AP - 31

STAGE 1 & 2 REPORTS

DATE:

March 15, 2001

SITE ASSESSMENT
FOR THE O-9 OIL LEAK

MARCH 15, 2001

PREPARED FOR:

BENSON – MONTIN – GREER DRILLING CORPORATION

PROJECT 62800307

4000 MONROE ROAD
FARMINGTON, NEW MEXICO 87401
(505) 326-2262

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Executive Summary for the O-9 Line Leak Investigation

Hydrocarbons were discovered in the vicinity of the O-9 pipeline by Benson-Montin-Greer Drilling Corporation (BMG) during the summer of 2000. BMG completed removal of approximately 2,800 cubic yards of hydrocarbon-impacted soils and backfilled the excavation with clean soil. BMG suspected local hydrocarbon impacts to subsurface soils and shallow groundwater. Philip Environmental Services Corporation (Philip) was contracted by BMG to complete soil borings, install groundwater monitoring wells and test the soil and groundwater for hydrocarbon constituents. This report summarizes the data collected during the site investigation of a crude oil pipeline that failed and resulting in a release to the surrounding soil, known as the O-9 Line Leak. The crude oil pipeline is located in the Santa Fe National Forest in Rio Arriba County, New Mexico.

The initial field investigation was completed August 29th and 30th, 2000. Philip mobilized a CME-75 drill rig, crew and geologist to perform this investigation. Soil borings were advanced up to 25 feet below the ground surface. Data collected during these two days indicate that soil and groundwater beneath the O-9 Line leak has been impacted by hydrocarbons. A soil sample obtained at a depth of 15 to 17 feet below ground surface at soil boring SB-9 indicated up to 1,800 parts per million of hydrocarbons (C-6 through C-36) were present as determined by U.S. Environmental Protection Agency (EPA) Method 8015 Modified. A groundwater sample obtained from monitoring well MW-5 indicated that elevated levels of benzene - 400 parts per billion (ppb), toluene – 56 ppb, ethylbenzene – 79 ppb and total xylenes – 260 ppb are present in shallow groundwater. Additional soil and groundwater samples obtained for laboratory analysis did not reveal elevated levels of hydrocarbons, therefore, it appears as though hydrocarbon impacts are limited to areas around borehole SB-9 and monitoring well MW-5.

On February 6, 2001, PSC mobilized to the site to develop and sample the monitoring wells to determine any changes in the presence of hydrocarbons. Groundwater samples from monitoring wells MW-1 through MW-4 submitted for laboratory analysis of hydrocarbons did not indicate any hydrocarbon impacts. Monitoring well MW-5 was found to contain 1.18 feet of free phase hydrocarbons at a depth of 16.23 feet below ground surface (bgs).

In general, Philip's investigation was limited to determining the presence of hydrocarbons in the soil and groundwater. Mr. Pat Sanchez with BMG directed Philip at locations where boreholes and monitoring wells were to be advanced in the area of the O-9 Line leak. The New Mexico Oil Conservation Division (NMOCD) has a ranking system for determining concentrations of hydrocarbons in soil that would determine remediation standards for clean up. Although Philip did not complete a risk assessment to determine the ranking of this site, the presence of shallow groundwater and the proximity of the Ojito Canyon wash to the site indicate that the ranking for this site would be high. A high-ranking site would require more stringent clean up standards, therefore, remedial actions would be required for both soil and groundwater at this site.

1.0 INTRODUCTION

Philip Environmental Services Corporation (Philip) was contracted by Benson-Montin-Greer Drilling Corporation (BMG) to perform a limited subsurface investigation of soil and groundwater from a crude oil pipeline spill. This report summarizes the information gathered during a field investigation at the O-9 line lead located in the Santa Fe National Forest, Rio Arriba County, New Mexico. Ten soil borings were completed on August 29th and 30th, 2000, to assess environmental impacts from the O-9 Line leak. Five of the soil borings were converted into monitoring wells.

1.1 BACKGROUND

A crude oil gathering line located in the Ojito Canyon failed during the summer of 2000 resulting in the release of approximately 20 barrels (bbls) of unrefined crude oil. BMG conducted initial recovery of the spill including excavation of approximately 2,800 cubic yards of soil. The excavated areas were backfilled with clean soils. BMG requested Philip to conduct soil and groundwater sampling and testing to determine the impact of the crude oil spill on subsurface soils and groundwater.

1.2 SITE LOCATION

The site is located approximately 12 miles northeast of the town of Lindrith, New Mexico in the Santa Fe National Forest. The approximate Longitude is 106^0 56.588' West and 36^0 28.572' North.

1.3 GEOGRAPHY

The site is located within the flood plain on the north side of Ojitos Canyon, approximately 7,500 feet above sea level in a mountainous region. Average precipitation is approximately 17 inches per year.

1.4 REGIONAL HYDROGEOLOGY AND GEOLOGY

The Ojitos Canyon and the associated flood plain are relatively narrow with numerous feeder canyons and washes that converge into Ojitos Canyon. The Tertiary San Jose Formation is the regional aquifer in the area. The surrounding mountains rise approximately 500 to 600 feet above the canyon floor. Groundwater in the area of the O-9 Line leak is approximately 16 feet below ground surface and is likely an alluvial aquifer associated with the Ojito Canyon. Groundwater in the area of the O-9 Line leak appears to flow in a southeast direction.

2.0 METHODS OF INVESTIGATION

2.1 BOREHOLE DRILLING AND SAMPLING METHODOLOGIES

Soil borings SB-1 through SB-10, shown on Figures 1, were completed using a CME-75 drill rig equipped with 6.25-inch (inside-diameter) hollow-stem augers. These borings were continuously cored using a split-barrel sampler, 18 inches in length and 1.5-inches in diameter. Mr. Pat Sanchez with BMG assisted in direction of drilling locations. Philip's field geologist, Mr. Bill Mansker, described the lithology of the soil at each boring location on individual "Record of Subsurface Exploration" forms, included in Appendix A.

The soil cores from borings SB-1 through SB-10 were tested with a FID at 5-feet intervals, or at points where staining or hydrocarbon odor was noted. Headspace readings were taken at these intervals by putting a portion of the core into a plastic bag. The plastic bag was sealed and placed in the sun for 10 to 20 minutes to volatilize any hydrocarbons present. The FID was then inserted into the bag and a headspace reading was obtained. Drilling and sampling were discontinued at depths of 20 to 25 feet below ground surface, since impacts from the surface spill were not anticipated to have impacted soils beyond these depths. Soil Borings; SB-1, SB-2, SB-6, SB-7 and SB-10 were converted into monitoring wells; MW-1, MW-2, MW-3, MW-4 and MW-5 respectively. These monitoring wells were used to obtain groundwater samples for analytical testing of hydrocarbon constituents.

Drilling equipment and sampling tools were decontaminated prior to use at each boring location. Decontamination procedures include cleaning the drilling equipment with an Alconox™ soap solution followed by a potable water rinse.

In the borings completed at each sampling interval, the core was split lengthwise; half of the core was placed into the plastic bag for field-testing with the FID. One sample from each soil boring was collected from one-half of the split spoon and placed into a four-ounce glass sample jar with a Teflon™-lined lid. Soil samples were tested for hydrocarbons using EPA Method Modified 8015 and EPA Method 8021. Samples were stored on ice and transported to laboratory for analysis. Each sample collected was labeled with the boring number, sample interval depth, date, time of collection, and required laboratory analysis.

All soil samples collected were submitted to Pinnacle Laboratories in Albuquerque, New Mexico, under strict chain-of-custody procedures.

2.2 MONITORING WELL INSTALLATION

Monitoring-well borings were advanced using the methods described in Section 2.1 of this report. The borings were advanced beyond the water to a depth of 20 to 25 feet below ground surface. Groundwater was encountered at depths of approximately 16 feet below ground surface. The wells were screened at intervals ranging from 10 to 25 below ground surface. Details of well construction are given on the Well Installation Records included in Appendix B. Detailed lithologic information was recorded on "Record of Subsurface Exploration" forms also included in Appendix A.

The monitoring wells were screened at the following intervals:

TABLE 1 – MONITORING WELL INSTALLATION DATA

Monitoring Well	Screen Interval	Top of Casing Elevation	Top of Screen	Bottom of Screen
MW-1	15	7507.22	7489.22	7504.22
MW-2	10	7506.5	7493.5	7503.5
MW-3	15	7508.63	7490.63	7505.63
MW-4	10	7507.1	7494.1	7504.1
MW-5	10	7503.22	7490.22	7500.22

2.3 MONITORING WELL DEVELOPMENT AND SAMPLING METHODOLOGY

Monitoring wells MW-1, MW-2, MW-3, MW-4 and MW-5 were developed by raising and dropping a Teflon™ bailer inside the well to surge water back and forth through the screen and by removing groundwater until the pH, temperature and total dissolved solids (TDS) stabilized. Groundwater samples were collected when the water being bailed from the wells was no longer silty and the temperature, pH, and conductivity readings stabilized.

Groundwater samples from MW-1, MW-2, MW-3, MW-4, and MW-5 were collected in pre-preserved, Volatile Organic Analysis (VOA) vials for analysis by EPA Method 8021 for benzene, toluene, ethylbenzene and xylenes (BTEX), and by EPA Method Modified 8015 for total petroleum hydrocarbons (TPH). These samples were also stored on ice and transported for analysis to Pinnacle Labs.

All samples collected were submitted to the laboratory under strict chain-of-custody procedures.

3.0 RESULTS

3.1 SITE LITHOLOGY

In general, soil lithology 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. Bedrock or sandstone was encountered in several of the borings, resulting in auger refusal. A complete record of the subsurface exploration is included in Appendix A. A site map showing locations of boreholes and monitoring wells is included as Figure 1.

3.2 SOIL SAMPLING RESULTS

Hydrocarbons were detected in Soil Boring SB-9 at greater than 1,000 parts per million using the FID. Significant hydrocarbon readings were not detected using the FID on the other soil borings. FID headspace readings are recorded on the Record of Subsurface Exploration forms included in Appendix A. The laboratory analyses of the soil samples collected from boring SB-9 did verify the presence of hydrocarbons in the subsurface. Significant levels of hydrocarbons were not detected in the other soil samples. The laboratory analytical reports for soil are included in Appendix C and are summarized in Table 2. The data from the soil borings indicate that hydrocarbon impacts are limited to areas around boring SB-9.

TABLE 2 – SOIL SAMPLING TPH ANALYSIS RESULTS AND FIELD SCREENING RESULTS

Sample ID (Location / Depth)	C6 - C10 Range mg/kg	C10 – C22 Range mg/kg	C23 –36 Range mg/kg	Field Screening FID
SB-1 / 25-27	<10	<10	<10	N/A(wet)
SB-2 / 13-15	<10	<10	<10	ND
SB-3 / 5-7	<10	17	<10	<0.5
SB-4 / 15-17	<10	11	<10	N/A(wet)
SB-5 / 5-7	<10	35	21	N/A
SB-6 / 20-22	>10	19	>10	<0.5
SB-7 / 15-17	<10	<10	<10	ND
SB-8 / 10-12	<10	29	<10	5.2
SB-9 / 15-17	650	860	290	>1,000
SB-10 / 10-12	<10	<10	<10	<0.5

The locations of the soil borings completed during this investigation are shown on Figure 4.

3.3 SITE HYDROGEOLOGY

On August 30, 2000, the depth to groundwater in MW-1 through MW-5 was measured with an oil/water interface probe. Water table elevations measured are shown in Table 3. Separate phase hydrocarbons were not present in the wells at the time of measurements.

TABLE 3 GROUNDWATER LEVEL INFORMATION – AUGUST 2000

Well	Top of Casing Elevation	Ground Water Elevation	Screened Interval	Top of Screen
MW-1	7507.22	7490.53	15	7489.22
MW-2	7506.5	7489.88	10	7493.5
MW-3	7508.63	7491.42	15	7490.63
MW-4	7507.1	7491.59	10	7494.1
MW-5	7503.22	7486.56	10	7490.22

Due to the relatively similar lithologies noted in all of the borings, it is assumed that all of the wells are hydraulically connected. It is expected that the various clay and sand layers will cause variations in the vertical and horizontal hydraulic conductivity.

The direction of groundwater flow in the shallow saturated zone is toward the southeast. The approximate hydraulic gradient is 0.040 ft/ft.

TABLE 4 GROUNDWATER LEVEL INFORMATION – FEBRUARY 2001

Well	Top of Casing Elevation	Ground Water Elevation	Screened Interval	Top of Screen
MW-1	7507.22	7491.14	15	7489.22
MW-2	7506.5	7490.59	10	7493.5
MW-3	7508.63	7491.75	15	7490.63
MW-4	7507.1	7492.05	10	7494.1
*MW-5	7503.22	7485.81	10	7490.22

MW-5 groundwater elevation. Free phase hydrocarbon elevation is at 7486.99 feet.

3.4 GROUNDWATER QUALITY

August 2000

Monitoring well MW-5 has elevated levels of BTEX and also revealed slightly elevated levels of hydrocarbons in the C-10 through C-22 range. Benzene concentrations are currently above the New Mexico Water Quality Control Commission (NMWQCC) standards. None of the other groundwater samples obtained for analysis revealed elevated levels of hydrocarbon constituents. The results of the groundwater sampling and analytical testing are summarized in Tables 4, 5 and 6. The laboratory analytical reports and quality assurance/quality control information are included in Appendix C.

TABLE 5 - GROUNDWATER SAMPLING PARAMETERS, AUGUST 2000			
Well	pH (Units)	Temperature (°C)	Total Dissolved Solids (g/L)
MW-1	8.74	16.9	0.370
MW-2	8.35	15.2	0.399
MW-3	8.19	14.3	0.709
MW-4	8.20	14.9	0.363
MW-5	8.21	12.6	0.387

TABLE 6 – GROUNDWATER SAMPLING, BTEX ANALYTICAL RESULTS, AUGUST 2000				
Well	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-1	<0.5	<0.5	<0.5	<0.5
MW-2	<0.5	<0.5	<0.5	2.1
MW-3	<0.5	<0.5	<0.5	<0.5
MW-4	<0.5	<0.5	<0.5	<0.5
MW-5	400	56	79	260
NMWQCC Standards	10	750	750	620
µg/L = micrograms per liter NMWQCC = New Mexico Water quality Control Commission				

TABLE 7 – GROUNDWATER SAMPLING, TPH ANALYTICAL RESULTS, AUGUST 2000			
Well	C6 - C10 Range	C10 – C22 Range	C23 –36 Range
MW-1	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-2	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-3	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-4	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-5	<2.0 mg/kg	1.6 mg/kg	<1.0 mg/kg

February 2001

Philip mobilized to the site on February 6, 2001 to develop and sample the monitoring wells to determine if any changes had occurred in the presence of hydrocarbons. Monitoring well MW-5 was found to contain fee phase hydrocarbon at a depth of 16.23 feet bgs. The thickness of the hydrocarbon layer was measured at 1.18 feet.

The remaining groundwater samples obtained for analysis from MW-1 through MW-4 did not reveal elevated levels of hydrocarbon constituents. The results of the groundwater sampling and analytical testing are summarized in Tables 7, 8 and 9. The laboratory analytical reports and quality assurance/quality control information are included in Appendix D.

TABLE 8 - GROUNDWATER SAMPLING PARAMETERS, FEBRUARY 2001			
Well	PH (Units)	Temperature (^{0}C)	Conductivity (mmhos/cm)
MW-1	5.54	7.6	0.862
MW-2	5.9	9.48	1.06
MW-3	4.97	9.3	84.6
MW-4	5.15	7.02	0.77

Parameters are averages from five different readings.

TABLE 9 – GROUNDWATER SAMPLING, BTEX ANALYTICAL RESULTS, AUGUST 2000				
Well	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	Total Xylenes µg/L
MW-1	<0.5	<0.5	<0.5	<0.5
MW-2	<0.5	<0.5	<0.5	<0.5
MW-3	<0.5	<0.5	<0.5	<0.5
MW-4	<0.5	<0.5	<0.5	<0.5
NMWQCC Standards	10	750	750	620

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

TABLE 10 – GROUNDWATER SAMPLING, TPH ANALYTICAL RESULTS, AUGUST 2000			
Well	C6 - C10 Range	C10 – C22 Range	C23 –36 Range
MW-1	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-2	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-3	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg
MW-4	<2.0 mg/kg	<1.0 mg/kg	<1.0 mg/kg

4.0 CONCLUSIONS

4.1 SOILS INVESTIGATION CONCLUSIONS

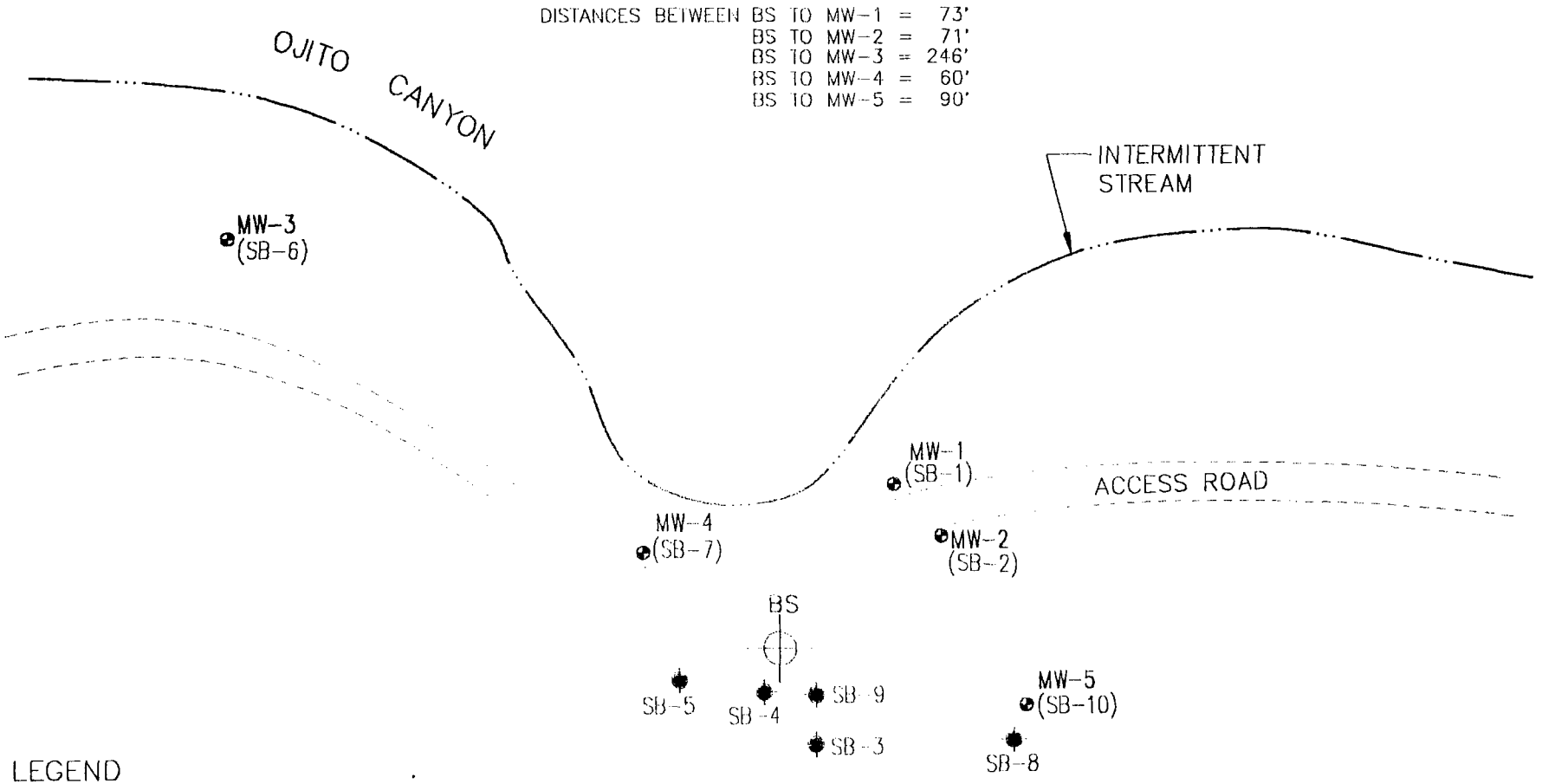
The field screening data from the soil borings indicate that hydrocarbons are located in soils surrounding SB-9 at a depth of 15 to 16.5 feet. Previous remedial excavations performed at the site appear to have removed the majority of hydrocarbon impacted soils above 15 feet in depth.

4.2 GROUNDWATER SAMPLING CONCLUSIONS

Groundwater in the area of the O-9 Line leak is approximately 16 feet below ground surface and flows to the southeast. Five monitoring wells were installed and sampled. Groundwater samples submitted for analytical testing revealed that monitoring well MW-5 has elevated levels of hydrocarbons, most notably benzene. Benzene concentrations in this well exceed the NMWQCC standards of 10 micrograms per liter and were analyzed at 400 micrograms per liter. The majority of the source of the hydrocarbons has been removed. Therefore, migration of hydrocarbons appears to be limited. The potential for migration of hydrocarbons in the groundwater in MW-5 is possible to the southeast.

