

# **Geological Report**

on

**COPRC Loon Creek O-6**

**Unit O, Section 6, Grid 65-10 127-00**

**Well Reached Total Depth on  
Feb 14, 2013 @ 06:35**

for

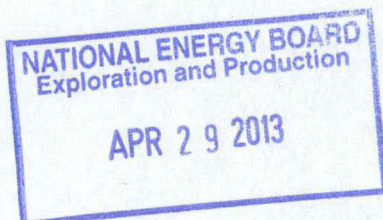
**ConocoPhillips Canada Resources Corp.**

**Well License # : 470**

**Prepared For:** Dave Oakley  
ConocoPhillips Canada Resources Co

**Prepared By:** Dave Lawrence  
Black Gold Geotechnical Services Ltd.

**N E B COPY**



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Dave Lawrence



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The COPRC Loon Creek O-6 well is a strat well that is being drilled to thoroughly investigate and evaluate the Canol & Hare Indian & Bluefish formations for potential hydrocarbon production from a future horizontal well drilling program. The entire section from just above the top of the Canol Shales to 50 meters into the Hume limestone platform was cored with wireline retrieveable cores. The well was also logged completely with a very extensive logging program by Schlumberger. Also the well was logged from surface to total depth with full gas chromatagraphy and a total gas analyzer. Mud samples were taken from various points while the well was drilled and will also be fully analyzed. While we were coring desorbtion tests were performed on site by corelab technicians. Full analysis of the fliud from the desorbtion tests and also a full analysis of the cores will also be completed at a later date by corelabs.



# Well Summary

Storage Units: Metric

## Well Information

Operator: ConocoPhillips Canada Resources Corp.  
Well Name: COPRC Loon Creek O-6  
Location: Unit O, Section 6, Grid 65-10 127-00  
UWI: 3000066510127000  
Pool: Undefined  
Field: Loon Creek  
State / Province: Northwest Territories  
Country: Canada  
License Number: 470  
Well Status: Cased

## Surface Co-ordinates

Hole Type: Vertical  
Latitude: 65 05 51.5 N  
UTM Northing: 7220618.30

Fault Indicator:  
Longitude: 127 00 30.7 W  
UTM Easting: 593560.14

N / S :

E / W :

## Int. Casing Co-ordinates

Latitude:

Longitude:

N / S :

E / W :

## Bottom Hole Co-ordinates

Latitude:

Longitude:

N / S : 9.69 Meters North

E / W : 28.17 Meters East of the surface location.

## Elevations

Ground Elevation: 252.40  
Kelly Bushing Elevation: 257.60  
Casing Flange Elevation: 252.73

Reference: Ground 5.20  
Kelly Bushing to Ground:  
Cut (-):  
Fill (+):

## Total Depth

### Measured Depth

### True Vertical Depth

Total Depth Driller (Tally) :	1,856.00	1,855.94
Total Depth Driller (Strap or SLM):		
Total Depth Logger:	1,857.60	1,857.54

## Miscellaneous Depths

Plugback Depth:  
Sidetrack Depth:

Water Depth Reference:  
Water Depth:

## Well Summary

Drilling Contractor: Beaver Drilling Ltd.  
Rig Release Date:

Spud Date: Jan 26, 2013 @ 12:00  
Total Depth Date: Feb 14, 2013 @ 06:35

Cores	#	Formation	Interval	Cut	Recovered	%
	1	Canol	1,622.00 1,649.00	27.00	27.00	100.00
	2	Canol	1,649.00 1,676.00	27.00	27.00	100.00
	3	Canol	1,676.00 1,703.00	27.00	27.00	100.00

ConocoPhillips Canada Resources Corp.  
UWI 3000066510127000

COPRC Loon Creek O-6  
Unit O, Section 6, Grid 65-10 127-00  
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## Well Summary

Storage Units:      Metric

4	Canol	1,703.00	1,730.00	27.00	27.00	100.00
5	Canol	1,730.00	1,757.00	27.00	27.00	100.00
6	Canol	1,757.00	1,784.00	27.00	27.00	100.00
7	Canol	1,784.00	1,811.00	27.00	27.00	100.00
8	Hume	1,811.00	1,838.00	27.00	27.00	100.00
9	Hume	1,838.00	1,856.00	18.00	17.70	98.33

### Casing Summary

Casing Type	Casing Size	Landed Depth	Hole Size
Surface	244.5	596.78	311.0

### Logging Summary

Company	Engineer	Total Depth (MD)	Logging tools
Schlumberger	Jeffery Tatlock	600.00	AIT, DSI, PPC, TLD, HGNS, TLD2, GPIT
	Jeffrey Tatlock	1,856.00	USIT / CBL
			RST-GR
			ADT / HNGS / PPC / CMR+ / GR
			UBI / dual OBMI / GPIT / PPC / SSCAN / PPC / GR
			AIT- Lithoscanner-TLD-HGNS-GR-TLD2



# Daily Drilling Summary

Storage Units: Metric

Date	Depth	Progress	Rotating Hours	Avg. P.R.	Daily Costs	Formation	Operational Status @ Report Time
Jan 27, 13	191.00		14.00			Quaternary	Drilling
Jan 28, 13	431.00	240.00	17.50	13.71		Quaternary	Drilling 311mm hole
Jan 29, 13	587.00	156.00	14.00	11.14		Slater River	Tripping (POOH)
Jan 30, 13	600.00	13.00	1.25	10.40		Slater River	POOH to log
Jan 31, 13	600.00	0.00	0.00	0.00		Slater River	Circ csg @ TD
Feb 01, 13	600.00	0.00	0.00	0.00		Slater River	Nipple up BOPs
Feb 02, 13	600.00	0.00	0.00	0.00		Slater River	Pressure test
Feb 03, 13	660.00	60.00	5.50	10.91		Slater River	Drilling 222mm main hole
Feb 04, 13	1,066.00	406.00	20.50	19.80		Imperial	Drilling 222mm hole
Feb 05, 13	1,440.00	374.00	19.75	18.94		Imperial	Drilling 222mm hole
Feb 06, 13	1,622.00	182.00	8.25	22.06		Imperial Base	Lay down dir tools
Feb 07, 13	1,622.00	0.00	0.00	0.00		Imperial	Cut core#1
Feb 08, 13	1,659.00	37.00	6.25	5.92		Canol	Cut Core#2
Feb 09, 13	1,703.00	44.00	5.50	8.00		Canol	Wireline out Core#3
Feb 10, 13	1,730.00	27.00	3.75	7.20		Canol	Wireline Core#4
Feb 11, 13	1,757.00	27.00	3.00	9.00		Canol	Wireline Core#5
Feb 12, 13	1,784.00	27.00	3.50	7.71		Canol	Recover Core#6
Feb 13, 13	1,816.00	32.00	4.75	6.74		Hume	Cut Core#8
Feb 14, 13	1,853.00	37.00	9.00	4.11		Hume	Cut Core#9
Feb 15, 13	1,856.00	3.00	0.75	4.00		Hume	Circ btms up after wiper trip @ TD
Feb 16, 13	1,856.00	0.00	0.00	0.00		Hume	Logging Run#2
Feb 17, 13	1,856.00	0.00	0.00	0.00		Hume	Logging Run#3
Feb 18, 13	1,856.00	0.00	0.00	0.00		Hume	Logging Run#4
Feb 19, 13	1,856.00	0.00	0.00	0.00		Hume	POOH Sideways

Accumulated Daily Costs:



## Casing Data Summary

Storage Units:

Metric

**Casing Type:** Surface

**Casing Size:** 244.5

**Hole Size:** 311.0

**Casing Landed @:** 596.78

**Total Joints:** 46

**Casing Date:** Jan 31, 2013 @ 05:00

**Plug Down Date:** Jan 31, 2013 @ 14:30

**# of Joints / Length / O.D. / Weight:** 244.5mm guide shoe  
1 jt 244.5mm 53.57kg csg  
1 244.5mm float collar  
44 jts 244.5mm, 53.57 kg/m, J-55 casing  
1 244.5mm, 53.57 kg/m J55 landing jt, total 598.78m

**Cementing Details:** Cemented casing with 26.1m<sup>3</sup> (26T) Thixotropic D804A-P + 2% CaCL<sub>2</sub> + 0.2% Antifoam, displaced with drill mud, bumped plug, pressure tested casing to 11,500 kpa for 10 min, test good. Received 6.5m<sup>3</sup> good cement slurry returns @ surface. Annulus remained static.

**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	S11G	311.0	0.0	600.0	600.0	46.75	12.83	2	2	WT	A	E	1	FC	TD	
1	Reed	MSR616N	222.0	600.0	1,622.0	1,022.0	49.00	20.86	2	2	CC	H	X	I	WT	CP	
1C	NOV	PR513	222.0	1,622.0	1,856.0	234.0	36.50	6.41	1	1	CT	N	X	I	BT	TD	

Total Rotating Hours: 132.25



# Core Report

Storage Units: Metric

Date: February 7, 2013

Core #: 1

Formations Cored: Canol

## Cored Interval

From: 1,622.00 To: 1,649.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion

Service Representative: Rhys Nichol, Dusty Zbitnoff, Ernie Chouckalis

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                             Bit Size (OD): 222.0    Serial #: E140308  
                             Original Hole Size: 222.0

Remarks: Cut 27.0 m in 4 hours.

## Detailed Core Descriptions

1,623.50 to 1,623.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, siliceous? no dry fluorescence, slow pale yellow cut with solvent.
1,625.00 to 1,625.10 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, siliceous? no dry fluorescence, pale light yellow streaming cut with solvent.
1,626.50 to 1,626.60 (0.10)	<b>Shale</b> as above.
1,628.00 to 1,628.10 (0.10)	<b>Shale</b> as above.
1,629.50 to 1,629.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, siliceous? fluorescence as above.
1,631.00 to 1,631.10 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, trace slightly silty, firm to hard, siliceous? fluorescence as above.
1,632.50 to 1,632.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, siliceous? fluorescence as above.
1,634.00 to 1,634.10 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, siliceous? trace minor fossil debris (spicules), fluorescence as above.
1,635.50 to 1,635.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, siliceous? fluorescence as above.
1,637.00 to 1,637.10 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, siliceous? trace pyrite, fluorescence as above.



## Core Report

Storage Units: Metric

1,638.50 to 1,638.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, slightly siliceous? fluorescence as above.
1,640.00 to 1,640.10 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, slightly bituminous, slightly siliceous? fluorescence as above.
1,641.50 to 1,641.60 (0.10)	<b>Shale</b> dark gray, subfissile, slightly micromicaceous, firm to hard, moderately brittle, slightly bituminous, slightly siliceous? trace small pyrite nodules, abundant sponge spicules, fluorescence as above.
1,643.00 to 1,643.10 (0.10)	<b>Shale</b> as above occasionally abundant disseminated pyrite infilling fossil casts (sponge spicules) with a fracture infilled with frosted medium crystalline calcite.
1,644.50 to 1,644.60 (0.10)	<b>Shale</b> dark gray, dark gray brown, brittle, slightly calcareous, slightly bituminous, occasional sponge spicules, show as above increasing fluorescence, hydrocarbon odor from core.
1,646.00 to 1,646.10 (0.10)	<b>Shale</b> dark gray, dark gray brown, slightly calcareous, slightly bituminous, occasional spicules as above, show as above, hydrocarbon odor as above.
1,647.50 to 1,647.60 (0.10)	<b>Shale</b> dark gray to dark gray brown, slightly bituminous, trace sponge spicules as above, slightly calcareous, shows as above.
1,648.90 to 1,649.00 (0.10)	<b>Shale</b> as above.



# Core Report

Storage Units: Metric

Date: February 8, 2013  
Core #: 2  
Formations Cored: Canol

## Cored Interval

From: 1,649.00 To: 1,676.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: Rhys Nichol, Dusty Zbitnoff, Ernie Chouckalis

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                            Bit Size (OD): 222.0    Serial #: E140308  
                            Original Hole Size: 222.0

Remarks: Cut 27m in 4.25 hours

## Detailed Core Descriptions

1,650.50 to 1,650.60 (0.10)	<b>Shale</b> dark gray, grades to dark gray brown in part, subfissile, slightly micromicaceous, very slightly calcareous, poor trace pyrite, trace minor carbonaceous matter, no dry fluorescence, pale slow yellow cut.
1,652.00 to 1,652.10 (0.10)	<b>Shale</b> dark gray, grades to dark gray brown in part, subfissile, slightly micromicaceous, very slightly calcareous, poor trace pyrite, increasing organic carbonaceous matter, no dry fluorescence, pale slow yellow cut.
1,653.50 to 1,653.60 (0.10)	<b>Shale</b> dark gray, grades to dark gray brown in part, subfissile, slightly micromicaceous, poor trace pyrite, minor carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.
1,655.00 to 1,655.10 (0.10)	<b>Shale</b> medium gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.
1,656.50 to 1,656.60 (0.10)	<b>Shale</b> medium to dark gray, gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.
1,658.00 to 1,658.10 (0.10)	<b>Shale</b> medium to dark gray, gray brown, subfissile, slightly micromicaceous, minor organic carbonaceous matter, frequent disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,659.50 to 1,659.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.



## Core Report

Storage Units: Metric

1,661.00 to 1,661.10 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.
1,662.50 to 1,662.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, no dry fluorescence, very faint pale slow yellow cut.
1,664.00 to 1,664.10 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,665.50 to 1,665.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,667.00 to 1,667.10 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, no dry fluorescence, very faint pale slow yellow cut.
1,668.50 to 1,668.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,670.00 to 1,670.10 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,671.50 to 1,671.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,673.00 to 1,673.10 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, trace disseminated pyrite, no dry fluorescence, very faint pale slow yellow cut.
1,674.50 to 1,674.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, no dry fluorescence, very faint pale slow yellow cut.
1,675.90 to 1,676.00 (0.10)	<b>Shale</b> gray brown, subfissile, slightly micromicaceous, slightly bituminous, minor organic carbonaceous matter, trace slightly silty, no dry fluorescence, very faint pale slow yellow cut.



# Core Report

Storage Units: Metric

Date: February 8, 2013  
Core #: 3  
Formations Cored: Canol

## Cored Interval

From: 1,676.00 To: 1,703.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: Rhys Nichol, Dusty Zbitnoff, Ernie Chouckalis

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                            Bit Size (OD): 222.0    Serial #: E140308  
                            Original Hole Size: 222.0

Remarks: Cut 27 meters in 4.25 hrs.

## Detailed Core Descriptions

1,677.50 to 1,677.60    **Shale**  
(0.10)    gray brown, fissile, slightly micromicaceous, firm to hard, becoming siliceous?  
                            slightly bituminous, minor organic carbonaceous matter, trace slightly silty, no  
                            dry fluorescence, very faint pale slow yellow cut.

## Lower Canol: 1,679.00 MD, 1,678.94 TVD, -1,421.34 SSL

1,679.00 to 1,679.10    **Shale**  
(0.10)    gray brown, fissile, slightly micromicaceous, firm to hard, becoming siliceous?  
                            becoming brittle, carbonaceous organic matter, faint shows as above.

1,680.50 to 1,680.60    **Shale**  
(0.10)    dark gray brown, fissile, slightly micromicaceous, firm to hard, becoming  
                            siliceous? becoming brittle, carbonaceous organic matter, faint shows as  
                            above.

1,682.00 to 1,682.10    **Shale**  
(0.10)    dark gray brown, fissile, slightly micromicaceous, firm to hard, siliceous? brittle,  
                            slightly fractured, carbonaceous organic matter, trace worm burrows infilled  
                            with pyrite, faint shows as above.

1,683.50 to 1,683.60    **Shale**  
(0.10)    as above, increasing disseminated pyrite, micro fractures infilled with pyrite.

1,685.00 to 1,685.10    **Shale**  
(0.10)    gray brown, fissile, slightly micromicaceous, firm to hard, slightly siliceous?  
                            occasionally brittle, shale laminated with pyrite, trace laminated with sandy  
                            shale in part, faint shows as above.

1,687.50 to 1,687.60    **Shale**  
(0.10)    as above, abundant disseminated pyrite, abundant unidentifiable fossil (plant  
                            remains) casts lined with carbonaceous matter, trace spicules?



## Core Report

Storage Units: Metric

1,688.00 to 1,688.10 (0.10)	<b>Shale</b> medium to dark gray brown, fissile, brittle, slightly micromicaceous, abundant disseminated pyrite, abundant carbonaceous fossil remains, trace fossil casts infilled with pyrite, faint show as above.
1,689.50 to 1,689.60 (0.10)	<b>Shale</b> gray brown, fissile, slightly micromicaceous, firm to hard, siliceous? brittle, carbonaceous organic matter, trace pyrite as above, faint shows as above.
1,691.00 to 1,691.10 (0.10)	<b>Shale</b> gray brown, fissile, slightly micromicaceous, firm to hard, siliceous? brittle, carbonaceous organic matter, appears slightly fractured with some micro fractures infilled with pyrite.
1,692.50 to 1,692.60 (0.10)	<b>Shale</b> dark gray brown to black, siliceous, brittle, hard, trace unidentifiable fossil casts? minor pyrite as above, faint show as above.
1,694.00 to 1,694.10 (0.10)	<b>Shale</b> dark gray brown, as above, siliceous? , occasionally speckled with light & dark colored chert, shows as above.
1,695.50 to 1,695.60 (0.10)	<b>Shale</b> dark gray brown, siliceous, hard, brittle, slightly micromicaceous, trace disseminated pyrite, very faint slow pale yellow cut.
1,697.00 to 1,697.10 (0.10)	<b>Shale</b> dark gray brown, siliceous, hard, brittle, slightly micromicaceous, trace disseminated pyrite, very faint slow pale yellow cut.
1,698.50 to 1,698.60 (0.10)	<b>Shale</b> dark gray brown, siliceous, hard, brittle, slightly micromicaceous, disseminated pyrite, very faint slow pale yellow cut.
1,700.00 to 1,700.10 (0.10)	<b>Shale</b> dark gray to dark gray brown, fissile, splintery, micromicaceous increasing slightly, siliceous? disseminated pyrite, abundant black organic matter, no dry fluorescence, slow pale yellow streaming cut.
1,701.50 to 1,701.60 (0.10)	<b>Shale</b> increasing gray brown, as above, increasing disseminated pyrite, decreasing organic matter. No visible oil bleeding from core throughout.



