

Noble Energy

Weld County, CO (NAD 83)

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

Kevin LC26-748

Original Wellbore

Design: Actual Surveys

05-123-40684

Sperry Drilling Services

Proposal Survey Report

13 May, 2015

Well Coordinates: 1,507,334.80 N, 3,431,879.50 E (40° 42' 56.20" N, 103° 56' 31.16" W)

Ground Level: 4,845.00 usft

Local Coordinate Origin:

Centered on Well Kevin LC26-748

Viewing Datum:

KB @ 4875.00usft (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 LC26-748
 Wellbore: Original Wellbore
 Design: Actual Surveys

Noble Energy



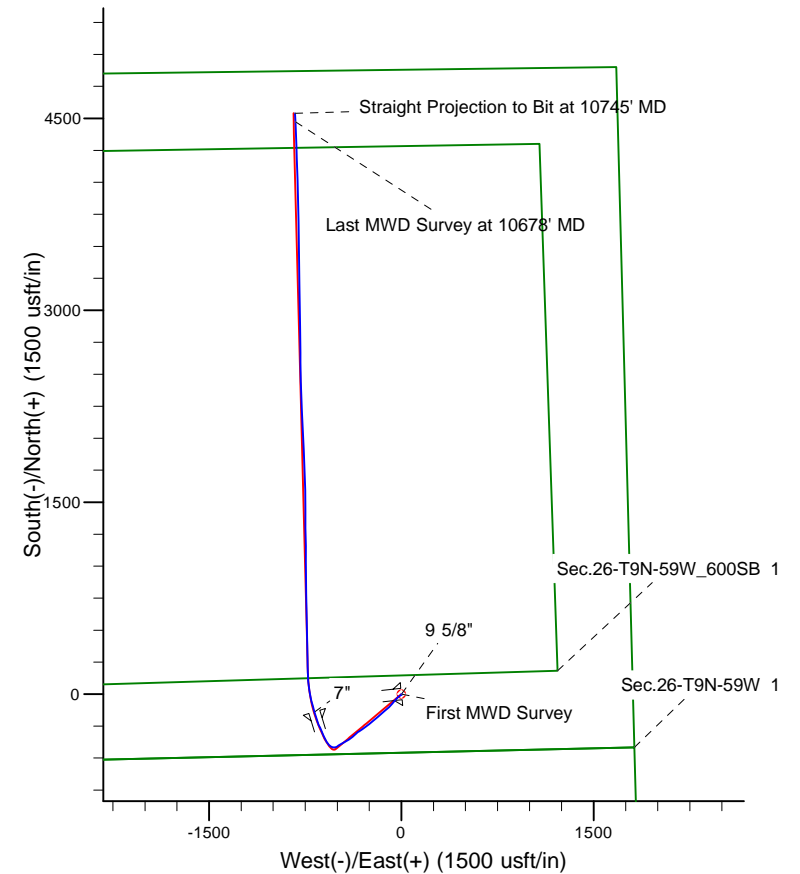
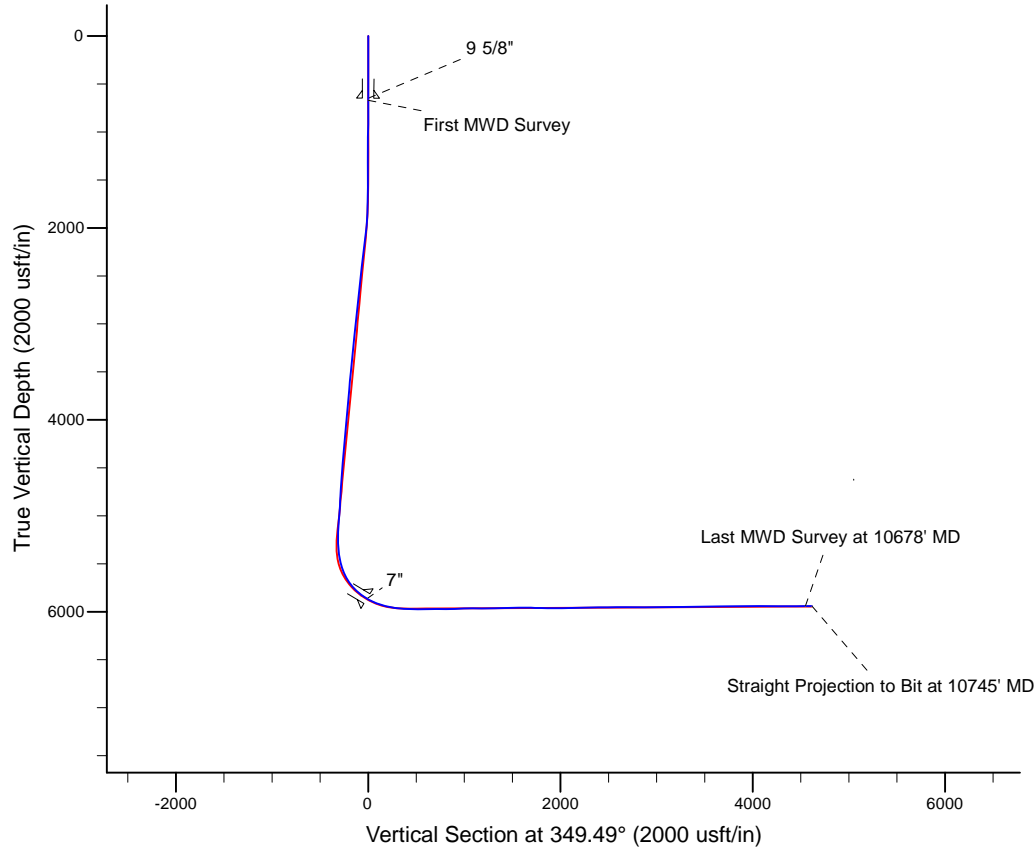
Platted SHL: 460' FSL, 1806' FEL
 Platted Lat/Long: 40.715610 N, 103.944740 W
 Location: Sec. 26-T9N-R59W