FIGURE 1

SITE MAP



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PHILLIP SERVICES

TITLE:

BENSEN-MARTIN-GREER DRILLING CORP.
CANADA OJITO (O-9)
LINE LEAK SPILL SITE

DWN:	DES.:	PROJECT NO.: 6280307
CJG	DM	CANADA OJITO (O-9)
CHKD: DM	APPD:	
DATE: 09/28/00	REV.: 0	FIGURE 1

APPENDIX A

"RECORD OF SUBSURFACE EXPLORATION" FORMS

RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 1 (MW - 1)
Well # MW - 1
Page 1 of 1

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

Project Name: BMG - Canada Ojito Oil Line Spill
Project Number: 62800307 Cost Code:
Project Location: N.E. of Lindrith, NM

Elevation: 7505 AMSL
Borehole Location: BMG - O9
GWL Depth:
Logged By: W. L. Mansker
Drilled By: PSC - GME 75 HAS
Date/Time Started: 8/29/00 0900 hr
Date/Time Completed: 8/29/00 100 hr

Well Logged By: W. L. Mansker
Personnel On-Site: W. L. Mansker, Danny Padilla
Contractors On-Site: None
Client Personnel On-Site: P. Sanchez

Drilling Method: CME 75 HAS 7 5/8" OD
Air Monitoring Method: FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts (cts / 18")
0			555 18"x2"							
5		5-6.5	10"	Brn, silty sand, damp 6" Brn, plastic silty clay	sm/cl		<1			<5
10		10-11.5	10"	2" - do. 6" plastic, damp tight clay	sm/cl		<1			11
15		15-16.5	18"	2" clay, 2"wet silty sand,2" clay, 1" sand. 11" Brn, silty, Plastic, clay	cl/sm		<1			5
20		20-21.5	12"	6" mottled, damp, silty clay, 6" hard silty clay	cl		<1			25
25		25-26	6"	6" - do - hard clay TD AT 27' Bgs	cl		<1			+50' for 6"
30										
35										
40										

Comments: NS = Not Sample TD = Total depth of drilling
SSS = Split- spoon sample FID = Flame Imigation detector

Geologist William Mansker

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RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 2
Well # (MW - 2)
Page 1 of 1

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

Project Name BMG - Canada Ojito oil spill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505
Borehole Location BMG - O9
GWL Depth 15'
Logged By Bill Mansker
Drilled By Danny Padilla
Date/Time Started 08/29/00
Date/Time Completed 08/29/00

Well Logged By Bill Mansker
Personnel On-Site Bill Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75 - 7 5/8"
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts C+S / 18"
0			18" SSS				FID PPM			
5			18"	Damp, loose silty fill sand @ reclamation areas			<1			5
10			18"	4" till, 6" pink-brn silty sand	SM		<1			20
15			18"	8" wet, brn silty sand 10" red brn, plasti , damp clay TD @ 18' in - ao - clay	SM CL CL		<1			30
20										
25										
30										
35										
40										

Comments:

Geologist Signature William Mansker

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RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 3
Well #
Page 1 of 1

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

Project Name BMG - Canada Ojito Oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505' AMSL
Borehole Location BMG - O9
GWL Depth 12'
Logged By William Mansker
Drilled By Danny Padilla
Date/Time Started 08/29/00
Date/Time Complete 8/29/00

Well Logged By William Mansker
Personnel On-Site Bill Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5			14"	4" topsoil, 10" Med - fine silty sand damp, loose	SM		L1			5
10			NSR							
				TD at 13' on sandstone bedrock. auger refusal	SM	sand stone	na			50 for 4"
15										
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

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RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 4
Well #
Page 1 of 1

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

Project Name BMG - Canada Ojito Oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505' AMSL
Borehole Location BMG - 09
GWL Depth 12'
Logged By William Mansker
Drilled By PSC
Date/Time Started 8/29/00 1330
Date/Time Completed 08/29/00 1400

Well Logged By William Mansker
Personnel On-Site William Mansker / Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts (c+s / 18 ")
0			18" SSS							
5				Loose, damp fill, sandy with medium yellow, red-brown clay	SM		<1			5
10			NSR 2"	No sample.			<1			50
15				Wet clay and very silty sand SH.HC odor at 14.75' TD 17' in cuttings TD - 17'	CL					17
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

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RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 5
Well #
Page 1 of 1

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 10 - 12'
Logged By William Mansker
Drilled By PSC
Date/Time Started 08/29/00
Date/Time Completed 08/29/00

Well Logged By William Mansker
Personnel On-Site William Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5			4"	BM. sandy, silty soil atop indervafed sandstone bed rock	SM	sand stone				50 for 6"
10				TD @ 7' bgs on sand stone. Auger refuse.						
15										
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

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RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 6
Well # MW-3
Page 1 of 1

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 20'
Logged By William Mansker
Drilled By PSC
Date/Time Started 08/29/00 1520
Date/Time Completed 08/29/0 1630

Well Logged By William Mansker
Personnel On-Site William Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5			12"	2" hard dry day, tight 10" silty sand, damp loose	CL SM		<1			6
10			12"	10" - do- sand 2" sandstone rock	SM		<1			12
15				No sample recovered	SM					+50
20			14"	sand wet @ N 19-20	SM					
				6" brn, wet, plastic clay	CL		<1			0.5
				8" wet silty sand	SM					
25				TD @ 25' - setwell						
30										
35										
40										

Comments:

Geologist William Mansker

J:\Z Misc folders\Drilling\1-40ft

RECORD OF SUBSURFACE EXPLORATION

Borehole # SB-7
Well # MW-4
Page 1 of 1

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N. of Regina, N.M.

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 20'
Logged By William Mansker
Drilled By PSC
Date/Time Started 08/29/00 1520
Date/Time Completed 08/29/0 1630

Well Logged By William Mansker
Personnel On-Site William Mansker, Danny Padialla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5			14"	4" silty clay, tight and damp 11" loose, brown, silty soil, damp	CL SM		4.4			9
10			11"	- do - sand, damp to moist	SM		4.3			9
15			10"	Red-brown, silty clay, tight, damp and mottled TD @ 17' bgs.	CL		4			18
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

J:\Z Misc folders\Drilling\1-40ft

RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 8
Well #
Page 1 of 1

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N. of Regina, N.M.

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 20'
Logged By William Mansker
Drilled By PSC
Date/Time Started 08/30/00 11:30
Date/Time Completed 8/30 11:45

Well Logged By William Mansker
Personnel On-Site Willam Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5			18"	3" Red, brown, silty clay, tight 15" loose, red-brown, silty sand damp	CL SM		5.2			5
10			6"	2" Silty clay 4" brown, loose,silty sand TD @ 7' On SS bedrock	SM		<1			35
15										
20										
25										
30										
35										
40										

Comments:

Geologist William Masker

J:\Z Misc folders\Drilling\1-40ft

RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 9
Well #
Page 1 of 1

Philip Environmental Services Corporation

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 15'
Logged By William Mansker
Drilled By Danny Padilla
Date/Time Started 8/30 12:15
Date/Time Completed 8/30 12:45

Well Logged By William Mansker
Personnel On-Site William Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5		5-7'	10"	Brown-red, silty clay	CL		3.4			15
10		10-12'	6"	- do - clay, dry	CL SM		3			9 SS rock insnoe
15		15-17'	10"	Medium sorted silty sand, wet with groundwater, phase separated hydrocarbon, strange odor.			>1000			12
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

J:\Z Misc folders\Drilling\1-40ft

RECORD OF SUBSURFACE EXPLORATION

Borehole # SB - 10
Well # MW-5
Page 1 of 1

Philip Environmental Services Corporation

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

Project Name BMG - Canada Ojito oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation 7505 AMSL
Borehole Location BMG - OC
GWL Depth 13'
Logged By William Mansker
Drilled By Danny Padialla
Date/Time Started 08/30/00 1520
Date/Time Completed 8/30 1630

Well Logged By William Mansker
Personnel On-Site William Mansker, Danny Padilla
Contractors On-Site None
Client Personnel On-Site Pat Sanchez

Drilling Method CME 75, 7 5/8 " O.D.
Air Monitoring Method FID

Depth (Feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description Classification System: USCS	USCS Symbol	Depth Lithology Change (feet)	Air Monitoring Units: NDU BZ	BH	S	Drilling Conditions & Blow Counts
0			18" SSS							
5		5-7'	18"	4" brn, clay, silty 2" brn, clay plastic damp 12" brn, silty, sand, loose damp,slight order	CL CL		2.8			7
10		10-12	18"	18" damp, loose, silty to clean, gravelly sand	SM		NO			6
15		15-17	NSR	GW at 14' bgs over drilled to 20' (TD) to set well	SM					
20										
25										
30										
35										
40										

Comments:

Geologist William Mansker

APPENDIX B

"MONITORING WELL INSTALLATION RECORD"

MONITORING WELL INSTALLATION RECORD

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

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

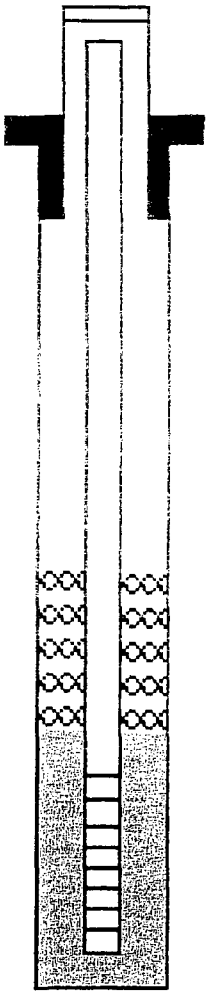
Project Name BMG –Canada Ojito Oil Spill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

Elevation T&C 7507.55' AMSL
Location BMG – O9
GWL Depth ~16'
Installed By Danny Padilla

On-Site Geologist WLM
Personnel On-Site WLM
Contractors On-Site WLM / PSC Drillers
Client Personnel On-Site Pat Sanchez - BMG

Date/Time Started 8/29/00
Date/Time Completed 8/29/00

Depths in Reference to Ground Surface		
Item	Material	Depth (feet)
Top of Protective Casing BGS	4" steel	3'
Bottom of Protective Casing BGS	4" steel	12"
Top of Permanent Borehole Casing BGS	2" Sch 40 pvc	3"
Bottom of Permanent Borehole Casing BGS	2" Sch 40 pvc	10'
Top of Concrete BGS		4"
Bottom of Concrete BGS		12"
Top of Grout	15-20% bent	12"
Bottom of Grout BGS	15-20% bent	12"
Top of Well Riser BGS	2" Sch 40 pvc	36"
Bottom of Well Riser BGS	2" Sch 40 pvc	12"
Top of Well Screen	0.010" Screen	-10
Bottom of Well Screen	0.010" Screen	-25
Top of Peltonite Seal	3/8" Bentonite	-6
Bottom of Peltonite Seal	3/8" Bentonite	-8
Top of Gravel Pack	10/20 Silica Sand	-8
Bottom of Gravel Pack	10/20 Silica Sand	-25
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		-16.69
Total Depth of Borehole AMSL		-25



Top of Protective Casing bgs +3
Top of Riser +3'
Ground Surface 0'

Top of Seal -6

Top of Gravel Pack -8'
Top of Screen -10'

Bottom of Screen -25'
Bottom of Borehole -25'

Comments: 15' screened

Geologist William Mansker

MONITORING WELL INSTALLATION RECORD

Borehole # SB - 2
Well # (MW – 2)
Page 1 of 1

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

Project Name BMG – Canada Ojito Oilspill
Project Number 62800307 Cost Code
Project Location N. of Regina, N.M.

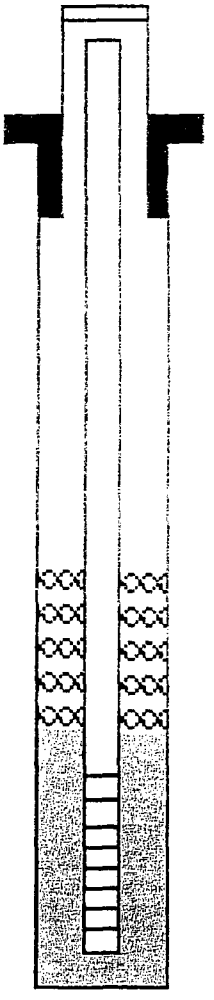
Elevation TOC 7506.20' AMSL
Well Location BMG – OC @ Road
GWL Depth ~ 16'
Installed By Danny Padilla

On-Site Geologist William Mansker
Personnel On-Site PSC
Contractors On-Site None
Client Personnel On-Site Pat Sanchez - BMG

Date/Time Started 08/29/00
Date/Time Completed 08/29/00

Depths in Reference to Ground Surface

Item	Material	Depth (feet)
Top of Protective Casing	4" steel	+3'
Bottom of Protective Casing	"	-1'
Top of Permanent Borehole Casing	2" Sch 40 pvc	+3'
Bottom of Permanent Borehole Casing		
Top of Concrete		+4"
Bottom of Concrete		-12"
Top of Grout		-12"
Bottom of Grout		-4'
Top of Well Riser		+3'
Bottom of Well Riser		-9'
Top of Well Screen	.010" Screen	-9'
Bottom of Well Screen	.010" Screen	-19'
Top of Peltonite Seal	3/8 " bentonite	-4'
Bottom of Peltonite Seal	3/8 " bentonite	-7'
Top of Gravel Pack	10/20 Silica Sand	-9'
Bottom of Gravel Pack	10/20 Silica Sand	-19'
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		16.62'
Total Depth of Borehole		20'



Top of Protective Casing +3
Top of Riser +3'
Ground Surface 0

Top of Seal 4'

Top of Gravel Pack 7'
Top of Screen 9'

Bottom of Screen 19'
Bottom of Borehole 20'

Comments: 10' screened interval

Geologist William Mansker

MONITORING WELL INSTALLATION RECORD

Borehole # SB - 6
Well # MW – 3
Page 1 of 1

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

Project Name BMG – Canada Ojiti oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, NM

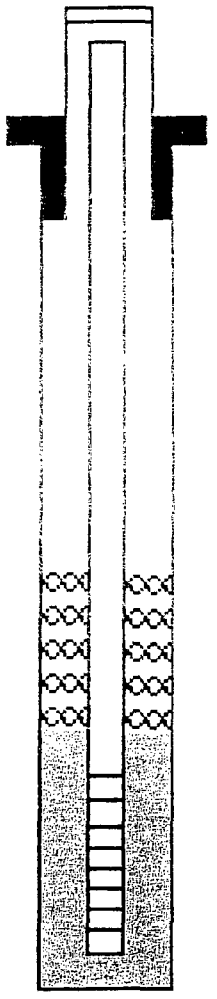
Elevation ToC 7508.63' AMSL
Well Location BMG O9, East side
GWL Depth ~17.2
Installed By Danny Padilla

On-Site Geologist William Mansker
Personnel On-Site William Mansker / PSC Drillers
Contractors On-Site
Client Personnel On-Site Pat Sanchez

Date/Time Started 08/29/00
Date/Time Completed 08/29/00

Depths in Reference to Ground Surface

Item	Material	Depth (feet)
Top of Protective Casing	4" steel	+3'
Bottom of Protective Casing		-1"
Top of Permanent Borehole Casing	2" Sch 40 pvc	+3'
Bottom of Permanent Borehole Casing		-25'
Top of Concrete		+4"
Bottom of Concrete		-12"
Top of Grout	15% bentonite	-6'
Bottom of Grout		-8'
Top of Well Riser	2" Sch 40 pvc	+3'
Bottom of Well Riser	2" Sch 40 pvc	-25'
Top of Well Screen	.010" screeen	-10'
Bottom of Well Screen	.010" screeen	-25'
Top of Peltonite Seal	3/8" bentonite	-6'
Bottom of Peltonite Seal	3/8" bentonite	8'
Top of Gravel Pack	10/20 Silica Sand	-8'
Bottom of Gravel Pack	10/20 Silica Sand	-25'
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		-17.21
Total Depth of Borehole		-25'



Top of Protective Casing +3
Top of Riser +3'
Ground Surface 0

Top of Seal 6'

Top of Gravel Pack 8'
Top of Screen 10'

Bottom of Screen 25'
Bottom of Borehole 25'

Comments: 15' screened interval

Geologist William Mansker

MONITORING WELL INSTALLATION RECORD

Borehole # SB – 7
Well # MW – 4
Page 1 of 1

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

Project Name BMG – Canada Ojiti oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, N.M.

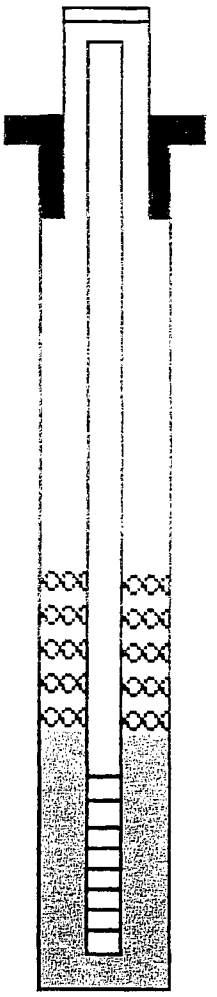
Elevation ToC 7507.10' AMSL
Well Location BMG O9, East side
GWL Depth ~15.5
Installed By Danny Padilla

On-Site Geologist William Mansker
Personnel On-Site William Mansker / PSC Drillers
Contractors On-Site
Client Personnel On-Site Pat Sanchez

Date/Time Started 08/30/00
Date/Time Completed 08/30/00

Depths in Reference to Ground Surface

Item	Material	Depth (feet)
Top of Protective Casing	4" steel	+3'
Bottom of Protective Casing		-12"
Top of Permanent Borehole Casing	2" Sch 40 pvc	+3'
Bottom of Permanent Borehole Casing		-17'
Top of Concrete		+4"
Bottom of Concrete		-12"
Top of Grout		-12"
Bottom of Grout		-3'
Top of Well Riser	2" sch 40 pvc	+3'
Bottom of Well Riser	2" sch 40 pvc	-17'
Top of Well Screen	.010" Screen	-7'
Bottom of Well Screen	.010" Screen	-17'
Top of Peltonite Seal	3/8" bentonite	-3'
Bottom of Peltonite Seal	3/8" bentonite	-5'
Top of Gravel Pack	10/20 Silica Sand	-5'
Bottom of Gravel Pack	10/20 Silica Sand	-17'
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		-15.51
Total Depth of Borehole		-17'



Top of Protective Casing +3
Top of Riser +3'
Ground Surface 0
Top of Seal -3'
Top of Gravel Pack -5'
Top of Screen -7'
Bottom of Screen -17'
Bottom of Borehole -17'

Comments: 10' screened intervel

Geologist William Mansker

MONITORING WELL INSTALLATION RECORD

Borehole # SB - 10
Well # MW - 5
Page 1 Of 1

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

Project Name BMG – Canada Ojiti oilspill
Project Number 62800307 Cost Code
Project Location N.E. of Lindrith, N.M.

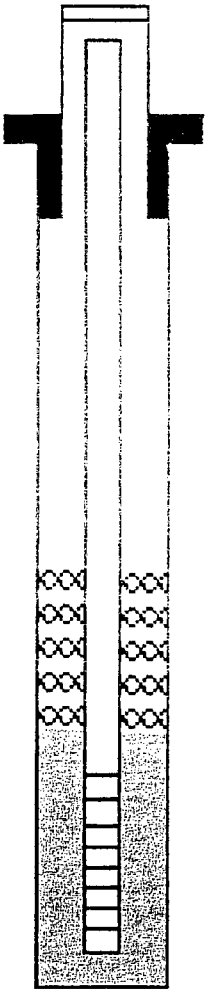
Elevation ToC 7503.22' AMSL
Well Location BMG OC, East side
GWL Depth ~16.6
Installed By Danny Padilla

On-Site Geologist William Mansker
Personnel On-Site William Mansker / PSC Drillers
Contractors On-Site
Client Personnel On-Site Pat Sanchez

Date/Time Started 08/30/00
Date/Time Completed 08/30/00

Depths in Reference to Ground Surface

Item	Material	Depth (feet)
Top of Protective Casing	4" steel	+3'
Bottom of Protective Casing		-12"
Top of Permanent Borehole Casing	2" Sch 40 pvc	+3'
Bottom of Permanent Borehole Casing		-20
Top of Concrete		+4"
Bottom of Concrete		-12"
Top of Grout		-12"
Bottom of Grout		-5'
Top of Well Riser		+3'
Bottom of Well Riser		-20'
Top of Well Screen	0.010" screen	-10'
Bottom of Well Screen	0.010" screen	-20'
Top of Peltonite Seal	3/8" Bentonite	-5'
Bottom of Peltonite Seal	3/8" Bentonite	-7.5'
Top of Gravel Pack	10-20 Silica Sand	-10'
Bottom of Gravel Pack	10-20 Silica Sand	-20'
Top of Natural Cave-In		
Bottom of Natural Cave-In		
Top of Groundwater		-16.66'
Total Depth of Borehole		-20'



Top of Protective Casing +3
Top of Riser +3'
Ground Surface 0
Top of Seal -5'
Top of Gravel Pack -7.5
Top of Screen -10
Bottom of Screen -20
Bottom of Borehole -20

Comments: 10' screened intervel

Geologist William Mansker

APPENDIX C

LABORATORY ANALYTICAL REPORTS FOR SOIL AND GROUNDWATER ANALYSIS AUGUST 2000

PINNACLE LABORATORIES

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

Pinnacle Lab ID number 009011
September 08, 2000

PHILIP ENVIRONMENTAL
4000 MONROE ROAD
FARMINGTON, NM 87401

Project Name EMG 0-9 OIL LINE LEAK
Project Number 62800307

Attention: DON FERNALD

On 09/01/00 Pinnacle Laboratories, Inc., NADHS License No. AE0392 pending, received a request to analyze aqueous and non-aq samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

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

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: jt

Enclosure

PINNACLE LABORATORIES

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

NT	: PHILIP ENVIRONMENTAL	PINNACLE ID	: 009011
JECT #	: 52800307	DATE RECEIVED	: 09/01/00
ECT NAME	: BMG 0-9 OIL LINE LEAK	REPORT DATE	: 09/08/00

CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
SB-1 @ 25-27	NON-AQ	08/29/00
SB-2 @ 13-15	NON-AQ	08/29/00
SB-3 @ 5-7	NON-AQ	08/29/00
SB-4 @ 16-17	NON-AQ	08/29/00
SB-5 @ 5-7	NON-AQ	08/29/00
SB-6 @ 20-22	NON-AQ	08/29/00
SB-7 @ 15-17	NON-AQ	08/30/00
SB-8 @ 10-12	NON-AQ	08/30/00
SB-9 @ 15-17	NON-AQ	08/30/00
SB-10 @ 10-12	NON-AQ	08/30/00
MW-1	AQUEOUS	08/30/00
MW-2	AQUEOUS	08/30/00
MW-3	AQUEOUS	08/30/00
MW-4	AQUEOUS	08/30/00
MW-5	AQUEOUS	08/30/00

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

ST : EPA 8021 MODIFIED
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
OJECT NAME : BMG 0-9 OIL LINE LEAK

MPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-1 @ 35-37	NON-AQ	08/29/00	09/06/00	09/06/00	1
	SB-2 @ 13-15	NON-AQ	08/29/00	09/06/00	09/06/00	1
	SB-3 @ 5-7	NON-AQ	08/29/00	09/09/00	09/06/00	1

RAMETER	DET. LIMIT	UNITS	SB-1 @ 35-37	SB-2 @ 13-15	SB-3 @ 5-7
NZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
LUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
HYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
RROGATE:					
OMOFLUOROBENCENE (%)			110	106	105
RROGATE LIMITS		65 - 120			

EMIST NOTES:

A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

EST : EPA 8021 MODIFIED
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
ROJECT NAME : BMG 0-9 OIL LINE LEAK

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-4 @ 15-17	NON-AQ	08/29/00	09/06/00	09/06/00	1
	SB-5 @ 5-7	NON-AQ	08/29/00	09/06/00	09/06/00	1
	SB-6 @ 20-22	NON-AQ	08/29/00	09/09/00	09/06/00	1

ARAMETER	DET. LIMIT	UNITS	SB-4 @ 15-17	SB-5 @ 5-7	SB-6 @ 20-22
ENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
LUENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
THYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	< 0.025
TAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	< 0.025
URROGATE:					
OMOFLUOROBENZENE (%)			107	104	105
RROGATE LIMITS	66 - 120				

EMIST NOTES:
A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

EST : EPA 8021 MODIFIED
LIENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
ROJECT # : 62800307
ROJECT NAME : SMG 0-9 OIL LINE LEAK

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-7 @ 15-17	NON-AQ	08/30/00	09/06/00	09/06/00	1
	SB-8 @ 10-12	NON-AQ	08/30/00	09/06/00	09/06/00	1
	SB-9 @ 15-17	NON-AQ	08/30/00	09/09/00	09/06/00	10

RAMETER	DET. LIMIT	UNITS	SB-7 @ 15-17	SB-8 @ 10-12	SB-9 @ 15-17
ENZENE	0.025	MG/KG	< 0.025	< 0.025	0.42
LUENE	0.025	MG/KG	< 0.025	< 0.025	2.1
THYLBENZENE	0.025	MG/KG	< 0.025	< 0.025	1.3
TAL XYLENES	0.025	MG/KG	< 0.025	< 0.025	9.9
URROGATE:					
OMOFLUOROBENZENE (%)			103	106	117
RROGATE LIMITS	65 - 120				

