

# Noble Energy

Weld County, CO (NAD 83)

Sec. 18-T5N-R63W

Vince State B13-63HN

MWD Survey

## Sperry Drilling Services

### Final Survey Report

08 January, 2013

Well Coordinates: 1,389,147.49 N, 3,284,292.46 E (40° 23' 49.63" N, 104° 28' 45.34" W)

Ground Level: 4,586.00 ft

Local Coordinate Origin:

Centered on Well Vince State B13-63HN

Viewing Datum:

KB @ 4610.00ft (H&P 343)

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 Vince State B13-63HN - MWD Survey

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
601.00	0.00	0.00	601.00	0.00	0.00	0.00	0.00
<b>Tie On To Surface Casing Assumed Vertical</b>							
641.00	1.11	38.67	641.00	0.30	0.24	-0.28	2.77
<b>First MWD Survey</b>							
831.00	1.69	57.52	830.94	3.24	3.76	-4.13	0.39
925.00	1.73	44.65	924.90	5.00	5.92	-6.50	0.41
1,020.00	1.31	55.31	1,019.87	6.64	7.82	-8.59	0.53
1,115.00	1.68	55.77	1,114.83	8.04	9.87	-10.79	0.39
1,299.00	1.35	59.17	1,298.77	10.67	13.96	-15.18	0.19
1,391.00	1.48	59.88	1,390.74	11.82	15.92	-17.26	0.14
1,484.00	1.39	55.58	1,483.71	13.06	17.89	-19.37	0.15
1,576.00	2.56	218.02	1,575.69	12.07	17.54	-18.91	4.25
1,668.00	5.37	211.54	1,667.46	6.78	14.02	-14.76	3.09
1,760.00	8.67	214.46	1,758.76	-2.61	7.85	-7.46	3.61
1,852.00	11.73	207.12	1,849.30	-16.65	-0.34	2.42	3.61
1,944.00	10.87	196.83	1,939.52	-33.28	-7.12	11.21	2.38
2,136.00	10.13	186.88	2,128.32	-67.38	-14.38	22.66	1.02
2,231.00	9.12	181.26	2,221.98	-83.20	-15.55	25.79	1.45
2,327.00	9.98	188.07	2,316.66	-99.04	-16.89	29.09	1.48
2,422.00	9.12	182.45	2,410.34	-114.72	-18.36	32.51	1.33
2,518.00	10.78	190.44	2,504.90	-131.15	-20.32	36.49	2.25
2,613.00	10.03	189.59	2,598.33	-148.04	-23.30	41.56	0.81
2,804.00	10.56	189.66	2,786.26	-181.70	-29.01	51.42	0.28
2,899.00	9.91	192.02	2,879.75	-198.27	-32.17	56.62	0.81
2,995.00	11.38	188.58	2,974.09	-215.72	-35.31	61.90	1.67
3,090.00	9.53	186.28	3,067.51	-232.81	-37.57	66.27	2.00
3,186.00	8.62	186.59	3,162.31	-247.85	-39.26	69.83	0.95
3,281.00	9.62	181.09	3,256.11	-262.86	-40.23	72.66	1.40
3,376.00	8.87	187.74	3,349.88	-278.06	-41.37	75.68	1.37
3,472.00	9.85	186.55	3,444.60	-293.55	-43.30	79.53	1.04
3,567.00	11.92	189.84	3,537.89	-311.29	-45.90	84.32	2.27
3,662.00	13.74	184.49	3,630.51	-332.21	-48.47	89.47	2.29
3,853.00	13.43	179.42	3,816.18	-377.00	-50.02	96.59	0.64
3,949.00	11.48	174.25	3,909.91	-397.66	-48.95	98.10	2.34
4,044.00	10.50	171.93	4,003.17	-415.63	-46.78	98.19	1.13
4,140.00	10.13	169.96	4,097.62	-432.61	-44.08	97.63	0.53
4,331.00	9.21	178.92	4,285.92	-464.43	-40.87	98.40	0.92
4,426.00	8.56	181.95	4,379.78	-479.10	-40.96	100.32	0.84
4,521.00	8.23	183.98	4,473.76	-492.95	-41.68	102.76	0.47
4,616.00	6.93	167.03	4,567.94	-505.32	-40.86	103.49	2.71
4,712.00	4.97	161.51	4,663.42	-514.91	-38.24	102.08	2.12
4,807.00	3.00	142.59	4,758.19	-520.79	-35.43	100.02	2.47
4,903.00	2.89	113.18	4,854.06	-523.73	-31.68	96.67	1.56
4,998.00	2.50	74.46	4,948.97	-524.12	-27.48	92.55	1.92
5,093.00	1.27	33.28	5,043.92	-522.69	-24.90	89.82	1.85
5,189.00	1.44	316.29	5,139.90	-520.92	-25.15	89.85	1.76
5,284.00	1.50	319.04	5,234.87	-519.12	-26.79	91.25	0.10
5,379.00	1.09	313.58	5,329.84	-517.56	-28.26	92.51	0.45
5,475.00	1.09	320.22	5,425.82	-516.23	-29.51	93.58	0.13

