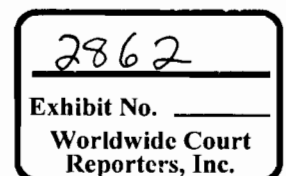


From: Bodek, Robert  
Sent: Wed Apr 14 18:53:04 2010  
To: Kamm, John; Chandler, Paul (ANADARKO); Naoki Ishii  
Cc: Beirne, Michael  
Subject: Pencore preliminary field report  
Importance: Normal  
Attachments: BP Macondo Pencor Preliminary Field Report.zip

Gents,  
Attached is the Pencore preliminary field report

<<...>>

Regards.  
***Bobby Bodek***  
BP America Inc.  
*Geological Operations Coordinator*  
**Gulf of Mexico Exploration - Tiger Team**  
(o) 281.366.3862  
(c) 713.213.7553



# PENCOR

5820 Hwy. 90 East  
Broussard, LA 70518  
Phone: 337-839-9060 Fax: 337-839-2330  
email: info.pencor@corelab.com



## On Site Sampling Summary

Oil Company: BP  
Well: OCS-G-32306 No. 1 ST 00 BP 01  
Field: Mississippi Canyon Block No. 252  
Prospect: "Macondo"  
Rig: Deepwater Horizon  
Prepared for: Ms. Kelly McAughan  
Date: April 14, 2010  
PENCOR Job No.: 36126

## Wellsite Personnel

BP Rep. Onsite  
PENCOR Representatives  
Wireline Company  
MDT Engineer

Mr. Stuart Lacy, Ms. Galina Skripnikova  
Jason Ducote, Paul Culpepper, Jason Peltier, Robert Richard  
Schlumberger  
Mr. Stephan Torgerson, Mr. Dave Kruzeniski

## Services Provided

<input checked="" type="checkbox"/>	On site laboratory
<input checked="" type="checkbox"/>	Pressurized reservoir fluid sub-sample transfers
<input checked="" type="checkbox"/>	Extended sample restoration
<input checked="" type="checkbox"/>	Oilbase mud contamination analysis
<input checked="" type="checkbox"/>	Gas-Liquid ratio and API gravity analysis
<input checked="" type="checkbox"/>	MPSR evaluations (opening pressures)
<input type="checkbox"/>	Measured viscosity (EMV)
<input type="checkbox"/>	Measured saturation pressure at Res (Bubble Point)
<input type="checkbox"/>	Pre-rinse of sample chambers
<input checked="" type="checkbox"/>	Post-rinse of sample chambers



Note: Information in this report is preliminary and subject to examination by senior analysts prior to final reporting.

PENCOR  
An ISO 9001 Registered Company  
info.pencor@corelab.com \* (800) 234-4205

## On Site Sequence of Events

DATE	TIME	EVENT
4/3/2010	2230	Equipment transported from PENCOR, Broussard, LA to C-Port 1 Dock In Fourchon, LA.
4/10/2010	0530	Four PENCOR personnel arrive at PHI, Houma, LA.
	0750	PENCOR personnel depart PHI/Houma in route to Mississippi Canyon 252 (Deepwater Horizon).
	0855	PENCOR personnel arrive at Mississippi Canyon Block 252 (Deepwater Horizon).
	0905	Received onboard safety orientation.
		Transocean is pulling out of the hole with drill pipe.
	1130	Reviewed and discussed PENCOR's job specific JSA. Emphasis was placed on hand safety and pinch points.
	1200	Spotted and positioned Pencor equipment on Port/Aft riser deck. Obtained Rhellant oil base mud and pure base oil samples. Began extraction of filtrate from mud for compositional analysis.
	1200	Collected 2-1gal. samples of drilling mud and 2-900cc samples of base oil.
	1220	Obtained copy of mud report.
	1245	TransOcean performed electrical and mechanical inspections on lab and generator.
	1400	Inspections complete; obtained power to mobile lab.
	1430	Began calibration of Chromatograph and establishing new baseline subtraction.
	1600	Began testing data acquisition equipment and transducers. Pressure tested system.
	2100	Transocean just pulled out of the hole with pipe.
	2230	Schlumberger begins first logging run with triple combo.
4/11/2010	0500	Schlumberger is out of the hole with triple combo.
	0700	Schlumberger begins the second logging run with CMR.
	1000	PENCOR personnel attend weekly fire/ abandon rig drill.
	1200	PENCOR personnel attended safety meeting.
	1245	Established new baseline on Gas Chromatograph.
	1250	Began liquid reference on Gas Chromatograph.
	1500	Began composition of mud filtrate.
	1530	Schlumberger is out of the hole with CMR.
	1630	Schlumberger begins the third logging run with OBMI.
	1830	Attended third party operational and safety meeting.
4/12/2010	0330	Schlumberger just pulled out of the hole with OBMI.
	0445	Schlumberger begins the forth logging run with MDT. Tool string consist of three 2 3/4 gallon chambers and three 6-packs.
	0655	Schlumberger is presently at the shoe with MDT.
	0800	Schlumberger begins taking downhole pressures.
	1100	PENCOR performs cylinder and system evacuations.
	1300	Began gas composition from gas reference.
	1430	Began evacuated blank on Gas Chromatograph column.
4/13/2010	0500	Reviewed and discussed PENCOR's job specific JSA. Emphasis was placed on electrical and pressure safety, and the awareness of evacuation routes.
	0600	MDT tools are at surface.
	0735	Obtained possession of the MRSC formation chambers.
	0750	PENCOR begins opening pressure procedures on the MRSC formation chambers.
	0820	Heated restoration of the MRSC formation chambers begin.
	1005	Obtained possession of the MPSR formation chambers.
	2020	Heated restoration of the MRSC formation chambers is complete.
	2025	Reviewed and discussed PENCOR's job specific JSA. Emphasis was placed on pressure safety, awareness of evacuation routes and everyone's job task; including the ability and the responsibility to "STOP" the job.
	2050	PENCOR begins pressurized transfers on MRSC -77 (18,124.0 ft. MD).
	2145	Lab analysis begins on the first sampling point (18,124.0 ft. MD).
	2300	Transfers completed on MRSC-77.

(continued on next page)

## On Site Sequence of Events

DATE	TIME	EVENT
4/14/2010	0015	PENCOR begins pressurized transfers on MRSC -150 (18,086.0 ft. MD).
	0100	Lab analysis begins on the second sampling point (18,086.0 ft. MD).
	0205	Transfers completed on MRSC-150.
	0320	PENCOR begins pressurized transfers on MRSC -147 (18,142.0 ft. MD).
	0410	Lab analysis begins on the final sampling point (18,142.0 ft. MD).
	0450	Transfers completed on MRSC-147.
	0615	PENCOR begins opening pressure procedures on the MPSR formation chambers.
	0845	MPSR's are packaged and stowed for shipment to PENCOR's Broussard Laboratory.
	0900	Chemically cleaning of the MRSC formation chambers begins.
	1140	Possession of the chemically cleaned MRSC's are returned to Schlumberger.
	1210	Lab analysis is complete.
	1245	PENCOR begins packaging equipment and mobile laboratory for transport.
	1300	Sent electronic copy of onsite analysis to Mr. Stuart Lacy.
	1305	Shipping paperwork is handed to the rig dispatcher, including MSDS's and multimodal.
	1330	Lab is tagged and ready for transport.

## Sample History and Information

PENCOR ID No.	Sample Depth (ft./MD)	Sample Source	Reservoir Condition (psig) (°F)	Sample Date	Sample Type	Opening Condition (psig / °F)	Restoration Condition (psig) (°F)	Restoration Time (Hours)	Transfer Date	Original Sample Volume (cc)
36126-01	N/A	Active Mud Pit	N/A	4/10/2010	Drilling Mud	N/A	N/A	N/A	N/A	3,500
36126-02	N/A	Active Mud Pit	N/A	4/10/2010	Drilling Mud	N/A	N/A	N/A	N/A	3,500
36126-03	N/A	Base Oil Tank	N/A	4/10/2010	Rhelet Base Oil	N/A	N/A	N/A	N/A	900
36126-04	N/A	Base Oil Tank	N/A	4/10/2010	Rhelet Base Oil	N/A	N/A	N/A	N/A	900
36126-05	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-06	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-07	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-08	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-09	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-10	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-11	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-12	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-13	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-14	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-15	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-16	18,124	MRSC-77	11,850	4/12/2010	Reservoir Fluid	6,440 / 68	14,000	170	4/13/2010	750
36126-17	18,124	MRSC-77	11,850	4/12/2010	Atmospheric Oil	6,440 / 68	14,000	170	4/13/2010	355
36126-18	18,124	MPSR-2471 (*)	11,850	4/12/2010	Unknown	6,255 / 68	N/A	N/A	N/A	N/A
36126-19	18,124	MPSR-4168 (*)	11,850	4/12/2010	Unknown	6,100 / 68	N/A	N/A	N/A	N/A
36126-20	18,124	MPSR-4096 (*)	11,850	4/12/2010	Unknown	6,500 / 66	N/A	N/A	N/A	N/A
36126-21	18,124	MPSR-1142 (*)	11,850	4/12/2010	Unknown	6,035 / 66	N/A	N/A	N/A	N/A
N/A	18,124	SPMC-477 (**)	11,850	4/12/2010	Unknown	N/A	N/A	N/A	N/A	N/A
N/A	18,124	SPMC-520 (**)	11,850	4/12/2010	Unknown	N/A	N/A	N/A	N/A	N/A

\*Samples unevaluated on site, shipped directly to the laboratory, volumes pending transfers.

