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# 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

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**NOVEMBER 26, 2001** 

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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  $\mu$ g/L respectively, which exceeds the State of New Mexico groundwater standards of 10  $\mu$ g/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.

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- 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 freephase 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 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 20<sup>th</sup> and 21<sup>st</sup>, 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<sup>TM</sup> 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<sup>TM</sup> 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	Groundwater	Relative				
	Top of Casing	Depth from Top of	Groundwater				
	Elevation	Casing	Depth				
<b>MW-1</b>	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				
<b>MW-7</b>	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	Toluene	Ethybenzene	Total Xylenes			
	μg/L	μg/L	μg/L	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	10	750	750	620			
Standard							



\* 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 ( $\mu$ g/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<sub>4</sub>, 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							
	*Conductivity	*Dissolved	*Reduced	Sulfate as SO <sub>4</sub>			
Monitoring Well	Mmhos/cm	Oxygen mg/L	Oxygen Potential	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			
	Nitrate	Ammonia	TDS	Dissolved Iron			
Monitoring Well	mg/L	as N mg/L	mg./L	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.

#### <u>Nitrate</u>

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.

#### <u>Sulfate</u>

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  $10^{\circ}$ C to  $15^{\circ}$ 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  $10^{\circ}$ C increase in temperature over the range of  $5^{\circ}$ C and  $25^{\circ}$ 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 reinstall 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 26<sup>th</sup>, 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



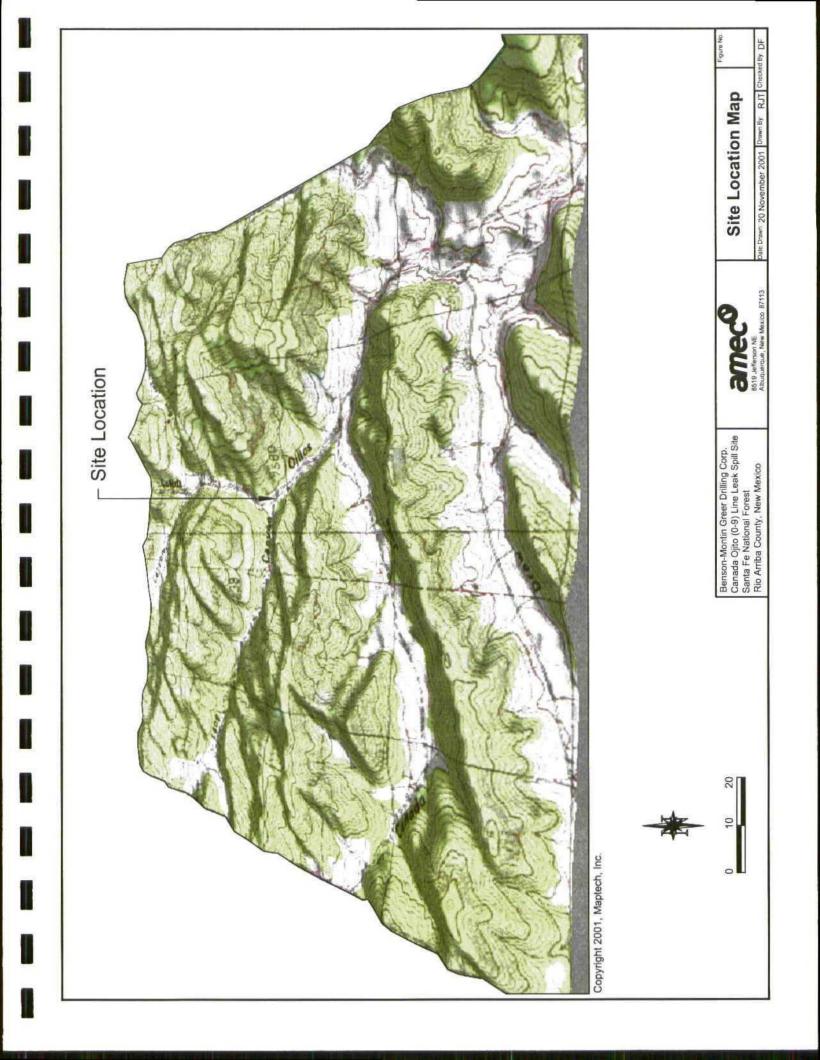
the removal of product. AMEC recommends the addition of an Oxygen Release Compound (ORC<sup>®</sup>) or similar product to monitoring wells MW-6 and MW-7 to enhance RNA factors and promote biodegradation of the hydrocarbons. Once free-phase hydrocarbons have been removed from monitoring well MW-5, an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

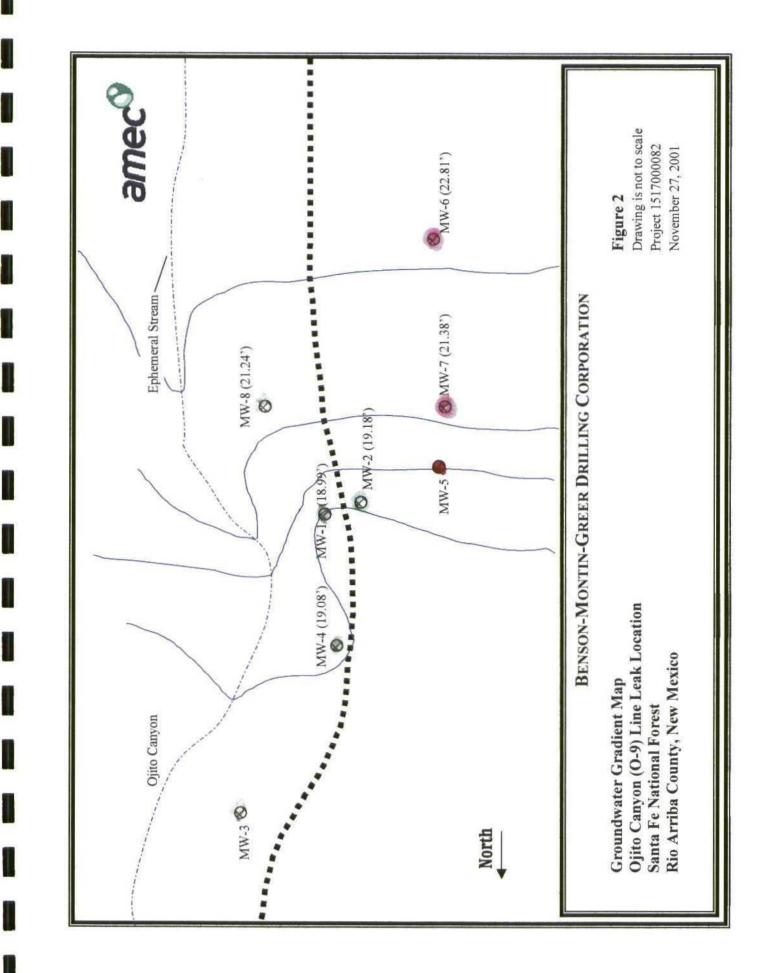


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ame	c <sup>©y</sup>						5B-13
Record of	Subsurf	ace Exp	loration		Boreh Well i		MW-6
AMEC Earth					Page	í	of /
2060 Afton Pl					MG O	9	
Farmington, N				Project Name			
(505) 327-792	28 Fax (50	5) 326-572	21		1 to Gan		
	_	,				1	1
levation	~ 7,5	CO'		Well Logged By	c	ernald	/
Borehole Locatio GWL Depth	~ /2 !	bas		Personnel On-Site Contractors On-Site	Envilat	ec h	<u>-</u>
ogged By	Do		erneld	Client Personnel On-Site	13146		Sanchez
Drilled By	<u>   {e </u>		edilla	Distance Manager	11 5 19 - 1	1 1/- 1	D 9"0D
Date/Time Start Date/Time Com		20/01	-12:10	Drilling Method Air Monitoring Method	HSA - C	0'4 1	
		12018					
Deeth	Comple	Sample	Samela Deparintion		Air Monitorir	10	Drilling Conditions
Depth (Peet)	Sample Interval	Type & Recovery	Sample Description Classification System: USCS		Units: NDL	ĭ i	& Blow Counts
		(inches)			Benzene H	2S	
			Sampling initiated	105 has			
5							
	27"	19"	Moderate reddish-brod silty sand (111)	wn fine	34		
	21		silty sand ((111)			-	
$\vdash$	1		<i>,</i>				
10		7-0 <b>000 01</b> 0-0000000000000000000000000000000		ann 1940an ao faoi na taona ann an taona ann an taona an taona an taon an taon an taon an an taon an ann an tao			
<b>├</b> ──	27"	24"	Moderate reddish brown t	THE SITTY STANDAY	3.8	ĺ	
	27"	16"	project clay - water @ ~ Fine to med. sand is p	11.5 pgs where	3.1	1	
15		16	Kine to med. sand is p	Werawy.	20		
	(27"	21"	dark reddish brown and gravel (very we	SITTY Sand	3.2		
			and graver (very we				
-			dark red-brown silty to black on black with	clay grading			
20			to black on black when	offler			
			NO HE Odors - very				
			The second se	,			
25			Boring advanced to				
20			& converted into M				
			15' of .010 screen. 4	5" end cap.			
É I			15 01 ,010 Deleti, "				
30			Total depth 19'9"				
			Sand 10-20 to 2 bgs				
┝──			2111 1 1 1 1 1 1 1	1" 1			
			36" bentonite holoplug t	o 695.			
35			Well complete @ 2:10	-			
┝				(			
			Used 12 bags 10.20 50"	Sand			
- 40			v			1	
L							
Comments:							
Comments,	<del> </del>			· · · · · · · · · · · · · · · · · · ·			
			Geologist Signature		- far	Z	
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ame	C			Borehole #	5B-14
	Subsurface Expl	oration		Well #	
	h & Environmental			Page	l of l
2060 Afton F Farmington	New Mexico 87401			MG 0-9	
-	28 Fax (505) 326-572	1	Project Number 15/78		
				Qiito Cany	1011
	- 7500'	· · · · · · · · · · · · · · · · · · ·		Pon Fernald	/
Borehole Location GWL Depth	~ /5'	· · · · · · · · · · · · · · · · · · ·	Personnel On-Site Contractors On-Site	Envirotech	· · · · · · · · · · · · · · · · · · ·
Logged By	Don Fer		Client Personnel On-Site		Sanchez
Drilled By Date/Time Starte	Eelly FE	<u>dilla</u> ~ 2:20	Drilling Method	<u>USA</u> PID	
Date/Time Comp		- 3:10	Air Monitoring Method	PID	
r	Sample			Fin	
Depth	Sample Type &	Sample Description		Air Monitoring Units: NDU	Drilling Conditions & Blow Counts
(Feet)	Interval Recovery (inches)	Classification System: USCS		<benzena 1128<="" td=""><td>&amp; Blow Counts</td></benzena>	& Blow Counts
0		Sampling initio	ted		
		Sampling initia: @ 10'bgs			
		@ 10 1933			
5					
10		a a construction de la construction parametro actual (construction de la construction personale de la construct	in a constant water and the state of performance and the state of the	- See a Name Usame Second RA Str	
	27" 22"	Moderate reddish bro. Sand to 11.5' From 11.5	wh fine silty.	-52.3	
	27" 6"	Sand to 11.5 From 11.5	-12 bgs is a		
15 /	27 6"	slight He odors.	-iltu		
	27" 18"	Sand to 11.5 From 11.5 Dale yellowish brown slight HC odors. pale yellowish brown medium grained	maist sand -	-115	
	27" 15"	medium grained	• • • •	17.0	
20		Reddish - brown sit fine to med. grained	ly sand	- /7.0	
		fine to med. grained	( (very wet)		
		· Polled brain class	the lat	77.4	
		Piele das	· · · · · ·		
25		tarely dey.			
		fairly dry. Terminated boring e - 1 bay 50# 36" bentoni * cuttings	9 18 bas.		
			it a		
30	Darkfiller	- 1 bay 50# 28" DENTONI	IE		
		s cuttings			
35					
40					
Comments:					
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Geologist Signature

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<b>AMEC<sup>LY</sup></b> Record of Subsurface I	Exploration		Borehoie # Well #	SB-15
AMEC Earth & Environmer 2060 Afton Place Farmington, New Mexico 874 (505) 327-7928 Fax (505) 326	401	Project Name Project Number 15/700005 Project Location		/ of /
Drilled By Kelly Date/Time Started 9/20/01	Fernald Padilla - 3:25 01 -	Well Logged By	A P)D	
Depth Sample Type (Feet) Interval Recov (inch	& Sample Description ery Classification System: USCS	1	HID Air Monitoring Units: NBU=- M2010	Drilling Conditions & Blow Counts
$ \begin{array}{c}     5 \\     \hline     10 \\     \hline     27^{"} 22 \\     \hline     27^{"} 16 \\     \hline     20 \\     20 \\     20 \\     20 \\     20 \\     30 \\     30 \\     35 \\     40 \\   \end{array} $	LOGISA DIOWN STUTY SAME	y med-fine -6 3'. HC ODOIRS	<sup>7</sup> 67 (4,5	
Comments:	L		<u> </u>	······································
	<u>Geologist Signature</u>		25	

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Record of Subsurface Exploration AMEC Earth & Environmental 2060 Afton Place Farmington, New Mexico 87401

(505) 327-7928 Fax (505) 326-5721

Elevation ~ 7,500' Borehole Location GWL Depth ~ /S' Logged By \_\_\_\_\_\_\_Fernald Drilled By \_\_\_\_\_\_Fernald Date/Time Started \_\_\_\_\_\_\_ Date/Time Completed \_\_\_\_\_\_\_\_

Borehole # Well # Page BMG ٠ Project Name Project Number Phase Project Location any Well Logged By Personnel On-Site Contractors On-Site rotech 1-61 Client Personnel On-Site Sanche 60 -5 A Drilling Method

PID

Air Monitoring Method

Depth (Feet)	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	P / D> Air Monitoring Units: <del>NDU</del> - B <del>onzene - 112</del> 5	Drilling Conditions & Blow Counts
			Initiated sampling @ 5'bgs		
5	27"	24"	Moderate reddish-brown fine silty sand. (7;11)	- 0.8	
	27" 27"	20" 8" -	Moderate reddish-prown silty fine to Medium grained sand w/problest rarger quartzite	7,2	
15			Moderate reddish-brown, grading to a pale yellow-brown silty med groined sand wy quartzite, slight it codors?	-3/3	
20 			Moist Dork brown to black silty - medium grained sand, HC ODORS	-147	
30			Water @ ~ 15! Boring terminated @ 20'bgs Converted to MW-7		
			MW-7 set ~ 19'695 Screen 19-9'695 - 10' 10-20 Samt 19-7'695 SE" hole blog 7.5'695		
40			36" hole blug 7.5 b55 growt "quirrgel" 0.5 bg 3 [2:30		
Comments:					
			Geologist Signature	2.2	

