

# Noble Energy

Weld County, CO (NAD 83)  
Sec. 1-T5N-R64W (Lucci 1 PAD)  
Lucci B01-69HNL

Design: Vaughn ESS and Sperry MWD Surveys

## Sperry Drilling Services

### Final Survey Report

28 May, 2013

Well Coordinates: 1,402,732.05 N, 3,276,831.22 E (40° 26' 04.70" N, 104° 30' 19.80" W)  
Ground Level: 4,617.00 ft

Local Coordinate Origin:	Centered on Well Lucci B01-69HNL - Slot A2
Viewing Datum:	KB=24' @ 4641.00ft (H&P 315)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied  
Version: 2003.16 Build: 431

**HALLIBURTON**

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
330.00	0.60	165.20	329.99	-1.67	0.44	0.34	0.18
Surveys from 330.00ft to 578.00ft are Vaughn ESS Surveys							
578.00	0.60	145.20	577.98	-3.99	1.51	1.26	0.08
Tie-On to Vaughn ESS Survey							
748.00	0.32	30.53	747.98	-4.31	2.26	1.99	0.46
First Sperry MWD Survey							
840.00	0.43	153.10	839.98	-4.40	2.55	2.27	0.72
933.00	0.31	228.61	932.97	-4.88	2.52	2.21	0.50
1,025.00	0.45	236.16	1,024.97	-5.24	2.03	1.70	0.16
1,118.00	0.52	260.82	1,117.97	-5.51	1.31	0.97	0.23
1,211.00	0.75	256.50	1,210.96	-5.72	0.30	-0.05	0.25
1,304.00	0.68	288.93	1,303.96	-5.69	-0.81	-1.16	0.44
1,397.00	1.72	331.67	1,396.94	-4.28	-1.99	-2.26	1.40
1,492.00	1.45	349.58	1,491.90	-1.84	-2.89	-3.00	0.59
1,587.00	1.12	333.09	1,586.88	0.17	-3.53	-3.51	0.52
1,682.00	0.89	339.97	1,681.86	1.69	-4.20	-4.09	0.27
1,776.00	2.03	350.34	1,775.83	4.02	-4.73	-4.47	1.24
1,871.00	2.31	8.63	1,870.76	7.57	-4.72	-4.25	0.78
1,966.00	3.93	8.01	1,965.62	12.68	-3.98	-3.19	1.71
2,061.00	4.69	1.20	2,060.35	19.79	-3.45	-2.22	0.96
2,156.00	5.65	3.49	2,154.96	28.34	-3.08	-1.32	1.03
2,251.00	6.70	4.73	2,249.41	38.53	-2.34	0.05	1.11
2,346.00	8.29	0.11	2,343.60	50.91	-1.87	1.29	1.79
2,441.00	9.09	357.91	2,437.51	65.25	-2.13	1.91	0.91
2,536.00	9.77	359.59	2,531.22	80.81	-2.46	2.55	0.77
2,630.00	9.93	357.39	2,623.84	96.89	-2.89	3.12	0.44
2,725.00	11.50	358.71	2,717.18	114.54	-3.47	3.62	1.67
2,820.00	11.58	359.78	2,810.26	133.54	-3.72	4.55	0.24
2,915.00	10.00	359.57	2,903.57	151.32	-3.82	5.55	1.66
3,010.00	10.25	0.95	2,997.10	168.02	-3.74	6.67	0.37
3,105.00	9.34	1.74	3,090.71	184.18	-3.37	8.04	0.97
3,200.00	9.22	5.00	3,184.47	199.47	-2.47	9.88	0.57
3,295.00	8.72	358.02	3,278.31	214.25	-2.06	11.21	1.26
3,390.00	9.21	355.86	3,372.15	229.03	-2.86	11.33	0.63
3,485.00	8.58	359.92	3,466.00	243.70	-3.41	11.68	0.94
3,579.00	10.25	2.80	3,558.74	259.06	-3.02	13.03	1.85
3,674.00	11.60	2.79	3,652.01	277.05	-2.14	15.02	1.42
3,769.00	12.46	2.35	3,744.92	296.83	-1.25	17.13	0.91
3,864.00	12.07	3.27	3,837.76	316.98	-0.27	19.36	0.46
3,959.00	10.28	1.76	3,930.95	335.37	0.56	21.32	1.91
4,054.00	9.39	359.15	4,024.55	351.59	0.71	22.47	1.05
4,149.00	8.13	355.89	4,118.45	366.04	0.11	22.77	1.43
4,244.00	8.39	356.97	4,212.46	379.67	-0.74	22.77	0.32
4,339.00	8.35	352.07	4,306.45	393.42	-2.06	22.31	0.75
4,434.00	8.24	352.22	4,400.46	407.00	-3.93	21.28	0.12
4,529.00	7.19	352.59	4,494.59	419.64	-5.62	20.37	1.11
4,623.00	6.40	347.53	4,587.93	430.59	-7.51	19.17	1.05
4,718.00	5.70	347.23	4,682.40	440.36	-9.69	17.59	0.74
4,813.00	4.58	353.82	4,777.02	448.73	-11.14	16.66	1.33

