

# Noble Energy

Weld County, CO (NAD 83)

Sec. 35-T9N-R59W (Kerri & Lynn PAD)

Lynn LC35-760

05-123-40664

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Final Survey Report

18 February, 2016

Surface UWI : 05-123-40664

Well Coordinates: 1,506,369.67 N, 3,430,243.95 E (40° 42' 46.94" N, 103° 56' 52.62" W)

Ground Level: 4,814.00 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 Lynn LC35-760

KB 24' @ 4838.00usft (H&P 343)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 35-T9N-R59W (Kerri & Lynn PAD)  
 Well: Lynn LC35-760  
 Wellbore: Plan A  
 Design: Actual Surveys



Platted SHL: 470' FNL, 1744' FWL  
 Platted Lat/Long: 40.71304 N, -103.94795 W  
 Location: Sec. 35-T9N-R59W

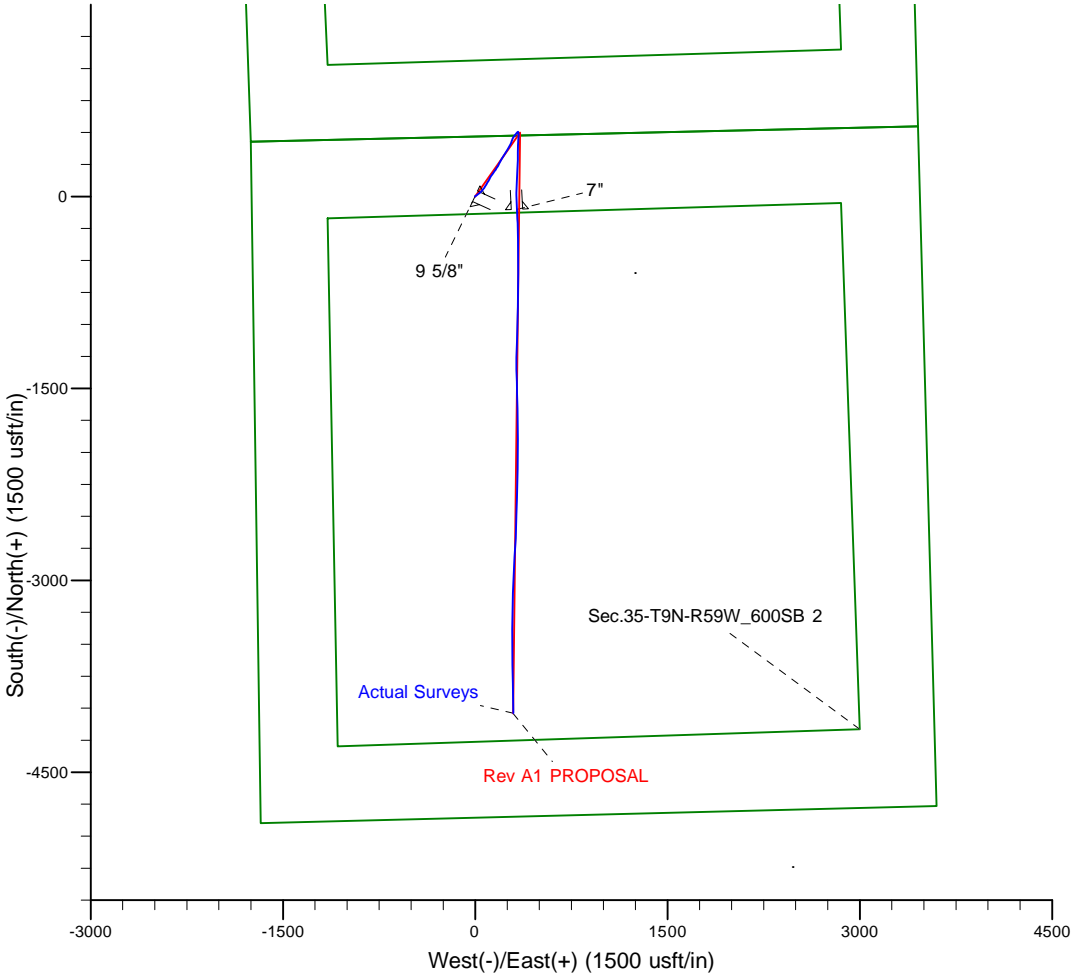
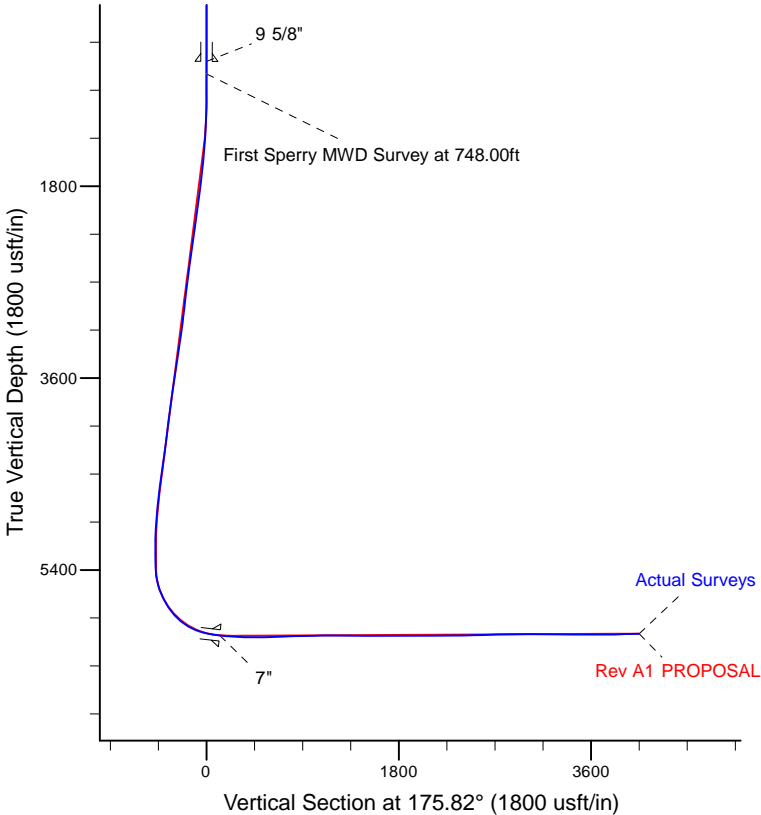
~7" Casing: 571' FNL, 2074' FWL  
 Lat/Long: 40.712747 N, -103.946782 W  
 State Planes - CO Northern: 1,506,268.48 N, 3,430,569.62 E  
 Location: Sec. 35-T9N-R59W

