Total Anions+Cations =	148	mg/l	(calculated)
Total Dissolved Solids =	4800	mg/l	(measured)
TDS/ion sum ratio =	32.33		
Electrical Cond =	6800	umh/cm	(measured)
TDS/EC ratio =	0.706		

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-2

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	93	0.02821	2.62353
Sulfate	940	0.02082	19.57080
Carbonate	2	0.03333	0.06666
Bi-Carbonate	1100	0.01639	18.02900
	Total Anions =		**40.28999**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	220	0.04990	10.97800
Potassium	6.7	0.02558	0.17139
Magnesium	28	0.08229	2.30412
Sodium	670	0.04350	29.14500
	Total Cations =		**42.59851**

Anion/Cation Balance (% difference) =	2.8%		
Total Anions+Cations =	83	mg/l	(calculated)
Total Dissolved Solids =	3000	mg/l	(measured)
TDS/ion sum ratio =	36.19		
Electrical Cond =	4100	umh/cm	(measured)
TDS/EC ratio =	0.732		

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-3

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	15	0.02821	0.42315
Sulfate	190	0.02082	3.95580
Carbonate	1	0.03333	0.03333
Bi-Carbonate	740	0.01639	12.12860
	Total Anions =		**16.54088**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	180	0.04990	8.98200
Potassium	3.3	0.02558	0.08441
Magnesium	20	0.08229	1.64580
Sodium	150	0.04350	6.52500
	Total Cations =		**17.23721**

Anion/Cation Balance (% difference) =	2.1%		
Total Anions+Cations =	34	mg/l	(calculated)
Total Dissolved Solids =	930	mg/l	(measured)
TDS/ion sum ratio =	27.53		
Electrical Cond =	1500	umh/cm	(measured)
TDS/EC ratio =	0.620		

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-4

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	37	0.02821	1.04377
Sulfate	2100	0.02082	43.72200
Carbonate	1	0.03333	0.03333
Bi-Carbonate	560	0.01639	9.17840
	Total Anions =		**53.9775**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	450	0.04990	22.45500
Potassium	3.9	0.02558	0.09976
Magnesium	47	0.08229	3.86763
Sodium	690	0.04350	30.01500
	Total Cations =		**56.43739**

Anion/Cation Balance (% difference) =	2.2%		
Total Anions+Cations =	110	mg/l	(calculated)
Total Dissolved Solids =	3900	mg/l	(measured)
TDS/ion sum ratio =	35.32		
Electrical Cond =	4700	umh/cm	(measured)
TDS/EC ratio =	0.830		

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-5

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	110	0.02821	3.10310
Sulfate	58	0.02082	1.20756
Carbonate	7	0.03333	0.23331
Bi-Carbonate	1300	0.01639	21.30700
	Total Anions =		**25.85097**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	140	0.04990	6.98600
Potassium	3.8	0.02558	0.09720
Magnesium	19	0.08229	1.56351
Sodium	620	0.04350	26.97000
	Total Cations =		**35.61671**

Anion/Cation Balance (% difference) = 15.9%

Total Anions+Cations =	61 mg/l	(calculated)
Total Dissolved Solids =	2000 mg/l	(measured)
TDS/ion sum ratio =	32.54	
Electrical Cond =	3000 umh/cm	(measured)
TDS/EC ratio =	0.667	

SEVERN TRENT STL

Cation-Anion Balance Worksheet

Accession Number: PLI 501099-6

Anions	Result (mg/l)	Factor	Total (me/l)
Chloride	30	0.02821	0.84630
Sulfate	2200	0.02082	45.80400
Carbonate	1	0.03333	0.03333
Bi-Carbonate	420	0.01639	6.88380
	Total Anions =		**53.56743**

Cations	Result (mg/l)	Factor	Total (me/l)
Calcium	450	0.04990	22.45500
Potassium	10	0.02558	0.25580
Magnesium	49	0.08229	4.03221
Sodium	740	0.04350	32.19000
	Total Cations =		**58.93301**

Anion/Cation Balance (% difference) =	4.8%		
Total Anions+Cations =	113	mg/l	(calculated)
Total Dissolved Solids =	4000	mg/l	(measured)
TDS/ion sum ratio =	35.56		
Electrical Cond =	4900	umh/cm	(measured)
TDS/EC ratio =	0.816		

Pinnacle Laboratories, Inc. **Interlab Chain of Custody** Date: 1/19/05 Page: 1 of 1

Network Project Manager: Jacinta Tenorio

Pinnacle Laboratories, Inc.
2709-D Pan American Freeway, NE
Albuquerque, NM 87107
(505) 344-3777 Fax (505) 344-4413

C501406

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
MW-5/501099-01	1/13/05	0851	AQ	
MW-6/501099-02		0925		
MW-7/501099-03		1025		
MW-3/501099-04		1102		
MW-2/501099-05		1147		
MW-4/501099-06	↓	1252	↓	

