



**Anglian Oil Company Ltd.
Northern Lights
AA Pad
AA16, Slot #09
MWD Run #4**

**Job No. AB-CD-12345678
Survey Date: January 11, 2013**

**True North Directional Services Inc.
Drilling Run Report**

May 31, 2017
Job No. AB-CD-12345678



Drilling Run Report for AA Pad, AA16, MWD Run #4

Job Number: AB-CD-12345678	Region: Northwest Territories, Canada	Lease/Block: 07654321	Company Rep. #1: Henry Samuel Quelch
Customer: Anglian Oil Company Ltd.	Field: Northern Lights	UWI No.:	Company Rep. #2: Eusebius Twigg
Well Name: AA16	Project: Northern Lights	Date: January 3, 2015	Geologist: Algernon Jasper Capper
Rig Name: Northern Skies III	Structure: AA Pad		Directional Supervisor: Herbert Henry Locke

Personnel Summary

Directional Drillers				MWD Operators				Gyro Surveyors			
Name	Start Date	End Date	Days	Name	Start Date	End Date	Days	Name	Start Date	End Date	Days
Robert Cherry	01/01/2015	12/01/2015	12	Herbert Henry Locke	01/01/2015	08/01/2015	8	Herbert Vernon-Smith	03/01/2015	12/01/2015	10
Frank Nugent	12/01/2015	12/01/2015	1	Hurree Janset Ram Singh	01/01/2015	04/01/2015	4				
				Hurree Janset Ram Singh	09/01/2015	12/01/2015	4				
				Herbert Henry Locke	13/01/2015	20/01/2015	8				

Drilling Summary

Start Depth: 1,217.15m	End Depth: 1,655.78m	Below Rotary Hours: 22.61hrs	Circulating Hours: 14.44hrs
Total Depth Drilled: 438.63m	Total Drilled Hours: 14.44hrs	Ave. Total ROP: 30.37m/hr	Percent Drilling: 63.89%
Total Rotating: 224.63m	Rotating Hours: 7.20hrs	Ave. Rotating ROP: 31.18m/hr	Percent Rotating: 49.87%
Total Sliding: 214.00m	Sliding Hours: 7.24hrs	Ave. Sliding ROP: 29.56m/hr	Percent Sliding: 50.13%

Pump Details

#	Model	Liner Size (mm)	Liner Rating (%)	Volume Efficiency (%)	Vol. per Stroke (m³)	Maximum Pressure (kPa)	Maximum Flow (m³/min)
1	National N-1000	140	100.00	100.00	0.02	27,200	1.72
2	National N-1300	152	100.00	100.00	0.03	29,647	2.05
3	National N-1600	152	100.00	100.00	0.02	37,507	2.00

Drilling Parameters

	Min	Max		Min	Max
WOB (N):	15	16	SPP Off Bottom (kPa):	5,001	5,100
Pick Up (N):	35	40	SPP On Bottom (kPa):	5,017	5,174
Slack Off (N):	35	40	Delta Pressure (kPa):	304	349
Rot. Off Bottom (N):	34	39	Flow Rate (m³/min):	2.53	3.00
Bottom Hole Temp (°C):	100.4	109.7	Pump Rate (SPM):	15	20
Rotary Speed (RPM):	29	38	Motor Speed (RPM):	38	48
Surface Torque (N-m):	3,007	3,495			

Bit Record

Bit Number: 5	Description: 6 5/8in PDC Bit	
Manufacturer: GoodEnuff	TFA: 2591.8mm²	Jets: 2 x 10, 1 x 20, 3 x 30
Model: True Blue	Bit Diameter: 167mm	Bit Hours: 14.44Hrs.
Type: PDC Bit	IADC#:	Bit Footage: 438.63m
Serial Number: 12345678	Condition: NO - No Dull Characteristics	
Reason for pulling out of hole: Reached TD		

