Noble Energy

Weld County, CO (NAD 83)
Sec. 26-T9N-59W (Gleason PAD)
Gleason LC35-725

Plan A

Design: Actual Surveys

05-123-40688

Sperry Drilling Services

Final Survey Report

13 May, 2015

Well Coordinates: 1,507,402.26 N, 3,433,020.61 E (40° 42' 56.66" N, 103° 56' 16.33" W)
Ground Level: 4,886.00 usft

Local Coordinate Origin:	Centered on Well Gleason LC35-725
Viewing Datum:	KB = 24' @ 4910.00usft (H&P 273)
TVDs to System:	N
North Reference:	Grid
Unit System:	Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 5000.1 Build: 73

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 26-T9N-59W (Gleason PAD)
Well: Gleason LC35-725
Wellbore: Plan A
Design: Actual Surveys

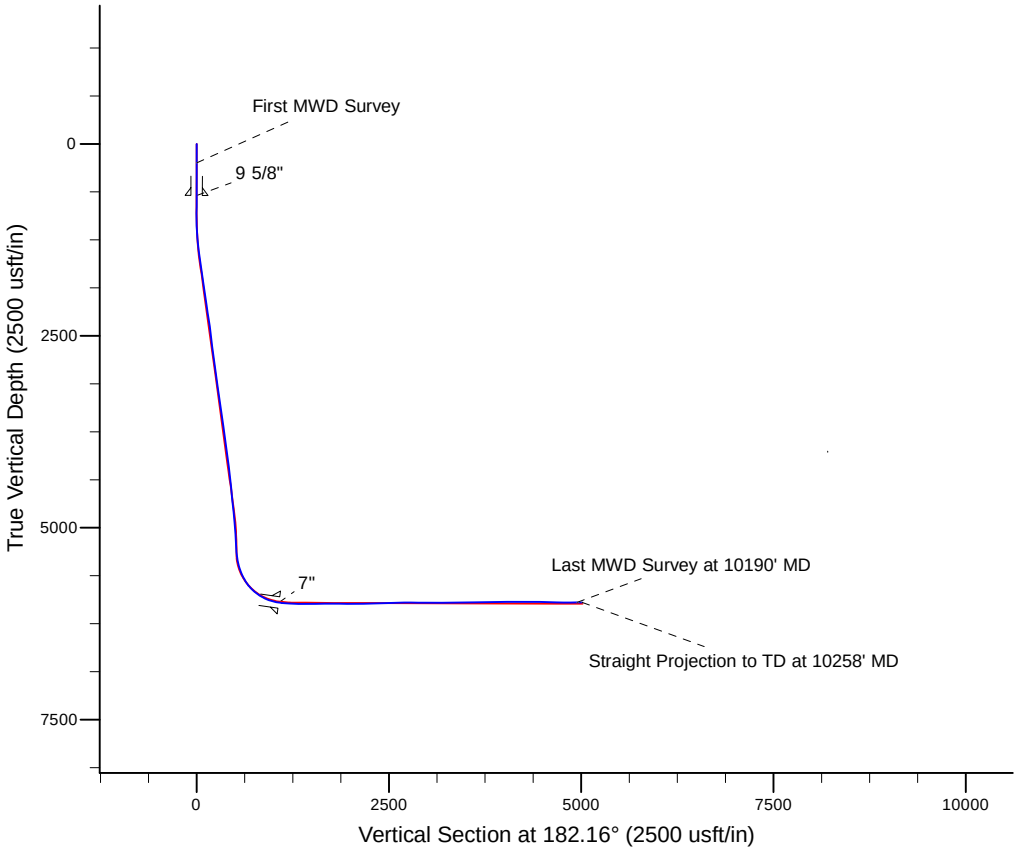
Noble Energy

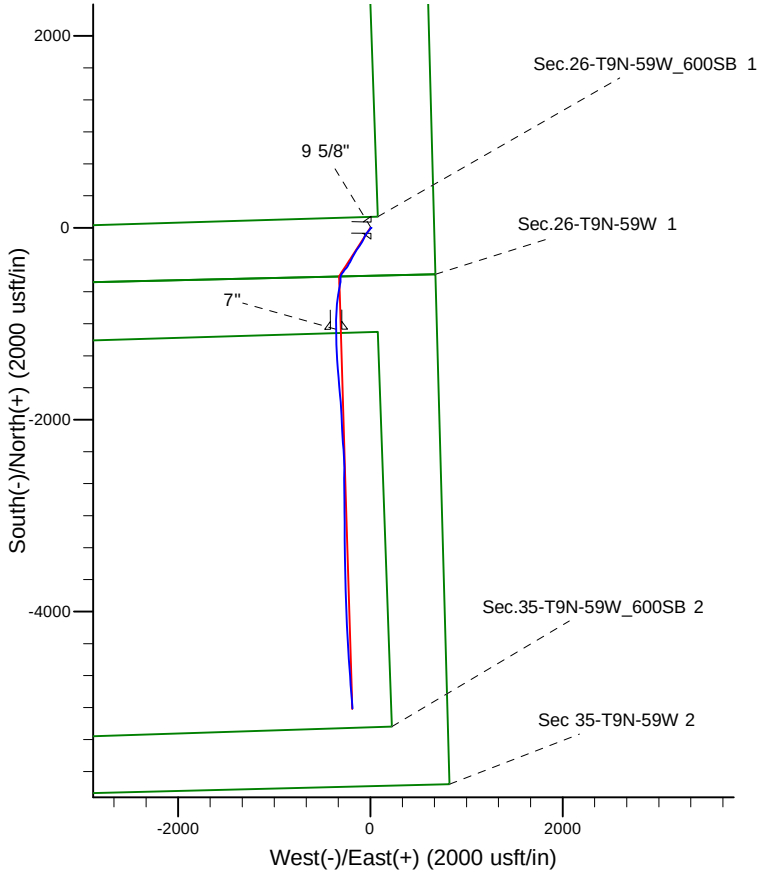
HALLIBURTON
Sperry Drilling

Platted SHL:	500' FSL, 664' FEL
Platted Lat/Long:	40.715740 N, 103.937870 W
Location:	Sec. 26-T9N-R59W
~7" Casing:	577 FNL,990 FEL
Lat/Long:	40.712855 N, 103.939220 W
State Planes - CO Northern:	1506344.91 N, 3432664.86 E
Location:	Sec. 35-T9N-R59W
Platted BHL:	810' FSL, 990' FEL
Lat/Long:	40.701990 N, 103.938870 W
State Planes - CO Northern	1502388.68 N, 3432831.63 E
Location:	Sec. 35-T9N-R59W

LEGEND

Gleason LC35-725, Plan A, Rev A0 PROPOSAL V0
Actual Surveys





WELL DETAILS: Gleason LC35-725

Ground Level: 4886.00
KB = 24' @ 4910.00usft (H&P 273)