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Record of Sub	surface	Exploration		Borehole # Well #	<u>513-17</u> Mul. 0
AMEC Earth & ]				Page	/ of /
2060 Afton Place			P	110 0	2
Farmington, New			Project Name 57 Project Number 1577	MG D DDP2 Phase	- 7
(505) 327-7928 F	ax (505) 32	6-5721	Project Number 75777	Gito Canyo	
levation	7,50		Well Logged By	Donter	nald
orehole Location _ WL Depth	SE	<u>gf_Mu2-8_</u>	Personnel On-Site . Contractors On-Site	Envirotec L	
.ogged By	~ ~	Fernald	Client Personnel On-Site	\$25.	and the second sec
Drilled By	Kelly	Padilla			
ate/Time Started		1/01 - 1:20	Drilling Method	<u>1151</u>	
)ate/Time Comple	ted <u>9/2/</u>	101 - 2:20	Air Monitoring Method	PID	
	Sa	ample		PITO	
	Sample Ty	vpe & Sample Description		Air Monitoring	Drilling Conditions
(Feet)	1	covery Classification System: USCS inches)		Units: HDU Benzene H2S	& Blow Counts
0					
-					
⊢					
5		n" Moderate reddish-brow	24 silty-sand		
$\vdash$	27'' 2.	2" Moderate leadish - Drou	silly - sand	-0.0	
	0-711 -	23° Dark reddish-brown Some black organic 4" "w/rust red 11 motiles 24" very moist 7" " (Water @~ 19'? band @ 19'-wate	moist clar.	+0.0	
	27" 5	3 Some black organic	matter present.		
┝━	27" 2	4" " Wast Sed	11 W	+0.0	
15		- WY rust ed			
		5" Il mottles	F 11 11	+0.0	
	27" 2	4" Very Moist	10,011 11	-00	
		7" Some San	1017	100	
20	21 7	?" " Water @~ 19'?	) sitty sand	+	
$\vdash$ $\mid$ $\mid$		bund @ 19'-wate	(		
		vana e			
25		Terminated boring	@ 20'bas		
		reruning eer borring	a		
		to convert to MW.	- Ø.		
<u>}−    </u>		10'- Screen 20-10' bg 10'- Screen 20-10' bg 10:20 Sand 20-8' bg: bentomite 8-6' bg:	5 Seh 40		
30		Asa Sand 20- 8' ha	5 4" PVC		
		have the of the	-		
		pentomite 8-6 bg:	>		
		Quickgel 6'- 0' bg s growt	5		
35		grout	-		
$\vdash$ $\mid$ $\mid$					
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# LI INSTALLATION DECODD

MONITORING WELL INSTA	LLATION RECOR	D		Bore	hole # <u>58 - 13</u>
AMEC Earth & Environmenta	al			Page	# 100 k/. 6
Farmington, New Mexico '87401			Project Nam	e GMG D	4
(505) 327-7928 Fax (505) 326-5721			Project Numbe	[ 151700038 )	9 Cost Code
			Project Location	n Diito Car	ova 17
Elevation $27.500$	·			t Da Fe	rnald
Well Location <u>Sof</u>	/ Mul-5	-	Personnel On-Sit		·····
GWL Depth $-\frac{12}{695}$	11a - Envirotech	-	Contractors On-Sit	e <u>Envirotech</u>	1. 53.4.1
Installed By <u>Kelly</u> Padi,	11a - Envirotech		ent Personnel On-Sit	tet Sanc	nez · DMm
Date/Time Started 9/20/	01 1:00				
Date/Time Completed 9/20/	1 1:50				
- 77					
Depths in Reference	e to Ground Surface				
Item	Material	Depth (feet)	F	Top of Protectiv	ve Casing $\sim 2'4''$
Top of Protective Casing	Lacking			Top of Riser	~ <u>2'</u>
Bottom of Protective Casing	Locking Steel protector	-6"		Ground Surface	0
Top of Permanent Borehole Casing	sch 40 prc	12'			
Bottom of Permanent Borehole Casing	4"sch 40 Puc	50'			
Top of Concrete		76"			
Bottom of Concrete		-6"			
Top of Grout					
Bottom of Grout		Bur			
Top of Well Riser	9"sd 40 pvc	-2'			
Bottom of Well Riser	4"sch 40 pve	5'			
Top of Well Screen	fisch 40 prc	5'	000 000	Top of Seal	
Bottom of Well Screen (	.010 sciten 1	20'			
Top of Peltonite Seal	18" bentanite heeping	6			
Bottom of Peltonite Seal	3/8" pentonite proplag	2'	$\infty$	Top of Gravel P	ack
Top of Gravel Pack	10-20 Sand .	2		Top of Screen	<u>s'</u>
Bottom of Gravel Pack	10.20 Sand	20'			
Top of Natural Cave-In					
Bottom of Natural Cave-In					<b>~</b> -'
Top of Groundwater		2/2'		Bottom of Scree	
Total Depth of Borehole		-20'		Bottom of Boreh	iole <u>20</u> °

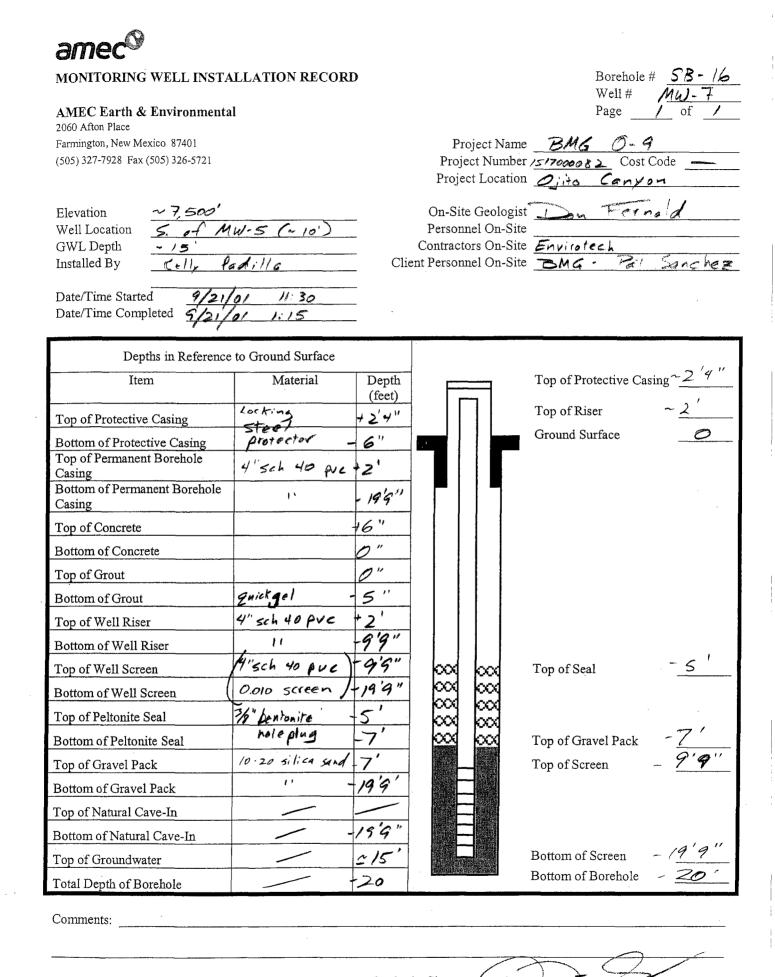
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Geologist Signature (



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MONITORING WELL INSTA	LLATION RECORI	)			Borehole # Well #	# <u>58-17</u> <u>MW-8</u>
AMEC Earth & Environmental					Page	/_ of /
2060 Afton Place Farmington, New Mexico 87401			Project N	lame <b>BM</b>	6 0	- 9
(505) 327-7928 Fax (505) 326-5721			Project Nur Project Loca	mber 1 <u>517000</u> ationi+•	282 Cost (	Code
Elevation $\sim 7,500$ Well Location $\leq E \circ f$ GWL Depth $\sim /\leq -19'$ Installed By $K \circ II_X$	111.2 8	-	On-Site Geol Personnel On	ogist	tern	a a
$\frac{GWL \text{ Depth}}{\frac{1}{\sqrt{5-19'}}}$		-	Contractors On	-Site Er vin	tech	
Installed By	adilla	_ Clie	nt Personnel On	-Site Blue	- 101	Darche
Date/Time Started 9/21/0	3:30	_				
Date/Time Completed 2/21/0	7 7: 90	-				
Depths in Reference						~! 4
Item	Material	Depth (feet)		Top of Pr	otective Cas	ing -2'4
Top of Protective Casing	Locking, Steel	12'4"		Top of R	iser	~2'
Bottom of Protective Casing	protector	6"		Ground S	Surface	O'
Top of Permanent Borehole Casing	4" sch 40 pvc	+2'				
Bottom of Permanent Borehole	11					
Casing		20'				
Top of Concrete		+6"				
Bottom of Concrete	aviet of 1	0				
Top of Grout Bottom of Grout	quick gel					
Top of Well Riser	4" sch 40 pre +	2'				
Bottom of Well Riser	11 -	-10'				
	4"sch 40 PVC -	10'		Top of Se	al	-6'
	0.DIO screen /-	20'				
Top of Peltonite Seal	Va" bentonite -	6'				
Bottom of Peltonite Seal	//	8'		Top of G	avel Pack	- 8'
Top of Gravel Pack	10-20 silica send	8'		Top of Sc	reen	- 10'
Bottom of Gravel Pack	) •	20'				
Top of Natural Cave-In	Builden Barran					
Bottom of Natural Cave-In		Setting and the set				/
Top of Groundwater		15-19'?		Bottom of		-20
Total Depth of Borehole		20'		Bottom of	Borehole	-20

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Comments:

Geologist Signature

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## WELL OBSERVATION DATA

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Project Name:	BMG	0-9 L	INE				Project No.:	15170	00082
Project Mngr:	DON	FERNA	HD				Cost Code:		
Client Co.:	BENSON	1- MON	ITIN - (	BREER			Date:	10/5/0	ופ
Site Name:	0-9	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. <b>41</b> ′			<u></u>
MW-2	1105			15.94'		22.10'			
Mw-7	1108			16.00		21.82'			
									<u></u>
							· · · · · · · · · · · · · · · · · · ·		
				·····					
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Comments:

Signature:

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Date:

10/5/01

		Project No. 15170000 62			Serial No. (If applicable)	leter			Comments		CRal Mal have		13				Date
		Proje	,		struments MapH Meter	<ul> <li>Conductivity Meter</li> <li>Conductivity Meter</li> <li>Conductivity Meter</li> <li>Other</li> </ul>	Water Disposal		/cm) Disolved /cm) Disolved /mg/L)		2 2	2 2	6		 	 	Ŭ
	RM	~			Instruments # pH Meter		Water [		Conductivity (mmhos/cm)	~/.	2 3	$\widetilde{\psi}$	48				Reviewer
	A Foi	- La -		anyon	-				Hd	Č	200	7 39	22		 		
	IG DAT	tre			5 5 63	Gravel Pack <u>(25)</u> Well Gallons to be Ilons Removed			Temperature (°C)	10 01	(×.)	0.9	10.4				10/5
and the second sec	OPMENT AND PURGING DATA FORM			0:19	Water Volume Calculation Initial Depth of Well (feet) <u>こく. ア多</u> Initial Depth to Water (feet) <u>/ ん. / ろ</u> Height of Water Column in Well (feet)	" Gravel e in Well Gallons			Product Volume Removed (gations) ncrement Cumulative						 		Date 5/2
	AND	Project Manager		Site Address_	rr Volume Calculatio Depth of Well (feet) _ Depth to Water (feet) th of Water Column in '	thes): Well 2 <sup>1</sup> . Gra Water Volume in Well Cubic Feet Gallons							1	_		Brile	
	MENT	Proje		Site /	rr Volume Calculati Depth of Well (feet) Depth to Water (fee th of Water Column in	(inches): Wa			Water Volume Removed (gallons) Increment Cumulative		r v	11					
	/ELOPI				Water Volume Calculation Initial Depth of Well (feet) Initial Depth to Water (feet) Heiaht of Water Column in W.	Diameter (inches): Well 2 1. Water Volume in Item Cubic Feet Go Well Casing Canvel Pack	Drilling Huids Total			ç	, v , v		1 1			12"	
	<b>WELL DEVEL</b>				ZFFI				n Ending Water Depth (feet)							47	$\mathbb{N}$
n West	WEI	0			val	e. A	merer		Intake Depth (feet) v							dre	
ķ		Ø			ater Remo meters	lopment Bailer 🖬 Bottom Valve 🗖 Double Check Valve	🗅 Stainless-steel Kemmerer		Removal Rate (gal/min)							Biad	
		- 9	SW6	0	a ies of Wá ator Para	lopment Baijer 🖬 Bottom Valve	ainless-s	-	Development Method Pump Bailer	7		_	7			a	
		MW-1 BMG		Ó	nt Criteria ing Volum in of Indic	Developme Bailer Jal EBot ble Dou		oval Data	Time Time	10 40	10.50	10:56	1106			 N Can	ignature (s
	<ul> <li>Development</li> <li>Purging</li> </ul>	Well Number_ Project Name	<b>Glient Company</b>	Site Name	Development Criteria 赵3 to 5 Casing Volumes of Water Removal 重 Stabilization of Indicator Parameters □ Other	Methods of Development Pump Bailer Centrifugal ErBottom Submersible Double	Peristaltic     Other	Water Removal Data	Date	9/26/01	J.	>	>			Comments _	Developer's Signature(s)

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Descent     Well DEVELOPMENT AND PURGING DATA FORM       Media Instrument     Project Managel       Media Number     Project Managel       Media Number     Project Managel       Project Nome     Project Managel       Clent Compony     Project Managel       Media Number     Media Number       Media Number     Media Numer       Double Check vive										•	·			a le	しし	
Project Manager     Project Manager     Project Manager       Site Address     Site Address     Site Address       Site Address     Site Address     Site Address       Initial Depth of Well (freet)     Z.     Apple       Initial Depth to Water Volume Calculation     Instruments     Project No       Initial Depth to Water Volume Calculation     Project No     Project No       Initial Depth to Water Volume Calculation     Propertion     Instruments       Initial Depth to Water Volume Calculation     Propertion     Propertion       Initial Depth to Water Volume Removed     Propertion     Propertion       Initial Depth for Open     Propertion     Propertion       Initial Depth for Open     Propertion     Propertion       Initial Propertion     Propertion     Propertion       Initial Properintin     Properint <td>Development Purging</td> <td></td> <td>~</td> <td>WEL</td> <td>l Dev</td> <td>'ELOPN</td> <td>AENT A</td> <td>ND PL</td> <td>IRGIN</td> <td>G DAT</td> <td>A For</td> <td>Z</td> <td></td> <td></td> <td>-</td> <td></td>	Development Purging		~	WEL	l Dev	'ELOPN	AENT A	ND PL	IRGIN	G DAT	A For	Z			-	
Site Address     S	ell Number 🔏 oject Name	6-0 1		to :			Project	Manage	1	. 1	rual		Project	1 1	of /	
Mater Volume Calculation     Instruments       Initial Depth to Water Calculation     Initial Depth to Water Calculation       Initial Depth to Water Column in Well (feet)     Z. Z. Z. Z. Z. Z. Z. Z. Z. Z. Z. Z. Z. Z	ent Company Name 💋						Site Ad		4	V	201					
Matrix     Water Volume in Weil     Gallons to be frem     Conductivity Meter       Check valve     Encode     Fermoved     Parting Fluids     Parting Fluids       Sestelel Kemmerer     Encode     Parting Fluids     Parting Fluids     Parting Fluids       Encode     Mater Dentil     Mater Disposal     Mater Disposal     Mater Disposal       Encode     Internation     Mater Dentil     Mater Disposal     Mater Disposal       Encode     Internation     Mater Dentil     Mater Disposal     Mater Disposal       Encode     Internation     Mater Disposal     Mater Disposal     Mater Disposal       Encode     Internation     Internation     Internation     Internation     Mater Disposal       Encode     Internation     Internation     Internation     Internation     Mater Disposal       Encode     Internation     Internation     Internation     Internation     Mater Disposal       Encode     Internation     Int	velopment ( 3 to 5 Casing Stabilization o □ Other	Criteria Volumes of Wi f Indicator Para	ater Remo ameters	val	SFEIO	<b>/ater Vo</b> ititial Dept ititial Dept eight of V	Lume Cald h of Well ( h to Wate Vater Colt inches): V	culation feet) r (feet) mm in We Vell Z '	22.10 15.91 (feet) Gravel	, 6./6. Pack 6.2	<i>د</i> ر ر	Istrument MapH Me	S ter nitor		Serial No. (If applicable) <u>VSI-610 D W</u>	
Milling Tructo     Water Disposal     Mater Disposal       Iolol     Iolol     Market Disposal     Market Disposal       Memory     Remory     Remory     Remory     Remory       Method     (galons)     Remory     Remory     Market Disposal       Method     (galons)     (galons)     Name     Market Disposal       Method     (galons)     (galons)     (galons)     Market Disposal       Method     (galons)     (galons)     (galons)     (galons)       Method     (galons)     (galons)     (galons)	ethods of De Pump Dentrifugal Submersible Peristaltic	velopment Bailer X Bottom V. Double C C Stainless-s	alve :heck Valv steel Kemi	/e merer		/ell Casing /ravel Paci		Volume ir	Well	Gallons to t Removed		Condu Tempe	ctivity Met rature Met <b>ORP</b>	er		
Removal weitrod method         Removal (reet)         Water Volume Removed (reet)         Water Volume Removed (reet)         Water Volume Removed (reet)         Water Volume Removed (reet)         Water Volume (reet)         Disolved (reet)         Mater Volume (reet) </td <td>□ Other</td> <td>l Data</td> <td></td> <td></td> <td></td> <td>otal Dial</td> <td></td> <td></td> <td></td> <td></td> <td>&gt;</td> <td>Vater Dis <i>on - s</i></td> <td>ite ite</td> <td>impact of in-dru</td> <td>h</td> <td></td>	□ Other	l Data				otal Dial					>	Vater Dis <i>on - s</i>	ite ite	impact of in-dru	h	
$ \begin{vmatrix} 5/61 &  3:25 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  3:15 \\ &  2:10 &  6:89 \\ &  4:15 \\ &  2:10 &  6:89 \\ &  4:15 \\ &  4$	Date	Development Development Method Pump Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Vol (c	ume Remove allons) Cumulative		t Volume d (gallons) Cumulative	Temperature (°C)		Conductivity (mmhos/cm)			command Command	
1345     1345     12.0     12.0     1463     5.56       1345     12.10     12.10     12.10     143     144	15/01	<u>א</u> ל - ג					0	Ń		13.12	7.09	7.24.	34K	185.3	322	<del></del>
a       a		<u>הכ</u>					11		$\backslash$	12.05	2.0	.463	5.56	200.4	52.47	<del></del>
		2					• •			0/.7/	la.9	ca) .	<u>б</u>	1 077		
														-		
Comments	mments							-								7

