Geological Report

on

COPRC Dodo Canyon E-76

Unit E, Section 76, Grid 65-10 126-45

Well Reached Total Depth on
Jan 20, 2014 @ 00:42

for

ConocoPhillips Canada Resources Corp.

Well License # : 470. NEB: 1211

Prepared For: Dave Oakley
ConocoPhillips Canada

Prepared By: Dave Lawrence / Gerry Pasveer
Black Gold Geotechnical Services Ltd.

Dave Lawrence / Gerry Pasveer

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The horizontal drilling target for this well is the Devonian Canol formation. The Canol is a siliceous organically-rich shale that is probably the source rock for the oil in the Norman Wells field (Kee Scarp Reef). The thickness of the Canol in this area makes it a good candidate to drill horizontally and then fracture hydraulically to obtain the hydrocarbons (hopefully light oil / condensate) which are trapped in the Canol due to the low permeability of the shale. Two vertical strat wells were drilled last winter and thoroughly investigated with cores and extensive logging programs to determine the best location in the Lower Canol to run the horizontal portion of this well.

The well was spudded on Dec 28, 2013. The drilling of surface hole went well except for a top drive breakdown that cost 2 days of rig time waiting on parts. The vertical & build sections also went well operationally with no signifiacnt hole troubles except for a couple of extra bit trips. The first was to change the drill bit which proved difficult to steer, the second trip was to dial up the motor angle from a 1.83 to a 2.12 degree bend. The 1.83 setting did not give us the necessary build rates needed to land the build section at a depth of 1908 meters and the programed angle of 88.5 degrees.

The horizontal portion of the well was trouble free and took only three days to drill to a total depth of 2910 meters measured depth on Jan 20, 2014 @ 00:42 hrs. This section of the well was drilled entirely in the Lower Canol formation. Right after drillout the well drilled out of the top of the target window for the first 200 meters due to too high of an angle caused by our casing which landed at an angle of approximently 90.5 degrees (our formation bed angle was 88.7 degrees). After steering back down into our target zone we then stayed in the window until TD.

Well Summary

Storage Units: Metric

Well Information

Operator:	**ConocoPhillips Canada Resources Corp.**
Well Name:	**COPRC Dodo Canyon E-76**
Location:	**Unit E, Section 76, Grid 65-10 126-45**
UWI:	300E766510126450
Pool:	Undefined
Field:	Dodo Canyon
State / Province:	Northwest Territories
Country:	Canada
License Number:	470, NEB: 1211
Well Status:	**Cased Hztl**

Surface Co-ordinates

Hole Type: Horizontal **Fault Indicator:**

Latitude: 65 05 27 N **Longitude:** 126 59 58 W

UTM Northing: 7219874.66 **UTM Easting:** 594010.01

N / S : Surface Location: c-76-L / 94-P-16

E / W : Surface UWI: 200C076L094P1699

Int. Casing Co-ordinates

Latitude: 7219988.32m N **Longitude:** 593815.38m

N / S : 119.8 m North

E / W : 190.99m West of surface location

Bottom Hole Co-ordinates

Latitude: 7220440.19m N **Longitude:** 592922.75m E

N / S : 599.85m North

E / W : 1069.12m West

Elevations

		Reference:	Grd
Ground Elevation:	268.20	**Kelly Bushing to Ground:**	5.20
Kelly Bushing Elevation:	273.40	**Cut (-):**	
Casing Flange Elevation:	268.20	**Fill (+):**	

Total Depth

	Measured Depth	**True Vertical Depth**
Total Depth Driller (Tally) :	2,910.00	1,803.76
Total Depth Driller (Strap or SLM):		
Total Depth Logger:		

Miscellaneous Depths

Plugback Depth:	**Water Depth Reference:**
Sidetrack Depth:	**Water Depth:**

Well Summary

Drilling Contractor:	Beaver Drilling Ltd.	**Spud Date:**	Dec 28, 2013 @ 06:30
Rig Release Date:		**Total Depth Date:**	Jan 20, 2014 @ 00:42

Cores	**#**	**Formation**	**Interval**	**Cut**	**Recovered**	**%**

Well Summary

Storage Units: Metric

Casing Summary

Casing Type	Casing Size	Landed Depth	Hole Size
Surface	244.5	603.00	311.0
Intermediate	177.8	1,907.17	222.0

Logging Summary

Company	Engineer	Total Depth (MD)	Logging tools
Schlumberger	Jeffrey Tatloc	1,908.00	AIT-TLD-HGNS-GR-BHC-TLD2-ECRD.
		2,910.00	USIT-CBL-GR

Daily Drilling Summary

Storage Units: Metric

Date	Depth	Progress	Rotating Hours	Avg. P.R.	Daily Costs	Formation	Operational Status @ Report Time
Dec 27, 13	0.00		0.00	0.00		Surface	Rigging up
Dec 28, 13	0.00	0.00	0.00	0.00		Surface	Pre-spud meeting
Dec 29, 13	156.00	156.00	11.00	14.18		Slater River	Wait on top drive parts
Dec 30, 13	156.00	0.00	0.00	0.00		Slater River	Wait on top drive parts
Dec 31, 13	212.00	56.00	3.00	18.67		Slater River	Tripping (RIH)
Jan 01, 14	396.00	184.00	5.50	33.45		Slater River	Wiper trip
Jan 02, 14	543.00	147.00	14.00	10.50		Slater River	Drilling
Jan 03, 14	592.00	49.00	8.00	6.13		Slater River	Ream & wash into hole
Jan 04, 14	603.00	11.00	1.75	6.29		Slater River	Cementing surface casing
Jan 05, 14	603.00	0.00	0.00	0.00		Slater River	Pressure test Manifold
Jan 06, 14	603.00	0.00	0.00	0.00		Slater River	RIH / Dir Tools
Jan 07, 14	808.00	205.00	8.25	24.85		Slater River	Drilling 222mm hole
Jan 08, 14	1,293.00	485.00	18.50	26.22		Imperial	Drilling 222mm hole
Jan 09, 14	1,556.00	263.00	19.25	13.66		Imperial	Drilling 222mm build
Jan 10, 14	1,599.00	43.00	6.50	6.62		Imperial	Tripping RIH (slip & cut)
Jan 11, 14	1,702.00	103.00	14.50	7.10		Upper Canol	Tripping (POOH)
Jan 12, 14	1,751.00	49.00	11.00	4.45		Lower Canol	Drilling 222mm build
Jan 13, 14	1,835.00	84.00	20.50	4.10		Lower Canol	Drilling 222mm build
Jan 14, 14	1,908.00	73.00	17.50	4.17		Lower Canol	Circ after wiper trip
Jan 15, 14	1,908.00	0.00	0.00	0.00		Lower Canol	Run 177.8mm casing
Jan 16, 14	1,908.00	0.00	0.00	0.00		Lower Canol	Attempt to land pack-off assembly
Jan 17, 14	1,945.00	37.00	4.00	9.25		Lower Canol	Drilling 156mm Hztl hole
Jan 18, 14	2,197.00	252.00	18.75	13.44		Lower Canol	Drilling 156mm Hztl hole
Jan 19, 14	2,571.00	374.00	18.75	19.95		Lower Canol	Drilling 156mm Hztl hole
Jan 20, 14	2,910.00	339.00	14.50	23.38		Lower Canol	Wiper Trip
Jan 21, 14	2,910.00	0.00	0.00	0.00		Lower Canol	Rig out loggers

Accumulated Daily Costs:

Casing Data Summary

Storage Units: Metric

Casing Type: Surface

Casing Size:	244.5	**Hole Size:**	311.0
Casing Landed @:	603.00	**Total Joints:**	47
Casing Date:	Jan 4, 2014 @ 02:30	**Plug Down Date:**	Jan 4, 2014 @ 07:45

# of Joints / Length / O.D. / Weight: 1 244.5 float.
1 244.5 mm shoe.
47 jts of 244.5mm, 53.6 kg/m, K-55, LT&C surface casing.

Cementing Details: Pump 5 m3 of 1000 kg/m3 fresh water, Pressure test Line to 21,000 kPa (held ok), bleed off pressure, Pump 5 m3 of 1300 kg/m3 MudPush II pre flush spacer, Pump 32 tonnes / 29.5 m3 (50% excess) of RFC 1740 cement with 0.2% Anti Foam + 1.0% CaCl2 + 1.1% Low Temp Fluid Loss + 0.6% Dispersant from 603m to 5.2m, Drop Plug and Displace with 23.8 m3 of Fresh Water

Remarks: 6 m3 good returns to surface.

Casing Type: Intermediate

Casing Size:	177.8	**Hole Size:**	222.0
Casing Landed @:	1,907.17	**Total Joints:**	150
Casing Date:	Jan 15, 2014 @ 15:30	**Plug Down Date:**	Jan 15, 2014 @ 22:15

# of Joints / Length / O.D. / Weight: 1 177.8mm float shoe
1jt of 177.8mm, 38.69kg/m P-110, LT&C csg
1 177.8mm float collar
149 jts 177.8mm, 38.69 kg/m, P-110, LT&C csg.

Cementing Details: Pump 8m3 of 1000kg/m3 CW8 pre-flush, stop & pressure test lines to 21000kpa (held ok) bled off and pump 8m3 of 1200kg/m3 MUDPUSH II pre-flush spacer.
Pump 20T (24.8m3) (30% excess) of Hilite 1400 lead with 0.2% Antifoam + 0.6% Low temp dispersant + 60L/T Gas control agent + 0.3% Antisettling, from 1369 - 5.2m, pump 13T (9.8m3) (30% excess) of 1900 kg/m3 coventional Class G Tail with 0.6% Fluid loss + 0.5% Dispersant + 0.2% antifoam + 0.2% retarder + 72L/T gas control agent from 1908-1369m. Drop plug and displace 37.8m3 of invert. Bump plug 3500 kpa over final circ pressure of 6500 kpa @ 22:15 hrs. Bleed of pressure and check out floats (holding OK), Pressure test casing to 18500 kpa for 10 min Held OK.

Remarks:

Bit Record Table (IADC Grading System)

Storage Units: Metric

*** For more detailed Bit Information refer to Bit Record ***

Bit #	Make	Type	Size	Depth In	Depth Out	Made	Hours	Avg. P.R.	I.A.D.C. Bit Condition								
									I	O	MDC	Loc	B	G	ODC	RP1	RP2
1A	REED	J&L	311.0	0.0	603.0	603.0	41.00	14.71	1	2	WT	S	1	I	NO	TD	
1	Ulterra	616	222.0	603.0	1,599.0	996.0	50.75	19.63	1	4	CT	G	X	I	NO	BHA	
2	Smith	FH18B	222.0	1,599.0	1,702.0	103.0	14.40	7.15	1	1	WT	G	E	I	NO	BHA	
2RR	Smith	FH18B	222.0	1,702.0	1,908.0	206.0	46.75	4.41	1	3	CT	S	E	I	WT	TD	
3	Smith	613	156.0	1,908.0	2,910.0	1,002.0	43.50	23.03	1	2	WT	S	X	I	NO	TD	

Total Rotating Hours: 196.40

Wireline Logging Summary

Storage Units: Metric

Logging Suite Number: 1
Wireline Logging Company: Schlumberger
District: Grande Prairie
Witness: Dave Lawrence

Engineer: Jeffrey Tatloc
Unit Number: 3139

Was Pressure Control Equipment Utilized: No
Was the Logging Job Mechanically Assisted: No

Maximum Deviation: 89.000 °
Hole Size: 222.0

Total Lost Time:
Loggers' Total Down Time:
Total Job Time (From Rig up to Rig down):

	Measured Depth	True Vertical Depth
Casing Depth Driller	603.00	602.97
Casing Depth Logger	603.00	602.97
Total Depth Driller (Tally)	1,908.00	1,776.68
Total Depth Driller (Strap or SLM)		

General Remarks: Called out for 11:00 hrs. Arrived @ 09:20 hrs.

Logging Run #: 1
Date: Jan 14, 2014

Drilling Fluid Data

Drilling Fluid Type: Invert (versaclean)
Fluid Density: 1025.0 **Viscosity:** 75 **pH:** **Fluid Loss:**

Mud Resistivity (Rm): @ °
Mud Resistivity (Rm) @ BHT: @ °
Mud Filtrate Resistivity (Rmf): @ °
Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: 71.5 °
Source (Rmf):
Source (Rmc):

Logging Run Information

Date on Bottom: Jan 14, 2014
Total Depth Logger: 1,819.10 (MD) 1,761.46 (TVD)

Logging Tools: AIT-TLD-HGNS-GR-BHC-TLD2-ECRD.

Remarks:

Hole Conditions: Good, wiper trip @ TD to 1466m prior to POOH to log.

Wireline Logging Summary

Storage Units: Metric

Logging Suite Number: 2
Wireline Logging Company: Schlumberger
District: Grande Prairie
Witness: Dave Lawrence

Engineer: Jeffrey Tatloc
Unit Number: 3139

Was Pressure Control Equipment Utilized: No
Was the Logging Job Mechanically Assisted: No

Maximum Deviation: 91.000 °
Hole Size: 156.0

Total Lost Time: 0.00
Loggers' Total Down Time: 0.00
Total Job Time (From Rig up to Rig down): 6.00

	Measured Depth	True Vertical Depth
Casing Depth Driller	1,908.00	1,776.68
Casing Depth Logger		
Total Depth Driller (Tally)	2,910.00	1,803.76
Total Depth Driller (Strap or SLM)		

General Remarks:

Logging Run #: 1
Date: Jan 20, 2014

Drilling Fluid Data

Drilling Fluid Type: Invert (versaclean)
Fluid Density: 1040.0 **Viscosity:** 75 **pH:** **Fluid Loss:**

Mud Resistivity (Rm): @ °
Mud Resistivity (Rm) @ BHT: @ °
Mud Filtrate Resistivity (Rmf): @ °
Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: 71.5 °
Source (Rmf):
Source (Rmc):

Logging Run Information

Date on Bottom: Jan 21, 2014
Total Depth Logger: 1,824.10 (MD) 1,763.35 (TVD)

Logging Tools: USIT-CBL-GR

Remarks:

Hole Conditions: Cased

Deviation / Directional Survey Report

Directional Drilling Company:	Beaver
Directional Drillers:	
Measured While Drilling (MWD) Hands:	
Survey Type:	drift
Survey Mode:	wireline
Survey Date:	Dec 28, 2013
Survey Calculation Method:	minimum curvature
Target Azimuth:	0.00 °
Dog Leg Severity Characteristic:	30.00

Survey Tie-In Information

Tie-In Co-Ordinates

Latitude:
Longitude:
N / S:
E / W:

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity

Kick-Off (Whipstock) Information

Kick-Off Co-Ordinates

Latitude:
Longitude:
N / S:
E / W:

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity

Remarks:

Survey Points

Storage Units: Metric

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
29.00		0.400					
62.00		0.500					
90.00		0.200					
118.00		0.200					
146.00		0.100					
183.00		0.200					
211.00		0.300					
240.00		0.500					
269.00		0.800					
306.00		1.000					
348.00		0.900					
378.00		0.400					
396.00		0.600					
433.00		0.600					
461.00		0.600					
489.00		0.500					
508.00		0.700					
544.00		0.400					
571.00		0.500					
603.00		0.500					

Deviation / Directional Survey Report

Directional Drilling Company:	Schlumberger
Directional Drillers:	Chad Chimuk, George Grigore
Measured While Drilling (MWD) Hands:	Dennis Caissie
Survey Type:	magnetic
Survey Mode:	MWD
Survey Date:	Jan 4, 2014
Survey Calculation Method:	minimum curvature
Target Azimuth:	299.99 °
Dog Leg Severity Characteristic:	30.00

Survey Tie-In Information

Tie-In Co-Ordinates

Latitude:
Longitude:
N / S:
E / W:

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00

Kick-Off (Whipstock) Information

Kick-Off Co-Ordinates

Latitude:
Longitude:
N / S:
E / W:

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity

Remarks: On the bit trip @ 1599m the drill string was strapped and it was discovered that we were missing 1 single, so a 9.36 meter depth correction was made (shallower). It was decided by the drilling departmnet not to change the survey deths, as it would not change the overall survey data that much due to the low angle at that time. All surveys from 600 to 1599 meters are out in depth by 9.36 meters.

