

Geological Report

on

Chevron et al Liard M-25

LIARD M-25

**Well Reached Total Depth on
Dec 17, 1999 @ 22:00**

for

CHEVRON CANADA RESOURCES

Prepared For: Rick Schmidtke & Darcy Deibert
Chevron Canada Resources

Prepared By: Brock Lillico
Lillico Petroleum Consultants

Brock Lillico

Well Summary

Storage Units: Metric

Well Information

Operator: CHEVRON CANADA RESOURCES
Well Name: Chevron et al Liard M-25
Location: LIARD M-25
UWI: 300M256030123300
Pool: LIARD
Field: LIARD
Province / State: NWT
Country: Canada
License Number: WID1867

Surface Node Hole Type: Deviated Fault Indicator: Yes
Co-ordinates Latitude: 60.4141000 Longitude: 123.5868000
N / S: 60 degrees 24 minutes 50.8 seconds Lat
E / W: 123 degrees 35 minutes 12.5 seconds W Long

Bottom Hole Node Latitude: Longitude:
Co-ordinates
N / S: 1477.27 meters North of Surface Location
E / W: 328.92 meters West of Surface Location

Elevations Reference:
Ground Elevation: 910.60 Kelly Bushing to Ground:
Kelly Bushing Elevation: 918.00 Cut (-):
Casing Flange Elevation: Fill (+):

Total Depth Measured Depth True Vertical Depth
Total Depth Driller (Tally): 3,770.00 3,382.40
Total Depth Driller (Strap or SLM):
Total Depth Logger:

Miscellaneous Depths Plugback Depth: Water Depth Reference:
Whipstock or Sidetrack Depth: Water Depth:

Well Summary

Drilling Contractor: Akita Drilling Rig #48 Spud Date: Sep 29, 1999 @ 09:30
Rig Release Date: Total Depth Date: Dec 17, 1999 @ 22:00

Cores	#	Formation	Interval	Cut	Recovered	%
	1	NAHANNI	3,450.00 3,452.00	2.00	1.50	75.00
	2	Nahanni	3,452.00 3,456.80	4.80	4.80	100.00

CHEVRON CANADA RESOURCES
UWI 300M256030123300

Chevron et al Liard M-25
LIARD M-25
Page 2-1

Daily Drilling Summary

Storage Units: Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
					mud and hole, Pull out of hole; Lay down directional tools; Pick up and rig to run casing; Ran 349mm surface casing to bottom; Circulating casing.
Oct 15, 1999	852	0.00	0.00	0.0	Ran in hole with drill pipe inside casing, stab into cementing tool, circulate and condition mud and hole; cemented surface casing; 10m3 good cement returns, lost circulation at end of displacement; cement visible from surface.
Oct 16, 1999	852	0.00	0.00	0.0	Nipple down Diverter; Install Casing Bowl; Nipple up BOP's; Pressure test casing to 1400 kPa low, 15000 kPa high; Blind rams, Upper pipe rams, Lower pipe rams, HCR valve, kill lines, manifold relief valves, sweep lines, actuator valves, manual mud saver to 1400 kPa low, 34500 kPa high, annular 1400 kPa low, 17500 kPa high for 10 minutes each; accumulator function test.
Oct 17, 1999	852	0.00	0.00	0.0	Nipple up kill lines, Pressure test kill lines and mud lines, lay down 6 9" Drill Collars, Pick up 3 6 3/4" Drill Collars, Function test Blind Rams, Rig up Lay down truck, Pick up drill pipe, displaced hole to water, continue picking up drill pipe racking stands in the derrick.
Oct 18, 1999	926	74.00	10.00	7.4	Rig out lay down truck, Pick Motor and MWD, test MWD, Pick up drille pipe and run in hole with Directional tools picking up drill pipe on the way in; Drilled out cement, float collar, and shoe joint; Drilled to 855m, ran leak off test; Started drilling ahead at 2200hrs.
Oct 19, 1999	941	15.00	4.00	3.8	Drilled 311mm hole to 929m; Trip for bit; Run 28 stands in hole opn ended to circulate out cement from surface casing job; circulated and clean out drill pipe; Pick up Directional Tools and run back in hole with New Bit #7 HW STR-20; Drilling 311mm hole.
Oct 20, 1999	1,112	171.00	22.00	7.8	Directionally Drilled 311mm hole holding at 27 degrees.
Oct 21, 1999	1,283	171.00	22.00	7.8	Drilled 311mm hole holding at 27 degrees @ 345 AZM.
Oct 22, 1999	1,432	149.00	22.00	6.8	Drilled 311mm hole holding at 27 degrees @ 345 AZM.
Oct 23, 1999	1,589	157.00	22.00	7.1	Drilled 311mm hole holding at 27 degrees @ 345 AZM.
Oct 24, 1999	1,680	91.00	9.00	10.1	Directionally Drilled 311mm hole to 1624m; Bit started torquing

Daily Drilling Summary

Storage Units:

Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
					up; Pull out of hole; Run in hole with New Bit #8 Reed HP43A; Drilled ahead
Oct 25, 1999	1,854	174.00	22.00	7.9	Directionally Drilled 311mm hole with MWD and Mud Motor.
Oct 26, 1999	1,985	131.00	22.00	6.0	Directionally Drilled 311mm hole with MWD and Mud Motor 1854-1985m; Mix and pump pill, start out of hole.
Oct 27, 1999	2,072	87.00	14.00	6.2	Trip for bit; Run in hole with New Bit # 9 REED EHP51; Hit Bridge at 1918m; Worked through and washed to bottom; Drilled ahead 311mm hole holding 27 degree angle at 345 AZM target.
Oct 28, 1999	2,242	170.00	22.00	7.7	Drilled 311mm hole holding at 27 degrees @ 345 AZM.
Oct 29, 1999	2,366	124.00	22.00	5.6	Drilled 311mm hole holding at 27 degrees @ 345 AZM.
Oct 30, 1999	2,436	70.00	11.00	6.4	Drilled 311mm hole to 2375m; bit torquing; trip for bit; Run in hole with New Bit # 10 Smith F-25; Drilled ahead holding at 27 degrees @ 345 AZM.
Oct 31, 1999	2,462	26.00	2.00	13.0	Drilled 311mm hole to 2447m; bit torquing; trip for bit; Run in hole with New Bit # 11; Drilled ahead holding at 27 degrees @ 345 AZM.
Nov 1, 1999	2,465	3.00	2.00	1.5	Drilled 311mm hole to 2465m; Bit slowed down and started torquing; Trip out of hole; Bit wiped out and out of gauge, 3 loose cones; Pressure Test BOP's; Run in hole to ream out undergauge hole.
Nov 2, 1999	2,474	9.00	3.50	2.6	Ran in hole with rotary assembly and New Bit # 12 RBI C45LRGSP; Reamed out undergauge hole and drill 1 meter to 2466m; Pull out of hole; Pick up MWD and Mud Motor plus New Bit #13 HW GT30; Run in hole; Drilled ahead 2466-2474m
Nov 3, 1999	2,549	75.00	22.00	3.4	Directional Drilled with MWD and Mud Motor holding 27 degrees @ 345 AZM.
Nov 4, 1999	2,572	23.00	7.00	3.3	Directional Drilled 311mm hole to 2572m; Hole angle dropped to 24.2 degrees; Trip out of hole; Pick up 150rpm mud motor and New Bit #14 Smith F-25 and run in hole.
Nov 5, 1999	2,605	33.00	12.00	2.8	Ran to bottom with New Bit #14 Smith F-25P, MWD, and 150 rpm Mud Motor; Drilled 311mm hole to 2605m, hole torquing up and stalling rotary table, pulled 20000daN over string weight to free pipe off bottom; Trip out of hole; Bit in good shape; Lay

Daily Drilling Summary

Storage Units: Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
					down stabilizers; Pick up new mud motor with 2.1 degree offset; Make up BHA.
Nov 6, 1999	2,665	60.00	18.00	3.3	Ran back to bottom with re-run Bit #14 Smith F-25P; no fill or tight hole; Drilled ahead 311mm hole
Nov 7, 1999	2,761	96.00	22.00	4.4	Drilled ahead 311mm hole.
Nov 8, 1999	2,835	74.00	18.00	4.1	Directionally Drilled 311mm hole to 2835m; Trip for bit
Nov 9, 1999	2,889	54.00	14.00	3.9	Trip out of hole; Run in hole with New Bit # 15 Smith 20MFP; Drilled ahead.
Nov 10, 1999	2,930	41.00	12.00	3.4	Drilled 311mm hole to 2930m; hole angle dropping; Trip for BHA and Bit; Turn motor setting to 2.4 degrees; Pick up New Bit # 16 REED HP51X; Run back in hole.
Nov 11, 1999	3,003	73.00	19.00	3.8	Ran in hole with New Bit #15 Reed EHP51X; Drilled ahead 311mm hole with Mud Motor and MWD building angle.
Nov 12, 1999	3,090	87.00	22.00	4.0	Drilled 311mm hole building angle to 28.9 degrees.
Nov 13, 1999	3,117	27.00	5.00	5.4	Drilled 311mm hole to 3112m; hole angle dropped to 27.2 degrees while trying to build; Trip out for deviation problems; Run in hole with New Bit # 17 HW GTM28; Run in hole; Start drilling @ 0730hrs.
Nov 14, 1999	3,193	76.00	22.00	3.5	Directionally Drilled 311mm hole, orienting up to build angle.
Nov 15, 1999	3,195	2.00	1.00	2.0	Directionally Drilled 311mm hole to 3195m; Bit quit drilling; Trip for bit; Run in hole with New Bit # 18 Reed HP53 and low speed mud motor; Start reaming at 3090m; ream dog sub through Lower Besa River 3090-3177m 0200-0800hrs.
Nov 16, 1999	3,211	16.00	8.00	2.0	Reamed dog sub and New Bit # 18 Reed EHP51A through Second Black Shale to bottom; Drilled ahead 311mm hole; Bit played out at 3211m after 8 hrs; Pull out of hole; EHP51A in poor condition, broken and dull cutters, 2 failed bearings; Pick up New Bit # 19 RBI C45LRG and run in hole.
Nov 17, 1999	3,232	21.00	21.00	1.0	Ran in hole with New Bit # 19 RBI C45LRGSP; Drilled ahead 311mm hole.
Nov 18, 1999	3,246	14.00	18.00	0.8	Directionally Drilled 311mm hole to 3246m, mainly rotating maintaining 30 degree drift and 340 AZM; Bit torqued up and stalled mud motor; Trip for bit.
Nov 19, 1999	3,258	12.00	12.00	1.0	Pulled out of hole with Bit # 19 RBI C45LRG; all 3 bearings

Daily Drilling Summary

Storage Units: Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
					failed; Pick up New Bit # 20 HW ATJ-44; Run in hole; Drilled ahead with MWD and Mud Motor.
Nov 20, 1999	3,274	16.00	18.00	0.9	Drilled 311mm hole to 3274m; Bit torquing with pump pressure spikes; Trip for Bit.
Nov 21, 1999	3,291	17.00	14.00	1.2	Pulled out of hole with Bit # 20 ATJ-44; Bit in good shape, mud motor in poor shape; change out mud motor and bit; Run in hole with New Bit # 21 HW ATJ-M33; Drilled ahead maintaining 30 degrees @ 340AZM.
Nov 22, 1999	3,324	33.00	22.00	1.5	Directionally Drilled ahead maintaining 30 degrees @ 340AZM.
Nov 23, 1999	3,342	18.00	18.00	1.0	Directionally Drilled ahead maintaining 30 degrees @ 340AZM to 3342m; Pump Pressured up and torque increased; Trip out of hole.
Nov 24, 1999	3,356	14.00	7.00	2.0	Pulled out of hole; Bit #21 in poor shape, broken buttons, failed bearing; Pick up New Bit # 22 Reed EHP53A; Run in hole; Directionally Drilled maintaining 30 degrees at 340AZM.
Nov 25, 1999	3,371	15.00	5.00	3.0	Directionally Drilled 311mm hole to 3371m; Bit quit drilling and torqued up and stalled mud motor; Trip for bit; Bit #22 Reed EHP53A came out in very poor condition, all 3 cones loose, scrubbed buttons, cone interference, and undergauge; Run in hole with New Bit #23 RBI C4LRG.
Nov 26, 1999	3,385	14.00	5.50	2.5	Ran in hole with New Bit #23 RBI C4LRG; Reamed undergauge hole and drilled 1 meter with rotary assembly to 3372m; Strap out of hole; Pick up New Bit #24 HW HS30 and Directional tools; Run in hole.
Nov 27, 1999	3,431	46.00	22.00	2.1	Directionally Drilled 311mm hole maintaining 30 degrees @ 340AZM.
Nov 28, 1999	3,446	15.00	6.50	2.3	Directionally Drilled 311mm hole to 3446m; Lost Circulation; Pull out of hole; Stand BHA and directional tools in derrick; Run back in hole open ended; Running in at 2500m @ 0800hrs.
Nov 29, 1999	3,446	0.00	0.00	0.0	Ran in hole to 3200m open ended; Rig up Dowell-Schlumberger and mix cement plug; Run in to 3446m; Rig in cementers and pump 5.7m3 cement plug; displace with rig pump and invert mud; good returns at end of displacement; Pull 5 stands out of plug; Break circulation and circulate

Daily Drilling Summary

Storage Units: Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
					bottoms up, good returns while circulating, no losses; Run in and tag cement plug at 3373m; Pull out of hole.
Nov 30, 1999	3,446	0.00	0.00	0.0	Pulled out of hole; Lay down 229mm Drill Collars; Lay down Directional Tools; Pick up Rerun Bit # 25RR RBI C4LRGSP; Run in hole; Polish cement plug 3373-3440m; Circulate Bottoms up; Pull out of hole.
Dec 1, 1999	3,446	0.00	0.00	0.0	Pulled out of hole; Ran logging run #1 AIT-DSI-EDAC-GPIT-AMS; 3437-848m, Gamma Ray to Surface; Run #2 UBI, coming out with main pass at 2700m @ 0830hrs.
Dec 2, 1999	3,446	0.00	0.00	0.0	Ran UBI; Ran OBDT; Pick up bit and start in hole.
Dec 3, 1999	3,446	0.00	0.00	0.0	Run in hole for clean out trip with re-run C4LRGSP; Circulate bottoms up; Trip Gas 11% with one pump at 90 strokes; circulate and condition mud; Pull out of hole; Rigging up to run casing.
Dec 4, 1999	3,446	0.00	0.00	0.0	Ran 24mm Intermediate Casing
Dec 5, 1999	3,446	0.00	0.00	0.0	Ran 244mm Casing to bottom; cemented casing; Plug down at 1940hrs, partial returns, no cement to surface; Rig out cementers; Pull BOP stack; set casing slips; Nipple up BOP's.
Dec 6, 1999	3,446	0.00	0.00	0.0	Nipple up BOP's; Pressure test; Run in hole with Bit # 25 Reed EHP53
Dec 7, 1999	3,446	0.00	0.00	0.0	Tried to drill out cement; very high torque 20000 amps; unable to rotate; Short trip doing torque test every 5 stands; Run back in hole; circulate and condition mud.
Dec 8, 1999	3,446	0.00	0.00	0.0	Pulled out of hole; Change BHA; Pick up Mud Motor; Run back in hole; Circulate mixing Lub 100 at 3406m; Torque testing all night while mixing Lub 100.
Dec 9, 1999	3,450	4.00	0.50	8.0	Circulate and Condition mud; Drill out cement and shoe 3437-3446m; Drill 216mm hole 3446-3450m; Circulate and condition mud; Pull out of hole; Pick up core barrel and C201 diamond bit; Run in hole.
Dec 10, 1999	3,452	2.00	1.00	2.0	Ran in hole with Core Barrels; Cut Core #1 3450.0-3452.0m; Pull out of hole, recover core; Run back in hole with Core Barrels and C201 Core bit.

Daily Drilling Summary

Storage Units: Metric

Date	A.M. Depth	Progress	Rotating Hours	Avg. P.R.	Daily Operational Summary
Dec 11, 1999	3,457	4.80	4.00	1.2	Ran in hole with Core Barrels; Cut Core #2 3452.0-3456.8m; Jammed off; Pull out of hole; Recover core; lay down Core Barrels; Pick up MWD and Mud Motor; Run in hole to drill.
Dec 12, 1999	3,494	37.20	15.00	2.5	Ran in hole with MWD and Mud Motor; Directionally Drilled 216mm hole turning hole direction to the right; Lost circulation at 3494m @ 0400hrs; mix mud.
Dec 13, 1999	3,575	81.00	19.00	4.3	Mixed mud to replace lost volume; Drilled ahead 216mm hole turning hole direction to the right.
Dec 14, 1999	3,671	96.00	22.00	4.4	Drilled 216mm hole turning hole direction to the right
Dec 15, 1999	3,685	14.00	4.00	3.5	Drilled 216mm hole to 3685m; Trip for bit; Drop some heavy weight off of BHA; Run back in hole with New Bit # 28 HW ATJ-S33.
Dec 16, 1999	3,685		0.00	0.0	Ran in hole to 2600m; unable to pump, MWD plugged off; Pull back out of hole; found cement peices in MWD ports; lay down 10 stands of drill pipe; Pick up 30 joints; Run back in hole.
Dec 17, 1999	3,736		15.00		Ran to bottom; MWD failed on bottom; Drill ahead rotating.

Casing Data Summary

Storage Units:

Metric

Casing Type	Casing Size	Casing Landed @	Hole Size
Surface	339.7	848.70	444.0
Intermediate	244.0	3,438.10	311.0

Bit Record Table (IADC Grading System)

Storage Units: Metric

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

Bit #	Make	Type	IADC		Depth In	Depth Out	Made	Hours	Avg. P.R.	I.A.D.C. Bit Condition									
			S	T						I	O	MDC	Loc	B	G	ODC	RP1	RP2	
1	HW	MAX22G			0.0	138.0	138.0	18.75	7.4	2	2	NO	A	4	I	NO	HP		
2	SEC	S86F			138.0	269.0	131.0	22.50	5.8	2	2	NO	A	3	I	NO	BHA		
1RR	HW	MAX22G			269.0	303.0	34.0	19.00	1.8	2	2	FC	H	E	I	NO	BHA		
4	REED	MS43A			303.0	595.0	292.0	04.50	2.8	2	8	BT	G	E	I	WT	HR		
5	REED	MS51AM			595.0	852.0	257.0	53.00	4.8	2	7	BT	G	E	I	SD	TD		
6	REED	EHP41H			852.0	929.0	77.0			5	8	BT	H	E	2	NO	PR		
7	HW	STR-20			929.0	1,624.0	695.0	91.50	7.6	2	2	WT	A	F	I	NO	TQ		
8	REED	EHP43H			1,624.0	1,985.0	361.0	46.75	7.7	2	2	NO	A	F	I	NO	PR		
9	REED	EHP51			1,985.0	2,375.0	390.0	54.50	7.2	2	2	CI	M	F	I	WT	TQ		
10	SMITH	F-25			2,375.0	2,447.0	72.0	13.00	5.5	3	8	BT	G	E	6	FC	TQ		
11	REED	EHP53AD			2,447.0	2,465.0	18.0	5.80	3.1	5	8	CI	A	F	6	RG	TQ		
12	RBI	C45LRGS			2,465.0	2,466.0	1.0	0.50	2.0	1	1	NO	A	E	2	NO	BHA		
13	HW	HM-30			2,466.0	2,572.0	106.0	32.00	3.3	3	3	WT	A	E	I		BHA		
14	SMITH	F-25P			2,572.0	2,835.0	263.0	68.00	3.9	7	6	BT	M	F	I	JD	HR		
15	SMITH	20MFP			2,835.0	2,930.0	95.0	22.00	4.3	2	3	BT	A	F	I	CT	DEV	BHA	
16	REED	EHP51X			2,930.0	3,112.0	182.0	42.50	4.3	2	3	BT	M	E	I	NO	DEV		
17	HW	GTM28			3,112.0	3,195.0	83.0	22.25	3.7	6	8	BT	A	E	2	FC	PR		
18	REED	EHP53A			3,195.0	3,211.0	16.0	8.30	1.9	6	4	FC	A	F	2	CI	TQ		
19	RBI	C45LRGS			3,211.0	3,246.0	35.0	36.75	1.0	3	5	CI	A	F	I	BT	PR	TQ	
20	HW	ATJ44			3,246.0	3,274.0	28.0	28.50	1.0	2	2	CT	A	E	I	WT	TQ		
21	HW	ATMJ-33			3,274.0	3,342.0	68.0	53.00	1.3	3	5	BT	A	F	I	CI	TQ		
22	REED	EHP53A			3,342.0	3,371.0	29.0	11.75	2.5	8	8	CT	A	F	10	LT	TQ	PR	
23	RBI	C4LRGS			3,371.0	3,372.0	1.0	0.50	2.0	2	2	BT	H	E	I	NO	BHA		
24	HW	HS30			3,372.0	3,446.0	74.0	33.00	2.2	2	2	BT	A	E	I	CT	HP	LOG	
25	REED	EHP53			3,446.0	3,450.0	4.0	1.00	4.0	1	1	NO	A	E	I	NO	CP		
26	Baker	C201			3,450.0	3,456.8	6.8	5.00	1.4	3	3				I				
27RR	REED	EHP53A			3,456.8	3,685.0	228.2	47.75	4.8	8	8	BT	A	F	2	WT	PR		
28	HW	ATJ-S33			3,685.0	3,770.0	85.0	23.00	3.7										

Total Rotating Hours: 865.10

Bit Record Table (TBG Grading System) Storage Units: Metric

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

Bit #	Make	Type	Size	IADC		Depth In	Depth Out	Made	Hours	Avg. P.R.	Bit Condition		
				S	T						T	B	G
1	HW	MAX22GD	444.00			0.0	138.0	138.0	18.75	7.4			
2	SEC	S86F	311.00			138.0	269.0	131.0	22.50	5.8			
1RR	HW	MAX22GD	444.00			269.0	303.0	34.0	19.00	1.8			
4	REED	MS43A	444.00			303.0	595.0	292.0	04.50	2.8			
5	REED	MS51AM	444.00			595.0	852.0	257.0	53.00	4.8			
6	REED	EHP41H	311.00			852.0	929.0	77.0					
7	HW	STR-20	311.00			929.0	1,624.0	695.0	91.50	7.6			
8	REED	EHP43H	311.00			1,624.0	1,985.0	361.0	46.75	7.7			
9	REED	EHP51	311.00			1,985.0	2,375.0	390.0	54.50	7.2			
10	SMITH	F-25	311.00			2,375.0	2,447.0	72.0	13.00	5.5			
11	REED	EHP53ADA	311.00			2,447.0	2,465.0	18.0	5.80	3.1			
12	RBI	C45LRGSP	311.00			2,465.0	2,466.0	1.0	0.50	2.0			
13	HW	HM-30	311.00			2,466.0	2,572.0	106.0	32.00	3.3			
14	SMITH	F-25P	311.00			2,572.0	2,835.0	263.0	68.00	3.9			
15	SMITH	20MFP	311.00			2,835.0	2,930.0	95.0	22.00	4.3			
16	REED	EHP51X	311.00			2,930.0	3,112.0	182.0	42.50	4.3			
17	HW	GTM28	311.00			3,112.0	3,195.0	83.0	22.25	3.7			
18	REED	EHP53A	311.00			3,195.0	3,211.0	16.0	8.30	1.9			
19	RBI	C45LRGSP	311.00			3,211.0	3,246.0	35.0	36.75	1.0			
20	HW	ATJ44	311.00			3,246.0	3,274.0	28.0	28.50	1.0			
21	HW	ATMJ-33	311.00			3,274.0	3,342.0	68.0	53.00	1.3			
22	REED	EHP53A	311.00			3,342.0	3,371.0	29.0	11.75	2.5			
23	RBI	C4LRGSP	311.00			3,371.0	3,372.0	1.0	0.50	2.0			
24	HW	HS30	311.00			3,372.0	3,446.0	74.0	33.00	2.2			
25	REED	EHP53	216.00			3,446.0	3,450.0	4.0	1.00	4.0			
26	Baker	C201	215.00			3,450.0	3,456.8	6.8	5.00	1.4			
27RR	REED	EHP53A	216.00			3,456.8	3,685.0	228.2	47.75	4.8			
28	HW	ATJ-S33	216.00			3,685.0	3,770.0	85.0	23.00	3.7			

Total Rotating Hours: 865.10

Bit Record

Pump Data

Pump #1	Model: National	Size: 9P-100	Type: triplex
Pump Rod Diameter:		Liner Size: 152	Stroke Length: 254
Efficiency Rating (%):			

Pump #2	Model: National	Size: 9P-100	Type: triplex
Pump Rod Diameter:		Liner Size: 152	Stroke Length: 254
Efficiency Rating (%):			

Bit Data

Storage Units: Metric

Bit #: 1	Make: HW	Type: MAX22GD	IADC Series / Type: /
Serial #: 22GD56	Size: 444.0	Jets / Nozzles: 7.50 / 7.50 / 7.50 /	T.F.A.:
Depth In: 0.00	Depth Out: 138.00	Made: 138.00	Rotating Hours: 18.75
	Average Drill Rate: 7.36	Total Rotating Hours: 18.75	

Bit Grade / Condition I.A.D.C.: 2 / 2 / NO / A / 4 / 1 / NO / HP / T / B / G: / /

Remarks:

Formations Drilled: Surface, Mattson Sandstone and Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	16,000	/	18,000	R.P.M.:	50 / 70
Pump 1 S.P.M. / Volume:	100	/		Pump 2 S.P.M. / Volume:	100.00 /
S.P.P.:	4,000	/	5,000	Mud Density:	1,050 / 1,080
Drift Angle:	0.000	/	2.250	Funnel Viscosity:	42 / 47

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 2	Make: SEC	Type: S86F	IADC Series / Type: /
Serial #: 708437	Size: 311.0	Jets / Nozzles: 9.00 / 9.00 / 9.00 /	T.F.A.:
Depth In: 138.00	Depth Out: 269.00	Made: 131.00	Rotating Hours: 22.50
	Average Drill Rate: 5.82	Total Rotating Hours: 41.25	

Bit Grade / Condition I.A.D.C.: 2 / 2 / NO / A / 3 / 1 / NO / BHA / T / B / G: / /

Remarks:

Formations Drilled: FLETT

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	4,000	/	10,000	R.P.M.:	60 / 100
Pump 1 S.P.M. / Volume:		/		Pump 2 S.P.M. / Volume:	/
S.P.P.:	11,000	/	14,000	Mud Density:	1,050 / 1,080
Drift Angle:	1.500	/	2.500	Funnel Viscosity:	42 / 68

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 1RR **Make:** HW **Type:** MAX22GD **IADC Series / Type:** /
Serial #: T22CT **Size:** 444.0 **Jets / Nozzles:** 7.50 / 7.50 / 7.50 / **T.F.A.:**
Depth In: 269.00 **Depth Out:** 303.00 **Made:** 34.00 **Rotating Hours:** 19.00
Average Drill Rate: 1.79 **Total Rotating Hours:** 60.25
Bit Grade / Condition I.A.D.C.: 2 / 2 / FC / H / E / I / NO / BHA / **T / B / G:** / /
Remarks: Bit hours include opening pilot hole.
Formations Drilled: FLETT
Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	17,000	/	18,000	R.P.M.:	80 / 80
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	9,000	/	15,000	Mud Density:	1,060 / 1,060
Drift Angle:	1.500	/	1.500	Funnel Viscosity:	50 / 50

Annular Velocity **Drill Collars:** **HeavyWeight Drill Pipe:** **Drill Pipe:**
Bottoms Up **Depth:** **Theoretical:** **Actual:**

Bit #: 4 **Make:** REED **Type:** MS43A **IADC Series / Type:** /
Serial #: TC1060 **Size:** 444.0 **Jets / Nozzles:** 9.00 / 9.00 / 9.00 / **T.F.A.:**
Depth In: 303.00 **Depth Out:** 595.00 **Made:** 292.00 **Rotating Hours:** 104.50
Average Drill Rate: 2.79 **Total Rotating Hours:** 164.75
Bit Grade / Condition I.A.D.C.: 2 / 8 / BT / G / E / I / WT / HR / **T / B / G:** / /
Remarks:
Formations Drilled: FLETT
Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	9,000	/	12,000	R.P.M.:	120 / 140
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	14,000	/	16,500	Mud Density:	1,055 / 1,080
Drift Angle:	2.600	/	20.100	Funnel Viscosity:	60 / 78

Annular Velocity **Drill Collars:** **HeavyWeight Drill Pipe:** **Drill Pipe:**
Bottoms Up **Depth:** **Theoretical:** **Actual:**

Bit #: 5 **Make:** REED **Type:** MS51AM **IADC Series / Type:** /
Serial #: TC1063 **Size:** 444.0 **Jets / Nozzles:** 9.00 / 9.00 / 9.00 / **T.F.A.:**
Depth In: 595.00 **Depth Out:** 852.00 **Made:** 257.00 **Rotating Hours:** 53.00
Average Drill Rate: 4.85 **Total Rotating Hours:** 217.75
Bit Grade / Condition I.A.D.C.: 2 / 7 / BT / G / E / I / SD / TD / **T / B / G:** / /
Remarks:
Formations Drilled: FLETT
Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	19,000	R.P.M.:	100 / 135
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	14,500	/	16,900	Mud Density:	1,100 / 1,140
Drift Angle:	19.400	/	27.500	Funnel Viscosity:	58 / 85

