



Well History

Freedom Ranch Unit FRU 197-33B6
API: 051031142400
Rio Blanco County, Colorado

EPOCH Well Services, Inc.
New Iberia, Louisiana

ExxonMobil
Development

CANRIG

Well History

Exxon Mobil Production Company

**Freedom Ranch Unit FRU 197-33B6
Rio Blanco County, Colorado**



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General Overview and Geology Exxon Mobil Production Company

**Freedom Ranch Unit FRU 197-33B6
Rio Blanco County, Colorado**



Introduction

Epoch Well Services (Epoch) of New Iberia, LA has been providing mud logging and contract geology services to the Exxon Mobil Drilling Group (Exxon Mobil) in the Piceance Basin of northwestern Colorado since late 2002. As part of these services, Epoch was requested to provide mud logging and geologic services for the Freedom Ranch Unit FRU 197-33B6 production well. The well was drilled as the fifth hole in a series of directional wells for production on the Piceance Creek Unit pad. The well is located in the Piceance Basin at the following coordinates:

- Latitude 39.921441000" N
- Longitude 108.282516000" W

The well was spudded on March 30, 2010. Drilling operations were conducted from spud through to a total depth of 12,775' (MD) on July 17, 2010. Drilling operations were conducted by Helmerich & Payne using a Flex 4 rig (#321). Canrig personnel logged and collected samples starting at 4,055' through to 12,775' MD. Drilling fluid engineering services were provided by Baroid Fluid Services. The well was drilled with conventional water-based mud (Low Solids Non-Dispersed) from surface through TD.

The well was cased and cemented according to the following:

- 15.5-inch casing from surface to 149 feet;
- 10.75-inch casing at 4,045 feet;
- 4.5-inch casing at 12,760 feet.

Epoch provided the following services for this drilling operation:

- General mud logging and geologic services including sample collection and description, and preparation of a lithologic log;
- Determination of total gas recovered using a QGM™ gas trap and quantified using a proprietary Epoch Total Hydrocarbon Analyzer equipped with a Flame Ionization Detector;
- Determination of gas chromatography using a proprietary Epoch Gas Chromatography unit also equipped with a Flame Ionization Detector which quantified the hydrocarbon species of methane, ethane, propane, iso- and normal butane, and iso- and normal pentane;
- CO₂ determination;
- Interaction with Exxon Mobil on-site and Houston-based personnel to determine formation tops and provide support as required through drilling.

General Geology

The Piceance Creek Basin is a discrete basin of sediments formed as a result of uplift associated with late-Cretaceous to Tertiary Laramide orogenic activity. The Piceance Creek Basin encompasses late Cretaceous and Tertiary continental rocks that are assigned to a variety of stratigraphic units. These units form a complex system characterized by early deposition of primarily marine and marginal-marine sediments associated with transgression-regression of a large inland sea followed by intricate inter-fingering of fluvial, marginal lacustrine and lacustrine environments. The stratigraphic nomenclature used for the FRU 197-33B6 well incorporates terminology as developed by Exxon Mobil and provided to Epoch.

Geologically, Epoch encountered 4 separate formations ranging in age from Eocene to Cretaceous. These formations, in order of their occurrence from surface, along with their assigned age periods are listed as follows:

- Wasatch Formation – Eocene;
- Ohio Creek Formation - Paleocene
- Williams Fork Formation – Cretaceous;
- Iles Formation – Cretaceous.

The Williams Fork and Iles Formations are assigned to the Mesa Verde Group.

The Wasatch, Williams Fork, and Iles Formations can be broken down into constituent members as follows:

- Wasatch A, B, C, D, F, G, and I Members;
- Williams Fork 850, 800, 700, 600, 500, 400, 300, 200 and Cameo Members;
- Rollins, Cozzette, and Corcoran Members of the Iles Formation.

According to Exxon Mobil nomenclature, below the Wasatch Formation the various formations and members are combined into 6 separate stratigraphic groups for classification of general reservoir type. The groupings are described as follows:

- Williams Fork 800 Member to Ohio Creek – Proximal Braided Reservoirs
- Williams Fork 200 to Williams Fork 700 Members – Distal Braided Reservoirs;
- Cameo Member – Meandering Stream Reservoirs;
- Rollins Member – Marine Reservoirs;
- Corcoran Coastal Plain and Cozzette Members – Meandering Stream Reservoirs;
- Corcoran Marine and Sego Members – Marine Reservoirs.

Exxon Mobil has further defined the stratigraphic sequence within the Piceance Basin according to sequence type classification. The relevant classifications are described as follows:

- AS – Abandonment Surface
- SB – Sequence Boundary
- FS – Flooding Surface
- MFS – Maximum Flooding Surface

In accordance with this classification scheme, the sequence tops and correlated stratigraphic name are presented in the table on the following page. All formation and member tops were identified from the mud log and are presented in measured depth (MD). It will be noted that some of the stratigraphic units as identified by Exxon Mobil are not included in this table. Those units omitted from this presentation occur within formations or members and, for reasons of simplicity, were not included.

FRU 197-33B6 Formation Tops

Formation/Member Name	Stratigraphic Unit Top	Depth (MD/TVD)
Wasatch Formation		
Wasatch "G"		5,558' / 5,328'
Wasatch "I"		5,857' / 5,627'
Ohio Creek Formation		
	950 Abandonment Surface (AS)	7,355' / 7,125'
Williams Fork Formation		
WF 850	900 Sequence Boundary (SB)	7,652' / 7,422'
WF 800	850 Abandonment Surface (AS)	7,860' / 7,630'
WF 700	800 Sequence Boundary (SB)	8,143' / 7,913'
WF 600	690 Abandonment Surface (AS)	8,314' / 8,084'
WF 500	600 Sequence Boundary (SB)	8,534' / 8,304'
WF 400	490 Abandonment Surface (AS)	9,053' / 8,823'
WF 300	400 Sequence Boundary (SB)	9,762' / 9,532'
WF 200	290 Abandonment Surface (AS)	10,811' / 10,581'
Cameo	210 Sequence Boundary (SB)	11,105' / 10,875'
Iles Formation		
Rollins Member	200 Sequence Boundary (SB)	11,399' / 11,169'
Trans Cozzette		11,617' / 11,387'
Cozzette Member	180 Flooding Surface (FS)	11,655' / 11,425'
Corcoran Coastal Plain	140 Flooding Surface (FS)	11,933' / 11,703'
Corcoran Marine	140 Sequence Boundary (SB)	12,560' / 12,330'

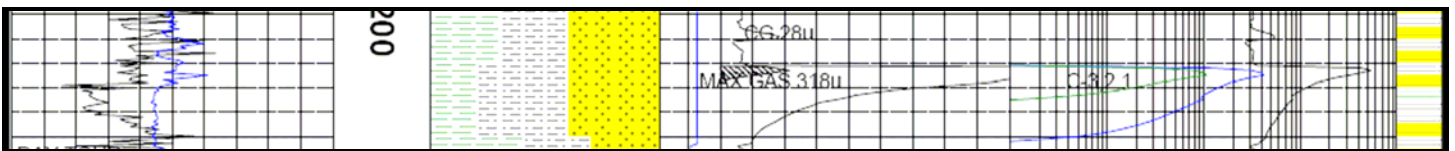
Upper Wasatch Formation

The Upper Wasatch Formation was encountered from the point of drilling out from surface casing (4,055' MD). Overall, the Upper Wasatch Formation consists of variably colored shale, sandstone, siltstone, and carbonates. Relevant data concerning drilling of the Upper Wasatch are presented as follows:

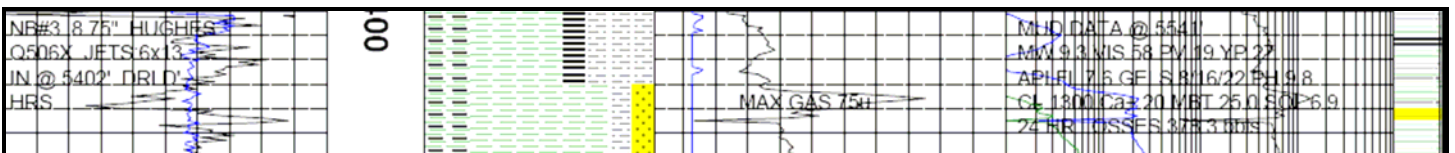
Upper Wasatch Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	312.175	1875.408	317.695
Minimum	7.738	0.000	0.000
Mean	91.228	281.743	20.862
Standard Deviation	35.193	114.953	16.785

The first significant gas show in the Upper Wasatch appeared at the base of the formation at 5,223' in association with a thin sandstone bed. This gas show produced a maximum gas of 318 units.



Next significant gas show occurred at 5,436' with a peak gas of 75 units. It is associated with a thin carbonaceous shale bed at the top of a thin sandstone layer.



Chromatography through the Upper Wasatch only showed C-1 throughout the drilled interval with C-2 and C-3 being observed during the high gas shows throughout the interval.

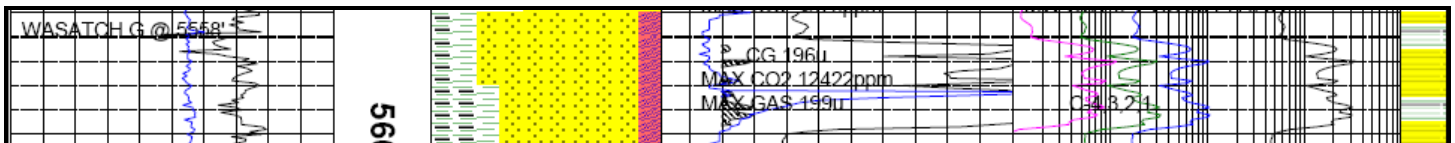
Lower Wasatch Formation

The lower Wasatch Formation is assigned from the occurrence of the top of the Wasatch "G" (5,558' MD / 5,328' TVD) through to the top of the Ohio Creek Formation (7,355' MD / 7,125' TVD). The Wasatch "G" consists of moderately to strongly kaolinitic sandstone which displays variable physical characteristics of hardness and overall appearance in accordance with the relative amount of kaolinite present. Kaolinite in this unit typically occurs as a matrix material; observed occurrences of kaolinite as a replacement of discrete clasts are rare. Lithologies in the lower Wasatch generally consist of interbedded shale, siltstone, sandstone, and less commonly, clay-stone.

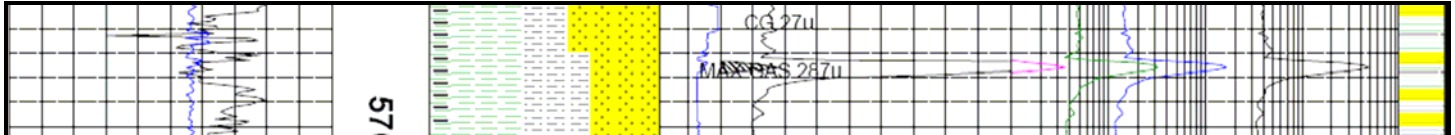
Lower Wasatch Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	261.514	17094.777	1473.879
Minimum	17.203	0.000	0.000
Mean	75.890	703.787	65.346
Standard Deviation	26.577	895.623	102.444

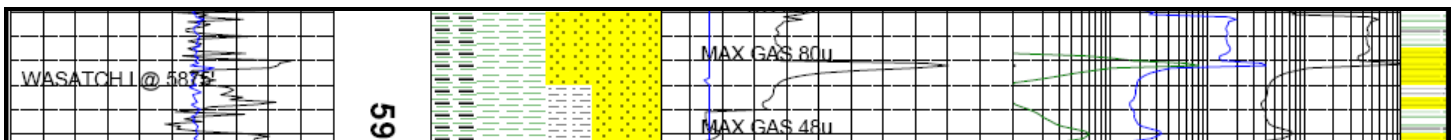
The first significant gas show occurred at the top of the Wasatch G sandstone at 5,592' with a maximum gas of 199 units. It was associated with a large sandstone body with interbedded carbonaceous shale beds and visible calcite fracture-fill in sample.



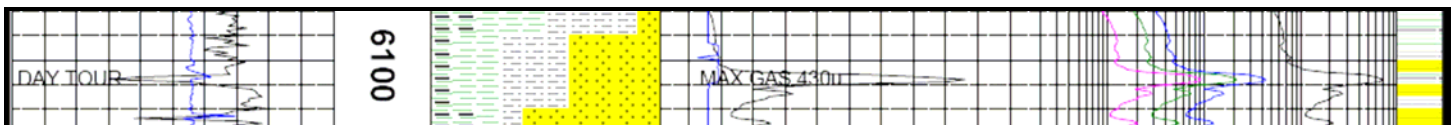
The next significant gas show occurred at 5,677' with a maximum gas show of 287 units. It was associated with interbedded sandstone and carbonaceous shale beds.



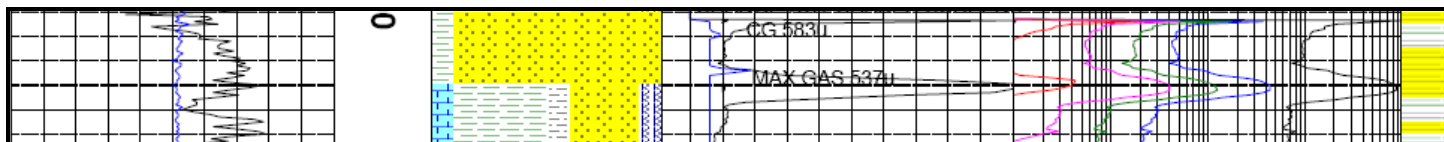
The next significant gas show of the Lower Wasatch occurred at 5,872' with a maximum gas show of 80 units. It was associated with the top of the Wasatch I sandstone bed.



The next significant gas show of the Lower Wasatch occurred at 6,108' with a maximum gas show of 430 units. It was associated with a 20' sandstone bed with interbedded carbonaceous shale layers.



The last and most significant gas show of the Lower Wasatch occurred at 6,841' with a maximum gas show of 597 units. It was associated at the base of a 20' sandstone bed found at the base of the Wasatch I formation.



Chromatography through the Lower Wasatch included C-1 through C-3, with C-4 and C-5 being observed during the high gas shows throughout the drilled interval.

Ohio Creek Formation/950 Abandonment Surface

As noted above, the Ohio Creek Formation top was encountered at (7,355' MD / 7,125' TVD). The Ohio Creek Formation is generally considered to mark the boundary between the Tertiary Wasatch Formation and the Cretaceous Mesa Verde Group. It is interpreted as an erosion surface and consists of slightly strongly kaolinitic sandstone where kaolinite occurs as a component in the matrix. A second sandstone unit encountered below the kaolinitic sandstone displays a general paucity of kaolinite and is characterized as a firm to hard, grain supported, dominantly quartz sandstone.

Relevant data concerning the Ohio Creek are presented as follows:

Ohio Creek Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	160.107	863.254	0.000
Minimum	25.321	0.000	0.000
Mean	74.200	16.815	0.000
Standard Deviation	23.880	101.520	0.000

On the FRU 197-33B6 well, the Rig Watch system was down, so significant gas shows were recorded.

900 Sequence Boundary/Williams Fork 850

The 900 sequence boundary, marking the top of the Mesa Verde Group and the Williams Fork 850 Formation occurred at (7,652' MD / 7,422' TVD). The Williams Fork 850 is dominated by sandstone, with lesser amounts of shale and siltstone. The sandstone encountered through this unit varies from grayish-white through grayish-green and dark gray and displays the following general characteristics:

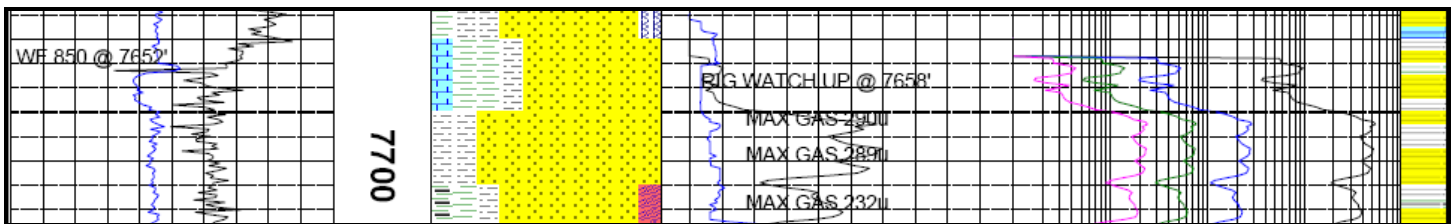
- Fine grained to very fine grained;
- Grain supported with carbonate-clay matrix;
- Surrounded to sub angular, clear to translucent quartz with moderate sphericity overall;
- Occasionally to commonly kaolinitic;
- Occasional dis-aggregation to loose sand grains in the sample tray.

The sandstones encountered in this unit are typical of the sandstones encountered through the entire drilled Mesa Verde Group section. Rates of Penetration, Total Gas, and CO₂ data for the WF 850 are presented as follows:

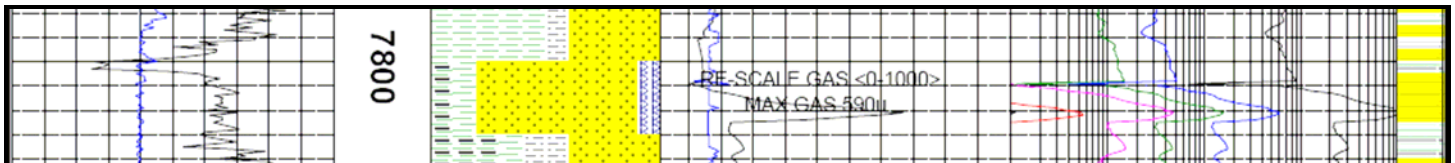
Williams Fork 850 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	150.590	2487.680	1238.295
Minimum	30.031	197.270	0.000
Mean	74.569	783.642	131.916
Standard Deviation	17.684	293.782	160.612

The Williams Fork 850 formation was marked a high gas show with a maximum gas of 290 units at 7,686'. It was associated with a large sandstone bed at the top of the formation. Calcite fracture-fill was also visible in sample at the base of this sandstone bed.



Last significant gas show for this formation occurred at 7,821', with a maximum gas of 668 units. It was associated with a large sandstone bed with interbedded kaolinitic sands and carbonaceous shale layers.



