



Well History

Piceance Creek Unit PCU 297-12A7
API 05-103-11161-00
Rio Blanco County, Colorado

Canrig Drilling Technology LTD
New Iberia, Louisiana

ExxonMobil
Development

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ExxonMobil Production Company

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, Colorado


Canrig Drilling Technology LTD

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Introduction and Geology

**Piceance Creek Unit PCU 297-12A7
Rio Blanco County, Colorado**



Introduction

Canrig Drilling Technology LTD (Canrig) of New Iberia, LA has been providing mud logging and contract geology services to the ExxonMobil Drilling Group (ExxonMobil) in the Piceance Basin of northwestern Colorado since late 2002. As part of these services, Canrig was requested to provide mud logging and geologic services for the Piceance Creek Unit (PCU) 297-12A7 production well. The well was drilled as the second production hole in a series of nine directional wells for production on the Piceance Creek Unit 297 pad. The well is located in the Piceance Basin at the following coordinates:

- Latitude 39.889005 N
- Longitude 108.23726 W

The well was spudded on October 12, 2008 by a separate rig which drilled to 3996' and set surface casing at 3980'. Drilling operations were then continued from surface casing to a total depth of 12866' (MD) on 11/22/2009. Drilling operations were conducted by Helmerich & Payne using a Flex 4 rig (#326). Canrig personnel logged and collected samples starting at 3996' through to 12866' MD. Drilling fluid engineering services were provided by Halliburton. The well was drilled with conventional water-based mud and spud mud to 3995', LSND (Low Solids Non-Dispersed) from 3996' through 5500', DSF (Drilling Stress Fluid) from 5501' to 5882', and LSND from 5883' to TD at 12866' MD.

The well was cased and cemented according to the following:

- 16-inch casing from surface to 130 feet.
- 10.75-inch casing at 3980 feet.
- 7.00-inch casing at 8881 feet.
- 4.5-inch casing at 12852 feet.

Canrig 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;
- Personnel - Two Senior Mud logging Geologists were onboard the rig at all times during the well with two Sample Catchers being assigned during actual drilling phases to ensure timely and accurate sample collection, processing and presentation as the Geology of the well dictated. Interaction with ExxonMobil on-site and Houston-based personnel to determine formation tops and provide support as required through drilling.

Canrig Drilling Technology LTD. wishes to thank you for the opportunity to provide services on this well and look forward to being of service to you again in the future.

Brandon Laiche/Don Thibodeaux/Jeremiah Kokes
Canrig Drilling Technology LTD
1615 Jefferson Island Road
New Iberia, LA 70560
(337) 364-2188
(337) 364-1667 (fax)

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 297-12A7 well incorporates terminology as developed by ExxonMobil and provided to Canrig.

Geologically, Canrig 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 Mesaverde 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 ExxonMobil 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 Segó Members – Marine Reservoirs.

ExxonMobil 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 ExxonMobil 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.

Formation/Member Name	Stratigraphic Unit Top	Depth (MD/TVD)
Wasatch Formation		
Lower Wasatch		5595' / 5449'
Ohio Creek Formation		
	950 Abandonment Surface (AS)	7450' / 7304'
Williams Fork Formation		
WF 800	850 Abandonment Surface (AS)	8000' / 7853'
WF 700	800 Sequence Boundary (SB)	8260' / 8113'
WF 500	600 Sequence Boundary (SB)	8690' / 8543'
WF 400	490 Abandonment Surface (AS)	9410' / 9263'
WF 200	290 Abandonment Surface (AS)	10020' / 9872'
Cameo	210 Sequence Boundary (SB)	11120' / 10972'
Iles Formation		
Rollins Member	200 Sequence Boundary (SB)	11710' / 11561'
TransCozzette Member	180 Maximum Flooding Surface (MFS)	11850' / 11701'
Cozzette Member	180 Flooding Surface (FS)	11920' / 11771'
Corcoran Coastal Plain	140 Flooding Surface (FS)	12190' / 12041'
Corcoran Marine	140 Sequence Boundary (SB)	12800' / 12651'

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Correlation and Gas Character

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

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PCU 297-12A7
Correlation and Gas Character

Correlation of formation tops from the Wasatch G to the Corcoran Marine for the PCU 297-12A7 has been confirmed by ExxonMobil geologists using correlating logs from nearby well pads, as well as the other wells drilled on this pad. LWD was conducted in the surface hole only. Directional drilling reached a max inclination of 17.58° at 2920' MD and was brought to 0.12° at 5275'. Overall the well was stratigraphically similar to that of wells drilled in the nearby area.

Wasatch Formation

The upper Wasatch was encountered when drilling out of the surface casing at 3996'. It consisted of interbedded sandstone, siltstone and shale. Background gas was in the 5 to 15 unit range. There were three gas shows of 232 to 705 units in 5 to 10 foot sandstones at 4930', 4972' and 5152'. This section was drilled with 8.9 to 9.4 PPG mud with minimal mud loss.

The Wasatch "G" at 5595' marked the top of the lower Wasatch. It consisted of interbedded sandstone, siltstone and shale with minor carbonaceous shale and coal. The G section consisted of 30 to 70% sandstone with the balance being siltstone and shale. There were three gas spikes above 200 units between 5650' and 5900'. These were in 5 to 10 foot thick sandstones. The interval was drilled with 9.2 PPG mud.

The Wasatch I was noted at 5900' with a marked decrease in sandstone to the 20 to 30% range in the top 500 feet of the section. There were five gas spikes from sandstone in the 5900' to 6950' interval. The shows were from 5 to 20 foot thick sandstone beds at: 5987', 6205', 6520', 6912' and 6945'. The remainder of the Wasatch I was marked by gases in the 50 to 125 unit range. The interval was drilled with 8.7 to 9.1 PPG mud.

Ohio Creek Formation

The Ohio Creek formation was drilled at 7450' in lithology consisting of 30% sandstone, 30% siltstone, 30% shale and 10% carbonaceous shale. Low gas readings at the start of this formation were due to lost circulation. Sandstone percentages ranged from 30% to 80% in this section. There were five max gas shows above 200 units. The first max gas spike of 226u came in at 7640' in 70% sandstone. The remaining 4 gas spikes came in with 50% and 60% sandstones and 10% coal. Connection gases ranged from 110 units to 650 units. Mud weights ranged from 9.05 to 9.20 PPG.

Williams Fork 800 Member

The top of the Williams Fork 800 was drilled at 8000'. This formation came in with a 10% coal seam and 40% sandstone producing a max gas spike of 313u. Sandstone increased throughout this section to 70%. There were seven gas shows above 200 units. The max gas high of 638 came in at 8060'. This section consisted of 40% to 70% sandstone with remaining percentages of siltstone and shale and three 10% coal seams. Mud weight of 9.20 PPG was used in this section.

Williams Fork 700 Member

The top of the Williams Fork 700 was encountered at 8260'. The lithology was 40% to 90% sandstone with small percentages of siltstone and shale. Two 10% carbonaceous shale seams ran throughout most of this section. Four gas shows over 200 units were recorded. A survey gas of 1541 units came in at 8673' and a wiper gas of 1104 units was seen at 8650'. Mud weight of 9.20 PPG was used in this section.

Williams Fork 500 Member

The top of the Williams Fork 500 was drilled at 8690'. The lithology was 30% to 50% sandstone and two 10% carbonaceous shale streamers along with balancing percentages of siltstone and shale. A 10% coal seam from 8795' to 8820' coincided with a max gas of 256 units. Two connection gases over 300 units occurred at 8750' and at 8850'. Mud weights of 9.20 to 9.45 PPG were used in this section.

Williams Fork 400 Member

The top of the Williams Fork 400 member was placed at 9410' MD. The lithology was 50% sandstone, 30% siltstone, and 20% shale. Sandstone intervals fluctuated from 20%-70% throughout the member with shale and carbonaceous shale increasing to 60% at the base. Fourteen gas shows above 400 units were seen while drilling. Major gas shows were seen in kaolinitic sands. Two peaks were seen between 10420' to 10435' of 2776 units and 3057 units; another peak between 10495' and 10515' of 1084 units; and four peaks were seen between 10630'-10635' (1036 units), 10640'-10665' (3333 units), 10685'- 10705' (1660 units), and 10635'-10720' (1760 units). Most other shows were seen in coaly or carbonaceous units averaging 440 units. High connection gases were common with a maximum value of 3333 units. The average connection gas was around 2307 units. Mud weight was maintained at 9.30 to 9.55 ppg.

Williams Fork 200 Member

The Williams Fork 200 came in at a depth of 11120' with a formation gas of 3130 units. The lithology consisted of 50% sandstone, 10% siltstone, 20% shale, and 20% carbonaceous shale. The percentage of carbonaceous shale would increase to 40% above the Cameo contact. A thin coal seam at 11195' produced 1807 units of gas. A show of 602 units was seen between 11310' and 11350' in medium grain sandstone. Another show of 742 units was seen in sandstone between 11355' and 11380'. The 200 Member had high connection gas with an average of 2561 units. The charge gas above the connection gas became apparent, usually over 3000 units. The member was drilled with 9.45 to 9.65 ppg mud. Mud losses were minimal throughout.

Cameo Member

The Cameo was encountered at a depth of 11430' with an ROP spike and formation gas of 980 units. The Cameo was very coaly throughout, especially between the depths of 11520' and 11620'. The area produced the majority of gas show seen in the Cameo. Five gas spikes were seen in this zone above 1000 units. The mud weight of 9.5 to 9.6 was used. Background gas was relatively high with most areas over 150u.

Rollins Member

The Rollins member came in at 11710' with a gas show of 1988 units. Lithology was 40% sandstone, 20% siltstone, 10% kaolinitic sand, 20% carbonaceous shale, and 10% coal. Sandstone remained between 40% and 50% sandstone. Background gas remained low, around 65 units. Mud losses increased to 100 bbls per hour while drilling through the Rollins. The Rollins was drilled with between 9.55 to 9.6 ppg.

TransCozzette Member

The TransCozzette was drilled into at 11850' measured depth. There was a gas show at the contact of 2848 units. The lithology of the TransCozzette was between 40 to 50% sandstone. Another gas show of 2890 units was seen between 11860' to 11880'. Mud weight was held between 9.55 and 9.60 ppg. Mud losses were lowered to 80 bbls per hour.

Cozzette Member

The Cozzette member top was drilled at 11920' MD. The lithology was 30% sandstone, 40% siltstone, 10% carbonaceous shale, and 10% coal. The percentage of siltstone ranged between 50% and 30%. The percentage of sandstone increased to 40% by the contact with the Corcoran Coastal Plain. No gas shows were seen within the Cozzette. Connection gases averaged 2427 units with a high of 2649 units. Mud weight was maintained within a 9.55 to 9.6 ppg range. Mud losses were low while drilling the member.

Corcoran Coastal Plain Member

The top of the Corcoran Coastal Plain was drilled at 12190' MD. The sample at the top consisted of 30% sandstone, 10% coal, and 60% siltstone. The sandstone percentage increased to 60% and varied from 20 to 60% throughout the interval. Coal seams were visible throughout most of the section and produced high gas values. The balance of the lithology consisted of interbedded siltstone, shale, carbonaceous shale, coal seams, and sandstones. There were five gas spikes that exceeded 300 units. The first show was in a thin sandstone unit between 12371' and 12376'. Two gas shows were seen in coal seams at 12415' to 12420' of 410 units and at 12436' to 12445' of 1907 units. Another show of 808 units was seen in a coal seam between 12702' to 12715'. A final show of 388 units was seen in a coal seam at 12755' to 12765'. Connections gases were high throughout, with a maximum 2808 units at 12309'. Mud weight was maintained at 9.5 and 9.65 ppg throughout. Mud losses were minimal throughout this section.

Corcoran Marine Member

The top of the Corcoran Marine was drilled at 12800' MD. It consisted of 20% sandstone, 50% siltstone, 20% carbonaceous shale, 10% shale. The proportion of lithology remained roughly constant throughout the section to a final depth of 12866'. There were no significant gas shows in the interval. Connection gases remained high with a maximum value of 2680 units. The interval was drilled with 9.60 to 9.65 ppg mud. Mud losses were minimal.