Survey Points

Storage Units: Metric

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
29.00	29.00	0.400	0.00	0.10	0.00	0.05	0.41
62.00	62.00	0.500	0.00	0.36	0.00	0.18	0.09
90.00	90.00	0.200	0.00	0.53	0.00	0.27	0.32
118.00	118.00	0.200	0.00	0.63	0.00	0.31	0.00
146.00	146.00	0.100	0.00	0.70	0.00	0.35	0.11
183.00	183.00	0.200	0.00	0.80	0.00	0.40	0.08
211.00	211.00	0.300	0.00	0.92	0.00	0.46	0.11
240.00	240.00	0.500	0.00	1.12	0.00	0.56	0.21
269.00	268.99	0.800	0.00	1.45	0.00	0.73	0.31
306.00	305.99	1.000	0.00	2.03	0.00	1.02	0.16
348.00	347.98	0.900	0.00	2.73	0.00	1.36	0.07
378.00	377.98	0.400	0.00	3.07	0.00	1.53	0.50
396.00	395.98	0.600	0.00	3.23	0.00	1.61	0.33
433.00	432.98	0.600	0.00	3.62	0.00	1.81	0.00
461.00	460.98	0.600	0.00	3.91	0.00	1.95	0.00
489.00	488.98	0.500	0.00	4.18	0.00	2.09	0.11
508.00	507.98	0.700	0.00	4.38	0.00	2.19	0.32
544.00	543.97	0.400	0.00	4.72	0.00	2.36	0.25
571.00	570.97	0.500	0.00	4.93	0.00	2.47	0.11
627.50	627.47	0.310	124.14	5.09	0.13	2.44	0.38
704.50	704.47	0.620	137.27	4.67	0.58	1.83	0.13
781.50	781.46	0.710	129.47	4.06	1.23	0.96	0.05
818.50	818.46	0.710	121.14	3.80	1.61	0.51	0.08
856.50	856.46	1.280	112.77	3.51	2.20	-0.15	0.46
896.50	896.45	1.280	113.56	3.16	3.02	-1.04	0.01
932.50	932.44	1.190	113.98	2.85	3.73	-1.81	0.08
970.50	970.43	0.880	151.55	2.43	4.23	-2.45	0.57
1,008.50	1,008.43	1.020	147.85	1.89	4.55	-3.00	0.12
1,046.50	1,046.42	1.190	133.05	1.33	5.02	-3.68	0.26
1,084.50	1,084.41	1.500	124.45	0.78	5.72	-4.56	0.29
1,122.50	1,122.40	1.100	145.78	0.20	6.33	-5.38	0.49
1,160.50	1,160.39	1.190	131.15	-0.36	6.83	-6.10	0.24

1,198.50	1,198.38	2.120	145.56	-1.20	7.53	-7.12	0.80
1,236.50	1,236.35	1.810	176.76	-2.38	7.96	-8.08	0.87
1,274.50	1,274.34	1.410	163.67	-3.43	8.12	-8.75	0.43
1,312.50	1,312.32	1.900	156.64	-4.46	8.51	-9.59	0.42
1,351.50	1,351.30	2.120	141.06	-5.61	9.22	-10.79	0.45
1,389.50	1,389.27	2.900	172.66	-7.11	9.78	-12.02	1.23
1,426.50	1,426.22	2.780	175.74	-8.93	9.97	-13.10	0.16
1,446.00	1,445.68	4.200	204.66	-10.05	9.70	-13.43	3.41
1,464.50	1,464.15	2.700	229.77	-10.95	9.09	-13.35	3.40
1,474.50	1,474.13	4.020	247.44	-11.24	8.58	-13.05	4.99
1,483.50	1,483.11	4.600	257.05	-11.44	7.94	-12.60	3.08
1,493.50	1,493.06	6.320	262.42	-11.60	7.01	-11.87	5.38
1,503.00	1,502.50	7.110	268.46	-11.69	5.90	-10.95	3.34
1,512.50	1,511.91	8.090	268.37	-11.72	4.64	-9.88	3.09
1,522.00	1,521.31	8.620	267.36	-11.77	3.26	-8.71	1.74
1,531.50	1,530.69	9.810	264.58	-11.88	1.75	-7.45	4.01
1,541.00	1,540.04	10.780	267.18	-12.00	0.05	-6.05	3.40
1,550.50	1,549.36	11.620	269.47	-12.06	-1.79	-4.48	3.00
1,560.00	1,558.65	12.590	269.78	-12.07	-3.78	-2.76	3.07
1,569.50	1,567.88	14.410	271.28	-12.05	-6.00	-0.82	5.85
1,580.00	1,578.02	15.600	270.75	-12.00	-8.72	1.55	3.42
1,589.50	1,587.10	18.780	267.97	-12.04	-11.52	3.97	10.37
1,599.00	1,596.08	19.400	278.37	-11.86	-14.61	6.73	10.90
1,608.50	1,605.04	19.310	287.85	-11.15	-17.67	9.73	9.92
1,617.50	1,613.53	19.800	296.44	-10.01	-20.45	12.71	9.71
1,627.00	1,622.45	20.190	300.14	-8.47	-23.31	15.95	4.18
1,636.50	1,631.34	21.210	303.36	-6.71	-26.16	19.31	4.83
1,645.50	1,639.69	22.800	306.18	-4.78	-28.93	22.67	6.36
1,655.00	1,648.39	24.480	309.35	-2.45	-31.94	26.44	6.65
1,664.50	1,656.94	27.220	309.27	0.18	-35.15	30.53	8.65
1,674.00	1,665.31	29.120	310.94	3.07	-38.57	34.94	6.50
1,683.50	1,673.53	31.200	312.66	6.25	-42.13	39.61	7.11
1,693.00	1,681.55	33.410	312.66	9.69	-45.86	44.57	6.98
1,702.50	1,689.36	36.100	310.68	13.29	-49.91	49.87	9.21
1,712.00	1,696.91	38.620	308.96	16.98	-54.34	55.55	8.61

1,721.50	1,704.17	41.710	305.96	20.70	-59.20	61.62	11.51
1,731.00	1,711.12	44.190	306.67	24.53	-64.42	68.06	7.98
1,740.50	1,717.77	47.020	306.67	28.59	-69.86	74.80	8.94
1,750.00	1,724.15	48.610	307.77	32.84	-75.47	81.78	5.64
1,759.50	1,730.28	50.910	309.66	37.38	-81.12	88.95	8.57
1,769.00	1,736.18	52.320	310.15	42.16	-86.84	96.28	4.61
1,778.50	1,741.78	55.500	312.17	47.21	-92.61	103.81	11.29
1,788.00	1,747.02	57.580	311.87	52.52	-98.50	111.56	6.62
1,797.50	1,751.91	60.410	310.28	57.86	-104.64	119.55	9.92
1,807.00	1,756.41	63.100	308.96	63.20	-111.08	127.80	9.25
1,816.50	1,760.48	66.110	308.78	68.58	-117.77	136.28	9.52
1,825.00	1,763.69	69.510	308.34	73.49	-123.92	144.06	12.09
1,835.00	1,766.86	73.490	307.55	79.32	-131.40	153.45	12.15
1,845.00	1,769.43	76.710	307.55	85.21	-139.06	163.03	9.66
1,854.50	1,771.42	79.100	305.56	90.74	-146.52	172.26	9.73
1,864.00	1,773.13	80.200	304.07	96.07	-154.19	181.57	5.79
1,873.50	1,774.60	82.020	303.67	101.30	-161.98	190.93	5.88
1,883.00	1,775.70	84.710	302.88	106.48	-169.87	200.35	8.85
1,889.50	1,776.19	86.610	302.26	109.97	-175.33	206.83	9.22
1,914.50	1,776.60	91.520	303.85	123.60	-196.28	231.78	6.19
1,924.00	1,776.34	91.600	302.88	128.82	-204.21	241.26	3.07
1,933.50	1,776.06	91.700	302.60	133.96	-212.20	250.75	0.94
1,943.00	1,775.79	91.600	303.40	139.13	-220.16	260.23	2.54
1,952.50	1,775.58	90.900	301.80	144.25	-228.16	269.72	5.51
1,962.00	1,775.42	91.000	303.30	149.36	-236.17	279.20	4.75
1,971.50	1,775.30	90.500	301.40	154.44	-244.19	288.70	6.20
1,981.00	1,775.20	90.700	300.90	159.35	-252.32	298.19	1.70
1,990.50	1,775.10	90.500	301.30	164.26	-260.46	307.69	1.41
2,000.00	1,775.08	89.700	300.30	169.13	-268.62	317.19	4.04
2,009.50	1,775.17	89.300	299.40	173.85	-276.86	326.69	3.11
2,019.00	1,775.37	88.300	300.00	178.56	-285.11	336.19	3.68
2,028.50	1,775.62	88.600	299.40	183.26	-293.35	345.68	2.12
2,038.00	1,775.86	88.500	298.50	187.86	-301.66	355.18	2.86
2,048.00	1,776.14	88.300	297.90	192.58	-310.47	365.17	1.90
2,057.00	1,776.41	88.300	297.90	196.79	-318.42	374.16	0.00

2,066.50	1,776.82	86.700	297.50	201.21	-326.83	383.64	5.21
2,076.50	1,777.42	86.500	296.80	205.76	-335.71	393.61	2.18
2,085.50	1,777.98	86.300	297.37	209.85	-343.71	402.58	2.01
2,095.00	1,778.64	85.820	295.65	214.08	-352.19	412.04	5.63
2,104.50	1,779.34	85.680	297.15	218.29	-360.67	421.50	4.74
2,113.50	1,780.02	85.590	296.97	222.38	-368.67	430.46	0.67
2,123.00	1,780.76	85.590	296.66	226.65	-377.12	439.92	0.98
2,132.50	1,781.48	85.680	295.25	230.79	-385.64	449.37	4.45
2,142.00	1,782.18	85.900	295.20	234.83	-394.21	458.81	0.71
2,151.00	1,782.83	85.820	295.16	238.65	-402.33	467.75	0.30
2,171.00	1,784.25	85.990	297.06	247.43	-420.24	487.65	2.85
2,181.50	1,785.00	85.900	296.57	252.16	-429.59	498.11	1.42
2,191.00	1,785.66	86.100	297.40	256.46	-438.03	507.58	2.69
2,199.50	1,786.21	86.400	296.40	260.29	-445.60	516.05	3.68
2,209.00	1,786.79	86.700	297.40	264.58	-454.06	525.51	3.29
2,218.50	1,787.29	87.200	296.40	268.87	-462.51	534.99	3.53
2,228.00	1,787.75	87.300	296.60	273.11	-471.01	544.46	0.71
2,237.50	1,788.15	87.900	297.00	277.39	-479.48	553.94	2.28
2,247.00	1,788.49	87.900	295.90	281.62	-487.98	563.41	3.47
2,266.00	1,789.14	88.200	296.40	289.99	-505.02	582.36	0.92
2,275.50	1,789.40	88.700	296.60	294.22	-513.52	591.84	1.70
2,294.50	1,789.71	89.400	297.10	302.80	-530.47	610.80	1.36
2,313.50	1,789.89	89.500	297.10	311.46	-547.39	629.78	0.16
2,342.00	1,790.17	89.400	298.40	324.73	-572.61	658.26	1.37
2,361.00	1,790.32	89.700	298.40	333.76	-589.32	677.25	0.47
2,380.00	1,790.40	89.800	298.20	342.77	-606.05	696.24	0.35
2,399.00	1,790.53	89.400	298.60	351.81	-622.76	715.23	0.89
2,418.00	1,790.70	89.600	298.80	360.93	-639.43	734.23	0.45
2,437.00	1,791.06	88.200	297.28	369.86	-656.19	753.21	3.26
2,455.50	1,791.58	88.600	296.84	378.27	-672.66	771.68	0.96
2,475.00	1,792.06	88.600	298.95	387.39	-689.89	791.16	3.25
2,494.00	1,792.52	88.600	297.28	396.34	-706.64	810.14	2.64
2,513.50	1,793.07	88.200	298.56	405.47	-723.86	829.62	2.06
2,532.00	1,793.62	88.380	298.65	414.33	-740.10	848.11	0.33
2,551.00	1,794.22	87.980	297.85	423.31	-756.83	867.09	1.41

2,570.00	1,794.87	88.100	298.80	432.32	-773.54	886.07	1.51
2,589.00	1,795.50	88.100	299.00	441.50	-790.17	905.06	0.32
2,608.00	1,796.10	88.300	299.00	450.71	-806.78	924.04	0.32
2,627.00	1,796.64	88.400	298.60	459.86	-823.42	943.03	0.65
2,646.00	1,797.16	88.500	297.00	468.71	-840.22	962.01	2.53
2,665.00	1,797.61	88.800	298.60	477.57	-857.02	980.99	2.57
2,684.00	1,798.15	87.900	297.30	486.47	-873.80	999.97	2.50
2,703.00	1,798.78	88.300	297.50	495.21	-890.66	1,018.94	0.71
2,721.00	1,799.29	88.500	298.60	503.67	-906.54	1,036.92	1.86
2,740.00	1,799.87	88.000	298.50	512.75	-923.22	1,055.91	0.81
2,759.00	1,800.50	88.200	299.40	521.94	-939.83	1,074.89	1.45
2,778.50	1,801.06	88.500	301.30	531.79	-956.65	1,094.38	2.96
2,798.50	1,801.55	88.700	300.30	542.03	-973.83	1,114.38	1.53
2,807.50	1,801.71	89.200	301.30	546.64	-981.56	1,123.37	3.73
2,837.00	1,802.09	89.310	302.48	562.22	-1,006.60	1,152.85	1.21
2,855.50	1,802.34	89.200	300.50	571.88	-1,022.37	1,171.35	3.22
2,890.00	1,803.24	87.800	301.07	589.53	-1,052.00	1,205.83	1.31

Drilling Fluid Summary

Storage Units: Metric

Drilling Fluid Type:	Gel Polymer	**From:**	0	**To:**	603
Drilling Fluid Type:	Invert (Versaclean)	**From:**	603	**To:**	2,910

Work Schedule

Storage Units: Metric

Company:	Black Gold Geotechnical			
Geologist:	**David Lawrence**			
Work Performed	**From:**	Dec 28, 2013	**To:**	Dec 21, 2014
Depths Logged	**From:**	0.0	**To:**	2,910.0

Remarks: Gerald Pasveer (Coromandel Resources Ltd.) logged surface hole and was the 2nd geologist for the main hole.

Formation Top Summary

Storage Units: Metric

Kelly Bushing Elevation: 273.40 **Casing Flange Elevation:** 268.20
Ground Elevation: 268.20

***** All Depths measured from Kelly Bushing Elevation *****

Group *Formation* Member	Prognosis (TVD)	Sample Top (MD)	Sample Top (TVD)	Log Top (MD)	Log Top (TVD)	Subsea	Thickness
Little Bear	31.00	31.00	31.00	24.00	24.00	249.40	
Slater River	51.00	76.00	76.00	65.00	65.00	208.40	
Arctic Red	827.00	791.00	790.96	788.00	787.96	-514.56	
Martin House	933.00	929.00	928.94	927.00	926.94	-653.54	
Imperial	968.00	966.30	966.23	963.30	963.23	-689.83	
Upper Canol	1653.00	1665.00	1657.38	1663.20	1655.77	-1382.37	
Lower Canol	1686.40	1700.50	1687.72	1698.80	1686.32	-1412.92	

Kelly Bushing Elevation: 273.40 **Casing Flange Elevation:** 268.20
Ground Elevation: 268.20

All Depths Measured from Kelly Bushing Elevation

Group:
Formation: Little Bear
Member:
Boundary Type: conformable
Fault Type:

Era: mesozoic
Series:
Period: Cretaceous
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	31.00	31.00	242.40	
Log Top	24.00	24.00	249.40	

Evaluation:

The Little Bear consisted of interbedded SHALE: light gray, blocky to sub blocky, dull, earthy, soft to very firm, minor very fine carbonaceous grains, trace glauconitic, very silty, trace sandy and SANDSTONE: clear to opaque quartz grains, salt and pepper, lower very fine to lower fine, 20% med brown to black lithic grains, minor carbonaceous grains, trace glauconitic, sub angular to sub rounded, well sorted, clay cement, friable to part well indurated, no shows.

Conclusion:

Due to the lack of hydrocarbon shows, these sands are wet.