Chromatography through the Williams Fork 850 Formation included C-1 through C-3 being observed throughout the drilled interval, with C-4 and C-5 appearing during the high gas shows.

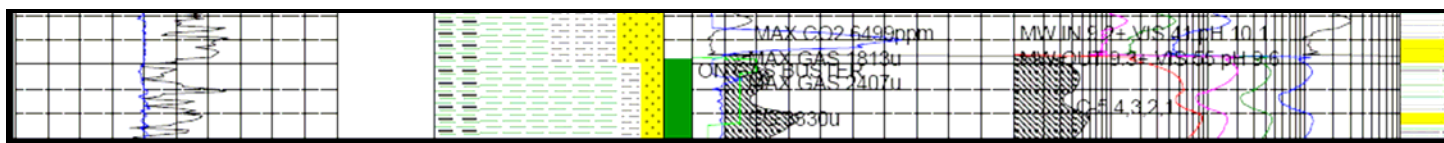
850 Abandonment Surface/Williams Fork 800

The 850 AS, which marks the top of the Williams Fork 800 was encountered at a depth of (7,860' MD / 7,630' TVD). A sandstone unit marks the upper contact. Relevant statistics for the WF 800 are listed below:

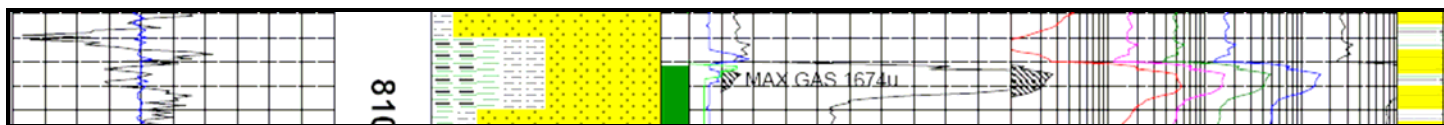
Williams Fork 800 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	193.778	6499.959	3329.883
Minimum	55.963	522.151	50.253
Mean	100.458	969.891	635.036
Standard Deviation	27.071	853.758	852.618

The first significant gas show from the Williams Fork 700 was recorded at 7,972' reaching 2,397 units. It was produced from a 25' sandstone bed with interbedded carbonaceous shale.



Final significant gas show for the Williams Fork 800 was at 8,086' with a maximum gas of 1,624 units. It is associated with an another 25' sandstone bed with interbedded carbonaceous shale and fine grain siltstones.



Chromatography through the Williams Fork 700 Formation included C-1 through C-4 being observed throughout the drilled interval with C-5 occurring at high gas peaks.

800 Sequence Boundary/Williams Fork 700

The 800 SB was encountered at (8,143' MD / 7,913' TVD). Like the Williams Fork 800, this sequence consists of dominantly sandstone with shale and siltstone interbedded down the section. The following features characterized the shale that interbedded through this unit:

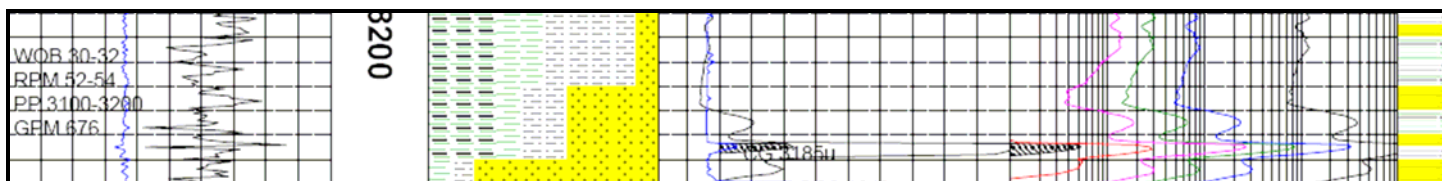
- Dark brown to dark gray color;
- Soft to slightly firm;
- Dull, earthy luster with occasional waxy zones;
- Occasionally silty zones.

Data for the WF 700 are summarized as follows:

Williams Fork 700 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	125.694	5021.750	3310.591
Minimum	22.808	635.859	28.079
Mean	71.689	1014.127	186.707
Standard Deviation	19.346	795.001	442.547

No significant gas shows occurred in the Williams Fork 700 formation. Only one large connection gas occurred at 8,246', which peaked at 3,185 units. The formation was comprised of predominately interbedded shale and fine-grain siltstones with occasional thin beds of sandstone and carbonaceous shale throughout the formation. Gradual thickening of sandstone beds towards the bottom of the formation.



Chromatography through the Williams Fork 700 Formation included C-1 through C-4 being observed throughout the drilled interval with C-5 occurring at connection gas peaks.

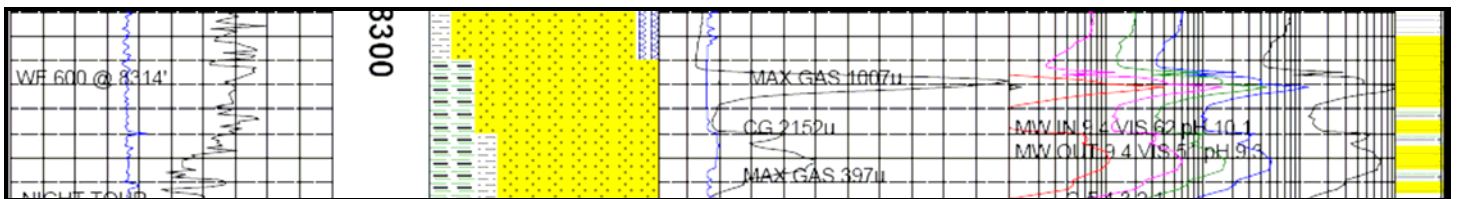
690 Abandonment Surface/Williams Fork 600

The 690 AS, marking the top of the Williams Fork 600 Member was encountered at (8,314' MD/ 8,084' TVD). The WF 600 was logged as sandstone with lesser amounts of shale and moderate amounts of siltstone. Relevant data for the WF 600 are summarized as follows:

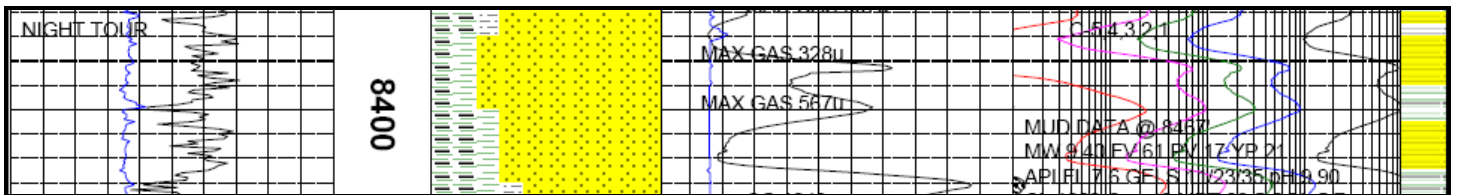
Williams Fork 600 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	131.58	1561.77	1086.90
Minimum	41.70	440.93	55.19
Mean	77.46	696.04	268.33
Standard Deviation	15.38	157.83	236.97

The first significant gas show in the Williams Fork 600 was 1007 units occurring at 8319'. It is associated with a large sandstone body at the top of the formation.



The final significant gas show in the Williams Fork 600 was 628 units occurring at 8383'. It is associated with another large sandstone body with interbedded carbonaceous shale layers. Another large gas peaked followed at 8400' with a maximum gas of 555 units.



Chromatography through the Williams Fork 600 Formation included C-1 through C-4, with C-5 being observed during the high gas shows throughout the drilled interval.

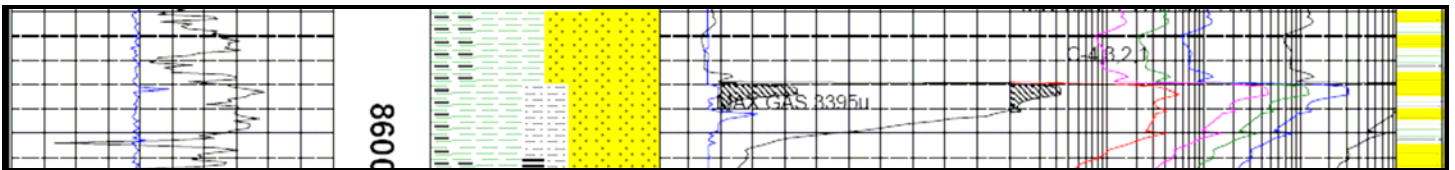
600 Sequence Boundary/Williams Fork 500

The 600 SB occurred at a depth of (8,534' MD / 8,304' TVD). The 600 SB also marks the top of the Williams Fork 500 formation. As with previous Williams Fork units, this unit is also dominated by sandstone. Data for the WF 500 are summarized as follows:

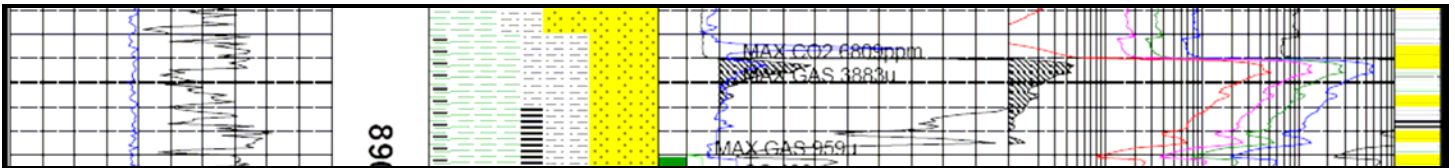
Williams Fork 500 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	173.235	7117.232	3882.909
Minimum	19.941	327.222	15.210
Mean	74.440	973.854	370.085
Standard Deviation	20.563	872.046	562.651

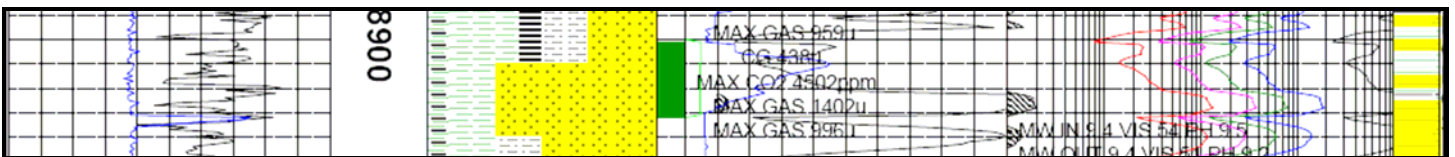
The first significant gas shows in the Williams Fork 500 occurred at 8,582' with maximum gas of 3395 units. The gas shows was associated with a thin sandstone bed at the top of the formation.



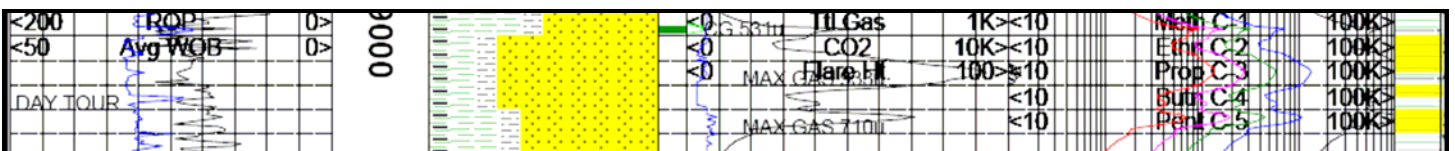
The next significant gas show of the Williams Fork 500 occurred at 8,863' with a maximum gas of 3883 units. The gas shows was associated with another thin sandstone bed with interbedded carbonaceous shale layers.



The next gas show of the Williams Fork 500 occurred at 8,928' with a maximum gas of 1402 units. The gas shows was associated with a very large sandstone bed with interbedded carbonaceous shale and siltstone.



The last significant gas show of the Williams Fork 500 occurred at 9,015' with a maximum gas of 933 units. The gas shows was associated with large sandstone with interbedded carbonaceous shale and siltstone. This sandstone was found at the base of the formation.



Chromatography through the WF 500 displayed C-1 through C-4, with C-5 being observed during the high gas shows throughout the drilled interval.

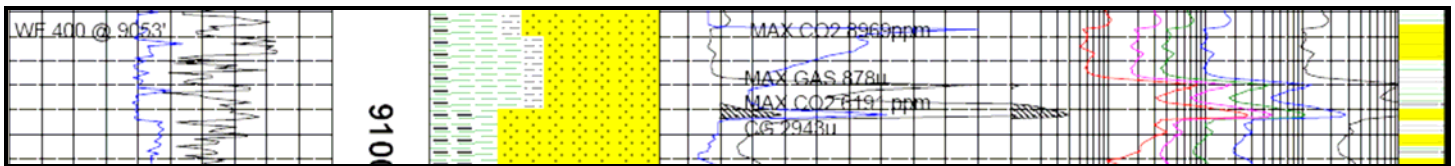
490 Abandonment Surface/ Williams Fork 400

The 490 Abandonment Surface was encountered (9,053' MD / 8,823' TVD) and marks the top of the Williams Fork 400 member. Sandstone, kaolinitic sandstone, and shale are common through the WF400. Data concerning the WF 400 are summarized as follows:

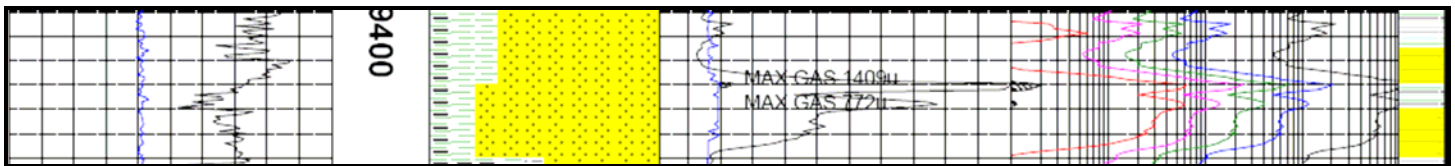
Williams Fork 400 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	162.536	8969.053	2911.343
Minimum	13.611	327.222	31.755
Mean	56.252	836.294	212.577
Standard Deviation	22.600	824.978	335.160

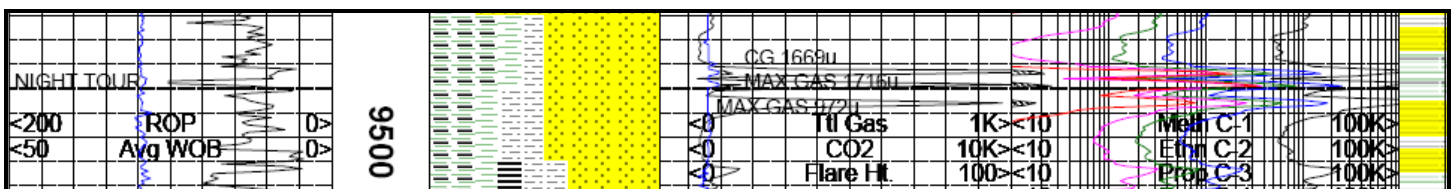
The William Fork 400 formation produced many high gas peaks through out the formation. Listed below are the most significant gas peaks for this formation. The first significant show from the Williams Fork 400 was produced from a large sandstone bed at the top of the formation. This sandstone had many thin interbedded carbonaceous shale layers at the top of this large sandstone where the maximum gas peaked at 2,911 units, which occurred at a depth of 9,092'.



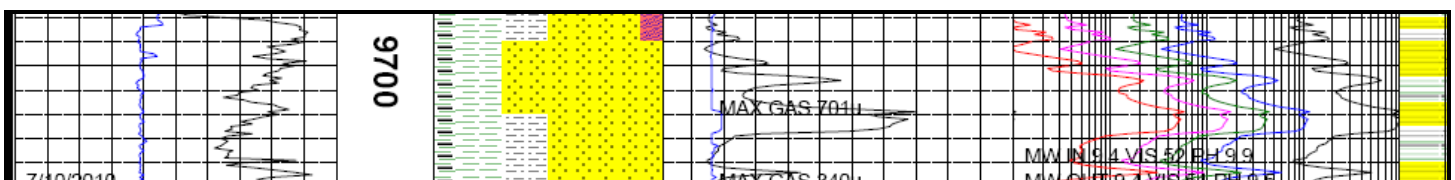
The next significant gas shows from the Williams Fork 400 was observed at 9,420', and peaked at 1,409 units. This show correlates with a large sandstone bed with interbedded carbonaceous shale and siltstone.



The next significant high gas recorded in the Williams Fork 400 was recorded at 9,479' with a maximum gas of 1,635 units. It was also produced from a thin carbonaceous shale bed between two large sandstone beds. This gas peak was followed by another gas peak of 972 units at 9,486'.



The final significant high gas recorded in the Williams Fork 400 was recorded at 9,719' with a maximum gas of 701 units. It was also produced from another large sandstone found at the base of the formation.



Chromatography through the WF 400 displayed C-1 through C-4, with C-5 being observed during the high gas shows throughout the drilled interval.