HEMIST NOTES:
A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

: EPA 8021 MODIFIED
IT : PHILIP ENVIRONMENTAL — PINNACLE I.D.: 009011
ECT # : 62800307
ECT NAME : BMG 0-9 OIL LINE LEAK

LE	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-10 @ 10-12	NON-AQ	08/30/00	09/06/00	09/06/00	1

METER	DET. LIMIT	UNITS	SB-10 @ 10-12
ENE	0.025	MG/KG	< 0.025
ENE	0.025	MG/KG	< 0.025
LBENZENE	0.025	MG/KG	< 0.025
L XYLENES	0.025	MG/KG	< 0.025

OGATE:
MOFLUOROBENZENE (%) 100
OGATE LIMITS (65 - 135)

IST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

ST : EPA 8021 MODIFIED
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
OJECT NAME : BMG 0-9 OIL LINE LEAK

MPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	MW-1	AQUEOUS	08/30/00	NA	09/07/00	1
	MW-2	AQUEOUS	08/30/00	NA	09/07/00	1
	MW-3	AQUEOUS	08/30/00	NA	09/07/00	1

RAMETER	DET. LIMIT	UNITS	MW-1	MW-2	MW-3
NZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
LUENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
HYLBENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TAL XYLENES	0.5	UG/L	< 0.5	0.7	< 0.5
RROGATE:					
OMOFLUOROBENZENE (%)			101	103	101
RROGATE LIMITS	80 - 120				

EMIST NOTES:
A

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Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

EST : EPA 8021 MODIFIED
LIENT : PHILIP ENVIRONMENTAL
ROJECT # : 62800307
ROJECT NAME : BMG 0-9 OIL LINE LEAK

PINNACLE I.D.: 009011

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	MW-4	AQUEOUS	08/30/00	NA	09/07/00	1
	MW-5	AQUEOUS	08/30/00	NA	09/07/00	5

RAMETER	DET. LIMIT	UNITS	MW-4	MW-5
NZENE	0.5	UG/L	< 0.5	400
LUENE	0.5	UG/L	< 0.5	66
HYLBENZENE	0.5	UG/L	< 0.5	79
TAL XYLENES	0.5	UG/L	< 0.5	280

RROGATE:
OMOFLUOROBENZENE (%) 102 [illegible]
RROGATE LIMITS 80 - 120

EMIST NOTES:

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 009011
ANK I. D.	: 090600	DATE EXTRACTED	: 09/06/00
IENT	: PHILIP ENVIRONMENTAL	DATE ANALYZED	: 09/06/00
ROJECT #	: 62800307	SAMPLE MATRIX	: NON-AQ
OJECT NAME	: BMG 0-9 OIL LINE LEAK		

RAMETER	UNITS	
ENZENE	MG/KG	<0.025
LUENE	MG/KG	<0.025
HYLBENZENE	MG/KG	<0.025
TAL XYLENES	MG/KG	<0.025
URROGATE:		
ROMOFLUOROBENZENE (%)		104
RROGATE LIMITS:	30 - 150	
EMIST NOTES:		
A		

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

[redacted]	: EPA 8021 MODIFIED	PINNACLE I.D.	: 009011
[redacted] I. D.	: 090700	DATE EXTRACTED	: NA
[redacted]NT	: PHILIP ENVIRONMENTAL	DATE ANALYZED	: 09/07/00
[redacted]ECT #	: 62800307	SAMPLE MATRIX	: AQUEOUS
[redacted]ECT NAME	: BMG 0-9 OIL LINE LEAK		

[redacted]AMETER	UNITS	
[redacted]ENE	UG/L	<0.5
[redacted]ENE	UG/L	<0.5
[redacted]YLBENZENE	UG/L	<0.5
[redacted]-XYLENES	UG/L	<0.5

[redacted]ROGATE:
[redacted]OFLUOROBENZENE (%) [redacted]
[redacted]OGATE LIMITS: [redacted]
[redacted]MIST NOTES:

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

: EPA 8021 MODIFIED

#:	009011-10	PINNACLE I.D. :	009011
	PHILIP ENVIRONMENTAL	DATE EXTRACTED :	09/06/00
ECT #:	62800307	DATE ANALYZED :	09/06/00
CT NAME:	BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX :	NON-AQ
		UNITS :	MG/KG

METER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
E	<0.025	1.00	0.96	96	0.87	87	10	(68 - 120)	30
NE	<0.025	1.00	0.98	98	0.95	95	3	(64 - 120)	30
BENZENE	<0.025	1.00	0.98	98	0.99	99	1	(49 - 127)	30
XYLENES	<0.025	3.00	2.95	98	3.00	100	2	(58 - 120	30

IST NOTES:

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

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

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

	: EPA 8021 MODIFIED		
#:	: 009011-11	PINNACLE I.D. :	009011
	: PHILIP ENVIRONMENTAL	DATE EXTRACTED :	NA
ECT #:	: 62800307	DATE ANALYZED :	09/07/00
CT NAME:	: BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX :	AQUEOUS
		UNITS :	UG/L

METER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
NE	<0.5	20.0	20.3	102	19.1	96	6	(80 - 120)	20
ENE	<0.5	20.0	20.3	102	21.0	105	3	(80 - 120)	20
BENZENE	<0.5	20.0	22.3	112	21.8	109	2	(80 - 120)	20
XYLENES	<0.5	60.0	66.5	111	65.4	109	2	(80 - 120)	20

LIST NOTES:

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

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

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

: EPA 8015 MODIFIED (DIRECT INJECT)
NT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
ECT # : 62800307
ECT NAME : BMG 0-9 OIL LINE LEAK

PLE

CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
SB-1 @ 25-27	NON-AQ	08/29/00	09/06/00	09/07/00	1
SB-2 @ 13-15	NON-AQ	08/29/00	09/06/00	09/07/00	1
SB-3 @ 5-7	NON-AQ	08/29/00	09/06/00	09/07/00	1

METER	DET. LIMIT	UNITS	SB-1 @ 25-27	SB-2 @ 13-15	SB-3 @ 5-7
HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
HYDROCARBONS, C10-C22	10	MG/KG	< 10	< 10	17
HYDROCARBONS, C22-C36	10	MG/KG	< 10	< 10	< 10
CULATED SUM:					17

OGATE:
RPHENYL (%) 99 101 100
OGATE LIMITS 65 - 151

IIST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

EST : EPA 8015 MODIFIED (DIRECT INJECT)
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
OJECT NAME : BMG 0-9 OIL LINE LEAK

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-4 @ 15-17	NON-AQ	08/29/00	09/06/00	09/07/00	1
5	SB-5 @ 5-7	NON-AQ	08/29/00	09/06/00	09/08/00	1
	SB-6 @ 20-22	NON-AQ	08/29/00	09/06/00	09/08/00	1

RAMETER	DET. LIMIT	UNITS	SB-4 @ 15-17	SB-5 @ 5-7	SB-6 @ 20-22
JEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	< 10
EL HYDROCARBONS, C10-C22	10	MG/KG	11	35	19
EL HYDROCARBONS, C22-C36	10	MG/KG	< 10	21	< 10
ALCULATED SUM:			11	56	19
RROGATE:					
-TERPHENYL (%)			96	107	108
RROGATE LIMITS	66 - 151				

EMIST NOTES:
A

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GAS CHROMATOGRAPHY RESULTS

EST : EPA 8015 MODIFIED (DIRECT INJECT)
LIENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
OJECT NAME : BMG 0-9 OIL LINE LEAK

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	SB-7 @ 15-17	NON-AQ	08/30/00	09/06/00	09/08/00	1
3	SB-8 @ 10-12	NON-AQ	08/30/00	09/06/00	09/08/00	1
	SB-9 @ 15-17	NON-AQ	08/30/00	09/06/00	09/08/00	1

RAMETER	DET. LIMIT	UNITS	SB-7 @ 15-17	SB-8 @ 10-12	SB-9 @ 15-17
UEL HYDROCARBONS, C6-C10	10	MG/KG	< 10	< 10	650
EL HYDROCARBONS, C10-C22	10	MG/KG	< 10	29	860
EL HYDROCARBONS, C22-C36	10	MG/KG	< 10	< 10	290
ALCULATED SUM:				29	1800

RROGATE:
-TERPHENYL (%) 100 101 116
RROGATE LIMITS 66 - 151

EMIST NOTES:
A

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
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GAS CHROMATOGRAPHY RESULTS

: EPA 8015 MODIFIED (DIRECT INJECT)
IT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
CT # : 62800307
CT NAME : BMG 0-9 OIL LINE LEAK

LE CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
SB-10 @ 10-12	NON-AQ	08/30/00	09/06/00	09/08/00	1

METER	DET. LIMIT	UNITS	SB-10 @ 10-12
HYDROCARBONS, C6-C10	10	MG/KG	< 10
HYDROCARBONS, C10-C22	10	MG/KG	< 10
HYDROCARBONS, C22-C36	10	MG/KG	< 10
LATED SUM:			
OGATE:			
PHENYL (%)			102
OGATE LIMITS	(66 - 151)		

IST NOTES:

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY RESULTS

ST : EPA 8015 MODIFIED (DIRECT INJECT)
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
OJECT # : 62800307
OJECT NAME : BMG 0-9 OIL LINE LEAK

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	MW-1	AQUEOUS	08/30/00	09/04/00	09/08/00	1
	MW-2	AQUEOUS	08/30/00	09/04/00	09/08/00	1
	MW-3	AQUEOUS	08/30/00	09/04/00	09/08/00	1

RAMETER	DET. LIMIT	UNITS	MW-1	MW-2	MW-3
EL HYDROCARBONS, C6-C10	2.0	MG/L	< 2.0	< 2.0	< 2.0
UEL HYDROCARBONS, C10-C22	1.0	MG/L	< 1.0	< 1.0	< 1.0
EL HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0	< 1.0
LCULATED SUM:					
RROGATE:					
TERPHENYL (%)			102	97	93
RROGATE LIMITS	79 - 124				

EMIST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

: EPA 8015 MODIFIED (DIRECT INJECT)
T : PHILIP ENVIRONMENTAL PINNACLE I.D.: 009011
CT # : 62800307
CT NAME : BMG 0-9 OIL LINE LEAK

LE CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
MW-4	NON-AQ	08/30/00	09/04/00	09/08/00	1
MW-5	NON-AQ	08/30/00	09/04/00	09/08/00	1

METER	DET. LIMIT	UNITS	MW-4	MW-5
YDROCARBONS, C6-C10	2.0	MG/L	< 2.0	< 2.0
YDROCARBONS, C10-C22	1.0	MG/L	< 1.0	1.6
HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0
LATED SUM:				1.6
OGATE:				
PHENYL (%)			102	107
GATE LIMITS	70 - 124 %			

T NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

T	: EPA 8015 MODIFIED (DIRECT INJECT)		
K I.D.	: 090600	PINNACLE I.D.	: 009011
NT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 09/06/00
JECT #	: 62800307	DATE ANALYZED	: 09/06/00
ECT NAME	: BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX	: NON-AQ

AMETER	UNITS	
HYDROCARBONS, C6-C10	MG/KG	< 10
HYDROCARBONS, C10-C22	MG/KG	< 10
HYDROCARBONS, C22-C38	MG/KG	< 10
ROGATE:		
IPHENYL (%)		99
ROGATE LIMITS	30 - 150	

MIST NOTES:

PINNACLE LABORATORIES

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Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

ST	: EPA 8015 MODIFIED (DIRECT INJECT)		
ANK I.D.	: 090400	PINNACLE I.D.	: 009011
ENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 09/04/00
OJECT #	: 62800307	DATE ANALYZED	: 09/06/00
OJECT NAME	: BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX	: AQUEOUS

RAMETER	UNITS	
EL HYDROCARBONS	MG/L	< 2.0
DROCARBON RANGE		< 1.0
DROCARBONS QUANTITATED USING		< 1.0
RROGATE:		
TERPHENYL (%)		88
RROGATE LIMITS	73 - 129	

EMIST NOTES:

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

EST	: EPA 8015 MODIFIED (DIRECT INJECT)		
MSD #	: 090600	PINNACLE I.D.	: 009011
ENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 09/06/00
ROJECT #	: 62800307	DATE ANALYZED	: 09/06/00
ROJECT NAME	: BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX	: NON-AQ
		UNITS	: MG/KG

ARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
EL HYDROCARBONS	<10	200	203	102	210	106	3	(56 - 148)	20

EMIST NOTES:

$$\text{ecovery} = \frac{\text{Spike Sample Result - Sample Result}}{\text{Spike Concentration}} \times 100$$

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

PINNACLE LABORATORIES

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GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

EST	: EPA 8015 MODIFIED (DIRECT INJECT)		
SMSD #	: 090400	PINNACLE I.D.	: 009011
ENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 09/04/00
OJECT #	: 62800307	DATE ANALYZED	: 09/06/00
OJECT NAME	: BMG 0-9 OIL LINE LEAK	SAMPLE MATRIX	: AQUEOUS
		UNITS	:

RAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
L HYDROCARBONS	<1.0	33.0	31.4	95	31.9	97	2	(64 - 127)	20

LMIST NOTES:

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

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

0090H

PHILIP ENVIRONMENTAL

Chain of Custody Record

4000 Monroe Road
Farmington, NM 87401

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

COC Serial No. C 2644

Project Name: BMG 0-9 Oil Line Leak
Project Number: 6280030 7 Phase . Task
Samplers: [signature]
Laboratory Name: Pinnacle
Laboratory Location: ABQ

Type of Analysis and Bottle: [illegible] 8015 [illegible] / 8021 [illegible] / Lab ID#

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	Analysis 1	Analysis 2	Lab ID#	Comments
SB-1 @ 25-27	8/29/00	0940	Soil	[illegible]	X	X	01	
SB-2 @ 13-15	8/29	1050	"	[illegible]	X	X	02	
SB-3 @ 5-7	8/29	1305	"	[illegible]	X	X	03	
SB-4 @ 15-17	8/29	1400	"	[illegible]	X	X	04	
SB-5 @ 5-7	8/29	1510	"	[illegible]	X	X	05	
SB-6 @ 20-22	8/29	1600	"	[illegible]	X	X	06	
SB-7 @ 15-17	8/30	0940	"	[illegible]	X	X	07	
SB-8 @ 10-12	8/30	1150	"	1	X	X	08	(only 1 4 oz jar)
SB-9 @ 15-17	8/30	1240	"	[illegible]	X	X	09	
SB-10 @ 10-12	8/30	1320	"	[illegible]	X	X	10	

Relinquished by:

Signature	Date	Time
[signature]	9/1/00	1625

Received By:

Signature	Date	Time
[signature]	9/1/00	1625

Samples Iced: ☐ Yes ☐ No

Preservatives (ONLY for Water Samples)

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

Carrier:

Airbill No.

Shipping and Lab Notes:

Fax Copy to Munster @ 292-0805

Rec'd @ [illegible] On Ice [illegible]

Send Report to Don Fernald

PE-176 4/95

009011

PHILIP ENVIRONMENTAL

Chain of Custody Record

4000 Monroe Road
Farmington, NM 87401

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

COC Serial No. C 2645

Project Name: BMG 0-9 Oil Line Leak

Project Number: 62800307 Phase . Task

Samplers: [illegible signature]

Laboratory — Name: Pinnacle — Location: ABQ

Type of Analysis and Bottle: [illegible] / Lab ID #

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	Type of Analysis	Lab ID #	Comments
MW-1	8/30/00	1650	Water	4	X	11	
MW-2	8/30/00	1700	"	4	X	12	
MW-3	8/30/00	1630	"	4	X	13	
MW-4	8/30/00	1710	"	4	X	14	
MW-5	8/30/00	1730	"	4	X	15	

Relinquished by: / **Received By:**

Signature	Date	Time	Signature	Date	Time
[signature]	9/1/00	1627	[signature]	9/1/00	1625

Samples Iced: ☑ Yes ☐ No

Preservatives (ONLY for Water Samples)

- ☐ Cyanide .... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis .... Hydrochloric acid (HCl)
- ☐ Metals .... Nitric acid (HNO_3)
- ☐ TPH (418.1) .... Sulfuric acid (H_2SO_4)
- ☑ Other (Specify) $HgCl_2$
- ☐ Other (Specify)

Carrier:

Airbill No.

Shipping and Lab Notes:

Rec'd @ 23c On Ice (Present

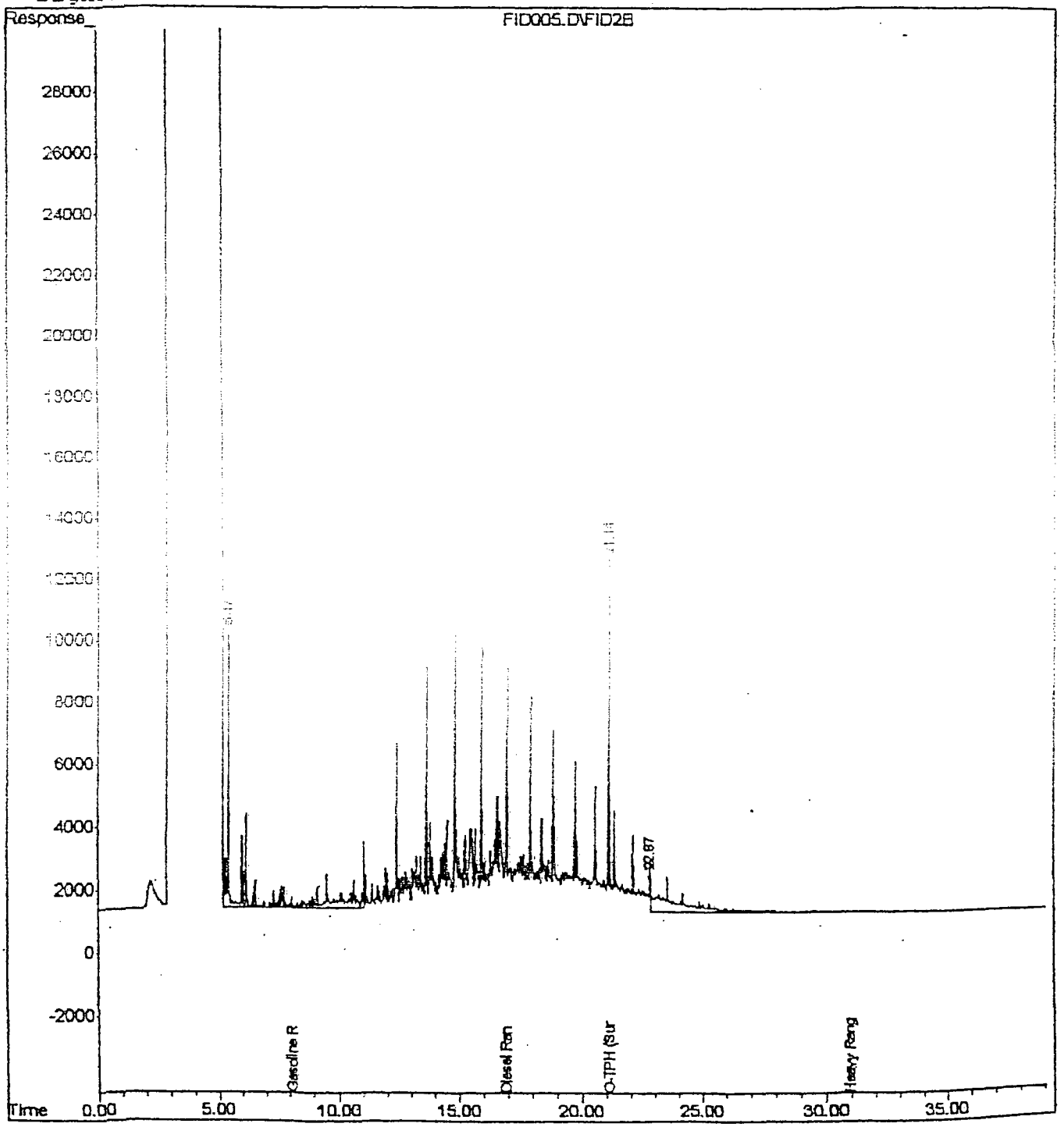
PE-176 4/95

IntFile : EVENTS.E

Quant Time: Mar 28 13:16 2000 Quant Results File: NM032100.RES

Quant Method : C:\HPCHEM\2\METHODS\NM032100.M (Chemstation Integrator)
Title : NM 8015
Last Update : Thu Mar 23 08:47:45 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

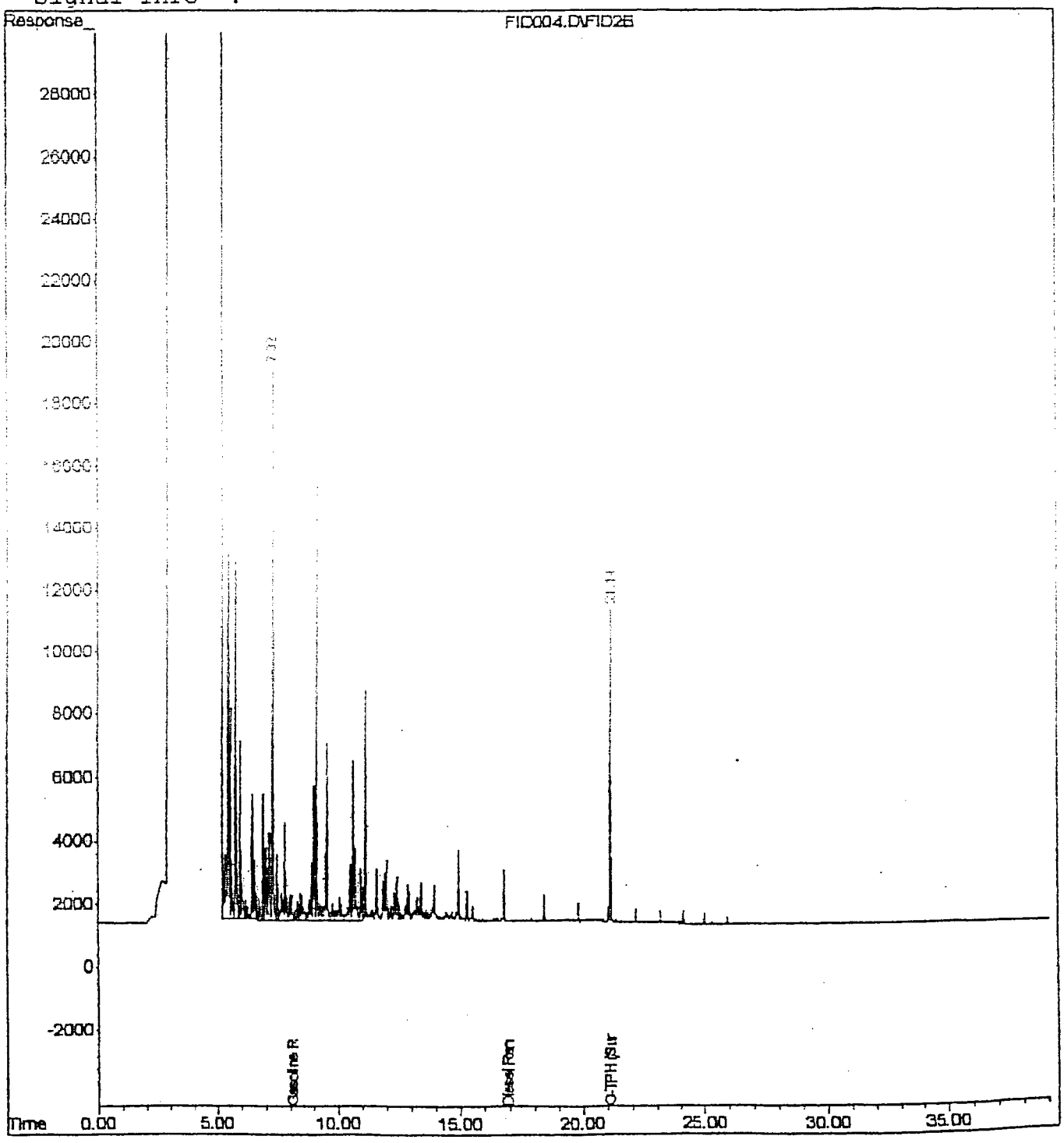
Sample : GAS CCV
Misc :
IntFile : EVENTS.E