\*\*SPMC chambers were collected and retained by Schlumberger, they are included in this report for information purposes.

## Sample History and Information

PENCOR ID No.	Sample Depth (Ft. MD)	Sample Source	Reservoir Condition (psia) (°F)	Sample Date	Sample Type	Opening Condition (psig / °F)	Restoration Condition (psia) (°F)	Restoration Time (Hours)	Transfer Date	Original Sample Volume (cc)
36126-22	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-23	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-24	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-25	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-26	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-27	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-28	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-29	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-30	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-31	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-32	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-33	18,086	MRSC-150	11,841 237	4/12/2010	Reservoir Fluid	6,490 / 68	14,000 170	12	4/14/2010	750
36126-34	18,086	MRSC-150	11,841 237	4/12/2010	Atmospheric Oil	6,490 / 68	14,000 170	12	4/14/2010	425
36126-35	18,086	MPSR-746 (*)	11,841 237	4/12/2010	Unknown	6,145 / 68	N/A	N/A	N/A	N/A
36126-36	18,086	MPSR-925 (*)	11,841 237	4/12/2010	Unknown	6,500 / 66	N/A	N/A	N/A	N/A
36126-37	18,086	MPSR-4069 (*)	11,841 237	4/12/2010	Unknown	8,410 / 66	N/A	N/A	N/A	N/A
36126-38	18,086	MPSR-501 (*)	11,841 237	4/12/2010	Unknown	5,045 / 66	N/A	N/A	N/A	N/A
N/A	18,086	SPMC-484 (**)	11,841 237	4/12/2010	Unknown	N/A	N/A	N/A	N/A	N/A
N/A	18,086	SPMC-552 (**)	11,841 237	4/12/2010	Unknown	N/A	N/A	N/A	N/A	N/A

\*\*Samples unevaluated on site, shipped directly to the laboratory, volumes pending transfers.

\*\*SPMC chambers were collected and retained by Schlumberger, they are included in this report for information purposes.

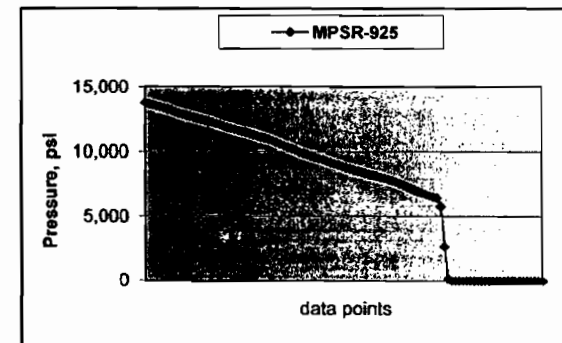
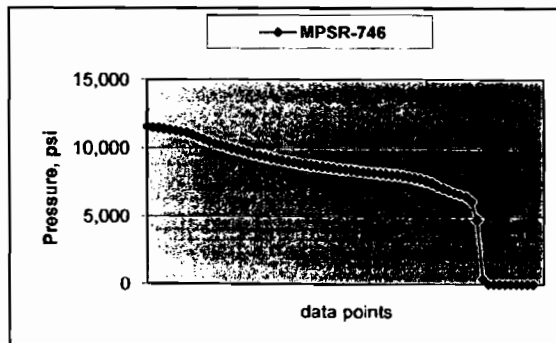
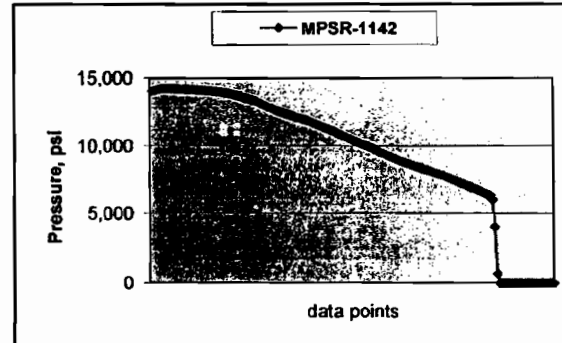
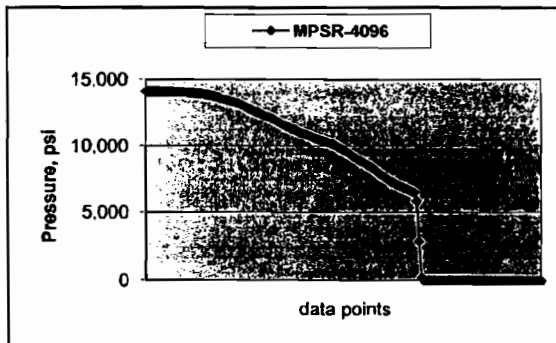
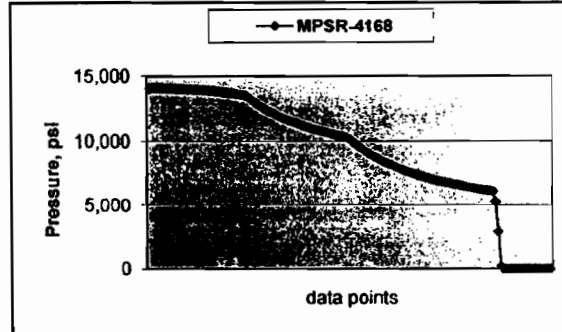
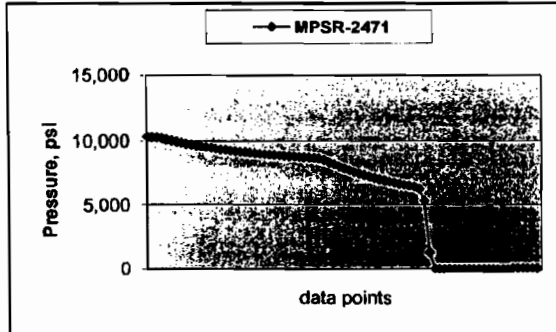
## MPSR Sampling Inventory

PENCOR ID No.	Sample Source	Sample Depth (FEMD)	Sample Date	Opening Pressure (psi)	Opening Temp (°F)	Reservoir Pressure (psi)	Reservoir Temp (°F)	Guard Pump Out Time (Minutes)	Guard Pump Out Volume (Gallons)	Sample Pump Out Time (Minutes)	Sample Pump Out Volume (Gallons)
36126-18	MPSR-2471	18,124	4/12/2010	6,255	66	11,850	236	157.8	19.8	157.7	5.8
36126-19	MPSR-4168	18,124	4/12/2010	6,100	66	11,850	236	168.1	25.2	168.0	6.2
36126-20	MPSR-4096	18,124	4/12/2010	6,500	66	11,850	236	178.9	26.9	176.8	6.4
36126-21	MPSR-1142	18,124	4/12/2010	6,035	66	11,850	236	186.3	28.6	186.2	6.7
36126-35	MPSR-746	18,086	4/12/2010	6,145	66	11,841	237	217.3	12.0	223.7	7.4
36126-36	MPSR-925	18,086	4/12/2010	6,500	66	11,841	237	233.3	24.0	240.1	7.4
36126-37	MPSR-4069	18,086	4/12/2010	6,410	66	11,841	237	260.3	25.0	267.5	12.3
36126-38	MPSR-601	18,086	4/12/2010	6,045	66	11,841	237	295.3	28.0	303.4	19.5
36126-52	MPSR-3810	18,142	4/12/2010	5,875	66	11,856	236	191.9	33.5	204.8	8.7
36126-53	MPSR-3547	18,142	4/12/2010	5,720	66	11,856	236	200.8	35.4	213.7	9.1
36126-54	MPSR-1268	18,142	4/12/2010	5,950	66	11,856	236	208.9	36.9	221.8	9.4
36126-55	MPSR-1181	18,142	4/12/2010	6,645	66	11,856	236	218.3	38.7	231.2	9.7
36126-56	MPSR-3980	18,142	4/12/2010	6,500	66	11,856	236	227.6	40.3	240.5	10.1
36126-57	MPSR-4065	18,142	4/12/2010	6,270	66	11,856	236	236.8	42.0	249.7	10.4

Pump out times and volumes as per Schlumberger field report.