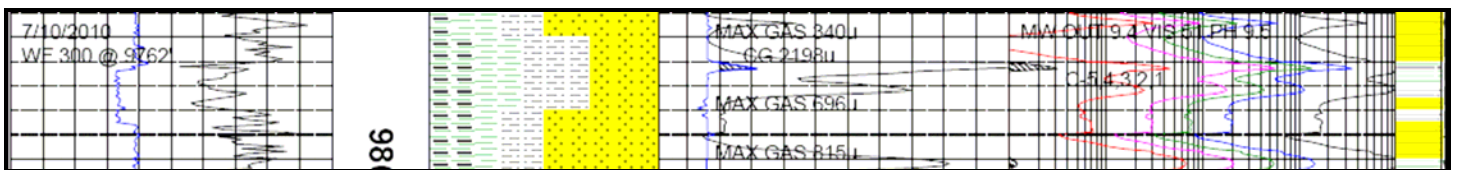
400 Sequence Boundary/ Williams Fork 300

The Williams Fork 300 member has an upper boundary of (9,762' MD / 9,532' TVD) and is determined by the 400 SB. The WF300 generally features interbedded sandstone/kaolinitic sandstone, shale, and carbonaceous shale. Data concerning the WF 300 are presented as follows:

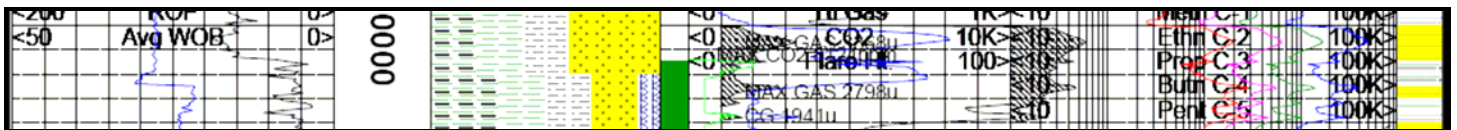
Williams Fork 300 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	133.720	36437.727	3990.105
Minimum	3.058	0.000	4.865
Mean	44.568	1688.165	661.984
Standard Deviation	22.100	3129.328	632.444

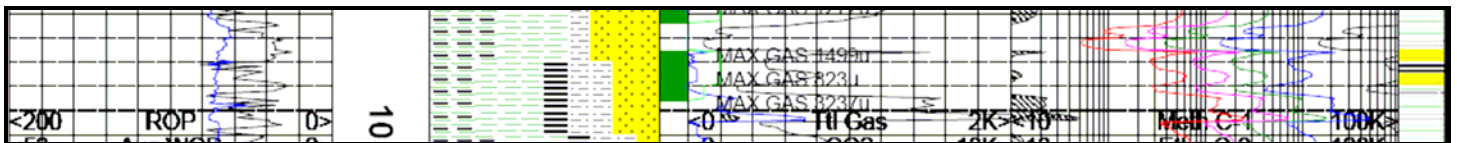
The William Fork 300 formation produced many high gas peaks as you moved farther down in the formation. The first gas shows from the Williams Fork 300 was noted at 9,772' peaking at 695 units. This peak was associated with a small sandstone bed at the top of the formation.



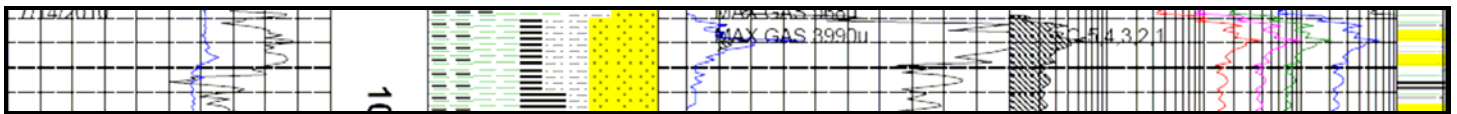
The next significant gas show of 3,368 units was recorded at 10,007'. It was in association with a 15' sandstone bed with interbedded carbonaceous shale layers.



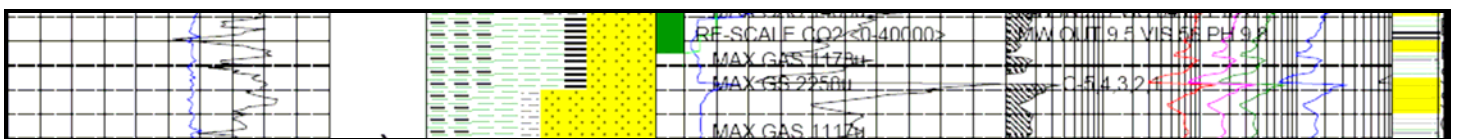
Another significant gas show of 3,237 units was recorded at 10,493'. It was associated with a carbonaceous shale bed with interbedded coals and sandstone layers.



The next significant gas show occurred at 10,569, with a maximum peak of 3,990 units. It was produced by a sandstone bed with interbedded carbonaceous shale and coal layers.



The final significant gas show was recorded at 10,768', and reached peaks of 2,253 units. This gas was associated with a 15' sandstone body at the base of the formation. It was interbedded with carbonaceous shale and coal layers.



Chromatography through the WF 300 included displayed C-1 through C-5 being observed during the high gas shows throughout the drilled interval.

290 Abandonment Surface/ Williams Fork 200

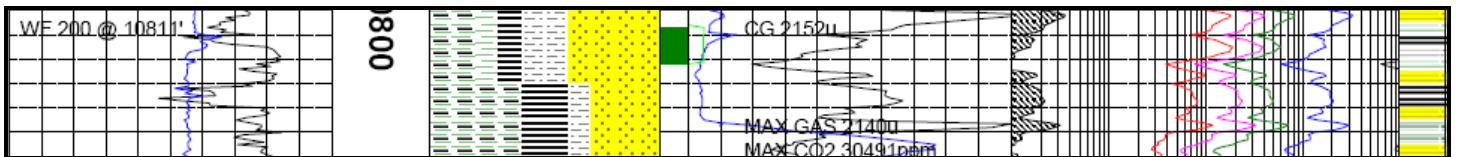
The 290 AS occurred at a depth of (10,811' MD / 10,581' TVD). The Williams Fork 200 member, whose top is marked by the 290 AS, encompasses interbedded sandstone, shale, carbonaceous shale, siltstone and coal.

Data for the WF 200 are summarized as follows:

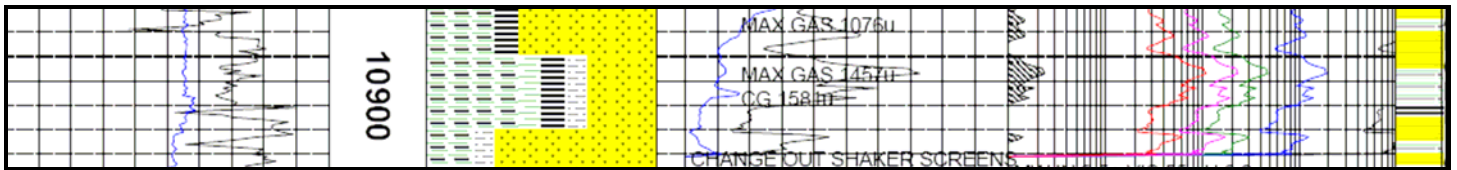
Williams Fork 200 Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	156.203	72204.984	2791.525
Minimum	19.687	0.000	0.000
Mean	57.695	8926.906	752.939
Standard Deviation	22.351	12856.700	419.155

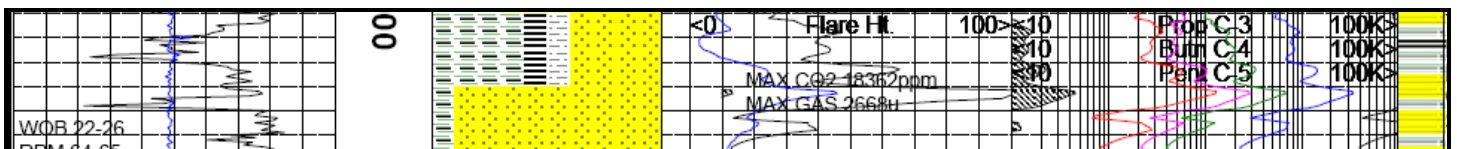
The William Fork 200 formation produced many high gas peaks through out the formation. The first high gas shows from the Williams Fork 200 was noted at 10,847', reaching a high gas peak of 2,140 units. This show was associated with an interbedded sandstone and carbonaceous shale with thin laminae of coal visible.



The next significant gas shows produced at 10,897', reaching an high gas peak of 1,457 units. This show was associated with the bottom of a sandstone bed with interbedded carbonaceous shale layers.



The final and most significant gas shows produced 2,668 units, and was recorded at 11,043', in association with the top of a large sandstone bed with interbedded carbonaceous shale. This large sandstone was located at the bottom of the formation.



Chromatography through the WF 200 included displayed C-1 through C-5 being observed during the high gas shows throughout the drilled interval.

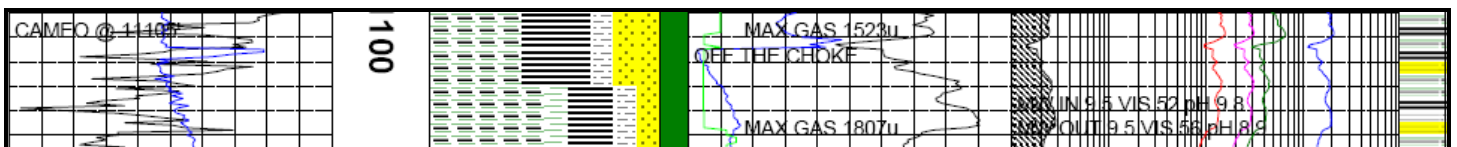
210 Sequence Boundary/Cameo Formation

The 210 SB, marking the top of the Cameo Formation, occurred at a depth of (11,105' MD/ 10,875' TVD). The rocks of the Cameo Formation include sandstone, shale, and siltstone along with a significant number of coal units. Data for the Cameo Formation are summarized as follows:

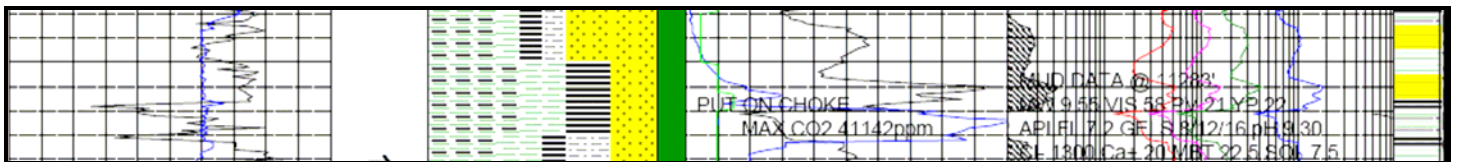
Cameo Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	192.637	42325.180	2247.050
Minimum	21.710	0.000	0.000
Mean	75.679	9643.907	1014.102
Standard Deviation	34.584	10579.377	438.693

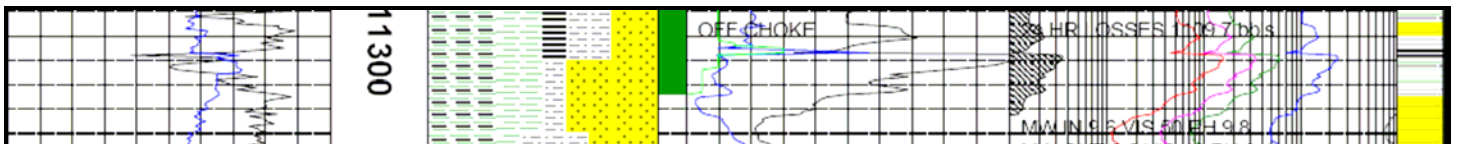
The Cameo formation produced many high gas peaks through out the formation. Four gas peaks produced above 1,800 units and are listed below. The first significant gas from the Cameo formation appeared at 11,144', peaking at 1,807 units. It was produced by large carbonaceous shale with interbedded coals found at the top of the formation.



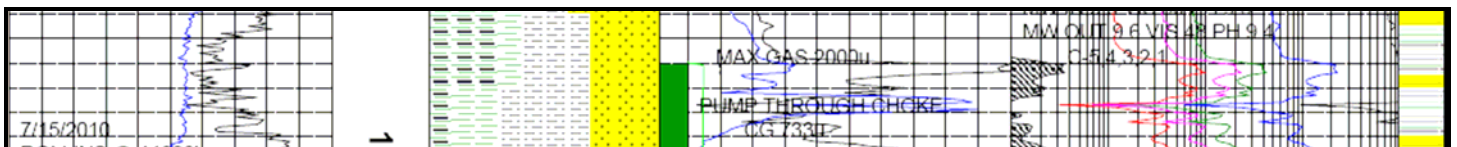
Another high gas show came in at 11,261', and recorded a peak gas of 1,841 units. It was produced by a 10' sandstone bed with interbedded coals and carbonaceous shale beds found predominately at the base of the sandstone.



The next significant gas show occurred at 11,309' with a high gas peak of 2,247 units. It is associated with a 5' coal bed with interbedded carbonaceous shale.



The last significant gas from the Cameo formation appeared at the base of the formation and was at 11,362' with a gas peak of 2,000 units. It was produced by a carbonaceous shale bed with interbedded sandstone and siltstone.



Chromatography through the Cameo Formation included C-1 through C-5 being observed during the high gas shows throughout the drilled interval.

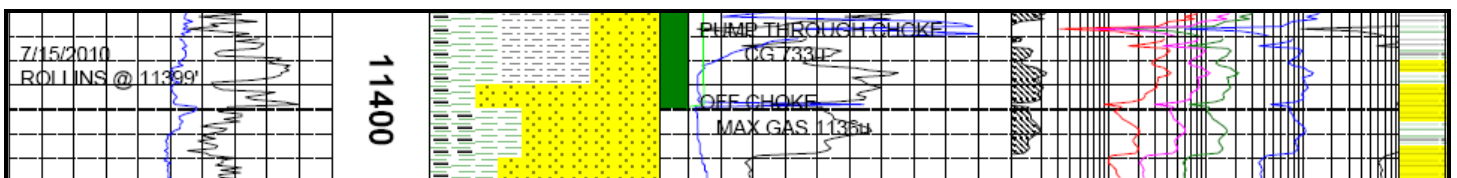
200 Sequence Boundary/Rollins Formation

The 200 SB occurred at (11,399' MD/ 11,169' TVD) and marks the top of the Rollins Formation. The top of the Rollins is dominated by thick, relatively clean sandstone. Data for the Rollins Formation are summarized as follows:

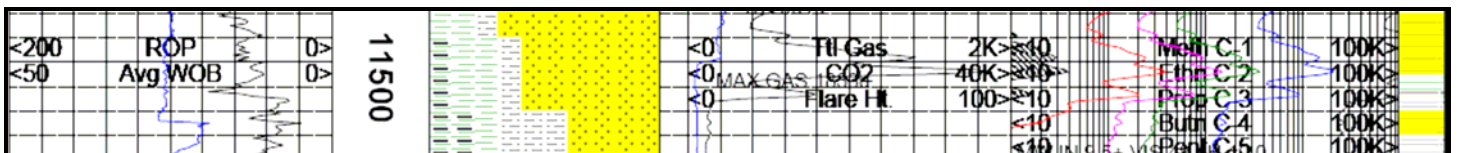
Rollins Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	89.546	24652.652	2540.320
Minimum	19.370	611.787	85.094
Mean	52.380	2226.906	610.559
Standard Deviation	13.607	3143.886	442.911

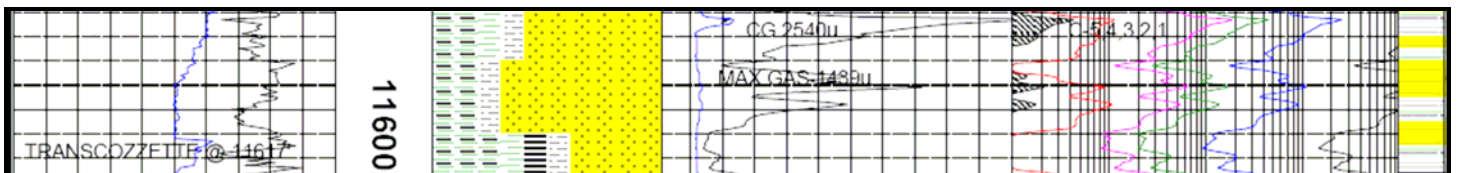
The Rollins formation produced many high gas peaks through out the formation. The first significant gas show of the Rollins Formation recorded at 11,419'. It recorded a maximum gas of 1,136 units, and was associated with a large sandstone body at the top of the formation with interbedded carbonaceous shale layers.



Another significant gas show of the Rollins Formation recorded at 11,504'. It recorded a maximum gas of 1,883 units, and was associated with the large sandstone from the top of the formation.



The last significant gas show of the Rollins Formation recorded at 11,591'. It recorded a maximum gas of 1,439 units, and was associated with another 20' sandstone bed.



Chromatography through the Rollins Formation included C-1 through C-5 being observed during the high gas shows throughout the drilled interval.

Trans-Cozzette Formation

The Trans-Cozzette occurred at (11,617' MD/ 11,387' TVD), and marks the transition zone between the Rollins Formation and the Cozzette Coastal Formation. It generally is a fine grain sandstone or siltstone bed at the base of the Rollins Formation. The following features characterized the sandstone that is present through this unit:

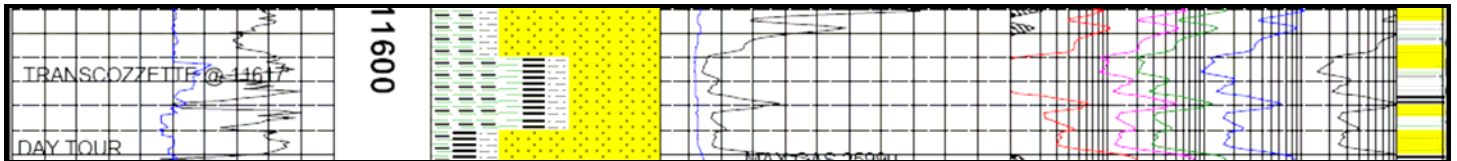
- Light brownish gray to light yellowish gray;
- Moderate hard to firm friable;
- Fine to medium to occasionally coarse grain;
- Occasionally silty zones.
- 5-6% visible carbonaceous material

Drilling and gas data for the Cozzette Formation are summarized as follows:

Trans-Cozzette Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	107.914	2386.825	973.216
Minimum	20.662	907.627	106.296
Mean	51.020	1227.232	287.170
Standard Deviation	22.184	332.135	211.973

The Trans-Cozzette only produced one high gas peak through out the formation, and is listed below. The significant gas show in the Trans-Cozzette occurred at 11,630'. It peaked at a maximum gas of 571 units. It is associated with a thin coal layer at the top of a large sandstone bed.



Chromatography through the Rollins Formation included C-1 through C-4 throughout the drilled interval, with C-5 occurring at high gas shows.