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Lithology Descriptions

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

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Upper Wasatch (3996' – 5594')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
3996	5594	256.80	9.20	70.62	11726.78	330.00	1677.07	1752.69	0.37	32.28

3996' Sandstone = light pale brownish yellow, light moderate brown, some clear to translucent; upper very fine to fine grain size; poor to fair sorted; subangular, subround in part; clear to frosted surface features; easily friable to friable; clay matrix cement trace calcareous cement; lithic and siltstone interbedded.

4090' Shale = moderate yellowish brown; crumbly, tenacity; subblocky fracture; wedgelike, tabular cuttings habit; dull earthy luster, silty, clayey texture; massive to thick structure.

4150' Sandstone = light pale brown, very light gray, off white with slight translucent grains; predominately quartz framework; lower fine to some upper fine grain; poor sorting; subangular to subround; traces frosted surface features; easily friable to some friable; clay matrix cement, trace calcareous cement; some grain supported; trace siltstone interbedded.

4260' Siltstone = light yellowish brown, moderate pale yellowish brown; pulverulent, crunchy tenacity; earthy subblocky fracture; wedgelike cuttings habit; dull semi earthy luster; gritty to granular texture; thin structure; grading to sandstone.

4340' Shale = brownish yellow orange, pale to moderate yellowish brown, occasionally medium gray with slight greenish hues; firm; crumbly to occasionally moderately tough; irregular, subblocky, rarely wedgelike cuttings habit; matte to rarely slightly resinous luster; dominantly smooth texture; moderately calcareous; locally silty, grading in part to and interbedded with siltstone; poor to moderate fissility.

4470' Sandstone = very light gray to white; occasionally with slight brownish hues; firm clasts range from very fine lower to fine lower; subangular to subround; moderately sorted; quartz rich, scattered to common dark gray to black lithics; clay matrix; light calcareous cement; locally silty, grades to and is interbedded with siltstone.

4570' Siltstone = moderate to dark yellowish brown, light gray, occasional slightly olive hues; firm to moderately hard; crumbly to occasionally moderately tough; earthy luster with scattered sparkles; abrasive, gritty texture; moderately calcareous; interbedded with and intergradational with shales.

4670' Shale = moderate to dark yellowish brown, brownish yellow orange, occasionally medium gray with slight greenish hues; firm; crumbly to occasionally moderately tough; irregular, subblocky, rarely wedgelike cuttings habit; matte to rarely slightly resinous luster; dominantly smooth texture; moderately calcareous; locally silty, grading in part to and interbedded with siltstone.

4790' Sandstone = white to very light gray; common "peppered" appearance; firm clasts range from very fine lower to fine lower; subangular to subround; moderately sorted; quartz rich, scattered to common dark gray to black lithics; clay matrix; light calcareous cement; locally silty, grades to and is interbedded with siltstone.

4890' Siltstone = moderate to dark yellowish brown, light gray, common greenish gray to olive hues; firm to moderately hard; crumbly to occasionally moderately tough; earthy luster with scattered sparkles; abrasive, gritty texture; moderately calcareous.

4970' Sandstone = pale tan stain to off white; light yellowish pale brown; some clear translucent quartz framework; upper very fine, predominately fine grain; poor sorting; traces subround, subangular in angularity; low sphericity; slight semi frosted surface features; friable to semi firm friable; clay matrix cement, very minor calcareous cement; dark gray to grayish black lithics and some dark brownish siltstone interbedded.

5100' Shale = very pale grayish orange, light pale yellowish brown, traces light olive gray; pulverulent, semi crumbly tenacity; earthy, subblocky slight irregular fracture; wedgelike slight blocky cuttings habit; dull earthy, clayey texture; thin structure; trace siltstone interbedded.

5190' Siltstone = yellowish brown, pale light brown; brittle tenacity, irregular fracture; wedgelike to tabular cuttings habit; resinous luster; gritty texture; massive to thin structure; grading to sandstone.

5260' Sandstone = white to very light gray; common pale yellowish brown hues; firm clasts range from very fine lower to fine lower; subangular to subround; moderately sorted; quartz rich, scattered to common dark gray to black lithics; clay matrix; light calcareous cement; locally silty, grades to and is interbedded with siltstone.

5360' Shale = pale grayish orange, light to moderate yellowish brown, traces light olive gray; crumbly to moderately tough tenacity; irregular and subblocky cuttings; matte luster; smooth to moderately silty texture; slightly to moderately calcareous; grades to and is interbedded with siltstone.

5450' Shale = medium gray, light bluish gray, light grayish red purple, dark yellowish orange; crumbly to pulverulent tenacity; irregular earthy fracture; platy to wedgelike with some elongated cuttings habit; waxy earthy luster; clayey texture; thin structure.

5530' Siltstone = light to medium brown, light bluish gray, some purplish hue; very fine grain; moderate hard to friable; gritty, silty texture; earthy luster; thinly bedded with shale.

Lower Wasatch (5595' – 7450')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
5595	7449	256.60	24.90	91.90	601.35	330.00	330.37	580.00	2.23	63.46

5630' Sandstone = white to very light gray, occasionally light greenish gray; friable to hard; clasts range from very fine lower to fine upper, rare medium lower grains; moderately sorted; subangular to subround; dominantly quartz with scattered dark gray to black lithics; occasional carbonaceous material; dominantly grain supported; clay matrix; lightly calcite cemented; interbedded with siltstone and shale.

5750' Shale = medium gray, grayish red, light bluish gray, dark yellowish orange; crumbly to crunchy tenacity; hackly to earthy fracture; platy to wedgelike cuttings habit; dull earthy luster; clayey to silty texture; massive structure.

5830' Siltstone = light gray to bluish gray, grayish red, pale brown; friable to firm friable; gritty texture; earthy with some slightly sparkling luster; thick structure; some grading to very fine sandstone.

5900' Shale = dark to dusky yellowish brown, light to medium gray, light greenish gray; firm to hard; crumbly to tough; blocky, tabular and occasional platy cuttings habit; earthy to occasionally slightly shiny luster; dominantly smooth to occasionally silty texture; non to slightly calcareous; occasionally with high carbonaceous content; poor to fair fissility.

6010' Sandstone = white to light gray with common very light brown hues; common "peppered" appearance; firm to moderately tough; clasts range from very fine lower to fine lower; subangular to subround; moderately sorted; dominantly quartz with scattered medium to dark gray lithics; occasional carbonaceous matter; variable grain/ matrix supported; white clay matrix; calcite cemented; silty in part, grades to and is interbedded with siltstone.

6140' Shale = light to medium gray, light bluish gray, grayish orange, grayish red some pale reddish brown; tough crumbly tenacity; irregular hackly fracture; platy to wedgelike with occasional elongate cuttings habit; waxy earthy luster; smooth to silty texture; abundant carbonaceous material with trace amount coal in sample.

6240' Shale = dusky yellowish brown, dark gray, brownish black, small amount light bluish gray, dense crumbly tenacity; hackly earthy fracture; tabular wedgelike cuttings habit; waxy earthy luster; smooth to silty texture; slightly fissile structure; occasional pyrite inclusions.

6330' Coal = black; brownish black; dense, brittle, crunchy tenacity; blocky, some conchoidal, and earthy fracture; flaky, tabular cuttings habit; vitreous luster; smooth texture; thick structure, some out-gassing visible.

6400' Sandstone = light gray with dark lithics pale brown with dark lithics; firm friable to friable; very fine to fine grains; well sorted; moderate sphericity quartz framework; subangular to subround; calcite cement.

6470' Shale = medium to dark gray, brownish black, grayish red, some variegated; dense, brittle to crumbly tenacity; irregular to earthy fracture; tabular to wedgelike with some elongate cuttings habit; waxy, earthy some slightly sparkling luster; smooth to silty texture; massive structure.

6560' Siltstone = dark to medium gray, dark brown, light gray, occasional slightly olive hues; firm to moderately hard; crumbly to occasionally moderately tough; earthy luster with scattered sparkles; abrasive, gritty texture; moderately calcareous; interbedded with and intergradational with shales.

6660' Sandstone = light gray to white, occasionally with slight greenish hues; easily friable to moderately tough; clasts range from very fine lower to fine lower; subangular to subround; moderately sorted; dominantly quartz, scattered dark gray lithics; mostly matrix supported; white clay matrix; moderately calcite cemented; interbedded with shale and siltstone.

6770' Shale = medium to dark gray, brownish black, reddish gray, rarely light greenish gray; firm to occasionally hard; crumbly to occasionally tough; tabular, blocky, occasionally platy cuttings habit; matte to rarely slightly resinous luster; smooth to moderately silty texture; non to occasionally slightly calcareous; some pieces with abundant carbonaceous material; poor to moderate fissility.

6890' Siltstone = medium to dark gray, dark brown, light gray, occasionally with slightly olive hues; firm to moderately hard; crumbly to occasionally moderately tough; dull luster with scattered sparkles; gritty, abrasive texture; moderately calcareous; scattered black pinpoint carbonaceous material; interbedded with sandstone and shale.

7000' Shale = pale brown, light, medium gray, light bluish gray, some with light purplish hues; crumbly to crunchy tenacity; irregular to earthy fracture; wedgelike to tabular some bladed cuttings habit; waxy earthy luster some slightly sparkly; silty texture; thin structure.

7090' Sandstone = white, light gray, light grayish brown with dark lithics, some clasts white with pale green hues, abundant translucent unconsolidated calcite; easily friable to friable; upper fine to upper very fine grains; subround to subangular; low sphericity; quartz framework; grain support with some calcite cement.

7190' Shale = light to medium gray, light bluish gray, grayish red, some purple hues; crumbly to pulverulent; irregular to earthy fracture; tabular to wedgelike cuttings habit; earthy luster; smooth to silty texture; thin structure.

7260' Sandstone = white to light gray with pale green hues and scattered dark lithics; very fine to upper fine grains; well sorted; subround to subangular; moderate sphericity; firm to easily friable; calcite cement.

7330' Shale = light to medium gray, light bluish gray, grayish red, reddish brown, some with purple hues; crumbly to pulverulent tenacity; irregular earthy fracture; tabular wedgelike cuttings habit; waxy, some sparkling luster; smooth to silty texture.

7410' Sandstone = white, light gray, light greenish gray, occasional bluish hues; easily friable to moderately tough; clasts range from very fine lower to fine upper; subangular to subround; moderately sorted; dominantly quartz with scattered dark gray to black lithics; clay matrix; calcite cemented

Ohio Creek (7450' – 7999')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
7450	7999	127.00	0.00	62.05	330.00	330.00	330.00	1715.00	0.00	168.25

7500' Sandstone = white, very light gray, clear and translucent grains; abundant unconsolidated grains; clasts easily friable; subround to subangular; poor sphericity; very fine to fine grain size well sorted; carbonaceous materials throughout.

7580' Shale = light to medium gray, brownish gray; brittle to crunchy; hackly, earthy fracture; wedge like cuttings habit; dull earthy luster; silty texture; thin structure.

7640' Sandstone = white with dark lithics, light gray with dark lithics, some with pale green hues; abundant unconsolidated grains; clasts hard to friable; very fine to upper fine grains; well sorted; sub angular to angular; poor sphericity; quartz framework; grain supported; calcite cement.

7730' Siltstone = medium to dark gray, light gray, dark brown, occasionally with slightly olive hues; firm to moderately hard; crumbly to occasionally moderately tough; dull luster with scattered sparkles; gritty, abrasive texture; moderately calcareous; scattered black pinpoint carbonaceous material; interbedded with sandstone and shale.

7840' Shale = medium to dark gray, brownish black, reddish gray, rarely light greenish gray; firm to occasionally hard; crumbly to occasionally tough; tabular, blocky, occasionally platy cuttings habit; matte to rarely slightly resinous luster; smooth to moderately silty texture; non to occasionally slightly calcareous; some pieces with abundant carbonaceous material.

