



LWD MEMORY LOG

Gamma Ray

Company: Noble Energy

Well: Bison Ridge Y22-734

Field: Weld County

County: Weld Country: United States

State: Colorado

Surface Location:

Latitude: 40° 46' 00" N
Longitude: 105° 43' 00" W

Other Services:

Wellbore Surveys

Status: Final Print

API No: 05-123-45371-00

Job ID: 8782673

SEC: 10

TWN: 2N

RGE: 64W

Permanent Datum (P.D.): Ground Level

Elevation: 4924.00 ft

Log Measured From: Rig Floor

Above P.D. 30.00 ft

Elev. KB: 4954.00 ft

Elev. DF: 4924.00 ft

Elev. GL: 4924.00 ft

N/A

Dates

Date From: 2017-12-14

Date To: 2017-12-16

Spud Date: 2017-12-13

Interval Logged

Top: (ft) 2037.00

Bottom: (ft) 17033.00

Magnetic Field Reference

Azi Reference North: Grid

Total Magnetic Field Strength: (nT) 52248

Mag to Reference North Correction: (deg) 7.44 E

Dip Angle: (deg) 66.65

52248

7.44 E

Borehole Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.000

30.00

2049.00

8.500

17033.00

9.625

36.00

30.00

2039.00

Casing Record

Hole Size (in)

From (ft)

To (ft)

Size (in)

Weight (lb/ft)

From (ft)

To (ft)

13.000

30.00

2049.00

8.500

17033.00

9.625

36.00

30.00

2039.00

Mud Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Diesel-Oil Based Mud

30.00

17033.00

8.500

14984.00

0.29 | 348.13

1.14 | 278.60

Deviation Record

Type

From (ft)

To (ft)

Hole Size (in)

Interval (ft)

Inc | Az (Start)

Inc | Az (End)

Diesel-Oil Based Mud

30.00

17033.00

8.500

14984.00

0.29 | 348.13

1.14 | 278.60

Acquisition System

Baker Hughes Cadence

Plot Studio

Software Version

RT4.1

4.1.7763.3

Other

Rig: H&P 524

Contractor: Helmerich & Payne Drilling Co

District: RMD Unit: D&E

©"4239"Dcmgt"Jwi jgu."c"IG"eqorcp{."NNE"ó"Cnn"tkijvu"tgugt xgf0"Dcmgt"Jwi jgu."c"IG"eqorcp{."NNE"cpf"kvu"chhknkcvgu"~0DJIGö+~rtq xkfgu"vjku"kphqtocvkqp"qp"cp"öcu"kuö"dcuku"hqt"igpgtcn"kphqtocvkqp" purposes and believes it to be accurate as of the date of publication. BHGE does not make any representation as to the accuracy or completeness of the information and makes no warranties of any kind, specific, implied or oral, to the fullest extent permissible by law, including those of merchantability and fitness for a particular purpose or use. BHGE hereby disclaims any and all liability for any direct, indirect, consequential or special damages, claims for lost profits, or third party claims arising from the use of the information, whether a claim is asserted in contract, tort, or otherwise. The BHGE logo is a trademark of Baker Hughes, a GE company, LLC. GE and the GE monogram are trademarks of General Electric Company used under trademark license.

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	2037.00	17020.00	2049.00	17033.00	2017-12-14 07:55	2017-12-16 19:02	55.13

Crew

Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite	Name	Arrive Wellsite	Depart Wellsite

John Bryson	2017-12-13	2017-12-16	Steven Cano	2017-12-13	2017-12-16							
-------------	------------	------------	-------------	------------	------------	--	--	--	--	--	--	--

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+ (%)
2017-12-14 04:40	1	2049.00	Diesel-Oil Based Mud	9.2	9	N/A	N/A	83.2/16.8	Active Pit	29000	0.00
2017-12-15 02:22	1	7195.00	Diesel-Oil Based Mud	9.1	10	N/A	N/A	81.4/18.6	Active Pit	30500	0.00
2017-12-16 20:10	1	13150.00	Diesel-Oil Based Mud	9.2	9	N/A	N/A	84.5/15.5	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	ATC_SU	12639607	Near Bit Inclination	5.93	6.76	7.000	4.330
1	ATC_SU	12639607	Near Bit VSS	5.93	6.76	7.000	4.330
1	ATC_MWD	12211066	Gamma (single)	2.20	12.38	7.000	3.250
1	ATC_MWD	12211066	Directional (mag)	12.27	22.45	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	Baker Hughes LWD run 1 utilized a 6.75 inch Navigamma service (Gamma Ray and Directional) behind a 8.5 inch bit and rotary steerable from 2049 to 17033 feet MD (2048 to 6859 feet TVD).

Remarks

Number	Measured Depth (ft)	Hole Section (in)	Run No.	Remark
1	17020.00	8.500	1	The interval from 17020 to 17033 feet MD (6859 feet TVD) was not logged due to sensor offset at well TD.

<div> <div>BAKER HUGHES</div> <div>a GE company</div> </div>	Company	Noble Energy	
	Well	Bison Ridge Y22-734	
	Interval	<div> <div>Date From:</div> <div>2017-12-14 00:55:08</div> <div>Date To:</div> <div>2017-12-16 12:00:07</div> </div> <div> <div>Top:</div> <div>2037.00</div> <div>Bottom:</div> <div>17032.00</div> </div>	
	Created	2017-12-17 04:23:17	

Gamma Ray - Apparent 3 ft Average GRAM				MD 1:1200 feet	Depth Averaged ROP 10 ft Average ROPA				Weight On Bit, Average 1 ft Average WOBA			
0150					10000				050			
API					ft/h				klb			
True Vertical Depth TVD									Downhole Temperature TCDM			
75001500								0300				
ft								degF				
				1900								
				2000								



