Group:
Formation: Slater River
Member:
Boundary Type: conformable
Fault Type:

Era: mesozoic
Series:
Period: Cretaceous
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	76.00	76.00	197.40	
Log Top	65.00	65.00	208.40	

Evaluation:

The Slater River consisted predominately of SHALE: medium gray, darker gray in part, blocky to sub blocky, platy in part, argillaceous, micromicaceous, rarely silty, firm to partly soft, rarely pyritized, trace nodule pyrite, trace acicular crystals (gypsum?), very minor Silty Sandy micro laminations. With interbedded SANDSTONE light to medium gray, salt and pepper, lower very fine to upper fine grained, trace lower med, clear to translucent quartz grains, lithc, rare glauconite, trace carbonaceous grains, trace dark mica, trace nodule pyrite, minor to very argillaceous, trace clay cement, trace calcite, trace sideritic, moderate well indurated, trace friable, poor to fair relief in part, trace siderite fragments, trace 2-4% intergranular porosity, no visible shows.

Conclusion:

Due to the lack of hydrocarbon shows, these sands should prove to be wet.

Kelly Bushing Elevation: 273.40 **Casing Flange Elevation:** 268.20
Ground Elevation: 268.20

All Depths Measured from Kelly Bushing Elevation

Group:
Formation: Arctic Red
Member:
Boundary Type: disconformable
Fault Type:

Era: mesozoic
Series:
Period: Cretaceous
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	791.00	790.96	-517.56	
Log Top	788.00	787.96	-514.56	

Evaluation:

The Artic Red consisted predominately of Shale medium to dark gray, blocky, subfissile in part, trace carbonaceous matter, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nodules?) occasional micro fractures infilled with calcite.

Conclusion:

Zone of little interest.

Group:
Formation: Martin House
Member:
Boundary Type: conformable
Fault Type:

Era: mesozoic
Series:
Period: Cretaceous
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	929.00	928.94	-655.54	
Log Top	927.00	926.94	-653.54	

Evaluation:

The Martin House consisted predominately of SANDSTONE cream to light gray, silt to very fine grain, sub angular, well sorted, quartzose, calcite & clay cement, glauconite, slightly shaly in part, no visible porosity, no show with a basal SANDSTONE cream, quartzose, fine grained, well sorted, sub angular, calcareous & kaolin matrix, trace glauconite, trace pyrite nodules, no visible porosity, no shows. Occasional vugs infilled with frosted calcite. These sands were interbedded with SHALE medium to dark gray, blocky, subfissile in part, slightly micromicaceous, trace silty, sideritic in part, occasional brown siderite fragments, trace very small fractures infilled with calcite.

Conclusion:

Due to the lack of porosity and hydrocarbon shows, these sands appear to be too tite for any hydrocarbon production.

Kelly Bushing Elevation: 273.40 **Casing Flange Elevation:** 268.20
Ground Elevation: 268.20

All Depths Measured from Kelly Bushing Elevation

Group:
Formation: Imperial
Member:
Boundary Type: disconformable
Fault Type:

Era: paleozoic
Series:
Period: Devonian
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	966.30	966.23	-692.83	
Log Top	963.30	963.23	-689.83	

Evaluation:

The Imperial formation can be separated into three distinct zones. The upper from 966 to 1094 meters was predominately SHALE light to medium gray green, medium gray in part, blocky, slight waxy texture in part, poor trace calcite, slightly micromicaceous, soft to moderately firm, trace silty, trace sandy in part, trace sideritic. With minor Sandstone & Siltstone stringers.

The middle zone from 1094 to 1465 meters consisted of interbedded SILTSTONE light gray, calcareous & clay matrix, sandy, trace glauconite, occasionally grades to very fine grain sandstone in part, occasionally shaly, tight, no shows and SANDSTONE cream to very light gray, very fine grain, sub angular, well sorted, calcite & clay cement, silty, trace dark lithic grains, poor trace glauconite, grades to siltstone in part, trace carbonaceous specks, no visible porosity, no show with interbedded Shale as above.

The lower Imperial consisted predominately of SHALE medium gray, dark gray in part, platy & subfissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part with a trace of minor Marlstone & Limestone stringers.

Conclusion:

Due to the lack of any significant oil & or gas shows this formation should prove to be unproductive.

Group:
Formation: Upper Canol
Member:
Boundary Type: conformable
Fault Type:

Era: paleozoic
Series:
Period: Devonian
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	1665.00	1657.38	-1383.98	
Log Top	1663.20	1655.77	-1382.37	

Evaluation:

The Upper Canol consisted of SHALE dark gray, brown black to black, moderate to very carbonaceous in part, blocky, sub blocky to fissile in part, firm (siliceous) to part soft, trace fractures, local pin point disseminated pyrite, trace nodular pyrite, silty texture in part, no fluorescence, very slow weak pale halo cut.

Conclusion:

The Upper Canol is a siliceous organically rich shale and with horizontal drilling and modern formation fracturing technologies should produce hydrocarbons.

Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 273.40 **Casing Flange Elevation:** 268.20
Ground Elevation: 268.20

All Depths Measured from Kelly Bushing Elevation

Group:
Formation: Lower Canol
Member:
Boundary Type: conformable
Fault Type:

Era: paleozoic
Series:
Period: Devonian
Stage:
Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	1700.50	1687.72	-1414.32	
Log Top	1698.80	1686.32	-1412.92	

Evaluation:

The Lower Canol was the target formation and was drilled horizontally and consisted entirely of SHALE: dark gray to occasionally black, dark gray brown, blocky, commonly fissile to subfissile, occasional carbonaceous matter, firm to occasionally hard, commonly brittle, calcareous in part, siliceous, slightly micromicaceous in part, trace disseminated pyrite, occasional pyrite nodules, occasional thinly laminated pyrite, trace minor siderite fragments (nodules?), trace minor micro fractures usually infilled with calcite, no dry fluorescence with weak slow pale cloudy yellow cut. Some shale was dark gray brown, blocky, soft, bituminous.

Intermediate casing was set @ 1908 meters and was thought to be @ 89 degrees, as it turns out casing was at approximently at 91 degrees, so when drilled out, we initially drilled at too high of an angle to the formation dip of 88.7 degrees. Being immediately to high it took us until 2100 meters to get turned back down into our target window. The Shale though the section from 1908-2100 meters was very calcareous and had generally lower gas shows. But once back in the target window, formation gas shows improved and the shales became basically less calcareous and more siliceous.

Conclusion:

Hopefully once these organically rich siliceous shales are stimulated with hydraulic fracturing, hydrocarbons (hopefully liquid) will be produced.

SAMPLE DESCRIPTIONS

Spud on December 28th, 2013 at 06:30hrs
Samples from 0 to 20m caught previously when conductor hole was drilled.

0-5 SANDSTONE: clear to opaque, part frosted and or quartz grains, salt and pepper, upper fine to lower very coarse, local granular and pebble, 25 to 30% vari color Chert, moderate coal grains, trace glauconitic, sub angular to sub rounded, occasional rounded, poorly sorted, argillaceous, unconsolidated, no shows, minor off white SILTSTONE and minor light grey SHALE.

5-10 SHALE: light grey, fissile, dull, soft, solitary, silty, sandy, washes from samples; inter bed with SANDSTONE: clear to opaque, part frosted and or quartz grains, salt and pepper, upper fine to lower very coarse, common granular and pebble, 25% vari color Chert, trace coal grains, trace glauconitic, sub angular to sub rounded, occasional rounded, poorly sorted, argillaceous, unconsolidated, no shows,

10-15 SHALE: light grey, fissile, dull, soft, trace carbonaceous grains, silty, sandy, common washes from samples; inter bed with SANDSTONE (20%): clear to opaque, part frosted and or quartz grains, very fine to lower very coarse with granular and pebble, 20% vari color Chert, occasional coal grains, sub angular to sub rounded, occasional rounded, poorly sorted, argillaceous, unconsolidated, no shows.

15-20 SHALE: light grey, fissile, trace micro laminations visible, dull, earthy, trace calcareous, soft to trace firm, minor very fine carbonaceous grains, trace glauconitic, silty, trace sandy, common washes from samples;

20-30 CEMENT: off white, firm, hard, brittle, well indurated.

Little Bear 31.00mMD, (31.00mTVD, 242.40mSS.)

30-40 SHALE: light grey, blocky to sub blocky, dull, earthy, soft to very firm, minor very fine carbonaceous grains, trace glauconitic, very silty, trace sandy, common washes from samples; with SANDSTONE: clear to opaque quartz grains, salt and pepper, lower very fine to part lower fine, 20% medium brown to black lithic grains, minor carbs grains, trace glauconitic, sub angular to sub rounded, well sorted, clay cement, friable to part well indurated, no shows.

40-50 SHALE: light grey, blocky to sub blocky, dull, earthy, soft to very firm, minor very fine carbonaceous grains, trace glauconitic, very silty, trace sandy, occasional micro laminations visible, part grading to SILTSTONE, no shows,

50-60 SHALE: light grey, blocky to sub blocky, dull, earthy, part micromicaceous, soft to very firm, trace carbonaceous material, rare glauconitic, moderate to part very silty, minor SILTSTONE stringers.

SAMPLE DESCRIPTIONS

60-70 SHALE: light grey, trace medium brown, blocky to sub blocky, dull, earthy, part micromicaceous, soft to very firm, trace carbonaceous material, moderate to part very silty, minor SILTSTONE stringers.

Slater River 76.00mMD, (76.00mTVD, 197.40mSS.)

70-80 SHALE: light grey, blocky to sub blocky, earthy, common micromicaceous, soft to very firm, trace carbonaceous material, trace siderite fragments, local disseminated pinpoint pyrite, moderate to part very silty, trace SILTSTONE stringers.

80-90 SHALE: light grey, blocky to sub blocky, earthy, common micromicaceous, soft to very firm, trace carbonaceous material, slightly more common siderite fragments, local disseminated pinpoint pyrite, trace nodules pyrite, moderate to part very silty, very minor local sandy, trace laminations visible, trace SILTSTONE stringers, light medium grey, argillaceous, sideritic, moderate to well indurated, slightly sandy, moderate dark lithic grains, tight, no shows.

90-100 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace siderite fragments, local disseminated pinpoint pyrite, moderate to part very silty, very minor local sandy, trace laminations visible.

100-110 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace siderite fragments, local disseminated pinpoint pyrite, rare glauconitic, trace very silty, rare SILTSTONE, light to medium grey, salt and pepper, argillaceous, trace sideritic, well indurated, minor lithic grains, tight, moderate sawdust in samples, no shows.

110-120 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace siderite fragments, local disseminated pinpoint pyrite, rare glauconitic, trace very silty, grading to trace SILTSTONE, light to medium grey, salt and pepper, argillaceous, trace sideritic, well indurated, common lithic grains, tight, no shows.

120-130 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, local disseminated pinpoint pyrite, rare glauconitic, trace very silty, rare SILTSTONE, light to medium grey, salt and pepper, argillaceous, trace sideritic, well indurated, common lithic grains, tight, moderate sawdust in samples, no shows.

130-140 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, local disseminated pinpoint pyrite, rare glauconitic, trace very silty, rare SILTSTONE, light to medium grey, salt and pepper, argillaceous, trace sideritic, well indurated, common lithic and occasional glauconitic grains, tight, no shows.

SAMPLE DESCRIPTIONS

140-150 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace disseminated pinpoint pyrite, trace very silty, occasional MDSTN stringers, dense, hard, rare SILTSTONE, tight, no shows.

150-160 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, very rare yellow white specks, very fine micro laminations visible, occasional dark mica's, silty in part, trace MDSTN, occasional grading to SILTSTONE, light to medium grey, salt and pepper, very argillaceous, trace sideritic, moderate to well indurated, sandy in part, common lithic and occasional glauconitic grains, trace SIDERITE fragments, tight, no shows.

160-170 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, soft to very firm, very rare yellow white specks, very fine micro laminations visible, occasional dark mica's, silty in part, trace MDSTN, occasional grading to SILTSTONE, light to medium grey, salt and pepper, very argillaceous, trace sideritic, moderate to well indurated, sandy in part, common lithic and occasional glauconitic grains, tight, no shows.

170-180 SHALE: medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace local yellow white specks, occasional very fine micro laminations visible, trace pyritized, trace dark mica's, silty in part, trace medium grey MDSTN stringers, part grading to SILTSTONE, light to medium grey, salt and pepper, very argillaceous, trace sideritic, moderate to well indurated, sandy in part, common lithic and occasional glauconitic grains, trace SIDERITE fragments, trace nodules Pyrite, tight, no shows.

180-190 SHALE: medium grey, blocky to sub blocky, micromicaceous, firm to part soft, trace local yellow white specks, occasional very fine micro laminations visible, trace pyritized, silty in part, part grading to SILTSTONE, light to medium grey, salt and pepper, very argillaceous, trace sideritic, moderate to well indurated, sandy in part, slightly more common pyritized, common lithic and occasional glauconitic grains, trace SIDERITE, trace pyritized fossil remains, tight, no shows.

190-200 SHALE: medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace local yellow white specks, occasional very fine micro laminations visible, trace pyritized, silty in part, trace SILTSTONE, trace SIDERITE, trace pyritized fossil remains, tight, no shows.

200-210 SHALE: medium grey, blocky to sub blocky, micromicaceous, soft to very firm, argillaceous, occasional very fine silty micro laminations visible, trace pyritized, silty in part, trace SILTSTONE grading to very fine Sandstone in part, tight, no shows.

SAMPLE DESCRIPTIONS

210-220 SHALE: medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace pyritized, silty in part, part grading to SILTSTONE, light to medium grey, salt and pepper, very argillaceous, trace sideritic, moderate to well indurated, grading to very fine Sandstone in part, common lithic and trace glauconitic grains, trace siderite fragments, tight, no shows.

220-230 SHALE: light to medium grey, blocky to sub blocky, micromicaceous, argillaceous, firm to part soft, part grading to light grey soft MDSTN, very minor silty laminations.

230-240 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, firm to part soft, silty in part, trace siderite fragments, tight, no shows, moderate sawdust in samples.

240-250 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace local disseminated pinpoint pyrite, rare nodules pyrite, part silty, trace siderite, minor silty laminations, moderate sawdust visible.

250-260 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, firm to part soft, trace local disseminated pinpoint pyrite, very rare SANDSTONE: clear to translucent, salt and pepper, very fine, lithic, sub angular, argillaceous, slightly calcareous, moderate indurated, no shows, moderate sawdust visible.

260-270 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous smooth appearance, firm to part soft, trace local disseminated pinpoint pyrite, SANDSTONE (10%); light grey, salt and pepper, very fine to part lower fine, clear to translucent quartz grains, lithic, trace carbonaceous, rare glauconitic, sub angular to sub rounded, part angular, common argillaceous dirty appearance, slightly calcareous, moderate indurated, friable, no shows, very poor inter grain porosity, moderate sawdust visible.

270-280 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, soft to very firm, trace local disseminated pinpoint pyrite, trace pyritized, SANDSTONE (15%); light grey, salt and pepper, very fine to lower fine, clear to translucent quartz grains, lithic, rare glauconitic, trace carbonaceous, moderate to very argillaceous, slightly calcareous, moderate to very well indurated, very poor inter grain porosity, no shows.

SAMPLE DESCRIPTIONS

280-290 SHALE: medium grey, blocky to sub blocky, micromicaceous in part, firm to part soft, trace local disseminated pinpoint pyrite, trace locally pyritized, occasional silty light medium brown MDSTN with SANDSTONE (25%); light to medium grey, salt and pepper, lower very fine to upper very fine grading occasional to lower to upper fine, clear to translucent quartz grains, lithic, rare glauconitic, trace carbs grains, moderate to very argillaceous, slightly calcareous in part, trace sideritic, moderate to well indurated, friable in part, trace siderite fragments, very poor inter grain porosity, no shows.

290-300 SHALE: medium grey, blocky to sub blocky, micromicaceous in part, soft to very firm, trace local disseminated pinpoint pyrite, trace locally pyritized, occasional silty light medium brown MDSTN with SANDSTONE (10%); light grey, salt and pepper, very fine to part lower fine, clear to translucent quartz grains, lithic, trace carbonaceous, rare glauconitic, slightly calcareous, moderate indurated, friable, trace siderite fragments, no shows, very poor inter grain porosity, moderate sawdust visible.

300-310 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, firm to part soft, trace local disseminated pinpoint pyrite, rare nodules pyrite, part silty, trace siderite, minor silty sandy micro laminations, trace pyritized.