Created By: Amanda Marchand
Created On: 5/13/2015

Design Report for Gleason LC35-725 - 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	0.45	90.86	250.00	-0.01	0.98	-0.02	0.18
First MWD Survey							
500.00	0.91	90.86	499.98	-0.06	3.95	-0.09	0.18
728.00	1.32	90.86	727.94	-0.13	8.38	-0.19	0.18
822.00	1.17	86.42	821.91	-0.08	10.42	-0.31	0.19
916.00	1.15	83.89	915.89	0.08	12.32	-0.54	0.06
1,011.00	1.45	241.68	1,010.88	-0.39	12.21	-0.07	2.69
1,105.00	3.18	241.74	1,104.80	-2.19	8.87	1.85	1.84
1,198.00	5.11	222.52	1,197.56	-6.46	3.79	6.32	2.53
1,290.00	6.94	222.33	1,289.05	-13.59	-2.72	13.69	1.99
1,383.00	9.97	217.69	1,381.03	-24.12	-11.43	24.53	3.34
1,475.00	9.78	219.35	1,471.67	-36.46	-21.25	37.24	0.37
1,567.00	9.56	218.74	1,562.36	-48.47	-30.98	49.60	0.26
1,660.00	10.36	211.88	1,653.96	-61.59	-40.23	63.06	1.54
1,844.00	9.56	210.57	1,835.19	-88.80	-56.74	90.87	0.45
2,027.00	9.02	204.56	2,015.79	-114.93	-70.43	117.50	0.61
2,119.00	8.63	201.78	2,106.70	-127.90	-75.99	130.67	0.63
2,210.00	9.24	213.49	2,196.60	-140.33	-82.56	143.34	2.10
2,394.00	9.10	210.18	2,378.25	-165.23	-98.03	168.81	0.30
2,487.00	9.15	208.53	2,470.08	-178.08	-105.25	181.92	0.29
2,579.00	8.79	216.99	2,560.95	-190.13	-112.98	194.25	1.48
2,671.00	8.82	214.31	2,651.87	-201.57	-121.18	205.99	0.45
2,858.00	8.77	214.39	2,836.67	-225.17	-137.32	230.19	0.03
2,952.00	8.83	214.92	2,929.57	-237.00	-145.49	242.31	0.11
3,046.00	8.47	218.05	3,022.50	-248.37	-153.89	253.99	0.63
3,141.00	8.08	217.26	3,116.51	-259.19	-162.24	265.12	0.43
3,236.00	8.96	206.60	3,210.46	-271.12	-169.60	277.32	1.90
3,424.00	8.89	203.66	3,396.19	-297.52	-181.98	304.16	0.25
3,519.00	9.07	203.35	3,490.02	-311.12	-187.90	317.97	0.20
3,613.00	9.31	209.03	3,582.82	-324.57	-194.52	331.66	1.00
3,708.00	9.76	206.70	3,676.51	-338.48	-201.87	345.84	0.62
3,802.00	9.67	205.27	3,769.16	-352.74	-208.82	360.35	0.27
3,897.00	9.12	214.00	3,862.89	-366.20	-216.44	374.09	1.61
3,991.00	8.71	211.90	3,955.75	-378.41	-224.36	386.60	0.56
4,085.00	7.83	208.32	4,048.78	-390.09	-231.16	398.52	1.08
4,180.00	7.70	208.19	4,142.90	-401.40	-237.24	410.05	0.14
4,274.00	8.06	223.25	4,236.03	-411.75	-244.73	420.68	2.22
4,368.00	8.18	220.65	4,329.08	-421.62	-253.60	430.88	0.41
4,652.00	6.62	212.19	4,610.72	-450.81	-275.49	460.87	0.67
4,747.00	6.75	219.39	4,705.07	-459.76	-281.95	470.05	0.89
4,841.00	6.38	214.78	4,798.46	-468.32	-288.43	478.85	0.68
5,124.00	4.73	206.62	5,080.12	-491.67	-302.63	502.72	0.64
5,218.00	3.16	211.43	5,173.90	-497.34	-305.72	508.50	1.71
5,407.00	5.71	191.28	5,362.33	-511.01	-310.28	522.34	1.56
5,501.00	12.57	183.13	5,455.08	-525.83	-311.75	537.20	7.41
5,596.00	19.75	178.34	5,546.27	-552.23	-311.85	563.58	7.68
5,690.00	25.01	189.24	5,633.20	-587.76	-314.58	599.19	7.11
5,786.00	34.47	189.95	5,716.46	-634.65	-322.55	646.35	9.86
5,880.00	43.37	190.65	5,789.52	-692.69	-333.14	704.75	9.48

