



LWD MEMORY LOG

Gamma Ray Multiple Propagation Resistivity

Scale:		Company: ConocoPhillips				
1:1200 MID		Well: Bear_3-65_22-23_3BH				
Depth Reference:		Field: Adams County				
Driller's Depth		County: Adams State:		Country: United States		
Status:	Surface Location:		Other Services:			
Final Print		Latitude:		039° 46' 22.730" N		
API No: 050001101510000		Longitude:		104° 39' 27.170" W		
Job ID: 9261082	SEC:	22	TWN:	3S	RGE: 6SW	
Permanent Datum (P.D.):	Ground Level	Elevation:		5571.00 ft		
Log Measured From:	Rig Floor	Above P.D.		25.00 ft		
Dates		Interval Drilled		Magnetic Field Reference		
Date From: 2018-08-02	Top: (ft) 2258.00	Azi Reference North: True		Dip Angle: (deg) 66.34		
Date To: 2018-08-08	Bottom: (ft) 18165.00	Total Magnetic Field Strength: (nT)		51815		
Spud Date: 2018-08-02	Mag to Reference North Correction: (deg)		8.27			
Borehole Record			Casing Record			
Hole Size (in)	From (ft)	To (ft)	Size (in)	Weight (lb/ft)	From (ft)	To (ft)
13.500	25.00	2258.00	9.625	36.00	25.00	2246.00
8.500	2258.00	18165.00				
Mud Record			Deviation Record			
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	2258.00	18165.00	8.500	15907.00	0.29 143.90	90.92 90.63
Acquisition System			Software Version			Other
Baker Hughes Cadence	RT 4.2	Rig: Nabors B16				
Pilot Studio	4.2.8155.1	Contractor: Nabors Drilling District: RMA			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)			
1	1	8.500	PDC	6.00	AutoTrak Curve	2244.00	7648.00	2258.00	7662.00	2018-08-02 13:31	2018-08-03 14:33	22.89
2	2	8.500	PDC	6.00	AutoTrak Curve	7648.00	13128.00	7662.00	13141.00	2018-08-04 01:01	2018-08-05 19:41	39.92
3	3	8.500	PDC	6.00	AutoTrak Curve	13128.00	18151.00	13141.00	18165.00	2018-08-06 18:38	2018-08-08 02:03	33.61

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adewale Adedeji	2018-08-02	2018-08-08						

Mud Properties Record

Date / Time	Run No.	Measured Depth	Mud Type	Density	Viscosity	pH	Fluid Loss	Oil / Water	Source	Total Chlorides	K+
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No.	No.	Depth (ft)	Type	(ppg)	(cP)		Loss (cm3)	Water		Chlorides (ppm)	(%)
2018-08-02 03:45	1	2258.00	Oil Based Mud	9.7	17	N/A	N/A	69/31	Active Pit	36000	0.00
2018-08-02 12:00	1	2258.00	Oil Based Mud	9.7	15	N/A	N/A	70.5/29.5	Active Pit	35000	0.00
2018-08-03 00:00	1	5391.00	Oil Based Mud	9.7	15	N/A	N/A	68/32	Active Pit	58000	0.00
2018-08-03 20:19	2	7662.00	Oil Based Mud	9.7	15	N/A	N/A	68/32	Active Pit	58000	0.00
2018-08-04 00:00	2	7662.00	Oil Based Mud	9.6	13	N/A	N/A	69.8/30.2	Active Pit	48000	0.00
2018-08-04 12:00	2	8229.00	Oil Based Mud	9.6	13	N/A	N/A	69/31	Active Pit	53000	0.00
2018-08-05 00:00	2	10962.00	Oil Based Mud	9.6	16	N/A	N/A	69/31	Active Pit	41000	0.00
2018-08-05 12:00	2	11888.00	Oil Based Mud	9.8	19	N/A	N/A	67.8/32.2	Active Pit	38000	0.00
2018-08-06 10:00	3	13138.00	Oil Based Mud	9.5	16	N/A	N/A	69.8/30.2	Active Pit	43000	0.00
2018-08-06 22:00	3	13645.00	Oil Based Mud	9.6	18	N/A	N/A	69.5/30.5	Active Pit	50000	0.00
2018-08-07 10:00	3	15609.00	Oil Based Mud	9.7	20	N/A	N/A	68.5/31.5	Active Pit	40500	0.00
2018-08-07 22:00	3	17562.00	Oil Based Mud	9.9	22	N/A	N/A	67/33	Active Pit	37000	0.00

