



LWD Composite Log

Azimuthal Gamma Ray

Scale: Company: Cub Creek Energy

1:1200 MD Well: Markham 8

Depth Reference: Field: Weld County

Driller's Depth County: Weld State: Colorado

Status: Surface Location: Other Services:

Final Print Latitude: Longitude: Wellbore Survey

API No: 05-123-43248-00 SEC: 32 TWN: 4N RGE: 68W

Job ID: 8071490 Permanent Datum (P.D.): Ground Level Elevation: 5041.00 ft KB: N/A

Log Measured From: Rig Floor Above P.D. 17.00 ft DF: 5058.00 ft GL: 5041.00 ft

Dates Interval Logged Magnetic Field Reference

Date From: 2016-09-10 Top: (ft) 1528.00 Azi Reference North: True Dip Angle: (deg) 66.75  
Date To: 2016-09-13 Bottom: (ft) 12163.00 Total Magnetic Field Strength: (nT) 52427  
Spud Date: 2016-07-31 Mag to Reference North Correction: (deg) 8.58 E

Borehole Record Casing Record

Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
8.750	1539.00	12163.00	9.625	36.00	17.00	1539.00

Mud Record Deviation Record

Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc   Az (Start)	Inc   Az (End)
Water Based Mud	1539.00	12163.00	13.500	1442.00	0.15   167.60	0.58   107.51
			8.750	10624.00	0.58   107.51	90.58   273.59

Acquisition System Software Version Other

Baker Hughes Cadence	G3.3	Rig: Xtreme 18
PlotStudio	3.3.7410.1	Contractor: Xtreme Coil Drilling
		District: RMD Unit: D&E

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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	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
2	2	8.750	PDC	2.00	AutoTrak Curve	1526.68	4814.94	1539.45	4821.54	2016-09-10 01:55	2016-09-10 15:40	13.33
3	3	8.750	PDC	2.00	AutoTrak Curve	4809.32	12156.26	4821.54	12162.86	2016-09-10 23:40	2016-09-13 08:58	59.86

Crew

Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite	Name		Arrive Wellsite	Depart Wellsite
Austin Small		2016-09-09	2016-09-14	Brandan Sackett		2016-09-09	2016-09-14				

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+ (%)
2016-09-09 12:07		2	1539.45	Water Based Mud	8.4	28	10.5	125.0	0/98	Suction	1000	0.00
2016-09-10 23:00		3	4821.54	Water Based Mud	8.6	28	8.3	100.0	0/98	Suction	700	0.00
2016-09-11 17:58		3	6930.50	Water Based Mud	9.8	41	10.3	5.6	2/90.5	Suction	1800	0.00
2016-09-12 08:01		3	8105.52	Water Based Mud	9.9	46	10.2	5.4	1.7/90.4	Suction	1500	0.00
2016-09-13 03:30		3	11232.18	Water Based Mud	10.0	45	9.9	5.6	2/89.7	Suction	1800	0.00

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
2	ATC_SU	12353084	Near Bit VSS	5.93	6.60	7.000	4.330
2	ATC_SU	12353084	Near Bit Inclination	5.93	6.60	7.000	4.330
2	ATC_MWD	12375741	Gamma (single)	2.76	12.77	7.000	3.250
2	ATC_MWD	12375741	Directional (mag)	12.28	22.29	7.000	3.250
3	ATC_SU	11994999	Near Bit Inclination	5.93	6.60	7.000	4.330
3	ATC_SU	11994999	Near Bit VSS	5.93	6.60	7.000	4.330
3	ATC_MWD	12141395	Gamma (single)	2.20	12.22	7.000	3.250
3	ATC_MWD	12141395	Directional (mag)	12.27	22.29	7.000	3.250

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 

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- 3 Gamma Ray Apparent (GRAM) is presented 0 to 200 API per customer request.
- 4 

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Remarks				
Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	1540.00	8.750	2	Gamma Ray logging operations began at 1539 feet (1539 feet TVD).
2	6870.00	8.750	3	Bulk gamma memory data was not recorded for the interval 6870 to 12163 ft MD (6596 to 7287 ft TVD). Realtime Bulk Gamma is displayed instead of the memory data. Azimuthal gamma is Memory data for the whole log.
3	12140.00	8.750	3	The interval from 12138 to 12163 feet MD (7287 feet TVD) was not logged due to sensor offset at well TD.

Curve Mnemonics		
Presented Curves	Description	Units
ROPA	Depth Averaged ROP 3 ft Average	ft/h
GRADM	Azimuthal Gamma Ray - Apparent - Down Quadrant 3 ft Average	API
GRAM	Gamma Ray - Apparent 3 ft Average	API
GRAUM	Azimuthal Gamma Ray - Apparent - Up Quadrant 3 ft Average	API
TCDM	Downhole Temperature	degF
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 1 ft Average	klb



Company Well

Interval

Created

Cub Creek Energy  
Markham 8  
Date From: 2016-09-10 01:55:01  
Date To: 2016-09-13 08:58:01  
2016-09-14 14:54

Top: 1528.00

Bottom: 12163.00

Gamma Ray - Apparent 3 ft Average GRAM

0200

API

Azimuthal Gamma Ray - Apparent - Up Quadrant 3 ft Average GRAUM

0200

API

Azimuthal Gamma Ray - Apparent - Down Quadrant 3 ft Average GRADM

0200

API

True Vertical Depth TVD

75001500

MD 1:1200 feet

Rate of Penetration 3 ft Average ROPA

10000

ft/h

Surface Weight On Bit 1 ft Average WOBA

050

klb

Downhole Temperature TCDM

0250

degF