Operator: CTI
Inst : FID-1
Multiplr: 1.00

Quant Time: Mar 28 12:32 2000 Quant Results File: NM032100.RES

Quant Method : C:\HPCHEM\2\METHODS\NM032100.M (Chemstation Integrator)
Title : NM 8015
Last Update : Thu Mar 23 08:47:45 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

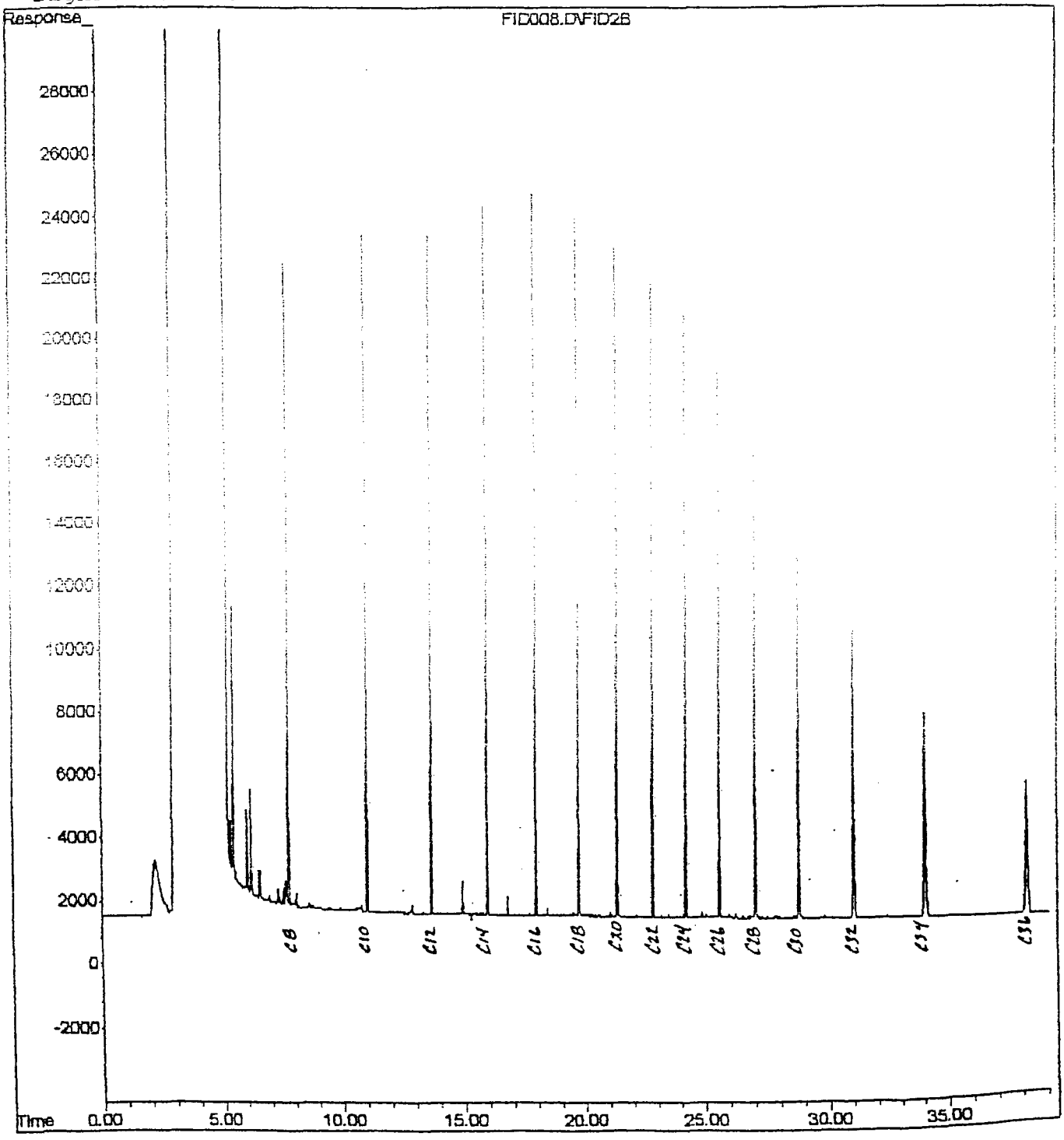


Sample : rt std c8 to c40 Inst : FID-1
Misc : Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Mar 22 10:00 2000 Quant Results File: NM03200D.RES

Quant Method : C:\HPCHEM\2\METHODS\NM03200D.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Mar 20 16:31:55 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

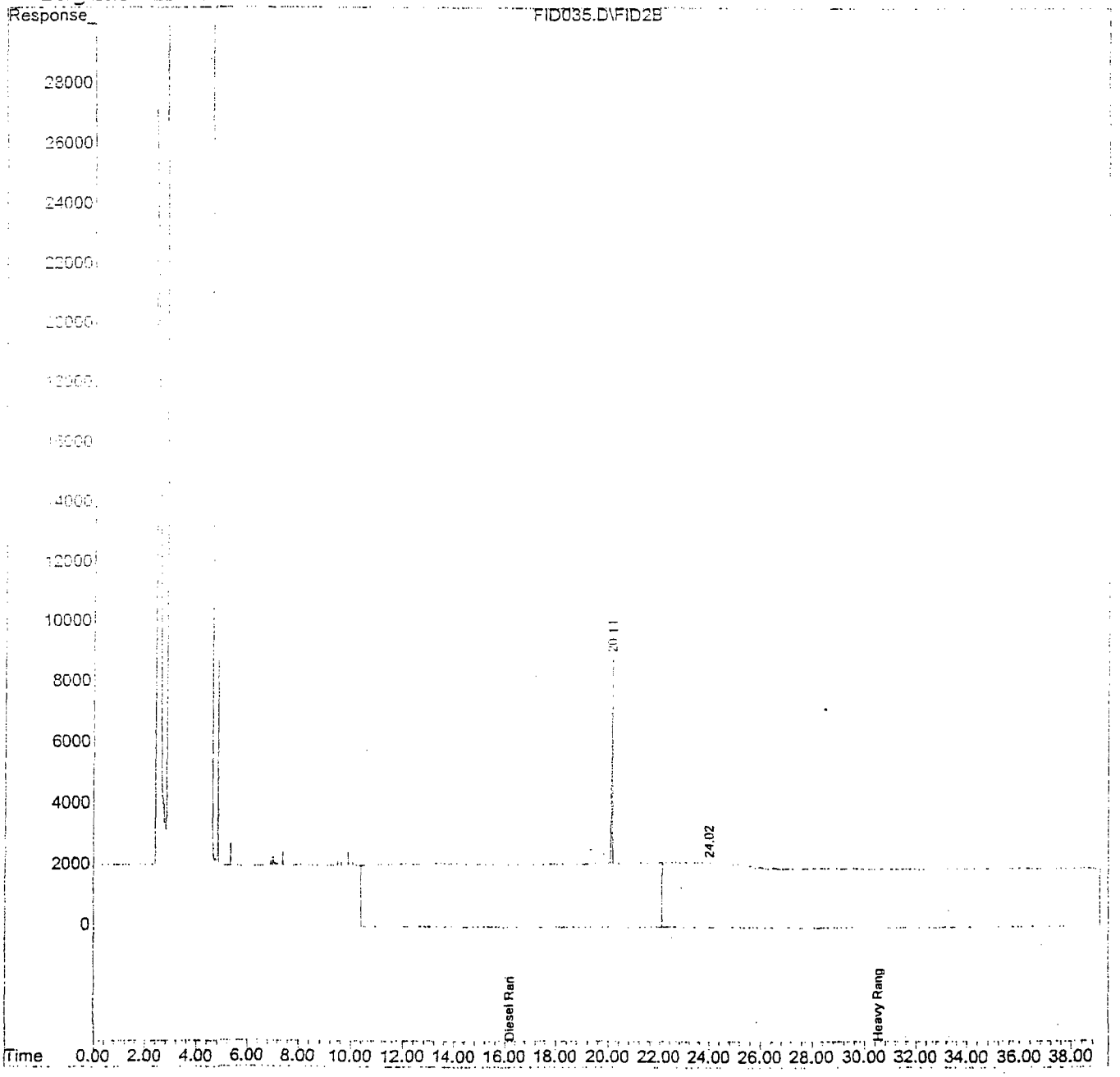


Data File : C:\HPCHEM\2\DATA\090600\FID035.D Vial: 35
Acq On : 7 Sep 2000 19:47 Operator:
Sample : 009011-01 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:11 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

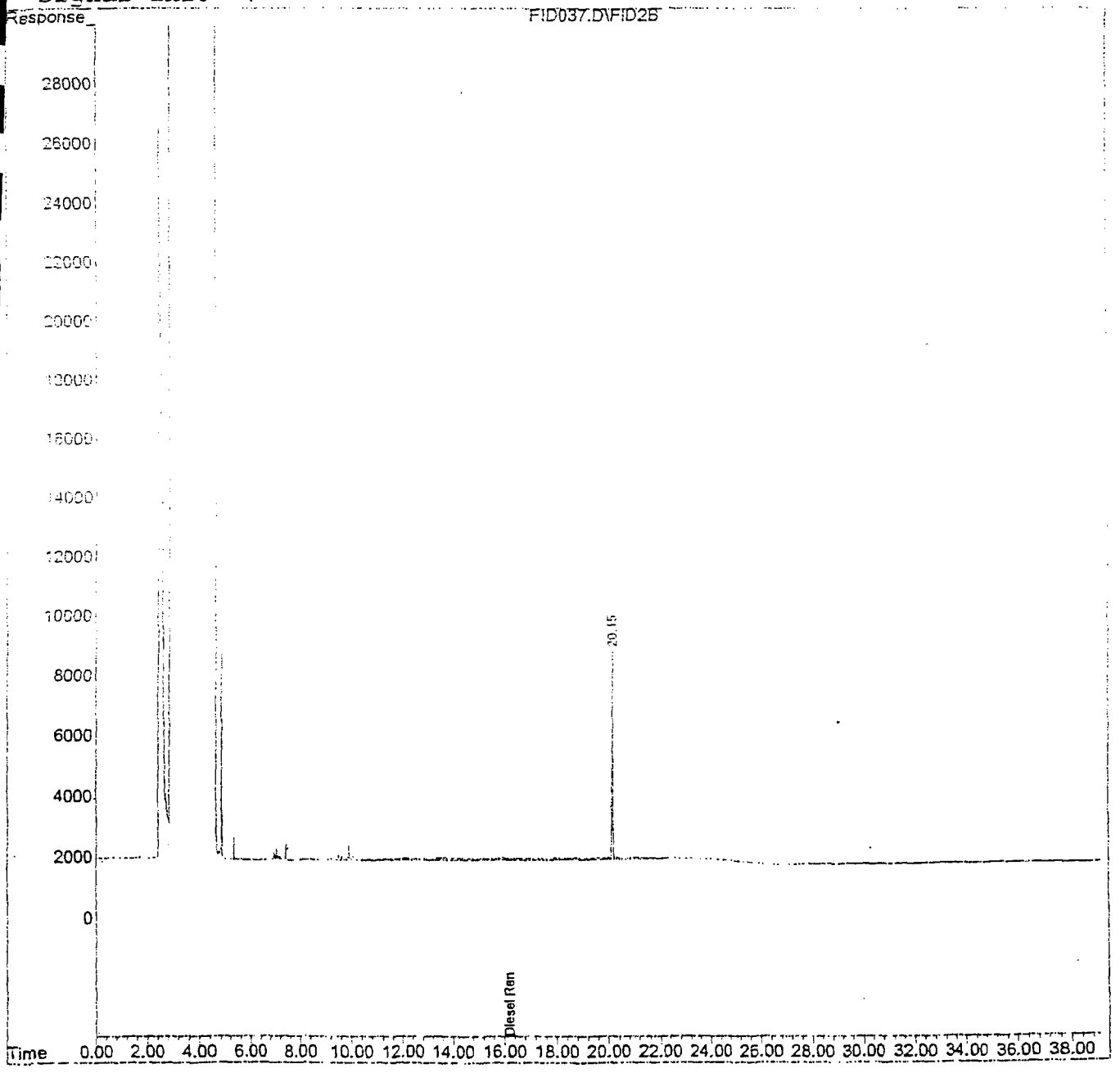


Data File : C:\HPCHEM\2\DATA\090600\FID037.D Vial: 37
Acq On : 7 Sep 2000 21:34 Operator:
Sample : 009011-02 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:14 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

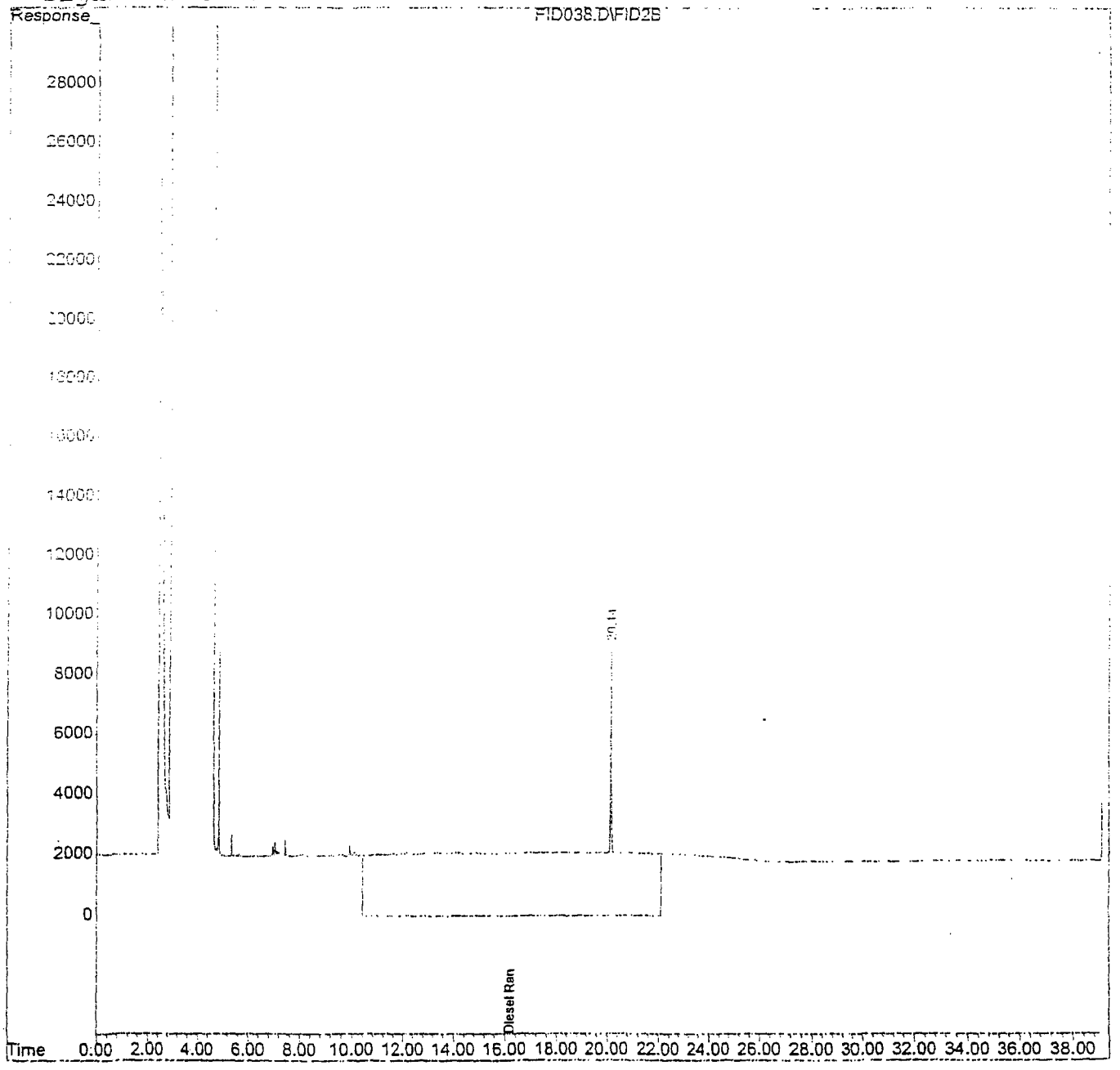


Data File : C:\HPCHEM\2\DATA\090600\FID038.D Vial: 38
Acq On : 7 Sep 2000 22:27 Operator:
Sample : 009011-03 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:15 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

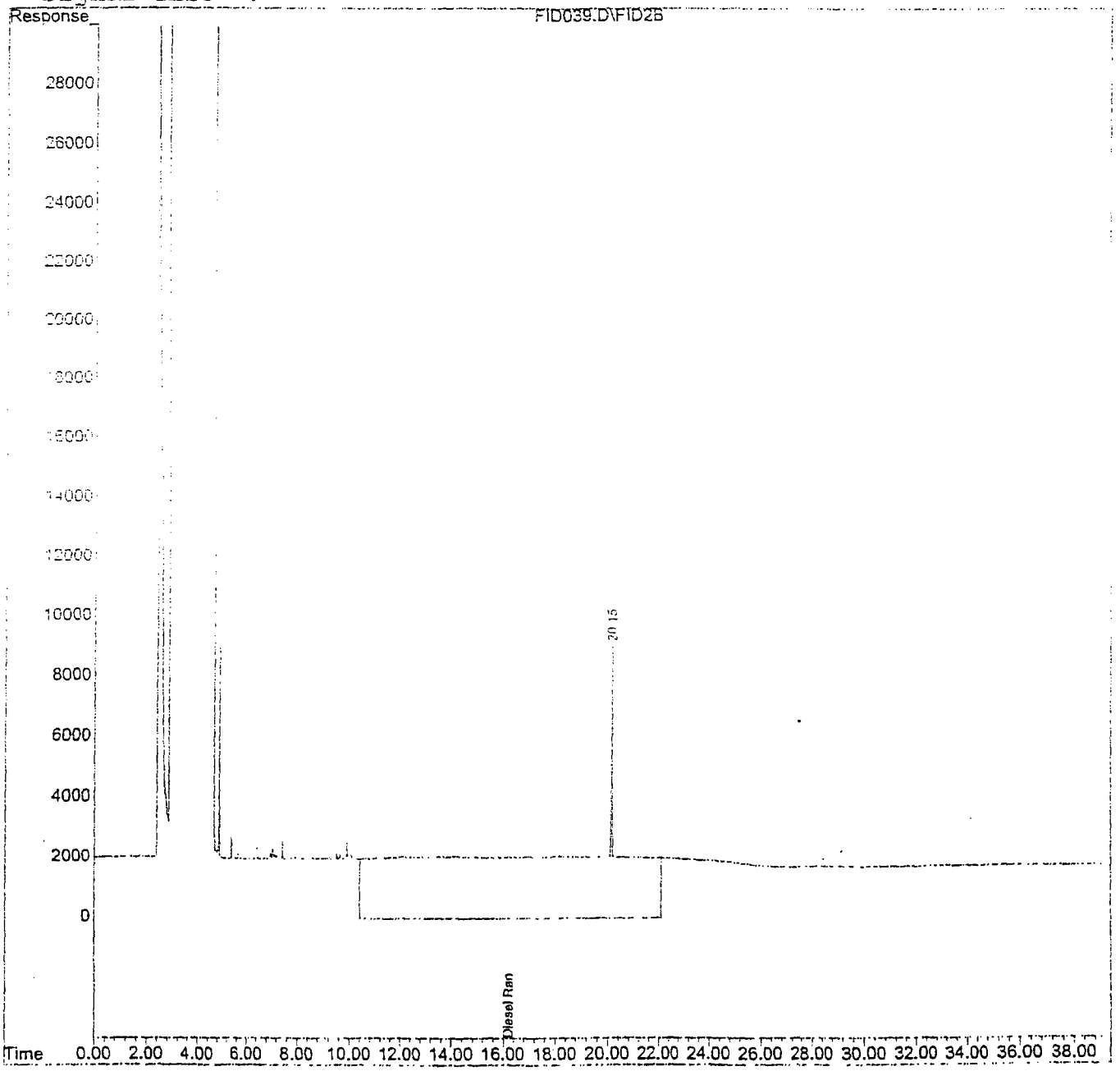


Data File : C:\HPCHEM\2\DATA\090600\FID039.D Vial: 39
Acq On : 7 Sep 2000 23:20 Operator:
Sample : 009011-04 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:15 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

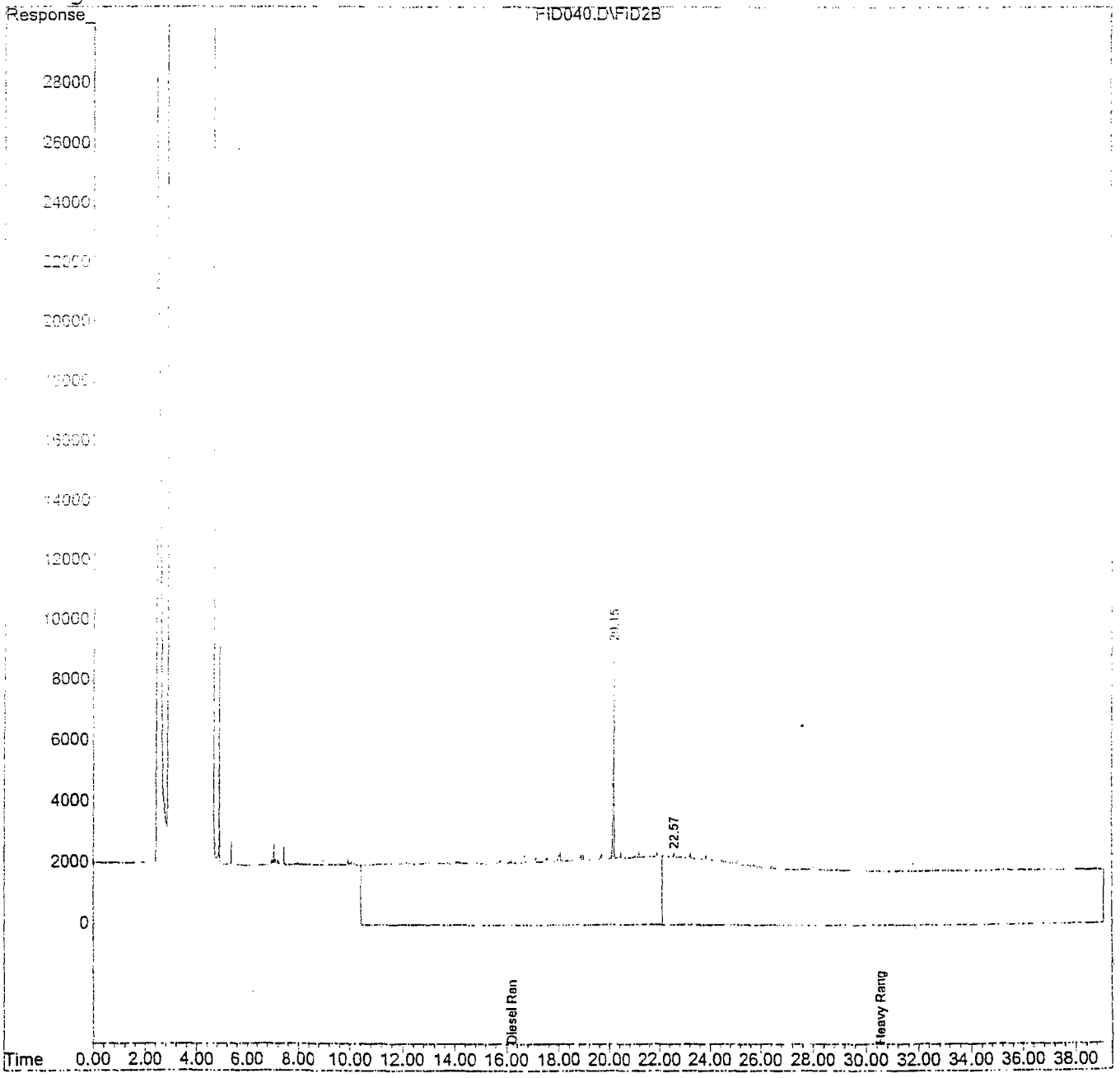


Data File : C:\HPCHEM\2\DATA\090600\FID040.D Vial: 40
Acq On : 8 Sep 2000 00:13 Operator:
Sample : 009011-05 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:17 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