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,908.00	1.87	14.45	4,871.86	454.00	-11.17	16.96	3.06
5,003.00	0.86	54.86	4,966.84	455.91	-10.20	18.05	1.41
5,098.00	0.63	68.58	5,061.83	456.51	-9.13	19.15	0.30
5,193.00	1.09	53.35	5,156.82	457.24	-7.92	20.41	0.54
5,288.00	1.33	57.69	5,251.80	458.37	-6.26	22.13	0.27
5,383.00	0.85	50.54	5,346.78	459.41	-4.78	23.67	0.52
5,478.00	1.30	64.98	5,441.76	460.31	-3.26	25.24	0.55
5,573.00	1.48	42.36	5,536.74	461.68	-1.46	27.13	0.60
5,668.00	1.39	59.35	5,631.71	463.17	0.36	29.03	0.46
5,763.00	1.29	39.23	5,726.68	464.59	2.03	30.79	0.50
5,858.00	0.96	44.38	5,821.66	465.98	3.26	32.10	0.36
5,960.00	0.79	84.56	5,923.65	466.66	4.56	33.44	0.61
6,043.00	4.33	84.95	6,006.56	466.99	8.25	37.15	4.27
6,091.00	10.36	88.93	6,054.14	467.23	14.37	43.27	12.60
6,138.00	14.29	91.21	6,100.05	467.19	24.40	53.28	8.42
6,186.00	17.22	88.98	6,146.24	467.19	37.43	66.29	6.23
6,233.00	19.52	88.48	6,190.84	467.52	52.24	81.08	4.91
6,281.00	23.15	88.82	6,235.55	467.93	69.70	98.53	7.57
6,328.00	27.34	91.83	6,278.05	467.77	89.73	118.52	9.32
6,376.00	32.44	93.37	6,319.65	466.66	113.61	142.29	10.74
6,423.00	37.01	92.72	6,358.27	465.25	140.34	168.88	9.76
6,471.00	41.49	90.60	6,395.43	464.40	170.69	199.11	9.74
6,518.00	46.46	90.09	6,429.25	464.21	203.31	231.66	10.60
6,566.00	51.40	91.28	6,460.77	463.76	239.48	267.74	10.46
6,613.00	54.66	91.53	6,489.03	462.84	277.02	305.14	6.95
6,661.00	59.05	91.08	6,515.27	461.93	317.19	345.18	9.18
6,708.00	64.70	90.01	6,537.42	461.54	358.62	386.51	12.19
6,756.00	68.75	90.24	6,556.38	461.45	402.70	430.50	8.45
6,803.00	71.83	89.92	6,572.23	461.39	446.94	474.65	6.58
6,851.00	74.28	90.88	6,586.22	461.06	492.86	520.45	5.45
6,898.00	76.33	91.12	6,598.14	460.27	538.31	565.77	4.39
6,944.00	78.92	91.28	6,608.00	459.33	583.23	610.54	5.64
6,988.00	81.59	90.84	6,615.45	458.53	626.58	653.77	6.14
<b>Estimated 7" Casing Point: 72' FSL, 1277' FWL (Not a Survey Station)</b>							
7,031.00	84.19	90.41	6,620.77	458.06	669.24	696.32	6.14
7,126.00	88.03	90.89	6,627.22	456.99	764.00	790.83	4.07
7,221.00	90.06	90.39	6,628.80	455.93	858.97	885.55	2.20
7,316.00	91.10	90.47	6,627.84	455.21	953.97	980.32	1.10
7,411.00	91.76	89.73	6,625.47	455.05	1,048.93	1,075.10	1.04
7,506.00	91.17	89.69	6,623.04	455.53	1,143.90	1,169.91	0.62
7,601.00	91.63	88.44	6,620.72	457.08	1,238.86	1,264.78	1.40
7,696.00	90.86	88.23	6,618.65	459.84	1,333.80	1,359.71	0.84
7,791.00	90.74	89.03	6,617.33	462.11	1,428.76	1,454.63	0.85
7,885.00	90.31	87.81	6,616.47	464.70	1,522.72	1,548.57	1.38
7,981.00	90.90	89.21	6,615.45	467.20	1,618.68	1,644.50	1.58
8,075.00	89.05	89.43	6,615.49	468.31	1,712.67	1,738.37	1.98
8,170.00	91.08	88.80	6,615.39	469.78	1,807.65	1,833.27	2.24
8,265.00	90.43	89.97	6,614.13	470.80	1,902.63	1,928.13	1.41
8,360.00	90.34	89.62	6,613.49	471.14	1,997.63	2,022.97	0.38
8,455.00	91.08	89.30	6,612.32	472.04	2,092.62	2,117.83	0.85
8,549.00	89.41	88.72	6,611.92	473.66	2,186.60	2,211.73	1.88