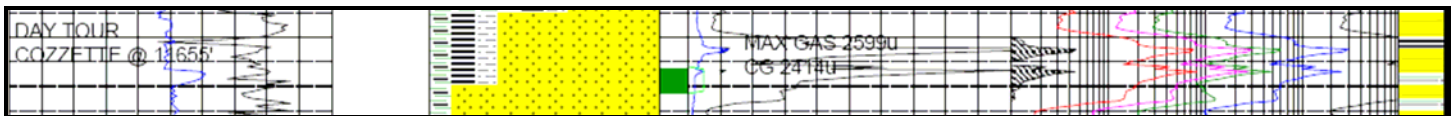
180 Flooding Surface/Cozzette Formation

The top of the Cozzette Formation, at (11,655' MD/ 11,425' TVD) is marked by the 180 FS. The Cozzette is composed of poorly consolidated sandstone, kaolinitic sandstone, shale, carbonaceous shale, and siltstone. Drilling and gas data for the Cozzette Formation are summarized as follows:

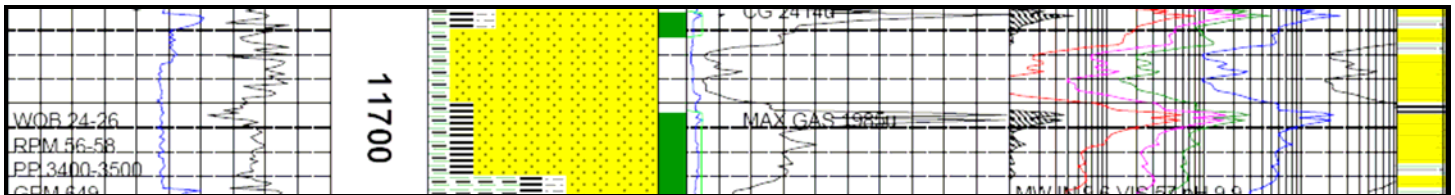
Cozzette Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	104.206	20137.205	2599.348
Minimum	13.330	624.951	72.033
Mean	42.606	1877.255	539.257
Standard Deviation	15.099	1637.390	429.623

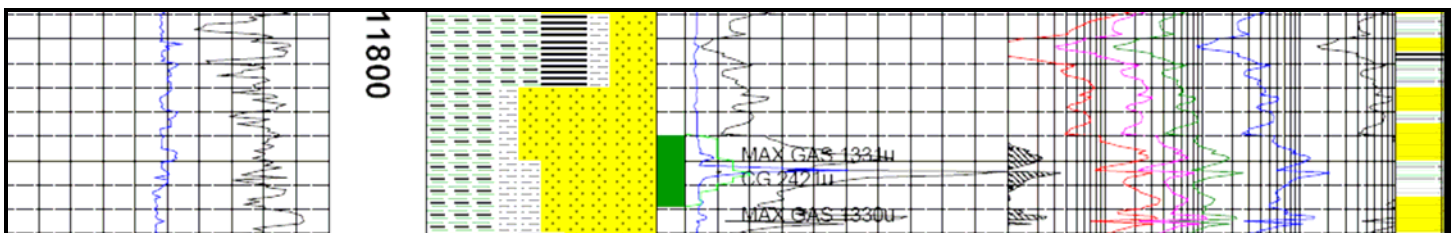
The Cozzette formation produced many high gas peaks through out the formation. The first significant gas shows of the Cozzette Formation recorded at 11,656'. It recorded a maximum gas of 2,599 units, and was associated with a large sandstone member at the top of the formation. The sandstone had interbedded carbonaceous shale and coal layers through out.



Another significant gas show of the Cozzette formation recorded at 11,705'. It recorded a maximum gas of 1,985 units, and was associated with a the coal bed in the middle of the large sandstone bed.



Another significant gas shows recorded at 11,874'. It recorded a maximum gas of 1,330 units, and was associated with a small sandstone bed at the base of the formation with interbedded carbonaceous shale and coal layers.



Chromatography through the Cozzette Formation included C-1 through C-4 throughout the drilled interval, with C-5 appearing at high gas shows.

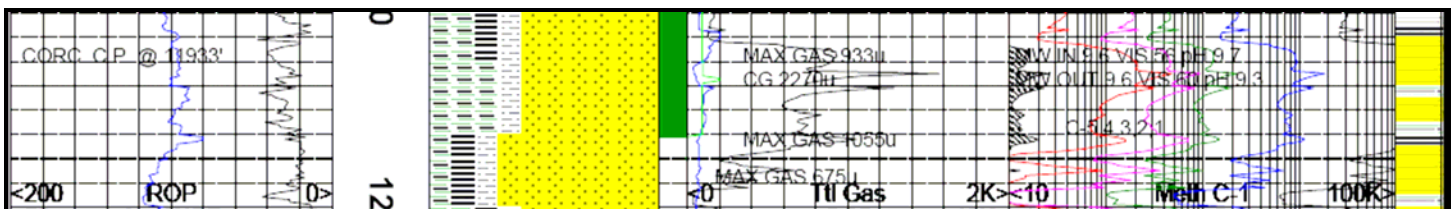
140 Flooding Surface/Corcoran Coastal Plain

The top of the Corcoran Coastal Plain, marked by the 140 Flooding Surface, was encountered at (11,933' MD / 11,703' TVD). This section encompasses a thick sequence of sandstone, shale, and carbonaceous shale. Drilling data for this section are summarized as follows:

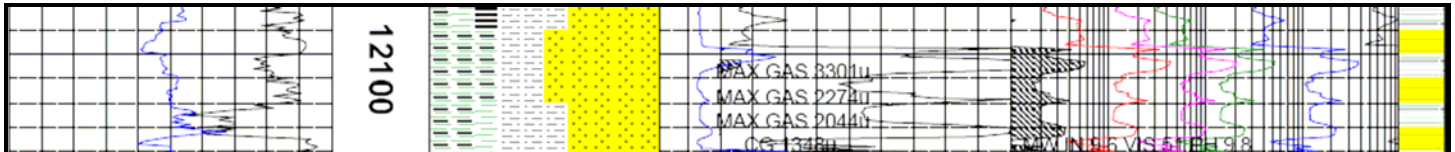
Corcoran Coastal Plain Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	158.997	19545.525	3300.720
Minimum	6.938	798.633	38.053
Mean	31.778	1826.560	485.838
Standard Deviation	20.367	1276.160	420.713

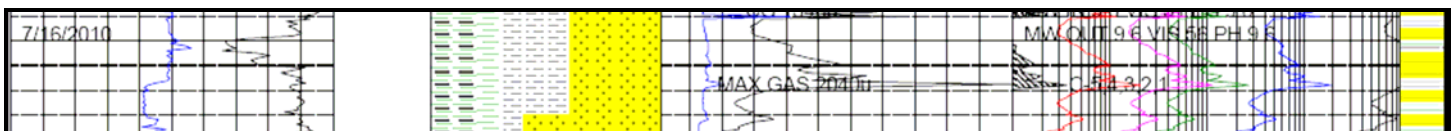
The Corcoran Coastal Plain formation produced many high gas peaks through out the formation. The first significant formation gas appeared at 11,938', with a high gas of 933 units. It was produced by a large sandstone body at the top of the formation.



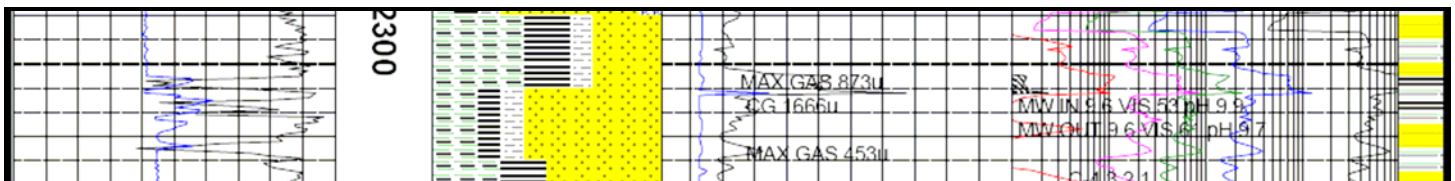
Another gas show recorded at 12,105'. It recorded a maximum gas of 3,301 units, and it was followed by two more large gas peaks of 2,274 units and 2,044 units. It was associated with interbedded sandstones, siltstone, and carbonaceous shale beds.



Another gas show occurred at 12,168' with a maximum peak gas of 2,040 units. It was associated with another sandstone bed in the middle of the formation.



Then last significant gas show was recorded at 12,325'. It recorded a maximum gas of 873 units, and was associated with a large carbonaceous shale and coal bed that was at the base of the formation.



Chromatography through the Corcoran Coastal Plain included C-1 through C-4 throughout the drilled interval, with C-5 occurring during high gas shows.

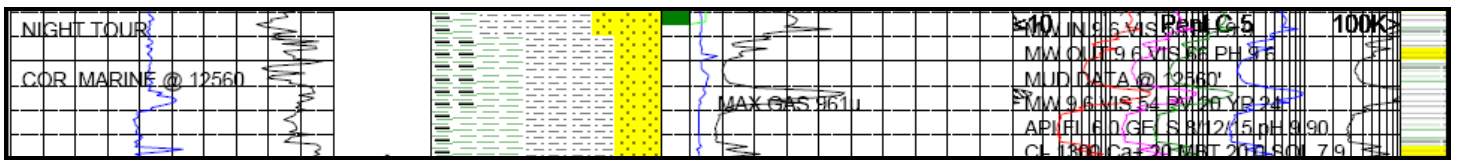
140 Sequence Boundary/Corcoran Marine Formation

The Corcoran Marine top was drilled at (12,560' MD / 12,330' TVD). This unit was composed dominantly of shale and siltstone with minor sandstone. The well was completed within the Corcoran Marine at a depth of 12,775' MD / 12,545' TVD. Data for the Corcoran Marine are summarized as follows:

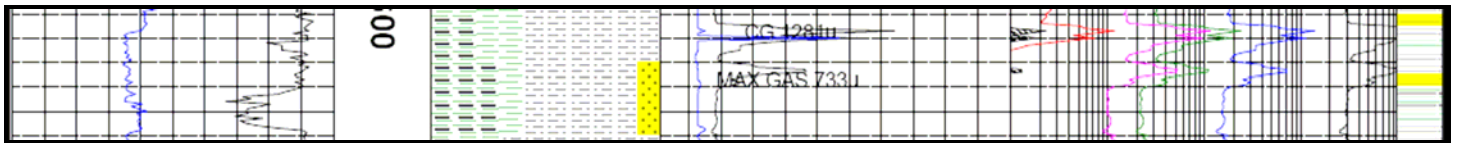
Corcoran Marine Formation Statistics

	ROP (Ft/Hr)	CO2 (ppm)	Total Gas (Units)
Maximum	70.050	18689.148	1469.576
Minimum	8.445	907.627	59.764
Mean	28.990	1403.216	270.913
Standard Deviation	13.072	1218.375	243.075

The first significant gas show recorded in the Corcoran Marine Formation occurred at 12,563', with a peak gas of 961 units. It is associated with a very thick siltstone body at the top of the formation.



The last significant gas show recorded in the Corcoran Marine Formation occurred at 12,634', reaching a peak gas of 733 units. It is associated with a thin sandstone bed on top of a 10' carbonaceous shale bed.



Chromatography through the Corcoran Marine included C-1 through C-4 throughout the drilled interval, with C-5 showing up at high gas peaks.

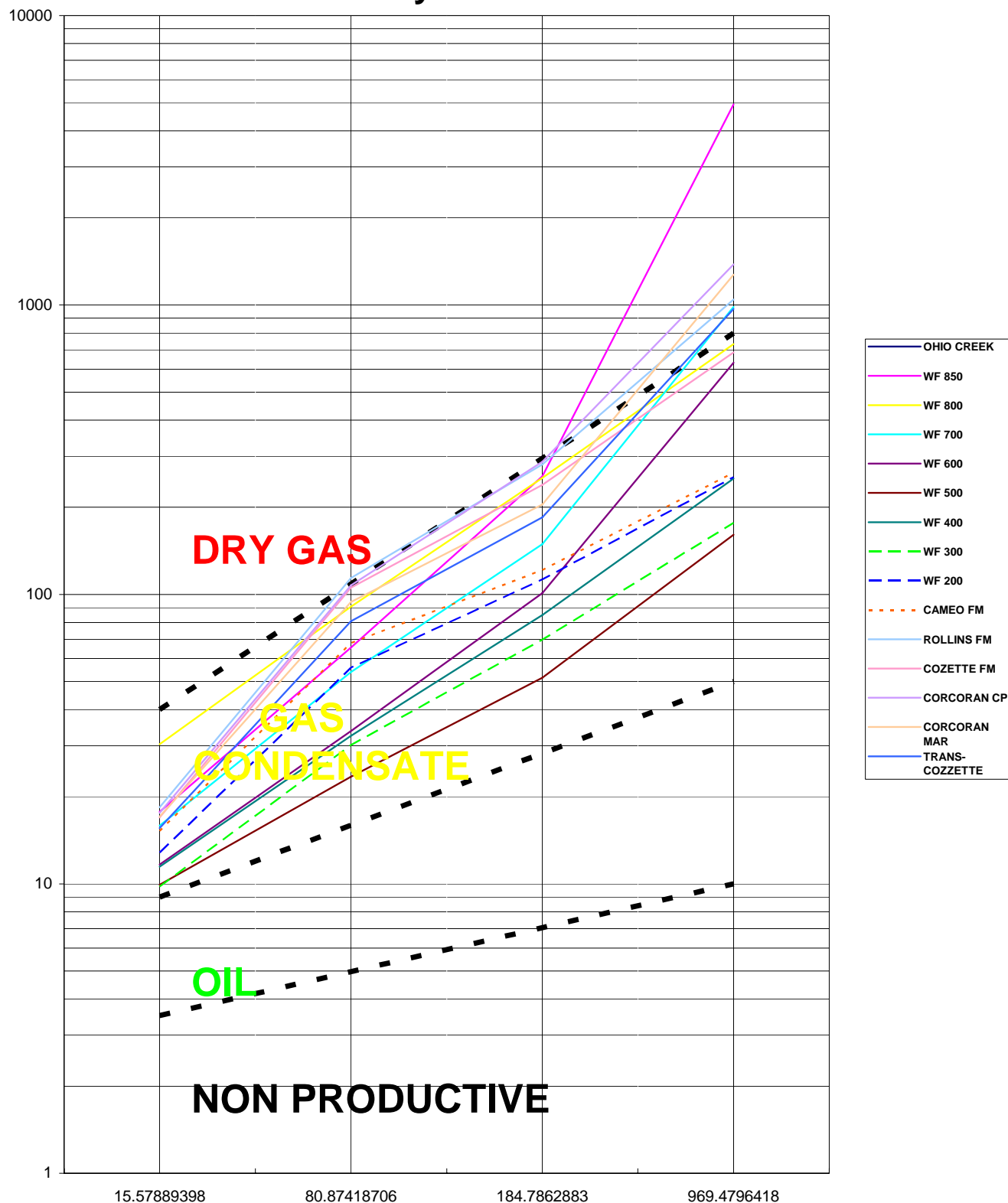
Other Data Plots

The following series of data plots summarize data concerning rate of penetration, total gas, and CO₂ as discussed in the above sections. Data are referenced to the formation top for each of the formations described above. The data are intended to illustrate general trends for each of these parameters relative to depth.