310-320 SHALE: medium grey, trace darker medium grey, blocky to sub blocky, micromicaceous, firm to part soft, rare nodules pyrite, part silty, trace siderite, minor silty sandy micro laminations, trace pyritized.

320-330 SHALE: medium grey, blocky to sub blocky, micromicaceous, firm to part soft, silty in part, trace nodules pyrite, trace sideritic, minor siderite fragments, trace pyritized, trace nodules pyrite, very rare Sandstone stringers.

330-340 SHALE: medium grey, blocky to sub blocky, micromicaceous, firm to part soft, silty in part, occasional siderite fragments, minor silty medium brown MDSTN, trace nodules pyrite, very minor Silty micro laminations.

340-350 SHALE: medium grey, blocky to sub blocky, micromicaceous, locally part silty, firm to part soft, trace MDSTN, trace nodules pyrite, very minor Silty laminations.

350-360 SHALE: medium grey, blocky to sub blocky, micromicaceous, locally part silty, firm to part soft, trace sideritic, trace nodules pyrite, very minor Silty laminations.

SAMPLE DESCRIPTIONS

360-370 SHALE: medium grey, blocky to sub blocky, micromicaceous in part, firm to part soft, SANDSTONE (25%); light to medium grey, salt and pepper, lower very fine to upper fine, trace lower medium, clear to translucent quartz grains, lithic, rare glauconitic, trace carbs grains, minor to very argillaceous, trace shaley, trace clay cement, local calcareous reaction, trace sideritic, moderate well indurated, part friable, poor to part fair relief, trace 2 to 4% inter grain porosity, no visible shows.

370-380 SHALE: medium grey, blocky to sub blocky, micromicaceous in part, firm to part soft, SANDSTONE (15%); light to medium grey, salt and pepper, lower very fine to upper fine, trace lower medium, clear to translucent quartz grains, lithic, rare glauconitic, trace carbs grains, minor to very argillaceous, trace clay cement, local calcareous reaction, trace sideritic, moderate well indurated, trace friable, poor to part fair relief, trace 2 to 4% inter grain porosity, no visible shows.

380-390 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous in part, firm to part soft, silty sandy in part, inter bedded with SANDSTONE (20%); light to medium grey, salt and pepper, lower very fine to upper fine, trace lower medium, clear to translucent quartz grains, lithic, rare glauconitic, trace carbs grains, trace dark mica's, trace nodules pyrite, minor to very argillaceous, trace clay cement, trace calcareous, trace sideritic, moderate well indurated, trace friable, poor to part fair relief, trace siderite fragments, trace 2 to 4% inter grain porosity, no visible shows.

390-400 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous, locally part silty, trace sideritic, firm to part soft, trace nodules pyrite, very minor Silty Sandy stringers, trace siderite fragments.

400-410 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous, locally part silty, firm to part soft, trace nodules pyrite, occasional SILTSTONE stringers.

410-420 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace nodules pyrite, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, very minor medium grey silty MDSTN preserved, no shows.

420-430 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace sideritic, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, very minor medium grey silty MDSTN preserved, no shows.

SAMPLE DESCRIPTIONS

430-440 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous in part, firm, part grading to silty MDSTN, SANDSTONE (25%); off white to medium grey, salt and pepper, lower very fine to upper fine, clear to translucent quartz grains, lithic, rare glauconitic, trace carbonaceous, shaley in part, clay cement, trace calcareous, moderate indurated, poor to trace fair relief, poor inter grain porosity, no visible shows.

440-450 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous in part, firm, part grading to silty MDSTN, SANDSTONE (20 to 25%); off white to medium grey, salt and pepper, lower very fine to upper fine, clear to translucent quartz grains, lithic, trace carbonaceous, shaley in part, clay cement, trace calcareous, moderate to well indurated, poor to trace fair relief, poor inter grain porosity, no visible shows.

450-460 SHALE: medium grey, trace darker grey, blocky to sub blocky, trace shards, micromicaceous in part, firm, trace MDSTN, SANDSTONE (15%); off white to medium grey, salt and pepper, lower very fine to upper fine, clear to translucent quartz grains, lithic, trace carbonaceous, shaley in part, clay cement, trace calcareous, fine laminations, trace siderite, trace nodules pyrite, part grading to SILTSTONE, poor inter grain porosity, no visible shows.

460-470 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace sideritic, argillaceous, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, very minor medium grey silty MDSTN preserved, no shows.

470-480 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace nodules pyrite, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, no shows.

480-490 SHALE: medium grey, minor darker grey, blocky to sub blocky, trace platy, micromicaceous, silty in part, trace sideritic, firm to trace soft, trace nodules pyrite, trace siderite fragments, part finely laminated with SILTSTONE, trace pyritized, and very minor SANDSTONE laminations: off white to light grey, salt and pepper, moderately to well consolidated, tight, no shows.

490-500 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous, locally part silty, firm to part soft, trace nodules pyrite, occasional SILTSTONE stringers, trace MDSTN, rare siderite fragments. tight, no shows.

500-510 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous, locally part silty, trace sideritic, firm to part soft, trace nodules pyrite, very minor Silty Sandy stringers, trace siderite fragments.

SAMPLE DESCRIPTIONS

510-520 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace nodules pyrite, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, no shows.

520-530 SHALE: medium grey, blocky to sub blocky, micromicaceous, silty in part, firm to part soft, trace nodules pyrite, trace siderite fragments, part finely laminated with SILTSTONE and occasional SANDSTONE: off white to light grey, salt and pepper, moderately to well consolidated, friable in part, very minor medium grey silty MDSTN preserved, no shows.

530-540 SHALE: medium grey, trace darker grey, blocky to sub blocky, micromicaceous, trace sideritic, locally part silty, firm to part soft, trace nodules pyrite, very minor Silty Sandy stringers, trace siderite fragments.

540-550 SHALE: medium grey, part darker grey, blocky to sub blocky, part platy, trace gypsum, micromicaceous, rarely silty, firm to part soft, trace pyritized, trace nodules pyrite, trace Silty Sandy micro laminations, trace siderite fragments.

550-560 SHALE: medium grey, part darker grey, blocky to sub blocky, part platy, trace gypsum, micromicaceous, rarely silty, firm to part soft, trace pyritized, trace nodules pyrite, trace sideritic, no acid response, less than 1% Silty Sandy micro laminations.

560-570 SHALE: medium grey, part darker grey, blocky to sub blocky, part platy, argillaceous, micromicaceous, rarely silty, firm to part soft, rarely pyritized, trace nodules pyrite, trace acicular calcite, very minor Silty Sandy micro laminations.

570-580 SHALE: medium grey, part darker grey, blocky to sub blocky, part platy, argillaceous, trace gypsum, micromicaceous, rarely silty, firm to part soft, rarely pyritized, trace sideritic, trace acicular calcite, less than 1% Silty Sandy micro laminations.

580-603 SHALE: medium grey, part darker grey, blocky to sub blocky, part platy, argillaceous, trace gypsum, micromicaceous, rarely silty, firm to part soft, rarely pyritized, trace sideritic.

Surface TD at 603m Reached on January 3rounded 2014 at 08:06hrs
Drilled out through Surface Casing on January 6th, 2014 at 14:45 hrs.

603-610 SHALE medium to dark grey, blocky, sub fissile in part, occasionally micromicaceous, poor trace silty.

SAMPLE DESCRIPTIONS

610-620 SHALE medium to dark grey, blocky, sub fissile in part, occasionally micromicaceous, poor trace silty / trace Siltstone stringers, light to medium grey, occasionally sandy, clay cement, slightly calcareous, tight, no shows.

620-630 SHALE medium to dark grey, blocky, sub fissile in part, occasionally micromicaceous, poor trace silty.

630-640 SHALE: medium to dark grey, blocky to sub fissile in part, moderately carbs where dark grey, micromicaceous in part, trace locally silty, firm to part soft, trace acicular calcite, very rare calcitic argillaceous Silty micro laminations.

640-650 SHALE: medium to dark grey, blocky to sub fissile in part, moderately carbs where dark grey, micromicaceous in part, trace locally silty, firm to part soft, rarely pyritized, trace acicular calcite, very rare calcitic argillaceous Silty Sandy micro laminations, occasional calcareous partings.

650-660 SHALE: medium to dark grey, blocky to sub fissile in part, moderately carbs where dark grey, micromicaceous in part, trace locally silty, firm to part soft, rarely pyritized, trace acicular calcite, very rare calcitic argillaceous Silty Sandy micro laminations, occasional calcareous partings.

660-670 SHALE: medium to dark grey, blocky to sub fissile trace fissile in part, moderately carbs where dark grey, micromicaceous in part, trace silty grainy appearance, firm to part soft, trace acicular calcite, trace calcitic argillaceous Silty stringers, occasional calcareous partings.

670-680 SHALE: medium to dark grey, blocky to sub fissile trace fissile in part, moderately carbs where dark grey, micromicaceous in part, trace silty grainy appearance, firm to part soft, trace acicular calcite, very rare calcitic argillaceous Silty Sandy micro laminations, occasional calcareous partings.

680-690 SHALE: medium to dark grey, blocky to sub fissile trace fissile in part, moderately carbs where dark grey, micromicaceous in part, satin texture in part, trace silty, firm brittle to part soft, trace acicular calcite, trace calcite healing micro fractures.

690-700 SHALE: medium to dark grey, blocky to sub fissile, trace carbs where dark grey, part micromicaceous, satin texture in part, trace silty, firm brittle, trace hard to part soft, trace calcite healing micro fractures.

700-710 SHALE: medium to dark grey, blocky to platy, fissile in part, trace carbs where dark grey, part micromicaceous, satin texture in part, trace silty, firm brittle, trace hard to part soft, trace calcite healing micro fractures, trace Siltstone stringers, off white to medium grey, sandy in part, clay cement, slightly calcareous, tight, no shows.

SAMPLE DESCRIPTIONS

710-720 SHALE: medium to dark grey, blocky to platy and fissile in part, trace carbonaceous, micromicaceous in part, satiny texture in part, trace silty, firm, trace hard to part soft, trace local calcite healing micro fractures, very minor Siltstone stringers, tight, no shows.

720-730 SHALE: medium to dark grey, blocky to platy and fissile in part, trace carbonaceous, micromicaceous in part, trace silty, firm, trace hard to part soft, trace local calcite healing micro fractures, very minor Siltstone stringers, tight, no shows.

730-740 SHALE: medium to dark grey, blocky to platy and fissile in part, trace carbonaceous, micromicaceous in part, satiny texture in part, trace silty, firm, trace hard to part soft, trace fractures, trace calcareous partings, very minor Siltstone stringers, tight, no shows.

740-750 SHALE: medium to dark grey, blocky to platy to fissile in part, trace carbonaceous, micromicaceous in part, satiny texture in part, slightly silty in part, firm, trace hard to part soft, very minor fractures visible, very minor Siltstone stringers, local micro laminations visible where silty, tight, no shows.

750-760 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, occasional micro fractures infilled with calcite.

760-770 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, occasional micro fractures infilled with calcite.

770-780 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, occasional micro fractures infilled with calcite with minor Claystone light grey, waxy, trace pyric, mica flakes.

780-790 SHALE medium to dark grey, blocky, sub fissile in part, minor carbonaceous material, slightly silty, occasionally micromicaceous, occasional micro fractures infilled with calcite with minor Claystone as above.

Arctic Red/ Albian unconformity 791.00mMD, (791.00mTVD, -517.60mSS.)

790-800 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, occasional micro fractures infilled with calcite with minor Claystone light grey, waxy, trace pyric, mica flakes.

800-810 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nods?) occasional micro fractures infilled with calcite.

SAMPLE DESCRIPTIONS

810-820 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nods?) occasional micro fractures infilled with calcite.

820-830 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nods?)

830-840 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nods?) poor trace plant remains.

840-850 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, minor brown siderite fragments (nods?)

850-860 SHALE medium to dark grey, blocky, sub fissile in part, trace carbonaceous material, slightly silty, occasionally micromicaceous, slightly sideritic.

860-870 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, slightly sideritic in part.

870-880 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, slightly sideritic in part, trace pyrite nods.

880-890 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, slightly sideritic in part, occasional brown siderite fragments (nods), trace pyrite nods. Trace Sandstone stringers light grey, very fine grained, sub angular, quartzose, well sorted, calcareous, silty, trace dark lithic grains, trace glauconite, tight, no shows.

890-900 Sandstone cream, light grey, very fine grained, sub angular, quartzose, well sorted, calcareous and clay cement, silty, trace dark lithic grains, trace glauconite, tight, no shows / SHALE as above.

900-910 Sandstone cream, light grey, very fine grained, sub angular, quartzose, well sorted, calcareous and clay cement, silty, trace dark lithic grains, trace glauconite, tight, no shows / SHALE as above.

910-920 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, slightly sideritic in part / 10% Sandstone stringers as above.

SAMPLE DESCRIPTIONS

Martin House 929.00mMD, (928.94mTVD, -655.54mSS.)

920-930 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, sideritic in part, trace micro fractures infilled with calcite / abundant brown siderite fragments / minor Sandstone stringers as above.

930-940 Sandstone cream to light grey, silt to very fine grained, sub angular, well sorted, quartzose, calcareous and clay cement, glauconite, silty, slightly shaley in part, no visible porosity, no show / SHALE as above.

940-950 SANDSTONE cream to light grey, silt to very fine grained, sub angular, well sorted, quartzose, calcareous and clay cement, glauconite, slightly shaley in part, no visible porosity, no show / interbedded SHALE as above.

950-960 SHALE medium to dark grey, blocky, sub fissile in part, slightly micromicaceous, trace silty, sideritic in part, trace micro fractures infilled with calcite / abundant brown siderite fragments / interbedded SANDSTONE as above.

960-966.3 SANDSTONE predominantly cream, quartzose, fine grained, well sorted, sub angular, calcareous and kaolinitic matrix, trace glauconite, trace pyrite nods, no visible porosity, no shows. Occasional vugs infilled with frosted calcite.

Imperial Fm 966.30mMD, (966.23mTVD, -692.83mSS.)

966.3-980 SHALE predominantly light to medium grey, grey green in part, blocky, slightly calcareous, slightly micromicaceous, trace silty, trace sandy in part / minor SANDSTONE stringers as above.

980-990 SHALE predominantly light to medium grey, grey green in part, blocky, slightly calcareous, slightly micromicaceous, trace silty, trace sandy in part / minor SANDSTONE stringers as above.

990-1000 SHALE light to medium grey green, medium grey in part, blocky, slightly waxy texture in part, poor trace calcareous, slightly micromicaceous, soft to moderately firm, trace silty, trace sandy in part / minor SANDSTONE stringers, light grey, grey green in part, very fine to fine grained, sub angular, moderately well sorted, calcareous and clay cement, slightly silty, shaley in part, trace glauconite, no visible porosity, no shows.

1000-1010 SHALE light to medium grey green, medium grey in part, blocky, slightly waxy texture in part, poor trace calcareous, slightly micromicaceous, soft to moderately firm, trace silty, trace sandy in part / minor SANDSTONE stringers as above.

SAMPLE DESCRIPTIONS

1010-1020 SHALE light to medium grey green, medium grey in part, blocky, slightly waxy texture in part, poor trace calcareous, slightly micromicaceous, soft to moderately firm, trace silty, trace sandy in part / minor SANDSTONE stringers as above, trace sideritic, trace pyric / Siltstone stringers light to medium grey, shaley, slightly calcareous, occasionally grades to very fine grained sandstone in part, tight, no shows.

1020-1030 SHALE: light to medium grey, trace grey green, blocky to platy, trace fissile, satiny texture in part, trace calcareous, slightly micromicaceous, firm to part soft, trace silty, trace grading to minor SANDSTONE stringers as above, trace sideritic, trace pyric / Siltstone stringers light to medium grey, shaley, slightly calcareous, tight, no shows.

1030-1040 SHALE: light to medium grey, trace grey green, blocky to platy, trace fissile, satiny texture in part, trace calcareous, trace locally moderately carbonaceous, part micromicaceous, firm to part soft, trace silty, part grading to SILTSTONE stringers, light grey to off white, slightly salt and pepper, shaley in part, slightly calcareous, clay cement, trace carbs material, part grading sandy, tight, no shows.