# Core Report

Storage Units: Metric

Date: February 9, 2013  
Core #: 4  
Formations Cored: Canol

## Cored Interval

From: 1,703.00 To: 1,730.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                            Bit Size (OD): 222.0    Serial #: E140308  
                            Original Hole Size: 222.0

Remarks: Cut 27m in 4 hours, full recovery.

## Detailed Core Descriptions

1,704.50 to 1,704.60 (0.10)	<b>Shale</b> dark gray brown, hard, subfissile, slightly micromicaceous, minor disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,706.00 to 1,706.10 (0.10)	<b>Shale</b> as above, occasionally laminated with Shale dark gray brown to black, fissile, splintery, slightly micromicaceous, trace disseminated pyrite.
1,707.50 to 1,707.60 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,709.00 to 1,709.10 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, unidentifiable fossil casts, (brachiopod?) faint fluorescence as above.
1,710.50 to 1,710.60 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,712.00 to 1,712.10 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,713.50 to 1,713.60 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, very slightly calcareous, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,715.00 to 1,715.10 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, very slightly calcareous, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, minor thin bioturbated layers, faint fluorescence as above.



## Core Report

Storage Units: Metric

1,716.50 to 1,716.60 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, very slightly calcareous, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, poss hydrocarbon odor, faint fluorescence as above.
1,718.00 to 1,718.10 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly calcareous, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,719.50 to 1,719.60 (0.10)	<b>Shale</b> dark gray brown, hard, siliceous?, slightly calcareous, slightly micromicaceous, disseminated pyrite, minor carbonaceous organic matter, faint fluorescence as above.
1,721.00 to 1,721.10 (0.10)	<b>Shale</b> as above, hard, brittle, laminated with brown chert stringers?
1,722.50 to 1,722.60 (0.10)	<b>Shale</b> dark gray brown to occasionally black as above, laminated with brown chert stringers?
1,724.00 to 1,724.10 (0.10)	<b>Shale</b> dark gray brown, very hard, brittle, siliceous, trace disseminated pyrite, trace carbonaceous organic matter, slightly micromicaceous, fluorescence as above.
1,725.50 to 1,725.60 (0.10)	<b>Shale</b> gray brown, hard, brittle, siliceous, increasing calcareous, slightly micromicaceous, disseminated pyrite, carbonaceous organic matter, fluorescence as above.
1,727.00 to 1,727.10 (0.10)	<b>Shale</b> gray brown, hard, brittle, siliceous, increasing calcareous, slightly micromicaceous, disseminated pyrite, carbonaceous organic matter, fluorescence as above.
1,728.50 to 1,728.60 (0.10)	<b>Shale</b> dark gray brown, hard, brittle, subfissile, siliceous, slightly calcareous, slightly micromicaceous, trace disseminated pyrite, trace organic matter as above, trace very slow fluorescence as above.
1,729.90 to 1,730.00 (0.10)	<b>Shale</b> dark gray brown, hard, brittle, subfissile, siliceous, slightly calcareous, slightly micromicaceous, trace disseminated pyrite, trace organic matter as above, trace very slow fluorescence as above. No visible oil bleeding from core throughout.



# Core Report

Storage Units: Metric

Date: February 10, 2013  
Core #: 5  
Formations Cored: Canol

## Cored Interval

From: 1,730.00 To: 1,757.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                             Bit Size (OD): 222.0    Serial #: E140308  
                             Original Hole Size: 222.0

## Remarks:

## Detailed Core Descriptions

1,731.50 to 1,731.60 (0.10)	<b>Shale</b> gray brown, subfissile, slightly siliceous, slightly calcareous, micromicaceous, trace disseminated pyrite, trace organic matter as above, trace very slow fluorescence as above.
1,733.00 to 1,733.10 (0.10)	<b>Shale</b> dark gray brown, subfissile, slightly siliceous, slightly calcareous, micromicaceous, no visible pyrite, trace organic matter as above, slow pale yellow streaming cut fluorescence.
1,734.50 to 1,734.60 (0.10)	<b>Shale</b> dark gray brown, subfissile, slightly siliceous, slightly calcareous, micromicaceous, no visible pyrite, trace organic matter as above, slow pale yellow streaming cut fluorescence.
1,736.00 to 1,736.10 (0.10)	<b>Shale</b> dark gray brown, hard, brittle, slightly siliceous? increasing calcareous, slightly micromicaceous, trace disseminated pyrite, slightly calcareous, shows as above.
1,737.50 to 1,737.60 (0.10)	<b>Shale</b> dark gray brown, as above, increasing calcareous, slightly micromicaceous, increasing carbonaceous organic matter, thin fractures infilled with frosted very fine crystalline calcite, shows as above.
1,739.00 to 1,739.10 (0.10)	<b>Shale</b> as above, no visible fractures.
1,740.50 to 1,740.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, slightly micromicaceous, minor carbonaceous organic matter, very pale slow light yellow cloudy cut.
1,742.00 to 1,742.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, less brittle, subfissile, slightly micromicaceous, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above.



## Core Report

Storage Units: Metric

1,743.50 to 1,743.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above.
1,745.00 to 1,745.10 (0.10)	<b>Shale</b> dark gray brown, increasing calcareous, firm, subfissile, slightly micromicaceous, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above. Core appeared fractured at end of sleeve.
1,746.50 to 1,746.60 (0.10)	<b>Shale</b> as above with stringers bioturbated shale, dark gray, brittle, trace very small fractures?
1,748.00 to 1,748.10 (0.10)	<b>Shale</b> very dark gray brown to black, carbonaceous, occasionally very calcareous, trace small fractures, occasional brittle, strong hydrocarbon odor, waxy lustre with scour, good fast yellow streaming cut fluorescence.
1,749.50 to 1,749.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, trace disseminated pyrite, carbonaceous organic matter, slow very faint pale yellow fluorescence.
1,751.00 to 1,751.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, brittle in part, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above.
1,752.50 to 1,752.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, minor carbonaceous organic matter, trace calcite veining, fluorescence as above.
1,754.00 to 1,754.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, disseminated pyrite with pyrite laminated within shale, abundant carbonaceous organic matter, fluorescence as above.
1,755.50 to 1,755.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, splintery, slightly micromicaceous, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above.
1,756.90 to 1,757.00 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, splintery, slightly micromicaceous, trace disseminated pyrite, minor carbonaceous organic matter, fluorescence as above.



# Core Report

Storage Units: Metric

Date: February 11, 2013  
Core #: 6  
Formations Cored: Canol

## Cored Interval

From: 1,757.00 To: 1,784.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                             Bit Size (OD): 222.0    Serial #: E140308  
                             Original Hole Size: 222.0

## Remarks:

## Detailed Core Descriptions

1,758.50 to 1,758.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, thin laminated pyrite with shale, minor carbonaceous organic matter, fluorescence as above.
1,760.00 to 1,760.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, firm, subfissile, slightly micromicaceous, no visible pyrite, minor carbonaceous organic matter, fluorescence as above.
1,761.50 to 1,761.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm, subfissile, slightly micromicaceous, no visible pyrite, minor carbonaceous organic matter, fluorescence as above.
1,763.00 to 1,763.10 (0.10)	<b>Shale</b> dark gray brown to occasionally black, slightly calcareous, hard, brittle, fissile, carbonaceous with carbonaceous organic matter, slightly micromicaceous, minor disseminated pyrite, fluorescence as above.
1,764.50 to 1,764.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, hard, brittle, fissile, siliceous? slightly micromicaceous, trace pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,766.00 to 1,766.10 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, hard, brittle, fissile, siliceous? slightly micromicaceous, trace pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,767.50 to 1,767.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, subfissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.



# Core Report

Storage Units:      Metric

1,769.00 to 1,769.10 (0.10)	<b>Shale</b> very dark gray brown, slightly calcareous, firm to hard, brittle, fissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,770.50 to 1,770.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, subfissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,772.00 to 1,772.10 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, subfissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,773.50 to 1,773.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, platy, fissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above. No visible oil bleeding from core throughout.
1,775.00 to 1,775.10 (0.10)	<b>Shale</b> as above, increasing micromicaceous.
1,776.50 to 1,776.60 (0.10)	<b>Shale</b> dark gray brown to black, slightly calcareous, firm, subfissile, slightly micromicaceous, trace disseminated pyrite, trace micro fractures? occasional carbonaceous organic matter, fluorescence as above.
1,778.00 to 1,778.10 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, subfissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,779.50 to 1,779.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, platy, fissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,781.00 to 1,781.10 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, platy, fissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,782.50 to 1,782.60 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm to hard, platy, subfissile, slightly micromicaceous, trace pyrite, occasional carbonaceous organic matter, fluorescence as above.
1,783.90 to 1,784.00 (0.10)	<b>Shale</b> dark gray brown, slightly calcareous, firm, platy, subfissile, slightly micromicaceous, no visible pyrite, occasional carbonaceous organic matter, fluorescence as above. No visible oil bleeding from core throughout.



# Core Report

Storage Units: Metric

Date: February 12, 2013  
Core #: 7  
Formations Cored: Canol

## Cored Interval

From: 1,784.00 To: 1,811.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                             Bit Size (OD): 222.0    Serial #: E140308  
                             Original Hole Size: 222.0

## Remarks:

## Detailed Core Descriptions

1,785.50 to 1,785.60 (0.10)	<b>Shale</b> dark gray brown to very dark gray, platy, fissile, slightly micromicaceous, slightly calcareous, abundant carbonaceous organic matter, slightly micromicaceous, abundant disseminated pyrite, fluorescence as above.
1,787.00 to 1,787.10 (0.10)	<b>Shale</b> very dark gray to black as above.
1,788.50 to 1,788.60 (0.10)	<b>Shale</b> dark gray brown to very dark gray, platy, fissile, slightly micromicaceous, non calcareous, carbonaceous organic matter, slightly micromicaceous, disseminated pyrite laminated with shale, fluorescence as above.
1,790.00 to 1,790.10 (0.10)	<b>Shale</b> very dark gray, platy, fissile, slightly micromicaceous, abundant carbonaceous organic matter, slightly micromicaceous, disseminated pyrite, fluorescence as above.
1,793.00 to 1,793.10 (0.10)	<b>Shale</b> dark gray brown to very dark gray, platy, fissile, slightly micromicaceous, abundant carbonaceous organic matter, slightly micromicaceous, no visible pyrite, fluorescence as above.
1,794.50 to 1,794.60 (0.10)	<b>Shale</b> very dark gray to black, platy, fissile, slightly micromicaceous, abundant carbonaceous organic matter, slightly micromicaceous, trace pyrite.
1,796.00 to 1,796.10 (0.10)	<b>Shale</b> dark gray to dark gray brown, platy, fissile, slightly micromicaceous, mottled with abundant carbonaceous organic matter, slightly micromicaceous, poor trace calcareous, no visible pyrite, fluorescence as above.
1,797.50 to 1,797.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, slightly micromicaceous, becoming silty, carbonaceous matter as above, no dry fluorescence, pale light yellow cloudy cut.



## Core Report

Storage Units: Metric

1,799.00 to 1,799.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, micromicaceous, abundant unidentifiable fossil casts, carbonaceous matter as above, no dry fluorescence, pale light yellow cloudy cut.
1,800.50 to 1,800.60 (0.10)	<b>Shale</b> dark gray brown, calcareous, slightly micromicaceous, abundant unidentifiable fossil casts, brachiopods, pelecypod, carbonaceous matter as above, no dry fluorescence, pale light yellow cloudy cut.
1,802.00 to 1,802.10 (0.10)	<b>Shale</b> dark gray brown, calcareous, slightly micromicaceous, sbifs, firm, abundant unident fossil casts, some infilled with pyrite, carbonaceous matter as above, no dry fluorescence, pale light yellow cloudy cut.
1,803.50 to 1,803.60 (0.10)	<b>Shale</b> as above, trace pelecypod.
1,805.00 to 1,805.10 (0.10)	<b>Limestone</b> light brown, wackestone, micrite matrix, unidentifiable fossil casts & fragments, no visible porosity, no shows.
1,806.50 to 1,806.60 (0.10)	<b>Limestone</b> dark gray brown as above, argillaceous, shaly, dark carbonaceous matter, spotty oil stain?
1,808.00 to 1,808.10 (0.10)	<b>Limestone</b> brown to dark brown, wackestone with micrite matrix, slightly argillaceous, unidentifiable fossil shadow, no visible porosity, no show
1,809.50 to 1,809.60 (0.10)	<b>Limestone</b> as above
1,810.90 to 1,811.00 (0.10)	<b>Limestone</b> light brown, fragmental packstone? recrystallized fine to medium crystalline, abundant unidentifiable fossil shadow, no visible porosity, no show



# Core Report

Storage Units: Metric

Date: February 13, 2013  
Core #: 8  
Formations Cored: Hume

## Cored Interval

From: 1,811.00 To: 1,838.00  
Cut: 27.00 Recovered: 27.00 100.00 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information    Bit Make: NOV    Bit Type: PR513  
                             Bit Size (OD): 222.0    Serial #: E140308  
                             Original Hole Size: 222.0

## Remarks:

## Detailed Core Descriptions

1,812.50 to 1,812.60 (0.10)	<b>Limestone</b> light brown, fragmental wackestone, micrite matrix, unidentifiable fossil casts infilled with calcite, coral?, ostracods, brachiopods? no visible porosity, no show.
1,814.00 to 1,814.10 (0.10)	<b>Limestone</b> as above, grades to mudstone in part, occlt recrystallized fine to medium crystalline in part.
1,815.50 to 1,815.60 (0.10)	<b>Limestone</b> light brown, fragmental wackestone, micrite matrix, unidentifiable fossil casts infilled with calcite, no visible porosity, no show.
1,817.00 to 1,817.10 (0.10)	<b>Limestone</b> medium brown, fragmental wackestone, micrite matrix, slightly argillaceous, unidentifiable fossil casts infilled with calcite, no visible porosity, no show.
1,818.50 to 1,818.60 (0.10)	<b>Limestone</b> light brown, fragmental wackestone, micrite matrix, unidentifiable fossil casts infilled with calcite, ostracods, no visible porosity, no show.
1,820.00 to 1,820.10 (0.10)	<b>Limestone</b> brown, fragmental wackestone, micrite matrix, unidentifiable fossil casts infilled with calcite, ostracods, no visible porosity, no show.
1,821.00 to 1,821.10 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized very fine crystalline, ostracods, unidentifiable fossil shadow, no visible porosity or shows.
1,822.50 to 1,822.60 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized very fine crystalline, ostracods, unidentifiable fossil infilled with frosted calcite (coral?) no visible porosity or shows.



## Core Report

Storage Units: Metric

1,824.00 to 1,824.10 (0.10)	<b>Limestone</b> dark brown, mudstone to wackestone, recrystallized micro to very fine crystalline, becoming argillaceous, unidentifiable fossil shadow, ostracods, pellets? no visible porosity or shows.
1,825.50 to 1,825.60 (0.10)	<b>Limestone</b> brown, mudstone, trace fossil as above, dense, no show
1,827.00 to 1,827.10 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized very fine crystalline in part, ostracods, unidentifiable fossil casts infilled with frosted calcite, no visible porosity or shows.
1,828.50 to 1,828.60 (0.10)	<b>Limestone</b> as above
1,830.00 to 1,830.10 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized micro to very fine crystalline, ostracods, unidentifiable fossil shadow, no visible porosity or shows.
1,831.50 to 1,831.60 (0.10)	<b>Limestone</b> as above.
1,833.00 to 1,833.10 (0.10)	<b>Limestone</b> medium brown, mudstone, pellets, oolites, trace unidentifiable fossil shadow, dense, no shows.
1,834.50 to 1,834.60 (0.10)	<b>Limestone</b> brown, wackestone, micrite matrix, recrystallized fine -m crystalline, ostracods, unidentifiable fossil casts infilled with frosted calcite, no visible porosity or shows.
1,836.00 to 1,836.10 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized very fine crystalline, ostracods, unidentifiable fossil shadow & casts infilled with fossil calcite, no visible porosity or shows.
1,837.50 to 1,837.60 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, recrystallized very fine crystalline, coral?, unidentifiable fossil shadow, no visible porosity or shows.



# Core Report

Storage Units: Metric

Date: February 14, 2013  
Core #: 9  
Formations Cored: Hume

## Cored Interval

From: 1,838.00 To: 1,856.00  
Cut: 18.00 Recovered: 17.70 98.33 %  
Core Diameter: 89.0

Coring Company: Corion  
Service Representative: R. Nichol, D. Zbitnoff, E. Chouckalis S. Gilbertson

Core Bit Information Bit Make: NOV Bit Type: PR513  
Bit Size (OD): 222.0 Serial #: E140308  
Original Hole Size: 222.0

## Remarks:

## Detailed Core Descriptions

1,839.50 to 1,839.60 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, recrystallized micro to very fine crystalline, unidentifiable fossil shadow, no visible porosity or shows.
1,841.00 to 1,841.10 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, recrystallized micro to very fine crystalline, unidentifiable coral, amphipora? unidentifiable fossil shadow, no visible porosity or shows.
1,842.50 to 1,842.60 (0.10)	<b>Limestone</b> brown, mudstone, slightly argillaceous, no visible fossil, no visible porosity or shows.
1,844.00 to 1,844.10 (0.10)	<b>Limestone</b> dark brown mudstone as above, slightly argillaceous.
1,845.50 to 1,845.60 (0.10)	<b>Limestone</b> as above, trace pyritic, trace ostracods, dense, no shows with minor dark gray to black, shale laminations, platy, fissile, carbonaceous.
1,847.90 to 1,848.00 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, recrystallized micro to very fine crystalline in part, unidentifiable fossil shadow, no visible porosity or shows.
1,849.40 to 1,849.50 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, unidentifiable fossil shadow, pellets, ostracods, no visible porosity or shows.
1,850.90 to 1,851.00 (0.10)	<b>Limestone</b> dark brown, floatstone with nodule stromatoporoids, lime mud matrix, recrystallized micro to very fine crystalline, argillaceous, shaly in part, unidentifiable fossil casts, no visible porosity, no shows.



## Core Report

Storage Units: Metric

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1,852.40 to 1,852.50 (0.10)	<b>Limestone</b> as above
1,853.90 to 1,854.00 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, unidentifiable fossil shadow, no visible porosity or shows.
1,855.90 to 1,856.00 (0.10)	<b>Limestone</b> brown, mudstone to wackestone, micrite matrix, slightly argillaceous, recrystallized micro to very fine crystalline, unidentifiable fossil shadow, no visible porosity or shows.