	Metals (8) RCRA	TCLP RCRA (8) Metals	Metals-13 PP List	Metals-TAL (23 Metals)	Dissolved Fe, Mn, Pb (6010)	Total Ca, Mg, K, Na, Fe, Mn	Cation/Anion Balance	Gen Chemistry: Alk+Bicarb/Carb/OH	TDS, EC, Cl, SO4, pH, Hardness	Total NO2/NO3	Volatile Organics GC/MS (8260)	BOD	COD	Pesticides/PCB (608/8081/8082)	Herbicides (615/8151)	PNA (8310)/8270 SIMS	8260 (TCLP 1311) ZHE		Base/Neutral Acid Compounds GC/MS (625/8270)	Uranium (ICP-MS)	Radium 226+228	Gross Alpha/Beta	TO-14	NUMBER OF CONTAINERS
MW-5/501099-01						X	X	X	X	X													
MW-6/501099-02						X	X	X	X	X													
MW-7/501099-03						X	X	X	X	X													
MW-3/501099-04						X	X	X	X	X													
MW-2/501099-05						X	X	X	X	X													
MW-4/501099-06						X	X	X	X	X													

PROJECT INFORMATION		SAMPLE RECEIPT		SAMPLES SENT TO:	
PROJECT #:	501099	Total Number of Containers		PENSACOLA - STL-FL	X
PROJ. NAME:	GI	Chain of Custody Seals		ESL - OR	
QC LEVEL:	STD. IV	Received Intact?		ATEL - AZ	
QC REQUIRED:	MS MSD BLANK	Received Good Cond./Cold		ATEL - MARION	
TAT:	STANDARD RUSH!!	LAB NUMBER:		ATEL - MELMORE	
				EHL	
DUE DATE:	1/28	COMMENTS:		GEL	
RUSH SURCHARGE:	—			U OF MIAMI	
CLIENT DISCOUNT:	—			WCAS	
SPECIAL CERTIFICATION REQUIRED:	YES NO			WOHL	

RELINQUISED BY: 1.	RELINQUISED BY: 2.
Signature: Francine Tenno Time: 1700	Signature: Time:
Printed Name: Francine Tenno Date: 1/17/05	Printed Name: Date:
Pinnacle Laboratories, Inc.	Company
RECEIVED BY: 1.	**RECEIVED BY: 2.**
Signature: Karen Hedare Time:	Signature: Time:
Printed Name: Date: 01-18-05	Printed Name: Date:
Company STL	Company

20°C

STL Pensacola
PROJECT SAMPLE INSPECTION FORM

SEVERN TRENT STL

Lab Order #: C501406 Date Received: 01-18-05

1.	Was there a Chain of Custody?	(Yes)	No*		8.	Were samples checked for preservative? *(Check pH of all H_2O requiring preservative (STL-PN SOP 917) except VOA vials that require zero headspace)*+*	(Yes)	No*	N/A
2.	Was Chain of Custody properly filled out and relinquished?	(Yes)	No*		9.	Is there sufficient volume for analysis requested?	Yes	(No*)	N/A (Can)
3.	Were all samples properly labeled and identified?	(Yes)	No*		10.	Were samples received within Holding Time? (REFER TO STL-SOP 1040)	(Yes)	No*	
4.	Were samples received cold? (Criteria: 0.1° - 6°C: STL-SOP 1055)	(Yes)	No*	N/A	11.	Is Headspace (bubble) visible > ¼" diameter in VOA vial(s)?*	Yes*	No	(N/A)
5.	Did samples require splitting or compositing*?	Yes*	(No)		12.	Were Trip Blanks Received?	Yes	No	(N/A)
6.	Were samples received in proper containers for analysis requested?	(Yes)	No*		13.	If yes, was analysis of Trip Blanks requested?	Yes	No	(N/A)
7.	Were all sample containers received intact?	(Yes)	No*		14.	Were MS/MSD-specific bottles provided?	Yes	No*	(N/A)
					15.	If any issues, how was PM notified?	PSIF ☒	Verbal ☒	

RM 1-18-05

Airbill Number(s): 12 878 168 01 4434 4696 Delivery By: (UPS) FedEx HD BUS DHL PE

(HD – Hand Delivery)

Cooler Number(s) & Temp(s) °C: Client 3.0°C IR-1

(IE. #340L, 4°C, IR-1 – COOLER NUMBER, TEMPERATURE, THERMOMETER NUMBER)

Comments (reference item numbers above and list sample IDs/Tests where appropriate):

*Limited volume for sample MW-2/501099-05.

Inspected By: RM Date: 01-18-05 Logged By: LLK Date: 18-JAN-05

* Note all Out-of-Control and/or questionable events on Comment Section of this form. For holding times, the analytical department will flag immediate hold time samples (pH, Dissolved O2, Residual Cl) as out of hold time, therefore, these samples will not be documented on this PSIF.

