

# Noble Energy

Weld County, CO (NAD 83)

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

Kevin LC26-728

05-123-40682

Original Wellbore

Design: Actual Surveys

## Sperry Drilling Services

### Final Survey Report

20 April, 2015

Surface UWI : 05-123-40682

Well Coordinates: 1,507,337.44 N, 3,432,029.18 E (40° 42' 56.20" N, 103° 56' 29.22" W)

Ground Level: 4,851.00 usft

Local Coordinate Origin:

Centered on Well Kevin LC26-728

Viewing Datum:

KB @ 4881.00usft (HP 321)

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: Kevin LC26-728  
 Wellbore: Original Wellbore  
 Design: Actual Surveys

# Noble Energy



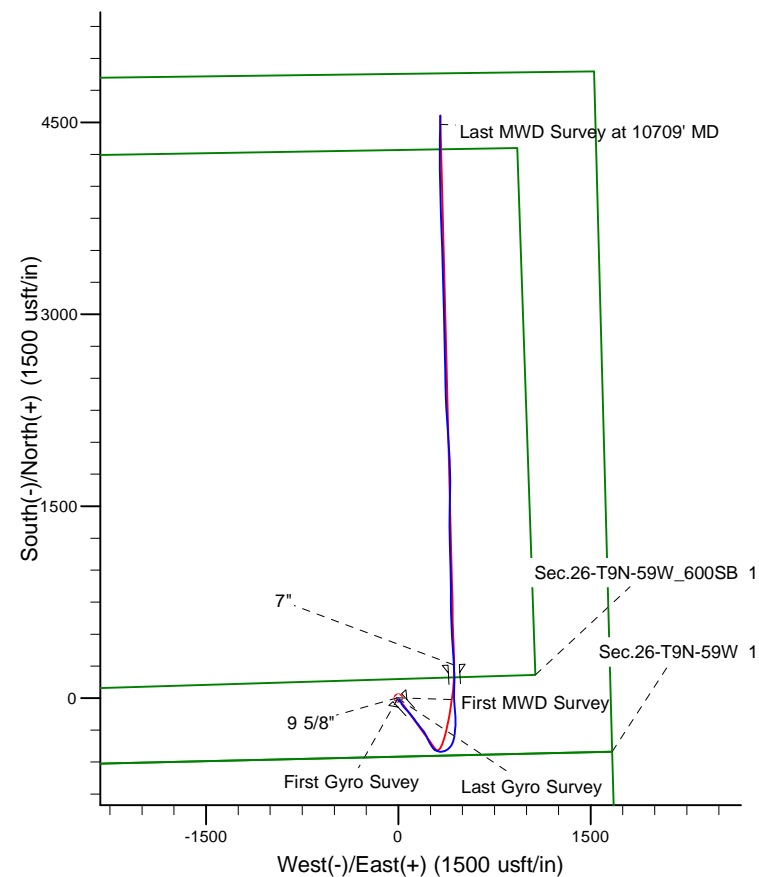
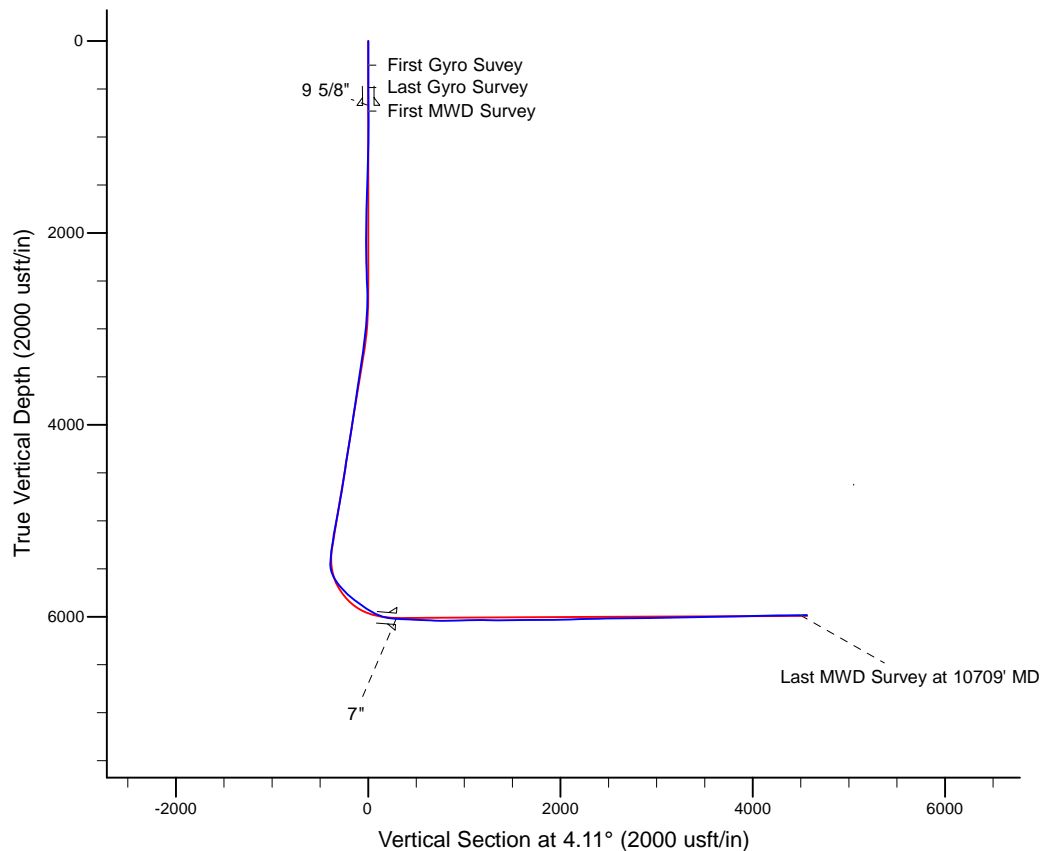
Platted SHL: 460' FSL, 1656' FEL  
 Platted Lat/Long: 40.715610 N, 103.941450 W  
 Location: Sec. 26-T9N-R59W