# Wireline Logging Summary

Storage Units:

Metric

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

Engineer: Jeffery Tatlock  
Unit Number: 2187

Was Pressure Control Equipment Utilized: No      Maximum Deviation: 1.300 °  
Was the Logging Job Mechanically Assisted: No      Hole Size: 311.0

Total Lost Time: 2.50  
Loggers' Total Down Time: 0.50  
Total Job Time (From Rig up to Rig down):

	Measured Depth	True Vertical Depth
Casing Depth Driller	20.00	20.00
Casing Depth Logger	20.00	20.00
Total Depth Driller (Tally)	600.00	599.94
Total Depth Driller (Strap or SLM)		

General Remarks: Loggers arrived at base camp on the night of Jan 29, prior to final call out.  
Called to location from camp @ 05:00 hrs.

Logging Run #: 1  
Date: Jan 30, 2012

## Drilling Fluid Data

Drilling Fluid Type: Gel Chem

Fluid Density: 1150.0      Viscosity: 88      pH: 8.0      Fluid Loss: 7.0

Mud Resistivity (Rm): @ °  
Mud Resistivity (Rm) @ BHT: @ °      Maximum Temperature: 30.9 °  
Mud Filtrate Resistivity (Rmf): @ °      Source (Rmf):  
Mud Cake Resistivity (Rmc): @ °      Source (Rmc):

## Logging Run Information

Date on Bottom: Jan 30, 2013  
Total Depth Logger: 600.00 (MD)      600.00 (TVD)

Logging Tools: AIT, DSI, PPC, TLD, HGNS, TLD2, GPIT

Remarks: Wiper tripped twice before logging, trip out to log was good.

Hole Conditions: Good



# Wireline Logging Summary

Storage Units: Metric

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

Engineer: Jeffrey Tatlock  
Unit Number: 2187

Was Pressure Control Equipment Utilized: No      Maximum Deviation: 2.500 °  
Was the Logging Job Mechanically Assisted: No      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	596.78	596.72
Casing Depth Logger	597.00	596.94
Total Depth Driller (Tally)	1,856.00	1,855.94
Total Depth Driller (Strap or SLM)		

General Remarks: There were 5 logging runs for logging job#2.

Logging Run #: 1  
Date: Feb 15, 2013

## Drilling Fluid Data

Drilling Fluid Type: Invert (versaclean)  
Fluid Density: 945.0      Viscosity: 84      pH:      Fluid Loss:

Mud Resistivity (Rm): @ °  
Mud Resistivity (Rm) @ BHT: @ °      Maximum Temperature: 66.2 °  
Mud Filtrate Resistivity (Rmf): @ °      Source (Rmf):  
Mud Cake Resistivity (Rmc): @ °      Source (Rmc):

## Logging Run Information

Date on Bottom: Feb 15, 2013  
Total Depth Logger: 1,858.00 (MD)      1,857.94 (TVD)

Logging Tools: AIT- Lithoscanner-TLD-HGNS-GR-TLD2

Remarks: Wiper tripped to surface casing.

Hole Conditions: Good



## Wireline Logging Summary

Storage Units:

Metric

Logging Run #: 2  
Date: Feb 16, 2013

### Drilling Fluid Data

Drilling Fluid Type: Invert  
Fluid Density: 945.0      Viscosity: 84      pH:      Fluid Loss:  
Mud Resistivity (Rm): @ °  
Mud Resistivity (Rm) @ BHT: @ °      Maximum Temperature: 66.2 °  
Mud Filtrate Resistivity (Rmf): @ °      Source (Rmf):  
Mud Cake Resistivity (Rmc): @ °      Source (Rmc):

### Logging Run Information

Date on Bottom: Feb 16, 2013  
Total Depth Logger: 1,857.60 (MD)      1,857.54 (TVD)  
Logging Tools: UBI / dual OBMI / GPIT / PPC / SSCAN / PPC / GR  
Remarks: UBI failed after 60 meters, got working again, lost approx 2 hours.  
Hole Conditions: Good



## Wireline Logging Summary

Storage Units:

Metric

Logging Run #: 3  
Date: Feb 16, 2013

### Drilling Fluid Data

Drilling Fluid Type: Invert

Fluid Density: 945.0

Viscosity: 77

pH:

Fluid Loss:

Mud Resistivity (Rm): @ °

Mud Resistivity (Rm) @ BHT: @ °

Mud Filtrate Resistivity (Rmf): @ °

Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: 66.2 °

Source (Rmf):

Source (Rmc):

### Logging Run Information

Date on Bottom: Feb 17, 2013

Total Depth Logger: 1,857.60 (MD) 1,857.54 (TVD)

Logging Tools: ADT / HNGS / PPC / CMR+ / GR

Remarks:

Hole Conditions: Good



# Wireline Logging Summary

Storage Units:

Metric

Logging Run #: 4  
Date: Feb 17, 2013

## Drilling Fluid Data

Drilling Fluid Type: Invert

Fluid Density: 945.0

Viscosity: 77

pH:

Fluid Loss:

Mud Resistivity (Rm): @ °

Mud Resistivity (Rm) @ BHT: @ °

Mud Filtrate Resistivity (Rmf): @ °

Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: 66.2 °

Source (Rmf):

Source (Rmc):

## Logging Run Information

Date on Bottom: Feb 17, 2013

Total Depth Logger: 1,857.60 (MD) 1,857.54 (TVD)

Logging Tools: RST-GR

Remarks:

Hole Conditions: Good



# Wireline Logging Summary

Storage Units:

Metric

Logging Run #: 5  
Date: Feb 18, 2013

## Drilling Fluid Data

Drilling Fluid Type: Invert

Fluid Density: 945.0

Viscosity: 77

pH:

Fluid Loss:

Mud Resistivity (Rm): @ °

Mud Resistivity (Rm) @ BHT: @ °

Mud Filtrate Resistivity (Rmf): @ °

Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: 66.2 °

Source (Rmf):

Source (Rmc):

## Logging Run Information

Date on Bottom: Feb 18, 2013

Total Depth Logger: 1,857.60 (MD)

1,857.54 (TVD)

Logging Tools: USIT / CBL

Remarks:

Hole Conditions: Good



# Deviation / Directional Survey Report

Directional Drilling Company: Beaver  
Directional Drillers:  
Measured While Drilling (MWD) Hands:  
Survey Type: drift  
Survey Mode: wireline  
Survey Date: Jan 24, 2013  
Survey Calculation Method: minimum curvature  
Target Azimuth: 360.00 °  
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
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00

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		0.500					
58.00		0.500					
86.00		0.200					
114.00		0.800					
142.00		0.100					
171.00		0.600					
199.00		0.700					
228.00		1.200					
257.00		0.900					
287.00		0.200					
314.00		1.000					
354.00		0.900					
390.00		1.100					
439.00		1.100					
478.00		1.300					
516.00		0.300					
555.00		1.300					
592.00		0.600					



# Deviation / Directional Survey Report

Directional Drilling Company: Schlumberger  
Directional Drillers: Yong Zhao  
Measured While Drilling (MWD) Hands: Reg Shipley  
Survey Type: magnetic  
Survey Mode: MWD  
Survey Date: Feb 3, 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
570.00	569.95	0.420	82.75	1.61	5.36		

## 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
0.00	0.00	0.000	0.00	0.00	0.00	0.00	0.00

Remarks: Surveys from 0 - 570 meters were done with Schlumberger GPIT.



# Survey Points

Storage Units:

Metric

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
10.00	10.00	0.800	69.05	0.02	0.07	0.02	2.40
20.00	20.00	0.850	78.21	0.07	0.20	0.07	0.42
30.00	30.00	0.740	91.01	0.08	0.34	0.08	0.62
40.00	40.00	0.710	90.42	0.08	0.47	0.08	0.09
50.00	50.00	0.650	50.91	0.11	0.57	0.11	1.39
60.00	60.00	0.360	18.18	0.18	0.63	0.18	1.19
70.00	70.00	0.270	245.58	0.20	0.61	0.20	1.73
80.00	80.00	0.270	213.47	0.17	0.58	0.17	0.45
90.00	90.00	0.360	176.36	0.12	0.57	0.12	0.65
100.00	100.00	0.520	166.45	0.04	0.58	0.04	0.53
110.00	109.99	0.630	132.87	-0.04	0.63	-0.04	1.05
120.00	119.99	0.790	99.41	-0.09	0.74	-0.09	1.31
130.00	129.99	0.630	76.99	-0.09	0.86	-0.09	0.95
140.00	139.99	0.380	31.01	-0.05	0.93	-0.05	1.37
150.00	149.99	0.300	351.04	0.01	0.95	0.01	0.73
160.00	159.99	0.260	226.91	0.02	0.93	0.02	1.49
170.00	169.99	0.130	239.42	0.00	0.90	0.00	0.41
180.00	179.99	0.320	189.47	-0.04	0.89	-0.04	0.77
190.00	189.99	0.320	189.13	-0.09	0.88	-0.09	0.01
200.00	199.99	0.480	160.01	-0.16	0.89	-0.16	0.76
210.00	209.99	0.670	135.59	-0.24	0.94	-0.24	0.92
220.00	219.99	0.740	120.62	-0.31	1.04	-0.31	0.59
230.00	229.99	0.950	86.91	-0.34	1.18	-0.34	1.59
240.00	239.99	0.950	67.80	-0.31	1.34	-0.31	0.95
250.00	249.99	0.550	27.39	-0.23	1.43	-0.23	1.92
260.00	259.99	0.550	34.26	-0.15	1.48	-0.15	0.20
270.00	269.99	0.570	30.24	-0.07	1.54	-0.07	0.13
280.00	279.99	0.520	25.80	0.02	1.58	0.02	0.20
290.00	289.99	0.610	29.79	0.10	1.63	0.10	0.29
300.00	299.99	0.560	27.49	0.19	1.68	0.19	0.17
310.00	309.98	0.500	21.63	0.28	1.71	0.28	0.24
320.00	319.98	0.270	32.75	0.34	1.74	0.34	0.72



330.00	329.98	0.270	81.96	0.36	1.78	0.36	0.67
340.00	339.98	0.900	98.56	0.35	1.88	0.35	1.94
350.00	349.98	1.200	70.84	0.37	2.06	0.37	1.74
360.00	359.98	1.130	65.32	0.45	2.25	0.45	0.40
370.00	369.98	1.050	61.59	0.54	2.42	0.54	0.32
380.00	379.98	1.050	62.29	0.62	2.58	0.62	0.04
390.00	389.98	0.970	58.73	0.71	2.73	0.71	0.30
400.00	399.97	1.070	65.17	0.79	2.89	0.79	0.46
410.00	409.97	0.990	65.67	0.87	3.05	0.87	0.24
420.00	419.97	1.100	70.31	0.93	3.22	0.93	0.42
430.00	429.97	0.970	66.96	1.00	3.39	1.00	0.43
440.00	439.97	0.840	59.75	1.07	3.53	1.07	0.52
450.00	449.97	0.930	68.17	1.14	3.67	1.14	0.47
460.00	459.96	1.020	70.07	1.20	3.83	1.20	0.29
470.00	469.96	0.890	72.26	1.25	3.99	1.25	0.41
480.00	479.96	0.760	70.61	1.30	4.12	1.30	0.40
490.00	489.96	0.880	67.97	1.35	4.26	1.35	0.38
500.00	499.96	1.000	73.44	1.40	4.41	1.40	0.45
510.00	509.96	1.040	74.27	1.45	4.58	1.45	0.13
520.00	519.96	1.010	68.89	1.51	4.75	1.51	0.30
530.00	529.96	0.990	76.06	1.56	4.92	1.56	0.38
540.00	539.95	0.940	74.58	1.60	5.08	1.60	0.17
550.00	549.95	0.460	90.85	1.62	5.20	1.62	1.54
560.00	559.95	0.460	100.96	1.62	5.28	1.62	0.24
570.00	569.95	0.420	82.75	1.61	5.35	1.61	0.43
600.59	600.54	1.010	110.09	1.53	5.72	1.53	0.65
619.94	619.89	1.010	122.48	1.38	6.02	1.38	0.34
639.09	639.03	1.100	125.10	1.19	6.32	1.19	0.16
651.96	651.90	1.100	125.12	1.05	6.52	1.05	0.00
670.96	670.90	1.490	123.41	0.80	6.87	0.80	0.62
715.36	715.28	1.710	126.48	0.09	7.89	0.09	0.16
726.00	725.92	1.410	120.59	-0.07	8.13	-0.07	0.96
735.65	735.56	1.010	128.42	-0.18	8.30	-0.18	1.34
754.85	754.76	1.320	119.50	-0.40	8.62	-0.40	0.56
764.71	764.62	1.100	112.99	-0.49	8.81	-0.49	0.79



784.15	784.05	1.320	111.59	-0.64	9.19	-0.64	0.34
793.85	793.75	1.190	81.31	-0.67	9.39	-0.67	2.06
812.06	811.96	1.410	51.12	-0.50	9.75	-0.50	1.17
830.96	830.85	1.580	49.01	-0.18	10.13	-0.18	0.28
860.24	860.12	2.020	64.70	0.30	10.90	0.30	0.67
879.60	879.46	1.890	62.98	0.59	11.49	0.59	0.22
898.73	898.59	1.190	23.61	0.92	11.85	0.92	1.93
926.60	926.45	1.320	19.08	1.49	12.08	1.49	0.18
955.60	955.44	1.710	32.88	2.17	12.42	2.17	0.55
985.10	984.93	1.580	42.42	2.84	12.93	2.84	0.31
1,014.95	1,014.76	1.890	51.51	3.45	13.60	3.45	0.42
1,043.60	1,043.40	2.110	57.62	4.02	14.41	4.02	0.32
1,071.58	1,071.36	2.420	62.41	4.57	15.37	4.57	0.39
1,090.66	1,090.42	2.110	51.60	4.98	16.00	4.98	0.83
1,101.16	1,100.91	2.290	55.20	5.22	16.33	5.22	0.65
1,119.52	1,119.26	1.190	24.40	5.60	16.71	5.60	2.30
1,138.74	1,138.48	1.320	299.98	5.89	16.60	5.89	2.64
1,177.53	1,177.26	1.190	321.29	6.43	15.96	6.43	0.37
1,196.83	1,196.56	1.010	337.60	6.74	15.77	6.74	0.56
1,216.03	1,215.75	1.580	351.22	7.16	15.66	7.16	1.01
1,235.60	1,235.32	1.010	6.29	7.60	15.64	7.60	1.01
1,264.35	1,264.06	1.580	321.29	8.16	15.42	8.16	1.17
1,274.14	1,273.85	1.890	325.50	8.40	15.24	8.40	1.03
1,301.38	1,301.08	0.700	320.72	8.90	14.88	8.90	1.31
1,321.64	1,321.34	0.620	328.98	9.09	14.75	9.09	0.18
1,349.45	1,349.15	0.480	352.80	9.33	14.66	9.33	0.29
1,368.89	1,368.59	0.480	345.11	9.49	14.63	9.49	0.10
1,388.05	1,387.75	0.790	33.41	9.68	14.68	9.68	0.93
1,407.23	1,406.92	1.010	41.48	9.92	14.86	9.92	0.40
1,426.40	1,426.09	1.320	63.11	10.14	15.17	10.14	0.83
1,445.99	1,445.67	1.800	65.49	10.37	15.65	10.37	0.74
1,465.03	1,464.70	2.590	65.18	10.68	16.32	10.68	1.24
1,484.30	1,483.96	1.410	68.39	10.95	16.93	10.95	1.84
1,503.96	1,503.61	0.220	67.29	11.05	17.19	11.05	1.82
1,522.79	1,522.44	0.700	78.01	11.09	17.34	11.09	0.77



1,541.84	1,541.49	2.020	72.61	11.21	17.77	11.21	2.09
1,580.88	1,580.52	0.790	107.28	11.34	18.68	11.34	1.11
1,599.91	1,599.54	1.100	93.61	11.29	18.99	11.29	0.60
1,607.85	1,607.48	1.100	88.69	11.28	19.14	11.28	0.36



# Deviation / Directional Survey Report

Directional Drilling Company: Schlumberger Logging  
Directional Drillers:  
Measured While Drilling (MWD) Hands:  
Survey Type: magnetic  
Survey Mode: wireline  
Survey Date: Feb 18, 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
1,607.85	1,607.48	1.100	88.69	11.28	19.14	11.28	0.36

## 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
1,610.00	1,609.63	0.983	93.28	11.28	19.18	11.28	2.01
1,620.00	1,619.63	1.080	93.28	11.27	19.36	11.27	0.29
1,630.00	1,629.63	1.217	91.77	11.26	19.56	11.26	0.42
1,640.00	1,639.62	1.327	90.51	11.26	19.78	11.26	0.34
1,650.00	1,649.62	1.397	90.34	11.25	20.02	11.25	0.21
1,660.00	1,659.62	1.472	90.97	11.25	20.27	11.25	0.23
1,670.00	1,669.61	1.569	93.21	11.24	20.53	11.24	0.34
1,680.00	1,679.61	1.694	94.80	11.22	20.82	11.22	0.40
1,690.00	1,689.61	1.828	95.90	11.19	21.12	11.19	0.42
1,700.00	1,699.60	1.957	97.37	11.15	21.45	11.15	0.41
1,710.00	1,709.59	2.105	97.79	11.11	21.80	11.11	0.45
1,720.00	1,719.59	2.265	98.97	11.05	22.18	11.05	0.50
1,730.00	1,729.58	2.424	99.66	10.99	22.58	10.99	0.48
1,740.00	1,739.57	2.583	100.61	10.91	23.01	10.91	0.49
1,750.00	1,749.56	2.768	101.43	10.82	23.47	10.82	0.57
1,760.00	1,759.54	2.951	102.44	10.72	23.96	10.72	0.57
1,770.00	1,769.53	3.120	103.02	10.60	24.48	10.60	0.52
1,780.00	1,779.52	3.290	103.61	10.47	25.02	10.47	0.52
1,790.00	1,789.50	3.444	103.92	10.33	25.59	10.33	0.46
1,800.00	1,799.48	3.623	103.54	10.18	26.19	10.18	0.54
1,810.00	1,809.46	3.817	103.90	10.03	26.82	10.03	0.59
1,820.00	1,819.43	3.993	103.96	9.87	27.48	9.87	0.53
1,830.00	1,829.41	4.148	104.10	9.69	28.17	9.69	0.46



## Drilling Fluid Summary

Storage Units: Metric

<b>Drilling Fluid Type:</b>	Spud Mud & Gel Chem	<b>From:</b>	0	<b>To:</b>	600
<b>Drilling Fluid Type:</b>	Invert (Versaclean)	<b>From:</b>	600	<b>To:</b>	1,856



## Work Schedule

Storage Units:

Metric

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**Company:** Black Gold Geotechnical  
**Geologist:** Dave Lawrence

**Work Performed**      **From:** Jan 24, 2013      **To:** Feb 14, 2013  
**Depths Logged**      **From:** 0.0      **To:** 1,856.0

**Remarks:** Stayed on location until Feb 19 to supervise wireline logging.

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# Formation Top Summary

Storage Units:

Metric

Kelly Bushing Elevation:  
Ground Elevation:

257.60  
252.40

Casing Flange Elevation:

252.73

**\*\* 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
<i>Little Bear</i>	29.00	31.00	31.00			226.60	
<i>Slater River</i>	48.00	36.00	36.00			221.60	
<i>Arctic Red</i>	578.00	570.00	569.94	570.00	569.94	-312.34	
<i>Sans Sault</i>	813.00	787.00	786.94	785.80	785.74	-528.14	
<i>Martin House</i>	888.00	882.50	882.44	881.30	881.24	-623.64	
<i>Imperial</i>	958.00	962.50	962.44	961.50	961.44	-703.84	
<i>Upper Canol</i>	1648.00	1642.50	1642.44	1647.00	1646.94	-1389.34	
<i>Lower Canol</i>	1673.00	1679.00	1678.94	1679.00	1678.94	-1421.34	
<i>Hare Indian</i>	1768.00			1788.00	1787.94	-1530.34	
<i>Bluefish</i>	1783.00			1796.00	1795.94	-1538.34	
<i>Hume</i>	1798.00	1804.00	1803.94	1805.30	1805.24	-1547.64	



## Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 257.60  
Ground Elevation: 252.40

Casing Flange Elevation: 252.73

*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	226.60	
Log Top				

**Evaluation:**

The Little Bear consisted of Sandstone stringers light gray, very fine grained, sub angular, well sorted, clay cement, minor dark lithic grains, poor trace glauconitic, occasionally silty, no visible porosity, no shows.