Platted BHL: 810' FNL, 1980' FWL  
 Platted Lat/Long: 40.702129 N, -103.947133 W  
 State Planes - CO Northern: 1,502,399.22 N, 3,430,540.12 E  
 Location: Sec. 35-T9N-R59W

LEGEND

Lynn LC35-760, Plan A, Rev A1 PROPOSAL V0

Actual Surveys



WELL DETAILS: Lynn LC35-760	
Ground Level:	4814.00
KB 24' @ 4838.00usft (H&P 343)	
Created By:	Tatiana Gomez
Created On:	2-18-2016

## Design Report for Lynn LC35-760 - 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
630.00	0.24	294.74	630.00	0.54	-1.18	-0.63	0.04
<b>9 5/8"</b>							
748.00	0.28	294.74	748.00	0.76	-1.66	-0.88	0.04
<b>First Sperry MWD Survey at 748.00ft</b>							
842.00	0.26	28.96	842.00	1.05	-1.77	-1.17	0.42
936.00	0.07	315.90	936.00	1.28	-1.70	-1.40	0.26
1,122.00	1.71	60.99	1,121.97	2.70	0.65	-2.65	0.93
1,213.00	5.89	53.52	1,212.75	6.14	5.59	-5.72	4.62
1,305.00	7.06	54.45	1,304.16	12.23	13.99	-11.18	1.28
1,397.00	7.85	53.90	1,395.38	19.22	23.66	-17.45	0.86
1,488.00	7.87	50.62	1,485.53	26.84	33.50	-24.32	0.49
1,669.00	8.49	43.11	1,664.69	44.45	52.21	-40.53	0.68
1,761.00	9.43	34.86	1,755.57	55.60	61.16	-50.99	1.73
1,852.00	9.56	34.14	1,845.32	67.97	69.66	-62.71	0.19
1,943.00	8.84	32.48	1,935.15	80.12	77.66	-74.25	0.84
2,035.00	10.43	32.31	2,025.85	93.12	85.90	-86.61	1.73
2,126.00	10.59	29.35	2,115.33	107.37	94.41	-100.20	0.62
2,217.00	9.92	29.74	2,204.87	121.47	102.39	-113.68	0.74
2,400.00	8.85	27.75	2,385.42	147.61	116.77	-138.71	0.61
2,491.00	9.47	35.96	2,475.26	159.87	124.42	-150.37	1.59
2,582.00	9.81	36.09	2,564.98	172.19	133.39	-162.01	0.37
2,673.00	9.43	34.80	2,654.70	184.58	142.21	-173.72	0.48
2,767.00	9.06	34.29	2,747.48	197.02	150.77	-185.50	0.40
2,862.00	8.89	33.71	2,841.31	209.30	159.06	-197.15	0.20
2,956.00	7.53	32.27	2,934.35	220.55	166.38	-207.84	1.46
3,050.00	7.11	32.05	3,027.58	230.69	172.75	-217.48	0.45
3,144.00	8.28	24.79	3,120.74	241.77	178.68	-228.10	1.62
3,239.00	10.07	29.13	3,214.52	255.24	185.59	-241.02	2.02
3,427.00	10.72	30.28	3,399.43	284.69	202.41	-269.18	0.36
3,522.00	10.93	29.88	3,492.74	300.13	211.35	-283.92	0.23
3,616.00	11.35	29.08	3,584.97	315.94	220.29	-299.04	0.48
3,711.00	9.73	34.29	3,678.37	330.75	229.35	-313.14	1.98
3,806.00	9.33	33.89	3,772.05	343.77	238.17	-325.49	0.43
3,900.00	8.78	32.37	3,864.88	356.16	246.26	-337.25	0.64
3,994.00	8.49	28.76	3,957.82	368.30	253.44	-348.84	0.65
4,088.00	9.17	31.53	4,050.70	380.77	260.70	-360.74	0.85
4,182.00	8.63	29.26	4,143.57	393.30	268.06	-372.71	0.69
4,277.00	8.42	23.68	4,237.52	405.89	274.34	-384.81	0.90
4,371.00	7.69	21.86	4,330.60	418.03	279.44	-396.54	0.82
4,465.00	8.94	21.44	4,423.61	430.67	284.45	-408.78	1.33
4,559.00	9.82	22.48	4,516.35	444.87	290.19	-422.53	0.95
4,653.00	9.43	19.94	4,609.03	459.52	295.88	-436.72	0.61
4,748.00	8.55	40.66	4,702.88	472.19	303.14	-448.83	3.51
4,842.00	7.32	41.60	4,795.98	481.97	311.67	-457.96	1.32
4,937.00	5.96	37.86	4,890.34	490.39	318.71	-465.85	1.50
5,031.00	4.79	40.26	4,983.93	497.24	324.24	-472.28	1.27
5,126.00	4.02	43.77	5,078.65	502.67	329.11	-477.34	0.86
5,220.00	1.93	83.04	5,172.52	505.25	332.96	-479.62	2.98
5,314.00	0.62	139.61	5,266.50	505.05	334.86	-479.29	1.78