\+ All volatile samples requested to be split or composited must be done in the Volatile Lab. Document: "Volatile sample values may be compromised due to sample splitting (compositing)"

\+ All pH results for North Carolina, and other requested projects are to be recorded on the pH log provided (STL-SOP 938).

\+ According to EPA, a bubble of ¼" or less is acceptable in 40 ml vials requiring volatile analysis. According to Florida DEP, excess headspace in liquid TCLP volatile containers shall be documented.

ANY PERSON MAKING OR ADDING COMMENTS TO ANY PART OF THIS PSIF MUST INITIAL AND DATE ALL CORRECTIONS, COMMENTS AND/OR INSTRUCTIONS.

SEVERN TRENT STL

Organic Data Qualifiers for Final Report

B	The analyte was detected in the method blank and in the client's sample.
D	The result was obtained from a dilution.
E	The result exceeds the calibration range.
J	Estimated value because the analyte concentration is less than the reporting limit.
M	A matrix effect was present.
N	Presumptive evidence of a compound. The compound was identified qualitatively or as a Tentatively Identified Compound.
N/C	Not Calculable. Either the sample spiked was > 4X spike concentration, or the compound was diluted out, or the results of sample duplicate analysis were <RL.
P	Second-column or detector confirmation exceeded method criteria. Appropriate value is reported and data is flagged/qualified as instructed by method/regulation.
U or < or ND	The analyte was not detected.
*	The result is not within control limit(s).

Inorganic Data Qualifiers for Final Report

B	The analyte was detected in the method blank and in the client's sample.
E	The reported value is estimated because of the presence of interference.
J	Estimated value because the analyte concentration is less than the reporting limit.
N	The spiked sample recovery is not within control limits.
N/C	Not Calculable. Either the sample spiked was > 4X spike concentration, or the compound was diluted out, or the results of sample duplicate analysis were <RL.
U or < or ND	The analyte was not detected.
*	Duplicate analysis not within control limits
M	The duplicate injection precision was not met.
S	The reported value was determined by the Method of Standard Addition (MSA).
W	Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance and post spike recovery is greater than or equal to 40%, the sample is flagged with a "W" and no further action is required.
+	The Standard Additions Correlation Coefficient is <0.995.
L	The result is not within control limit(s).

It is permissible to submit an Out-of-Control Events/Corrective Action form and/or Case Narrative in lieu of using above qualifiers.

When the laboratory receives a sample that does not meet EPA requirements for sample collection, preservation or holding time, the laboratory is required to reject the samples. The client must be notified and asked whether the lab should proceed with analysis. Data from any samples that do not meet sample acceptance criteria (collection, preservation and holding time), must be flagged, or noted on a corrective action form or case narrative, or addressed on the Project Sample Inspection Form (PSIF) in an unambiguous manner clearly defining the nature and substance of the variation. NPDES samples from North Carolina that do not meet EPA requirements for sample collection, preservation or holding time are non-reportable for NPDES compliance monitoring.

Abbreviations

ND	Not Detected at or above the STL Pensacola reporting limit (RL)
NS	Not Submitted
NA	Not Applicable
MDL	STL Pensacola Method Detection Limit
RL	STL Pensacola Reporting Limit
NoMS	Not enough sample provided to prepare and/or analyze a method-required matrix spike (MS) and/or duplicate (MSD)
TIC	Tentatively Identified Compound

Florida Projects Inorganic/Organic

Refer to FL DEP 62-160; Table 4 Data Qualifier Codes. FL DEP Rule 62-160, Table 1 lists the Florida sites which require data qualifiers.

Arizona DEQ Projects

Any qualified data submitted to Arizona DEQ (ADEQ) after January 1, 2001 must be designated using the Arizona Data Qualifiers as developed by the Arizona ELAC technical subcommittee. Refer to the ADEQ qualifier list.

Severn Trent Laboratories Inc.
STL Pensacola • 3355 McLemore Dr • Pensacola, FL 32514
Tel 850 474 1001 Fax 850 484 5315 • *www.stl-inc.com*

Revised/Effective: 08-09-04

SEVERN TRENT STL

STL PENSACOLA
Certifications, Memberships & Affiliations

Alabama Department of Environmental Management, Laboratory ID No. 40150 (Drinking Water by Reciprocity with FL)

Arizona Department of Health Services, Lab ID No. AZ0589 (Hazardous Waste & Wastewater)

Arkansas Department of Pollution Control and Ecology, (88-0689) (Environmental)

California Department of Health Services, **ELAP** Laboratory ID No. 2510 (Hazardous Waste and Wastewater)

Connecticut Department of Health Services, Connecticut Lab Approval No. PH-0697 (D W, H W and Wastewater)