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,644.00	87.66	89.44	6,614.34	475.18	2,281.55	2,306.59	1.99
8,739.00	89.85	90.12	6,616.41	475.55	2,376.52	2,401.40	2.41
8,834.00	90.15	90.80	6,616.41	474.79	2,471.52	2,496.17	0.78
8,929.00	89.38	90.43	6,616.80	473.77	2,566.51	2,590.92	0.90
9,024.00	87.63	89.17	6,619.28	474.10	2,661.47	2,685.72	2.27
9,118.00	88.15	88.97	6,622.74	475.62	2,755.40	2,779.56	0.59
9,213.00	89.97	88.86	6,624.30	477.42	2,850.36	2,874.45	1.92
9,308.00	92.62	88.47	6,622.15	479.63	2,945.30	2,969.35	2.82
9,403.00	90.59	86.36	6,619.49	483.92	3,040.16	3,064.29	3.08
9,498.00	89.72	87.17	6,619.23	489.28	3,135.01	3,159.28	1.25
9,593.00	91.20	87.67	6,618.47	493.55	3,229.90	3,254.26	1.64
9,688.00	89.44	86.61	6,617.94	498.29	3,324.78	3,349.25	2.16
9,782.00	90.28	87.44	6,618.17	503.17	3,418.65	3,443.24	1.26
9,873.00	91.26	86.26	6,616.94	508.17	3,509.50	3,534.23	1.69
9,966.00	90.77	88.78	6,615.30	512.19	3,602.39	3,627.19	2.76
10,058.00	91.51	89.98	6,613.47	513.19	3,694.37	3,719.05	1.53
10,152.00	90.43	90.49	6,611.88	512.80	3,788.35	3,812.83	1.27
10,245.00	91.20	91.59	6,610.55	511.12	3,881.32	3,905.52	1.44
10,337.00	90.12	89.72	6,609.49	510.07	3,973.31	3,997.26	2.35
10,430.00	92.19	89.86	6,607.62	510.41	4,066.28	4,090.08	2.23
10,522.00	91.63	89.91	6,604.55	510.59	4,158.23	4,181.86	0.61
10,614.00	91.23	90.51	6,602.26	510.25	4,250.20	4,273.64	0.78
10,708.00	89.48	89.33	6,601.67	510.38	4,344.19	4,367.46	2.25
10,800.00	90.56	89.40	6,601.64	511.40	4,436.19	4,459.34	1.18
10,893.00	89.63	90.25	6,601.49	511.69	4,529.18	4,552.17	1.35
10,986.00	91.17	90.58	6,600.84	511.01	4,622.18	4,644.95	1.69
11,080.00	89.69	89.97	6,600.13	510.56	4,716.17	4,738.73	1.70
11,172.00	88.00	90.25	6,601.99	510.39	4,808.15	4,830.52	1.86
11,265.00	87.90	89.67	6,605.31	510.45	4,901.09	4,923.29	0.63
11,356.00	87.66	89.00	6,608.84	511.51	4,992.01	5,014.10	0.78
11,449.00	88.61	88.49	6,611.87	513.54	5,084.94	5,106.98	1.16
11,541.00	92.10	90.23	6,611.30	514.57	5,176.91	5,198.84	4.24
11,636.00	92.04	89.12	6,607.86	515.11	5,271.85	5,293.63	1.17
11,730.00	91.05	90.60	6,605.33	515.34	5,365.81	5,387.42	1.89
11,825.00	90.18	90.44	6,604.31	514.48	5,460.80	5,482.18	0.93
11,920.00	90.65	89.92	6,603.62	514.18	5,555.80	5,576.97	0.74
12,015.00	91.08	89.38	6,602.19	514.76	5,650.78	5,671.81	0.73
12,110.00	89.51	89.31	6,601.70	515.84	5,745.77	5,766.69	1.65
12,205.00	89.57	89.24	6,602.46	517.05	5,840.76	5,861.57	0.10
12,300.00	90.77	88.85	6,602.18	518.63	5,935.75	5,956.47	1.33
12,395.00	89.54	87.90	6,601.92	521.32	6,030.70	6,051.41	1.64
12,490.00	89.72	87.87	6,602.54	524.83	6,125.64	6,146.38	0.19
12,585.00	90.37	87.23	6,602.46	528.89	6,220.55	6,241.36	0.96
12,680.00	90.52	88.63	6,601.72	532.32	6,315.48	6,336.32	1.48
12,774.00	90.89	88.28	6,600.57	534.86	6,409.44	6,430.26	0.54
12,869.00	89.17	88.04	6,600.52	537.91	6,504.39	6,525.21	1.83
12,964.00	90.46	88.18	6,600.82	541.04	6,599.33	6,620.17	1.37
13,059.00	91.17	88.06	6,599.47	544.16	6,694.27	6,715.12	0.76
13,154.00	89.82	88.48	6,598.65	547.02	6,789.22	6,810.07	1.49
13,249.00	90.55	88.64	6,598.34	549.41	6,884.19	6,905.00	0.79
13,344.00	89.72	88.61	6,598.12	551.69	6,979.16	6,999.93	0.87