## Design Report for Lynn LC35-760 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,409.00	1.27	179.61	5,361.49	503.61	335.20	-477.82	0.94
5,504.00	6.54	165.19	5,456.23	497.32	336.59	-471.45	5.60
5,598.00	17.21	179.88	5,548.11	478.18	338.00	-452.26	11.71
5,692.00	23.86	184.20	5,636.09	445.27	336.63	-419.54	7.25
5,787.00	32.21	183.45	5,719.87	400.76	333.70	-375.36	8.80
5,882.00	37.70	178.66	5,797.72	346.39	332.85	-321.20	6.46
5,977.00	46.61	181.64	5,868.08	282.72	332.54	-257.72	9.61
6,071.00	61.15	183.77	5,923.34	207.09	328.84	-182.56	15.57
6,165.00	68.19	182.35	5,963.54	122.30	324.33	-98.32	7.61
6,260.00	76.44	180.78	5,992.37	31.90	321.89	-8.35	8.83
6,349.00	82.80	177.24	6,008.41	-55.57	323.43	79.00	8.15
6,395.00	83.65	177.14	6,013.83	-101.19	325.67	124.67	1.86
7"							
6,441.00	84.50	177.05	6,018.58	-146.89	327.99	170.41	1.86
6,532.00	86.24	178.32	6,025.93	-237.51	331.65	261.06	2.36
6,623.00	88.00	178.96	6,030.50	-328.37	333.81	351.83	2.06
6,715.00	90.52	179.79	6,031.69	-420.34	334.81	443.64	2.88
6,806.00	91.29	180.20	6,030.25	-511.33	334.82	534.38	0.96
6,896.00	91.85	180.37	6,027.78	-601.30	334.37	624.08	0.65
7,082.00	92.00	179.79	6,021.54	-787.19	334.11	809.46	0.32
7,176.00	91.42	181.46	6,018.73	-881.14	333.08	903.08	1.88
7,270.00	90.95	182.27	6,016.79	-975.07	330.03	996.54	1.00
7,365.00	91.97	182.32	6,014.37	-1,069.96	326.22	1,090.90	1.07
7,459.00	89.38	181.41	6,013.26	-1,163.89	323.16	1,184.36	2.92
7,554.00	88.64	180.26	6,014.90	-1,258.87	321.78	1,278.98	1.44
7,648.00	89.35	179.07	6,016.55	-1,352.85	322.33	1,372.75	1.47
7,743.00	89.94	178.51	6,017.14	-1,447.83	324.34	1,467.62	0.86
7,837.00	90.12	178.59	6,017.09	-1,541.80	326.71	1,561.51	0.21
7,930.00	89.35	178.44	6,017.52	-1,634.76	329.12	1,654.41	0.84
8,025.00	90.31	180.09	6,017.80	-1,729.75	330.34	1,749.23	2.01
8,214.00	90.31	179.01	6,016.78	-1,918.74	331.83	1,937.83	0.57
8,308.00	90.18	181.00	6,016.38	-2,012.73	331.82	2,031.57	2.12
8,403.00	89.97	180.62	6,016.25	-2,107.72	330.48	2,126.21	0.46
8,497.00	90.28	180.70	6,016.05	-2,201.72	329.39	2,219.87	0.34
8,591.00	90.86	181.62	6,015.11	-2,295.69	327.49	2,313.46	1.16
8,686.00	91.11	181.61	6,013.48	-2,390.64	324.81	2,407.96	0.26
8,780.00	90.40	181.51	6,012.24	-2,484.60	322.25	2,501.48	0.76
8,873.00	91.48	182.27	6,010.71	-2,577.53	319.19	2,593.94	1.42
8,968.00	92.87	182.50	6,007.11	-2,672.38	315.24	2,688.25	1.48
9,062.00	91.02	182.39	6,003.92	-2,766.23	311.23	2,781.56	1.97
9,251.00	90.71	183.92	6,001.06	-2,954.92	300.83	2,968.99	0.83
9,346.00	88.80	182.09	6,001.47	-3,049.78	295.85	3,063.23	2.78
9,440.00	88.89	182.03	6,003.37	-3,143.70	292.47	3,156.66	0.12
9,535.00	89.23	181.08	6,004.92	-3,238.65	289.89	3,251.17	1.06
9,629.00	91.26	180.48	6,004.52	-3,332.64	288.61	3,344.81	2.25
9,724.00	89.88	179.67	6,003.58	-3,427.63	288.49	3,439.54	1.68
9,818.00	89.04	178.81	6,004.46	-3,521.61	289.74	3,533.37	1.28
9,913.00	89.48	179.66	6,005.69	-3,616.60	291.01	3,628.19	1.01
10,008.00	90.68	179.25	6,005.56	-3,711.59	291.91	3,723.00	1.33
10,102.00	91.14	179.33	6,004.06	-3,805.57	293.07	3,816.81	0.50
10,197.00	91.36	178.80	6,001.99	-3,900.54	294.62	3,911.64	0.60