7950' Sandstone = light gray, light greenish gray; common "peppered" appearance; easily friable to occasionally hard; clasts range from very fine lower to fine lower, rare medium lower grains; angular to subround; moderately sorted; dominantly quartz; scattered dark gray lithics and carbonaceous matter; white clay matrix; variable grain/matrix supported; lightly calcite cemented; interbedded with siltstone and shale

WF 800 (8000' – 8259')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
8000	8259	124.20	20.30	67.91	330.00	330.00	330.00	638.70	25.53	168.33

8000' Shale = light medium gray, dark brown, light bluish gray, occasional light greenish hues; crumbly to brittle tenacity; irregular to earthy fracture; wedge like to tabular, occasional platy cuttings habit; waxy earthy luster some slightly sparkly; silty texture; thinly interbedded with siltstone and sandstone.

8170' Sandstone = light gray to light greenish gray; common "peppered" appearance; easily friable to occasionally hard; clasts range from very fine lower to fine lower; angular to subround; moderately sorted; dominantly quartz; scattered lithics and carbonaceous matter; mostly loose grains in sample; white clay matrix; light calcite cement.

WF 700 (8260' – 8689')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
8260	8689	121.80	16.20	49.02	330.00	330.00	330.00	1541.75	0.00	108.16

8260' Shale = light to medium gray, brownish black, light bluish gray, some with purple; crumbly to crunchy tenacity; irregular to hackly fracture; platy to wedge like cuttings habit; earthy, some slightly sparkly luster; smooth to silty texture; trace coal in sample.

8350' Sandstone = white, some with pale green hue, transparent and translucent; predominately unconsolidated grains; clasts easily friable; lower fine to lower medium grain size; well sorted; subangular to angular; poor sphericity; carbonaceous material throughout; slight calcite cement; quart framework.

8440' Sandstone = white with dark lithics, some with pale green hue; abundant unconsolidated grains; clasts firm to friable; subround to subangular; very fine to upper fine grains; well sorted; quartz framework, calcite cement.

8510' Shale = light to medium gray, dark gray, light bluish gray; brittle to crunchy tenacity; earthy to hackly fracture; tabular to wedge like cuttings habit; waxy earthy luster; smooth to silty texture; thin structure.

8580' Siltstone = medium to dark gray, light gray, dark brown, firm to moderately hard; crumbly to commonly moderately tough; dull luster with scattered sparkles; gritty, abrasive texture; moderately calcareous; scattered black pinpoint carbonaceous material; interbedded with sandstone and shale.

WF 500 (8690' – 9409')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
8690	9409	98.00	19.20	53.23	330.00	330.00	330.00	3115.34	3.50	202.78

8690' Sandstone = light gray with occasional very light greenish gray hues, common "peppered" appearance; easily friable to firm; clasts range from very fine lower to fine lower; angular to subround; moderately sorted; quartz rich with scattered lithics; white clay matrix; variable matrix/grain supported; light calcite cement; interbedded with siltstone and shale.

8790' Shale = light to dark gray, moderate to dark brownish gray, light greenish gray; firm to occasionally moderately hard; crumbly to occasionally moderately tough; blocky, tabular and platy cuttings habit; matte luster; smooth to locally silty texture; slightly to moderately calcareous.

TD intermediate at 8896'. casing set at 8881'.

8900' Shale = light to medium gray; dense to brittle; wedgelike to sub-tabular cuttings habit; clayey to silty texture; dull to earthy luster; interbedded with light to medium gray siltstone that grades into a light gray to mottled brownish gray sandstone; low gas.

8980' Sandstone = light to medium gray, with salt and pepper appearance with black and reddish brown lithic fragments; 90 to 60% quartz clasts with the remainder lithic fragments; fine to medium grained fair to poor sorting; moderate sphericity interbedded medium to bluish gray shale and grades into siltstone, especially at base; high gas seen throughout.

9080' Sandstone = light gray to medium gray; fine to very fine, rare medium; quartz clasts with minor lithic fragments; fair to well sorted; subrounded to rounded; friable to firm friable; calcite cement; interbedded with and grades into a gray siltstone and interbedded with gray shale and minor carbonaceous shale.

9170' Siltstone = light to dark gray with brownish gray hues; brittle to crumbly; irregular to conchoidal fractures; platy to nodular cuttings; earthy to slight sparkly luster; silty texture with minor abrasiveness observed in grading from sandstones; interbedded in sandstones with shales; low gas.

9260' Shale = light to medium gray; brittle to crumbly; planar to splintery fractures; massive elongated cuttings; dull to slight waxy luster; smooth texture; dark grayish black organic staining observed in shales; appears grading to carbonaceous shales; traces of pyrite observed; lower gas values.

9350' Sandstone = light brown to grayish white; medium to fine grains; fair to well sorting; subangular to subrounded; moderate sphericity; traces of frosted crystals; easily friable to friable; dominant calcite cement with occasional quartz grains; traces of black lithic fragments; kaolinitic sands becoming abundant; trace of glauconitic staining in sands; moderately higher gas.

WF 400 (9410' – 11259')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
9410	11259	143.50	18.80	63.14	2500.81	330.00	332.42	3333.05	12.00	259.83

9460' Siltstone = light to medium gray with occasional brown and blue gray hues; brittle to crumbly; irregular to conchoidal fractures; slight sparkly to dull luster; silty with a slightly abrasive texture observed with grading from sandstones; trace of black organic staining on siltstones and sands; low gas values.

9560' Carbonaceous shale = medium to dark grayish black; dense to brittle; irregular to planar fractures; massive to tabular cuttings; dull to slightly earthy luster; smooth texture; appears grading from darker organic rich shales; darker sandstones are grading to organic stained siltstones; low gas values.

9660' Sandstone = light to medium gray, brownish gray to dusky brown seen in moderate amounts; quartz clasts 90 to 50% with the remainder brown or black lithic fragments; medium to very fine, predominately fine; brownish sandstone poor to fair sorting, gray fair to well sorting; subrounded to subangular; low to moderate sphericity; frosted grains occasionally stained brown; friable to firm friable; calcite cement; grain supported with floating grains; carbonaceous material seen along cross-bed planes; interbedded shale and minor carbonaceous shale and interbedded siltstone, occasionally grading into siltstone; low gas and high connection gas seen; no fluorescence or cut.

9850' Siltstone = medium to medium light gray; crunchy to dense tenacity; tabular to wedgelike cuttings habit, minor curved; earthy to dull luster, minor sparkling from vitreous sands; silty to granular texture; interbedded fine to very fine sandstone and gray shale, minor carbonaceous shale; low background gas with high connection gases; slightly to moderately calcareous.

9960' Shale = light to medium gray; dense to brittle; wedgelike to sub-tabular cuttings habit; clayey to silty texture; dull to earthy luster; interbedded with light to medium gray siltstone and light gray to mottled brownish gray sandstone; low gas.

10040' Siltstone = medium to medium light gray; crunchy to dense tenacity; tabular to wedgelike cuttings habit; earthy to dull luster; silty to gritty texture; interbedded fine to very fine sandstone with organic staining and gray shale and carbonaceous shale, minor interbedded coal seams; gas seen in coal seams, low background gas.

10140' Shale = medium dark gray to dark gray, medium light gray; crunchy to dense tenacity; tabular to wedgelike cuttings habit; dull to earthy luster; silty to clayey texture, very minor gritty texture; interbedded siltstone and sandstone; gas seen in sandstone.

10220' Sandstone = light to medium gray with dark gray and brown hues; medium to fine grains; fair to well sorting; subangular to subrounded; moderate sphericity; friable to firmly friable; calcite cement dominated with minor silica cement; less than 3% black lithics in sands; appears grading to siltstones; moderately higher gas values in sands.

10320' Shale = medium to dark gray with occasional light gray hues; tough to slightly brittle; irregular to blocky fractures; massive to tabular cuttings; dull and earthy luster; smooth texture minor traces of individual calcite crystals in sample; sandstone grades to siltstones; lower gas values observed.

10410' Sandstone = light grayish white to white with brown/gray/white unconsolidated kaolinitic sands; medium to fine grains; fair to well sorting; subrounded to rounded; moderate to sphericity; soft unconsolidated to firmly friable sands; abundant pyrite in sample; sandstone grading to siltstone are very abrasive and contain traces of black organics; moderate to high gas values in sands.

10530' Siltstone = light to medium gray with brown to bluish gray hues; dense to slightly crumbly; irregular to mottled fractures; platy to tabular cuttings; slight sparkly to earthy luster; silty to abrasive texture; traces of pyrite and kaolinitic sands in sample; grades into abrasive siltstone from sands; interbedded in sandstones and shales; lower gas values observed.

10640' Shale = light to medium gray with dark grayish black hues; dense to slightly crumbly; irregular to few splintery fractures; massive to tabular cuttings; dull to waxy luster; smooth texture; interbedded with coal in sands and siltstones; darker organic shales are grading from organic rich siltstone low to moderate gas values.

10740' Siltstone = medium to dark gray with light brownish gray and bluish gray hues; dense to crunchy; irregular to splintery fractures; platy to wedgelike cuttings; sparkly to earthy luster abrasive to silty texture; sandstones appear darker from organic staining and grading into abrasive siltstones; traces of coal and kaolinitic sands; low to moderate gas values.

10850' Carbonaceous Shale = light to medium gray with occasional dark gray to grayish brown hues; brittle to crumbly; blocky to planar fractures; platy to elongated cuttings; dull earthy luster; smooth texture; interbedded in sandstone and siltstone; moderate gas values.

10940' Sandstone = light gray to brownish gray; friable to firm friable; quartz clasts with lithic clasts giving a salt and pepper appearance; fine to medium; interbedded coal seam with gas show.

11000' Carbonaceous Shale = black to brownish black; crunchy to crumbly; irregular to blocky fracture; wedgelike to elongated cuttings with moderate tabular cuttings; dull to earthy, some sparkling; carbonaceous shale has two texture: clayey to silty or gritty to granular; interbedded lithic sandstone and shale, minor coal making up to 10% of cuttings seen in samples; moderately to non-calcareous.

WF 200 (11120' – 11429')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11120	11429	204.70	27.30	72.97	330.00	330.00	330.00	3231.49	66.24	427.05

11120' Carbonaceous Shale = black to brownish black; crumbly to brittle; blocky or planar fracture; tabular to wedgelike cuttings; earthy or dull, rare waxy luster; silty to clayey, minor smooth or gritty texture; thick to massive structure; interbedded organic rich siltstone and sandstones, minor coal; gas seen in coal and sandstone units; elevated background gas and high connection gases seen.

11240' Carbonaceous Shale = black to brownish black, medium dark to very dark gray; irregular to planar fractures; massive to tabular cuttings; dull to slightly earthy luster, minor sparkling due to disseminated pyrite; dense to brittle; smooth to silty, often silty to granular texture, minor gas from coal or sand.

11330' Sandstone = brownish gray to medium gray; medium to fine grain; predominately quartz clasts with up to 40% lithic fragments subangular to subrounded, angular lithic fragments; calcareous cement; friable to firm friable; grain supported organic staining on frosted grains; low to moderate visible porosity; moderate gas seen in sandstone; no fluorescence.

Cameo (11430' – 11709')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11430	11709	184.20	37.20	87.09	1686.76	330.00	338.72	3215.29	63.42	594.44

11430' Carbonaceous Shale = black to brownish black to dark gray; crunchy to dense tenacity; tabular to wedgelike cuttings habit; dull to earthy luster; silty to clayey texture; interbedded with coal and organic rich siltstone and sandstone gas seen in sandstone.

11510' Coal = black to brownish black; brittle tenacity; blocky to irregular fracture; tabular to nodular; vitreous to frosted luster; smooth to silty; thin to laminated structure; interbedded carbonaceous shale, organic rich siltstone, and organic rich lithic sandstone gas seen in coal beds; coal seen

11600' Carbonaceous Shale = black to brownish black, medium dark to very dark gray; irregular to planar fractures; massive to tabular cuttings; dull to slightly earthy luster; dense to brittle; smooth to silty, often silty to granular texture, minor gas from coal or sand.

11680' Carbonaceous Shale = black to brownish black; dense to crunchy; gritty to clayey; interbedded sandstone and coal.

Rollins Member (11710' – 11849')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11710	11849	141.60	39.30	80.42	872.70	330.00	337.75	2996.05	35.04	579.54

11710' Sandstone = light gray to grayish white with gray/white/light grayish brown kaolinitic sands; fine grains; well sorted; subangular to rounded; moderate to high sphericity; unconsolidated to firmly friable; silica dominated cement and matrix; siltstone and carbonaceous shales interbedded in sands; moderate to higher gas values in sands and coal.