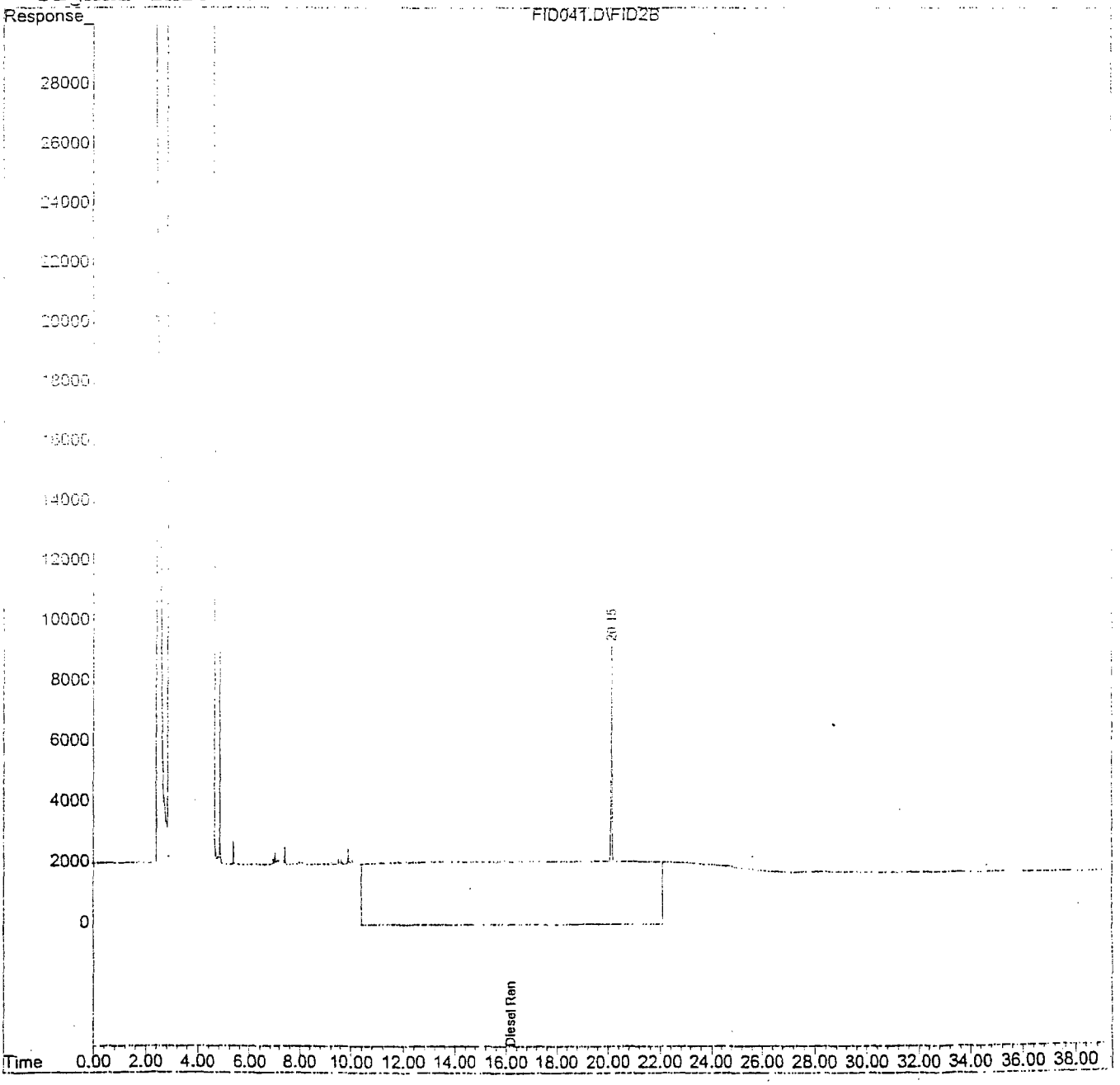


Data File : C:\HPCHEM\2\DATA\090600\FID041.D Vial: 41
Acq On : 8 Sep 2000 1:06 Operator:
Sample : 009011-06 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:18 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

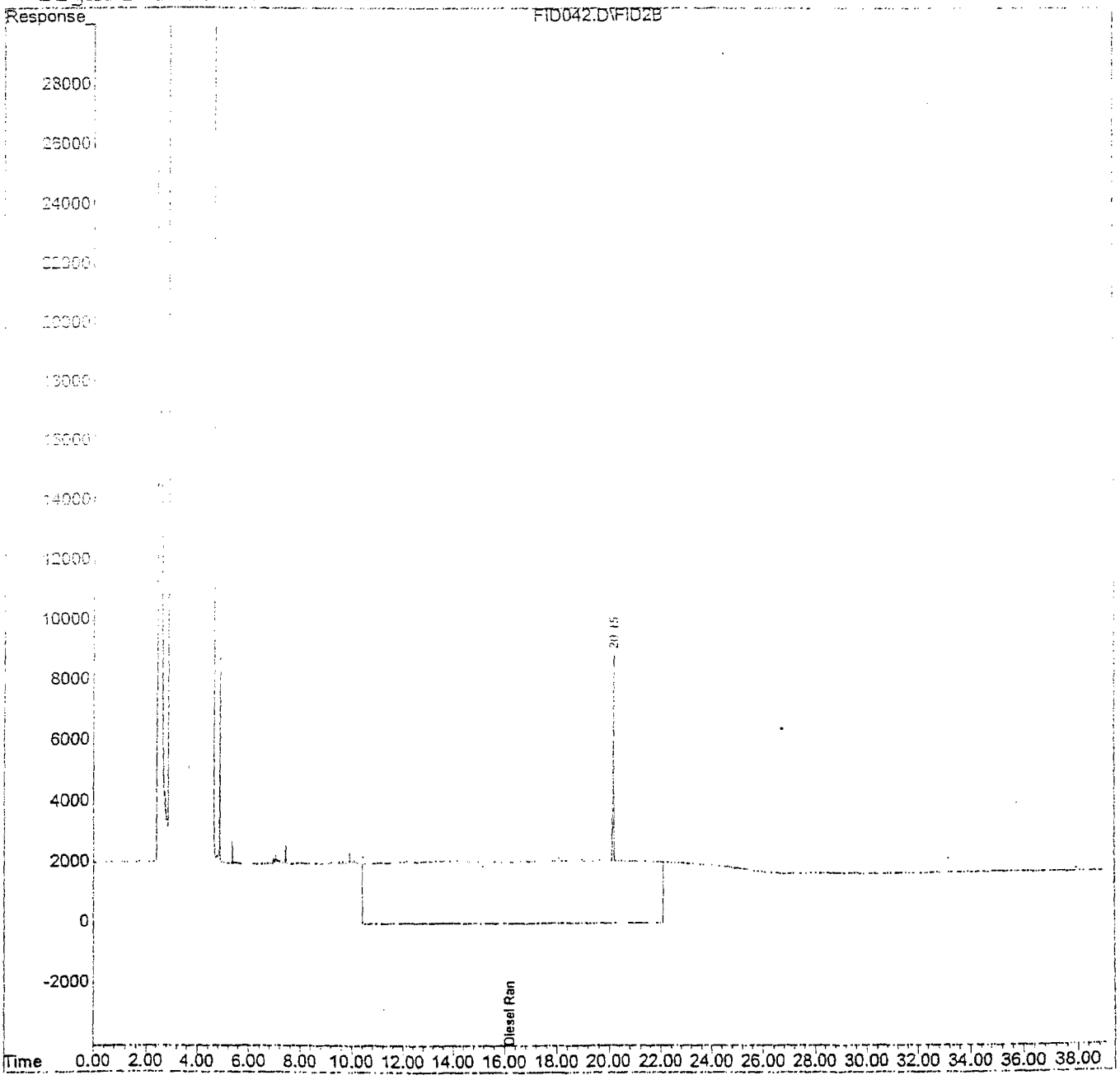


Data File : C:\HPCHEM\2\DATA\090600\FID042.D Vial: 42
Acq On : 8 Sep 2000 1:59 Operator:
Sample : 009011-07 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:20 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

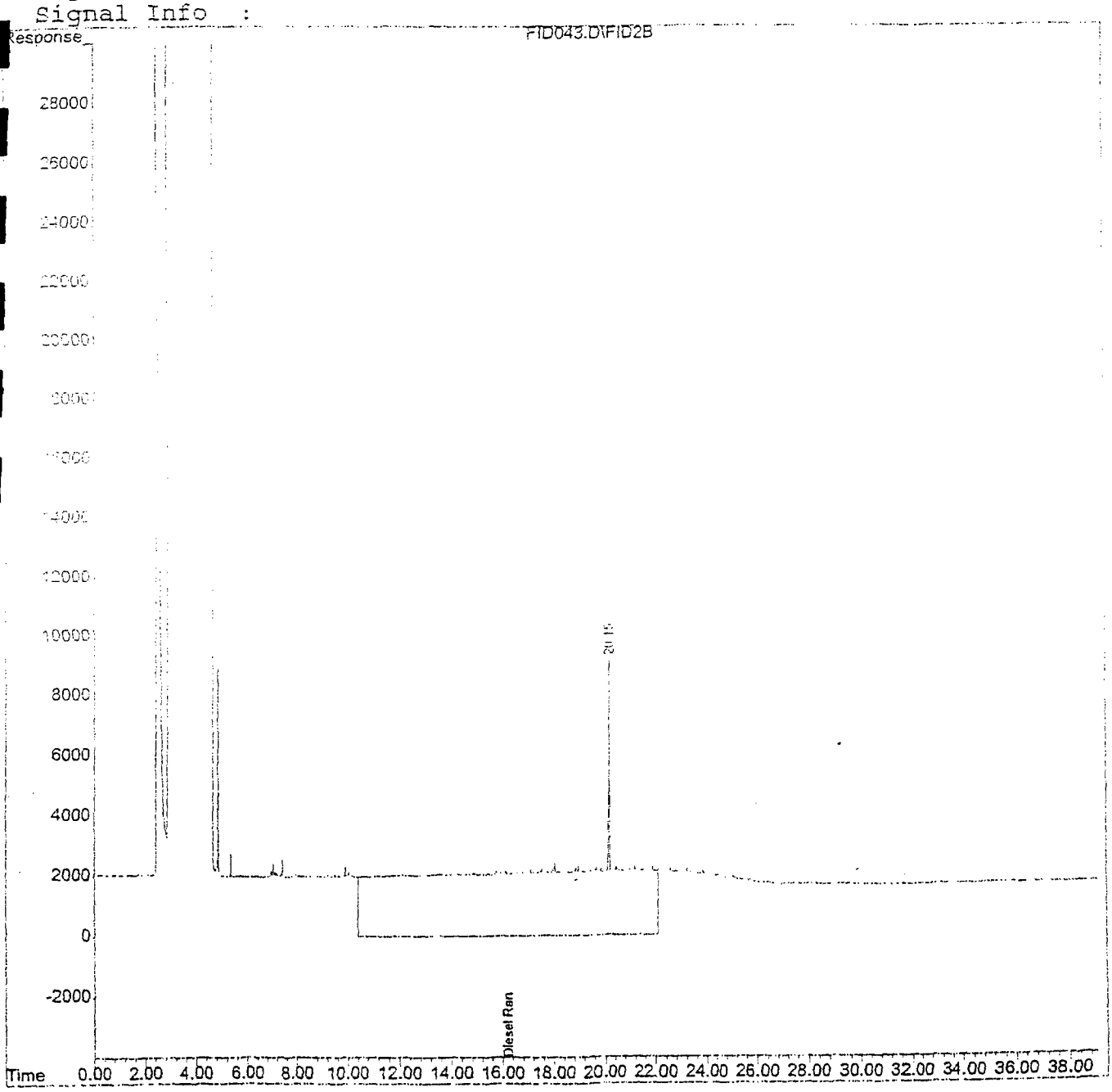


Data File : C:\HPCHEM\2\DATA\090600\FID043.D Vial: 43
Acq On : 8 Sep 2000 2:52 Operator:
Sample : 009011-08 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:20 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

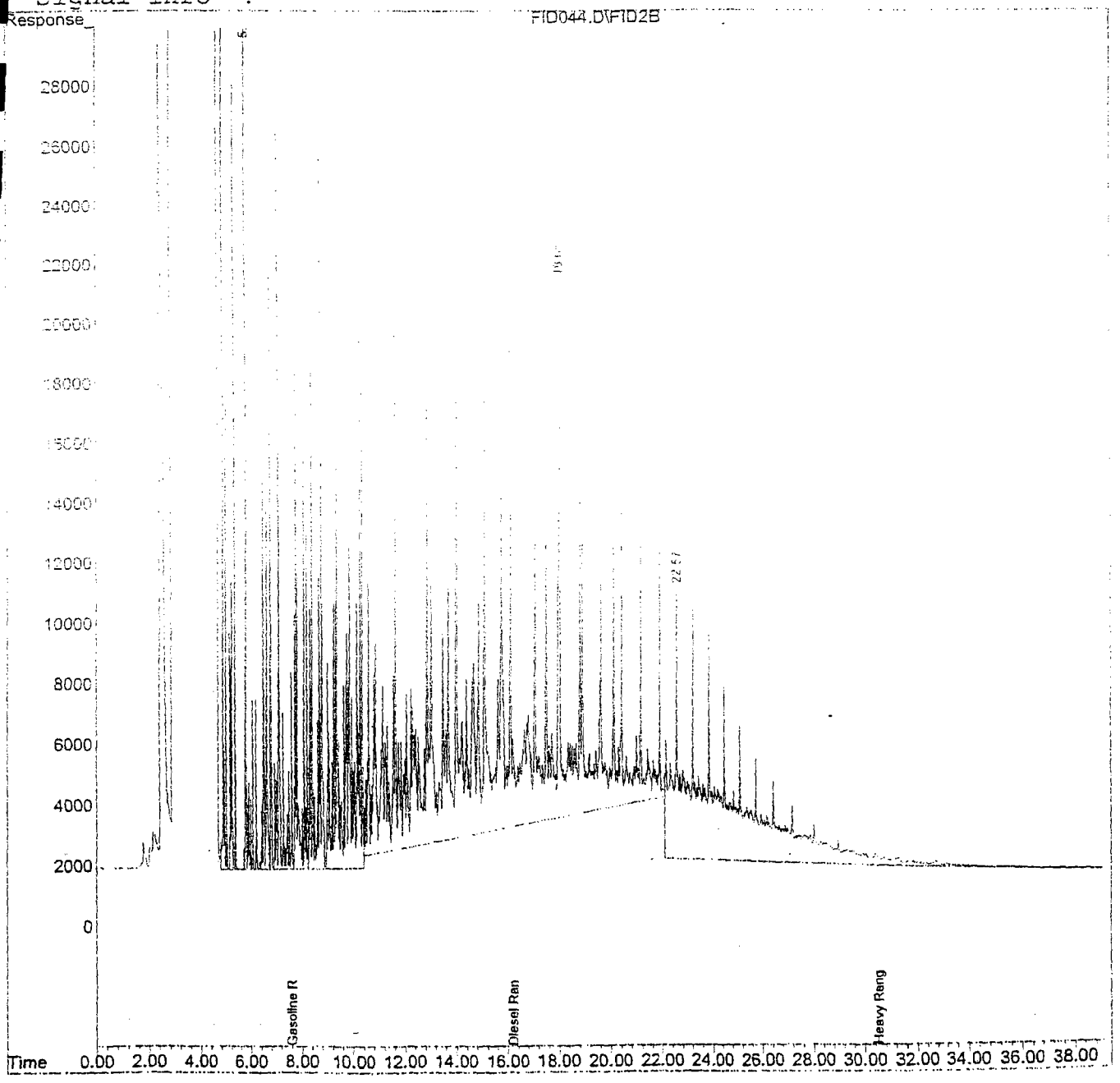


Data File : C:\HPCHEM\2\DATA\090600\FID044.D Vial: 44
Acq On : 8 Sep 2000 3:45 Operator:
Sample : 009011-09 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:21 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

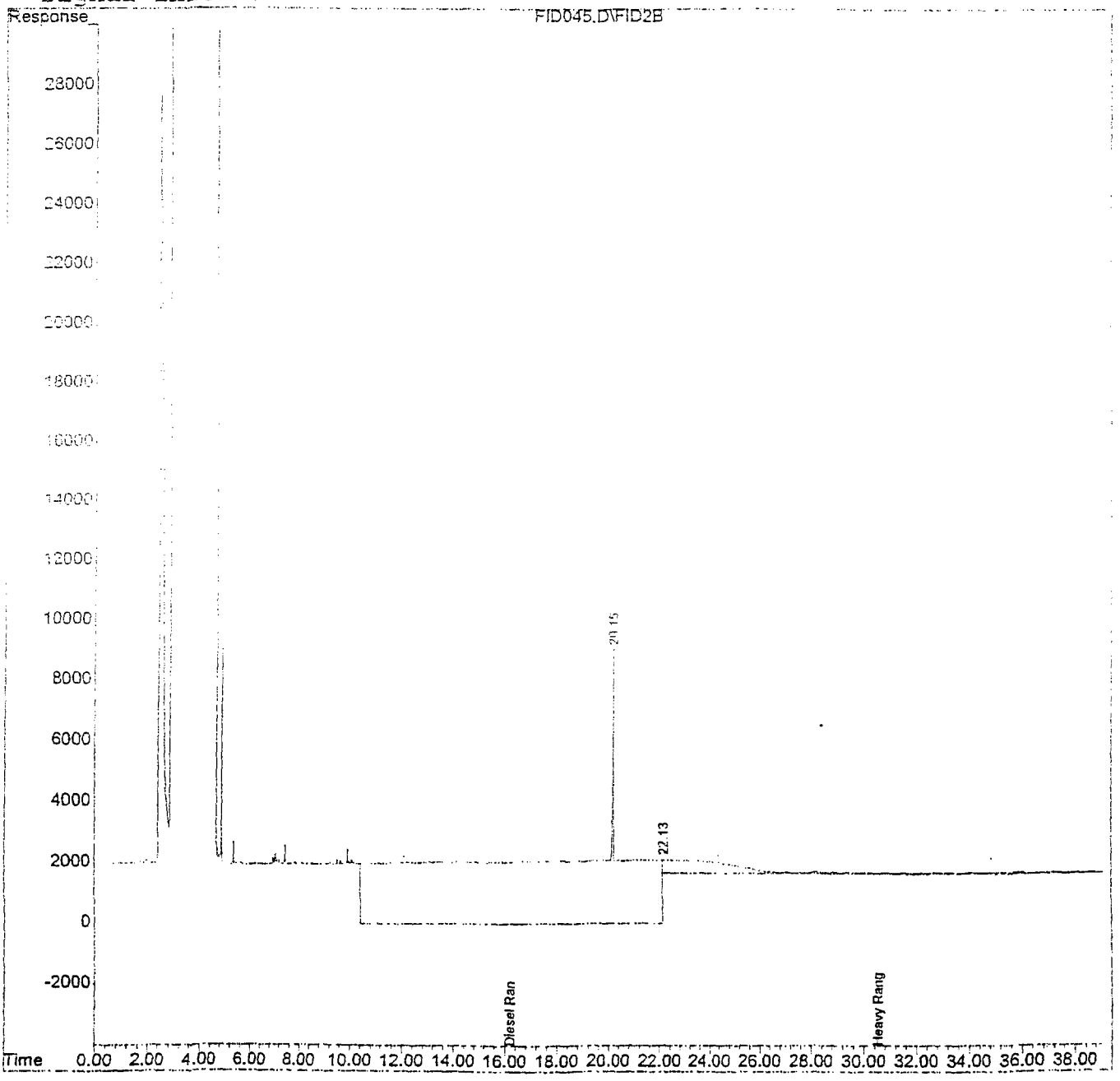


Data File : C:\HPCHEM\2\DATA\090600\FID045.D Vial: 45
Acq On : 8 Sep 2000 4:37 Operator:
Sample : 009011-10 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:24 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