Motor Properties

Description: 4 3/4" Motor Lobe 4:5 - 6.3 stg	Motor Type: Motor	Manufacturer: GoodEnuff	Model: PowerPuff	Serial Number: 23456789	Lobe/Stage: 4:5/6.0	
Mud Type: Oil Based Mud	Stabilizer Type:		Rubber Type:		Fit Type:	
Pad OD: 114mm	NB Stabilizer: 114	Bit to Bend: 1.22m	Bend Angle: 2.00°	Pressure Drop: 6,206kPa	Rev. Rate: 2641.72Rev/m³	Rotor Jet: 12mm
Motor Footage: 438.63m	Below Rotary Hours: 22.61hrs	Circulating Hours: 14.44hrs	Rotating Footage: 224.63m	Rotating Hours: 7.20hrs	Sliding Footage: 214.00m	Sliding Hours: 7.24hrs
Proposed Build Rate: 11.81°/30m	Actual Build Rate: 11.81°/30m	Date/Time In: 03/01/2015 8:15 AM	Date/Time Out: 04/01/2015 6:52 AM	Number of Stalls: 0	Stall Duration: 0.00mins	Extended Motor: No
Motor Failed: No	Condition: Showing signs of fatigue stress					

Motor Discussion

This is the Motor Comment

Drillstring Components (BHA #4)

Item #	Description	Vendor	Serial No.	Outside Diameter (mm)	Inside Diameter (mm)	Fishing Neck OD (mm)	Fishing Neck Length (m)	Top Connection	Length (m)	Total Length (m)
1	6 5/8in PDC Bit	GoodEnuff	12345678	167	89	152	0.00	3 1/2 REG	0.35	0.35
2	4 3/4" Motor Lobe 4:5 - 6.3 stg	GoodEnuff	23456789	121	60	0	0.00	3 1/2 REG	7.87	8.22
3	Float Sub			123	50	0	0.00	3 1/2 REG	1.16	9.38
4	Float Sub			123	50	0	0.00	3 1/2 REG	1.17	10.55
5	4 3/4" MWD			121	72	0	0.00	3 1/2 REG	20.29	30.84
6	4 3/4" DC - 44.00 lb/ft			121	64	0	0.00	3 1/2 REG	18.86	49.70
7	Cross Over			133	63	0	0.00	3 1/2 REG	0.58	50.28
8	Mechanical Jar			121	57	0	0.00	3 1/2 REG	4.99	55.27
9	Cross Over			130	58	0	0.00	2 3/8 REG	0.82	56.09
10	4" DP (X) H90 - 15.70 lb/ft			102	82	0	0.00	2 3/8 REG	600.00	656.09
11	4" HWDP NC40(FH) - 29.70 lb/ft			102	65	0	0.00	2 3/8 REG	800.00	1,456.09

Drilling Run Report for AA Pad, AA16, MWD Run #4

Drillstring Components (BHA #4)										
Item #	Description	Vendor	Serial No.	Outside Diameter (mm)	Inside Diameter (mm)	Fishing Neck OD (mm)	Fishing Neck Length (m)	Top Connection	Length (m)	Total Length (m)
12	4" DP (S) NC46(IF) - 15.70 lb/ft			102	82	0	0.00	2 3/8 REG	190.79	1,646.88

Mud Properties															
Date	Time	Bit Depth (m)	Mud Weight (kg/m ³)	Yield Point (Pa)	Plastic Viscosity (Pa-s)	Funnel Viscosity (Secs)	Chlorides (ppm)	pH	Oil (%)	Gas (%)	Sand (%)	Solids (%)	Water Line (m)	Bot.Hole Temp. (°C)	Flow Temp. (°C)
03 Jan 2015	14:18	1,299.22	1,623.61	10.54	0.02	52	101.71	5.95	0.00	2058.08	0.00	10.45	5.18	105.9	76.7
03 Jan 2015	17:07	1,390.76	1,509.98	10.39	0.02	51	109.24	5.32	0.00	2054.44	0.00	10.08	5.18	108.7	82.0
03 Jan 2015	20:15	1,463.55	1,635.90	10.18	0.02	54	100.44	5.28	0.00	2063.03	0.00	10.67	5.23	106.3	77.0
03 Jan 2015	23:09	1,555.23	1,623.14	10.10	0.02	54	103.61	5.54	0.00	2023.12	0.00	10.96	5.28	100.4	72.5
04 Jan 2015	02:12	1,647.48	1,697.60	10.24	0.02	52	102.22	5.48	0.00	2063.54	0.00	10.07	5.10	109.7	84.2

