AP - 31

STAGE 1 & 2 REPORTS

DATE:

Nov. 26, 2001

SITE EVALUATION OF THE OJITO CANYON (O-9) LINE LEAK AND REMEDIAL SYSTEM SANTA FE NATIONAL FOREST RIO ARRIBA COUNTY, NEW MEXICO

PREPARED FOR:

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PROJECT 1517000082

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EXECUTIVE SUMMARY

Benson-Montin-Greer Drilling Corporation (BMG) has been actively working on the remediation of a crude oil spill leak that occurred in a remote area north of Regina, New Mexico since the summer of 2000. BMG initially removed 2,800 cubic yards of hydrocarbon-impacted soils after the spill occurred. Subsequently, numerous subsurface borings were advanced along with the installation of five monitoring wells in August of 2000. Free-phase hydrocarbons were discovered in monitoring well, MW-5 at a thickness of over one foot. BMG initiated recovery of the hydrocarbon product from the groundwater in February of 2001. Additional sampling and testing of the groundwater at the site has not indicated that monitoring wells, MW-1 through MW-4 has been impacted by hydrocarbons. The groundwater recovery system (a Xitech remotely operated skimmer) has not recovered much (less than 5 gallons) hydrocarbon product since installation.

BMG contracted AMEC to complete further investigation of the groundwater at the site along with evaluation of the product recovery system in September 2001. AMEC installed three additional groundwater-monitoring wells at the site on September 20 and 21, 2001. Subsequent field visits, measurements, development, sampling and testing revealed the following:

- Groundwater appears to be flowing in an easterly direction.
- The site is located in a remote area, far from any domestic water wells.
- Hydrocarbons located in MW-5 have been reduced from over one foot to 0.48 feet in thickness.
- Monitoring wells, MW-6 and MW-7, directly down gradient of MW-5 have elevations of benzene at 69 and 350 µg/L respectively, which exceeds the State of New Mexico groundwater standards of 10 µg/L of benzene.
- The lack of oxygen in monitoring wells, MW-6 and MW-7 indicates that Remediation by natural attenuation (RNA) appears to be occurring at the site.
- The product recovery system does not appear to be working as originally specified. This system is has been sent in for repairs during October 2001. The system will be re-evaluated during November 2001 after installation. If deemed ineffective, an alternative product recovery system will be implemented.

AMEC has made the following recommendations based on our field evaluations:

- AMEC recommends proper closure and abandonment of monitoring wells MW-1, MW-2, MW-3, MW-4. The groundwater does not appear to be impacted and the wells are located up gradient of the spill site and do not appear to be of value for monitoring groundwater quality.

- AMEC recommends use of an alternative product recovery system for monitoring well MW-5 should the Xitech system not work to the standards specified. Alternative product recovery may include installation of hydrophobic hydrocarbon absorbent "socks" that can be removed and replaced periodically, or, regular hand bailing of the well to remove PSH.
- AMEC recommends annual groundwater samples are collected from groundwater monitoring wells MW-6, MW-7 and MW-8 for hydrocarbon constituents and RNA factors.
- AMEC recommends annual groundwater samples be collected from MW-5 following the removal of product. AMEC recommends the addition of an Oxygen Release Compound (ORC®) or similar product to monitoring wells MW-6 and MW-7 to enhance RNA factors and promote biodegradation of the hydrocarbons. Once free-phase hydrocarbons have been removed from monitoring well MW-5, an ORC® or similar product may be introduced to expedite RNA.

1.0 INTRODUCTION

Benson-Montin-Greer Drilling Corporation (BMG) owns and operates a crude oil production collection pipeline north of Regina, New Mexico. This site has been the focus of a soil and groundwater evaluation as a result of a crude oil spill from the gathering line located in Ojito Canyon and is known as known as the Ojito (O-9) line leak. This report reviews the initial remedial activities and installation of the first five groundwater monitoring wells, as well as the subsequent investigation and installation of the additional three-groundwater monitoring wells by AMEC (Figure 1).

1.1 Site Location

Ojito Canyon is located north of Regina, New Mexico in the Santa Fe National Forest, Figure 2. The approximate position of the site is approximately 7,500 feet above sea level, at 106° 56.588' West Longitude and 36° 28.572' North Latitude. The site legal description is Section 21, Township 26 North and Range 1 West, Rio Arriba County, New Mexico. The crude oil spill occurred in a fairly flat area of the canyon floor, approximately 100 feet south of the Ojito Arroyo. The elevation rises sharply along the southern portion of the spill area.

1.2 Regional Hydrology and Geology

The site is located within the flood plain of the Ojito Canyon and receives approximately 17 inches of rain per year. The Ojito Canyon and the associated flood plain are relatively narrow with numerous feeder canyons and washes that converge into the Ojito Canyon. The surrounding mountains rise approximately 500 to 600 feet above the canyon floor. The Tertiary San Jose Formation is the regional aquifer. Groundwater in the area of the site is approximately 16 feet bgs and is likely an alluvial aquifer. Groundwater in the area of the site appears to flow in a east direction, Figure 2 .

1.3 Background

Listed below is a brief overview of the site activities, illustrated in Figure 1:

- A crude oil gathering line located in Ojito Canyon failed during the summer of 2000 resulting in the release of approximately 20 barrels (bbls) of crude oil.
- BMG performed the initial response by excavating approximately 2,800-cubic yards of hydrocarbon impacted soil then backfilling with clean soils.
- During August of 2000, an initial assessment was conducted to define the extent of hydrocarbon impact on soil and shallow groundwater resulting from the crude oil spill. Five groundwater monitoring wells were installed in and around the former spill area and numbered MW-1 through MW-5 (Figure 1). Laboratory analyses of groundwater samples collected from monitoring wells MW1, MW-3, and MW-4 indicated no detectable levels of benzene, toluene, ethyl benzene, or xylenes (BTEX) as

summarized in Appendix A. Laboratory analysis of a groundwater sample from MW-2 indicate a trace of total xylenes (Appendix A).

- During sampling and testing of groundwater at the site in February 2001, Phase separated hydrocarbons (PSH) were measured in groundwater monitoring well MW-5 at a thickness of 1.18 feet.
- As a result of the February sampling event, a hydrocarbon product recovery system was installed in February 2001 to remove the PSH on the groundwater. The product recovery system has not performed in accordance to the manufacturers specifications to date. AMEC is aggressively working with the product recovery system manufacturer to resolve this issue within the next several months.
- In September 2001 BMG requested that AMEC conduct a limited subsurface investigation and recommend a remedial strategy for this area. The scope of work for this investigation includes:
- Drill soil borings and collect soil samples to delineate the area of hydrocarbon impact,
- Install groundwater monitoring wells,
- Collect groundwater samples from each monitoring well following well completion and development according to New Mexico Oil Conservation Division (NMOCD) guidelines,
- Develop the recommended remedial strategy,
- Prepare a summary report.

2.0 METHODS OF INVESTIGATION

2.1 Borehole Drilling and Sampling

On September 20th and 21st, 2001, AMEC's field geologist, Don Fernald conducted subsurface field sampling activities at the site. Subsurface soil samples were collected using a CME-75 truck mounted drill rig equipped with a 6.25-inch (inside diameter) hollow stem auger. The borings were sampled at random depths using an 18-inch long, 1.5-inch diameter split-spoon sampling device. Mr. Pat Sanchez with BMG was present during the drilling activities and assisted AMEC in determining the locations for the soil borings . A total of seven soil borings (SB-11 through SB-17) were advanced in areas to the south and east of monitoring well MW-5 as shown on Figure 1. A description of the subsurface exploration and soil sample descriptions is included in Appendix B.

Soil samples were screened in the field using a photoionization detector (PID) using headspace methodologies at five-foot intervals or at continuous intervals, as determined by the field geologist, to determine the presence of volatile hydrocarbons. Soil samples were placed into a plastic Ziplock™ bag and placed in the sun for a period of approximately 10-minutes or more to allow for volatilization of hydrocarbons. All borings were terminated at depths of 20 feet bgs or less. Select soil samples were obtained from the borings and placed into 4-ounce sampling jars, labeled, documented on chain-of-custody (COC) forms, placed on ice and shipped to Pinnacle Laboratories in Albuquerque, New Mexico. Soil samples submitted for analyses were analyzed according to US EPA Method Modified 8015 and 8021, which includes Total Petroleum Hydrocarbons (TPH) and BTEX, respectively. Of the seven soil borings three, SB-13, SB-16 and SB-17, were converted to groundwater monitoring wells and numbered MW-6, MW-7 and MW-8, respectively.

Drilling and sampling equipment was decontaminated prior to use and between each sampling event by cleaning with Alconox™ soap and rinsing with potable water

2.2 Monitoring Well Installation

Soil borings were advanced using the methods previously described in Section 2.1 for obtaining soil samples . The borings were advanced beyond the shallow groundwater depth, which ranged from approximately 12 to 14 feet bgs. The monitoring wells were screened at depths ranging between 10 and 20 feet bgs. Details of well construction are provided on the *Well Installation Records* included in Appendix C. Detailed lithologic information was recorded on *Record of Subsurface Exploration* forms also included in Appendix B.

2.3 Monitoring Well Development and Sampling

Monitoring wells, MW-1 through MW-8 were developed by raising and dropping a polyethylene bailer inside the well to surge water back and forth through the screen. A minimum of three well casing volumes of water were removed and groundwater samples were collected when the temperature, pH, and conductivity of the water being bailed from the wells stabilized.

Groundwater samples were collected to determine if groundwater had been impacted by the crude oil spill. In addition to evaluating the groundwater for hydrocarbon impacts, groundwater testing also provides an assessment of the conditions conducive to natural attenuation of the hydrocarbons in groundwater.

Each groundwater monitoring well was first purged of a minimum of three well-casing volumes of groundwater using a 2-inch diameter polyethylene bailer. A YSI Model 600XL water quality meter was used to collect intrinsic remediation (IR) parameters in each monitoring well. These IR parameters included dissolved oxygen (DO), pH, temperature, and conductivity.

On September 25, 2001, monitoring wells MW-1, MW-3, MW-4, MW-6, MW-7 and MW-8 were sampled. Monitoring wells MW-2, MW-6 and MW-7 were sampled on October 5, 2001. Monitoring well, MW-5 was not sampled due to the presence of PSH on the groundwater surface. Prior to sampling, water level measurements were collected from the monitoring wells.

Interpretation of the groundwater elevation map, Figure 3, shows a groundwater divide across the site with a hydraulic gradient to the south and southeast. The Ojito Canyon influences the direction of groundwater flow and gradient as it slopes in a south-southeast direction.

3.0 RESULTS

3.1 Site Lithology

The soil in the area of the site consists of brown to red silty sand and silty clay. Areas that have been previously excavated for remediation have been backfilled with fine silty sand. Thin layers of tight clays were encountered periodically. A few thin layers or "stringers" of sand with pebbles were encountered in the associated shallow groundwater. A complete log of the shallow, subsurface exploration is included in Appendix B. A site map showing locations of the boreholes and monitoring wells is presented in Figure 1.

3.2 Soil Sampling Results

Hydrocarbons were detected in soil borings SB-11, SB-14, SB-15 and SB-16 using field screening procedures with the PID . There did not appear to be significant levels of hydrocarbons in the other soil borings examined during this evaluation. PID headspace readings are recorded on the Record of Subsurface Exploration forms included in Appendix B. Results of the laboratory analyses of the soil samples collected from SB-15 indicate the presence of hydrocarbon-impacted soil. The laboratory analytical reports and quality assurance and quality control data are included in Appendix D and summarized in Table 1. The field data and laboratory analyses indicate that hydrocarbon impacts were discovered in and around soil borings SB-11, SB-14, SB-15 and SB-16. Soil boring locations are depicted in Figure 2.

TABLE 1 – SOIL SAMPLING RESULTS FOR BTEX AND TPH

Location / Depth	C6 – C10 Range Mg/kg	C10 – C22 Range Mg/kg	C23 – 36 Range Mg/kg	BTEX Mg/kg
SB-11 / 12-14'	< 10	< 10	< 10	< 0.025
SB-12 / 12-14'	< 10	< 10	< 10	< 0.025
SB-13 / 12-14'	< 10	< 10	< 10	< 0.031
SB-14 / 14-16'	< 10	< 10	< 10	< 0.045
SB-15 / 12-14'	19	84	30	< 0.069
SB-17 / 10-12'	< 10	< 10	< 10	< 0.025

3.3 Site Hydrogeology

On October 5, 2001 the depth to groundwater in monitoring well MW-1 through MW-8 was measured and recorded with an oil/water interface probe. Relative water table elevations measured are shown in Table 3. PSH were measured in monitoring well MW-5 at a thickness of 0.48 feet and was not used in calculating the groundwater elevation map.

TABLE 2 - RELATIVE GROUNDWATER LEVEL INFORMATION – OCTOBER 2001			
Monitoring Well	**Relative Top of Casing Elevation**	**Groundwater Depth from Top of Casing**	**Relative Groundwater Depth**
MW-1	2.84	16.15	18.99
MW-2	3.24	15.94	19.18
MW-3*	-	17.01	-
MW-4	3.94	15.14	19.08
MW-5*	-	16.74	-
MW-6	7.00	15.81	22.81
MW-7	5.38	16.00	21.38
MW-8	7.18	14.06	21.24

* - The relative measurement of the casing elevation was not performed due to an obscured view by the shed for MW-5 and trees for MW-3.

The relative depth to groundwater was used to determine groundwater gradient at the site. A groundwater gradient map is depicted in Figure 2.

Lithologies in all of the soil borings were similar, therefore, it is assumed that all of the wells are hydraulically connected. The various clay and sand layers most likely will cause variations in vertical and horizontal hydraulic conductivity.

The direction of groundwater flow in the shallow saturated zone is toward the east.

3.4 Groundwater Quality

Groundwater samples were obtained from monitoring wells MW-1, MW-2, MW-3, MW-4, MW-6, MW-7 and MW-8. Groundwater samples were not obtained from monitoring well MW-5 due to the presence of PSH on the groundwater. Each ground-water sample was analyzed for BTEX using EPA Method 8021 and TPH using EPA Method 8015.

TABLE 3 SEPTEMBER – OCTOBER 2001 GROUNDWATER SAMPLING RESULTS FOR BTEX & TPH				
Monitoring Well	Benzene µg/L	Toluene µg/L	Ethybenzene µg/L	Total Xylenes µg/L
MW-1	< 0.5	< 0.5	< 0.5	< 0.5
MW-2*	< 0.5	< 0.5	< 0.5	< 0.5
MW-3	< 0.5	< 0.5	< 0.5	< 0.5
MW-4	< 0.5	< 0.5	< 0.5	< 0.5
MW-6	69	< 0.5	23	41
MW-7	350	47	87	310
MW-8	< 0.5	< 0.5	< 0.5	< 0.5
NMED - WQCC Standard	10	750	750	620

* The laboratory did not receive the groundwater sample obtained from monitoring well MW-2 at the required temperature of less than 4 degrees Celsius.

Groundwater samples obtained from MW-6 and MW-7 exceed the New Mexico Environment Department, Water Quality Control Commission (NMED – WQCC) standards of 10 micrograms per liter (µg/L) of Benzene in groundwater. Concentrations of all other parameters were below the NMED – WQCC Standards.

TPH analyses of the groundwater did not reveal concentrations above detectable levels in all of the monitoring wells with the exception to MW-7 which had a total TPH value of 3.9 parts per million (ppm).

To assess whether remediation by natural attenuation (RNA) is occurring at the site, ground-water samples from monitoring wells MW-6 and MW-7 were also analyzed for natural attenuation parameters. These parameters included nitrate, sulfate as SO_4, ammonia, total dissolved solids (TDS), dissolved Iron and manganese. Additionally, field testing of monitoring wells MW-2, MW-6 and MW-7 were performed to determine levels of dissolved oxygen, conductivity, reduced oxygen potential to determine a baseline for monitoring natural attenuation factors of the groundwater.

TABLE 4 – OCTOBER 2001 GROUNDWATER SAMPLING RESULTS FOR RNA FACTORS

Monitoring Well	*Conductivity Mmhos/cm	*Dissolved Oxygen mg/L	*Reduced Oxygen Potential	Sulfate as SO_4 mg/L
MW-2	.463	6.44	226.7	Not Tested
MW-6	.544	3.29	213.9	13
MW-7	.547	3.10	-65.9	8.6
Monitoring Well	**Nitrate mg/L**	**Ammonia as N mg/L**	**TDS mg./L**	**Dissolved Iron mg/L**
MW-2	Not Tested	Not Tested	Not Tested	Not Tested
MW-6	0.10	< 0.5	480	< 0.10
MW-7	<0.10	< 0.5	460	< 0.10

*Field Test – Field tests shown above are for tests performed after development of the monitoring wells.

4.0 GROUNDWATER REMEDIATION & PRODUCT RECOVERY

4.1 Natural Attenuation Indicator Parameters

The purpose of collecting natural attenuation parameters is to assess whether RNA, particularly intrinsic biodegradation, is occurring within the groundwater beneath the subject site. Natural attenuation may result from destructive or nondestructive processes. Destructive processes include biodegradation (the primary destructive process for fuel hydrocarbons), abiotic oxidation, and hydrolysis. Nondestructive attenuation processes include dilution, sorption, dispersion, and volatilization. Intrinsic biodegradation is the degradation of contaminants by indigenous microorganisms under prevailing site conditions. For biodegradation to occur, bacteria must be able to biodegrade the particular contaminants present, required organic and inorganic nutrients must be available, and the physical and chemical conditions of the site must be suitable. Bacteria use the carbon source of contaminants for energy and cell production by catalyzing the transfer of electrons from an electron donor (the contaminant) to an electron acceptor such as oxygen, or in the absence of oxygen, to nitrate, ferric iron, sulfate, and carbon dioxide (Kelley et al. 1996).

Most fuel hydrocarbons are susceptible to biodegradation because they can be used as electron donors for energy and as a source of carbon for cell reproduction. Electron acceptors are used preferentially, beginning with oxygen and ending with carbon dioxide. If oxygen is available, it will be used before nitrate, which will be used before iron, sulfate, and carbon dioxide. Typically, the outer edges of a plume are aerobic (oxygen consuming) and the center of the plume is anaerobic (depleted of oxygen). Under anaerobic conditions, methane is generated as a by-product, and methane concentrations are generally observed to be inversely related to dissolved oxygen concentrations where biodegradation is occurring.

The natural attenuation indicator parameter results suggest that several intrinsic biodegredation processes are occurring in groundwater in the vicinity of the spill location. These processes include aerobic respiration, denitrification, and sulfanogenesis. A depletion of dissolved oxygen, nitrogen, and sulfate in the center of the plume suggests that these compounds are being used as electron acceptors and that fuel hydrocarbons are being consumed by the microorganisms under both aerobic and anaerobic conditions. The following figures and discussion appear to demonstrate these conditions.

Table 4 shows the results of RNA indicator parameters including dissolved oxygen, nitrate, sulfate, and ferrous iron. The results shown for dissolved oxygen were recorded by placing the probe down the monitoring wells prior to and during purging by hand bailing methods. The Hanna Water meter was utilized to collect DO measurements in the field. Sulfate and nitrate results are from groundwater samples analyzed by Pinnacle Laboratories. Other water parameters including pH, specific conductivity and

temperature were recorded in a ground water sampling log and are presented in Appendix D.

Dissolved Oxygen

The results in Table 4 show that DO concentrations are lowest in groundwater sampled from monitoring well MW-7, which is near MW-5 which has PSH. Conversely, higher DO concentrations were observed in monitoring wells located in the cross-gradient direction (MW-2), and in monitoring wells located farther in the down-gradient direction (MW-6). Low concentrations of DO observed in the center of the plume suggest oxygen is being consumed and that aerobic biodegradation is occurring.

Nitrate

Results in Table 4 shows that the lowest concentrations of nitrate occur in the monitoring wells located within the impacted area of MW-7. Slightly higher concentrations of nitrate were observed in the down gradient well (MW-6), which also had low levels of benzene. A depletion of nitrate is expected in impacted areas when anaerobic biodegradation processes are active because nitrate is used as an electron acceptor.

Sulfate

As with nitrate, the depletion of sulfate within the impacted area suggests that sulfate is utilized as an electron acceptor. Reported results in Table 4 show that the lowest sulfate concentrations occur in MW-7, is located within and downgradient of the impacted area whereas, higher levels of sulfate are reported in the down-gradient well MW-6.

Temperature

The measured groundwater temperatures ranged from approximately 10°C to 15°C. These temperatures are favorable to support natural attenuation. Groundwater temperature affects the metabolic activity of bacteria. Rates of hydrocarbon biodegradation roughly double for every 10°C increase in temperature over the range of 5°C and 25°C (Wiedemeier et al. 1995).