Florida DOH, **NELAP** Laboratory ID No. E81010 (Drinking Water, Hazardous Waste and Wastewater)

Florida DEP/DOH CompQAP # 980156

Illinois Environmental Laboratory Accreditation Program (ELAP), **NELAP** Laboratory ID No. 200041 (Wastewater and Hazardous Waste)

Iowa Department of Natural Resources, Laboratory ID No. 367 (Wastewater, UST, Solid Waste, & Contaminated Sites)

Kansas Department of Health & Environment, **NELAP** Laboratory ID No. E10253 (Wastewater and Hazardous Waste)

Kentucky NR&EPC, Laboratory ID No. 90043 (Drinking Water)

Kentucky Petroleum Storage Tank Env Assurance Fund, Laboratory ID No. 0053 (UST)

Louisiana DEQ, LELAP, **NELAP** Laboratory ID No. 02075, Agency Interest ID 30748 (Environmental)

Maryland DH&MH Laboratory ID No. 233 (Drinking Water by Reciprocity with Florida)

Massachusetts DEP, Laboratory ID No. M-FL094 (Wastewater)

Michigan Bureau of E&OccH, Laboratory ID No.9912 (Drinking Water by Reciprocity with Florida)

New Hampshire DES ELAP, **NELAP** Laboratory ID No. 250502 (Drinking Water & Wastewater)

New Jersey DEP&E, **NELAP** Laboratory ID No. FL006 (Wastewater and Hazardous Waster)

North Carolina DENR, Laboratory ID No. 314 (Hazardous Waste and Wastewater)

North Dakota DH&Consol Labs, Laboratory ID No. R-108 Wastewater and Hazardous Waste by Reciprocity with Arizona)

Oklahoma Department of Environmental Quality, Laboratory ID No. 9810 (Hazardous Waste and Wastewater)

Pennsylvania Department of Environmental Resources, **NELAP** Laboratory ID No. 68-467 (Drinking Water & Wastewater)

South Carolina DH&EC, Laboratory ID No. 96026 (Wastewater & Solids/Hazardous Waste by Reciprocity with FL)

Tennessee Department of Health & Environment, Laboratory ID No. 02907 (Drinking Water)

Virginia Department of General Services, Laboratory ID No. 00008 (Drinking Water by Reciprocity with FL)

West Virginia DOE, Office of Water Resources, Laboratory ID No. 136 (Haz Waste and Wastewater)

EPA ICR (Information Collection Rule) Approved Laboratory, Laboratory ID No. ICRFL031

NFESC (Naval Facilities Engineering Services Center)

USACE (United States Army Corps. of Engineers), MRD

STL Pensacola also has a foreign soil permit to accept soils from locations other than the continental United States. Permit No. S-37599

PINNACLE LABORATORIES

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 11305 PAGE: 1 OF 1

PLI Accession #: 501099

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: MJN

COMPANY: Ladestar Services

ADDRESS: PO 3861
Farmington NM

PHONE: 505 334 2791

FAX:

BILL TO: Tim Kinney

COMPANY: Giant

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.
MW-5	11305	851	WG	01
MW-6	11305	0925	WG	02
MW-7	11305	1025	WG	03
MW-3	11305	1162	WG	04
MW-2	11304	1147	WG	05
MW-4	11305	1252	WG	06
Trip	~~11305~~	~~0920~~	WG	07
↓	0107	1030		

Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	(M8015) Gas/Purge & Trap	8021 (BTEX)/8015 (Gasoline) MTBE	8021 (BTEX) ☐MTBE ☐TMB ☐PCE	8021 (TCL)	8021 (EDX)	8021 (HALO)	8021 (CUST)	504.1 EDB ☐/DBCP ☐	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics ☐PBMS	8260 (CUST) Volatile Organics	8260 (Landfill) Volatile Organics	Pesticides/PCB (608/8081/8082)	Herbicides (615/8151)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Polynuclear Aromatics (610/8310/8270-SIMS)	General Chemistry: Alk+Bicarb/Carb/NH	TDS, EC, Cl, SO4, Hardness	Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method1311)	Metals: Ca, Mg, K, Na, Fe, Mn	Cation/Anion Balance	NUMBER OF CONTAINERS
				X					X									X	X					X	X	6
				X					X									X	X					X	X	6
				X					X									X	X					X	X	6
				X					X									X	X					X	X	6
				X					X									X	X					X	X	6
				X					X									X	X					X	X	6
				X					X	DH, NO2/NO3															1

WEEKEND ANALYSES MAY RESULT IN AN ADDITIONAL SURCHARGE - PLEASE INQUIRE.