Exxon Mobil
Freedom Ranch Unit 197-33B6
Pixler Plot

FRU 197-33B6

Pixler Plot Of Average Chromatography Data By Formation

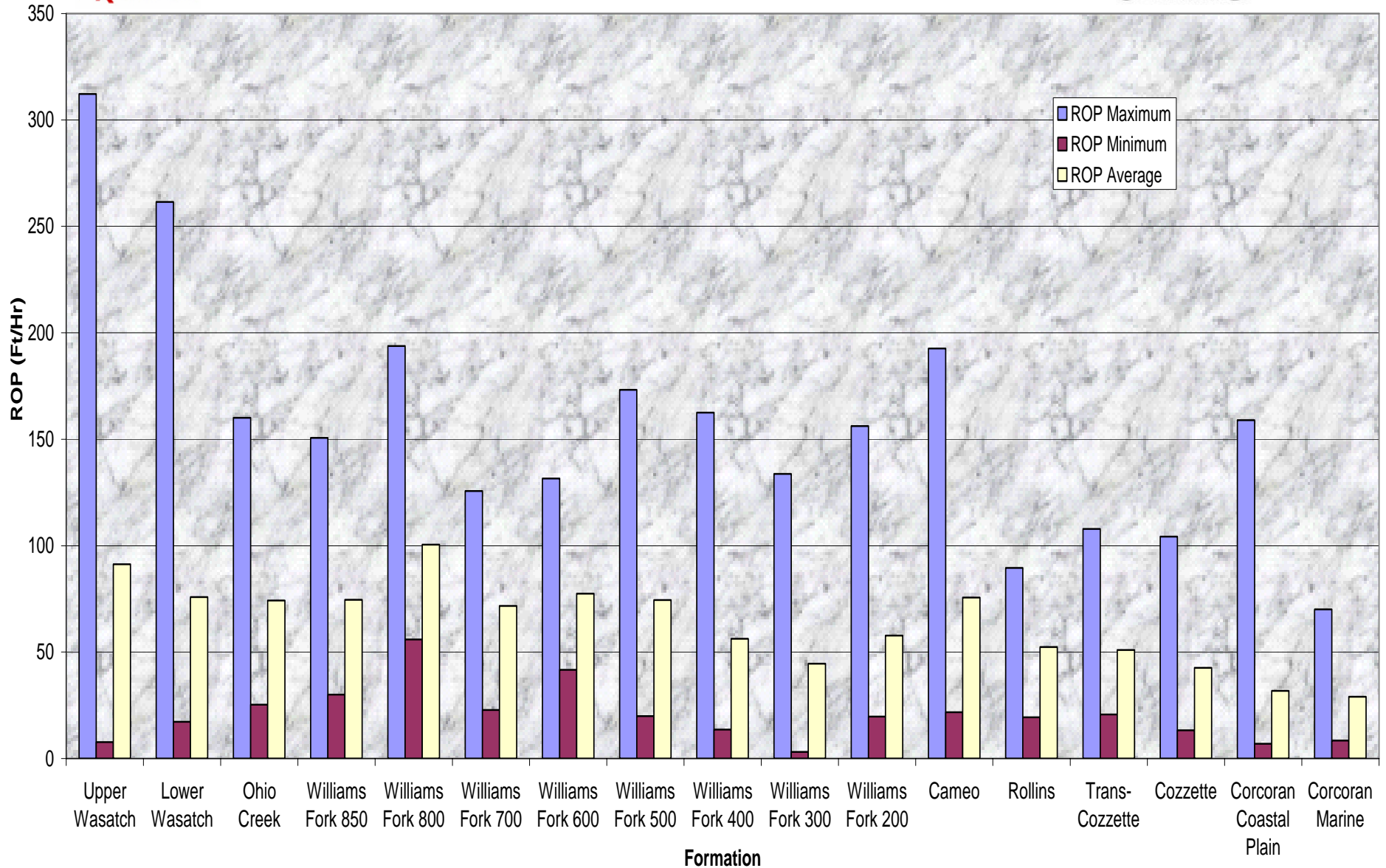


Exxon Mobil
Freedom Ranch Unit 197-33B6
Other Data Plots

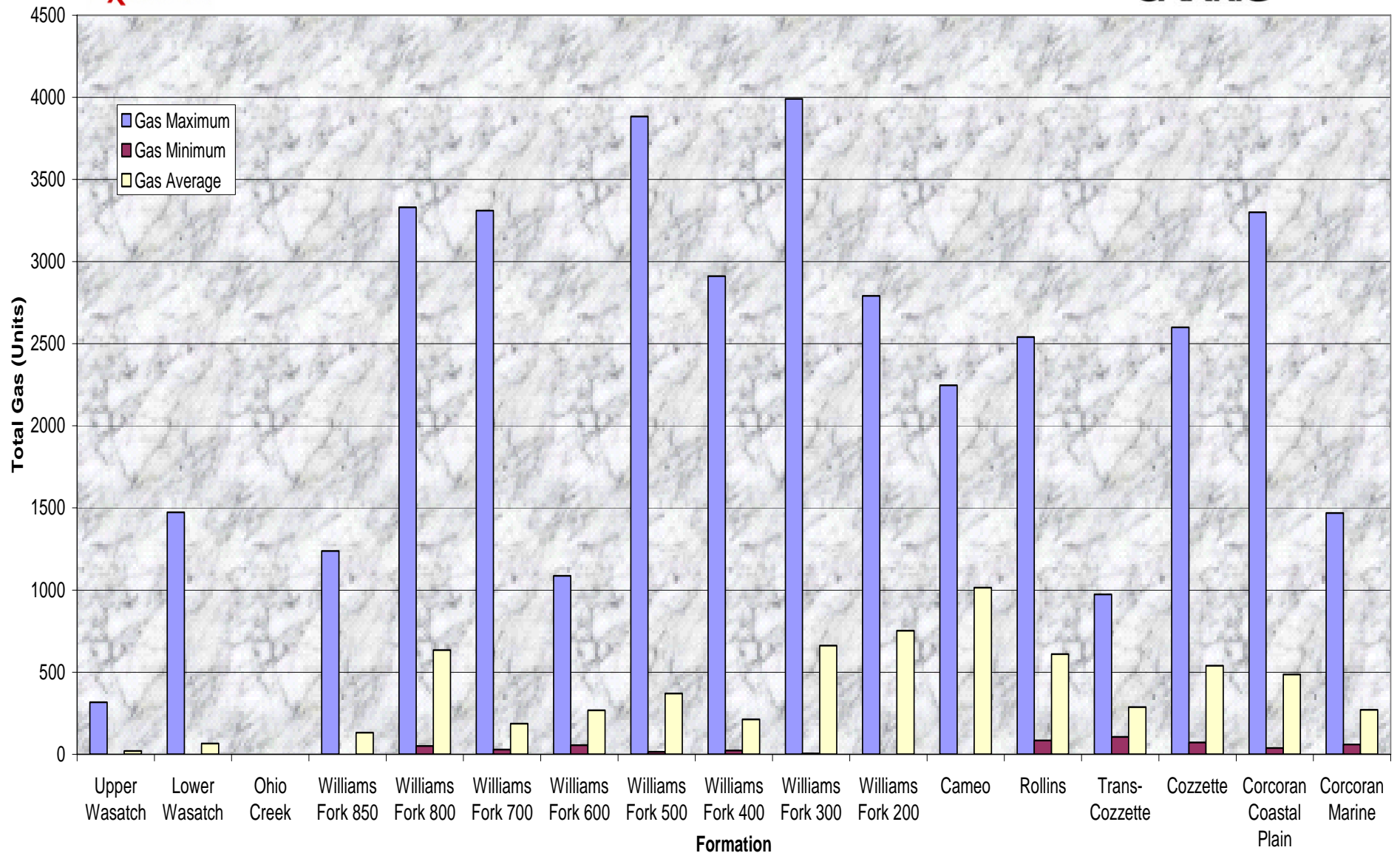
FRU 197-33B6
Rate of Penetration Statistics

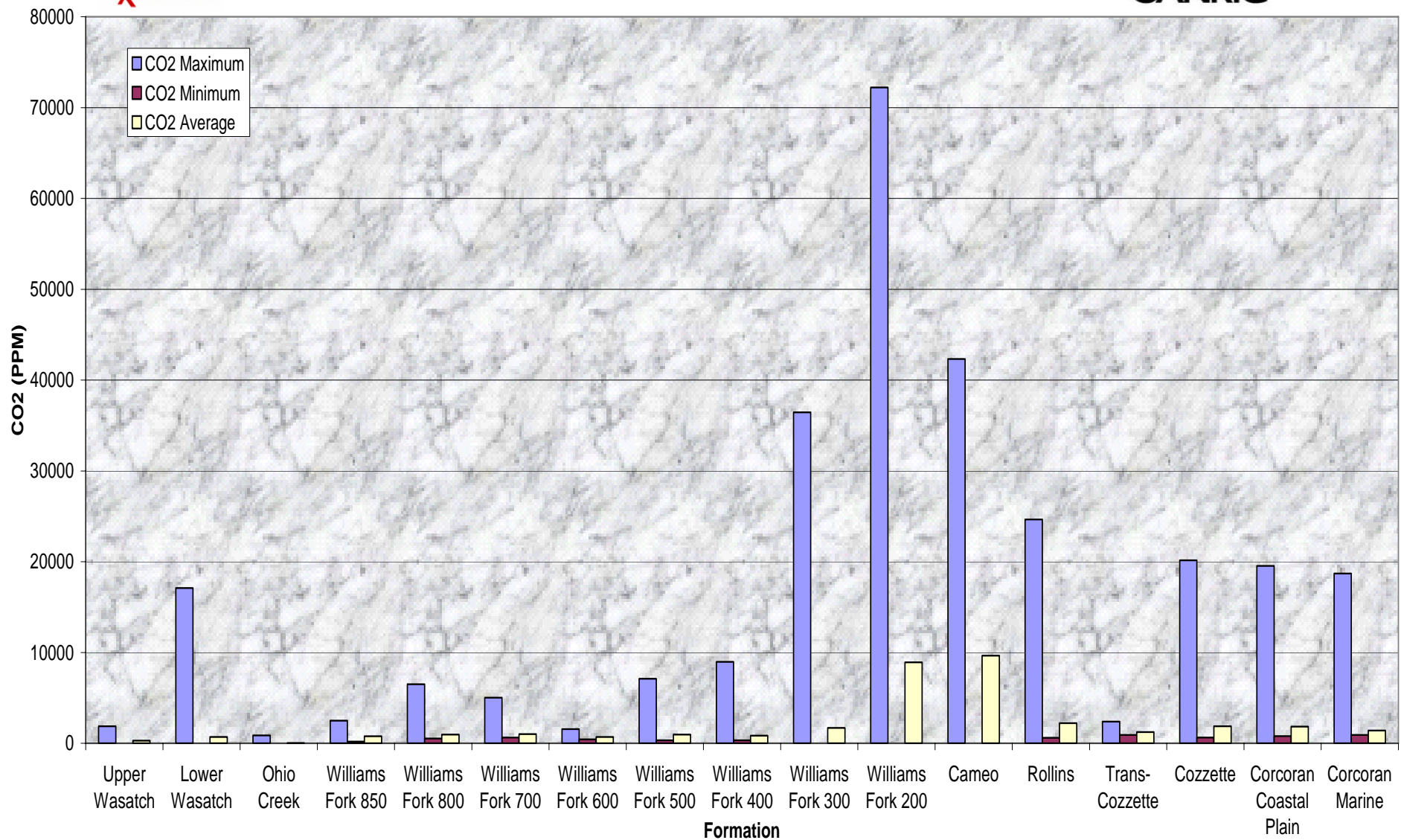
ExxonMobil

CANRIG



FRU 197-33B6
Total Gas Statistics By Formation





Exxon Mobil
Freedom Ranch Unit 197-33B6
Formation Descriptions

4040' Sandstone = White to translucent to very light gray; mostly quartz framework with 2-3% dark lithics visible in sample; 15% to 20% paleosols visible in sample; very coarse to medium to fine grain; grades into a fine grain siltstone; fair to poorly sorted; sub-round to sub-angular grains; moderate to low sphericity; no visible surface features; moderate hard to firm friable; calcitic cementation due to moderate reaction in dilute hcl; no visible hydrocarbons in sample; grain supported.

4180' Shale = Very light gray to slight mottle yellowish brown; brittle to crumbly tenacity; planar to slight splintery to irregular fracturing; cuttings tend to be platy to flaky in habit; dull earthy to semi greasy luster; smooth to clayey texture; no other visible bedding features; visible nacholite crystals in the sample.

4280' Siltstone = Medium light gray to light olive gray; crunchy to stiff tenacity; predominately hackly to semi planar to slight blocky fracturing; cuttings tend to be wedge-like to elongated tabular to occasionally bladed in habit; dull to semi waxy to slight greasy luster; gritty to semi granular to silty texture; no other visible bedding features.

4380' Limestone = Light brownish gray to light olive gray; high reaction in dilute hcl; crunchy to stiff tenacity; irregular to hackly to slight splintery fracturing; cuttings tend to be tabular to nodular to semi elongated wedgelike in habit; dull earthy to slight waxy to semi resinous luster; smooth to matte texture; no other visible bedding features.

4480' Sandstone = Light greenish gray to white to very light gray; mostly quartz framework; fine to medium size grains with poor sorting; angular to sub-angular; low sphericity; firmly friable with a slight moderate hardness; calcite cement with moderate reaction with hcl; no visible bedding.

4570' Shale = Medium light gray to light bluish gray to occasionally greenish gray with some moderate red and grayish purple hues; brittle to crumbly tenacity; planar fracturing; cuttings are tabular to slightly platy; dull to earthy luster smooth to slightly silty texture; thick laminae structure.

4660' Siltstone = Pale olive to dark yellowish brown to medium light gray; crumbly to slightly brittle tenacity; irregular to blocky fracturing; cuttings are massive semi-tabular; earthy to dull luster; silty to gritty to slightly clayey texture; thick to massive structure.

4750' Shale = Medium light gray to grayish green to light bluish gray with streaks of grayish purple and light olive brown and dusky red; crumbly to slightly brittle tenacity; irregular to blocky to semi-planar fracturing; tabular to platy cuttings; dull to earthy to waxy luster; smooth to clayey texture; thick structure.

4850' Sandstone = Very light gray to white to translucent; composed of mostly quartz framework with approximately 5-10% black lithic clasts; fine grained and well sorted; sub-angular; low to moderate sphericity; moderate hard to firmly friable; moderate to weak reaction suggests calcite cement; small amounts of white kaolinitic matrix; no visible bedding; occasional dark yellowish orange hues.

4970' Siltstone = Medium gray to light brownish gray to moderate olive brown to moderate brown; tenacity is mostly brittle to often crumbly; irregular to blocky fracturing; cuttings are slightly massive to tabular; earthy to slightly frosted luster; gritty to silty texture; grading from sandstone; massive to thick structure; low gas associated with sample.

5080' Sandstone = Translucent to grayish orange pink to light olive gray; dominate quartz framework with trace amounts of very fine black clasts; mostly fine grained with occasional medium grains; well to fair sorted; sub-rounded to sub-angular with moderate to low sphericity; moderate hard; slight to moderate reaction with hcl suggests some calcite cement; grain supported with occasional fragments displaying a white kaolinitic matrix; increasing amount of loose grains in sample.

5220' Shale = Medium blush gray to grayish green to medium gray with light olive brown to medium yellow streaks; brittle to slightly crumbly tenacity; planar to sub-blocky; tabular to platy to slightly wedge-like in habit; dull earthy to semi waxy luster; predominately smooth to clayey to slight matte in texture; 2-5% paleosols visible in sample; no other visible bedding features.

5330' Siltstone = Very light gray to light bluish gray to medium bluish gray; crunchy to crumbly tenacity; planar to slight hackly fracturing; cuttings tend to be platy to slight wedge-like to semi tabular in habit; slight frosted to semi to slight greasy luster; gritty to silty texture.

5420' Carbonaceous Shale = Brownish gray to olive gray to dark olive gray; crunchy to crumbly to occasionally stiff tenacity; predominately planar to slight hackly fracturing; visible beds of carbonaceous material; visible veins of pyrite in sample; cuttings tend to be wedge-like to semi tabular in habit; frosted to earthy luster; texture ranges from smooth to silty; thick structure.

5530' Sandstone = White to translucent to medium light gray; dominant quartz frame-work with approximately 10% fine black lithic clasts embedded; coarse to fine grained with poor sorting; angular to very angular with low sphericity; easily friable to friable to occasionally firmly friable; strong to moderate strong reaction with HCl suggests calcite cement; matrix supported with calcite matrix; abundant pyrite in sample as an accessory mineral; no visible bedding.

5660' Shale = Pale blue to medium bluish gray to medium gray; brittle to slightly crunchy tenacity; fractures from planar to slightly splintery; cuttings are platy to flaky to semi tabular; waxy to dull luster; silty to smooth texture; grading from siltstone; occasional dusky-red and dark greenish yellow hues observed on some of the sample; thick structure.

5770' Siltstone = Medium dark gray to moderate brown to moderate olive brown; crumbly to slightly brittle tenacity; irregular to blocky fracturing; cuttings are tabular to slightly massive habit; earthy to waxy luster; texture mostly ranges from gritty to silty and occasionally slightly clayey; thick structure.

5870' Carbonaceous Shale = Grayish black to brownish black; dense to brittle with occasionally a slightly crumbly tenacity irregular to planar to sub blocky fracturing; wedge-like cuttings; polished to earthy luster; texture is smooth to silty; thin structure; interbedded with sandstone; shale and siltstone.

5960' Sandstone = White to medium light gray to translucent; quartz framework; coarse to fine grained with poor sorting; angular to sub-angular with low sphericity; easily friable to friable; abundant loose grains in sample; calcite cement; matrix supported with calcite; strong reaction with dilute HCl; trace amounts of pyrite present in sample as an accessory.

6070' Shale = Medium light gray to medium dark gray with occasional dusky red and dark greenish yellow hues; crumbly to slightly crunchy to predominately brittle tenacity; planar to slight hackly fracturing; cuttings to be platy to flaky to occasionally tabular in habit; dull earthy to semi waxy to slight greasy luster; smooth to clayey texture; no other visible bedding features.

6180' Siltstone = Medium gray to light olive gray to light greenish gray; crunchy to stiff to occasionally crumbly tenacity; predominately hackly to slight blocky to slightly planar fracturing; cuttings tend to be platy to nodular to wedge-like to semi tabular in habit; slight frosted to semi sparkling to slight waxy luster; occasionally granular to semi gritty to predominately silty texture; no other visible bedding features.

6300' Coal = Brownish black to olive black to occasionally olive gray; tough to stiff to slight crunchy tenacity; predominately planar to blocky to splintery fracturing; cuttings tend to be wedge-like to elongated tabular in habit; dull earthy to slight greasy to sparkling luster; gritty to smooth to silty texture; visible beds of carbonaceous material; visible degassing along carbonaceous beds.

6410' Sandstone = Translucent to white to very light gray to light brownish gray; mostly quartz framework with 2-3% dark lithics visible in sample; coarse to medium to predominately fine grain; poor to fair sorted; sub-round to sub-angular grains; moderate to low sphericity; no visible bedding features on grains; hard to moderate hard to occasionally firm friable; no visible hydrocarbons in sample; grain supported; calcite cementation due to moderate reaction in dilute HCl.

6550' Siltstone = Very light gray to light olive gray to light bluish gray; crunchy to crumbly to stiff tenacity; irregular to blocky to predominately hackly fracturing; cuttings tend to be platy to bladed to elongated tabular in habit; dull earthy to semi sparkling to slight frosted luster; silty to gritty to semi granular texture.

6650' Shale = Light greenish gray to yellowish gray to pale yellowish brown; brittle to crumbly tenacity; planar to slight hackly fracturing; cuttings tend to be platy to flaky to semi splintery in habit; dull earthy to semi greasy to slight waxy luster; matte to smooth to clayey texture; no other visible bedding features.

6750' Sandstone = White to translucent to very light gray; mostly quartz framework with 1-2% chlorite visible in sample; coarse to very coarse to medium; grades into a gritty siltstone; fair to well sorted; sub-angular to sub-round grains; low to moderate sphericity; no visible surface features; unconsolidated grains due to bit action; firm

friable to moderate hard to hard; calcite cementation due to high reaction in dilute HCl; no visible hydrocarbons; grain supported.

6890' Shale = Yellowish gray to light greenish gray to light yellowish gray; crunchy to crumbly tenacity; planar to slight hackly fracturing; cuttings tend to be platy to flaky in habit; dull earthy to slight greasy luster; smooth to matte to slight clayey texture.

6970' Sandstone = Medium light gray to white to translucent and occasionally light brownish gray; quartz framework with trace small black lithic clasts; medium grained with fair to poor sorting; sub-angular to sub-rounded with moderate to low sphericity; firmly friable to friable; abundant loose grains in sample moderated to strong reaction with HCl suggests calcite cement; matrix support; contains trace amounts of pyrite.

7090' Carbonaceous Shale = Black to grayish black to brownish black; crumbly to slightly brittle tenacity; blocky to semi planar fracturing; tabular to wedge-like cuttings; smooth to silty texture; thin structure.

7160' Shale = Very light gray to light gray to occasionally medium gray; predominately brittle to crumbly to slightly crunchy tenacity; predominately planar to slight hackly to semi splintery fracturing; cuttings tend to be platy to flaky to occasionally tabular to wedge-like in habit; dull earthy to greasy to semi-resinous luster; matte to predominately smooth to clayey texture; no other visible bedding features.