4.2 Product Recovery System Progress

A PSH recovery program was initiated in February 2001 for MW-5. PSH was attempted using a two-inch, Xitech Remote Passive skimmer. The Xitech skimmer was on a timer and set to go on every three days for a period of one hour. The system did not appear to be working properly; therefore AMEC removed the recovery system and sent it to the manufacturer for troubleshooting and replacement of the hydrophobic filter.

Mr. Robert Thompson with AMEC mobilized to the site on November 15, 2001 to re-install the product recovery system with Xitech representative, Mr. Don Brock. The

system was tested at this time and still found to be ineffective. Xitech indicated that they would like to return to the site the following week with their lead engineer, Mr. Dwight Patterson, to troubleshoot the system.

On November 19, 2001, Mr. Robert Thompson with AMEC, Mr. Don Brock and Mr. Dwight Patterson with Xitech mobilized to the site to determine the problems with the product recovery system. The recovery system was inspected and appeared to be in good condition. The system was forced down into the water column of monitoring well, MW-5, actuated and found to be working. Upon further inspection of the product recovery system, Mr. Dwight Patterson indicated that the tubing on the recovery system used to recover product and adjust the height of the recovery system with varying water and product levels did not appear to be working properly. Mr. Patterson indicated that they are currently using a smaller diameter; more flexible tubing that adjusts more readily to varying water and product levels in wells. Additionally, the tubing appeared to be sticking to the inside casing of the well and not allowing the float to travel freely within the screened interval of the pump. AMEC is planning to return to the site the week of November 26th, 2001 to replace the tubing and test the effectiveness of the product recovery system.

The system will be tested at the time of installation and monitored for effectiveness. Alternative means of product recovery will be considered, such as bailing product manually, if the recovery system is not working upon re-installation.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on analytical results of the soil and groundwater samples collected from current and past sampling events, the following conclusions are presented:

- Laboratory analyses of groundwater samples collected from monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-8 has not been impacted by the crude oil spill. Groundwater sampled and tested in monitoring wells MW-5, MW-6 and MW-7 has been impacted by the crude oil spill. PSH are located in monitoring well MW-5.
- During the excavation of the crude oil spill, it is assumed that most of the visible crude oil was removed. However, it is possible that residual crude oil continue to impact the groundwater in areas on the eastern portion of the spill site due to the low levels of benzene detected in groundwater in monitoring well MW-6.
- The site is in a remote mountain valley and appears to be several miles from the nearest water well, as determined by review of the State Engineers Office records. Adverse effects to human health from hydrocarbon-impacted water appear to be low. Impacts appear to be localized to the area of the spill.
- Groundwater at the site appears to be flowing in an easterly direction as determined by groundwater levels obtained during October 2001.
- Field and analytical testing of groundwater appears to indicate that RNA is occurring at the site due to low levels of dissolved oxygen in monitoring wells MW-7 and MW-6 with higher levels in the areas that do not appear to be impacted, such as monitoring well MW-2.
- The remote hydrocarbon product recovery system has not been working to the standards and efficiency as specified by the manufacturer. AMEC is working aggressively with the manufacturer of the system to resolve this problem and will monitor the effectiveness of the system upon repairs and reinstallation.

AMEC recommends the remedial strategy for the site:

- AMEC recommends proper closure and abandonment of monitoring wells MW-1, MW-2, MW-3, MW-4. The groundwater analytical results do not indicate that these wells have been impacted by hydrocarbons. These wells are located up gradient of the spill site and do not appear to be of value for monitoring groundwater quality.
- AMEC recommends use of an alternative product recovery system for monitoring well MW-5 should the Xitech system not work to the standards specified. Alternative product recovery may include installation of hydrophobic hydrocarbon absorbent "socks" that can be removed and replaced periodically, or, regular hand bailing of the well to remove PSH.
- AMEC recommends annual groundwater samples be collected and tested from groundwater monitoring wells MW-6, MW-7 and MW-8 for hydrocarbon constituents and RNA factors.
- AMEC recommends annual groundwater samples be collected from MW-5 following

the removal of product. AMEC recommends the addition of an Oxygen Release Compound (ORC®) or similar product to monitoring wells MW-6 and MW-7 to enhance RNA factors and promote biodegradation of the hydrocarbons. Once free-phase hydrocarbons have been removed from monitoring well MW-5, an ORC® or similar product may be introduced to expedite RNA.

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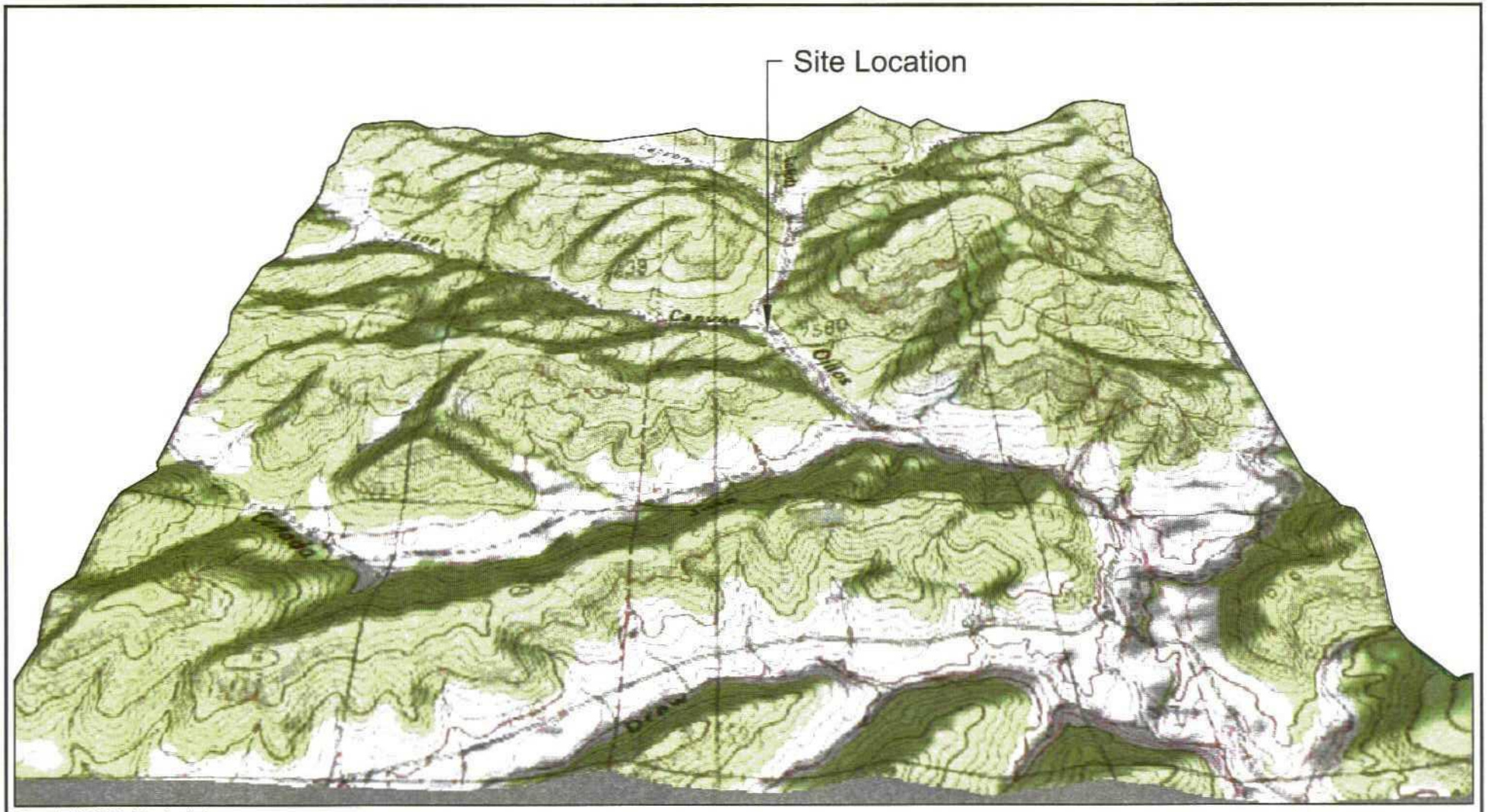

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Benson-Montin Greer Drilling Corp.
Canada Ojito (0-9) Line Leak Spill Site
Santa Fe National Forest
Rio Arriba County, New Mexico

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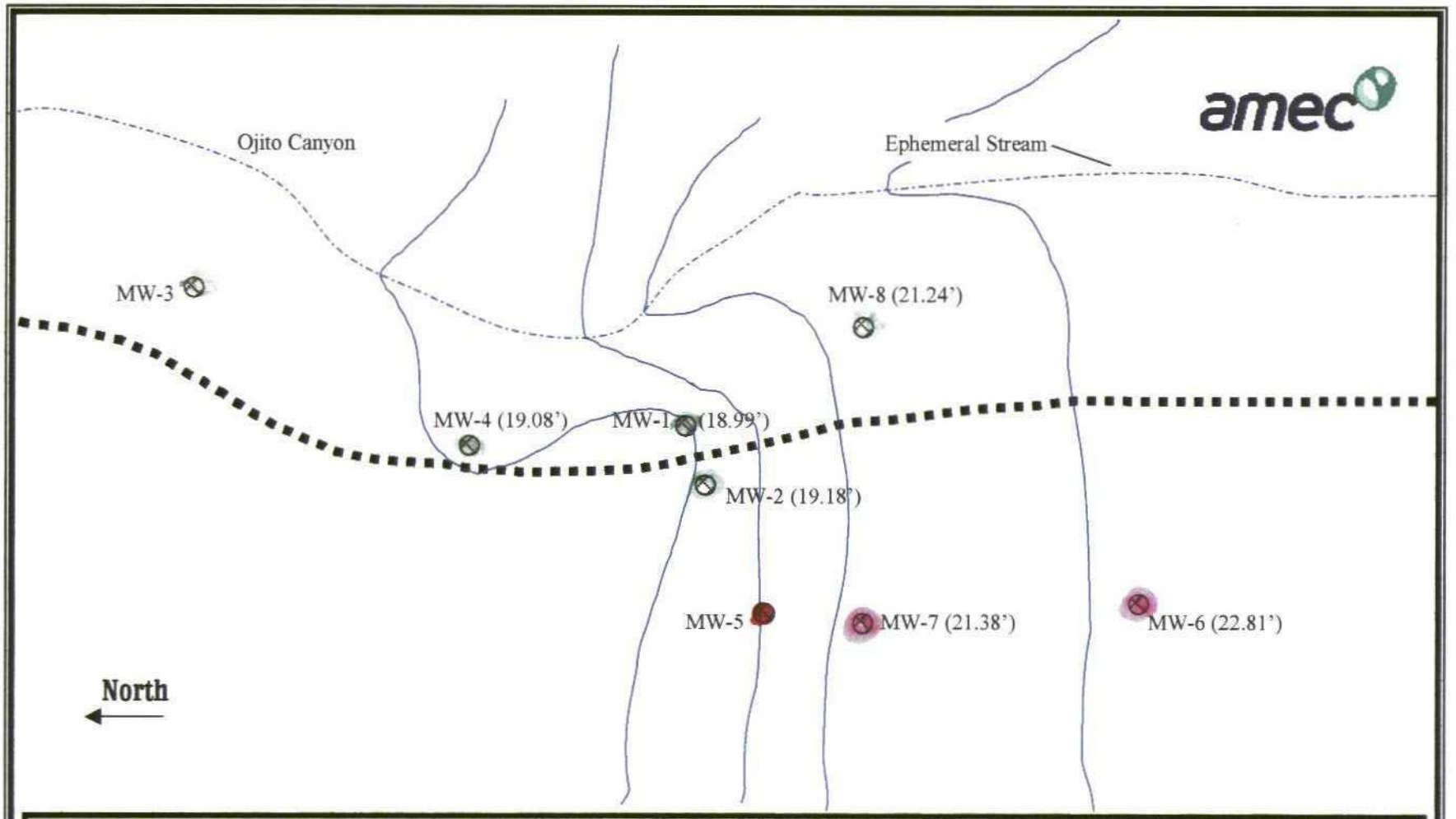
Site Location Map

Figure No.

Date Drawn: 20 November 2001 | Drawn By: RJT | Checked By: DF



BENSON-MONTIN-GREER DRILLING CORPORATION

Groundwater Gradient Map
Ojito Canyon (O-9) Line Leak Location
Santa Fe National Forest
Rio Arriba County, New Mexico

Figure 2
Drawing is not to scale
Project 1517000082
November 27, 2001

amec

Record of Subsurface Exploration

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Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

Borehole # SB-11
Well #
Page 1 of 1

Project Name 0-9
Project Number 151700082 Phase
Project Location Ojito Canyon - Rio Arriba Co

Elevation ~ 7,500'
Borehole Location
GWL Depth ~ 14' bgs
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/20/01 - 10:15 AM.
Date/Time Completed 9/20/01 -

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Ray Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~NDU~~ ~~Benzene~~ ~~H2S~~		Drilling Conditions & Blow Counts
0							
5		27"	26"	Moderate reddish-brown fine, silty, sand. Moderate Moisture	9.2		
10		27"	20"	Moderate to dark reddish brown fine to coarser silty sand. Grey SS @ ~ 11' - slight HC. odors	738		
	X	27"	21"	Pale yellow-brown moist sand (H_2O) layer @ ~ 13' - red-brown clay below	10.3		
15		27"	12"	Moderate to dark reddish brown silty clay (moist)	11.8		
20				Boring terminated @ 16' bgs			
25				Backfilled hole w/ 1-50# 3/8" holeplug. Quenched w/ H_2O Backfilled remainder of boring w/ cuttings			
30							
35							
40							

Comments:

Geologist Signature

3/17/01\Drillog

amec

Record of Subsurface Exploration

AMEC Earth & Environmental
2060 Afton Place
Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

Borehole # SB-12
Well #
Page 1 of 1

Project Name O-9
Project Number 151700082 Phase
Project Location Ojito Canyon

Elevation ~7,500'
Borehole Location
GWL Depth ~15' bgs
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/20/01 - 11:15
Date/Time Completed

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Pat Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~NBU~~ Benzene ~~H2S~~		Drilling Conditions & Blow Counts
0				Initiated sampling @ 5' bgs			
5		27"	25"	Moderate reddish-brown fine silty sand (fill).	3.8		
10		27"	14"	Moderate reddish-brown fine to med. silty sand. Moderate moisture.	2.3		
	X	27"	~23"	~ reddish-brown fine-med sand (H2O) @ ~13'. Clay red-brown w/ light-olive-grey mottles.	3.4		
15		27"	17"	Clay layer (tight/moist) @ 15-17' bgs. Moderate reddish brown w/ light olive-grey mottles.	2.8		
20				Boring terminated @ 17' bgs. 1 bag hole plug. Quenched w/ H2O Backfill w/ cuttings.			
25							
30							
35							
40							

Comments:

Geologist Signature

amec

Record of Subsurface Exploration

AMEC Earth & Environmental
2060 Afton Place
Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

Borehole # SB-13
Well # MW-6
Page 1 of 1

Project Name BMG O-9
Project Number 151700082 Phase —
Project Location O'9 to Canyon

Elevation ~7,500'
Borehole Location —
GWL Depth ~12' bgs
Logged By Don Fermald
Drilled By Kelly Padilla
Date/Time Started 9/20/01 - 12:10
Date/Time Completed 9/20/01 - 1:00

Well Logged By Don Fermald
Personnel On-Site
Contractors On-Site Enviotech
Client Personnel On-Site BMG Pat Sanchez

Drilling Method HSA - 6¼" - ID 9" OD
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	Air Monitoring Units: NDU Benzene	H2S	Drilling Conditions & Blow Counts
0				Sampling initiated @ 5' bgs			
5		27"	19"	Moderate reddish-brown fine silty sand (fill)	3.4		
10		27"	24"	Moderate reddish-brown fine silty, sandy moist clay - water @ ~11.5' bgs where fine to med. sand is prevalent.	3.8		
		27"	16"	dark reddish-brown silty sand and gravel (very wet)	3.1		
15	X	27"	21"	dark red-brown silty clay grading to black or black w/mottles. no HC odors - very wet	3.2		
20				Boring advanced to 20' bgs & converted into MW-6. 15' of .010 screen, 4.5" end cap. Total depth 19'9" Sand 10-20 to 2' bgs 3/8" bentonite holeplug to 6" bgs. Well complete @ 2:10 Used 12 bags 10-20 50# sand.			
25							
30							
35							
40							

Comments:

Geologist Signature Don Fermald

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Record of Subsurface Exploration

AMEC Earth & Environmental
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Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

Borehole # SB-14
Well #
Page 1 of 1

Project Name BMG O-9
Project Number 157000082 Phase
Project Location Ojito - Canyon

Elevation ~7500'
Borehole Location
GWL Depth ~15'
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/20/01 - 2:20
Date/Time Completed 9/20/01 - 3:10

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Pat Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~NDU~~ ~~Benzene H2S~~	Drilling Conditions & Blow Counts
0				Sampling initiated @ 10' bgs		
5						
10		27"	22"	Moderate reddish-brown fine silty sand to 11.5' From 11.5-12' bgs is a pale yellowish brown sand. slight HC odors.	52.3	
		27"	6"			
15	X	27"	18"	pale yellowish-brown moist silty sand. medium grained	11.5	
		27"	15"	Reddish-brown silty sand fine to med. grained (very wet)	17.0	
20				Reddish-brown clay - tight, fairly dry.	72.4	
25				Terminated boring @ 18' bgs.		
30				Backfilled - 1 bag 50# 3/8" bentonite & cuttings		
35						
40						

Comments:

Geologist Signature

2532

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Record of Subsurface Exploration

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Farmington, New Mexico 87401
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Borehole # SB-15
Well #
Page 1 of 1

Project Name BMG O-9
Project Number 151700008.2 Phase
Project Location Ojito Canyon

Elevation ~ 7,500'
Borehole Location
GWL Depth ~ 13'
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/20/01 - 3:25
Date/Time Completed 9/20/01 -

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Pat Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~MDU~~ ~~Benzene~~ ~~H2S~~	Drilling Conditions & Blow Counts
0						
5						
10		27"	22"	fine Reddish brown silty sand fill to 11" Reddish brown silty sand courser w/gravel	1,467	
15	X	27"	16"	HC odors. Reddish brown silty med-fine grained - water @ ~13'. HC ODORS	64.5	
20				Terminated boring @ 20' bgs		
25						
30						
35						
40						

Comments:

Geologist Signature

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Record of Subsurface Exploration

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Borehole # SB-16
Well # MW-7
Page 1 of 1

Project Name BMG - 0.9
Project Number 157000082 Phase
Project Location Ojito Canyon

Elevation ~ 7,500'
Borehole Location
GWL Depth ~ 15'
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/21/01 - 1010
Date/Time Completed 9/21/01 - 1130

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Pat Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~NDU~~ Benzene ~~H2S~~	Drilling Conditions & Blow Counts
0				Initiated sampling @ 5' bgs		
5		27"	24"	Moderate reddish-brown fine silty sand. (Fill)	0.8	
10		27"	20"	Moderate reddish-brown silty fine to medium grained sand w/pebbles & larger quartzite	7.2	
		27"	8"	Moderate reddish-brown, grading to a pale yellow-brown silty med grained sand w/quartzite, slight HC odors? Moist	3.3	
15				Dark brown to black silty medium grained sand, HC ODORS Water @ ~ 15'	147	
20				Boring terminated @ 20' bgs Converted to MW-7		
25				MW-7 set ~ 19' bgs screen 19.9' bgs - 10' 10-20 Sand 19.7' bgs 3/8" hole plug 7.5' bgs Grout "quikgel" 0-5' bgs		
30				1230		
35						
40						

Comments:

Geologist Signature

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Record of Subsurface Exploration

AMEC Earth & Environmental
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Farmington, New Mexico 87401
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Borehole # SB-17
Well # MW-8
Page 1 of 1

Project Name BMG O-9
Project Number 51700082 Phase —
Project Location Ojito Canyon

Elevation ~7,500'
Borehole Location SE of MW-8
GWL Depth ~19'?
Logged By Don Fernald
Drilled By Kelly Padilla
Date/Time Started 9/21/01 - 1:20
Date/Time Completed 9/21/01 - 2:20