PROJECT INFORMATION

PROJ. NO.: 30002-1

PROJ. NAME: Giant Crude

P.O. NO.:

SHIPPED VIA: TURN 30

SAMPLE RECEIPT

NO CONTAINERS	37
CUSTODY SEALS	Y / N / (NA)
RECEIVED INTACT	Y
BLUE ICE/ICE	3.9°c

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐24hr* ☐48hr* ☐72hr* ☐1 WEEK (NORMAL) ☒

*NOT AVAILABLE ON ALL ANALYSES

CERTIFICATION REQUIRED ☐ NM ☐ SDWA ☐ AZ ☐ OTHER

METHANOL PRESERVATION ☐ METALS ☐ TOTAL ☐ DISSOLVED

COMMENTS: No MTBE

BTEX ONLY

* MW-2 (-05): Anions (cl) was dropped and spilled most of contents. BP 1-15-05

RELINQUISHED BY: 1.

Signature: Time: 0930

Printed Name: MJ Nee Date: 1/14/05

Company: Ladestar

See Reverse side (Force Majeure)

RECEIVED BY: 1.

Signature: Time:

Printed Name: Date:

Company:

RELINQUISHED BY: 2.

Signature: Time:

Printed Name: Date:

Company:

RECEIVED BY: (LAB) 2.

Signature: Time: 0630

Printed Name: Brian T. Penck Date: 1-15-05

Pinnacle Laboratories Inc.

Appendix B

Summary of Ground Water Analyses

Lodestar Services, Incorporated
PO Box 3861 Farmington, NM 87499-3861 Office (505) 334-2791

Summary of Ground Water Analytical Results for BTEX - September 1994 Through January 2005

NMWQCC Standards		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
		10	**750**	**750**	**620**
MW-1*	Sep-94	NS	NS	NS	NS
	Apr-95	NS	NS	NS	NS
	Sep-99	NS	NS	NS	NS
	Dec-99	NS	NS	NS	NS
	May-01	NS	NS	NS	NS
	May-02	NS	NS	NS	NS
MW-2	Sep-94	**640**	600	82	**690**
	Apr-95	**220**	280	53	430
	Sep-99	NSP	NSP	NSP	NSP
	Dec-99	NSP	NSP	NSP	NSP
	May-01	NSP	NSP	NSP	NSP
	May-02	NSP	NSP	NSP	NSP
	Jan-03	**1700**	ND	650	**3200**
	Jan-04	**1100**	ND	340	**1800**
	Jan-05	**430**	ND	360	**1000**
MW-3	Sep-94	ND	ND	ND	ND
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	ND
	Jan-05	ND	ND	ND	ND
MW-4	Sep-94	2.1	ND	ND	1.2
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	ND
	Jan-05	ND	ND	ND	ND
MW-5	Sep-94	NS	NS	NS	NS
	Apr-95	ND	ND	ND	ND
	Sep-99	ND	ND	ND	ND
	Dec-99	ND	ND	ND	ND
	May-01	ND	ND	ND	ND
	May-02	ND	ND	ND	ND
	Jan-03	ND	ND	ND	ND
	Jan-04	ND	ND	ND	1.1
	Jan-05	ND	ND	ND	ND

NMWQCC Standards		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
		10	**750**	**750**	**620**
MW-6	May-01	**12**	15	13	83
	May-02	ND	ND	0.53	1.4
	Oct -02	ND	ND	ND	3.2
	Jan-03	6.0	20	87	350
	Jul-03	ND	2.7	3.2	16
	Sept-03	0.8	3.7	4.0	24
	Jan-04	0.9	1.6	2.9	16
	Jan-05	ND	ND	ND	ND
MW-7	May-01	**2,400**	ND	380	**2,800**
	June-02	**2,000**	ND	140	**1,100**
	Oct-02	**1100**	ND	79	490
	Jan-03	**3200**	ND	400	**3100**
	Jan-04	**3300**	ND	460	**3300**
	Jan-05	**1600**	ND	220	**1500**

Notes:
µg/L = micrograms per liter
ND = not detected
NS = not sampled
NSP = not sampled due to product in well
*MW-1 was not screened within the aquifer
**MW-6 and MW-7 were installed in May 2001
NMWQCC = New Mexico Water Quality Control Commission

Summary of Ground Water Analytical Results for General Water Chemistry - 1994, 2001 ,2002, 2003, 2004, and 2005