Annular Velocity **Drill Collars:** **HeavyWeight Drill Pipe:** **Drill Pipe:**
Bottoms Up **Depth:** **Theoretical:** **Actual:**

Bit Data

Storage Units:

Metric

Bit #: 6 Make: REED Type: EHP41H IADC Series / Type: /
 Serial #: MM9004 Size: 311.0 Jets / Nozzles: 7.50 / 7.50 / 7.50 / T.F.A.:
 Depth In: 852.00 Depth Out: 929.00 Made: 77.00 Rotating Hours:
 Average Drill Rate: Total Rotating Hours:
 Bit Grade / Condition I.A.D.C.: 5 / 8 / BT / H / E / 2 / NO / PR / T / B / G: / /
 Remarks:
 Formations Drilled: LOWER FLETT SHALE
 Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	17,000	/	18,000	R.P.M.:	100 / 140
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	14,000	/	20,000	Mud Density:	1,010 / 1,020
Drift Angle:	26.800	/	27.600	Funnel Viscosity:	100 / 109

Annular Velocity Bottoms Up Drill Collars: Depth: HeavyWeight Drill Pipe: Theoretical: Drill Pipe: Actual:

Bit #: 7 Make: HW Type: STR-20 IADC Series / Type: /
 Serial #: K13YW Size: 311.0 Jets / Nozzles: 7.50 / 7.50 / 9.00 / T.F.A.:
 Depth In: 929.00 Depth Out: 1,624.00 Made: 695.00 Rotating Hours: 91.50
 Average Drill Rate: 7.60 Total Rotating Hours: 309.25
 Bit Grade / Condition I.A.D.C.: 2 / 2 / WT / A / F / I / NO / TQ / T / B / G: / /
 Remarks:
 Formations Drilled: LOWER FLETT SHALE, BESA RIVER SHALE
 Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	10,000	/	13,000	R.P.M.:	150 / 180
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	13,500	/	14,600	Mud Density:	1,000 / 1,030
Drift Angle:	26.500	/	28.100	Funnel Viscosity:	62 / 138

Annular Velocity Bottoms Up Drill Collars: Depth: HeavyWeight Drill Pipe: Theoretical: Drill Pipe: Actual:

Bit #: 8 Make: REED Type: EHP43H IADC Series / Type: /
 Serial #: DQ8160 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 9.00 / T.F.A.:
 Depth In: 1,624.00 Depth Out: 1,985.00 Made: 361.00 Rotating Hours: 46.75
 Average Drill Rate: 7.72 Total Rotating Hours: 356.00
 Bit Grade / Condition I.A.D.C.: 2 / 2 / NO / A / F / I / NO / PR / T / B / G: / /
 Remarks: Change pump liners to 140mm
 Formations Drilled: BESA RIVER
 Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	10,000	/	13,000	R.P.M.:	100 / 130
Pump 1 S.P.M. / Volume:	115	/	1,250.00	Pump 2 S.P.M. / Volume:	115.00 / 1,250.00
S.P.P.:	17,000	/	18,700	Mud Density:	1,025 / 1,055
Drift Angle:	26.700	/	28.400	Funnel Viscosity:	62 / 71

Annular Velocity Bottoms Up Drill Collars: Depth: HeavyWeight Drill Pipe: Theoretical: Drill Pipe: Actual:

Bit Data

Storage Units:

Metric

Bit #: 9 Make: REED Type: EHP51 IADC Series / Type: /
 Serial #: ED1969 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 9.00 / T.F.A.:
 Depth In: 1,985.00 Depth Out: 2,375.00 Made: 390.00 Rotating Hours: 54.50
 Average Drill Rate: 7.16 Total Rotating Hours: 410.50

Bit Grade / Condition I.A.D.C.: 2 / 2 / CI / M / F / I / WT / TQ / T / B / G: / /

Remarks:

Formations Drilled: BESA RIVER

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	16,000	R.P.M.:	150 / 180
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	18,600	/	19,000	Mud Density:	1,050 / 1,070
Drift Angle:	26.300	/	28.200	Funnel Viscosity:	61 / 70

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 10 Make: SMITH Type: F-25 IADC Series / Type: /
 Serial #: LX0942 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 9.00 / T.F.A.:
 Depth In: 2,375.00 Depth Out: 2,447.00 Made: 72.00 Rotating Hours: 13.00
 Average Drill Rate: 5.54 Total Rotating Hours: 423.50

Bit Grade / Condition I.A.D.C.: 3 / 8 / BT / G / E / 6 / FC / TQ / T / B / G: / /

Remarks:

Formations Drilled: FIRST BLACK SHALE, hard siliceous Shale @ 2435-2447m

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	14,000	/	18,000	R.P.M.:	150 / 180
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	19,300	Mud Density:	1,075 / 1,080
Drift Angle:	27.600	/	27.900	Funnel Viscosity:	65 / 69

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 11 Make: REED Type: HP53ADA IADC Series / Type: /
 Serial #: DQ8815 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 9.00 / T.F.A.:
 Depth In: 2,447.00 Depth Out: 2,465.00 Made: 18.00 Rotating Hours: 5.80
 Average Drill Rate: 3.10 Total Rotating Hours: 429.30

Bit Grade / Condition I.A.D.C.: 5 / 8 / CI / A / F / 6 / RG / TQ / T / B / G: / /

Remarks:

Formations Drilled: FIRST BLACK SHALE, hard siliceous Shale and Marlstone @ 2447-2465m

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	14,000	/	18,000	R.P.M.:	100 / 130
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	19,000	Mud Density:	1,080 / 1,085
Drift Angle:	26.100	/	27.500	Funnel Viscosity:	73 / 75

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 12 Make: RBI Type: 45LRGSP IADC Series / Type: /
 Serial #: BW118B Size: 311.0 Jets / Nozzles: 9.00 / 9.00 / 9.00 / T.F.A.:
 Depth In: 2,465.00 Depth Out: 2,466.00 Made: 1.00 Rotating Hours: 0.50
 Average Drill Rate: 2.00 Total Rotating Hours: 429.80
 Bit Grade / Condition I.A.D.C.: 1 / 1 / NO / A / E / 2 / NO / BHA / T / B / G: / /

Remarks:

Formations Drilled: First Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	18,000	R.P.M.:	60 / 60
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	19,000	Mud Density:	1,080 / 1,080
Drift Angle:	26.000	/	26.000	Funnel Viscosity:	75 / 75

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 13 Make: HW Type: HM-30 IADC Series / Type: /
 Serial #: X90YY Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 2,466.00 Depth Out: 2,572.00 Made: 106.00 Rotating Hours: 32.00
 Average Drill Rate: 3.31 Total Rotating Hours: 461.80
 Bit Grade / Condition I.A.D.C.: 3 / 3 / WT / A / E / 1 / / BHA / T / B / G: / /

Remarks:

Formations Drilled: First Black Shale; Lower Besa River

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	14,000	/	30,000	R.P.M.:	90 / 120
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	18,600	/	19,200	Mud Density:	1,070 / 1,080
Drift Angle:	23.700	/	27.300	Funnel Viscosity:	76 / 83

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 14 Make: SMITH Type: F-25P IADC Series / Type: /
 Serial #: LX0941 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 2,572.00 Depth Out: 2,835.00 Made: 263.00 Rotating Hours: 68.00
 Average Drill Rate: 3.87 Total Rotating Hours: 529.80
 Bit Grade / Condition I.A.D.C.: 7 / 6 / BT / M / F / 1 / JD / HR / T / B / G: / /

Remarks:

Formations Drilled: Lower Besa River

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	24,000	R.P.M.:	90 / 130
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	19,300	Mud Density:	1,080 / 1,095
Drift Angle:	23.300	/	29.100	Funnel Viscosity:	77 / 120

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 15 Make: SMITH Type: 20MFP IADC Series / Type: /
 Serial #: LX8786 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 2,835.00 Depth Out: 2,930.00 Made: 95.00 Rotating Hours: 22.00
 Average Drill Rate: 4.32 Total Rotating Hours: 551.80

Bit Grade / Condition I.A.D.C.: 2 / 3 / BT / A / F / I / CT / DEV / BHA T / B / G: / /

Remarks:

Formations Drilled: Lower Besa River

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	16,000	/	24,000	R.P.M.:	90 / 130
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	20,500	Mud Density:	1,085 / 1,090
Drift Angle:	22.200	/	28.300	Funnel Viscosity:	85 / 98

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 16 Make: REED Type: EHP51X IADC Series / Type: /
 Serial #: LQ4090 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 2,930.00 Depth Out: 3,112.00 Made: 182.00 Rotating Hours: 42.50
 Average Drill Rate: 4.28 Total Rotating Hours: 594.30

Bit Grade / Condition I.A.D.C.: 2 / 3 / BT / M / E / I / NO / DEV / T / B / G: / /

Remarks:

Formations Drilled: Lower Besa River

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	30,000	R.P.M.:	90 / 130
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,500	/	20,600	Mud Density:	1,085 / 1,100
Drift Angle:	23.200	/	28.900	Funnel Viscosity:	92 / 120

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 17 Make: HW Type: GTM28 IADC Series / Type: /
 Serial #: P94YH Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 3,112.00 Depth Out: 3,195.00 Made: 83.00 Rotating Hours: 22.25
 Average Drill Rate: 3.73 Total Rotating Hours: 616.55

Bit Grade / Condition I.A.D.C.: 6 / 8 / BT / A / E / 2 / FC / PR / T / B / G: / /

Remarks:

Formations Drilled: Lower Besa River; Second Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	30,000	R.P.M.:	90 / 130
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,000	/	20,500	Mud Density:	1,130 / 1,140
Drift Angle:	27.400	/	30.900	Funnel Viscosity:	98 / 118

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 18 Make: REED Type: EHP53A IADC Series / Type: /
 Serial #: MM9063 Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 3,195.00 Depth Out: 3,211.00 Made: 16.00 Rotating Hours: 8.30
 Average Drill Rate: 1.93 Total Rotating Hours: 624.85
 Bit Grade / Condition I.A.D.C.: 6 / 4 / FC / A / F / 2 / CI / TQ / T / B / G: / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	15,000	/	30,000	R.P.M.:	70 / 90
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	19,300	/	20,300	Mud Density:	1,150 / 1,150
Drift Angle:	30.800	/	30.900	Funnel Viscosity:	115 / 115

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 19 Make: RBI Type: 45LRGSP IADC Series / Type: /
 Serial #: BW120B Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 3,211.00 Depth Out: 3,246.00 Made: 35.00 Rotating Hours: 36.75
 Average Drill Rate: 0.95 Total Rotating Hours: 661.60
 Bit Grade / Condition I.A.D.C.: 3 / 5 / CI / A / F / I / BT / PR / TQ T / B / G: / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	20,000	/	30,000	R.P.M.:	80 / 100
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	20,000	/	20,000	Mud Density:	1,140 / 1,146
Drift Angle:	30.100	/	30.800	Funnel Viscosity:	89 / 90

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 20 Make: HW Type: ATJ44 IADC Series / Type: /
 Serial #: V55CW Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 3,246.00 Depth Out: 3,274.00 Made: 28.00 Rotating Hours: 28.50
 Average Drill Rate: 0.98 Total Rotating Hours: 690.10
 Bit Grade / Condition I.A.D.C.: 2 / 2 / CT / A / E / I / WT / TQ / T / B / G: / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	30,000	/	30,000	R.P.M.:	90 / 90
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	20,000	/	20,000	Mud Density:	1,140 / 1,146
Drift Angle:	30.300	/	30.900	Funnel Viscosity:	75 / 75

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 21 **Make:** HW **Type:** ATMJ-33 **IADC Series / Type:** /
Serial #: B44DJ **Size:** 311.0 **Jets / Nozzles:** 2.00 / 2.00 / 2.00 / **T.F.A.:**
Depth In: 3,274.00 **Depth Out:** 3,342.00 **Made:** 68.00 **Rotating Hours:** 53.00
Average Drill Rate: 1.28 **Total Rotating Hours:** 743.10
Bit Grade / Condition **I.A.D.C.:** 3 / 5 / BT / A / F / I / CI / TQ / **T / B / G:** / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min		Max		Min		Max
Force on Bit:	25,000	/	30,000	R.P.M.:	100	/	105
Pump 1 S.P.M. / Volume:		/		Pump 2 S.P.M. / Volume:		/	
S.P.P.:	21,000	/	21,000	Mud Density:	1,140	/	1,140
Drift Angle:	29.700	/	31.200	Funnel Viscosity:	82	/	90

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 22 **Make:** REED **Type:** EHP53A **IADC Series / Type:** /
Serial #: ED1382 **Size:** 311.0 **Jets / Nozzles:** 2.00 / 2.00 / 2.00 / 9.00 **T.F.A.:**
Depth In: 3,342.00 **Depth Out:** 3,371.00 **Made:** 29.00 **Rotating Hours:** 11.75
Average Drill Rate: 2.47 **Total Rotating Hours:** 754.85
Bit Grade / Condition **I.A.D.C.:** 8 / 8 / CT / A / F / 10 / LT / TQ / PR **T / B / G:** / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min		Max		Min		Max
Force on Bit:	30,000	/	30,000	R.P.M.:	105	/	105
Pump 1 S.P.M. / Volume:		/		Pump 2 S.P.M. / Volume:		/	
S.P.P.:	21,000	/	21,000	Mud Density:	1,140	/	1,140
Drift Angle:	30.000	/	31.900	Funnel Viscosity:	94	/	94

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 23 **Make:** RBI **Type:** C4LRGSP **IADC Series / Type:** /
Serial #: BW001 **Size:** 311.0 **Jets / Nozzles:** 2.00 / 2.00 / 7.00 / **T.F.A.:**
Depth In: 3,371.00 **Depth Out:** 3,372.00 **Made:** 1.00 **Rotating Hours:** 0.50
Average Drill Rate: 2.00 **Total Rotating Hours:** 755.35
Bit Grade / Condition **I.A.D.C.:** 2 / 2 / BT / H / E / I / NO / BHA / **T / B / G:** / /

Remarks:

Formations Drilled: Second Black Shale

Drilling Parameters

	Min		Max		Min		Max
Force on Bit:	12,000	/	12,000	R.P.M.:	60	/	60
Pump 1 S.P.M. / Volume:		/		Pump 2 S.P.M. / Volume:		/	
S.P.P.:	21,000	/	21,000	Mud Density:	1,140	/	1,140
Drift Angle:	32.000	/	32.000	Funnel Viscosity:	94	/	94

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 24 Make: HW Type: HS30 IADC Series / Type: /
 Serial #: G29DD Size: 311.0 Jets / Nozzles: 2.00 / 2.00 / 2.00 / T.F.A.:
 Depth In: 3,372.00 Depth Out: 3,446.00 Made: 74.00 Rotating Hours: 33.00
 Average Drill Rate: 2.24 Total Rotating Hours: 788.35

Bit Grade / Condition I.A.D.C.: 2 / 2 / BT / A / E / I / CT / HP / LOG T / B / G: / /

Remarks: Lost Circulation

Formations Drilled: Second Black Shale

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	25,000	/	30,000	R.P.M.:	80 / 100
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	21,000	/	21,600	Mud Density:	1,140 / 1,140
Drift Angle:	30.000	/	32.000	Funnel Viscosity:	83 / 83

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 25 Make: REED Type: EHP53 IADC Series / Type: /
 Serial #: MM911 Size: 216.0 Jets / Nozzles: 9.00 / 9.00 / 9.00 / T.F.A.:
 Depth In: 3,446.00 Depth Out: 3,450.00 Made: 4.00 Rotating Hours: 1.00
 Average Drill Rate: 4.00 Total Rotating Hours: 789.35

Bit Grade / Condition I.A.D.C.: 1 / 1 / NO / A / E / I / NO / CP / T / B / G: / /

Remarks:

Formations Drilled: Nahanni

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	/			R.P.M.:	/
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	/			Mud Density:	/
Drift Angle:	/			Funnel Viscosity:	/

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit #: 26 Make: Baker Type: C201 IADC Series / Type: /
 Serial #: 0322037 Size: 215.0 Jets / Nozzles: / / / T.F.A.:
 Depth In: 3,450.00 Depth Out: 3,456.80 Made: 6.80 Rotating Hours: 5.00
 Average Drill Rate: 1.36 Total Rotating Hours: 794.35

Bit Grade / Condition I.A.D.C.: 3 / 3 / / / / / / T / B / G: / /

Remarks:

Formations Drilled: Nahanni

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	3,000	/	5,000	R.P.M.:	45 / 60
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	5,500	/	7,200	Mud Density:	1,020 / 1,050
Drift Angle:	31.000	/	31.000	Funnel Viscosity:	50 / 80

Annular Velocity
Bottoms Up

Drill Collars:
Depth:

HeavyWeight Drill Pipe:
Theoretical:

Drill Pipe:
Actual:

Bit Data

Storage Units:

Metric

Bit #: 27RR Make: REED Type: EHP53A IADC Series / Type: /
Serial #: MM911 Size: 216.0 Jets / Nozzles: 9.00 / 9.00 / 9.00 / T.F.A.:
Depth In: 3,456.80 Depth Out: 3,685.00 Made: 228.20 Rotating Hours: 47.75
Average Drill Rate: 4.78 Total Rotating Hours: 842.10
Bit Grade / Condition I.A.D.C.: 8 / 8 / BT / A / F / 2 / WT / PR / T / B / G: / /

Remarks:

Formations Drilled: NAHANNI

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	11,000	/	12,000	R.P.M.:	70 / 100
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	8,000	/	8,300	Mud Density:	1,040 / 1,050
Drift Angle:	31.000	/	37.000	Funnel Viscosity:	50 / 55

Annular Velocity
Bottoms UpDrill Collars:
Depth:HeavyWeight Drill Pipe:
Theoretical:Drill Pipe:
Actual:

Bit #: 28 Make: HW Type: ATJ-S33 IADC Series / Type: /
Serial #: W89CR Size: 216.0 Jets / Nozzles: 9.00 / 9.00 / 9.00 / T.F.A.:
Depth In: 3,685.00 Depth Out: 3,770.00 Made: 85.00 Rotating Hours: 23.00
Average Drill Rate: 3.70 Total Rotating Hours: 865.10
Bit Grade / Condition I.A.D.C.: / / / / / / / T / B / G: / /

Remarks:

Formations Drilled: NAHANNI

Drilling Parameters

	Min	Max		Min	Max
Force on Bit:	11,000	/	12,000	R.P.M.:	100 / 100
Pump 1 S.P.M. / Volume:	/			Pump 2 S.P.M. / Volume:	/
S.P.P.:	6,700	/	7,000	Mud Density:	1,045 / 1,050
Drift Angle:	36.000	/	39.000	Funnel Viscosity:	54 / 61

Annular Velocity
Bottoms UpDrill Collars:
Depth:HeavyWeight Drill Pipe:
Theoretical:Drill Pipe:
Actual:

Core Report

Storage Units: Metric

Date: Dec 9,1999
Core #: 1
Formations Cored: NAHANNI

Cored Interval

From: 3,450.00 To: 3,452.00
Cut: 2.00 Recovered: 1.50 75.00%
Core Diameter: 102.00

Coring Company: BAKER HUGHES INTEQ
Service Representative: Tony Johnston

Core Bit Information Bit Make: Baker Bit Type: C201
 Bit Size (OD): 216.00 Serial #: 0322037
 Original Hole Size: 216.00

Remarks:

Detailed Core Descriptions

- 3,450.00 to 3,450.60 **DOLOMITE**
(0.60) dark gray host rock with up to 60% very light gray dolomite recrystallization, fine to very coarse crystalline, brecciated, slightly fossiliferous with trace *Amphipora*?, poor to fair intercrystalline, vug and fracture porosity (estimated 5%), trace pyrobitumen, no hydrocarbon fluorescence, trace vugs to 2cm with drusy dolomite rhombs and rare trace hexagonal quartz crystals, scattered fractures, trace stylolites, interval mainly rubble
- 3,450.60 to 3,451.20 **DOLOMITE**
(0.60) as above, dark gray host with 50% very light gray recrystallized dolomite, fine to very coarse crystalline, abundant fractures at 45 degrees to core axis, poor to fair vug and fracture porosity, no fluorescence, vugs to 2cm with drusy very coarse dolomite rhombs and trace hexagonal quartz crystals
- 3,451.20 to 3,451.50 **DOLOMITE**
(0.30) as above, poor to fair fracture porosity, (estimated 3-5%), trace pyrite, abundant fractures, interval all rubble
- 3,451.50 to 3,452.00 **Dolomite**
(0.50) Lost Core

Core Report

Storage Units: Metric

Date: Dec 10, 1999
Core #: 2
Formations Cored: Nahanni

Cored Interval

From: 3,452.00 To: 3,456.80
Cut: 4.80 Recovered: 4.80 100.00 %
Core Diameter: 102.00

Coring Company: Baker Hughes Inteq
Service Representative: Tony Johnston

Core Bit Information Bit Make: Baker Bit Type: C201
 Bit Size (OD): 216.00 Serial #: 0322037
 Original Hole Size: 216.00

Remarks:

Detailed Core Descriptions

- 3,452.00 to 3,452.40 **DOLOMITE**
(0.40) dark gray host rock with 60% recrystallized secondary white Dolomite, fine to very coarse crystalline, calcareous with very large calcite crystals, mainly tight with trace fracture and intercrystalline porosity (estimated <3%), no fluorescence, abundant coarse Dolomite crystals and minor hexagonal quartz crystals on fracture plane
- 3,452.40 to 3,453.00 **DOLOMITE**
(0.60) medium to dark gray, fine to coarse crystalline, abundant vertical to high angle fractures, fair fracture porosity (estimated 5%), trace vug and intercrystalline porosity, no fluorescence, thin flat argillaceous break at base of interval, 5cm streak poor to fair intercrystalline porosity above base contact
- 3,453.00 to 3,454.50 **DOLOMITE**
(1.50) dark gray with scattered white Dolomite fracture filling and inclusions to 20% rock volume, very fine to medium crystalline with very coarse crystalline white Dolomite, poor fracture porosity (estimated 3%) in high angle microfractures, no fluorescence, white Dolomite fracture filling to 6mm
- 3,454.50 to 3,456.80 **DOLOMITE**
(2.30) as above, dark gray host rock with up to 25% white Dolomite recrystallization, very fine to medium crystalline matrix with coarse to very coarse recrystallized Dolomite, fossiliferous, Corals? fair fracture and vug porosity (estimated 5-7%), no fluorescence, no pyrobitumen in open vugs, vugs to 7cm with very coarse drusy Dolomite rhombs and minor hexagonal quartz crystals, scattered open vertical to high angle fractures, rubble at base of interval

Wireline Logging Summary

Storage Units:

Metric

Logging Suite Number: 1
Wireline Logging Company: Schlumberger
District: Grande Prairie
Witness: B. Lillico
Engineer: Tanya Schneider
Unit Number: 2016

Was Pressure Control Equipment Utilized: Maximum Deviation: 32.000 °
Was the Logging Job Mechanically Assisted: Hole Size: 311.0

Total Lost Time: 14.00
Loggers' Total Down Time: 0.00
Total Job Time (From Rig up to Rig down): 10.00

	Measured Depth	True Vertical Depth
Casing Depth Driller	848.70	817.80
Casing Depth Logger	848.70	817.80
Total Depth Driller (Tally)	3,440.00	3,116.00
Total Depth Driller (Strap or SLM)	3,440.00	

General Remarks: Hole in good shape; 8m3 over bit size; Lost 11 hrs on UBI, Lost 3 hrs on OBDT.

Logging Run #: 1
Date: Nov 30, 1999

Drilling Fluid Data

Drilling Fluid Type: Invert Oil Base Mud
Fluid Density: 1100 Viscosity: 73 pH: Fluid Loss: 8.0

Mud Resistivity (Rm): @ °
Mud Resistivity (Rm) @ BHT: @ ° Maximum Temperature: 118.0 °
Mud Filtrate Resistivity (Rmf): @ ° Source (Rmf): N/A
Mud Cake Resistivity (Rmc): @ ° Source (Rmc):

Logging Run Information

Date on Bottom: Nov 30, 1999
Total Depth Logger: 3,437.50 (MD) 3,113.80 (TVD)

Logging Tools: AIT-DSI-EDAC-GPIT-AMS; 3437-848m, Gamma Ray to Surface; Hole Volume Log shows hole close to gauge, 8m3 over gauge.

Remarks: Repeat sections good; calibrations good.

Hole Conditions: Hole in good shape.

Wireline Logging Summary

Storage Units: Metric

Logging Run #: 2
Date: Dec 1, 1999

Drilling Fluid Data

Drilling Fluid Type: Invert Oil Base Mud
Fluid Density: 1100 Viscosity: 73 pH: Fluid Loss: 8.0

Mud Resistivity (Rm):	@	°		
Mud Resistivity (Rm) @ BHT:	@	°	Maximum Temperature:	130.0 °
Mud Filtrate Resistivity (Rmf):	@	°	Source (Rmf):	N/A
Mud Cake Resistivity (Rmc):	@	°	Source (Rmc):	

Logging Run Information

Date on Bottom: Dec 1, 1999
Total Depth Logger: 3,427.00 (MD) 3,104.80 (TVD)

Logging Tools: Ultra-Sonic Borehole Imager; 3720-1650m; Lost 11 hours re-logging bottom and leap-frogging over noisy intervals.

Remarks: UBI seeing noise spikes; relogged bottom section; logged entire interval on medium resolution; Standoff rubber and string found in UBI tool once back at surface. Some difficulty getting UBI to spin.

Hole Conditions: Only got down to 3427m; hole good coming out.

Wireline Logging Summary

Storage Units:

Metric

Logging Run #: 3
Date: Dec 1, 1999

Drilling Fluid Data

Drilling Fluid Type: Invert Oil Base Mud

Fluid Density: 1100 Viscosity: 73 pH: Fluid Loss: 8.0

Mud Resistivity (Rm): @ °

Mud Resistivity (Rm) @ BHT: @ °

Mud Filtrate Resistivity (Rmf): @ °

Mud Cake Resistivity (Rmc): @ °

Maximum Temperature: °

Source (Rmf):

Source (Rmc):

Logging Run Information

Date on Bottom: Dec 1, 1999

Total Depth Logger: 3,725.00 (MD) 3,103.50 (TVD)

Logging Tools: Oil Base Dipmeter; 3725-848m; had to boot computer and run back to bottom from 2700m and re-log.

Remarks:

Hole Conditions: Got down to 3725m, logged out to surface casing, hole good coming out.