Well Logged By Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG Pat Sanchez

Drilling Method HSA
Air Monitoring Method PID

Depth (Feet)		Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	PID Air Monitoring Units: ~~NDU~~ Benzene ~~H2S~~		Drilling Conditions & Blow Counts
0							
5		27"	22"	Moderate reddish-brown silty-sand	0.0		
10		27"	23"	Dark reddish-brown moist clay. Some black organic matter present.	0.0		
		27"	24"	" w/rust red " "	0.0		
15		27"	25"	" mottles " "	0.0		
		27"	24"	" very moist Some sand @ 17' " "	0.0		
20		27"	27"	" (Water @ ~19'?) silty sand			
25				band @ 19' - water Terminated boring @ 20' bgs to convert to MW-8. 10'-screen 20-10' bgs Sch 40 4" PVC 10-20 Sand 20-8' bgs bentonite 8-6' bgs Quick gel grout 6'-0' bgs.			
30							
35							
40							

Comments:

Geologist Signature

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MONITORING WELL INSTALLATION RECORD

Borehole # SB-13
Well # MW-6
Page 1 of 1

AMEC Earth & Environmental
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Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

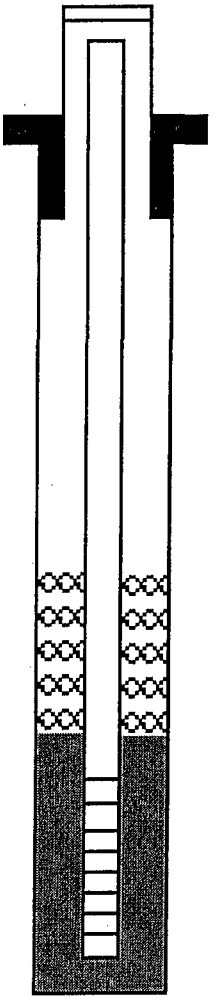
Project Name BMG O-9
Project Number 151700082 Cost Code —
Project Location Ojito Canyon

Elevation ~7,500'
Well Location S of MW-5
GWL Depth ~12' bgs
Installed By Kelly Padilla - Envirotech

Date/Time Started 9/20/01 1:00
Date/Time Completed 9/20/01 1:50

On-Site Geologist Dan Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site Pat Sanchez - BMG

Depths in Reference to Ground Surface		
Item	Material	Depth (feet)
Top of Protective Casing	Locking	+2'4"
Bottom of Protective Casing	steel protector	-6"
Top of Permanent Borehole Casing	sch 40 pvc	+2'
Bottom of Permanent Borehole Casing	4" sch 40 PVC	-20'
Top of Concrete		+6"
Bottom of Concrete		-6"
Top of Grout	—	—
Bottom of Grout	—	~~-6"~~
Top of Well Riser	4" sch 40 pvc	-2'
Bottom of Well Riser	4" sch 40 pvc	-5'
Top of Well Screen	4" sch 40 pvc	-5'
Bottom of Well Screen	.010 screen	-20'
Top of Peltonite Seal	3/8" bentonite hydrog	-6"
Bottom of Peltonite Seal	3/8" bentonite hydrog	-2'
Top of Gravel Pack	10-20 Sand	-2'
Bottom of Gravel Pack	10-20 Sand	-20'
Top of Natural Cave-In	—	—
Bottom of Natural Cave-In	—	—
Top of Groundwater	—	~12'
Total Depth of Borehole	—	-20'



Top of Protective Casing ~2'4"
Top of Riser ~2'
Ground Surface 0
Top of Seal —
Top of Gravel Pack —
Top of Screen 5'
Bottom of Screen 20'
Bottom of Borehole 20'

Comments: —

Geologist Signature

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MONITORING WELL INSTALLATION RECORD

Borehole # SB-16
Well # MW-7
Page 1 of 1

AMEC Earth & Environmental
2060 Afton Place
Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

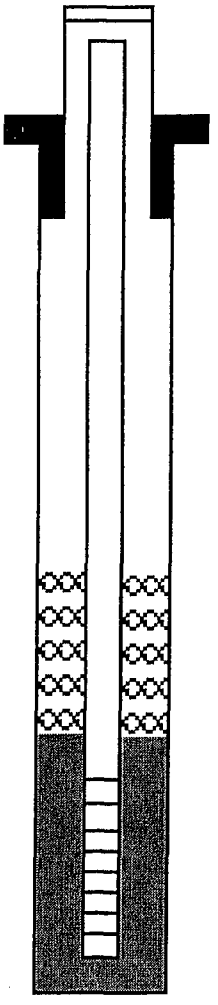
Project Name BMG O-9
Project Number 151700008.2 Cost Code —
Project Location Ojito Canyon

Elevation ~7,500'
Well Location S. of MW-5 (~10')
GWL Depth ~15'
Installed By Cellx Padilla

On-Site Geologist Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BMG - Pat Sanchez

Date/Time Started 9/21/01 11:30
Date/Time Completed 9/21/01 1:15

Depths in Reference to Ground Surface		
Item	Material	Depth (feet)
Top of Protective Casing	Locking steel protector	+2'4"
Bottom of Protective Casing		-6"
Top of Permanent Borehole Casing	4" sch 40 pvc	+2'
Bottom of Permanent Borehole Casing	"	-19'9"
Top of Concrete		+6"
Bottom of Concrete		0"
Top of Grout		0"
Bottom of Grout	Quickgel	-5"
Top of Well Riser	4" sch 40 pvc	+2'
Bottom of Well Riser	"	-9'9"
Top of Well Screen	4" sch 40 pvc	-9'9"
Bottom of Well Screen	0.010 screen	-19'9"
Top of Peltonite Seal	3/8" bentonite	-5'
Bottom of Peltonite Seal	hole plug	-7'
Top of Gravel Pack	10-20 silica sand	-7'
Bottom of Gravel Pack	"	-19'9"
Top of Natural Cave-In	—	—
Bottom of Natural Cave-In	—	-19'9"
Top of Groundwater	—	~15'
Total Depth of Borehole	—	-20



Top of Protective Casing ~2'4"
Top of Riser ~2'
Ground Surface 0
Top of Seal -5'
Top of Gravel Pack -7'
Top of Screen -9'9"
Bottom of Screen -19'9"
Bottom of Borehole -20'

Comments:

Geologist Signature

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MONITORING WELL INSTALLATION RECORD

Borehole # SB-17
Well # MW-8
Page 1 of 1

AMEC Earth & Environmental
2060 Afton Place
Farmington, New Mexico 87401
(505) 327-7928 Fax (505) 326-5721

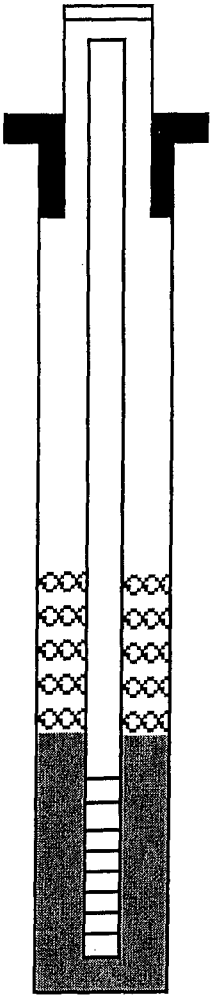
Project Name BMG 0-9
Project Number 151700000382 Cost Code —
Project Location Ojito Canyon

Elevation ~7,500
Well Location SE of MW-8
GWL Depth ~15-19' ?
Installed By Kelly Padilla

On-Site Geologist Don Fernald
Personnel On-Site
Contractors On-Site Envirotech
Client Personnel On-Site BLM - Pat Sanchez

Date/Time Started 9/21/01 3:30
Date/Time Completed 9/21/01 4:40

Depths in Reference to Ground Surface		
Item	Material	Depth (feet)
Top of Protective Casing	Locking Steel protector	+2'4"
Bottom of Protective Casing		-6"
Top of Permanent Borehole Casing	4" sch 40 pvc	+2'
Bottom of Permanent Borehole Casing	"	20'
Top of Concrete		+6"
Bottom of Concrete		0'
Top of Grout	quick gel	0'
Bottom of Grout	"	-6'
Top of Well Riser	4" sch 40 pvc	+2'
Bottom of Well Riser	"	-10'
Top of Well Screen	4" sch 40 pvc	-10'
Bottom of Well Screen	0.010 screen	-20'
Top of Peltonite Seal	3/8" bentonite	-6'
Bottom of Peltonite Seal	"	-8'
Top of Gravel Pack	10-20 silica sand	-8'
Bottom of Gravel Pack	"	-20'
Top of Natural Cave-In	—	—
Bottom of Natural Cave-In	—	—
Top of Groundwater	—	~15-19'?
Total Depth of Borehole	—	-20'



Top of Protective Casing +2'4"
Top of Riser +2'
Ground Surface 0'
Top of Seal -6'
Top of Gravel Pack -8'
Top of Screen -10'
Bottom of Screen -20'
Bottom of Borehole -20

Comments: _____

Geologist Signature _____

WELL OBSERVATION DATA

amec

Project Name: BMG O-9 LINE

Project No.: 1517000082

Project Mngr: DON FERNALD

Cost Code: /

Client Co.: BENSON-MONTIN-GREER

Date: 10/5/01

Site Name: O-9 LINE

Well or Piezometer	Time	Reason Not Measured	Depth to Floating Product (Feet)	Depth to Water (Feet)	Depth to Sinking Product (Feet)	Total Well Depth (Feet)	Floating Product Thickness	Sinking Product Thickness	Comments
MW-5	1034		16.26'	16.74'		22.90'	0.48'		
MW-3	1040		—	17.01'		28.14'	—		
MW-4	1048		—	15.14'		17.12'	—		
MW-1	1051		—	16.15'		24.78'	—		
MW-8	1055		—	14.06'		22.68'	—		
MW-6	1101		—	15.81'		23.41'	—		
MW-2	1105		—	15.94'		22.10'	—		
MW-7	1108		—	16.00'		21.82'	—		

Reason Not Measured: D = Dry; O = Obstructed; N = Not Accessible

Comments:

Signature: [signature]

Date: 10/5/01

☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW-1

Page 1 of 1

Project Name BMG O-9 Project Manager Dan Fernald Project No. 1517000082

Client Company BMG

Site Name O-9 Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 24.78'
Initial Depth to Water (feet) 16.15'
Height of Water Column in Well (feet) 8.63'
Diameter (inches): Well 2" Gravel Pack 6.25"

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	see below		
Gravel Pack			
Drilling Fluids			
Total			

Instruments

	Serial No. (If applicable)
☑ pH Meter	
☐ DO Monitor	
☑ Conductivity Meter	
☑ Temperature Meter	
☐ Other	

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
9/25/01	10:40		✓				0+	0+			12.4	6.81	476		Clear
↓	10:50						2.5	2.5			11.0	7.28	470		red-brown
↓	10:56						2.5	5.0			10.3	7.39	482		"
↓	11:06		✓				2.5	7.5			10.4	7.5	489		"

Comments Nearly bailed dry to 12" in bailer

Developer's Signature(s) _____ Date 9/25/01 Reviewer _____ Date _____

☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW- 2

Page 1 of 1

Project Name O-9 "Ojito"

Project Manager Don Fernald

Project No. 1517000082

Client Company B-M-G

Site Name O-9

Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 22.10'
Initial Depth to Water (feet) 15.94'
Height of Water Column in Well (feet) 6.16'
Diameter (inches): Well 2" Gravel Pack 6.25"

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

Instruments

	Serial No. (If applicable)
☒ pH Meter	YSI-610DM
☒ DO Monitor	
☒ Conductivity Meter	
☒ Temperature Meter	
☒ Other ORP	

Water Disposal on-site / impacted in-drum

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	mV Comments: ORP	DO %
10/5/01	13:25						0	0	/	/	13.12	7.09	.482	3.42	185.3	32.2
"	13:31						2.5	2.5	/	/	12.05	7.0	.463	5.56	200.4	52.4%
"	1345						2.5	5.0	/	/	12.10	6.89	.463	6.44	226.7	59.7%

Comments _____

Developer's Signature(s) _____ Date 9/25/01

Reviewer _____ Date _____

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☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW-3

Page 1 of 1

Project Name O-9 "Ojito" Project Manager Don Fernald Project No. 151700082

Client Company B-M-G

Site Name O-9 Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 28.14'
Initial Depth to Water (feet) 17.01'
Height of Water Column in Well (feet) 11.13
Diameter (inches): Well 2" Gravel Pack 6.25"

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing	SEE Below		
Gravel Pack			
Drilling Fluids			
Total			

Instruments

Serial No. (If applicable)

☒ pH Meter _____
☐ DO Monitor _____
☒ Conductivity Meter _____
☒ Temperature Meter _____
☐ Other _____

Water Disposal on-site / impacted in-drum

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
9/25	9:40		✓				0	0	~~0~~	~~0~~	13.3	7.2	472		Clear
	9:45		✓				2.5	2.5	~~2.5~~	~~2.5~~	10.3	7.31	451		red-brown
	9:51		✓				2.5	5.0	~~5~~	~~5~~	10.2	7.35	449.9		"
	9:59		✓				2.5	7.5	~~2.5~~	~~7.5~~	9.9	7.37	443.5		"

Comments Note: - No product in well.

Developer's Signature(s) _____ Date 9/25/01 Reviewer _____ Date _____

☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW-4

Page 1 of 1

Project Name O-9 Project Manager Don Ternald Project No. 1517000082

Client Company BMG

Site Name O-9 Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 17.12'
Initial Depth to Water (feet) 15.14'
Height of Water Column in Well (feet) 1.98'
Diameter (inches): Well 2" Gravel Pack 6.25"

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing	SEE BELOW		
Gravel Pack			
Drilling Fluids			
Total			

Instruments

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

Water Disposal

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
9/25	10:09		✓				0+	0+	/	/	11.3	7.25	411.3		clear
"	10:21		✓				2.5	2.5	/	/	11.1	7.44	402.9		red-brown
"	10:30		✓				2.5	5.0			11.0	7.39	400.9		"

Comments Not much water in well ~1.5' to 1'

Developer's Signature(s) _____ Date 9/25/01 Reviewer _____ Date _____

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☐ Development
☐ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW-6

Page 1 of 1

Project Name O-9 "Ojito"

Project Manager Don Fernald

Project No. 1517000082

Client Company B-M-G

Site Name O-9

Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other _____

Water Volume Calculation

Initial Depth of Well (feet) 23.41
Initial Depth to Water (feet) 15.81
Height of Water Column in Well (feet) 7.6'
Diameter (inches): Well 4" Gravel Pack 6.25"

Item	Water Volume in Well		Gallons to be Removed
	Cubic Feet	Gallons	
Well Casing	SEE BELOW		
Gravel Pack			
Drilling Fluids			
Total			

Instruments

Serial No. (If applicable)

☒ pH Meter YSI-610 DM
☒ DO Monitor
☒ Conductivity Meter
☒ Temperature Meter
☒ Other ORP

Water Disposal on-site / impacted in-drum

Water Removal Data

Date	Time	Development Method		Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons)		Product Volume Removed (gallons)		Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments	
		Pump	Bailer				Increment	Cumulative	Increment	Cumulative					ORP mV	DO %
10/5/01	13:50		X				0	0	/	/	10.58	6.86	.537	.52	217.5	4.7
"	14:00		X				5	5	/	/	11.11	6.88	.540	2.31	219.4	21.4
"	14:08		X				5	10	/	/	10.63	6.90	.533	1.72	219.3	15.8
"	1416		X				5	15	/	/	11.16	6.92	.544	3.29	213.9	30.5

Comments _____

Developer's Signature(s) _____ Date 9/25/01 Reviewer _____ Date _____

☐ Development
☒ Purging

WELL DEVELOPMENT AND PURGING DATA FORM

Well Number MW-7 Page 1 of 1

Project Name O-9 "Ojito" Project Manager Don Fernald Project No. 151700082

Client Company B-M-G

Site Name O-9 Site Address Ojito Canyon

Development Criteria

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

Methods of Development

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

☐ Other

Water Volume Calculation

Initial Depth of Well (feet) 21.82'
Initial Depth to Water (feet) 16.00'
Height of Water Column in Well (feet) 5.82'
Diameter (inches): Well 4" Gravel Pack 6.25"

Item	Water Volume in Well: Cubic Feet	Water Volume in Well: Gallons	Gallons to be Removed
Well Casing		SEE BELOW	
Gravel Pack			
Drilling Fluids			
Total			

Instruments

	Serial No. (If applicable)
☒ pH Meter	451-610DM
☒ DO Monitor	" "
☒ Conductivity Meter	" "
☒ Temperature Meter	" "
☒ Other ORP	

Water Disposal on-site / impacted in-drum

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Volume Removed (gallons): Increment	Water Volume Removed (gallons): Cumulative	Product Volume Removed (gallons): Increment	Product Volume Removed (gallons): Cumulative	Temperature (°C)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments: ORP mV	Comments: DO %
10/5/01	14:19		X				0	0	—	—	11.39	6.83	.558	.84	-76.9	7.8
14:30 "	14:30		X				5	5	/	/	11.3	6.81	.550	1.20	-77.3	11.5
"	14:36		X				5	10	/	/	11.74	6.81	.551	1.93	-72.6	18.9
"	1445		X				5	15	—	—	11.70	6.81	.547	3-10	-65.9	30.0

Comments No product, but sheen and odors (hydrocarbon) present

Developer's Signature(s) Date 10/5/01 Reviewer Date

PINNACLE LABORATORIES

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

Pinnacle Lab ID number **109102**
October 11, 2001

AMEC EARTH & ENVIRONMENTAL
2060 AFTON PLACE
FARMINGTON, NM 87401

Project Name BMG 0-9
Project Number 1517000082

Attention: DON FERNALD

On 09/27/01 Pinnacle Laboratories, Inc., (ADHS License No. AZ0592 pending), received a request to analyze **aqueous and 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

MR: jt

Enclosure

PINNACLE LABORATORIES

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CLIENT	: AMEC EARTH & ENVIRONMENTAL	PINNACLE ID	: 109102
PROJECT #	: 1517000082	DATE RECEIVED	: 09/27/01
PROJECT NAME	: BMG 0-9	REPORT DATE	: 10/11/01

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
109102 - 01	82-SB-11/12-14'	NON-AQ	09/20/01
109102 - 02	82-SB-12/12-14'	NON-AQ	09/20/01
109102 - 03	82-SB-13/14-16'	NON-AQ	09/20/01
109102 - 04	82-SB-14/14-16'	NON-AQ	09/20/01
109102 - 05	82-SB-15/12-14'	NON-AQ	09/20/01
109102 - 06	82-SB-17/10-12'	NON-AQ	09/21/01
109102 - 07	82-SB-14/12-14'	NON-AQ	09/20/01
109102 - 08	82-SB-13/10-12'	NON-AQ	09/20/01
109102 - 09	82-SB-13/12-14'	NON-AQ	09/20/01
109102 - 10	82-SB-17/18-20'	NON-AQ	09/21/01
109102 - 11	82-MW-6	AQUEOUS	09/25/01
109102 - 12	82-MW-7	AQUEOUS	09/25/01
109102 - 13	82-MW-1	AQUEOUS	09/25/01
109102 - 14	82-MW-8	AQUEOUS	09/25/01
109102 - 15	82-MW-3	AQUEOUS	09/25/01
109102 - 16	82-MW-4	AQUEOUS	09/25/01
109102 - 17	TRIP BLANK	AQUEOUS	09/17/01

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	82-SB-11/12-14'	NON-AQ	09/20/01	10/01/01	10/02/01	1
02	82-SB-12/12-14'	NON-AQ	09/20/01	10/01/01	10/02/01	1
03	82-SB-13/14-16'	NON-AQ	09/20/01	10/01/01	10/02/01	1

PARAMETER	DET. LIMIT	UNITS	82-SB-11/12-14'	82-SB-12/12-14'	82-SB-13/14-16'
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	**MG/KG**	< 0.025	< 0.025	**0.031**
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
SURROGATE:					
BROMOFLUOROBENZENE (%)			89	90	85
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
NA

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	82-SB-14/14-16'	NON-AQ	09/20/01	10/01/01	10/02/01	1
05	82-SB-15/12-14'	NON-AQ	09/20/01	10/01/01	10/02/01	1
06	82-SB-17/10-12'	NON-AQ	09/21/01	10/01/01	10/02/01	1

PARAMETER	DET. LIMIT	UNITS	82-SB-14/14-16'	82-SB-15/12-14'	82-SB-17/10-12'
BENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOLUENE	0.025	**MG/KG**	< 0.025	**0.026**	< 0.025
ETHYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TOTAL XYLENES	0.025	**MG/KG**	**0.045**	**0.043**	< 0.025
SURROGATE:					
BROMOFLUOROBENZENE (%)			90	93	82
SURROGATE LIMITS	(65 - 120)				