## MDT Run No. 1 Opening Pressure Plots

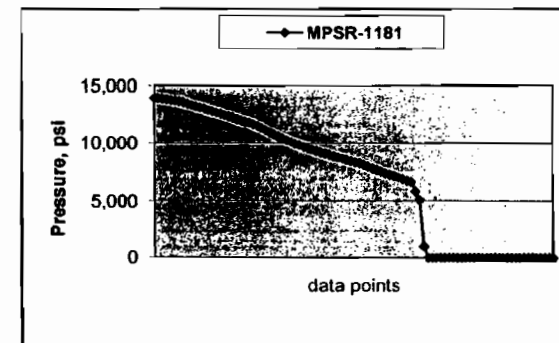
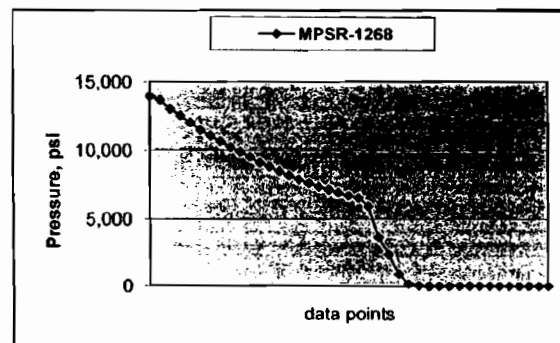
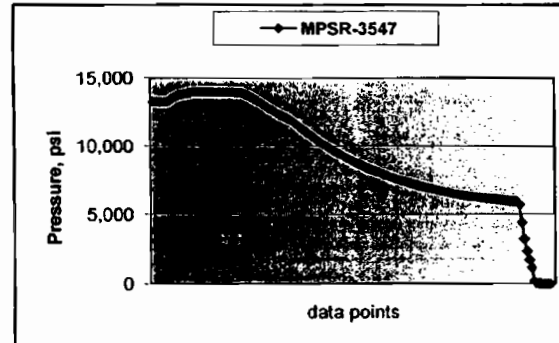
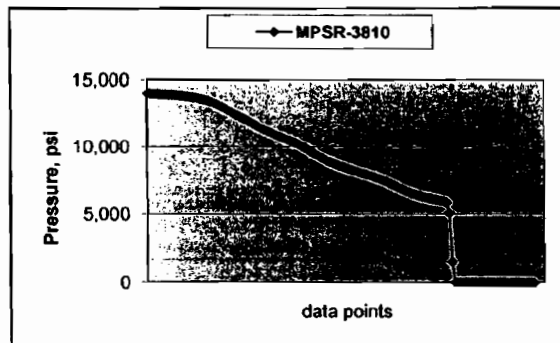
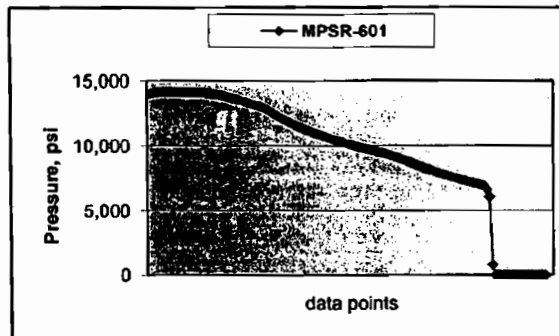
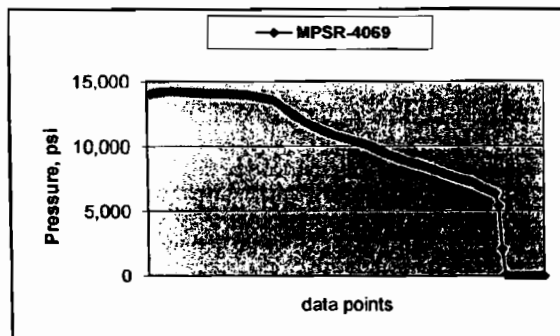
(All measured on site using "data acquisition" in the mobile laboratory)





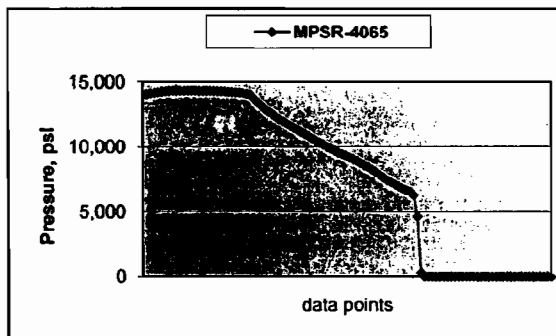
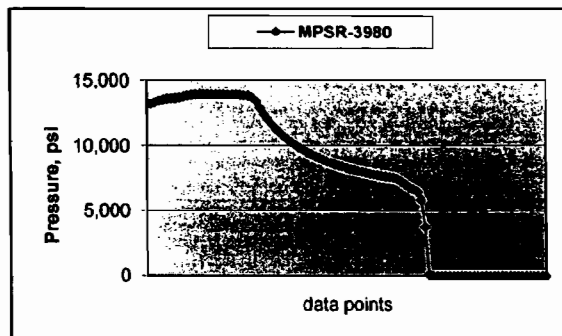
## MDT Run No. 1 Opening Pressure Plots

(All measured on site using "data acquisition" in the mobile laboratory)



## MDT Run No. 1 Opening Pressure Plots

(All measured on site using "data acquisition" in the mobile laboratory)



## MDT Sampling Inventory

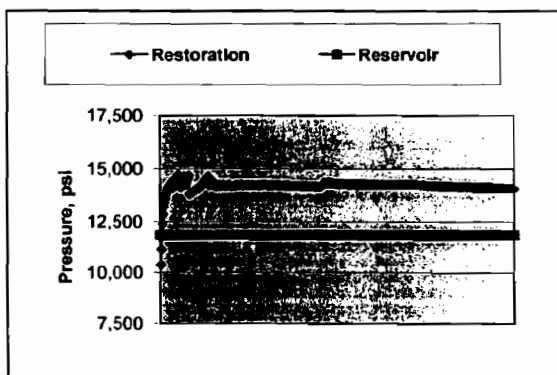
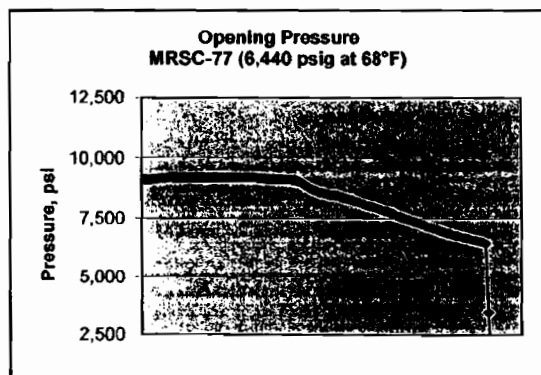
## MRSC-77

Sample: 1-1

Sample Depth:	18,124.0 Ft. MD	Sand Name:	M 56
Sampling Date:	4/12/2010	Pump Out Time:	139.1 Minutes
Formation Pressure:	11,850 psi	Pump Out Volume:	5.1 Gallons
Formation Temperature:	236.0° F	Opening Pressure:	6,440 psi
Restoration Time:	12 hours	Opening Temperature:	68° F

PENCOR ID. No.	Sample Type	Cylinder Number	Trans/Rest Pressure (psig)	Trans/Rest Temperature (°F)	Transfer Date	Transfer Time (hrs)	Initial Sample Volume (cc)
36126-05	Reservoir Fluid	25D595	14,000	170	4/13/2010	2050	750
36126-06	Reservoir Fluid	25D883	14,000	170	4/13/2010	2055	750
36126-07	Reservoir Fluid	25D1092	14,000	170	4/13/2010	2100	750
36126-08	Reservoir Fluid	25D601	14,000	170	4/13/2010	2105	750
36126-09	Reservoir Fluid	25D692	14,000	170	4/13/2010	2110	750
36126-10	Reservoir Fluid	25D839	14,000	170	4/13/2010	2115	750
36126-11	Reservoir Fluid	25D478	14,000	170	4/13/2010	2220	750
36126-12	Reservoir Fluid	25D583	14,000	170	4/13/2010	2225	750
36126-13	Reservoir Fluid	25D963	14,000	170	4/13/2010	2230	750
36126-14	Reservoir Fluid	25D899	14,000	170	4/13/2010	2240	750
36126-15	Reservoir Fluid	25D528	14,000	170	4/13/2010	2245	750
36126-16	Reservoir Fluid	25D1132	14,000	170	4/13/2010	2250	750
36126-17	Atmospheric Oil	N/A	14,000	170	4/13/2010	2255	355