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
13,439.00	90.06	88.71	6,598.30	553.91	7,074.14	7,094.86	0.37
13,534.00	89.48	88.74	6,598.68	556.03	7,169.11	7,189.78	0.61
13,629.00	90.52	89.21	6,598.68	557.73	7,264.10	7,284.69	1.20
13,723.00	90.92	89.37	6,597.50	558.89	7,358.08	7,378.57	0.46
13,818.00	89.75	88.78	6,596.95	560.42	7,453.07	7,473.46	1.38
13,913.00	90.00	88.72	6,597.16	562.50	7,548.04	7,568.39	0.27
14,008.00	91.63	88.95	6,595.80	564.43	7,643.01	7,663.29	1.73
14,103.00	90.96	88.67	6,593.66	566.40	7,737.96	7,758.19	0.76
14,197.00	90.25	87.99	6,592.66	569.14	7,831.92	7,852.13	1.05
14,292.00	89.88	89.17	6,592.56	571.49	7,926.89	7,947.06	1.30
14,387.00	90.25	88.69	6,592.45	573.27	8,021.87	8,041.97	0.64
14,482.00	89.47	89.58	6,592.68	574.70	8,116.86	8,136.87	1.25
14,577.00	89.57	88.75	6,593.48	576.09	8,211.84	8,231.76	0.88
14,672.00	89.57	88.21	6,594.19	578.61	8,306.81	8,326.69	0.57
14,767.00	88.49	89.87	6,595.80	580.20	8,401.77	8,421.58	2.08
14,862.00	89.01	89.40	6,597.87	580.80	8,496.75	8,516.41	0.74
14,957.00	89.88	88.71	6,598.79	582.37	8,591.73	8,611.30	1.17
15,052.00	90.25	88.90	6,598.68	584.35	8,686.71	8,706.22	0.44
15,147.00	90.74	89.11	6,597.86	586.00	8,781.69	8,801.13	0.56
15,242.00	90.71	88.76	6,596.66	587.77	8,876.67	8,896.03	0.37
15,337.00	91.39	88.84	6,594.92	589.75	8,971.63	8,990.93	0.72
15,432.00	92.75	89.43	6,591.49	591.19	9,066.55	9,085.76	1.56
15,587.00	93.24	89.66	6,583.39	592.42	9,221.34	9,240.33	0.35
<b>Final Sperry MWD Survey</b>							
15,648.00	93.24	89.66	6,579.94	592.78	9,282.24	9,301.13	0.00
<b>Survey Projection to TD - Estimated BHL: 92' FSL, 536' FEL</b>							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
330.00	329.99	-1.67	0.44	Surveys from 330.00ft to 578.00ft are Vaughn ESS Surveys
578.00	577.98	-3.99	1.51	Tie-On to Vaughn ESS Survey
748.00	747.98	-4.31	2.26	First Sperry MWD Survey
6,988.00	6,615.45	458.53	626.58	Estimated 7" Casing Point: 72' FSL, 1277' FWL (Not a Survey Station)
15,587.00	6,583.39	592.42	9,221.34	Final Sperry MWD Survey
15,648.00	6,579.94	592.78	9,282.24	Survey Projection to TD
15,648.00	6,579.94	592.78	9,282.24	Estimated BHL: 92' FSL, 536' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	+E/-W (ft)	Start TVD (ft)
Target	Lucci B01-69HNL_PlanA - Rev0_BH	86.45	Slot	0.00	0.00	0.00

