



LWD MEMORY LOG

Gamma Ray

Company: Confluence Resources

Well: 70 Ranch 10-18-3L

Field: DJ Basin

County: Weld Country: United States

State: Colorado

Driller's Depth

Status: Final Print

API No: 05123466120000

Job ID: 109837014

Permanent Datum (P.D.): Mean Sea Level

Log Measured From: Rig Floor

Dates

From: 2019-07-29 To: 2019-08-03 Spud: 2019-06-01

Drilled (ft) 23.00 Top: 23.00 Bottom: 16525.00

Logged (ft) 1552.00 Top: 1552.00 Bottom: 16513.00

Azi Reference North: True Dip Angle: (deg) 66.77

Total Magnetic Field Strength: (nT) 52171

Mag to Reference North Correction: (deg) 7.98

Borehole Record

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.500

23.00

1565.00

1565.00

8.500

1565.00

1565.00

1565.00

1565.00

1565.00

1565.00

1565.00

1565.00

1565.00

Mud Record

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Water Based Mud

Diesel-Oil Based Mud

1565.00

1565.00

1565.00

Acquisition System

Software Version

RT 5.2

Plot Studio

Other

Rig: Ensign 140

Contractor: Ensign 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 (ft)	Bottom (ft)	From (ft)	To (ft)	Start Logging	End Logging	
1	1	13.500	PDC	6.00	Steerable	0.00	0.00	23.00	1565.00	N/A	N/A	6.48
2	2	8.500	PDC	3.00	AutoTrak Curve	1552.00	11990.00	1565.00	11103.00	2019-07-29 08:57	2019-08-01 06:43	49.77
3	3	8.500	PDC	3.00	AutoTrak Curve	11990.00	16513.00	11103.00	16525.00	2019-08-02 00:34	2019-08-03 06:43	29.64

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite
Shawn McCaffrey	2019-07-29	2019-08-04						

Mud Properties Record

Date / Time	Run No.	Depth (ft)	Mud Type	Density (ppg)	Viscosity (cP)	pH	Fluid Loss (cm3)	Oil / Water	Source	Total Chlorides (ppm)	K+ (%)
2019-06-01 06:20	1	23.00	Water Based Mud	8.7	1	7	N/A	N/A	Active Pit	340	0.00
2019-07-29 15:00	2	1565.00	Diesel-Oil Based Mud	9.7	13	N/A	N/A	87/13	Active Pit	25000	0.00
2019-07-30 03:00	2	3000.00	Diesel-Oil Based Mud	9.4	10	N/A	N/A	87/13	Active Pit	30000	0.00

2019-07-31 03:00	2	7125.00	Diesel-Oil Based Mud	9.6	11	N/A	N/A	82/18	Active Pit	31000	0.00
2019-08-01 03:00	2	10694.00	Diesel-Oil Based Mud	9.6	11	N/A	N/A	84/16	Active Pit	30000	0.00
2019-08-01 17:44	3	11103.00	Diesel-Oil Based Mud	9.6	11	N/A	N/A	84/16	Active Pit	30000	0.00
2019-08-02 03:00	3	11670.00	Diesel-Oil Based Mud	9.7	11	N/A	N/A	85/15	Active Pit	28000	0.00
2019-08-03 03:00	3	15965.00	Diesel-Oil Based Mud	9.6	13	N/A	N/A	81/19	Active Pit	26000	0.00
2019-08-03 14:00	3	16525.00	Diesel-Oil Based Mud	9.7	14	N/A	N/A	82/18	Active Pit	31000	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)
1	NaviTrak	13249128	VSS	16.47	52.54	8.000	3.250
1	NaviTrak	13249128	Directional (mag)	16.47	52.54	8.000	3.250
2	AutoTrak Curve Steering Unit	12124244	Near Bit Inclination	5.93	6.73	7.000	4.330
2	AutoTrak Curve Steering Unit	12124244	Near Bit VSS	5.93	6.73	7.000	4.330
2	AutoTrak Curve MWD	14205167	Gamma (single)	2.74	12.89	7.000	3.250
2	AutoTrak Curve MWD	14205167	Directional (mag)	12.26	22.41	7.000	3.250
3	AutoTrak Curve Steering Unit	12124244	Near Bit Inclination	5.93	6.73	7.000	4.330
3	AutoTrak Curve Steering Unit	12124244	Near Bit VSS	5.93	6.73	7.000	4.330
3	AutoTrak Curve MWD	14205167	Gamma (single)	2.74	12.89	7.000	3.250
3	AutoTrak Curve MWD	14205167	Directional (mag)	12.26	22.41	7.000	3.250

Service and Tool Mnemonics

Mnemonic	Name	Description
NTK	NaviTrak	Probe Based Directional Module, NaviTrak Platform
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

Comments

1	Depth measurements were obtained from a depth control system not supplied or operated by Baker Hughes, a GE company. Due to a lack of control by Baker Hughes, a GE company logging engineers, depth calibrations and measurements could not be independently verified and the unverified depths as supplied to Baker Hughes, a GE company are being used to present logging data.
2	Baker Hughes, a GE company run 1 utilized 8 inch Directional-only with NaviTrak service behind a 13 ½ inch bit an 8 inch steerable assembly from 23 to 1565 feet MD (23 to 1565 feet TVD) therefore, no logging data was acquired for this run.
3	Baker Hughes, a GE company run 2 and 3 utilized 6 ¾ inch NaviGamma services (Gamma Ray and Directional) behind 8 ½ inch bit and rotary steerable assembly from 1565 to 16525 feet MD (1565 to 6402 feet TVD).
4	Gamma Ray Apparent (GRAM) is presented 0 to 300 API per customer request.

Remarks

Number	Depth (ft)	Hole Section (in)	Run No.	Remark
1	5967.00	8.500	2	The interval from 5967 to 5983 feet MD (5962to 5978 feet TVD) was not logged due to differential and torque spikes shutting down the tool while drilling ahead.

Curve Mnemonics

Presented Curves	Description	Units
ROPA	Depth Averaged ROP 10 ft Average	ft/h
TVD	True Vertical Depth	ft
WOBA	Weight On Bit, Average 3 ft Average	klb
GRAM	Gamma Ray - Apparent - Memory 3 ft Average	API
TCDM	Directional Real-Time Survey Temperature	degF

<div> <div>Gamma Ray - Apparent 3 ft Average GRAM</div> <div>0300</div> <div>API</div> <div>True Vertical Depth TVD</div> <div>75001500</div> <div>ft</div> </div>	MD 1:1200 feet	<div> <div>Depth Averaged ROP 10 ft Average ROPA</div> <div>10000</div> <div>ft/h</div> </div>	<div> <div>Weight On Bit, Average 3 ft Average WOBA</div> <div>050</div> <div>klb</div> <div>Downhole Temperature TCDM</div> <div>0300</div> <div>degF</div> </div>
	1400		
	1500		



