**Conclusion:**

Zone of little interest.

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	36.00	36.00	221.60	
Log Top				

**Evaluation:**

The Slater River consisted of interbedded Shale predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace pyritic, slightly silty in part, trace sideritic with trace brown siderite fragments with trace minor Siltstone stringers, medium gray, clay cement, tight, no shows. With some interbedded Sandstone salt and pepper, fine grained, sub angular, moderately well sorted, siliceous & slightly calcareous cement, kaolin matrix in part, occasional dark lithic grains, poor trace pyritic, poor to fair intergranular porosity 8%, no visible shows.

**Conclusion:**

The sand at 310 meters had some fair intergranular porosity, but the lack of shows indicate that this sand is wet.



## Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 257.60  
Ground Elevation: 252.40

Casing Flange Elevation: 252.73

*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	570.00	569.94	-312.34	
Log Top	570.00	569.94	-312.34	

### Evaluation:

The Arctic Red consisted of predominately Shale: medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus., trace Siltstone stringers light to medium gray, calcareous & clay cement, tight, no show.

### Conclusion:

Zone of little interest.

Group:  
Formation: Sans Sault  
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	787.00	786.94	-529.34	
Log Top	785.80	785.74	-528.14	

### Evaluation:

The Sans Sault consisted of predominately Shale: medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments with trace minor light gray claystone laminations as above.

### Conclusion:

Zone of little interest.



## Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 257.60  
Ground Elevation: 252.40

Casing Flange Elevation: 252.73

*All Depths Measured from Kelly Bushing Elevation*

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	882.50	882.44	-624.84	
Log Top	881.30	881.24	-623.64	

### Evaluation:

The Martin House consisted of interbedded Sandstone: cream to very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, trace dark lithic grains, calcareous & kaolin cement, silty, grades to sandy siltstone in part, poor trace pyritic, occasionally glauconitic, no visible porosity, no shows and Shale: medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, trace sandy, sandy in part, trace brown siderite fragments.

### Conclusion:

The sands appear too tight for hydrocarbon production.

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	962.50	962.44	-704.84	
Log Top	961.50	961.44	-703.84	

### Evaluation:

The Imperial consisted of predominately Shale: medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part. There was a sandy section in the formation from 1085-1290 meters with interbedded Sandstone: very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly in part, trace dark lithic grains, poor trace glauconitic, grades to siltstone, tight, no shows.

### Conclusion:

Zone of little interest.



## Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 257.60  
Ground Elevation: 252.40

Casing Flange Elevation: 252.73

### All Depths Measured from Kelly Bushing Elevation

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	1642.50	1642.44	-1384.84	
Log Top	1647.00	1646.94	-1389.34	

#### Evaluation:

The Upper Canol was cored with sleeve cores and only the ends of the sleeves were described, so evaluation will have to be determined at a later date.

#### Conclusion:

Group:  
Formation: Hare Indian  
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				
Log Top	1788.00	1787.94	-1530.34	

#### Evaluation:

#### Conclusion:



## Formation Evaluations

Storage Units: Metric

Kelly Bushing Elevation: 257.60  
Ground Elevation: 252.40

Casing Flange Elevation: 252.73

*All Depths Measured from Kelly Bushing Elevation*

Group:  
Formation: Bluefish  
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				
Log Top	1796.00	1795.94	-1538.34	

Evaluation:

Conclusion:

Group:  
Formation: Hume  
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	1804.00	1803.94	-1546.34	
Log Top	1805.30	1805.24	-1547.64	

Evaluation:

Conclusion:



## Sample Descriptions

Storage Units:

Metric

0.00 to 5.00 (5.00)	100% <b>Sandstone</b> rust brown, vitreous & light colored quartz & varicolored chert, medium grained, sub rounded, poor sorting, unconsolidated, abundant varicolored sub rounded chert & quartz pebbles, no visible shows, trace minor gray shale & light gray siltstone.
5.00 to 10.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, soft, occasionally silty, occasional carbonaceous specks with 10% Siltstone stringers, light gray, clay matrix, very slightly calcareous, occasionally sandy, no visible porosity, no shows.
10.00 to 15.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, soft, occasionally silty, occasional carbonaceous specks with 10% Siltstone stringers, light gray, clay matrix, very slightly calcareous, occasionally sandy, carbonaceous grains, no visible porosity, no shows.
15.00 to 20.00 (5.00)	100% <b>Shale</b> as above, trace glauconitic, trace pyrite nodules.
20.00 to 25.00 (5.00)	100% <b>Cement</b>
25.00 to 30.00 (5.00)	100% <b>Cement</b>
30.00 to 35.00 (5.00)	70% <b>Shale</b> light to medium gray, blocky, soft, occasionally sandy & silty, trace carbonaceous specks with minor Siltstone stringers as above.  30% <b>Sandstone</b> light gray, very fine grained, sub angular, well sorted, clay cement, minor dark lithic grains, poor trace glauconitic, occasionally silty, no visible porosity, no shows.
35.00 to 40.00 (5.00)	80% <b>Shale</b> as above  20% <b>SANDSTONE</b> light gray, very fine grained, sub angular, well sorted, clay cement, dark lithic grains, poor trace glauconitic, occasionally silty, no visible porosity, no shows.
40.00 to 45.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks with minor Siltstone stringers as above with 10% Sandstone stringers & laminations, light gray, very fine grained, sub angular, well sorted, clay cement, dark lithic grains, poor trace glauconitic, occasionally silty, no visible porosity, no shows.
45.00 to 50.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks.



## Sample Descriptions

Storage Units:

Metric

50.00 to 55.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks with minor Sandstone stringers as above.
55.00 to 60.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks with 10% Siltstone stringers as above in part with Siltstone light gray brown, sandy, sideritic, shaly, tight, no shows.
60.00 to 65.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks, sideritic in part with trace brown siderite fragments with minor Siltstone stringers as above.
65.00 to 70.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks, sideritic in part with trace brown siderite fragments with minor Siltstone stringers as above.
70.00 to 75.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, slightly micromicaceous, trace silty in part, trace carbonaceous specks, sideritic in part with trace brown siderite fragments with minor Siltstone stringers as above.
75.00 to 80.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, platy in part, slightly micromicaceous, trace silty, soft to firm, minor disseminated pyrite & trace pyrite nodules, minor Siltstone stringers, light gray, clay matrix, trace calcareous, trace dark lithic grains, tight, no visible show.
80.00 to 85.00 (5.00)	100% <b>Shale</b> as above
85.00 to 90.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, trace platy, slightly micromicaceous, trace silty in part, trace carbonaceous specks, pyrite nodules, minor sideritic in part with trace brown siderite fragments with minor Siltstone stringers as above.
90.00 to 95.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, platy in part, slightly micromicaceous, trace silty in part, occasionally sandy, trace carbonaceous specks, pyritic with occasional pyrite nodules, minor sideritic in part with trace brown siderite fragments with minor Siltstone stringers, light to medium gray, clay matrix, slightly sandy, trace dark lithic grains, tight, no shows.
95.00 to 100.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, platy in part, slightly micromicaceous, trace silty in part, occasionally sandy, trace carbonaceous specks, pyritic with occasional pyrite nodules, minor sideritic in part with trace brown siderite fragments.



## Sample Descriptions

Storage Units:

Metric

100.00 to 105.00 (5.00)	100% <b>Shale</b> as above
105.00 to 110.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, platy in part, soft to slightly firm, slightly micromicaceous, trace silty in part, trace sandy, trace carbonaceous specks, pyritic with trace pyrite nodules, minor sideritic in part with trace brown siderite fragments.
110.00 to 115.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, platy in part, moderately firm, slightly micromicaceous, trace silty in part, trace sandy, trace carbonaceous specks, pyritic with trace pyrite nodules, minor sideritic in part with minor Siltstone laminations as above.
115.00 to 120.00 (5.00)	100% <b>Shale</b> light to medium gray, trace gray brown in part, blocky, platy in part, moderately firm, slightly micromicaceous, trace silty in part, trace sandy, trace carbonaceous specks, pyritic with trace pyrite nodules, minor sideritic in part with minor Siltstone laminations as above.
120.00 to 125.00 (5.00)	100% <b>Shale</b> predominately light to medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, trace silty in part, trace carbonaceous specks, trace pyritic, minor sideritic in part with minor Siltstone laminations as above.
125.00 to 130.00 (5.00)	100% <b>Shale</b> predominately light to medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, trace silty in part, trace carbonaceous specks, trace pyritic with poor trace pyrite nodules, minor sideritic in part with minor Siltstone laminations as above.
130.00 to 135.00 (5.00)	100% <b>Shale</b> predominately light to medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, trace pyritic with poor trace pyrite nodules.
135.00 to 140.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, trace pyritic with poor trace pyrite nodules.
140.00 to 145.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, increasing silty, trace pyritic with poor trace pyrite nodules with minor Siltstone laminations light to medium gray, clay cement, grades to silty shale in part, tight, no shows.
145.00 to 150.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, occasionally silty, pyritic with trace pyrite nodules with minor Siltstone laminations light to medium gray, clay cement, grades to silty shale in part, tight, no shows.



## Sample Descriptions

Storage Units:

Metric

150.00 to 155.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, occasionally silty, sandy in part, pyritic with trace pyrite nodules with minor Siltstone laminations as above.
155.00 to 160.00 (5.00)	100% <b>Shale</b> as above, increasing sideritic with Sandstone stringers 10%, light gray, very fine grained, sub angular, well sorted, clay cement, slightly calcareous, pyritic, grades to sandy siltstone in part, tight, no shows.
160.00 to 165.00 (5.00)	100% <b>Shale</b> as above, Sandstone stringers increasing to 15%.
165.00 to 170.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, trace platy in part, moderately firm, slightly micromicaceous, occasionally silty, sandy in part, sideritic in part with trace brown siderite fragments, trace pyritic with trace pyrite nodules with minor Sandstone laminations as above.
170.00 to 175.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, platy in part, moderately firm, slightly micromicaceous, occasionally silty, trace sandy in part, slightly sideritic in part, trace pyritic with trace pyrite nodules with minor Sandstone laminations light gray, salt and pepper, lower fine grained, sub angular, moderately well sorted, calcareous, slightly carbonaceous, trace glauconitic, shaly in part, tight, no show.
175.00 to 180.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, platy in part, moderately firm, slightly micromicaceous, occasionally silty, trace sandy in part, slightly sideritic in part, trace pyritic with trace pyrite nodules with minor Sandstone laminations light gray, salt and pepper, lower fine grained, sub angular, moderately well sorted, calcareous, slightly carbonaceous, trace glauconitic, shaly in part, tight, no show.
180.00 to 185.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, platy in part, moderately firm, slightly micromicaceous, occasionally silty, trace sandy in part, slightly sideritic in part, trace pyritic with trace pyrite nodules with 10% Sandstone laminations light gray, salt and pepper, lower fine grained, sub angular, moderately well sorted, calcareous, slightly carbonaceous, trace glauconitic, shaly in part, tight, no show.
185.00 to 190.00 (5.00)	100% <b>Shale</b> light to medium gray, blocky, platy in part, moderately firm, slightly micromicaceous, occasionally silty, trace sandy in part, slightly sideritic in part, trace pyritic with trace pyrite nodules with minor Sandstone laminations light gray, salt and pepper, lower fine grained, sub angular, moderately well sorted, calcareous, slightly carbonaceous, trace glauconitic, shaly in part, tight, no show.
190.00 to 195.00 (5.00)	100% <b>Shale</b> predominately Shale as above.



## Sample Descriptions

Storage Units:

Metric

195.00 to 200.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace minor Siltstone stringers as above.
200.00 to 205.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, minor Siltstone stringers as above.
205.00 to 210.00 (5.00)	100% <b>Shale</b> as above, increasing silty, trace minor shell fragments (brachiopods?), trace sideritic with 5% Siltstone stringers, medium gray, clay matrix, pyritic, shaly, sandy in part, occasionally grades to very fine grained sandstone in part, tight, no shows.
210.00 to 215.00 (5.00)	80% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace sandy in part, trace pyrite, minor Siltstone stringers as above.  20% <b>Sandstone</b> light to medium gray, very fine grained, sub angular, moderately well sorted, calcareous & clay cement, carbonaceous grains, slightly pyritic, silty, shaly, tight, no shows.
215.00 to 220.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite with 5% Sandstone stringers as above.
220.00 to 225.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.
225.00 to 230.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.
230.00 to 235.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.
235.00 to 240.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.



## Sample Descriptions

Storage Units:

Metric

240.00 to 245.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, slightly sideritic with trace brown siderite fragments with minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.
245.00 to 250.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace inoceramus, trace pyrite, trace sideritic with minor Siltstone stringers, light to medium gray, clay & calcareous cement, carbonaceous grains, shaly, trace pyritic, tight, no shows.
250.00 to 255.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, slightly silty, moderately firm, trace minor carbonaceous specks, trace pyritic, trace sideritic.
255.00 to 260.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, slightly silty, moderately firm, trace minor carbonaceous specks, trace pyritic, trace sideritic with trace brown siderite fragments, trace inoceramus.
260.00 to 265.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, slightly silty, moderately firm, trace minor carbonaceous specks, trace pyritic, trace sideritic with trace brown siderite fragments.
265.00 to 270.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, slightly silty, moderately firm, trace minor carbonaceous specks, trace pyritic, trace sideritic with trace brown siderite fragments.
270.00 to 275.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace pyritic, trace sideritic with trace brown siderite fragments.
275.00 to 280.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace pyritic, slightly silty in part, trace sideritic with trace brown siderite fragments with trace minor Siltstone stringers, medium gray, clay cement, tight, no shows.
280.00 to 285.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace pyritic, slightly silty in part, trace sideritic with trace brown siderite fragments with minor Siltstone stringers, medium gray, clay cement, tight, no shows.



# Sample Descriptions

Storage Units:

Metric

285.00 to 290.00 (5.00)	100% <b>Shale</b> predominately medium gray, blocky, trace platy, slightly micromicaceous, moderately firm, trace minor carbonaceous specks, trace pyritic, slightly silty in part, trace sideritic with trace brown siderite fragments with 5% Siltstone stringers, medium gray, clay cement, sandy, grades to very fine grained sandstone in part, carbonaceous specks, tight, no shows.
290.00 to 295.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor sub fissile, slightly micromicaceous, slightly arenaceous, trace disseminated pyrite with <5% Sandstone laminations, light gray, very fine grained, sub angular, well sorted, clay & calcareous cement, slightly silty, no visible porosity, no shows.
295.00 to 300.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor sub fissile, slightly micromicaceous, slightly arenaceous, trace disseminated pyrite, trace siderite fragments with 5% Sandstone laminations, light gray, very fine grained, sub angular, well sorted, clay & calcareous cement, slightly silty, no visible porosity, no shows
300.00 to 305.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor sub fissile, slightly micromicaceous, slightly arenaceous, moderately firm, trace disseminated pyrite with 5% Sandstone laminations as above.
305.00 to 310.00 (5.00)	70% <b>Shale</b> as above
	30% <b>Sandstone</b> salt and pepper, fine grained, sub angular, moderately well sorted, siliceous & slightly calcareous cement, kaolin matrix in part, occasional dark lithic grains, poor trace pyritic, poor to fine intergranular porosity 8%, no visible shows.
310.00 to 315.00 (5.00)	60% <b>Sandstone</b> light gray, salt and pepper, fine grained, sub angular, moderately well sorted, siliceous & slightly calcareous cement, kaolin cement in part, dark lithic grains, trace glauconitic, trace pyritic, slightly sideritic, tight to poor intergranular porosity 4%, no visible shows with occasional brown siderite fragments (nodules?)
	40% <b>Shale</b> as above
315.00 to 320.00 (5.00)	70% <b>Shale</b> predominately medium gray, minor sub fissile, slightly micromicaceous, slightly arenaceous, trace pyrite, occasionally sideritic with brown siderite fragments in sample.
	30% <b>SANDSTONE</b> light to medium gray, light gray brown, lower fine grained, sub angular, moderately well sorted, siliceous & slightly calcareous, kaolin matrix in part, sideritic, trace glauconitic, pyrite, dark lithic grains, increasing shaly, no visible porosity or show.



