

Noble Energy

Weld County, CO (NAD 83)

Sec. 26-T9N-59W (Gleason PAD)

Gleason LC35-715

Original Wellbore

Design: Actual Surveys

05-123-40691

Sperry Drilling Services

Final Survey Report

30 April, 2015

Well Coordinates: 1,507,403.58 N, 3,433,095.45 E (40° 42' 56.66" N, 103° 56' 15.36" W)

Ground Level: 4,889.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Gleason LC35-715

KB = 24 @ 4913.00usft (H&P 273)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 26-T9N-59W (Gleason PAD)
 Well: Gleason LC35-715
 Wellbore: Original Wellbore
 Design: Actual Surveys

Noble Energy



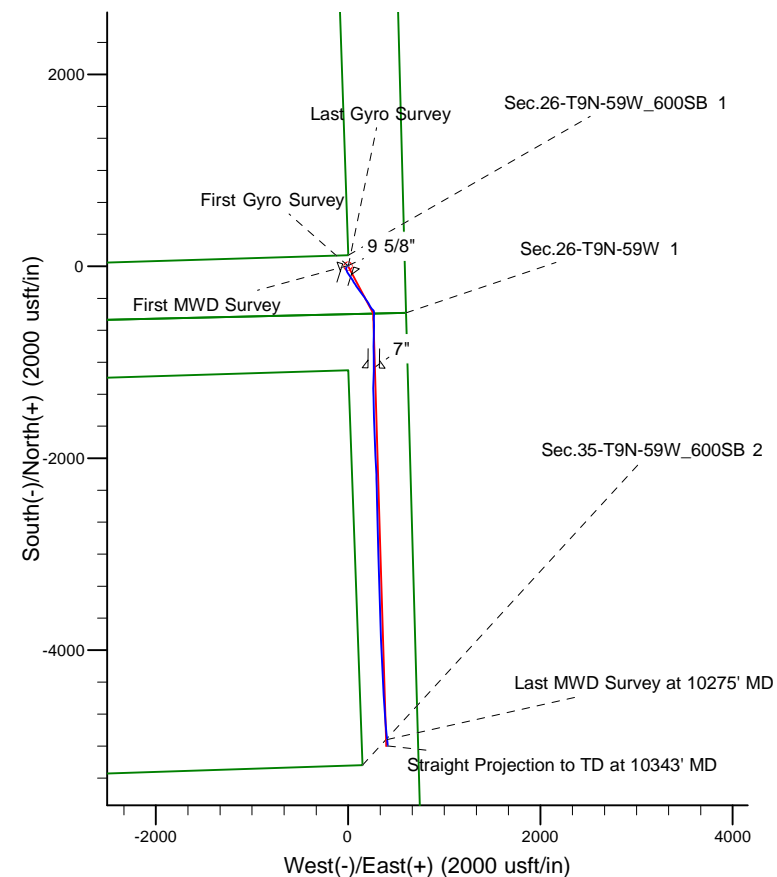
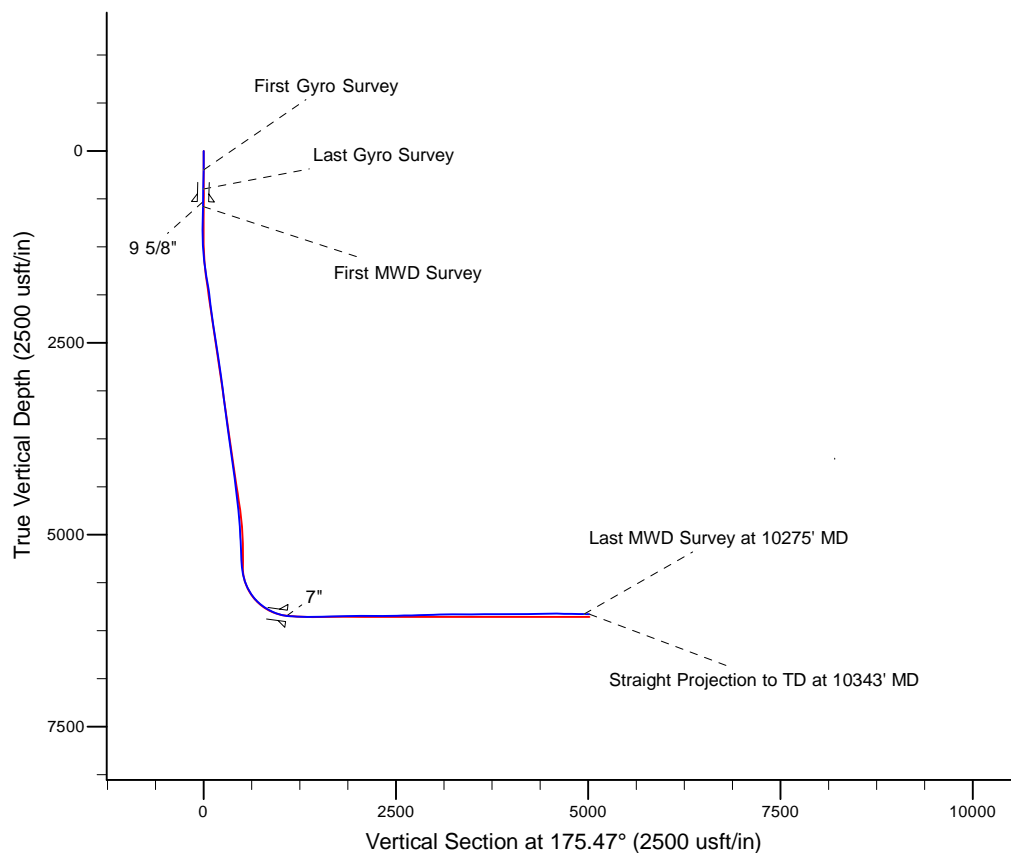
Platted SHL: 500' FSL, 589' FEL
 Platted Lat/Long: 40.715740 N, 103.9376 W
 Location: Sec. 26-T9N-R59W