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C:\My Documents\RST\Forms\MW Dvlpmnt 2.dot )

ameco	Project No. 15170 000 82		Serial No. (If applicable)	eter eter	impacted in-drum	Comments	Clear	red-bor	5 =			
			Instruments ApH Meter D DO Monitor	DConductivity Meter Temperature Meter	Water Disposal on - site	Conductivity Dissolved (mmhos/cm) Oxygen (mg/L)	472	451	4435			
FORM	Fernald	anyon	□ 94 ⊔ Lust	•		Hd	7.2	7.31	46.7			
PMENT AND PLIRGING DATA FORM	1 L		(1.13	Gravel Pack <u>6.25</u> <u>Well</u> Gallons to be tilons Removed		Temperature (°C)	13.3	<i>1</i> 0.3	16.6			
IRGING	er by	4.10	<i>28.14'</i> /7.0/`	A Gravel P Gallons		Product Volume T Removed (gallons) ncrement Cumulative	X	X				
	Project Manager_	Site Address	I (feet)	es): Well <u>Z''</u> Gra Water Volume in Well ubic Feet Gallons			×	X			 .//.	
MENT	Proje	Site A	Water Volume Calculation Initial Depth of Well (feet) Initial Depth to Water (feet) Height of Water Column in W		ids is	Volume Removed (gallons) ent Cumulative	0	. 2.5	1 N	 	 in w	
EVELOF			Water V Initial De Initial De Height o	Diameter (i ltem Well Casing	Drilling Fluids Total	Water	0	5.0	2.5		 t	
WELL DEVELO	Ŧ	,			K I	Depth Ending et) Water Depth (feet)					 produ	
5	19. 19.	<b>U</b>	Removal ters	k Vave	el Kemmere	Removal Intake Depth Rate (feet) (gal/min)					 op	
	MØ	· /// - c	Development Criteria X 3 to 5 Casing Volumes of Water Removal X Stabilization of Indicator Parameters □ Other	elopment Bailer Mattom Valve Double Check Valve	🗆 Stainless-steel Kemmerer Data	Development Rer Method (gc Pump Bailer	7	7	77		 1	
	MW	any	Development Criteria	×.	stc Stc	Time Pure	9:40	242	62.6		Note	
□ □ Development □ Purging	Well Number_	Client Company Site Name	Yelopmen 3 to 5 Casi Stabilization □ Other	ethods of Dev Pump Centrifugal Submersible	Contractific State     Contraction     Contraction     Contraction     Contraction     Contraction	Date	125		_		Comments	

ameco	Page of/ ect No. <u>/ حرا جا حصصار ک</u>		Serial No. (If applicable)	ster		Comments	Clear	red-brown	2			verDate
	Page		struments Lacon Meter D D0 Monitor	Conductivity Meter Fremperature Meter	isposal	vity Dissolved cm) Oxygen (mg/L)	3	6	6			Date
RM	na (J		Instruments AdpH Meter	Dendr Affempe	Water Disposal	Conductivity (mmhos/cm)	5 4/1.3	4 402.9				Reviewer
ATA FO	2	an lor	1.20	ved be		ture pH	7.25	7.44	\$5.F			
	6	9 4.	(2) (4) (et) (.9	vel Pack 6.25 Gallons to be Removed		re Temperature ans) (°C) ative	(1.3	/ ///	<i>.</i>			25/01
o Purg	undger /	$\left  \dot{O} \right $	ation t)	es): Well <u>2<sup>4</sup></u> Gra Water Volume in Well Lubic Feet Gallons		Product Volume Removed (gallons) Increment Cumulative					et -	Date
PMENT AND PURGING DATA FORM	Project Manager_	Site Address_	Water Volume Calculation Initial Depth of Well (feet) $/\overline{\mathcal{F}}$ , $/\overline{2}$ Initial Depth to Water (feet) $/\underline{\mathcal{F}}$ , $/\overline{\mathcal{V}}$ Height of Water Column in Well (feet)	Diameter (inches): Well <u>2<sup>w</sup></u> Gravel Pack <u>6</u> 25 Water Volume in Well Gallons to be Item Cubic Feet Gallons Removed Well Casing FEEt		Volume Removed (gallons) ent Cumulative In	6+	2.5	5.0		5.12	
ELOPME			Water Volur Initial Depth Initial Depth Height of Wo	Diameter (in Item Well Casing Gravel Pack	Drilling Huids Total	Water Increm	+0	2.5	2.5		K.	
Well Develo			H <u>Pi Pi K</u>	ă <u>5</u>	Drilling	Ending Water Depth (feet)					- 17	
Wei			noval	alve		Intake Dept (feet)					fer .	les les
			Development Criteria ↓ 3 to 5 Casing Volumes of Water Removal ↓ Stabilization of Indicator Parameters □ Other	lopment Bailer Bottom Valve Double Check Valve	u siumess-sieer verminerer Jata	ment Removal Rate 3d (gal/min) ailer		7	7		L was	
	1-4 0-9	0	riteria Volumes of Indicator I	Methods of Development Pump Bailer E Centrifugal E Bottom Submersible E Double	Data	Development Method Pump Bailer	9		R		L nuch	ature(s)
Ment	Well Number <b>MA</b> Project Name Client Company	ne O.	Development Criteria A 3 to 5 Casing Volume A Stabilization of Indica D Other	ethods of Dev Pump Centrifugal Submersible	D Other	Time	- 10.09	17:01	<b>K</b> :0/		ants 🖌	Developer's Signature(s),
□ Development	Well Number∠ Project Name_ ©lient Compa	Site Name_	Developm A 3 to 5 C A Stabilizat	Methods Pump D Cen Subr	Udher Dother Water Rei	Date	9/25	$\checkmark$	>		Comments	Develo

Well Development and Purging Data Form	on Fernald Proj	Site Address Oji ta Canyan	Water Volume Calculation Initial Depth of Well (feet) Initial Depth to Water (feet) <u>J</u> Height of Water Column in W	Viam Well Crave	Total market area Water Disposal impacted	Intake Depth Ending Water Volume Removed Product Volume Temperature p.H. Conductivity Dissolved (gallons) (feet) Water Depth (gallons) (gallons) (°C) (mmhos/cm) (mmhos/cm) (mg/L) (mg/L) (mg/L) (mg/L)		5 / 11.11 6.18 ,540 2.31 219.4	10 10 10.63 6.90 533 1.72 219.3	5 15 5 11.16 6.92 ,544 3.29 213.9 30.5			
Development Purging Well Number <u>M</u> - 6	Project Name 0 - 9 0 0	Site Name_0-9	Development Criteria 2 to 5 Casing Volumes of Water Removal 2 Stabilization of Indicator Parameters	Methods of Development Pump Bailer D Centrifugal X Bottom Valve D Submersible D Double Check Valve D Peristaltic D Stainless-steel Kemmerer	□ Other	velopment Removal Method (gal/min) mp) Bailer	13.60	(4.00	14:08	1/1/e X		Comments	

Page of Project No. 15170 00062	Instruments Serial No. (If applicable) K pH Meter <u>751 - 610 DM</u> M Do Monitor <u>11 11</u> Conductivity Meter <u>11 11</u> M Temperature Meter <u>11 11</u> Mater Disposal <i>immacted</i>	
WELL DEVELOPMENT AND PURGING DATA FORM	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Product Volume Temperature PH Removed gallons; (°C), PH Increment Cumulative (°C), (
WELL DEVELOPMER		Removal Intake Depth Ending Kater Volume Removed Rate (gallons) (feet) Water Depth Gallons) (feet) Increment Cumulitive S S S S S S S S S S S S S S S S S S S
Development R. Purging Well Nurnber <u>MW-</u> 7 Project Name <u>O-9</u>	Site Name	Water Removal Data Water Removal Data Date Time Pump Bater I 14.19 X I 14.13 X I 14.15 X I 14

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

Pinnacle Lab ID number October 11, 2001 109102

AMEC EARTH & ENVIRONMENTAL 2060 AFTON PLACE FARMINGTON, NM 87401

Project NameBMG 0-9Project Number1517000082

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.

A Mitchell &

H. Mitchell Rubenstein, Ph. D. General Manager

MR: jt

Enclosure

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CLIENT	: AMEC EARTH & ENVIRONMENTAL	PINNACLE ID	: 109102
ROJECT #	: 1517000082	DATE RECEIVED	: 09/27/01
ROJECT NAME	: BMG 0-9	REPORT DATE	: 10/11/01
INNACLE			DATE
ID #	CLIENT DESCRIPTION	MATRIX	COLLECTED
9102 - 01	82-SB-11/12-14'	NON-AQ	09/20/01
9102 - 02	82-SB-12/12-14'	NON-AQ	09/20/01
09102 - 03	82-SB-13/14-16'	NON-AQ	09/20/01
9102 - 04	82-SB-14/14-16'	NON-AQ	09/20/01
9102 - 05	82-SB-15/12-14'	NON-AQ	09/20/01
09102 - 06	82-SB-17/10-12'	NON-AQ	09/21/01
09102 - 07	82-SB-14/12-14'	NON-AQ	09/20/01
9102 - 08	82-SB-13/10-12'	NON-AQ	09/20/01
9102 - 09	82-SB-13/12-14'	NON-AQ	09/20/01
09102 - 10	82-SB-17/18-20'	NON-AQ	09/21/01
9102 - 11	82-MW-6	AQUEOUS	09/25/01
9102 - 12	82-MW-7	AQUEOUS	09/25/01
09102 - 13	82-MW-1	AQUEOUS	09/25/01
09102 - 14	82-MW-8	AQUEOUS	09/25/01
9102 - 15	82-MW-3	AQUEOUS	09/25/01
09102 - 16	82-MW-4	AQUEOUS	09/25/01
09102 - 17	TRIP BLANK	AQUEOUS	09/17/01



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# GAS CHROMATOGRAPHY RESULTS

TEST LIENT ROJECT # PROJECT NAME	: EPA 8021 MOD : AMEC EARTH 8 : 1517000082 : BMG 0-9		ENTAL	1	PINNACLE I.I	D.: 109102
AMPLE			DATE	DATE	DATE	DIL.
. # CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
01 82-SB-11/12-1	4'	NON-AQ	09/20/01	10/01/01	10/02/01	1
82-SB-12/12-1	4'	NON-AQ	09/20/01	10/01/01	10/02/01	1
82-SB-13/14-1	6'	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'
ENZENE	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
DTAL XYLENES	0.025		MG/KG	< 0.025	< 0.025	< 0.025
SURROGATE: ROMOFLUOROBENZENE SURROGATE LIMITS	E (%) (65 - 120)			89	90	85

CHEMIST NOTES:

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### GAS CHROMATOGRAPHY RESULTS

TEST		: EPA 8021 MODI	IFIED						
DLIENT		: AMEC EARTH 8	ENVIRONM	ENTAL	PINNACLE I.D.: 109102				
PROJECT #	ŧ	: 1517000082							
PROJECT N	NAME	: BMG 0-9							
BAMPLE				DATE	DATE	DATE	DIL.		
D. #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR		
04	82-SB-14/14-16	) <sup>1</sup>	NON-AQ	09/20/01	10/01/01	10/02/01	1		
5 6	82-SB-15/12-14	,'	NON-AQ	09/20/01	10/01/01	10/02/01	1		
6	82-SB-17/10-12	)) -	NON-AQ	09/21/01	10/01/01	10/02/01	1		
PARAMETE	R	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		
		0.025		MG/KG	< 0.025	0.026	< 0.025		
ETHYLBEN		0.025		MG/KG	< 0.025	< 0.025	< 0.025		
TOTAL XYL	ENES	0.025		MG/KG	0.045	0.043	< 0.025		
	TE: JOROBENZENE TE LIMITS	(%) (65 - 120)			90	93	82		

CHEMIST NOTES:

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# GAS CHROMATOGRAPHY RESULTS

TEST		: EPA 8021 MOD	IFIED						
CLIENT		: AMEC EARTH	& ENVIRONMI	ENTAL		PINNACLE I.D.: 109102			
PROJEC	CT #	: 1517000082			4				
PROJEC	CT NAME	: BMG 0-9							
SAMPLE	2			DATE	DATE	DATE	DIL.		
ID. #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	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		
PARAM	ETER	DET. LIMIT		UNITS	82-MW-6	82-MW-7	82-MW-1		
BENZEN	NE	0.5		UG/L	69	350	< 0.5		
TOLUEN	NE	0.5		UG/L	< 0.5	47	< 0.5		
ETHYLE	BENZENE	0.5		UG/L	23	87	< 0.5		
TOTAL	XYLENES	0.5		UG/L	41	310	< 0.5		
SURRO	GATE:								
BROMO	FLUOROBENZEN	Ξ(%)			107	102	87		
SURRO	GATE LIMITS	(80 - 120)							

CHEMIST NOTES: N/A

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# GAS CHROMATOGRAPHY RESULTS