~7" Casing: 660 FSL, 1212 FEL  
 Lat/Long: 40.716301 N, 103.939874 W  
 State Planes - CO Northern: 1507596.86 N, 3432461.67 E  
 Location: Sec. 26-T9N-R59W

Platted BHL: 330' FNL, 1210' FEL  
 Lat/Long: 40.728090 N, 103.939980 W  
 State Planes - CO Northern: 1511890.74 N, 3432356.63 E  
 Location: Sec. 26-T9N-R59W

## LEGEND

- △ Kevin LC26-728, Original Wellbore, Plan B0 V0
- Actual Surveys



WELL DETAILS: Kevin LC26-728

Ground Level: 4851.00  
 KB @ 4881.00usft (HP 321)

Created By: Amanda Marchand  
 Created On: 4/20/2015

**Design Report for Kevin LC26-728 - 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
252.00	1.40	259.92	251.97	-0.54	-3.03	-0.75	0.56
<b>First Gyro Survey</b>							
485.00	1.00	338.52	484.94	0.86	-6.58	0.38	0.67
<b>Last Gyro Survey</b>							
731.00	0.11	226.39	730.92	2.69	-7.54	2.14	0.43
<b>First MWD Survey</b>							
824.00	0.31	266.73	823.92	2.61	-7.85	2.04	0.25
916.00	0.33	242.84	915.92	2.48	-8.34	1.87	0.15
1,008.00	0.42	236.12	1,007.92	2.17	-8.85	1.53	0.11
1,100.00	0.68	234.95	1,099.92	1.67	-9.58	0.98	0.28
1,191.00	1.56	187.11	1,190.90	0.13	-10.17	-0.60	1.33
1,302.00	1.91	184.44	1,301.85	-3.21	-10.50	-3.96	0.32
1,394.00	2.22	163.13	1,393.79	-6.45	-10.10	-7.16	0.89
1,486.00	2.51	134.25	1,485.71	-9.56	-8.14	-10.12	1.32
1,579.00	2.43	134.82	1,578.63	-12.37	-5.29	-12.72	0.09
1,670.00	2.47	139.65	1,669.55	-15.22	-2.65	-15.37	0.23
1,763.00	2.33	138.18	1,762.46	-18.16	-0.09	-18.12	0.16
1,854.00	2.48	137.68	1,853.38	-20.99	2.47	-20.76	0.17
1,946.00	2.19	108.06	1,945.31	-23.01	5.48	-22.56	1.33
2,038.00	1.40	71.24	2,037.27	-23.19	8.21	-22.55	1.48
2,129.00	1.25	43.30	2,128.24	-22.11	9.95	-21.34	0.72
2,222.00	1.39	42.30	2,221.22	-20.54	11.40	-19.67	0.15
2,314.00	1.46	49.86	2,313.19	-18.96	13.05	-17.98	0.22
2,405.00	1.79	22.29	2,404.16	-16.90	14.47	-15.82	0.92
2,498.00	1.83	21.30	2,497.11	-14.17	15.57	-13.02	0.05
2,590.00	0.90	6.39	2,589.08	-12.08	16.18	-10.89	1.07
2,683.00	0.85	292.44	2,682.07	-11.10	15.62	-9.95	1.13
2,778.00	0.99	189.25	2,777.07	-11.64	14.84	-10.54	1.52
2,872.00	3.40	179.22	2,870.99	-15.23	14.75	-14.13	2.59
2,967.00	5.89	165.83	2,965.67	-22.77	15.98	-21.57	2.84
3,062.00	7.65	157.89	3,060.01	-33.36	19.55	-31.87	2.09
3,157.00	8.85	149.37	3,154.03	-45.50	25.66	-43.55	1.80
3,251.00	9.82	141.12	3,246.79	-57.97	34.37	-55.35	1.76
3,346.00	11.41	138.30	3,340.16	-71.29	45.71	-67.83	1.76
3,441.00	12.89	137.78	3,433.03	-86.15	59.08	-81.69	1.56
3,535.00	12.73	137.64	3,524.69	-101.57	73.11	-96.07	0.17
3,630.00	11.94	136.26	3,617.50	-116.41	86.95	-109.87	0.89
3,724.00	11.51	142.76	3,709.54	-130.90	99.35	-123.43	1.48
3,819.00	11.34	143.92	3,802.66	-145.99	110.59	-137.68	0.30
3,914.00	10.72	143.51	3,895.90	-160.64	121.34	-151.53	0.66
4,008.00	10.54	146.89	3,988.29	-174.87	131.24	-165.01	0.69
4,103.00	11.78	142.39	4,081.49	-189.83	141.90	-179.17	1.59
4,198.00	12.98	142.29	4,174.28	-205.96	154.35	-194.36	1.26
4,292.00	13.03	140.64	4,265.87	-222.50	167.52	-209.91	0.40
4,387.00	11.76	143.85	4,358.65	-238.60	180.03	-225.07	1.52
4,482.00	10.62	140.88	4,451.85	-253.21	191.26	-238.84	1.34
4,577.00	10.91	141.73	4,545.18	-267.06	202.35	-251.86	0.35
4,671.00	10.80	152.91	4,637.50	-281.89	211.88	-265.96	2.24
4,766.00	10.71	156.39	4,730.84	-297.90	219.46	-281.39	0.69