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

### Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
330.00	578.00	Vaughn ESS Surveys	EMS
748.00	6,988.00	Sperry MWD Surveys	MWD+IFR1
6,988.00	15,648.00	Sperry MWD Surveys	MWD+IFR1

### Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
6,988.00	6,615.45	7" Csg	7	8-3/4

## Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys

**Targets**

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			4,658.03	457.56		1,403,189.60	3,281,489.07		
Point 2			9,818.03	500.56		1,403,232.59	3,286,648.88		
Point 3			9,846.03	-2,084.44		1,400,647.69	3,286,676.87		
Point 4			4,691.03	-2,176.44		1,400,555.70	3,281,522.07		
Point 5			4,658.03	457.56		1,403,189.60	3,281,489.07		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			4,625.03	3,090.56		1,405,822.50	3,281,456.07		
Point 2			9,785.03	3,168.56		1,405,900.49	3,286,615.88		
Point 3			9,818.03	500.56		1,403,232.59	3,286,648.88		
Point 4			4,658.03	457.56		1,403,189.60	3,281,489.07		
Point 5			4,625.03	3,090.56		1,405,822.50	3,281,456.07		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-189.97	-95.44		1,402,636.62	3,276,641.26		
Point 2			4,198.03	-2.44		1,402,729.61	3,281,029.09		
Point 3			4,231.03	-2,176.44		1,400,555.70	3,281,062.09		
Point 4			-190.97	-2,280.44		1,400,451.70	3,276,640.26		
Point 5			-189.97	-95.44		1,402,636.62	3,276,641.26		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			5,118.03	-2.44		1,402,729.61	3,281,949.05		
Point 2			9,358.03	-41.44		1,402,690.61	3,286,188.89		
Point 3			9,386.03	-2,084.44		1,400,647.69	3,286,216.89		
Point 4			5,151.03	-2,176.44		1,400,555.70	3,281,982.05		
Point 5			5,118.03	-2.44		1,402,729.61	3,281,949.05		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			5,085.03	3,090.56		1,405,822.50	3,281,916.06		
Point 2			9,325.03	3,168.56		1,405,900.49	3,286,155.89		
Point 3			9,358.03	960.56		1,403,692.58	3,286,188.89		
Point 4			5,118.03	917.56		1,403,649.58	3,281,949.05		
Point 5			5,085.03	3,090.56		1,405,822.50	3,281,916.06		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-676.97	3,001.56		1,405,733.50	3,276,154.27		
Point 2			4,625.03	3,090.56		1,405,822.50	3,281,456.07		
Point 3			4,658.03	457.56		1,403,189.60	3,281,489.07		
Point 4			-649.97	364.56		1,403,096.60	3,276,181.27		
Point 5			-676.97	3,001.56		1,405,733.50	3,276,154.27		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-649.97	364.56		1,403,096.60	3,276,181.27		
Point 2			4,658.03	457.56		1,403,189.60	3,281,489.07		
Point 3			4,691.03	-2,176.44		1,400,555.70	3,281,522.07		
Point 4			-650.97	-2,280.44		1,400,451.70	3,276,180.27		
Point 5			-649.97	364.56		1,403,096.60	3,276,181.27		
Lucci	0.00	0.00	0.00	-0.44	-38.97	1,402,731.61	3,276,792.25	40° 26' 4.704 N	104° 30' 20.304 W
- actual wellpath misses target center by 38.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-216.97	3,001.56		1,405,733.50	3,276,614.26		
Point 2			4,165.03	3,090.56		1,405,822.50	3,280,996.09		