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
11	82-MW-6	AQUEOUS	09/25/01	NA	10/04/01	1
12	82-MW-7	AQUEOUS	09/25/01	NA	10/05/01	5
13	82-MW-1	AQUEOUS	09/25/01	NA	10/04/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-6	82-MW-7	82-MW-1
BENZENE	0.5	**UG/L**	**69**	**350**	< 0.5
TOLUENE	0.5	**UG/L**	< 0.5	**47**	< 0.5
ETHYLBENZENE	0.5	**UG/L**	**23**	**87**	< 0.5
TOTAL XYLENES	0.5	**UG/L**	**41**	**310**	< 0.5
SURROGATE:					
BROMOFLUOROBENZENE (%)			107	102	87
SURROGATE LIMITS	(80 - 120)				

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
14	82-MW-8	AQUEOUS	09/25/01	NA	10/04/01	1
15	82-MW-3	AQUEOUS	09/25/01	NA	10/04/01	1
16	82-MW-4	AQUEOUS	09/25/01	NA	10/04/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-8	82-MW-3	82-MW-4
BENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TOLUENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
ETHYLBENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TOTAL XYLENES	0.5	UG/L	< 0.5	< 0.5	< 0.5
SURROGATE:					
BROMOFLUOROBENZENE (%)			84	85	87
SURROGATE LIMITS	(80 - 120)				

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

PINNACLE I.D.: 109102

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
17	TB	AQUEOUS	09/17/01	NA	10/04/01	1

PARAMETER	DET. LIMIT	UNITS	TB
BENZENE	0.5	UG/L	< 0.5
TOLUENE	0.5	UG/L	< 0.5
ETHYLBENZENE	0.5	UG/L	< 0.5
TOTAL XYLENES	0.5	UG/L	< 0.5

SURROGATE:
BROMOFLUOROBENZENE (%) 89
SURROGATE LIMITS (80 - 120)

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 109102
BLANK I. D.	: 100101	DATE EXTRACTED	: 10/01/01
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE ANALYZED	: 10/02/01
PROJECT #	: 1517000082	SAMPLE MATRIX	: NON-AQ
PROJECT NAME	: BMG 0-9		

PARAMETER	UNITS	
BENZENE	MG/KG	<0.025
TOLUENE	MG/KG	<0.025
ETHYLBENZENE	MG/KG	<0.025
TOTAL XYLENES	MG/KG	<0.025
SURROGATE:		
BROMOFLUOROBENZENE (%)		96
SURROGATE LIMITS:	(80 - 120)	

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 109102
BLANK I. D.	: 100401	DATE EXTRACTED	: NA
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE ANALYZED	: 10/04/01
PROJECT #	: 1517000082	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: BMG 0-9		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		90
SURROGATE LIMITS:	(80 - 120)	

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 109102
BLANK I. D.	: 100501	DATE EXTRACTED	: NA
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE ANALYZED	: 10/05/01
PROJECT #	: 1517000082	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: BMG 0-9		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
SURROGATE:		
BROMOFLUOROBENZENE (%)		89
SURROGATE LIMITS:	(80 - 120)	

CHEMIST NOTES:
NA

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GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8021 MODIFIED		
MSMSD #	: 109103-01	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 10/01/01
PROJECT #	: 1517000082	DATE ANALYZED	: 10/02/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: NON-AQ
		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	1.10	110	1.10	110	0	(68 - 120)	20
TOLUENE	0.035	1.00	0.98	95	0.98	95	0	(64 - 120)	20
ETHYLBENZENE	<0.025	1.00	0.96	96	0.97	97	1	(49 - 127)	20
TOTAL XYLENES	<0.025	3.00	2.88	96	2.92	97	1	(58 - 120)	20

CHEMIST NOTES:
NA

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

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

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8021 MODIFIED		
MSMSD #	: 100401	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXRACTED	: NA
PROJECT #	: 1517000082	DATE ANALYZED	: 10/04/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS
		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	20.0	100	19.5	98	3	(80 - 120)	20
TOLUENE	<0.5	20.0	18.5	93	18.0	90	3	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	19.0	95	18.5	93	3	(80 - 120)	20
TOTAL XYLENES	<0.5	60.0	57.4	96	56.3	94	2	(80 - 120)	20

CHEMIST NOTES:
NA

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

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

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE I. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	82-SB-11/12-14'	NON-AQ	09/20/01	09/29/01	09/29/01	1
02	82-SB-12/12-14'	NON-AQ	09/20/01	09/29/01	09/29/01	1
03	82-SB-13/14-16'	NON-AQ	09/20/01	09/29/01	09/29/01	1

PARAMETER	DET. LIMIT	UNITS	82-SB-11/12-14'	82-SB-12/12-14'	82-SB-13/14-16'
FUEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
FUEL HYDROCARBONS, C10-C22	10	MG/KG	< 10	< 10	< 10
FUEL HYDROCARBONS, C22-C36	10	MG/KG	< 10	< 10	< 10
CALCULATED SUM:					
SURROGATE:					
O-TERPHENYL (%)			90	89	90
SURROGATE LIMITS	(66 - 151)				

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE I. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
04	82-SB-14/14-16'	NON-AQ	09/20/01	09/29/01	09/29/01	1
05	82-SB-15/12-14'	NON-AQ	09/20/01	09/29/01	09/29/01	1
[illegible]	82-SB-17/10-12'	NON-AQ	09/21/01	09/29/01	09/29/01	1

PARAMETER	DET. LIMIT	UNITS	82-SB-14/14-16'	82-SB-15/12-14'	82-SB-17/10-12'
FUEL HYDROCARBONS, C6-C10	10	**MG/KG**	< 10	**19**	< 10
FUEL HYDROCARBONS, C10-C22	10	**MG/KG**	< 10	**84**	< 10
FUEL HYDROCARBONS, C22-C36	10	**MG/KG**	< 10	**30**	< 10
CALCULATED SUM:				**133**	
SURROGATE:					
O-TERPHENYL (%)			91	91	90
SURROGATE LIMITS	(66 - 151)				

CHEMIST NOTES:
N/A

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
[illegible]	82-MW-6	AQUEOUS	09/25/01	09/28/01	09/28/01	1
12	82-MW-7	AQUEOUS	09/25/01	09/28/01	09/28/01	1
[illegible]	82-MW-1	AQUEOUS	09/25/01	09/28/01	09/28/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-6	82-MW-7	82-MW-1
FUEL HYDROCARBONS, C6-C10	2.0	**MG/L**	< 2.0	**2.5**	< 2.0
FUEL HYDROCARBONS, C10-C22	1.0	**MG/L**	< 1.0	**1.4**	< 1.0
FUEL HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0	< 1.0
CALCULATED SUM:				**3.9**	
SURROGATE:					
P-TERPHENYL (%)			100	102	97
SURROGATE LIMITS	(79 - 124)				

CHEMIST NOTES:
NA

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 109102
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE #.	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
[illegible]	82-MW-8	AQUEOUS	09/25/01	09/28/01	09/28/01	1
15	82-MW-3	AQUEOUS	09/25/01	09/28/01	09/29/01	1
[illegible]	82-MW-4	AQUEOUS	09/25/01	09/28/01	09/29/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-8	82-MW-3	82-MW-4
FUEL HYDROCARBONS, C6-C10	2.0	MG/L	< 2.0	< 2.0	< 2.0
FUEL HYDROCARBONS, C10-C22	1.0	MG/L	< 1.0	< 1.0	< 1.0
FUEL HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0	< 1.0
CALCULATED SUM:					
SURROGATE:					
TERPHENYL (%)			99	102	101
SURROGATE LIMITS	(79 - 124)				

CHEMIST NOTES:
NA

PINNACLE LABORATORIES

2709-D Pan American Freeway NE
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Phone (505) 344-3777
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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
BLANK I.D.	: 092901	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 09/29/01
PROJECT #	: 1517000082	DATE ANALYZED	: 09/29/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: NON-AQ

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 (%)		88
SURROGATE LIMITS	(80 - 151)	

CHEMIST NOTES:
NA

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
BLANK I.D.	: 092801	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 09/28/01
PROJECT #	: 1517000082	DATE ANALYZED	: 09/28/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/L	< 2.0
HYDROCARBON RANGE		< 1.0
HYDROCARBONS QUANTITATED USING		< 1.0
SURROGATE:		
O-TERPHENYL (%)		95
SURROGATE LIMITS	(78 - 128)	

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
MSMSD #	: 109103-03	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 09/29/01
PROJECT #	: 1517000082	DATE ANALYZED	: 09/30/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: NON-AQ
		UNITS	: MG/KG

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<10	200	216	108	216	108	0	(56 - 148)	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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Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
MSMSD #	: 092801	PINNACLE I.D.	: 109102
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXRACTED	: 09/28/01
PROJECT #	: 1517000082	DATE ANALYZED	: 09/28/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS
		UNITS	:

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<1.0	33.0	36.4	110	36.0	109	1	(64 - 127)	20

CHEMIST NOTES:
NA

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

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

PINNACLE LABORATORIES

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 9/26/01 PAGE: 1 OF 1

PLI Accession #: 109102

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: Don Fernald

COMPANY: AMEC Earth & Enviro

ADDRESS: 2060 Afton Pl

Farmington, NM 87401

PHONE: 505-327-7928

FAX: 505-326-5721

BILL TO:

COMPANY: SAME

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	8015/8020 DRO	(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 ☐	Major ions/Metals	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	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 (Method 1311)	Metals: Hold		NUMBER OF CONTAINERS
82-SB-11/12-14'	9/20/01		Soil	01			X																										1
82-SB 12/12-14'	9/20/01		Soil	02			X																										1
82-SB 13/14-16	9/20/01		Soil	03			X																										1
82-SB 14/14-16	9/20/01		Soil	04			X																										1
82-SB 15/12-14'	9/20/01		Soil	05			X																										1
82-SB 17/10-12'	9/20/01		Soil	06			X																										1
82-SB 14/12-14	9/20/01		Soil	07																											X		1
82-SB-13/10-12	9/20/01		Soil	08																											X		1
82-SB-13/12-14	9/20/01		Soil	09																											X		1
82-SB-17/18-20	9/21/01		Soil	10																											X		1

PROJECT INFORMATION

PROJ. NO.: 15170000082

PROJ. NAME: BMG O-9

P.O. NO.:

SHIPPED VIA:

SAMPLE RECEIPT

NO. CONTAINERS	10
CUSTODY SEALS	Y / N (NA)
RECEIVED INTACT	YES
BLUE ICE/ICE	4.0°C

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

CERTIFICATION REQUIRED: ☐ NM ☐ SDWA ☐ OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

RELINQUISHED BY: 1.

Signature: Time: 14:00

Printed Name: Don Fernald Date: 9/26/01

Company: AMEC

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: 1025

Printed Name: Francine Tanio Date: 9/27/01

Pinnacle Laboratories Inc.

PINNACLE LABORATORIES

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 9/26/01 PAGE: 1 OF 1

PLI Accession #: 109102

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: Don Fernald

COMPANY: AMEC Earth & Enviro
ADDRESS: 2060 AFTON PL
FARMINGTON, NM 87401
PHONE: 505-327-7928
FAX: 505-326-5721

BILL TO:
COMPANY: Same
ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	8015/8020 DRO	(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 ☐	Major ions + TDS call	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	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 (Method 1311)	Metals:		NUMBER OF CONTAINERS
82-MW-6	9/24/01	15:10	H2O	11			X									X																2
82-mw-7	9/25/01	15:00	H2O	12			X									X																4
82-mw-1	9/25/01	13:57	H2O	13			X																									2
82-mw-8	9/25/01	14:05	H2O	14			X									X																2
82-mw-3	9/25/01	13:45	H2O	15			X																									2
82-mw-4	9/25/01	13:51	H2O	16			X																									2
TB	9/17/01	15:25	H2O	17						X																						1

PROJECT INFORMATION

PROJ. NO.: 151700082
PROJ. NAME: BMG O-9
P.O. NO.: 1517000 82
SHIPPED VIA: Greyhound

SAMPLE RECEIPT

NO. CONTAINERS	17
CUSTODY SEALS	Y / N (NA)
RECEIVED INTACT	YES
BLUE ICE/ICE	4.0 c

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

CERTIFICATION REQUIRED: ☐ NM ☐ SDWA ☐ OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

-12, -14 ions + TDS cancelled at the request of client. Client will resample for these parameters.

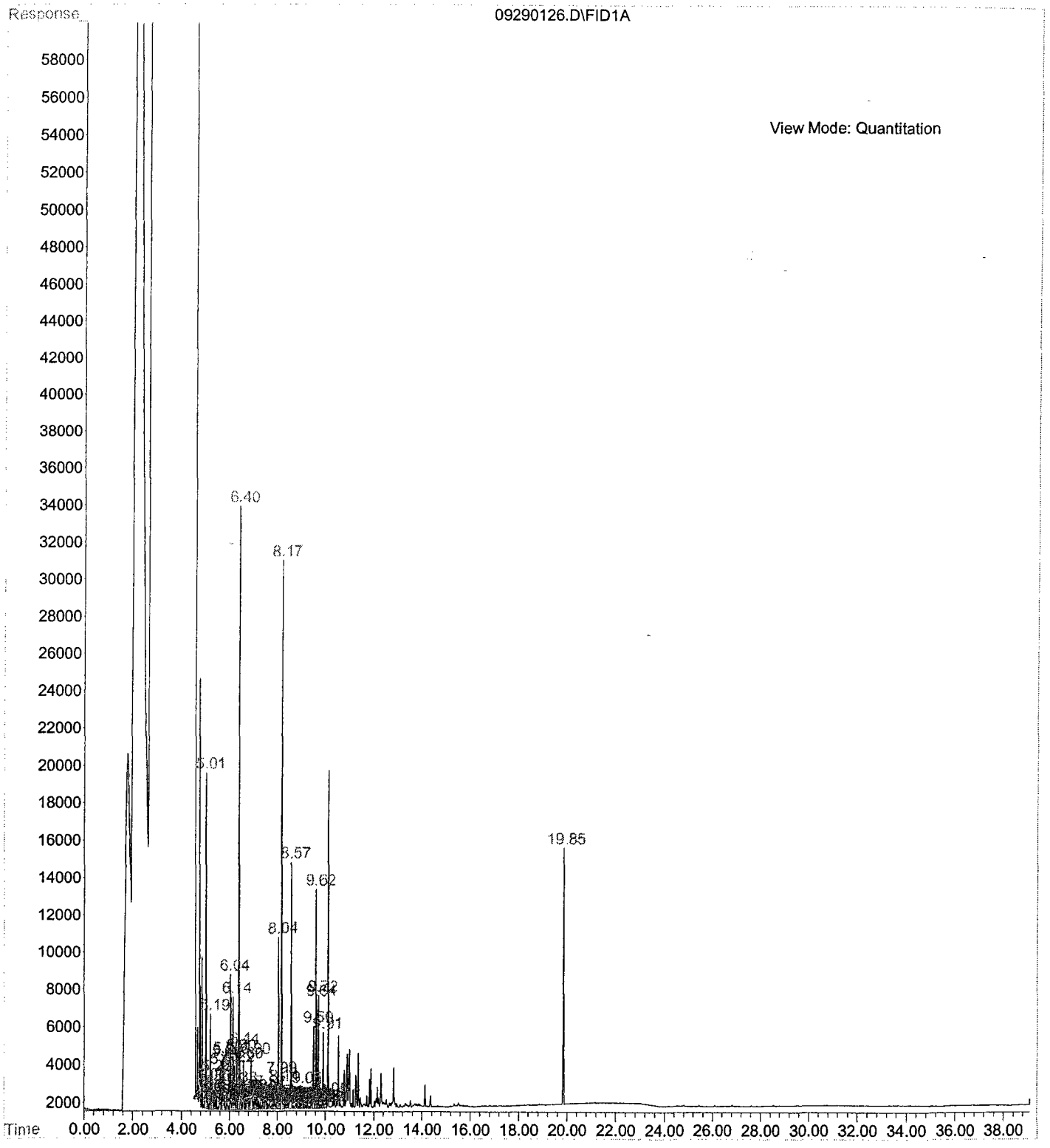
RELINQUISHED BY: 1.
Signature: [signature] Time: 14:00
Printed Name: Don Fernald Date: 9/26/01
Company: AMEC
See reverse side (Force Majeure)

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

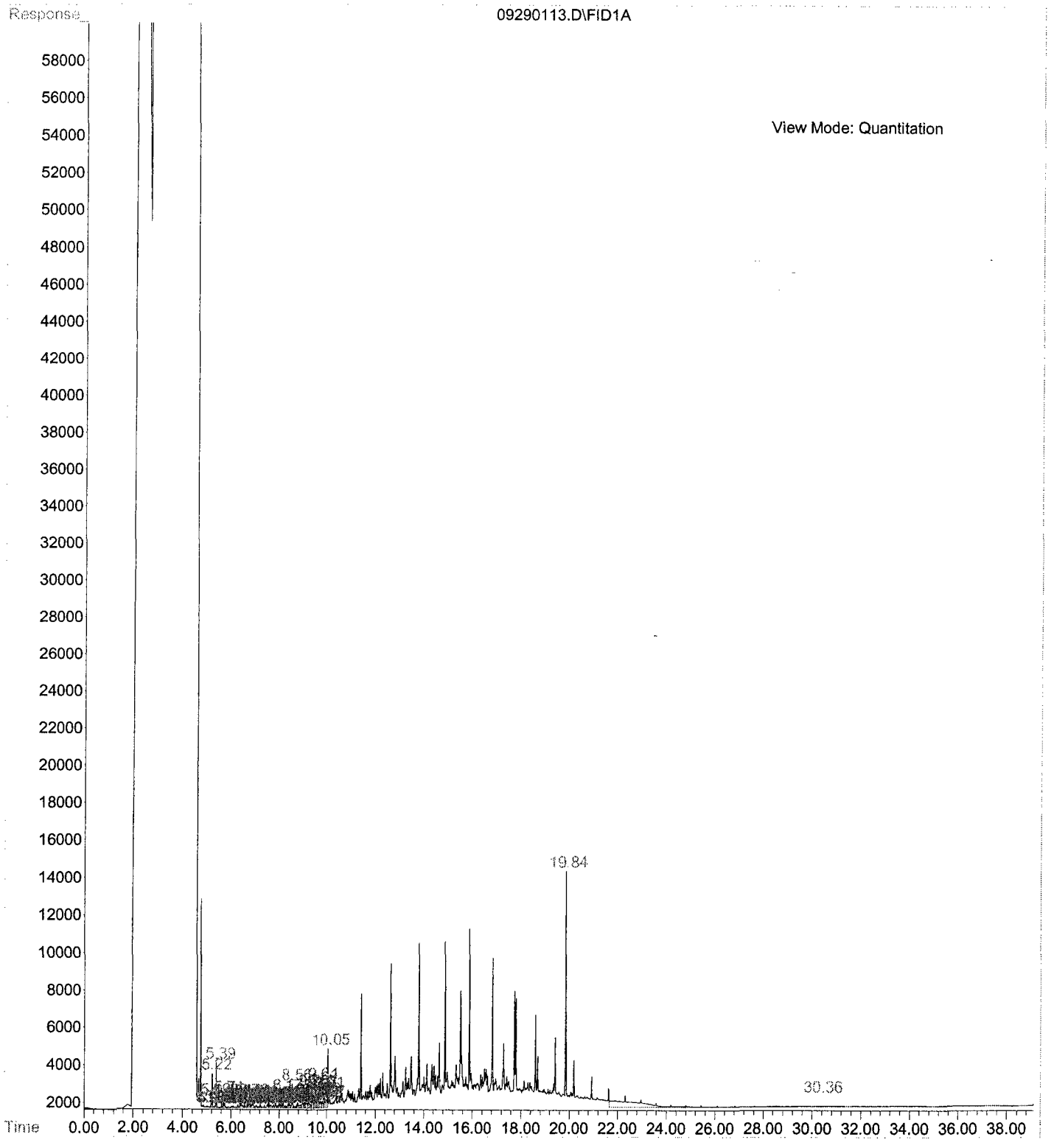
RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date:
Company:

RECEIVED BY: (LAB) 2.
Signature: Francine Tanno Time: 1025
Printed Name: Francine Tanno Date: 9/27/01
Pinnacle Laboratories Inc.

