

BAKER HUGHES				LWD MEMORY LOG			
Gamma Ray							
Scale:		Company: Noble Energy					
1:1200 MD		Well: Freedom Federal LC21-635					
Depth Reference:		Field: Weld County					
Driller's Depth		County: Weld		Country: United States			
Status:		State: Colorado					
Final Print		Surface Location:		Other Services:			
API No: 0512342805		Latitude:		Elev. KB:		N/A	
Job ID: 8597124		Longitude:		Elev. DF:		4913.00 ft	
Permanent Datum (P.D.): Mean Sea Level		Elevation: 4883.00 ft		Elev. GL:		4883.00 ft	
Log Measured From: Rig Floor		Above P.D. 30.00 ft					
Dates		Interval Logged		Magnetic Field Reference			
Date From: 2017-07-18		Top: (ft) 1940.00		Azi Reference North: Grid		Dip Angle: (deg) 67.08	
Date To: 2017-07-19		Bottom: (ft) 11137.00		Total Magnetic Field Strength: (nT)		52608	
Spud Date: 2017-07-17				Mag to Reference North Correction: (deg)		6.72 E	
Borehole Record				Casing Record			
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)	
8.500	1940.00	11149.00	9.625	36.00	30.00	1930.00	

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Log Run Summary												
Run No	Bit Run No.	Bit Size (in)	Bit Type	Bit Gauge Length (in)	Assembly Type	Logged Interval		Bit Depth Interval		Date / Time		Circ. Hours (h)
						Top (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	8.500	PDC	2.00	AutoTrak Curve	1928.00	11137.00	1940.00	11149.00	2017-07-18 01:46	2017-07-19 10:40	30.69

Crew									
Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite
Steven Cano		2017-07-17	2017-07-19	Ty Jackson		2017-07-17	2017-07-19		

Mud Properties Record											
Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2017-07-17 13:01	1	1940.00	Oil Based Mud	9.1	8	N/A	N/A	84.3/15.7	Active Pit	26000	0.00
2017-07-19 13:49	1	6000.00	Oil Based Mud	9.2	9	N/A	N/A	76.5/23.5	Active Pit	25000	0.00
2017-07-19 13:50	1	10300.00	Oil Based Mud	9.2	10	N/A	N/A	81.8/18.2	Active Pit	30000	0.00

Equipment and Service Data							
Run No.	Tool		Serial Number	Measurement		Sensor Offset (ft)	Bit Offset (ft)
1	ATC_SU		14169980	Near Bit VSS		5.93	6.76
1	ATC_SU		14169980	Near Bit Inclination		5.93	6.76
1	ATC_MWD		1421599	Gamma (single)		2.75	12.93
1	ATC_MWD		1421599	Directional (mag)		12.27	22.45

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC_SU	ATC_SU	Auto Trak Curve Steering Unit
ATC_MWD	ATC_MWD	Auto Trak Curve MWD
ATC_LCPM	ATC_LCPM	Auto Trak Curve LCPM

Comments

- 1
- Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to lack of control by Baker Hughes logging engineers, depth calibrations and measurements could not be independently verified.
- 2
- Baker Hughes LWD run 1 utilized a 6 3/4 inch Navigamma service (Gamma Ray and Directional) behind a 8 1/2 inch and rotary steerable from 1940 to 11149 feet MD (1940 to 6109 feet TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	11137.00	8.500	1	The interval from 11137 to 11149 feet MD ( 6109 feet TVD) was not logged due to tool not powering on and sensor offset at well TD.















