

Noble Energy

Weld County, CO (NAD 83)

Sec. 9-T9N-R58W (Rohn State 9 LD10 South PAD)

Rohn State LD10-62HN - A3

Original Wellbore

Design: Noble Flexishot and Sperry MWD Survey

Sperry Drilling Services

Final Report

06 November, 2014

Well Coordinates: 1,524,200.44 N, 3,454,003.71 E (40° 45' 38.88" N, 103° 51' 39.85" W)

Ground Level: 4,719.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Rohn State LD10-62HN - Slot A3

KB=24' @ 4743.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 9-T9N-R58W (Rohn State 9 LD10 South PAD)
 Well: Rohn State LD10-62HN
 Wellbore: Original Wellbore
 Design: Noble Flexishot and Sperry MWD Survey



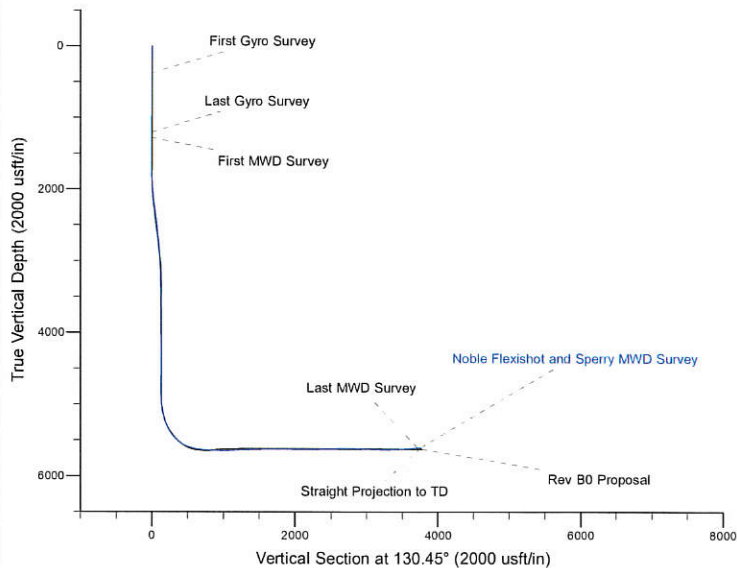
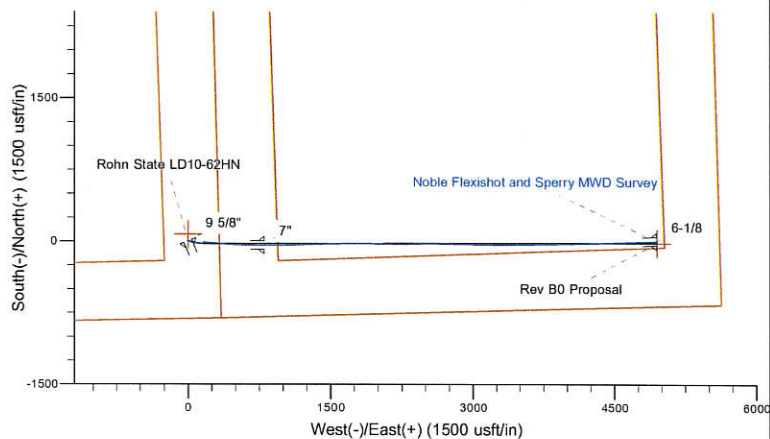
HALLIBURTON

Sperry Drilling

Platted SHL: 848' FSL, 330' FEL
 Platted Lat/Long: 40.760910 N, 103.861070 W
 Location: Sec. 9-T9N-R58W

~7" Casing: 756' FSL, 1907' FEL
 Lat/Long: 40.760646 N, -103.858179 W
 State Planes - CO Northern: 1524159.31 N, 3454805.36 E
 Sec. 9-T9N-R58W

Platted BHL: 990' FSL, 660' FEL
 Lat/Long: 40.7605 N, 103.84322 W
 State Planes - CO Northern: 1524183.05N, 3458949.85E
 Location: Sec. 10-T9N-R58W