## Design Report for Kevin LC26-728 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,861.00	12.07	158.02	4,823.96	-315.20	226.72	-298.12	1.47
4,956.00	12.25	152.62	4,916.84	-333.36	235.07	-315.64	1.21
5,051.00	12.34	152.56	5,009.66	-351.32	244.38	-332.88	0.10
5,145.00	12.96	143.85	5,101.38	-368.75	255.23	-349.49	2.13
5,240.00	11.25	145.28	5,194.27	-384.97	266.79	-364.84	1.83
5,335.00	11.48	137.19	5,287.41	-399.52	278.50	-378.51	1.69
5,383.00	15.85	118.79	5,334.06	-406.19	287.50	-384.52	12.74
5,430.00	19.84	111.72	5,378.80	-412.23	300.54	-389.61	9.65
5,478.00	22.88	102.86	5,423.51	-417.33	317.21	-393.50	9.22
5,524.00	25.74	86.92	5,465.47	-418.78	335.93	-393.61	15.51
5,572.00	28.70	71.43	5,508.20	-414.54	357.29	-387.85	15.95
5,619.00	31.29	57.99	5,548.95	-404.47	378.37	-376.29	15.29
5,667.00	34.40	44.05	5,589.33	-388.09	398.40	-358.51	16.99
5,713.00	37.14	31.75	5,626.70	-366.91	414.76	-336.21	16.70
5,761.00	39.93	18.89	5,664.30	-339.96	427.40	-308.43	17.64
5,808.00	41.18	10.71	5,700.04	-310.47	435.16	-278.45	11.62
5,856.00	43.66	7.03	5,735.48	-278.48	440.13	-246.20	7.31
5,903.00	46.71	4.63	5,768.60	-245.32	443.50	-212.88	7.43
5,951.00	50.37	2.10	5,800.38	-209.42	445.59	-176.92	8.59
5,998.00	53.66	359.00	5,829.31	-172.39	445.92	-139.96	8.72
6,046.00	55.53	356.46	5,857.12	-133.31	444.36	-101.09	5.81
6,093.00	55.50	355.38	5,883.73	-94.67	441.60	-62.74	1.90
6,141.00	56.29	355.39	5,910.64	-55.05	438.41	-23.46	1.65
6,187.00	57.89	357.07	5,935.63	-16.52	435.87	14.79	4.64
6,235.00	61.13	0.17	5,959.99	24.82	434.89	55.95	8.75
6,282.00	67.39	1.42	5,980.39	67.13	435.49	98.19	13.53
6,330.00	71.27	1.12	5,997.33	112.02	436.49	143.04	8.10
6,377.00	78.28	359.19	6,009.67	157.34	436.60	188.25	15.43
6,433.00	84.42	357.22	6,018.09	212.65	434.86	243.29	11.50
6,521.00	87.10	356.83	6,024.59	300.28	430.30	330.37	3.08
6,613.00	87.32	355.95	6,029.07	391.99	424.52	421.43	0.98
6,704.00	87.72	356.76	6,033.01	482.72	418.74	511.51	0.99
6,797.00	87.26	358.10	6,037.08	575.53	414.57	603.79	1.52
6,889.00	88.37	358.16	6,040.59	667.41	411.57	695.22	1.21
6,982.00	89.78	358.87	6,042.09	760.37	409.16	787.76	1.70
7,076.00	91.45	0.09	6,041.08	854.35	408.31	881.44	2.20
7,171.00	92.31	359.83	6,037.97	949.30	408.24	976.14	0.95
7,266.00	90.80	358.60	6,035.39	1,044.25	406.94	1,070.75	2.05
7,360.00	89.01	357.89	6,035.54	1,138.20	404.06	1,164.26	2.05
7,455.00	89.51	358.15	6,036.77	1,233.14	400.78	1,258.71	0.59
7,549.00	89.60	359.32	6,037.50	1,327.11	398.70	1,352.29	1.25
7,644.00	90.55	1.01	6,037.38	1,422.11	398.98	1,447.06	2.04
7,739.00	90.92	1.33	6,036.16	1,517.08	400.92	1,541.93	0.51
7,834.00	91.23	1.31	6,034.38	1,612.04	403.11	1,636.80	0.33
7,929.00	90.77	359.96	6,032.72	1,707.01	404.16	1,731.61	1.50
8,023.00	89.26	358.31	6,032.69	1,801.00	402.74	1,825.25	2.38
8,118.00	89.88	357.56	6,033.41	1,895.93	399.32	1,919.69	1.02
8,213.00	91.88	355.61	6,031.95	1,990.74	393.66	2,013.85	2.94
8,307.00	92.37	355.11	6,028.46	2,084.37	386.06	2,106.69	0.74
8,402.00	91.48	356.01	6,025.27	2,179.03	378.71	2,200.58	1.33
8,497.00	91.20	357.27	6,023.05	2,273.84	373.14	2,294.75	1.36

