

# Noble Energy

Weld County, CO (NAD 83)

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

Lynn LC35-750

05-123-40663

Plan A

Design: Actual Surveys

## Sperry Drilling Services

### Final Survey Report

22 February, 2016

Surface UWI : 05-123-40663

Well Coordinates: 1,506,370.30 N, 3,430,279.99 E (40° 42' 46.94" N, 103° 56' 52.15" 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 LC35-750

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 LC35-750  
 Wellbore: Plan A  
 Design: Actual Surveys



Platted SHL: 470' FNL, 1782' FWL  
 Platted Lat/Long: 40.71304 N, -103.94782 W  
 Location: Sec. 35-T9N-R59W

~7" Casing: 501' FNL, 2530 FWL  
 Lat/Long: 40.712933 N, -103.945113 W  
 State Planes - CO Northern: 1,506,344.34 N, 3,431,031.01 E  
 Location: Sec. 35-T9N-R59W

Platted BHL: 810' FSL, 2624 FEL  
 Platted Lat/Long: 40.702145 N, -103.944728 W  
 State Planes - CO Northern: 1,502,416.60 N, 3,431,206.61 E  
 Location: Sec. 35-T9N-R59W

LEGEND

Lynn LC35-750, Plan A, Rev A4 PROPOSAL V0

Actual Surveys

WELL DETAILS: Lynn LC35-750	
Ground Level:	4814.00
KB = 24' @ 4838.00usft (H&P 343)	
Created By:	Tatiana Gomez
Created On:	2-22-2016

## Design Report for Lynn LC35-750 - 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
612.00	0.29	157.35	612.00	-1.43	0.60	1.53	0.05
<b>9 5/8"</b>							
653.00	0.31	157.35	653.00	-1.63	0.68	1.74	0.05
<b>First Sperry MWD Survey at 653.00</b>							
748.00	0.34	190.15	748.00	-2.14	0.73	2.25	0.20
842.00	0.84	98.05	841.99	-2.52	1.36	2.76	0.98
936.00	2.60	68.14	935.95	-1.82	4.02	2.67	2.04
1,030.00	4.17	58.29	1,029.78	0.77	8.91	1.23	1.78
1,122.00	6.76	53.85	1,121.36	5.73	16.13	-1.99	2.85
1,213.00	8.36	51.83	1,211.56	12.97	25.66	-6.94	1.78
1,305.00	9.89	50.49	1,302.39	22.13	37.01	-13.34	1.68
1,397.00	11.43	53.43	1,392.80	32.59	50.43	-20.55	1.77
1,488.00	11.73	54.22	1,481.95	43.37	65.17	-27.78	0.37
1,579.00	11.41	53.95	1,571.10	54.08	79.96	-34.92	0.36
1,669.00	10.88	53.35	1,659.41	64.39	93.97	-41.85	0.60
1,761.00	10.20	52.77	1,749.85	74.50	107.42	-48.72	0.75
1,852.00	10.63	51.80	1,839.35	84.56	120.43	-55.63	0.51
1,943.00	10.12	51.54	1,928.87	94.73	133.29	-62.68	0.56
2,035.00	10.98	51.50	2,019.31	105.21	146.47	-69.96	0.93
2,126.00	10.73	50.48	2,108.68	115.99	159.79	-77.51	0.35
2,217.00	10.28	51.70	2,198.16	126.42	172.70	-84.80	0.55
2,309.00	11.14	50.23	2,288.55	137.19	185.97	-92.35	0.98
2,400.00	10.62	49.32	2,377.92	148.28	199.09	-100.24	0.60
2,491.00	10.16	49.06	2,467.42	159.01	211.51	-107.93	0.51
2,582.00	11.09	51.40	2,556.86	169.73	224.41	-115.51	1.13
2,673.00	11.38	52.10	2,646.12	180.70	238.34	-123.11	0.35
2,767.00	11.69	47.73	2,738.22	192.80	252.70	-131.71	0.99
2,862.00	11.51	46.75	2,831.28	205.77	266.73	-141.23	0.28
2,956.00	10.84	47.12	2,923.50	218.21	280.04	-150.40	0.72
3,050.00	9.75	45.34	3,015.98	229.82	292.17	-159.01	1.21
3,144.00	10.30	45.38	3,108.55	241.32	303.82	-167.63	0.59
3,239.00	10.41	48.21	3,202.00	253.00	316.26	-176.25	0.55
3,333.00	12.46	54.36	3,294.14	264.57	330.84	-184.29	2.53
3,427.00	11.76	53.27	3,386.04	276.21	346.76	-192.09	0.78
3,522.00	11.29	53.75	3,479.13	287.50	362.01	-199.70	0.50
3,616.00	11.06	53.99	3,571.34	298.24	376.73	-206.90	0.25
3,711.00	10.72	55.10	3,664.63	308.65	391.35	-213.79	0.42
3,805.00	12.00	50.34	3,756.79	319.89	406.04	-221.48	1.69
3,994.00	11.01	46.99	3,941.99	344.75	434.36	-239.40	0.63
4,088.00	10.28	44.46	4,034.38	356.86	446.80	-248.44	0.92
4,182.00	10.33	48.51	4,126.86	368.43	458.99	-257.01	0.77
4,276.00	11.09	52.28	4,219.23	379.54	472.46	-264.84	1.10
4,370.00	11.07	51.10	4,311.47	390.74	486.63	-272.61	0.24
4,465.00	10.19	48.95	4,404.84	401.98	500.06	-280.58	1.02
4,559.00	10.36	46.51	4,497.34	413.26	512.47	-288.81	0.50
4,653.00	10.68	42.92	4,589.76	425.46	524.53	-298.02	0.78
4,748.00	10.89	39.39	4,683.08	438.84	536.22	-308.46	0.73
4,842.00	10.96	41.47	4,775.38	452.40	547.77	-319.11	0.43
4,937.00	11.41	43.84	4,868.57	465.94	560.26	-329.53	0.68