~7" Casing: 576 FNL, 332 FEL
 Lat/Long: 40.712819 N, 103.936708 W
 State Planes - CO Northern: 1506343.85 N, 3433361.51 E
 Location: Sec. 26-T9N-R59W

Platted BHL: 810' FSL, 330' FEL
 Lat/Long: 40.7020 N, 103.936490 W
 State Planes - CO Northern: 1502403.94 N, 3433491.37 E
 Location: Sec. 35-T9N-R59W

LEGEND

- + Gleason LC35-715, Original Wellbore, Rev A0 PROPOSAL V0
- Actual Surveys



WELL DETAILS: Gleason LC35-715

Ground Level: 4889.00
 KB = 24 @ 4913.00usft (H&P 273)

Created By: Amanda Marchand
 Created On: 4/30/2015

Design Report for Gleason LC35-715 - Actual Surveys

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
250.00	0.50	17.36	250.00	1.04	0.33	-1.01	0.20
First Gyro Survey							
500.00	0.99	17.36	499.97	4.14	1.30	-4.03	0.20
Last Gyro Survey							
727.00	1.44	17.36	726.92	8.74	2.73	-8.49	0.20
First MWD Survey							
822.00	1.32	17.77	821.90	10.92	3.42	-10.61	0.13
916.00	0.68	78.80	915.88	12.06	4.30	-11.68	1.23
1,105.00	1.39	277.02	1,104.87	12.56	3.12	-12.27	1.08
1,198.00	4.04	242.52	1,197.76	11.18	-0.90	-11.22	3.23
1,290.00	6.28	231.07	1,289.38	6.52	-7.69	-7.11	2.67
1,382.00	7.52	208.83	1,380.73	-1.91	-14.51	0.76	3.17
1,475.00	8.48	194.82	1,472.84	-13.87	-19.20	12.32	2.33
1,567.00	9.09	174.00	1,563.78	-27.66	-20.18	25.98	3.50
1,752.00	9.30	157.04	1,746.44	-55.97	-12.82	54.78	1.46
1,937.00	8.18	140.52	1,929.31	-79.89	1.39	79.75	1.48
2,119.00	8.40	145.60	2,109.41	-100.86	17.13	101.89	0.42
2,302.00	10.11	151.16	2,290.03	-125.96	32.43	128.12	1.05
2,579.00	9.69	144.96	2,562.91	-166.34	57.54	170.37	0.41
2,763.00	9.67	145.22	2,744.29	-191.71	75.25	197.06	0.03
2,858.00	9.59	146.96	2,837.95	-204.90	84.11	210.90	0.32
2,952.00	9.50	145.57	2,930.65	-217.86	92.77	224.51	0.26
3,046.00	8.98	146.70	3,023.43	-230.39	101.18	237.66	0.59
3,141.00	8.09	145.59	3,117.38	-242.10	109.03	249.96	0.95
3,235.00	7.49	141.61	3,210.51	-252.36	116.57	260.78	0.86
3,330.00	8.92	145.38	3,304.54	-263.28	124.60	272.29	1.61
3,425.00	8.96	143.41	3,398.38	-275.28	133.20	284.94	0.32
3,519.00	8.86	142.68	3,491.25	-286.91	141.95	297.22	0.16
3,614.00	8.79	141.85	3,585.12	-298.44	150.87	309.42	0.15
3,708.00	8.89	141.37	3,678.01	-309.76	159.84	321.41	0.13
3,802.00	9.52	148.29	3,770.80	-322.05	168.46	334.34	1.35
3,896.00	9.62	148.37	3,863.49	-335.35	176.67	348.25	0.11
4,085.00	8.26	143.39	4,050.19	-359.70	193.04	373.81	0.83
4,179.00	7.78	140.78	4,143.27	-370.05	201.09	384.77	0.64
4,273.00	8.73	152.30	4,236.31	-381.29	208.43	396.56	2.02
4,367.00	8.82	152.01	4,329.21	-393.97	215.13	409.72	0.11
4,462.00	8.24	150.31	4,423.15	-406.32	221.92	422.57	0.67
4,556.00	8.01	149.06	4,516.21	-417.79	228.63	434.53	0.31
4,651.00	7.26	145.42	4,610.37	-428.41	235.44	445.65	0.94
4,746.00	6.23	143.45	4,704.71	-437.49	241.91	455.22	1.11
4,840.00	5.53	138.00	4,798.22	-444.95	247.98	463.14	0.95
4,935.00	4.81	134.52	4,892.83	-451.15	253.88	469.78	0.83
5,030.00	4.47	134.21	4,987.52	-456.52	259.38	475.57	0.36
5,124.00	3.24	156.51	5,081.31	-461.51	263.06	480.84	2.04
5,219.00	2.62	151.84	5,176.18	-465.89	265.16	485.37	0.70
5,313.00	2.59	152.27	5,270.09	-469.66	267.16	489.29	0.04
5,408.00	2.38	150.63	5,365.00	-473.28	269.13	493.05	0.23
5,597.00	13.97	186.55	5,551.82	-499.46	268.44	519.10	6.41
5,691.00	22.19	180.41	5,641.11	-528.54	267.02	547.97	8.96

