



LWD MEMORY LOG

Gamma Ray Multiple Propagation Resistivity

Scale: 1:1200		Company: ConocoPhillips				
Measured Depth		Well: Schuh_3-65_21-20_3AH				
Depth Reference:		Field: Adams County				
Driller's Depth		County: Adams State: Colorado Country: United States				
Status:	Surface Location:		Other Services:			
Final Print		Latitude: 039° 46' 21.540" N				
API No: 05001102010000		Longitude: 104° 39' 40.090" W				
Job ID: 109541489	SEC: 21	TWN: 3S	RGE: 65W			
Permanent Datum (P.D.):	Ground Level	Elevation: Above P.D.	5595.00 ft 25.00 ft			
Log Measured From:	Rig Floor		Elev. KB: 5620.00 ft			
			Elev. DF: 5595.00 ft			
Dates		Magnetic Field Reference				
Interval Drilled		Azimuth Reference				
Date From: 2018-12-14	Top: (ft) 2258.00	Dip Angle: (deg) 66.35				
Date To: 2018-12-19	Bottom: (ft) 18028.00	Total Magnetic Field Strength: (nT) 51785				
Spud Date: 2018-12-12	Mag to Reference North Correction: (deg) 8.29					
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	2247.00
8.500	2258.00	18028.00				
Mud Record						
Type	From (ft)	To (ft)	Hole Size (in)	Interval (ft)	Inc Az (Start)	Inc Az (End)
Oil Based Mud	2258.00	18028.00	8.500	15770.00	0.22 232.82	89.82 274.09
Deviation Record						
Acquisition System						
Software Version			Other			
Baker Hughes Cadence	RT 5.0		Rig:	Nabors B16		
Pilot Studio	5.0.8260.3		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
						Top	Bottom	From	To	Start Logging	End Logging	
						(ft)	(ft)	(ft)	(ft)			
1	1	8.500	PDC	4.00	AutoTrak Curve	2245.00	18015.00	2258.50	18028.00	2018-12-14 18:05	2018-12-18 09:11	82.27

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Adewale Adedeeji	2018-12-11	2018-12-19						

Mud Properties Record

Date / Time	Run	Measured	Mud	Density	Viscosity	pH	Fluid	Oil /	Source	Total	K+
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Date / Time	Run No.	Measured Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Slurry Water	Sealant	Total Solids (ppm)	Chlorides (ppm)	Resistivity (ohm.m)
2018-12-14 14:42	1	2258.00	Oil Based Mud	10.0	16	N/A	N/A	66/34	Active Pit	38000		0.00
2018-12-15 00:00	1	3466.00	Oil Based Mud	9.8	16	N/A	N/A	64.5/35.5	Active Pit	50000		0.00
2018-12-15 12:00	1	6190.00	Oil Based Mud	9.8	16	N/A	N/A	66/34	Active Pit	52000		0.00
2018-12-16 00:00	1	7838.00	Oil Based Mud	9.7	13	N/A	N/A	69/31	Active Pit	48000		0.00
2018-12-16 12:00	1	9650.00	Oil Based Mud	9.7	13	N/A	N/A	68.5/31.5	Active Pit	45000		0.00
2018-12-17 00:00	1	11854.00	Oil Based Mud	9.8	15	N/A	N/A	68.5/31.5	Active Pit	42000		0.00
2018-12-17 12:00	1	14214.00	Oil Based Mud	10.0	16	N/A	N/A	67/33	Active Pit	44000		0.00
2018-12-18 00:00	1	16582.00	Oil Based Mud	10.0	17	N/A	N/A	66.5/33.5	Active Pit	43000		0.00

Mud Resistivity Record

				Surface				Downhole			
Date / Time	Run No.	Measured Depth (ft)	Surface Temp (degF)	Rm (ohm.m)	Rmf (ohm.m)	Rmc (ohm.m)	BHCT (degF)	Rm @ BHCT (ohm.m)	Rmf @ BHCT (ohm.m)	Rmc @ BHCT (ohm.m)	
2018-12-16 17:46	1	10773.00	144.0	100.000	N/A	N/A	220.0	100.000	N/A	N/A	
2018-12-17 00:00	1	11669.00	152.0	100.000	N/A	N/A	230.0	100.000	N/A	N/A	
2018-12-17 12:00	1	14114.00	158.0	100.000	N/A	N/A	240.0	100.000	N/A	N/A	
2018-12-18 00:00	1	16495.00	162.0	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	AutoTrak Curve Steering Unit	11813727	Near Bit VSS	5.93	6.93	7.000	4.330
1	AutoTrak Curve Steering Unit	11813727	Near Bit Inclination	5.93	6.93	7.000	4.330
1	AutoTrak Curve MWD	14256850	Gamma (single)	2.76	13.10	7.000	3.250
1	AutoTrak Curve MWD	14256850	Directional (mag)	12.28	22.62	7.000	3.250
1	OnTrak	14609701	Pressure	1.17	10687.45	6.750	0.000
1	OnTrak	14609701	Gamma (double)	2.06	10688.34	6.750	0.000
1	OnTrak	14609701	Resistivity (4tx)	6.10	10692.38	6.750	0.000
1	OnTrak	14609701	Directional (mag)	11.89	10698.17	6.750	0.000

Service and Tool Mnemonics

Mnemonic	Name	Description
ATC SU	AutoTrak Curve SU	Auto Trak Curve Steering Unit
ATC MWD	AutoTrak Curve MWD	Auto Trak Curve MWD
ATC LCPM	AutoTrak Curve 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) and Ontrak Services (Multiple Propagation Resistivity) behind a 8.5 inch bit and Rotary steerable assembly from 2258 to 18028 feet MD (2258 to 7928 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

TVD	True Vertical Depth	ft
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
TCDM	Downhole Temperature	degF

Gamma Ray - Apparent - Memory 3 ft Average [GRAM]	MD 1:1200 feet	Resistivity Phase - Corrected - 2MHz [RPCHM]	Downhole Temperature [TCDM]
0 200		0.2 2000	0 300
API		ohm.m	degF
Depth Averaged ROP 3 ft Average [ROPA]		Resistivity Phase - Corrected - 400kHz [RPCLM]	Conductivity Attenuation - Corrected - 400kHz [CACLM]
1000 0		0.2 2000	4000 0
ft/h		ohm.m	mmho/m
True Vertical Depth [TVD]		Resistivity Attenuation - Corrected - 2MHz [RACHM]	
0 10000		0.2 2000	
ft		ohm.m	
		Resistivity Attenuation - Corrected - 400kHz [RACLM]	
		0.2 2000	
		ohm.m	