Note = Rigwatch down from 7195' MD to 7658' MD. Caught sample based off bottoms up strokes; unable to correlate gas.

7330' Siltstone = Light olive gray to brownish to medium gray; crunchy to stiff to tough tenacity; irregular to planar to predominately hackly fracturing; cuttings tend to be tabular to elongated wedge-like in habit; sparkling to slight greasy to semi frosted luster; occasionally granular to gritty to silty texture; no other visible bedding features.

7430' Ohio Creek Sandstone = White to translucent to very light gray; 3-5% dark lithics visible in the sample; very coarse to medium to predominately coarse grain size; fair to well sorted; sub-angular to sub-round grains; moderate to high sphericity; grains have a slight polish appearance; unconsolidated grains due to bit action; firm friable to moderate hard; grain supported; calcitic cementation due to high reaction in dilute HCl; no visible hydrocarbons in sample; grain supported; mostly quartz framework.

7580' Shale = Light greenish gray to light bluish gray to very light gray; brittle to crumbly tenacity; predominately planar to slight blocky fracturing; cuttings tend to be platy to flaky to slight bladed in habit; dull earthy to semi waxy to slight greasy luster; clayey to smooth to matte texture; thin beds of carbonaceous material visible through out the sample; no other visible bedding features.

7700' Limestone = Light brownish gray to light olive gray to semi greenish gray; tough to stiff tenacity; dissolves readily in dilute HCl; irregular to hackly to semi splintery fracturing; cuttings tend to be elongate tabular to wedge-like to predominately nodular in habit; sparkling to slight frosted to semi waxy to slight resinous luster; matte to crystal'n texture; no other visible bedding features.

7820' Shale = Light greenish gray to very light gray; brittle to crumbly to occasionally crunchy tenacity; predominately planar to slight hackly to semi blocky fracturing; cuttings tend to be platy to flaky to occasionally tabular in habit; dull earthy to semi greasy luster; clayey to smooth to predominately matte texture; no other visible bedding features; no accessory minerals present in sample.

7940' Sandstone = White to very light gray to light gray with a few light greenish gray; mostly quartz frame-work; visible chlorite crystals and 5-6% carbonaceous material visible in sample; very coarse to coarse; poor to fair sorted; sub-angular to angular grains; moderate to high sphericity; no visible surface features; firm friable to friable to occasional moderate hard; grain supported; no visible hydrocarbons; calcite cementation due to moderate reaction in dilute HCl.

8080' Carbonaceous Shale = Olive gray to medium gray to occasionally medium dark gray; crunchy to crumbly to semi brittle tenacity; visible beds of carbonaceous material; irregular to slight planar to blocky fracturing; cuttings tend to be platy to flaky in habit; dull to sparkling to semi metallic to slight frosted luster; gritty to occasionally granular to silty texture; visible degassing along carbonaceous material beds; thinly bedded carbonaceous material visible through out the sample.

8220' Siltstone = Very light brownish gray to light yellowish gray; crunchy to semi stiff tenacity; irregular to slight planar to hackly fracturing; cuttings tend to be wedge-like to semi tabular in habit; slight frosted to semi sparkling luster; gritty to granular texture; no other visible bedding features.

8310' Sandstone = White to translucent to very light gray mostly quartz framework with 1-2% dark lithics visible in sample; very coarse to coarse; poor to fair sorted; sub-angular to angular grains; moderate to low sphericity; grains have a slight frosted appearance; moderate hard to firm friable; unconsolidated grains due to bit action; calcite cementation due to moderate reaction in dilute HCl; no visible hydrocarbons in sample; grain supported; layers of carbonaceous materials observed.

8450' Sandstone = White to very light gray to translucent; dominate quartz framework; fine to occasionally medium grained with fair to semi well sorting; sub-angular to sub-rounded with moderate sphericity; easily friable to friable with majority sample in loose grains from bit action; strong to moderate reaction with HCl suggests calcite cement; white kaolinitic along with some possible calcite cement; less than 5% fine black lithics in sample; no visible bedding.

8580' Carbonaceous Shale = Grayish black to brownish black; crumbly to slightly brittle tenacity; fractures from irregular to blocky; cuttings produce a wedge-like to tabular habit; earthy to polished luster; smooth to silty texture thin structure; interbedded with sandstone.

8670' Siltstone = Medium light gray to brownish gray; brittle to slightly dense tenacity; irregular fracturing; cuttings are tabular to slightly massive; earthy to waxy with a slight sparkling luster; silty to occasionally gritty texture; thick to slightly massive structure.

8750' Shale = Medium light gray to medium bluish gray with occasional moderate yellow hues; brittle to crunchy tenacity fractures from planar to blocky; cuttings display a tabular to platy habit; dull to earthy luster; texture is smooth to silty; thin to laminae structure.

8840' Sandstone = White to very light gray to medium gray with some translucent; quartz framework with approximately 3-5% black lithic clasts; medium to fine grained with poor sorting; angular to sub-angular; with low sphericity; firmly friable to friable with abundant loose grains in sample' strong reaction with HCl suggests calcite cement; kaolinitic cement; trace amounts of pyrite in sample.

8960' Carbonaceous Shale = Black to grayish black; crumbly to brittle tenacity; fractures from blocky to irregular; nodular to wedge-like cuttings; polished to resinous luster; smooth texture; thin structure; interbedded with sandstone and shale.

9040' Sandstone = White to translucent to very light gray; mostly quartz framework with 1-3% dark lithics visible in sample; very coarse to granular to coarse grain; angular to sub-angular grains; high to moderate sphericity; grains have a slight polished appearance; visible bands of carbonaceous material in sample; visible calcite fractures in sample; unconsolidated grains due to bit action; firm friable to moderate hard; high reaction in dilute HCl indicating a calcite cementation; grain supported; no visible hydrocarbons in sample.

9190' Shale = Very light gray to yellowish gray to occasionally light greenish gray; brittle to crumbly to occasionally semi-malleable tenacity; irregular to predominately planar to semi hackly fracturing; cuttings tend to be platy to semi elongated tabular to slight wedge-like in habit; dull earthy to semi greasy to slight waxy luster; smooth to clayey to occasionally matte texture; no other visible bedding features.

9310' Carbonaceous Shale = Light brownish gray to light olive gray to brownish black; crunchy to crumbly to semi brittle tenacity; irregular to blocky to semi splintery fracturing; cuttings tend to be platy to flaky in habit; slight frosted to semi sparkling to slight greasy luster; smooth to semi gritty to silty texture; visible beds of carbonaceous material; grades into a fine grain siltstone.

9430' Shale = Very light gray to light brownish gray to medium gray; crunchy to brittle to crumbly tenacity; predominately planar to hackly fracturing; cutting tend to be platy to flaky to elongated tabular in habit; dull earthy to slightly waxy luster; texture is smooth; structure is thin to laminae.

9520' Sandstone = White to light gray to occasionally medium dark gray; quartz framework with approximately 5-10% black lithic clasts; coarse to fine grained with poor sorting; angular to sub-angular with low to moderate sphericity; firmly friable to occasionally moderate hard; moderate to strong reaction with HCl suggests calcite cement; matrix support; finer grained sandstone tends to be more brownish gray and is grading into siltstone.

9650' Shale = Medium bluish gray to medium light gray with occasional moderate yellow hues; tenacity is brittle to crunchy to occasionally slightly crumbly planar to splintery fracturing; cuttings are flaky to tabular; smooth to silty texture; laminae to thin structure; fracture fill observed running through some of the sample.

9750' Carbonaceous Shale = Black to grayish black; brittle tenacity; blocky to irregular fracturing; cuttings are nodular to wedge-like; resinous to polished luster; smooth to silty texture thin structure; high gas associated with sample.

9830' Siltstone = Brownish gray to olive gray; dense to crumbly tenacity; fractures from blocky to irregular; cuttings are massive to tabular; earthy to dull to waxy with a slight sparkling luster; silty to gritty texture; grading from fine grained sandstone.

9910' Sandstone = Light brownish gray to light olive gray to white to very light gray; mostly quartz framework with 5-6 % dark lithics visible in the sample; coarse to medium to fine grain; poor to fair sorted; sub-round to round grains; low to moderate sphericity; grains have a slight frosted appearance; firm friable to moderate hard; calcite cementation due to high reaction in dilute HCl; no visible hydrocarbons in sample; grain supported; visible bands of carbonaceous shale.

10050' Shale = Very light greenish gray to light gray; crunchy to crumbly to semi brittle tenacity; predominately planar to slight blocky fracturing; cuttings tend to be platy to flaky in habit; dull earthy to semi greasy luster; smooth to clayey to slight matte texture; no other visible bedding features.

10140' Siltstone = Very light gray to medium light gray to light olive gray; crunchy to crumbly to predominately stiff tenacity; planar to irregular to slightly blocky fracturing; cuttings are tabular to slightly massive; dull to earthy with a slight sparkling luster; silty to gritty texture; thick structure.

10230' Carbonaceous Shale = Brownish black to grayish black to black; brittle to crumbly tenacity; irregular to planar to occasionally slightly blocky fracturing; cuttings are tabular to wedge-like; earthy to polished luster; smooth to silty texture; thin structure; pyrite crystals visible in sample; visible bands of carbonaceous material in sample; visible degassing in sample.

10360' Sandstone = Medium gray to brownish gray; quartz framework with fine to very fine grains; well sorted; sub-rounded to sub-angular with moderate sphericity; moderate hard to slightly firmly friable grain supported; slight reaction with HCl suggests some calcite cement; no visible bedding; thin layers of carbonaceous shale can occasionally be seen in some of the sample; contains trace amounts of pyrite as accessory.

10480' Coal = Black; tenacity is slightly brittle to mostly crumbly to pulverulent fractures from planar to blocky; cuttings are wedge-like to nodular; polished to resinous to earthy luster; smooth to clayey texture; thin structure; high gas associated with sample.

10560' Carbonaceous Shale = Brownish black to grayish black; tenacity is brittle to slightly dense; fractures from planar to semi blocky; cuttings display a platy to tabular habit; waxy to earthy luster; texture is smooth to silty to occasionally clayey; thick structure; high gas associated with sample.

10650' Shale = Greenish gray to pale blue to medium dark gray with occasional dark greenish yellow hues; tenacity is brittle to crumbly; fractures from splintery to planar; cuttings are platy to flaky; dull waxy luster; smooth to silty texture; thick structure.

10730' Siltstone = Medium dark gray to brownish gray to moderate olive brown; dense to brittle tenacity; blocky to planar fracturing; cuttings are tabular to slightly platy; earthy to dull to slightly sparkling luster; silty to gritty texture; thin structure.

10810' Sandstone = White to translucent to very light brownish gray; mostly quartz framework with 1-3% dark lithics visible in the sample; very coarse to coarse to medium grain size; fair to poorly sorted; sub-angular to sub-round grains; high to moderate sphericity; no visible surface features; firm friable to moderate hard; grain supported; no visible hydrocarbons in sample; calcite cementation due to moderate to high reaction dilute HCl.

10940' Carbonaceous Shale = Grayish black to brownish black to medium dark gray; crunchy to crumbly to slight brittle tenacity; predominately planar to slight hackly to semi splintery cuttings habit; cuttings tend to be wedge-like to semi elongated tabular to platy cuttings habit; greasy to occasionally sparkling to dull earthy to

semi waxy luster; predominately gritty to silty to slight matte texture; visible degassing along carbonaceous material beds; massive structures.

11080' Coal = Black to brownish black to olive black; crunchy to stiff tenacity; irregular to blocky to predominately conchoidal fracturing; cuttings tend to be wedge-like to occasionally bladed to elongated tabular in habit; predominately greasy to waxy to semi sparkling to slight vitreous luster; predominately matte to smooth to occasionally silty to gritty texture; visible degassing through out the sample.

11200' Sandstone = Translucent to light brown to light gray to white; dominate quartz framework with approximately 5% black lithic clasts interbedded; fine to medium fine grained with well sorting; sub-round to sub-angular with moderate sphericity; firmly friable to moderate hardness; grain supported; light to moderate reaction with HCl suggests calcareous cement; thin laminar coal and carbonaceous banding observed; high gas associated with sample.

11330' Carbonaceous Shale = Grayish black to brownish black to black; crunchy to slightly brittle tenacity; mostly planar to slightly blocky fracturing; cuttings are splintery to tabular to platy; earthy to occasionally dull to resinous luster; smooth to clayey to silty texture; thick structure.

11420' Sandstone = White to very light gray; beach sand; quartz framework; medium grained with well sorting; sub-rounded with moderate sphericity; moderate hard to hard; calcareous cement; moderate to weak reaction with HCl; contains trace fine black lithic clasts; no visible bedding; frosted surface abrasion features on the quartz grains; abundant loose grains from bit action.

11530' Shale = Grayish green to pale blue to medium gray; brittle to crumbly tenacity fractures from planar to splintery; platy to flaky cuttings; waxy to dull luster; smooth texture; laminae to thin structure; interbedded with sandstone and carbonaceous shale.

11610' Carbonaceous Shale = Light olive gray to brownish gray; crunchy to crumbly to occasionally brittle tenacity; blocky to slight splintery to semi planar fracturing; cuttings tend to be platy o wedge-like to slight tabular in habit; dull to semi sparkling to slight greasy luster; predominately gritty to silty to semi granular texture; visible bands of carbonaceous material visible through out the sample; visible degassing along the bands.

11740' Sandstone = Light brownish gray to light gray to white to occasional translucent; mostly quartz framework with 4-5% dark lithics visible in sample; very coarse to coarse to occasionally medium grain size; fair to poorly sorted; sub-round to round grains; moderate to high sphericity; grains have a slight pitted appearance; a few unconsolidated grains due to bit action; firm friable to moderate hard to very hard; grain supported; a few visible hydrocarbons in sample @ 11880' in a firm coarse grain sandstone; cementation is probably more silicious than calcitic due to very low reaction in dilute HCl; no other visible bedding features.

11920' Siltstone = Light brownish gray to light gray to light bluish gray; crunchy to crumbly to semi stiff tenacity; blocky to slight planar to predominately hackly fracturing; cuttings tend to be semi wedge-like to elongated tabular in habit; slight frosted to semi sparkling to slight greasy luster; gritty to silty to slightly clayey texture; thick structure.

12020' Carbonaceous Shale= Brownish black to black to olive black; dense to slightly brittle tenacity; blocky to irregular to occasionally slightly planar fracturing; cuttings are nodular to wedge-like; resinous to greasy to earthy luster; smooth to silty to clayey texture; thin structure; interbedded with sandstone and siltstone.

12120' Sandstone = Brownish gray to medium light gray to olive gray; quartz framework with less than 5 % black lithic clasts interbedded; fine to medium grained with well sorting; sub-rounded to sub-angular with moderate sphericity; frosted surface abrasion; hard to moderate hard; grain supported; no reaction with HCl suggests siliceous cement; no visible bedding.

12230' Siltstone = Light bluish gray to light brownish gray; crunchy to predominately stiff to semi brittle tenacity; hackly to planar to occasionally blocky fracturing; cuttings tend to be platy to semi tabular to occasionally wedge-like in habit; frosted to slight sparkling to semi greasy luster; gritty to granular to silty texture; no other visible bedding features.

12340' Coal = Olive black to grayish black to brownish black; stiff to crunchy to occasionally crumbly tenacity; blocky to predominately conchoidal to semi planar fracturing; cuttings tend to be mostly wedge-like to slight

elongated tabular to slight bladed in habit; dull earthy to waxy to semi sparkling luster; matte to smooth to slight gritty texture; visible degassing along the carbonaceous material.

12460' Sandstone = Very light gray to white to very light brownish gray; mostly quartz framework with 7-8% dark lithics visible in sample; coarse to medium to mostly fine to very fine grain; fair to well sorted; round to sub-round grains; low sphericity; hard to very hard; very low to no reaction with HCl suggests siliceous cement; no visible bedding.

12560' Siltstone = Brownish gray to olive gray to brownish black; tough to slightly brittle tenacity; irregular to blocky fracturing; cuttings are massive to tabular; earthy to dull with a sparkling luster; silty to gritty texture; massive to thick structure.

12640' Shale = Medium gray to medium bluish gray with light olive brown hues; brittle to slightly crunchy tenacity; planar to splintery fracturing; cuttings are platy to flaky; dull waxy luster; silty to smooth texture; laminae to thin structure.