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**Design Report for Lucci B01-69HNL - Vaughn ESS and Sperry MWD Surveys**


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Point 3				4,198.03	917.56	1,403,649.58	3,281,029.09		
Point 4				-189.97	824.56	1,403,556.58	3,276,641.26		
Point 5				-216.97	3,001.56	1,405,733.50	3,276,614.26		
Lucci	0.00	0.00	6,592.08	575.86	9,283.44	1,403,307.89	3,286,114.31	40° 26' 9.348 N	104° 28' 19.668 W
- actual wellpath misses target center by 20.86ft at 15648.00ft MD (6579.94 TVD, 592.78 N, 9282.24 E)									
- Point									

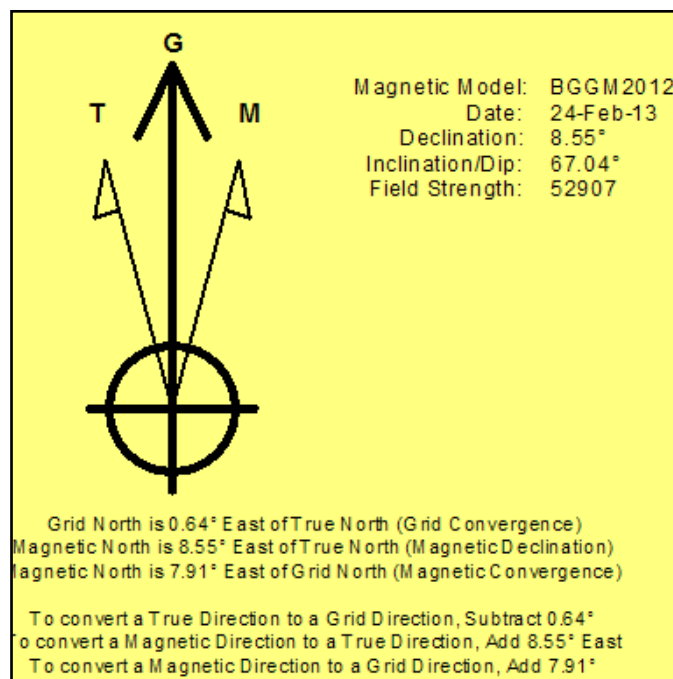


# North Reference Sheet for Sec. 1-T5N-R64W (Lucci 1 PAD) - Lucci B01-69HNL

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' @ 4641.00ft (H&P 315). Northing and Easting are relative to Lucci B01-69HNL - Slot A2  
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° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°  
False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99996198

Grid Coordinates of Well: 1,402,732.05 ft N, 3,276,831.22 ft E  
Geographical Coordinates of Well: 40° 26' 04.70" N, 104° 30' 19.80" W  
Grid Convergence at Surface is: 0.64°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,648.00ft  
the Bottom Hole Displacement is 9,301.15ft in the Direction of 86.35° (Grid).  
Magnetic Convergence at surface is: -7.91° (24 February 2013, , BGGM2012)

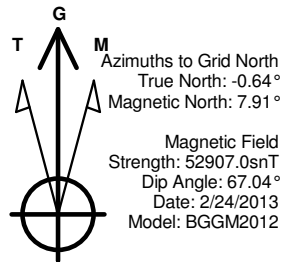


Project: Weld County, CO (NAD 83)  
 Site: Sec. 1-T5N-R64W (Lucci 1 PAD)  
 Well: Lucci B01-69HNL