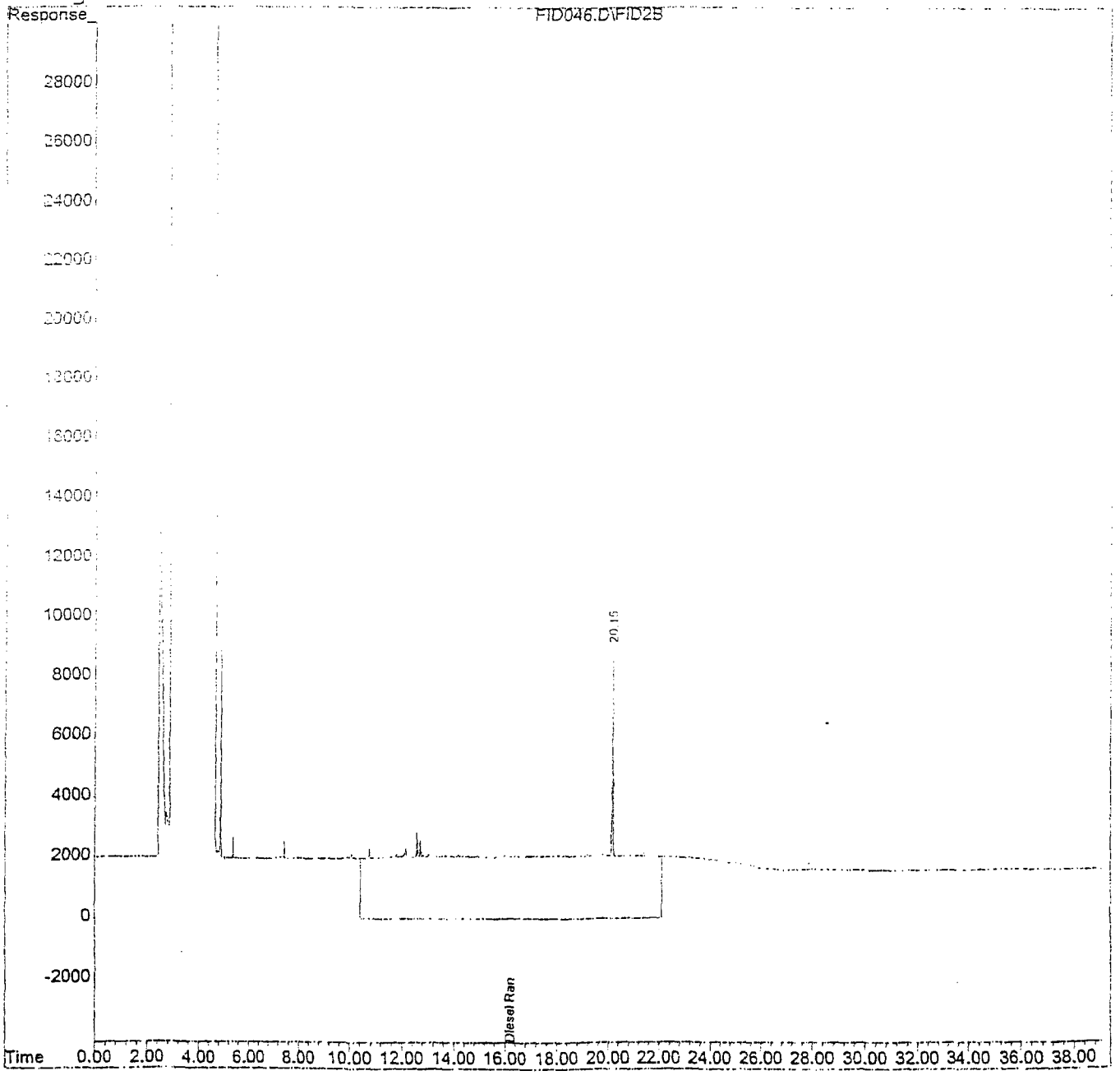


Data File : C:\HPCHEM\2\DATA\090600\FID046.D Vial: 46
Acq On : 8 Sep 2000 5:30 Operator:
Sample : 009011-11 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:25 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



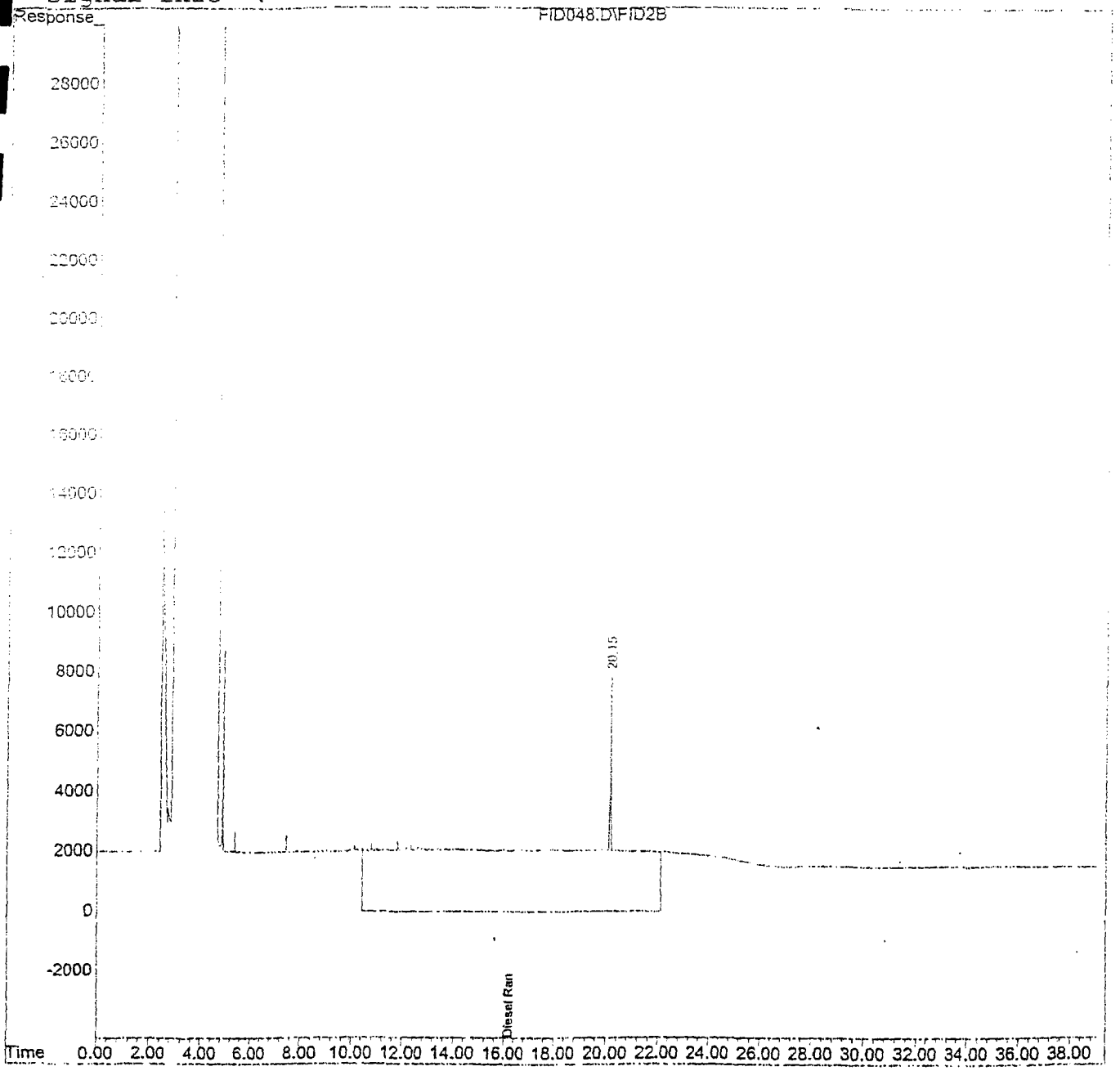
Data File : C:\HPCHEM\2\DATA\090600\FID048.D
Acq On : 8 Sep 2000 7:17
Sample : 00911-12
Misc : front inj. rear detector
IntFile : EVENTS.E

Vial: 48
Operator:
Inst : FID-1
Multiplr: 1.00

Quant Time: Sep 8 10:27 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

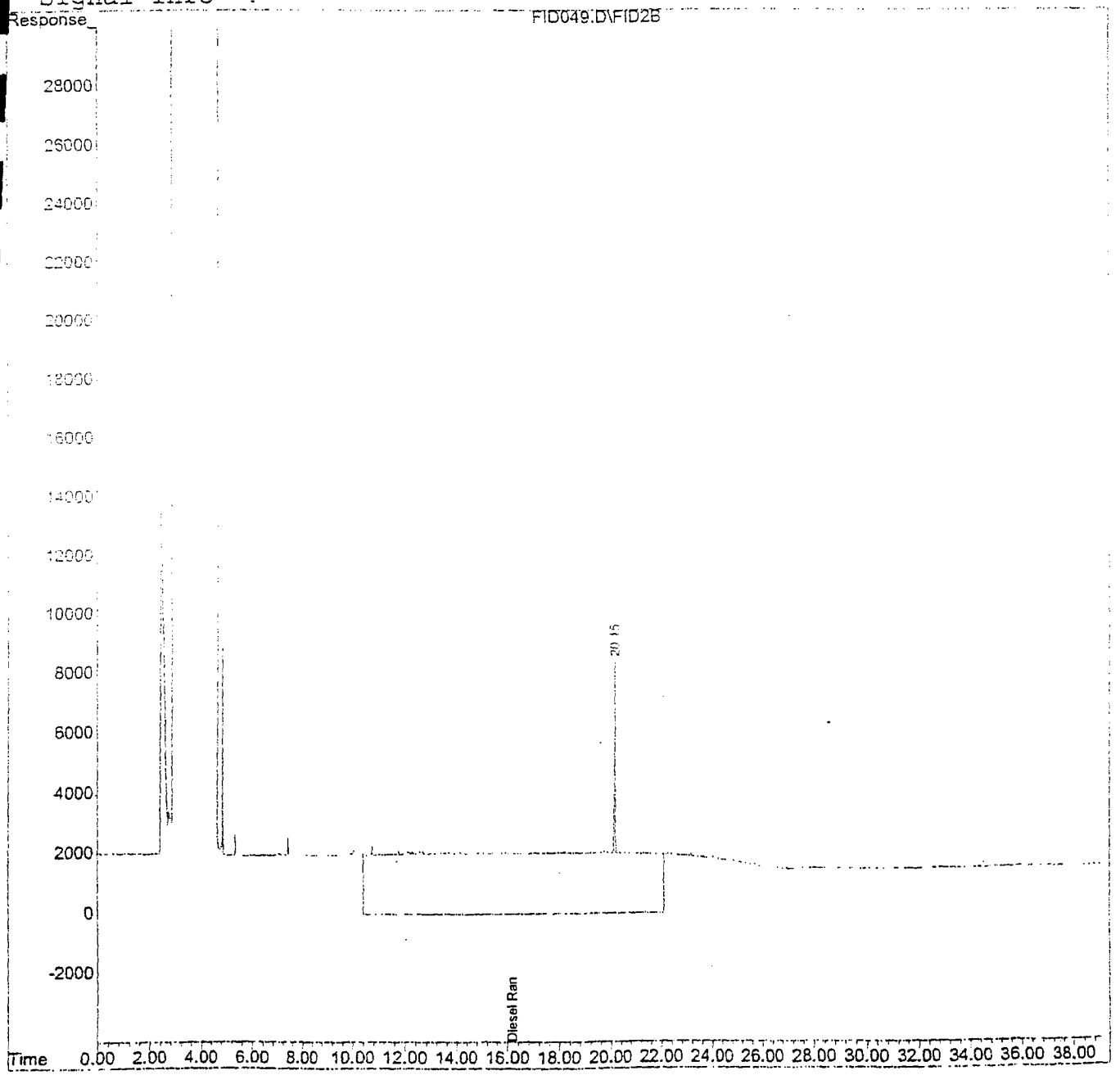


Data File : C:\HPCHEM\2\DATA\090600\FID049.D Vial: 49
Acq On : 8 Sep 2000 8:10 Operator:
Sample : 00911-13 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:27 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



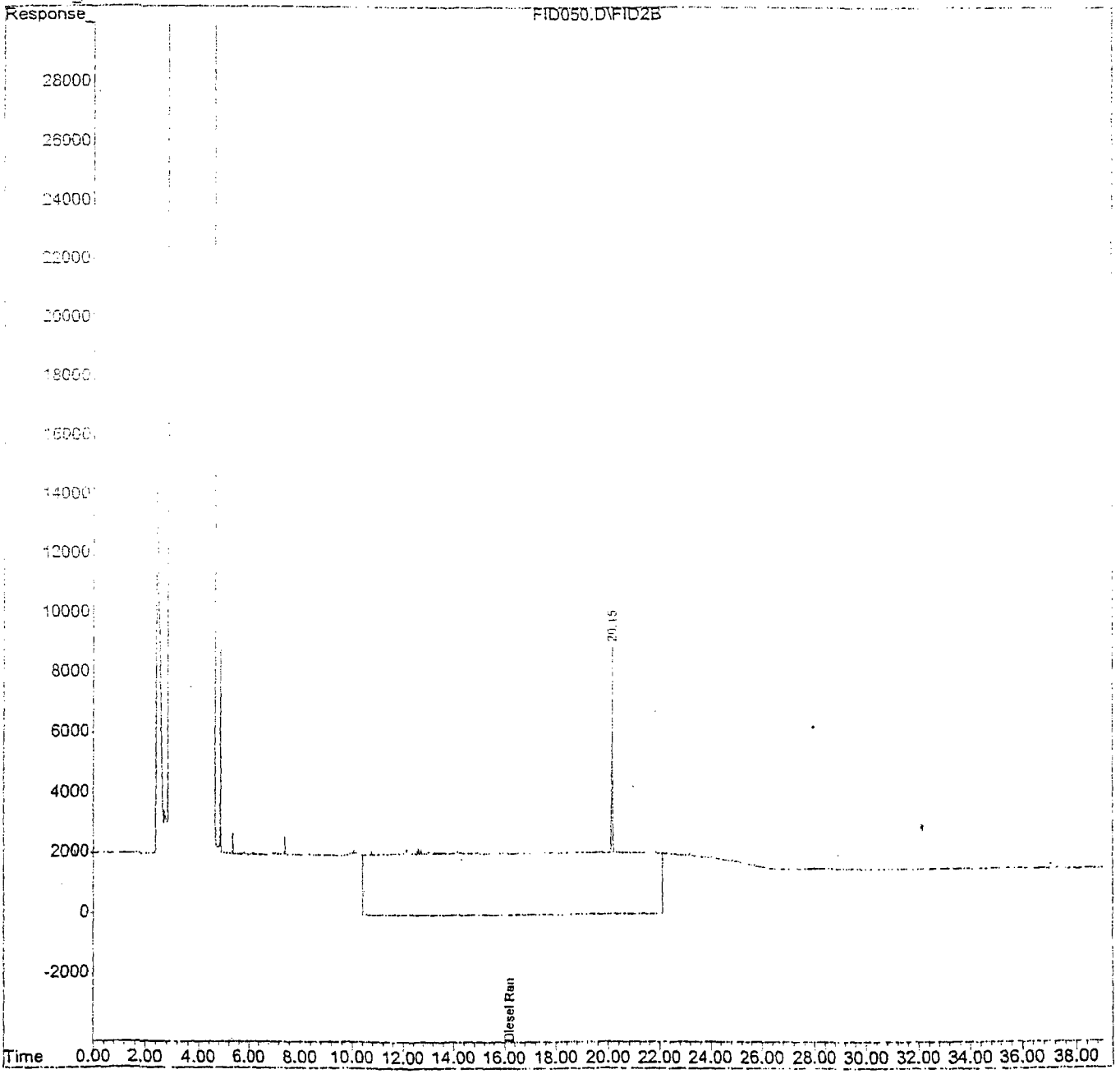
Data File : C:\HPCHEM\2\DATA\090600\FID050.D
Acq On : 8 Sep 2000 9:03
Sample : 00911-14
Misc : front inj. rear detector
IntFile : EVENTS.E

Vial: 50
Operator:
Inst : FID-1
Multiplr: 1.00

Quant Time: Sep 8 10:28 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :

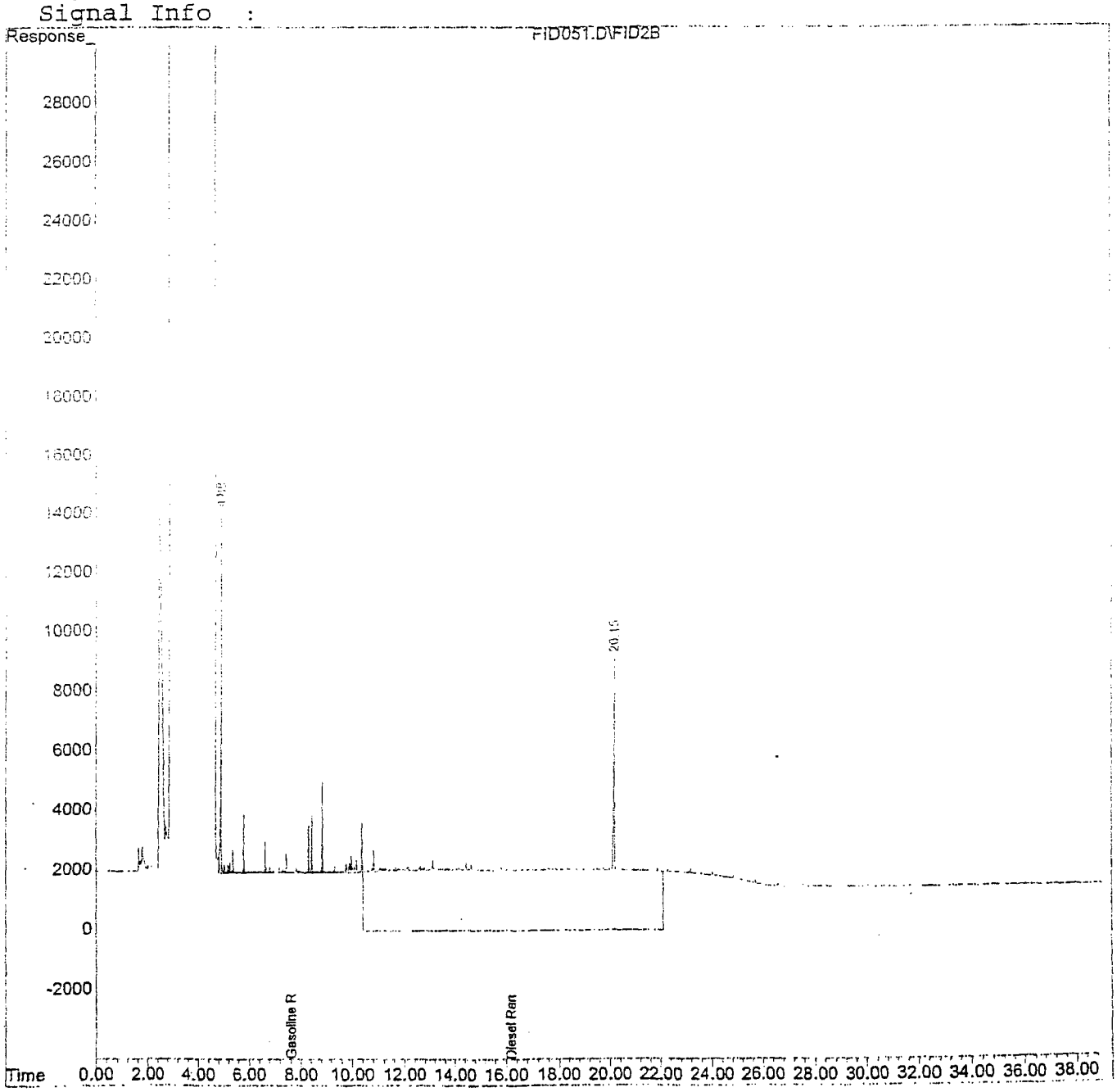


Data File : C:\HPCHEM\2\DATA\090600\FID051.D
Acq On : 8 Sep 2000 9:56 Operator:
Sample : 00911-15 Inst : FID-1
Misc : front inj. rear detector Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Sep 8 10:47 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



Quantitation Report

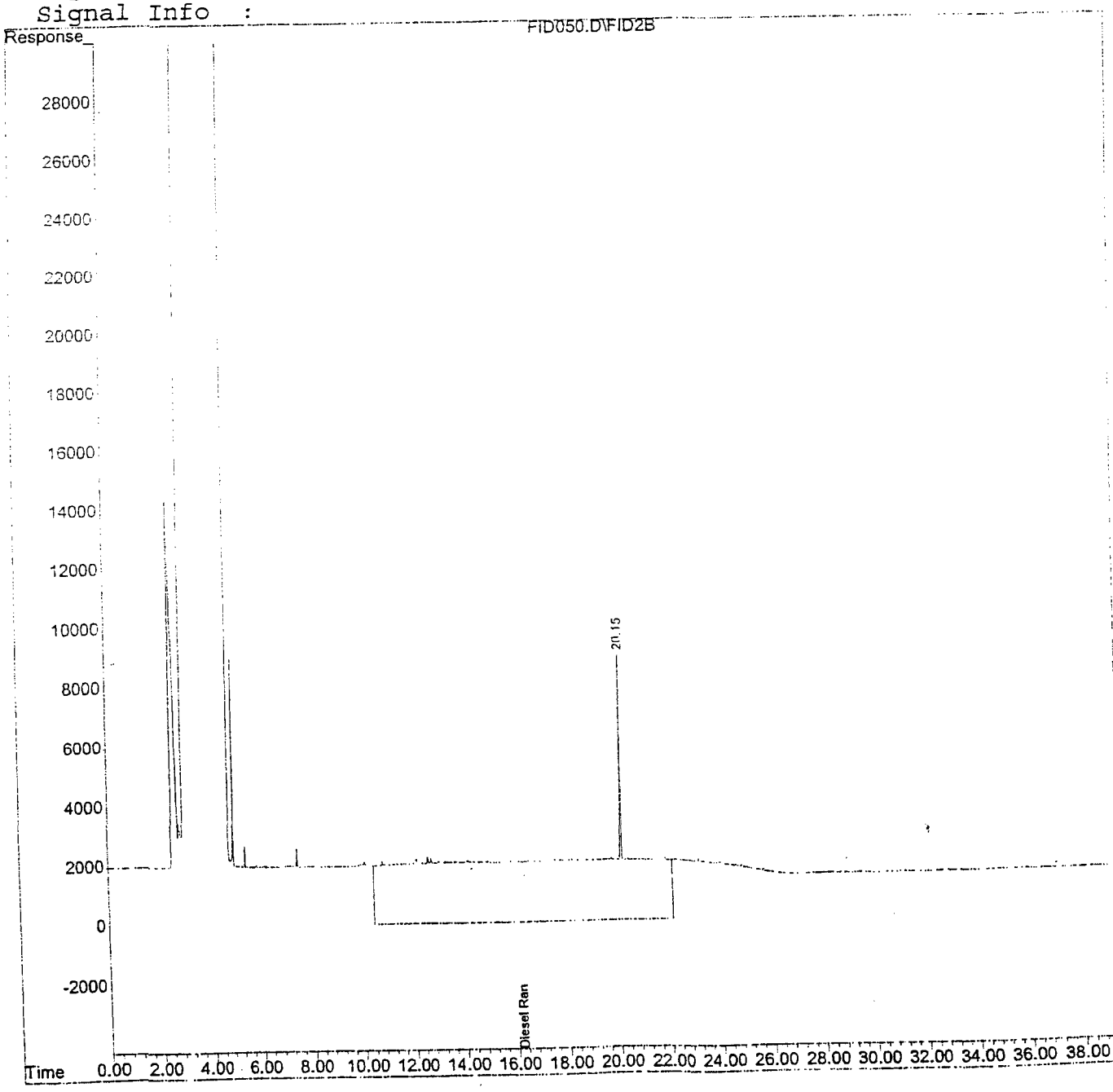
Data File : C:\HPCHEM\2\DATA\090600\FID050.D
Acq On : 8 Sep 2000 9:03
Sample : 00911-14
Misc : front inj. rear detector
IntFile : EVENTS.E

Vial: 50
Operator:
Inst : FID-1
Multiplr: 1.00

Quant Time: Sep 8 10:28 2000 Quant Results File: NM0902FR.RES

Quant Method : C:\HPCHEM\2\METHODS\NM0902FR.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Sep 04 14:02:53 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM0902FR.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



APPENDIX D

LABORATORY ANALYTICAL REPORTS
GROUNDWATER ANALYSIS
FEBRUARY 2001

PINNACLE LABORATORIES

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

Pinnacle Lab ID number **102020**
February 12, 2001

PHILIP ENVIRONMENTAL
4000 MONROE ROAD
FARMINGTON. NM 87401

Project Name BMG 0-9 LINE MW SAMPLING
Project Number 62800420

Attention: ROBERT THOMPSON

On 02/07/01 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.