Activity Breakdown									
Date	Start Time	End Time	Hours	Start Depth (m)	End Depth (m)	Course Length (m)	Rate of Penetr'n (m/hr)	Activity	Comment
03 Jan 2015	08:15	11:45	3.50	1,217.15	1,217.15			Tripping In	
03 Jan 2015	11:45	19:36	7.84	1,217.15	1,454.46	237.31	30.28	Drilling	
03 Jan 2015	19:36	19:56	0.34	1,454.46	1,454.46			Short Trip Out	
03 Jan 2015	19:56	20:15	0.32	1,454.46	1,454.46			Short Trip In	
03 Jan 2015	20:15	02:52	6.61	1,454.46	1,655.78	201.32	30.48	Drilling	
04 Jan 2015	02:52	06:52	4.00	1,655.78	1,655.78			Tripping Out	
04 Jan 2015	06:52	08:52	2.00	1,655.78	1,655.78			Rig Up & Tear Down	

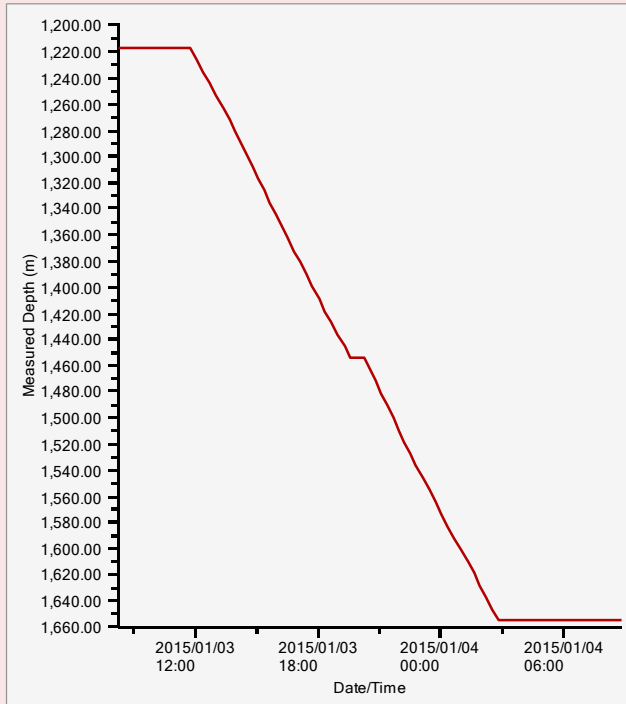
Drilling Records																		*Surveys are interpolated from actual surveys
Date	Drilling Mode	Start Time	End Time	Hours	Start Depth (m)	End Depth (m)	Depth Drilled (m)	WOB (N)	ROP (m/hr)	RPM (RPM)	Surface Torque (N-m)	Flow Rate (m ³ /min)	Delta SPP (kPa)	TFO (°)	INC (°)	AZM (°)	DLS (°/30m)	Comment
03 Jan	Sliding	11:45	11:59	0.23	1,217.15	1,222.15	5.00		21.50					-60.00	89.75	64.50	2.33	
03 Jan	Rotating	11:59	12:06	0.11	1,222.15	1,226.07	3.92	16	36.37	29	3,450	2.83	336		89.73	64.20	2.33	
03 Jan	Sliding	12:06	12:14	0.14	1,226.07	1,231.07	5.00		36.84					120.00	89.91	64.33	2.09	
03 Jan	Rotating	12:14	12:22	0.14	1,231.07	1,235.13	4.06	16	29.48	37	3,435	2.97	331		90.10	64.54	2.09	
03 Jan	Sliding	12:22	12:28	0.09	1,235.13	1,241.13	6.00		64.54					-90.00	89.91	64.89	2.57	
03 Jan	Rotating	12:28	12:41	0.23	1,241.13	1,244.07	2.94	16	13.06	33	3,380	2.83	332		89.74	65.08	2.57	
03 Jan	Sliding	12:41	12:52	0.18	1,244.07	1,248.07	4.00		21.81					30.00	89.67	65.17	0.98	
03 Jan	Rotating	12:52	13:02	0.16	1,248.07	1,253.77	5.70	16	35.62	37	3,293	2.64	331		89.82	65.06	0.98	
03 Jan	Sliding	13:02	13:08	0.11	1,253.77	1,257.77	4.00		37.61					120.00	89.78	65.09	0.91	
03 Jan	Rotating	13:08	13:22	0.24	1,257.77	1,263.15	5.38	16	22.68	33	3,310	2.77	334		89.65	65.18	0.91	
03 Jan	Sliding	13:22	13:29	0.11	1,263.15	1,269.15	6.00		53.58					-50.00	90.00	64.89	2.55	
03 Jan	Rotating	13:29	13:43	0.23	1,269.15	1,271.90	2.75	15	12.18	36	3,191	2.68	307		90.18	64.74	2.55	