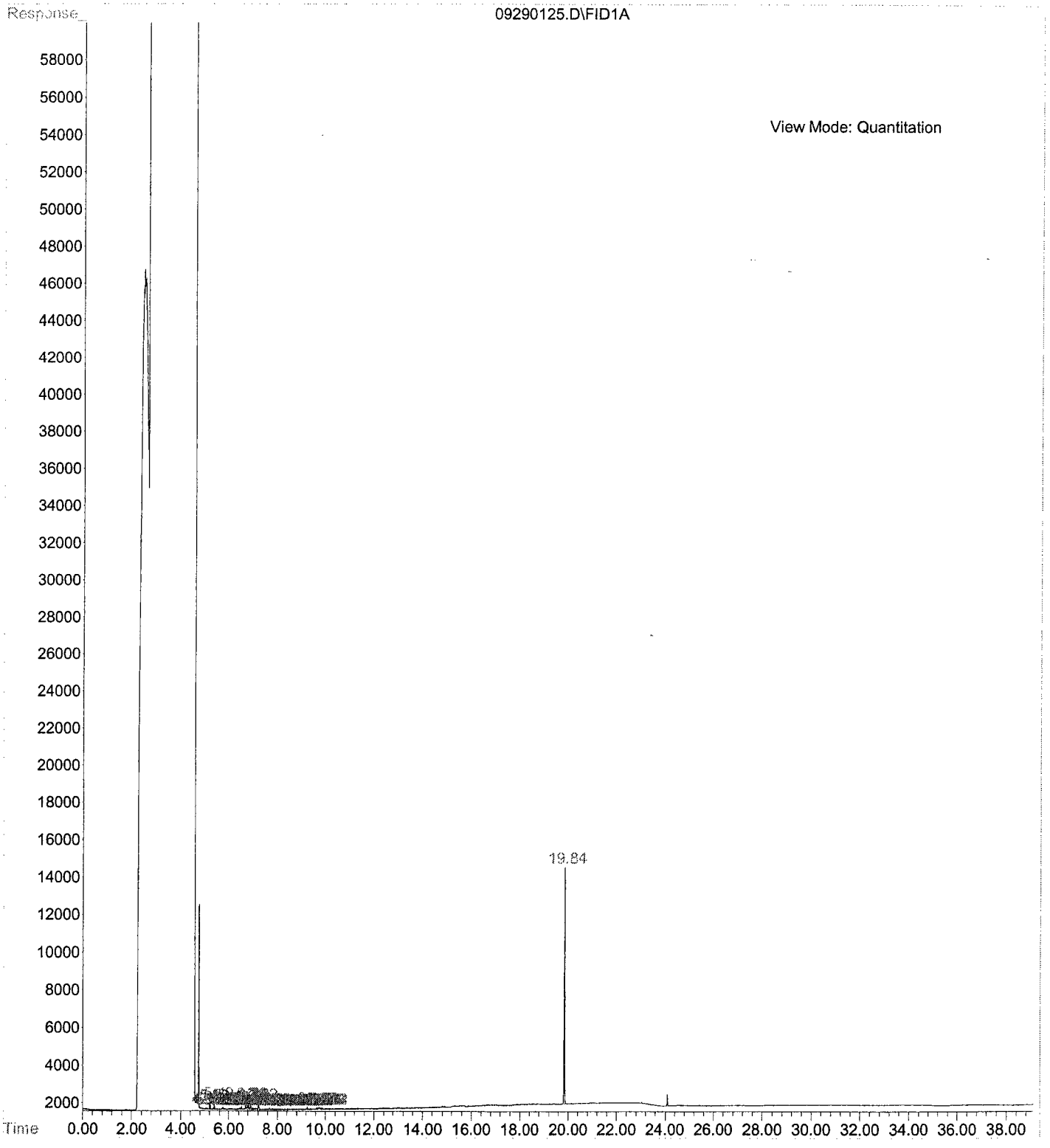
File : C:\HPCHEM\2\DATA\092901\09290126.D
Operator : ccm
Acquired : 30 Sep 2001 13:37 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: gas ccv
Misc Info : GC4-35-05 (exp 11/13/2001)
Vial Number: 26



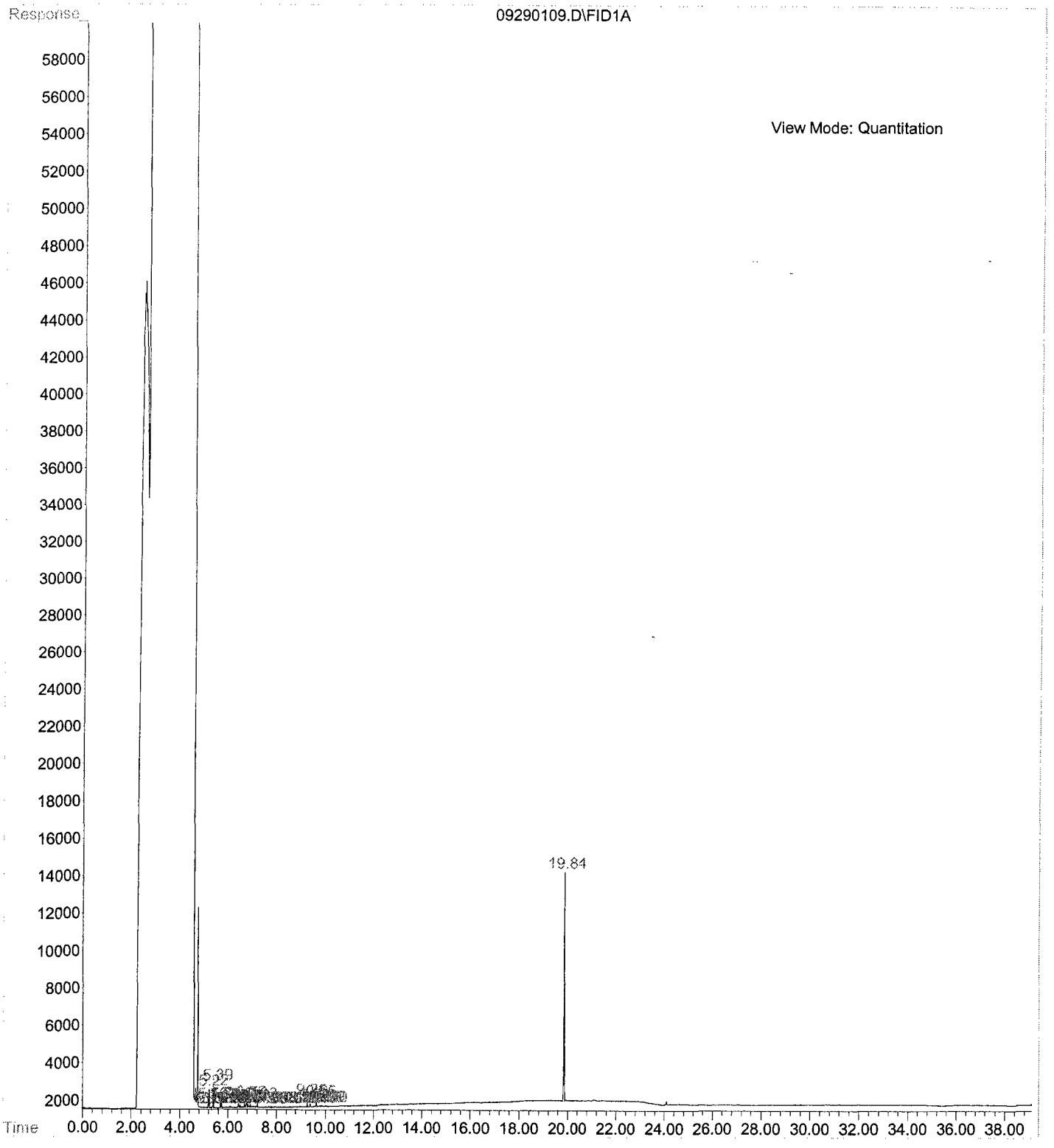
File : C:\HPCHEM\2\DATA\092901\09290113.D
Operator : ccm
Acquired : 30 Sep 2001 2:21 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: dsl ccv
Misc Info : GC4-35-06 (exp 11/13/2001)
Vial Number: 13



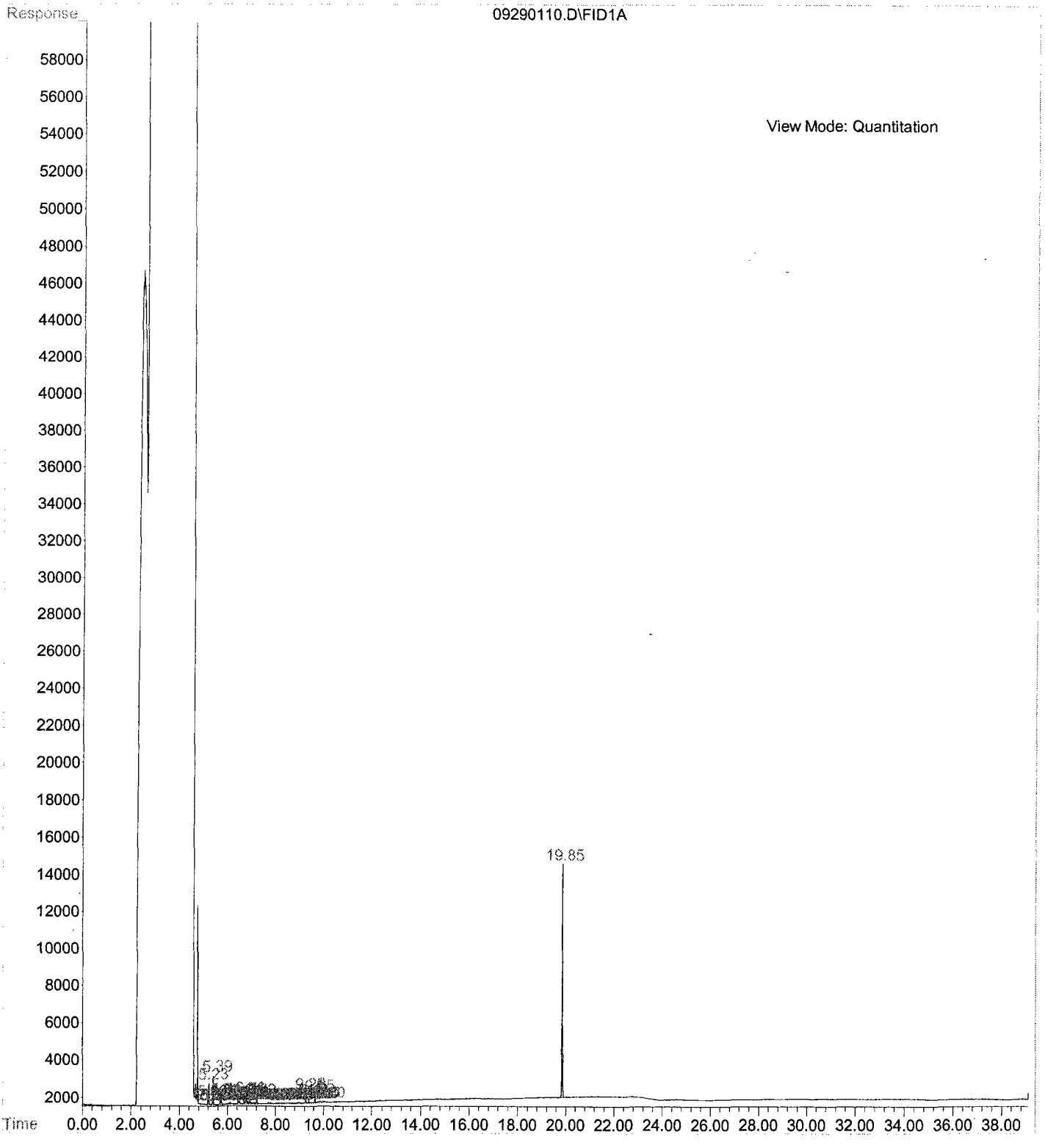
File : C:\HPCHEM\2\DATA\092901\09290125.D
Operator : ccm
Acquired : 30 Sep 2001 12:44 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-01 (re)
Misc Info : GC4-35-05 (exp 11/13/2001)
Vial Number: 25



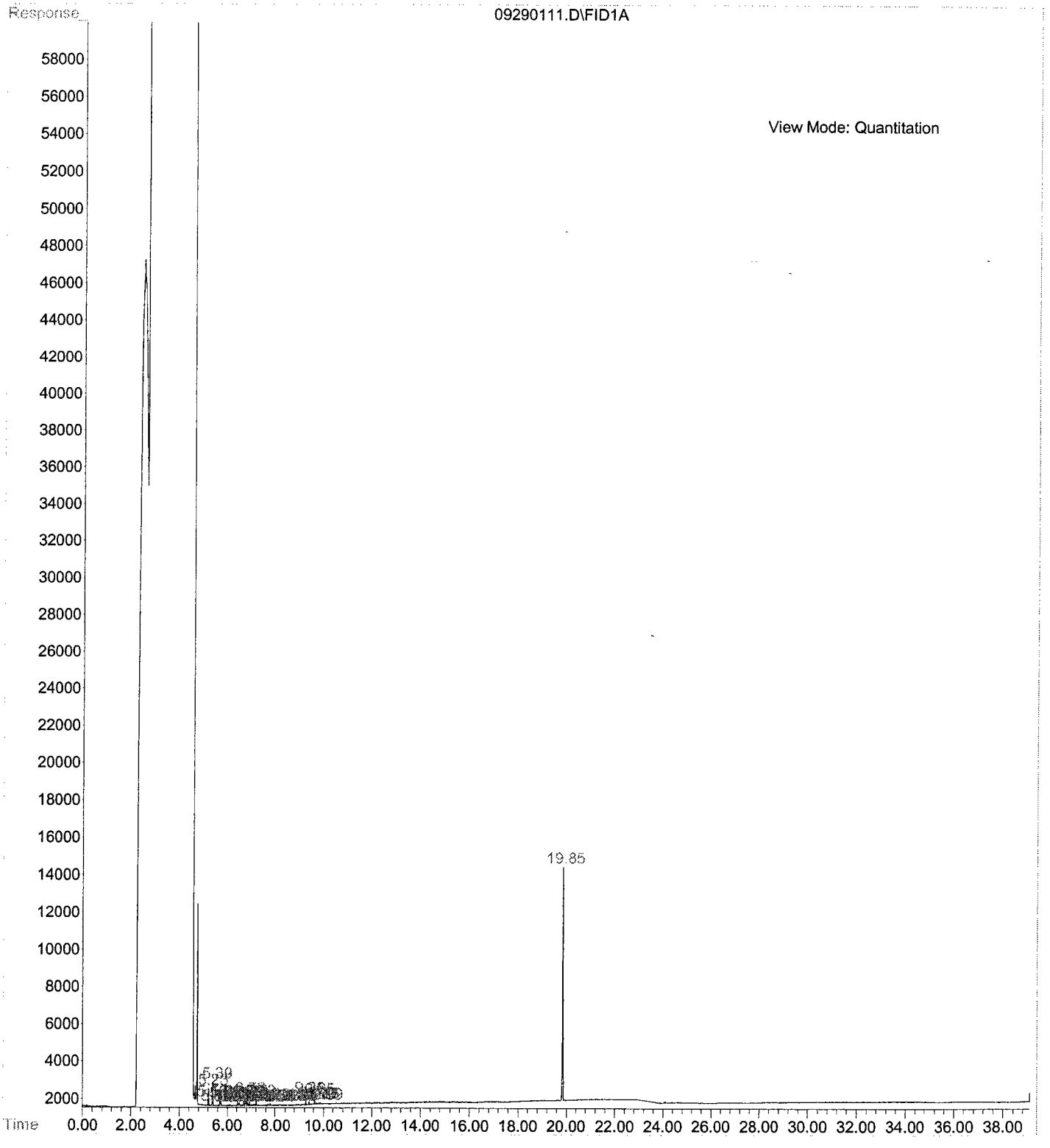
File : C:\HPCHEM\2\DATA\092901\09290109.D
Operator : ccm
Acquired : 29 Sep 2001 22:53 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-02
Misc Info :
Vial Number: 9



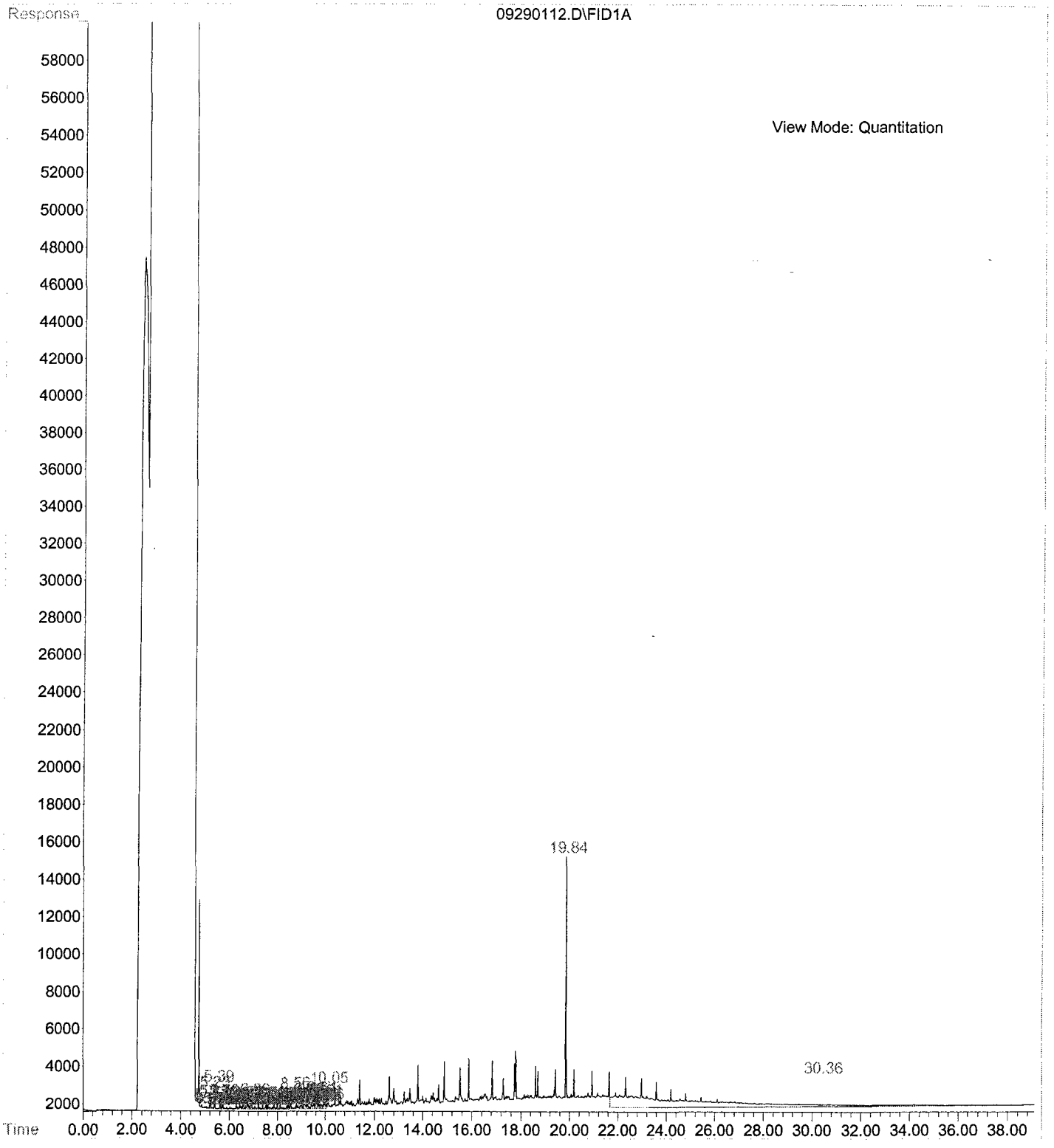
File : C:\HPCHEM\2\DATA\092901\09290110.D
Operator : ccm
Acquired : 29 Sep 2001 23:45 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-03
Misc Info :
Vial Number: 10