## Sample Descriptions

Storage Units:

Metric

320.00 to 325.00 (5.00)	90% <b>Shale</b> light to medium gray, moderately firm, minor sub fissile, trace carbonaceous matter, occasionally colored brown (sideritic) with trace brown siderite fragments, silty & slightly arenaceous in part.
	10% <b>Sandstone</b> as above
325.00 to 330.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm, minor sub fissile, trace carbonaceous matter, trace inoceramus, occasionally colored brown (sideritic) with trace bnr siderite fragments, silty & slightly arenaceous in part with 5% Sandstone stringers as above.
330.00 to 335.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally colored brown (sideritic) with trace brown siderite fragments, silty & slightly arenaceous in part with 5% Sandstone laminations & stringers as above.
335.00 to 340.00 (5.00)	100% <b>Shale</b> as above, increasing arenaceous with 5% sandstone stringers & laminations as above.
340.00 to 345.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally colored brown (sideritic) with trace bnr siderite fragments, silty & slightly arenaceous in part with 5% Sandstone laminations & stringers as above.
345.00 to 350.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), minor silty & slightly sandy in part, trace pyrite nodules with trace Sandstone laminations & lenses as above.
350.00 to 355.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), minor silty & slightly sandy in part, trace pyrite nodules with trace Siltstone laminations & lenses, light gray, clay & slightly calcareous cement, no visible porosity, or show.
355.00 to 360.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), minor silty & slightly sandy in part, trace pyrite nodules with trace Siltstone laminations as above.
360.00 to 365.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), occasionally slightly silty & slightly sandy in part, trace pyrite nodules with trace Siltstone laminations as above.



## Sample Descriptions

Storage Units:

Metric

365.00 to 370.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), occasionally slightly silty & slightly sandy in part, trace disseminated pyrite with trace Siltstone laminations as above.
370.00 to 375.00 (5.00)	100% <b>Shale</b> light to medium gray, moderately firm,, trace carbonaceous specks, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), occasionally slightly silty & slightly sandy in part, trace pyrite nodules with trace Siltstone laminations as above.
375.00 to 380.00 (5.00)	100% <b>Shale</b> as above with trace minor coal lenses.
380.00 to 385.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), occasionally slightly silty & slightly sandy in part, trace pyrite nodules with trace Siltstone laminations as above.
385.00 to 390.00 (5.00)	100% <b>Shale</b> as above with 20% Sandstone light to medium gray, salt and pepper, upper fine grained, sub angular, medium sorting, quartz & chert, clay matrix, slightly calcareous, trace siliceous cement, occasional dark lithic grains, trace glauconitic grains, pyrite, occasionally shaly with occasional medium gray shale lenses, no visible porosity, no shows.
390.00 to 395.00 (5.00)	<b>Missed Sample</b>
395.00 to 400.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, trace inoceramus, occasionally light gray brown (sideritic), trace brown siderite fragments (nodules), occasionally slightly silty & slightly sandy in part, trace pyrite nodules with 5% Sandstone stringers as above.
400.00 to 405.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with minor Sandstone laminations as above.
405.00 to 410.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with minor Sandstone laminations as above.
410.00 to 415.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with minor Sandstone laminations as above.



## Sample Descriptions

Storage Units:

Metric

415.00 to 420.00 (5.00)	100% <b>Shale</b> light to medium gray, minor sub fissile, moderately firm, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with minor Sandstone laminations as above.
420.00 to 425.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with trace minor Sandstone laminations as above.
425.00 to 430.00 (5.00)	80% <b>Shale</b> as above, increasing arenaceous, becoming glauconitic.
	20% <b>Sandstone</b> salt and pepper, upper fine grained, sub angular, moderately well sorted, kaolin matrix, slightly siliceous, dark lithic grains, poor trace glauconitic, trace pyritic, no visible porosity or shows.
430.00 to 435.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic. with 5% Sandstone stringers as above.
435.00 to 440.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic, trace pyrite nodules with trace Sandstone laminations as above.
440.00 to 445.00 (5.00)	70% <b>Shale</b> as above
	30% <b>Sandstone</b> light gray, salt and pepper, upper fine grained, sub angular, moderately well sorted, kaolin matrix, slightly siliceous, dark lithic grains, poor trace glauconitic, trace pyritic, no visible porosity or shows.
445.00 to 450.00 (5.00)	80% <b>Shale</b> as above
	20% <b>Sandstone</b> as above
450.00 to 455.00 (5.00)	80% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic.
	20% <b>Sandstone</b> as above



## Sample Descriptions

Storage Units:

Metric

455.00 to 460.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with 5% Sandstone stringers as above.
460.00 to 465.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & slightly sandy in part, trace pyritic with abundant pyrite nodules with 5% Sandstone stringers as above.
465.00 to 470.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & trace sandy in part, trace pyritic, trace pyrite nodules.
470.00 to 475.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & trace sandy in part, trace pyritic with minor Sandstone stringers as above with Sandstone medium gray, very fine grained, sub angular, well sorted, clay cement, silty, shaly, tight, no shows.
475.00 to 480.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & trace sandy in part, trace pyritic, trace pyrite nodules with 5% Sandstone as above.
480.00 to 485.00 (5.00)	100% <b>Shale</b> as above
485.00 to 490.00 (5.00)	100% <b>Shale</b> predominately medium gray, moderately firm, subfissile in part, slightly micromicaceous, minor light gray brown shale (sideritic), trace silty & trace sandy in part, trace pyritic, trace pyrite nodules.
490.00 to 495.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor subfissile, slightly micromicaceous, slightly silty, pyrite nodules, minor gray brown sideritic shale with trace Sandstone laminations as above.
495.00 to 500.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor subfissile, slightly micromicaceous, slightly silty, pyrite nodules, minor gray brown sideritic shale with trace Sandstone laminations as above, trace amber.
500.00 to 505.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor subfissile, slightly micromicaceous, slightly silty, pyrite nodules, minor light gray brown sideritic shale with trace Sandstone laminations as above.



## Sample Descriptions

Storage Units:

Metric

505.00 to 510.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor subfissile, slightly micromicaceous, slightly silty, pyrite nodules, minor light gray brown sideritic shale with trace Sandstone laminations as above.
510.00 to 515.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor subfissile, slightly micromicaceous, slightly silty, pyrite nodules, minor light gray brown sideritic shale with minor Sandstone laminations as above.
515.00 to 520.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, slightly micromicaceous, trace silty, trace pyrite nodules, minor light gray brown sideritic shale.
520.00 to 525.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, trace pyrite nodules, trace minor light gray brown sideritic shale, trace minor Sandstone lenses as above.
525.00 to 530.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, moderately firm, trace pyrite nodules, trace minor light gray brown sideritic shale, trace minor Sandstone lenses as above.
530.00 to 535.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, moderately firm, trace pyrite nodules, trace minor light gray brown sideritic shale, trace minor Sandstone lenses as above.
535.00 to 540.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, moderately firm, trace pyrite nodules, trace minor Sandstone lenses as above.
540.00 to 545.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, moderately firm, trace pyrite nodules, trace minor Sandstone lenses as above.
545.00 to 550.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, silty in part, slightly micromicaceous, moderately firm, trace pyrite nodules, trace minor Sandstone lenses as above.
550.00 to 555.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, increasing subfissile in part, slightly carbonaceous, slightly micromicaceous, trace pyrite, trace unidentifiable fossil fragments.
555.00 to 560.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, increasing subfissile in part, slightly carbonaceous, slightly micromicaceous, trace pyrite, trace inoceramus.



## Sample Descriptions

Storage Units:

Metric

560.00 to 565.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, increasing subfissile in part, slightly carbonaceous, slightly micromicaceous, trace pyrite nodules, trace inoceramus.
565.00 to 570.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, increasing subfissile, increasing carbonaceous, slightly micromicaceous, trace pyrite nodules, inoceramus.
570.00 to 575.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, occasionally subfissile, carbonaceous in part, slightly micromicaceous, trace pyrite nodules, inoceramus.
575.00 to 580.00 (5.00)	100% <b>Shale</b> medium gray, occasionally dark gray, occasionally subfissile, carbonaceous in part, micromicaceous, trace pyrite nodules, inoceramus.
580.00 to 585.00 (5.00)	100% <b>Shale</b> medium gray, occasionally dark gray, occasionally subfissile, carbonaceous in part, micromicaceous, trace pyrite nodules, inoceramus.
585.00 to 590.00 (5.00)	100% <b>Shale</b> medium gray, occasionally dark gray, occasionally subfissile, carbonaceous in part, micromicaceous, trace pyrite nodules, inoceramus.
590.00 to 595.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part, pyrite nodules, inoceramus with trace minor Siltstone laminations, light to medium gray, calcareous & clay cement, trace carbonaceous specks, sandy in part, no visible porosity, no shows.
595.00 to 600.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part, pyrite nodules, inoceramus with trace minor Siltstone laminations, light to medium gray, calcareous & clay cement, trace carbonaceous specks, sandy in part, no visible porosity, no shows.
600.00 to 605.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part with minor Siltstone laminations, light to medium gray, calcareous & clay cement, trace carbonaceous specks, no visible porosity, no shows.
605.00 to 610.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part with minor Siltstone laminations, light to medium gray, calcareous & clay cement, trace carbonaceous specks, no visible porosity, no shows.
610.00 to 615.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part, trace pyrite with minor Siltstone laminations, light to medium gray, calcareous & clay cement, trace carbonaceous specks, no visible porosity, no shows. Minor 5% cement in sample.



## Sample Descriptions

Storage Units:

Metric

615.00 to 620.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part with minor Siltstone stringers & laminations as above.
620.00 to 625.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous in part, occasionally micromicaceous, slightly silty in part.
625.00 to 630.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace pyrite, trace inoceramus., poor trace siltstone laminations as above.
630.00 to 635.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace pyrite, trace inoceramus., poor trace siltstone laminations as above.
635.00 to 640.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace pyrite, trace inoceramus., poor trace siltstone laminations as above.
640.00 to 645.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace pyrite, trace inoceramus., poor trace siltstone laminations as above.
645.00 to 650.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace pyrite, trace inoceramus., poor trace siltstone laminations as above.
650.00 to 655.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus., poor trace siltstone laminations as above.
655.00 to 660.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus., trace Siltstone stringers light to medium gray, calcareous & clay cement, tight, no show.
660.00 to 665.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus., poor trace siltstone laminations as above.
665.00 to 670.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus, poor trace siltstone laminations as above.



## Sample Descriptions

Storage Units:

Metric

670.00 to 675.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus, poor trace siltstone laminations as above.
675.00 to 680.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus, poor trace siltstone laminations as above.
680.00 to 685.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, inoceramus.
685.00 to 690.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace slightly sideritic in part, inoceramus.
690.00 to 695.00 (5.00)	100% <b>Shale</b> as above with trace minor Limestone laminations, mottled crn white, soft, chly, (fractures?) dense.
695.00 to 700.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, good trace inoceramus.
700.00 to 705.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, good trace inoceramus, trace small fractures infilled with white calcite & cream chalky limestone in part.
705.00 to 710.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, good trace inoceramus, trace small fractures infilled with white calcite.
710.00 to 715.00 (5.00)	100% <b>Shale</b> as above , poor trace pyrite with trace minor light gray claystone laminations, soft, waxy.
715.00 to 720.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite, inoceramus, trace minor fractures as above.
720.00 to 725.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, good trace inoceramus, trace small fractures as above
725.00 to 730.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, inoceramus, trace minor micro fractures infilled with calcite as above.
730.00 to 735.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, inoceramus, trace minor micro fractures infilled with calcite as above.



## Sample Descriptions

Storage Units:

Metric

735.00 to 740.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, inoceramus, trace minor micro fractures infilled with calcite as above.
740.00 to 745.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, inoceramus, trace minor micro fractures infilled with calcite as above.
745.00 to 750.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, inoceramus, trace minor micro fractures infilled with calcite as above.
750.00 to 755.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace inoceramus.
755.00 to 760.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace inoceramus, poor trace fractures as above.
760.00 to 765.00 (5.00)	100% <b>Shale</b> as above, minor Claystone laminations, light gray, sandy, slightly calcareous, occasional abundant mics flakes, grades to clayey sandstone in part.
765.00 to 770.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace inoceramus with minor Claystone as above.
770.00 to 775.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace inoceramus with poor trace Claystone laminations, light gray, soft, waxy, trace sandy as above.
775.00 to 780.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly carbonaceous, occasionally slightly micromicaceous, trace inoceramus, trace pyrite nodules with trace minor Claystone laminations or lenses as above.
780.00 to 785.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly waxy texture in part, slightly micromicaceous in part, slightly carbonaceous, occasionally slightly sideritic with trace minor claystone stringers as above, sandy as above. Poor trace light green shale, waxy texture.
785.00 to 790.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile, slightly waxy texture in part, slightly micromicaceous in part, slightly carbonaceous, becoming slightly silty in part, trace pyrite nodules, occasionally slightly sideritic with trace minor claystone stringers as above, sandy as above.



## Sample Descriptions

Storage Units:

Metric

790.00 to 795.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile, slightly waxy texture in part, slightly micromicaceous in part, slightly carbonaceous, slightly silty in part, trace pyrite nodules, occasionally slightly sideritic with occasional brown siderite fragments with trace light gray brown sideritic claystone laminations.
795.00 to 800.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile in part, slightly micromicaceous in part, slightly carbonaceous, poor trace silty in part, trace pyrite nodules, occasionally slightly sideritic with occasional brown siderite fragments.
800.00 to 805.00 (5.00)	100% <b>Shale</b> medium with minor dark gray, subfissile in part, slightly micromicaceous in part, slightly carbonaceous, slightly silty in part, trace pyrite nodules & disseminated pyrite, occasionally slightly sideritic with occasional brown siderite fragments.
805.00 to 810.00 (5.00)	100% <b>Shale</b> medium with minor dark gray, subfissile in part, slightly micromicaceous in part, slightly carbonaceous, slightly silty in part, trace pyrite, occasionally slightly sideritic with occasional brown siderite fragments.
810.00 to 815.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments (nodules?), trace minor light gray claystone laminations.
815.00 to 820.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments (nodules?) trace minor light gray claystone laminations as above.
820.00 to 825.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments (nodules?)
825.00 to 830.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments.
830.00 to 835.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments with trace minor light gray claystone laminations as above.
835.00 to 840.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments.



## Sample Descriptions

Storage Units:

Metric

840.00 to 845.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments.
845.00 to 850.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments.
850.00 to 855.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, occasionally sideritic with trace brown siderite fragments with trace minor light green shale laminations, soft, waxy texture.
855.00 to 860.00 (5.00)	100% <b>Shale</b> as above with trace Limestone stringers buff, mudstone to wackestone, occasionally chalky, no visible porosity or show
860.00 to 865.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, poor trace sideritic.
865.00 to 870.00 (5.00)	100% <b>Shale</b> as above with trace Limestone stringers as above.
870.00 to 875.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, subfissile, slightly micromicaceous, slightly sideritic in part, trace pyrite nodules, poor trace minor limestone lenses as above.
875.00 to 880.00 (5.00)	100% <b>Shale</b> as above, trace inoceramus.
880.00 to 885.00 (5.00)	70% <b>Shale</b> as above, becoming sandy in part.
	30% <b>Sandstone</b> cream to very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, trace dark lithic grains, calcareous & kaolin cement, silty, grades to sandy siltstone in part, poor trace pyritic, occasionally glauconitic, no visible porosity, no shows.
885.00 to 890.00 (5.00)	70% <b>Shale</b> as above
	30% <b>Sandstone</b> cream to very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, trace dark lithic grains, calcareous & kaolin cement, silty, grades to sandy siltstone in part, poor trace pyritic, occasionally glauconitic, no visible porosity, no shows.



## Sample Descriptions

Storage Units:

Metric

890.00 to 895.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, trace sandy, sandy in part with 5% Sandstone stringers as above.
895.00 to 900.00 (5.00)	100% <b>Shale</b> medium gray, minor dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, trace sandy, sandy in part, trace sideritic with minor Sandstone stringers as above.
900.00 to 905.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, trace sandy, sandy in part, trace brown siderite fragments.
905.00 to 910.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace pyrite nodules, trace sandy, sandy in part
910.00 to 915.00 (5.00)	100% <b>Shale</b> as above
915.00 to 920.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, trace white coarse crystalline calcite (fractures)
920.00 to 925.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile, slightly micromicaceous, slightly carbonaceous, poor trace sideritic, slightly waxy texture in part.
925.00 to 930.00 (5.00)	100% <b>Shale</b> as above with minor Sandstone light gray, very fine grained, sub angular, well sorted, calcareous & clay cement, glauconitic, silty, shaly in part, slightly sideritic in part, no visible porosity, no shows.
930.00 to 935.00 (5.00)	80% <b>Sandstone</b> light gray, very fine grained, sub angular, well sorted, calcareous & clay cement, glauconitic, silty, shaly in part, slightly sideritic in part, no visible porosity, no shows, minor frosted calcite in sample from fractures
	20% <b>Shale</b> as above
935.00 to 940.00 (5.00)	70% <b>Sandstone</b> light gray, very fine grained, sub angular, well sorted, calcareous & clay cement, glauconitic, silty, shaly in part, slightly sideritic in part, no visible porosity, no shows. trace minor calcite as above.
	30% <b>Shale</b> as above



## Sample Descriptions

Storage Units:

Metric

940.00 to 945.00 (5.00)	70% <b>Sandstone</b> light gray, very fine grained, sub angular, well sorted, calcareous & clay cement, glauconitic, silty, shaly in part, slightly sideritic in part, no visible porosity, no shows.
	30% <b>Shale</b> medium to occasionally dark gray, carbonaceous in part, slightly micromicaceous, occasionally silty, trace sandy, trace glauconitic.
945.00 to 950.00 (5.00)	80% <b>Shale</b> medium to occasionally dark gray, subfissile in part, carbonaceous in part, slightly micromicaceous, trace silty in part.
	20% <b>Sandstone</b> as above, grades to siltstone in part.
950.00 to 955.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, subfissile in part, carbonaceous in part, slightly micromicaceous, trace silty in part with minor Sandstone as above.
955.00 to 960.00 (5.00)	60% <b>Sandstone</b> light to medium gray, very fine grained, sub angular, moderately well sorted, calcareous & clay cement, silty, shaly in part, grades to sandy siltstone in part, glauconitic, trace sideritic, no visible porosity, no shows.
	40% <b>Shale</b> medium to occasionally dark gray, subfissile in part, carbonaceous in part, slightly micromicaceous, silty in part, sandy in part.
960.00 to 965.00 (5.00)	50% <b>Sandstone</b> light to medium gray, very fine grained, sub angular, moderately well sorted, calcareous & clay cement, silty, shaly in part, grades to sandy siltstone in part, glauconitic, trace sideritic, no visible porosity, no shows.
	50% <b>Shale</b> as above, trace pyrite nodules.
965.00 to 970.00 (5.00)	100% <b>Shale</b> medium gray, gray green, subfissile, slightly micromicaceous, slightly waxy texture.
970.00 to 975.00 (5.00)	100% <b>Shale</b> medium gray, gray green, subfissile, slightly micromicaceous, slightly waxy texture with minor Sandstone stringers as above.
975.00 to 980.00 (5.00)	100% <b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part.
980.00 to 985.00 (5.00)	100% <b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part.