Design Report for Gleason LC35-715 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,786.00	29.20	178.34	5,726.66	-569.69	267.56	589.04	7.44
5,881.00	36.78	178.41	5,806.29	-621.36	269.03	640.66	7.98
5,975.00	47.11	183.19	5,876.13	-684.06	267.89	703.07	11.50
6,069.00	54.90	182.40	5,935.23	-756.97	264.36	775.48	8.31
6,164.00	61.71	179.05	5,985.12	-837.73	263.42	855.92	7.77
6,258.00	69.27	178.27	6,024.09	-923.18	265.44	941.25	8.08
6,352.00	78.64	180.22	6,050.05	-1,013.40	266.59	1,031.29	10.16
6,424.00	84.19	181.54	6,060.79	-1,084.56	265.49	1,102.13	7.92
6,518.00	87.63	181.44	6,067.49	-1,178.27	263.05	1,195.36	3.66
6,612.00	88.95	179.99	6,070.30	-1,272.22	261.88	1,288.92	2.09
6,707.00	90.74	179.39	6,070.56	-1,367.21	262.40	1,383.66	1.99
6,801.00	91.05	178.76	6,069.09	-1,461.19	263.91	1,477.46	0.75
6,896.00	90.31	178.02	6,067.96	-1,556.14	266.58	1,572.33	1.10
6,990.00	91.54	176.64	6,066.44	-1,650.02	270.96	1,666.27	1.97
7,085.00	91.82	177.83	6,063.66	-1,744.87	275.54	1,761.18	1.29
7,179.00	92.07	178.74	6,060.47	-1,838.77	278.35	1,855.01	1.00
7,273.00	90.59	177.68	6,058.29	-1,932.70	281.29	1,948.87	1.94
7,368.00	89.75	177.14	6,058.00	-2,027.60	285.58	2,043.82	1.05
7,463.00	89.81	177.03	6,058.37	-2,122.48	290.41	2,138.78	0.13
7,557.00	90.09	178.40	6,058.45	-2,216.40	294.16	2,232.70	1.49
7,652.00	89.69	178.56	6,058.63	-2,311.37	296.68	2,327.57	0.45
7,746.00	90.83	178.52	6,058.21	-2,405.33	299.07	2,421.44	1.21
7,840.00	91.30	177.95	6,056.46	-2,499.27	301.97	2,515.31	0.79
7,934.00	90.89	178.44	6,054.66	-2,593.21	304.93	2,609.19	0.68
8,028.00	91.63	178.90	6,052.60	-2,687.16	307.11	2,703.02	0.93
8,123.00	91.70	178.85	6,049.84	-2,782.10	308.98	2,797.81	0.09
8,217.00	92.10	178.58	6,046.72	-2,876.02	311.08	2,891.61	0.51
8,311.00	92.06	178.54	6,043.31	-2,969.93	313.44	2,985.41	0.06
8,405.00	91.17	178.67	6,040.66	-3,063.87	315.73	3,079.23	0.96
8,500.00	90.25	178.80	6,039.48	-3,158.84	317.83	3,174.07	0.98
8,594.00	90.46	178.60	6,038.90	-3,252.81	319.96	3,267.92	0.31
8,689.00	89.29	177.37	6,039.11	-3,347.75	323.30	3,362.82	1.79
8,784.00	90.77	177.89	6,039.06	-3,442.66	327.23	3,457.75	1.65
8,878.00	90.34	178.52	6,038.15	-3,536.61	330.17	3,551.64	0.81
8,973.00	90.46	178.84	6,037.48	-3,631.58	332.36	3,646.49	0.36
9,068.00	89.94	178.06	6,037.15	-3,726.55	334.93	3,741.36	0.99
9,162.00	89.94	177.76	6,037.25	-3,820.48	338.36	3,835.27	0.32
9,257.00	89.82	177.43	6,037.45	-3,915.40	342.35	3,930.21	0.37
9,351.00	90.90	177.35	6,036.86	-4,009.30	346.63	4,024.15	1.15
9,446.00	91.76	177.52	6,034.65	-4,104.18	350.88	4,119.07	0.92
9,540.00	90.49	177.48	6,032.81	-4,198.07	354.98	4,212.99	1.35
9,635.00	90.92	177.24	6,031.64	-4,292.96	359.35	4,307.93	0.52
9,729.00	90.49	177.27	6,030.48	-4,386.84	363.85	4,401.88	0.46
9,824.00	89.66	176.13	6,030.36	-4,481.68	369.32	4,496.85	1.48
9,919.00	90.80	175.84	6,029.98	-4,576.45	375.97	4,591.85	1.24
10,013.00	88.92	175.61	6,030.20	-4,670.18	382.98	4,685.84	2.01
10,107.00	89.07	175.51	6,031.85	-4,763.89	390.25	4,779.83	0.19
10,202.00	89.20	175.24	6,033.29	-4,858.57	397.91	4,874.82	0.32
10,275.00	89.32	174.60	6,034.23	-4,931.27	404.38	4,947.81	0.89
Last MWD Survey at 10275' MD							
10,343.00	89.32	174.60	6,035.04	-4,998.97	410.78	5,015.79	0.00