## Design Report for Vince State B13-63HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,570.00	1.02	357.17	5,520.81	-514.69	-30.13	94.01	0.71
5,666.00	1.35	2.47	5,616.79	-512.71	-30.12	93.75	0.36
5,762.00	1.37	302.21	5,712.77	-510.97	-31.05	94.45	1.42
5,857.00	5.18	295.57	5,807.59	-508.51	-35.88	98.94	4.02
5,905.00	8.48	294.46	5,855.25	-506.11	-41.05	103.78	6.88
5,953.00	12.12	294.16	5,902.46	-502.58	-48.88	111.10	7.58
6,001.00	15.31	293.66	5,949.09	-497.97	-59.28	120.85	6.65
6,048.00	17.65	292.16	5,994.16	-492.79	-71.56	132.39	5.06
6,096.00	20.00	292.42	6,039.59	-486.92	-85.89	145.88	4.90
6,144.00	22.50	290.40	6,084.32	-480.58	-102.09	161.16	5.43
6,192.00	25.64	288.94	6,128.14	-474.01	-120.53	178.64	6.66
6,239.00	28.27	288.60	6,170.03	-467.16	-140.70	197.80	5.61
6,287.00	31.41	289.45	6,211.66	-459.37	-163.27	219.22	6.60
6,334.00	35.27	291.61	6,250.92	-450.29	-187.45	242.08	8.59
6,382.00	40.63	288.29	6,288.76	-440.27	-215.19	268.36	11.95
6,429.00	46.10	283.79	6,322.93	-431.42	-246.20	298.02	13.36
6,477.00	51.84	280.00	6,354.43	-424.02	-281.61	332.24	13.36
6,525.00	57.08	277.38	6,382.32	-418.15	-320.21	369.80	11.78
6,573.00	62.77	273.21	6,406.38	-414.36	-361.54	410.34	14.03
6,620.00	68.20	269.40	6,425.88	-413.42	-404.27	452.62	13.70
6,668.00	73.27	266.62	6,441.71	-415.01	-449.53	497.73	11.89
6,715.00	76.48	264.83	6,453.97	-418.39	-494.77	543.03	7.76
6,782.00	81.87	264.18	6,466.55	-424.70	-560.25	608.79	8.10
6,853.00	84.92	264.98	6,474.72	-431.36	-630.46	679.28	4.44
6,949.00	85.03	264.41	6,483.13	-440.20	-725.68	774.86	0.60
7,044.00	85.97	264.61	6,490.58	-449.26	-819.95	869.52	1.01
7,140.00	88.55	266.16	6,495.17	-456.97	-915.52	965.31	3.13
7,236.00	89.91	266.19	6,496.46	-463.37	-1,011.29	1,061.14	1.42
7,332.00	89.75	266.73	6,496.74	-469.30	-1,107.11	1,156.94	0.59
7,427.00	90.95	266.60	6,496.16	-474.83	-1,201.94	1,251.73	1.27
7,522.00	91.82	267.54	6,493.87	-479.68	-1,296.79	1,346.44	1.35
7,618.00	91.82	266.50	6,490.82	-484.67	-1,392.61	1,442.14	1.08
7,713.00	90.99	266.52	6,488.49	-490.45	-1,487.41	1,536.91	0.87
7,808.00	89.94	263.37	6,487.72	-498.82	-1,582.02	1,631.83	3.50
7,904.00	90.06	263.57	6,487.72	-509.74	-1,677.40	1,727.83	0.24
7,999.00	89.38	264.47	6,488.18	-519.64	-1,771.88	1,822.80	1.19
8,094.00	89.75	266.03	6,488.90	-527.50	-1,866.54	1,917.71	1.69
8,189.00	89.51	267.01	6,489.52	-533.27	-1,961.37	2,012.52	1.06
8,285.00	89.94	266.11	6,489.98	-539.03	-2,057.19	2,108.31	1.04
8,380.00	90.80	267.09	6,489.36	-544.66	-2,152.02	2,203.10	1.37
8,475.00	90.15	267.52	6,488.58	-549.13	-2,246.91	2,297.81	0.82
8,571.00	89.13	267.81	6,489.18	-553.04	-2,342.83	2,393.47	1.10
8,666.00	88.86	268.59	6,490.85	-556.02	-2,437.77	2,488.04	0.87
8,762.00	89.94	269.57	6,491.85	-557.56	-2,533.75	2,583.46	1.52
8,857.00	89.75	268.54	6,492.11	-559.13	-2,628.73	2,677.90	1.10
8,952.00	89.82	268.82	6,492.46	-561.32	-2,723.70	2,772.41	0.30
9,048.00	90.03	269.79	6,492.59	-562.48	-2,819.70	2,867.80	1.03
9,143.00	88.15	268.93	6,494.10	-563.55	-2,914.67	2,962.17	2.18
9,239.00	88.21	268.26	6,497.15	-565.90	-3,010.60	3,057.64	0.70
9,334.00	91.05	268.76	6,497.76	-568.37	-3,105.55	3,152.16	3.04
9,430.00	90.46	267.77	6,496.50	-571.27	-3,201.50	3,247.72	1.20