-7" Casing: 661 FSL, 2531 FEL
 Lat/Long: 40.715262 N, 103.944443 W
 State Planes - CO Northern: 1507196.15 N, 3431201.79 E
 Location: Sec. 26-T9N-R59W

Platted BHL: 330' FNL, 2530' FEL
 Lat/Long: 40.728110 N, 103.944740 W
 State Planes - CO Northern: 1511874.85 N, 3431037.41 E
 Location: Sec. 26-T9N-R59W

LEGEND

- Kevin LC26-748, Original Wellbore, Rev B0 V0
- Actual Surveys



WELL DETAILS: Kevin LC26-748	
Ground Level:	4845.00
KB @ 4875.00usft (HP 321)	
Created By:	Amanda Marchand
Created On:	5/13/2015



Design Report for Kevin LC26-748 - 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
671.00	0.37	83.70	671.00	0.24	2.15	-0.16	0.06
First MWD Survey							
732.00	0.28	85.60	731.99	0.27	2.50	-0.19	0.15
824.00	0.25	119.21	823.99	0.19	2.90	-0.34	0.17
916.00	0.34	123.39	915.99	-0.06	3.30	-0.66	0.10
1,008.00	0.36	146.98	1,007.99	-0.45	3.69	-1.12	0.16
1,100.00	0.40	160.63	1,099.99	-1.00	3.95	-1.70	0.11
1,303.00	0.51	109.99	1,302.98	-1.97	5.03	-2.86	0.20
1,395.00	0.51	116.13	1,394.98	-2.29	5.79	-3.31	0.06
1,487.00	0.37	131.85	1,486.98	-2.67	6.38	-3.79	0.20
1,579.00	1.66	273.24	1,578.97	-2.79	5.27	-3.71	2.13
1,671.00	3.22	246.97	1,670.88	-3.73	1.56	-3.95	2.04
1,763.00	3.93	237.07	1,762.70	-6.46	-3.47	-5.71	1.02
1,855.00	6.40	236.48	1,854.32	-11.00	-10.39	-8.92	2.69
1,947.00	8.21	227.94	1,945.57	-18.23	-19.54	-14.36	2.29
2,038.00	10.37	223.94	2,035.38	-28.49	-30.05	-22.53	2.48
2,130.00	11.15	223.25	2,125.76	-40.93	-41.89	-32.60	0.86
2,222.00	11.38	220.64	2,215.99	-54.29	-53.90	-43.55	0.61
2,314.00	10.69	217.63	2,306.29	-67.94	-65.02	-54.94	0.98
2,406.00	11.67	226.34	2,396.54	-81.12	-76.96	-65.73	2.12
2,498.00	11.73	224.94	2,486.63	-94.17	-90.30	-76.12	0.32
2,591.00	11.66	222.89	2,577.70	-107.74	-103.37	-87.08	0.45
2,683.00	11.65	231.85	2,667.81	-120.29	-117.01	-96.94	1.97
2,778.00	11.75	231.39	2,760.84	-132.25	-132.11	-105.94	0.14
2,873.00	11.67	229.50	2,853.86	-144.53	-146.97	-115.30	0.41
2,967.00	11.63	228.88	2,945.93	-156.94	-161.34	-124.88	0.14
3,062.00	11.14	227.69	3,039.06	-169.41	-175.34	-134.59	0.57
3,157.00	10.36	224.86	3,132.39	-181.64	-188.15	-144.28	0.99
3,251.00	10.16	224.55	3,224.89	-193.54	-199.93	-153.84	0.22
3,346.00	11.20	232.91	3,318.25	-205.08	-213.17	-162.76	1.96
3,441.00	11.60	233.33	3,411.37	-216.35	-228.19	-171.10	0.43
3,536.00	12.34	232.17	3,504.31	-228.28	-243.87	-179.97	0.82
3,630.00	13.13	231.60	3,595.99	-241.07	-260.17	-189.58	0.85
3,725.00	11.62	233.91	3,688.78	-253.41	-276.36	-198.76	1.67
3,819.00	11.60	233.86	3,780.86	-264.56	-291.64	-206.94	0.02
4,008.00	12.10	237.31	3,965.83	-286.46	-323.66	-222.63	0.46
4,103.00	10.79	230.98	4,058.95	-297.44	-338.95	-230.64	1.91
4,198.00	10.08	229.55	4,152.37	-308.43	-352.18	-239.03	0.80
4,293.00	9.03	226.99	4,246.06	-318.91	-363.96	-247.19	1.19
4,388.00	9.97	229.93	4,339.75	-329.29	-375.71	-255.25	1.11
4,482.00	10.28	231.57	4,432.29	-339.74	-388.50	-263.20	0.45
4,577.00	11.07	234.00	4,525.64	-350.37	-402.52	-271.09	0.96
4,672.00	9.35	238.03	4,619.14	-359.82	-416.45	-277.84	1.96
4,767.00	11.29	243.93	4,712.60	-368.00	-431.35	-283.16	2.32
4,862.00	10.84	240.27	4,805.83	-376.51	-447.46	-288.60	0.88
4,956.00	9.51	238.35	4,898.35	-384.97	-461.75	-294.31	1.46
5,051.00	9.83	241.16	4,992.00	-393.00	-475.53	-299.69	0.60
5,146.00	10.45	235.20	5,085.52	-401.83	-489.71	-305.78	1.28
5,241.00	8.98	236.38	5,179.16	-410.85	-502.96	-312.24	1.56