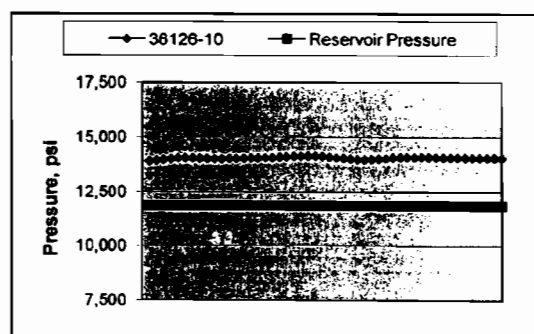
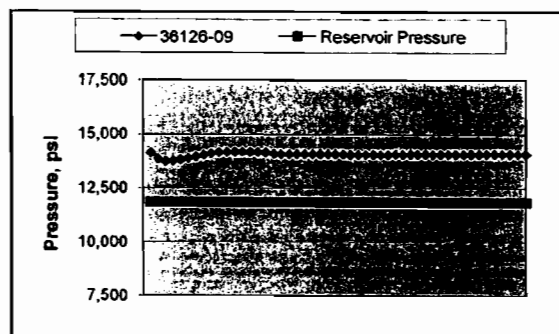
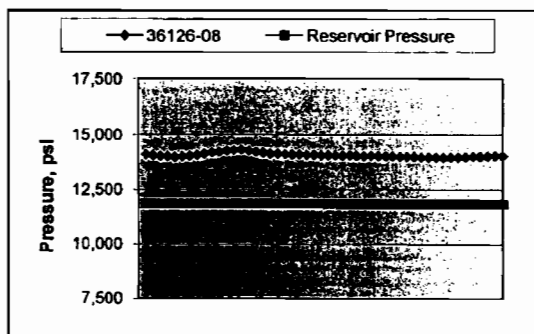
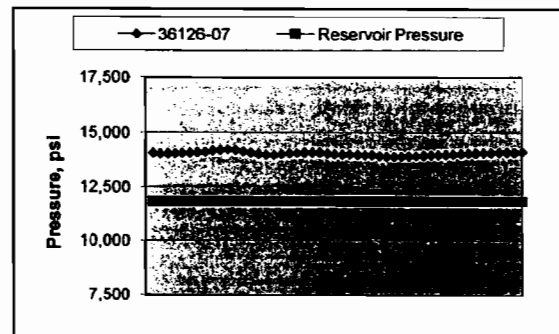
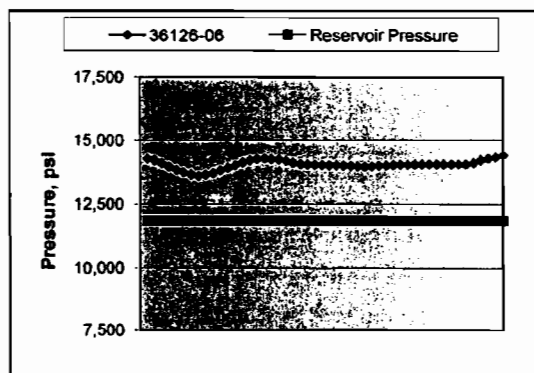
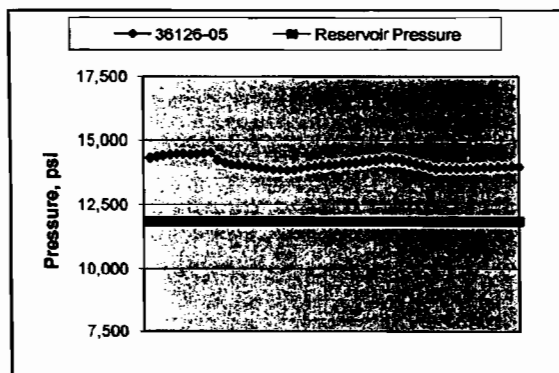
MDT sampling conditions, pump time, & pump out supplied by Schlumberger onsite representative.



## MDT Chamber Cylinder Transfers

## MRSC-77

(all measured on site using "data acquisition" in the mobile laboratory)



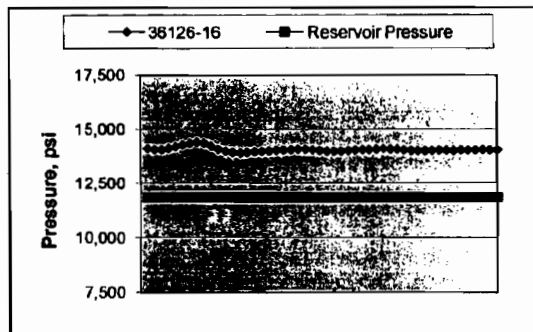
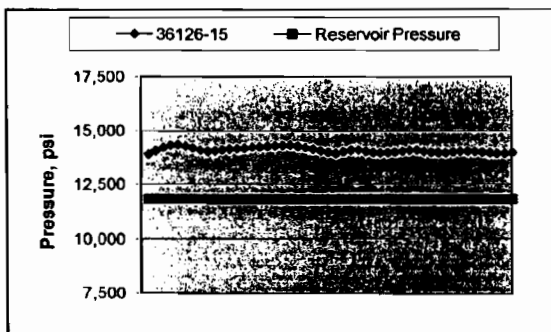
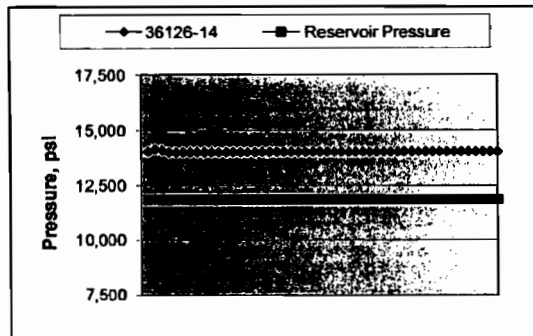
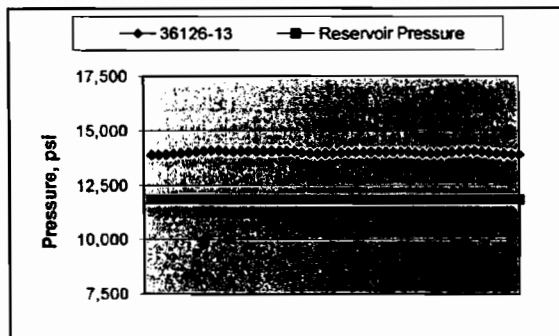
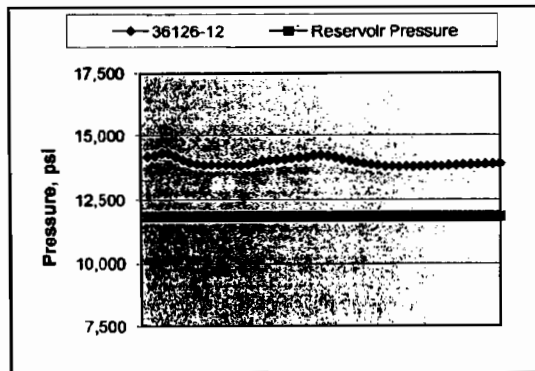
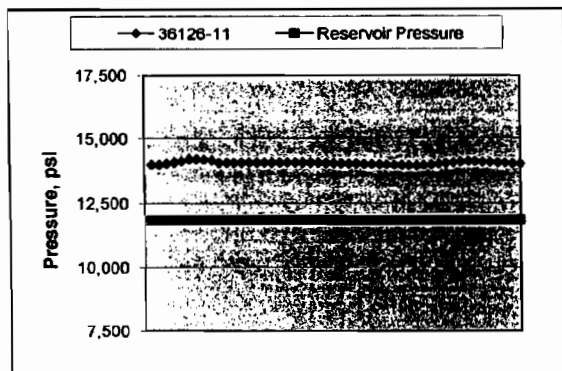
### Comments:

Transfers performed by: Jason Pellier - PENCOR (performed on site using Safe-Tran 30/25)  
Complete restoration and transfer logged by PENCOR's on site laboratory.

## MDT Chamber Cylinder Transfers

## MRSC-77

(all measured on site using "data acquisition" in the mobile laboratory)



### Comments:

Transfers performed by: Jason Peltier - PENCOR (performed on site using Safe-Tran 30/25).  
Complete restoration and transfer logged by PENCOR's on site laboratory.

### Reservoir Zero Flash

PENCOR ID No. 36126-10 Sample Depth 18,124.0 Ft. MD  
Reservoir Fluid Flashed from 14,000 psi @ 170° F to atmospheric pressure and 60°F

Sampling Conditions:	14,000 psi @ 170° F	
Gas-Liquid Ratio	2,909	ft <sup>3</sup> of Stock Tank Vapors / bbl Stock Tank Liquid
API Gravity of liquid	34.7	@ 60°F
Color of Stock Tank Liquid	Light Crude	
Gas-liquid ratio is cubic feet of gas at 15.025 psia and 60 °F per barrel of stock tank liquid at 60 °F.		

### Chromatograph Analysis of Flash Gas

Component	Molecular Percent	GPM @ 15.025 Psia	Weight Percent	Molecular Weight
Nitrogen	0.576	0.000	0.714	28.013
Carbon Dioxide	1.084	0.000	2.109	44.010
Hydrogen Sulfide	0.000	0.000	0.000	34.082
Methane	78.897	0.000	55.953	16.043
Ethane	7.529	2.050	10.008	30.070
Propane	5.177	1.455	10.092	44.097
Iso-Butane	1.041	0.347	2.676	58.123
N-Butane	2.265	0.729	5.821	58.123
Iso-Pentane	0.778	0.291	2.483	72.150
N-Pentane	0.862	0.319	2.751	72.150
Hexanes	0.725	0.308	2.763	86.177
Heptanes	0.661	0.262	2.652	90.746
Octanes	0.279	0.124	1.278	103.732
Nonanes	0.104	0.055	0.565	123.294
Decane Plus	0.022	0.014	0.135	139.413
Totals	100.000	5.952	100.000	

### Calculated Properties of Gas

Gas Specific Gravity	(Air = 1.00)	=	0.7837
Net Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1235.3 Real
Gross Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1359.3 Real
Gross Heat of Combustion - Sat.	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Wet=	1335.5 Water Sat.
Gas Compressibility	(@ 1 Atm. @ 60 °F)	Z =	0.9962