LEGEND

- Rohn State LD10-62HN, Original Wellbore, Rev B0 Proposal V0
- Noble Flexishot and Sperry MWD Survey

WELL DETAILS: Rohn State LD10-62HN

Ground Level: 4719.00
 KB=24' @ 4743.00usft (H&P 273)

Created By: Gordy Roth
 Created On: 11/06/2014

Design Report for Rohn State LD10-62HN - Noble Flexishot and Sperry MWD Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
380.00	0.20	293.17	380.00	0.26	-0.61	-0.63	0.05
First Gyro Survey							
745.00	0.30	253.77	745.00	0.24	-2.11	-1.77	0.05
1,209.00	0.80	337.77	1,208.98	2.90	-4.50	-5.31	0.18
Last Gyro Survey							
1,283.00	0.36	55.39	1,282.98	3.51	-4.51	-5.71	1.09
First MWD Survey							
1,376.00	0.40	85.49	1,375.97	3.71	-3.94	-5.41	0.22
1,469.00	0.56	47.38	1,468.97	4.04	-3.29	-5.12	0.37
1,562.00	0.41	27.93	1,561.97	4.64	-2.80	-5.14	0.24
1,747.00	0.29	218.33	1,746.97	4.86	-2.78	-5.26	0.38
1,840.00	2.07	139.62	1,839.94	3.39	-1.83	-3.60	2.19
1,933.00	3.23	112.73	1,932.85	1.10	1.67	0.56	1.80
2,026.00	5.82	110.02	2,025.55	-1.53	8.52	7.47	2.79
2,119.00	7.63	111.40	2,117.91	-5.39	18.70	17.73	1.95
2,212.00	8.24	102.66	2,210.02	-9.11	30.95	29.46	1.45
2,305.00	7.81	101.49	2,302.11	-11.83	43.64	40.88	0.49
2,398.00	7.20	98.49	2,394.31	-13.94	55.60	51.36	0.78
2,582.00	8.18	96.60	2,576.65	-17.15	80.01	72.01	0.55
2,677.00	7.76	97.01	2,670.74	-18.71	93.09	82.98	0.45
2,772.00	7.10	97.05	2,764.94	-20.21	105.28	93.23	0.69
2,867.00	5.92	91.83	2,859.32	-21.09	116.00	101.96	1.39
2,962.00	5.31	88.60	2,953.87	-21.14	125.30	109.06	0.72
3,057.00	5.08	83.43	3,048.48	-20.55	133.87	115.21	0.55
3,152.00	4.83	84.05	3,143.12	-19.66	142.02	120.83	0.27
3,246.00	3.17	61.70	3,236.90	-18.01	148.25	124.50	2.39
3,436.00	0.87	44.49	3,426.77	-14.49	153.89	126.51	1.24
3,531.00	0.92	45.60	3,521.76	-13.45	154.94	126.63	0.06
3,721.00	0.07	18.00	3,711.75	-12.27	156.06	126.72	0.45
4,005.00	0.55	111.28	3,995.74	-12.60	157.39	127.94	0.20
4,100.00	0.55	117.36	4,090.74	-12.97	158.22	128.82	0.06
4,290.00	0.39	84.90	4,280.73	-13.33	159.67	130.16	0.16
4,574.00	0.90	343.36	4,564.72	-11.11	160.00	128.96	0.37
4,669.00	0.51	26.22	4,659.71	-10.02	159.97	128.23	0.66
4,764.00	0.34	1.19	4,754.71	-9.36	160.16	127.95	0.26
4,859.00	0.35	2.09	4,849.71	-8.78	160.18	127.59	0.01
4,954.00	3.57	95.75	4,944.65	-8.79	163.13	129.84	3.80
5,002.00	8.27	98.31	4,992.38	-9.44	168.04	134.00	9.80
5,049.00	10.39	93.07	5,038.75	-10.16	175.61	140.23	4.85
5,097.00	12.83	87.11	5,085.77	-10.12	185.26	147.54	5.66
5,144.00	15.39	90.16	5,131.35	-9.87	196.71	156.10	5.67
5,192.00	18.14	93.71	5,177.30	-10.37	210.54	166.95	6.11
5,239.00	21.72	94.98	5,221.48	-11.60	226.51	179.90	7.67
5,287.00	25.20	95.94	5,265.51	-13.43	245.53	195.56	7.29
5,333.00	29.27	95.73	5,306.40	-15.57	266.47	212.88	8.85
5,381.00	33.50	96.58	5,347.37	-18.26	291.31	233.53	8.86
5,428.00	38.00	95.71	5,385.50	-21.19	318.61	256.20	9.64
5,476.00	42.18	96.47	5,422.22	-24.47	349.34	281.72	8.77
5,523.00	46.25	95.44	5,455.90	-27.86	381.93	308.72	8.79