1040-1050 SHALE: light to medium grey, trace grey green, blocky to platy, trace fissile, satiny texture in part, trace calcareous, trace locally moderately carbonaceous, part micromicaceous, firm to part soft, trace silty, trace grading to SILTSTONE stringers, light grey to off white, slightly salt and pepper, shaley in part, slightly calcareous, tight, no shows.

1050-1060 SHALE: light to medium grey, trace grey green, blocky to platy, trace fissile, satiny texture in part, trace calcareous, part micromicaceous, firm to part soft, trace silty, trace grading to SILTSTONE stringers, light grey to off white, part grey green, slightly salt and pepper, shaley in part, slightly to moderately calcareous, tight, no shows.

1060-1070 SHALE: light to medium grey, trace grey green, blocky to platy, part micromicaceous, trace locally moderately carbonaceous, firm brittle to part soft, trace silty, minor SILTSTONE stringers, light grey to off white, part grey green, slightly salt and pepper, shaley in part, slightly to moderately calcareous, tight, no shows.

1070-1080 SHALE: light to medium grey, trace grey green, blocky to platy, part micromicaceous, firm brittle to part soft, trace locally moderately carbonaceous, trace silty, minor SILTSTONE stringers, light grey to off white, part grey green, slightly salt and pepper, shaley in part, slightly to moderately calcareous, tight, no shows.

SAMPLE DESCRIPTIONS

1080-1090 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, firm brittle to trace soft, waxy satiny texture, trace locally moderately carbonaceous, minor SILTSTONE stringers, tight, no shows.

1090-1100 SHALE: light to medium grey, trace grey green, blocky to platy, part micromicaceous, firm brittle to part soft, trace carbs material, inter bedded with SANDSTONE, light grey to off white, part grey green, slightly salt and pepper, very fine to trace lower fine, sub angular to sub rounded, trace carbs material, silty, clay cement, slightly to moderately calcareous, part grading to SILTSTONE, tight, no shows.

1100-1110 SHALE: light to medium grey, trace grey green, blocky to platy, part micromicaceous, firm brittle to part soft, inter bedded with SANDSTONE, light grey to off white, part grey green, silty, clay cement, slightly to moderately calcareous, part grading to SILTSTONE, tight, no shows.

1110-1120 SHALE: light to medium grey, trace grey green, blocky to platy, part micromicaceous, firm brittle to part soft, trace carbs material inter bedded with SANDSTONE, light grey to off white, part grey green, slightly salt and pepper, very fine to trace lower fine, sub angular to sub rounded, trace carbs material, silty, clay cement, slightly to moderately calcareous, tight, part grading to SILTSTONE, no shows.

1120-1130 SHALE: light to medium grey, blocky to platy, part micromicaceous, firm brittle to part soft, inter bedded with SANDSTONE, light grey to off white, slightly salt and pepper, very fine to trace lower fine, sub angular to sub rounded, trace carbs material, silty, clay cement, slightly to moderately calcareous, dense, tight, part grading to SILTSTONE, no shows.

1130-1140 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, SILTSTONE, light grey to off white, part grey green, slightly salt and pepper, trace glauconitic, trace sideritic, trace carbs material, clay cement, slightly to moderately calcareous, trace sandy, dense, tight,

1140-1150 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, firm brittle to trace soft, waxy satiny texture, trace locally moderately carbonaceous, minor SILTSTONE stringers, trace marly, tight, no shows.

1150-1160 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, trace marly, SILTSTONE, light grey to off white, part grey green, slightly salt and pepper, trace glauconitic, trace sideritic, trace lithic, clay cement, slightly to moderately calcareous, trace sandy, dense, tight,

SAMPLE DESCRIPTIONS

1160-1170 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, trace grading marly, trace red grey ferruginous stringers, SILTSTONE, light grey to off white, slightly salt and pepper, trace sideritic, trace lithic, clay cement, slightly to moderately calcareous, trace sandy, dense, tight,

1170-1180 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, trace grading marly, trace red grey ferruginous stringers, SILTSTONE laminations.

1180-1190 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, firm brittle to trace soft, trace grading marly, trace red grey ferruginous stringers, waxy satiny texture, minor SILTSTONE Sandstone stringers.

1190-1200 SHALE: light to medium grey, blocky to platy, trace fissile, part micromicaceous, firm brittle to trace soft, trace grading marly, trace red grey ferruginous stringers, minor SILTSTONE Sandstone stringers.

1200-1210 SHALE: light to medium grey, blocky, sub blocky, platy, part micromicaceous with SILTSTONE, light grey to off white, part grey green, slightly salt and pepper, part glauconitic, clay cement, slightly to moderately calcareous, trace grading sandy, dense, tight,

1210-1220 SHALE: light to medium grey, blocky to platy, part micromicaceous, firm brittle to part soft, inter bedded with SANDSTONE, light grey to off white, slightly salt and pepper, silty, very fine to trace lower fine, predominantly sub angular, trace carbs material, clay cement, slightly to moderately calcareous, dense, tight, part grading to SILTSTONE, no shows.

1220-1230 SHALE: light to medium grey, blocky to platy, part micromicaceous, firm brittle to part soft, inter bedded with SANDSTONE, light grey to off white, slightly salt and pepper, silty, very fine to trace lower fine, predominantly sub angular, clay cement, slightly to moderately calcareous, local Sandstone and Siltstone stringers, tight, no shows.

1230-1240 SHALE: light to medium grey, grey green in part, slightly micromicaceous, occasional minor carbonaceous material, poor trace pyric / interbedded SILTSTONE light grey, clay and calcareous cement, sandy in part, shaley, tight, no shows.

1240-1250 SHALE: light to medium grey, grey green in part, slightly micromicaceous, occasional minor carbonaceous material, poor trace pyric / interbedded SILTSTONE light grey, clay and calcareous cement, sandy in part, shaley, tight, no shows.

SAMPLE DESCRIPTIONS

1250-1260 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, tight, no shows / SHALE as above.

1260-1270 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, tight, no shows / SHALE as above.

1270-1280 SANDSTONE light grey, very fine to fine grained, sub angular, well sorted, calcareous and clay cement, trace carbonaceous material, silty, no visible porosity, no show / SILTSTONE and SHALE as above.

1280-1290 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, tight, no shows / SHALE as above.

1290-1300 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, tight, no shows / SHALE as above.

1300-1310 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, occasionally shaley, tight, no shows / interbedded SHALE light to medium grey, light grey green in part, blocky, silty, slightly micromicaceous, poor trace carbonaceous material.

1310-1320 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, occasionally shaley, tight, no shows / minor interbedded SHALE light to medium grey, light grey green in part, blocky, silty, slightly micromicaceous, poor trace carbonaceous material.

1320-1330 SILTSTONE light grey, calcareous and clay matrix, sandy, trace glauconite, occasionally grades to very fine grained SANDSTONE in part, occasionally shaley, tight, no shows / interbedded minor SHALE light to medium grey, light grey green in part, blocky, silty, slightly micromicaceous, poor trace carbonaceous material.

1330-1340 SILTSTONE light to medium grey, calcareous and clay cement, slightly sandy in part, shaley, trace dark lithic grains, trace glauconite, grades to silty SHALE in part, no visible porosity, no show / interbedded SHALE as above.

1340-1347 SILTSTONE light to medium grey, calcareous and clay cement, slightly sandy in part, shaley, trace dark lithic grains, trace glauconite, grades to silty SHALE in part, no visible porosity, no show / interbedded SHALE as above.

SAMPLE DESCRIPTIONS

1347-1358 SANDSTONE cream to very light grey, very fine grained, sub angular, well sorted, calcareous and clay cement, silty, trace dark lithic grains, poor trace glauconite, grades to siltstone in part, trace carbonaceous specs, no visible porosity, no show / Siltstone and SHALE as above.

1358-1365 SANDSTONE cream to very light grey, very fine grained, sub angular, well sorted, calcareous and clay cement, silty, trace dark lithic grains, poor trace glauconite, grades to siltstone in part, no visible porosity, no show / Siltstone and SHALE as above.

1365-1370 SILTSTONE light to medium grey, slightly calcareous and clay cement, occasionally slightly sandy, trace glauconitic, trace dark lithic grains, occasionally shaley, trace pyric, tight, no shows / interbedded SANDSTONE cream to very light grey, very fine grained, sub angular, well sorted, calcareous and clay cement, no shows.

1370-1380 SILTSTONE light to medium grey, slightly calcareous and clay cement, occasionally slightly sandy, trace glauconitic, trace dark lithic grains, occasionally shaley, trace pyric, tight, no shows / interbedded SHALE as above, trace siderite nods.

1380-1390 SHALE predominantly medium grey, blocky, sub fissile in part, micromicaceous, trace silty, firm, occasionally silty, trace siderite / SILTSTONE stringers as above.

1390-1400 SHALE predominantly medium grey, blocky, sub fissile in part, micromicaceous, trace silty, firm, occasionally silty, trace siderite / increasing SILTSTONE as above.

1400-1410 SHALE predominantly medium grey, blocky, sub fissile in part, micromicaceous, trace silty, firm, sideritic in part, occasionally silty, trace siderite nods / SILTSTONE as above.

1410-1420 SHALE medium grey, blocky, sub fissile in part, micromicaceous, silty, poor trace carbonaceous specs, slightly sideritic / interbedded SILTSTONE light to medium grey, clay and calcareous matrix, occasionally very shaley, minor carbonaceous material, grade to silty SHALE in part, tight, no show.

1420-1430 poor trace carbonaceous specs, slightly sideritic / interbedded SILTSTONE light to medium grey, clay and calcareous matrix, occasionally very shaley, grade to silty SHALE in part, tight, no show.

SAMPLE DESCRIPTIONS

1430-1440 SILTSTONE light to medium grey, clay and calcareous matrix, occasionally very shaley, grade to silty SHALE in part, tight, no show / SHALE medium grey, blocky, sub fissile in part, slightly waxy texture in part, micromicaceous, silty, poor trace carbonaceous specs, slightly sideritic.

1440-1450 SILTSTONE light to medium grey, clay and calcareous matrix, occasionally very shaley, grade to silty SHALE in part, tight, no show / interbedded SHALE medium grey, blocky, sub fissile in part, slightly waxy texture in part, micromicaceous, silty, poor trace carbonaceous specs.

1450-1465 SILTSTONE light to medium grey, clay and calcareous matrix, occasionally very shaley, grade to silty SHALE in part, tight, no show / interbedded SHALE medium grey, blocky, sub fissile in part, micromicaceous, silty, poor trace carbonaceous specs.

1465-1470 SHALE: medium grey, part darker grey, sub blocky to platy and common fissile, part micromicaceous, locally part silty, soft to part firm, waxy satiny texture, very minor Silty laminations.

1470-1480 SHALE: medium grey to part darker grey, platy, sub fissile, sub blocky, part micromicaceous, waxy satiny texture, rare carbs material, trace silty, soft to part firm, very rare grading silty.

1480-1490 SHALE: medium grey to part darker grey, sub fissile to fissile, part platy, sub blocky, part micromicaceous, rare carbs material, trace silty, soft to part firm, very rare grading silty.

1490-1500 SHALE: medium grey to part darker grey, platy, fissile, sub blocky, part micromicaceous, waxy satiny texture, trace silty, soft to part firm.

1500-1510 SHALE: medium grey to part darker grey, sub fissile to fissile, part platy, part micromicaceous, rare carbs material, trace silty, soft to part firm, very rare grading silty.

1510-1520 SHALE: medium grey to part darker grey, sub fissile to fissile, part platy, part micromicaceous, trace silty, soft to part firm, very rare grading silty.

1520-1530 SHALE: predominantly medium grey, sub fissile, firm, slightly micromicaceous, slightly calcareous, trace silty in part / trace minor Limestone stringers tan, mudstone, slightly argillaceous, dense, no show.

1530-1540 SHALE: predominantly medium grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

SAMPLE DESCRIPTIONS

1540-1550 SHALE: predominantly medium grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

1550-1560 SHALE: predominantly medium grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part. Trace Marlstone stringers, grey brown, calcareous.

1560-1570 SHALE: predominantly medium grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

1570-1580 SHALE: predominantly medium grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

1580-1590 SHALE: predominantly medium grey, trace minor dark grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

1590-1600 SHALE: predominantly medium grey, trace minor dark grey, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, trace silty in part.

1600-1610 SHALE: predominantly medium grey, dark grey increasing, platy and sub fissile, blocky in part, moderately firm, slightly micromicaceous, slightly calcareous, poor trace silty in part.

1610-1620 SHALE: medium to occasionally dark grey, platy and sub fissile, blocky in part, firm, slightly micromicaceous, poor trace silty in part, trace minor micro fractures, trace pyrite, trace minor light grey Claystone stringers.

1620-1630 SHALE: medium to occasionally dark grey, platy and sub fissile, blocky in part, firm, slightly micromicaceous, poor trace silty in part, trace micro fractures with calcite healing visible, minor Claystone.

1630-1635 SHALE: medium to occasionally dark grey, platy and sub fissile, blocky in part, firm, slightly micromicaceous, poor trace silty in part, trace micro fractures to part very silty.

1635-1640 SHALE: brown black to black, minor medium brown, rare medium grey, predominantly carbonaceous, micromicaceous in part, blocky to sub blocky to fissile in part, firm brittle to part soft, trace calcite filled micro fractures, trace pyritized, silty texture in part, trace silty micro laminations, no fluorescence, very slow weak pale halo cut.

SAMPLE DESCRIPTIONS

1640-1650 SHALE: brown black to black, minor medium brown, predominantly carbonaceous, blocky to sub blocky to fissile in part, firm brittle to part soft, trace calcite filled micro fractures, trace pyritized, silty texture in part, no fluorescence, very slow weak pale halo cut.

1650-1665 SHALE: brown black to black, minor medium brown, predominantly carbonaceous, blocky to sub blocky to fissile in part, firm brittle to part soft, trace calcite filled micro fractures, trace pyritized, silty texture in part, trace silty micro laminations, no fluorescence, very slow weak pale halo cut.

Upper Canol 1665.00mMD, (1657.38mTVD, -1383.98mSS.)

1665-1670 SHALE: brown black to black, carbonaceous, blocky, sub blocky to fissile in part, firm to part soft, trace micro fractures, local pinpoint disseminated pyrite, trace nodules pyrite, silty texture in part, no fluorescence, very slow weak pale halo cut.

1670-1680 SHALE: dark grey, brown black to black, moderate to very carbs in part, blocky, sub blocky to fissile in part, firm to part soft, trace fractures, local pinpoint disseminated pyrite, trace nodules pyrite, silty texture in part, no fluorescence, very slow weak pale halo cut.

1680-1690 SHALE: dark grey, brown black to black, moderate to very carbs in part, blocky, sub blocky to fissile in part, firm to part soft, trace fractures, rare calcareous partings, local pinpoint disseminated pyrite, trace nodules pyrite, silty texture in part, no fluorescence, very slow weak pale halo cut.

1690-1700 SHALE: dark grey, brown black to black, moderate to very carbs in part, blocky, sub blocky to fissile in part, firm to part soft, trace fractures, rare calcareous partings, local pinpoint disseminated pyrite, trace nodules pyrite, silty in part, no fluorescence, very slow weak pale halo cut.

Trip out of hole at 1702m to Dial upper Motor from 1.83° to 2.12°

** Lower Canol 1700.50mMD, (1687.78mTVD, -1414.38mSS.)

1700-1710 SHALE: dark grey, brown black to black, moderate to very carbs in part, blocky to sub blocky, trace fissile, firm to soft, trace hard, silica in part, rare calcareous partings, local pinpoint disseminated pyrite,more common nodules pyrite, trace pyrite filling fracture, silty in part, no fluorescence, very slow weak pale halo cut.

SAMPLE DESCRIPTIONS

1710-1720 SHALE: dark grey, brown black to black, moderate to very carbs in part, blocky to sub blocky, trace fissile, firm to soft, trace hard, silica in part, rare calcareous partings, more common nodules pyrite, trace pyrite filling fracture, local pinpoint disseminated pyrite, trace micro laminations visible, no fluorescence, very slow weak pale halo cut.

1720-1730 SHALE: very dark grey, brown black to black, moderate to very carbs in part, increase in silica cement, blocky to sub blocky, trace fissile, firm to soft, part hard angular chips, rare calcareous partings, trace dark brown chert fragments, trace nodules pyrite, trace pyritized banding, very rare calcite healing fracture, no fluorescence, very slow weak pale halo cut.