Deviation / Directional Survey Report

Directional Drilling Company:	Baker Hughes Inteq
Directional Drillers:	Logan Gardipee, Stewart Schmidt
Measured While Drilling (MWD) Hands:	Anthony Khan
Survey Type:	electronic
Survey Mode:	MWD
Survey Date:	9/29/1999
Survey Calculation Method:	minimum curvature
Vertical Section Calculated on:	345.80 ° plane

Survey Tie-In Information

Tie-In Depths	Measured Depth:	True Vertical Depth (TVD):
Tie-In Node	Latitude:	Longitude:
Tie-In Co-Ordinates		
N / S:		
E / W:		

Kick-Off (Whipstock) Information

Kick-Off Depths	Measured Depth:	303.00	True Vertical Depth (TVD):	303.00
Kick-Off Node	Latitude:	60.4141000	Longitude:	123.5868000
Kick-Off Co-Ordinates				
N / S:	6.52 meters North of Surface Location			
E / W:	3.71 meters East of Surface Location			

Remarks: Vertical Section calculated on 345.8 AZM

Survey Points

Storage Units:

Metric

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
28.00	28.00	0.500	226.00	-0.08	-0.09	-0.06	0.54
58.00	58.00	0.500	328.00	-0.06	-0.25	0.00	0.78
92.00	92.00	1.250	6.00	0.43	-0.29	0.49	0.80
129.00	129.00	2.250	34.00	1.43	0.16	1.35	1.04
162.00	162.00	2.500	32.00	2.58	0.90	2.28	0.24
192.00	191.92	2.500	36.00	3.66	1.63	3.15	0.17
228.00	227.90	1.750	32.00	4.77	2.38	4.04	0.64
257.00	256.88	1.500	36.00	5.45	2.84	4.59	0.28
285.00	284.87	1.700	43.60	6.05	3.34	5.04	0.31
295.60	295.47	1.800	36.40	6.20	3.55	5.23	0.68
303.30	303.16	2.300	35.30	6.52	3.71	5.41	1.95
312.70	312.55	2.600	30.80	6.85	3.93	5.68	1.14
321.80	321.64	3.200	27.30	7.26	4.15	6.02	2.06
331.30	331.12	4.000	23.60	7.80	4.41	6.48	2.63
341.00	340.80	4.800	15.90	8.50	4.65	7.10	3.07
350.70	350.46	5.600	12.50	9.35	4.87	7.87	2.65
360.40	360.10	6.500	7.70	10.36	5.04	8.80	3.19
369.90	369.53	7.200	2.90	11.48	5.15	9.87	2.85
379.20	378.76	7.700	358.30	12.69	5.16	11.04	2.51
388.90	388.36	8.200	354.60	14.03	5.07	12.35	2.21
398.70	398.05	9.200	351.70	15.50	4.89	13.82	3.34
408.30	407.52	9.900	351.10	17.07	4.66	15.41	2.21
417.90	416.96	10.500	348.10	18.74	4.35	17.11	2.50
427.50	426.40	10.900	345.40	20.48	3.94	18.89	2.00
436.50	435.23	11.300	343.10	22.14	3.47	20.62	1.99
446.00	444.54	11.800	340.50	23.95	2.87	22.52	2.28
455.80	454.12	12.100	339.70	25.86	2.18	24.54	1.05
465.20	463.31	12.500	337.00	27.72	1.44	26.52	2.24
475.80	473.64	13.200	336.90	29.89	0.52	28.85	1.98
484.60	482.20	13.600	336.50	31.76	-0.29	30.86	1.40
494.20	491.52	14.200	336.70	33.88	-1.20	33.14	1.88
503.70	500.72	14.600	336.20	36.04	-2.15	35.47	1.31
513.20	509.91	15.100	337.80	38.29	-3.10	37.88	2.04
522.90	519.26	15.500	337.60	40.65	-4.07	40.41	1.25
532.70	528.70	16.000	338.40	43.12	-5.07	43.05	1.67

542.50	538.10	16.500	338.20	45.67	-6.08	45.77	1.54
552.20	547.39	17.200	338.90	48.29	-7.11	48.55	2.25
561.20	555.97	17.700	340.20	50.81	-8.05	51.24	2.11
571.00	565.28	18.700	340.90	53.70	-9.07	54.29	3.13
580.60	574.36	19.400	341.90	56.67	-10.07	57.41	2.41
590.10	583.30	20.100	341.70	59.72	-11.07	60.61	2.22
599.50	592.11	20.600	341.60	62.82	-12.10	63.87	1.60
608.70	600.71	21.000	340.90	65.92	-13.15	67.13	1.54
618.30	609.64	22.000	342.90	69.26	-14.24	70.64	3.87
627.80	618.45	22.200	344.00	72.69	-15.26	74.21	1.45
637.50	627.42	22.400	345.20	76.23	-16.24	77.89	1.54
646.50	635.74	22.300	343.90	79.53	-17.15	81.31	1.68
656.00	644.50	23.200	344.10	83.06	-18.16	84.98	2.85
665.50	653.21	24.000	342.40	86.71	-19.26	88.78	3.32
675.10	661.95	25.000	343.70	90.51	-20.42	92.76	3.55
684.80	670.75	24.600	342.60	94.41	-21.60	96.82	1.89
694.30	679.39	24.700	341.40	98.18	-22.82	100.77	1.61
703.50	687.72	25.300	341.70	101.86	-24.05	104.65	2.00
712.90	696.19	26.300	341.40	105.74	-25.35	108.73	3.22
722.40	704.67	27.200	339.10	109.77	-26.79	112.99	4.33
731.80	713.02	27.500	337.70	113.78	-28.38	117.27	2.26
741.30	721.47	26.900	340.10	117.83	-29.95	121.58	3.95
750.90	730.05	26.400	339.90	121.88	-31.42	125.86	1.59
760.10	738.29	26.300	340.80	125.72	-32.79	129.93	1.34
769.30	746.53	26.600	342.30	129.61	-34.09	134.01	2.39
778.80	755.03	26.400	343.50	133.66	-35.34	138.25	1.80
788.60	763.80	26.700	346.20	137.89	-36.48	142.63	3.81
797.90	772.12	26.300	346.80	141.93	-37.45	146.77	1.55
807.70	780.91	26.200	349.40	146.17	-38.34	151.10	3.53
817.20	789.45	25.800	350.80	150.27	-39.06	155.26	2.31
826.50	797.82	26.000	351.60	154.28	-39.68	159.30	1.30
836.30	806.63	25.900	354.10	158.54	-40.21	163.56	3.36
867.70	834.74	27.000	352.60	172.43	-41.84	177.42	1.23
877.40	843.37	27.500	350.70	176.82	-42.48	181.84	3.10
887.00	851.88	27.500	348.40	181.18	-43.29	186.26	3.32
896.50	860.30	27.600	348.80	185.49	-44.15	190.65	0.66
906.00	868.75	26.900	347.20	189.74	-45.06	195.00	3.20
915.60	877.31	26.800	348.40	193.98	-45.97	199.33	1.72
924.00	884.81	27.000	348.10	197.70	-46.75	203.13	0.86

933.40	893.18	26.900	346.00	201.85	-47.70	207.39	3.05
942.80	901.57	26.900	344.20	205.96	-48.80	211.64	2.60
952.20	909.95	27.000	345.30	210.07	-49.92	215.90	1.62
961.90	918.60	26.800	345.10	214.31	-51.04	220.29	0.68
971.30	926.98	26.900	346.50	218.43	-52.08	224.53	2.04
980.70	935.38	26.600	346.30	222.54	-53.07	228.76	1.00
990.00	943.69	26.700	347.00	226.60	-54.04	232.93	1.06
999.60	952.26	26.900	344.90	230.80	-55.09	237.26	3.02
1,009.10	960.73	26.900	345.00	234.95	-56.20	241.56	0.14
1,018.80	969.38	26.900	345.60	239.19	-57.32	245.95	0.84
1,037.50	986.08	26.600	345.10	247.34	-59.45	254.36	0.60
1,047.10	994.66	26.700	344.80	258.67	-60.56	258.67	0.52
1,056.60	1,003.14	26.900	344.50	255.63	-61.70	262.95	0.76
1,066.00	1,011.51	27.300	344.20	259.75	-62.85	267.23	1.31
1,075.50	1,019.95	27.400	343.40	263.94	-64.06	271.59	1.34
1,085.10	1,028.47	27.300	343.00	268.16	-65.34	276.00	0.65
1,094.60	1,036.92	27.200	344.10	272.34	-66.57	280.34	1.62
1,104.30	1,045.55	27.000	343.60	276.58	-67.80	284.76	0.94
1,113.90	1,054.12	26.700	341.80	280.72	-69.09	289.08	2.71
1,123.50	1,062.70	26.500	341.80	284.80	-70.43	293.38	0.63
1,133.10	1,071.29	26.600	342.20	288.88	-71.76	297.66	0.64
1,142.70	1,079.87	26.800	343.40	293.00	-73.03	301.97	1.80
1,152.30	1,088.44	26.700	343.60	297.15	-74.26	306.28	0.42
1,161.90	1,097.01	26.900	342.70	301.29	-75.51	310.61	1.41
1,171.40	1,105.47	27.300	344.10	305.44	-76.75	314.93	2.38
1,181.00	1,114.00	27.300	344.30	309.67	-77.95	319.33	0.29
1,190.60	1,122.53	27.200	344.20	313.90	-79.14	323.73	0.34
1,199.60	1,130.55	26.900	343.50	317.84	-80.28	327.82	1.46
1,209.10	1,139.01	27.000	343.20	321.96	-81.51	332.12	0.53
1,218.50	1,147.37	27.500	343.00	326.08	-82.76	336.42	1.62
1,228.20	1,155.95	28.100	344.40	330.42	-84.03	340.94	1.86
1,237.70	1,164.33	28.100	344.50	334.73	-85.23	345.41	0.15
1,247.40	1,172.89	28.000	344.50	339.13	-86.45	349.97	0.31
1,257.10	1,181.47	27.700	342.80	343.47	-87.73	354.50	2.63
1,266.10	1,189.45	27.500	344.30	347.47	-88.91	358.67	2.41
1,275.50	1,197.79	27.400	343.60	351.64	-90.11	363.00	1.08
1,285.00	1,206.22	27.400	344.00	355.84	-91.33	367.37	0.58
1,294.60	1,214.74	27.500	344.20	360.09	-92.54	371.79	0.43
1,304.10	1,223.17	27.400	344.70	364.31	-93.71	376.17	0.79

1,313.60	1,231.61	27.200	344.30	368.51	-94.88	380.52	0.86
1,323.10	1,240.07	26.900	343.30	372.66	-96.08	384.84	1.72
1,332.60	1,248.53	27.200	342.90	376.79	-97.34	389.16	1.11
1,342.10	1,256.97	27.500	342.10	380.95	-98.65	393.51	1.50
1,357.50	1,270.62	27.700	344.40	387.78	-100.71	400.64	2.11
1,361.10	1,273.81	27.600	344.50	389.39	-101.15	402.31	0.92
1,370.80	1,282.41	27.400	345.60	393.72	-102.31	406.79	1.69
1,380.30	1,290.86	27.100	344.50	397.92	-103.43	411.14	1.85
1,389.90	1,299.41	27.100	344.10	402.13	-104.61	415.51	0.57
1,399.50	1,307.95	27.100	344.60	406.35	-105.79	419.88	0.71
1,409.00	1,316.40	27.400	344.00	410.53	-106.97	424.23	1.28
1,418.60	1,324.92	27.500	345.60	414.80	-108.13	428.65	2.33
1,428.20	1,333.43	27.500	346.30	419.10	-109.21	433.09	1.01
1,437.80	1,341.96	27.100	346.80	423.39	-110.23	437.49	1.44
1,447.30	1,350.43	26.900	346.20	427.58	-111.24	441.80	1.07
1,456.90	1,358.98	27.000	345.40	431.80	-112.31	446.15	1.18
1,466.50	1,367.54	27.000	345.50	436.02	-113.40	450.51	0.14
1,476.10	1,376.10	26.800	345.20	440.22	-114.50	454.85	0.76
1,485.70	1,384.66	27.100	345.20	444.42	-115.61	459.20	0.94
1,495.60	1,393.45	27.700	345.40	448.83	-116.77	463.76	1.84
1,504.90	1,401.67	27.900	345.50	453.03	-117.86	468.10	0.66
1,514.50	1,410.16	27.800	345.60	457.37	-118.98	472.58	0.34
1,524.00	1,418.56	27.800	346.00	461.67	-120.06	477.01	0.59
1,533.60	1,426.06	27.600	347.70	466.01	-121.08	481.47	2.55
1,543.20	1,435.58	27.500	347.90	470.35	-122.02	485.91	0.43
1,552.70	1,443.99	27.700	347.70	474.65	-122.95	490.31	0.70
1,562.40	1,452.58	27.700	346.80	479.05	-123.94	494.82	1.29
1,571.90	1,461.00	27.500	346.10	483.33	-124.97	499.22	1.20
1,581.50	1,469.52	27.300	346.70	487.62	-126.01	503.64	1.07
1,600.70	1,486.57	27.500	347.90	496.24	-127.95	512.47	0.92
1,610.60	1,495.36	27.400	349.50	500.72	-128.85	517.03	2.26
1,620.20	1,503.86	27.800	348.80	505.09	-129.69	521.47	1.61
1,629.70	1,512.27	27.700	348.10	509.42	-130.57	525.88	1.08
1,639.30	1,520.77	27.800	349.00	513.80	-131.46	530.35	1.35
1,648.90	1,529.26	27.900	348.10	518.20	-132.35	534.83	1.35
1,658.60	1,537.84	27.700	348.60	522.63	-133.26	539.35	0.95
1,668.20	1,546.33	27.900	350.20	527.03	-134.09	543.82	2.41
1,677.80	1,554.80	28.300	352.50	531.50	-134.76	548.32	3.61
1,687.40	1,563.25	28.400	352.30	536.02	-135.37	552.84	0.43

1,696.90	1,571.61	28.300	353.10	540.49	-135.94	557.32	1.24
1,706.50	1,580.07	28.000	351.60	544.98	-136.54	561.82	2.40
1,716.10	1,588.54	28.100	349.70	549.43	-137.28	566.32	2.81
1,725.70	1,597.02	28.000	348.60	553.87	-138.13	570.83	1.65
1,735.20	1,605.41	27.800	347.70	558.22	-139.04	575.27	1.47
1,744.80	1,613.90	28.000	347.10	562.60	-140.02	579.76	1.08
1,754.40	1,622.38	27.800	346.90	566.98	-141.03	584.25	0.69
1,764.00	1,630.87	27.900	346.40	571.34	-142.07	588.73	0.79
1,773.60	1,639.34	28.100	345.40	575.71	-143.16	593.24	1.59
1,783.10	1,647.74	27.800	345.70	580.02	-144.27	597.69	1.05
1,792.70	1,656.23	27.800	344.10	584.35	-145.44	602.17	2.33
1,802.30	1,664.72	27.700	343.90	588.64	-146.67	606.64	0.43
1,811.90	1,673.22	27.800	345.00	592.95	-147.87	611.11	1.63
1,821.40	1,681.62	27.800	343.00	597.21	-149.09	615.53	2.95
1,831.00	1,690.12	27.600	342.80	601.47	-150.40	619.99	0.69
1,840.60	1,698.63	27.600	342.10	605.71	-151.75	624.43	1.01
1,850.20	1,707.14	27.500	342.20	609.94	-153.11	628.86	0.34
1,859.80	1,715.66	27.400	342.30	614.15	-154.46	633.28	0.34
1,869.30	1,724.11	27.000	342.70	618.30	-155.76	637.61	1.39
1,878.90	1,732.67	26.900	342.70	622.45	-157.05	641.96	0.31
1,888.50	1,741.24	26.700	343.90	626.60	-158.30	646.28	1.80
1,898.10	1,749.81	26.700	343.80	630.74	-159.50	650.59	0.14
1,907.70	1,758.38	26.900	344.10	634.90	-160.70	634.90	0.75
1,917.20	1,766.84	27.400	344.30	639.07	-161.88	659.25	1.61
1,926.80	1,775.35	27.600	344.40	634.34	-163.07	663.68	0.64
1,936.40	1,783.84	28.000	343.80	647.64	-164.30	668.16	1.53
1,946.00	1,792.32	28.100	344.10	651.98	-165.55	672.67	0.54
1,955.60	1,800.80	27.700	344.10	656.30	-166.78	677.16	1.25
1,965.10	1,809.21	27.800	344.50	660.56	-167.97	681.58	0.67
1,974.70	1,817.69	28.000	345.90	664.90	-169.12	686.07	2.14
1,984.40	1,826.26	27.800	345.80	669.30	-170.23	690.61	0.64
1,993.90	1,834.67	27.700	347.40	673.61	-171.26	695.04	2.37
2,003.50	1,843.17	27.700	346.90	677.96	-172.25	699.50	0.73
2,013.10	1,851.66	27.900	345.60	682.31	-173.31	703.97	2.00
2,022.70	1,860.14	28.000	344.10	686.65	-174.49	708.47	2.22
2,032.30	1,868.63	27.800	344.10	690.97	-175.72	712.96	0.62
2,041.80	1,877.05	27.400	343.20	695.19	-176.96	717.36	1.82
2,051.40	1,885.59	26.800	343.70	699.39	-178.20	721.73	2.01
2,061.00	1,894.16	26.800	344.50	703.55	-179.39	726.06	1.13

2,070.60	1,902.73	26.800	344.90	707.72	-180.53	730.38	0.56
2,080.20	1,911.31	26.600	346.10	711.90	-181.61	734.70	1.80
2,089.80	1,919.86	27.300	345.90	716.12	-182.66	739.05	2.21
2,099.40	1,928.38	27.600	345.40	720.41	-183.76	743.47	1.18
2,109.00	1,936.87	28.100	346.50	724.76	-184.85	747.96	1.56
2,118.50	1,945.26	27.800	345.80	729.08	-185.92	752.41	1.40
2,128.10	1,953.75	28.000	345.60	733.43	-187.02	756.90	0.69
2,137.70	1,962.24	27.500	344.90	737.76	-188.16	761.37	1.87
2,147.30	1,970.78	27.000	344.40	742.00	-189.33	765.77	1.72
2,156.90	1,979.34	26.800	344.60	746.18	-190.49	770.11	0.69
2,166.50	1,987.90	27.000	344.60	750.37	-191.64	774.45	0.62
2,176.00	1,996.35	27.300	345.50	754.56	-192.76	778.79	1.61
2,185.00	2,004.36	27.100	345.40	758.74	-193.79	782.90	0.68
2,195.20	2,013.44	27.000	345.20	763.03	-194.97	787.54	0.40
2,204.80	2,021.99	27.100	344.30	767.24	-196.12	791.90	1.32
2,214.40	2,030.53	27.300	343.00	771.45	-197.35	796.29	0.63
2,224.00	2,039.04	27.800	343.70	775.70	-198.62	800.72	1.86
2,233.50	2,047.44	27.900	342.80	779.95	-199.90	805.16	1.36
2,243.10	2,055.93	27.900	342.50	784.24	-201.24	809.64	0.44
2,252.70	2,064.40	28.200	342.60	788.55	-202.60	814.15	0.95
2,262.30	2,072.87	28.000	342.80	792.86	-203.94	818.66	0.69
2,271.90	2,081.36	27.600	342.30	797.13	-205.28	823.13	1.45
2,281.50	2,089.88	27.200	342.80	801.35	-206.61	827.55	1.44
2,291.10	2,098.43	26.900	342.70	805.52	-207.90	831.91	0.95
2,300.50	2,106.83	26.600	342.60	809.56	-209.17	836.13	0.97
2,310.00	2,115.33	26.400	341.20	813.59	-210.48	840.36	2.07
2,319.50	2,123.84	26.300	341.90	817.58	-211.82	844.56	1.03
2,329.10	2,132.43	26.800	340.90	821.65	-213.19	848.84	2.10
2,338.70	2,140.99	27.100	341.10	825.77	-214.60	853.18	0.98
2,348.30	2,149.52	27.300	342.60	829.93	-215.97	857.55	2.23
2,357.80	2,157.97	27.300	342.90	834.10	-217.26	861.91	0.43
2,367.40	2,166.48	27.800	344.40	838.36	-218.51	866.34	2.67
2,377.00	2,174.97	27.900	345.50	842.69	-219.67	870.83	1.64
2,386.60	2,183.45	27.900	345.70	847.04	-220.79	875.32	0.29
2,396.00	2,191.75	28.000	344.60	851.30	-221.92	879.72	1.68
2,405.80	2,200.42	27.600	345.10	855.71	-223.12	884.29	1.42
2,415.30	2,208.84	27.600	345.80	859.97	-224.22	888.69	1.02
2,424.70	2,217.17	27.600	345.70	864.19	-225.29	893.05	0.15
2,438.00	2,228.95	27.800	343.90	870.15	-226.91	899.23	1.94

2,447.40	2,237.27	27.500	344.70	874.35	-228.09	903.59	1.52
2,460.90	2,249.32	26.100	345.90	880.24	-229.64	909.68	3.34
2,470.50	2,257.96	25.700	346.10	884.31	-230.66	913.87	1.28
2,480.00	2,266.53	25.300	346.40	888.28	-231.63	917.96	1.33
2,489.60	2,275.22	25.000	346.60	892.25	-232.58	922.04	0.97
2,499.20	2,283.92	25.000	345.20	896.18	-233.57	926.10	1.85
2,508.80	2,292.59	26.000	344.40	900.17	-234.65	930.23	3.31
2,518.40	2,301.17	27.200	344.00	904.31	-235.82	934.53	3.79
2,528.00	2,309.71	27.300	345.30	908.55	-236.99	938.92	1.89
2,537.50	2,318.19	26.200	346.20	912.69	-238.04	943.20	3.70
2,546.90	2,326.66	25.200	346.70	916.65	-238.99	947.27	3.27
2,556.40	2,335.29	24.200	347.70	920.52	-239.87	951.24	3.42
2,566.20	2,344.25	23.700	348.50	924.42	-240.70	955.21	1.83
2,575.80	2,353.05	23.300	350.00	928.18	-241.41	959.04	2.25
2,585.40	2,361.85	23.700	349.90	931.95	-242.08	962.85	1.26
2,595.00	2,370.63	24.100	349.10	935.77	-242.79	966.73	1.61
2,604.60	2,379.39	24.200	350.60	939.64	-243.48	970.65	1.94
2,614.20	2,388.14	24.300	351.10	943.53	-244.11	974.58	0.71
2,623.80	2,396.60	24.200	350.50	947.42	-244.74	978.51	0.83
2,633.40	2,405.64	24.500	349.80	951.32	-245.41	982.45	1.30
2,643.00	2,414.38	24.500	349.70	955.24	-246.12	986.43	0.13
2,652.40	2,422.92	24.800	349.00	959.09	-246.85	990.34	1.34
2,661.90	2,431.53	25.200	348.50	963.03	-247.63	994.35	1.43
2,671.40	2,440.09	26.200	348.70	967.07	-248.44	998.46	3.17
2,681.00	2,448.68	26.900	348.40	971.27	-249.30	1,002.75	2.23
2,690.60	2,457.21	27.800	347.30	975.58	-250.22	1,007.16	3.23
2,700.10	2,465.60	28.000	347.60	979.92	-251.19	1,011.60	0.77
2,709.60	2,473.98	28.200	346.60	984.28	-252.19	1,016.07	1.62
2,719.00	2,482.27	28.100	347.40	988.61	-253.19	1,020.51	1.25
2,728.50	2,490.62	28.800	346.50	993.01	-254.21	1,025.03	2.59
2,738.00	2,498.94	29.100	344.90	997.47	-255.35	1,029.63	2.62
2,747.60	2,507.31	29.400	343.50	1,001.98	-256.62	1,034.32	2.33
2,757.20	2,515.66	29.900	341.60	1,006.51	-258.05	1,039.06	3.33
2,766.90	2,524.07	29.700	339.60	1,011.06	-259.65	1,043.86	3.14
2,776.60	2,532.51	29.400	338.50	1,015.53	-261.36	1,048.61	1.92
2,786.20	2,540.88	29.200	338.40	1,019.90	-263.08	1,053.27	0.64
2,795.90	2,549.36	28.900	337.70	1,024.27	-264.84	1,057.94	1.40
2,805.50	2,557.79	28.500	337.20	1,028.52	-266.60	1,062.49	1.41
2,815.20	2,566.31	28.600	336.30	1,032.78	-268.43	1,067.07	1.37

2,824.70	2,574.65	28.500	335.90	1,036.93	-270.28	1,071.55	0.68
2,834.30	2,583.08	28.600	336.10	1,041.12	-272.15	1,076.07	0.43
2,844.20	2,591.79	28.300	335.50	1,045.43	-274.08	1,080.72	1.26
2,854.00	2,600.44	27.600	332.60	1,049.56	-276.09	1,085.21	4.68
2,863.70	2,609.05	27.400	331.70	1,053.52	-278.18	1,089.56	1.43
2,873.50	2,617.79	26.200	332.50	1,057.42	-280.25	1,093.86	3.84
2,883.20	2,626.56	24.600	333.90	1,061.13	-282.13	1,097.92	5.29
2,892.90	2,635.43	23.000	335.50	1,064.67	-283.80	1,101.76	5.34
2,902.60	2,644.37	22.700	334.30	1,068.08	-285.40	1,105.45	1.71
2,912.30	2,653.34	22.200	334.20	1,071.42	-287.01	1,109.08	1.55
2,922.00	2,662.32	22.200	333.50	1,074.71	-288.62	1,112.67	0.82
2,931.60	2,671.19	22.600	335.30	1,078.01	-290.20	1,116.26	2.48
2,941.30	2,680.13	23.200	335.50	1,081.44	-291.77	1,119.97	1.87
2,950.90	2,688.93	23.800	337.93	1,084.95	-293.30	1,123.74	3.02
2,960.60	2,697.80	24.100	334.80	1,088.55	-294.90	1,127.62	24.10
2,970.40	2,706.73	24.400	336.00	1,092.21	-296.57	1,131.58	1.77
2,980.10	2,715.56	24.500	334.50	1,095.85	-298.25	1,135.53	1.94
2,989.90	2,724.46	24.900	335.70	1,099.57	-299.98	1,139.55	1.96
2,999.50	2,733.15	25.400	335.00	1,103.27	-301.68	1,143.56	1.82
3,009.20	2,741.89	26.100	335.40	1,107.10	-303.45	1,147.71	2.23
3,018.80	2,750.49	26.700	336.60	1,111.00	-305.18	1,151.91	2.51
3,028.50	2,759.14	27.100	336.40	1,115.02	-306.93	1,156.24	1.27
3,038.10	2,767.68	27.400	335.80	1,119.04	-308.71	1,160.58	1.27
3,047.80	2,776.25	28.400	335.30	1,123.17	-310.59	1,165.04	3.18
3,057.30	2,784.59	28.800	335.60	1,127.31	-312.48	1,169.52	1.34
3,066.90	2,793.00	28.900	336.90	1,131.55	-314.35	1,174.08	1.98
3,076.40	2,801.34	28.300	337.00	1,135.73	-316.73	1,178.58	1.90
3,086.10	2,809.90	27.700	336.10	1,139.91	-317.94	1,183.07	2.27
3,095.80	2,818.51	27.200	336.20	1,144.00	-319.75	1,187.48	1.55
3,105.50	2,827.14	27.100	337.80	1,148.08	-321.48	1,191.85	2.28
3,115.10	2,835.68	27.400	336.80	1,152.13	-323.17	1,196.20	1.71
3,124.80	2,844.28	27.600	336.50	1,156.24	-324.95	1,200.62	0.75
3,134.50	2,852.86	27.900	338.80	1,160.42	-326.67	1,205.09	3.44
3,144.20	2,861.41	28.500	338.60	1,164.69	-328.33	1,209.64	1.88
3,153.90	2,869.91	29.100	338.70	1,169.04	-330.03	1,214.28	1.86
3,163.70	2,878.46	29.500	339.20	1,173.52	-331.75	1,219.04	1.44
3,173.40	2,886.89	29.700	339.30	1,178.00	-333.45	1,223.80	0.64
3,183.60	2,895.72	30.400	339.50	1,182.78	-335.25	1,228.87	2.08
3,193.30	2,904.07	30.900	339.40	1,187.41	-336.99	1,233.79	1.55

3,202.60	2,912.05	30.900	339.50	1,191.88	-338.66	1,238.54	0.17
3,212.20	2,920.29	30.800	339.60	1,196.50	-340.38	1,243.43	0.35
3,221.90	2,928.63	30.700	340.70	1,201.16	-342.07	1,248.36	1.77
3,231.60	2,936.97	30.500	340.00	1,205.81	-343.73	1,253.28	1.26
3,241.00	2,945.09	30.100	340.30	1,210.27	-345.34	1,258.00	1.36
3,250.70	2,953.47	30.300	339.80	1,214.86	-347.00	1,262.85	0.99
3,260.40	2,961.82	30.900	340.20	1,219.50	-348.69	1,267.77	1.96
3,270.80	2,970.75	30.900	340.20	1,224.52	-350.50	1,273.08	0.00
3,280.50	2,979.06	31.200	339.50	1,229.22	-352.22	1,278.06	1.45
3,290.10	2,987.27	31.100	340.00	1,233.88	-353.94	1,282.99	0.87
3,299.70	2,995.51	30.600	339.70	1,238.50	-355.64	1,287.89	1.63
3,309.30	3,003.78	30.500	339.20	1,243.07	-357.35	1,292.74	0.85
3,319.00	3,012.16	30.100	339.70	1,247.65	-359.07	1,297.60	1.46
3,328.70	3,020.56	29.800	342.50	1,252.23	-360.64	1,302.43	4.42
3,338.40	3,028.98	29.700	341.90	1,256.81	-362.11	1,307.23	0.97
3,348.10	3,037.40	30.000	341.90	1,261.40	-363.61	1,312.05	0.93
3,357.80	3,045.76	30.900	341.50	1,266.07	-365.15	1,316.95	2.85
3,367.40	3,053.95	31.900	341.90	1,270.82	-366.72	1,321.94	3.19
3,377.00	3,062.10	32.000	342.70	1,275.66	-368.27	1,327.01	1.36
3,386.60	3,070.26	31.600	342.50	1,280.49	-369.78	1,332.06	1.29
3,396.40	3,078.61	31.400	341.50	1,285.36	-371.36	1,337.17	1.71
3,406.10	3,086.91	30.900	340.60	1,290.10	-372.99	1,342.17	2.11
3,415.80	3,095.22	31.200	340.60	1,294.82	-374.65	1,347.15	0.93
3,425.50	3,103.53	31.000	340.20	1,299.54	-376.33	1,352.14	0.89

Deviation / Directional Survey Report

Directional Drilling Company:	Baker Hughes Inteq
Directional Drillers:	Logan Gardipee
Measured While Drilling (MWD) Hands:	Anthony Khan
Survey Type:	electronic
Survey Mode:	MWD
Survey Date:	12/11/1999
Survey Calculation Method:	minimum curvature
Vertical Section Calculated on:	40.00 ° plane

Survey Tie-In Information

Tie-In Depths	Measured Depth:	3,425.50	True Vertical Depth (TVD):	3,103.53
Tie-In Node	Latitude:		Longitude:	
Tie-In Co-Ordinates				
N / S: 1299.54 meters North of surface location				
E / W: 376.33 meters West of surface location				

Kick-Off (Whipstock) Information

Kick-Off Depths	Measured Depth:	True Vertical Depth (TVD):
Kick-Off Node	Latitude:	Longitude:
Kick-Off Co-Ordinates		
N / S:		
E / W:		

Remarks: After running casing to 3437m hole target azimuth was changed to 40 degrees AZM at 36 degrees drift.