## Oil Based Mud Filtrate Contamination Evaluation

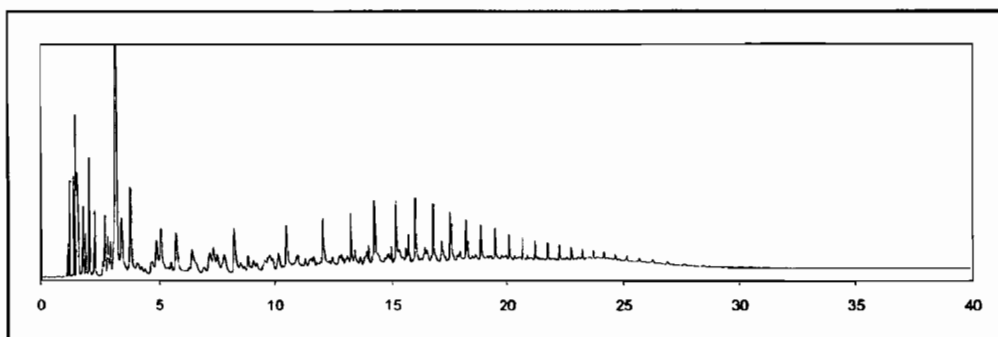
Oil-base mud filtrate contamination evaluation consists of using chromatograms for overlay comparison where a capillary column and temperature programming are utilized to see peaks on the order of C30 and higher. For this analysis, individual peaks and peak area counts were used to determine weight percent oil base drilling fluid contamination present in the stock tank liquid. A review of our findings is as follows:

Sample ID No.	36126-10
Sample Depth	18,124 MD ft.
Rheliant Contamination in S.T. Liquid	< 1.0 wt%
API Gravity of Contaminated STO	34.7
API Gravity of Uncontaminated STO	34.7
Color of Stock Tank Liquid	Light Crude

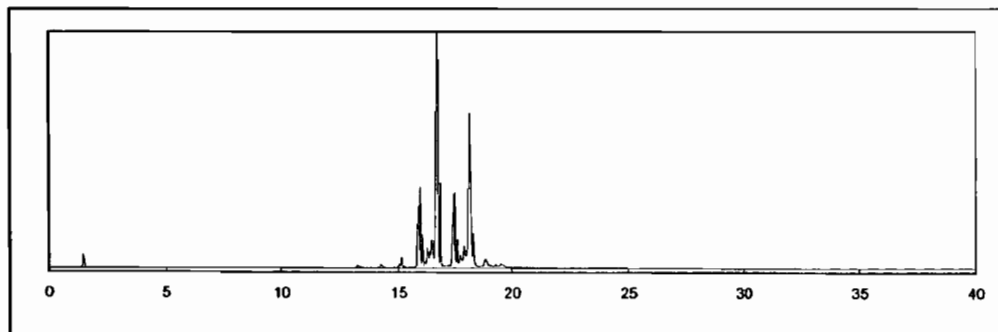
The sample chromatogram exhibits a broad range of hydrocarbons typical of naturally occurring reservoir fluids. An overlay comparison of this chromatogram with the Rheliant chromatogram shows some amount of oil base contamination. An estimation of the contamination in the subject sample was based on a plot of the peak area counts versus those of the Rheliant mud filtrate sample. The peak area counts of the estimated uncontaminated sample are subtracted from the contaminated sample peak area counts and weight percent contamination is calculated. Utilizing the reservoir fluid zero flash results, an estimate of weight percent Rheliant contamination in the reservoir fluid sample is calculated.

Rheliant Contamination in Res. Fluid	< 1.0 wt%
Measured GOR (SCF/bbl)	2,909
Corrected GOR (SCF/bbl)	2,920

### Stock Tank Oil Chromatogram (ID No. 36126-10)



### Chromatogram of Rheliant used as a reference (ID No. 36126-01)



## MDT Sampling Inventory

## MRSC-150

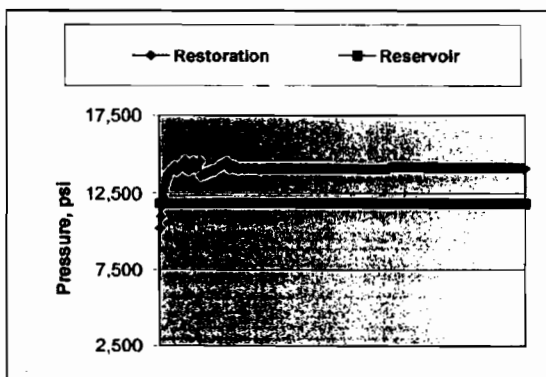
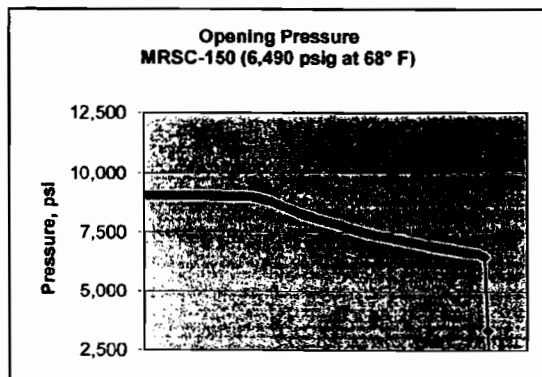
Sample: 1-2

Sample Depth: 18,086.0 Ft. MD  
Sampling Date: 4/12/2010  
Formation Pressure: 11,841 psi  
Formation Temperature: 236.7 °F  
Restoration Time: 12 hours

Sand Name: M 56  
Pump Out Time: 153.9 Minutes  
Pump Out Volume: 4.7 Gallons  
Opening Pressure: 6,490 psi  
Opening Temperature: 68° F

PENCOR ID. No.	Sample Type	Cylinder Number	Trans/Rest Pressure (psig)	Trans/Rest Temperature (°F)	Transfer Date	Transfer Time (hrs)	Initial Sample Volume (cc)
36126-22	Reservoir Fluid	25D035	14,000	170	04/14/2010	0015	750
36126-23	Reservoir Fluid	25D547	14,000	170	04/14/2010	0020	750
36126-24	Reservoir Fluid	25D656	14,000	170	04/14/2010	0025	750
36126-25	Reservoir Fluid	25D678	14,000	170	04/14/2010	0030	750
36126-26	Reservoir Fluid	25D798	14,000	170	04/14/2010	0035	750
36126-27	Reservoir Fluid	25D666	14,000	170	04/14/2010	0040	750
36126-28	Reservoir Fluid	25D1185	14,000	170	04/14/2010	0135	750
36126-29	Reservoir Fluid	25D717	14,000	170	04/14/2010	0140	750
36126-30	Reservoir Fluid	25D881	14,000	170	04/14/2010	0145	750
36126-31	Reservoir Fluid	25D589	14,000	170	04/14/2010	0155	750
36126-32	Reservoir Fluid	25D1085	14,000	170	04/14/2010	0200	750
36126-33	Reservoir Fluid	25D913	14,000	170	04/14/2010	0205	750
36126-34	Atmospheric Oil	N/A	14,000	170	04/14/2010	0210	425

MDT sampling conditions, pump time, & pump out supplied by Schlumberger onsite representative.

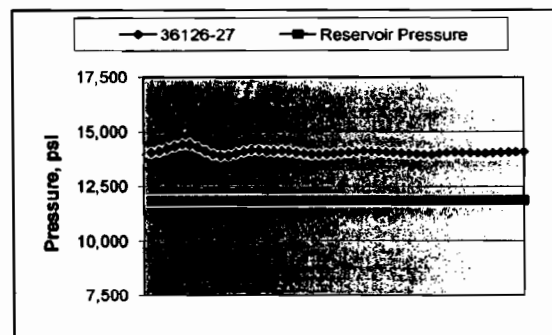
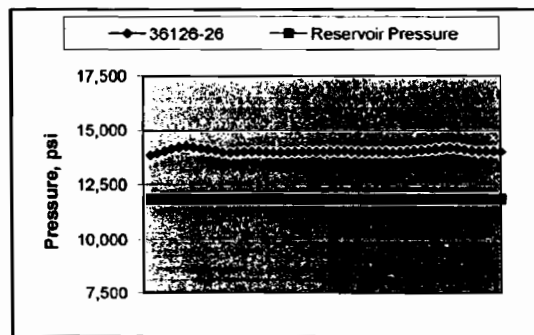
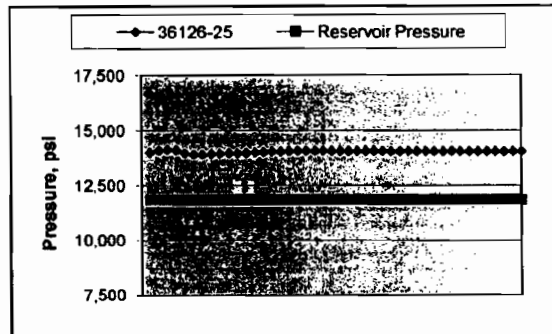
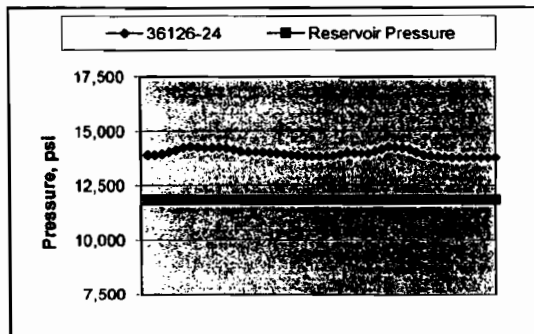
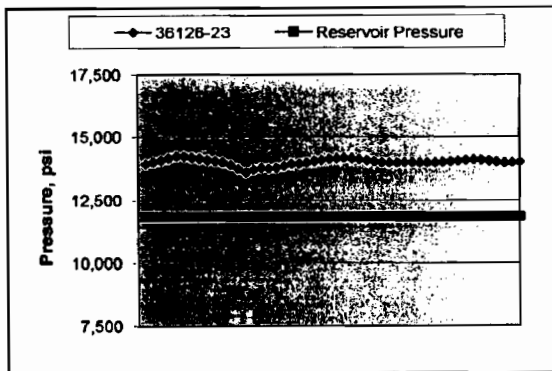
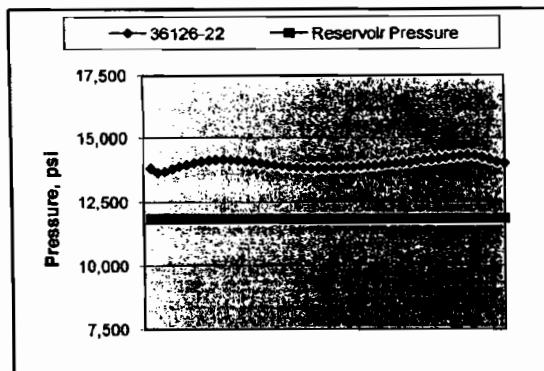