## Design Report for Vince State B13-63HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,525.00	90.34	268.22	6,495.83	-574.60	-3,296.44	3,342.34	0.49
9,621.00	90.00	266.36	6,495.55	-579.14	-3,392.32	3,438.04	1.97
9,716.00	89.97	264.09	6,495.57	-587.04	-3,486.99	3,532.95	2.39
9,811.00	90.49	266.07	6,495.19	-595.19	-3,581.63	3,627.88	2.15
9,907.00	90.15	268.48	6,494.66	-599.75	-3,677.52	3,723.58	2.54
10,002.00	88.95	268.53	6,495.40	-602.23	-3,772.48	3,818.11	1.26
10,098.00	89.07	268.64	6,497.06	-604.60	-3,868.43	3,913.62	0.17
10,193.00	91.39	268.12	6,496.68	-607.29	-3,963.39	4,008.17	2.50
10,288.00	90.03	270.33	6,495.50	-608.57	-4,058.37	4,102.56	2.73
10,383.00	88.80	271.58	6,496.47	-606.99	-4,153.34	4,196.60	1.85
10,479.00	89.57	270.82	6,497.84	-604.98	-4,249.31	4,291.57	1.13
10,574.00	89.14	270.52	6,498.91	-603.87	-4,344.30	4,385.68	0.55
10,670.00	90.89	270.17	6,498.88	-603.29	-4,440.29	4,480.86	1.86
10,765.00	89.41	271.40	6,498.63	-601.99	-4,535.28	4,574.94	2.03
10,860.00	88.55	270.01	6,500.32	-600.82	-4,630.25	4,669.03	1.72
10,956.00	90.40	269.26	6,501.20	-601.43	-4,726.24	4,764.35	2.08
10,986.00	91.02	269.06	6,500.83	-601.87	-4,756.24	4,794.16	2.17
<b>Final MWD Survey</b>							
11,050.00	91.02	269.06	6,499.69	-602.92	-4,820.22	4,857.78	0.00
<b>Bit Projection - Estimated BHL 1322'FSL 2105'FEL</b>							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
601.00	601.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
641.00	641.00	0.30	0.24	First MWD Survey
10,986.00	6,500.83	-601.87	-4,756.24	Final MWD Survey
11,050.00	6,499.69	-602.92	-4,820.22	Bit Projection
11,050.00	6,499.69	-602.92	-4,820.22	Estimated BHL 1322'FSL 2105'FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Vince State B13-63HN_PlanA - Rev1_BHL Tgt	262.84	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
601.00	11,050.00	Sperry MWD Surveys	MWD