Survey Points

Storage Units:

Metric

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
3,453.40	3,127.46	30.900	333.80	1,312.73	-381.93	760.11	3.54
3,463.00	3,135.68	31.500	334.40	1,317.21	-384.10	762.14	2.11
3,472.80	3,144.04	31.400	335.20	1,321.83	-386.28	764.29	1.31
3,482.40	3,152.22	31.700	338.30	1,326.45	-388.26	766.55	5.15
3,492.00	3,160.35	32.500	341.90	1,331.24	-390.00	769.11	6.48
3,501.70	3,168.54	32.400	345.10	1,336.23	-391.47	771.98	5.32
3,511.40	3,176.73	32.300	348.20	1,341.28	-392.67	775.07	5.14
3,521.10	3,184.84	34.200	351.70	1,346.51	-393.60	778.49	8.35
3,530.80	3,192.77	36.200	357.00	1,352.07	-394.14	782.40	11.29
3,540.41	3,200.46	37.400	1.10	1,357.82	-394.23	786.74	8.54
3,550.20	3,208.18	38.600	2.90	1,363.85	-394.02	791.50	5.00
3,559.90	3,215.72	39.400	5.60	1,369.94	-393.57	796.45	5.81
3,569.60	3,223.22	39.300	7.70	1,376.04	-392.85	801.59	4.13
3,579.30	3,230.75	38.900	11.70	1,382.07	-391.82	806.87	7.90
3,589.00	3,238.38	37.400	14.40	1,387.91	-390.47	812.21	6.94
3,598.60	3,246.05	36.500	17.40	1,393.46	-388.90	817.47	6.30
3,608.30	3,253.87	36.200	20.30	1,398.90	-387.04	822.83	5.40
3,618.00	3,261.69	36.300	23.20	1,404.22	-384.91	828.28	5.31
3,627.70	3,269.51	36.300	26.00	1,409.44	-382.52	833.81	5.13
3,637.30	3,277.25	36.200	30.20	1,414.45	-379.85	839.37	7.77
3,647.00	3,285.06	36.500	35.00	1,419.29	-376.76	845.06	8.85
3,656.70	3,292.83	37.100	38.30	1,423.95	-373.29	850.86	6.39
3,666.40	3,300.59	36.600	40.40	1,428.45	-369.60	856.68	4.19
3,672.00	3,305.11	36.000	40.40	1,430.97	-367.45	859.99	3.21
3,714.60	3,339.15	37.900	39.30	1,450.63	-351.05	885.60	1.42

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
28.00	28.00	0.500	226.00	-0.08	-0.09	-0.06	0.54
58.00	58.00	0.500	328.00	-0.06	-0.25	0.00	0.78
92.00	92.00	1.250	6.00	0.43	-0.29	0.49	0.80
129.00	129.00	2.250	34.00	1.43	0.16	1.35	1.04
162.00	162.00	2.500	32.00	2.58	0.90	2.28	0.24
192.00	191.92	2.500	36.00	3.66	1.63	3.15	0.17
228.00	227.90	1.750	32.00	4.77	2.38	4.04	0.64
257.00	256.88	1.500	36.00	5.45	2.84	4.59	0.28
285.00	284.87	1.700	43.60	6.05	3.34	5.04	0.31
295.60	295.47	1.800	36.40	6.20	3.55	5.23	0.68
303.30	303.16	2.300	35.30	6.52	3.71	5.41	1.95
312.70	312.55	2.600	30.80	6.85	3.93	5.68	1.14
321.80	321.64	3.200	27.30	7.26	4.15	6.02	2.06
331.30	331.12	4.000	23.60	7.80	4.41	6.48	2.63
341.00	340.80	4.800	15.90	8.50	4.65	7.10	3.07
350.70	350.46	5.600	12.50	9.35	4.87	7.87	2.65
360.40	360.10	6.500	7.70	10.36	5.04	8.80	3.19
369.90	369.53	7.200	2.90	11.48	5.15	9.87	2.85
379.20	378.76	7.700	358.30	12.69	5.16	11.04	2.51
388.90	388.36	8.200	354.60	14.03	5.07	12.35	2.21
398.70	398.05	9.200	351.70	15.50	4.89	13.82	3.34
408.30	407.52	9.900	351.10	17.07	4.66	15.41	2.21
417.90	416.96	10.500	348.10	18.74	4.35	17.11	2.50
427.50	426.40	10.900	345.40	20.48	3.94	18.89	2.00
436.50	435.23	11.300	343.10	22.14	3.47	20.62	1.99
446.00	444.54	11.800	340.50	23.95	2.87	22.52	2.28
455.80	454.12	12.100	339.70	25.86	2.18	24.54	1.05
465.20	463.31	12.500	337.00	27.72	1.44	26.52	2.24
475.80	473.64	13.200	336.90	29.89	0.52	28.85	1.98
484.60	482.20	13.600	336.50	31.76	-0.29	30.86	1.40
494.20	491.52	14.200	336.70	33.88	-1.20	33.14	1.88
503.70	500.72	14.600	336.20	36.04	-2.15	35.47	1.31
513.20	509.91	15.100	337.80	38.29	-3.10	37.88	2.04
522.90	519.26	15.500	337.60	40.65	-4.07	40.41	1.25

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
532.70	528.70	16.000	338.40	43.12	-5.07	43.05	1.67
542.50	538.10	16.500	338.20	45.67	-6.08	45.77	1.54
552.20	547.39	17.200	338.90	48.29	-7.11	48.55	2.25
561.20	555.97	17.700	340.20	50.81	-8.05	51.24	2.11
571.00	565.28	18.700	340.90	53.70	-9.07	54.29	3.13
580.60	574.36	19.400	341.90	56.67	-10.07	57.41	2.41
590.10	583.30	20.100	341.70	59.72	-11.07	60.61	2.22
599.50	592.11	20.600	341.60	62.82	-12.10	63.87	1.60
608.70	600.71	21.000	340.90	65.92	-13.15	67.13	1.54
618.30	609.64	22.000	342.90	69.26	-14.24	70.64	3.87
627.80	618.45	22.200	344.00	72.69	-15.26	74.21	1.45
637.50	627.42	22.400	345.20	76.23	-16.24	77.89	1.54
646.50	635.74	22.300	343.90	79.53	-17.15	81.31	1.68
656.00	644.50	23.200	344.10	83.06	-18.16	84.98	2.85
665.50	653.21	24.000	342.40	86.71	-19.26	88.78	3.32
675.10	661.95	25.000	343.70	90.51	-20.42	92.76	3.55
684.80	670.75	24.600	342.60	94.41	-21.60	96.82	1.89
694.30	679.39	24.700	341.40	98.18	-22.82	100.77	1.61
703.50	687.72	25.300	341.70	101.86	-24.05	104.65	2.00
712.90	696.19	26.300	341.40	105.74	-25.35	108.73	3.22
722.40	704.67	27.200	339.10	109.77	-26.79	112.99	4.33
731.80	713.02	27.500	337.70	113.78	-28.38	117.27	2.26
741.30	721.47	26.900	340.10	117.83	-29.95	121.58	3.95
750.90	730.05	26.400	339.90	121.88	-31.42	125.86	1.59
760.10	738.29	26.300	340.80	125.72	-32.79	129.93	1.34
769.30	746.53	26.600	342.30	129.61	-34.09	134.01	2.39
778.80	755.03	26.400	343.50	133.66	-35.34	138.25	1.80
788.60	763.80	26.700	346.20	137.89	-36.48	142.63	3.81
797.90	772.12	26.300	346.80	141.93	-37.45	146.77	1.55
807.70	780.91	26.200	349.40	146.17	-38.34	151.10	3.53
817.20	789.45	25.800	350.80	150.27	-39.06	155.26	2.31
826.50	797.82	26.000	351.60	154.28	-39.68	159.30	1.30
836.30	806.63	25.900	354.10	158.54	-40.21	163.56	3.36
867.70	834.74	27.000	352.60	172.43	-41.84	177.42	1.23

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
877.40	843.37	27.500	350.70	176.82	-42.48	181.84	3.10
887.00	851.88	27.500	348.40	181.18	-43.29	186.26	3.32
896.50	860.30	27.600	348.80	185.49	-44.15	190.65	0.66
906.00	868.75	26.900	347.20	189.74	-45.06	195.00	3.20
915.60	877.31	26.800	348.40	193.98	-45.97	199.33	1.72
924.00	884.81	27.000	348.10	197.70	-46.75	203.13	0.86
933.40	893.18	26.900	346.00	201.85	-47.70	207.39	3.05
942.80	901.57	26.900	344.20	205.96	-48.80	211.64	2.60
952.20	909.95	27.000	345.30	210.07	-49.92	215.90	1.62
961.90	918.60	26.800	345.10	214.31	-51.04	220.29	0.68
971.30	926.98	26.900	346.50	218.43	-52.08	224.53	2.04
980.70	935.38	26.600	346.30	222.54	-53.07	228.76	1.00
990.00	943.69	26.700	347.00	226.60	-54.04	232.93	1.06
999.60	952.26	26.900	344.90	230.80	-55.09	237.26	3.02
1,009.10	960.73	26.900	345.00	234.95	-56.20	241.56	0.14
1,018.80	969.38	26.900	345.60	239.19	-57.32	245.95	0.84
1,037.50	986.08	26.600	345.10	247.34	-59.45	254.36	0.60
1,047.10	994.66	26.700	344.80	258.67	-60.56	258.67	0.52
1,056.60	1,003.14	26.900	344.50	255.63	-61.70	262.95	0.76
1,066.00	1,011.51	27.300	344.20	259.75	-62.85	267.23	1.31
1,075.50	1,019.95	27.400	343.40	263.94	-64.06	271.59	1.34
1,085.10	1,028.47	27.300	343.00	268.16	-65.34	276.00	0.65
1,094.60	1,036.92	27.200	344.10	272.34	-66.57	280.34	1.62
1,104.30	1,045.55	27.000	343.60	276.58	-67.80	284.76	0.94
1,113.90	1,054.12	26.700	341.80	280.72	-69.09	289.08	2.71
1,123.50	1,062.70	26.500	341.80	284.80	-70.43	293.38	0.63
1,133.10	1,071.29	26.600	342.20	288.88	-71.76	297.66	0.64
1,142.70	1,079.87	26.800	343.40	293.00	-73.03	301.97	1.80
1,152.30	1,088.44	26.700	343.60	297.15	-74.26	306.28	0.42
1,161.90	1,097.01	26.900	342.70	301.29	-75.51	310.61	1.41
1,171.40	1,105.47	27.300	344.10	305.44	-76.75	314.93	2.38
1,181.00	1,114.00	27.300	344.30	309.67	-77.95	319.33	0.29
1,190.60	1,122.53	27.200	344.20	313.90	-79.14	323.73	0.34
1,199.60	1,130.55	26.900	343.50	317.84	-80.28	327.82	1.46

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
1,209.10	1,139.01	27.000	343.20	321.96	-81.51	332.12	0.53
1,218.50	1,147.37	27.500	343.00	326.08	-82.76	336.42	1.62
1,228.20	1,155.95	28.100	344.40	330.42	-84.03	340.94	1.86
1,237.70	1,164.33	28.100	344.50	334.73	-85.23	345.41	0.15
1,247.40	1,172.89	28.000	344.50	339.13	-86.45	349.97	0.31
1,257.10	1,181.47	27.700	342.80	343.47	-87.73	354.50	2.63
1,266.10	1,189.45	27.500	344.30	347.47	-88.91	358.67	2.41
1,275.50	1,197.79	27.400	343.60	351.64	-90.11	363.00	1.08
1,285.00	1,206.22	27.400	344.00	355.84	-91.33	367.37	0.58
1,294.60	1,214.74	27.500	344.20	360.09	-92.54	371.79	0.43
1,304.10	1,223.17	27.400	344.70	364.31	-93.71	376.17	0.79
1,313.60	1,231.61	27.200	344.30	368.51	-94.88	380.52	0.86
1,323.10	1,240.07	26.900	343.30	372.66	-96.08	384.84	1.72
1,332.60	1,248.53	27.200	342.90	376.79	-97.34	389.16	1.11
1,342.10	1,256.97	27.500	342.10	380.95	-98.65	393.51	1.50
1,357.50	1,270.62	27.700	344.40	387.78	-100.71	400.64	2.11
1,361.10	1,273.81	27.600	344.50	389.39	-101.15	402.31	0.92
1,370.80	1,282.41	27.400	345.60	393.72	-102.31	406.79	1.69
1,380.30	1,290.86	27.100	344.50	397.92	-103.43	411.14	1.85
1,389.90	1,299.41	27.100	344.10	402.13	-104.61	415.51	0.57
1,399.50	1,307.95	27.100	344.60	406.35	-105.79	419.88	0.71
1,409.00	1,316.40	27.400	344.00	410.53	-106.97	424.23	1.28
1,418.60	1,324.92	27.500	345.60	414.80	-108.13	428.65	2.33
1,428.20	1,333.43	27.500	346.30	419.10	-109.21	433.09	1.01
1,437.80	1,341.96	27.100	346.80	423.39	-110.23	437.49	1.44
1,447.30	1,350.43	26.900	346.20	427.58	-111.24	441.80	1.07
1,456.90	1,358.98	27.000	345.40	431.80	-112.31	446.15	1.18
1,466.50	1,367.54	27.000	345.50	436.02	-113.40	450.51	0.14
1,476.10	1,376.10	26.800	345.20	440.22	-114.50	454.85	0.76
1,485.70	1,384.66	27.100	345.20	444.42	-115.61	459.20	0.94
1,495.60	1,393.45	27.700	345.40	448.83	-116.77	463.76	1.84
1,504.90	1,401.67	27.900	345.50	453.03	-117.86	468.10	0.66
1,514.50	1,410.16	27.800	345.60	457.37	-118.98	472.58	0.34
1,524.00	1,418.56	27.800	346.00	461.67	-120.06	477.01	0.59

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
1,533.60	1,426.06	27.600	347.70	466.01	-121.08	481.47	2.55
1,543.20	1,435.58	27.500	347.90	470.35	-122.02	485.91	0.43
1,552.70	1,443.99	27.700	347.70	474.65	-122.95	490.31	0.70
1,562.40	1,452.58	27.700	346.80	479.05	-123.94	494.82	1.29
1,571.90	1,461.00	27.500	346.10	483.33	-124.97	499.22	1.20
1,581.50	1,469.52	27.300	346.70	487.62	-126.01	503.64	1.07
1,600.70	1,486.57	27.500	347.90	496.24	-127.95	512.47	0.92
1,610.60	1,495.36	27.400	349.50	500.72	-128.85	517.03	2.26
1,620.20	1,503.86	27.800	348.80	505.09	-129.69	521.47	1.61
1,629.70	1,512.27	27.700	348.10	509.42	-130.57	525.88	1.08
1,639.30	1,520.77	27.800	349.00	513.80	-131.46	530.35	1.35
1,648.90	1,529.26	27.900	348.10	518.20	-132.35	534.83	1.35
1,658.60	1,537.84	27.700	348.60	522.63	-133.26	539.35	0.95
1,668.20	1,546.33	27.900	350.20	527.03	-134.09	543.82	2.41
1,677.80	1,554.80	28.300	352.50	531.50	-134.76	548.32	3.61
1,687.40	1,563.25	28.400	352.30	536.02	-135.37	552.84	0.43
1,696.90	1,571.61	28.300	353.10	540.49	-135.94	557.32	1.24
1,706.50	1,580.07	28.000	351.60	544.98	-136.54	561.82	2.40
1,716.10	1,588.54	28.100	349.70	549.43	-137.28	566.32	2.81
1,725.70	1,597.02	28.000	348.60	553.87	-138.13	570.83	1.65
1,735.20	1,605.41	27.800	347.70	558.22	-139.04	575.27	1.47
1,744.80	1,613.90	28.000	347.10	562.60	-140.02	579.76	1.08
1,754.40	1,622.38	27.800	346.90	566.98	-141.03	584.25	0.69
1,764.00	1,630.87	27.900	346.40	571.34	-142.07	588.73	0.79
1,773.60	1,639.34	28.100	345.40	575.71	-143.16	593.24	1.59
1,783.10	1,647.74	27.800	345.70	580.02	-144.27	597.69	1.05
1,792.70	1,656.23	27.800	344.10	584.35	-145.44	602.17	2.33
1,802.30	1,664.72	27.700	343.90	588.64	-146.67	606.64	0.43
1,811.90	1,673.22	27.800	345.00	592.95	-147.87	611.11	1.63
1,821.40	1,681.62	27.800	343.00	597.21	-149.09	615.53	2.95
1,831.00	1,690.12	27.600	342.80	601.47	-150.40	619.99	0.69
1,840.60	1,698.63	27.600	342.10	605.71	-151.75	624.43	1.01
1,850.20	1,707.14	27.500	342.20	609.94	-153.11	628.86	0.34
1,859.80	1,715.66	27.400	342.30	614.15	-154.46	633.28	0.34

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
1,869.30	1,724.11	27.000	342.70	618.30	-155.76	637.61	1.39
1,878.90	1,732.67	26.900	342.70	622.45	-157.05	641.96	0.31
1,888.50	1,741.24	26.700	343.90	626.60	-158.30	646.28	1.80
1,898.10	1,749.81	26.700	343.80	630.74	-159.50	650.59	0.14
1,907.70	1,758.38	26.900	344.10	634.90	-160.70	634.90	0.75
1,917.20	1,766.84	27.400	344.30	639.07	-161.88	659.25	1.61
1,926.80	1,775.35	27.600	344.40	634.34	-163.07	663.68	0.64
1,936.40	1,783.84	28.000	343.80	647.64	-164.30	668.16	1.53
1,946.00	1,792.32	28.100	344.10	651.98	-165.55	672.67	0.54
1,955.60	1,800.80	27.700	344.10	656.30	-166.78	677.16	1.25
1,965.10	1,809.21	27.800	344.50	660.56	-167.97	681.58	0.67
1,974.70	1,817.69	28.000	345.90	664.90	-169.12	686.07	2.14
1,984.40	1,826.26	27.800	345.80	669.30	-170.23	690.61	0.64
1,993.90	1,834.67	27.700	347.40	673.61	-171.26	695.04	2.37
2,003.50	1,843.17	27.700	346.90	677.96	-172.25	699.50	0.73
2,013.10	1,851.66	27.900	345.60	682.31	-173.31	703.97	2.00
2,022.70	1,860.14	28.000	344.10	686.65	-174.49	708.47	2.22
2,032.30	1,868.63	27.800	344.10	690.97	-175.72	712.96	0.62
2,041.80	1,877.05	27.400	343.20	695.19	-176.96	717.36	1.82
2,051.40	1,885.59	26.800	343.70	699.39	-178.20	721.73	2.01
2,061.00	1,894.16	26.800	344.50	703.55	-179.39	726.06	1.13
2,070.60	1,902.73	26.800	344.90	707.72	-180.53	730.38	0.56
2,080.20	1,911.31	26.600	346.10	711.90	-181.61	734.70	1.80
2,089.80	1,919.86	27.300	345.90	716.12	-182.66	739.05	2.21
2,099.40	1,928.38	27.600	345.40	720.41	-183.76	743.47	1.18
2,109.00	1,936.87	28.100	346.50	724.76	-184.85	747.96	1.56
2,118.50	1,945.26	27.800	345.80	729.08	-185.92	752.41	1.40
2,128.10	1,953.75	28.000	345.60	733.43	-187.02	756.90	0.69
2,137.70	1,962.24	27.500	344.90	737.76	-188.16	761.37	1.87
2,147.30	1,970.78	27.000	344.40	742.00	-189.33	765.77	1.72
2,156.90	1,979.34	26.800	344.60	746.18	-190.49	770.11	0.69
2,166.50	1,987.90	27.000	344.60	750.37	-191.64	774.45	0.62
2,176.00	1,996.35	27.300	345.50	754.56	-192.76	778.79	1.61
2,185.00	2,004.36	27.100	345.40	758.74	-193.79	782.90	0.68

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N/-S Distance	+E/-W Distance	Vertical Section	DogLeg Severity
2,195.20	2,013.44	27.000	345.20	763.03	-194.97	787.54	0.40
2,204.80	2,021.99	27.100	344.30	767.24	-196.12	791.90	1.32
2,214.40	2,030.53	27.300	343.00	771.45	-197.35	796.29	0.63
2,224.00	2,039.04	27.800	343.70	775.70	-198.62	800.72	1.86
2,233.50	2,047.44	27.900	342.80	779.95	-199.90	805.16	1.36
2,243.10	2,055.93	27.900	342.50	784.24	-201.24	809.64	0.44
2,252.70	2,064.40	28.200	342.60	788.55	-202.60	814.15	0.95
2,262.30	2,072.87	28.000	342.80	792.86	-203.94	818.66	0.69
2,271.90	2,081.36	27.600	342.30	797.13	-205.28	823.13	1.45
2,281.50	2,089.88	27.200	342.80	801.35	-206.61	827.55	1.44
2,291.10	2,098.43	26.900	342.70	805.52	-207.90	831.91	0.95
2,300.50	2,106.83	26.600	342.60	809.56	-209.17	836.13	0.97
2,310.00	2,115.33	26.400	341.20	813.59	-210.48	840.36	2.07
2,319.50	2,123.84	26.300	341.90	817.58	-211.82	844.56	1.03
2,329.10	2,132.43	26.800	340.90	821.65	-213.19	848.84	2.10
2,338.70	2,140.99	27.100	341.10	825.77	-214.60	853.18	0.98
2,348.30	2,149.52	27.300	342.60	829.93	-215.97	857.55	2.23
2,357.80	2,157.97	27.300	342.90	834.10	-217.26	861.91	0.43
2,367.40	2,166.48	27.800	344.40	838.36	-218.51	866.34	2.67
2,377.00	2,174.97	27.900	345.50	842.69	-219.67	870.83	1.64
2,386.60	2,183.45	27.900	345.70	847.04	-220.79	875.32	0.29
2,396.00	2,191.75	28.000	344.60	851.30	-221.92	879.72	1.68
2,405.80	2,200.42	27.600	345.10	855.71	-223.12	884.29	1.42
2,415.30	2,208.84	27.600	345.80	859.97	-224.22	888.69	1.02
2,424.70	2,217.17	27.600	345.70	864.19	-225.29	893.05	0.15
2,438.00	2,228.95	27.800	343.90	870.15	-226.91	899.23	1.94
2,447.40	2,237.27	27.500	344.70	874.35	-228.09	903.59	1.52
2,460.90	2,249.32	26.100	345.90	880.24	-229.64	909.68	3.34
2,470.50	2,257.96	25.700	346.10	884.31	-230.66	913.87	1.28
2,480.00	2,266.53	25.300	346.40	888.28	-231.63	917.96	1.33
2,489.60	2,275.22	25.000	346.60	892.25	-232.58	922.04	0.97
2,499.20	2,283.92	25.000	345.20	896.18	-233.57	926.10	1.85
2,508.80	2,292.59	26.000	344.40	900.17	-234.65	930.23	3.31
2,518.40	2,301.17	27.200	344.00	904.31	-235.82	934.53	3.79

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N/-S Distance	+E/-W Distance	Vertical Section	DogLeg Severity
2,528.00	2,309.71	27.300	345.30	908.55	-236.99	938.92	1.89
2,537.50	2,318.19	26.200	346.20	912.69	-238.04	943.20	3.70
2,546.90	2,326.66	25.200	346.70	916.65	-238.99	947.27	3.27
2,556.40	2,335.29	24.200	347.70	920.52	-239.87	951.24	3.42
2,566.20	2,344.25	23.700	348.50	924.42	-240.70	955.21	1.83
2,575.80	2,353.05	23.300	350.00	928.18	-241.41	959.04	2.25
2,585.40	2,361.85	23.700	349.90	931.95	-242.08	962.85	1.26
2,595.00	2,370.63	24.100	349.10	935.77	-242.79	966.73	1.61
2,604.60	2,379.39	24.200	350.60	939.64	-243.48	970.65	1.94
2,614.20	2,388.14	24.300	351.10	943.53	-244.11	974.58	0.71
2,623.80	2,396.60	24.200	350.50	947.42	-244.74	978.51	0.83
2,633.40	2,405.64	24.500	349.80	951.32	-245.41	982.45	1.30
2,643.00	2,414.38	24.500	349.70	955.24	-246.12	986.43	0.13
2,652.40	2,422.92	24.800	349.00	959.09	-246.85	990.34	1.34
2,661.90	2,431.53	25.200	348.50	963.03	-247.63	994.35	1.43
2,671.40	2,440.09	26.200	348.70	967.07	-248.44	998.46	3.17
2,681.00	2,448.68	26.900	348.40	971.27	-249.30	1,002.75	2.23
2,690.60	2,457.21	27.800	347.30	975.58	-250.22	1,007.16	3.23
2,700.10	2,465.60	28.000	347.60	979.92	-251.19	1,011.60	0.77
2,709.60	2,473.98	28.200	346.60	984.28	-252.19	1,016.07	1.62
2,719.00	2,482.27	28.100	347.40	988.61	-253.19	1,020.51	1.25
2,728.50	2,490.62	28.800	346.50	993.01	-254.21	1,025.03	2.59
2,738.00	2,498.94	29.100	344.90	997.47	-255.35	1,029.63	2.62
2,747.60	2,507.31	29.400	343.50	1,001.98	-256.62	1,034.32	2.33
2,757.20	2,515.66	29.900	341.60	1,006.51	-258.05	1,039.06	3.33
2,766.90	2,524.07	29.700	339.60	1,011.06	-259.65	1,043.86	3.14
2,776.60	2,532.51	29.400	338.50	1,015.53	-261.36	1,048.61	1.92
2,786.20	2,540.88	29.200	338.40	1,019.90	-263.08	1,053.27	0.64
2,795.90	2,549.36	28.900	337.70	1,024.27	-264.84	1,057.94	1.40
2,805.50	2,557.79	28.500	337.20	1,028.52	-266.60	1,062.49	1.41
2,815.20	2,566.31	28.600	336.30	1,032.78	-268.43	1,067.07	1.37
2,824.70	2,574.65	28.500	335.90	1,036.93	-270.28	1,071.55	0.68
2,834.30	2,583.08	28.600	336.10	1,041.12	-272.15	1,076.07	0.43
2,844.20	2,591.79	28.300	335.50	1,045.43	-274.08	1,080.72	1.26

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
2,854.00	2,600.44	27.600	332.60	1,049.56	-276.09	1,085.21	4.68
2,863.70	2,609.05	27.400	331.70	1,053.52	-278.18	1,089.56	1.43
2,873.50	2,617.79	26.200	332.50	1,057.42	-280.25	1,093.86	3.84
2,883.20	2,626.56	24.600	333.90	1,061.13	-282.13	1,097.92	5.29
2,892.90	2,635.43	23.000	335.50	1,064.67	-283.80	1,101.76	5.34
2,902.60	2,644.37	22.700	334.30	1,068.08	-285.40	1,105.45	1.71
2,912.30	2,653.34	22.200	334.20	1,071.42	-287.01	1,109.08	1.55
2,922.00	2,662.32	22.200	333.50	1,074.71	-288.62	1,112.67	0.82
2,931.60	2,671.19	22.600	335.30	1,078.01	-290.20	1,116.26	2.48
2,941.30	2,680.13	23.200	335.50	1,081.44	-291.77	1,119.97	1.87
2,950.90	2,688.93	23.800	337.93	1,084.95	-293.30	1,123.74	3.02
2,960.60	2,697.80	24.100	334.80	1,088.55	-294.90	1,127.62	24.10
2,970.40	2,706.73	24.400	336.00	1,092.21	-296.57	1,131.58	1.77
2,980.10	2,715.56	24.500	334.50	1,095.85	-298.25	1,135.53	1.94
2,989.90	2,724.46	24.900	335.70	1,099.57	-299.98	1,139.55	1.96
2,999.50	2,733.15	25.400	335.00	1,103.27	-301.68	1,143.56	1.82
3,009.20	2,741.89	26.100	335.40	1,107.10	-303.45	1,147.71	2.23
3,018.80	2,750.49	26.700	336.60	1,111.00	-305.18	1,151.91	2.51
3,028.50	2,759.14	27.100	336.40	1,115.02	-306.93	1,156.24	1.27
3,038.10	2,767.68	27.400	335.80	1,119.04	-308.71	1,160.58	1.27
3,047.80	2,776.25	28.400	335.30	1,123.17	-310.59	1,165.04	3.18
3,057.30	2,784.59	28.800	335.60	1,127.31	-312.48	1,169.52	1.34
3,066.90	2,793.00	28.900	336.90	1,131.55	-314.35	1,174.08	1.98
3,076.40	2,801.34	28.300	337.00	1,135.73	-316.73	1,178.58	1.90
3,086.10	2,809.90	27.700	336.10	1,139.91	-317.94	1,183.07	2.27
3,095.80	2,818.51	27.200	336.20	1,144.00	-319.75	1,187.48	1.55
3,105.50	2,827.14	27.100	337.80	1,148.08	-321.48	1,191.85	2.28
3,115.10	2,835.68	27.400	336.80	1,152.13	-323.17	1,196.20	1.71
3,124.80	2,844.28	27.600	336.50	1,156.24	-324.95	1,200.62	0.75
3,134.50	2,852.86	27.900	338.80	1,160.42	-326.67	1,205.09	3.44
3,144.20	2,861.41	28.500	338.60	1,164.69	-328.33	1,209.64	1.88
3,153.90	2,869.91	29.100	338.70	1,169.04	-330.03	1,214.28	1.86
3,163.70	2,878.46	29.500	339.20	1,173.52	-331.75	1,219.04	1.44
3,173.40	2,886.89	29.700	339.30	1,178.00	-333.45	1,223.80	0.64