TD FRU 197-33B6 ON 07/17/2010 @ 12775' MD

**Exxon Mobil
Freedom Ranch Unit 197-33B6**

Daily Activity Summary

**NOTE – Data for This Section Provided By Exxon Mobil, Baker Hughes,
Hemlerich & Payne, and Onsite Epoch Personnel**

- 3/30/2010** Skid the rig from B1 to B6. Stabilize the riser onto the new well, and start rig up to drill after skid. Tighten storm clamps, and unhook hoses from upper skid rams. Allow steam to circulate in the sub and the floor. Allow water to circulate to sub and floor. Hook up mud line to day tank, and hook up mud line between upper and lower sub sections. Move power washer tank and pumps to gain access to B1 well. Hook up flow line to pit manifold. Install flow line extension, and hook up flow line to rotating head. Install long turnbuckles across hammer seal. Walk pipe wrangler, set down beaver slide. Hook up Geronimo line. Hook up cellar tarps. Assist in installing valves, and cap on well B1. Removing casing bales, and install drilling bales and elevators. Conduct a hazard hunt. Pressure test mud line to 3000psi. Slip and cut drill line of about 75 feet. Service the top drive with 5 shots in bonnet seal, and 2 shots in wash pipe. Pick up bit and directional tools. Tag at 149'. Conduct a shallow hole test for tool. Drill and slide from 170' to 230'.
- 3/31/2010** Drill and slide from 230' to 475'. Pull heavy weight drill pipe, and run collars back in to the hole. Pick up jars, and run into the hole. Drill and slide from 475' to 485'. Lay down single, and rig up wireline. Drill and slide from 485' to 1684'.
- 4/01/2010** Drill and slide from 1684' to 2473'. Service the top drive with 6 shots in bonnet seal. Drill and slide from 2473' to 4055'. Pump high viscosity sweep, and circulate to surface.
- 4/02/2010** Circulate sweep around, and pump a slug. Pull out of the hole from 4053' to surface. Lay down Bottom Hole Assembly. Move subs, and bit off the floor. Clean the rig floor. Lay down bales and elevators, and install bushings. Pull up the casing running tool, and rig up the casing tongs. Service the rig with 7 shots in the bonnet seal. Hold pre-job, and pick up shoe track and run 10.75" casing to 1781'. Fill casing and circulate. Run 10.75" casing from 1781' to 2715'. Circulate in casing with 100 mud viscosity and a 10ppg mud weight. Pick up DV tool and run 10.75" casing from 2715' to 3078'. Wash down from 3078' to 4050'. Circulate bottoms up, while meeting with Halliburton. Blow out Topdrive, stand pipe and mud line. Rig up Halliburton cement head, and connect cement lines.
- 7/03/2010** Skid from FRU197-33B1 to FRU197-33B6. Move pipe wrangler, and nipple up BOP, flow line and mud line.
- 7/04/2010** Rig up turnbuckles, mud line, trip tanks lines, flow line and the Roggless decent. Run heavy weight in the hole, and rig up test plug. Tested Blow Out Preventer, and rig down tester stand. Rack back heavy weight drill pipe, and switch out jars. Install wear bushing. Conduct a safety meeting on picking up power drive and directional tools. Pick up power drive, and make up bit. Pick up drill collars and MWD tools. Pick up and run Bottom Hole Assembly in the hole. Test MWD tool at 450 GPM. Cut and slip 60' of drill line. Conduct a hazard hunt. Trip in the hole from 920' to 1302', and test casing pressure test. Wash to DV tool, and drill out DV tool. Conduct another casing pressure test for half an hour. Circulate at 1363', and conduct another casing pressure test. Trip into the hole from 1363' to 3686'.
- 7/05/2010** Wash and ream and tag cement. Drilled out cement, float, and shoe, and then drilled 10' of new formation. Condition and circulate the mud. Perform P.I.T. Drill ahead from 4065' to 5307'.
- 7/06/2010** Drilled from 5307' to 5402', and pump a sweep around. After sweep came to surface, a slug was pumped down hole. Tripped out of the hole from 5402' to 827'. Pull rotating rubber, and set back heavy weight drill pipe and 7.25" drill collars. Trip in the hole with new Bottom Hole Assembly, and continue to trip into the hole from 892' to 4267'. Wash and ream from 4267' to 4435'. Trip in hole from 4435' to 5402', and drilled from 5402' to 6136'.
- 7/07/2010** Drill from 6136' to 6912'. Conduct a rig service with 3 shots in the bonnet seal. Continue to drill ahead from 6912' to 7662'. Condition and circulate the mud. Conduct a safety stand down.
- 7/08/2010** Continue with safety stand down. Drilled from 7662' to 8341'. Conduct a rig service, and then continue with drilling ahead from 8341' to 8937'. Circulate and work on mud pump number 1. Continue to drill ahead from 8937' to 9089'.
- 7/09/2010** Drill from 9089' to 9242'. Conduct a rig service with 5 shots in the bonnet seal, and fix wash out module. Drill from 9242' to 9977'.

7/10/2010 Drill from 9977' to 10248'. Conduct a safety Step back on changing out rotating head. Changed out the rotating head. Drilled from 10248' to 10334'.

7/11/2010 Drilled from 10334' to 10343'. Rack a stand back, and circulate sweeps around. Bring mud weight up from a 9.4 to a 9.6, and relax the well. Displace and spot 80bbls of 12.5ppg mud. Back reamed out of the hole from 10234' to 7696'. Pull out of the hole using positive displacement from 7696' to 6635'. Back ream from 6635' to 5705'. Pull out of the hole using positive displacement from 5705' to 5660'.

7/12/2010 Use positive displacement out of the hole from 5660' to 4043'. Circulate a sweep around at the shoe, and conduct a flow check. Displace with 60bbls of 12ppg mud, and then followed by 275 strokes of active 9.6 mud. Trip out of the hole on trip tanks from 4043' to 892'. Remove rotating rubber, a stand of heavy weight drill pipe, and the jars. Lay down 16 7.25 drill collars, two string stabilizers, a float sub, a Tele-drift, and a near bit transition sub. Break the bit off, while still on the trip tanks. Pick up 7.875" bit, near bit, two string stabilizers, a float sub, and 16 6.5" drill collars. Also picked up a cross over. Installed the rotating head rubber, while still on trip tanks. Trip in the hole from 892' to 4043' on the trip tanks. While circulating a bottoms up at the shoe, they cut and slip drill line to about 60'. Service the rig with 5 shots in the bonnet seal. Trip in to the hole from 4043' to 5853' on trip tanks. Fill pipe, and was and ream from 5853' to 8058'.

7/13/2010 Wash and ream from 8058' to 8424'. Pump a sweep at 8424', and continue to wash and ream from 8424' to 10330'. Circulate a bottoms up at 10330', and then circulate a sweep around. Drill from 10343' to 10494'. Service the rig, and continue to drill ahead from 10494' to 10904'.

7/14/2010 Drill from 10904' to 11116', and circulate on the choke while changing out gasket on the flow line. Drill from 11116' to 11215', and circulate on the choke again. Start weighting the mud up to a 9.6, and change the gasket on the flow sensor. Drill from 11215' to 11283'. Drill from 11283' to 11308', and circulate through the choke. Drill from 11308' to 11409', and circulate through the choke. Drill from 11409' to 11680'.

7/15/2010 Drill ahead from 11680' to 11951'. Service top drive (8 shots in bonnet seal). Drill ahead from 11951' to 11975'. Change swab on #2 pump #2 POD. Drill ahead from 11975' to 12298'.

7/16/2010 Drill ahead from 12298' to 12520'. Service top drive (10 shots in bonnet seal). Drill from 12520' to 12568'. C/O pop off on #1 pump. Drill to 12775'. Circulate and relax the well. Back ream out from 12775' to 12522'.

7/17/2010 Back ream from 12522' to 10323'. Circulate at transition and pump high viscosity sweep at 60 spm. Circulate bottoms up at 30 spm and spot 12.5 ppg mud at 10323'. Trip out of hole from 10323' to 4012' using PDM. Circulate bottoms up and monitor well. Spot 80 bbls of 12.5 ppg mud. Pull out of hole from 4012' to 893', then monitor well. Lay down BHA from 893'. Pull wear bushing and remove bales and elevators from top drive. Rig up CRT. Rig service (4 shots in bonnet seal). Install dummy hanger into well. M/U shoe track and Baker Lock first four joints above top float. Run casing from 340' to 1,719'.

7/18/2010 Run casing from 1,719' to 4,023'. Circulate bottoms up at 4,023' at 45spm. Pull trip nipple and install rotating head. Run casing from 4,023' to 6,888'. Wash down from 6,888' to 7,013'. Run casing from 7,013' to 8,474'. Wash down from 8,474' to 8,510'. Run casing from 8,510' to 9,064'. Run casing from 9,064' to 12,722'. Pull rotating head, and move up landing joint. Circulate a bottoms up. Rig down casing running tool, and rig up cement equipment. Pump 50bbls of poly flake, and displace with 435 bbls of mud. Pressure test cement lines to 250psi and 5,000 psi. Pump 70bbls of tuned spacer at 11.0ppg. Drop bottom plug. Pump 1,081bbls of cement at 12.0ppg.

7/19/2010 Pump 849bbls of cement at 12ppg. Displace with 180bbls of NaCl water at 8bbls/min and a pump pressure of 2450psi. Bumped the plug with 1850psi, and bleed back. Wash down Haliburton lines. Conducted a job safety meeting with Haliburton. Rig down cementer's tools. Lay down landing joint, and set pack off. Lay down casing bails and elevators, and rig up drill pipe assembly and elevators. Cap well head and test. Skid over to FRU197-33B9.

Exxon Mobil
Freedom Ranch Unit 197-33B6
Survey Data and Plots

EXXONMOBIL**PICEANCE CREEK, COLORADO****Freedom Ranch Unit 197-33B6**


SURVEY SUMMARY

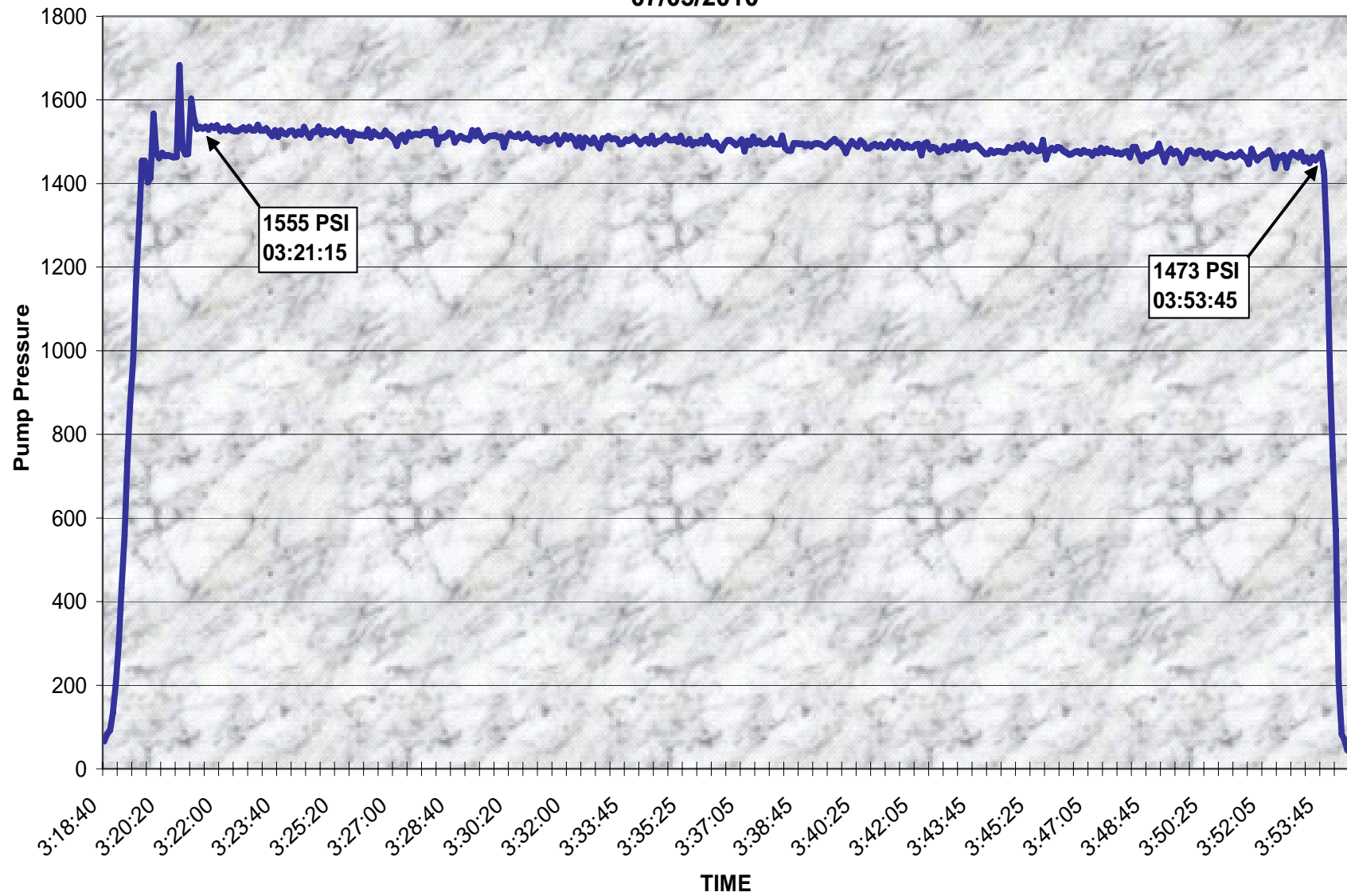
MEASURED DEPTH	INCL	AZIMUTH	TVD	VERTICAL SECTION	COORDINATES		DOGLEG SEVERITY
					N/S	E/W	
0	0	0	0	0	0	0	0
30	0	0	30	0	0	0	0
83	0.63	209.52	82.99893	-0.16163	-0.25355	-0.14357	1.18868
113	0.62	218.08	112.9972	-0.32204	-0.52484	-0.32494	0.31273
143	0.68	250.25	142.9953	-0.36916	-0.71276	-0.5926	1.21587
173	0.79	276.5	172.9929	-0.23382	-0.7495	-0.96564	1.16854
204	1.16	298.59	203.9885	0.14171	-0.57515	-1.4535	1.6806
234	1.58	309.78	233.9799	0.7711	-0.1652	-2.03799	1.65353
264	2.19	317.77	263.9636	1.70311	0.52387	-2.7411	2.20922
294	2.77	323.38	293.9354	2.9699	1.53012	-3.55877	2.09358
400	4.67	332.83	399.7022	9.90064	7.52035	-7.07198	1.61856
489	6.65	335.96	488.2641	18.67184	15.4507	-10.8261	2.25077
578	8.62	336.43	576.4707	30.4795	26.2713	-15.5929	2.21458
669	10.45	334.37	666.21	45.5406	39.96379	-21.8901	2.04533
764	12.23	332.38	759.352	64.21701	56.64848	-30.2824	1.91815
861	14.69	330.18	853.681	86.7755	76.42548	-41.1633	2.59
957	16.07	331.64	946.2412	112.2141	98.67947	-53.5284	1.49291
1054	17.22	330.5	1039.175	139.9773	122.991	-66.9763	1.23238
1174	19.22	332.06	1153.154	177.4718	155.9037	-84.9795	1.71537
1268	20.06	331.12	1241.685	209.052	183.6893	-100.015	0.95471
1363	20.42	330.51	1330.818	241.8883	212.3814	-116.043	0.43925
1459	20.58	330.2	1420.739	275.4664	241.6004	-132.672	0.20141
1554	20.75	330.84	1509.627	308.9548	270.7855	-149.17	0.29756
1648	20.6	331.07	1597.573	342.1173	299.7998	-165.283	0.18146
1742	20.5	331.47	1685.591	375.0945	328.7338	-181.144	0.18338
1839	20.46	331.57	1776.461	409.0181	358.5651	-197.328	0.05479
1935	20.18	331.85	1866.486	442.3438	387.9201	-213.128	0.30875
2030	19.96	331.79	1955.717	474.9351	416.6569	-228.523	0.23259
2126	20.71	330.2	2045.734	508.2675	445.8267	-244.705	0.97031
2220	20.24	329.74	2133.796	541.0958	474.2944	-261.159	0.52849
2318	19.02	329.55	2226.098	573.9541	502.7039	-277.795	1.2466
2414	19.5	327.76	2316.726	605.5161	529.7422	-294.27	0.79259
2508	20.18	327.08	2405.146	637.2554	556.6227	-311.452	0.76392
2602	20.66	328.01	2493.239	669.8909	584.2976	-329.048	0.61635
2697	21.03	328.5	2582.021	703.5693	613.0455	-346.833	0.43055
2793	21.18	328.13	2671.581	738.0105	642.4604	-364.99	0.20898
2887	21.28	327.83	2759.202	771.9073	671.3202	-383.038	0.15708
2982	21.34	327.29	2847.707	806.2635	700.4567	-401.557	0.21601
3079	21.01	326.79	2938.157	841.0984	729.8558	-420.619	0.38782