NMWQCC Standards		Lab pH (su)	Conductivity (µmhos/cm)	TDS (mg/L)	Alkalinity ($CaCO_3$) (mg/L)	Hardness ($CaCO_3$) (mg/L)	Sodium Absorption Ratio	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)
		6-9	No Std	1,000	No Std	No Std	No Std	No Std	No Std	No Std	250	600	No Std	No Std	No Std	No Std
MW2	1994	6.6	4,920	3,049	957	NT	11.785	1,170	0	0	1,050	245	325	30	1.4	828
	2001	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP
	2002	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP	NSP
	2003	7	3230	3220	1520	416	NT	1850	<1	<1	51	369	133	20	1	660
	2004	7	3100	2000	1500	420	NT	1500	<1	<1	85	130	140	18	3	680
	2005	7.6	3000	2000	1300	430	NT	1300	7	<1	110	58	140	19	3.8	620
MW3	1994	7.1	4,250	3,413	521	NT	8.147	635	0	0	48	1,920	439	37	1.4	661
	2001	7.3	4,500	3,960	459	1,220	NT	559	<1	<1	78	2,250	423	40.4	2.5	711
	2002	7	4,440	3,820	358	1,290	NT	437	<1	<1	46	2,520	446	43	0.6	705
	2003	7	4320	3660	560	1230	NT	683	<1	<1	56	2330	428	39.4	1.6	671
	2004	7.3	4500	4000	560	1400	NT	560	1	<1	44	2300	320	44	3.6	780
	2005	7.4	4700	2000	560	1400	NT	560	1	<1	37	2100	450	47	3.9	690
MW4	1994	7.0	5,420	4,389	576	NT	10.883	703	0	0	175	2,470	439	53	3.5	907
	2001	7.1	5,090	4,630	490	1,460	NT	597	<1	<1	77	2,680	500	52.5	4.2	900
	2002	6.9	5,140	4,420	358	1,310	NT	437	<1	<1	47	2,930	449	47	2.6	873
	2003	7	4460	3850	400	1070	NT	488	<1	<1	40	2570	361	40.8	2.8	667
	2004	7.3	4500	3900	400	1200	NT	400	3	<1	27	2500	390	44	6.7	810
	2005	7.3	4900	4000	420	1300	NT	420	1	<1	30	2200	450	49	10	740
MW5	1994	6.9	6,000	4,410	775	NT	8.84	945	0	0	996	1,390	634	51	6.6	861
	2001	6.7	7,000	5,230	757	2,010	NT	923	<1	<1	1,320	1,230	700	63.2	5.6	924
	2002	6.5	6,880	4,810	567	1,880	NT	692	<1	<1	1,200	1,230	661	55.3	4.9	855
	2003	6.6	6910	5080	830	1780	NT	1010	<1	<1	1090	1330	616	58.1	4.8	829
	2004	6.8	6700	4600	840	2000	NT	840	1	<1	1300	1400	690	57	11	1000
	2005	7.0	6800	4800	870	1900	NT	870	<1	<1	1100	1200	670	60	10	910

NMWQCC Standards		Lab pH (su)	Conductivity (µmhos/cm)	TDS (mg/L)	Alkalinity ($CaCO_3$) (mg/L)	Hardness ($CaCO_3$) (mg/L)	Sodium Absorption Ratio	Bicarbonate (HCO_3) (mg/L)	Carbonate (CO_3) (mg/L)	Hydroxide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)
		6-9	No Std	1,000	No Std	No Std	No Std	No Std	No Std	No Std	250	600	No Std	No Std	No Std	No Std
MW6	2001	6.9	5,470	4,580	740	1,550	NT	903	<1	<1	80	2,780	534	53.3	6.3	1,030
	2002	6.8	4,460	3,560	669	932	NT	816	<1	<1	55	1,900	319	33	2.5	830
	2003	7	3070	2180	1140	602	NT	1390	<1	<1	79	540	203	23.1	2.1	514
	2004	7.2	4100	3000	1000	1100	NT	1000	<1	<1	96	1400	390	63	29	870
	2005	7.2	4100	3000	1100	670	NT	1100	2	<1	93	940	220	28	6.7	670
MW7	2001	6.7	2,160	1,710	600	843	NT	732	<1	<1	52	642	296	25.6	1.6	234
	2002	6.8	1,870	1,570	432	758	NT	527	<1	<1	20	700	258	27.8	2.2	151
	2003	6.7	1310	810	696	531	NT	849	<1	<1	35	57	152	36.8	1.0	126
	2004	6.8	1400	920	720	520	NT	720	<1	<1	13	120	170	23	7.0	170
	2005	7.0	1500	930	740	540	NT	740	1	<1	15	190	180	20	3.3	150

Notes: For Summary of Ground Water Analytical Results for General Water Chemistry - 1994, 2001 ,2002, 2003, 2004, and 2005

s.u. = standard units
µmhos/cm = micromhos per centimeter
mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission
No Std = no standard
NS = not sampled; MW-1 was not screened within the aquifer
NSP = no sample collected due to product in well
NT = Not Tested

Summary of Ground Water Analytical Results for Polynuclear Aromatic Hydrocarbons (EPA 610) - September 1994

Units: µg/L	MW-3	MW-2	MW-4
Naphthalene	<0.5	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
1-Methylnaphthalene	<0.30	5.8	<0.30

Notes:
µg/L = micrograms per liter

Summary of Ground Water Analytical Results for Priority Pollutant Metals – September 1994

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

Notes:
mg/L = milligrams per liter
NMWQCC = New Mexico Water Quality Control Commission
No Std = no standard