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	I.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
3,183.60	2,895.72	30.400	339.50	1,182.78	-335.25	1,228.87	2.08
3,193.30	2,904.07	30.900	339.40	1,187.41	-336.99	1,233.79	1.55
3,202.60	2,912.05	30.900	339.50	1,191.88	-338.66	1,238.54	0.17
3,212.20	2,920.29	30.800	339.60	1,196.50	-340.38	1,243.43	0.35
3,221.90	2,928.63	30.700	340.70	1,201.16	-342.07	1,248.36	1.77
3,231.60	2,936.97	30.500	340.00	1,205.81	-343.73	1,253.28	1.26
3,241.00	2,945.09	30.100	340.30	1,210.27	-345.34	1,258.00	1.36
3,250.70	2,953.47	30.300	339.80	1,214.86	-347.00	1,262.85	0.99
3,260.40	2,961.82	30.900	340.20	1,219.50	-348.69	1,267.77	1.96
3,270.80	2,970.75	30.900	340.20	1,224.52	-350.50	1,273.08	0.00
3,280.50	2,979.06	31.200	339.50	1,229.22	-352.22	1,278.06	1.45
3,290.10	2,987.27	31.100	340.00	1,233.88	-353.94	1,282.99	0.87
3,299.70	2,995.51	30.600	339.70	1,238.50	-355.64	1,287.89	1.63
3,309.30	3,003.78	30.500	339.20	1,243.07	-357.35	1,292.74	0.85
3,319.00	3,012.16	30.100	339.70	1,247.65	-359.07	1,297.60	1.46
3,328.70	3,020.56	29.800	342.50	1,252.23	-360.64	1,302.43	4.42
3,338.40	3,028.98	29.700	341.90	1,256.81	-362.11	1,307.23	0.97
3,348.10	3,037.40	30.000	341.90	1,261.40	-363.61	1,312.05	0.93
3,357.80	3,045.76	30.900	341.50	1,266.07	-365.15	1,316.95	2.85
3,367.40	3,053.95	31.900	341.90	1,270.82	-366.72	1,321.94	3.19
3,377.00	3,062.10	32.000	342.70	1,275.66	-368.27	1,327.01	1.36
3,386.60	3,070.26	31.600	342.50	1,280.49	-369.78	1,332.06	1.29
3,396.40	3,078.61	31.400	341.50	1,285.36	-371.36	1,337.17	1.71
3,406.10	3,086.91	30.900	340.60	1,290.10	-372.99	1,342.17	2.11
3,415.80	3,095.22	31.200	340.60	1,294.82	-374.65	1,347.15	0.93
3,425.50	3,103.53	31.000	340.20	1,299.54	-376.33	1,352.14	0.89

Directional Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	T.V.D.	Drift Angle (°)	Azimuth (°)	+N / -S Distance	+E / -W Distance	Vertical Section	DogLeg Severity
3,453.40	3,127.46	30.900	333.80	1,312.73	-381.93	760.11	3.54
3,463.00	3,135.68	31.500	334.40	1,317.21	-384.10	762.14	2.11
3,472.80	3,144.04	31.400	335.20	1,321.83	-386.28	764.29	1.31
3,482.40	3,152.22	31.700	338.30	1,326.45	-388.26	766.55	5.15
3,492.00	3,160.35	32.500	341.90	1,331.24	-390.00	769.11	6.48
3,501.70	3,168.54	32.400	345.10	1,336.23	-391.47	771.98	5.32
3,511.40	3,176.73	32.300	348.20	1,341.28	-392.67	775.07	5.14
3,521.10	3,184.84	34.200	351.70	1,346.51	-393.60	778.49	8.35
3,530.80	3,192.77	36.200	357.00	1,352.07	-394.14	782.40	11.29
3,540.41	3,200.46	37.400	1.10	1,357.82	-394.23	786.74	8.54
3,550.20	3,208.18	38.600	2.90	1,363.85	-394.02	791.50	5.00
3,559.90	3,215.72	39.400	5.60	1,369.94	-393.57	796.45	5.81
3,569.60	3,223.22	39.300	7.70	1,376.04	-392.85	801.59	4.13
3,579.30	3,230.75	38.900	11.70	1,382.07	-391.82	806.87	7.90
3,589.00	3,238.38	37.400	14.40	1,387.91	-390.47	812.21	6.94
3,598.60	3,246.05	36.500	17.40	1,393.46	-388.90	817.47	6.30
3,608.30	3,253.87	36.200	20.30	1,398.90	-387.04	822.83	5.40
3,618.00	3,261.69	36.300	23.20	1,404.22	-384.91	828.28	5.31
3,627.70	3,269.51	36.300	26.00	1,409.44	-382.52	833.81	5.13
3,637.30	3,277.25	36.200	30.20	1,414.45	-379.85	839.37	7.77
3,647.00	3,285.06	36.500	35.00	1,419.29	-376.76	845.06	8.85
3,656.70	3,292.83	37.100	38.30	1,423.95	-373.29	850.86	6.39
3,666.40	3,300.59	36.600	40.40	1,428.45	-369.60	856.68	4.19
3,672.00	3,305.11	36.000	40.40	1,430.97	-367.45	859.99	3.21
3,714.60	3,339.15	37.900	39.30	1,450.63	-351.05	885.60	1.42

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
28.00	0.500	226.00	532.70	16.000	338.40
58.00	0.500	328.00	542.50	16.500	338.20
92.00	1.250	6.00	552.20	17.200	338.90
129.00	2.250	34.00	561.20	17.700	340.20
162.00	2.500	32.00	571.00	18.700	340.90
192.00	2.500	36.00	580.60	19.400	341.90
228.00	1.750	32.00	590.10	20.100	341.70
257.00	1.500	36.00	599.50	20.600	341.60
285.00	1.700	43.60	608.70	21.000	340.90
295.60	1.800	36.40	618.30	22.000	342.90
303.30	2.300	35.30	627.80	22.200	344.00
312.70	2.600	30.80	637.50	22.400	345.20
321.80	3.200	27.30	646.50	22.300	343.90
331.30	4.000	23.60	656.00	23.200	344.10
341.00	4.800	15.90	665.50	24.000	342.40
350.70	5.600	12.50	675.10	25.000	343.70
360.40	6.500	7.70	684.80	24.600	342.60
369.90	7.200	2.90	694.30	24.700	341.40
379.20	7.700	358.30	703.50	25.300	341.70
388.90	8.200	354.60	712.90	26.300	341.40
398.70	9.200	351.70	722.40	27.200	339.10
408.30	9.900	351.10	731.80	27.500	337.70
417.90	10.500	348.10	741.30	26.900	340.10
427.50	10.900	345.40	750.90	26.400	339.90
436.50	11.300	343.10	760.10	26.300	340.80
446.00	11.800	340.50	769.30	26.600	342.30
455.80	12.100	339.70	778.80	26.400	343.50
465.20	12.500	337.00	788.60	26.700	346.20
475.80	13.200	336.90	797.90	26.300	346.80
484.60	13.600	336.50	807.70	26.200	349.40
494.20	14.200	336.70	817.20	25.800	350.80
503.70	14.600	336.20	826.50	26.000	351.60
513.20	15.100	337.80	836.30	25.900	354.10
522.90	15.500	337.60	867.70	27.000	352.60

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
877.40	27.500	350.70	1,209.10	27.000	343.20
887.00	27.500	348.40	1,218.50	27.500	343.00
896.50	27.600	348.80	1,228.20	28.100	344.40
906.00	26.900	347.20	1,237.70	28.100	344.50
915.60	26.800	348.40	1,247.40	28.000	344.50
924.00	27.000	348.10	1,257.10	27.700	342.80
933.40	26.900	346.00	1,266.10	27.500	344.30
942.80	26.900	344.20	1,275.50	27.400	343.60
952.20	27.000	345.30	1,285.00	27.400	344.00
961.90	26.800	345.10	1,294.60	27.500	344.20
971.30	26.900	346.50	1,304.10	27.400	344.70
980.70	26.600	346.30	1,313.60	27.200	344.30
990.00	26.700	347.00	1,323.10	26.900	343.30
999.60	26.900	344.90	1,332.60	27.200	342.90
1,009.10	26.900	345.00	1,342.10	27.500	342.10
1,018.80	26.900	345.60	1,357.50	27.700	344.40
1,037.50	26.600	345.10	1,361.10	27.600	344.50
1,047.10	26.700	344.80	1,370.80	27.400	345.60
1,056.60	26.900	344.50	1,380.30	27.100	344.50
1,066.00	27.300	344.20	1,389.90	27.100	344.10
1,075.50	27.400	343.40	1,399.50	27.100	344.60
1,085.10	27.300	343.00	1,409.00	27.400	344.00
1,094.60	27.200	344.10	1,418.60	27.500	345.60
1,104.30	27.000	343.60	1,428.20	27.500	346.30
1,113.90	26.700	341.80	1,437.80	27.100	346.80
1,123.50	26.500	341.80	1,447.30	26.900	346.20
1,133.10	26.600	342.20	1,456.90	27.000	345.40
1,142.70	26.800	343.40	1,466.50	27.000	345.50
1,152.30	26.700	343.60	1,476.10	26.800	345.20
1,161.90	26.900	342.70	1,485.70	27.100	345.20
1,171.40	27.300	344.10	1,495.60	27.700	345.40
1,181.00	27.300	344.30	1,504.90	27.900	345.50
1,190.60	27.200	344.20	1,514.50	27.800	345.60
1,199.60	26.900	343.50	1,524.00	27.800	346.00

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
1,533.60	27.600	347.70	1,869.30	27.000	342.70
1,543.20	27.500	347.90	1,878.90	26.900	342.70
1,552.70	27.700	347.70	1,888.50	26.700	343.90
1,562.40	27.700	346.80	1,898.10	26.700	343.80
1,571.90	27.500	346.10	1,907.70	26.900	344.10
1,581.50	27.300	346.70	1,917.20	27.400	344.30
1,600.70	27.500	347.90	1,926.80	27.600	344.40
1,610.60	27.400	349.50	1,936.40	28.000	343.80
1,620.20	27.800	348.80	1,946.00	28.100	344.10
1,629.70	27.700	348.10	1,955.60	27.700	344.10
1,639.30	27.800	349.00	1,965.10	27.800	344.50
1,648.90	27.900	348.10	1,974.70	28.000	345.90
1,658.60	27.700	348.60	1,984.40	27.800	345.80
1,668.20	27.900	350.20	1,993.90	27.700	347.40
1,677.80	28.300	352.50	2,003.50	27.700	346.90
1,687.40	28.400	352.30	2,013.10	27.900	345.60
1,696.90	28.300	353.10	2,022.70	28.000	344.10
1,706.50	28.000	351.60	2,032.30	27.800	344.10
1,716.10	28.100	349.70	2,041.80	27.400	343.20
1,725.70	28.000	348.60	2,051.40	26.800	343.70
1,735.20	27.800	347.70	2,061.00	26.800	344.50
1,744.80	28.000	347.10	2,070.60	26.800	344.90
1,754.40	27.800	346.90	2,080.20	26.600	346.10
1,764.00	27.900	346.40	2,089.80	27.300	345.90
1,773.60	28.100	345.40	2,099.40	27.600	345.40
1,783.10	27.800	345.70	2,109.00	28.100	346.50
1,792.70	27.800	344.10	2,118.50	27.800	345.80
1,802.30	27.700	343.90	2,128.10	28.000	345.60
1,811.90	27.800	345.00	2,137.70	27.500	344.90
1,821.40	27.800	343.00	2,147.30	27.000	344.40
1,831.00	27.600	342.80	2,156.90	26.800	344.60
1,840.60	27.600	342.10	2,166.50	27.000	344.60
1,850.20	27.500	342.20	2,176.00	27.300	345.50
1,859.80	27.400	342.30	2,185.00	27.100	345.40

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
2,195.20	27.000	345.20	2,528.00	27.300	345.30
2,204.80	27.100	344.30	2,537.50	26.200	346.20
2,214.40	27.300	343.00	2,546.90	25.200	346.70
2,224.00	27.800	343.70	2,556.40	24.200	347.70
2,233.50	27.900	342.80	2,566.20	23.700	348.50
2,243.10	27.900	342.50	2,575.80	23.300	350.00
2,252.70	28.200	342.60	2,585.40	23.700	349.90
2,262.30	28.000	342.80	2,595.00	24.100	349.10
2,271.90	27.600	342.30	2,604.60	24.200	350.60
2,281.50	27.200	342.80	2,614.20	24.300	351.10
2,291.10	26.900	342.70	2,623.80	24.200	350.50
2,300.50	26.600	342.60	2,633.40	24.500	349.80
2,310.00	26.400	341.20	2,643.00	24.500	349.70
2,319.50	26.300	341.90	2,652.40	24.800	349.00
2,329.10	26.800	340.90	2,661.90	25.200	348.50
2,338.70	27.100	341.10	2,671.40	26.200	348.70
2,348.30	27.300	342.60	2,681.00	26.900	348.40
2,357.80	27.300	342.90	2,690.60	27.800	347.30
2,367.40	27.800	344.40	2,700.10	28.000	347.60
2,377.00	27.900	345.50	2,709.60	28.200	346.60
2,386.60	27.900	345.70	2,719.00	28.100	347.40
2,396.00	28.000	344.60	2,728.50	28.800	346.50
2,405.80	27.600	345.10	2,738.00	29.100	344.90
2,415.30	27.600	345.80	2,747.60	29.400	343.50
2,424.70	27.600	345.70	2,757.20	29.900	341.60
2,438.00	27.800	343.90	2,766.90	29.700	339.60
2,447.40	27.500	344.70	2,776.60	29.400	338.50
2,460.90	26.100	345.90	2,786.20	29.200	338.40
2,470.50	25.700	346.10	2,795.90	28.900	337.70
2,480.00	25.300	346.40	2,805.50	28.500	337.20
2,489.60	25.000	346.60	2,815.20	28.600	336.30
2,499.20	25.000	345.20	2,824.70	28.500	335.90
2,508.80	26.000	344.40	2,834.30	28.600	336.10
2,518.40	27.200	344.00	2,844.20	28.300	335.50

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
2,854.00	27.600	332.60	3,183.60	30.400	339.50
2,863.70	27.400	331.70	3,193.30	30.900	339.40
2,873.50	26.200	332.50	3,202.60	30.900	339.50
2,883.20	24.600	333.90	3,212.20	30.800	339.60
2,892.90	23.000	335.50	3,221.90	30.700	340.70
2,902.60	22.700	334.30	3,231.60	30.500	340.00
2,912.30	22.200	334.20	3,241.00	30.100	340.30
2,922.00	22.200	333.50	3,250.70	30.300	339.80
2,931.60	22.600	335.30	3,260.40	30.900	340.20
2,941.30	23.200	335.50	3,270.80	30.900	340.20
2,950.90	23.800	337.93	3,280.50	31.200	339.50
2,960.60	24.100	334.80	3,290.10	31.100	340.00
2,970.40	24.400	336.00	3,299.70	30.600	339.70
2,980.10	24.500	334.50	3,309.30	30.500	339.20
2,989.90	24.900	335.70	3,319.00	30.100	339.70
2,999.50	25.400	335.00	3,328.70	29.800	342.50
3,009.20	26.100	335.40	3,338.40	29.700	341.90
3,018.80	26.700	336.60	3,348.10	30.000	341.90
3,028.50	27.100	336.40	3,357.80	30.900	341.50
3,038.10	27.400	335.80	3,367.40	31.900	341.90
3,047.80	28.400	335.30	3,377.00	32.000	342.70
3,057.30	28.800	335.60	3,386.60	31.600	342.50
3,066.90	28.900	336.90	3,396.40	31.400	341.50
3,076.40	28.300	337.00	3,406.10	30.900	340.60
3,086.10	27.700	336.10	3,415.80	31.200	340.60
3,095.80	27.200	336.20	3,425.50	31.000	340.20
3,105.50	27.100	337.80			
3,115.10	27.400	336.80			
3,124.80	27.600	336.50			
3,134.50	27.900	338.80			
3,144.20	28.500	338.60			
3,153.90	29.100	338.70			
3,163.70	29.500	339.20			
3,173.40	29.700	339.30			

Deviation Survey Points

Storage Units: Metric

Survey Type: electronic / MWD

Measured Depth	Drift Angle (°)	Azimuth (°)	Measured Depth	Drift Angle (°)	Azimuth (°)
3,453.40	30.900	333.80			
3,463.00	31.500	334.40			
3,472.80	31.400	335.20			
3,482.40	31.700	338.30			
3,492.00	32.500	341.90			
3,501.70	32.400	345.10			
3,511.40	32.300	348.20			
3,521.10	34.200	351.70			
3,530.80	36.200	357.00			
3,540.41	37.400	1.10			
3,550.20	38.600	2.90			
3,559.90	39.400	5.60			
3,569.60	39.300	7.70			
3,579.30	38.900	11.70			
3,589.00	37.400	14.40			
3,598.60	36.500	17.40			
3,608.30	36.200	20.30			
3,618.00	36.300	23.20			
3,627.70	36.300	26.00			
3,637.30	36.200	30.20			
3,647.00	36.500	35.00			
3,656.70	37.100	38.30			
3,666.40	36.600	40.40			
3,672.00	36.000	40.40			
3,714.60	37.900	39.30			

Abandonment Plug Summary

Storage Units:

Metric

Plug #:

From:

To:

Amount of Cement Used:

Volume:

Density:

Cement Blend:

Date / Time Plug Down:

Plug Felt or Logged By:

Representative:

Date / Time Plug Felt or Logged:

Depth Plug Felt:

Remarks:

Drilling Fluid Summary

Storage Units:

Metric

Drilling Fluid Type:	Gel Chem	From:	0	To:	840
Drilling Fluid Type:	Invert Base Oil System	From:	840	To:	3,446
Drilling Fluid Type:	Light Gel System	From:	3,446	To:	3,770

Work Schedule

Storage Units:

Metric

Company: Lillico Petroleum Consultants
Geologist: Brock Lillico

Work Performed **From:** Sep 25, 1999 **To:** Dec 17, 1999
Depths Logged **From:** 0 **To:** 3,770

Remarks:

Company: Lillico Petroleum Consultants
Geologist: **Chromatographer:** Cathy Lillico

Work Performed **From:** Nov 15, 1999 **To:** Dec 17, 1999
Depths Logged **From:** 3,196 **To:** 3,770

Remarks: SRI Gas Chromatograph with FID and TCD detectors; SRI FID Total Gas Detector with Pason Interface; Tooke Engineering CC Gas Detector; Analytical Logging H2S Detector; Continental Delphian Mud Duck.

Formation Top Summary

Storage Units:

Metric

Kelly Bushing Elevation: 918.00
Ground Elevation: 910.60

Casing Flange Elevation:

**** 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
MATTSON	0.00	0.00	0.00			918.00	140.00
FLETT	200.00	140.00	140.00	138.00	138.00	780.00	779.80
BESA RIVER	992.00	960.00	916.90	961.00	917.80	0.20	970.10
Exshaw 1st Black Sha	1,897.00	2,054.00	1,887.90	2,054.00	1,887.90	-969.90	427.15
LOWER BESA RIVER	2,277.00	2,542.00	2,322.20	2,534.00	2,315.05	-1,397.05	570.65
Muskwa 2nd Black Sha	2,882.00	3,168.60	2,882.70	3,172.00	2,885.70	-1,967.70	
NAHANNI	3,152.00	3,425.00	3,103.10			-2,185.10	269.20
Faulted 2nd Black Sha		3,757.00	3,372.30			-2,454.30	

Formation Evaluations

Storage Units:

Metric

Kelly Bushing Elevation: 918.00
Ground Elevation: 910.60

Casing Flange Elevation:

All Depths Measured from Kelly Bushing Elevation

medium to dark gray brown, very fine to fine grained Packstone, some Wackestone, argillaceous to very argillaceous, very fossiliferous, Crinoids, spicules, Brachiopods, tight, no shows, trace Chert, scattered MARLSTONE, dark brown to dark gray brown, calcareous, slightly fossiliferous, tight, no shows, trace calcite filled microfractures. Background gas started showing up with the first trace of Methane at 254m, then ranged .002% to .03%. Sections with higher gas levels were: 288-303m ranged 0.5% to 1.45%; 786-852m .03% to .13%. At Surface Casing point, 852m, drilling fluid was changed over to a base oil invert system. Below that point, gas levels ranged from .002% to .06%.

Conclusion:

The Flett has poor hydrocarbon production potential due to lack of porosity.

Group:

Formation: BESA RIVER

Member:

Boundary Type: conformable

Fault Type:

Era:

Series:

Period: Mississippian

Stage:

Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	960.00	916.90	1.10	971.00
Log Top	961.00	917.80	0.20	970.10

Evaluation:

The Besa River is SHALE, medium gray to green gray, grading downwards to medium to dark gray, fissile, splintery in part, slightly calcareous to very calcareous in part, pearly luster, bentonitic in part, fossiliferous, trace inarticulate Brachiopods, trace Crinoids, soft in part and easily washed away with water, trace pyrite, trace microfractures with anhydrite filling, scattered Marlstone, dark brown to dark gray brown, microcrystalline, calcareous, slightly fossiliferous, tight, no shows, trace Limestone stringers, medium brown, Wackestone, very argillaceous, fossiliferous, Crinoids, tight, no shows, trace disseminated pyrite, trace siderite, medium to dark gray brown, hard, trace Siltstone, medium gray, quartzose, very argillaceous grading to silty Shale, tight, no shows, trace open fractures with medium to coarse calcite crystals, trace sparry calcite crystals at 1160-1175m, trace slickenside. Microfractures show throughout the Besa River with a trace fracture porosity at 1670-1675m. Background gas increased from .1% to a peak of 13% at 1672m.

Conclusion:

The Besa River Shale has poor potential for hydrocarbon production. The interval 1670-1675m should be checked for fracture identification.

Formation Evaluations

Storage Units:

Metric

Kelly Bushing Elevation: 918.00
Ground Elevation: 910.60

Casing Flange Elevation:

*All Depths Measured from Kelly Bushing Elevation***Group:****Formation:** Exshaw 1st Black Shale**Member:****Boundary Type:** conformable**Fault Type:****Era:****Series:****Period:** Mississippian**Stage:****Age (Approx):** Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	2,054.00	1,887.90	-969.90	434.30
Log Top	2,054.00	1,887.90	-969.90	427.15

Evaluation:

The First Black Shale is very dark gray to dark brown gray to black, fissile, micromicaceous, slightly sideritic in part, bituminous, very siliceous and hard at 2300-2542m, very siliceous grading to black Chert at 2430-2460m, trace microfractures cemented with anhydrite above 2300m, below 2300m is quartz healed microfractures, trace microfractures with scattered quartz crystal shards and trace hexagonal quartz crystal clusters at 2500-2540m, calcite in part, trace pyrite, interbedded Marlstone in part, dark gray brown, microcrystalline, calcareous, tight. Trace of fracture porosity at 2510-2520m. Background gas increased at the top of the First Black Shale from 0.2% to 1%, and ranged 1% to 1.6% through most of the zone. Sections of higher gas were at 2198-2203m ranging 2% to 4.4%, and at 2350-2426m 2% to 2.4%.

Conclusion:

The First Black Shale has poor hydrocarbon production potential, but is organic and looks like a good source rock. The lower half on the zone, at 2300-2542m is siliceous and very hard. The section at 2510-2520m should be checked for fracture identification.

Group:**Formation:** LOWER BESA RIVER**Member:****Boundary Type:** conformable**Fault Type:****Era:****Series:****Period:** Devonian**Stage:****Age (Approx):** Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	2,542.00	2,322.20	-1,404.20	560.50
Log Top	2,534.00	2,315.05	-1,397.05	570.65

Evaluation:

The Lower Besa River is SHALE, medium to dark gray, medium green gray in part, micromicaceous, fissile, slightly bentonitic and moderately soft, very slightly calcareous to marly in part, slightly bituminous in part, trace pyrite, trace slickenside, trace microfractures with quartz crystal fragments and shards, becoming slightly silty towards base of zone with trace Siltstone laminations, light to medium gray, quartzose, very argillaceous, slightly siliceous and hard, tight. Background gas through the Lower Besa River ranged from 0.1% to 1.0% with zones of high gas at 2786-2813m 1% to 3.06% at 2787m and 2.87% at 2812m. Other peaks include 2852m 1.69%, 2871m 6.94%, and at 2946m 3.76%. Gas levels in the bottom part of the zone, at 3015-3169m, increased to a range of 2.2% to 7.2%.

Conclusion:**CHEVRON CANADA RESOURCES**

UWI 300M256030123300

Chevron et al Liard M-25

LIARD M-25

Page 17-3

Formation Evaluations

Storage Units:

Metric

Kelly Bushing Elevation: 918.00

Casing Flange Elevation:

Ground Elevation: 910.60

All Depths Measured from Kelly Bushing Elevation

The Lower Besa River Shale has no hydrocarbon production potential.

Group:**Formation:** Muskwa 2nd Black Shale**Member:****Boundary Type:** conformable**Fault Type:****Era:****Series:****Period:** Devonian**Stage:****Age (Approx):** Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	3,168.60	2,882.70	-1,964.70	220.40
Log Top	3,172.00	2,885.70	-1,967.70	

Evaluation:

The Second Black Shale is dark gray to very dark gray to black, dark brown gray in part, fissile to splintery in part, slightly siliceous to very siliceous and hard in part, slightly bituminous, pyritic in part with scattered disseminated microcrystalline pyrite, minor microfractures, trace quartz healed microfractures to 2mm, clear quartz crystal cement, open in part with trace fine hexagonal quartz crystals, interbedded CHERT at 3195-3242m, black, hard, trace conchoidal fracture, argillaceous, tight. Below 3250m is a trace of Shale, dark gray, calcareous with trace calcareous white specks, trace slickenside. Background gas while drilling the 2nd Black Shale ranged from 1.7% to 5.4%, mainly Methane, with traces of Ethane and Propane, also trace of CO₂.

Conclusion:

The Second Black Shale has poor gas production potential, but looks like an excellent source rock.

Group:**Formation:** NAHANNI**Member:****Boundary Type:** conformable**Fault Type:****Era:****Series:****Period:** Devonian**Stage:****Age (Approx):** Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	3,425.00	3,103.10	-2,185.10	269.20
Log Top				

Evaluation:

The Nahanni is DOLOMITE, light to medium gray, microcrystalline to fine crystalline, to coarse crystalline in part, trace fossil shadows, trace poor intercrystalline and fracture porosity, no fluorescence, trace pyrobitumen, scattered loose coarse Dolomite and sparry calcite crystals, trace clear quartz crystal fragments, very fine cuttings. While drilling to casing point, there were 6 fast 0.2m drilling breaks at 3441.2-3441.4m, 3442.0-3442.2m, 3443.6-3443.8m, 3445.0-3445.2m, 3445.6-3445.8m, 3446.4-3446.8m. Within 2 minutes of drilling the last fifth at 3446.8m, total circulation was lost, and within 2 hours, 175m³ of invert mud (1140kg/m³) was lost downhole. Casing was then ran to 3437m. When drilling was resumed with lower density (1050kg/m³) water base mud, 2 cores were cut, total interval 3450-3456.8m. Lithology from core is DOLOMITE, dark gray host rock with up to 60% very light gray dolomite recrystallization, fine to very coarse crystalline, brecciated, slightly calcareous, slightly fossiliferous with trace Amphipora?, poor to fair intercrystalline, vug and fracture porosity (estimated 5%),

CHEVRON CANADA RESOURCES

UWI 300M256030123300

Chevron et al Liard M-25

LIARD M-25

Page 17-4

Formation Evaluations

Storage Units:

Metric

Kelly Bushing Elevation: 918.00
Ground Elevation: 910.60

Casing Flange Elevation:

All Depths Measured from Kelly Bushing Elevation

trace pyrobitumen, no hydrocarbon fluorescence, vugs to 7cm with drusy very coarse dolomite rhombs and trace hexagonal quartz crystals, abundant open fractures from 45 degrees to core axis to vertical, trace stylolites, abundant rubble. Sections with fair porosity from samples include 3457-3495m, 3504-3525m, then streaks of poor to fair porosity at 3541-3544m, 3550-3555m, 3558-3573m, 3575-3577m, 3583-3586m, 3590-3592m, 3601-3603m, 3620-3622m, 3632-3635m, 3642-3650m, 3658-3661m, 3690-3692m, 3698-3700m, 3701-3702m, 3705-3706m, 3709-3710m, 3715-3718m, 3723-3725m, then a thicker interval at 3734-3745m. Circulation was lost again at 3494m. Initially 30m³ of drilling mud at 1050kg/m³ were lost at 3494m, then, after mixing volume drilling was resumed with partial losses, and another 70m³ was lost while drilling down to 3520m at a rate of 5m³/hr. Mud returns gradually increased back to 100% by adding calcium carbonate to drilling mud. There were no significant losses below 3520m. Background gas ranged from .012% to 1.0% with some peaks correlating to previously listed intervals including one while coring at 3450.8m .103%, and drilled sections at 3461m .65%, 3475m .47%, 3482m .72%, 3486m .82%, 3515m .52%, 3525m .32%, 3543m .14%, 3552m .21%, then a section at 3558-3571m ranging .18% to .46%, 3576m .24%, 3585m .48%, 3591m .4%, 3602m .49%, 3621m .36%, then one of the higher peaks in the Nahanni 3643m .97%, 3659m .78%, 3691m .24%, and at 3741m .21%. Gas logged was all Methane, with occasional traces of Ethane, and traces of CO₂. Gas chromatography suggests a very dry gas reservoir.