Design Report for Kevin LC26-748 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,335.00	9.71	260.77	5,271.95	-416.19	-516.90	-314.94	4.25
5,383.00	14.07	275.27	5,318.91	-416.30	-526.71	-313.26	10.94
5,430.00	15.35	283.74	5,364.38	-414.30	-538.45	-309.15	5.32
5,524.00	14.42	311.18	5,455.34	-403.62	-559.37	-294.84	7.49
5,572.00	17.46	319.70	5,501.49	-394.19	-568.53	-283.90	7.98
5,619.00	20.39	328.41	5,545.95	-381.84	-577.38	-270.14	8.64
5,667.00	23.81	332.68	5,590.42	-366.10	-586.21	-253.05	7.87
5,714.00	27.69	334.40	5,632.75	-347.82	-595.29	-233.42	8.41
5,762.00	33.01	333.64	5,674.16	-326.03	-605.92	-210.06	11.11
5,809.00	38.22	333.66	5,712.35	-301.51	-618.06	-183.74	11.09
5,857.00	43.39	335.61	5,748.67	-273.17	-631.47	-153.42	11.09
5,903.00	47.34	339.12	5,780.99	-242.96	-644.03	-121.43	10.16
5,951.00	50.85	341.30	5,812.42	-208.82	-656.29	-85.63	8.08
5,998.00	54.62	343.74	5,840.88	-173.15	-667.50	-48.52	9.02
6,046.00	59.55	343.24	5,866.95	-134.53	-678.96	-8.45	10.31
6,093.00	64.13	344.46	5,889.13	-94.74	-690.47	32.77	10.01
6,141.00	68.09	347.33	5,908.57	-52.18	-701.14	76.56	9.90
6,188.00	72.35	348.48	5,924.47	-8.95	-710.40	120.76	9.35
6,282.00	77.71	353.80	5,948.76	80.72	-724.33	211.46	7.90
6,330.00	80.65	356.99	5,957.77	127.70	-728.10	258.34	8.95
6,354.00	82.34	358.16	5,961.32	151.41	-729.11	281.84	8.53
6,427.00	86.76	359.25	5,968.25	224.05	-730.75	353.55	6.23
6,518.00	88.37	358.81	5,972.12	314.95	-732.29	443.21	1.83
6,610.00	89.60	358.87	5,973.75	406.91	-734.15	533.97	1.34
6,703.00	90.65	358.83	5,973.54	499.89	-736.02	625.74	1.13
6,795.00	89.91	358.01	5,973.09	591.85	-738.55	716.62	1.20
6,887.00	91.26	359.29	5,972.15	683.82	-740.72	807.44	2.02
6,982.00	91.82	359.32	5,969.60	778.78	-741.87	901.01	0.59
7,077.00	91.63	359.12	5,966.74	873.73	-743.16	994.60	0.29
7,172.00	89.91	359.86	5,965.46	968.71	-744.01	1,088.15	1.97
7,266.00	89.69	359.31	5,965.79	1,062.71	-744.69	1,180.69	0.63
7,361.00	91.23	359.23	5,965.03	1,157.69	-745.90	1,274.31	1.62
7,456.00	91.63	358.96	5,962.66	1,252.65	-747.40	1,367.95	0.51
7,550.00	90.95	0.21	5,960.54	1,346.62	-748.08	1,460.47	1.51
7,645.00	90.77	359.72	5,959.12	1,441.61	-748.14	1,553.87	0.55
7,740.00	89.57	358.99	5,958.84	1,536.60	-749.21	1,647.47	1.48
7,834.00	88.55	358.36	5,960.38	1,630.56	-751.38	1,740.25	1.28
7,929.00	89.60	358.10	5,961.91	1,725.50	-754.32	1,834.13	1.14
8,024.00	90.22	358.20	5,962.06	1,820.45	-757.38	1,928.05	0.66
8,119.00	89.29	357.11	5,962.47	1,915.37	-761.27	2,022.08	1.51
8,213.00	91.60	357.16	5,961.74	2,009.24	-765.97	2,115.24	2.46
8,308.00	91.36	357.26	5,959.28	2,104.10	-770.59	2,209.35	0.27
8,403.00	91.39	357.10	5,957.00	2,198.96	-775.26	2,303.46	0.17
8,497.00	90.49	357.58	5,955.46	2,292.84	-779.62	2,396.57	1.09
8,592.00	90.95	358.07	5,954.27	2,387.77	-783.23	2,490.56	0.71
8,687.00	90.28	359.56	5,953.25	2,482.74	-785.19	2,584.30	1.72
8,782.00	90.12	359.12	5,952.92	2,577.73	-786.29	2,677.90	0.49
8,876.00	89.78	359.19	5,953.00	2,671.72	-787.67	2,770.56	0.37
8,971.00	90.65	359.54	5,952.64	2,766.71	-788.73	2,864.15	0.99
9,066.00	89.66	358.59	5,952.38	2,861.70	-790.28	2,957.83	1.44
9,161.00	89.94	359.26	5,952.72	2,956.68	-792.06	3,051.54	0.76