Design Report for Gleason LC35-725 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,258.00	78.92	179.41	5,969.47	-1,016.94	-356.00	1,029.62	9.74
6,345.00	85.22	180.40	5,981.46	-1,103.06	-355.87	1,115.68	7.33
6,436.00	86.95	178.11	5,987.68	-1,193.83	-354.69	1,206.34	3.15
6,528.00	88.09	176.68	5,991.66	-1,285.65	-350.51	1,297.94	1.99
6,621.00	90.06	176.26	5,993.16	-1,378.45	-344.78	1,390.46	2.17
6,713.00	90.34	175.62	5,992.84	-1,470.22	-338.27	1,481.92	0.76
6,805.00	90.46	175.35	5,992.19	-1,561.93	-331.03	1,573.29	0.32
6,897.00	90.46	174.73	5,991.46	-1,653.58	-323.07	1,664.58	0.67
6,989.00	90.12	174.39	5,990.99	-1,745.17	-314.35	1,755.77	0.52
7,084.00	89.63	176.64	5,991.20	-1,839.87	-306.92	1,850.13	2.42
7,179.00	88.80	176.99	5,992.50	-1,934.71	-301.65	1,944.70	0.95
7,273.00	91.14	177.52	5,992.55	-2,028.60	-297.14	2,038.35	2.55
7,462.00	90.65	175.96	5,989.60	-2,217.26	-286.40	2,226.48	0.87
7,556.00	91.11	175.03	5,988.15	-2,310.96	-279.01	2,319.83	1.10
7,651.00	92.19	178.11	5,985.42	-2,405.74	-273.33	2,414.33	3.43
7,745.00	93.43	180.33	5,980.81	-2,499.61	-272.05	2,508.08	2.70
7,840.00	91.61	179.89	5,976.63	-2,594.51	-272.24	2,602.93	1.97
7,934.00	89.35	179.58	5,975.84	-2,688.50	-271.80	2,696.83	2.43
8,028.00	88.86	179.59	5,977.31	-2,782.49	-271.12	2,790.73	0.52
8,122.00	89.51	179.41	5,978.65	-2,876.48	-270.30	2,884.62	0.72
8,216.00	89.01	179.28	5,979.86	-2,970.46	-269.23	2,978.49	0.55
8,311.00	90.40	179.13	5,980.35	-3,065.45	-267.91	3,073.36	1.47
8,405.00	90.52	179.80	5,979.60	-3,159.44	-267.03	3,167.26	0.72
8,499.00	91.05	179.53	5,978.31	-3,253.43	-266.48	3,261.16	0.63
8,594.00	91.51	179.43	5,976.19	-3,348.40	-265.62	3,356.03	0.50
8,688.00	92.10	179.45	5,973.23	-3,442.35	-264.70	3,449.88	0.63
8,783.00	90.74	179.19	5,970.87	-3,537.31	-263.57	3,544.73	1.46
8,878.00	89.32	178.27	5,970.82	-3,632.29	-261.47	3,639.56	1.78
8,972.00	89.75	178.47	5,971.59	-3,726.24	-258.79	3,733.35	0.50
9,067.00	90.00	177.94	5,971.79	-3,821.20	-255.82	3,828.12	0.62
9,162.00	90.71	177.61	5,971.20	-3,916.12	-252.13	3,922.84	0.82
9,257.00	90.96	177.67	5,969.82	-4,011.03	-248.22	4,017.53	0.27
9,351.00	91.39	177.94	5,967.89	-4,104.94	-244.62	4,111.24	0.54
9,445.00	92.09	177.53	5,965.04	-4,198.82	-240.91	4,204.92	0.86
9,540.00	89.75	177.07	5,963.51	-4,293.70	-236.43	4,299.56	2.51
9,634.00	88.58	176.66	5,964.88	-4,387.55	-231.29	4,393.15	1.32
9,729.00	88.03	176.04	5,967.69	-4,482.31	-225.25	4,487.62	0.87
9,824.00	87.31	175.90	5,971.55	-4,577.00	-218.58	4,581.98	0.77
9,918.00	88.92	175.91	5,974.65	-4,670.71	-211.87	4,675.37	1.71
10,012.00	89.54	175.70	5,975.91	-4,764.44	-204.99	4,768.78	0.70
10,107.00	90.68	175.42	5,975.73	-4,859.16	-197.64	4,863.15	1.24
10,190.00	91.11	175.56	5,974.43	-4,941.89	-191.11	4,945.58	0.54
Last MWD Survey at 10190' MD							
10,258.00	91.11	175.56	5,973.11	-5,009.67	-185.85	5,013.12	0.00
Straight Projection to TD at 10258' MD							

Design Report for Gleason LC35-725 - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
250.00	250.00	-0.01	0.98	First MWD Survey
10,190.00	5,974.43	-4,941.89	-191.11	Last MWD Survey at 10190' MD
10,258.00	5,973.11	-5,009.67	-185.85	Straight Projection to TD at 10258' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Gleason LC35-725_Rev A0_BH	182.16	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
250.00	5,880.00	Intermediate Surveys	MWD
5,974.00	10,258.00	Production Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
675.00	674.95	9 5/8"	9-5/8	13-3/4
6,299.00	5,976.30	7"	7	8-3/4

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
Gleason LC35-725_SI	0.00	0.00	0.00	0.02	0.00	1,507,402.28	3,433,020.61	40.715740	-103.937870
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Gleason LC35-725_Re	0.00	0.00	5,992.00	-5,013.63	-188.98	1,502,388.68	3,432,831.63	40.701990	-103.938870
- actual wellpath misses target center by 19.55usft at 10258.00usft MD (5973.11 TVD, -5009.67 N, -185.85 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.69 °/100usft	Maximum Dogleg over Survey:	9.86 °/100usft at 5,786.00 usft
Net Tortousity applicable to Plans:	0.64 °/100usft	Directional Difficulty Index:	6.183

Audit Info

North Reference Sheet for Sec. 26-T9N-59W (Gleason PAD) - Gleason LC35-725 - Plan A

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' @ 4910.00usft (H&P 273). Northing and Easting are relative to Gleason LC35-725

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: 1,507,402.26 usft N, 3,433,020.61 usft E

Geographical Coordinates of Well: 40° 42' 56.66" N, 103° 56' 16.33" W

Grid Convergence at Surface is: 1.01°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,258.00usft

the Bottom Hole Displacement is 5,013.12usft in the Direction of 182.12° (Grid).

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