Design Report for Rohn State LD10-62HN - Noble Flexishot and Sperry MWD Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,571.00	51.16	95.16	5,487.56	-31.19	417.83	338.19	10.24
5,618.00	55.97	94.03	5,515.47	-34.21	455.51	368.83	10.41
5,666.00	61.54	93.17	5,540.36	-36.77	496.45	401.65	11.70
5,713.00	66.39	92.26	5,560.98	-38.77	538.62	435.03	10.46
5,761.00	71.18	90.49	5,578.35	-39.83	583.34	469.75	10.55
5,808.00	73.93	89.76	5,592.44	-39.92	628.17	503.93	6.04
5,856.00	76.40	90.14	5,604.72	-39.88	674.57	539.21	5.20
5,902.00	79.50	90.49	5,614.33	-40.13	719.55	573.60	6.78
5,936.00	81.81	90.71	5,619.85	-40.48	753.09	599.35	6.82
6,023.00	83.89	90.91	5,630.67	-41.70	839.40	665.83	2.40
6,113.00	85.72	88.96	5,638.82	-41.60	929.03	733.96	2.96
6,175.00	88.00	87.96	5,642.22	-39.94	990.91	779.97	4.01
6,268.00	90.06	89.05	5,643.79	-37.51	1,083.85	849.13	2.51
6,360.00	90.03	88.48	5,643.72	-35.53	1,175.83	917.83	0.62
6,452.00	89.82	88.10	5,643.84	-32.78	1,267.79	986.03	0.47
6,547.00	89.23	87.52	5,644.63	-29.15	1,362.72	1,055.91	0.87
6,642.00	92.53	88.66	5,643.17	-25.99	1,457.64	1,126.09	3.68
6,737.00	93.27	87.67	5,638.37	-22.95	1,552.47	1,196.28	1.30
6,831.00	92.53	90.37	5,633.61	-21.34	1,646.32	1,266.67	2.97
6,926.00	91.14	90.39	5,630.57	-21.97	1,741.27	1,339.33	1.46
7,021.00	90.37	89.46	5,629.31	-21.85	1,836.26	1,411.53	1.27
7,116.00	91.42	91.51	5,627.83	-22.65	1,931.24	1,484.33	2.42
7,211.00	91.82	91.72	5,625.15	-25.33	2,026.16	1,558.30	0.48
7,306.00	91.14	91.37	5,622.69	-27.89	2,121.10	1,632.20	0.80
7,401.00	89.11	89.60	5,622.48	-28.69	2,216.08	1,705.01	2.83
7,496.00	88.64	88.82	5,624.35	-27.38	2,311.06	1,776.43	0.96
7,591.00	90.15	88.87	5,625.35	-25.47	2,406.03	1,847.46	1.59
7,686.00	89.60	88.95	5,625.56	-23.66	2,501.01	1,918.57	0.59
7,780.00	89.66	91.06	5,626.17	-23.67	2,595.00	1,990.10	2.25
7,875.00	90.18	90.98	5,626.30	-25.36	2,689.99	2,063.48	0.55
7,970.00	89.48	90.55	5,626.58	-26.63	2,784.98	2,136.59	0.86
8,065.00	90.99	91.30	5,626.19	-28.16	2,879.96	2,209.86	1.77
8,160.00	91.32	91.57	5,624.28	-30.54	2,974.91	2,283.66	0.45
8,350.00	90.74	90.90	5,620.86	-34.64	3,164.83	2,430.85	0.47
8,445.00	91.17	90.30	5,619.28	-35.63	3,259.82	2,503.77	0.78
8,539.00	91.76	90.07	5,616.87	-35.94	3,353.78	2,575.47	0.67
8,634.00	89.26	89.33	5,616.03	-35.44	3,448.77	2,647.43	2.74
8,729.00	89.60	89.32	5,616.97	-34.32	3,543.76	2,718.99	0.36
8,823.00	89.97	89.14	5,617.33	-33.06	3,637.75	2,789.70	0.44
8,918.00	87.57	89.09	5,619.37	-31.59	3,732.71	2,861.01	2.53
9,013.00	87.66	88.21	5,623.32	-29.35	3,827.60	2,931.77	0.93
9,108.00	88.37	89.05	5,626.61	-27.08	3,922.51	3,002.52	1.16
9,203.00	88.74	89.08	5,629.01	-25.53	4,017.47	3,073.78	0.39
9,298.00	88.74	88.42	5,631.09	-23.46	4,112.43	3,144.69	0.69
9,393.00	88.74	88.18	5,633.18	-20.64	4,207.36	3,215.11	0.25
9,487.00	90.99	88.50	5,633.41	-17.92	4,301.31	3,284.84	2.42
9,582.00	91.45	88.56	5,631.38	-15.48	4,396.26	3,355.51	0.49
9,676.00	92.00	88.49	5,628.55	-13.07	4,490.19	3,425.42	0.59
9,771.00	92.28	88.33	5,625.01	-10.43	4,585.08	3,495.92	0.34
9,866.00	92.74	88.31	5,620.85	-7.65	4,679.95	3,566.31	0.48
9,961.00	93.42	87.73	5,615.74	-4.37	4,774.76	3,636.33	0.94