Design Report for Kevin LC26-748 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,256.00	90.62	359.09	5,952.25	3,051.67	-793.43	3,145.19	0.74
9,351.00	90.77	359.12	5,951.10	3,146.65	-794.91	3,238.85	0.16
9,445.00	90.71	359.25	5,949.89	3,240.63	-796.25	3,331.50	0.15
9,540.00	90.83	359.70	5,948.61	3,335.62	-797.12	3,425.05	0.49
9,635.00	91.51	359.50	5,946.67	3,430.59	-797.78	3,518.56	0.75
9,730.00	91.82	358.48	5,943.91	3,525.54	-799.46	3,612.21	1.12
9,824.00	90.40	359.28	5,942.09	3,619.50	-801.29	3,704.93	1.73
9,919.00	90.31	358.93	5,941.50	3,714.49	-802.78	3,798.60	0.38
10,014.00	89.57	358.70	5,941.60	3,809.47	-804.74	3,892.34	0.82
10,109.00	89.38	358.82	5,942.47	3,904.44	-806.80	3,986.10	0.24
10,204.00	90.12	357.85	5,942.88	3,999.40	-809.56	4,079.96	1.28
10,299.00	89.60	357.99	5,943.12	4,094.33	-813.00	4,173.94	0.57
10,393.00	90.37	358.51	5,943.14	4,188.29	-815.88	4,266.84	0.99
10,488.00	89.57	357.97	5,943.19	4,283.24	-818.79	4,360.74	1.02
10,583.00	90.80	357.69	5,942.88	4,378.17	-822.39	4,454.73	1.33
10,678.00	90.99	357.41	5,941.40	4,473.07	-826.45	4,548.78	0.36
Last MWD Survey at 10678' MD							
10,745.00	90.99	357.41	5,940.24	4,539.99	-829.48	4,615.13	0.00
Straight Projection to Bit at 10745' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
671.00	671.00	0.24	2.15	First MWD Survey
10,678.00	5,941.40	4,473.07	-826.45	Last MWD Survey at 10678' MD
10,745.00	5,940.24	4,539.99	-829.48	Straight Projection to Bit at 10745' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Kevin LC26-748_BHL	349.49	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
671.00	6,354.00	Intermediate Surveys	MWD+IFR1+MS_WY
6,427.00	10,745.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
649.00	649.00	9 5/8"	9-5/8	13-3/4
6,041.00	5,864.40	7"	7	8-3/4

Design Report for Kevin LC26-748 - Actual Surveys

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 LC26-748_BHL - actual wellpath misses target center by 16.82usft at 10745.00usft MD (5940.24 TVD, 4539.99 N, -829.48 E) - Point	0.00	0.00	5,929.12	4,540.10	-842.10	1,511,874.85	3,431,037.41	40.728110	-103.944740
Kevin LC26-748_LNGI - actual wellpath misses target center by 0.72usft at 6387.76usft MD (5965.22 TVD, 184.93 N, -730.04 E) - Point	0.00	0.00	5,964.50	185.00	-730.00	1,507,519.79	3,431,149.51	40.716153	-103.944611

Directional Difficulty Index

Average Dogleg over Survey:	1.73 °/100usft	Maximum Dogleg over Survey:	11.11 °/100usft at 5,762.00 usft
Net Tortosity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.280

Audit Info

North Reference Sheet for Sec. 26-T9N-59W (Gleason PAD) - Kevin LC26-748 - 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 @ 4875.00usft (HP 321). Northing and Easting are relative to Kevin LC26-748

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: 1,507,334.80 usft N, 3,431,879.50 usft E

Geographical Coordinates of Well: 40° 42' 56.20" N, 103° 56' 31.16" W

Grid Convergence at Surface is: 1.01°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,745.00usft the Bottom Hole Displacement is 4,615.15usft in the Direction of 349.65° (Grid).

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