03 Jan	Sliding	13:43	13:50	0.12	1,271.90	1,274.90	3.00		25.36					140.00	90.23	64.85	4.06	
03 Jan	Rotating	13:50	13:59	0.15	1,274.90	1,280.61	5.71	15	37.65	36	3,320	2.98	331		90.06	65.61	4.06	
03 Jan	Sliding	13:59	14:10	0.18	1,280.61	1,285.61	5.00		27.28					-70.00	89.92	65.72	1.19	
03 Jan	Rotating	14:10	14:18	0.13	1,285.61	1,290.43	4.82	16	38.20	34	3,207	2.90	348		89.80	65.57	1.19	
03 Jan	Sliding	14:18	14:23	0.10	1,290.43	1,295.43	5.00		52.35					120.00	89.78	65.37	1.27	
03 Jan	Rotating	14:23	14:33	0.15	1,295.43	1,299.22	3.79	16	24.47	33	3,487	2.79	312		89.79	65.21	1.27	
03 Jan	Sliding	14:33	14:44	0.19	1,299.22	1,303.22	4.00		21.10					-140.00	89.93	65.07	1.87	
03 Jan	Rotating	14:44	14:49	0.09	1,303.22	1,308.43	5.21	16	59.31	32	3,167	2.55	306		90.21	64.90	1.87	
03 Jan	Sliding	14:49	14:58	0.15	1,308.43	1,311.43	3.00		20.63					-120.00	90.20	64.99	2.14	
03 Jan	Rotating	14:58	15:05	0.11	1,311.43	1,317.61	6.18	16	55.35	35	3,289	2.76	322		90.02	65.39	2.14	
03 Jan	Sliding	15:05	15:11	0.11	1,317.61	1,321.61	4.00		35.88					-30.00	90.10	65.10	4.00	
03 Jan	Rotating	15:11	15:22	0.18	1,321.61	1,326.48	4.87	16	26.79	37	3,335	2.58	319		90.29	64.48	4.00	
03 Jan	Sliding	15:22	15:31	0.15	1,326.48	1,330.48	4.00		27.50					140.00	90.21	64.27	1.44	
03 Jan	Rotating	15:31	15:38	0.11	1,330.48	1,335.75	5.27	15	47.33	38	3,477	2.77	322		89.98	64.15	1.44	
03 Jan	Sliding	15:38	15:52	0.24	1,335.75	1,339.75	4.00		16.91					-90.00	89.86	64.22	1.42	
03 Jan	Rotating	15:52	15:58	0.11	1,339.75	1,344.67	4.92	15	46.06	37	3,015	2.72	317		89.76	64.43	1.42	
03 Jan	Sliding	15:58	16:05	0.12	1,344.67	1,347.67	3.00		25.10					-120.00	89.82	64.66	3.52	
03 Jan	Rotating	16:05	16:15	0.15	1,347.67	1,354.31	6.64	15	43.11	37	3,374	2.95	304		90.18	65.35	3.52	
03 Jan	Sliding	16:15	16:26	0.18	1,354.31	1,358.31	4.00		21.82					130.00	90.10	65.63	2.60	
03 Jan	Rotating	16:26	16:32	0.11	1,358.31	1,363.04	4.73	15	43.03	35	3,100	2.61	344		89.75	65.85	2.60	
03 Jan	Sliding	16:32	16:44	0.19	1,363.04	1,367.04	4.00		21.15					60.00	89.66	65.55	3.83	
03 Jan	Rotating	16:44	16:49	0.08	1,367.04	1,372.95	5.91	16	70.49	29	3,369	2.95	312		89.66	64.79	3.83	