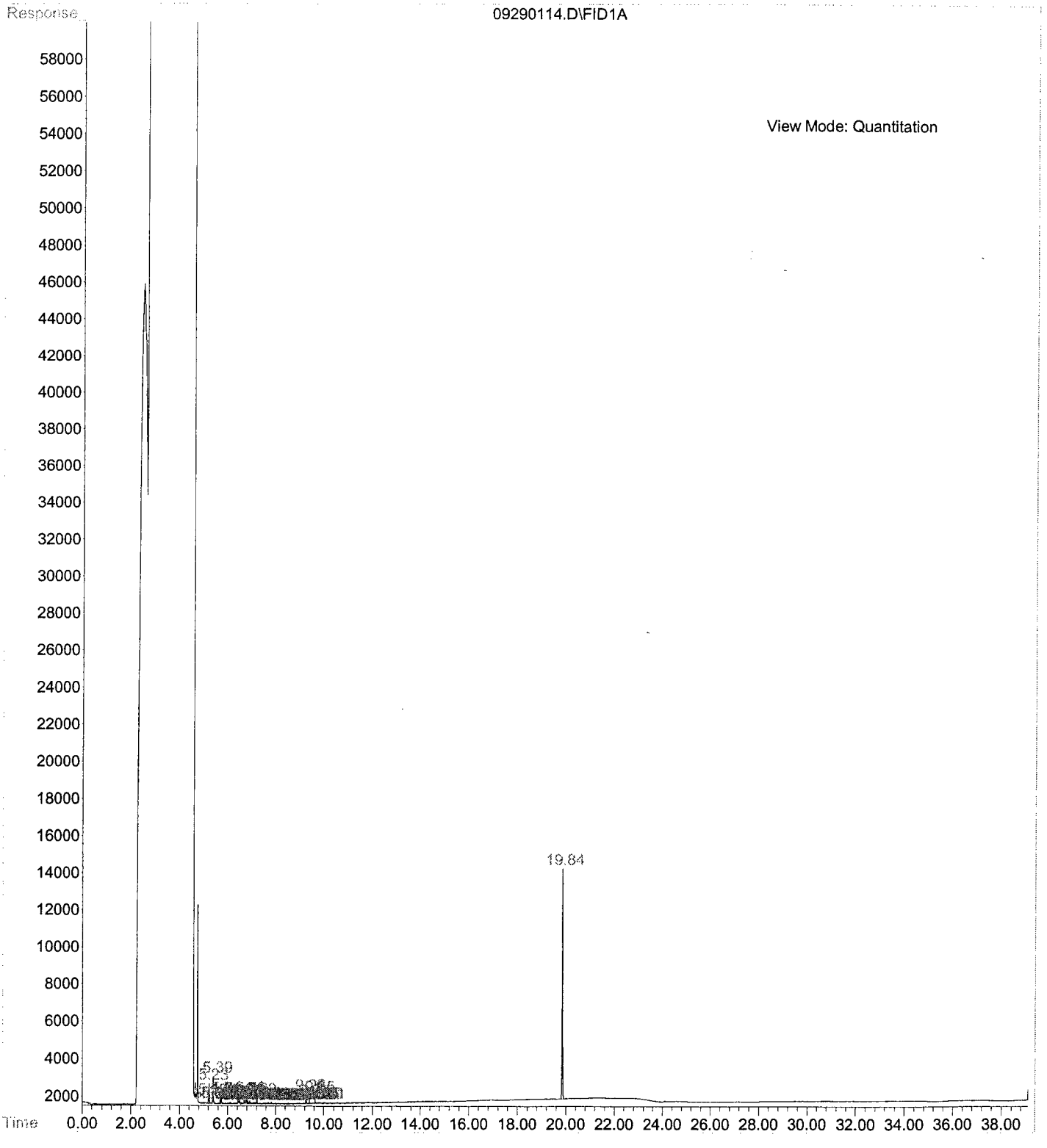
File : C:\HPCHEM\2\DATA\092901\09290111.D
Operator : ccm
Acquired : 30 Sep 2001 00:37 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-04
Misc Info :
Vial Number: 11



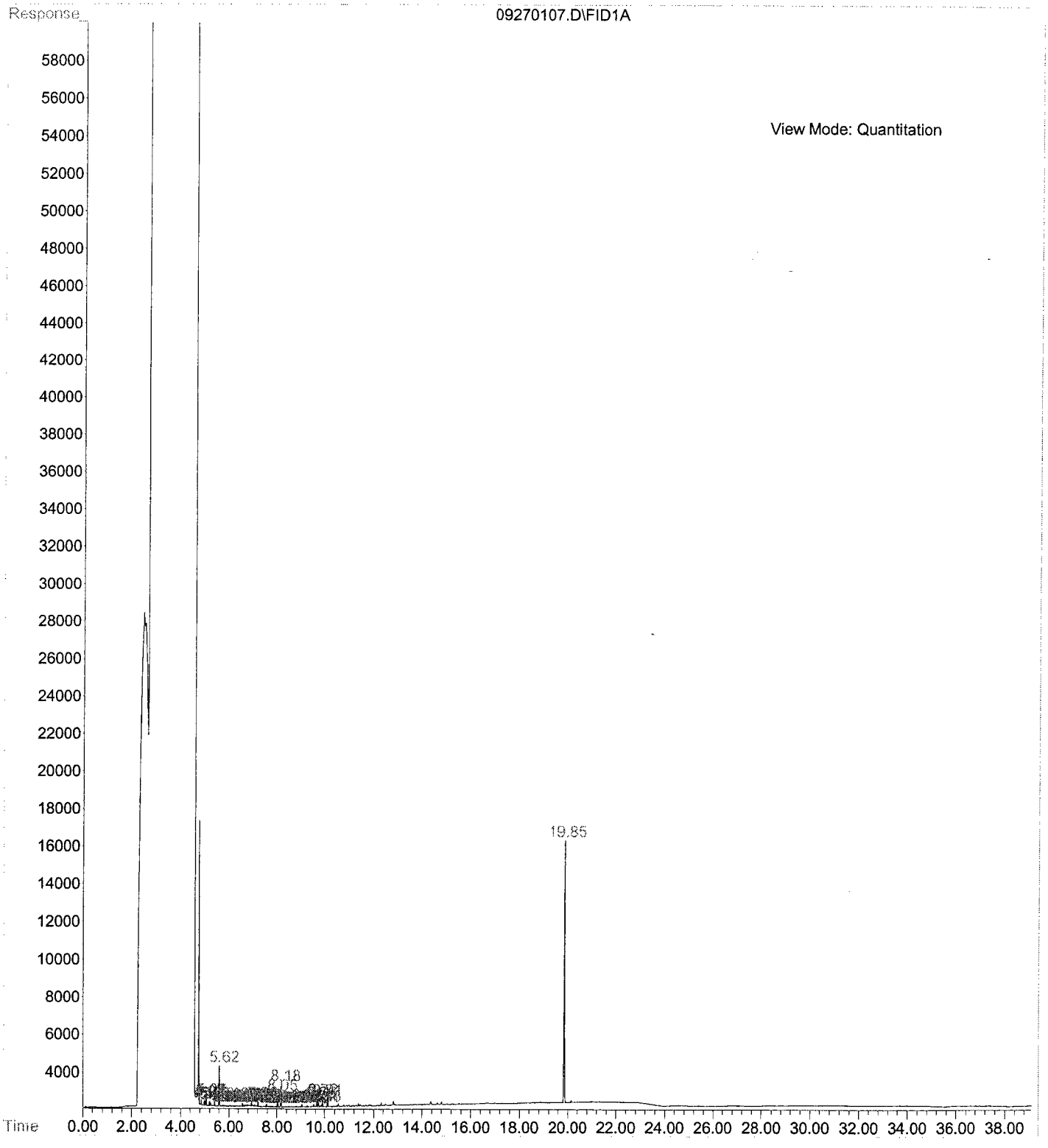
File : C:\HPCHEM\2\DATA\092901\09290112.D
Operator : ccm
Acquired : 30 Sep 2001 1:29 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-05
Misc Info :
Vial Number: 12



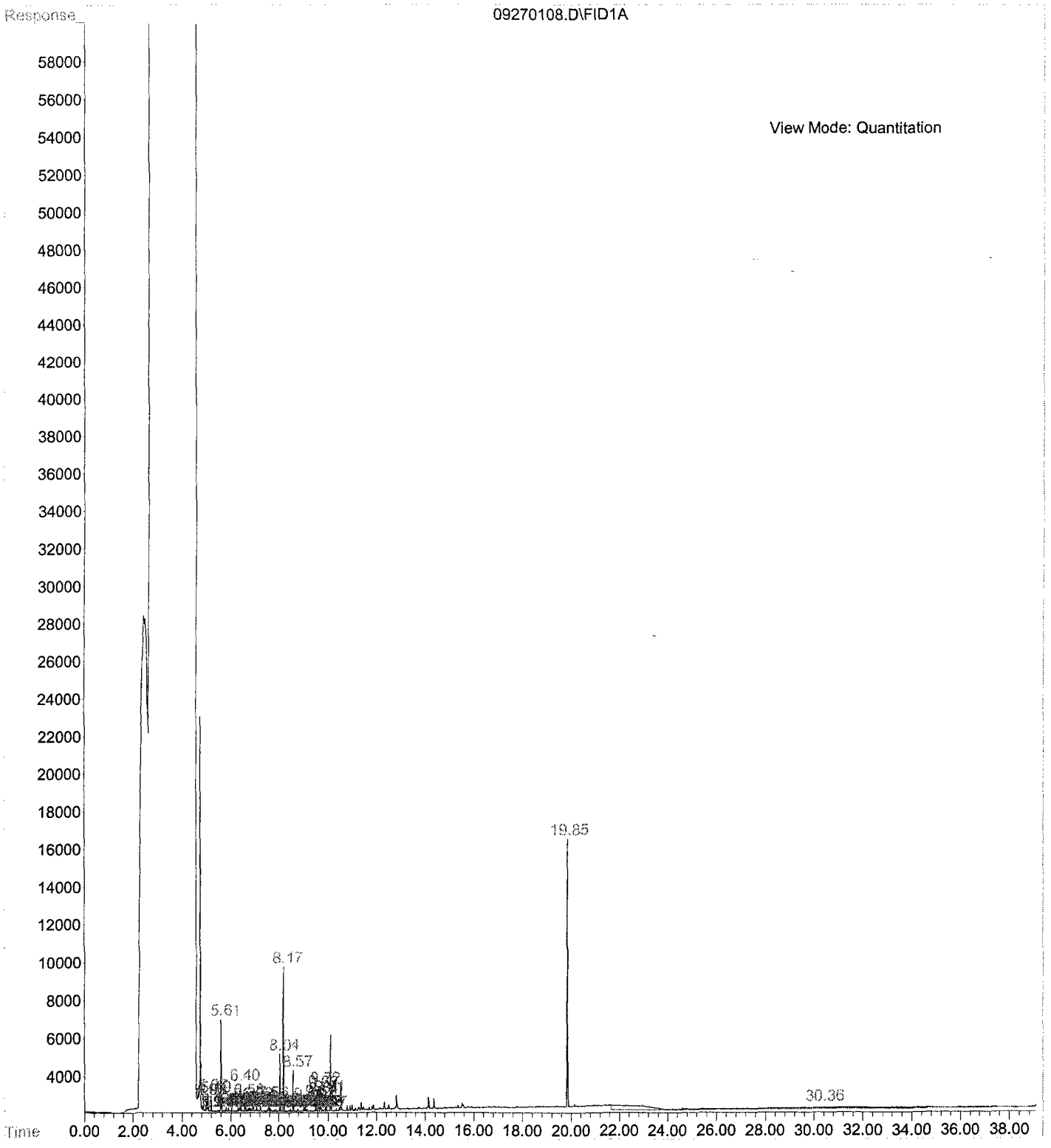
File : C:\HPCHEM\2\DATA\092901\09290114.D
Operator : ccm
Acquired : 30 Sep 2001 3:13 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-06
Misc Info :
Vial Number: 14



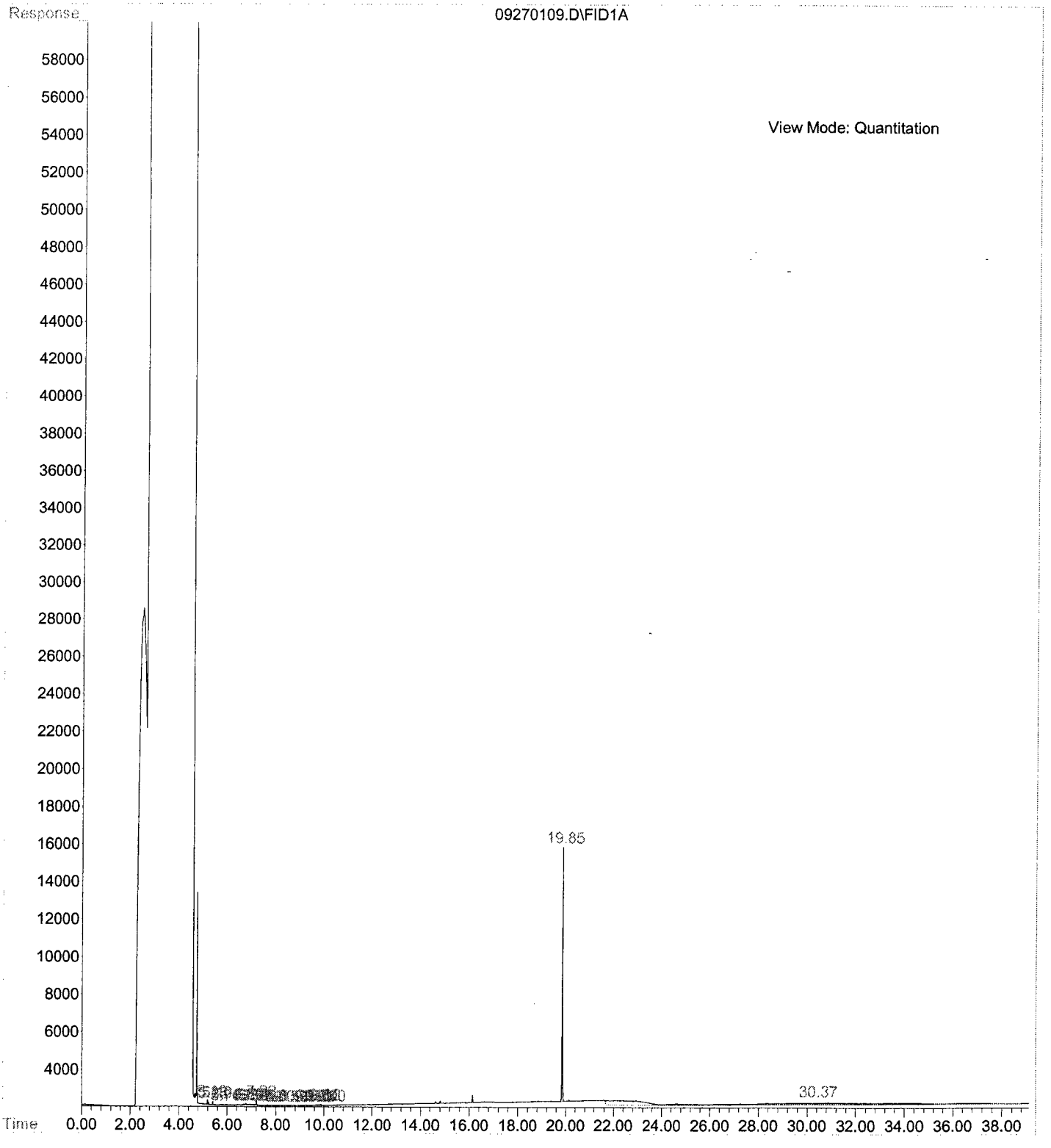
File : C:\HPCHEM\2\DATA\092701\09270107.D
Operator : ccm
Acquired : 28 Sep 2001 21:15 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-11
Misc Info :
Vial Number: 7



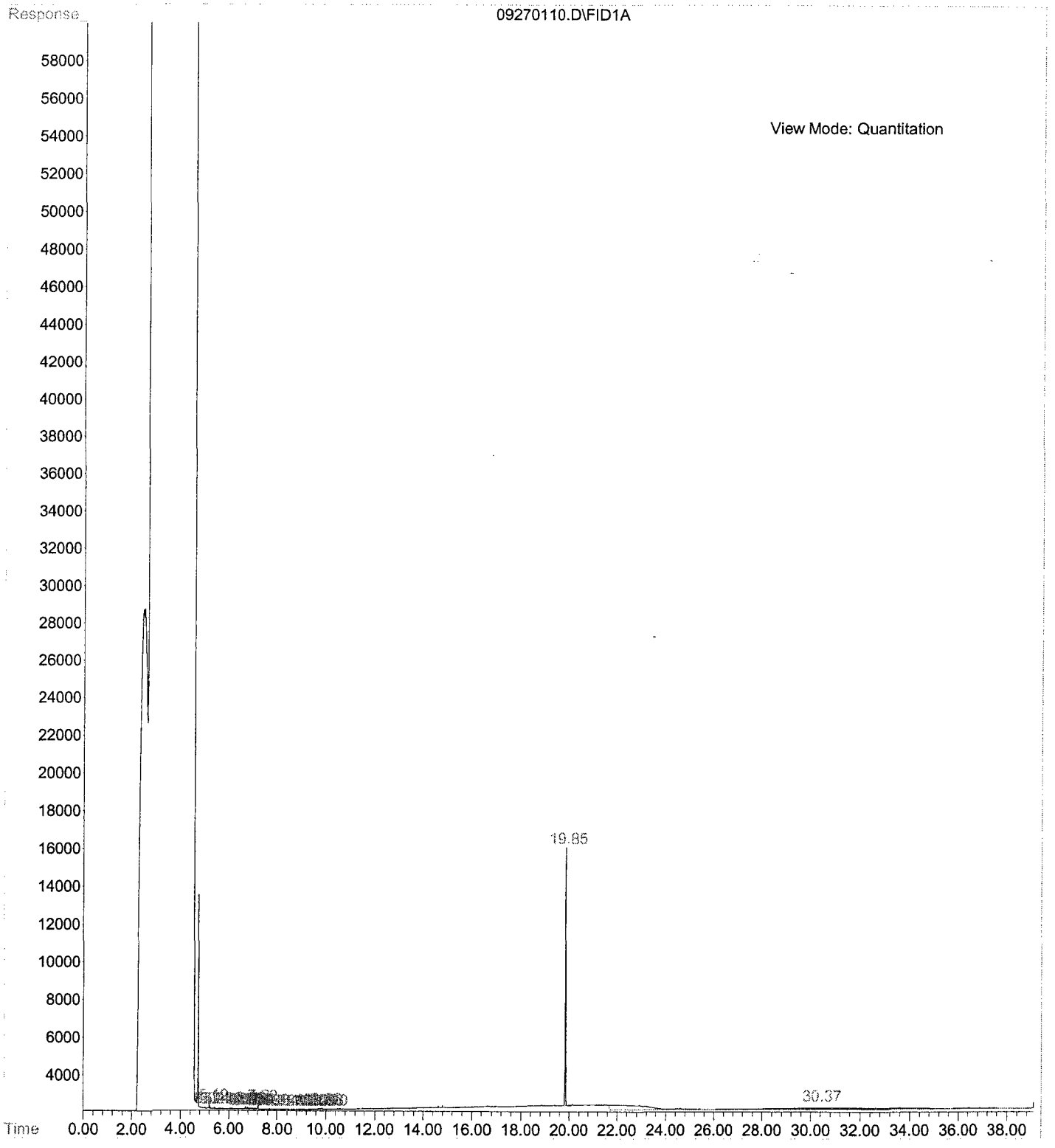
File : C:\HPCHEM\2\DATA\092701\09270108.D
Operator : ccm
Acquired : 28 Sep 2001 22:07 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-12
Misc Info :
Vial Number: 8