## MDT Chamber Cylinder Transfers

## MRSC-150

(all measured on site using "data acquisition" in the mobile laboratory)



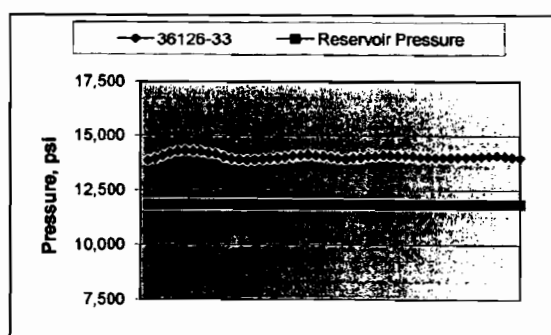
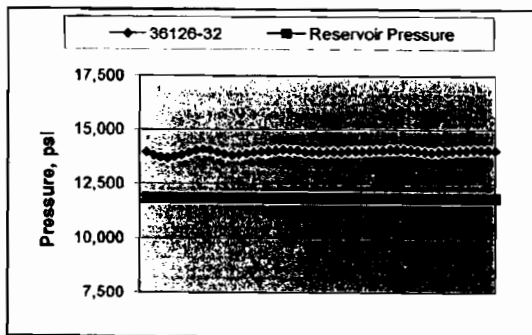
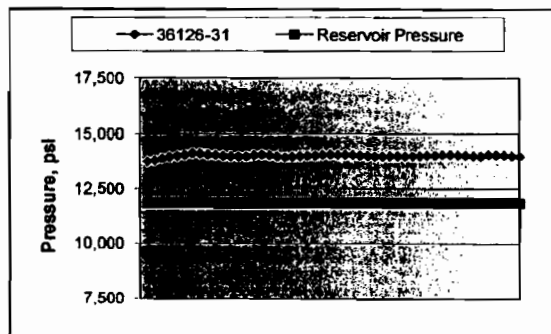
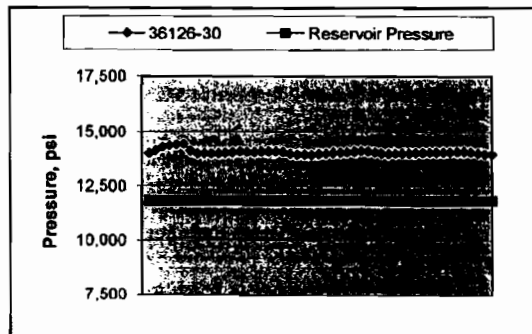
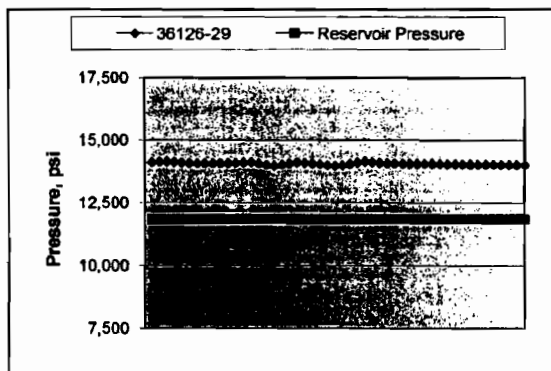
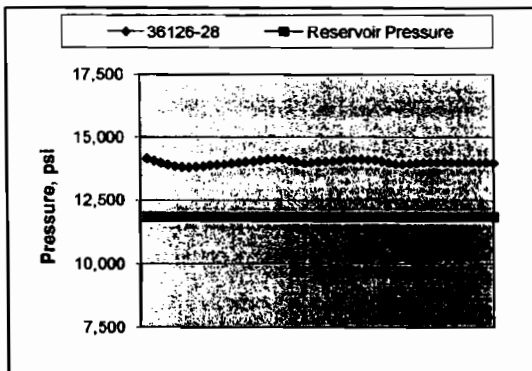
### Comments:

Transfers performed by: Jason Peltier- PENCOR (performed on site using Safe-Tran 30/25).  
Complete restoration and transfer logged by PENCOR's on site laboratory.

## MDT Chamber Cylinder Transfers

## MRSC-150

(all measured on site using "data acquisition" in the mobile laboratory)



### Comments:

Transfers performed by: Jason Peltier- PENCOR (performed on site using Safe-Tran 30/25;  
Complete restoration and transfer logged by PENCOR's on site laboratory.

### Reservoir Zero Flash

PENCOR ID No. 36126-27 Sample Depth 18,086.0 Ft. MD

Reservoir Fluid Flashed from 14,000 psi @ 170° F to atmospheric pressure and 60°F

Sampling Conditions:	14,000 psi @ 170° F	
Gas-Liquid Ratio:	2,977	ft³ of Stock Tank Vapors / bbl Stock Tank Liquid
API Gravity of Liquid:	35.0	@ 60°F
Color of Stock Tank Liquid:	Crude	
Gas-liquid ratio is cubic feet of gas at 15.025 psia and 60 °F per barrel of stock tank liquid at 60 °F.		

### Chromatograph Analysis of Flash Gas

Component	Molecular Percent	GPM @ 15.025 Psia	Weight Percent	Molecular Weight
Nitrogen	0.755	0.000	1.044	28.013
Carbon Dioxide	0.000	0.000	0.000	44.010
Hydrogen Sulfide	0.000	0.000	0.000	34.082
Methane	82.458	0.000	65.262	16.043
Ethane	8.436	2.297	12.514	30.070
Propane	5.628	1.582	12.243	44.097
Iso-Butane	1.608	0.537	4.612	58.123
N-Butane	0.206	0.066	0.591	58.123
Iso-Pentane	0.000	0.000	0.000	72.150
N-Pentane	0.491	0.182	1.749	72.150
Hexanes	0.212	0.089	0.900	86.177
Heptanes	0.129	0.061	0.642	101.237
Octanes	0.064	0.033	0.359	113.873
Nonanes	0.011	0.006	0.068	126.937
Decane Plus	0.002	0.002	0.016	135.960
Totals	100.000	4.855	100.000	

### Calculated Properties of Gas

Gas Specific Gravity	(Air = 1.00)	=	0.7019
Net Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1138.4 Real
Gross Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1256.1 Real
Gross Heat of Combustion - Sat.	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Wet=	1234.1 Water Sat.
Gas Compressibility	(@ 1 Atm. @ 60 °F)	Z =	0.9967

### Oil Based Mud Filtrate Contamination Evaluation

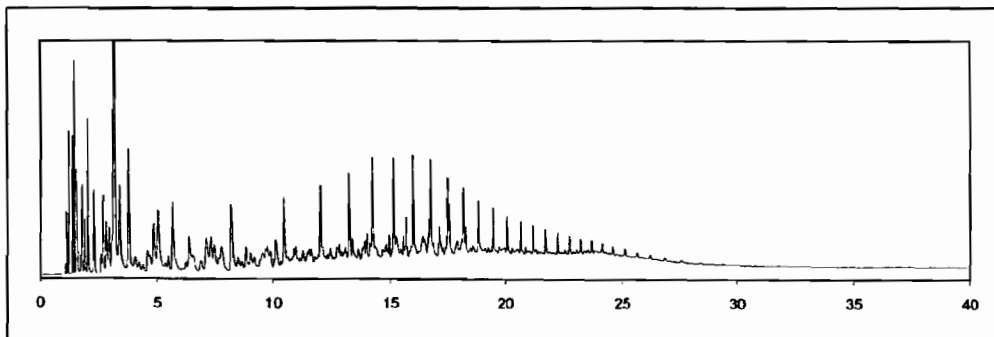
Oil-base mud filtrate contamination evaluation consists of using chromatograms for overlay comparison where a capillary column and temperature programming are utilized to see peaks on the order of C30 and higher. For this analysis, individual peaks and peak area counts were used to determine weight percent oil base drilling fluid contamination present in the stock tank liquid. A review of our findings is as follows:

Sample ID No.	36126-27
Sample Depth	18,086 MC ft.
Rheliant Contamination in S.T. Liquid	1.2 wt%
API Gravity of Contaminated STO	35.0
API Gravity of Uncontaminated STO	34.9
Color of Stock Tank Liquid	Light Crude

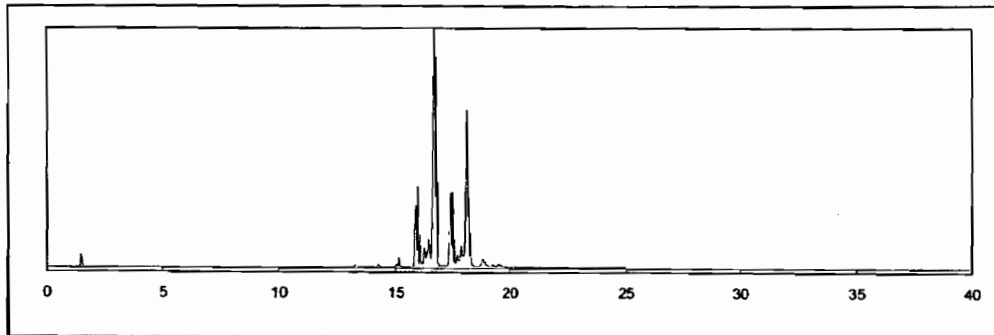
The sample chromatogram exhibits a broad range of hydrocarbons typical of naturally occurring reservoir fluids. An overlay comparison of this chromatogram with the Rheliant chromatogram shows some amount of oil base contamination. An estimation of the contamination in the subject sample was based on a plot of the peak area counts versus those of the Rheliant mud filtrate sample. The peak area counts of the estimated uncontaminated sample are subtracted from the contaminated sample peak area counts and weight percent contamination is calculated. Utilizing the reservoir fluid zero flash results, an estimate of weight percent Rheliant contamination in the reservoir fluid sample is calculated.

Rheliant Contamination in Res. Fluid	< 1.0 wt%
Measured GOR (SCF/bbl)	2,977
Corrected GOR (SCF/bbl)	3,017

Stock Tank Oil Chromatogram (ID No. 36126-27)



Chromatogram of Rheliant used as a reference (ID No. 36126-01)



## MDT Sampling Inventory

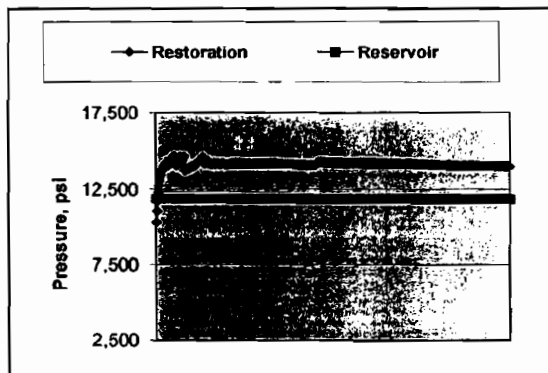
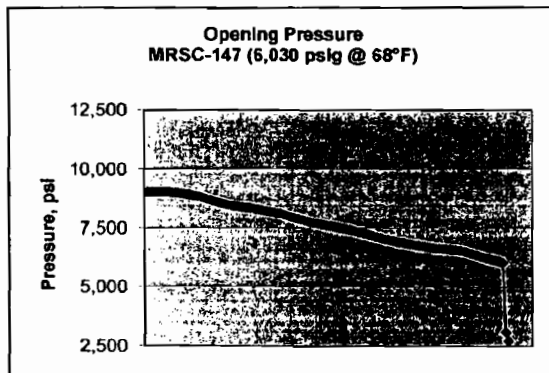
## MRSC-147

Sample: 1-3

Sample Depth:	18,142.0 Ft. MD	Sand Name:	M 56
Sampling Date:	4/12/2010	Pump Out Time:	196.9 Minutes
Formation Pressure:	11,855.8 psi	Pump Out Volume:	8.4 Gallons
Formation Temperature:	236.0 °F	Opening Pressure:	6,030 psi
Restoration Time:	12 hours	Opening Temperature:	68° F

PENCOR ID. No.	Sample Type	Cylinder Number	Trans/Rest Pressure (psig)	Trans/Rest Temperature (°F)	Transfer Date	Transfer Time (hrs)	Initial Sample Volume (cc)
36126-39	Reservoir Fluid	25D1111	14,000	170	04/14/2010	0320	750
36126-40	Reservoir Fluid	25D954	14,000	170	04/14/2010	0325	750
36126-41	Reservoir Fluid	25D948	14,000	170	04/14/2010	0335	750
36126-42	Reservoir Fluid	25D923	14,000	170	04/14/2010	0340	750
36126-43	Reservoir Fluid	25D1115	14,000	170	04/14/2010	0345	750
36126-44	Reservoir Fluid	25D1108	14,000	170	04/14/2010	0355	750
36126-45	Reservoir Fluid	25D152	14,000	170	04/14/2010	0420	750
36126-46	Reservoir Fluid	25D1154	14,000	170	04/14/2010	0425	750
36126-47	Reservoir Fluid	25D778	14,000	170	04/14/2010	0430	750
36126-48	Reservoir Fluid	25D759	14,000	170	04/14/2010	0435	750
36126-49	Reservoir Fluid	25D765	14,000	170	04/14/2010	0440	750
36126-50	Reservoir Fluid	25D459	14,000	170	04/14/2010	0445	750
36126-51	Atmospheric Oil	N/A	14,000	170	04/14/2010	N/A	425

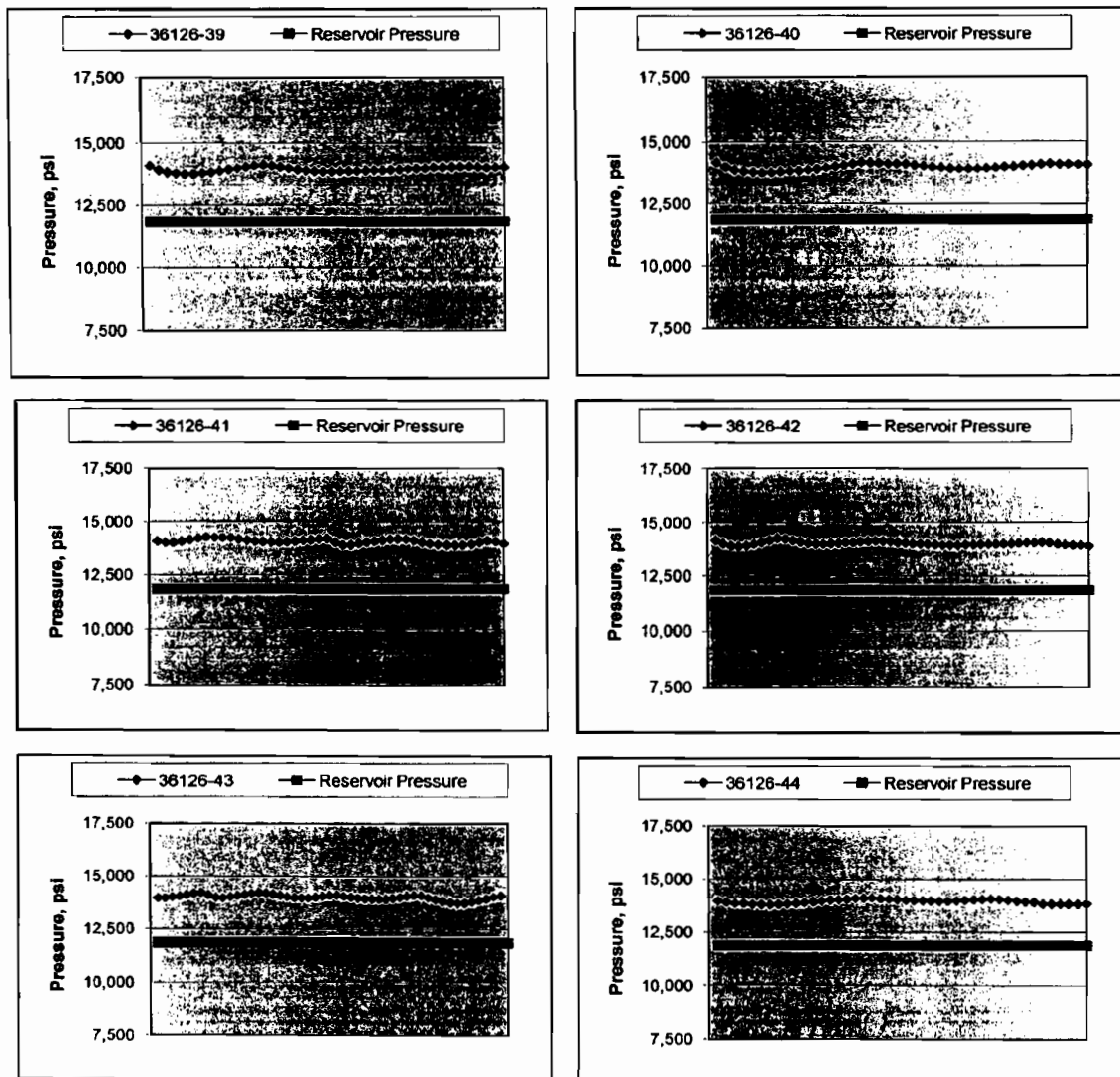
MDT sampling conditions, pump time, & pump out supplied by Schlumberger onsite representative.