TEST CLIENT PROJE PROJE	- CT #	EPA 8021 MOE AMEC EARTH 1517000082 BMG 0-9		ENTAL		PINNACLE I.I	D.: 109102
SAMPL	E			DATE	DATE	DATE	DIL.
SAMPL ID. #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	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
15 16	82-MW-4		AQUEOUS	09/25/01	NA	10/04/01	1
PARAM	IETER	DET. LIMIT		UNITS	82-MW-8	82-MW-3	82-MW-4
BENZE	NE	0.5		UG/L	< 0.5	< 0.5	< 0.5
TOLUE	NE	0.5		UG/L	< 0.5	< 0.5	< 0.5
	BENZENE	0.5		UG/L	< 0.5	< 0.5	< 0.5
TOTAL	XYLENES	0.5		UG/L	< 0.5	< 0.5	< 0.5
SURRC							
	OFLUOROBENZENE (% OGATE LIMITS	%) (80 - 120)			84	85	87

CHEMIST NOTES:

N/A



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## GAS CHROMATOGRAPHY RESULTS

SAM ID. # 17 PAR/	NT JECT # JECT NAME	: EPA 8021 MOD : AMEC EARTH : 1517000082 : BMG 0-9 D.		ENTAL DATE		PINNACLE I.D.:	: 109102
PRO SAM ID. # 17 PAR/	JECT NAME PLE CLIENT I.	: 1517000082 : BMG 0-9	& ENVIRONMI			PINNACLE I.D.	: 109102
PRO SAM ID. # 17 PAR/	JECT NAME PLE CLIENT I.	: BMG 0-9					
SAM ID. # 17 PAR/	PLE CLIENT I.						
ID. # <u>17</u> PAR/	CLIENT I.	D.					
17 , PAR/		D.		DAIL	DATE	DATE	DIL.
PAR	TB		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
ł			AQUEOUS	09/17/01	NA	10/04/01	1
	AMETER	DET. LIMIT		UNITS	ТВ		
BEN.	ZENE	0.5		UG/L	< 0.5		
TOLL	JENE	0.5		UG/L	< 0.5		
	YLBENZENE	0.5		UG/L	< 0.5		
тоти	AL XYLENES	0.5		UG/L	< 0.5		
	ROGATE:						
BRO SUR	MOFLUOROBENZ ROGATE LIMITS	ZENE (%) (80 - 120)			89		

CHEMIST NOTES: N/A

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### GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

TEST EMANK I. D. CLIENT PROJECT # FACOJECT NAME	: EPA 8021 MODIFIED : 100101 : AMEC EARTH & ENVIRONMENTAL : 1517000082 : BMG 0-9	PINNACLE I.D. DATE EXTRACTED DATE ANALYZED SAMPLE MATRIX	: 109102 : 10/01/01 : 10/02/01 : NON-AQ
PARAMETER	UNITS		
BENZENE	MG/KG	<0.025	
TLUENE	MG/KG	<0.025	
ETHYLBENZENE	MG/KG	<0.025	
TOTAL XYLENES	MG/KG	<0.025	
SURROGATE:		96	
BROMOFLUOROBENZENE (%) SURROGATE LIMITS: CHEMIST NOTES: N/A	( 80 - 120 )	30	



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### GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

TEST ELANK I. D. CLIENT PROJECT #	: EPA 8021 MODIFIED : 100401 : AMEC EARTH & ENVIRONMENTAL : 1517000082	PINNACLE I.D. DATE EXTRACTED DATE ANALYZED SAMPLE MATRIX	: 109102 : NA : 10/04/01 : AQUEOUS
PARAMETER	: BMG 0-9 UNITS	,	· · · · · · · · · · · · · · · · · · ·
BENZENE	UG/L	<0.5	
TUUENE	UG/L	<0.5	
ETHYLBENZENE	UG/L	<0.5	
TOTAL XYLENES	UG/L	<0.5	
SURROGATE:	•		
BROMOFLUOROBENZENE (%)		90	
SPRROGATE LIMITS: GEIEMIST NOTES: N/A	( 80 - 120 )		



### GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

TUST BLANK I. D. CLIENT FLOJECT # PROJECT NAME	: EPA 8021 MODIFIED : 100501 : AMEC EARTH & ENVIRONMENTAL : 1517000082 : BMG 0-9	PINNACLE I.D. DATE EXTRACTED DATE ANALYZED SAMPLE MATRIX	: 109102 : NA : 10/05/01 : AQUEOUS
P <u>A</u> RAMETER	UNITS		
EINZENE	UG/L	<0.5	
TOLUENE	UG/L	<0.5	
EIHYLBENZENE	UG/L	<0.5	
T TAL XYLENES	UG/L	<0.5	
SURROGATE: EOMOFLUOROBENZENE (%) SORROGATE LIMITS: CHEMIST NOTES:	( 80 - 120 )	89	

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# GAS CHROMATOGRAPHY QUALITY CONTROL MSMSD

EST SMSD # CLIENT PROJECT # ROJECT NAME	: EPA 8021 MC : 109103-01 : AMEC EART : 1517000082 : BMG 0-9		ONMENTAL		PINNAÇLE I DATE EXTR DATE ANAL SAMPLE M/ UNITS	ACTED YZED	:	109102 10/01/01 10/02/01 NON-AQ MG/KG	
	SAMPLE	CONC	SPIKED	%	DUP	DUP		REC	RPD
RAMETER	RESULT	SPIKE	SAMPLE	REC	SPIKE	% REC	RPD	LIMITS	LIMITS
INZENE	<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
HYLBENZENE	<0.025	1.00	0.96	96	0.97	97	1	(49 - 127)	20
DTAL XYLENES	<0.025	3.00	2.88	96	2.92	97	1	(58 - 120)	20

----- X 100

### CHEMIST NOTES:

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Recovery =

(Spike Sample Result - Sample Result)

------ X 100

Spike Concentration

(Sample Result - Duplicate Result)

RPD (Relative Percent Difference) =

Average Result



# GAS CHROMATOGRAPHY QUALITY CONTROL MSMSD

TEST GMSD # CLIENT PROJECT # ROJECT NAME	: EPA 8021 MC : 100401 : AMEC EART : 1517000082 : BMG 0-9		ONMENTAL		PINNAÇLE I DATE EXRA DATE ANAL SAMPLE M/ UNITS	CTED YZED	: : :	109102 NA 10/04/01 AQUEOUS UG/L	
	SAMPLE	CONC	SPIKED	%	DUP	DUP		REC	RPD
PARAMETER	RESULT	SPIKE	SAMPLE	REC	SPIKE	% REC	RPD	LIMITS	LIMITS
	<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
THYLBENZENE	<0.5	20.0	19.0	95	18.5	93	3	( 80 - 120 )	20
DTAL XYLENES	<0.5	60.0	57.4	96	56.3	94	2	( 80 - 120 )	20

CHEMIST NOTES:

Recovery =

(Spike Sample Result - Sample Result) ------ X 100

Spike Concentration

(Sample Result - Duplicate Result)

RPD (Relative Percent Difference) =

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Average Result



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### GAS CHROMATOGRAPHY RESULTS

TEST							
		: EPA 8015 MO	•				
		: AMEC EARTH	& ENVIRON	MENTAL		PINNACLE I.	D.: 109102
ROJECT #	ŧ	: 1517000082			4		
PROJECT N	NAME	: BMG 0-9					
SAMPLE				DATE	DATE	DATE	DIL.
. #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	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
	82-SB-13/14-16'		NON-AQ	09/20/01	09/29/01	09/29/01	1
PARAMETE	R	DET. LIMIT	UN	NTS	82-SB-11/12-14'	82-SB-12/12-14'	82-SB-13/14-16'
ELIEL HYDE	ROCARBONS, C6-C10	10	MO	G/KG	< 10	< 10	< 10
UEL HYDF	ROCARBONS, C10-C22	10	MG	6/KG	< 10	< 10	< 10
FUEL HYDF	ROCARBONS, C22-C36	10	MO	6/KG	< 10	< 10	< 10
CALCULAT							
SURROGA <sup>®</sup>							
O-TERPHE					90	89	90
JRROGA	TE LIMITS	(66 - 151)					

HEMIST NOTES:

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### GAS CHROMATOGRAPHY RESULTS

TEST LIENT ROJECT ;		: EPA 8015 MO : AMEC EARTH : 1517000082 : BMG 0-9	•	,		PINNACLE I.C	0.: 109102
SAMPLE				DATE	DATE	DATE	DIL.
. #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
04	82-SB-14/14-16'	······································	NON-AQ	09/20/01	09/29/01	09/29/01	1
<u>05</u>	82-SB-15/12-14'		NON-AQ	09/20/01	09/29/01	09/29/01	1
	82-SB-17/10-12'		NON-AQ	09/21/01	09/29/01	09/29/01	1
PARAMET	ER	DET. LIMIT	UN	NTS	82-SB-14/14-16'	82-SB-15/12-14'	82-SB-17/10-12'
FUEL HYD	ROCARBONS, C6-C10	10	MG	6/KG	< 10	19	< 10
JEL HYD	ROCARBONS, C10-C22	10	MG	S/KG	< 10	84	< 10
FUEL HYD	ROCARBONS, C22-C36	10	MG	S/KG	< 10	30	< 10
SURROGA	TE:				04	133	90
O-TERPHE		(66 - 151)			91	91	90

HEMIST NOTES:

N/A



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### GAS CHROMATOGRAPHY RESULTS

TEST CLIENT ROJECT # ROJECT N		: EPA 8015 MC : AMEC EART : 1517000082 : BMG 0-9	-		`)	PINNACLE I.[	D.: 109102
SAMPLE				DATE	DATE	DATE	DIL.
<b>.</b> #	CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
	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
<b>1</b>	82-MW-1		AQUEOUS	09/25/01	09/28/01	09/28/01	1
ARAMETE		DET. LIMIT	UN	ITS	82-MW-6	82-MW-7	82-MW-1
FUEL HYDR	OCARBONS, C6-C10	2.0	M	G/L	< 2.0	2.5	< 2.0
EUEL HYDR	OCARBONS, C10-C22	1.0	MC	G/L	< 1.0	1.4	< 1.0
JEL HYDR	OCARBONS, C22-C36	1.0	M	G/L	< 1.0	< 1.0	< 1.0
CALCULATE	ED SUM:					3.9	
URROGAT TERPHEN SURROGAT	NYL (%)	(79 - 124)			100	102	97

CHEMIST NOTES:

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# GAS CHROMATOGRAPHY RESULTS

TEST CLIENT ROJECT # PROJECT NAME	: EPA 8015 MC : AMEC EARTI : 1517000082 : BMG 0-9			<b>-)</b>	PINNACLE I.I	D.: 109102
SAMPLE	. DIVIG 0-9		DATE	DATE	DATE	DIL.
. # CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
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
82-MW-4		AQUEOUS	09/25/01	09/28/01	09/29/01	1
	DET. LIMIT	UN	ITS	82-MW-8	82-MW-3	82-MW-4
FUEL HYDROCARBONS, C6-C10	2.0	M	G/L	< 2.0	< 2.0	< 2.0
EUEL HYDROCARBONS, C10-C22	1.0	M	G/L	< 1.0	< 1.0	< 1.0
EL HYDROCARBONS, C22-C36	1.0	M	G/L	< 1.0	< 1.0	< 1.0
ALCULATED SUM:						
TIRROGATE: TERPHENYL (%) SURROGATE LIMITS	( 79 - 124 )			99	102	101

CHEMIST NOTES:



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# GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

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

ARAMETER		UNITS		
JEL HYDROCARBONS, C6-C10	)	MG/KG	< 10	
FUEL HYDROCARBONS, C10-C	22	MG/KG	< 10	
JEL HYDROCARBONS, C22-C	36	MG/KG	< 10	
SURROGATE:				
TERPHENYL (%)			88	
JRROGATE LIMITS	(80 - 151)			

CHEMIST NOTES:



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# GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

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

RAMETER		UNITS		
EL HYDROCARBONS		MG/L	< 2.0	·········
HYDROCARBON RANGE			< 1.0	
PTOROCARBONS QUANTI	TATED USING		< 1.0	
SURROGATE: TERPHENYL (%) URROGATE LIMITS	( 78 - 128 )		95	

CHEMIST NOTES:

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#### GAS CHROMATOGRAPHY QUALITY CONTROL MSMSD

ST SMSD # CLIENT PROJECT # ROJECT NAME	: EPA 8015 MC : 109103-03 : AMEC EARTH : 1517000082 : BMG 0-9	,	IRECT INJECT) ONMENTAL		PINNAÇLE DATE EXTF DATE ANAL SAMPLE M/ UNITS	RACTED LYZED	:	109102 09/29/01 09/30/01 NON-AQ MG/KG	
	SAMPLE	CONC	SPIKED	%	DUP	DUP		REC	RPD
RAMETER	RESULT	SPIKE	SAMPLE	REC	SPIKE	% REC	RPD	LIMITS	LIMITS
EL HYDROCARBONS	<10	200	216	108	216	108	0	(56 - 148)	20

CHEMIST NOTES:

% Recovery ≈

(Spike Sample Result - Sample Result)

----- X 100 -----

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Spike Concentration

(Sample Result - Duplicate Result) ----- X 100

RPD (Relative Percent Difference) =

Average Result

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# GAS CHROMATOGRAPHY QUALITY CONTROL MSMSD

TEST SMSD # CLIENT PROJECT # ROJECT NAME	: EPA 8015 MC : 092801 : AMEC EARTH : 1517000082 : BMG 0-9	,	IRECT INJECT) ONMENTAL		PINNAÇLE I DATE EXRA DATE ANAL SAMPLE MA UNITS	CTED YZED	:	109102 09/28/01 09/28/01 AQUEOUS	
	SAMPLE	CONC	SPIKED	%	DUP	DUP		REC	RPD
PARAMETER	RESULT	SPIKE	SAMPLE	REC	SPIKE	<u>% REC</u>	RPD	LIMITS	LIMITS
JEL HYDROCARBONS	<1.0	33.0	36.4	110	36.0	109	1	(64 - 127)	20

CHEMIST NOTES:

Recovery =

(Spike Sample Result - Sample Result)