# Noble Energy

**HALLIBURTON**

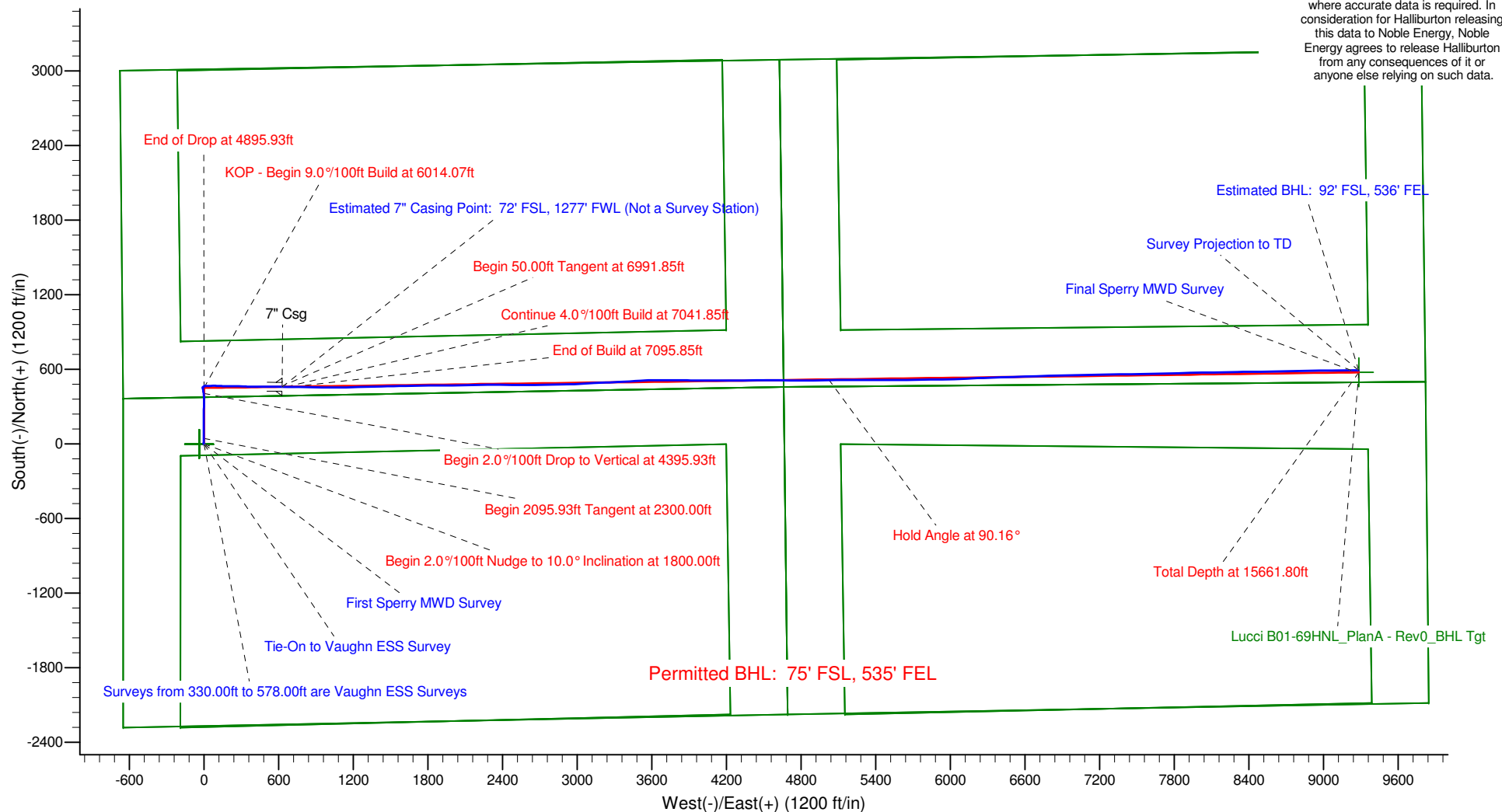
Sperry Drilling



## LEGEND

- Lucci B01-69HNL, Plan A, Plan A - Rev 0 Proposal V0
- Vaughn ESS and Sperry MWD Surveys

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Lucci B01-69HNL well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.



Project: Weld County, CO (NAD 83)  
Site: Sec. 1-T5N-R64W (Lucci 1 PAD)  
Well: Lucci B01-69HNL

# Noble Energy

**HALLIBURTON**

Sperry Drilling



Azimuths to Grid North  
True North:  $-0.64^\circ$   
Magnetic North:  $7.91^\circ$

Magnetic Field  
Strength: 52907.0snT  
Dip Angle:  $67.04^\circ$   
Date: 2/24/2013  
Model: BGGM2012

## LEGEND

- Lucci B01-69HNL, Plan A, Plan A - Rev 0 Proposal V0
- Vaughn ESS and Sperry MWD Surveys

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Lucci B01-69HNL well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the distances from BHL to section lines from that final survey to allow Noble Energy to meet its requirements under Colorado law. These distances are generated by a mathematical algorithm based on rough data collected after the well is drilled. Halliburton considers it to be a rough estimate only and it is not to be relied upon in any application where accurate data is required. In consideration for Halliburton releasing this data to Noble Energy, Noble Energy agrees to release Halliburton from any consequences of it or anyone else relying on such data.