## Design Report for Vince State B13-63HN - MWD Survey

**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
Vince State	0.00	0.00	6,500.73	-605.17	-4,820.44	1,388,542.35	3,279,472.21	40° 23' 44.196 N	104° 29' 47.724 W
- actual wellpath misses target center by 2.48ft at 11050.00ft MD (6499.69 TVD, -602.92 N, -4820.22 E)									
- Point									
Vince State	0.00	0.00	0.00	0.00	0.00	1,389,147.49	3,284,292.46	40° 23' 49.632 N	104° 28' 45.336 W
- actual wellpath hits target center									
- Polygon									
Point 1			-2,680.00	-1,907.00		1,387,240.56	3,281,612.57		
Point 2			-8,003.00	-1,945.00		1,387,202.56	3,276,289.78		
Point 3			-8,044.00	688.00		1,389,835.46	3,276,248.78		
Point 4			-8,044.00	3,258.00		1,392,405.36	3,276,248.78		
Point 5			-2,789.00	3,258.00		1,392,405.36	3,281,503.57		
Point 6			-2,749.00	672.00		1,389,819.46	3,281,543.57		
Point 7			-2,680.00	-1,907.00		1,387,240.56	3,281,612.57		
SLW State PC	0.00	0.00	-4.00	1,520.37	-2,128.79	1,390,667.79	3,282,163.75	40° 24' 4.896 N	104° 29' 12.624 W
- actual wellpath misses target center by 2615.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-2,748.79	671.37		1,389,818.83	3,281,543.78		
Point 2			-2,788.79	3,258.37		1,392,405.72	3,281,503.78		
Point 3			-179.79	3,226.37		1,392,373.72	3,284,112.68		
Point 4			2,495.21	3,195.37		1,392,342.73	3,286,787.57		
Point 5			2,530.21	670.37		1,389,817.83	3,286,822.57		
Point 6			2,565.21	-1,853.63		1,387,293.93	3,286,857.57		
Point 7			-78.79	-1,880.63		1,387,266.93	3,284,213.67		
Point 8			-2,679.79	-1,906.63		1,387,240.93	3,281,612.77		
Point 9			-2,748.79	671.37		1,389,818.83	3,281,543.78		
SLW State PC	0.00	0.00	-4.00	1,520.37	-2,128.79	1,390,667.79	3,282,163.75	40° 24' 4.896 N	104° 29' 12.624 W
- actual wellpath misses target center by 2615.97ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			-2,288.79	671.37		1,389,818.83	3,282,003.76		
Point 2			-2,328.79	2,798.37		1,391,945.74	3,281,963.76		
Point 3			-179.79	2,766.37		1,391,913.74	3,284,112.68		
Point 4			2,035.21	2,735.37		1,391,882.74	3,286,327.59		
Point 5			2,070.21	670.37		1,389,817.83	3,286,362.59		
Point 6			2,105.21	-1,393.63		1,387,753.91	3,286,397.58		
Point 7			-78.79	-1,420.63		1,387,726.91	3,284,213.67		
Point 8			-2,219.79	-1,446.63		1,387,700.91	3,282,072.76		
Point 9			-2,288.79	671.37		1,389,818.83	3,282,003.76		
Vince State	0.00	0.00	0.00	0.00	0.00	1,389,147.49	3,284,292.46	40° 23' 49.632 N	104° 28' 45.336 W
- actual wellpath hits target center									
- Polygon									
Point 1			-3,140.00	-1,447.00		1,387,700.54	3,281,152.59		
Point 2			-7,543.00	-1,485.00		1,387,662.55	3,276,749.76		
Point 3			-7,584.00	688.00		1,389,835.46	3,276,708.76		
Point 4			-7,584.00	2,798.00		1,391,945.37	3,276,708.76		
Point 5			-3,249.00	2,798.00		1,391,945.37	3,281,043.59		
Point 6			-3,209.00	672.00		1,389,819.46	3,281,083.59		
Point 7			-3,140.00	-1,447.00		1,387,700.54	3,281,152.59		