1730-1740 SHALE: very dark grey, brown black to black, moderate to very carbs in part, trace silica cement, blocky to sub blocky, trace fissile, firm to soft, part hard angular chips, trace calcareous partings, trace nodules pyrite, trace pyritized, rare calcite healing fracture, no fluorescence, very slow weak pale halo cut.

1740-1750 SHALE: dark grey, dark grey brown, blocky, sub fissile in part, slightly micromicaceous, carbonaceous material, brittle, firm to hard (siliceous), cherty / dark grey chert fragments occasionally speckled, pyric / pyrite nods / minor grey brown bituminous shale, SHALE cuts / solvent, pale yellow cloudy cut.

1750-1760 SHALE: abundant brown to grey brown, blocky, bituminous / dark grey siliceous SHALE as above / shows as above.

1760-1770 SHALE: dark grey, dark grey brown, blocky, slightly carbonaceous, sub fissile in part, hard, calcareous, occasionally siliceous, slightly micromicaceous, trace pyric / SHALE grey brown, blocky, soft, bituminous, slightly calcareous, pale yellow cloudy cut.

1770-1780 SHALE: dark grey, dark grey brown, blocky, slightly carbonaceous, sub fissile in part, hard, calcareous, occasionally siliceous, slightly micromicaceous, trace pyric / SHALE grey brown, blocky, soft, bituminous, slightly calcareous, pale cloudy yellow cut.

1780-1790 SHALE: dark grey, dark grey brown, blocky, carbonaceous, sub fissile in part, hard, part calcareous, occasionally siliceous, slightly micromicaceous, trace pyric / SHALE grey brown, blocky, soft, bituminous, slightly calcareous, pale cloudy yellow cut.

1790-1800 SHALE: dark grey, dark grey brown, blocky, trace carbonaceous, sub fissile in part, hard, part calcareous, occasionally siliceous, slightly micromicaceous, trace pyric, trace pyrite filling micro fracture, trace nodules pyrite, part SHALE grey brown, blocky, soft, bituminous, pale cloudy yellow cut.

SAMPLE DESCRIPTIONS

1800-1810 SHALE: dark grey, dark grey brown, blocky, trace carbonaceous, sub fissile in part, hard, part calcareous, occasionally siliceous, slightly micromicaceous, trace pyric, trace calcite healing micro fracture, trace nodules pyrite, very rare calcareous partings, inter bedded in part with SHALE grey brown, blocky, soft, bituminous, pale cloudy yellow cut.

1810-1820 SHALE: dark grey, dark grey brown, blocky, trace carbonaceous, sub fissile in part, hard, increase in calcareous reaction, part siliceous, slightly micromicaceous, occasional calcareous partings, trace pyric, trace calcite healing micro fracture, trace nodules pyrite, inter bedded in part with SHALE grey brown, blocky, soft, bituminous, pale cloudy yellow cut.

1820-1830 SHALE: very dark grey, blocky, slightly carbonaceous, firm to hard (siliceous), common calcareous, slightly micromicaceous, trace pyric / pyrite nods, trace micro fractures infilled with calcite, slow pale yellow cloudy cut. With occasional SHALE grey brown, blocky, soft, bituminous, show as above.

1830-1840 SHALE: very dark grey, blocky, slightly carbonaceous, firm to hard (siliceous), common calcareous, slightly micromicaceous, trace laminated pyric / trace pyrite nods, trace micro fractures infilled with calcite, slow pale yellow cloudy cut. With occasional SHALE grey brown, blocky, soft, bituminous, show as above. Trace Limestone laminations mottled light brown, mudstone to wackestone, slightly argillaceous, trace pyric, dense, no shows.

1840-1850 SHALE: dark grey to black, blocky, carbonaceous, firm to hard (siliceous), common calcareous, slightly micromicaceous, trace pyrite nods, trace micro fractures infilled with calcite, slow pale yellow cloudy cut. With occasional SHALE grey brown, blocky, soft, bituminous, show as above.

1850-1860 SHALE: dark grey to black, blocky, carbonaceous, common brittle, firm to hard, siliceous and calcareous, slightly micromicaceous, minor pyrite nods and trace laminated pyrite, slow pale yellow cloudy cut. With occasional SHALE grey brown, blocky, soft, bituminous, show as above.

1860-1870 SHALE: dark grey to black, blocky, carbonaceous, common brittle, firm to hard, calcareous to slightly calcareous, trace non, occasionally part silica, slightly micromicaceous, minor pyrite nods and trace pyric laminations, weak slow pale cloudy yellow cut; with occasional SHALE grey brown, blocky, soft, bituminous, weak slow pale cloudy yellow cut.

1870-1880 SHALE: dark grey to black, blocky, carbonaceous, common brittle, firm to hard, slightly calcareous to part calcareous, part non calcareous, slightly micromicaceous, occasionally part silica, weak slow pale cloudy yellow cut, minor pyrite nods and trace pyric laminations; with occasional SHALE grey brown, blocky, soft, bituminous, weak slow pale cloudy yellow cut.

SAMPLE DESCRIPTIONS

1880-1890 SHALE: dark grey to black, blocky, carbonaceous, common brittle, firm to hard, non calcareous to slightly calcareous, trace calcareous, occasionally part silica, locally micromicaceous, minor pyrite nods and trace pyric laminations with occasional SHALE grey brown, blocky, soft, bituminous, weak slow pale cloudy yellow cut.

1890-1900 SHALE: dark grey to black, blocky, carbonaceous, common brittle, firm to hard, slightly calcareous to trace calcareous, occasionally part silica, locally micromicaceous, minor pyrite nods and trace pyric laminations, with occasional SHALE grey brown, blocky, soft, bituminous, weak slow pale cloudy yellow cut.

1900-1908 SHALE: dark grey to black, blocky, carbonaceous, firm to part hard, brittle, slightly calcareous to trace calcareous, occasionally part silica, locally micromicaceous, minor pyrite nods and trace pyric laminations, with occasional SHALE grey brown, blocky, soft, bituminous, weak slow pale cloudy yellow cut.

ICP Reached on Jan 14th, 2014 02:26hrs
Ext to: 1908mMD (1776.82mTVD, -1503.42mSS, 225.30mVS)
119.80m North 190.99m West of Well Center
Grid N/E Y/X: N 7219988.32 m, E 593815.38 m

SAMPLE DESCRIPTIONS

Lateral Section
Drilled ahead on Lateral Section on January 17th, 2014 at 00:40hrs

1907-1920 SHALE: dark grey to black, blocky, carbonaceous, firm to part hard, brittle, predominantly very slightly calcareous to trace locally calcareous, occasionally part silica, locally micromicaceous, trace pyrite nods, common pinpoint disseminated pyrite with local pyritic micro laminations, interbedded in part with SHALE dark grey brown, blocky, soft, bituminous, trace calcareous, rare calcareous partings, weak slow pale cloudy yellow cut.

1920-1940 SHALE: dark grey to black, blocky, carbonaceous, firm to part hard, brittle in part, slightly calcareous, silica, locally micromicaceous, trace pyrite nods, trace disseminated pyrite with local pyritic micro laminations, interbedded in part with SHALE dark grey brown, blocky, soft, bituminous, calcareous, rare calcareous partings, weak slow pale cloudy yellow cut, bituminous shale increasing with depth.

1940-1960 SHALE: dark grey, blocky, carbonaceous, firm, brittle in part, slightly micromicaceous, trace silty, increasing calcareous and silica, minor disseminated pyrite, trace laminated pyrite, occasional Shale grey brown, blocky, soft, bituminous / minor Limestone laminations mottled light grey brown, mudstone to wackestone, slightly argillaceous, dense, no show.

1960-1980 SHALE dark grey, blocky, slightly micromicaceous, very calcareous, grades to calcareous marlstone, carbonaceous, silica in part, trace pyritic / increasing LIMESTONE stringers mottled light brown, wackestone, micro matrix, slightly argillaceous, dense, no shows.

1980-2000 SHALE dark grey, dark grey brown, blocky, firm, brittle in part, slightly micromicaceous, very calcareous, carbonaceous, slightly bituminous, silica in part, trace pyritic.

2000-2020 SHALE dark grey, dark grey brown, blocky, firm, brittle in part, slightly micromicaceous, very calcareous, grades to calcareous marlstone in part, carbonaceous, slightly bituminous, silica in part, trace pyritic.

2020-2040 SHALE dark grey, dark grey brown, blocky, firm, brittle in part, slightly micromicaceous, very calcareous, grades to calcareous marlstone in part, carbonaceous, slightly bituminous, silica in part, trace pyritic.

2040-2060 SHALE dark grey, dark grey brown, blocky, firm, brittle in part, slightly micromicaceous, very calcareous, grades to calcareous marlstone in part, carbonaceous, occasionally slightly bituminous, silica in part, poor trace pyritic. Trace LIMESTONE stringers, light grey brown, mudstone to wackestone, slightly argillaceous, dense.

SAMPLE DESCRIPTIONS

2060-2080 SHALE dark grey, dark grey brown, blocky, firm, brittle in part, slightly micromicaceous, very calcareous increasing with depth, grades to calcareous marlstone in part, carbonaceous, occasionally slightly bituminous, silica in part, poor trace pyritic. Trace LIMESTONE stringers, light grey brown, mudstone to wackestone, slightly argillaceous, dense.

2080-2100 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, brittle in part, very calcareous, trace silica, locally micromicaceous, part Limy, locally common LIMESTONE grains, trace disseminated pinpoint pyrite with local pyritic micro laminations, trace nodules pyrite, trace dirty LIMESTONE stringers, very rare calcite healing micro fracture, weak slow pale cloudy yellow cut.

2100-2120 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, brittle in part, moderate with trace very calcareous, trace silica, micromicaceous in part, trace local LIMESTONE grains, trace disseminated pinpoint pyrite with rare pyritic micro laminations, trace nodules pyrite, minor dirty LIMESTONE stringers, weak slow pale cloudy yellow cut.

2120-2140 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, brittle in part, slightly to moderately calcareous with trace very calcareous, trace silica, micromicaceous in part, trace local LIMESTONE stringers; pyritic in part, wackestone, trace disseminated pinpoint pyrite, trace nodules pyrite, weak slow pale cloudy yellow cut.

2140-2160 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, slightly to moderately calcareous with trace very calcareous, trace silica, micromicaceous in part, minor local LIMESTONE stringers, trace disseminated pinpoint pyrite, trace nodules pyrite, weak slow pale cloudy yellow cut.

2160-2180 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, moderate grading to more calcareous, trace silica, micromicaceous in part, occasional calcareous partings, trace limestone stringers, trace disseminated pinpoint pyrite, trace nodules pyrite, weak slow pale cloudy yellow cut.

2180-2200 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous, locally part bituminous, firm to part hard, decreasing calcareous, silica, micromicaceous in part, trace limestone stringers as before, trace disseminated pinpoint pyrite, trace nodules pyrite, weak slow pale cloudy yellow cut.

SAMPLE DESCRIPTIONS

2200-2220 SHALE: dark grey to black, blocky, occasionally part sub fissile, carbonaceous material, locally part bituminous, firm to part hard, slightly calcareous, silica, slightly micromicaceous in part, trace limestone stringers as before, trace disseminated pinpoint pyrite, trace nodules pyrite, weak slow pale cloudy yellow cut.

2220-2240 SHALE: predominantly dark grey, blocky, slightly micromicaceous, trace silty, firm to hard and siliceous, sub brittle, slightly calcareous, trace pyritic with pyrite nods, carbonaceous material, no dry fluorescence, slow pale yellow cut.

2240-2260 SHALE: predominantly dark grey, blocky, slightly micromicaceous, firm to hard and siliceous, sub brittle, slightly calcareous, trace pyrite nods, trace carbonaceous material, no dry fluorescence, slow pale yellow cut.

2260-2280 SHALE: predominantly dark grey, blocky, slightly micromicaceous, firm to hard and siliceous, sub brittle, slightly calcareous, trace pyrite nods, minor carbonaceous material, no dry fluorescence, slow pale yellow cut.

2280-2300 SHALE: predominantly dark grey, blocky, slightly micromicaceous, firm to hard and siliceous, sub brittle, slightly calcareous, trace pyrite nods, minor carbonaceous material, no dry fluorescence, slow pale yellow cut.

2300-2320 SHALE predominantly very dark grey, occasionally grades to black, blocky, slightly micromicaceous, firm to hard, siliceous, brittle, trace calcareous, trace pyrite nods, minor carbonaceous material, no dry fluorescence, slow pale yellow cut.

2320-2340 SHALE predominantly very dark grey, occasionally grades to black, blocky, slightly micromicaceous, firm to hard, siliceous, brittle, trace calcareous, trace pyrite nods, minor carbonaceous material, trace minor micro fractures infilled with white calcite, no dry fluorescence, slow pale yellow cut.

2340-2360 SHALE predominantly very dark grey, occasionally grades to black, blocky, slightly micromicaceous, firm to hard, siliceous, brittle, trace calcareous, trace pyrite nods, minor carbonaceous material, no dry fluorescence, slow pale yellow cut.

2360-2380 SHALE predominantly very dark grey, occasionally grades to black, blocky, slightly micromicaceous, firm to hard, siliceous, brittle, trace calcareous, increasing pyrite nods, minor carbonaceous material, no dry fluorescence, slow pale yellow cut.

SAMPLE DESCRIPTIONS

2380-2400 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, part slightly with trace calcareous, trace locally silica, micromicaceous in part, common disseminated pinpoint pyrite visible, trace nodules pyrite, rare limey chips, very weak slow pale cloudy yellow cut.

2400-2420 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, trace very slightly calcareous, micromicaceous in part, common disseminated pinpoint pyrite visible, trace nodules pyrite, very rare very very fine calcite healing fractures, very weak slow pale cloudy yellow cut.

2420-2440 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, trace very slightly calcareous, micromicaceous in part, common disseminated pinpoint pyrite visible, trace nodules pyrite, very rare very very fine calcite healing fractures, very weak slow pale cloudy yellow cut.

2440-2460 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, increase to moderate calcareous, occasionally calcareous, micromicaceous in part, moderate to locally very common disseminated pinpoint pyrite, trace pyritic, trace pyritic laminations, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2460-2480 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, moderate to slightly calcareous, trace calcareous, micromicaceous in part, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2480-2500 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, slight and moderately calcareous, micromicaceous in part, disseminated pinpoint pyrite, trace pyritic laminated, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2500-2520 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, moderately to part slightly calcareous, micromicaceous in part, disseminated pinpoint pyrite, no visible fractures, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2520-2540 SHALE: very dark grey to black, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, moderately to part slightly calcareous, micromicaceous in part, disseminated pinpoint pyrite, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

SAMPLE DESCRIPTIONS

2540-2560 SHALE: very dark grey, dark grey brown in part, blocky, occasionally part sub fissile, carbonaceous, firm to part hard, trace silica, moderately to part slightly calcareous, slightly micromicaceous in part, disseminated pyrite, trace pyrite nods, very weak slow pale cloudy yellow cut.

2560-2580 SHALE: very dark grey, dark grey brown in part, blocky, occasionally part sub fissile, carbonaceous, firm to hard, trace silica, moderately to part slightly calcareous, micromicaceous in part, disseminated pinpoint pyrite, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2580-2600 SHALE: dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, trace fossil casts infilled with pyrite, very weak slow pale cloudy yellow cut. Trace minor Limestone stringers, mottled light grey brown, wackestone, micro matrix, slightly argillaceous, dense.

2600-2620 SHALE: dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, trace fossil casts infilled with pyrite, very weak slow pale cloudy yellow cut. Increasing Limestone stringers as before.

2620-2640 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, trace micro fractures infilled with calcite, very weak slow pale cloudy yellow cut. Trace Limestone stringers as before.

2640-2660 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, trace micro fractures infilled with calcite, very weak slow pale cloudy yellow cut. Trace brown sideritic claystone stringers.

2660-2680 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, very weak slow pale cloudy yellow cut. Trace brown siderite fragments.

2680-2700 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, very slightly micromicaceous in part, trace disseminated pyrite, trace nodules pyrite, trace small fractures infilled with white calcite, very weak slow pale cloudy yellow cut. Trace brown siderite fragments, Trace Limestone stringers as before.