## Sample Descriptions

Storage Units:

Metric

985.00 to 990.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part.
990.00 to 995.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part.
995.00 to 1,000.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part.
1,000.00 to 1,005.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement, shaly, tight, no shows.
1,005.00 to 1,010.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement, shaly, tight, no shows.
1,010.00 to 1,015.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement, shaly, tight, no shows.
1,015.00 to 1,020.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement; shaly, tight, no shows.
1,020.00 to 1,025.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement, shaly, tight, no shows.
1,025.00 to 1,030.00 (5.00)	100%	<b>Shale</b> medium gray, gray green in part, trace red brown, platy, subfissile, slightly micromicaceous, trace silty in part with occasional 5% interbedded Sandstone stringers, light to medium gray, gray green, very fine grained, sub angular, well sorted, calcareous & clay cement, shaly, tight, no shows.
1,030.00 to 1,035.00 (5.00)	100%	<b>Shale</b> light to medium gray, subfissile in part, slightly micromicaceous, occasionally silty, slightly calcareous in part, grades to shaly silty in part, trace frosted calcite (minor fractures) trace minor light gray claystone stringers, trace minor Sandstone stringers as above.



## Sample Descriptions

Storage Units:

Metric

- 1,035.00 to 1,040.00 100% **Shale**  
(5.00) light to medium gray, subfissile in part, slightly micromicaceous, occasionally silty, slightly calcareous in part, grades to shaly silty in part, trace frosted calcite (minor fractures) trace minor light gray claystone stringers, trace minor Sandstone stringers as above.
- 1,040.00 to 1,045.00 70% **Shale**  
(5.00) light to medium gray, subfissile in part, slightly micromicaceous, occasionally silty, slightly calcareous in part, grades to shaly silty in part, trace minor light gray claystone stringers.
- 30% **Sandstone**  
light gray, very fine grained, sub angular, well sorted, calcareous & clay cement, trace dark lithic grains, grades to sandy siltstone in part, silty, shaly, tight, no shows.
- 1,045.00 to 1,050.00 100% **Shale**  
(5.00) predominately medium gray, subfissile in part, slightly micromicaceous, occasionally silty, slightly calcareous in part, grades to shaly silty in part, trace minor Sandstone stringers as above.
- 1,050.00 to 1,055.00 100% **Shale**  
(5.00) predominately medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty with occasional interbedded claystone light gray, soft, slightly calcareous.
- 1,055.00 to 1,060.00 100% **Shale**  
(5.00) predominately medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, slightly sandy in part with occasional interbedded claystone light gray, soft, slightly calcareous.
- 1,060.00 to 1,065.00 70% **Shale**  
(5.00) as above, trace frosted calcite (minor fractures)
- 30% **Sandstone**  
light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly, poor trace glauconitic, trace dark lithic grains, occasionally grades to sandy siltstone, no visible porosity, no shows.
- 1,065.00 to 1,070.00 80% **Shale**  
(5.00) predominately medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, trace sandy with occasional interbedded claystone light gray, soft, slightly calcareous.
- 20% **Sandstone**  
as above
- 1,070.00 to 1,075.00 100% **Shale**  
(5.00) light to medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, trace sandy with occasional interbedded claystone light gray, soft, slightly calcareous.



## Sample Descriptions

Storage Units:

Metric

1,075.00 to 1,080.00 (5.00)	100%	<b>Shale</b> light to medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, trace sandy with occasional interbedded claystone light gray, soft, slightly calcareous, grades to marlstone in part.
1,080.00 to 1,085.00 (5.00)	100%	<b>Shale</b> light to medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, trace sandy with occasional interbedded claystone light gray, soft, slightly calcareous, grades to marlstone in part.
1,085.00 to 1,090.00 (5.00)	90%	<b>Shale</b> light to medium gray, subfissile in part, slightly micromicaceous, occasional slightly waxy texture, occasionally silty, trace sandy with occasional interbedded claystone light gray, soft, slightly calcareous, grades to marlstone in part.
	10%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally shaly, no visible porosity or shows.
1,090.00 to 1,095.00 (5.00)	60%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally shaly, no visible porosity or shows.
	40%	<b>Shale</b> as above
1,095.00 to 1,100.00 (5.00)	80%	<b>Shale</b> as above with abundant cream claystone, soft, calcareous, grades to marlstone in part, occasionally sandy & slightly silty.
	20%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally shaly, no visible porosity or shows.
1,100.00 to 1,105.00 (5.00)	50%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, grades to sandy siltstone in part, occasionally shaly, no visible porosity or shows.
	50%	<b>Shale</b> as above
1,105.00 to 1,110.00 (5.00)	80%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally grades to sandy siltstone in part, occasionally shaly, no visible porosity or shows.
	20%	<b>Shale</b> as above



## Sample Descriptions

Storage Units:

Metric

- 
- |                                |     |   |
|--------------------------------|-----|---|
| 1,110.00 to 1,115.00<br>(5.00) | 70% | <b>Sandstone</b><br>as above, occasional red brown sandstone, ferruginous, trace frosted calcite in sample indicating fractures.  |
|                                | 30% | <b>Shale</b><br>as above with minor red brown shale, ferruginous, occasionally very silty & sandy.  |
| 1,115.00 to 1,120.00<br>(5.00) | 50% | <b>Sandstone</b><br>light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally shaly, no visible porosity or shows.  |
|                                | 50% | <b>Shale</b><br>light to medium gray, subfissile in part, slightly micromicaceous, occasionally silty & sandy, grades to shaly siltstone & sandstone in part, good trace frosted calcite from small fractures closed @ depth? or vugs in sandstone.   |
| 1,120.00 to 1,125.00<br>(5.00) | 50% | <b>Sandstone</b><br>light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, trace minor dark lithic grains, silty, occasionally shaly, slightly sideritic in part, no visible porosity or shows.                          |
|                                | 50% | <b>Shale</b><br>as above  |
| 1,125.00 to 1,130.00<br>(5.00) | 80% | <b>Shale</b><br>medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, occasional interbedded light gray & rust gray claystone, very soft, occasionally grades to marlstone in part, frosted calcite in sample as before.       |
|                                | 20% | <b>Sandstone</b><br>as above  |
| 1,130.00 to 1,135.00<br>(5.00) | 80% | <b>Shale</b><br>medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, occasional interbedded light gray & rust gray claystone, very soft, occasionally grades to marlstone in part, trace frosted calcite in sample as before. |
|                                | 20% | <b>Sandstone</b><br>as above with minor rust colored sandstone as above.  |
| 1,135.00 to 1,140.00<br>(5.00) | 90% | <b>Shale</b><br>medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, occasional interbedded light gray claystone, very soft, occasionally grades to marlstone in part.  |
|                                | 10% | <b>Sandstone</b><br>as above  |



## Sample Descriptions

Storage Units:

Metric

- 1,140.00 to 1,145.00 90% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, occasional interbedded light gray claystone, very soft, occasionally grades to marlstone in part.
- 10% **Sandstone**  
as above
- 1,145.00 to 1,150.00 100% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, occasional interbedded light gray claystone, very soft, occasionally grades to marlstone in part with minor Sandstone stringers as above.
- 1,150.00 to 1,155.00 100% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, trace claystone as above with minor interbedded Sandstone stringers as above.
- 1,155.00 to 1,160.00 100% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, trace claystone as above with 10% interbedded Sandstone stringers as above.
- 1,160.00 to 1,165.00 100% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, grades to shaly siltstone in part, slightly micromicaceous, trace claystone as above with minor interbedded Sandstone stringers as above.
- 1,165.00 to 1,170.00 100% **Shale**  
(5.00) as above, trace minor red gray ferruginous shale stringers.
- 1,170.00 to 1,175.00 100% **Shale**  
(5.00) medium gray with minor light & darker gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous, trace claystone as above with minor interbedded Sandstone stringers as above.
- 1,175.00 to 1,180.00 100% **Shale**  
(5.00) as above with 10-15% Sandstone stringers cream to light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, trace dark lithic grains, silty, shaly, tight, no shows.
- 1,180.00 to 1,185.00 100% **Shale**  
(5.00) medium to dark gray, subfissile in part, occasionally silty & sandy, slightly micromicaceous with 15% Sandstone cream to light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, trace dark lithic grains, silty, shaly, tight, no shows.
- 1,185.00 to 1,190.00 100% **Shale**  
(5.00) light to medium gray, minor dark gray as above.
- 1,190.00 to 1,195.00 100% **Shale**  
(5.00) as above, abundant light gray claystone.



## Sample Descriptions

Storage Units:

Metric

1,195.00 to 1,200.00 (5.00)	100%	<b>Shale</b> medium to dark gray, subfissile in part, slightly carbonaceous, slightly micromicaceous, silty & trace sandy in part, occasionally grades to shaly siltstone in part with 5% Sandstone stringers as above.
1,200.00 to 1,205.00 (5.00)	90%	<b>Sandstone</b> cream, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, poor trace dark lithic grains, poor trace arkosic, no visible porosity or shows.
	10%	<b>Shale</b> as above
1,205.00 to 1,210.00 (5.00)	40%	<b>Siltstone</b> light to medium gray, slightly calcareous & clay cement, occasionally sandy, grades to very fine grained sandstone in part, shaly, trace dark lithic grains, tight, no shows.
	30%	<b>Sandstone</b> as above
	30%	<b>Shale</b> medium gray, blocky, silty, slightly micromicaceous, grades to siltstone in part.
1,210.00 to 1,215.00 (5.00)	40%	<b>Shale</b> as above
	40%	<b>Siltstone</b> as above
	20%	<b>Sandstone</b> as above
1,215.00 to 1,220.00 (5.00)	50%	<b>Siltstone</b> light to medium gray, clay cement, calcareous in part, shaly, sandy, grades to very fine grained sandstone in part, trace dark lithic grains, tight, no shows.
	30%	<b>Shale</b> medium gray, subfissile in part, slightly micromicaceous, slightly carbonaceous in part, occasionally very silty, trace sandy.
	20%	<b>Sandstone</b> as above
1,220.00 to 1,225.00 (5.00)	40%	<b>Sandstone</b> light to medium gray, very fine grained, sub angular, moderately well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly, trace dark lithic grains, grades to sandy shale in part, tight, no shows.
	40%	<b>Shale</b> as above, trace red brown shale



## Sample Descriptions

Storage Units:

Metric

1,220.00 to 1,225.00 (5.00)	20%	<b>Siltstone</b> as above
1,225.00 to 1,230.00 (5.00)	50%	<b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally very silty, trace sandy, slightly micromicaceous, slightly waxy texture in part.
	30%	<b>Sandstone</b> as above
	20%	<b>Siltstone</b> as above
1,230.00 to 1,235.00 (5.00)	50%	<b>Sandstone</b> light gray, very fine grained, sub angular as above, grades to siltstone in part
	50%	<b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally very silty, trace sandy, slightly micromicaceous, slightly waxy texture in part.
1,235.00 to 1,240.00 (5.00)	100%	<b>Sandstone</b> very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly in part, trace dark lithic grains, poor trace glauconitic, grades to siltstone, tight, no shows.
1,240.00 to 1,245.00 (5.00)	90%	<b>Sandstone</b> as above
	10%	<b>Shale</b> as above
1,245.00 to 1,250.00 (5.00)	80%	<b>Sandstone</b> very light gray, very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly in part, trace dark lithic grains, poor trace glauconitic, grades to siltstone, tight, no shows.
	20%	<b>Shale</b> as above
1,250.00 to 1,255.00 (5.00)	90%	<b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally very silty, trace sandy, slightly micromicaceous, slightly waxy texture in part.
	10%	<b>Sandstone</b> as above
1,255.00 to 1,260.00 (5.00)	90%	<b>Shale</b> medium to occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally very silty, trace sandy, slightly micromicaceous, slightly waxy texture in part.



## Sample Descriptions

Storage Units:

Metric

1,255.00 to 1,260.00 (5.00)	10%	<b>Sandstone</b> as above
1,260.00 to 1,265.00 (5.00)	60%	<b>Sandstone</b> very light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly, trace dark lithic grains, tight, no shows.
	40%	<b>Shale</b> light to medium gray, occasionally dark gray, subfissile in part, slightly carbonaceous in part, occasionally very silty, trace sandy, slightly micromicaceous, slightly waxy texture in part, trace sideritic.
1,265.00 to 1,270.00 (5.00)	90%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	10%	<b>Shale</b> as above
1,270.00 to 1,275.00 (5.00)	90%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	10%	<b>Shale</b> as above
1,275.00 to 1,280.00 (5.00)	100%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows with Shale laminations as above.
1,280.00 to 1,285.00 (5.00)	70%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows. Occasionally grades to sandy Siltstone in part.
	30%	<b>Shale</b> light to medium gray, blocky, very silty, sandy in part, slightly micromicaceous,
1,285.00 to 1,290.00 (5.00)	80%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	20%	<b>Shale</b> as above



## Sample Descriptions

Storage Units:

Metric

1,290.00 to 1,295.00 (5.00)	80%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	20%	<b>Shale</b> as above
1,295.00 to 1,300.00 (5.00)	70%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	30%	<b>Shale</b> light gray, very fine grained, sub angular, moderately well sorted, sub angular, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
1,300.00 to 1,305.00 (5.00)	80%	<b>SANDSTONE</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows.
	20%	<b>Shale</b> as above
1,305.00 to 1,310.00 (5.00)	80%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows. Grades to sandy Siltstone in part.
	20%	<b>Shale</b> as above
1,310.00 to 1,315.00 (5.00)	60%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows. Grades to sandy Siltstone in part.
	40%	<b>Shale</b> medium gray, blocky, silty, sandy, slightly micromicaceous in part, occasionally grades to shaly siltstone in part.
1,315.00 to 1,320.00 (5.00)	70%	<b>Shale</b> as above
	30%	<b>Sandstone</b> light to medium gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, tight, no shows. Grades to sandy Siltstone in part.
1,320.00 to 1,325.00 (5.00)	70%	<b>Shale</b> as above



## Sample Descriptions

Storage Units:

Metric

1,320.00 to 1,325.00 (5.00)	30%	<b>Sandstone</b> light to medium gray as above.
1,325.00 to 1,330.00 (5.00)	100%	<b>Shale</b> medium gray, blocky, silty, sandy in part, slightly micromicaceous, grades to shaly siltstone in part.
1,330.00 to 1,335.00 (5.00)	100%	<b>Shale</b> medium gray, blocky, silty, sandy in part, slightly micromicaceous, grades to shaly siltstone in part.
1,335.00 to 1,340.00 (5.00)	100%	<b>Shale</b> medium gray, blocky, silty, sandy in part, slightly micromicaceous, grades to shaly siltstone in part.
1,340.00 to 1,345.00 (5.00)	100%	<b>Shale</b> medium gray, blocky, silty, sandy in part, slightly micromicaceous, grades to shaly siltstone in part with 10% Sandstone as above.
1,345.00 to 1,350.00 (5.00)	80%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, trace frosted calcite (fractures)no visible porosity, no shows.
	20%	<b>Shale</b> medium gray, blocky, silty, sandy in part, slightly micromicaceous, grades to shaly siltstone in part.
1,350.00 to 1,355.00 (5.00)	60%	<b>Sandstone</b> light gray, very fine grained, sub angular, moderately well sorted, quartz & light colored, calcareous & clay cement, trace glauconitic, silty, shaly in part, trace dark lithic grains, trace frosted calcite (fractures)no visible porosity, no shows.
	40%	<b>Shale</b> as above
1,355.00 to 1,360.00 (5.00)	80%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part.
	20%	<b>Sandstone</b> as above
1,360.00 to 1,365.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 10% Sandstone as above.
1,365.00 to 1,370.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part.



## Sample Descriptions

Storage Units:

Metric

1,370.00 to 1,375.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part.
1,375.00 to 1,380.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,380.00 to 1,385.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,385.00 to 1,390.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,390.00 to 1,395.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,395.00 to 1,400.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,400.00 to 1,405.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,405.00 to 1,410.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with 5% Sandstone stringers as above.
1,410.00 to 1,415.00 (5.00)	100%	<b>Shale</b> medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with occasional light gray Claystone, soft, occasionally silty, slightly calcareous in part, grades to marlstone in part with 5% Sandstone stringers as above.
1,415.00 to 1,420.00 (5.00)	80%	<b>Shale</b> as above
	20%	<b>Sandstone</b> light gray, lower very fine grained, sub angular, well sorted, quartz & light colored chert, calcareous & clay cement, silty, shaly in part, trace dark lithic grains, grades to sandy siltstone in part, tight, no shows



## Sample Descriptions

Storage Units:

Metric

- 1,420.00 to 1,425.00 100% **Shale**  
(5.00) medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with occasional light gray Claystone, soft, occasionally silty, slightly calcareous in part, grades to marlstone in part with 10% Sandstone stringers as above.
- 1,425.00 to 1,430.00 100% **Shale**  
(5.00) medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with occasional light gray Claystone, soft, occasionally silty, slightly calcareous in part, grades to marlstone in part with 10% Sandstone stringers as above.
- 1,430.00 to 1,435.00 100% **Shale**  
(5.00) medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part with occasional light gray Claystone, soft, occasionally silty, slightly calcareous in part, grades to marlstone in part with 5% Sandstone stringers as above.
- 1,435.00 to 1,440.00 100% **Shale**  
(5.00) medium gray, dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part, trace minor SANDSTONE laminations as above.
- 1,440.00 to 1,445.00 100% **Shale**  
(5.00) medium gray, minor dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part, trace minor SANDSTONE laminations as above.
- 1,445.00 to 1,450.00 100% **Shale**  
(5.00) medium gray, minor dark gray in part, subfissile in part, slightly micromicaceous, occasionally silty, trace sandy, slightly carbonaceous in part, trace minor SANDSTONE laminations as above.
- 1,450.00 to 1,455.00 100% **Shale**  
(5.00) medium gray, minor dark gray, subfissile in part, slightly micromicaceous, trace silty in part with trace frosted calcite in sample (minor fractures?)
- 1,455.00 to 1,460.00 100% **Shale**  
(5.00) medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
- 1,460.00 to 1,465.00 100% **Shale**  
(5.00) medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
- 1,465.00 to 1,470.00 100% **Shale**  
(5.00) medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
- 1,470.00 to 1,475.00 100% **Shale**  
(5.00) medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.