Design Report for Gleason LC35-715 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
Straight Projection to TD at 10343' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.00	250.00	1.04	0.33	First Gyro Survey
500.00	499.97	4.14	1.30	Last Gyro Survey
727.00	726.92	8.74	2.73	First MWD Survey
10,275.00	6,034.23	-4,931.27	404.38	Last MWD Survey at 10275' MD
10,343.00	6,035.04	-4,998.97	410.78	Straight Projection to TD at 10343' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Gleason LC35-715_Rev A0_BH	175.47	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
250.00	500.00	Gyro Surveys	Flexi-Shot
500.00	6,352.00	Intermediate Surveys	MWD
6,352.00	10,343.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
665.00	664.94	9 5/8"	9-5/8	13-3/4
6,399.00	6,057.84	7"	7	8-3/4

Wellbore Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Gleason LC35-715_St	0.00	0.00	0.00	0.01	0.00	1,507,403.59	3,433,095.45	40.715740	-103.937600
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Gleason LC35-715_Re	0.00	0.00	6,070.00	-4,999.69	395.92	1,502,403.94	3,433,491.37	40.702000	-103.936490
- actual wellpath misses target center by 37.99usft at 10342.74usft MD (6035.03 TVD, -4998.70 N, 410.75 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.64 °/100usft	Maximum Dogleg over Survey:	11.50 °/100usft at 5,975.00 usft
Net Tortousity applicable to Plans:	0.60 °/100usft	Directional Difficulty Index:	6.172

Design Report for Gleason LC35-715 - Actual Surveys

Audit Info

North Reference Sheet for Sec. 26-T9N-59W (Gleason PAD) - Gleason LC35-715 - 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 @ 4913.00usft (H&P 273). Northing and Easting are relative to Gleason LC35-715

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: 0.99998973

Grid Coordinates of Well: 1,507,403.58 usft N, 3,433,095.45 usft E

Geographical Coordinates of Well: 40° 42' 56.66" N, 103° 56' 15.36" W

Grid Convergence at Surface is: 1.01°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,343.00usft the Bottom Hole Displacement is 5,015.82usft in the Direction of 175.30° (Grid).

Magnetic Convergence at surface is: -7.03° (6 March 2015, , BGGM2014)