SAMPLE DESCRIPTIONS

2700-2720 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, silica, slightly calcareous, very slightly micromicaceous in part, trace nodules pyrite, very weak slow pale cloudy yellow cut. Trace brown siderite fragments, Trace Limestone stringers as before.

2720-2740 SHALE: very dark grey, blocky, occasionally part sub fissile, carbonaceous, firm to hard, brittle in part, silica, slightly calcareous, very slightly micromicaceous in part, trace nodules pyrite, very weak slow pale cloudy yellow cut.

2740-2760 SHALE: very dark grey, blocky, trace shards, carbonaceous, firm to hard, commonly brittle, local conchoidal fracture, silica, slightly calcareous, very slightly micromicaceous in part, trace nodules pyrite, trace micro fractures infilled with white calcite, very weak slow pale cloudy yellow cut.

2760-2780 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, commonly brittle, local conchoidal fracture, silica, only trace locally slightly calcareous, micromicaceous in part, disseminated pinpoint pyrite, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

2780-2800 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, commonly brittle, local conchoidal fracture, silica, part less carbs where silica cement increasing, trace locally very slightly calcareous, micromicaceous in part, disseminated pinpoint pyrite, trace pyritic, occasional nodules pyrite common, very rare calcite healing very very fine mico fracture, very weak slow pale cloudy yellow cut.

2800-2820 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, commonly brittle, local conchoidal fracture, silica, trace locally very slightly calcareous, micromicaceous in part, trace pyritic, disseminated pinpoint pyrite common, occasional nodules pyrite, very rare calcite healing very very fine micro fracture, very weak slow pale cloudy yellow cut.

2820-2840 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, silica, trace locally very slightly calcareous, micromicaceous in part, trace pyritic, disseminated pinpoint pyrite common, moderate nodules pyrite, very rare calcite healing very very fine micro fracture, very weak slow pale cloudy yellow cut.

2840-2860 SHALE: very dark grey to black, blocky, carbonaceous, firm to part hard, brittle, silica, trace locally very slightly calcareous, micromicaceous in part, trace pyritic, disseminated pinpoint pyrite, trace nodules pyrite, very weak slow pale cloudy yellow cut.

SAMPLE DESCRIPTIONS

2860-2880 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, brittle, trace conchoidal fracture, silica, trace very slightly calcareous, micromicaceous in part, trace pyritic, disseminated pinpoint pyrite common, occasional nodules pyrite, very rare calcite healing very very fine micro fracture, very weak slow pale cloudy yellow cut.

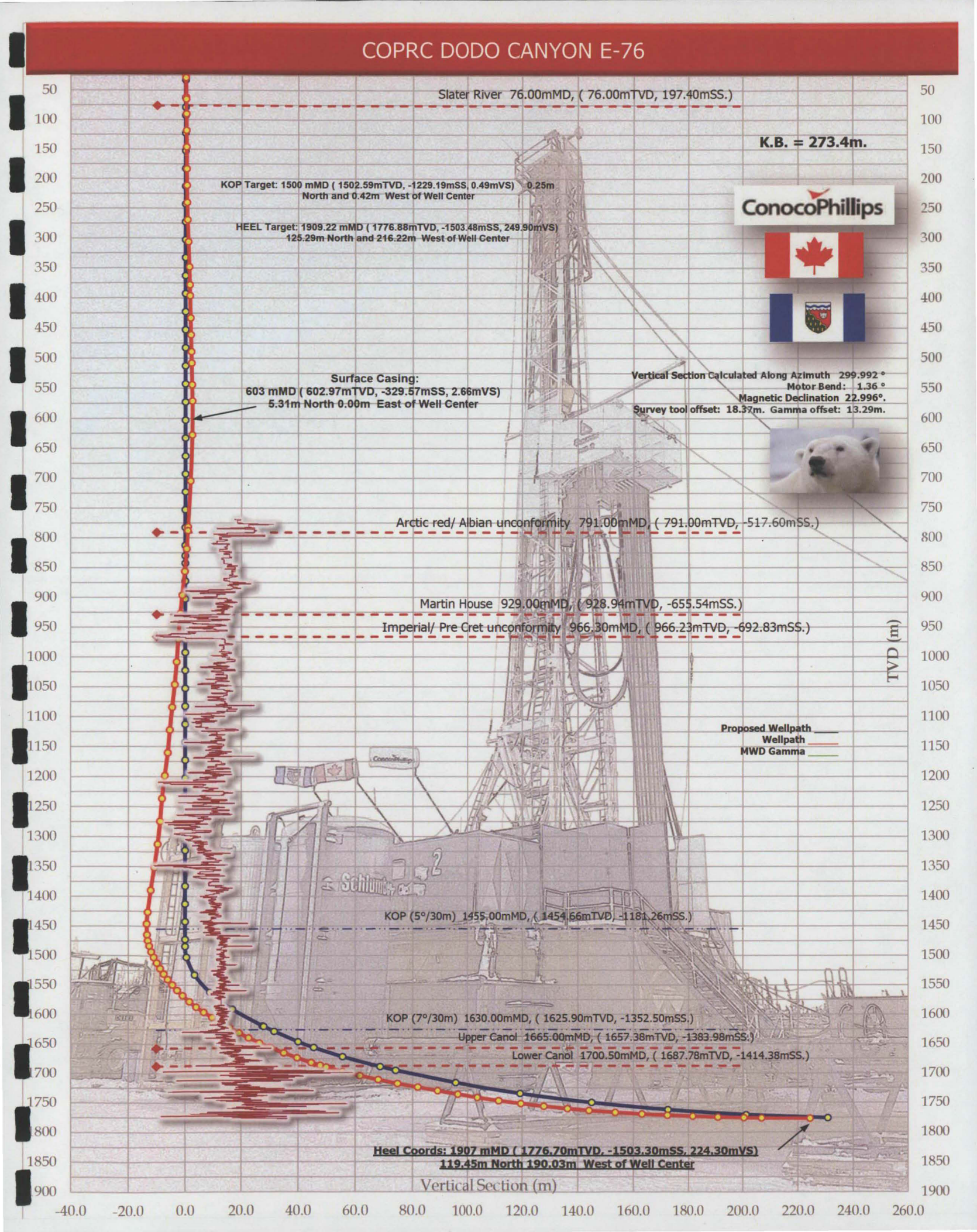
2880-2900 SHALE: very dark grey to black, blocky, trace shards, carbonaceous, firm to part hard, brittle, trace conchoidal fracture, silica, trace very slightly calcareous, micromicaceous in part, trace pyritic, disseminated pinpoint pyrite common, occasional nodules pyrite, very rare calcite healing very very fine micro fracture, very weak slow pale cloudy yellow cut.

2900-2910 SHALE: very dark grey to black, blocky, carbonaceous, firm to part hard, brittle, trace conchoidal fracture, silica, trace very slightly calcareous, very rare moderately calcareous, micromicaceous in part, disseminated pinpoint pyrite common, occasional nodules pyrite, very weak slow pale cloudy yellow cut.

Driller's TD on January 20th, 2014 at 00:42 hrs.
Extrapolated to:
2910 mMD (1804.01mTVD, to 1530.61mSS, 1225.81mVS)
599.85m North 1069.12m West of Well Center
Grid N/E Y/X: N 7220440.19m, E 592922.75

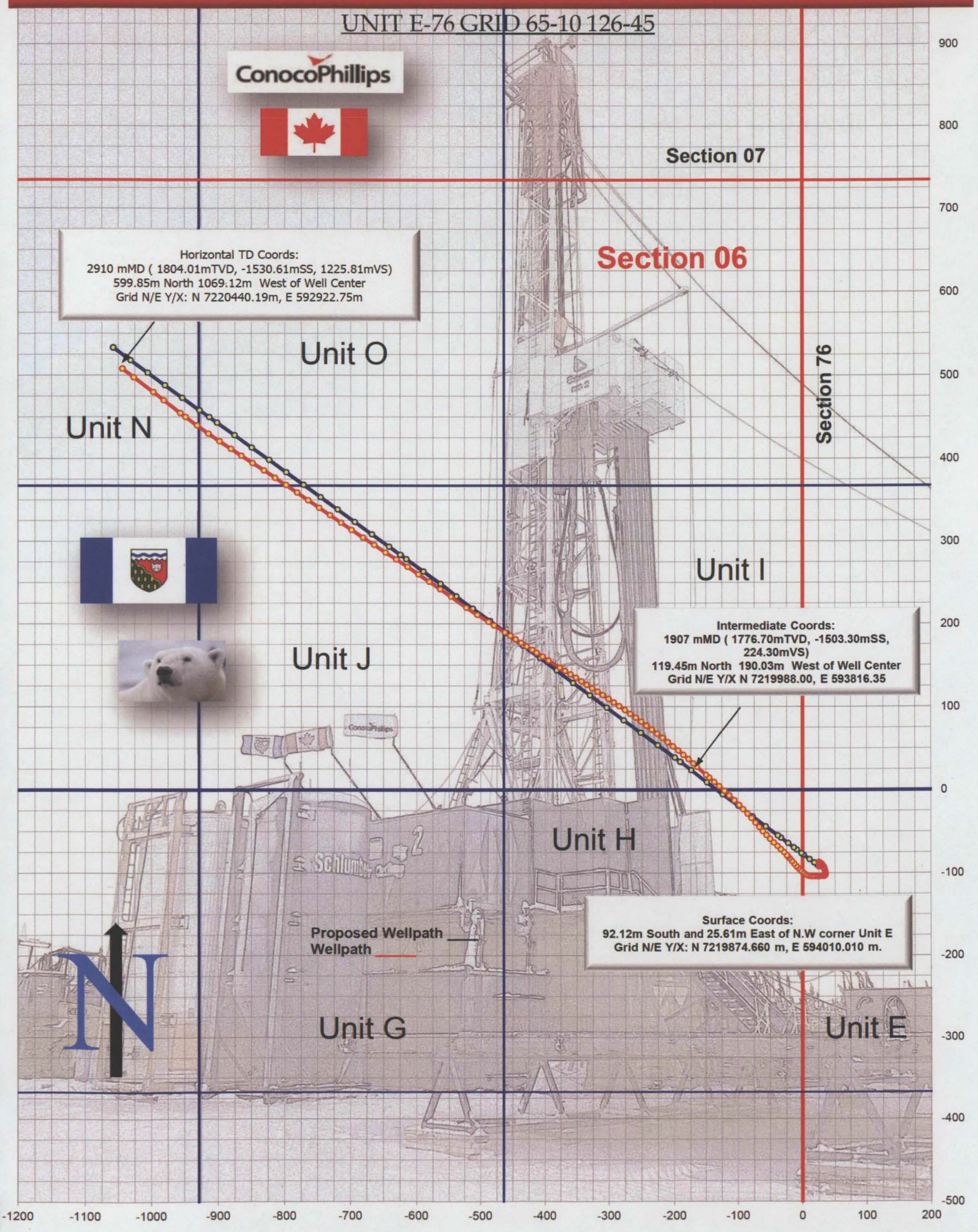
1003.00 meters have been drilled from the ICP at 1907.00mMD to TD.