Drilling Run Report for AA Pad, AA16, MWD Run #4

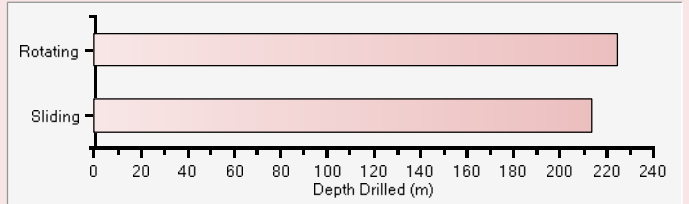
Survey Data										
Survey Depth (m)	Incl. (°)	(Grid) Azimuth (°)	Vertical Depth (m)	Subsea Depth (m)	Local Coordinates		Map Coordinates		Vertical Section (m)	Dogleg Rate (°/30m)
					Northings (m)	Eastings (m)	Northings (m)	Eastings (m)		
1,236.77	90.17	64.62	491.80	-137.81	106.78 S	744.97 E	6,789,223.43 N	573,238.02 E	730.31	2.09
1,246.15	89.62	65.21	491.82	-137.79	102.81 S	753.47 E	6,789,227.40 N	573,246.51 E	739.17	2.57
1,254.90	89.85	65.04	491.86	-137.75	99.12 S	761.41 E	6,789,231.09 N	573,254.45 E	747.44	0.98
1,263.61	89.64	65.19	491.90	-137.71	95.46 S	769.31 E	6,789,234.75 N	573,262.35 E	755.67	0.91
1,273.43	90.28	64.66	491.90	-137.71	91.30 S	778.20 E	6,789,238.91 N	573,271.24 E	764.94	2.55
1,282.22	90.01	65.82	491.88	-137.73	87.62 S	786.18 E	6,789,242.59 N	573,279.23 E	773.26	4.06
1,291.43	89.77	65.54	491.90	-137.71	83.82 S	794.58 E	6,789,246.39 N	573,287.62 E	781.99	1.19
1,300.61	89.79	65.15	491.94	-137.67	79.99 S	802.92 E	6,789,250.22 N	573,295.96 E	790.68	1.27
1,309.48	90.26	64.86	491.93	-137.68	76.25 S	810.96 E	6,789,253.96 N	573,304.00 E	799.06	1.87
1,318.75	89.99	65.47	491.91	-137.70	72.35 S	819.37 E	6,789,257.86 N	573,312.41 E	807.82	2.14
1,327.67	90.33	64.33	491.89	-137.72	68.57 S	827.45 E	6,789,261.64 N	573,320.49 E	816.24	4.00
1,337.31	89.92	64.12	491.87	-137.74	64.38 S	836.13 E	6,789,265.83 N	573,329.17 E	825.30	1.44
1,346.04	89.73	64.49	491.89	-137.72	60.59 S	844.00 E	6,789,269.62 N	573,337.04 E	833.51	1.42
1,355.95	90.27	65.52	491.89	-137.72	56.40 S	852.98 E	6,789,273.81 N	573,346.02 E	842.87	3.52
1,364.27	89.66	65.90	491.90	-137.71	52.98 S	860.56 E	6,789,277.23 N	573,353.60 E	850.76	2.60
1,373.76	89.66	64.69	491.95	-137.66	49.01 S	869.18 E	6,789,281.20 N	573,362.22 E	859.74	3.83
1,382.74	89.58	65.37	492.01	-137.60	45.22 S	877.32 E	6,789,284.99 N	573,370.36 E	868.22	2.28
1,392.49	89.75	65.58	492.07	-137.54	41.18 S	886.19 E	6,789,289.03 N	573,379.23 E	877.46	0.84
1,401.52	89.40	64.07	492.14	-137.47	37.34 S	894.37 E	6,789,292.87 N	573,387.41 E	885.98	5.15
1,410.19	90.14	65.59	492.17	-137.44	33.65 S	902.21 E	6,789,296.56 N	573,395.25 E	894.16	5.84
1,419.74	90.24	64.97	492.14	-137.47	29.65 S	910.89 E	6,789,300.56 N	573,403.93 E	903.19	1.98