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

H. Mitchell Rubenstein, Ph. D.
General Manager

MR: jt

Enclosure

PINNACLE LABORATORIES

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

ENT	: PHILIP ENVIRONMENTAL	PINNACLE ID	: 102020
ROJECT #	: 62800420	DATE RECEIVED	: 02/07/01
OJECT NAME	: BMG 0-9 LINE MW SAMPLING	REPORT DATE	: 02/12/01

NACLE ID #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
020 - 01	BMG MW01	AQUEOUS	02/06/01
020 - 02	BMG MW02	AQUEOUS	02/06/01
2020 - 03	BMG MW03	AQUEOUS	02/06/01
2020 - 04	BMG MW04	AQUEOUS	02/06/01
020 - 05	TRIP BLANK	AQUEOUS	02/06/01

PINNACLE LABORATORIES

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Albuquerque, New Mexico 87107
Phone (505) 344-3777
Fax (505) 344-4413

GAS CHROMATOGRAPHY RESULTS

EST : EPA 8021 MODIFIED
LIENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 102020
OJECT # : 62800420
ROJECT NAME : BMG 0-9 LINE MW SAMPLING

AMPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
1	BMG MW01	AQUEOUS	02/06/01	NA	02/08/01	1
2	BMG MW02	AQUEOUS	02/06/01	NA	02/08/01	1
3	BMG MW03	AQUEOUS	02/06/01	NA	02/08/01	1

ARAMETER	DET. LIMIT	UNITS	BMG MW01	BMG MW02	BMG MW03
ENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
LUENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
THYLBENZENE	0.5	UG/L	< 0.5	< 0.5	< 0.5
TAL XYLENES	0.5	UG/L	< 0.5	< 0.5	< 0.5
URROGATE:					
ROMOFLUOROBENZENE (%)			104	102	104
RROGATE LIMITS	(80 - 120)				

HEMIST NOTES:
A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

ST : EPA 8021 MODIFIED
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 102020
OJECT # : 62800420
OJECT NAME : BMG 0-9 LINE MW SAMPLING

MPLE #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
	BMG MW04	AQUEOUS	02/06/01	NA	02/08/01	1
	TRIP BLANK	AQUEOUS	02/06/01	NA	02/08/01	1

RAMETER	DET. LIMIT	UNITS	BMG MW04	TRIP BLANK
NZENE	0.5	UG/L	< 0.5	< 0.5
LUENE	0.5	UG/L	< 0.5	< 0.5
HYLBENZENE	0.5	UG/L	< 0.5	< 0.5
TAL XYLENES	0.5	UG/L	< 0.5	< 0.5

RROGATE:
OMOFLUOROBENZENE (%) 105 105
RROGATE LIMITS (80 - 120)

EMIST NOTES:
A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

EST	: EPA 8021 MODIFIED	PINNACLE I.D.	: 102020
NK I. D.	: 020801	DATE EXTRACTED	: NA
ENT	: PHILIP ENVIRONMENTAL	DATE ANALYZED	: 02/08/01
OJECT #	: 62800420	SAMPLE MATRIX	: AQUEOUS
OJECT NAME	: BMG 0-9 LINE MW SAMPLING		

AMETER	UNITS	
ENZENE	UG/L	<0.5
UENE	UG/L	<0.5
YLBENZENE	UG/L	<0.5
TAL XYLENES	UG/L	<0.5

ROGATE:
OMOFLUOROBENZENE (%) 103
ROGATE LIMITS: (80 - 120)
EMIST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

EST	: EPA 8021 MODIFIED		
MSD #	: 102020-01	PINNACLE I.D.	: 102020
ENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: NA
ROJECT #	: 62800420	DATE ANALYZED	: 02/08/01
OJECT NAME	: BMG 0-9 LINE MW SAMPLING	SAMPLE MATRIX	: AQUEOUS
		UNITS	: UG/L

ARAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
ZENE	<0.5	20.0	19.9	100	20.3	102	2	(80 - 120)	20
OLUENE	<0.5	20.0	18.6	93	18.9	95	2	(80 - 120)	20
THYLBENZENE	<0.5	20.0	20.2	101	20.5	103	1	(80 - 120)	20
TAL XYLENES	<0.5	60.0	60.0	100	59.8	100	0	(80 - 120)	20

HEMIST NOTES:

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

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

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

ST : EPA 8015 MODIFIED (DIRECT INJECT)
IENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 102020
JECT # : 62800420
JECT NAME : BMG 0-9 LINE MW SAMPLING

MPLE CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
BMG MW01	AQUEOUS	02/06/01	02/10/01	02/10/01	1
BMG MW02	AQUEOUS	02/06/01	02/10/01	02/10/01	1
BMG MW03	AQUEOUS	02/06/01	02/10/01	02/10/01	1

AMETER	DET. LIMIT	UNITS	BMG MW01	BMG MW02	BMG MW03
EL HYDROCARBONS, C6-C10	2.0	MG/L	< 2.0	< 2.0	< 2.0
EL HYDROCARBONS, C10-C22	1.0	MG/L	< 1.0	< 1.0	< 1.0
L HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0	< 1.0	< 1.0
CULATED SUM:					
RROGATE:					
ERPHENYL (%)			98	97	97
RROGATE LIMITS	(79 - 124)				

EMIST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS

: EPA 8015 MODIFIED (DIRECT INJECT)
ENT : PHILIP ENVIRONMENTAL PINNACLE I.D.: 102020
ECT # : 62800420
ECT NAME : BMG 0-9 LINE MW SAMPLING

MPLE CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
BMG MW04	AQUEOUS	02/06/01	02/10/01	02/10/01	1

RAMETER	DET. LIMIT	UNITS	BMG MW04
EL HYDROCARBONS, C6-C10	2.0	MG/L	< 2.0
HYDROCARBONS, C10-C22	1.0	MG/L	< 1.0
E HYDROCARBONS, C22-C36	1.0	MG/L	< 1.0
LCULATED SUM:			
ROGATE:			
ERPHENYL (%)			38
ROGATE LIMITS	(79 - 124)		

MIST NOTES:

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY RESULTS
REAGENT BLANK

EST	: EPA 8015 MODIFIED (DIRECT INJECT)		
ANK I.D.	: 021001	PINNACLE I.D.	: 102020
IENT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 02/10/01
OJECT #	: 62800420	DATE ANALYZED	: 02/11/01
OJECT NAME	: BMG 0-9 LINE MW SAMPLING	SAMPLE MATRIX	: Aqueous

RAMETER	UNITS	
EL HYDROCARBONS, C6-C10	MG/L	< 2.0
JEL HYDROCARBONS, C10-C22	MG/L	< 1.0
EL HYDROCARBONS, C22-C36	MG/L	< 1.0
URROGATE:		
TERPHENYL (%)		88
RROGATE LIMITS	(73 - 128)	

EMIST NOTES:
A

PINNACLE LABORATORIES

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

GAS CHROMATOGRAPHY QUALITY CONTROL
MSMSD

ST	: EPA 8015 MODIFIED (DIRECT INJECT)		
MSD #	: 021001	PINNACLE I.D.	: 102020
NT	: PHILIP ENVIRONMENTAL	DATE EXTRACTED	: 02/10/01
OJECT #	: 62800420	DATE ANALYZED	: 02/10/01
OJECT NAME	: BMG 0-9 LINE MW SAMPLING	SAMPLE MATRIX	: AQUEOUS
		UNITS	: MG/L

RAMETER	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD	REC LIMITS	RPD LIMITS
L HYDROCARBONS	<1.0	33.0	35.3	107	33.0	100	7	(64 - 127)	20

EMIST NOTES:

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

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

PHILIP ENVIRONMENTAL

Chain of Custody Record

102020

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

COC Serial No. C 2846

Project Name BMG 0-9 Line MW Samplings

Project Number 6800420 Phase . Task 0301

Samplers C. Maez

Laboratory Name PINNACLE

Location ALBQ N.M.

Type of Analysis and Bottle: BTEX 8021; TPH 8015 DRO; LOGID

Sample Number (and depth)	Date	Time	Matrix	Total Number of Bottles	BTEX 8021	TPH 8015 DRO	LOGID	Comments
BMG MW 01	02-06-01	1136	H_2O	2	X	X	01	09 LEAK
BMG MW 02	02-06-01	0949	H_2O	2	X	X	02	09 LEAK
BMG MW 03	02-06-01	1145	H_2O	2	X	X	03	09 LEAK
BMG MW 04	02-06-01	1141	H_2O	2	X	X	04	09 LEAK
Trip Blank	02-06-01	1600	H_2O	1	X		05	

Relinquished by:

Signature	Date	Time
[signature]	02-06-01	1600

Received By:

Signature	Date	Time
[signature]	2/7/01	0905

Samples Iced: ☑ Yes ☐ No

Carrier: GReyhound

Airbill No GLI 160691985 3

Preservatives (ONLY for Water Samples)

- ☐ Cyanide .... Sodium hyroxide (NaOH)
- ☐ Volatile Organic Analysis .... Hydrochloric acid (HCl)
- ☐ Metals .... Nitric acid (HNO_3)
- ☐ TPH (418.1) .... Sulfuric acid (H_2SO_4)
- ☑ Other (Specify) $HgCl_2$
- ☐ Other (Specify)

Shipping and Lab Notes:

Rec'd @ 3.2°C

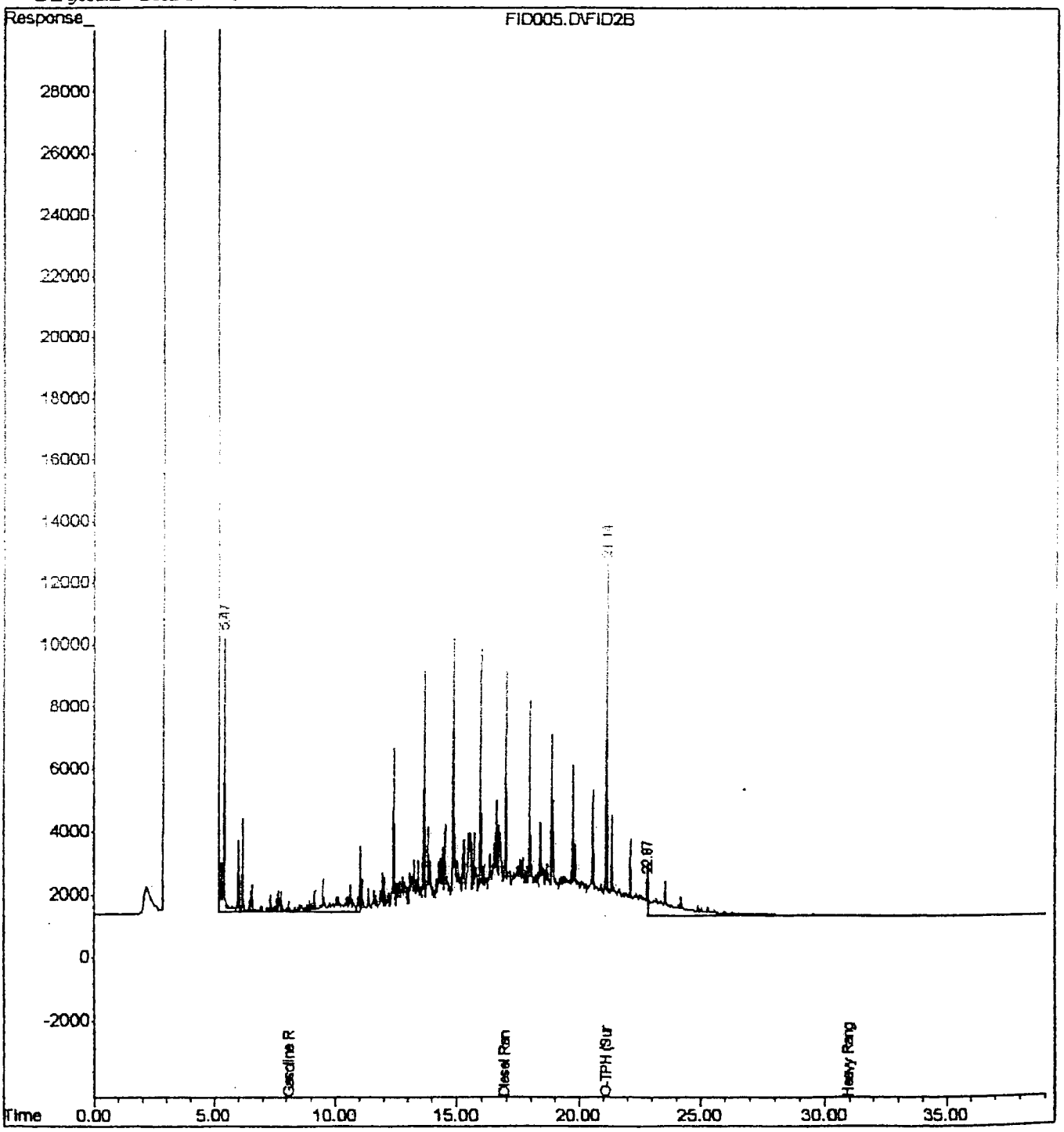
PE-176 4/95

Misc : Multiplr: 1.00
IntFile : EVENTS.E

Quant Time: Mar 28 13:16 2000 Quant Results File: NM032100.RES

Quant Method : C:\HPCHEM\2\METHODS\NM032100.M (Chemstation Integrator)
Title : NM 8015
Last Update : Thu Mar 23 08:47:45 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



Quantitation Report (Not Reviewed)

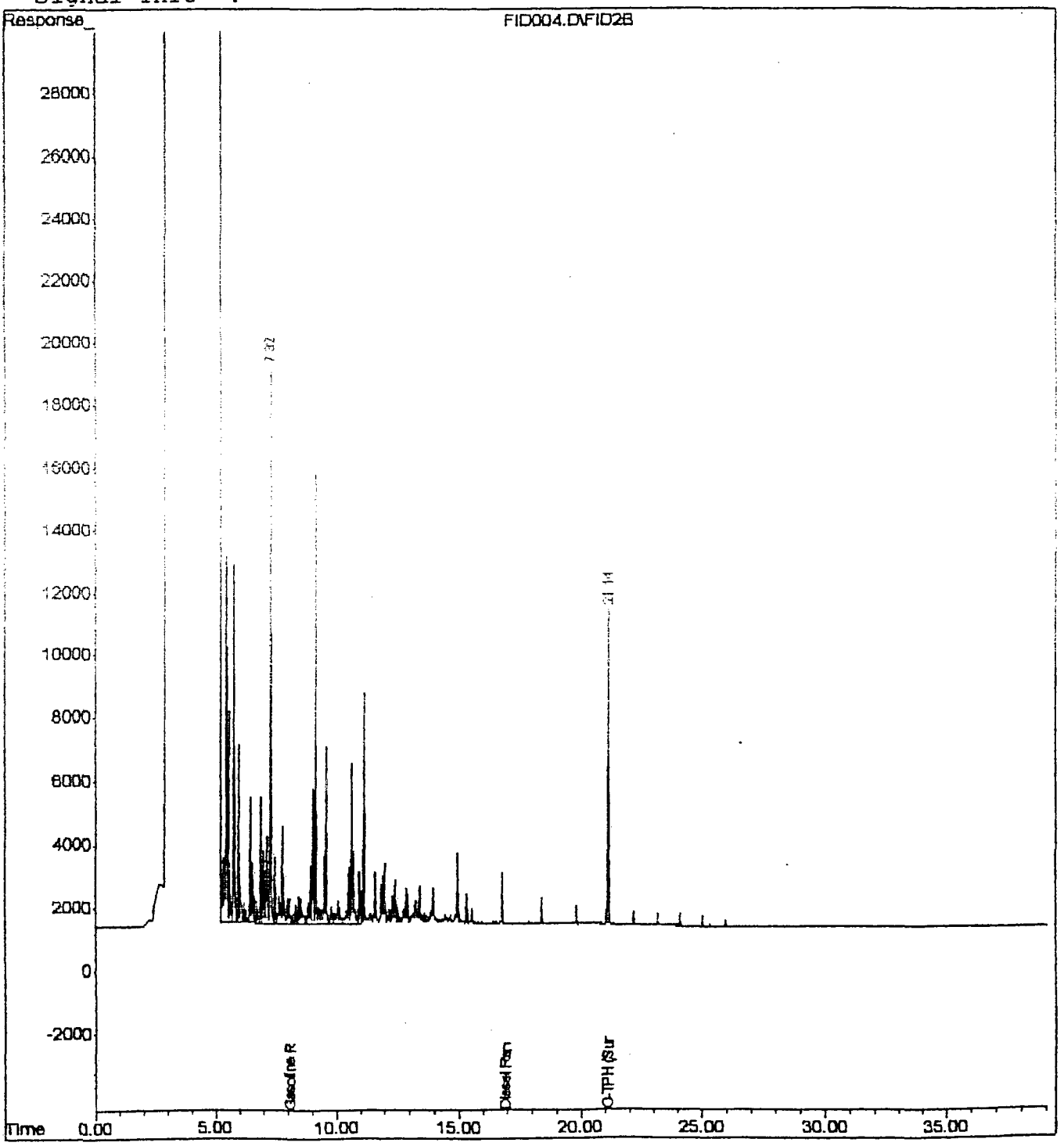
Acq On : 28 Mar 2000 11:05
Sample : GAS CCV
Misc :
IntFile : EVENTS.E

Operator: cff
Inst : FID-1
Multiplr: 1.00

Quant Time: Mar 28 12:32 2000 Quant Results File: NM032100.RES

Quant Method : C:\HPCHEM\2\METHODS\NM032100.M (Chemstation Integrator)
Title : NM 8015
Last Update : Thu Mar 23 08:47:45 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

Volume Inj. : 2ul
Signal Phase :
Signal Info :



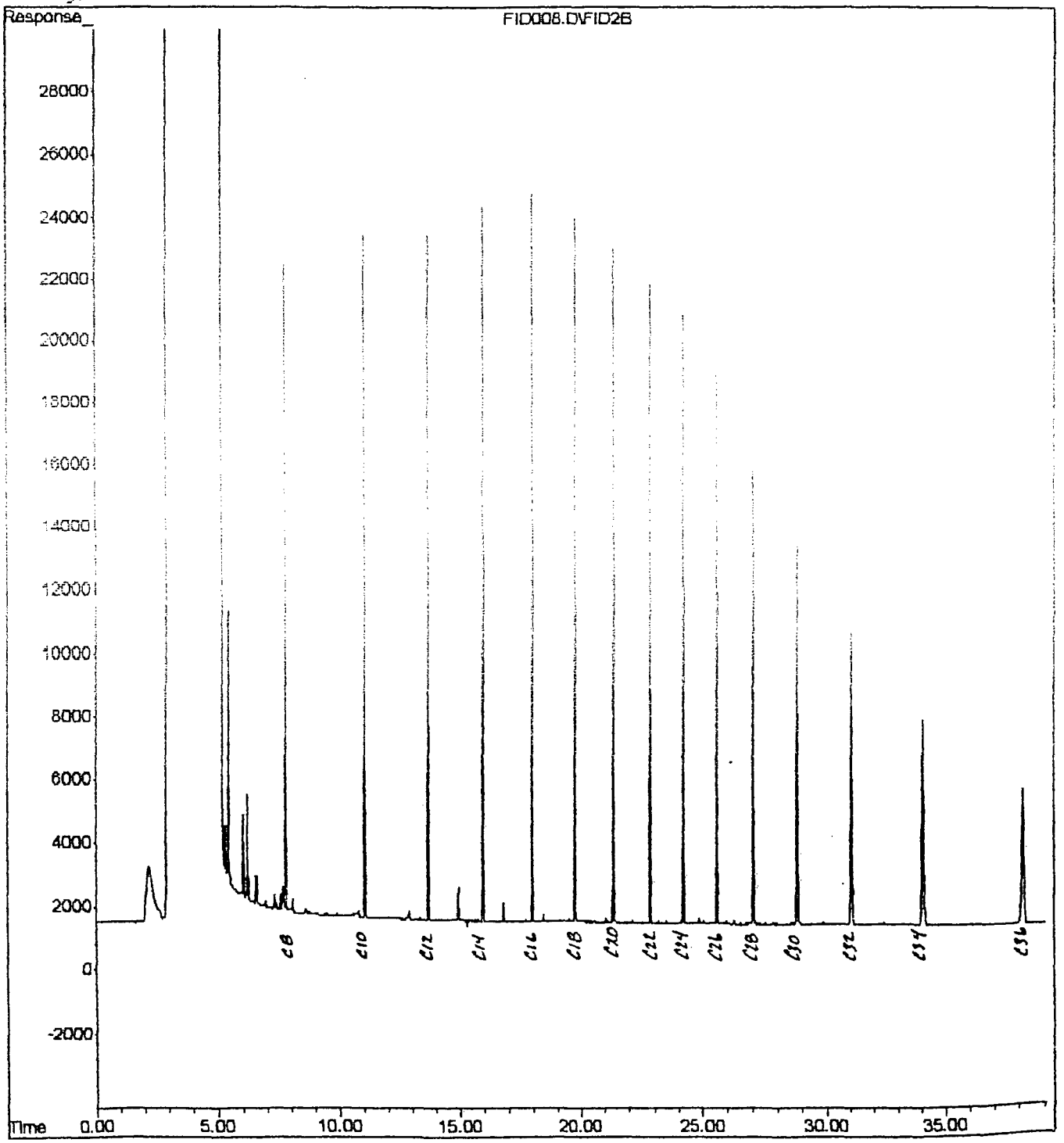
Sample : rt std c8 to c40
Misc :
IntFile : EVENTS.E