Bioventing Data Table: Carbon Dioxide Concentrations at Monitoring Points

	2/10/03	2/17/03 1332 hours	2/17/03 1601 hours	2/18/03	2/19/03	2/21/03	2/24/03	2/25/03	3/5/03	3/19/03	10/21/03	1/20/04	Average Concentration During Operations	Percentage of Pretest Reading
IP10	1.8	5.8	5.4	7.6	6	5.6	7.8	7.8	5.4	8.8	11.5	0	6.52	362%
IP11	0	0	0	0	0	0	0	0	0	0	10	1.3	1.03	
IP13	0.2	0.2	2	1.8	1.4	2	1.8	1.8	2.9	2.6	0.4	2.2	1.74	868%
IP14	1	2.8	9.2	2.8	7.4	9.4	4.2	6.6	7.2	5.4	9.6	10.6	6.84	684%
IP15	0.8	0.2	2.4	1.2	0	0	0	0.8	0.6	0.8	1.8	5.5	1.21	151%
IP17	1	0.6	1	1	1.2	0.8	1	0.8	0.8	1.2	2.2	1.5	1.10	110%
IP19	0.4	1.4	1.8	1.2	1.6	1	1.8	1.6	1.6	0.2	0.8	0.6	1.24	309%
IP20	0.6	3.2	3.2	3.6	3.8	4.2	4.8	4.6	5.8	8	15.2	13.6	6.36	1061%
IP21	1.4	0.6	1	0.8	1	0.6	0.8	1	1.2	2	0.9	3.3	1.20	86%
IP22	0.4	1	1	1.2	0.8	0.2	0.8	1	1.2	1.6	0	1.5	0.94	234%
IP23	0.6	0.4	0.8	0.6	0.6	0.4	0.6	0.6	0.6	1	0.5	1.2	0.66	111%
IP8	0.8	10.8	14.2	13	14.4	13.4	6.2	14	14.6	15.8	17.1	14.2	13.43	1678%
MP14	1	3.6	3.6	3	3.4	3.4	2.2	2.8	3.2	4	1.1	6.4	3.34	334%
MP15	0.6	2	1.2	2.4	1.8	1.4	1.6	2	2.2	2.2	1.5	1.7	1.82	303%
MP16	0.06	0.8	1.4	1	1.2	0.8	1.2	1.2	1	1.4	0.4	0.3	0.97	1621%
MP4	1.2	10.4	11.4	10.4	11	11	10	10.6	10.2	12	20	15.5	12.05	1004%
MP7	1.4	4.4	7	7.8	8.2	5.6	5.4	4.4	7.2	8.4	3.2	0	5.60	400%
MP9	1	1.2	1.8	1.6	2	1.2	1.2	1.4	1.6	2	4	2.8	1.89	189%
Ave.	0.79	2.74	3.80	3.39	3.66	3.39	2.86	3.50	3.74	4.30	5.57	4.57	3.77	476%

System was started on 2/17/03 0900 hrs

Lodestar Services, Incorporated
PO Box 3861 Farmington, NM 87499-3861 Office (505) 334-2791

Bioventing Data Table: Carbon Dioxide Concentrations at Monitoring Points

	4/29/04	7/28/04	10/19/04	1/12/05	Average Concentration During 2004	Percentage of Pretest Reading 2004	Percentage of 2003 Reading
IP10	7.6	15.9	12.9	7.4	10.95	608%	168%
IP11	1.3	15.0	23.3	8.0	11.90		1158%
IP13	1.4	0.3	2.5	1.3	1.38	688%	79%
IP14	12.5	4.3	7.0	16.4	10.05	1005%	147%
IP15	0.0	1.2	0.1	0.0	0.33	41%	27%
IP17	1.3	0.7	1.2	1.8	1.25	125%	114%
IP19	na	na	na	3.5	3.50	875%	283%
IP20	12.6	2.6	10.9	7.5	8.40	1400%	132%
IP21	2.8	1.9	2.7	1.4	2.20	157%	183%
IP22	1.8	1.9	2.0	1.7	1.85	463%	198%
IP23	0.6	1.2	0.5	na	0.77	128%	116%
IP8	9.5	0.2	17.1	15.5	10.58	1322%	79%
MP14	7.3	2.4	13.5	8.7	7.98	798%	239%
MP15	2.1	3.8	3.0	5.8	3.68	613%	202%
MP16	0.9	2.5	0.4	1.8	1.40	2333%	144%
MP4	12.8	2.6	26.9	15.5	14.45	1204%	120%
MP7	7.2	0.7	16.9	8.2	8.25	589%	147%
MP9	0.2	2.1	1.4	0.2	0.98	98%	52%
Ave.	**4.55**	**3.29**	**7.91**	**5.82**	5.55	700%	147%