## Sample Descriptions

Storage Units:

Metric

1,475.00 to 1,480.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part, trace frosted calcite in sample
1,480.00 to 1,485.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,485.00 to 1,490.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,490.00 to 1,495.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,495.00 to 1,500.00 (5.00)	100% <b>Shale</b> medium to occasionally dark gray, platy, fissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,500.00 to 1,505.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,505.00 to 1,510.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,510.00 to 1,515.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,515.00 to 1,520.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part.
1,520.00 to 1,525.00 (5.00)	100% <b>Shale</b> as above with minor light gray Claystone stringers.
1,525.00 to 1,530.00 (5.00)	100% <b>Shale</b> medium to dark gray, subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part with minor Claystone stringers as above with trace frosted calcite in sample from possible fractures.
1,530.00 to 1,535.00 (5.00)	100% <b>Shale</b> medium gray with minor dark gray; subfissile, slightly micromicaceous, slightly waxy texture, trace silty in part with minor claystone as above.
1,535.00 to 1,540.00 (5.00)	100% <b>Shale</b> predominately medium gray, platy, subfissile, slightly micromicaceous, poor trace silty in part, trace claystone as above, trace frosted calcite as above.



## Sample Descriptions

Storage Units:

Metric

1,540.00 to 1,545.00 (5.00)	100% <b>Shale</b> predominately medium gray, platy, subfissile, slightly micromicaceous, poor trace silty in part.
1,545.00 to 1,550.00 (5.00)	100% <b>Shale</b> as above.
1,550.00 to 1,555.00 (5.00)	100% <b>Shale</b> predominately medium gray, platy, subfissile, slightly micromicaceous, poor trace silty in part, trace claystone as above, good trace frosted calcite as above.
1,555.00 to 1,560.00 (5.00)	100% <b>Shale</b> predominately medium gray, platy, subfissile, slightly micromicaceous, poor trace silty in part, trace claystone as above, trace frosted calcite as above.
1,560.00 to 1,565.00 (5.00)	100% <b>Shale</b> predominately medium gray, platy, subfissile, slightly micromicaceous, poor trace silty in part, trace claystone as above, trace frosted calcite as above.
1,565.00 to 1,570.00 (5.00)	100% <b>Shale</b> predominately medium gray, subfissile, slightly micromicaceous, poor trace silty in part, trace claystone as above, trace frosted calcite as above.
1,570.00 to 1,575.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.
1,575.00 to 1,580.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.
1,580.00 to 1,585.00 (5.00)	100% <b>Shale</b> predominately medium gray, minor dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.
1,585.00 to 1,590.00 (5.00)	100% <b>Shale</b> predominately medium gray, increasing dark gray, predominately subfissile, slightly micromicaceous, trace silty in part, trace minor frosted cxln calcite (fractures?)
1,590.00 to 1,595.00 (5.00)	100% <b>Shale</b> medium gray, increasing dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.
1,595.00 to 1,600.00 (5.00)	100% <b>Shale</b> medium to dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.
1,600.00 to 1,605.00 (5.00)	100% <b>Shale</b> medium gray, occasional dark gray, predominately subfissile, slightly micromicaceous, trace silty in part.



## Sample Descriptions

Storage Units:

Metric

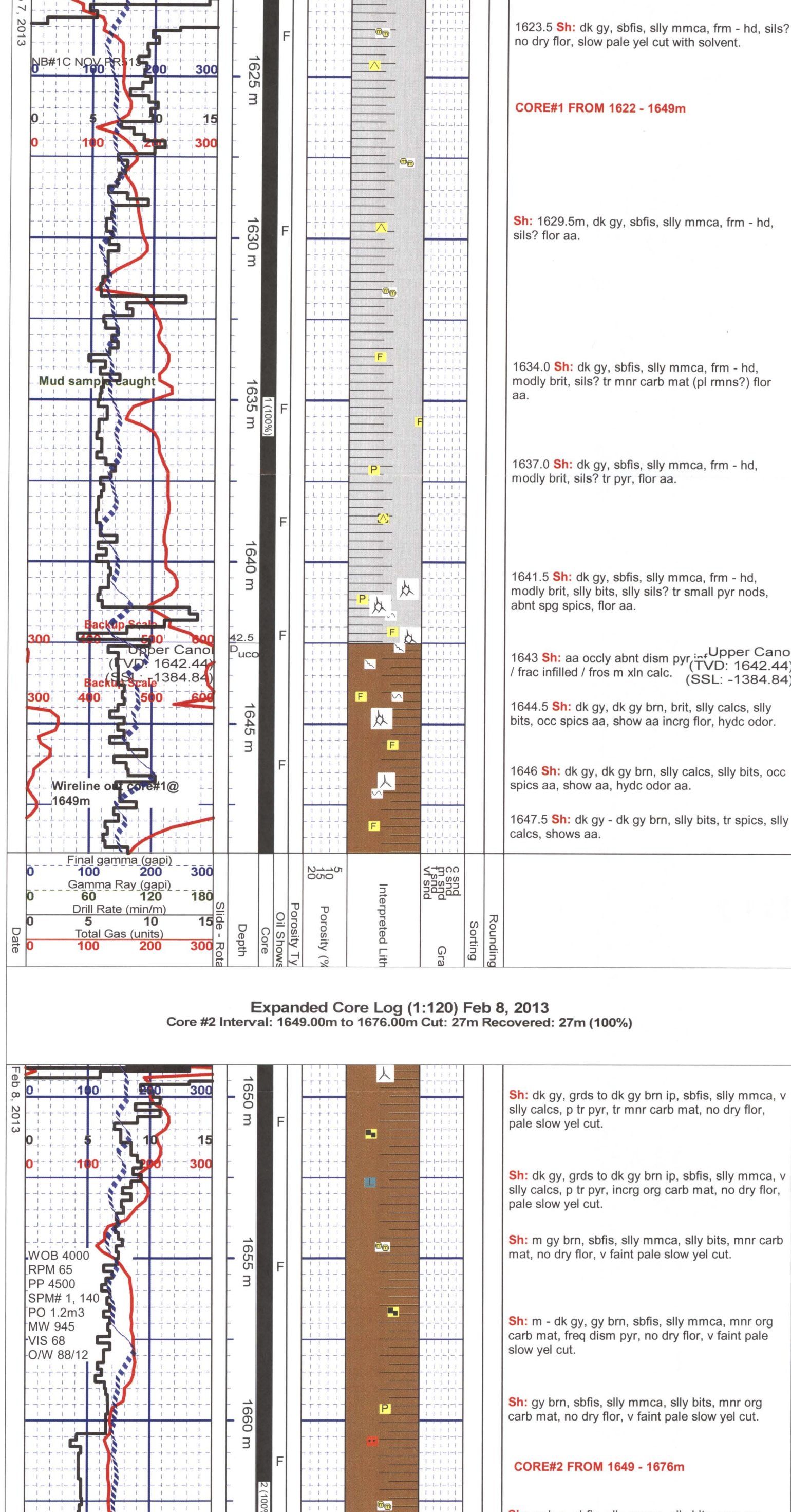
- 
- 1,605.00 to 1,610.00 100% **Shale**  
(5.00) as above
- 1,610.00 to 1,615.00 100% **Shale**  
(5.00) as above with trace calcite as above with trace minor Siltstone stringers, light gray, sandy, clay cement, trace calcareous, grades to very fine grained sandstone in part, tight, no shows.
- 1,615.00 to 1,620.00 100% **Shale**  
(5.00) as above with Shale medium to dark gray brown, blocky, bituminous, soft, calcareous, fluorescence yellow in solvent.
- 1,620.00 to 1,622.00 100% **Shale**  
(2.00) as above, trace pyrite.



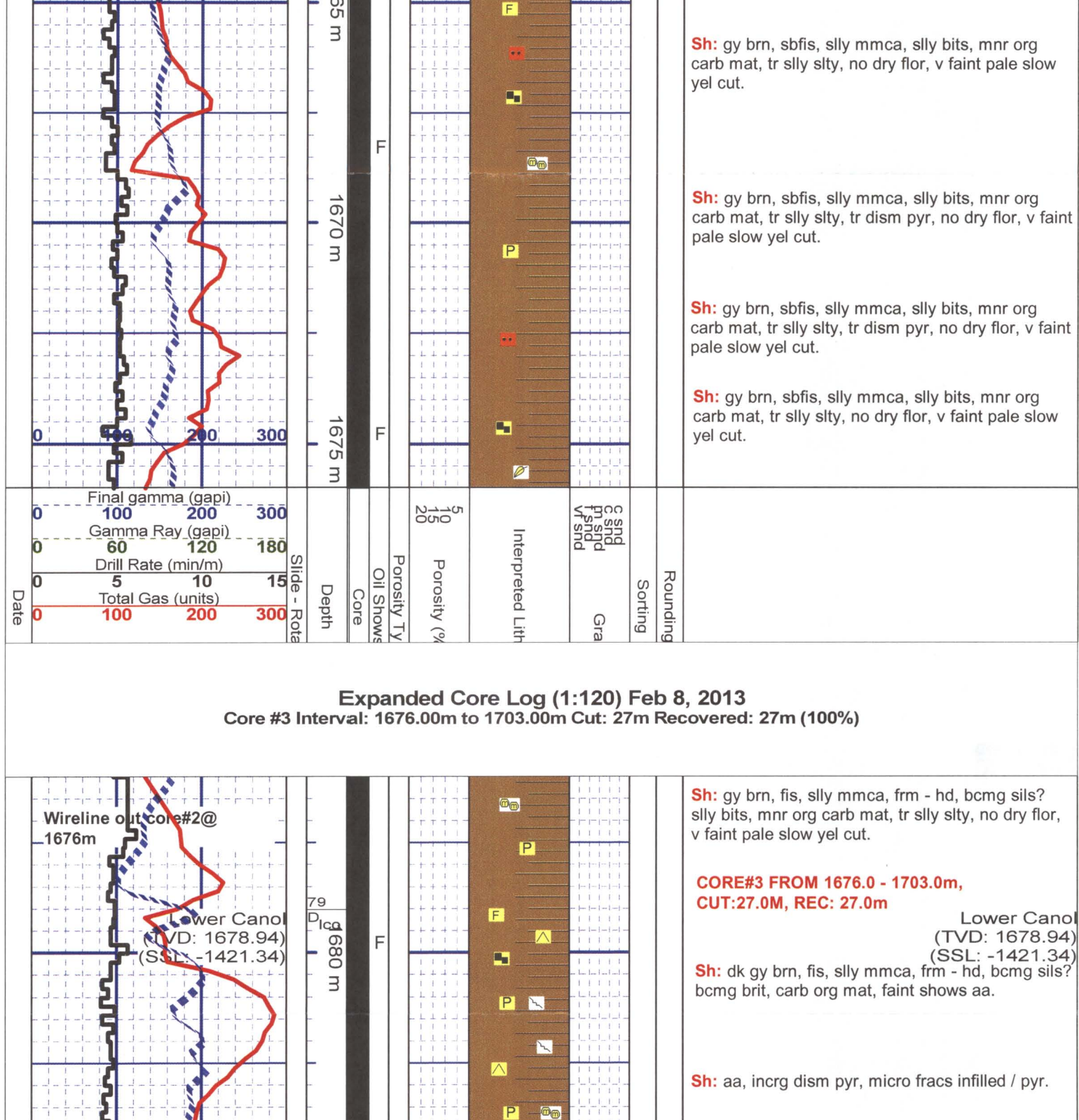




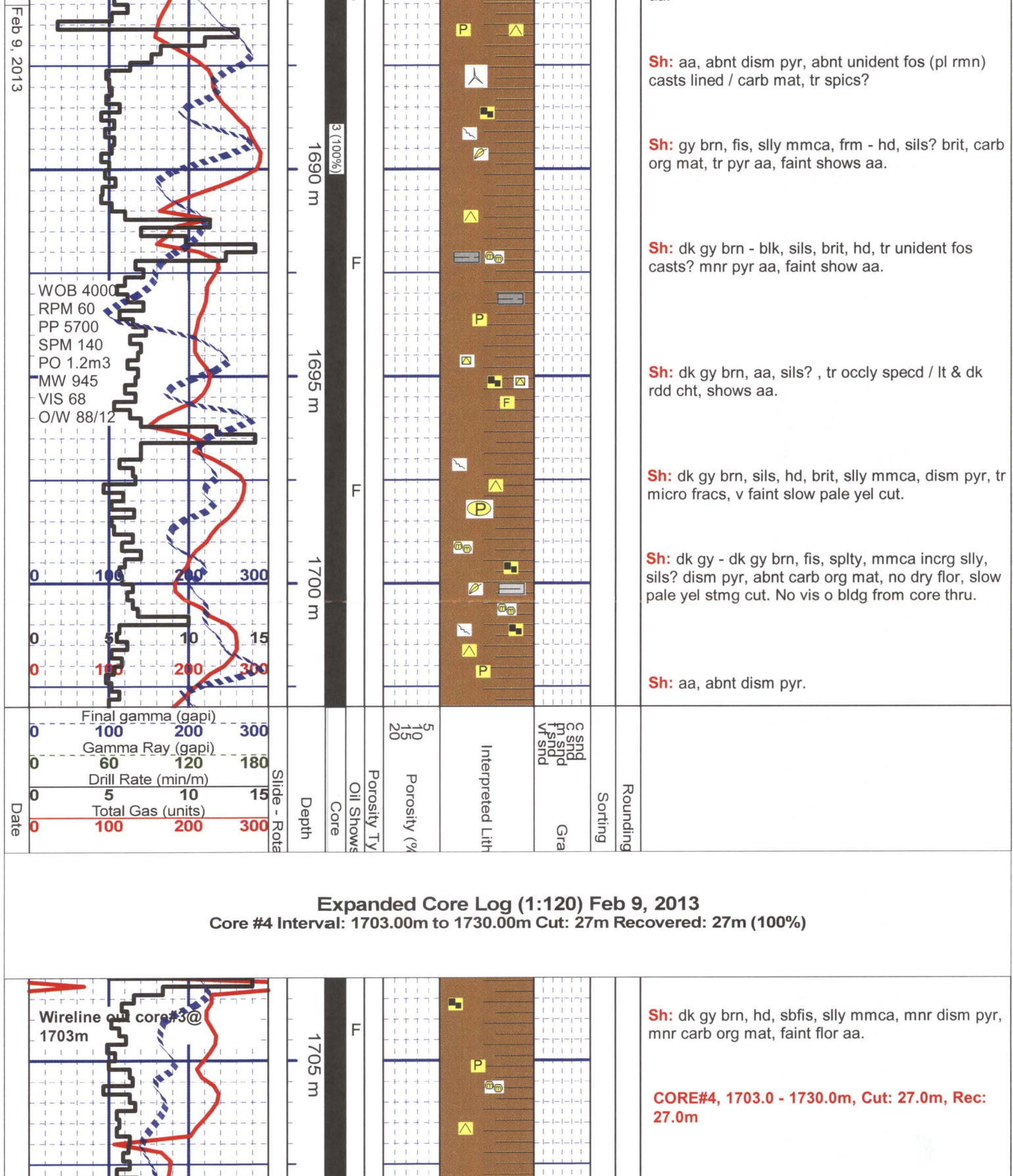
Expanded Core Log (1:120) Feb 7, 2013  
Core #1 Interval: 1622.00m to 1649.00m Cut: 27m Recovered: 27m (100%)