Conclusion:

Samples and core show Dolomite with streaks of fracture and vug porosity. Samples also show streaks of porosity with drusy Dolomite rhombs and hexagonal quartz crystals. The Nahanni has good potential for gas production at this location.

Group:

Formation: Faulted 2nd Black Shale

Member:

Boundary Type: other

Fault Type: overthrust

Era:

Series:

Period: Devonian

Stage:

Age (Approx): Million years.

	Measured Depth	True Vertical Depth	Subsea	Thickness
Sample Top	3,757.00	3,372.30	-2,454.30	
Log Top				

Evaluation:

The well drilled through a fault and back into the Second Black Shale at 3757m, Samples were SHALE, very dark gray to black, siliceous to very siliceous and hard, slightly bituminous, slightly calcareous in part, trace slickenside, abundant calcite filled microfractures, trace clear quartz filled microfractures. Background gas climbed to a peak of .67% at 3758m.

Conclusion:

Fractures in the Second Black Shale may contribute to Nahanni gas production.

Sample Descriptions

Storage Units:

Metric

15.00 to 18.00 (3.00)	CEMENT from condutor hole
18.00 to 25.00 (7.00)	SANDSTONE rusty red gray to orange, light gray in part, quartzose, very fine to fine grained, subangular to subrounded, fair sorting, siliceous, slightly kaolinitic, scattered red clast matrix, trace medium gray argillaceous laminations, trace mica flakes, poor to fair porosity, no shows, scattered pyrobitumen, scattered Shale, dark gray to black, very micaceous with large mica flakes, carbonaceous in part, trace red brown Claystone
25.00 to 30.00 (5.00)	SANDSTONE mainly very light gray, trace light red brown to orange, minor yellow tan, quartzose, fine grained, subangular to subrounded, well sorted, clean, siliceous, slightly kaolinitic, friable in part, poor to fair porosity, no shows, trace pyrobitumen, trace Shale streaks, very dark gray to black, micaceous, slightly carbonaceous
30.00 to 35.00 (5.00)	SANDSTONE rusty red to light gray, orange brown in part, quartzose, very fine to fine grained, subangular to subrounded, fair sorting, siliceous, very siliceous and hard in part, vitreous, kaolinitic with minor kaolin inclusions, trace poor porosity, no shows, interbedded SHALE, dark gray to black, micromicaceous, silty and sandy in part, trace rusty red brown Shale streaks
35.00 to 40.00 (5.00)	SANDSTONE mainly light gray to very light gray with some patchy yellow limonite staining, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, slightly kaolinitic, trace dark gray Shale laminations, mainly tight with streaks poor to fair porosity, no shows, minor Shale, medium to dark gray to brown gray, yellow limonite staining in part, very sandy in part, micaceous
40.00 to 45.00 (5.00)	SANDSTONE light gray to yellow tan, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, slightly kaolinitic, limonitic in part, scattered dark gray Shale laminations, trace poor porosity, no shows, increasing interbedded SHALE, dark gray to black, micaceous, sandy in part, trace pyrite
45.00 to 50.00 (5.00)	SANDSTONE light gray to tan to red brown, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, very siliceous and hard in part, kaolinitic, varved with dark gray laminations and rusty red clay matrix in part, micaceous in part, mainly tight with trace poor porosity, no shows, scattered SHALE, dark gray to black, micromicaceous, sandy and silty in part, slightly carbonaceous in part
50.00 to 55.00 (5.00)	SANDSTONE as above, light gray to tan brown, medium gray in part, quartzose, very fine to fine grained, siliceous, kaolinitic, argillaceous in part, slightly carbonaceous, tight, no shows, increasing SHALE, dark gray to black as above, fissile in part, silty, micaceous

Sample Descriptions

Storage Units:

Metric

55.00 to 60.00 (5.00)	SANDSTONE light gray to very light gray, yellow tan in part, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, slightly kaolinitic, minor dark gray argillaceous lithoclasts, trace poor porosity, no shows, trace pyrobitumen
60.00 to 65.00 (5.00)	SANDSTONE light to medium gray, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, kaolinitic in part, argillaceous to very argillaceous with abundant argillaceous clasts, laminations, and inclusions, micaceous, tight, no shows
65.00 to 70.00 (5.00)	SANDSTONE as above, mainly medium gray, very fine grained, siliceous, pyritic matrix in part, argillaceous to very argillaceous, tight, no shows
70.00 to 75.00 (5.00)	SHALE dark gray to black, micromicaceous, fissile in part, silty, sandy to very sandy grading to black argillaceous Sandstone, very fine grained, tight, trace pyrite
75.00 to 80.00 (5.00)	SHALE dark gray to black, micromicaceous, fissile, silty and sandy in part, scattered pyrite, trace siderite
80.00 to 85.00 (5.00)	SHALE dark gray to very dark gray as above, becoming sandy to very sandy with increasing Sandstone streaks, light to medium gray, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, siliceous, kaolinitic, argillaceous with scattered dark gray Shale laminations, tight, no shows, trace siderite, trace pyrite
85.00 to 90.00 (5.00)	SHALE dark gray to very dark gray, micaceous, sandy to very sandy, minor pyrite, scattered SANDSTONE, mainly medium gray, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, slightly siliceous, kaolinitic in part, argillaceous with scattered dark gray Shale laminations, pyritic matrix in part, tight, no shows
90.00 to 95.00 (5.00)	SHALE dark gray to very dark gray as above, sandy, scattered SHALE, very dark gray to black, micromicaceous, fissile, slightly silty
95.00 to 100.00 (5.00)	SANDSTONE light gray to very light gray, tan yellow in part, trace red brown, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, slightly siliceous, kaolinitic in part, friable in part, streaks fair porosity, no shows
100.00 to 105.00 (5.00)	SANDSTONE light gray, quartzose, fine grained, subangular, well sorted, siliceous, kaolinitic, slightly argillaceous with trace dark gray Shale laminations, very slightly carbonaceous in part, friable in part, tight with streaks poor to fair porosity, no shows, trace dark gray Shale as above, trace pyrite

Sample Descriptions

Storage Units:

Metric

105.00 to 110.00 (5.00)	SANDSTONE light gray as above, very fine to fine grained, siliceous, slightly kaolinitic, argillaceous with thin Shale laminations, friable in part, poor to fair porosity, no shows
110.00 to 115.00 (5.00)	SHALE dark gray to black, micaceous, fissile in part, slightly carbonaceous in part, silty and sandy in part, trace siderite, trace Sandstone as above
115.00 to 120.00 (5.00)	SHALE dark gray, fissile, micromicaceous, slightly fossiliferous with trace Crinoid fragments, trace pyrite, trace siderite, trace Sandstone stringers
120.00 to 125.00 (5.00)	SANDSTONE medium gray brown, quartzose, very fine to fine grained, subangular to subrounded, moderately well sorted, dolomitic to very dolomitic, very argillaceous, pyritic in part, tight, no shows, interbedded SHALE as above, trace pyrite, trace siderite, scattered Siltstone, medium gray brown, very dolomitic grading to silty Dolomite, very argillaceous, tight, no shows
125.00 to 130.00 (5.00)	SHALE medium to dark green gray, sandy to very sandy, well indurated, trace pyrite, trace siderite, scattered Sandstone, medium gray brown as above, very fine to fine grained, silty, very dolomitic grading to sandy Dolomite, very argillaceous, tight, no shows
130.00 to 135.00 (5.00)	SHALE medium to dark green gray as above, dark gray in part, very sandy, calcareous in part, fossiliferous with scattered Crinoids, minor LIMESTONE, medium gray to brown gray, very sandy grading to calcareous Sandstone, very argillaceous, fossiliferous with scattered Crinoid fragments, silty, tight, no shows
135.00 to 140.00 (5.00)	SHALE medium to dark green gray, micromicaceous, fissile, waxy in part, slightly fossiliferous, trace Crinoids, trace Bryozoans, scattered Limestone, medium brown to gray brown, microcrystalline, fine to coarse grained fragmental Packstone, argillaceous to very argillaceous in part, fossiliferous with abundant coarse Crinoidal fragments, tight, no shows
140.00 to 145.00 (5.00)	LIMESTONE medium brown, gray brown in part, light brown in part, fine to coarse grained Packstone, argillaceous to very argillaceous, siliceous with trace silicified fossil remnants, fossiliferous with abundant Crinoids, pelletoidal, tight, no shows, disseminated pyrite, scattered SHALE, medium to dark gray green, slightly calcareous, fossiliferous
145.00 to 150.00 (5.00)	LIMESTONE as above, medium brown to gray brown, Packstone, very argillaceous, fossiliferous, Crinoids, Ostracods, trace Brachiopods, pellets, tight, no shows, interbedded Shale as above, gray green, calcareous, fossiliferous, Crinoids, Ostracods

Sample Descriptions

Storage Units:

Metric

150.00 to 155.00 (5.00)	LIMESTONE medium brown gray, fine to very coarse grained fragmental Packstone, siliceous to very siliceous, cherty, fossiliferous, argillaceous, tight, no shows, scattered Chert, medium gray to medium to dark gray brown, calcareous in part, mainly opaque, translucent in part, calcareous in part, hard, scattered Shale as above
155.00 to 160.00 (5.00)	LIMESTONE as above, light to medium brown to gray brown, fine to very coarse grained Grainstone, siliceous, fossiliferous, Crinoids, abundant Ostracods, trace Brachiopods, pellets, tight, no shows, minor disseminated pyrite, scattered CHERT, medium to dark brown to brown gray, vitreous, calcareous in part, hard
160.00 to 165.00 (5.00)	LIMESTONE light to medium tan brown, fine to very coarse fragmental Grainstone, very fossiliferous, scattered Crinoid fragments, trace Brachiopods, tight, no shows, minor disseminated pyrite, minor Dolomite streaks, medium gray, microcrystalline to very fine crystalline, calcareous, tight, no shows
165.00 to 170.00 (5.00)	LIMESTONE as above, tan brown Grainstone, very fossiliferous, Crinoids, Bryozoans, Brachiopods, Ostracods, tight, no shows, rough drilling, slowed RPM
170.00 to 175.00 (5.00)	LIMESTONE light to medium brown to gray brown, fine to very coarse fragmental Grainstone, very fossiliferous, Crinoids, Bryozoans, Brachiopods, Ostracods, pellets, tight, no shows, trace light gray Chert
175.00 to 180.00 (5.00)	LIMESTONE light to medium brown skeletal Grainstone as above, scattered LIMESTONE, medium gray, very fine to medium grained Packstone, slightly argillaceous, fossiliferous, Crinoids, Brachiopods, Bryozoans, tight, no shows, minor Shale streaks, dark gray to dark green gray, scattered Chert light to medium gray
180.00 to 185.00 (5.00)	LIMESTONE light to medium gray brown, fine to very coarse grained Packstone and Grainstone, slightly argillaceous, very fossiliferous, Crinoids, Bryozoans, Brachiopods, trace pellets, tight, no shows, scattered Chert
185.00 to 190.00 (5.00)	LIMESTONE as above, mainly medium brown skeletal Grainstone, Crinoids, Ostracods, Bryozoans, Brachiopods, tight, no shows, minor Chert, light blue gray with translucent brown mottling
190.00 to 195.00 (5.00)	LIMESTONE light to medium brown Grainstone as above, some Packstone, argillaceous in part, slightly dolomitic in part, very fossiliferous, tight, no shows, minor Chert, scattered Shale streaks, dark gray to dark green gray, calcareous, fossiliferous
195.00 to 200.00 (5.00)	LIMESTONE light to medium gray brown, fine to very coarse grained skeletal Packstone and Grainstone, slightly argillaceous, very fossiliferous, Crinoids, Bryozoans,

	Brachiopods, Ostracods, trace pellets, tight, no shows, scattered Chert, mainly light gray, light to medium gray brown in part, trace Shale streaks, dark gray, fissile
200.00 to 205.00 (5.00)	LIMESTONE mainly light to medium brown skeletal Grainstone as above, very fossiliferous, tight, no shows, scattered LIMESTONE, medium gray brown, fine to very coarse grained Packstone, argillaceous to very argillaceous in part, very fossiliferous, Crinoids, Bryozoans, tight, no shows, minor Chert, minor Shale streaks, dark gray, slightly calcareous, fossiliferous, fissile in part
205.00 to 210.00 (5.00)	LIMESTONE medium brown to gray brown Packstone and Grainstone as above, fossiliferous, abundant Crinoids, Brachiopods, tight, no shows, interbedded SHALE, dark gray, calcareous in part, fossiliferous, trace Crinoids, Ostracods, trace Marlstone, dark gray, calcareous, fossiliferous, tight
210.00 to 215.00 (5.00)	SHALE dark gray to dark green gray, calcareous to very calcareous grading to Marlstone in part, fissile, fossiliferous, Crinoids, Ostracods, interbedded LIMESTONE, medium brown to medium gray brown, fine to very coarse grained Packstone and Grainstone, slightly argillaceous in part, very fossiliferous, Crinoids, Bryozoans, Brachiopods, trace pellets, tight, no shows, scattered Chert
215.00 to 220.00 (5.00)	SHALE dark gray to dark green gray as above, very calcareous grading to Marlstone, fossiliferous, Crinoids, spicules, minor LIMESTONE, light to medium brown to gray brown, fine to very coarse grained skeletal Grainstone and Packstone, slightly argillaceous in part, fossiliferous, abundant loose Ostracods, Crinoids, Brachiopods, tight, no shows, trace pyrite
220.00 to 225.00 (5.00)	LIMESTONE medium brown to brown gray, very fine to coarse grained Packstone, argillaceous, very fossiliferous, Crinoids, Brachiopods, abundant Ostracods, trace pellets, tight, no shows, trace pyrite, interbedded Marlstone, dark gray brown, calcareous, fossiliferous, Brachiopods, tight, no shows
225.00 to 230.00 (5.00)	LIMESTONE light to medium brown to gray brown, fine to coarse grained Packstone and Grainstone, slightly argillaceous, slightly dolomitic in part, very fossiliferous, Crinoids, Brachiopods, trace pellets, tight, no shows, interbedded SHALE, medium to dark gray, calcareous to very calcareous grading to Marlstone, fossiliferous, trace Ostracods, Crinoids, scattered Chert
230.00 to 235.00 (5.00)	LIMESTONE light to medium gray brown, very fine to coarse grained Packstone, slightly argillaceous, very fossiliferous, abundant Crinoidal fragments, scattered spicules, trace Brachiopods, tight, no shows, scattered LIMESTONE, medium to dark gray brown, very fine grained Wackestone with coarse Crinoidal fragments in part, argillaceous to very argillaceous, fossiliferous, tight, no shows, minor Chert

Sample Descriptions

Storage Units:

Metric

235.00 to 240.00 (5.00)	LIMESTONE light gray brown, fine to very coarse fragmental Grainstone, clean, very fossiliferous, Crinoids, Brachiopods, pellets, tight, no shows, trace pyrite, scattered LIMESTONE, medium to dark brown gray, very fine to coarse grained Packstone, slightly argillaceous, fossiliferous, Crinoids, Brachiopods, tight, no shows, trace stylolites
240.00 to 245.00 (5.00)	LIMESTONE light to medium brown to gray brown, fine to very coarse grained Grainstone and Packstone, slightly argillaceous in part, dolomitic in part, fossiliferous, Crinoids, Brachiopods, Ostracods, pellets, tight, no shows, trace stylolites, scattered Chert, mainly light gray to light brown gray
245.00 to 250.00 (5.00)	LIMESTONE medium brown to gray brown, microcrystalline, very fine to coarse grained Packstone, trace Grainstone, argillaceous, fossiliferous, Crinoids, Ostracods, tight, no shows, scattered Marlstone, dark gray to dark gray brown, calcareous, fossiliferous, tight, no shows
250.00 to 255.00 (5.00)	LIMESTONE as above, medium brown Packstone, very fossiliferous with scattered coarse Crinoid fragments, Brachiopods, Bryozoans, tight, no shows, decreasing Marlstone as above
255.00 to 260.00 (5.00)	SHALE dark gray to dark gray brown, dark green gray in part, calcareous to calcareous, fossiliferous with scattered skeletal fragments including Crinoids, Brachiopods, Ostracods, scattered LIMESTONE as above
260.00 to 265.00 (5.00)	SHALE mainly dark gray as above, calcareous to very calcareous, marly, fossiliferous, Ostracods, Crinoids, scattered LIMESTONE as above
265.00 to 285.00 (20.00)	NO SAMPLES Depth Correction
285.00 to 290.00 (5.00)	LIMESTONE medium brown to medium gray brown, fine to very coarse grained fragmental Packstone, slightly argillaceous, very fossiliferous, abundant Crinoid fragments, Brachiopods, Ostracods, Bryozoans, tight, no shows, interbedded SHALE, dark gray, calcareous to very calcareous, fossiliferous, Crinoids, Brachiopods, trace Marlstone, medium gray, calcareous
290.00 to 295.00 (5.00)	SHALE dark gray as above, very calcareous grading to Marlstone, very fossiliferous, Crinoids, Brachiopods, abundant Bryozoans, Ostracods, scattered LIMESTONE as above
295.00 to 300.00 (5.00)	SHALE dark gray as above, very calcareous, very fossiliferous with abundant Crinoids, Ostracods, Bryozoans, and Brachiopods, scattered LIMESTONE, light to medium brown, fine to very grained Packstone and Grainstone, clean, very fossiliferous,

Sample Descriptions

Storage Units:

Metric

Crinoids, Brachiopods, tight, no shows

300.00 to 305.00
(5.00)**LIMESTONE**

medium brown to medium gray brown, fine to coarse grained Packstone, fragmental, slightly argillaceous, fossiliferous, Crinoids, Brachiopods, Bryozoans, Ostracods, tight, no shows, scattered SHALE, medium to dark gray, calcareous to very calcareous grading to Marlstone, very fossiliferous, Crinoids, Brachiopods, trace pyrite

305.00 to 310.00
(5.00)**LIMESTONE**

medium gray brown, very fine to medium grained Packstone, argillaceous, fossiliferous, Crinoids, Brachiopods, tight, no shows, scattered SHALE, dark gray, very calcareous grading to Marlstone, very fossiliferous

310.00 to 315.00
(5.00)**LIMESTONE**

medium brown to medium gray brown, very fine to medium grained Packstone, scattered coarse Crinoidal fragments, argillaceous, very fossiliferous, Crinoids, Brachiopods, Ostracods, tight, no shows, minor Marlstone, dark brown gray, calcareous, fossiliferous, tight

315.00 to 320.00
(5.00)**SHALE**

as above, mainly dark gray, calcareous to very calcareous grading to Marlstone, fossiliferous, interbedded LIMESTONE as above, medium brown to medium gray brown, very fine to medium grained Packstone, argillaceous to very argillaceous in part, very fossiliferous, Crinoids, Brachiopods, Ostracods, tight, no shows

320.00 to 325.00
(5.00)**LIMESTONE**

medium gray brown, very fine to fine grained Packstone, scattered medium to coarse grained Crinoidal fragments, argillaceous, fossiliferous, mainly Crinoids and Brachiopods, trace Ostracods, tight, no shows, scattered Marlstone, dark gray to dark brown gray, calcareous, fossiliferous, tight, no shows

325.00 to 330.00
(5.00)**LIMESTONE**

medium brown to gray brown, very fine to very coarse grained Packstone, fragmental, argillaceous in part, fossiliferous, Crinoids, Brachiopods, trace Ostracods, trace spicules, tight, no shows, trace disseminated pyrite, trace SHALE, dark gray to dark green gray, very calcareous, marly, very fossiliferous, Ostracods, Crinoids, Brachiopods

330.00 to 335.00
(5.00)**SHALE**

dark gray as above, very calcareous, very fossiliferous, abundant Bryozoans, Crinoids, trace Brachiopods, trace pellets, minor LIMESTONE as above

335.00 to 340.00
(5.00)**SHALE**

dark gray as above, slightly calcareous to very calcareous in part, very fossiliferous, Crinoids, Brachiopods, Bryozoans, Ostracods, scattered LIMESTONE, medium gray brown, fine to coarse grained fragmental Packstone, slightly argillaceous in part, very fossiliferous, Ostracods, Crinoids, Brachiopods, tight, no shows

340.00 to 345.00 (5.00)	LIMESTONE medium brown to medium gray brown, very fine to very coarse fragmental Packstone, slightly argillaceous, very fossiliferous, Crinoids, Brachiopods, Ostracods, Bryozoans, trace spicules, tight, no shows, trace calcite healed microfractures, scattered SHALE as above, very calcareous, fossiliferous
345.00 to 350.00 (5.00)	LIMESTONE as above, skeletal Packstone, tight, no shows, interbedded SHALE, dark gray to medium to dark green gray, calcareous to very calcareous grading to Marlstone, abundant fossil fragments, Crinoids, Brachiopods, Bryozoans, trace pyrite
350.00 to 355.00 (5.00)	LIMESTONE medium brown to gray brown, very fine to coarse grained Packstone, argillaceous to very argillaceous, fossiliferous, Crinoids, Brachiopods, Bryozoans, Ostracods, tight, no shows, trace Chert, medium brown, scattered SHALE, dark gray to dark green gray, slightly calcareous to very calcareous, waxy in part, very fossiliferous, trace Siltstone, medium gray, quartzose, siliceous, calcareous, argillaceous, tight, no shows
355.00 to 360.00 (5.00)	LIMESTONE medium brown to gray brown, very fine to medium grained Packstone, argillaceous to very argillaceous, fossiliferous, Crinoids, Brachiopods, tight, no shows, scattered Chert, medium to dark brown, increasing SHALE, dark gray to medium to dark green gray, waxy in part, slightly calcareous to very calcareous, marly in part, fossiliferous, Crinoids, trace slickenside
360.00 to 365.00 (5.00)	LIMESTONE medium to dark brown to gray brown, very fine to fine grained Packstone with scattered loose coarse to very coarse skeletal fragments, very argillaceous, fossiliferous, Crinoids, tight, no shows, scattered Chert as above, scattered SHALE, mainly dark gray, slightly calcareous to very calcareous, fossiliferous
365.00 to 370.00 (5.00)	LIMESTONE medium to dark gray brown as above, argillaceous to very argillaceous, very fossiliferous, tight, no shows, trace microfractures healed with white calcite, scattered SHALE, dark gray, slightly calcareous, grading to Marlstone in part, fossiliferous, Crinoids, trace slickenside, scattered Chert, dark gray to dark gray brown, hard
370.00 to 375.00 (5.00)	LIMESTONE medium to dark brown to gray brown, Wackestone, argillaceous to very argillaceous grading to Marlstone, fossiliferous, scattered Crinoids fragments, tight, no shows, scattered white calcite filling microfractures, scattered medium brown Packstone as above, scattered SHALE, dark gray to medium to dark green gray, calcareous in part, fossiliferous
375.00 to 380.00 (5.00)	SHALE dark gray to dark green gray, fissile in part, slightly calcareous to very calcareous in part, fossiliferous, abundant loose Crinoids, decreasing LIMESTONE as above, trace coarse white calcite crystals

Sample Descriptions

Storage Units:

Metric

380.00 to 385.00 (5.00)	LIMESTONE medium brown to brown gray, very fine to fine grained Packstone, argillaceous to very argillaceous, fossiliferous, Crinoids, Brachiopods, tight, no shows, abundant Chert, medium to dark brown to gray brown, scattered SHALE as above
385.00 to 390.00 (5.00)	LIMESTONE medium brown to medium to dark brown gray, very fine to coarse grained packstone with scattered very fine to coarse grained wackestone, argillaceous to very argillaceous, fossiliferous, Crinoids, Brachiopods, tight, no shows, scattered fractures cemented with coarse white calcite, trace Chert, trace pyrite, scattered SHALE, dark gray to dark brown gray, very calcareous grading to argillaceous Limestone, fossiliferous, abundant Crinoid fragments
390.00 to 395.00 (5.00)	LIMESTONE as above, fossiliferous, tight, no shows, scattered Chert, increasing interbedded SHALE, dark gray to green gray, calcareous to very calcareous, fossiliferous, scattered loose Crinoid fragments, trace Brachiopods
395.00 to 400.00 (5.00)	LIMESTONE medium brown to medium gray brown, very fine to medium grained Packstone, trace Wackestone, argillaceous to very argillaceous, slightly silty in part, very fossiliferous, Crinoids, Brachiopods, Bryozoans, tight, no shows, scattered fractures filled with coarse white calcite, minor Siltstone, medium gray, calcareous, slightly argillaceous, tight, no shows, scattered Shale as above, trace Chert
400.00 to 405.00 (5.00)	LIMESTONE as above, argillaceous, slightly silty in part, fossiliferous, tight, no shows, increasing interbedded SHALE, dark gray, fissile, slightly calcareous in part, to very calcareous in part, fossiliferous, Crinoids, Brachiopods, Bryozoans, trace slickenside, minor Chert
405.00 to 410.00 (5.00)	LIMESTONE medium brown to gray brown, very fine to medium grained packstone, trace wackestone, argillaceous in part, slightly dolomitic in part, fossiliferous, Brachiopods, Crinoids, trace spicules, tight, no shows, mrn Chert, trace SHALE as above
410.00 to 415.00 (5.00)	LIMESTONE medium to dark gray brown, very fine to coarse grained Packstone, some Wackestone, argillaceous, fossiliferous, Crinoids, Brachiopods, trace fracture porosity, no shows, scattered clear calcite crystals, scattered Chert, medium to dark brown to brown gray, minor SHALE, dark gray, medium gray in part, fissile, slightly calcareous to very calcareous grading to Marlstone in part, fossiliferous, trace Crinoids, trace slickenside
415.00 to 420.00 (5.00)	LIMESTONE medium to dark gray brown, very fine to fine grained Packstone, scattered Wackestone, argillaceous to very argillaceous, slightly fossiliferous with trace Crinoids, Brachiopods, trace Bryozoans, streak fracture porosity at 417m, no shows, scattered sparry calcite crystals in fractured section, abundant Chert, dark brown to dark gray brown, scattered Shale as above, medium to dark gray to very dark gray in part, slightly calcareous to very calcareous in part, fossiliferous

Sample Descriptions

Storage Units:

Metric

2,230.00 to 2,240.00 (10.00)	SHALE dark gray to dark brown gray to black, micromicaceous, fissile, slightly bituminous, trace pyrite, trace Marlstone streaks
2,240.00 to 2,250.00 (10.00)	SHALE very dark gray to black as above, micromicaceous, fissile, bituminous, moderately indurated, increasing pyrite, trace loose mica from lost circulation material
2,250.00 to 2,260.00 (10.00)	SHALE dark brown gray to black, micromicaceous, fissile, slightly bituminous, moderately indurated, slightly anhydritic with anhydrite inclusions and fracture filling, trace pyrite
2,260.00 to 2,270.00 (10.00)	SHALE very dark gray to dark brown gray to black as above, micromicaceous, fissile, slightly bituminous, moderately indurated and blocky in part, trace pyrite
2,270.00 to 2,280.00 (10.00)	SHALE very dark gray to black, dark brown gray in part, micromicaceous, fissile, bituminous, trace pyrite
2,280.00 to 2,290.00 (10.00)	SHALE as above, mainly black, dark brown gray in part, micromicaceous, fissile, bituminous, moderately indurated in part, minor pyrite
2,290.00 to 2,300.00 (10.00)	SHALE as above, very dark brown gray to black, slightly bituminous, siliceous and well indurated in part, trace pyrite
2,300.00 to 2,310.00 (10.00)	SHALE black, very dark gray to very dark brown gray in part, siliceous and hard in part, bituminous, trace pyrite
2,310.00 to 2,320.00 (10.00)	SHALE black, dark gray to very dark brown gray in part, micromicaceous, very siliceous and hard, bituminous, minor pyrite
2,320.00 to 2,330.00 (10.00)	SHALE black, very dark brown gray in part, micromicaceous, fissile, slightly siliceous, hard, bituminous, trace pyrite
2,330.00 to 2,340.00 (10.00)	SHALE black as above, very dark gray to dark brown gray in part, micromicaceous, fissile, bituminous, siliceous, well indurated, minor pyrite
2,340.00 to 2,350.00 (10.00)	SHALE very dark gray to black, dark brown gray in part, micromicaceous, fissile to blocky in part, very siliceous and hard in part, bituminous, trace pyrite, trace fractures with anhydrite filling, trace quartz crystals
2,350.00 to 2,360.00 (10.00)	SHALE mainly black, very dark gray to dark brown gray in part, micromicaceous, fissile to blocky, very siliceous and hard, bituminous, slightly sideritic in part, trace pyrite,