TransCozzette Member (11850' – 11919')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11850	11919	167.400	48.700	93.676	330.000	330.000	330.000	2890.92 7	114.697	977.604

11840' Siltstone = medium to dark gray with grayish brown hues; dense to slightly crumbly; irregular to planar fractures; platy to elongated cuttings; sparkly to earthy luster; very abrasive to silty texture; black organic banding; appears grading from dark gray and brown sandstones into abrasive sucrosic high organic siltstones; coal is seen throughout sample; sandstones becoming darker as carbonaceous shales are abundant; moderate to high gas.

Cozzette Member (11920' – 12189')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11920	12189	153.50	16.70	64.29	330.00	330.00	330.00	2649.98	26.64	276.42

11950' Coal = dull to glossy black; crumbly to pulverulent; planar to mottled fracture platy to nodular cuttings; slight polished to resinous luster; smooth texture; interbedded in shales and siltstones; alternating sandstone thicknesses observed; higher gas values in coal seams and sands.

12040' Sandstone = medium to dark gray with brownish gray hues; medium to fine grains; fair sorting; subangular to rounded; moderate to high sphericity; less than 5% kaolinitic sands observed; silica dominated cement and matrix; siltstones also contain high silica content; sands grading into high silica and abrasive siltstones; moderate gas values.

12140' Siltstone = medium grayish brown to light brown; dense to crumbly; blocky irregular fractures; platy to wedgelike cuttings; sparkly to earthy luster; silty to abrasive texture; coal content increasing; sandstone grading into siltstones; sands becoming cleaner with less dark organics; lower gas values.

Corcoran Coastal Plain (12190' – 12799')

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
12190	12799	148.10	6.40	45.80	1144.06	330.00	333.23	2815.17	3.65	289.50

12230' Sandstone = light to medium gray with dark gray and brown hues; medium to fine grains; fair to well sorting; subangular to subrounded; moderate sphericity; friable to firmly friable; calcite cement dominated with minor silica cement; less than 3% black lithics in sands; appears grading to siltstones.

12320' Siltstone = medium to dark brownish gray dense to brittle; irregular to planar fractures; massive to tabular cuttings; dull to earthy luster; silty to granular texture; highly organic; grades into carbonaceous shale, interbedded sandstone and frequent coal seams; gas seen in coal seams.

12410' Coal = black to grayish black; crunchy to dense; massive to tabular cuttings; waxy to vitreous luster; smooth to clayey; interbedded carbonaceous shale, siltstone, and organic rich lithic sandstone; gas seen in coal; seen degassing.

12480' Sandstone = light to medium gray; firm friable to moderately hard; quartz clasts with 20% to 10% lithic fragments; fine to very fine, occasionally medium grain size; siliceous and calcareous cement; grades into a granular to sucrosic siltstone, interbedded carbonaceous shale and minor coal.

12570' Siltstone = medium to dark grayish brown and black; slightly dense to brittle; irregular splintery fractures; platy to elongated cuttings; sparkly to earthy luster; silty to gritty texture; coal and carbonaceous shale interbedded in siltstones; moderate gas values.

12650' Coal = slightly dull to glossy black; brittle to pulverulent; blocky to conchoidal fractures; massive to wedgelike cuttings; slight resinous to waxy luster; smooth texture; interbedded in siltstones and sandstones; higher gas values in coal seams.

12730' Sandstone = light gray to grayish white medium to fine grains; fair to well sorting; subangular to rounded; moderate sphericity; friable to moderately hard; silica cement and quartz grains observed; appears grading into coarser/granular siltstone; traces of coal; moderate to lower gas values.

Corcoran Marine (12800' – 13866' TD)

Interval		ROP			CO2			TLGAS		
From	To	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
11600	11799	20.20	3.70	10.50	330.00	330.00	330.00	194.35	42.06	42.06

11810' Siltstone = black to blackish gray; firm to dense; planar fracture; tabular to platy cuttings; gritty to silty; grades into a black to dark gray shale; low gas.

TD @ 12866' MD, 11717' TVD at 04:56 11/22/09.

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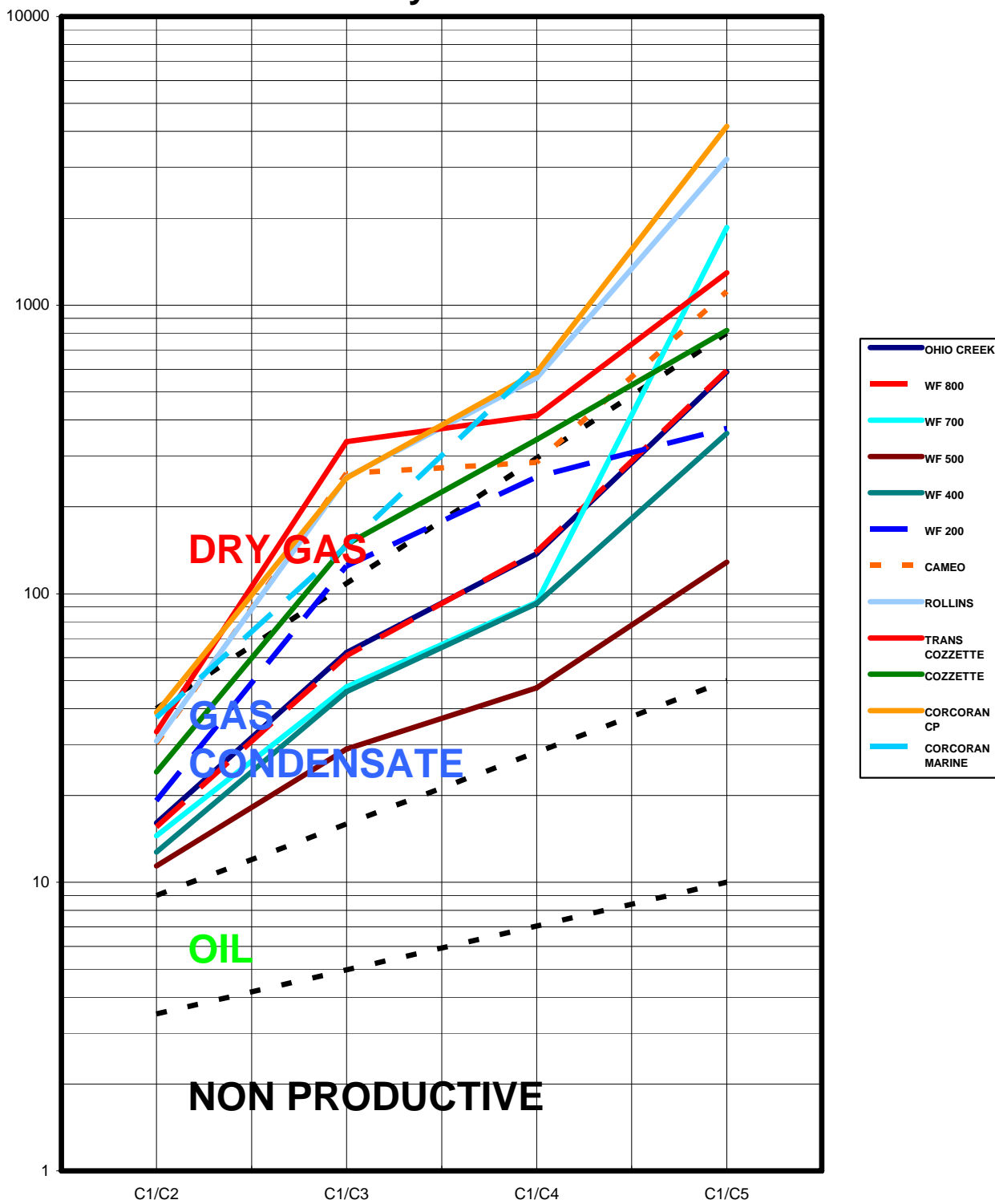
Pixler Plot

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

CANRIG  **Canrig Drilling Technology LTD**

PCU 297-12 A7
Pixler Plot Of Average Chromatography
Data By Formation



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Other Data Plots

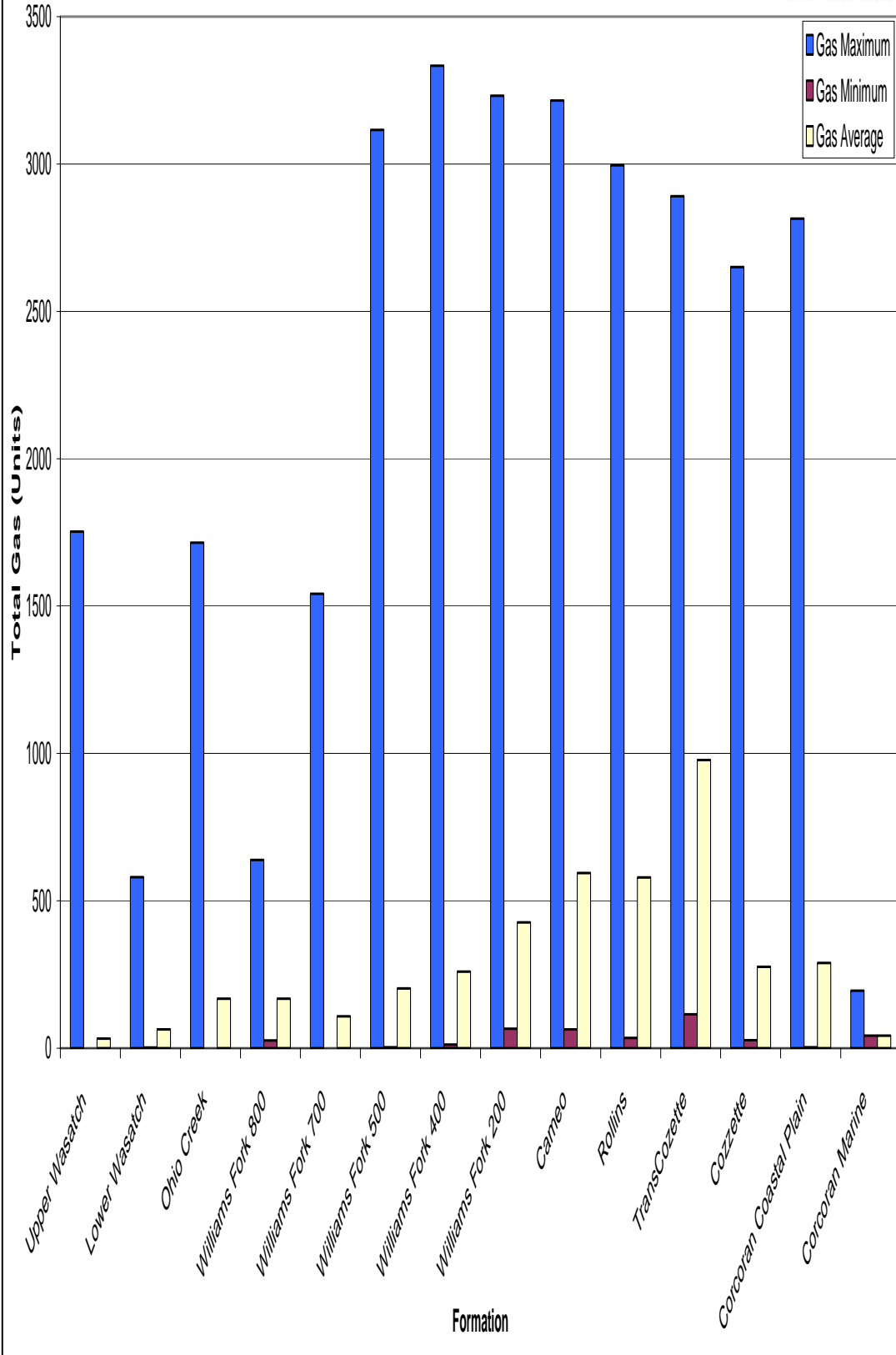
Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