COPRC DODO CANYON E-76

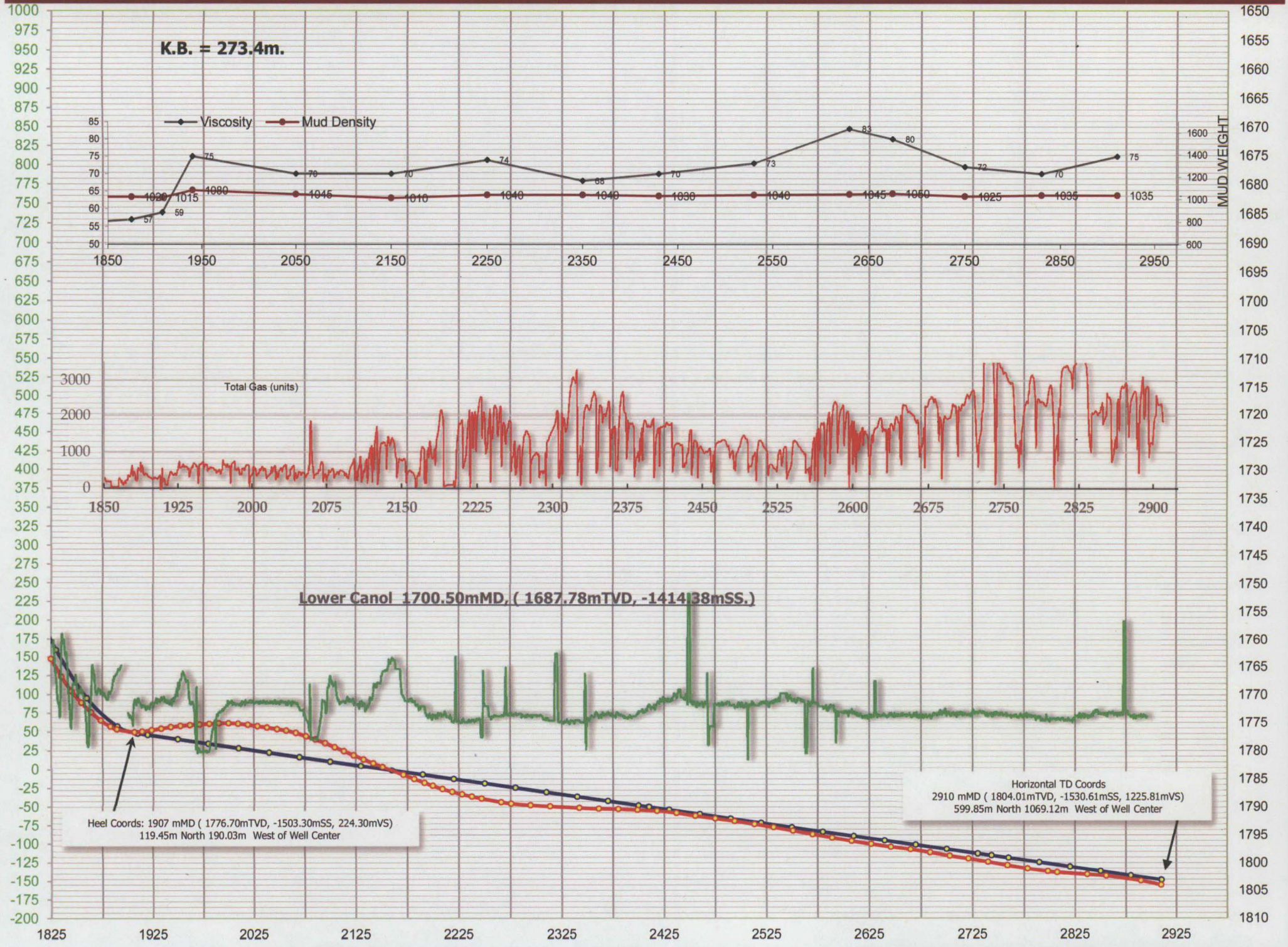


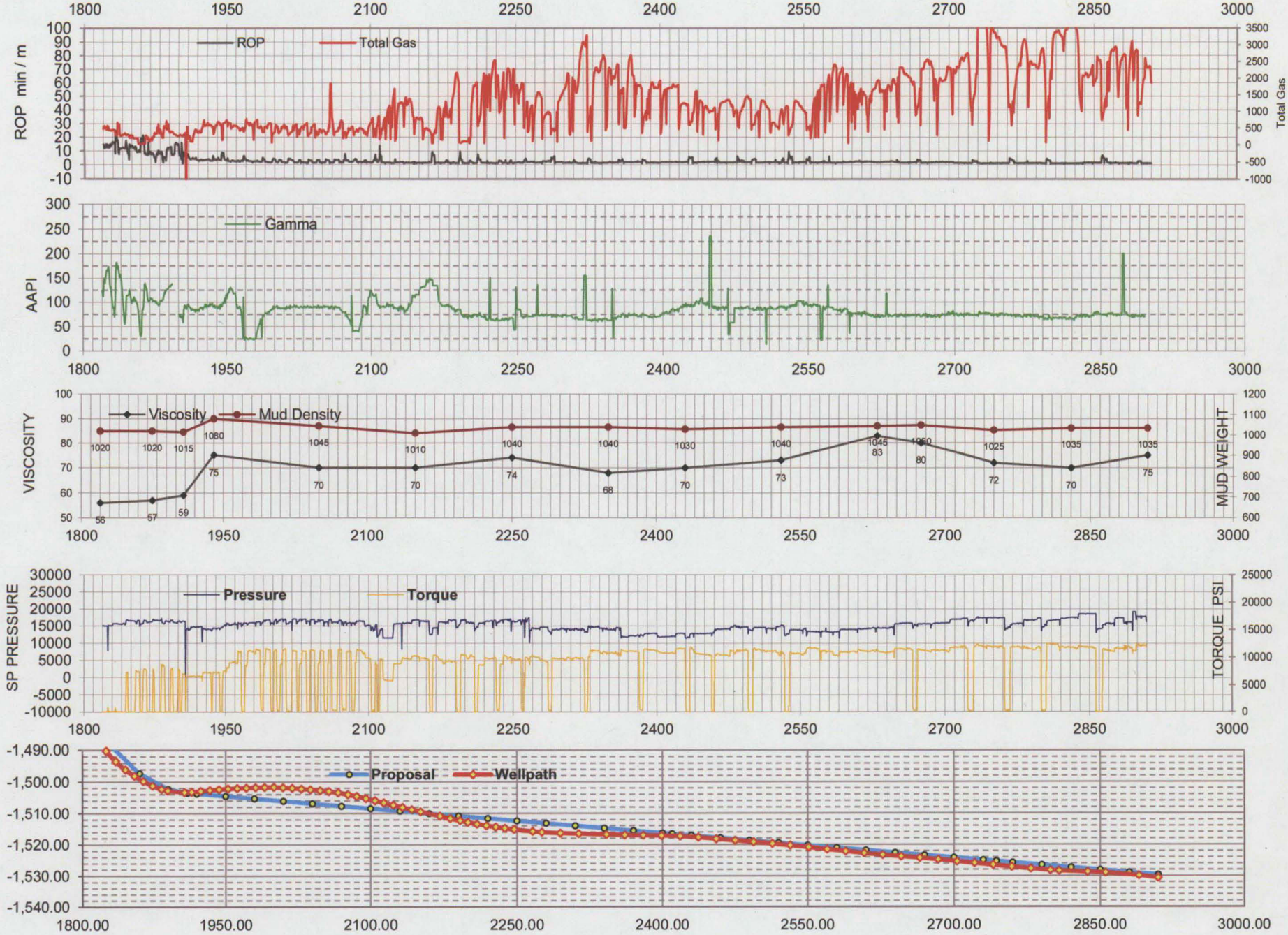
COPRC DODO CANYON E-76

UNIT E-76 GRID 65-10 126-45



COPRC DODO CANYON E-76




ROP min / m
ROP
Total Gas
Total Gas
AAPI
Gamma
VISCOSITY
Viscosity
Mud Density
MUD WEIGHT
SP PRESSURE
Pressure
Torque
TORQUE PSI
Proposal
Wellpath
1800
1950
2100
2250
2400
2550
2700
2850
3000
1800.00
1950.00
2100.00
2250.00
2400.00
2550.00
2700.00
2850.00
3000.00

ConocoPhillips

Scale 1:240 (5"=100') Metric
Measured Depth Log

Well Name: Dodo Canyon E-76
Well Id:
Location: UWID: 300E766510126450 ; Surf. Loc: UNIT E-76 GRID 65-10 126-45
License Number: EL 470
Region: Canol
Spud Date: Dec 28, 2013 06:30hrs
Drilling Completed: Jan 20, 2014 00:42hrs
Surface Coordinates: Lat / Long: N 65° 5' 27.02793", W 126° 59' 58.04610"
Grid N/E Y/X: N 7219874.660m, E 594010.010m
Bottom Hole Coordinates: 595.85m North 1069.12m West of Well Center
Grid N/E Y/X: N 7220440.19m, E 592922.75m
Ground Elevation (m): 268.2
K.B. Elevation (m): 273.4
Logged Interval (m): 1908 To: 2890
Total Depth (m): 1910
Formation: Lower Canol Fm
Type of Drilling Fluid: Gel Chem (Surface) Invert VersaClean C12 (Build; Lateral)

Comments

Samples from: 5m to 2910mMD (Build and Lateral), washed and vialed for Operator and AEUB at 5m intervals;
AFE#: 10351817
Drilling Rig: Beaver #2
Drilling Supervisor: Richard Turgeon; Dave Opper
Gas Detection: MD Totco Gas Analyzer
Geological Services: David Lawrence Black Gold Geotechnical Services LTD.
Gerry Pawver Coronmodel Resources LTD.
Directional Services: Sperry Drilling Services
MWD Services: Sperry Drilling Services
Wireline Logs: Schlumberger (Vertical into Build)

ROCK TYPES

Anhy, Brec, Chert, Clyst, Coal, Congl, Dol, Gyp, Igne, Lmst, Meta, Mrlst, Salt, Shale blk, Shale bk 2, Shcol, Shgy, Sltst, Ss, Till

ACCESSORIES

FOSSIL: Algae, Amph, Belm, Bioclst, Brach, Bryozoa, Cephal, Coral, Crin, Echin, Fish, Foram, Fossil, Gastro, Oolite, Ostra, Pelec, Pellet, Pisolite, Plant, Strom

MINERAL: Anhy, Arg, Bent, Bit, Brecfrag, Calc, Carb, Chtdk, Chtlt, Dol, Feldspar, Ferrpel, Ferr, Fracture, Gyp, Hcymin, Kaol, Ls grns, Marl, Micmica, Mnrst, Phos, Pyr, Salt, Sandy, Sideritic, Sil, Sulphur, Tuff

STRINGER: Anhy, Arg, Bent, Coal, Dol, Gyp, Ls, Mrst, Sltstrg, Sstrg

TEXTURE: Boundst, Chalky, Cryxln, Earthy, Finexln, Grainst, Lithogr, Microxln, Mudst, Packst, Wackest

OPERATOR

Company: ConocoPhillips Canada
Address: 2100, 401- 9 Ave SW
Calgary Alberta
T2P 2H7

GEOLOGIST

Name: Dave Lawrence; Gerald Pawver
Company: Black Gold Geotechnical Services LTD.
Address: 2009 Colville Road
Route 9
New Haven PE

ICP Reached on Jan 10th, 2014 03:30hrs

Drilled ahead on Lateral Section on January 17th, 2014 at 05:40hrs

ConocoPhillips

Driller's TD on January 20th, 2014 at 00:42 hrs

Extrapolated to:
2910 mMD (1804.01mTVD, -1530.61mSS, 1225.81mVS)
595.85m North 1069.12m West of Well Center
Grid NE Y/X: N 7220440.19m, E 592922.75m

Spud on December 28th, 2013 at 06:30hrs

ConocoPhillips

Scale 1:240 (5"=100') Metric
Measured Depth Log

Well Name: Dodo Canyon E-76
Well Id:
Location: UWID: 300E766510126450 ; Surf. Loc: UNIT E-76 GRID 65-10 126-45
License Number: EL 470
Region: Canol
Spud Date: Dec 27, 2013 06:30hrs
Drilling Completed: Jan 14th, 2014 02:26hrs
Surface Coordinates: Lat / Long: N 65° 5' 27.02793", W 126° 59' 58.04610"
Grid N/E Y/X: N 7219874.660 m, E 594010.010 m
Bottom Hole Coordinates: 119.80m North 190.99m West of Well Center
Grid N/E Y/X: N 7219988.32 m, E 593815.38 m
Ground Elevation (m): 268.2
K.B. Elevation (m): 273.4
Logged Interval (m): 0 To: 1889.5 Total Depth (m): 1908
Formation: Lower Canol Fm
Type of Drilling Fluid: Gel Chem (Surface) Invert VersaClean C12 (Build; Lateral)

OPERATOR

Company: ConocoPhillips Canada
Address: 2100, 401- 9 Ave SW
Calgary, Alberta
T2P 2H7

GEOLOGIST

Name: Dave Lawrence; Gerald Pasveer
Company: Black Gold Geotechnical Services LTD.
Address: 2009 Colville Road
Route 9
New Haven PE

Drilling

Samples from: 0m to 2910mMD (Build and Lateral), washed and vialed for Operator and NEB at 5m intervals;
AFE#: 10351817
Drilling Rig: Beaver #2
Drilling Supervisor: Richard Turgeon; Dave Opper
Gas Detection: MD Totco Gas Analyzer
Geological Services: David Lawrence Black Gold Geotechnical Services LTD.
Gerry Pasveer Coromandel Resources LTD.
Directional Services: Sperry Drilling Services
MWD Services: Extreme Engineering
Wireline Logs: Schlumberger (Vertical into Build)

ROCK TYPES

Anhy, Bent, Brec, Cement, Cht gy, Cht blk, Cht, Clyst, Coal, Congl, Dol, Gyp, Igne, Lmst, Meta, Mrlst, Salt, Shale, Shcol, Shblk, Shgy, Sltst, Ss, Till

ACCESSORIES

FOSSIL: Algae, Amph, Belm, Bioclst, Brach, Bryozoa, Cephal, Coral, Crin, Echin, Fish, Foram, Fossil, Gastro, Oolite, Ostra, Pelec, Pellet, Pisolite, Plant, Strom

MINERAL: Anhy, Arggrn, Arg, Bent, Bit, Brecfrag, Calc, Carb, Chtdk, Chtlt, Dol, Feldspar, Ferrpel, Ferr, Fracture, Glau, Gyp, Hvymin, Kaol, Marl, Micmica, Minxl, Nodule, Organic, Phos, Pyr, Ls grs, Sideritic, Siderite, Salt, Sandy, Silt, Sil, Sulphur, Tuff, pebbles, Ls, Mrst, Shstgr dk, Sltstrg, Ssstrg

STRINGER: Anhy, Arg, Bent, Coal, Dol, Gyp

TEXTURE: Boundst, Chalky, Cryxln, Earthy, Finexln, Grainst, Lithogr, Microxln, Mudst, Packst, Wackest, Sh mudst

OTHER SYMBOLS

POROSITY: Earthy, Fenest, Fracture, Inter, Moldic, Organic, Pinpoint, Vuggy

OIL SHOW: Even, Spotted, Ques, Dead

SORTING: Well, Moderate, Poor

ROUNDING: Rounded, Subrnd, Subang, Angular

INTERVAL: Core, Dst

EVENT: Rft, Casing, Top, Bit trip, Sidewall

Geology	Drilling	Depth	Porosity	Lithology	Grain Size	Geological Descriptions
ROP (min/m), Gas (units), Gamma (API)	WOB (kdaN), SPP (kPa), Rotary (RPM), Torque (kNm), Diff (kPa)					

Bit #1
REED_J&L
311mm_B181332
Jets: 1x12.7_ 3 x 15.9
In @ 0m_ Out at 588m
594m / 41hrs / 14.48mhr
1-2-WT-S-1-0-NO-TD

Den: 1000
Vis: 33

COPRC DODO CANYON E-76 / Surface: UNIT E-76 GRID 65-10 126-45 / 300E766510126450 / K.B. = 273.4m

0-5 SS: clr - op, pt fros & or qtz grns, s&p, u f - l v c, loc gran and pbl, 25-30% vari col Chert, mod coal grns, tr glauc, sb ang - sb rd, occ rd, ply std, arg, uncons, ns, mnr off wh SLTST & mnr lt gy SH.

5-10 SH: lt gy, fis, dull, sft, sol, silty, sandy, washes from smpl; int bed wi SS: clr - op, pt fros & or qtz grns, s&p, u f - l v c, com gran and pbl, 25% vari col Chert, tr coal grns, tr glauc, sb ang - sb rd, occ rd, ply std, arg, uncons, ns,

10-15 SH: lt gy, fis, dull, sft, tr carb grns, silty, sandy, com washes from smpl; int bed wi SS (20%): clr - op, pt fros & or qtz grns, v f - l v c wi gran and pbl, 20% vari col Chert, occ coal grns, sb ang - sb rd, occ rd, ply std, arg, uncons, ns.

15-20 SH: lt gy, fis, tr micro lams vis, dull, rthy, tr calc, sft - tr firm, mnr v f carb grns, tr glauc, silty, tr sandy, com washes from smpl;

20-30 CEMENT: off wh, firm, hard, brittle, w ind.

ConocoPhillips
COPRC DODO CANYON E-76
UNIT E-76 GRID 65-10 126-45
300E766510126450
Spud on December 28th, 2013 at 06:30hrs
Samples from 0-20m caught previously when conductor hole was drilled.

Little Bear 31.00mMD, (31.00mTVD, 242.40mSS.)

30-40 SH: lt gy, blky - sb blky, dull, rthy, sft - v firm, mnr v f carb grns, tr glauc, v silty, tr sandy, com washes from smpl; wi SS: clr - op qtz grns, s&p, l v f - pt l f, 20% med brn - blk lithc grns, mnr carbs grns, tr glauc, sb ang - sb rd, w sld, cly cmt, fri - pt w ind, ns.

40-50 SH: lt gy, blky - sb blky, dull, rthy, sft - v firm, mnr v f carb grns, tr glauc, v silty, tr sandy, occ micro lams vis, pt grdg to SLTST, ns.

50-60 SH: lt gy, blky - sb blky, dull, rthy, pt micmica, sft - v firm, tr carb mat, rr glauc, mod - pt v silty, mnr SLTST stgrs.

com sft sol SH washing from samples

60-70 SH: lt gy, tr med brn, blky - sb blky, dull, rthy, pt micmica, sft - v firm, tr carb mat, mod - pt v silty, mnr SLTST stgrs.

70-80 SH: lt gy, blky - sb blky, rthy, com micmica, sft - v firm, tr carb mat, tr sid frags, loc diss pp pyr, mod - pt v silty, tr SLTST stgrs.

Slater River 76.00mMD, (76.00mTVD, 197.40mSS.)

com sft sol SH washing from samples

80-90 SH: lt gy, blky - sb blky, rthy, com micmica, sft - v firm, tr carb mat, slly more com sid frags, loc diss pp pyr, rr nod pyr, mod - pt v silty, v mnr loc sandy, tr lams is, tr SLTST stgrs, lt med gy, arg, sidic, mod - w ind, slly sandy, mod dk lithc grns, tt, ns.

com sft sol SH washing from samples

90-100 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, tr sid frags, loc diss pp pyr, mod - pt v silty, v mnr loc sandy, tr lams vis.

100-110 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, tr sid frags, loc diss pp pyr, rr glauc, tr v silty, rr SLTST, lt - med gy, s&p, arg, tr sidic, w ind, mnr lithc grns, tt, mod sawdust in samples, ns.

110-120 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, tr sid frags, loc diss pp pyr, rr glauc, tr v silty, grdg to tr SLTST, lt - med gy, s&p, arg, tr sidic, w ind, com lithc grns, tt, ns.

120-130 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, loc diss pp pyr, rr glauc, tr v silty, rr SLTST, lt - med gy, s&p, arg, tr sidic, w ind, com lithc grns, tt, mod sawdust in samples, ns.

com sft sol SH washing from samples

130-140 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, loc diss pp pyr, rr glauc, tr v silty, rr SLTST, lt - med gy, s&p, arg, tr sidic, w ind, com lithc & occ glauc grns, tt, ns.

140-150 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, tr diss pp pyr, tr v silty, occ MDSTN stgrs, dense, hd, rr SLTST, tt, ns.

150-160 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, v rr yel wh specks, v f micro lams vis, com dk mica's, silty, tr MDSTN, occ grdg to SLTST, lt - med gy, s&p, v arg, tr sidic, mod - w ind, sandy lp, com lithc & occ glauc grns, tr SID frags, tt, ns.

160-170 SH: lt - med gy, blky - sb blky, micmica, sft - v firm, v rr yel wh specks, occ v f micro lams vis, com dk mica's, silty lp, tr MDSTN, occ grdg to SLTST, lt - med gy, s&p, v arg, tr sidic, mod - w ind, sandy lp, com lithc & occ glauc grns, tt, ns.

170-180 SH: med gy, blky - sb blky, micmica, sft - v firm, tr loc yel wh specks, occ v f micro lams vis, pyritized, tr dk mica's, silty lp, tr med gy MDSTN stgrs, pt grdg to SLTST, lt - med gy, s&p, v arg, tr sidic, mod - w ind, sandy lp, com lithc & occ glauc grns, tr SID frags, tr nod Pyr, tt, ns.

180-190 SH: med gy, blky - sb blky, micmica, firm - pt sft, tr loc yel wh specks, occ v f micro lams vis, tr