Sample Descriptions

Storage Units:

Metric

	trace fractures with clear quartz infill, trace slickenside
2,360.00 to 2,370.00 (10.00)	SHALE dark gray to black, micromicaceous, fissile to blocky, siliceous and very hard in part, trace pyrite, trace slickenside, trace anhydrite filled microfractures
2,370.00 to 2,375.00 (5.00)	SHALE dark gray to dark brown gray, to black in part, micromicaceous, fissile to blocky, slightly bituminous, siliceous and hard in part, trace pyrite
2,375.00 to 2,380.00 (5.00)	SHALE very dark brown gray to black, fissile, micromicaceous, bituminous, trace pyrite
2,380.00 to 2,385.00 (5.00)	SHALE very dark gray to black, very dark brown gray in part, micromicaceous, fissile to blocky, siliceous and well indurated, bituminous, trace slickenside, trace pyrite, minor Shale, medium gray to green gray, micromicaceous, fissile, moderately soft
2,385.00 to 2,390.00 (5.00)	SHALE very dark gray to black as above, bituminous, siliceous and hard, abundant slickenside, trace Marlstone streaks, medium gray, calcareous, tight, scattered pyrite
2,390.00 to 2,400.00 (10.00)	SHALE very dark gray to dark brown gray to black, micromicaceous, fissile to blocky, siliceous and well indurated, bituminous, trace slickenside, trace pyrite, trace Shale streaks, medium gray to green gray, micromicaceous, fissile, moderately soft
2,400.00 to 2,410.00 (10.00)	SHALE very dark gray to black as above, siliceous, bituminous, trace pyrite
2,410.00 to 2,420.00 (10.00)	SHALE very dark gray to dark brown gray, to black in part, micromicaceous, fissile to blocky, siliceous to very siliceous and hard, slightly bituminous, trace slickenside, trace pyrite
2,420.00 to 2,430.00 (10.00)	SHALE dark gray to dark brown gray as above, black in part, siliceous, bituminous, hard, trace microfractures cement with calcite in part, trace clear quartz fracture filling, minor pyrite, trace dark gray dolomitic Marlstone streaks
2,430.00 to 2,440.00 (10.00)	SHALE dark gray to black, micromicaceous, fissile, siliceous to very siliceous grading to black Chert in part, hard, bituminous, trace pyrite, trace Marlstone streaks, dark brown gray, dolomitic, calcareous in part, siliceous, hard, tight
2,440.00 to 2,445.00 (5.00)	SHALE very dark gray to black, very siliceous grading to black Chert, very hard, bituminous, trace thin microfractures healed with calcite, trace pyrite, trace Marlstone, dark brown gray, microcrystalline, dolomitic, siliceous, tight

Sample Descriptions

Storage Units:

Metric

2,445.00 to 2,450.00 (5.00)	SHALE black, very dark gray to very dark brown gray in part, very siliceous and hard, slightly bituminous, trace slickenside, trace Marlstone, very dark brown gray to black, microcrystalline, calcareous to dolomitic, very siliceous, slightly silty, tight
2,450.00 to 2,455.00 (5.00)	SHALE as above, very dark gray to black, very siliceous grading to black Chert, very hard, slightly bituminous, trace disseminated pyrite, trace Marlstone as above
2,455.00 to 2,460.00 (5.00)	SHALE very dark gray to black as above, very siliceous and hard, slightly bituminous, trace pyrite, increasing Marlstone, dark gray brown to black, microcrystalline, siliceous and hard, calcareous, tight
2,460.00 to 2,465.00 (5.00)	SHALE very dark gray to black as above, micromicaceous, siliceous grading to black Chert, slightly bituminous, trace pyrite, interbedded Marlstone, dark gray brown to black, microcrystalline, siliceous, calcareous to dolomitic in part, tight
2,465.00 to 2,470.00 (5.00)	SHALE very dark gray to black, micromicaceous, siliceous and hard, slightly bituminous, marly in part
2,470.00 to 2,475.00 (5.00)	SHALE very dark gray to black as above, very siliceous and hard grading to black Chert in part, slightly bituminous
2,475.00 to 2,480.00 (5.00)	SHALE very dark gray to black, dark brown gray in part, micromicaceous, fissile, very siliceous, hard, slightly bituminous,
2,480.00 to 2,485.00 (5.00)	SHALE black, very dark gray to very dark brown gray in part, micromicaceous, fissile, siliceous, slightly bituminous, well indurated, trace microfractures
2,485.00 to 2,490.00 (5.00)	SHALE black as above, siliceous, slightly bituminous, trace black Chert
2,490.00 to 2,495.00 (5.00)	SHALE very dark gray to black, dark brown gray, micromicaceous, fissile, very siliceous and hard, slightly bituminous, trace calcite cemented microfractures
2,495.00 to 2,500.00 (5.00)	SHALE black as above, very dark gray to very dark brown gray, micromicaceous, fissile, siliceous, moderately indurated to very hard in part, slightly bituminous
2,500.00 to 2,505.00 (5.00)	SHALE very dark gray to black as above, siliceous, moderately indurated to very hard in part, slightly bituminous, trace pyrite

Sample Descriptions

Storage Units:

Metric

2,505.00 to 2,510.00 (5.00)	SHALE very dark gray to black as above, siliceous, slightly sideritic in part, trace clear quartz crystal shards
2,510.00 to 2,515.00 (5.00)	SHALE very dark gray to dark brown gray to black, micromicaceous, fissile, very siliceous and hard, slightly bituminous, scattered quartz crystal shards, trace hexagonal quartz crystal clusters, trace fracture porosity, no shows
2,515.00 to 2,520.00 (5.00)	SHALE very dark brown gray to black as above, siliceous, very slightly bituminous, trace microfractures with clear quartz infilling
2,520.00 to 2,525.00 (5.00)	SHALE dark gray to dark brown gray to black, micromicaceous, siliceous in part, moderately indurated to very hard in part, slightly bituminous, marly in part, trace fracture porosity, no shows, scattered microfractures mainly healed with clear quartz, trace quartz crystal clusters
2,525.00 to 2,530.00 (5.00)	SHALE very dark gray to black, dark brown gray in part, micromicaceous, fissile to blocky, siliceous to very siliceous and hard, slightly bituminous in part, scattered fractures cemented with clear quartz, trace drusy hexagonal very fine to medium quartz crystals, trace dark gray soft Shale
2,530.00 to 2,535.00 (5.00)	SHALE dark gray to black as above, siliceous, well indurated, scattered quartz filled fractures
2,535.00 to 2,540.00 (5.00)	SHALE very dark gray to black as above, siliceous, scattered fractures and quartz crystal fragments, increasing Shale, medium to dark gray, micromicaceous, fissile, moderately soft
2,540.00 to 2,545.00 (5.00)	SHALE medium gray, micromicaceous, fissile, soft, decreasing dark gray Shale as above
2,545.00 to 2,550.00 (5.00)	SHALE medium to dark gray, micromicaceous, fissile, slightly bentonitic and moderately soft, trace pyrite
2,550.00 to 2,555.00 (5.00)	SHALE medium to dark gray as above, trace medium green gray, micromicaceous, slightly bentonitic in part
2,555.00 to 2,560.00 (5.00)	SHALE medium gray, micromicaceous, fissile, moderately soft, trace disseminated pyrite
2,560.00 to 2,565.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, trace disseminated pyrite

Sample Descriptions

Storage Units:

Metric

2,565.00 to 2,570.00 (5.00)	SHALE mainly medium gray as above, trace green gray, micromicaceous, marly in part, slightly bentonitic in part, moderately soft
2,570.00 to 2,575.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly bentonitic, moderately soft, trace pyrite
2,575.00 to 2,580.00 (5.00)	SHALE medium gray to green gray as above, slightly bentonitic and soft, trace pyrite, trace marly streaks
2,580.00 to 2,585.00 (5.00)	SHALE medium gray to medium green gray, dark gray in part, micromicaceous, fissile, moderately soft, slightly bentonitic in part, very slightly calcareous to marly in part, trace pyrite
2,585.00 to 2,590.00 (5.00)	SHALE as above, medium to dark gray to green gray, micromicaceous, fissile, trace pyrite, trace slickenside, trace quartz filled microfractures
2,590.00 to 2,595.00 (5.00)	SHALE medium to dark gray to green gray as above, trace slickenside, trace microfractures with quartz crystal fragments and shards
2,595.00 to 2,600.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, slightly marly in part, slightly bentonitic in part, moderately soft, trace pyrite, trace quartz crystal fragments
2,600.00 to 2,605.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, bentonitic and soft, trace pyrite, trace slickenside
2,605.00 to 2,610.00 (5.00)	SHALE medium to dark gray to green gray as above, slightly bentonitic, poor sample, tripped for drillbit
2,610.00 to 2,615.00 (5.00)	SHALE mainly medium gray to green gray, to dark gray in part, micromicaceous, fissile, slightly bentonitic and soft, trace disseminated microcrystalline pyrite, trace black Shale, siliceous and hard
2,615.00 to 2,620.00 (5.00)	SHALE medium gray, micromicaceous, fissile, slightly bentonitic, moderately soft
2,620.00 to 2,625.00 (5.00)	SHALE medium gray to medium to dark green gray, micromicaceous, fissile, moderately soft, slightly bentonitic, trace slickenside, rare trace anhydrite healed microfractures
2,625.00 to 2,630.00 (5.00)	SHALE as above, medium gray to green gray, bentonitic in part, trace marly streaks, trace slickenside

Sample Descriptions

Storage Units:

Metric

2,630.00 to 2,635.00 (5.00)	SHALE medium gray to medium to dark green gray, micromicaceous, fissile, slightly bentonitic and soft
2,635.00 to 2,640.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, moderately soft, becoming marly in part
2,640.00 to 2,645.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly bentonitic, minor calcareous streaks, trace Limestone stringers, light brown gray, cryptocrystalline, argillaceous, tight
2,645.00 to 2,650.00 (5.00)	SHALE as above, medium to dark gray to green gray, slightly bentonitic, becoming slightly calcareous to marly, trace disseminated pyrite
2,650.00 to 2,655.00 (5.00)	SHALE medium gray to green gray, dark gray, micromicaceous, fissile, slightly calcareous to marly, slightly bentonitic and soft in part
2,655.00 to 2,660.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, moderately soft, marly streaks
2,660.00 to 2,665.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly calcareous to marly, moderately soft in part
2,665.00 to 2,670.00 (5.00)	SHALE medium gray to green gray, dark gray in part, micromicaceous, fissile, slightly calcareous to marly, trace Limestone stringers, light to medium brown gray, cryptocrystalline, argillaceous, tight
2,670.00 to 2,675.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, calcareous streaks, trace microcrystalline pyrite
2,675.00 to 2,680.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, very slightly calcareous to marly, trace pyrite
2,680.00 to 2,685.00 (5.00)	SHALE as above, marly streaks, trace LIMESTONE stringers
2,685.00 to 2,690.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, marly streaks, moderately soft, slightly bituminous in part, trace pyrite

Sample Descriptions

Storage Units:

Metric

2,690.00 to 2,695.00 (5.00)	SHALE as above, increasing dark gray to dark green gray, micromicaceous, fissile
2,695.00 to 2,700.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, minor calcareous streaks, trace anhydrite healed microfractures
2,700.00 to 2,705.00 (5.00)	SHALE medium gray to green gray, trace dark gray, micromicaceous, fissile, mainly soft with minor calcareous to marly streaks, trace pyrite
2,705.00 to 2,710.00 (5.00)	SHALE mainly medium gray to green gray as above, micromicaceous, fissile, moderately soft, trace marly streaks
2,710.00 to 2,715.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, moderately soft, calcareous streaks, slightly bituminous in part, trace pyrite
2,715.00 to 2,720.00 (5.00)	SHALE as above, fissile, soft with trace harder marly streaks
2,720.00 to 2,725.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, moderately soft, trace marly stringers, scattered SHALE, dark gray to black, micromicaceous, slightly harder, trace pyrite
2,725.00 to 2,730.00 (5.00)	SHALE medium gray to green gray to dark gray in part, micromicaceous, fissile, marly streaks, trace pyrite
2,730.00 to 2,735.00 (5.00)	SHALE medium to dark gray to green gray as above, micromicaceous, fissile, decreasing marly streaks, increasing pyrite
2,735.00 to 2,740.00 (5.00)	SHALE medium to dark gray to green gray, scattered dark brown gray, micromicaceous, fissile, minor marly streaks, slightly bituminous in part, trace pyrite
2,740.00 to 2,745.00 (5.00)	SHALE medium gray to green gray as above, increasing interbedded SHALE, dark brown gray to black, fissile, slightly bituminous, trace slickenside
2,745.00 to 2,750.00 (5.00)	SHALE dark gray to dark brown gray to black, micromicaceous, moderately soft, slightly bituminous, trace pyrite, scattered medium gray to green gray Shale as above
2,750.00 to 2,755.00 (5.00)	SHALE dark gray to dark brown gray to black, micromicaceous, moderately indurated, slightly bituminous, trace slickenside, trace pyrite

Sample Descriptions

Storage Units:

Metric

2,755.00 to 2,760.00 (5.00)	SHALE dark gray to black as above, bituminous, interbedded SHALE, medium gray to green gray, micromicaceous, fissile, marly in part, trace slickenside
2,760.00 to 2,765.00 (5.00)	SHALE medium gray to green gray, dark brown gray to black in part, micromicaceous, fissile, moderately soft, trace marly streaks, bituminous in part, trace pyrite
2,765.00 to 2,770.00 (5.00)	SHALE dark gray to black, dark brown gray in part, micromicaceous, fissile, moderately indurated, bituminous, trace pyrite, trace black Chert, scattered soft green gray Shale as above
2,770.00 to 2,775.00 (5.00)	SHALE very dark gray to black, micromicaceous, fissile, slightly bituminous, moderately indurated with softer streaks, trace pyrite, trace black Chert
2,775.00 to 2,780.00 (5.00)	SHALE dark gray to black as above, medium gray to green gray in part, micromicaceous, fissile, slightly siliceous and moderately indurated in part, bituminous in part, trace pyrite
2,780.00 to 2,785.00 (5.00)	SHALE dark gray to black as above, slightly bituminous, scattered Shale, medium gray to medium green gray, micromicaceous, fissile, trace pyrite
2,785.00 to 2,790.00 (5.00)	SHALE very dark brown gray to black, bituminous, fissile, moderately soft in part to indurated in part, trace pyrite, trace slickenside, rare trace microfractures
2,790.00 to 2,795.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, slightly bituminous in part, trace pyrite, trace slickenside
2,795.00 to 2,800.00 (5.00)	SHALE medium to dark gray to green gray, micromicaceous, fissile, trace calcareous streaks, trace pyrite
2,800.00 to 2,810.00 (10.00)	SHALE medium gray to green gray, micromicaceous, fissile, trace marly streaks, trace pyrite, trace dark gray Shale as above
2,810.00 to 2,815.00 (5.00)	SHALE mainly medium gray to medium green gray, dark gray in part, micromicaceous, fissile, moderately soft, trace marly streaks, slightly bituminous in part
2,815.00 to 2,820.00 (5.00)	SHALE medium gray to green gray as above, interbedded SHALE, dark gray to black, micromicaceous, fissile, bituminous, trace pyrite

Sample Descriptions

Storage Units:

Metric

2,820.00 to 2,825.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, moderately soft, trace slickenside, trace pyrite, decreasing dark gray Shale as above
2,825.00 to 2,835.00 (10.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, moderately soft, trace marly streaks, trace pyrite
2,835.00 to 2,840.00 (5.00)	SHALE medium gray to green gray, to dark gray in part, micromicaceous, fissile, mainly soft with some harder marly streaks, trace slickenside, very fine cuttings
2,840.00 to 2,845.00 (5.00)	SHALE as above, mainly medium gray to green gray, dark gray and slightly bituminous in part, trace pyrite
2,845.00 to 2,850.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, moderately soft, trace black Shale, fissile, slightly bituminous, trace pyrite
2,850.00 to 2,855.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, fairly soft, trace slickenside, trace calcite healed microfractures, trace SHALE, dark gray to very dark gray to black, micromicaceous, fissile, bituminous
2,855.00 to 2,860.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, slightly silty with very fine silt in part, trace Siltstone laminations, medium gray to medium green gray, quartzose, very argillaceous, siliceous and hard, tight
2,860.00 to 2,865.00 (5.00)	SHALE as above, medium gray to green gray, dark gray in part, micromicaceous, fissile, slightly silty with trace Siltstone laminations, very fine cuttings
2,865.00 to 2,870.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, trace marly streaks, very slightly silty in part, trace Siltstone laminations, trace dark gray to black Shale
2,870.00 to 2,875.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, trace silty streaks, trace slickenside, trace microfractures, calcite healed in part, trace Shale, very dark gray to black, moderately indurated, slightly bituminous
2,875.00 to 2,880.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, soft, slightly silty in part, trace slickenside, very fine cuttings
2,880.00 to 2,885.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, trace Shale, dark gray to black, micromicaceous, fissile, slightly bituminous, moderately indurated

Sample Descriptions

Storage Units:

Metric

2,885.00 to 2,890.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, moderately soft in part, very slightly silty in part with trace Siltstone laminations
2,890.00 to 2,895.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, very slightly silty in part, trace Siltstone laminations, light to medium gray, quartzose, very argillaceous, slightly siliceous and hard, tight, trace Shale, dark gray, micromicaceous, slightly harder than medium gray Shale
2,895.00 to 2,900.00 (5.00)	SHALE medium gray as above, increasing Shale, dark gray to black, micromicaceous, fissile, slightly bituminous in part, trace pyrite, very fine cuttings
2,900.00 to 2,905.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, moderately soft, trace pyrite, trace Siltstone laminations, medium gray, very fine silt, argillaceous, siliceous and hard in part, tight
2,905.00 to 2,910.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, moderately soft, slightly silty, trace Siltstone stringers
2,910.00 to 2,915.00 (5.00)	SHALE medium gray to green gray as above, slightly silty with trace Siltstone laminations
2,915.00 to 2,920.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, trace Siltstone laminations, light to medium gray to green gray, quartzose, very argillaceous, siliceous and hard in part, tight, very fine cuttings
2,920.00 to 2,925.00 (5.00)	SHALE medium gray to green gray, dark gray to dark brown gray in part, micromicaceous, fissile, moderately soft, very slightly silty in part, rare trace Siltstone laminations
2,925.00 to 2,930.00 (5.00)	SHALE medium gray to green gray as above, trace brown gray, micromicaceous, trace Siltstone laminations, trace pyrite
2,930.00 to 2,935.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly silty in part, trace Siltstone laminations, medium to dark gray, very argillaceous, siliceous and hard in part, tight, trace dark gray Shale, micromicaceous, slightly silty
2,935.00 to 2,940.00 (5.00)	SHALE medium gray to medium green gray as above, micromicaceous, fissile, moderately soft, trace Siltstone streaks, medium to dark gray, very argillaceous, slightly siliceous in part, tight
2,940.00 to 2,945.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, soft

Sample Descriptions

Storage Units:

Metric

2,945.00 to 2,950.00 (5.00)	SHALE mainly medium gray, micromicaceous, fissile, soft, scattered SHALE, dark gray to dark gray brown to black, micromicaceous, siliceous in part, bituminous, trace Siltstone streaks, medium gray, slightly calcareous in part, siliceous and hard in part, very argillaceous, tight
2,950.00 to 2,955.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, soft, slightly silty in part, trace marly streaks
2,955.00 to 2,960.00 (5.00)	SHALE medium gray to green gray as above, trace Limestone stringers, light to medium brown gray, cryptocrystalline, argillaceous, tight, no shows, trace Siltstone laminations
2,960.00 to 2,965.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly fossiliferous, sift, trace hard siliceous Siltstone laminations
2,965.00 to 2,970.00 (5.00)	SHALE as above, medium gray to medium green gray, micromicaceous, fissile, very soft with scattered small round aggregations of clay particles, trace pyrite, increasing Siltstone streaks, medium gray, siliceous and hard, argillaceous, tight
2,970.00 to 2,975.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, soft, trace Siltstone laminations, medium gray, siliceous, argillaceous
2,975.00 to 2,980.00 (5.00)	SHALE as above, medium gray to green gray, scattered Shale, very dark gray to black, micromicaceous, siliceous, slightly bituminous
2,980.00 to 2,985.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, slightly bentonitic and soft, trace pyrite, rare trace calcite filled microfractures, trace Siltstone streaks, medium gray to very dark gray, very argillaceous, siliceous and hard, tight, trace Shale, very dark gray to black, micromicaceous, slightly siliceous, slightly bituminous
2,985.00 to 2,990.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, very soft, scattered small aggregations of clay particles, trace Siltstone, very dark gray, argillaceous, slightly sideritic, tight
2,990.00 to 2,995.00 (5.00)	SHALE medium gray to medium green gray as above, very soft, trace siderite, trace calcite healed microfractures
2,995.00 to 3,000.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, very soft, trace dark gray to black Shale streaks

Sample Descriptions

Storage Units:

Metric

3,000.00 to 3,005.00 (5.00)	SHALE as above, very soft, abundant small aggregations of clay particles, easily turned to powder when squeezed
3,005.00 to 3,010.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, soft, slightly silty in part, trace Siltstone laminations, light to medium gray to green gray, very argillaceous, micromicaceous, siliceous, slightly calcareous, well indurated, tight
3,010.00 to 3,015.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, soft, slightly calcareous to marly in part, silty in part, trace slickenside, trace Shale, dark gray to black, fissile, slightly harder than medium gray Shale
3,015.00 to 3,020.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, soft, slightly silty in part, slightly calcareous in part, minor Shale, dark brown gray to black, soft, bituminous, trace Siltstone, medium gray to very dark gray, argillaceous, siliceous, slightly calcareous, tight
3,020.00 to 3,025.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, moderately soft, trace slickenside, minor Shale, very dark gray to black, slightly bituminous, soft to very siliceous and hard in part, trace quartz crystal fragments, microfractures?
3,025.00 to 3,030.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, soft, minor slickenside, trace pyrite, trace quartz crystal fragments
3,030.00 to 3,035.00 (5.00)	SHALE medium gray to green gray as above, soft, slightly calcareous in part, slightly fossiliferous with trace Crinoid fragments, trace pyrite
3,035.00 to 3,040.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, soft, slightly fossiliferous, trace calcareous streaks, trace Siltstone laminations
3,040.00 to 3,045.00 (5.00)	SHALE as above, mainly soft with harder streaks, minor calcareous streaks, trace pyrite, trace hard Siltstone laminations
3,045.00 to 3,050.00 (5.00)	SHALE medium gray to green gray as above, soft, slightly calcareous in part, trace slickenside, minor Shale, dark gray to black, siliceous, sideritic in part, hard, trace pyrite
3,050.00 to 3,055.00 (5.00)	SHALE mgy to green gray as above, micromicaceous, fissile, soft, increasing Siltstone streaks, medium gray, quartzose, siliceous, slightly calcareous, argillaceous, tight

Sample Descriptions

Storage Units:

Metric

3,055.00 to 3,060.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, soft, trace slickenside, minor Siltstone streaks, medium gray, siliceous and vitreous in part, hard, slightly calcareous, argillaceous, tight
3,060.00 to 3,065.00 (5.00)	SHALE medium gray to medium green gray, micromicaceous, fissile, mainly soft with streaks slightly harder, trace slickenside, trace Siltstone streaks
3,065.00 to 3,070.00 (5.00)	SHALE medium gray as above, soft, streaks hard Siltstone, medium gray, siliceous, argillaceous, tight
3,070.00 to 3,075.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, becoming slightly more indurated in part, trace slickenside, trace pyrite
3,075.00 to 3,080.00 (5.00)	SHALE medium gray to green gray as above, trace Siltstone laminations, medium gray to green gray, siliceous and hard, tight
3,080.00 to 3,085.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, soft to very soft with aggregated clay particles, trace disseminated pyrite, trace Siltstone laminations, medium to dark gray, siliceous, tight
3,085.00 to 3,090.00 (5.00)	SHALE medium gray to green gray as above, micromicaceous, fissile, moderately soft, trace Siltstone, medium to dark gray, siliceous, sideritic in part, argillaceous, tight
3,090.00 to 3,095.00 (5.00)	SHALE medium gray, micromicaceous, fissile, very soft to moderately soft, slightly silty with very fine silt in part, trace Siltstone laminations
3,095.00 to 3,100.00 (5.00)	SHALE medium gray as above, micromicaceous, fissile, soft, trace Siltstone laminations
3,100.00 to 3,110.00 (10.00)	SHALE medium gray, micromicaceous, fissile, very soft to moderately soft, slightly silty in part, trace slickenside, trace pyrite, trace Siltstone laminations, medium gray, siliceous, argillaceous, slightly calcareous in part, tight
3,110.00 to 3,115.00 (5.00)	SHALE medium gray, micromicaceous, fissile, splintery in part, very soft to moderately soft, trace pyrite, trace Siltstone laminations
3,115.00 to 3,120.00 (5.00)	SHALE medium gray as above, micromicaceous, fissile, slightly silty in part with very fine silt, trace pyrite, increasing Siltstone laminations, medium gray, quartzose, siliceous and hard, tight

Sample Descriptions

Storage Units:

Metric

3,120.00 to 3,125.00 (5.00)	SHALE medium gray as above, micromicaceous, fissile, trace pyrite, trace quartz crystal fragments
3,125.00 to 3,130.00 (5.00)	SHALE medium to dark gray to green gray, dark gray to black in part, micromicaceous, fissile, trace quartz crystal fragments, trace Siltstone laminations, medium gray, siliceous and hard, tight
3,130.00 to 3,135.00 (5.00)	SHALE mainly medium gray to green gray, minor dark gray to dark green gray, micromicaceous, fissile, trace slickenside, minor Siltstone laminations
3,135.00 to 3,140.00 (5.00)	SHALE mainly medium gray as above, minor medium to dark green gray, micromicaceous, fissile, very soft to moderately soft, trace Siltstone laminations
3,140.00 to 3,145.00 (5.00)	SHALE medium gray to medium to dark green gray, micromicaceous, fissile, very soft to moderately soft, slightly silty in part, trace disseminated pyrite, trace Siltstone laminations
3,145.00 to 3,150.00 (5.00)	SHALE medium to dark gray to green gray as above, micromicaceous, fissile, soft, trace Siltstone laminations
3,150.00 to 3,155.00 (5.00)	SHALE as above, micromicaceous, fissile, soft, increasing Siltstone laminations
3,155.00 to 3,160.00 (5.00)	SHALE medium gray to green gray, micromicaceous, fissile, very soft to moderately soft, slightly silty, trace pyrite, trace siderite, scattered Siltstone laminations, medium to dark gray, quartzose, siliceous, slightly calcareous, argillaceous, hard, tight
3,160.00 to 3,165.00 (5.00)	SHALE as above, medium to dark green gray in part, micromicaceous, fissile, soft becoming slightly more indurated in part, trace marly streaks, trace Siltstone streaks
3,165.00 to 3,169.00 (4.00)	SHALE medium to dark gray to green gray as above, micromicaceous, fissile, moderately soft, trace Siltstone streaks
3,169.00 to 3,175.00 (6.00)	SHALE dark gray to very dark gray to black, dark brown gray in part, fissile, moderately indurated in part, slightly bituminous in part, trace marly streaks, trace pyrite
3,175.00 to 3,180.00 (5.00)	SHALE dark gray to black as above, micromicaceous, fissile to splintery in part, well indurated, siliceous, slightly bituminous, minor disseminated pyrite

Sample Descriptions

Storage Units:

Metric

3,180.00 to 3,185.00 (5.00)	SHALE very dark gray to black, micromicaceous, fissile to splintery, siliceous, slightly bituminous, pyritic with scattered floating microcrystalline to very fine crystalline cubes and pyritohedrons in part
3,185.00 to 3,190.00 (5.00)	SHALE dark gray to black, micromicaceous, fissile to splintery in part, siliceous and very hard in part, slightly bituminous, trace thin quartz filled microfractures, trace pyrite
3,190.00 to 3,195.00 (5.00)	SHALE very dark gray to black as above, very siliceous and hard in part, pyritic in part with scattered disseminated microcrystalline pyrite, minor microfractures, clear quartz crystal cement, open in part with trace fine hexagonal quartz crystals, trace black Chert
3,195.00 to 3,200.00 (5.00)	SHALE very dark gray to black, fissile in part, very siliceous grading to Chert, very hard, slightly bituminous, trace pyrite, interbedded CHERT, black, hard, trace conchoidal fracture, argillaceous, tight
3,200.00 to 3,205.00 (5.00)	SHALE as above, very dark gray to black, splintery in part, very siliceous, hard, trace conchoidal fracture, slightly bituminous with minor softer bituminous traces, trace microfractures cement with quartz, trace pyrite, scattered black Chert
3,205.00 to 3,210.00 (5.00)	SHALE as above, very dark gray to black, very siliceous grading to Chert, bituminous, increasing microfractures with quartz crystal lining, trace fracture porosity, no shows, trace pyrite
3,210.00 to 3,215.00 (5.00)	SHALE very dark gray to black, dark brown gray in part, fissile in part, very siliceous grading to Chert, bituminous, trace microfractures, cemented with quartz crystal lining, trace slickenside, trace pyrite, trace black Chert
3,215.00 to 3,220.00 (5.00)	SHALE black as above, very siliceous and hard, slightly softer and bituminous in part, trace pyrite, trace quartz filled microfractures, trace Chert, black, opaque, hard
3,220.00 to 3,225.00 (5.00)	SHALE very dark gray to black, fissile in part, splintery in part, very siliceous and hard, trace conchoidal fracture, slightly bituminous, trace slickenside, trace quartz healed microfractures, increasing interbedded Chert, black, very hard
3,225.00 to 3,230.00 (5.00)	SHALE as above, black, very siliceous and hard grading to argillaceous Chert, trace slightly softer bituminous stringers, trace microfractures, scattered Chert, black, hard, conchoidal fracture

Sample Descriptions

Storage Units:

Metric

3,230.00 to 3,235.00 (5.00)	SHALE very dark gray to black, very siliceous and hard, slightly bituminous, increasing quartz filled fractures to 2mm, trace pyrite
3,235.00 to 3,240.00 (5.00)	SHALE black, blocky, very siliceous and hard grading to black Chert, conchoidal fracture, slightly bituminous, trace quartz healed microfractures, trace quartz crystal fragments, trace pyrite
3,240.00 to 3,245.00 (5.00)	SHALE very dark gray to black as above, very siliceous and hard, marly and dolomitic in part, trace quartz filled microfractures, scattered black Chert
3,245.00 to 3,250.00 (5.00)	SHALE dark gray to black, siliceous to very siliceous in part, micromicaceous, fissile in part to blocky in part, slightly bituminous, trace pyrite, trace microfractures, trace dark gray dolomitic Marlstone
3,250.00 to 3,255.00 (5.00)	SHALE dark gray to black, siliceous and hard in part, slightly bituminous, softer and calcareous in part with trace calcareous white specks, trace pyrite, trace microfractures, trace quartz crystal fragments
3,255.00 to 3,260.00 (5.00)	SHALE very dark gray to black, micromicaceous, siliceous, moderately indurated to very hard, slightly calcareous to marly in part, trace calcareous white specks, trace pyrite, minor microfractures
3,260.00 to 3,265.00 (5.00)	SHALE very dark gray to black, siliceous to very siliceous in part, moderately indurated to very hard, slightly bituminous, trace microfractures, trace pyrite, trace dark gray calcareous Shale, moderately indurated
3,265.00 to 3,270.00 (5.00)	SHALE very dark gray to black, siliceous and very hard in part, calcareous in part grading to Marlstone, trace microfractures, trace pyrite
3,270.00 to 3,275.00 (5.00)	SHALE very dark gray to black, siliceous, slightly calcareous and marly in part, slightly bituminous, moderately indurated to very hard, trace slickenside, trace pyrite, trace Marlstone, dark gray, microcrystalline, calcareous, tight
3,275.00 to 3,280.00 (5.00)	SHALE very dark gray to black, micromicaceous, fissile, siliceous, mainly hard to moderately indurated in part, slightly bituminous, trace slickenside, trace microfractures, trace pyrite
3,280.00 to 3,285.00 (5.00)	SHALE very dark gray to black as above, siliceous, slightly bituminous, well indurated, trace microfractures, trace quartz crystal fragments, very fine cuttings, trace Marlstone stringers, dark gray, calcareous, tight

Sample Descriptions

Storage Units:

Metric

3,285.00 to 3,290.00 (5.00)	SHALE very dark gray to black, micromicaceous, fissile in part, siliceous, slightly bituminous, calcareous in part, moderately to well indurated, trace microfractures, trace pyrite
3,290.00 to 3,295.00 (5.00)	SHALE as above, black, siliceous, hard, slightly bituminous, marly in part, trace microfractures, trace quartz crystal shards
3,295.00 to 3,300.00 (5.00)	SHALE dark brown gray to black, soft, bituminous, slightly calcareous in part
3,300.00 to 3,305.00 (5.00)	SHALE very dark brown gray to black, bituminous, slightly calcareous with trace calcareous white specks, soft, trace microfractures, trace quartz crystal fragments, interbedded SHALE, very dark gray to black, siliceous and hard, slightly bituminous, marly, micromicaceous, fissile
3,305.00 to 3,310.00 (5.00)	SHALE very dark gray to black, micromicaceous, fissile, siliceous, moderately indurated, slightly calcareous to marly in part, trace calcareous white specks, trace quartz healed microfractures, trace slickenside, trace pyrite
3,310.00 to 3,315.00 (5.00)	SHALE very dark gray to black as above, micromicaceous, siliceous and hard, well indurated, marly in part, trace microfractures with calcite crystal lining and rare trace pyrobitumen, trace slickenside
3,315.00 to 3,320.00 (5.00)	SHALE very dark gray to black, siliceous to very siliceous and hard in part, slightly calcareous to marly in part, bituminous, trace microfractures with calcite cement, trace pyrite
3,320.00 to 3,325.00 (5.00)	SHALE as above, black, siliceous, hard, trace microfractures with calcareous cement, trace calcareous white specks, trace slickenside, trace pyrite
3,325.00 to 3,330.00 (5.00)	SHALE very dark gray to black as above, siliceous and very hard in part, slightly calcareous to marly in part, trace microfractures, trace slickenside
3,330.00 to 3,335.00 (5.00)	SHALE very dark gray to black, blocky, micromicaceous, siliceous to very siliceous and hard, slightly bituminous, very slightly calcareous in part
3,335.00 to 3,340.00 (5.00)	SHALE very dark gray to black as above, very siliceous, well indurated, trace quartz healed microfractures
3,340.00 to 3,345.00 (5.00)	SHALE very dark gray to black, micromicaceous, siliceous, slightly calcareous to dolomitic in part, well indurated, trace microfractures, trace slickenside

3,345.00 to 3,350.00 (5.00)	SHALE black as above, siliceous to very siliceous, calcareous in part with trace calcareous white specks, slightly bituminous, trace calcite filled microfractures, trace Dolomite, medium gray, very fine to medium crystalline, trace poor intercrystalline porosity, scattered pyrobitumen plugging
3,350.00 to 3,355.00 (5.00)	SHALE as above, black, siliceous to very siliceous and hard, trace Shale, dark brown gray to black, calcareous with trace calcareous white specks in part, moderately soft, rare trace Dolomite, medium to dark gray, very fine to fine crystalline, to medium crystalline in part, argillaceous, tight due to pyrobitumen plugging, abundant pyrobitumen, up to 20% rock volume, some chips have pyrobitumen framework after etching, trace silty residue
3,355.00 to 3,360.00 (5.00)	SHALE very dark gray to black, dark brown gray in part, siliceous to very siliceous, calcareous to very calcareous grading to Marlstone in part, moderately to well indurated, trace dark gray Dolomite stringers as above, very fine to fine crystalline, argillaceous, tight, scattered pyrobitumen, fracture filling? trace pyrite, trace slickenside
3,360.00 to 3,365.00 (5.00)	SHALE very dark gray to black as above, siliceous and hard in part, calcareous in part with trace calcareous white specks, trace slickenside
3,365.00 to 3,370.00 (5.00)	SHALE very dark gray to black, siliceous, calcareous to very calcareous grading to black Marlstone in part, slightly bituminous, calcareous white specks in part, trace calcite veins
3,370.00 to 3,375.00 (5.00)	SHALE very dark gray to black, calcareous, siliceous, bituminous, trace calcareous white specks, trace slickenside, scattered microfractures with trace calcite fracture filling and veins to 2mm
3,375.00 to 3,380.00 (5.00)	SHALE as above, siliceous and very hard in part, calcareous to marly, slightly bituminous, increasing slickenside, trace microfractures
3,380.00 to 3,385.00 (5.00)	SHALE dark gray to black, siliceous in part, calcareous to very calcareous with calcareous white specks in part, marly, bituminous, scattered slickenside, trace microfractures
3,385.00 to 3,390.00 (5.00)	SHALE dark gray to black, siliceous to very siliceous and hard, sideritic in part, slightly calcareous, trace slickenside, trace microfractures, trace loose quartz crystal fragments

Sample Descriptions

Storage Units:

Metric

3,390.00 to 3,395.00 (5.00)	SHALE very dark gray to black as above, siliceous and hard, slightly calcareous in part, slightly bituminous, trace calcareous white specks, scattered calcite filled microfractures and veins, trace pyrite, trace slickenside
3,395.00 to 3,400.00 (5.00)	SHALE very dark gray to dark brown gray to black, siliceous to very siliceous, hard, trace conchoidal fracture, slightly calcareous in part, slightly bituminous, scattered microfractures with calcite cement in part, quartz healed in part, trace loose clear quartz crystal fragments, trace slickenside
3,400.00 to 3,405.00 (5.00)	SHALE dark gray to dark brown gray to black as above, siliceous to very siliceous, well indurated, slightly calcareous in part with trace calcareous white specks, slightly bituminous, abundant microfractures, mainly very thin to 1mm, quartz and calcite healed with minor quartz crystal fragments, trace slickenside
3,405.00 to 3,410.00 (5.00)	SHALE dark gray to dark brown gray to black, very siliceous and hard, well indurated, conchoidal fracture in part, slightly bituminous, abundant microfractures, scattered clear quartz crystal fragments, trace slickenside, trace Shale, dark gray, dolomitic to very dolomitic with scattered white dolomite specks
3,410.00 to 3,415.00 (5.00)	SHALE very dark brown gray to black as above, siliceous to very siliceous and hard, calcareous in part, bituminous, scattered microfractures, calcite healed in part, quartz healed in part, scattered slickenside
3,415.00 to 3,420.00 (5.00)	SHALE very dark gray to dark brown gray to black, siliceous and hard, calcareous in part, slightly bituminous, abundant microfractures with calcareous cement, scattered slickenside
3,420.00 to 3,425.00 (5.00)	SHALE very dark gray to black, siliceous to very siliceous in part, moderately to well indurated, calcareous in part, slightly bituminous, scattered microfractures with calcareous cement in part, scattered loose coarse calcite crystals, minor calcite veins, trace clear quartz crystal fragments, minor slickenside
3,425.00 to 3,430.00 (5.00)	SHALE dark gray to black as above, siliceous to very siliceous, well indurated, trace conchoidal fracture, calcareous in part with scattered calcareous white specks, scattered microfractures with calcite cement, minor slickenside, trace calcite veins
3,430.00 to 3,435.00 (5.00)	SHALE very dark gray to black as above, siliceous and hard, slightly calcareous in part, bituminous, scattered microfractures cemented with calcite and dolomite, trace quartz, trace slickenside

Sample Descriptions

Storage Units:

Metric

3,435.00 to 3,440.00 (5.00)	DOLOMITE light to medium gray, microcrystalline to fine crystalline, to coarse crystalline in part, trace fossil shadows, trace poor intercrystalline porosity, no fluorescence, trace pyrobitumen, trace quartz crystal fragments, abundant Shale as above
3,440.00 to 3,445.00 (5.00)	DOLOMITE light gray, fine to coarse crystalline, mainly tight with trace poor intercrystalline porosity, pyrobitumen in part, very fine cuttings, scattered loose coarse Dolomite and sparry calcite crystals, trace clear quartz crystal fragments
3,445.00 to 3,450.00 (5.00)	DOLOMITE light gray to medium gray, microcrystalline to medium crystalline, trace poor intercrystalline porosity, trace pyrobitumen, very fine cuttings, sample mainly cement
3,457.00 to 3,460.00 (3.00)	DOLOMITE light to medium gray with 50% coarse white Dolomite, very fine to coarse crystalline, slightly calcareous in part, fair fracture and vug porosity, trace pyrobitumen, no fluorescence, scattered clear quartz crystal fragments
3,460.00 to 3,465.00 (5.00)	DOLOMITE medium to dark gray, very fine to fine crystalline with 50% coarse to very coarse crystalline white Dolomite, fair fracture porosity, trace vug porosity, trace pyrobitumen, no fluorescence, abundant clear quartz crystal fragments, hexagonal in part, scattered drusy Dolomite rhombs
3,465.00 to 3,470.00 (5.00)	DOLOMITE light to medium gray with 65% white Dolomite crystals, very fine to very coarse crystalline, slightly siliceous with silty residue, poor to fair vug and fracture porosity, no fluorescence, minor pyrobitumen, scattered drusy Dolomite rhombs, scattered clear quartz crystals, hexagonal in part, trace hexagonal quartz crystal clusters
3,470.00 to 3,475.00 (5.00)	DOLOMITE as above, up to 75% recrystallized white Dolomite crystals, poor to fair fracture and vug porosity, trace pyrobitumen, no fluorescence, scattered drusy Dolomite crystals and quartz crystal fragments
3,475.00 to 3,480.00 (5.00)	DOLOMITE light to medium gray with 65% white Dolomite recrystallization, very fine to very coarse crystalline, siliceous, trace fossil shadows, fair fracture and vug porosity, no fluorescence, minor pyrobitumen, increasing drusy Dolomite rhombs, scattered clear quartz crystal fragments and trace hexagonal crystal clusters
3,480.00 to 3,485.00 (5.00)	DOLOMITE light to medium gray as above, fair fracture and vug porosity, increasing pyrobitumen, no fluorescence, scattered drusy Dolomite rhombs and quartz crystal fragments, hexagonal in part
3,485.00 to 3,490.00 (5.00)	DOLOMITE medium to dark gray host with 60% white Dolomite recrystallization, very fine to medium crystalline dark Dolomite, medium to very coarse crystalline white Dolomite, slightly siliceous, fair to good fracture and vug porosity, minor pyrobitumen, no

Sample Descriptions

Storage Units:

Metric

	fluorescence, scattered very coarse Dolomite rhombs, trace rosettes, trace quartz crystal fragments
3,490.00 to 3,495.00 (5.00)	DOLOMITE as above, medium to dark gray host with 50% very coarse white Dolomite recrystallization, fair to good fracture and vug porosity, scattered pyrobitumen, no fluorescence, abundant drusy Dolomite crystals and clear quartz crystal fragments
3,495.00 to 3,500.00 (5.00)	DOLOMITE medium to dark gray, very fine to medium crystalline, 40% very coarse white Dolomite crystals, slightly calcareous, poor to fair fracture and vug porosity, trace intercrystalline porosity, no fluorescence, minor pyrobitumen, scattered drusy Dolomite rhombs, trace quartz crystal fragments, scattered LIMESTONE, light gray brown, cryptocrystalline, slightly dolomitic, tight, no shows
3,500.00 to 3,505.00 (5.00)	DOLOMITE medium to dark gray as above, very fine to medium crystalline, slightly calcareous, trace fossil remnants, poor to fair fracture and vug porosity, no fluorescence, scattered pyrobitumen, scattered drusy coarse to very coarse Dolomite crystals, minor clear quartz crystal fragments, trace LIMESTONE as above, light brown to gray brown, cryptocrystalline, tight, no shows, trace stylolites, rare trace dark gray Chert
3,505.00 to 3,510.00 (5.00)	DOLOMITE medium to dark gray host with 50% coarse to very coarse white Dolomite recrystallization, trace fossil shadows, poor to fair fracture and vug porosity, scattered pyrobitumen, no fluorescence, scattered drusy Dolomite crystals, rhombs in part, scattered clear quartz crystals, hexagonal in part
3,510.00 to 3,515.00 (5.00)	DOLOMITE dark gray, very fine to fine crystalline, fossiliferous, trace Amphipora?, streaks poor to fair fracture and vug porosity, trace intercrystalline porosity, minor pyrobitumen, scattered drusy Dolomite crystals, trace clear quartz crystal fragments, up to 30% coarse white Dolomite
3,515.00 to 3,520.00 (5.00)	DOLOMITE medium to dark gray, very fine to medium crystalline with 25% coarse to very coarse white Dolomite, slightly fossiliferous, streaks poor fracture and vug porosity, minor pyrobitumen, no fluorescence, trace drusy Dolomite crystals, minor clear quartz crystal fragments
3,520.00 to 3,525.00 (5.00)	DOLOMITE dark gray host rock with up to 40% coarse white recrystallized white Dolomite, fossiliferous, trace poor fracture and vug porosity, no fluorescence, trace pyrobitumen, trace drusy Dolomite crystals, trace clear quartz crystal fragments, trace black Chert
3,525.00 to 3,530.00 (5.00)	DOLOMITE as above, trace poor fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite crystals, decreasing clear quartz crystal fragments

3,530.00 to 3,535.00 (5.00)	DOLOMITE medium to dark gray host with 50% very coarse white Dolomite recrystallization, fossiliferous, streaks poor fracture and vug porosity, decreasing pyrobitumen, scattered drusy Dolomite rhombs, trace clear quartz crystal fragments, rare trace hexagonal quartz
3,535.00 to 3,540.00 (5.00)	DOLOMITE as above, dark gray with 50% white recrystallization, fossiliferous, trace fracture and vug porosity, no shows, trace quartz crystal fragments
3,540.00 to 3,545.00 (5.00)	DOLOMITE as above, increasing streaks fracture and vug porosity with very coarse drusy Dolomite crystals
3,545.00 to 3,550.00 (5.00)	DOLOMITE medium to dark gray host rock with up to 50% coarse white Dolomite recrystallization, fossiliferous with scattered fossil shadows, mainly tight with trace fracture and vug porosity, no fluorescence, trace pyrobitumen, scattered coarse white Dolomite filling thin microfractures
3,550.00 to 3,555.00 (5.00)	DOLOMITE dark gray with 50% white Dolomite as above, streaks poor fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite rhombs, trace rosettes, trace quartz crystal fragments
3,555.00 to 3,560.00 (5.00)	DOLOMITE dark gray, very fine to medium crystalline, up to 50% very coarse white Dolomite recrystallization, fossiliferous, trace fracture and vug porosity, decreasing pyrobitumen, scattered drusy Dolomite rhombs, trace clear quartz crystal fragments
3,560.00 to 3,565.00 (5.00)	DOLOMITE as above, increasing streaks of fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite crystals and hexagonal quartz crystals
3,565.00 to 3,570.00 (5.00)	DOLOMITE as above, medium to dark gray with 50% white Dolomite recrystallization, slightly fossiliferous, streaks fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite crystals, trace clear quartz crystal fragments, trace pyrite
3,570.00 to 3,575.00 (5.00)	DOLOMITE medium to dark gray host rock with up to 50% recrystallized coarse to very coarse white Dolomite, very fine to coarse crystalline, mainly tight with trace poor fracture and vug porosity, trace pyrobitumen, trace drusy Dolomite crystals, decreasing clear quartz crystal fragments
3,575.00 to 3,580.00 (5.00)	DOLOMITE as above, dark gray, very fine to medium crystalline with abundant coarse white Dolomite, mainly tight with trace fracture porosity, no shows, scattered white Dolomite filled microfractures, trace dark gray Chert

Sample Descriptions

Storage Units:

Metric

3,580.00 to 3,585.00 (5.00)	DOLOMITE medium to dark gray with 40% white Dolomite recrystallization, slightly fossiliferous, mainly tight with trace poor fracture and vug porosity, trace pyrobitumen, trace drusy Dolomite rhombs, trace quartz crystal fragments, trace dark gray Chert
3,585.00 to 3,590.00 (5.00)	DOLOMITE medium to dark gray host with up to 50% coarse to very coarse white Dolomite, scattered bituminous residue, fossiliferous, mainly tight, no shows, trace microfractures
3,590.00 to 3,595.00 (5.00)	DOLOMITE as above, streak fracture and vug porosity, no shows, trace stylolites
3,595.00 to 3,600.00 (5.00)	DOLOMITE medium to dark gray host, very fine to medium crystalline, up to 50% coarse white Dolomite crystals, fossiliferous, mainly tight with streak poor fracture porosity, trace fracture plane with fine slender hexagonal quartz crystals
3,600.00 to 3,605.00 (5.00)	DOLOMITE dark gray with 50% coarse to very coarse white Dolomite recrystallization, slightly fossiliferous, mainly tight with streak poor fracture porosity, no shows, trace quartz crystals lining open fractures
3,605.00 to 3,610.00 (5.00)	DOLOMITE as above, dark gray with abundant coarse white Dolomite crystals, tight, no shows, trace quartz crystal fragments
3,610.00 to 3,615.00 (5.00)	DOLOMITE medium to dark gray with 50% coarse white Dolomite recrystallization, fossiliferous, mainly tight with streaks fracture and vug porosity, trace drusy Dolomite and quartz crystal fragments, scattered white Dolomite filled microfractures, trace medium to dark gray Chert fragments
3,615.00 to 3,620.00 (5.00)	DOLOMITE dark gray host rock with up to 60% coarse to very coarse white Dolomite recrystallization, fossiliferous, mainly tight, no shows, trace white Dolomite filled microfractures
3,620.00 to 3,625.00 (5.00)	DOLOMITE as above, streak poor fracture and vug porosity, trace pyrobitumen, no fluorescence, trace fine crystalline hexagonal quartz lining fracture planes, trace large quartz fragments
3,625.00 to 3,630.00 (5.00)	DOLOMITE medium to dark gray, very fine to medium crystalline with 50% coarse white crystalline Dolomite, fossiliferous, scattered microfractures, mainly tight with trace fracture porosity, no shows
3,630.00 to 3,635.00 (5.00)	DOLOMITE as above, streak poor fracture porosity, no shows, trace drusy Dolomite rhombs, trace hexagonal quartz crystals

Sample Descriptions

Storage Units: Metric

3,635.00 to 3,640.00 (5.00)	DOLOMITE as above, increasing fracture porosity, no shows, trace hexagonal quartz crystals lining open fracture planes
3,640.00 to 3,645.00 (5.00)	DOLOMITE dark gray, very fine to medium crystalline with up to 60% coarse to very coarse white Dolomite, fossiliferous, streaks poor to fair fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite crystals and hexagonal quartz crystals lining fracture planes
3,645.00 to 3,650.00 (5.00)	DOLOMITE as above, dark gray to black with abundant white recrystallization, trace fracture porosity, no shows, trace quartz crystal fragments
3,650.00 to 3,655.00 (5.00)	DOLOMITE as above, streaks poor fracture and vug porosity, scattered drusy Dolomite rhombs, minor clear quartz crystals and trace hexagonal quartz crystal clusters
3,655.00 to 3,660.00 (5.00)	DOLOMITE dark gray with 50% coarse to very coarse white Dolomite recrystallization, trace fossil remnants, streak poor to fair fracture and vug porosity, trace pyrobitumen, scattered drusy Dolomite rhombs, trace hexagonal quartz crystals, rare trace disseminated pyrite, trace dark gray Chert
3,660.00 to 3,665.00 (5.00)	DOLOMITE as above, streaks poor fracture and vug porosity, no shows, scattered drusy Dolomite rhombs, minor quartz crystal fragments
3,665.00 to 3,670.00 (5.00)	DOLOMITE dark gray to black, microcrystalline to fine crystalline, up to 30% white Dolomite recrystallization, slightly fossiliferous, mainly tight with trace fracture porosity, no shows, trace quartz crystal fragments, hexagonal in part, trace white Dolomite filled microfractures
3,670.00 to 3,675.00 (5.00)	DOLOMITE as above, streak poor fracture and vug porosity, trace drusy Dolomite rhombs, trace hexagonal quartz crystals
3,675.00 to 3,680.00 (5.00)	DOLOMITE dark gray to black, microcrystalline to fine crystalline, up to 25% white Dolomite recrystallization, slightly fossiliferous, mainly tight, no shows, trace white Dolomite filled microfractures, trace quartz crystal fragments
3,680.00 to 3,685.00 (5.00)	DOLOMITE as above, dark gray to black host rock, microcrystalline to fine crystalline, fossiliferous, tight, no shows, scattered coarse to very coarse white Dolomite crystals
3,685.00 to 3,690.00 (5.00)	DOLOMITE medium to dark brown gray, very fine to medium crystalline, fossiliferous, trace poor

Sample Descriptions

Storage Units:

Metric

	intercrystalline, fracture and vug porosity, no shows, rare trace pyrobitumen, scattered coarse to very coarse white Dolomite crystals, trace rhombs
3,690.00 to 3,695.00 (5.00)	DOLOMITE as above, medium gray brown to dark brown gray to black in part, very fine to coarse crystalline, slightly fossiliferous, trace poor intercrystalline, vug and fracture porosity, trace pyrobitumen, no fluorescence, scattered very coarse white Dolomite crystals, trace Shale stringers, medium gray to medium brown gray, soft
3,695.00 to 3,700.00 (5.00)	DOLOMITE medium gray to gray brown, very fine to fine crystalline, mainly tight with streaks poor intercrystalline, vug, and fracture porosity, no shows, scattered very coarse drusy Dolomite crystals, trace quartz crystal shards, very fine cuttings
3,700.00 to 3,705.00 (5.00)	DOLOMITE medium to dark gray brown, microcrystalline to medium crystalline, trace poor intercrystalline, vug and fracture porosity, trace pyrobitumen, scattered drusy Dolomite crystals, trace quartz crystal shards, very fine cuttings
3,705.00 to 3,710.00 (5.00)	DOLOMITE as above, medium brown to medium to dark gray brown, very fine to medium crystalline with scattered coarse to very coarse white Dolomite recrystallization, fossiliferous, streaks poor intercrystalline, vug and fracture porosity, trace pyrobitumen, trace drusy Dolomite rhombs, rare trace quartz crystals, hexagonal in part
3,710.00 to 3,715.00 (5.00)	DOLOMITE medium to dark gray brown, very fine to medium crystalline, fossiliferous, mainly tight with trace poor vug and fracture porosity, trace pyrobitumen, decreasing coarse white Dolomite crystals
3,715.00 to 3,720.00 (5.00)	DOLOMITE medium to dark gray brown to black in part, very fine to medium crystalline, up to 50% coarse to very coarse white Dolomite recrystallization, slightly fossiliferous, tight with streaks poor intercrystalline, vug and fracture porosity, trace pyrobitumen, trace drusy Dolomite crystals, trace quartz crystal shards
3,720.00 to 3,725.00 (5.00)	DOLOMITE as above, increasing streaks intercrystalline, vug and fracture porosity, trace drusy Dolomite rhombs with pyrobitumen in part
3,725.00 to 3,730.00 (5.00)	DOLOMITE as above, streaks poor intercrystalline, vug and fracture porosity, trace drusy Dolomite rhombs to 2mm, trace pyrobitumen, trace quartz crystal fragments, trace stylolites
3,730.00 to 3,735.00 (5.00)	DOLOMITE medium to dark gray to gray brown host, microcrystalline to fine crystalline, up to 50% coarse to very coarse white Dolomite recrystallization, slightly fossiliferous, streaks poor intercrystalline, vug, and fracture porosity, trace pyrobitumen, scattered drusy Dolomite crystals, trace rhombs, trace clear quartz crystal fragments

3,735.00 to 3,740.00
(5.00)

DOLOMITE

as above, medium to dark gray host with up to 50% recrystallized white Dolomite, streaks poor intercrystalline, vug and trace fracture porosity, trace pyrobitumen, abundant very coarse Dolomite crystals, drusy rhombs in part, trace clear quartz crystal fragments, rare trace green gray Shale laminations

3,740.00 to 3,745.00
(5.00)

DOLOMITE

medium to dark gray brown, microcrystalline to medium crystalline with up to 50% very coarse white Dolomite crystals, slightly fossiliferous, streaks poor to fair intercrystalline, vug and fracture porosity, scattered drusy Dolomite rhombs with trace pyrobitumen, trace dark gray Chert

3,745.00 to 3,750.00
(5.00)

DOLOMITE

as above, streaks poor intercrystalline, vug and fracture porosity, minor pyrobitumen, scattered drusy Dolomite crystals, rhombs in part, trace sparry calcite crystals, trace disseminated pyrite

3,750.00 to 3,757.00
(7.00)

DOLOMITE

medium to dark gray brown, very fine to medium crystalline, 30% white Dolomite recrystallization, fossiliferous, mainly tight with trace poor intercrystalline porosity, trace pyrobitumen, scattered Chert, medium to dark brown to brown gray, trace quartz crystal shards

3,757.00 to 3,760.00
(3.00)

SHALE

very dark gray to black, siliceous to very siliceous and hard, slightly bituminous, slightly calcareous in part, trace clear quartz filled microfractures

3,760.00 to 3,765.00
(5.00)

SHALE

black as above, siliceous and hard, calcareous in part, slightly bituminous, trace slickenside, abundant calcite filled microfractures

3,765.00 to 3,770.00
(5.00)

SHALE

very dark gray to black, siliceous, slightly softer, calcareous and fissile in part, slightly bituminous, scattered calcite filled microfractures