1,428.48	89.68	64.41	492.15	-137.46	25.92 S	918.79 E	6,789,304.29 N	573,411.83 E	911.43	2.71
1,437.46	90.10	65.20	492.16	-137.45	22.10 S	926.91 E	6,789,308.11 N	573,419.95 E	919.90	3.00
1,446.55	89.81	65.82	492.17	-137.44	18.33 S	935.19 E	6,789,311.88 N	573,428.23 E	928.51	2.25
1,455.99	90.21	65.89	492.17	-137.44	14.47 S	943.80 E	6,789,315.74 N	573,436.84 E	937.47	1.31
1,465.61	90.14	65.31	492.14	-137.47	10.49 S	952.56 E	6,789,319.72 N	573,445.60 E	946.59	1.83
1,474.27	89.84	64.03	492.14	-137.47	6.79 S	960.39 E	6,789,323.42 N	573,453.43 E	954.75	4.55
1,483.36	89.48	64.82	492.20	-137.41	2.86 S	968.59 E	6,789,327.35 N	573,461.63 E	963.31	2.88
1,492.75	89.81	65.43	492.25	-137.36	1.09 N	977.11 E	6,789,331.30 N	573,470.15 E	972.18	2.21
1,501.67	89.74	63.52	492.29	-137.32	4.93 N	985.15 E	6,789,335.14 N	573,478.20 E	980.58	6.43
1,510.91	90.11	65.41	492.30	-137.31	8.91 N	993.49 E	6,789,339.12 N	573,486.53 E	989.28	6.25
1,519.76	89.71	63.65	492.31	-137.30	12.72 N	1,001.48 E	6,789,342.93 N	573,494.52 E	997.61	6.12
1,529.35	90.20	64.09	492.32	-137.29	16.94 N	1,010.09 E	6,789,347.15 N	573,503.13 E	1,006.61	2.05
1,538.23	89.55	64.67	492.34	-137.27	20.78 N	1,018.10 E	6,789,350.99 N	573,511.14 E	1,014.96	2.93
1,548.03	89.99	65.12	492.38	-137.23	24.94 N	1,026.97 E	6,789,355.15 N	573,520.01 E	1,024.21	1.93
1,556.91	90.36	63.58	492.35	-137.26	28.79 N	1,034.97 E	6,789,359.00 N	573,528.02 E	1,032.56	5.33
1,566.22	89.64	63.61	492.35	-137.26	32.93 N	1,043.31 E	6,789,363.14 N	573,536.35 E	1,041.28	2.30
1,575.55	90.34	64.63	492.35	-137.26	37.00 N	1,051.71 E	6,789,367.21 N	573,544.75 E	1,050.04	3.97
1,584.10	89.51	64.13	492.37	-137.24	40.70 N	1,059.42 E	6,789,370.91 N	573,552.46 E	1,058.09	3.39
1,593.46	90.38	64.33	492.37	-137.24	44.77 N	1,067.85 E	6,789,374.98 N	573,560.89 E	1,066.88	2.86
1,602.15	90.03	64.52	492.34	-137.27	48.52 N	1,075.68 E	6,789,378.73 N	573,568.72 E	1,075.06	1.39
1,611.85	90.00	64.97	492.34	-137.27	52.66 N	1,084.46 E	6,789,382.87 N	573,577.50 E	1,084.21	1.39
1,620.78	90.30	64.40	492.32	-137.29	56.47 N	1,092.53 E	6,789,386.68 N	573,585.57 E	1,092.63	2.16
1,630.48	89.98	64.15	492.29	-137.32	60.68 N	1,101.27 E	6,789,390.89 N	573,594.31 E	1,101.75	1.29
1,638.78	89.65	63.65	492.32	-137.29	64.34 N	1,108.72 E	6,789,394.55 N	573,601.76 E	1,109.53	2.16