## Design Report for Lynn LC35-760 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,267.00	91.79	178.67	6,000.07	-3,970.49	296.17	3,981.52	0.64
<b>Final Sperry MWD Survey at 10267.00ft</b>							
10,335.00	91.79	178.67	5,997.94	-4,038.44	297.75	4,049.40	0.00
<b>Straight Line Projection to TD at 10335.00ft</b>							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
748.00	748.00	0.76	-1.66	First Sperry MWD Survey at 748.00ft
10,267.00	6,000.07	-3,970.49	296.17	Final Sperry MWD Survey at 10267.00ft
10,335.00	5,997.94	-4,038.44	297.75	Straight Line Projection to TD at 10335.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Lynn LC35-760_Rev A1_BHL	175.82	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
748.00	6,349.00	Intermediate Sperry MWD Surveys	MWD
6,441.00	10,335.00	Production Sperry MWD Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
630.00	630.00	9 5/8"	9-5/8	13-3/4
6,395.00	6,013.83	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									
Lynn LC35-760_Rev A	0.00	0.00	0.00	0.01	0.00	1,506,369.68	3,430,243.95	40.713040	-103.947950
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Lynn LC35-760_Rev A	0.00	0.00	5,997.00	-4,039.51	295.33	1,502,330.20	3,430,539.28	40.701940	-103.947140
- actual wellpath misses target center by 2.80usft at 10335.00usft MD (5997.94 TVD, -4038.44 N, 297.75 E)									
- Point									
Lynn LC35-760_Rev A	0.00	0.00	5,997.00	-4,039.51	295.33	1,502,330.20	3,430,539.28	40.701940	-103.947140
- actual wellpath misses target center by 2.80usft at 10335.00usft MD (5997.94 TVD, -4038.44 N, 297.75 E)									
- Point									

Design Report for Lynn LC35-760 - Actual Surveys

Directional Difficulty Index

Average Dogleg over Survey:	1.75 °/100usft	Maximum Dogleg over Survey:	15.57 °/100usft at 6,071.00 usft
Net Tortosity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.204

Audit Info

North Reference Sheet for Sec. 35-T9N-R59W (Kerri & Lynn PAD) - Lynn LC35-760  
- 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' @ 4838.00usft (H&P 343). Northing and Easting are relative to Lynn LC35-760  
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: 0.99998935

Grid Coordinates of Well: 1,506,369.67 usft N, 3,430,243.95 usft E  
Geographical Coordinates of Well: 40° 42' 46.94" N, 103° 56' 52.62" W  
Grid Convergence at Surface is: 1.00°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,335.00usft  
the Bottom Hole Displacement is 4,049.40usft in the Direction of 175.78° (Grid).  
Magnetic Convergence at surface is: -7.02° (12 January 2016, , BGGM2015)