## MDT Chamber Cylinder Transfers

## MRSC-147

(all measured on site using "data acquisition" in the mobile laboratory)



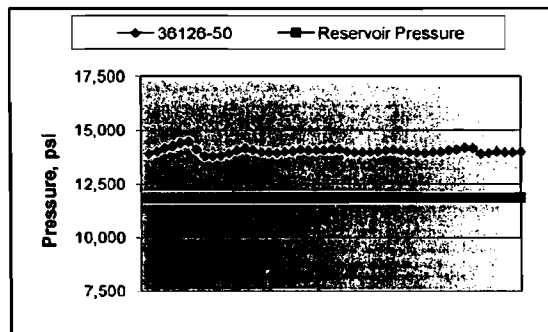
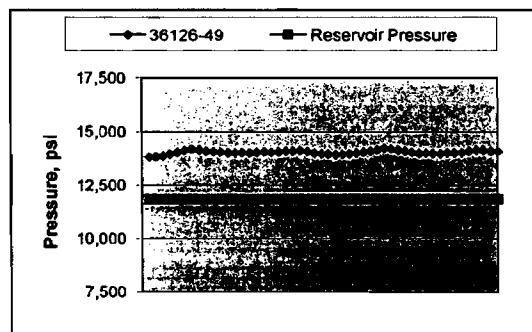
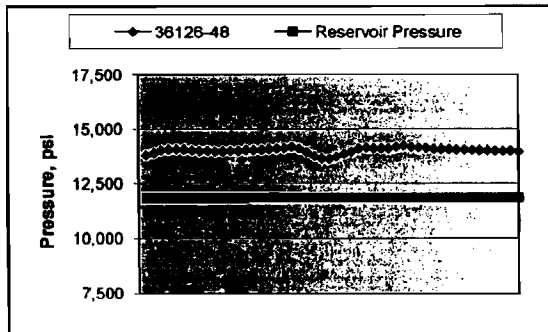
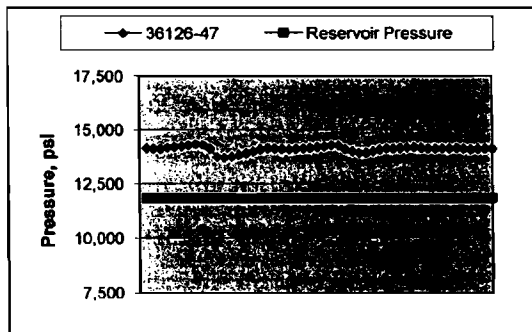
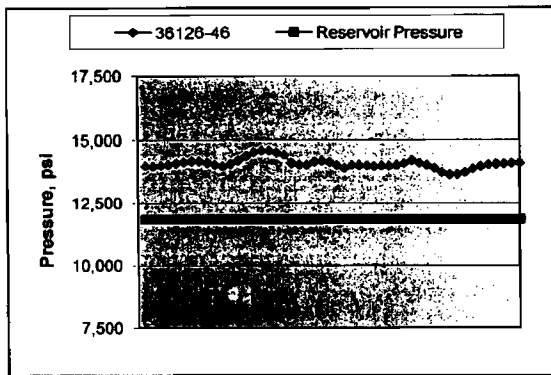
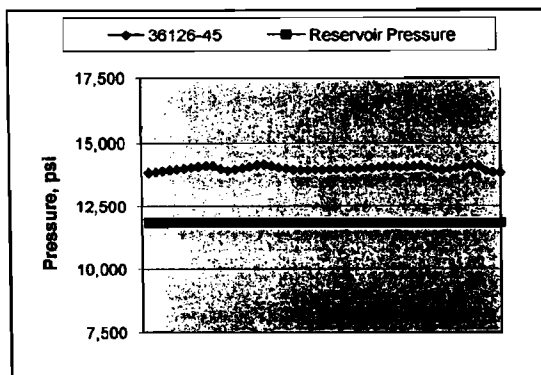
### Comments:

Transfers performed by: Jason Peltier - PENCOR (performed on site using Safe-Tran 30/25)  
Complete restoration and transfer logged by PENCOR's on site laboratory.

## MDT Chamber Cylinder Transfers

## MRSC-147

(all measured on site using "data acquisition" in the mobile laboratory)



### Comments:

Transfers performed by: Jason Peltier - PENCOR (performed on site using Safe-Tran 30/25  
Complete restoration and transfer logged by PENCOR's on site laboratory.

### Reservoir Zero Flash

PENCOR ID No. 36126-44 Sample Depth 18,142.0 Ft. MD  
Reservoir Fluid Flashed from 14,000 psi @ 170° F to atmospheric pressure and 60°F

Sampling Conditions:	14,000 psi @ 170° F	
Gas-Liquid Ratio	2,840	ft <sup>3</sup> of Stock Tank Vapors / bbl Stock Tank Liquid
API Gravity of Liquid	35.0	@ 60°F
Color of Stock Tank Liquid:	Light Crude	
Gas-liquid ratio is cubic feet of gas at 15,025 psia and 60 °F per barrel of stock tank liquid at 60 °F.		

### Chromatograph Analysis of Flash Gas

Component	Molecular Percent	GPM @ 15.025 Psia	Weight Percent	Molecular Weight
Nitrogen	0.576	0.000	0.714	28.013
Carbon Dioxide	1.084	0.000	2.109	44.010
Hydrogen Sulfide	0.000	0.000	0.000	34.082
Methane	78.897	0.000	55.953	16.043
Ethane	7.529	2.050	10.008	30.070
Propane	5.177	1.455	10.092	44.097
Iso-Butane	1.041	0.347	2.676	58.123
N-Butane	2.265	0.729	5.821	58.123
Iso-Pentane	0.778	0.291	2.483	72.150
N-Pentane	0.862	0.319	2.751	72.150
Hexanes	0.725	0.306	2.783	86.177
Heptanes	0.681	0.262	2.652	90.746
Octanes	0.279	0.124	1.278	103.732
Nonanes	0.104	0.055	0.565	123.294
Decane Plus	0.022	0.014	0.135	139.413
Totals	100.000	5.952	100.000	

### Calculated Properties of Gas

Gas Specific Gravity	(Air = 1.00)	=	0.7837
Net Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1235.3 Real
Gross Heat of Combustion	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Dry=	1359.3 Real
Gross Heat of Combustion - Sat.	(Btu/Cu.Ft. @ 15.025 Psia @ 60 °F)	Wet=	1335.5 Water Sat.
Gas Compressibility	(@ 1 Atm. @ 60 °F)	Z =	0.9962



## Oil Based Mud Filtrate Contamination Evaluation

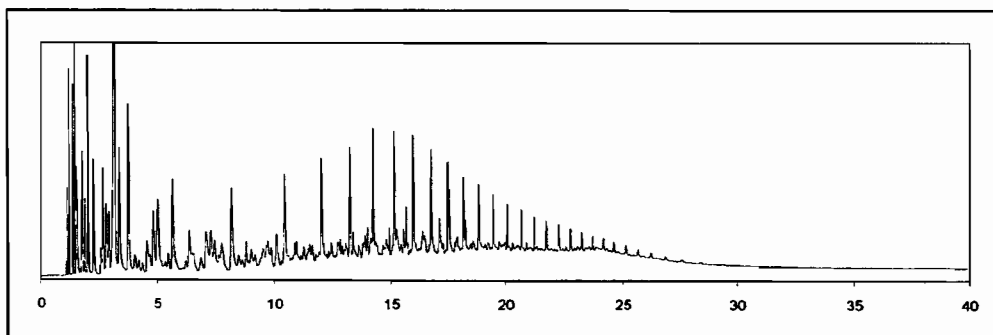
Oil-base mud filtrate contamination evaluation consists of using chromatograms for overlay comparison where a capillary column and temperature programming are utilized to see peaks on the order of C30 and higher. For this analysis, individual peaks and peak area counts were used to determine weight percent oil base drilling fluid contamination present in the stock tank liquid. A review of our findings is as follows:

Sample ID No.	36126-44
Sample Depth	18,142 MD ft.
Rheliant Contamination in S.T. Liquid	< 1.0 wt%
API Gravity of Contaminated STO	35.0
API Gravity of Uncontaminated STO	35.0
Color of Stock Tank Liquid	Light Crude

The sample chromatogram exhibits a broad range of hydrocarbons typical of naturally occurring reservoir fluids. An overlay comparison of this chromatogram with the Rheliant chromatogram shows some amount of oil base contamination. An estimation of the contamination in the subject sample was based on a plot of the peak area counts versus those of the Rheliant mud filtrate sample. The peak area counts of the estimated uncontaminated sample are subtracted from the contaminated sample peak area counts and weight percent contamination is calculated. Utilizing the reservoir fluid zero flash results, an estimate of weight percent Rheliant contamination in the reservoir fluid sample is calculated.

Rheliant Contamination in Res. Fluid	< 1.0 wt%
Measured GOR (SCF/bbl)	2,840
Corrected GOR (SCF/bbl)	2,845

Stock Tank Oil Chromatogram (ID No. 36126-44)



Chromatogram of Rheliant used as a reference (ID No. 36126-01)