## North Reference Sheet for Sec. 18-T5N-R63W - Vince State B13-63HN

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB @ 4610.00ft (H&P 343). Northing and Easting are relative to Vince State B13-63HN

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: 0.99996010

Grid Coordinates of Well: 1,389,147.49 ft N, 3,284,292.46 ft E

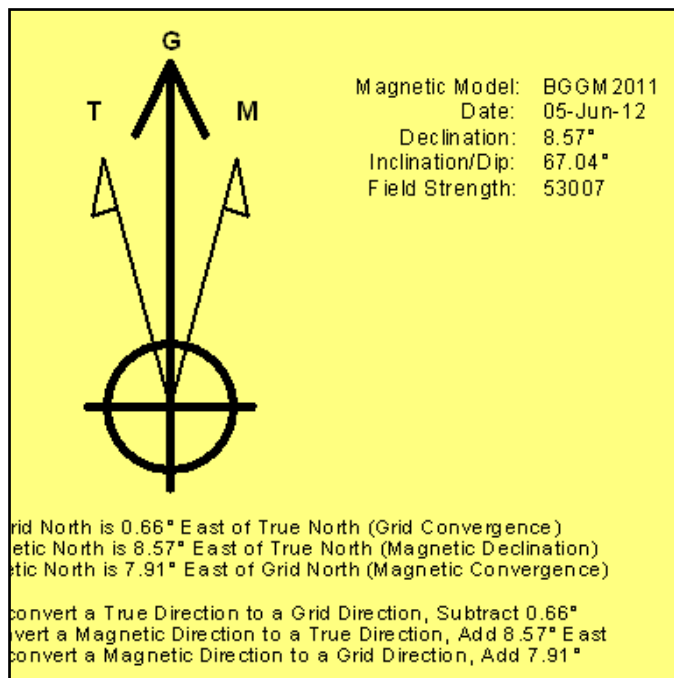
Geographical Coordinates of Well: 40° 23' 49.63" N, 104° 28' 45.34" W

Grid Convergence at Surface is: 0.66°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,050.00ft

the Bottom Hole Displacement is 4,857.78ft in the Direction of 262.87° (Grid).

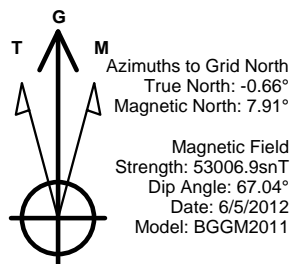
Magnetic Convergence at surface is: -7.91° ( 5 June 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)  
 Site: Sec. 18-T5N-R63W  
 Well: Vince State B13-63HN