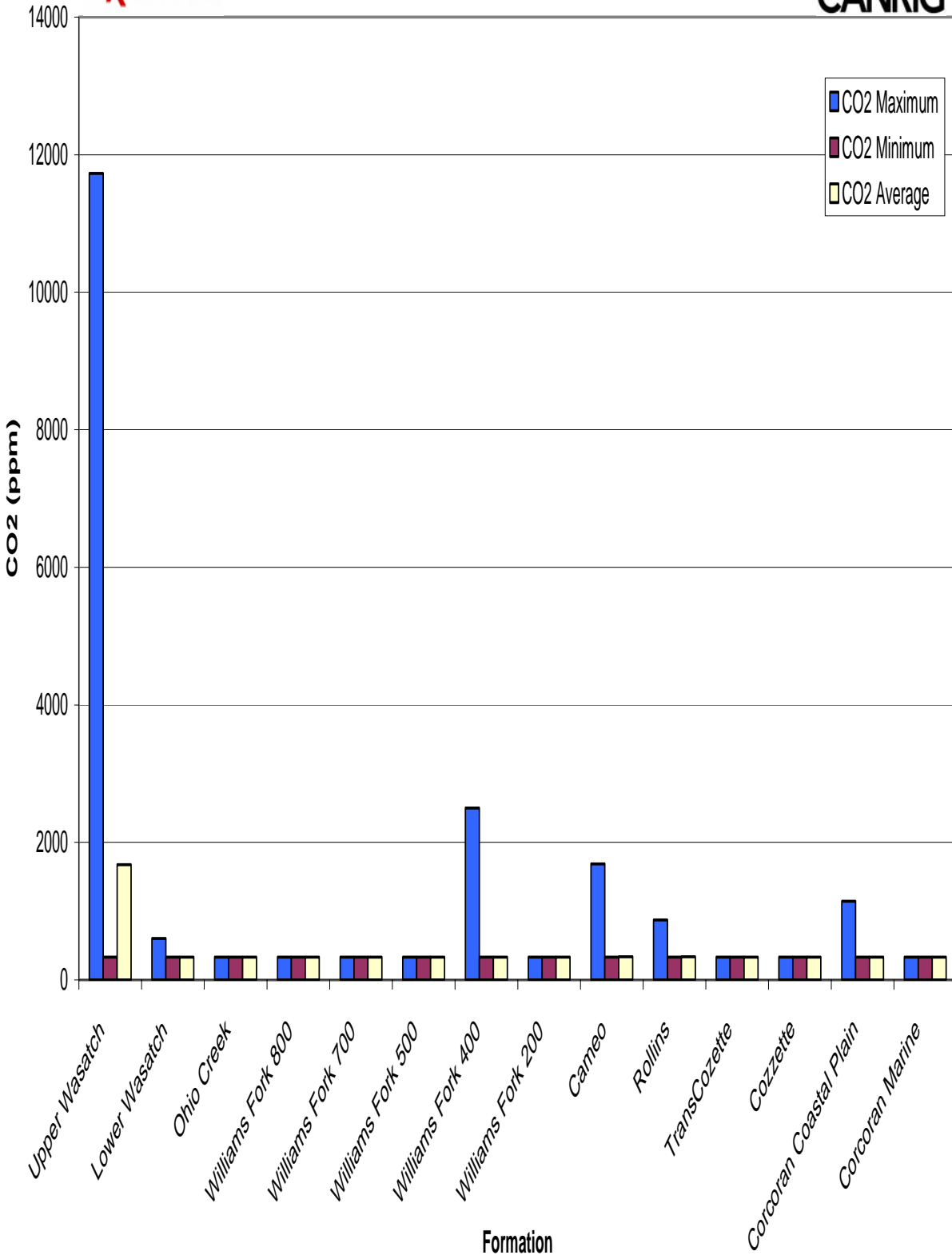
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PCU 297-12A7
Total Gas Statistics By Formation

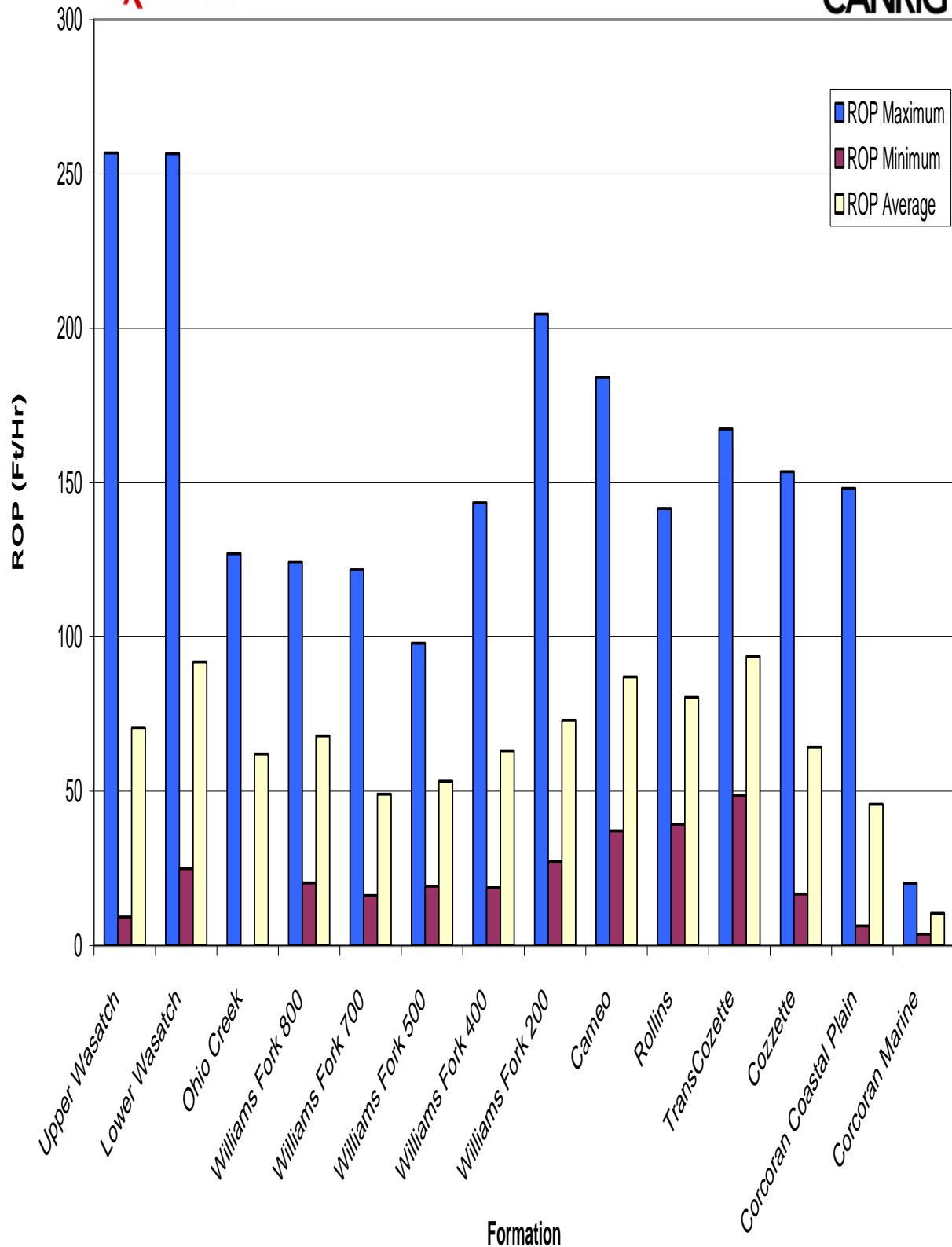


PCU 297-12A7
CO2 Statistics



PCU 297-12A7

Rate of Penetration Statistics



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Ballooning Surveillance Charts

Piceance Creek Unit PCU 297-12A7

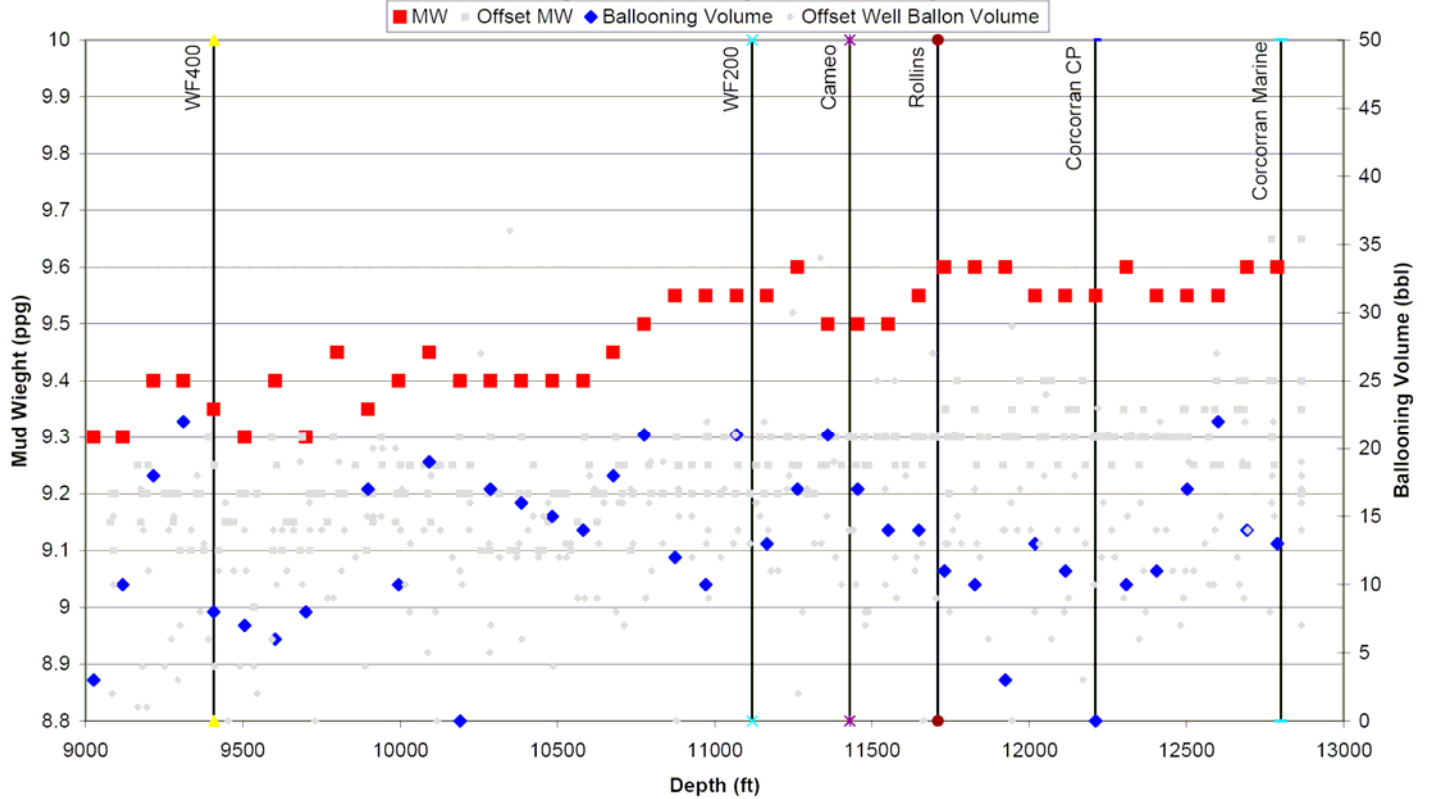
Rio Blanco County, CO.