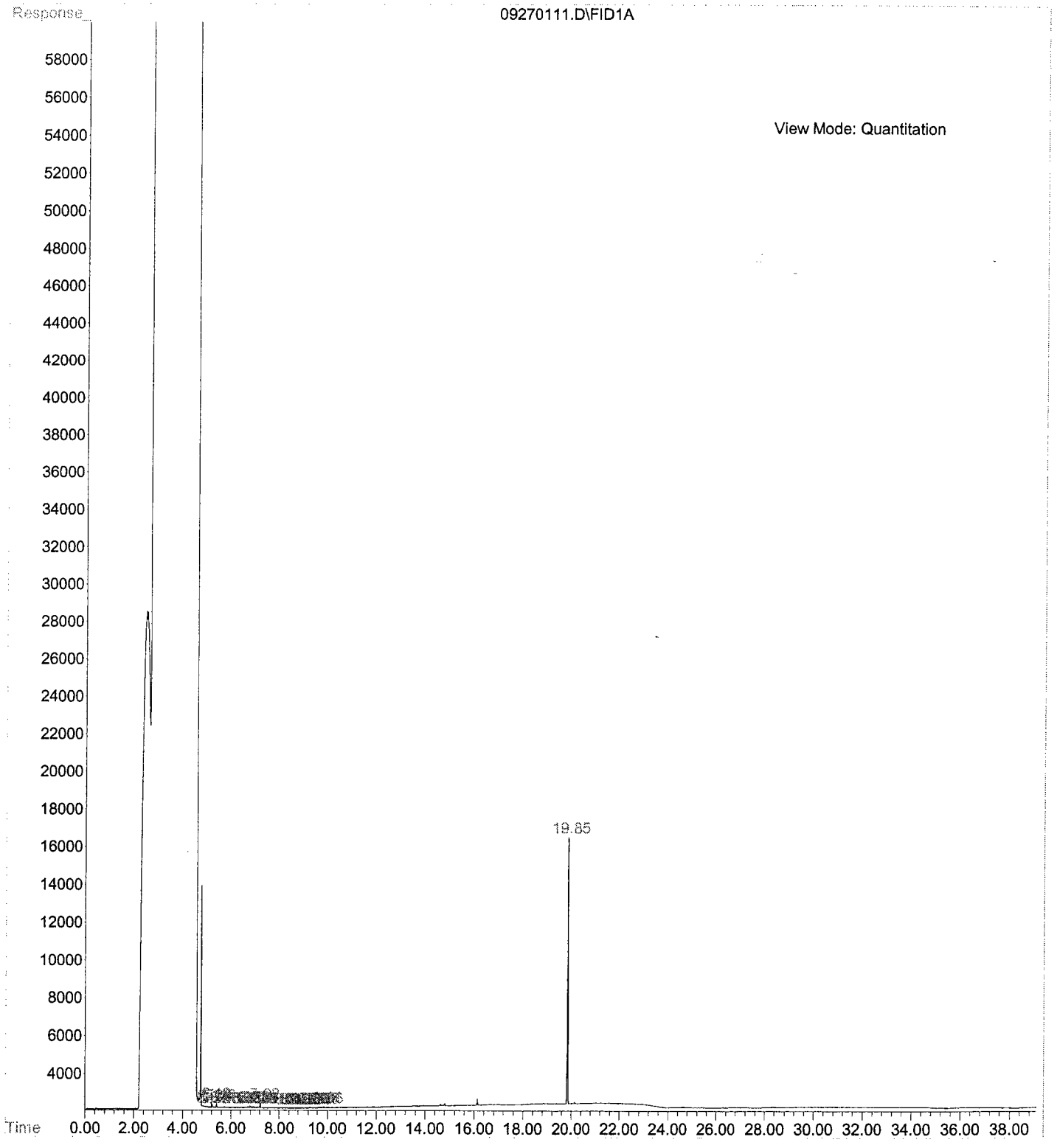
File : C:\HPCHEM\2\DATA\092701\09270109.D
Operator : ccm
Acquired : 28 Sep 2001 23:00 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-13
Misc Info :
Vial Number: 9



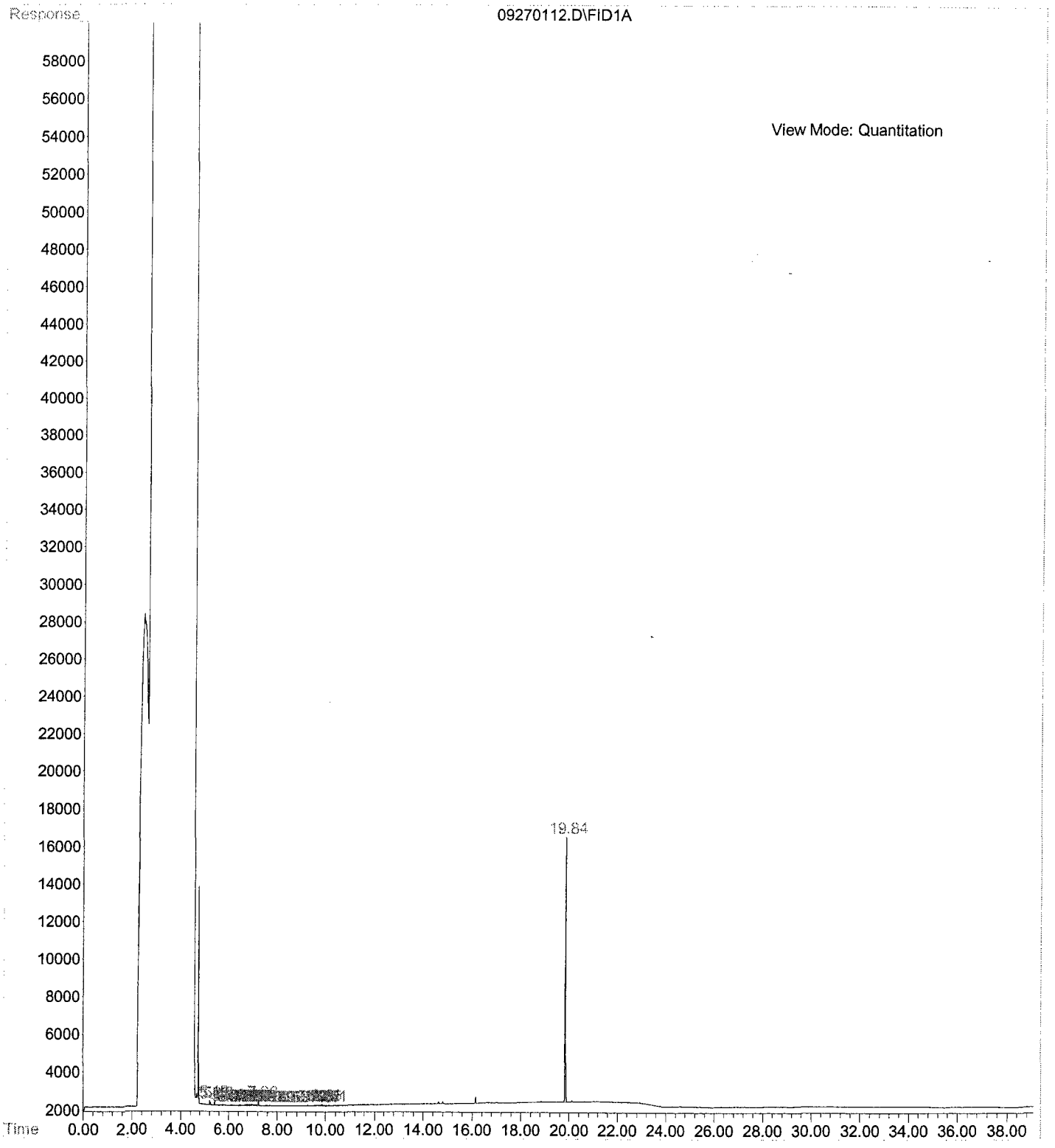
File : C:\HPCHEM\2\DATA\092701\09270110.D
Operator : ccm
Acquired : 28 Sep 2001 23:52 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-14
Misc Info :
Vial Number: 10



File : C:\HPCHEM\2\DATA\092701\09270111.D
Operator : ccm
Acquired : 29 Sep 2001 00:43 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-15
Misc Info :
Vial Number: 11



File : C:\HPCHEM\2\DATA\092701\09270112.D
Operator : ccm
Acquired : 29 Sep 2001 1:35 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-16
Misc Info :
Vial Number: 12



PINNACLE LABORATORIES

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

Pinnacle Lab ID number **110045**
October 26, 2001

AMEC EARTH & ENVIRONMENTAL
2060 AFTON PLACE
FARMINGTON, NM 87401

Project Name BMG 0-9
Project Number 1517000082

Attention: DON FERNALD

On 10/06/01 Pinnacle Laboratories, Inc., (ADHS License No. AZ0592 pending), 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.

The sample was incorrectly sent to Severn Trent. Upon return shipment the sample was received at 16 degrees celsius. The client was notified and the sample was analyzed with this limitation.

EPA method 8015 and 8021 analyses were performed by Pinnacle Laboratories, Inc. Albuquerque, NM.

All other analyses were performed by Severn Trent Laboratories, Inc. 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

MR: jt

Enclosure

PINNACLE LABORATORIES

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

CLIENT	: AMEC EARTH & ENVIRONMENTAL	PINNACLE ID	: 110045
PROJECT #	: 1517000082	DATE RECEIVED	: 10/06/01
PROJECT NAME	: BMG 0-9	REPORT DATE	: 10/26/01

PINNACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
110045 - 01	82-MW-2	AQUEOUS	10/05/01
110045 - 02	82-MW-6	AQUEOUS	10/05/01
110045 - 03	82-MW-7	AQUEOUS	10/05/01

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8021 MODIFIED
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 110045
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE ID. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	82-MW-2	AQUEOUS	10/05/01	NA	10/11/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-2
BENZENE	0.5	UG/L	< 0.5
TOLUENE	0.5	UG/L	< 0.5
ETHYLBENZENE	0.5	UG/L	< 0.5
TOTAL XYLENES	0.5	UG/L	< 0.5
METHYL-t-BUTYL ETHER	2.5	**UG/L**	**3.2**

SURROGATE:
BROMOFLUOROBENZENE (%) 87
SURROGATE LIMITS (80 - 120)

CHEMIST NOTES:
Due to the absence of Total Xylenes in the sample, the low level presence of Total Xylenes in the reagent blank, does not affect the data quality of this sample.

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 110045
BLANK I. D.	: 101101	DATE EXTRACTED	: N/A
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE ANALYZED	: 10/11/01
PROJECT #	: 1517000082	SAMPLE MATRIX	: AQUEOUS
PROJECT NAME	: BMG 0-9		

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	**UG/L**	**0.88**
METHYL-t-BUTYL ETHER	UG/L	<2.5
1,3,5-TRIMETHYLBENZENE	UG/L	<0.5
1,2,4-TRIMETHYLBENZENE	UG/L	<0.5

SURROGATE:
BROMOFLUOROBENZENE (%) 89
SURROGATE LIMITS: (80 - 120)

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8021 MODIFIED		
MSMSD #	: 110052-05	PINNACLE I.D.	: 110045
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: N/A
PROJECT #	: 1517000082	DATE ANALYZED	: 10/11/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS
		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	23.1	116	22.8	114	1	(80 - 120)	20
TOLUENE	<0.5	20.0	20.2	101	19.9	100	1	(80 - 120)	20
ETHYLBENZENE	<0.5	20.0	19.9	100	19.9	100	0	(80 - 120)	20
TOTAL XYLENES	<0.5	60.0	60.2	100	60.1	100	0	(80 - 120)	20

CHEMIST NOTES:
N/A

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

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

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS

TEST : EPA 8015 MODIFIED (DIRECT INJECT)
CLIENT : AMEC EARTH & ENVIRONMENTAL PINNACLE I.D.: 110045
PROJECT # : 1517000082
PROJECT NAME : BMG 0-9

SAMPLE ID #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
01	82-MW-2	AQUEOUS	10/05/01	10/14/01	10/14/01	1

PARAMETER	DET. LIMIT	UNITS	82-MW-2
FUEL HYDROCARBONS, C6-C10	2.0	MG/L	< 2.0
FUEL HYDROCARBONS, C10-C22	1.0	MG/L	< 1.0
FUEL HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0
CALCULATED SUM:			
SURROGATE:			
O-TERPHENYL (%)			88
SURROGATE LIMITS	(79 - 124)		

CHEMIST NOTES:
N/A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
BLANK I.D.	: 101401	PINNACLE I.D.	: 110045
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 10/14/01
PROJECT #	: 1517000082	DATE ANALYZED	: 10/14/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS

PARAMETER	UNITS	
FUEL HYDROCARBONS	MG/L	< 2.0
HYDROCARBON RANGE		< 1.0
HYDROCARBONS QUANTITATED USING		< 1.0
SURROGATE:		
P-TERPHENYL (%)		88
SURROGATE LIMITS	(78 - 128)	

CHEMIST NOTES:
NA

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

TEST	: EPA 8015 MODIFIED (DIRECT INJECT)		
MSMSD #	: 101401	PINNACLE I.D.	: 110045
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE EXTRACTED	: 10/14/01
PROJECT #	: 1517000082	DATE ANALYZED	: 10/14/01
PROJECT NAME	: BMG 0-9	SAMPLE MATRIX	: AQUEOUS
		UNITS	: MG/L

PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
FUEL HYDROCARBONS	<1.0	33.0	34.0	103	33.0	100	3	(64 - 127)	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 SERVICES

STL Pensacola
LOG NO: C1-10186
Received: 06 OCT 01
Reported: 19 OCT 01

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

Project: 110045, AMEC-BMG-09
Sampled By: Client
Code: 081811019

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
10186-2	82-MW-6/110045-02	10-05-01/14:16
10186-3	82-MW-7110045-03	10-05-01/14:45

PARAMETER	10186-2	10186-3
Nitrate-Nitrite, Nitrogen (353.2/354.1/4500-NO3)		
Nitrate + Nitrite-N, mg/l	0.10	<0.10
Nitrate-N, mg/l	0.10	<0.10
Nitrite-N, mg/l	<0.10	<0.10
Dilution Factor	1	1
Prep Date	10.06.01	10.06.01
Analysis Date	10.08.01	10.08.01
Batch ID	N3W62B	N3W62B
Prep Method	4500-NO2B	4500-NO2B
Analyst	CR	CR
Ammonia (as N) (350.1), mg/l	<0.05	<0.05
Dilution Factor	1	1
Prep Date	10.11.01	10.11.01
Analysis Date	10.12.01	10.12.01
Batch ID	AAW33A	AAW33A
Prep Method	350.1	350.1
Analyst	CR	CR
Total Dissolved Solids (160.1), mg/l	480	460
Dilution Factor	1	1
Prep Date	10.08.01	10.08.01
Analysis Date	10.09.01	10.09.01
Batch ID	TDW089	TDW089
Prep Method	160.1	160.1
Analyst	ST	ST

SEVERN TRENT SERVICES

STL Pensacola
LOG NO: C1-10186
Received: 06 OCT 01
Reported: 19 OCT 01

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

Project: 110045, AMEC-BMG-09
Sampled By: Client
Code: 081811019

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE/ TIME SAMPLED
10186-2	82-MW-6/110045-02	10-05-01/14:16
10186-3	82-MW-7110045-03	10-05-01/14:45

PARAMETER	10186-2	10186-3
Sulfate as SO4 (375.4), mg/l	13	8.6
Dilution Factor	1	1
Analysis Date	10.15.01	10.15.01
Batch ID	SEW133	SEW133
Analyst	BE	BE
Iron, Dissolved (6010B), mg/l	<0.10	<0.10
Dilution Factor	1	1
Prep Date	10.11.01	10.11.01
Analysis Date	10.12.01	10.12.01
Batch ID	PD124	PD124
Prep Method		
Analyst	GSP	GSP
Manganese, Dissolved (6010B), mg/l	0.31	1.9
Dilution Factor	1	1
Prep Date	10.11.01	10.11.01
Analysis Date	10.12.01	10.12.01
Batch ID	PD124	PD124
Analyst	GSP	GSP

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C1-10186
Received: 06 OCT 01
Reported: 19 OCT 01

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

Project: 110045, AMEC-BMG-09
Sampled By: Client
Code: 081811019

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
10186-4	Method Blank	
10186-5	Lab Control Standard % Recovery	
10186-6	Matrix Spike % Recovery	
10186-7	Matrix Spike Duplicate % Recovery	

PARAMETER	10186-4	10186-5	10186-6	10186-7
Nitrate-Nitrite, Nitrogen (353.2/354.1/4500-NO3)				
Nitrate + Nitrite-N, mg/l	<0.10	102 %	69 %	69 %
Nitrite-N, mg/l	<0.10	100 %	100 %	100 %
Dilution Factor	1	---	---	---
Prep Date	10.06.01	---	---	---
Analysis Date	10.08.01	---	---	---
Batch ID	N3W62B	N3W62B	N3W62B	N3W62B
Prep Method	4500-NO2B	---	---	---
Analyst	CR	---	---	---
Ammonia (as N) (350.1), mg/l	<0.05	96 %	76 %	76 %
Dilution Factor	1	---	---	---
Prep Date	10.11.01	---	---	---
Analysis Date	10.12.01	---	---	---
Batch ID	AAW33A	AAW33A	AAW33A	AAW33A
Prep Method	350.1			
Analyst	CR	---	---	---
Total Dissolved Solids (160.1), mg/l	<5.0	101 %	N/A	N/A
Dilution Factor	1	---	---	---
Prep Date	10.08.01	---	---	---
Analysis Date	10.09.01	---	---	---
Batch ID	TDW089		---	---
Prep Method	160.1	---	---	---
Analyst	ST	---	---	---

SEVERN TRENT SERVICES

STL Pensacola

LOG NO: C1-10186
Received: 06 OCT 01
Reported: 19 OCT 01

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

Project: 110045, AMEC-BMG-09
Sampled By: Client
Code: 081811019

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
10186-4	Method Blank	
10186-5	Lab Control Standard % Recovery	
10186-6	Matrix Spike % Recovery	
10186-7	Matrix Spike Duplicate % Recovery	

PARAMETER	10186-4	10186-5	10186-6	10186-7
Sulfate as SO4 (375.4), mg/l	<5.0	92 %	129 %	129 %
Dilution Factor	1	---	---	---
Analysis Date	10.15.01	---	---	---
Batch ID	SEW133	SEW133	SEW133	SEW133
Prep Method	---			
Analyst	BE	---	---	---
Iron, Dissolved (6010B), mg/l	<0.10	99 %	99 %	100 %
Dilution Factor	1	---	---	---
Prep Date	10.11.01	---	---	---
Analysis Date	10.12.01	---	---	---
Batch ID	PD124	PD124	PD124	PD124
Prep Method				
Analyst	GSP	---	---	---
Manganese, Dissolved (6010B), mg/l	<0.010	99 %	98 %	99 %
Dilution Factor	1	---	---	---
Prep Date	10.11.01	---	---	---
Analysis Date	10.12.01	---	---	---
Batch ID	PD124	PD124	PD124	PD124
Analyst	GSP	---	---	---

SEVERN TRENT SERVICES

STL Pensacola
LOG NO: C1-10186
Received: 06 OCT 01
Reported: 19 OCT 01

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

Project: 110045, AMEC-BMG-09
Sampled By: Client
Code: 081811019

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	DATE/ TIME SAMPLED
10186-4	Method Blank	
10186-5	Lab Control Standard % Recovery	
10186-6	Matrix Spike % Recovery	
10186-7	Matrix Spike Duplicate % Recovery	

PARAMETER	10186-4	10186-5	10186-6	10186-7

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.
See the Project Sample Inspection Form (PSIF) to determine if a sample was received that did not meet EPA requirements for sample collection, preservation, or holding time.