Design Report for Rohn State LD10-62HN - Noble Flexishot and Sperry MWD Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,065.00	93.48	87.85	5,609.48	-0.37	4,878.49	3,712.67	0.13
Last MWD Survey							
10,130.00	93.48	87.85	5,605.54	2.07	4,943.33	3,760.43	0.00
Straight Projection to TD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
380.00	380.00	0.26	-0.61	First Gyro Survey
1,209.00	1,208.98	2.90	-4.50	Last Gyro Survey
1,283.00	1,282.98	3.51	-4.51	First MWD Survey
10,065.00	5,609.48	-0.37	4,878.49	Last MWD Survey
10,130.00	5,605.54	2.07	4,943.33	Straight Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	130.45	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
380.00	1,209.00	Noble Flexishot Surveys	Flexi-Shot
1,283.00	5,936.00	Intermediate Surveys	MWD
6,023.00	10,130.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,203.00	1,202.98	9 5/8"	9-5/8	13-3/4
5,985.00	5,626.33	7"	7	8-3/4
10,130.00	5,605.54	6-1/8"	6-1/8	6-1/8

Design Report for Rohn State LD10-62HN - Noble Flexishot and Sperry MWD Survey

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Rohn State LD10-63HI	0.00	0.00	2.00	76.50	-1.41	1,524,276.94	3,454,002.30	40.761010	-103.861070
- actual wellpath misses target center by 76.51usft at 2.05usft MD (2.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2.00	-879.00	352.00	1,523,397.94	3,454,354.30	
Point 2				2.00	4,431.00	217.00	1,528,707.92	3,454,219.30	
Point 3				2.00	4,562.00	5,481.00	1,528,838.92	3,459,483.28	
Point 4				2.00	-737.00	5,625.00	1,523,539.94	3,459,627.28	
Point 5				2.00	-879.00	352.00	1,523,397.94	3,454,354.30	
Rohn State LD10-63HI	0.00	0.00	2.00	76.50	-1.41	1,524,276.94	3,454,002.30	40.761010	-103.861070
- actual wellpath misses target center by 76.51usft at 2.05usft MD (2.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2.00	-879.00	352.00	1,523,397.94	3,454,354.30	
Point 2				2.00	-972.00	-4,903.00	1,523,304.94	3,449,099.32	
Point 3				2.00	4,331.00	-5,031.00	1,528,607.92	3,448,971.32	
Point 4				2.00	4,431.00	217.00	1,528,707.92	3,454,219.30	
Point 5				2.00	-879.00	352.00	1,523,397.94	3,454,354.30	
Rohn State LD10-63HI	0.00	0.00	2.00	76.50	-1.41	1,524,276.94	3,454,002.30	40.761010	-103.861070