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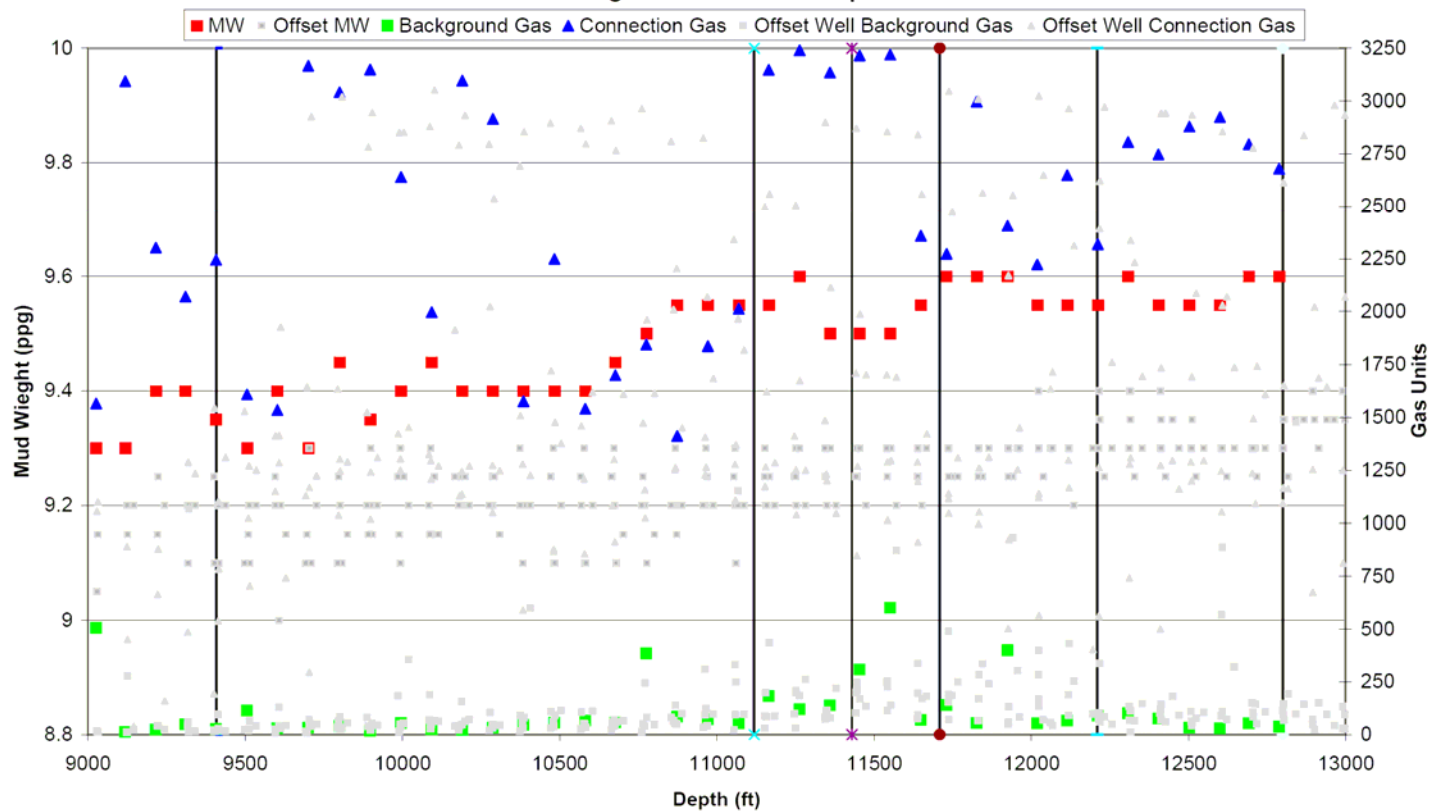
PCU 297-12A7



Mud Weight & Ballooning Volume vs. Depth



Mud Weight & Gas Units vs. Depth



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Mud Losses Summary

**Piceance Creek Unit PCU 297-12A7
Rio Blanco County, CO.**

 **CANRIG** Canrig Drilling Technology LTD

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
	Start	END	Daily	Specific Depth of loss (if known)	EVIDENCE (Depth)	DEPTH ON	DEPTH OFF	DEPTH	SIZE	DEPTH INTERVAL	PEAK GAS (units)		
22-May	4007	4007	0.00										Skidded over PCU 297-12A7, drilled surface shoe, drilling ahead
23-May	4007	5000	0.00										Drilling ahead with directional tool on oil set
24-May	5000	5400	599.80										POOH, laid down Power Drive BHA, TH, wash and ream, Circulate hole, Displace DSF
25-May	5400	5825	1112.20	5650'									Displaced LSND with DSF, lost full returns at 5650', Drilled to 5820' losses slowed
26-May	5825	6135	1188.30										Circulated, back reamed to shoe, displaced DSF with LSND, drilled to 6135'
27-May	6135	7063	3592.80										Drill ahead, Pumped 45 bbis LCM pill with 24 ppb WALLNUT
28-May	7063	7427	3063.20	7485'									Perform wiper trip to shoe, lost returns @ 7485', Stopped drilling to build volume.
29-May	7427	8194	4920.40										Drill ahead to 8317', Perform 3 stand wiper trips every 3 stands drilled.
30-May	8194	8896	3868.80										Drill ahead to 8896' MD, 3 stand wiper trips, circulate, survey.
31-May	8896	8896	1862.10										JSA and rig up casing equipment. Run casing
1-Jun	8896	8896	2180.70										Run casing to 8840, cement, Skid rig to 12A6
16-Nov	8896	8896	0.00										Made up BHA, prepare to run in hole, perform casing pressure test, and FIT.
17-Nov	8896	8906	253.20										Tripped in hole; performed Casing Pressure Test; drilled out 10' of formation; performed FIT; currently wireline logging with Schlumberger
18-Nov	8906	9420	213.20				8690	8690	No Flare	N/A	8690-8690	2249	Drilling ahead; going on gas buster for every connection gas.
							8986	8990	No Flare	N/A	8986-8990	3120	
							8991	9026	8991'-9026'	10'-15'	8991-9026	2065	
							9215	9219	9215'-9219'	10'-15'	9215-9219	2303	
							9310	9314	9310'-9314'	10'	9310-9314	2072	
							9407	9411	No Flare	N/A	9407-9411	2245	
19-Nov	9420	10610	1409.50				9436	9440	No Flare	N/A	9436-9440	463	Continued drilling ahead at a report time depth of 10610'; going on gas buster every connection.
							9503	9510	9503'-9510'	5'-10'	9503-9510	1610	
							9602	9606	No Flare	N/A	9602-9606	1535	
							9717	9728	9717'-9728'	5'-10'	9717-9728	3166	
							9804	9817	9804'-9817'	15'-20'	9804-9817	3041	
							9890	9896	9890'-9896'	20'	9890-9896	3148	
							9985	9996	9985'-9996'	15'	9985-9996	2641	
							10081	10088	10081'-10088'	15'-20'	10081-10088	1998	
							10282	10288	10282'-10288'	15'-20'	10282-10288	2915	
							10377	10387	10377'-10387'	10'-15'	10377-10387	1575	
					10422-10434		10422	10434	10422'-10434'	5'	10422-10434	3057	
							10477	10485	10477'-10485'	10'-15'	10477-10485	2249	
							10497	10508	10497'-10508'	5'-10'	10497-10508	1063	
							10568	10588	10568'-10588'	5'-10'	10568-10588	2241	
20-Nov	10610	12080	479.30				10630	10634	10630'-10634'	5'	10630-10634	1036	Continued drillign ahead at a report time depth of 12080'; going on gas buster when needed; minor amounts of CO2 observed during connection gas returns.
							10643	10661	10643'-10661'	10'-15'	10643-10661	3333	
							10669	10679	10669'-10679'	10'-20'	10669-10679	1699	
							10762	10776	10762'-10776'	15'	10762-10776	2098	
							10870	10876	No Flare	N/A	10870-10876	1412	
							11065	11069	11066'-11069'	20'	11065-11069	2013	
											11115-11120	3135	
							11155	11166	No Flare	N/A	11155-11166	3161	
							11353	11360	No Flare	N/A	11353-11360	3134	
											11420-11430	980	
											11514-11521	1828	
											11526-11539	1835	
											11558-11566	1420	
											11577-11581	1245	
											11717-11736	2275	
											11822-11831	2996	
											11842-11890	2890	
											11911-11927	2408	
											12003-12023	2224	
21-Nov	12080	12820	1184.6								12106-12117	2649	Continued drilling ahead at a report time depth of 12820'; overall background is decreasing as drilling continues through the lower portion of the Corcorran Coastal Plain towards the Corcorran Marine.
											12199-12213	2319	
											12371-12376	2365	
											12442-12447	1907	
							12600	12600	No Flare	N/A			
											12683-12717	2796	
											12743-12756	388	
											12785-12791	2680	
22-Nov	12820	12866	457.2										Drilled to 12866' cir B/U build MW up to 10.0ppg POOH to run casing tight spots 9770 and 12450.
23-Nov	12866	12866	37										Pulled up into shoe cir B/U pumped 12.5ppg pill pooh picked up casing equipment and CRT tool; TH to show with 4.5" casing broke circulation; TH at report time
24-Nov	12866	12866	724				12866	12866	12866	5'			Ran casing to shoe broke circulation; TH wash and reaming to bottom cir B/U rigged down CRT tool rigged up cement equipment circulate B/U pumped cemen
							12866	12866	12866	5'			
Total Losses to Date			27146.30										

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**Daily Activity Summary
From H&P Daily Tour Sheet**

**Piceance Creek Unit PCU 297-12A7
Rio Blanco County, CO.**

CANRIG  Canrig Drilling Technology LTD

05/20/09

Skid rig from A-9 to A-7; nipple up stack and flow line.

05/21/09

Rig up and prepare to test BOP. Test BOP and pick up BHA

05/22/09

Pick up BHA. Trip in to 1029', test directional equipment. Cut drill line. Circulate bottoms up. Test casing to 1600 psi for 30 minutes. Drill out float, shoe and new formation to 4007'. Circulate and run FIT test. Drill to 4170'

05/23/09

Drilling ahead from 4170' to 5300'; directional drilling off set section of well Pull out of hole to lay down directional BHA; Max 705u, CO2 330 ppm.

05/24/09

Lay down directional tools; trip in hole. Wash and ream. Change to DSF fluid. Drill from 5300' to 5610'; lost all returns at 5560' with a max gas of 170u; max CO2 of 10640 ppm.

05/25/09

Pump DSF and check mud level every 15 minutes. Circulate, drill and monitor well; drilled from 5610' to 5882'; max gas of 1752 units; max CO2 of 11455 ppm.

05/26/09

Wash and ream. Circulate bottoms up. Drill from 5610' to 6360'. Wipe hole. Circulate and survey. Max gas: 1752 units. Max CO2: 11725 ppm.

05/27/09

Drill from 6360p' to 7410' with three stand wiper trip at 7030'. Begin wiper trip to shoe. Max gas: 580 units, Max CO2: 601 ppm.

5/28/09

Trip in from 3978', wash and ream. Drill from 7410'; lost circulation at 7490', work stuck pipe, build mud, drill to 7625'.

5/29/09

Drill from 7625' to 7987', circulate, three stand wiper trip; drill to 8274', three stand wiper trip. Circulate and survey at 8369'. Drill to 8471'.

5/30/09

Drilled ahead to a depth of 8896' for the intermediate casing; prepare to run casing; run in hole with casing.

5/31/2009

Rig up cementing equipment; cement intermediate casing; prepare to skid rig to next hole.

11/17/2009

Test Bop and blind rams; perform blowout control function test; install wear bushing; make up BHA and trip in the hole; pick up and lay down drill pipe; prepare for casing pressure test followed by drilling out 10' of formation before performing FIT.

11/18/2009

Trip in the hole to 8443'; pull trip nipple and install rotating head; tag cement at 8779'; perform casing pressure test; drill 10' of formation and circulate bottom sup; perform Formation Integrity Test; trip out of hole; rig up Schlumberger wire-line tools and log hole.

11/19/2009

Currently drilling ahead at 10513'; pumped 10bbbls stacked sweeps 3 at a time to clean hole and control losses.

11/20/2009

Continuing to drill ahead from 11936'; pumped 10bbbls stacked sweeps to clean the hole; experiencing higher mud losses throughout the Rollins and into the Cozette.

11/21/2009

Continued drilling ahead from 12080'; pumped sweeps to maintain a clean hole and to remedy mud losses; currently drilling through the Corcorran Coastal Plain and into the Corcorran Marine.

11/22/2009

Finished drilling hole to 12886' MD; circulated and condition hole and build MW to 10.0ppg; pulled out of hole conventionally until tight spot at 12450' and 9770'; began to back ream out of hole to shoe; circulated bottom's up spotted 12.5 ppg pill; monitor well for 30 min; continued pulling out of the hole to run casing.