------ X 100

Spike Concentration

(Sample Result - Duplicate Result) ) = ------ X 100

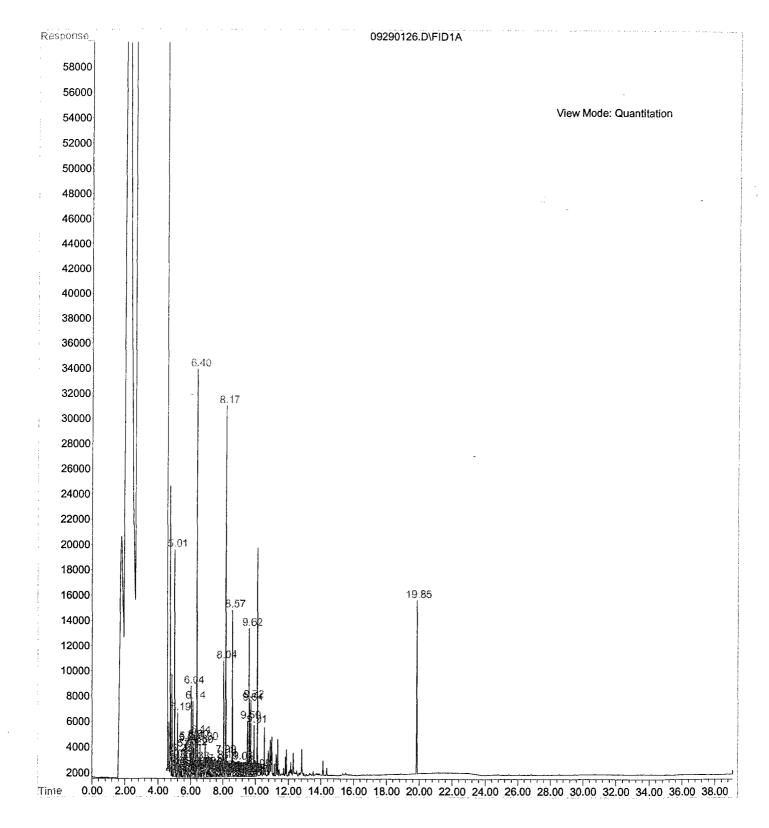
RPD (Relative Percent Difference) =

Average Result

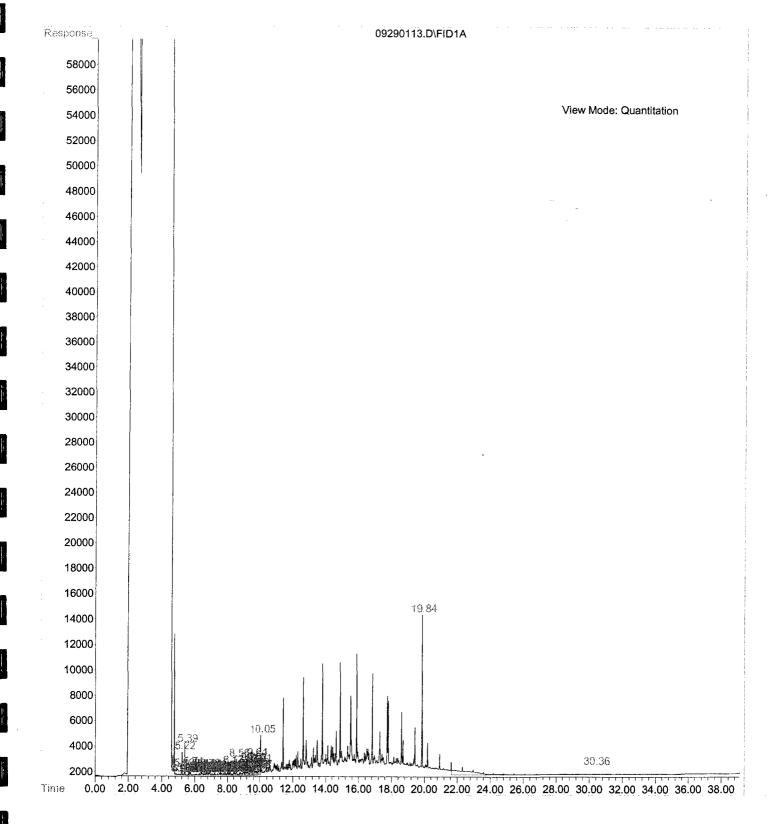
ANALYSIS REQUEST		s (282) (282)	soir Janic Janic Janic	e Org tile O 8/808 71)	8/8/9 09) 8	IDG (81 16) 29 161 (61	rbicid												1. RELINQUISHED	Signature:	Printed Name	10	Company	1 RECEIVED BY. (LAB)		And a	Pinnacle Laboratories Inc.
1879 - C - C		~/ <i>"</i>	<i>i € i</i> Les	0rga	V Iatile <sup>(</sup> Iatile ( Itile (	08 🗆	60 (L 60 (Fu 60 (Fu 60 (Fu 60 (C	Ь <sup>63</sup> 856 856 856 856 856 207											RELINQUISHED BY	Signatures ) ( 1 21-00	Printed Name / Pate: /	Ferrels	Company & M E Company & Majeure)	VED BY:	signature: time:	Printed Name: Date:	Compare.
	3E	) MTE	oline ap DR	Direc 25 17 & T 8 To 26 26 26 26 26 26 26 26 26 26 26 26 26	9015 Purge 26108	VTC) DX) DX) LEX) C (C (C (C (C (C) C (C) (C (C) (C (C) (C)	21 (H 21 (B 21 (B 21 (B 21 (B 21 (C 21 (C)2)))))))))))))))))))))))))))))))))))	802 805 805 805 805 805 805 805 805 805 805	X	X	×	×	×	×					QUIRED FOR RUSH PROJECTS	1 WEEK (NORMAL)	SDWA OTHER /						
Fernald	th #	2 4 4	38	5721		J.F.		VTE TIME MATRIX LAB (LD)	1 Soil 01	Soi1 02	1 5011 05	Soi/ 04	Soil 05	5011 OV	1, 100 /	Sei/ 60	10, 50, 1 04	101 301 1	PRIOR AUTHORIZATION IS RE	(RUSH) 24hr 48hr 72hr 0	CERTIFICATION REQUIRED:	METHANOL PRESERVATION	COMMENTS: FIXED FEE				
PROJECT MANAGER: Jon	AMEC	FAP MIN	PHONE: 0205-327-1	FAX: 5-65-326-	BIFT TO:	COMPANY: ADDRESS: ADDRESS:		SAMPLEID	82-58-11/12-141 9ac	82-5012/12-14 Hey	82-5B 13/14-16 940	82-5B 14/14-16 960	82-5B 15/13-141 9/201	-SB17/10-121	- 56 14/12-14	- 53-13/10-12- 91	-5B-15/12-14 4	11/10/201/11	PROJECT INFORMATION	PROJ. NO.: 1517000082	PROJ. NAME: BMG 0-9	P.O. NO.:	SHIPPED VIA:	PLE RECEIPT			BLUE ICERCE) 4-0°C
	PROJECT MANAGER: Non Junal	COMPANY: JMEC Earth & ENVIEO E	COMPANY: AME C Earth & ENVIEO FF ADDRESS: 20 60 AFTON PI FF EADDRESS: 20 60 AFTON DI FF	PROJECT MANAGER: JON JUMALOL COMPANY: AME C Earth & ENVIRO ADDRESS: 20 60 AFTON PI FARMINGTON, NM 8740/ 19100 FARMINGTON, NM 8740/ 1000 ADDRESS: 327-7928 PHONE: 505-337-7928	PROJECT MANAGER: JON JUNALOL COMPANY: AME C Earth & ENVIRO ADDRESS: 20 60 AFTON PI PHONE: 505-330-5723 FAX: 505-336-5723 FAX: 505-5723 FAX: 505-	PROJECT MANAGER: JON     JUNALOL       COMPANY:     Am E C     Earth \$ ENVIRO       ADDRESS:     20 b0     Afton PI       ADDRESS:     20 b0     Afton PI       Incoarbons     (418.1)     TRPH       PHONE:     505-336-573/     NRO       BILL TO:     505-336-573/     NRO	PHOJECT MANAGER: Jon Junalol COMPANY: Ame C Earth & Enviro ADDRESS: 20 60 AF ton PI ADDRESS: 20 60 AF ton PI ADDRESS: 20 60 AF ton PI ADDRESS: 20 60 AF ton PI MHYdrocarbons (418.1) TRPH MM Hydrocarbons (418.1) TRPH MM H	PHOUECT MANGGER: J'ON JUMAGER: J'AO JUMAUY: J'ON JUMAGER: J'AO JUMAUY: J'UMAGER: J	PHOUECT MANAGER: JOON JUMACCOMPANY: Ame C Earth & ENVIED ADDRESS: 20 60 AF ton PI PHONE: 205-330-7938 FAX: 505-336-5738 BILL TO: COMPANY: ADDRESS: An M 8740/ FAX: 505-336-5738 BILL TO: COMPANY: ADDRESS: MARTAN LABID Petroleum Hydrocarbons (418.1) TRPH COMPANY: ADDRESS: MARTAN LABID Petroleum Hydrocarbons (418.1) TRPH MARTAN LABID	Jernalol       Jernalol	PROJECT MANAGER: Unit       Jon       Junatol         COMPANY:       Ame       C.       Eanth \$ Enviro         COMPANY:       Ame       C.       Eanth \$ Enviro         ADDRESS:       20 b0       Affon P1       Ame         ADDRESS:       20 b0       Affon P1       Ame         ADDRESS:       20 b0       Affon P1       Ame         FAX:       50 b1       7331-7928       Ame         FAX:       50 b1       50 b1       66s/Purge & Trap         BlL1TO:       ComPany       Ame       Ame       Ame         ADDRESS:       21 b1       40 b1       50 b1       66s/Purge & Trap         SAMPLE D       DATE       Main       Main       Main       Main         SAMPLE D       Back       Main       Sain       6627 (HALO)       Sain	PROLECT MANGER: UCN       JUNE       LENALON       JUNE         COMPANY:       Ame       Earth & Enviro       ADDRESS:       Ame       Earth & Enviro         ADDRESS:       ADDRESS:       Abore       Affon       PI       PI         ADDRESS:       Abore       Affon       PI       Apone       Ame       Earth & Enviro         ADDRESS:       Abore       Affon       PI       Apone       Ame       Earth & Enviro         ADDRESS:       Abore       Abore       Affon       PI       Apone       Apone       Apone         FAX:       So.5- 331-7993       And FT       And FT       Apone       Apone	PROJECT MANAGER: JOCH       JELINALO       JELINALO         COMPANY:       Am E C.       Earth, \$ Envireo         ADDRESS:       20 60       AF ton P i         ADDRESS:       20 60       AF ton P i         FAX:       20 5-337-74-38       An W 8740/         FAX:       505-336-573/       An W 8740/         FAX:       505-336-573/       An M 8740/         FAX:       505-336-573/       An M 8740/         FAX:       505-336-573/       An M 8740/         FAX:       505-336-573/       An M 8740/         FAX:       505-336-573/       An M 70         ADDRESS:       An M 7       8051 (BTEX)         ADDRESS:       205-537-74-38       An M 70         ADDRESS:       205-538-11/12-14/       206/01         SAMPLE ID       DATE       MATAN         ADDRESS:       201/10-14/       201/10-14/         S21-58-11/12-14/       206/1       501/1         S22-58-11/12-14/       206/1       501/1         S23-58       13/14-16       201/1         S23-58       13/14-16       201/1         S23-58       13/14-16       201/1         S23-58       20/1       20/1	MNY:     Ame CRR:     Lon     JunaceR:       MNY:     Ame C     Earth & Enth     Earth & Enth       MNY:     Ame C     Earth & Enth     Earth       MNY:     Ame C     Earth & Enth     Earth       MNY:     Ame C     Earth     Earth       Farmiweton     NMN     Sign     Farmiweton       SS:     Sale     Sale     Sale       SS:     Sale     Sale     Sale       MNY:     Ame C     Earth       SS:     Sale     Sale       SS:     Sale       Sale     Sale       Sale     Sale       Sale     Sale       Sale     Sal       Sal     Sal       Sal     Sal       <	ANY:     Ameder:     JOAn     JLUnaton       ANY:     Ame     Earth, & Entraton     Ame       ANY:     Ame     Ame     Ano       Any:     Ame     Ano     Ano       Any:     Ano     Ano     Ano       Any:     Ano     Ano     Ano       Ano     Ano     Ano       Ano     Ano     <	ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         ANY:       Ameter: Jon Jurnacoli         Any:       Any Kalin         Any Ange       Soli         Any Ange       Soli         Any Ange	ANY:     Алу:     Алу:	АМК АМК АМК АМК АМК АМК АМК АМК	ANY:     Алу:     Алу:	ANN:         Ame C         Earth, \$ Envire           ANN:         Ame C         Earth, \$ Envire           ANN:         Ame C         Earth, \$ Envire           ANN:         Ame C         Earth, \$ Envire           ANN:         Ame C         Earth, \$ Envire           ANN:         Ame C         Earth, \$ Envire           ANN:         Ane C         Earth, \$ Envire           ANN:         Ane C         Earth, \$ Envire           ANN:         Ane C         Earth, \$ Envire           ANN:         Ane C         Earth, \$ Envire           ANN:         Ane C         Balling           ANN:         Ane C         Balling           ANN:         Ann E         Balling           ANN:         Ann E         Balling           ANN:         Ann E         Balling           Anni:         Ann E         Balling           Anni:         Ann E         Balling           Anni:         Ann E         Balling           Anni:         Ann E         Balling           B 13/10-14         Balling         Soil           B 13/10-12         Soil         Balling           B 13/10-12         Soil         Balling </td <td>ANV:     Апессьей Альмасся:     Дале са са ла са са са ла са са са ла са са са ла са са ла са са са ла са са ла са са ла са са ла са са са ла са са са ла са са са ла са са са ла са са са ла са са са ла са са са са ла са са са ла са са са ла са са са са ла са са са са са са са са са са са са са</td> <td>ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Bable           ANN:         Ane C.         Bable           Ane C.         Bable         Bable           Bable         Soli         Bab</td> <td>ANY:       Ame C.       Earth. # Envired         ANY:       Ane:       Ane:       Anvired         ANY:       Ane:       Ane:       Anvired         ANS:       Area       Anvired       Anvired         Anvired       Anvired       Anvired       Anvired         Anvired</td> <td>ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Anneroline (Insertinged Insertinged Insertencontinged Insertinged Insertinged Insertinge</td> <td>ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       Anyne     Алунствани</td> <td>ANY       Ame C       E arth, ‡ Anyrao         ANY       Ame C       E arth, ‡ Anyrao         ESS       FAR muudoffin Jon       Balon         ARY       Ame C       E arth, ‡ Anyrao         FAR muudoffin       Anyr       Balon         FAR muudoffin       Anyr       Balon         FAR muudoffin       Balon       Balon         Balon       Sain       Marthx man         Balon       Sain       Marthx man</td> <td>ANY     Альнассь     Эльнассс       ANY     Альста     Эльнассс       ANY     Альста     Альнассс       ANY     Альста     Альста       Ano     Альста     Альста       Ano</td>	ANV:     Апессьей Альмасся:     Дале са са ла са са са ла са са са ла са са са ла са са ла са са са ла са са ла са са ла са са ла са са са ла са са са ла са са са ла са са са ла са са са ла са са са ла са са са са ла са са са ла са са са ла са са са са ла са са са са са са са са са са са са са	ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ame C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Earth. \$ Entrie           ANN:         Ane C.         Bable           ANN:         Ane C.         Bable           Ane C.         Bable         Bable           Bable         Soli         Bab	ANY:       Ame C.       Earth. # Envired         ANY:       Ame C.       Earth. # Envired         ANY:       Ame C.       Earth. # Envired         ANY:       Ame C.       Earth. # Envired         ANY:       Ame C.       Earth. # Envired         ANY:       Ane:       Ane:       Anvired         ANY:       Ane:       Ane:       Anvired         ANS:       Area       Anvired       Anvired         Anvired       Anvired       Anvired       Anvired         Anvired	ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Ame C. Earth. \$ EAUrico.         ANY:       Anneroline (Insertinged Insertinged Insertencontinged Insertinged Insertinged Insertinge	ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       ANY:     Алунствания     Алунствания       Anyne     Алунствани	ANY       Ame C       E arth, ‡ Anyrao         ANY       Ame C       E arth, ‡ Anyrao         ESS       FAR muudoffin Jon       Balon         ARY       Ame C       E arth, ‡ Anyrao         FAR muudoffin       Anyr       Balon         FAR muudoffin       Anyr       Balon         FAR muudoffin       Balon       Balon         Balon       Sain       Marthx man         Balon       Sain       Marthx man	ANY     Альнассь     Эльнассс       ANY     Альста     Эльнассс       ANY     Альста     Альнассс       ANY     Альста     Альста       Ano     Альста     Альста       Ano

ssion #: 109102	EST.	Herbicides (615/8151) Base/Neural/Poid Compounds GC/MS (625/8270) Polynuclear Aromatics (610/8310/8270-SIMS) General Chemistry: Target Analyte List Metals (13) RCRA Metals by TCLP (Method 1311) RCRA Metals (8) RCRA Metals (8) Metals: Metals:										1. RELINQUISHED BY:	CLAN Signature: Time	Printed Name: Date:	Contraction of Contraction	Company.	1. RECEIVED BY: (LAB) 2.	· · / / .	PULLINGUNG WAINO 9/27/01	Pinnacle Laboratories Inc.
CHAIN OF CUSTODY PLI Accession #		Rols       Rols       Rols       Rols         Rols       Rols				×						REQUIRED FOR RUSH PROJECTS RELINQUISHED BY:	(NORMAL) (N SIGTATURE)		-Brind of	See reverse side (Force Majeure)	C. C. C. J. Stanature. Time.			Compary:
Pinnacle Laboratories Inc. C	on Fernald	С Еалth F ENVIRO DATE TON PI 327-7928 336-572/ ПЛИ САВІД Petroleum Hydrocarbons (418.1) ТЯРН Petroleum Hydrocarbons (418.1) ТЯРН (MOD.8015) Djesel/Direct Inject	12401 15:10 140 11	25/01 15:00 H20	925/01 13:57 H2D 3	14:05 H20	13:45 420 1		1/1/00/1525 1/20 2 +			PRIOR AUTHORIZATION IS	RUSH) 24hr 34hr 72hr 1 WEEK	0-9 CERTIFICATION REQUIRED: UNM SDWA		COMMENTS: FIXED FEE	is request	WILLIN Wiel resample to y	105	2.03
MINICL PINNACL	PROJECT MANAGER: ()	ADDRESS: AD GO ADDRESS: AD GO PHONE: 505-60 BILL TO: 505-60 BILL TO: 505-60 ADDRESS: 30 60 FARM	m 8.2 - MM-C	82-mw-7	Sa-mw-1	82-mm-68	NIG221	83. mu 4		EL	МРС	C PROJECT INFORMATION	PROJ. NO.: 151700082	PROJ. NAME: BMG		HIPED VIA. CANDINE RECEIDED	NO C	CUSTODY SEALS	ASE	BUUEICENCE