Note: All survey data provided by Schlumberger

**Exxon Mobil
Freedom Ranch Unit 197-33B6
Pressure Tests**

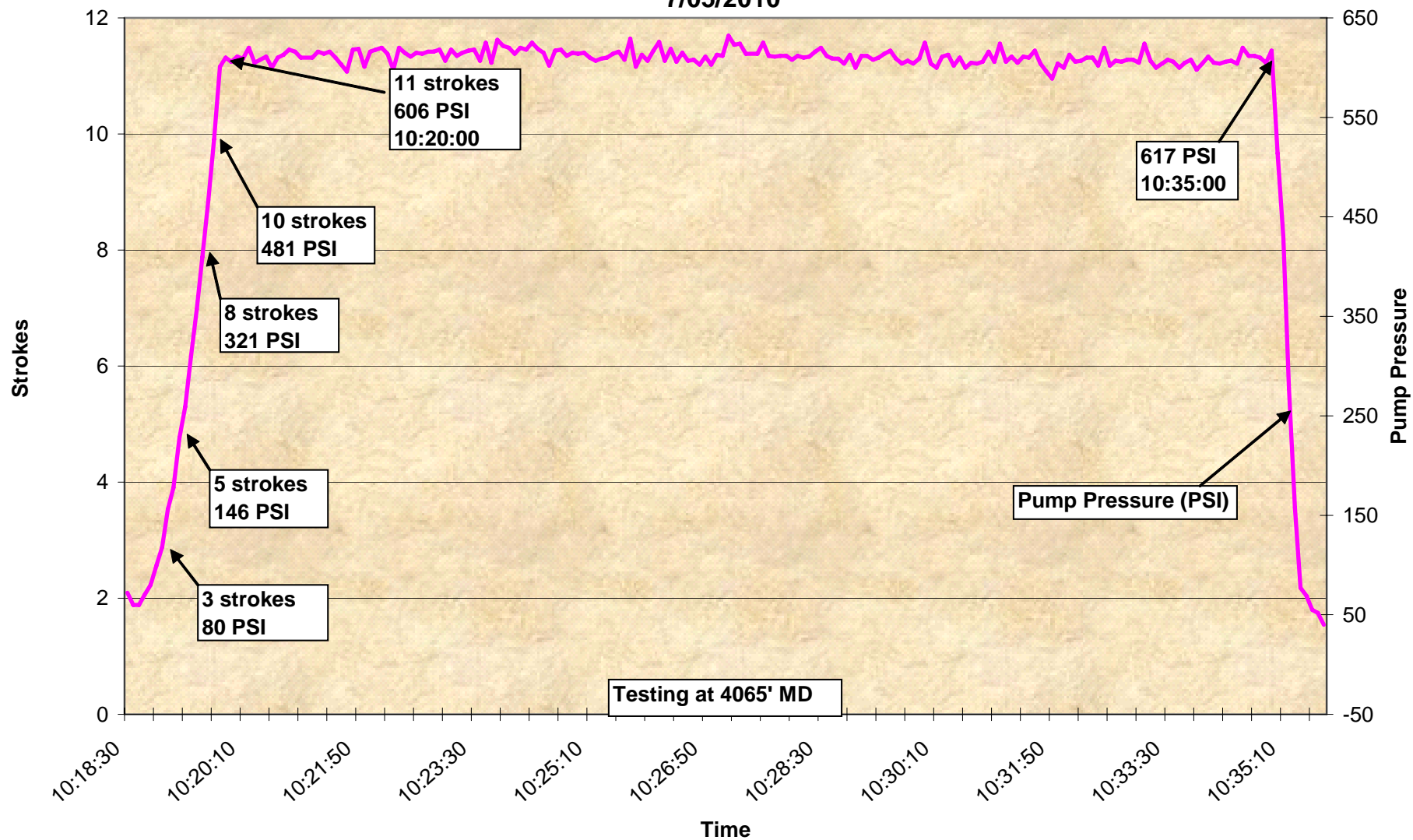


ExxonMobil FRU197-33B6
30 Min. 10.75" CPT 1363' MD
07/05/2010





ExxonMobil FRU 197-33B6
15 Min. FIT 4065' MD
7/05/2010



Exxon Mobil
Freedom Ranch Unit 197-33B6
Drilling Fluid Reports

FREEDOM RANCH UNIT FRU 197-33B6

WATER BASED MUD REPORT

Mud Engineering Services Provided By Baroid Fluid Services

Property	7/04/2010	7/05/2010	7/06/2010	7/07/2010	7/08/2010	7/09/2010	7/10/2010
Sample Temperature (deg F)	100	98	110	110	93	116	138
Sample Depth	4055	4316	5402	6200	8352	8998	10158
Mud Weight (lb/gal)	9.40	9.25	9.30	9.40	9.40	9.40	9.40
FV (sec/quart)	58	56	58	53	61	53	65
PV(cP)	16	17	19	15	17	17	24
YP (lb/100 ft ²)	28	25	27	28	21	19	25
Gels (10 sec lb/100ft ²)	9	9	8	8	11	9	12
Gels (10 min lb/100ft ²)	16	15	16	14	23	19	22
Gels (10 30 min lb/100ft ²)	20	20	22	18	35	30	41
API FL (cc/30 min)	7.0	6.0	7.6	6.4	7.6	6.8	8.0
Cake (API)	1	1	1	1	2	2	3
pH	9.80	10.90	9.80	9.70	9.90	9.70	10.00
PM	1.00	1.20	1.00	1.00	1.00	1.00	0.90
Pf	0.10	0.30	0.10	0.10	0.10	0.05	0.10
MF	0.95	1.00	1.30	1.00	0.35	0.45	0.50
Excess Lime (lb/bbl)	0.24	0.24	0.24	0.24	0.24	0.25	0.21
Hardness (mg/l)	20	40	20	20	40	40	40
Chlorides (mg/l)	1300	1300	1300	1300	1200	1300	1400
MBT (lb/bbl)	17.5	22.5	25.0	22.5	22.5	22.5	22.5
Retort Water (%)	92.0	93.1	92.8	92.5	94.0	94.2	94.0
Sand (%)	0.10	0.10	0.10	0.10	0.25	0.20	0.25
Corrected Solids (%)	7.0	6.4	6.9	7.2	5.7	5.5	5.6

FREEDOM RANCH UNIT FRU 197-33B6

WATER BASED MUD REPORT

Mud Engineering Services Provided By Baroid Fluid Services

Property	7/11/2010	7/12/2010	7/13/2010	7/14/2010	7/15/2010	7/16/2010	7/17/2010
Sample Temperature (deg F)	122	92	105	105	150	145	145
Sample Depth	10343	10343	10343	10936	11948	12500	12775
Mud Weight (lb/gal)	9.60	9.60	9.40	9.55	9.60	9.60	9.80
FV (sec/quart)	57	47	54	58	55	54	57
20PV(cP)	21	17	21	21	20	20	21
YP (lb/100 ft ²)	19	8	22	22	24	24	32
Gels (10 sec lb/100ft ²)	9	6	9	8	8	8	8
Gels (10 min lb/100ft ²)	16	12	15	12	13	12	18
Gels (10 30 min lb/100ft ²)	23	23	20	16	18	15	17
API FL (cc/30 min)	7.6	8.0	6.6	7.2	6.6	6.0	6.0
Cake (API)	2	2	1	2	½	½	½
pH	9.60	9.70	9.90	9.30	9.60	9.90	9.70
PM	1.10	0.80	0.90	0.60	0.95	0.90	0.85
Pf	0.05	-	0.05	-	0.10	0.25	0.30
MF	0.35	0.70	0.95	1.40	1.80	2.25	2.80
Excess Lime (lb/bbl)	0.27	0.21	0.22	0.16	0.22	0.17	0.15
Hardness (mg/l)	60	40	20	20	20	20	20
Chlorides (mg/l)	1300	1300	1300	1300	1300	1300	1300
MBT (lb/bbl)	22.5	22.5	22.5	22.5	22.5	20.0	20
Retort Water (%)	93.0	93.0	93.0	92.0	91.8	91.0	90.2
Sand (%)	0.35	0.30	0.25	0.40	0.40	0.30	0.30
Corrected Solids (%)	6.6	6.6	6.6	7.5	7.9	7.9	8.6

FREEDOM RANCH UNIT FRU 197-33B6

WATER BASED MUD REPORT

Mud Engineering Services Provided By Baroid Fluid Services

Property	7/18/2010	7/19/2010					
Sample Temperature (deg F)	90	90					
Sample Depth	12775	12775					
Mud Weight (lb/gal)	9.70	9.65					
FV (sec/quart)	51	45					
20PV(cP)	15	12					
YP (lb/100 ft ²)	17	18					
Gels (10 sec lb/100ft ²)	7	6					
Gels (10 min lb/100ft ²)	13	8					
Gels (10 30 min lb/100ft ²)	15	12					
API FL (cc/30 min)	6.4	7.0					
Cake (API)	½	1.0					
pH	9.70	9.10					
PM	0.80	0.70					
Pf	0.15	0.05					
MF	1.40	1.80					
Excess Lime (lb/bbl)	0.17	0.17					
Hardness (mg/l)	20	20					
Chlorides (mg/l)	1300	1300					
MBT (lb/bbl)	17.5	17.5					
Retort Water (%)	90.9	91.4					
Sand (%)	0.30	0.30					
Corrected Solids (%)	8.2	7.9					

Exxon Mobil
Freedom Ranch Unit 197-33B6
Bit History



FRU 197-33B6

[illegible]

Exxon Mobil
Freedom Ranch Unit 197-33B6
Ballooning Data

DEPTH (ft)	VOLUME (bbls)	Connection Gas (u)	Background Gas (u)	Mud Weight	Mud Losses (bbls)
4065	0	11	11	9.2	0
4162	3.2	18	10	9.2	0
4257	4	24	11	9.3	0
4353	4.4	17	13	9.3	0
4448	0.5	25	15	9.3	0
4543	15	66	23	9.3	0
4641	4.1	71	22	9.3	0
4737	2.3	17	17	9.3	0
4833	7.3	56	24	9.3	0
4930	4.2	63	14	9.3	0
5019	6.6	51	17	9.3	0
5114	3.5	31	15	9.3	12
5210	3.2	33	17	9.3	6.6
5305	2.9	15	11	9.35	0
5471	4.1	39	16	9.5	47
5565	7.6	208	36	9.5	51.3
5661	4.7	111	26	9.5	10
5757	5.9	105	23	9.4	32.3
5852	7.9	91	25	9.4	0
5949	1.2	1329	53	9.3	46
6045	4.1	1099	37	9.4	58
6142	0.7	746	33	9.35	235
6239	10.1	2802	50	9.35	189
6334	0.8	1051	60	9.3	137
6433	13.7	188	50	9.3	288
6527	NA	338	48	9.3	181
6623	NA	330	43	9.25	267
6718	5.9	610	33	9.25	96
6814	13.7	583	26	9.25	56
6910	29.2	770	44	9.2	38
7009	49.3	1695	39	9.2	32
7091	41	1514	40	9.2	26
7187	NA	NA	NA	9.2	NA

DEPTH (ft)	VOLUME (bbls)	Flow Out %	Connection Gas (u)	Background Gas (u)	Mud Weight	Mud Losses (bbls)
7284	27.3	0	1350	41	9.2	58
7379	24.5	1	851	15	9.2	68.9
7475	34.5	3	471	23	9.4	231.4
7571	21	1	919	47	9.4	358.7
7669	26	3	NA	118	9.4	157.1
7764	35	5	1247	27	9.4	434
7860	13	3	1097	38	9.4	408
7956	25	6	3330	50	9.35	357
8052	30	7	4105	149	9.2	480
8148	20	25	2516	93	9.4	277
8243	40	4	3185	45	9.4	353
8342	38	4	2152	81	9.4	221
8438	23	6	1437	89	9.4	135
8534	37	4	1134	145	9.4	225
8630	50	4	1134	114	9.4	133
8709	96	3	2105	123	9.4	187
8805	50	4	2257	98	9.4	147
8901	60	5	3604	151	9.4	152.3
8997	103	5	2576	107	9.4	171
9093	78	4	1941	72	9.4	218
9189	45	21	3604	57	9.4	210
9284	41	16	2674	46	9.4	137
9380	33	23	2948	23	9.4	239
9477	44	30	1349	37	9.4	102
9573	80	5	1799	45	9.4	54
9667	69	5	1210	62	9.4	47
9763	56	5	1669	71	9.4	147
9859	75	4	3331	129	9.4	270
9945	82	2	2576	88	9.5	311
10037	33	20	1941	1385	9.5	358
10134	41	11	2592	144	9.4	61
10229	37	7	1770	65	9.4	160

* When flow is zero, 11 bbls are subtracted to compensate for flow line draining.

DEPTH (ft)	VOLUME (bbls)	Flow Out %	Connection Gas (u)	Background Gas (u)	Mud Weight	Mud Losses (bbls)
10327	8	56	2812	113	9.4	82
10424	68	7	2184	75	9.4	0
10521	55	6	3696	194	9.4	0
10617	41	5	1171	695	9.4	0
10713	39	7	3146	964	9.4	109
10809	70	12	2150	774	9.5	169
10906	41	5	1581	679	9.5	40
10997	41	6	1752	254	9.55	51
11093	56	7	2286	263	9.55	820
11187	53	4	1709	793	9.5	369
11281	61	29	986	839	9.5	21
11380	73	11	951	542	9.6	
11476	49	30	1921	267	9.6	20
11572	47	33	2917	124	9.5	31
11663	38	14	2414	140	9.6	106
11759	54	24	2255	234	9.55	36
11855	83	21	2421	229	9.5	54
11951	63	28	2270	717	9.65	33
12048	34	13	2373	356	9.6	0
12138	42	24	2617	393	9.6	81
12236	51	12	2310	297	9.6	181
12333	55	12	1666	214	9.6	125
12427	51	12	1377	188	9.6	128
12524	35	11	1370	322	9.6	68
12621	59	13	1801	168	9.6	34
12718	33	14	1469	155	9.6	76

* When flow is zero, 11 bbls are subtracted to compensate for flow line draining.

Exxon Mobil
Freedom Ranch Unit 197-33B6
Losses and Gas Buster Data

ExxonMobil					FRU 197-33B6								CANRIG	
DATE		DEPTH		DAILY LOSSES (bbls)		FRACTURES		GAS BUSTER		FLARE		SHOWS		COMMENTS e.g. unusual and/or significant events/occurrences, detailed info on losses (e.g. full/partial lost returns, depth we see changes in flow from drilling parameters, etc), other general observations
DD/MM	START	END	Daily	Specific Depth of loss (if known)	EVIDENCE (Depth)	DEPTH ON	DEPTH OFF	DEPTH	SIZE	DEPTH INTERVAL (ft)	PEAK GAS (units)			
4-Jul	4,055	4,056	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	Skid from 33B1. Test BOP's and pick up BHA.	
5-Jul	4,055	4,576	182.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	Drill out DV tool and drill out 10' of new formation to perform FIT to 12.0 ppg. Drill to 4575'. Mud was really foamed up due to cement from the surface section of this hole using defoamer to combat the effects.	
6-Jul	4,575	5,541	378.3	NA	NA	NA	NA	NA	NA	5220-5260 5500-5510	318 81	NA	Drill to 5402', then TOOH to lay down directional tools. Pick up new BHA and TIR to 5402'. Drill ahead to 5541'. Run geltime, gel/Desco, polymer sweeps with light to medium increase in cuttings. MBT increased to 25 psi due to formation clays. 25-40 bbl/hr water, centrifuge, desilter, was used to remove as much as possible, as well as Pas-L to decrease water loss and E-Z Mud to encapsulate clays. Wall nut sized balls of clay observed going over shakers.	
7-Jul	5,541	7,182	2435.7	8300-8560	6650-6810	NA	NA	NA	NA	5560-5800 5870-5885 5930-5935 6105-6115 6270-6290 6300-6310 6733-6760 6836-6846	199 287 267 430 337 481 268 637	NA	Drilled from 5541' to 6987'. Losses occurred in the wasatch I formation. Greatest losses were between 6300' - 6550' at 780 bbl/hr. Run 80 bbl sweeps followed by 30 bbl LCM sweeps. Flow rate increased better after 40-50 bbl LCM sweeps.	
8-Jul	7,182	8,487	4330	~7600-8160	7710-7740	7848 8082	8051 8137	10 5	20 15	7876-7726 7810-7826 7846-8010 8080-8180 8316-8326 8376-8410	290 690 2407 1674 1007 687	NA	Drilled from 6987' to 8467'. Major losses began ~7540' in the Ohio Creek @ ~300 bbl/hr. Continual losses throughout the day. Total losses over 4200 bbls. Current losses have slowed to ~100 bbl/hr. Continuous gas started ~8000' in the WF 800. In the WF 700, most gas was seen of ~4100 units.	
9-Jul	8,487	9,531	1313.2	NA	8120-8160	8901 8998	8935 8998	5 5	5 5	8576-8805 8860-8900 9006-9040 9416-9446 9470-9490	3396 3883 933 1409 1716	NA	Drilled from 8467' to 9531'. 800 bbls of losses occurred in the WF 500 (in addition to the losses in the same zone on last report). Currently adding MIL-LUBE, at 1 drum every 3 hrs. Total 6 drums to get to 25%. Circulated and conditioned mud while working on mud pump #1. Replaced (2) API 100 (Brandt 215) mesh screens; shaker2-screens4, shaker3-screens4.	
10-Jul	9,531	10,181	1474.2	NA	9880-9890	10018	10088	10	20	9596-9836 9716-9730 9796-9830 9876-9890 9986-10070 10146-10160	631 701 1063 774 3368 847	NA	Drilled from 9531' to 10181'. Losses increased when mud weight was increased to 9.5ppg to over 150 bbl/hr. Cut mud weight back to 9.4ppg with centrifuge and desilter. Losses stopped. Saw gas throughout report duration. Most fit 10020' to 10055'. CO2 exceeded 8000ppm. Replaced (14) API 100 (Brandt 215) mesh screens; Shaker 1 - screen 1 (3x), screen 2 (3x), screen 3 (1x); Shaker 2 - screen 1 (1x), screen 2 (1x), screen 3 (1x); Shaker 3 - screen 1 (1x), screen 2 (1x), screen 3 (1x), screen 4 (1x).	
11-Jul	10,181	10,343	889.2	NA	NA	10228 10319	10248 10331	5 5	15 20	10226-10278 10310-10343	1682 870	NA	Drilled from 10181' to 10343'. Decision made to make bit run at about 08:00. Hole continued to return mud, began using PDM. Pack off noticed @ ~8000'.	
12-Jul	10,343	10,343	244.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	Back ream out of hole. Picked up 7 7/8" bit and BHA. Trip in hole, washed and reamed from 5553'. Maintaining mud weight at 9.6 ppg to 9000'. Will activate centrifuge and desilter to cut weight to 9.4 ppg.	
13-Jul	10,343	10,380	1342.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	Wash and ream to 10330'. Drill to 10390'. Sweeping hole every stand with light to medium increase in cuttings.	
14-Jul	10,380	11,283	1109.7	NA	NA	10421 10443 10488 10602 10713 10807 11078	10431 10463 10485 10633 10764 10821 11323	10 5 5 5 5 5 10	20 10 10 5 5 5 25	10400-10626 10666-10880 10986-11160	3297 3990 2088	NA	Drill to 11283'. At 11116' had a gas influx as well as a gasket on flowline fail. Circulated on choke while repairing gasket. At 11215' took another influx and gasket failed. Circulated through choke until gasket was repaired. Weighted up mud to 9.5 ppg. CO2 levels reached ~73,000 PPM with gas reaching ~ 3600 units. Lime was added to combat CO2.	
15-Jul	11,283	12,021	784	NA	NA	11283 11381 11480 11683 11704 11840 11898	11323 11408 11478 11672 11788 11888 11970	15 5 10 5 5 10 5	30 5 20 5 15 20 10	11282-11396 11356-11431 11466-11616 11580-11610 11700-11710 11870-11890	2247 2000 1833 1439 1866 1330	NA	Drilled to 12021'. Connection gas averaging ~ 2500 units. CO2 ~ 5000 PPM. Sweeps run every stand with light increase in cuttings.	
16-Jul	12,021	12,580	323.8	NA	NA	12424 12524	12453 12434	5 5	10 15	12096-12140 12166-12170 12466-12470	3301 2040 680	NA	Drill to 12560'. Averaging ~ 25 bbl/hr. CO2 contamination being treated with lime. 8 drums of MIL-Lube was added to reduce torque.	
17-Jul	12,580	12,776	384.4	NA	NA	NA	NA	NA	NA	12560-12670 12830-12840	981 793	NA	Drill to 12775'. Weight up to 9.8 ppg. Ream to transition zone and set 90 bbls. Of 12.5 ppg slug. PDM to 4600' with no issues.	
18-Jul	12,775	12,776	312.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	Trip out of hole from 4600' to 550'. Lay down BHA and rig up CRT. Run casing to 9000.	
19-Jul	12,775	12,776	622	NA	NA	NA	NA	NA	NA	NA	NA	NA	Finish running casing to 12722'. Pick up cementers tools, and cement the hole, and set casing at 12751'. Rig down cementer's tools.	
20-Jul														
Total Losses to Date			16981.2											