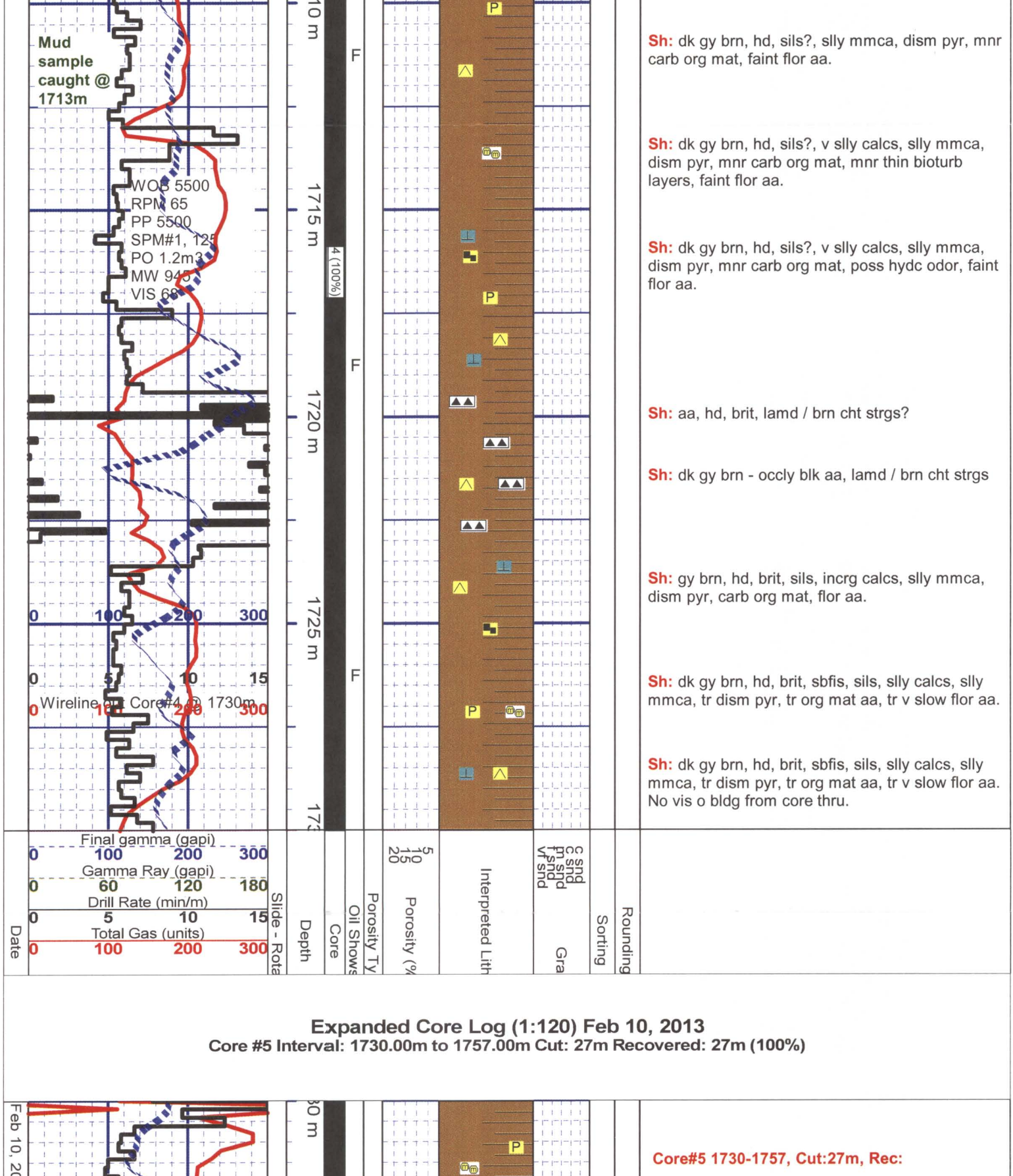
Expanded Core Log (1:120) Feb 8, 2013  
Core #2 Interval: 1649.00m to 1676.00m Cut: 27m Recovered: 27m (100%)



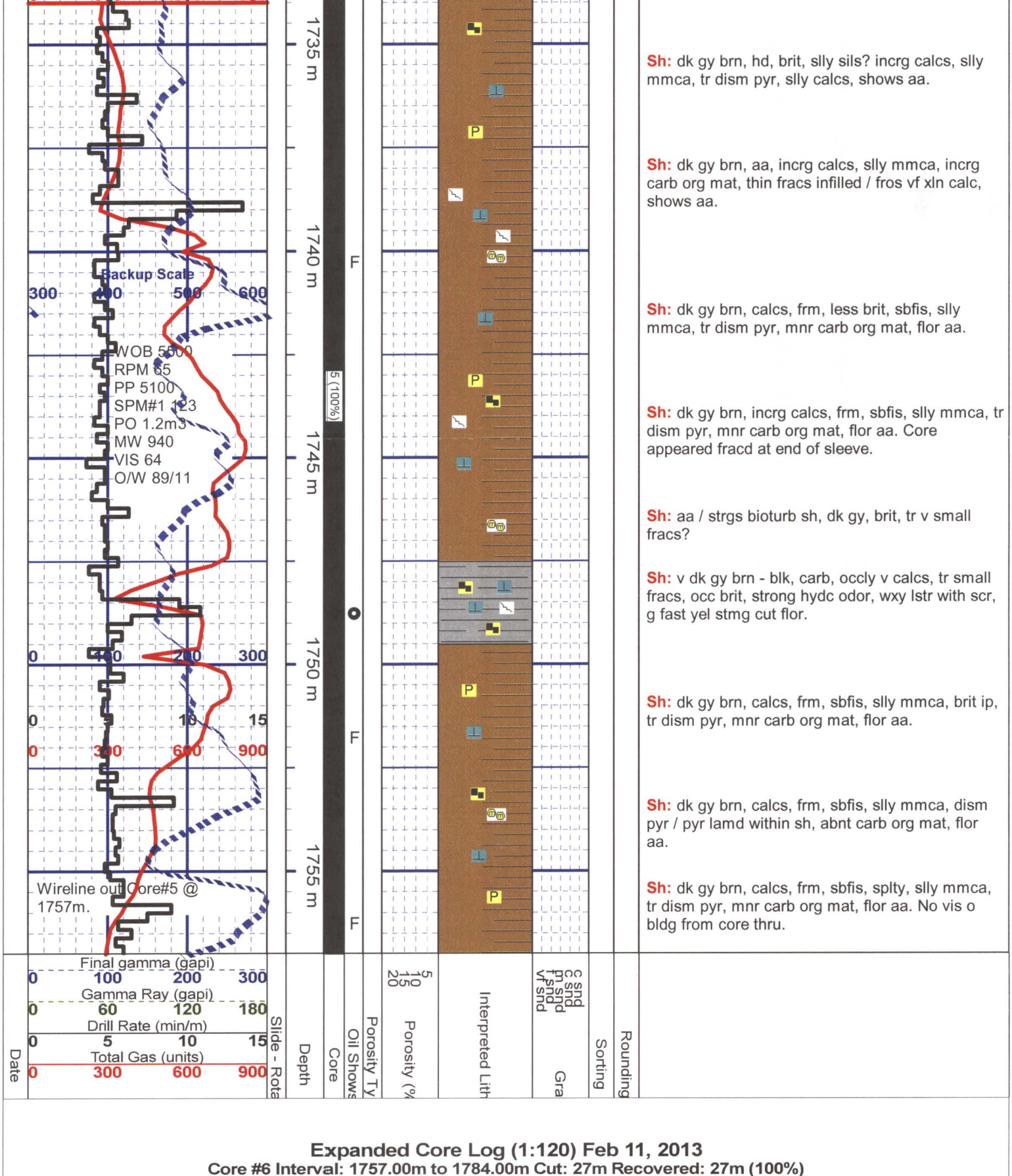
Expanded Core Log (1:120) Feb 8, 2013  
Core #3 Interval: 1676.00m to 1703.00m Cut: 27m Recovered: 27m (100%)



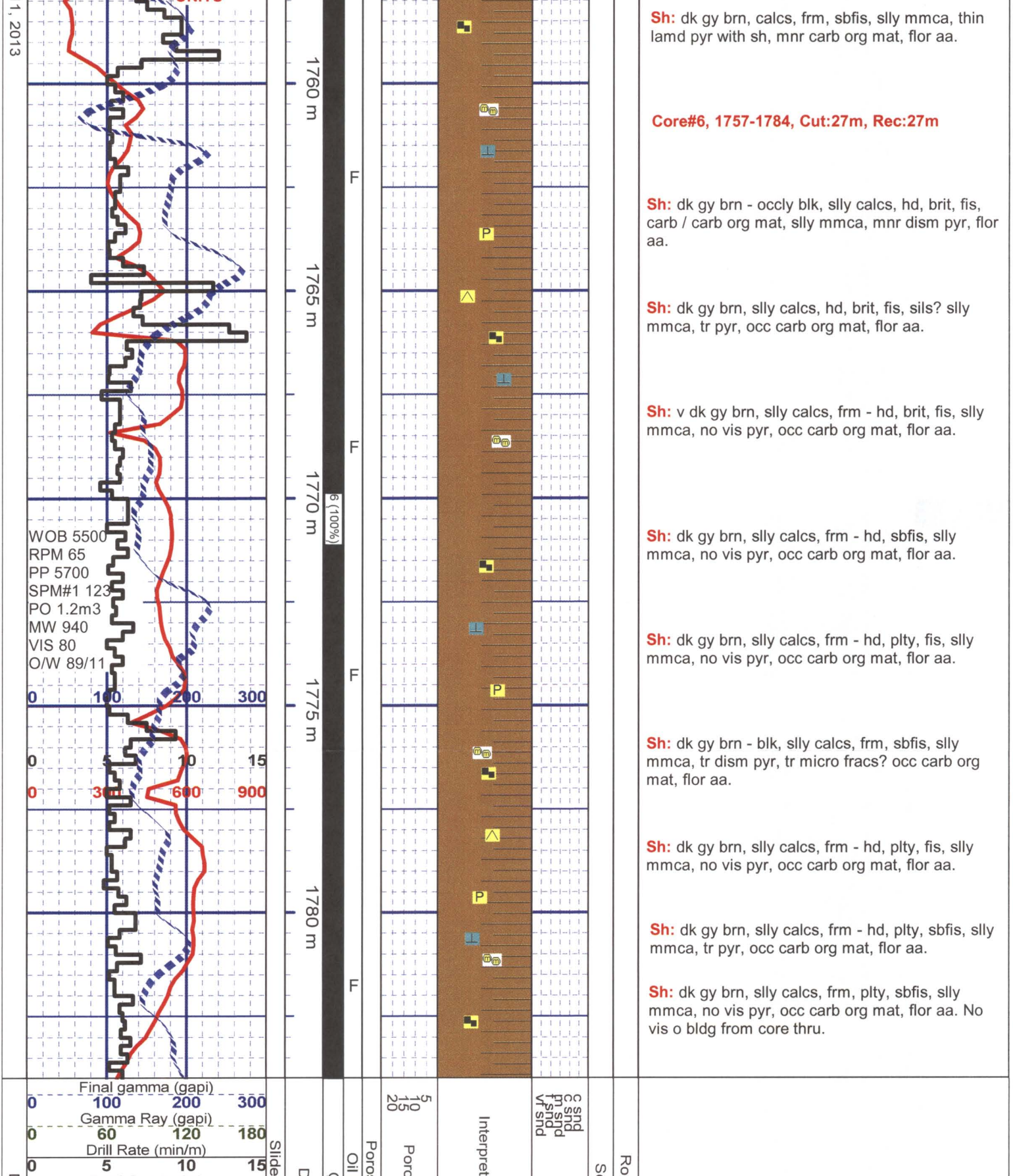
Expanded Core Log (1:120) Feb 9, 2013  
Core #4 Interval: 1703.00m to 1730.00m Cut: 27m Recovered: 27m (100%)



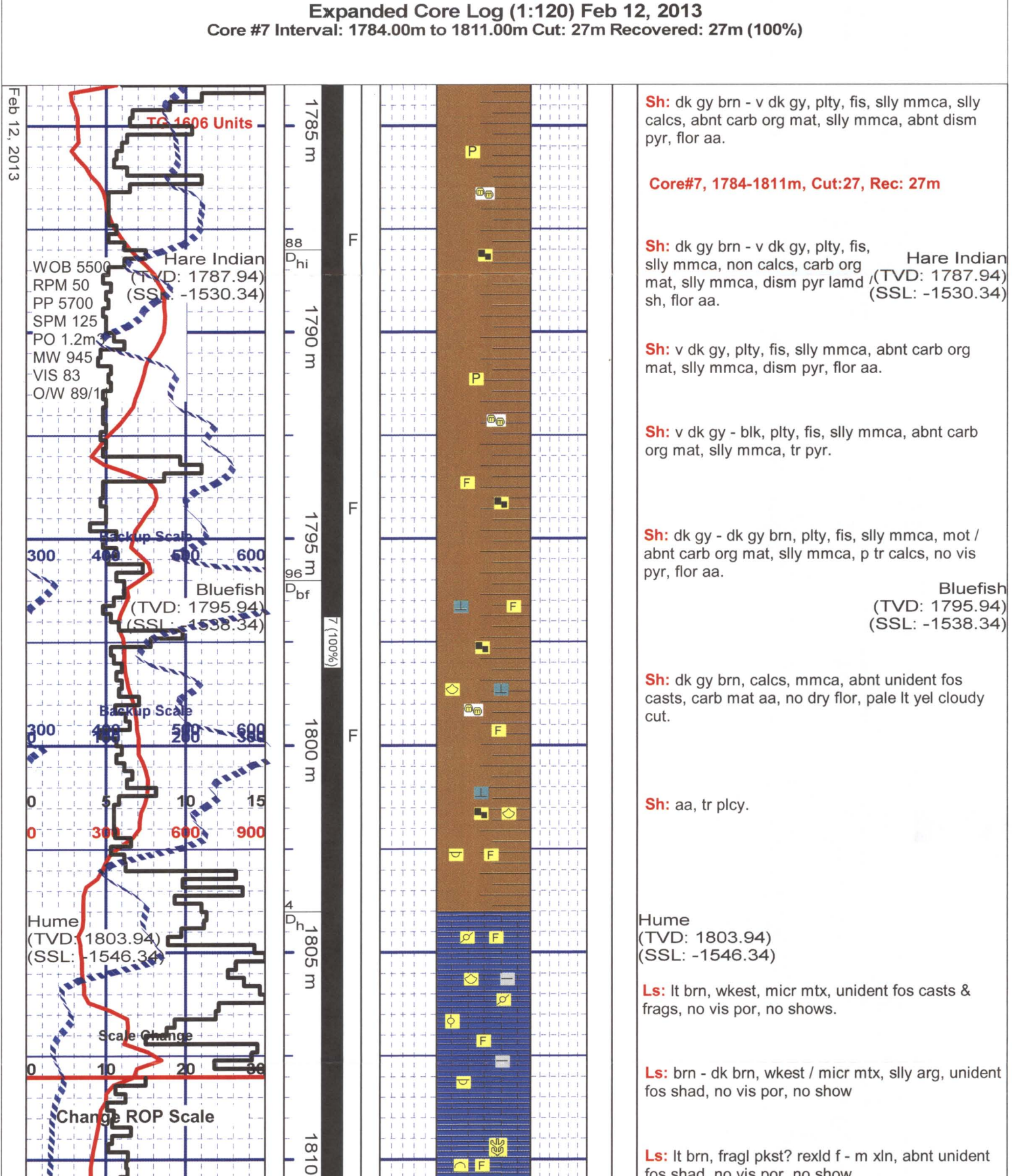
Expanded Core Log (1:120) Feb 10, 2013  
Core #5 Interval: 1730.00m to 1757.00m Cut: 27m Recovered: 27m (100%)



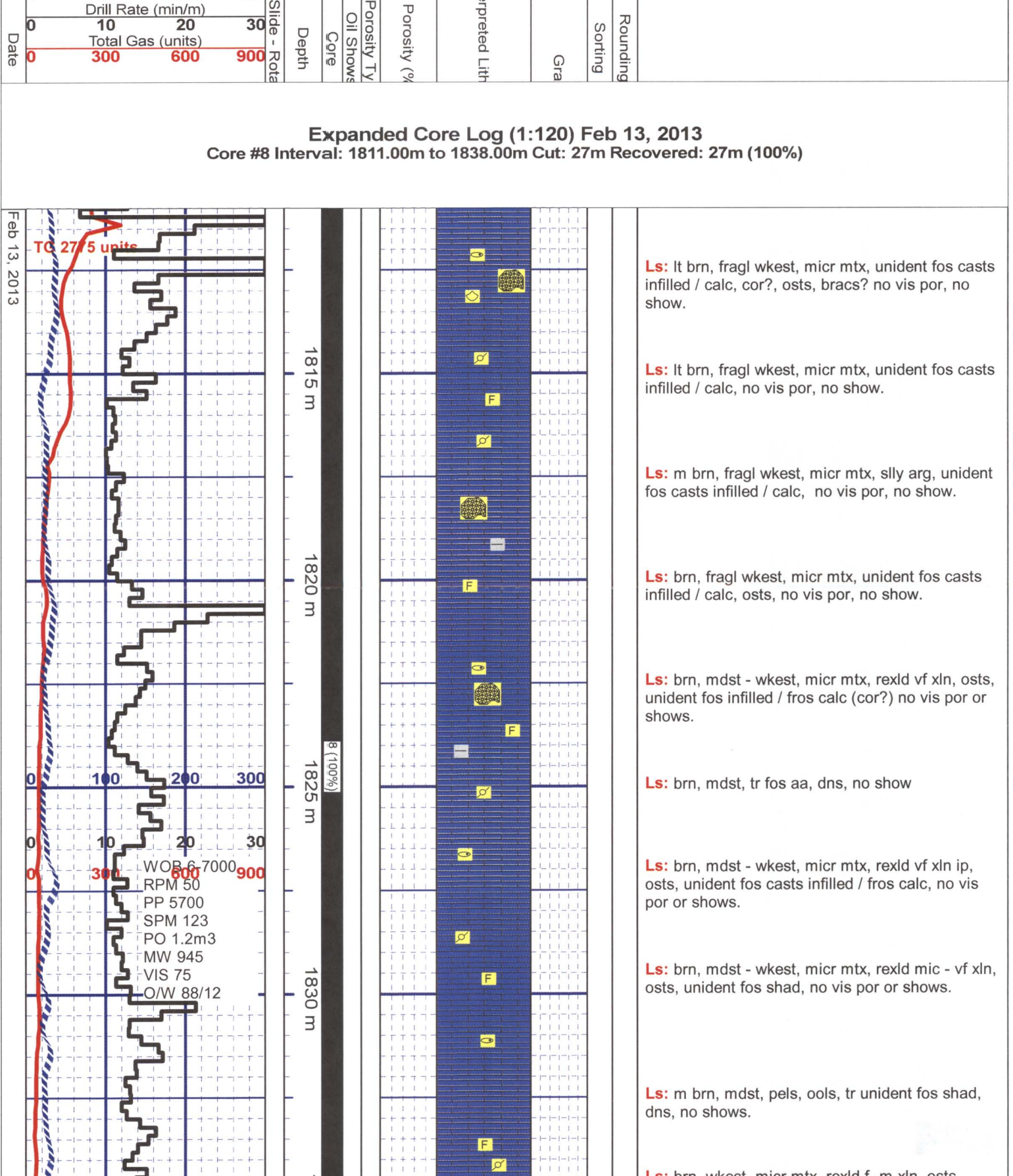
Expanded Core Log (1:120) Feb 11, 2013  
Core #6 Interval: 1757.00m to 1784.00m Cut: 27m Recovered: 27m (100%)



Expanded Core Log (1:120) Feb 12, 2013  
Core #7 Interval: 1784.00m to 1811.00m Cut: 27m Recovered: 27m (100%)



Expanded Core Log (1:120) Feb 13, 2013  
Core #8 Interval: 1811.00m to 1838.00m Cut: 27m Recovered: 27m (100%)



Expanded Core Log (1:120) Feb 14, 2013  
Core #9 Interval: 1838.00m to 1856.00m Cut: 12m Recovered: 17.7m (98.33%)