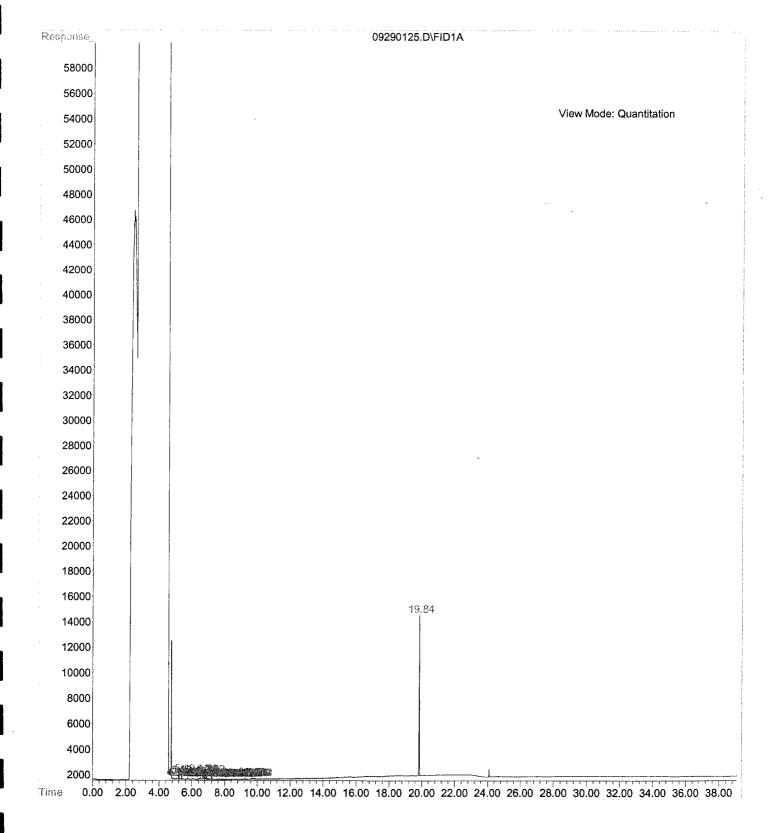
File : C:\HPCHEM\2\DATA\092901\09290126.D Operator : ccm Acquired : 30 Sep 2001 13:37 using AcqMethod NM0913F.M Instrument : FID-1 Sample Name: gas ccv Misc Info : GC4-35-05 (exp 11/13/2001) Vial Number: 26



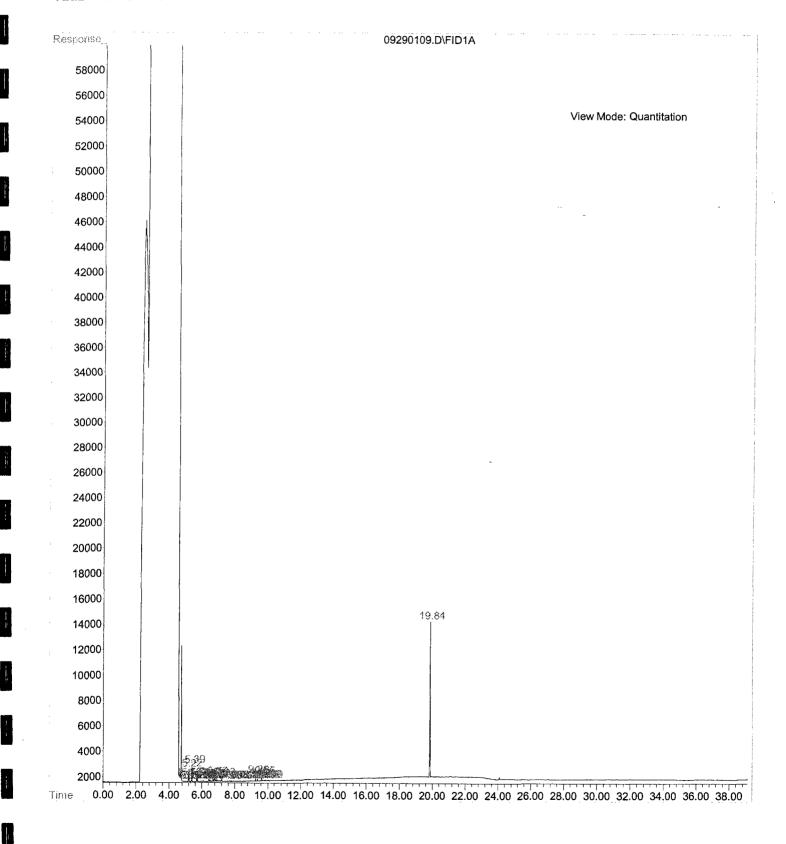
File : C:\HPCHEM\2\DATA\092901\09290113.D Operator : ccm Acquired : 30 Sep 2001 2:21 using AcqMethod NM0913F.M Instrument : FID-1 Sample Name: dsl ccv Misc Info : GC4-35-06 (exp 11/13/2001) Vial Number: 13



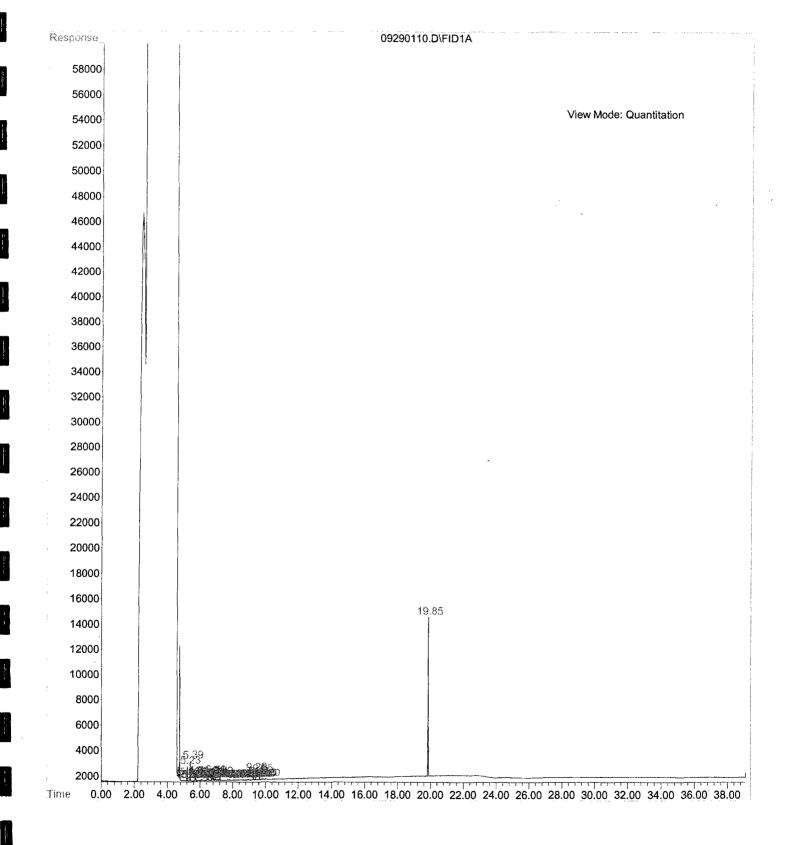
File : C:\HPCHEM\2\DATA\092901\09290125.D
Operator : ccm
Acquired : 30 Sep 2001 12:44 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-01 (re)
Misc Info : GC4-35-05 (exp 11/13/2001)
Vial Number: 25



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

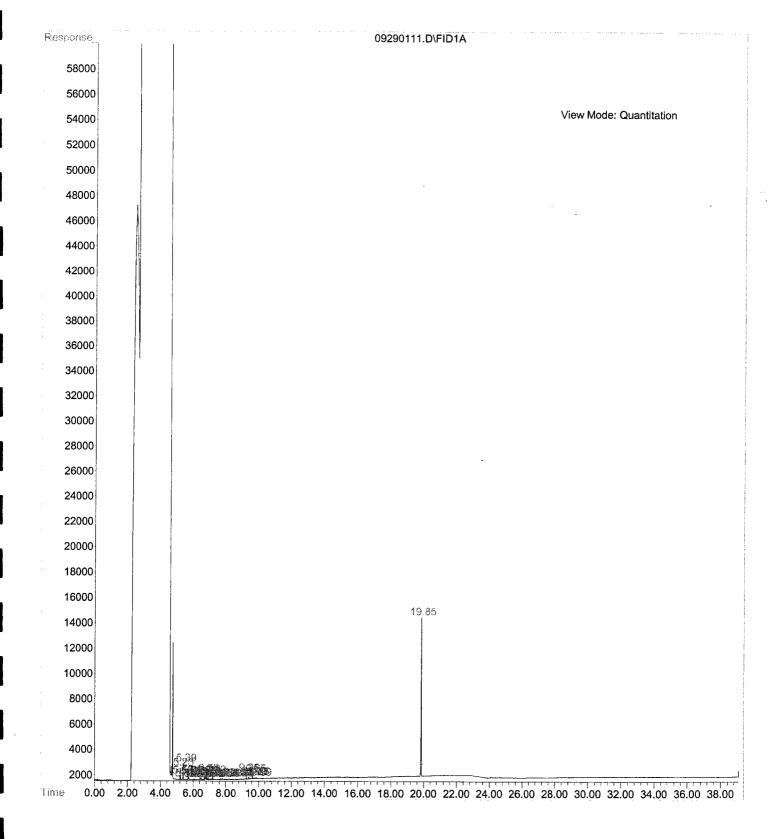


File : C:\HPCHEM\2\DATA\092901\09290110.D Operator : ccm Acquired : 29 Sep 2001 23:45 using AcqMethod NM0913F.M Instrument : FID-1 Sample Name: 109102-03 Misc Info : Vial Number: 10



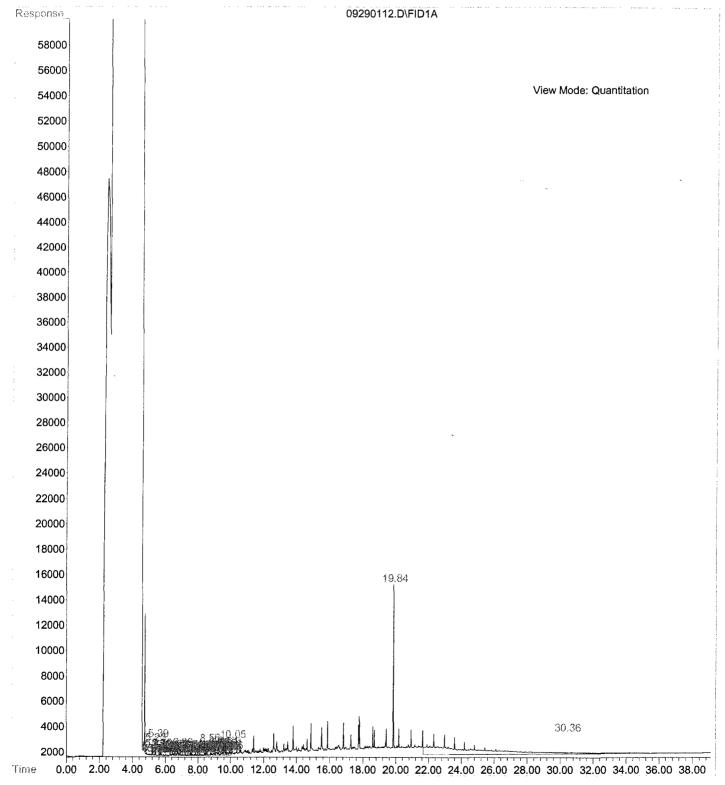
A.