11/23/2009

Finished pulling out of the hole; picked up casing equipment and CRT tool; tipped in the hole with 4.5" casing to shoe at 8823'; broke circulation; tripped in the hole to 9288' tight spot washed and reamed through it.

11/24/2009

Tripping in hole wash and reaming down to 11554'; circulated B/U; finished washing to bottom to 12852'; Circulated B/U; rigged down CRT tool; rigged up cement equipment; circulated B/U; performed cement job and prepare to nipple down BOP stack and skid rig over to 12A9 well.

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Survey Data

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

 **CANRIG** Canrig Drilling Technology LTD



RIO BLANCO, COLORADO
Piceance Creek Unit 297-12A7



SURVEY DATA
Provided by Schlumberger

	MD Depth (ftKB)	Inc Angle (°)	Azimuth (°)	TVD Depth (ft)	Vertical Section (ft)	DLS (°/100ft)	Vertical		
							+N/S- (ft)	+E/W- (ft)	
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	17.20	0.00	0.00	17.20	0.00	0.00	0.00	0.00	
	30.20	0.00	0.00	30.20	0.00	0.00	0.00	0.00	
	139.20	0.40	96.99	139.20	0.37	0.37	-0.05	0.38	
	166.20	0.14	38.48	166.20	0.46	1.29	-0.03	0.49	
	342.20	1.14	69.57	342.19	1.78	0.58	0.75	2.27	
	411.20	2.87	78.60	411.14	3.70	2.54	1.33	4.60	
	457.20	4.15	81.68	457.05	6.06	2.81	1.80	7.38	
	502.20	5.21	80.57	501.90	9.16	2.36	2.37	11.01	
	547.20	6.33	88.06	546.68	13.13	2.99	2.79	15.50	
	592.20	7.04	88.49	591.37	17.87	1.58	2.94	20.74	
	637.20	7.11	90.26	636.03	22.93	0.51	3.00	26.28	
	669.20	7.14	91.63	667.78	26.60	0.54	2.94	30.25	
	733.20	8.81	87.50	731.16	34.71	2.76	3.04	39.12	
	828.20	11.41	85.21	824.68	49.54	2.77	4.14	55.75	
	1018.20	12.05	86.67	1010.71	83.83	0.37	6.86	94.28	
	1113.20	13.88	84.01	1103.28	102.63	2.03	8.63	115.52	
	1208.20	15.64	86.28	1195.14	123.96	1.95	10.65	139.63	
	1304.20	16.06	86.08	1287.49	147.29	0.44	12.39	165.79	
	1399.20	15.91	86.42	1378.82	170.57	0.19	14.11	191.90	
	1494.20	15.81	85.77	1470.21	193.65	0.21	15.87	217.80	
	1589.20	15.65	86.19	1561.65	216.52	0.21	17.68	243.49	
	1684.20	15.56	85.65	1653.15	239.20	0.18	19.50	268.98	
	1779.20	15.35	85.94	1744.71	261.64	0.24	21.35	294.23	
	1874.20	15.96	84.61	1836.19	284.26	0.74	23.47	319.77	
	1969.20	16.06	84.32	1927.50	307.19	0.13	26.00	345.85	
	2065.20	15.81	83.98	2019.81	330.20	0.28	28.68	372.07	
	2160.20	15.82	83.50	2111.22	352.71	0.14	31.51	397.81	
	2255.20	15.73	81.92	2202.64	374.92	0.46	34.78	423.42	
	2350.20	14.41	83.33	2294.37	396.15	1.44	37.97	447.91	
	2445.20	15.73	82.80	2386.10	417.47	1.40	40.95	472.43	
	2540.20	15.47	82.80	2477.60	439.47	0.27	44.16	497.78	
	2635.20	14.94	82.45	2569.28	460.89	0.57	47.35	522.49	
	2730.20	16.70	84.21	2660.67	483.31	1.92	50.34	548.21	
	2825.20	17.31	85.61	2751.52	507.74	0.77	52.80	575.88	
	2920.20	17.58	84.73	2842.15	532.84	0.40	55.20	604.26	
	3015.20	17.40	84.56	2932.76	557.88	0.20	57.86	632.69	
	3110.20	16.96	84.21	3023.52	582.43	0.48	60.61	660.61	
	3205.20	16.70	83.68	3114.45	606.39	0.32	63.51	687.96	
	3300.20	16.79	83.50	3205.42	630.15	0.11	66.56	715.16	
	3395.20	15.91	86.67	3296.58	653.69	1.32	68.87	741.80	
	3491.20	15.20	88.07	3389.07	676.82	0.84	70.06	767.51	
	3585.20	15.20	87.02	3479.78	699.01	0.29	71.12	792.13	



RIO BLANCO, COLORADO
Piceance Creek Unit 297-12A7



SURVEY DATA
Provided by Schlumberger

	MD Depth (ftKB)	Inc Angle (°)	Azimuth (°)	TVD Depth (ft)	Vertical Section (ft)	DLS (°/100ft)	Vertical		
							+N/S- (ft)	+E/W- (ft)	
	3680.20	14.94	87.72	3571.51	721.21	0.33	72.25	816.81	
	3776.20	14.94	87.55	3664.26	743.50	0.05	73.27	841.54	
	3871.20	15.12	86.32	3756.02	765.56	0.39	74.59	866.13	
	3928.20	15.03	87.02	3811.05	778.81	0.36	75.45	880.93	
	4040.00	15.01	86.31	3919.03	804.69	0.17	77.14	909.86	
	4134.00	15.25	85.59	4009.78	826.47	0.32	78.87	934.33	
	4228.00	15.30	85.07	4100.45	848.33	0.16	80.89	959.01	
	4325.00	15.27	84.14	4194.02	870.75	0.25	83.29	984.47	
	4417.00	15.34	83.18	4282.76	891.84	0.29	85.97	1008.61	
	4513.00	14.39	84.01	4375.55	913.22	1.01	88.73	1033.08	
	4604.00	12.79	85.61	4464.00	931.99	1.81	90.68	1054.37	
	4700.00	11.01	87.74	4557.93	949.66	1.91	91.85	1074.13	
	4795.00	8.99	89.59	4651.48	964.63	2.15	92.26	1090.61	
	4892.00	7.23	90.84	4747.51	977.21	1.82	92.23	1104.30	
	4988.00	5.37	89.90	4842.92	986.91	1.94	92.15	1114.83	
	5084.00	3.30	88.30	4938.64	993.54	2.16	92.24	1122.08	
	5179.00	1.85	80.79	5033.55	997.31	1.56	92.56	1126.33	
	5275.00	0.12	102.22	5129.53	998.71	1.81	92.79	1127.96	
	5316.00	0.12	102.22	5170.53	998.79	0.00	92.77	1128.04	

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Drilling Fluid Reports

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

 **CANRIG** Canrig Drilling Technology LTD



PICEANCE CREEK UNIT PCU 297-12A7
WATER BASED MUD REPORT
 Mud Engineering Services Provided By Baroid

Property	5/22/2009	5/23/2009	5/24/2009	5/25/2009	5/26/2009	5/27/2009	5/28/2009
Sample Temperature (deg F)	---	131	135	115	106	111	115
Sample Depth	4007	5000	5315	5825	6135	6962	7427
Mud Weight (lb/gal)	8.9	9.25	9.3	9.25	8.9	8.8	9.05
FV (sec/quart)	35	50	51	--	56	48	51
PV(cP)	7	18	17	22	14	12	11
YP (lb/100 ft2)	8	19	20	17	21	18	18
Gels (10 sec lb/100ft2)	3	9	9	12	14	8	8
Gels (10 min lb/100ft2)	7	25	23	--	32	20	28
Gels (30 min lb/100ft2)	12	48	38	--	35	43	42
API FL (cc/30 min)	13.5	8.6	9.2	100	9.6	11.0	12.4
Cake (API)	2	2	3	--	2	2	2
pH	10.4	10.6	--	--	10.6	10.1	10.0
Pm	1.20	1.20	1.0	--	0.96	0.71	0.75
Hardness (mg/l)	80	20	20	--	20	20	20
Chlorides (mg/l)	1100	1300	--	1300	1200	1200	1300
MBT (lb/bbl)	15.0	25.0	20.0	--	17.5	20.0	20.0
Sand (%)	0.20	0.20	0.20	--	--	0.25	0.20
Corrected Solids (%)	3.7	6.7	7.2	6.8	4.2	3.2	4.2
CO2	330	330	10640	11455	11725	601	330



PICEANCE CREEK UNIT PCU 297-12A7
WATER BASED MUD REPORT
Mud Engineering Services Provided By Baroid

Property	5/29/2009	5/30/2009	5/31/2009	6/01/2009	11/16/2009	11/17/2009	11/18/2009
Sample Temperature (deg F)	110	---	---	---	---	---	104
Sample Depth	8194	8896	8896	8896	8896	8906	9200
Mud Weight (lb/gal)	9.2	9.45	9.30	9.10	10.00	9.20	9.30
FV (sec/quart)	50	50	51	41	44	38	40
PV(cP)	14	15	13	9	12	11	12
YP (lb/100 ft2)	16	17	17	12	14	11	13
Gels (10 sec lb/100ft2)	8	8	8	6	4	3	4
Gels (10 min lb/100ft2)	22	19	22	10	8	5	8
Gels (30 min lb/100ft2)	39	31	31	15	12	6	11
API FL (cc/30 min)	11.0	10.0	12.0	12.0	8.0	9.4	8.6
Cake (API)	2/-	2/-	2/-	2/-	2/-	2/-	2/-
pH	10.0	10.0	9.50	9.10	9.90	9.60	9.70
Pm	0.70	.73	0.65	.50	.80	.60	.58
Hardness (mg/l)	20	20	20	10	40	20	40
Chlorides (mg/l)	1300	130	1400	1700	2100	2100	2200
MBT (lb/bbl)	20.0	17.5	20.0	17.5	12.5	10.0	12.5
Sand (%)	0.20	.20	.15	.10	---	----	.25
Corrected Solids (%)	4.7	6.2	5.2	4.2	7.2	4.2	4.7
CO2	330	330	330	330	330	330	330



**PICEANCE CREEK UNIT PCU 297-12A7
WATER BASED MUD REPORT**

Mud Engineering Services Provided By Baroid

Property	11/19/2009	11/20/2009	11/21/2009	11/22/2009	11/23/2009	11/24/2009	
Sample Temperature (deg F)	108	122	121	122		89	
Sample Depth	10326	11446	12592	12866	12866	12886	
Mud Weight (lb/gal)	9.40	9.50	9.60	10.0	10.0	9.95	
FV (sec/quart)	43	45	45	44	43	43	
PV(cP)	14	14	16	14	14	13	
YP (lb/100 ft2)	15	17	18	17	16	16	
Gels (10 sec lb/100ft2)	5	6	6	5	5	5	
Gels (10 min lb/100ft2)	10	10	13	10	10	11	
Gels (30 min lb/100ft2)	16	14	20	16	16	18	
API FL (cc/30 min)	7.8	7.4	6.6	6.5	7.0	7.0	
Cake (API)	2/-	2/-	2/-	2/-	2/-	2/-	
pH	10.20	9.80	9.70	9.70	9.0	9.80	
Pm	1.20	.80	.75	0.77	0.60	0.60	
Hardness (mg/l)	40	40	40	40	40	30	
Chlorides (mg/l)	2200	2200	1800	1800	1800	2400	
MBT (lb/bbl)	15.0	15.0	15.0	15.0	15.0	15.0	
Sand (%)	.35	.40	.45	0.45	0.45	0.35	
Corrected Solids (%)	5.0	5.5	6.2	7.8	7.8	7.6	
CO2	330	330	2200	330	330	330	

ExxonMobil

Bit History

Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

CANRIG Canrig Drilling Technology LTD



Bit History PCU 297-12A7

Bit #	Ser #	Mfr.	Size	Type	Jet Sizes	Depth In	Depth Out	Footage	Avg ROP	Hours
1	SURFACE									
2	SURFACE									
3	7014935	HUGHES	9 7/8"	HCM504ZX	4X13 2X12	3995'	5316'	1321'	42.6	31.00
4	JY9320	SMITH	9 7/8"	MI616	4X13 2X12	5316'	8896'	3580'	58.21	61.50
5	7123474	HUGHES	6.125"	TR11259R	3X13	8896'	8906'	10'	4.44	51.18
6	7125167	HUGHES	6.125"	QD406	3X13	8906'	13866'	3960'	45.78	86.50