Drilling Run Report for AA Pad, AA16, MWD Run #4

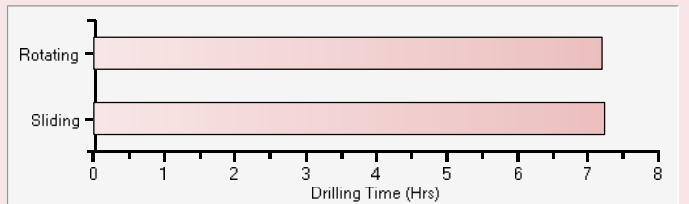
Time vs Depth



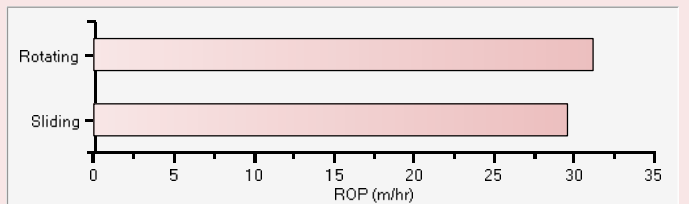
Depth Drilled



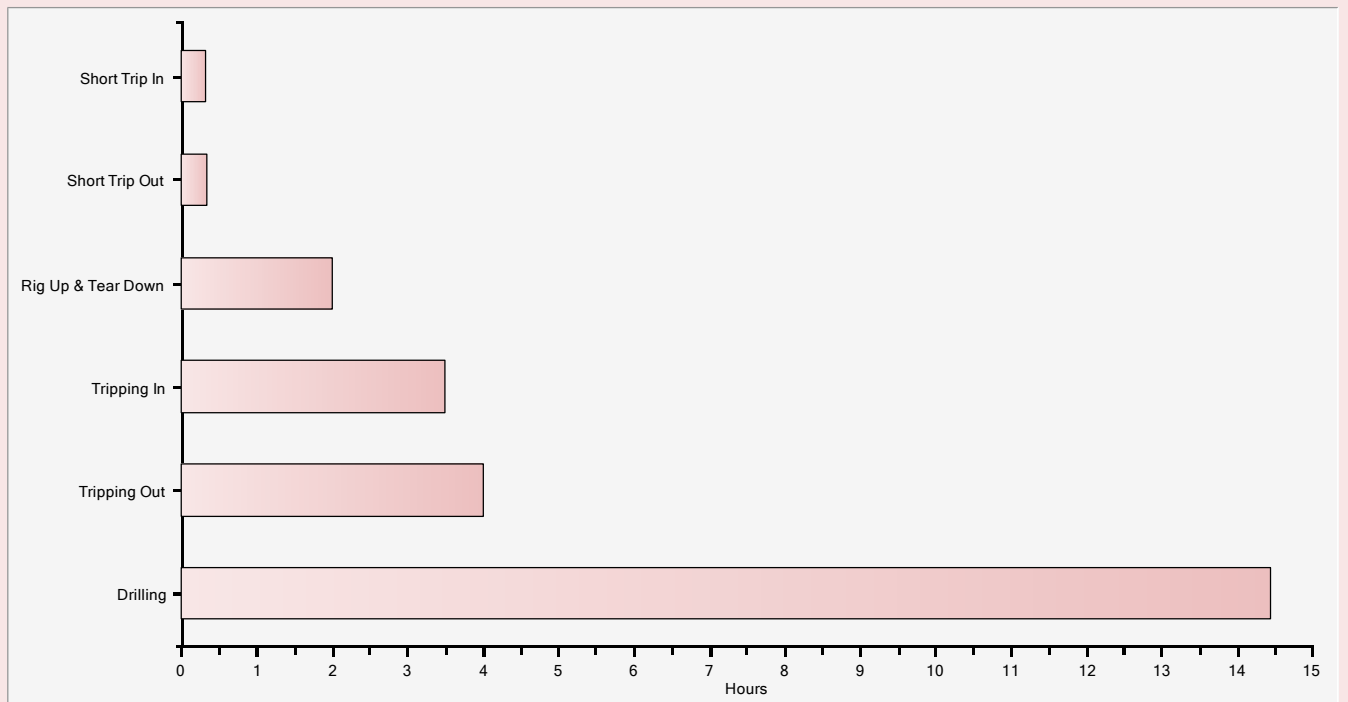
Drilling Time



Average Rate of Penetration



Activity



Drilling Run Report for AA Pad, AA16, MWD Run #4

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