## Design Report for Lynn LC35-750 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,031.00	11.18	45.78	4,960.75	479.00	573.23	-339.38	0.47
5,126.00	9.87	45.44	5,054.15	491.14	585.64	-348.45	1.38
5,221.00	10.58	54.01	5,147.65	501.98	598.49	-356.15	1.77
5,315.00	14.70	87.98	5,239.47	507.48	617.43	-357.30	8.86
5,409.00	17.60	106.34	5,329.81	503.90	643.01	-348.12	6.21
5,504.00	19.35	122.68	5,419.97	491.35	670.06	-329.86	5.73
5,599.00	23.36	145.27	5,508.58	467.32	694.09	-301.09	9.56
5,693.00	23.27	151.09	5,594.92	435.75	713.68	-265.94	2.45
5,788.00	28.54	161.01	5,680.38	397.82	730.16	-225.30	7.17
5,883.00	44.23	173.56	5,756.73	343.02	741.34	-169.38	18.21
5,977.00	53.10	175.43	5,818.75	272.83	748.03	-99.47	9.55
6,071.00	60.79	177.07	5,869.99	194.28	753.13	-21.75	8.31
6,166.00	73.31	182.24	5,906.98	107.01	753.47	63.41	14.09
6,256.00	84.29	180.64	5,924.43	18.89	751.28	148.83	12.32
6,301.00	86.48	180.00	5,928.05	-25.96	751.03	192.50	5.07
7"							
6,341.00	88.43	179.44	5,929.83	-65.92	751.22	231.50	5.07
6,432.00	90.52	179.68	5,930.66	-156.91	751.92	320.36	2.31
6,523.00	91.42	179.36	5,929.12	-247.89	752.68	409.23	1.05
6,614.00	90.43	179.36	5,927.65	-338.87	753.70	498.15	1.09
6,705.00	90.22	179.21	5,927.14	-429.86	754.84	587.11	0.28
6,799.00	89.45	179.07	5,927.41	-523.85	756.25	679.05	0.83
6,893.00	89.01	178.78	5,928.67	-617.83	758.01	771.06	0.56
6,988.00	90.55	179.26	5,929.03	-712.81	759.63	864.02	1.70
7,082.00	91.11	178.57	5,927.67	-806.78	761.41	956.04	0.95
7,177.00	91.82	178.88	5,925.24	-901.73	763.53	1,049.07	0.82
7,271.00	90.59	177.55	5,923.27	-995.66	766.45	1,141.29	1.93
7,365.00	90.92	177.42	5,922.03	-1,089.56	770.58	1,233.76	0.38
7,460.00	90.22	177.89	5,921.08	-1,184.47	774.47	1,327.15	0.89
7,554.00	90.18	177.69	5,920.76	-1,278.40	778.09	1,419.53	0.22
7,648.00	90.34	177.85	5,920.33	-1,372.33	781.75	1,511.92	0.24
7,742.00	90.68	177.16	5,919.49	-1,466.24	785.84	1,604.38	0.82
7,836.00	90.06	177.37	5,918.88	-1,560.13	790.33	1,696.91	0.70
7,931.00	90.31	176.56	5,918.58	-1,654.99	795.36	1,790.52	0.89
8,025.00	90.09	176.54	5,918.25	-1,748.82	801.01	1,883.25	0.24
8,120.00	89.45	176.23	5,918.63	-1,843.63	807.00	1,977.02	0.75
8,214.00	88.83	175.54	5,920.04	-1,937.38	813.75	2,069.91	0.99
8,309.00	89.23	176.25	5,921.65	-2,032.12	820.55	2,163.79	0.86
8,403.00	89.88	176.50	5,922.38	-2,125.93	826.49	2,256.57	0.74
8,498.00	90.59	177.43	5,921.99	-2,220.79	831.52	2,350.17	1.23
8,591.00	90.00	176.73	5,921.51	-2,313.67	836.26	2,441.77	0.98
8,685.00	89.41	176.62	5,922.00	-2,407.51	841.71	2,534.47	0.64
8,780.00	89.08	177.19	5,923.25	-2,502.36	846.84	2,628.08	0.69
8,874.00	88.71	176.68	5,925.06	-2,596.21	851.86	2,720.70	0.67
8,969.00	89.72	176.44	5,926.36	-2,691.03	857.56	2,814.40	1.09
9,063.00	91.23	177.08	5,925.58	-2,784.87	862.87	2,907.08	1.74
9,157.00	92.22	176.41	5,922.75	-2,878.67	868.21	2,999.71	1.27
9,252.00	91.29	176.55	5,919.84	-2,973.45	874.04	3,093.41	0.99
9,346.00	90.74	175.33	5,918.18	-3,067.20	880.69	3,186.28	1.42
9,441.00	90.80	175.31	5,916.90	-3,161.87	888.44	3,280.31	0.07
9,535.00	91.02	176.46	5,915.41	-3,255.62	895.19	3,373.20	1.25