ExxonMobil

Pressure Test Graphs

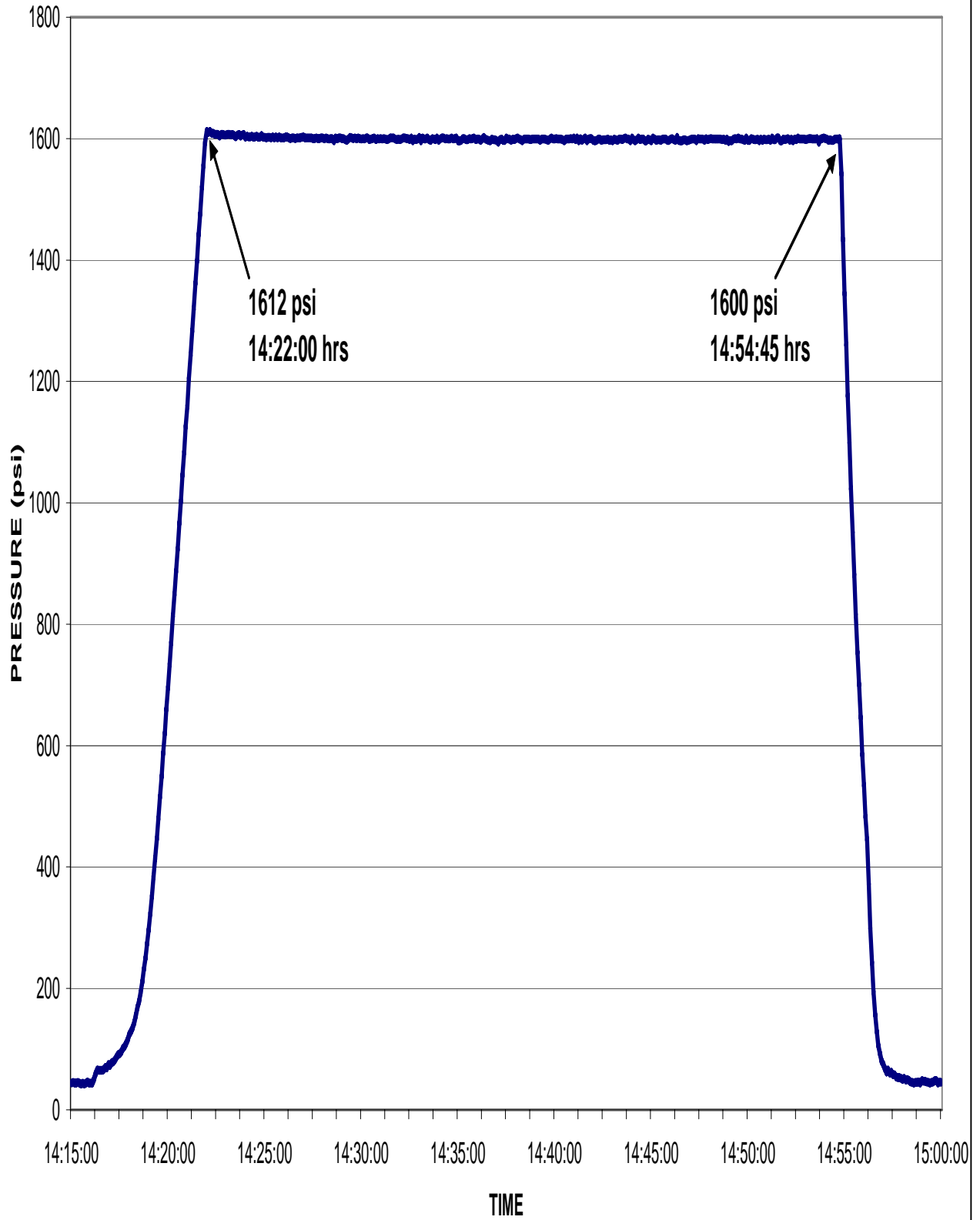
Piceance Creek Unit PCU 297-12A7

Rio Blanco County, CO.

CANRIG  Canrig Drilling Technology LTD

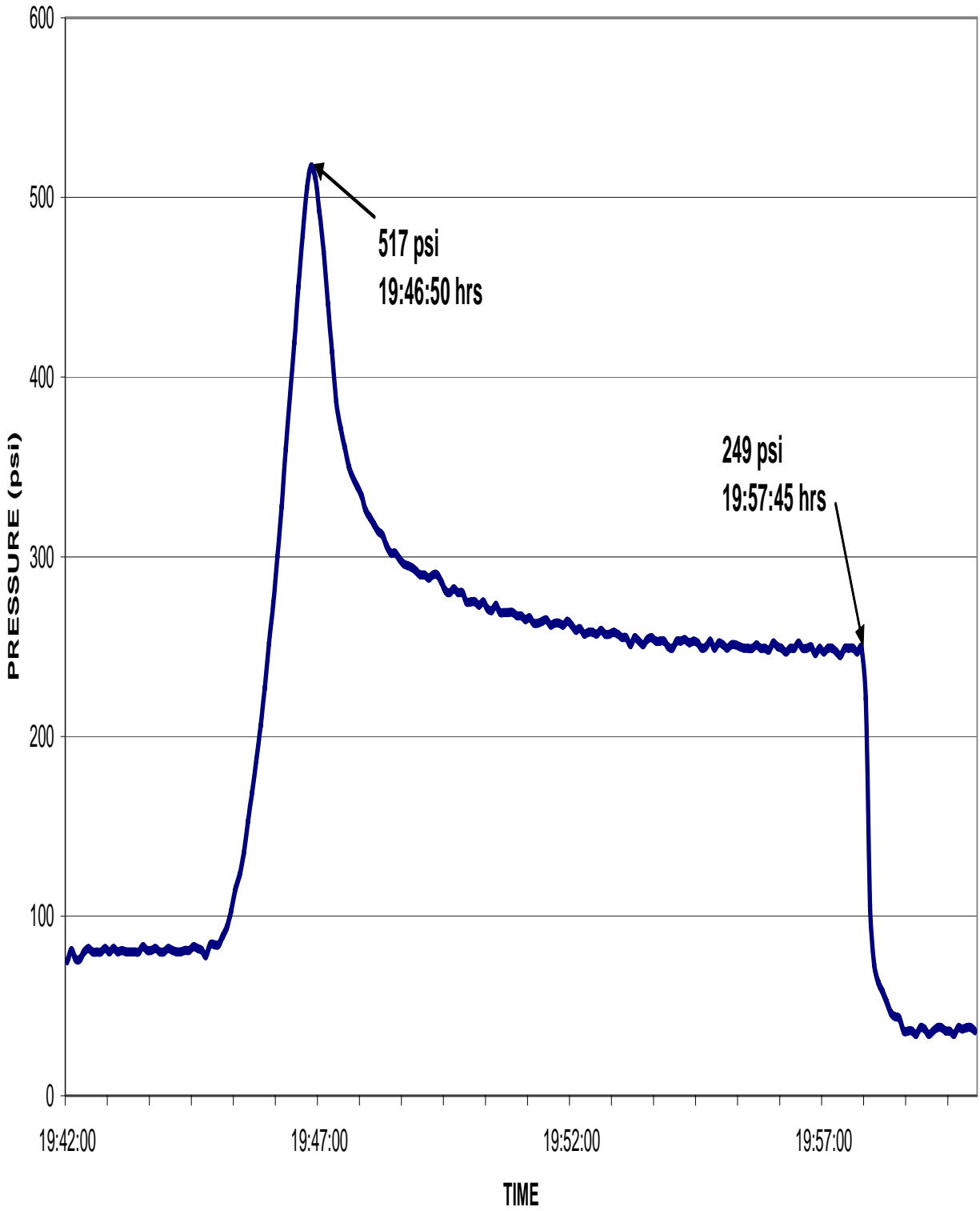
ExxonMobil PCU 297-12A7
Surface Casing Pressure Test

05/22/2009



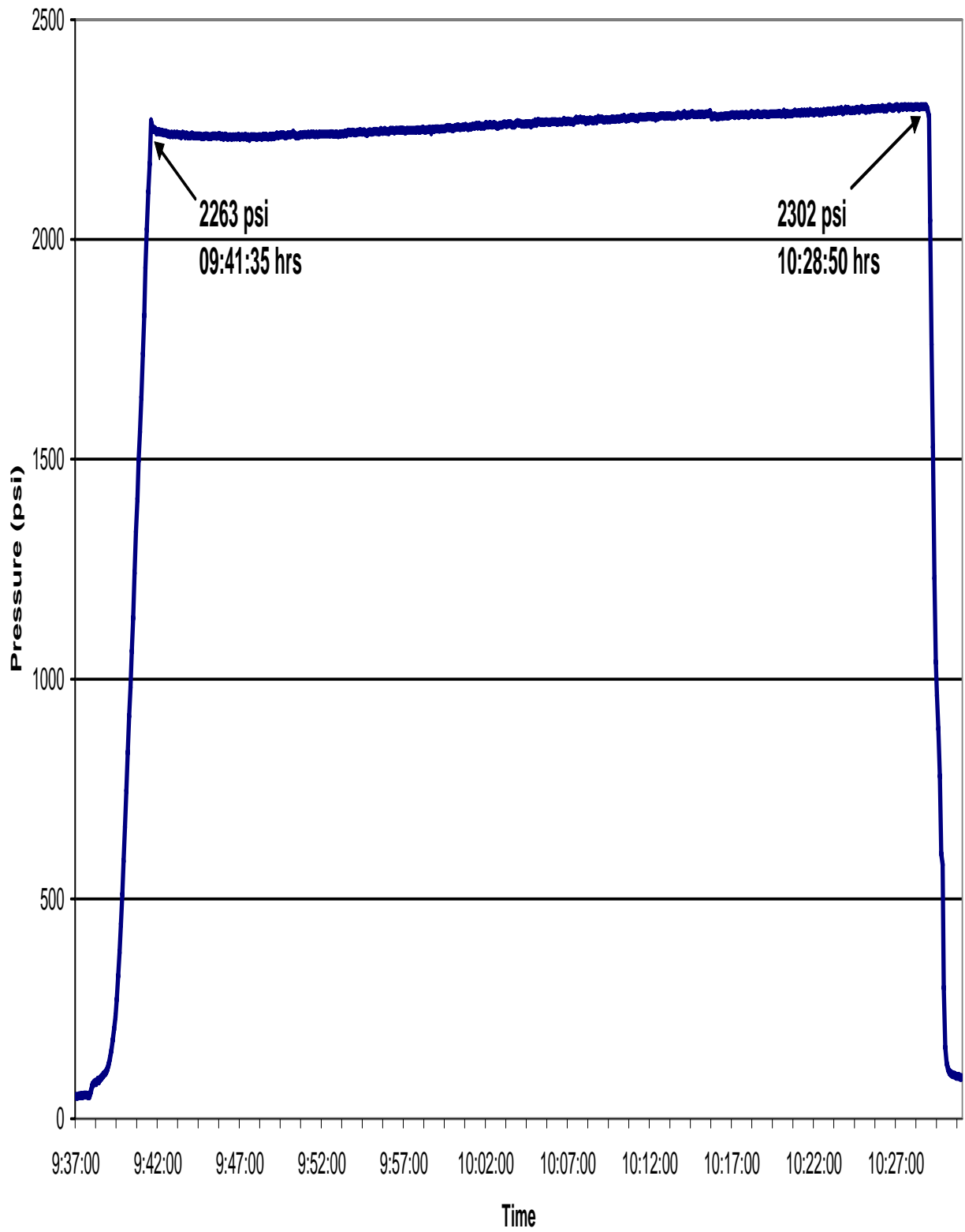
ExxonMobil PCU 297-12A7
Surface Casing Formation Integrity Test

05/22/2009



11/17/2009

ExxonMobil PCU 297-12A7 Intermdiate Casing Pressure Test



11/17/2009

ExxonMobil PCU297-12A7 Intermediate Formation Integrity Test