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

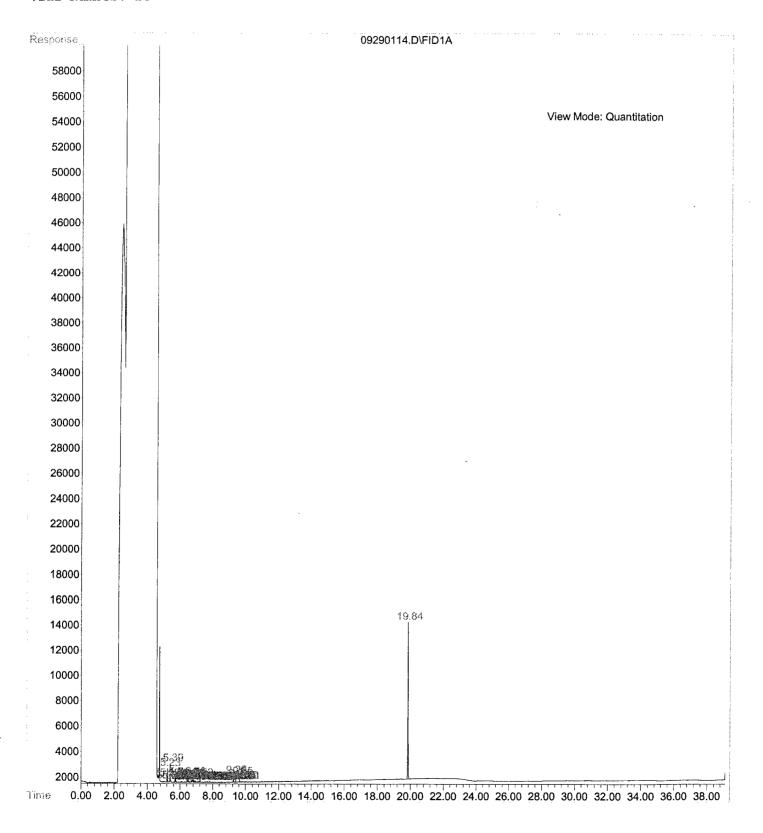


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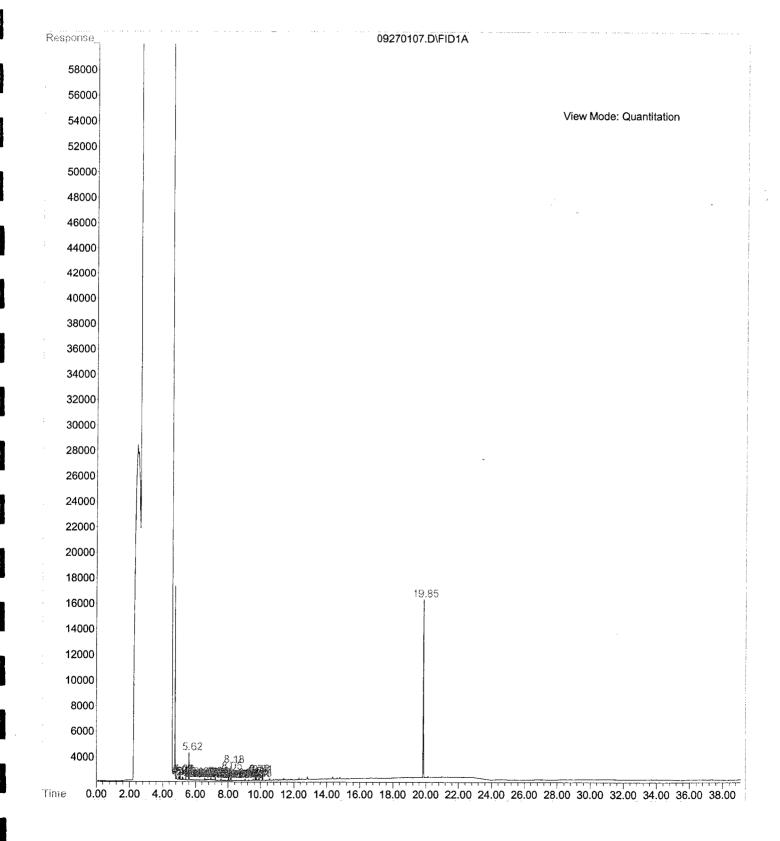
File : C:\HPCHEM\2\DATA\092901\09290112.D
Operator : ccm
Acquired : 30 Sep 2001 1:29 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-05
Misc Info :
Vial Number: 12



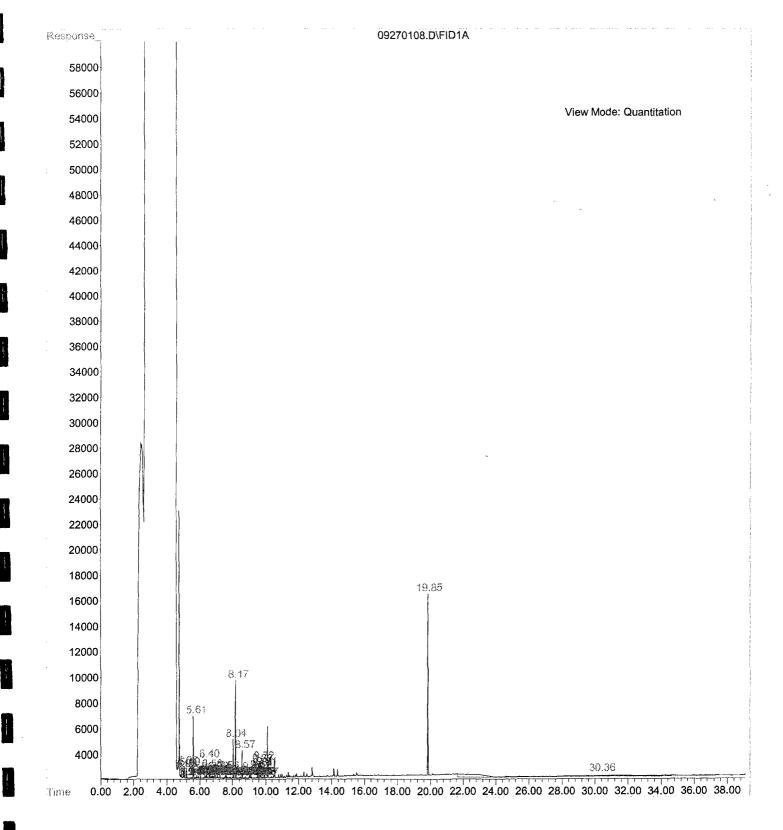
File : C:\HPCHEM\2\DATA\092901\09290114.D Operator : ccm Acquired : 30 Sep 2001 3:13 using AcqMethod NM0913F.M Instrument : FID-1 Sample Name: 109102-06 Misc Info : Vial Number: 14



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

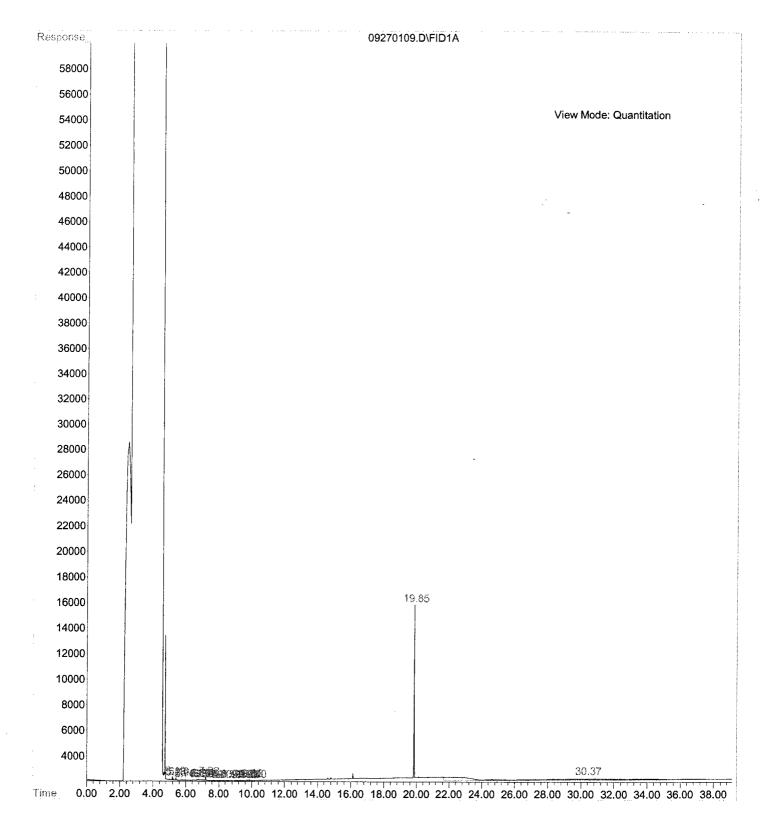


File : C:\HPCHEM\2\DATA\092701\09270108.D
Operator : ccm
Acquired : 28 Sep 2001 22:07 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-12
Misc Info :
Vial Number: 8

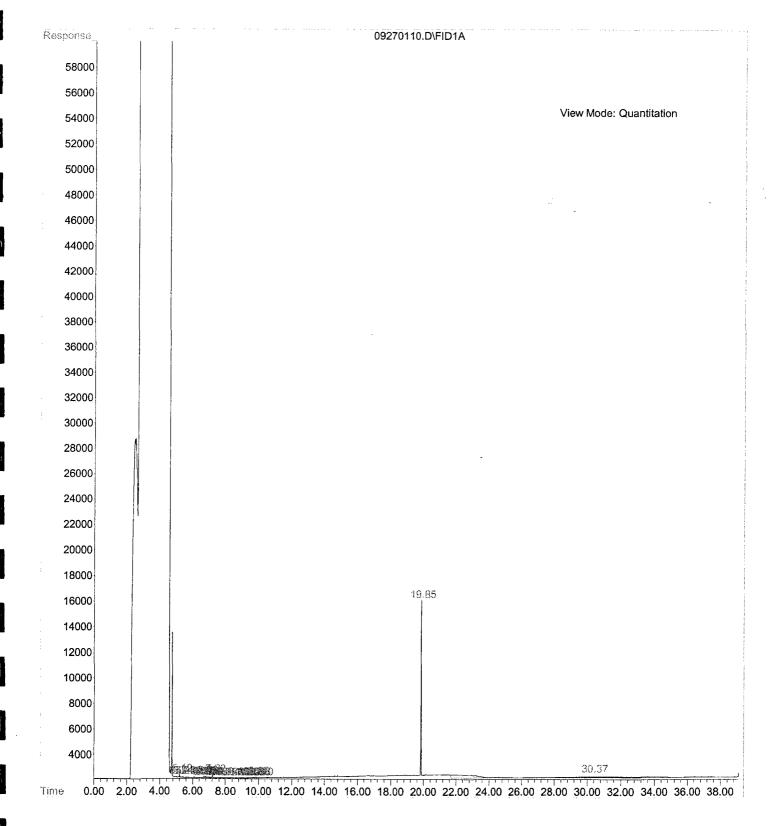


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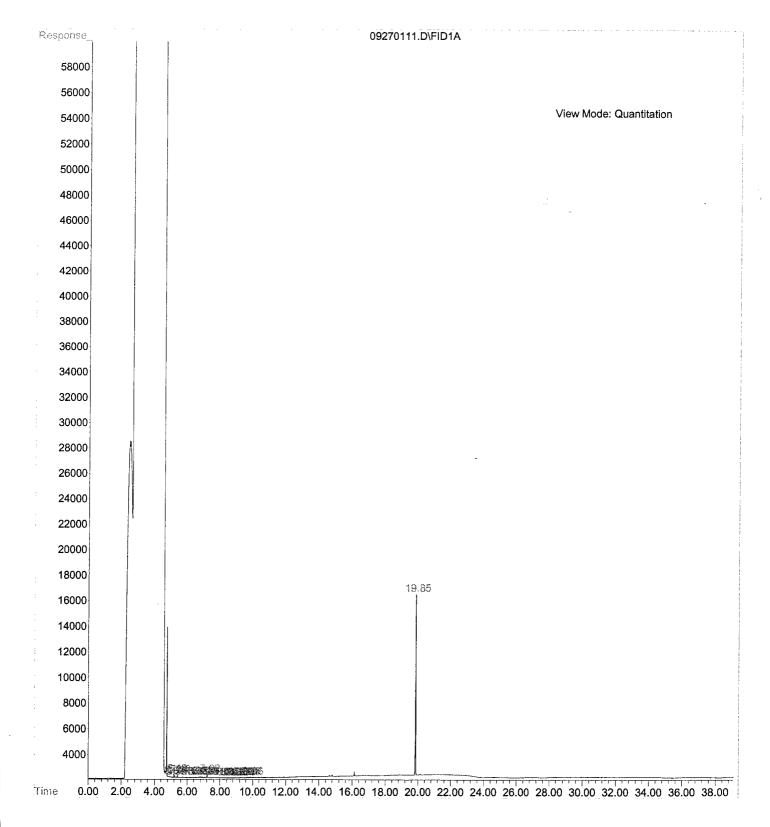
File : C:\HPCHEM\2\DATA\092701\09270109.D
Operator : ccm
Acquired : 28 Sep 2001 23:00 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-13
Misc Info :
Vial Number: 9



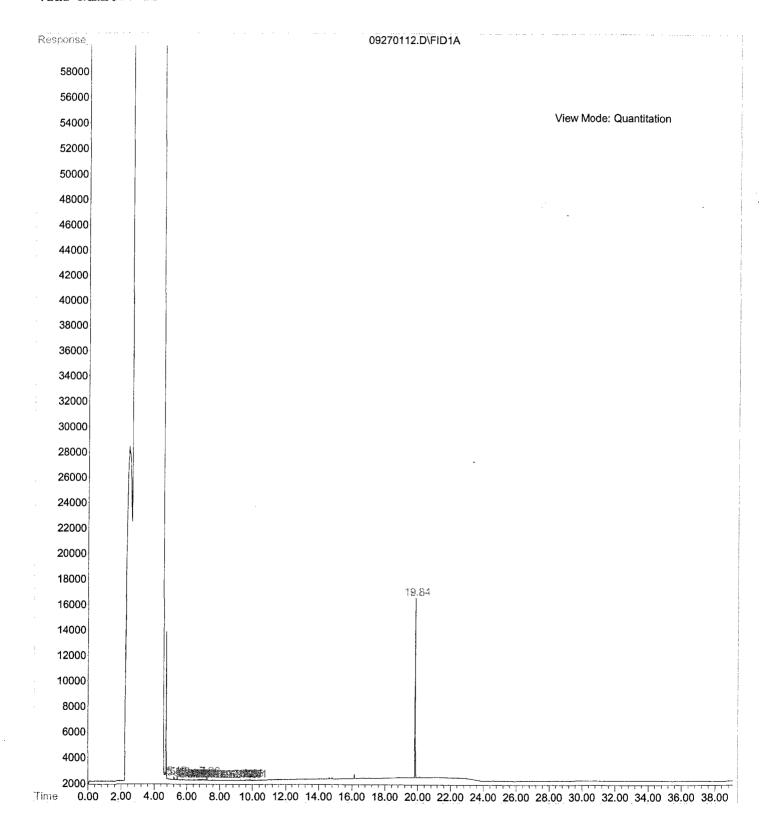
File : C:\HPCHEM\2\DATA\092701\09270110.D
Operator : ccm
Acquired : 28 Sep 2001 23:52 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: 109102-14
Misc Info :
Vial Number: 10



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



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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 NameBMG 0-9Project Number1517000082

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



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
F OJECT #	: 1517000082	DATE RECEIVED	: 10/06/01
F OJECT NAME	: BMG 0-9	REPORT DATE	: 10/26/01
PINNACLE			DATE
ID #	CLIENT DESCRIPTION	MATRIX	COLLECTED
10045 - 01 110045 - 02	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



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## GAS CHROMATOGRAPHY RESULTS

TEST CLIENT PROJECT # PROJECT NAME	: EPA 8021 MOE : AMEC EARTH : 1517000082 : BMG 0-9		IENTAL		PINNACLE I.D.	: 110045
BAMPLE			DATE	DATE	DATE	DIL.
D. # CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	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		
BURROGATE: BROMOFLUOROBENZENE BURROGATE LIMITS	: (%) ( 80 - 120 )			87		

## 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.





### GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

TUST EMANK I. D.	: EPA 8021 MODIFIED : 101101	PINNACLE I.D. DATE EXTRACTED	: 110045 : N/A
CLIENT	: AMEC EARTH & ENVIRONMENTAL	DATE ANALYZED	: 10/11/01
REOJECT #	: 1517000082	SAMPLE MATRIX	: AQUEOUS
FIOJECT NAME	: BMG 0-9		
PARAMETER	UNITS		
BENZENE	UG/L	<0.5	
TUENE	UG/L	<0.5	
ETHYLBENZENE	UG/L	<0.5	
TETAL XYLENES	UG/L	0.88	
NETHYL-t-BUTYL ETHER	UG/L	<2.5	
1,3,5-TRIMETHYLBENZENE	UG/L	<0.5	
1,4-TRIMETHYLBENZENE	UG/L	<0.5	
SURROGATE:			
EDOMOFLUOROBENZENE (%) SERROGATE LIMITS: CHEMIST NOTES: N/A	( 80 - 120 )	89	





		GAS CHRO	DMATOGRAPH MSM		Y CONTROL				
TEST SMSD # LIENT PROJECT # PROJECT NAME	: EPA 8021 MC : 110052-05 : AMEC EARTI : 1517000082 : BMG 0-9				PINNACLE DATE EXTF DATE ANAL SAMPLE M/ UNITS	RACTED YZED	: : : : : : : : : : : : : : : : : : : :	110045 N/A 10/11/01 AQUEOUS UG/L	
PARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
NZENE	<0.5	20.0	23.1	116	22.8	114	1	(80 - 120)	20
BLUENE	<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
TAL XYLENES	<0.5	60.0	60.2	100	60.1	100	0	( 80 - 120 )	20
CHEMIST NOTES: N/A									
	Sample Result - Sa								