## Design Report for Lynn LC35-750 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,630.00	90.96	177.41	5,913.77	-3,350.47	900.27	3,466.80	1.00
9,725.00	91.39	177.38	5,911.82	-3,445.35	904.58	3,560.26	0.45
9,819.00	90.65	178.11	5,910.15	-3,539.26	908.28	3,652.64	1.11
9,914.00	90.09	177.52	5,909.53	-3,634.19	911.90	3,745.99	0.86
10,008.00	88.89	176.94	5,910.37	-3,728.07	916.45	3,838.53	1.42
10,102.00	88.03	177.05	5,912.90	-3,821.91	921.37	3,931.11	0.92
10,197.00	88.46	178.01	5,915.81	-3,916.77	925.46	4,024.51	1.11
10,234.00	88.86	178.37	5,916.67	-3,953.74	926.63	4,060.81	1.45
<b>Final Sperry MWD Survey at 10234.00ft</b>							
10,302.00	88.86	178.37	5,918.02	-4,021.70	928.57	4,127.50	0.00
<b>Straight Line Projection to TD at 10302.00ft</b>							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
653.00	653.00	-1.63	0.68	First Sperry MWD Survey at 653.00
10,234.00	5,916.67	-3,953.74	926.63	Final Sperry MWD Survey at 10234.00ft
10,302.00	5,918.02	-4,021.70	928.57	Straight Line Projection to TD at 10302.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Lynn LC35-750_Rev A4_BHL	167.14	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
653.00	6,256.00	Intermediate Sperry MWD Surveys	MWD
6,341.00	10,302.00	Production Sperry MWD Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
612.00	612.00	9 5/8"	9-5/8	13-3/4
6,301.00	5,928.05	7"	7	8-3/4

## Design Report for Lynn LC35-750 - 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
Lynn LC35-750_Rev A - actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	0.01	0.00	1,506,370.31	3,430,279.99	40.713040	-103.947820
Lynn LC35-750_Rev A - actual wellpath misses target center by 48.09usft at 10302.00usft MD (5918.02 TVD, -4021.70 N, 928.57 E) - Point	0.00	0.00	5,871.00	-4,024.93	919.05	1,502,345.41	3,431,199.02	40.701950	-103.944760
Lynn LC35-750_Rev A - actual wellpath misses target center by 48.09usft at 10302.00usft MD (5918.02 TVD, -4021.70 N, 928.57 E) - Point	0.00	0.00	5,871.00	-4,024.93	919.05	1,502,345.41	3,431,199.02	40.701950	-103.944760
Lynn LC35-750_Rev A - actual wellpath misses target center by 48.09usft at 10302.00usft MD (5918.02 TVD, -4021.70 N, 928.57 E) - Point	0.00	0.00	5,871.00	-4,024.93	919.05	1,502,345.41	3,431,199.02	40.701950	-103.944760
Lynn LC35-750_Rev A - actual wellpath misses target center by 14.92usft at 10302.00usft MD (5918.02 TVD, -4021.70 N, 928.57 E) - Point	0.00	0.00	5,907.00	-4,024.93	919.05	1,502,345.41	3,431,199.02	40.701950	-103.944760
Lynn LC35-750_Rev A - actual wellpath misses target center by 14.92usft at 10302.00usft MD (5918.02 TVD, -4021.70 N, 928.57 E) - Point	0.00	0.00	5,907.00	-4,024.93	919.05	1,502,345.41	3,431,199.02	40.701950	-103.944760

### Directional Difficulty Index

Average Dogleg over Survey:	1.73 °/100usft	Maximum Dogleg over Survey:	18.21 °/100usft at 5,883.00 usft
Net Tortosity applicable to Plans:	0.65 °/100usft	Directional Difficulty Index:	6.224

### Audit Info

North Reference Sheet for Sec. 35-T9N-R59W (Kerri & Lynn PAD) - Lynn LC35-750  
- 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 LC35-750

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: 1,506,370.30 usft N, 3,430,279.99 usft E

Geographical Coordinates of Well: 40° 42' 46.94" N, 103° 56' 52.15" W

Grid Convergence at Surface is: 1.00°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,302.00usft  
the Bottom Hole Displacement is 4,127.51usft in the Direction of 167.00° (Grid).

Magnetic Convergence at surface is: -7.02° (18 January 2016, , BGGM2015)