Inst : FID-1
Multiplr: 1.00

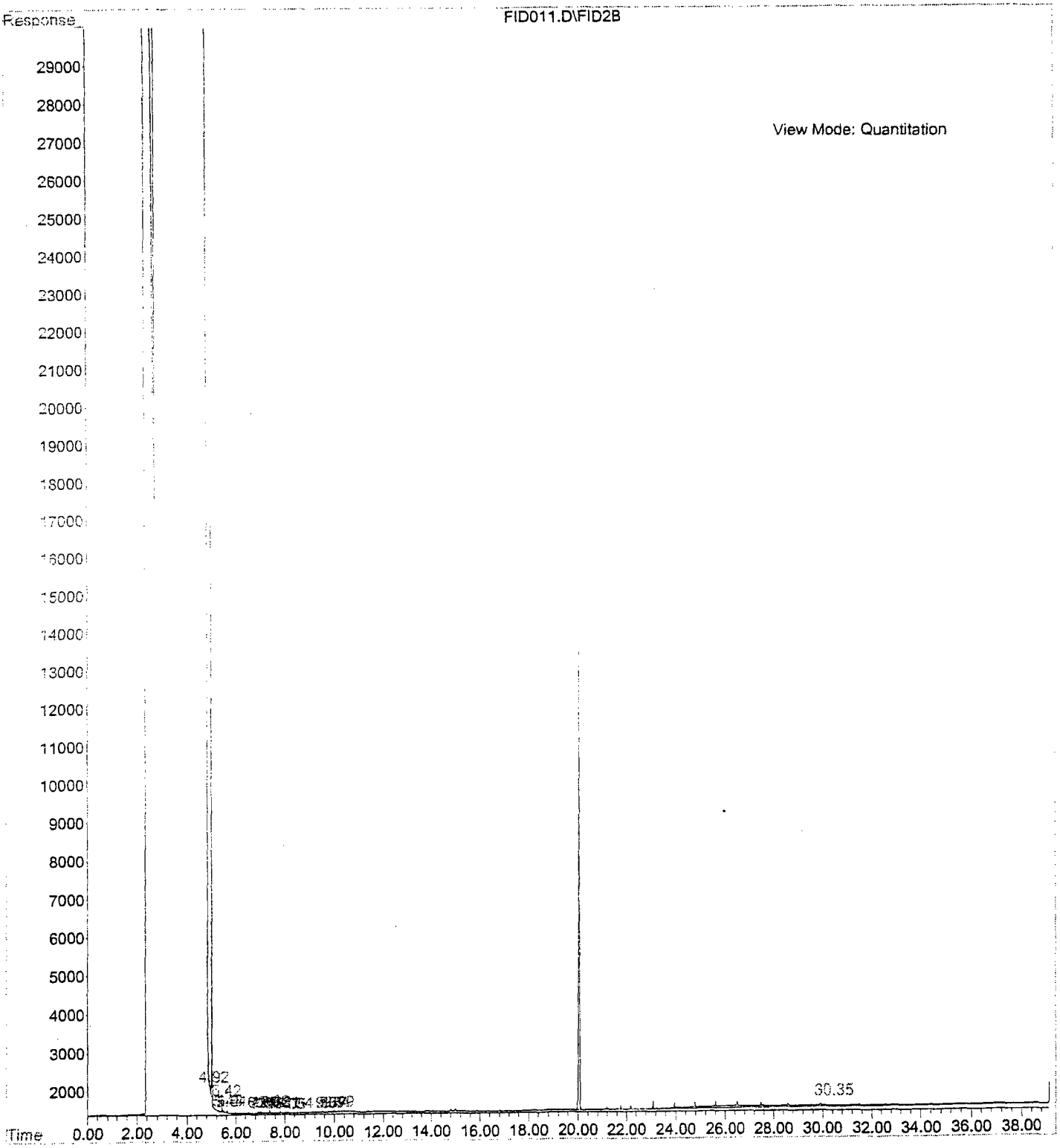
Quant Time: Mar 22 10:00 2000 Quant Results File: NM03200D.RES

Quant Method : C:\HPCHEM\2\METHODS\NM03200D.M (Chemstation Integrator)
Title : NM 8015
Last Update : Mon Mar 20 16:31:55 2000
Response via : Multiple Level Calibration
DataAcq Meth : NM03200D.M

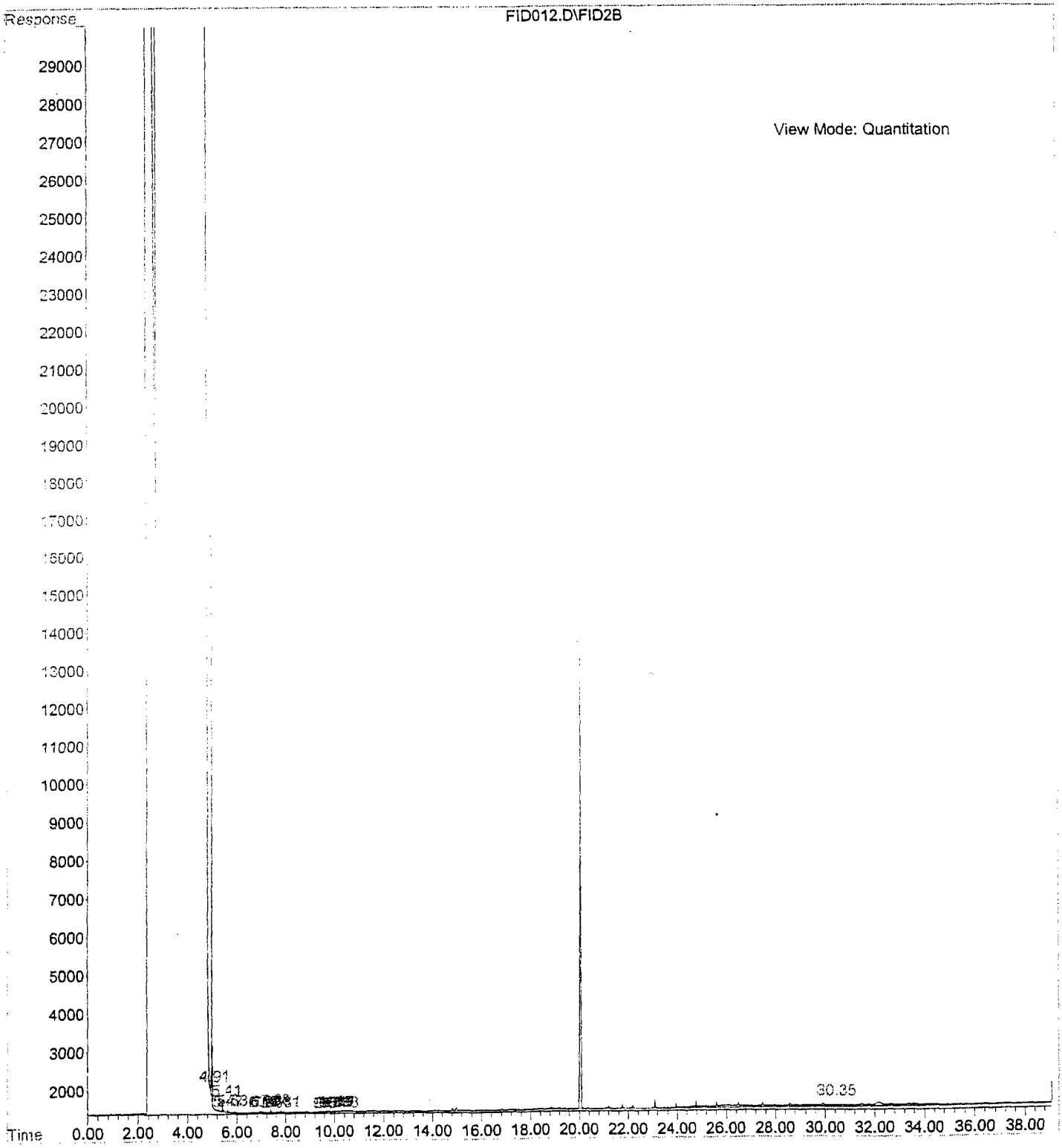
Volume Inj. : 2ul
Signal Phase :
Signal Info :



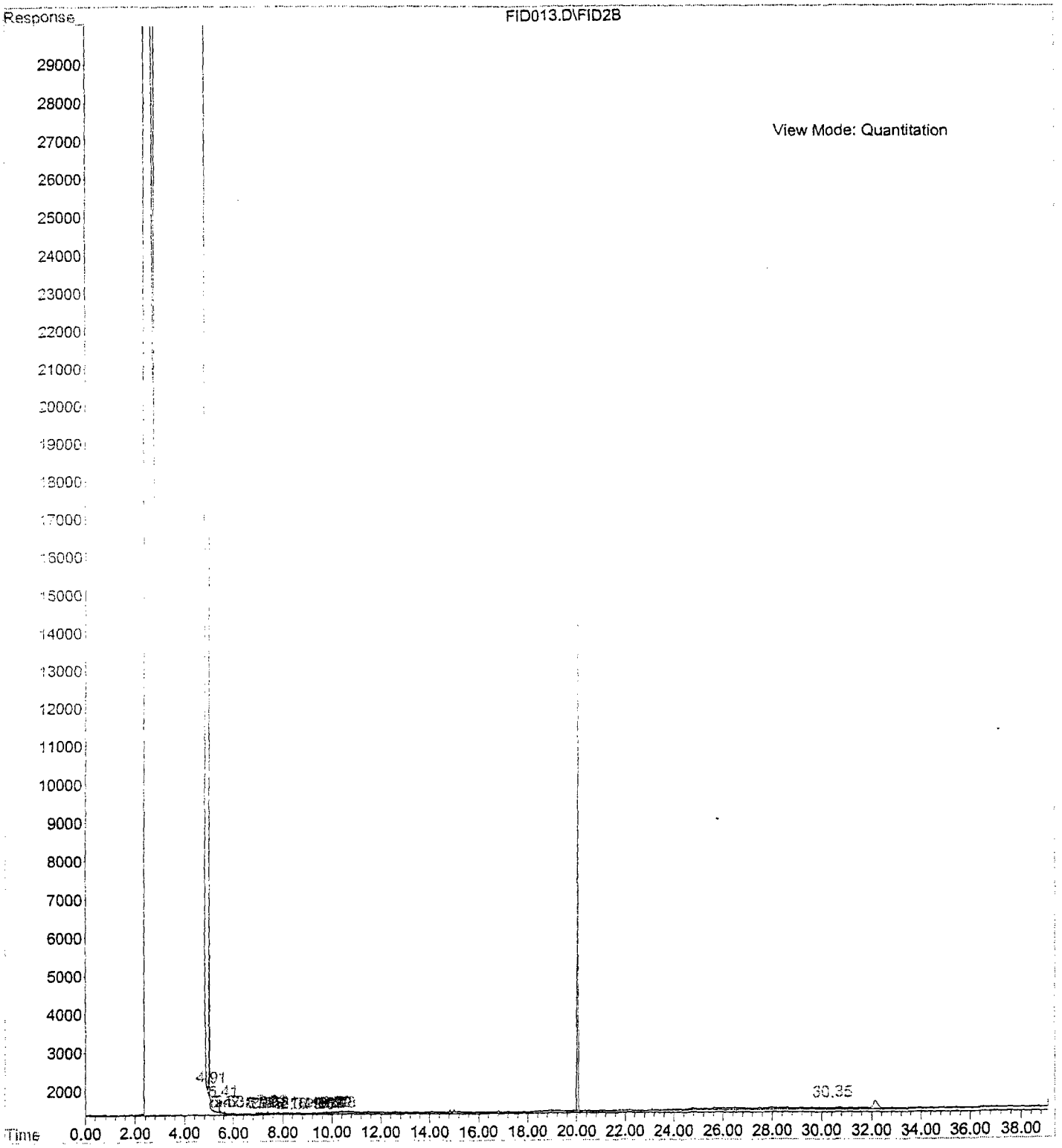
File : C:\HPCHEM\2\DATA\021001\FID011.D
Operator :
Acquired : 10 Feb 2001 15:31 using AcqMethod NM1108FR.M
Instrument : FID-1
Sample Name: 102020-01
Misc Info :
Vial Number: 10



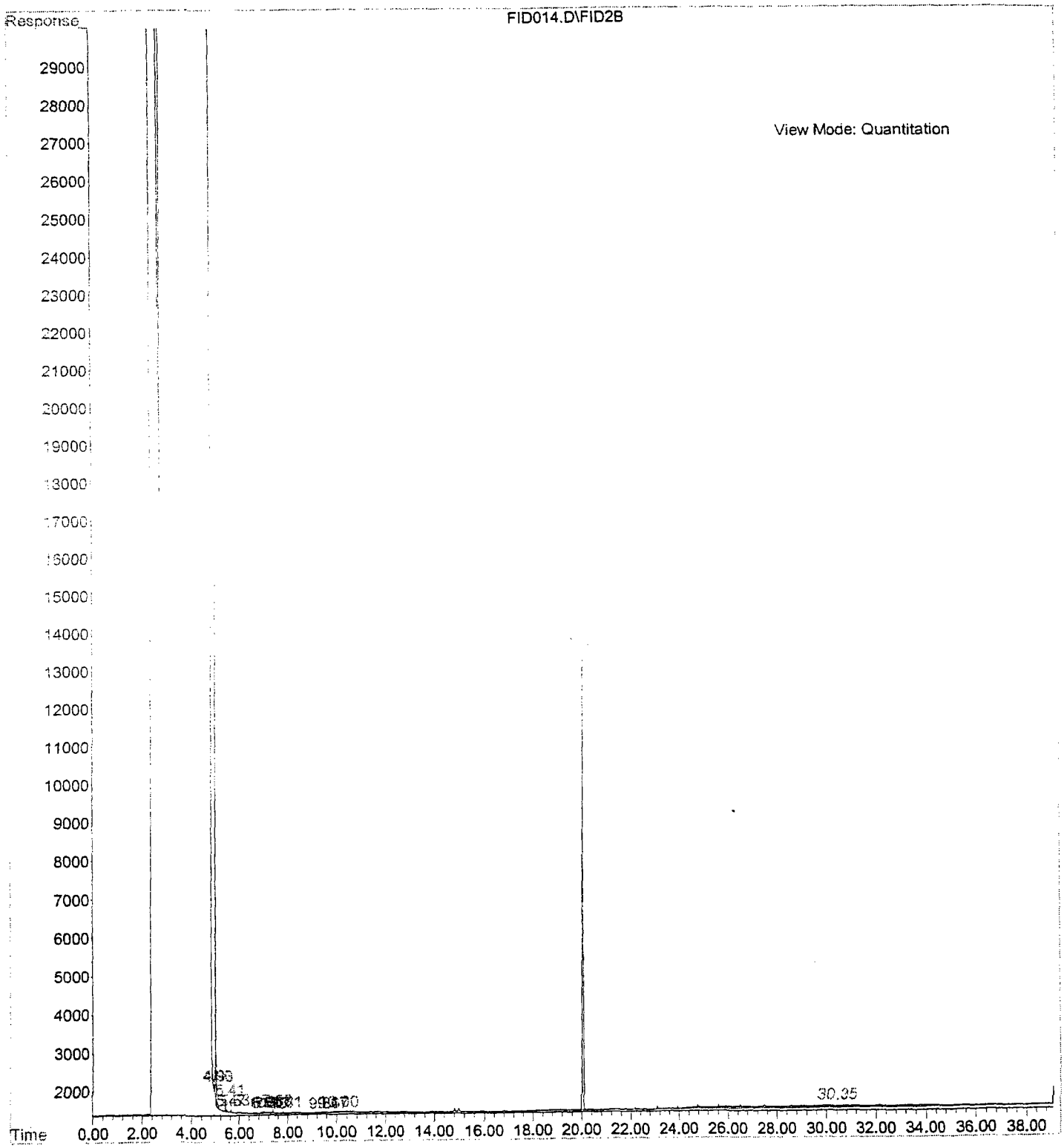
File : C:\HPCHEM\2\DATA\021001\FID012.D
Operator :
Acquired : 10 Feb 2001 16:24 using AcqMethod NM1108FR.M
Instrument : FID-1
Sample Name: 102020-02
Misc Info :
Vial Number: 11



File : C:\HPCHEM\2\DATA\021001\FID013.D
Operator :
Acquired : 10 Feb 2001 17:18 using AcqMethod NM1108FR.M
Instrument : FID-1
Sample Name: 102020-03
Misc Info :
Vial Number: 12



File : C:\HPCHEM\2\DATA\021001\FID014.D
Operator :
Acquired : 10 Feb 2001 18:11 using AcqMethod NM1108FR.M
Instrument : FID-1
Sample Name: 102020-04
Misc Info :
Vial Number: 13



PHILIP ENVIRONMENTAL

Well Number Mw 01

WELL DEVELOPMENT AND PURGING DATA

Serial No. WOPD-

Page 1 of 1

Project Name BMG 0-9 Line MV Sampling [illegible]

Project No. 62200420

Client Company [illegible]

Phase.Task No. ______

Site Name 0-9 Oil Leak [illegible] Forest

Development Criteria

☑ (3) to 5 Casing Volumes of Water Removal
☑ Stabilization of Indicator Parameters
☐ Other ______

[illegible]

Instruments — Serial No. (If applicable)

☑ pH Meter — Hydac
☐ DO Monitor
☑ Conductivity Meter — Hydac
☑ Temperature Meter — Hydac
☐ Other ______

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic
☐ Other ______

Bailer
☑ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

Water Disposal
On Site

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	[illegible]	[illegible]	[illegible]	[illegible]	Temperature (°)	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/l)	Comments
02-06-01	0959		X								6.6	5.97	0.82		Cloudy Brown No Odor
	1004		X								7.6	5.31	0.82		" "
	1008		X								7.6	5.53	0.93		" "
	1012		X								8.1	5.52	0.92		" "
	1015		X								8.1	5.32	0.92		No Change

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

Comments (No Product) Sampled [illegible]

Developer's Signature(s) [signature] Date [illegible] Reviewer RT Date 2/6/01

PHILIP ENVIRONMENTAL

WELL DEVELOPMENT AND PURGING DATA

Well Number: Mw - 02

Serial No. WDPD-

Page 1 of 1

Project Name: BMG 0-9 Line MW Sampling [illegible] Thompson

Project No. 62900420

Client Company: Benson-Montin-Greer Drilling [illegible]

Phase.Task No. 0301

Site Name: 0-4 Oil Leak [illegible] Santa Fe National Forest

Development Criteria

- ☑ (3) to 5 Casing Volumes of Water Removal
- ☑ Stabilization of Indicator Parameters
- ☐ Other

[illegible] (faded well volume calculation block)

Instruments — Serial No. (If applicable)

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

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☑ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other

Water Disposal: On Site

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Water Removed: Increment	Water Removed: Cumulative	[illegible]	Temperature	pH	Conductivity (umhos/cm)	Dissolved Oxygen (mg/l)	Comments
02-06-01	0916		X				.75	[illegible]		9.3	6.30	1110		Cloudy Brown no odor
	0918		X				.75	1.50		9.5	6.40	1220		" "
	0920		X				.75	[illegible]		9.6	5.70	1000		" "
	0921		X				.75	[illegible]		9.5	5.59	0990		" "
	0923		X				.75			9.5	5.54	0980		no Change

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

Comments: No Product Sample [illegible] 0949

Developer's Signature(s): [signature] [illegible] Reviewer: RT Date: 2/6/01

Form A0101 Rev. 10/6/94 F:\NEWFORM\PE_A0101.DOT 1/31/94

PHILIP ENVIRONMENTAL

WELL DEVELOPMENT AND PURGING DATA

Well Number: MW 03

Serial No. WDPD-

Page 1 of 1

Project Name: BMG 0-9 Line MW Sampling

Project No. 62800420

Client Company: Benson-Montin-Greer

Phase.Task No. 0301

Site Name: O-9 Oil Leak

[illegible] National Forest

Development Criteria

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

[illegible]: 28.11 / 15.88 / 12.23

Methods of Development

Pump
☐ Centrifugal
☐ Submersible
☐ Peristaltic

Bailer
☑ Bottom Valve
☐ Double Check Valve
☐ Stainless-steel Kemmerer

☐ Other

Instruments — Serial No. (if applicable)

☑ pH Meter: Hydac
☐ DO Monitor:
☐ Conductivity Meter: Hydac
☐ Temperature Meter: Hydac
☐ Other

Water Disposal: on site

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	[illegible]	[illegible]	Temperature	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/l)	Comments
02-06-01	1111		X				1.25	[illegible]	8.6	5.01	094		Cloudy Brown no Odor
	1115		X				1.25	[illegible]	8.9	5.03	094		" "
	1119		X				1.25	[illegible]	9.5	4.99	095		" "
	11.24		X				1.25	[illegible]	9.9	4.99	095		" "
	11 29		X				1.25	[illegible]	9.9	4.94	095		no Change

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

Comments: (No Free Product) Sampled for [illegible]

Developer's Signature(s): [signature]   Date: [illegible]   Reviewer: RT   Date: 2/6/01

PHILIP ENVIRONMENTAL

WELL DEVELOPMENT AND PURGING DATA

Well Number: MW 04

Serial No. WDPD-

Page 1 of 1

Project Name: BMG O-9 Line MW Sampling [illegible] Thompson

Project No. 62800420

Client Company: Benson-Montin-[illegible]

Phase.Task No. 0301

Site Name: O-9 oil Leak [illegible] National Forest

Development Criteria

- ☑ (3) to 5 Casing Volumes of Water Removal
- ☑ Stabilization of Indicator Parameters
- ☐ Other ______

[illegible]

Methods of Development

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

☐ Other ______

Instruments

Instrument	Serial No. (if applicable)
☐ pH Meter	Hydac
☐ DO Monitor	
☐ Conductivity Meter	Hydac
☐ Temperature Meter	Hydac
☐ Other	

Water Disposal: On Site

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	Volume removed: Increment	Volume removed: Cumulative	[illegible]	[illegible]	Temperature	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/L)	Comments
02-06-01	1035		X				[illegible]	[illegible]			6.9	5.27	0.79		Cloudy Brown no odor
	1037		X				[illegible]	[illegible]			7.0	5.26	0.77		" "
	1039		X				[illegible]	[illegible]			7.1	5.19	0.77		" "
	10.41		X				[illegible]	[illegible]			7.0	5.09	0.77		" "
	1043		X				[illegible]	[illegible]			7.1	5.02	0.77		No Change

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

Comments: (No Free Phase Product) Sampled [illegible]

Developer's Signature(s): [signature] Date [illegible] Reviewer: RT Date: 2/6/01

PHILIP ENVIRONMENTAL

WELL DEVELOPMENT AND PURGING DATA

Well Number MW-5

Serial No. WDPD-

Page 1 of 1

Project Name BMG 0-9 LINE MW SAMPLING

Project No. C2800420

Client Company Benson-Montin-Greer [illegible]

Phase.Task No. 0301

Site Name 0-9 Oil Leak

[illegible] ...EST

Development Criteria

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

[illegible] 17.41

[illegible] N/A

Methods of Development

Pump
- ☐ Centrifugal
- ☐ Submersible
- ☐ Peristaltic

Bailer
- ☐ Bottom Valve
- ☐ Double Check Valve
- ☐ Stainless-steel Kemmerer

☐ Other ______

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

Water Disposal N/A

Water Removal Data

Date	Time	Development Method: Pump	Development Method: Bailer	Removal Rate (gal/min)	Intake Depth (feet)	Ending Water Depth (feet)	[illegible]	[illegible]	[illegible]	Temperature	pH	Conductivity (mmhos/cm)	Dissolved Oxygen (mg/l)	Comments
NO	DATA			COLLECTED			DUE		PRESENCE		OF	FREE	PHASE	HYDROCARBONS

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

Comments [illegible] 1.18 product Thickness

(No Sample Taken [illegible]

Developer's Signature(s) [signature] Date [illegible]/6/01 Reviewer RT Date 2/6/01

IMPORTANT MESSAGE

FOR
DATE 11/19 TIME 10:27 A.M. P.M.
M Pat Sanchez
OF Banson, Montin Greer
PHONE 325 -
AREA CODE NUMBER EXTENSION
☐ FAX
☐ MOBILE
AREA CODE NUMBER TIME TO CALL

TELEPHONED	Discovered	PLEASE CALL Summer 2000	
CAME TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		RUSH	
RETURNED YOUR CALL		SPECIAL ATTENTION	

MESSAGE MW = 15 Unit A
Sec 21 T26N R1W
09 Spill site
crude spill
pipelines
excavated to GW
SIGNED product on water
put in MW's

TOPS FORM 3002P LITHO IN U.S.A.