Bioventing Data Table: Oxygen Concentrations in Monitoring Points

	2/10/03	2/17/03 1332 hrs	2/17/03 1601hrs	2/18/03	2/19/03	2/21/03	2/24/03	2/25/03	3/5/03	3/19/03	10/21/04	1/20/04	Average Concentration During Operations	Percentage of Pretest Reading
IP10	17.20	2.00	5.50	0.90	2.80	2.90	0.90	0.90	6.00	1.00	10.10	1.60	3.15	18%
IP11	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.90	20.00	20.90	9.20	18.20	19.51	93%
IP13	20.90	20.60	18.40	18.60	19.60	18.00	18.60	18.60	17.90	16.70	20.50	17.30	18.62	89%
IP14	19.90	15.70	1.70	14.70	5.60	0.90	10.40	6.50	3.10	3.30	0	1.60	5.77	29%
IP15	20.90	20.90	20.70	17.30	20.90	20.90	20.90	20.70	20.40	20.80	18.70	18.60	20.07	96%
IP17	20.90	20.60	20.80	20.30	20.60	20.90	20.90	20.80	20.70	20.40	19.60	19.20	20.44	98%
IP19	20.90	18.30	18.80	18.90	18.80	20.20	19.20	19.10	18.00	20.90	20.40	19.40	19.27	92%
IP20	20.50	14.00	14.00	13.30	10.40	2.20	3.20	3.00	2.20	0.90	0	1.50	5.88	29%
IP21	20.90	19.70	19.50	19.90	19.80	18.10	19.20	18.00	16.20	13.80	19.90	17.50	18.33	88%
IP22	20.90	19.60	20.80	19.90	20.40	20.90	20.90	20.30	19.80	19.10	21.10	18.70	20.14	96%
IP23	20.90	20.90	20.90	20.70	20.90	20.90	20.90	20.90	20.30	20.90	20.70	19.60	20.69	99%
IP8	20.20	4.60	2.10	4.00	2.90	3.30	11.50	1.80	2.00	2.20	0	1.40	3.25	16%
MP14	19.20	13.10	13.70	14.80	14.30	13.70	17.30	15.40	13.10	11.20	19.30	10.30	14.20	74%
MP15	20.90	17.90	18.10	19.90	18.50	19.70	20.30	18.80	17.60	18.50	19.30	13.80	18.40	88%
MP16	20.90	19.90	20.20	19.70	20.30	20.90	20.80	20.10	19.20	19.40	20.90	19.80	20.11	96%
MP4	19.00	1.10	1.00	3.40	2.60	1.80	3.00	1.70	3.10	3.40	0	0.20	1.94	10%
MP7	18.60	7.70	2.40	1.20	1.20	5.30	8.20	10.40	3.10	1.10	15.70	15.90	6.56	35%
MP9	20.50	19.40	19.30	19.00	18.90	19.90	20.60	19.30	18.80	18.40	16.00	17.70	13.13	64%
Ave.	20.23	15.38	14.38	14.86	14.41	13.97	15.43	14.29	13.42	12.94	13.97	12.91	13.86	69%

System was started on 2/17/03 0900 hrs

Lodestar Services, Incorporated
PO Box 3861 Farmington, NM 87499-3861 Office (505) 334-2791

Bioventing Data Table: Oxygen Concentrations in Monitoring Points

	4/29/2004	7/28/2004	10/19/04	1/12/2005	Average Concentration During 2004	Percentage of Pretest Reading 2004	Percentage of 2003 Reading
IP10	11.40	11.30	15.20	11.60	12.38	72%	393%
IP11	18.60	5.40	-	10.50	8.63	41%	44%
IP13	19.70	20.30	17.30	18.50	18.95	91%	102%
IP14	-	18.00	-	-	4.50	23%	78%
IP15	20.20	18.90	20.10	20.50	19.93	95%	99%
IP17	19.40	19.70	19.30	18.40	19.20	92%	94%
IP19	na	na	na	16.2	16.20	78%	84%
IP20	2.20	14.30	4.10	8.10	7.18	35%	122%
IP21	18.10	17.20	18.20	18.90	18.10	87%	99%
IP22	17.90	14.70	17.70	19.70	17.50	84%	87%
IP23	19.60	19.30	19.10	na	19.33	93%	93%
IP8	0.50	18.50	-	0.20	4.80	24%	147%
MP14	4.80	16.10	4.20	8.10	8.30	43%	58%
MP15	17.90	14.90	14.70	12.00	14.88	71%	81%
MP16	19.70	18.00	19.70	18.40	18.95	91%	94%
MP4	1.90	19.40	-	3.30	6.15	32%	318%
MP7	6.60	19.20	-	5.60	7.85	42%	120%
MP9	19.90	17.60	17.80	20.20	18.88	92%	144%
Ave.	12.85	16.64	11.02	12.36	13.43	66%	97%