---- X 100

Spike Concentration

(Sample Result - Duplicate Result)

D (Relative Percent Difference) =

Average Result



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### GAS CHROMATOGRAPHY RESULTS

TEST TEIENT FEOJECT # PROJECT NAME	: EPA 8015 MC : AMEC EARTH : 1517000082 : BMG 0-9	•		-)	PINNACLE I.D.	: 110045
	DMC 0-5		DATE	DATE	DATE	DIL.
I #CLIENT I.D.		MATRIX	SAMPLED	EXTRACTED	ANALYZED	FACTOR
01 82-MW-2		AQUEOUS	10/05/01	10/14/01	10/14/01	1
PARAMETER	DET. LIMIT	UN	ITS	82-MW-2		
F EL HYDROCARBONS, C6-C10	2.0	M	G/L	< 2.0		
FUEL HYDROCARBONS, C10-C22	1.0	M	G/L	< 1.0		
FUEL HYDROCARBONS, C22-C36	1.0	M	G/L	< 1.0		
CLCULATED SUM:						
SURROGATE:						
Q_TERPHENYL (%)				88		
S RROGATE LIMITS	(79 - 124)					

CEMIST NOTES:

N/A



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## GAS CHROMATOGRAPHY RESULTS REAGENT BLANK

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

ARAMETER		UNITS		
FUEL HYDROCARBONS		MG/L	< 2.0	
HYDROCARBON RANGE			< 1.0	
YDROCARBONS QUANT	ITATED USING		< 1.0	
SURROGATE: TERPHENYL (%) SURROGATE LIMITS	(78 - 128)		88	

CHEMIST NOTES:



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# GAS CHROMATOGRAPHY QUALITY CONTROL MSMSD

EST EMSD # CLIENT PROJECT # ROJECT NAME	: 101401	, ,	DIFIED (DIRECT INJECT) & ENVIRONMENTAL		PINNACLE DATE EXTF DATE ANAL SAMPLE M/ UNITS	RACTED YZED	:	110045 10/14/01 10/14/01 AQUEOUS MG/L	
	SAMPLE	CONC	SPIKED	%	DUP	DUP		REC	RPD
FIRAMETER	RESULT	SPIKE	SAMPLE	REC	SPIKE	% REC	RPD	LIMITS	LIMITS
EL HYDROCARBONS	<1.0	33.0	34.0	103	33.0	100	3	(64 - 127)	20

CHEMIST NOTES:

% Recovery =

(Spike Sample Result - Sample Result)

----- X 100

Spike Concentration

(Sample Result - Duplicate Result) ------ X 100

RPD (Relative Percent Difference) =

Average Result



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

LOG NO	REPORT OF RESULTS SAMPLE DESCRIPTION , LIQUID SAMPLES	-	Sampled Code DATE/	AMEC-BMG-09 d By: Client e: 081811019 Page 1
10186-2	82-MW-6/110045-02 82-MW-7110045-03	1	0-05-01/14	16
PARAMETER		10186-2	10186-3	
Nitrate-Ni	trite, Nitrogen (353.2/354.1/4500-NO3) Nitrite-N, mg/l I, mg/l Factor Date	0.10 0.10 <0.10 1 10.06.01 10.08.01 N3W62B	<0.10 <0.10 <0.10 1 10.06.01 10.08.01 N3W62B 4500-NO2B	
Ammonia (a Dilution Prep Date Analysis Batch ID Prep Meth Analyst	Date	1 10.11.01 10.12.01 AAW33A	10.11.01 10.12.01 AAW33A 350.1	
Total Diss Dilution Prep Date Analysis Batch ID Prep Meth Analyst	Date	1 10.08.01 10.09.01 TDW089	460 1 10.08.01 10.09.01 TDW089 160.1 ST	



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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		keported: I	9 001 01
		Project	t: 110045, AME Sampled By Code: 0	
	REPORT OF RESULTS			Page 2
LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES		DATE/ IME SAMPLED	
10186-2	82-MW-6/110045-02 82-MW-7110045-03	10	0-05-01/14:16	
PARAMET		10186-2	10186-3	
Sulfate Diluti	as SO4 (375.4), mg/l on Factor is Date ID	13 1 10.15.01 SEW133	8.6 1	
Diluti Prep D	is Date ID ethod	1 10.11.01 10.12.01 PD124		
Diluti Prep D	is Date ID	1 10.11.01 10.12.01 PD124	10.11.01	

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

Pinn 2709	Jacinta Tenorio acle Laboratories -D Pan American Freew querque, NM 87107	ay Northeast		Reported	1; 19 OCT 01
			Proje	Sampled	AMEC-BMG-09 1 By: Client e: 081811019
		REPORT OF RESULTS			Page 3
	AMPLE DESCRIPTION , Q		SAMPLES 7		
10186-4 M 10186-5 L 10186-6 M 10186-7 M		Recovery y % Recovery			
PARAMETER		10186-4	10186-5	10186-6	10186-7
Nitrate-Nitr	ite, Nitrogen (353.2/	354.1/4500-NO3)			
	itrite-N, mg/l	<0.10	102 %	69 %	69 % 100 %
Nitrite-N, 1	2.	<0.10	100 %		
Dilution Fa	ctor	1			
Prep Date	t o	10.06.01			
Analysis Da Batch ID	Le	10.08.01			
Prep Method				N3W62B	
Analyst		4500-NO2B CR			
Analyst		CR			
Ammonia (as l	N) (350.1), mg/l	<0.05	96 %	76 %	76 %
Dilution Fa		1			
Prep Date		10.11.01			
Analysis Dat	te	10.12.01			
Batch ID		AAW33A	AAW33A	AAW33A	AAW33A
Prep Method		350.1			
Analyst		CR			
	ved Solids (160.1), m	g/l <5.0	101 %		
Dilution Fac	ctor	1			
Prep Date		10.08.01			
Analysis Dat	te	10.09.01			
Batch ID		TDW089			
Prep Method		160.1			
Analyst		ST			



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

		REPORT OF RESULTS	-	Code	By: Client : 081811019 Page 4
LOG NO	SAMPLE DESCRIPTION , (	QC REPORT FOR LIQUID	SAMPLES 7	TIME SAMPLED	
10186-5 10186-6	Method Blank Lab Control Standard % Matrix Spike % Recover Matrix Spike Duplicate	-y			
PARAMETER			10186-5	10186-6	10186-7
Dilution Analysis Batch ID Prep Met Analyst	s SO4 (375.4), mg/l Factor Date hod solved (6010B), mg/l	<5.0 1 10.15.01		129 %  SEW133  99 %	SEW133
Prep Dat Analysis Batch ID Prep Met Analyst	Date	10.11.01 10.12.01 PD124 GSP	 PD124	PD124	PD124
Dilution Prep Dat Analysis Batch ID Analyst	e Date	1 10.11.01 10.12.01 PD124 GSP	99 %   PD124 	98 %   PD124 	99 %   PD124 

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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 Page 5

#### REPORT OF RESULTS

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

10186-7 Matrix Spike Duplicate % Recovery

PARAMETER 10186-5 10186-6 10186-7

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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.

Lange Larson, Project Manager

Final Page Of Report



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## 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
82	extruded; however, this analyte was not detected in the blank analyzed with the samples.
0.2	The product in the sensitive 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.
Ġ	Some and the duration is the result of the adverted by the adverted by the adverted by the test of the second adverted by the
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 ( $\leq 2^{\circ}$ C or $\geq 6^{\circ}$ 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 ( <sup>1</sup> sample, MS or MSD was analyzed twice to confirm surrogate/spike failure, <sup>2</sup> sample and/or
	MS/MSD chromatogram(s) had interfering peaks, <sup>3</sup> sample result was > 4 X spike added, <sup>4</sup> metals serial dilution was
	performed, or <sup>5</sup> 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 guantitation may be an estimation.
R1	(For nondetects) Temperature limits exceeded ( $\leq 2^{\circ}$ 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.
Ø	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.
<ul> <li>* (Metals &amp; Wet Chem)</li> </ul>	Elevated reporting limit due to matrix interference (dilution prior to digestion and/or analysis)

### 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 \word\certlist\condcert.lst revised 09/13/01

Lab Order #:	C110186	Date Receive	d: 10-6-01 SERVICES
1. Was there a	Chain of Custody?	Yes No*	8. Were samples checked for Yes No <sup>4</sup> N/ preservative? (Check pH of all H2O requiring preservative (STL-PN SOP 917) except VOA vials that require
	f Custody properly relinguished?	Yes No*	<ul> <li>zero headspace)<sup>+</sup></li> <li>9. Is there sufficient volume for Yes No<sup>4</sup> N/ analysis requested?</li> </ul>
3. Were sample	s received cold? 6°C: STL-SOP	Yes No <sup>+</sup> N/A	
<ol> <li>Were all sam labeled and id</li> <li>Did samples compositing<sup>4</sup></li> </ol>	dentified? require splitting or	Yes No <sup>+</sup> Yes <sup>+</sup> No	11. Is Headspace visible > ¼ " in Yes <sup>+</sup> (No) N, diameter in VOA vials?* If any headspace is evident, comment in out-of-control
Req By: PM 6. Were sample proper conta	l Client Other*	Ves No*	section. 12. If sent, were matrix spike Yes No* (N, bottles returned?
requested? 7. Were all sam received inta	ple containers ct?	Yes No*	13. Was Project Manager notified Yes No* of problems? (initials: <u>PS/4</u> ) m/h 10-6-0(
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Cooler Number	(s): <u>Clier</u>	1	Shipping Charges://A
Cooler Weight(	's): <u>/</u> ♀≭		Cooler Temp(s) (°C):
	Events and Insp	ection Comments	s: Nas requested on COC but bottle for this analysis. Po
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9. Sang We did SAMPLES	ENT TO ST	- BY ERROR	(Use back of PSIFFOR ADDITIONAL NOTES AND COMMENTS)
9. Samp We did SAMPLES	DMH	<u>– By Error</u> Date: <u>10-601</u>	۲۷. 
9. Samp WL did SAMPLES Inspected By: * Note all Out-o time samples * If Other, note	ENT TO ST DMH f-Control and/or questional pH, Dissolved O2, Residual who requested the splitting	Date: <u>10-60</u> ble events on Comment Section CL) as out of hold time, there g or compositing of samples of	(USE BACK OF PSIFFOR ADDITIONAL NOTES AND COMMENTS ) Logged By: <u>PFE</u> Date: <u>10/6/01</u> on of this form. For holding times, the enalytici department will flag immediate hold efore, these samples will not be documented on this PSIF. on the Comment Section of this form. All volatile samples requested to be split or
9. Samp WL dud Samples Samples Inspected By: Note all Out-o time samples If Other, note composited m + All preserveth	EKT TO ST DMH f-Control and/or questional pH, Dissolved O <sub>2</sub> , Residual who requested the splitting nust be done in the Volatile	Date: <u>10-60</u> Date: <u>10-60</u> ble events on Comment Section CL) as out of hold time, there g or compositing of samples of Lab. Document: <u>"Volatile sam</u> Carolina, the State of New Yor	(Use BACK OF PSIFFOR ADDITIONAL NOTES AND COMMENTS ) Logged By: <u>PFE</u> Date: <u>10/6/01</u> on of this form. For holding times, the analyticl department will flag immediate hold afore, these samples will not be documented on this PSIF.

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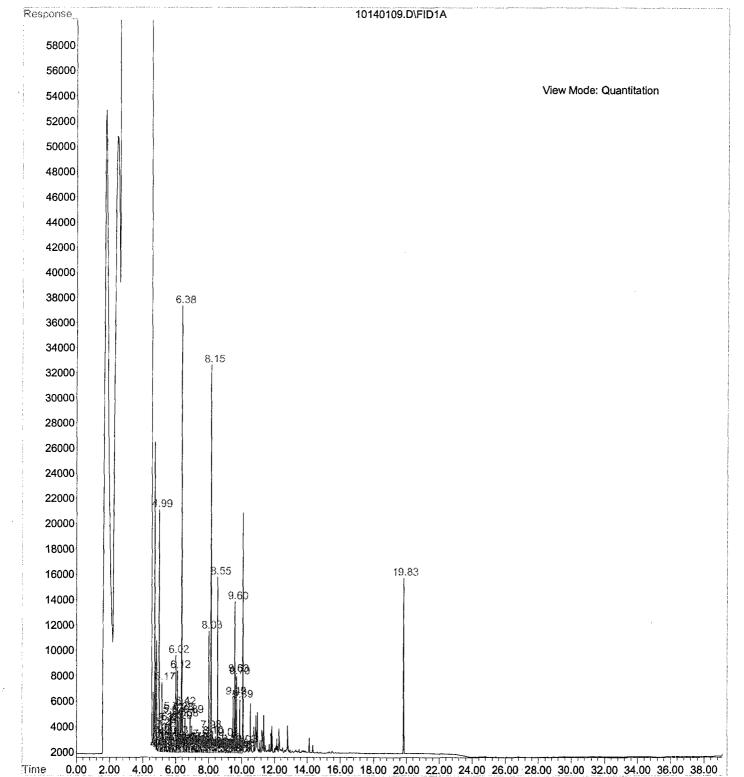
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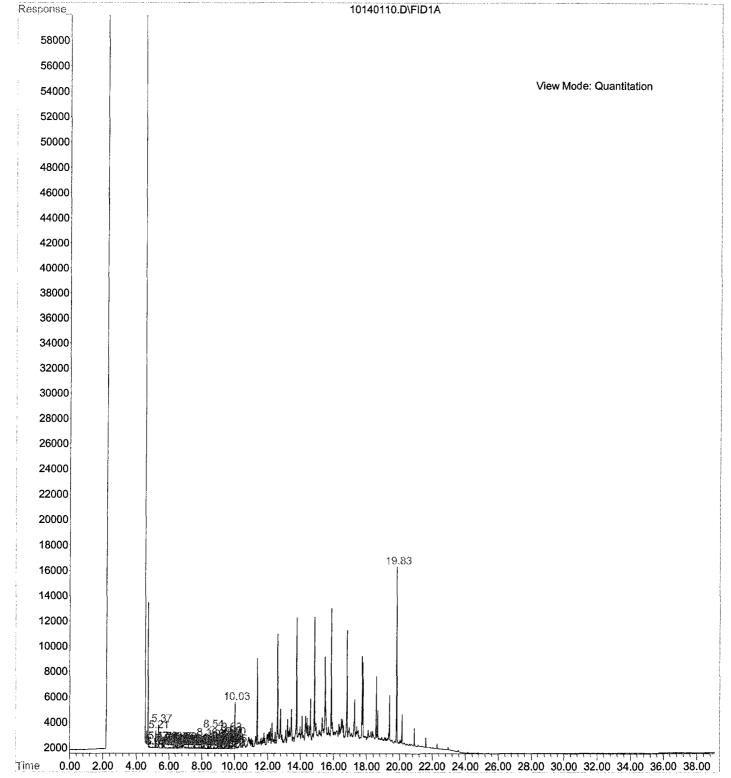
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File : C:\HPCHEM\2\DATA\101401\10140109.D
Operator : ccm
Acquired : 15 Oct 2001 3:21 using AcqMethod NM0913F.M
Instrument : FID-1
Sample Name: gas ccv
Misc Info :
Vial Number: 9



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