## Design Report for Kevin LC26-728 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,591.00	91.63	358.46	6,020.73	2,367.74	369.64	2,388.16	1.35
8,686.00	91.91	358.96	6,017.79	2,462.67	367.51	2,482.69	0.60
8,781.00	91.45	358.98	6,015.01	2,557.62	365.80	2,577.27	0.48
8,876.00	90.06	358.85	6,013.76	2,652.59	364.00	2,671.86	1.47
8,971.00	90.25	358.51	6,013.50	2,747.56	361.81	2,766.44	0.41
9,065.00	90.18	358.76	6,013.15	2,841.53	359.57	2,860.01	0.28
9,160.00	90.15	358.42	6,012.87	2,936.51	357.23	2,954.57	0.36
9,255.00	90.80	358.82	6,012.08	3,031.47	354.95	3,049.13	0.80
9,350.00	90.89	358.75	6,010.68	3,126.44	352.93	3,143.70	0.12
9,445.00	90.83	358.79	6,009.26	3,221.41	350.89	3,238.28	0.08
9,539.00	90.92	358.35	6,007.82	3,315.37	348.55	3,331.83	0.48
9,634.00	91.20	358.32	6,006.06	3,410.31	345.79	3,426.33	0.30
9,729.00	91.33	357.69	6,003.97	3,505.23	342.48	3,520.77	0.68
9,824.00	91.88	357.69	6,001.31	3,600.12	338.65	3,615.13	0.58
9,919.00	91.36	358.00	5,998.62	3,695.01	335.08	3,709.53	0.64
10,014.00	91.05	358.51	5,996.62	3,789.95	332.19	3,804.01	0.63
10,109.00	91.05	358.52	5,994.88	3,884.90	329.73	3,898.54	0.01
10,203.00	92.34	358.05	5,992.10	3,978.81	326.92	3,992.01	1.46
10,298.00	91.48	359.34	5,988.94	4,073.73	324.76	4,086.53	1.63
10,393.00	90.34	0.17	5,987.43	4,168.72	324.35	4,181.24	1.48
10,488.00	90.92	359.78	5,986.38	4,263.71	324.31	4,275.99	0.74
10,582.00	89.69	0.70	5,985.88	4,357.71	324.70	4,369.77	1.63
10,677.00	90.96	0.60	5,985.34	4,452.70	325.78	4,464.59	1.34
10,709.00	91.51	0.44	5,984.65	4,484.69	326.07	4,496.52	1.79
Last MWD Survey at 10709' MD							
10,777.00	91.51	0.44	5,982.86	4,552.66	326.59	4,564.36	0.00
Stright Projection to TD at 10777' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
252.00	251.97	-0.54	-3.03	First Gyro Survey
485.00	484.94	0.86	-6.58	Last Gyro Survey
731.00	730.92	2.69	-7.54	First MWD Survey
10,709.00	5,984.65	4,484.69	326.07	Last MWD Survey at 10709' MD
10,777.00	5,982.86	4,552.66	326.59	Stright Projection to TD at 10777' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	Kevin LC26-728_BHL	4.11	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
252.00	485.00	Gyro Surveys	Flexi-Shot
731.00	6,433.00	Intermediate Surveys	MWD
6,521.00	10,777.00	Production Surveys	MWD

## Design Report for Kevin LC26-728 - Actual Surveys

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
672.00	9 5/8"		9-5/8	13-3/4
6,480.00	6,022.07	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
Kevin LC26-728_LNDf	0.00	0.00	6,009.00	211.00	435.50	1,507,548.44	3,432,464.67	40.716168	-103.939866
- actual wellpath misses target center by 8.90usft at 6429.99usft MD (6017.79 TVD, 209.65 N, 435.00 E)									
- Point									
Kevin LC26-728_BHL	0.00	0.00	6,021.95	4,553.34	327.46	1,511,890.74	3,432,356.63	40.728090	-103.939980
- actual wellpath misses target center by 39.10usft at 10776.66usft MD (5982.87 TVD, 4552.32 N, 326.59 E)									
- Point									

### Directional Difficulty Index

Average Dogleg over Survey:	2.00 °/100usft	Maximum Dogleg over Survey:	17.64 °/100usft at 5,761.00 usft
Net Tortousity applicable to Plans:	0.94 °/100usft	Directional Difficulty Index:	6.336

### Audit Info

North Reference Sheet for Sec. 26-T9N-59W (Gleason PAD) - Kevin LC26-728 - 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 @ 4881.00usft (HP 321). Northing and Easting are relative to Kevin LC26-728

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: 0.99998971

Grid Coordinates of Well: 1,507,337.44 usft N, 3,432,029.18 usft E

Geographical Coordinates of Well: 40° 42' 56.20" N, 103° 56' 29.22" W

Grid Convergence at Surface is: 1.01°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,777.00usft the Bottom Hole Displacement is 4,564.36usft in the Direction of 4.10° (Grid).

Magnetic Convergence at surface is: -7.03° (17 March 2015, , BGGM2014)