Lance Larson, Project Manager

Final Page Of Report

SEVERN TRENT SERVICES

STL Pensacola

Data Qualifiers for Final Report

B1	The analyte was detected in the associated method blank (sample itself is flagged even though sample is ND).
B2	The analyte was detected in the sample(s) and in the associated method blank analyzed on the day samples were extruded; however, this analyte was not detected in the blank analyzed with the samples.
B3	The analyte was found in the associated blank as well as in the associated sample(s) (qualifier is applied to the sample, not to the blank).
B4	Sample results were corrected due to contaminants in Fractionation Blank
D	Diluted out (surrogate or spike due to sample dilution)
E	Compound concentration exceeds the upper calibration range of the instrument.
F	The reported value is < STL Pensacola RL and ≥ the STL Pensacola MDL; therefore, the quantitation is estimation.
G	Sample and/or duplicate result is at or below 5 X (times) the STL Reporting Limit and the absolute difference between the sample and duplicate result is at or below the STL reporting limit; therefore, the results are "in control".
H1	Sample and/or duplicate is below 5 X (times) the STL Reporting Limit and the absolute difference between the results exceeds the STL Reporting Limit; therefore, the results are "out of control"
H2	Sample and duplicate (or MS and MSD) RPD is above control limit.
J (description)	The analyte was positively identified, the quantitation may be an estimation
J4	(For positive results)Temperature limits exceeded (≤2°C or ≥ 6°C), non-reportable for NDPES compliance monitoring.
J6	(For positive results) LCS or Surrogate %R is > upper control limit (UCL), results may be biased high
J8	Matrix spike and post spike recoveries are outside control limits. See out of Control Events/Corrective Action Form.
J9	(For positive results) LCS or Surrogate %R is < lower control limit (LCL), results may be biased low
M1	A matrix effect was present ([1]sample, MS or MSD was analyzed twice to confirm surrogate/spike failure, [2]sample and/or MS/MSD chromatogram(s) had interfering peaks, [3]sample result was > 4 X spike added, [4]metals serial dilution was performed, or [5]metals post spike is < 40% R)
M2	The MS and/or MSD %R or RPD was outside upper or lower control limits; not necessarily due to matrix effect.
N/C	Not Calculable; Sample spiked is > 4X spike concentration (may also use this flag in place of negative numbers)
NH	Sample and duplicate results are "out of control". The sample is nonhomogeneous.
NoMS	Not enough sample provided to prepare and/or analyze a method-required matrix spike (MS) and/or duplicate (MSD)
Q	The analytical (post digestion) spike is reported due to the percent recovery being outside limits on the matrix (pre-digestion) spike.
R (description)	The quantitation may be an estimation.
R1	(For nondetects) Temperature limits exceeded (≤2°C or ≥ 6°C); non-reportable for NDPES compliance monitoring
R2	Improper preservation, no preservative present or insufficient amounts of preservative in sample upon receipt, non-reportable for NDPES compliance monitoring
R3	Improper preservation, incorrect preservative present in sample upon receipt, non-reportable for NPDES compliance
R4	Holding time exceeded, non-reportable for NDPES compliance monitoring.
R5	Sample collection requirements not met, see case narrative.
R6	LCS or surrogate %R is < LCL and analyte is not detected or surrogate %R is < 10% for detects/nondetects.
R7	Internal standard area outside –50% to +100% of calibration verification standard.
R8	Initial calibration or any calibration verification exceeds acceptance criteria.
R9	Not filtered and preserved at time of collection.
R10	Headspace >1/4" in diameter in volatile vials, non-reportable for NPDES compliance monitoring
R11	Samples were filtered and preserved within 4 hours of collection.
R12	Analysis performed outside the 12-hour tune or not within tune criteria.
S1	The Method of Standard Additions (MSA) has been performed on this sample.
S2	Incorrect sample amount was submitted to the laboratory for analysis
S3 (Flashpoint)	This method is not designed for solids and the results may not be accepted by any regulator for such purposes.
T	Second-column or detector confirmation exceeded the SW-846 criteria of 40% RPD for this compound.
TIC	The compound is not within the initial calibration curve. It is searched for qualitatively or as a Tentatively Identified Compound.
U	The analyte was analyzed for but not detected (at or above the RL or the MDL, whichever is entered next to the "U" value. Value for result will never be below the MDL)
W	Post-digestion spike for Furnace AA is out of control limits (85-115%), while sample absorbance is less than 50% spike absorbance.
@	Adjusted reporting limit due to sample composition, not due to overcal (dilution prior to digestion and/or analysis).
#	Elevated reporting limit due to insufficient sample size
1 pt	The compound has been quantitated against a one point calibration.
* (Metals & Wet Chem)	Elevated reporting limit due to matrix interference (dilution prior to digestion and/or analysis)

Revised: 06/19/01

STL PENSACOLA
State Certifications

Alabama Department of Environmental Management, Laboratory ID No. 40150 (Drinking Water by Reciprocity with FL), expires 06/30/02

Arizona Department of Health Services, Lab ID No. AZ0589 (Hazardous Waste & Wastewater), expires 01/12/02

Arkansas Department of Pollution Control and Ecology, (No Laboratory ID No. assigned by state) (Environmental), expires 02/07/02

*State of **California**, Department of Health Services, Laboratory ID No. 01128CA (Hazardous Waste and Wastewater), expires 03/31/02*

*State of **Connecticut**, Department of Health Services, Connecticut Lab Approval No. PH-0697 (D W, H W and Wastewater), expires 09/30/01*

Delaware Health & Social Services, Division of Public Health, Laboratory ID No. FL094 (Drinking Water by Reciprocity with FL) Extension granted

Florida DOH Laboratory ID No. E81010 (Drinking Water, Hazardous Waste and Wastewater), expires 06/30/02

Florida DEP/DOH CompQAP # 980156

Florida, Radioactive Materials License No. G0733-1, no expiration date assigned

Foreign Soil Permit, Permit No. S-37599

Kansas Department of Health & Environment, Laboratory ID No. E10253 (Wastewater and Hazardous Waste), expires 10/31/01

*Commonwealth of **Kentucky**, Natural Resources and Environmental Protection Cabinet, Laboratory ID No. 90043 (Drinking Water), expires 12/31/01*

*State of **Louisiana**, DHH, Office of Public Health Division of Laboratories, Laboratory ID No. LA000017 (Drinking Water), expires 12/31/01*

Louisiana Department of Environmental Quality, LELAP, Laboratory ID No. 02075, Agency Interest ID 30748 (Environmental, expires 6/30/02)

*State of **Maryland**, DH&MH Laboratory ID No. 233 (Drinking Water by Reciprocity with Florida), expires 09/30/02*

*Commonwealth of **Massachusetts**, DEP, Laboratory ID No. M-FL094 (Wastewater), expires 06/30/02*

*State of **Michigan**, Bureau of E&OccH, Laboratory ID No.9912 (Drinking Water by Reciprocity with Florida), expires 06/30/02*

*New **Hampshire** DES ELAP, Laboratory ID No. 250501 (Wastewater), expires 08/16/02*

*State of New **Jersey**, Department of Env. Protection & Energy, Laboratory ID No. 49006 (Wastewater and Hazardous Waster), expires 06/30/01*

New York State, Department of Health, Laboratory ID No. 11503 (WW and Solids/Hazardous Waste), expires 03/31/02

North Carolina Department of Environment & Natural Resources, Laboratory ID No. 314 (Hazardous Waste and Wastewater), expires 12/31/01

North Dakota DH&Consol Labs, Laboratory ID No. R-108 Wastewater and Hazardous Waste by Reciprocity with Florida), expires 06/30/02

*State of **Oklahoma**, Oklahoma Department of Environmental Quality, Laboratory ID No. 9810 (Hazardous Waste and Wastewater), expires 08/31/02*

*Commonwealth of **Pennsylvania**, Department of Environmental Resources, Laboratory ID No. 68-467 (Drinking Water), expires 12/01/01*

South Carolina DH&EC, Laboratory ID No. 96026 (Wastewater & Solids/Hazardous Waste by Reciprocity with FL), expires 06/30/02

Tennessee Department of Health & Environment, Laboratory ID No. 02907 (Drinking Water), expires 08/03/04

Virginia Department of General Services, Laboratory ID No. 00008 (Drinking Water by Reciprocity with FL), expires 06/30/02

*State of **Washington**, Department of Ecology, Laboratory ID No. C282 (Hazardous Waste and Wastewater), expires 09/14/01*

West Virginia Division of Env., Office of Water Resources, Laboratory ID No. 136 (Haz Waste and Wastewater Reciprocity FL), expires 12/31/01

*American Industrial Hygiene Association (**AIHA**) Accredited Laboratory, Laboratory ID No. 100704, expires 04/01/04*

STL Pensacola
PROJECT SAMPLE INSPECTION FORM

SEVERN TRENT SERVICES

Lab Order #: C110186 Date Received: 10-6-01

1. Was there a Chain of Custody? (Yes) No+
2. Was Chain of Custody properly filled out and relinquished? (Yes) No+
3. Were samples received cold? (Criteria: 2° - 6°C: STL-SOP) (Yes) No+ N/A
4. Were all samples properly labeled and identified? (Yes) No+
5. Did samples require splitting or compositing♦? Yes+ (No)
   Req By: PM Client Other♦
6. Were samples received in proper containers for analysis requested? (Yes) No+
7. Were all sample containers received intact? (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
9. Is there sufficient volume for analysis requested? (Yes) No+ N/A *(Can)*
10. Were samples received within Holding Time? (REFER TO STL-SOP 1040) (Yes) No+
11. Is Headspace visible > ¼" in diameter in VOA vials?* If any headspace is evident, comment in out-of-control section. Yes+ (No) N/A
12. If sent, were matrix spike bottles returned? Yes No+ (N/A)
13. Was Project Manager notified of problems? (initials: PSH DMH 10-6-01) (Yes) No+ DMH 10-6-01

Airbill Number(s): 1Z 878 168 22 1004 3320

Shipped By: UPS

Cooler Number(s): client

Shipping Charges: N/A

Cooler Weight(s): 19#

Cooler Temp(s) (°C): 2° (CCK11)

(LIST THERMOMETER NUMBER(S) FOR VERIFICATION)

Out of Control Events and Inspection Comments:

9. Sample MW-2, DEO was requested on COC but we did not received a bottle for this analysis. DMH 10-6-01
SAMPLE SENT TO STL BY ERROR. SEND BACK TO PINNACLE. LL 10/9 @1035

(USE BACK OF PSIF FOR ADDITIONAL NOTES AND COMMENTS)

Inspected By: DMH **Date:** 10-6-01 **Logged By:** BFE **Date:** 10/6/01

♣ *Note all Out-of-Control and/or questionable events on Comment Section of this form. For holding times, the analytic department will flag immediate hold time samples(pH, Dissolved O_2, Residual CL) as out of hold time, therefore, these samples will not be documented on this PSIF.*

♦ *If Other, note who requested the splitting or compositing of samples on the Comment Section of this form. 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 preservatives for the State of North Carolina, the State of New York, and other requested samples are to be recorded on the sheet provided to record pH results (STL-SOP 938, section 2.2.9).*

* *According to EPA, ¼" of headspace is allowed in 40 ml vials requiring volatile analysis, however, STL makes it policy to record any headspace as out-of-control (STL-SOP 938, section 2.2.12).*

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 10/5/01 PAGE: 1 OF 1

PLI Accession #: C1101 86

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: Don Fernald

COMPANY: AMEC

ADDRESS: 2080 Afton
Farmington, NM 87401

PHONE: (505) 327-7928

FAX: (505) 326-5126

BILL TO: ABOVE

COMPANY:

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB I.D.	Petroleum Hydrocarbons (418.1) TRPH	(MOD.8015) Diesel/Direct Inject	8015/8020 Don Fernald	(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 ☐	Fe Mn	8260 (TCL) Volatile Organics	8260 (Full) Volatile Organics	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:	NO3, NH3, NO2, Sq, TDS	Priority Pollutant Metals (13)	Target Analyte List Metals (23)	RCRA Metals (8)	RCRA Metals by TCLP (Method 1311)	Metals:		NUMBER OF CONTAINERS
82-MW-2	10/5/01	13:06	H2O	1			X																										3
82-MW-6	10/5/01	14:16	H2O	2												X										X							3
82-MW-7	10/4/01	14:45	H2O	3												X										X							3

PROJECT INFORMATION

PROJ. NO.: 151700008 2

PROJ. NAME: BMG 0-9

P.O. NO.:

SHIPPED VIA: UPS

SAMPLE RECEIPT

NO. CONTAINERS	
CUSTODY SEALS	Y/N/NA
RECEIVED INTACT	
BLUE ICE/ICE	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

CERTIFICATION REQUIRED: ☐ NM ☐ SDWA ☐ OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

NORMAL TAT

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
Signature: Time: 17:25	Signature: Time:
Printed Name: Don Fernald Date: 10/5/01	Printed Name: Date:
Company: AMEC	Company:
See reverse side (Force Majeure)	
RECEIVED BY: 1.	**RECEIVED BY: (LAB) 2.**
Signature: Time: Davette Howard 1035	Signature: Time:
Printed Name: Date: Davette Howard 10-6-01	Printed Name: Date:
Company: STL DNS	Pinnacle Laboratories Inc.

110045

Pinnacle Laboratories Inc.

CHAIN OF CUSTODY

DATE: 9/5/01 PAGE: 1 OF 1

PLI Accession #: C110186

SHADED AREAS ARE FOR LAB USE ONLY.

PLEASE FILL THIS FORM IN COMPLETELY.

PROJECT MANAGER: Don Fernald

COMPANY: AMEC

ADDRESS: 200 Afton Farmington, NM 87401

PHONE: (505) 327-7928

FAX: (505) 326-5126

BILL TO: ABOVE

COMPANY:

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB #	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	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 (Method 1311)	Metals:	
82-MW-2	10/5/01	13:06	H2O	1		X																							
82-MW-6	10/5/01	14:16	H2O	2										X										X					
82-MW-7	10/5/01	14:45	H2O	3										X										X					

Fe, Mn (Dissolved)

NO3, NO2, Br, SO4, TDS

PROJECT INFORMATION	
PROJ. NO.:	15170000 82
PROJ. NAME:	BMG 0-9
P.O. NO.:	
SHIPPED VIA:	UPS

SAMPLE RECEIPT	
NO. CONTAINERS	
CUSTODY SEALS	Y/N/NA
RECEIVED INTACT	
BLUE ICE/ICE	

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

CERTIFICATION REQUIRED: ☐ NM ☐ SDWA ☐ OTHER

METHANOL PRESERVATION ☐

COMMENTS: FIXED FEE ☐

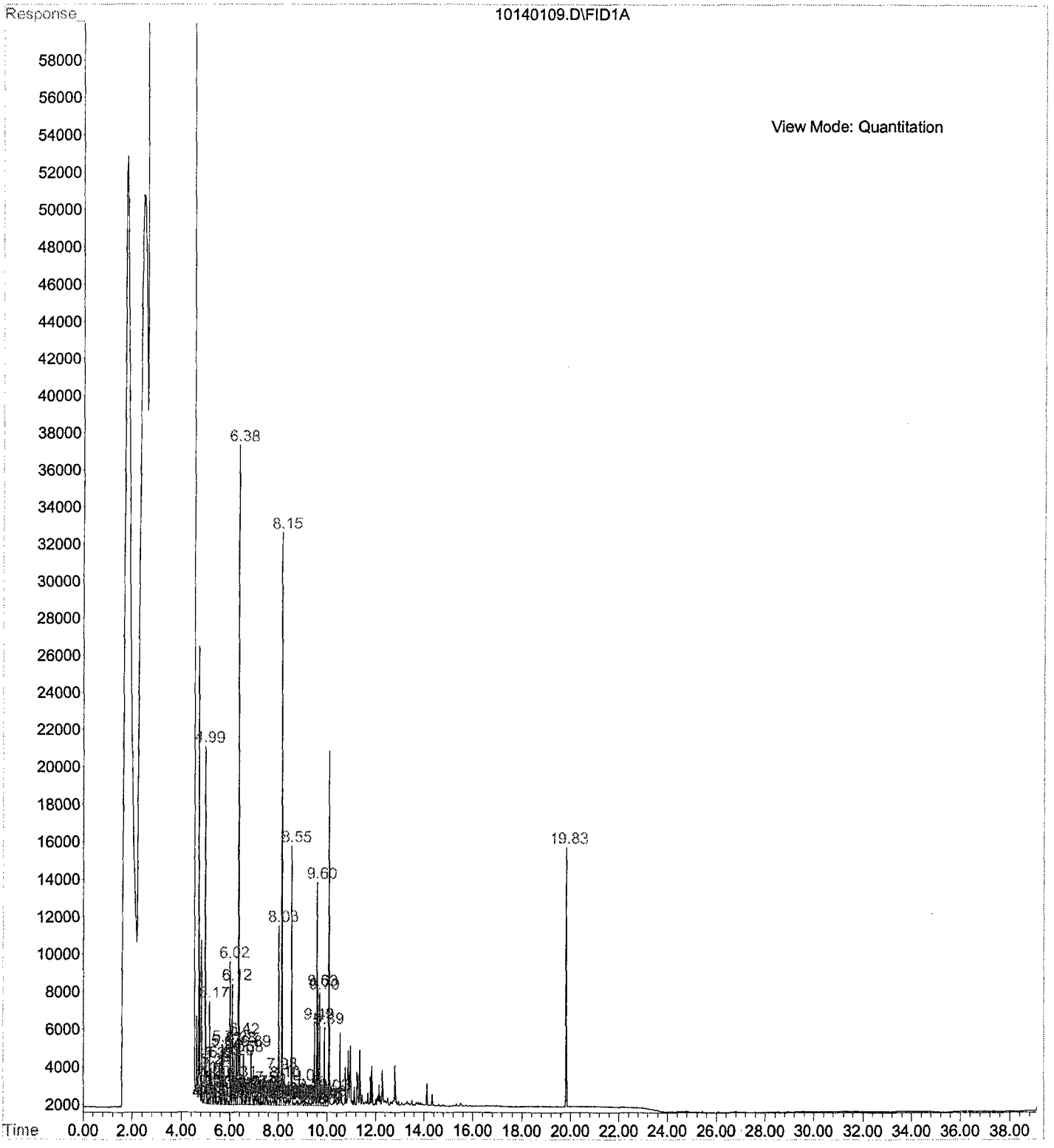
NORMAL TAT

Please filter & preserve samples for dissolved metals.

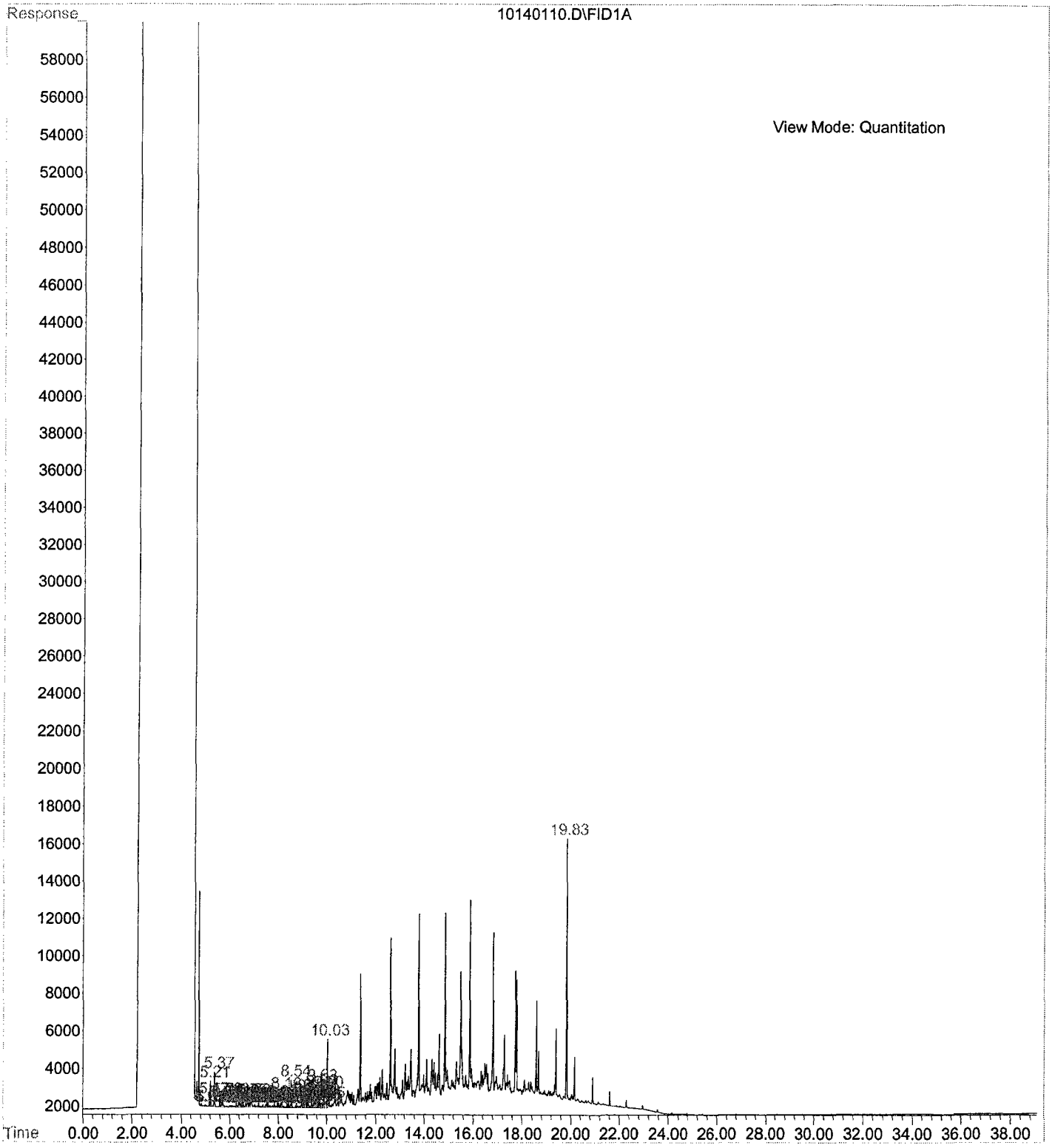
Rec'd MW-2 @ 16.1°C

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
Signature:	Signature:
Time: 17:25	Time: 1700
Printed Name: Don Fernald	Printed Name: R. ELDERKIN
Date: 10/5/01	Date: 10/9/01
Company: AMEC	Company: STL-PNS
RECEIVED BY: 1.	RECEIVED BY: (LAB) 2.
Signature: Daverette Howard	Signature: Francine Tanno
Time: 0935	Time: 0935
Printed Name: Daverette Howard	Printed Name: Francine Tanno
Date: 10/6/01	Date: 10/10
Company: STL PNS	Pinnacle Laboratories Inc.

File : C:\HPCHEM\2\DATA\101401\10140109.D
Operator : ccm
Acquired : 15 Oct 2001 3:21 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: gas ccv
Misc Info :
Vial Number: 9



File : C:\HPCHEM\2\DATA\101401\10140110.D
Operator : ccm
Acquired : 15 Oct 2001 4:14 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: dsl ccv
Misc Info :
Vial Number: 10



File : C:\HPCHEM\2\DATA\101401\10140108.D
Operator : ccm
Acquired : 15 Oct 2001 2:29 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 110045-01
Misc Info :
Vial Number: 8