- actual wellpath misses target center by 76.51usft at 2.05usft MD (2.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2.00	3,831.00	-383.00	1,528,107.93	3,453,619.30	
Point 2				2.00	-279.00	-248.00	1,523,997.94	3,453,754.30	
Point 3				2.00	-372.00	-4,303.00	1,523,904.94	3,449,699.31	
Point 4				2.00	3,731.00	-4,431.00	1,528,007.93	3,449,571.31	
Point 5				2.00	3,831.00	-383.00	1,528,107.93	3,453,619.30	
Rohn State LD10-63HI	0.00	0.00	2.00	76.50	-1.41	1,524,276.94	3,454,002.30	40.761010	-103.861070
- actual wellpath misses target center by 76.51usft at 2.05usft MD (2.05 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				2.00	-279.00	952.00	1,523,997.94	3,454,954.29	
Point 2				2.00	3,831.00	817.00	1,528,107.93	3,454,819.30	
Point 3				2.00	3,962.00	4,881.00	1,528,238.93	3,458,883.28	
Point 4				2.00	-137.00	5,025.00	1,524,139.94	3,459,027.28	
Point 5				2.00	-279.00	952.00	1,523,997.94	3,454,954.29	
Rohn State LD10-62HI	0.00	0.00	5,624.31	-17.39	4,946.16	1,524,183.05	3,458,949.85	40.760500	-103.843220
- actual wellpath misses target center by 27.18usft at 10130.00usft MD (5605.54 TVD, 2.07 N, 4943.33 E)									
- Point									
Rohn State LD10-62HI	0.00	0.00	5,624.31	-17.39	4,946.16	1,524,183.05	3,458,949.85	40.760500	-103.843220
- actual wellpath misses target center by 27.18usft at 10130.00usft MD (5605.54 TVD, 2.07 N, 4943.33 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.61 °/100usft	Maximum Dogleg over Survey:	11.70 °/100usft at 5,666.00 usft
Net Tortousity applicable to Plans:	0.47 °/100usft	Directional Difficulty Index:	6.164

Audit Info

**North Reference Sheet for Sec. 9-T9N-R58W (Rohn State 9 LD10 South PAD) -
Rohn State LD10-62HN - Original Wellbore**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB=24' @ 4743.00usft (H&P 273). Northing and Easting are relative to Rohn State LD10-62HN - Slot A3

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999642

Grid Coordinates of Well: 1,524,200.44 usft N, 3,454,003.71 usft E

Geographical Coordinates of Well: 40° 45' 38.88" N, 103° 51' 39.85" W

Grid Convergence at Surface is: 1.06°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,130.00usft
the Bottom Hole Displacement is 4,943.33usft in the Direction of 89.98° (Grid).

Magnetic Convergence at surface is: -6.98° (10 October 2014, , BGGM2014)