Mud Resistivity Record

Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Surface			BHCT (degF)	Downhole		
				Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)		Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)
2018-08-05 06:08	2	10962.00	140.0	100.000	N/A	N/A	233.0	100.000	N/A	N/A
2018-08-05 12:00	2	11888.00	140.0	100.000	N/A	N/A	233.0	100.000	N/A	N/A
2018-08-06 10:00	3	13138.00	140.0	100.000	N/A	N/A	240.0	100.000	N/A	N/A
2018-08-06 22:00	3	13624.00	140.0	100.000	N/A	N/A	245.0	100.000	N/A	N/A
2018-08-07 10:00	3	15609.00	155.0	100.000	N/A	N/A	250.0	100.000	N/A	N/A
2018-08-07 22:00	3	17610.00	158.0	100.000	N/A	N/A	255.0	100.000	N/A	N/A

Equipment and Service Data

Run No.	Tool	Serial Number	Measurement	Sensor Offset (ft)	Bit Offset (ft)	Max O.D. (in)	Min I.D. (in)
1	ATC_SU	14547137	Near Bit VSS	5.93	6.93	7.000	4.330
1	ATC_SU	14547137	Near Bit Inclination	5.93	6.93	7.000	4.330
1	ATC_MWD	14219812	Gamma (single)	2.76	13.10	7.000	3.250
1	ATC_MWD	14219812	Directional (mag)	12.28	22.62	7.000	3.250
2	ATC_SU	14169950	Near Bit Inclination	5.93	6.93	7.000	4.330
2	ATC_SU	14169950	Near Bit VSS	5.93	6.93	7.000	4.330
2	ATC_MWD	12899370	Gamma (single)	2.77	13.10	7.000	3.250
2	ATC_MWD	12899370	Directional (mag)	12.29	22.62	7.000	3.250
2	OnTrak	12004344	Pressure	1.17	10875.69	6.750	2.875
2	OnTrak	12004344	Gamma (double)	2.06	10876.58	6.750	2.875
2	OnTrak	12004344	Resistivity (4tx)	6.10	10880.62	6.750	2.875
2	OnTrak	12004344	Directional (mag)	11.89	10886.41	6.750	2.875
3	ATC_SU	14192923	Near Bit Inclination	5.93	6.93	7.000	4.330
3	ATC_SU	14192923	Near Bit VSS	5.93	6.93	7.000	4.330
3	ATC_MWD	12141354	Gamma (single)	2.76	13.10	7.000	3.250
3	ATC_MWD	12141354	Directional (mag)	12.28	22.62	7.000	3.250
3	OnTrak	12004344	Pressure	1.17	10877.92	6.750	2.875
3	OnTrak	12004344	Gamma (double)	2.06	10878.81	6.750	2.875
3	OnTrak	12004344	Resistivity (4tx)	6.10	10882.85	6.750	2.875
3	OnTrak	12004344	Directional (mag)	11.89	10888.64	6.750	2.875

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
OTK	OnTrak	Sensor Sub (Inc, Azi, Temp, Azimuthal GR, Res, AP, VSS), OnTrak Platform
BCPM	BCPM	Bi-Directional Communication and Power Module, OnTrak Platform

Comments

1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes, a GE Company (BHGE). Due to the lack of control by BHGE logging engineers, depth calibrations and measurements could not be independently verified.
2	BHGE LWD run 1 utilized 6.75 inch NaviGamma Services (Gamma Ray and Directional) behind a 8.5 inch bit and Rotary steerable assembly from 2258 to 7662 feet MD (2258 to 7514 feet TVD).
3	BHGE LWD runs 2 and 3 utilized 6.75 inch NaviGamma Services (Gamma Ray and Directional) and Ontrak Services (Multiple Propagation Resistivity) behind a 8.5 inch bit and Rotary steerable assembly from 7662 to 18165 feet MD (7514 to 7813 feet TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	2258.00	8.500	1	BHGE logging services began at 2258 feet MD (2258 feet TVD) per customer request.

Curve Mnemonics

Presented Curves	Description	Units
CACLM	Conductivity Attenuation - Corrected - 400kHz	mmho/m
RACHM	Resistivity Attenuation - Corrected - 2MHz	ohm.m
RACLM	Resistivity Attenuation - Corrected - 400kHz	ohm.m
RPCHM	Resistivity Phase - Corrected - 2MHz	ohm.m
RPCLM	Resistivity Phase - Corrected - 400kHz	ohm.m
RPTHM	Resistivity Time Since Drilled	min
ROPA	Depth Averaged ROP 3 ft Average	ft/h
TVD	True Vertical Depth	ft
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
TCDM	Directional Real-Time Survey Temperature	degF