# Noble Energy

**HALLIBURTON**  
 Sperry Drilling

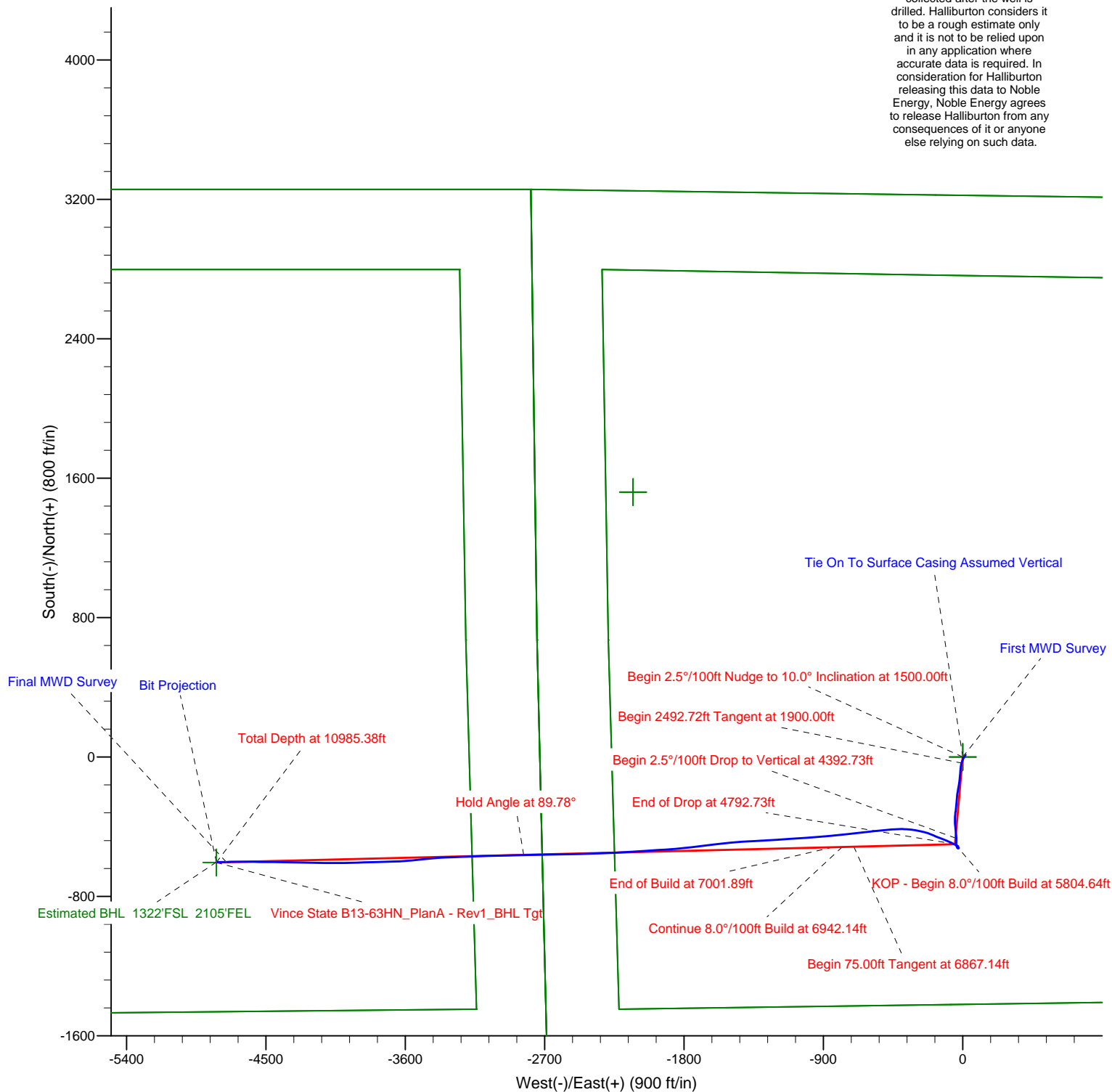


## LEGEND

- Vince State B13-63HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Permitted BHL: 1320' FSL,  
 2105' FEL

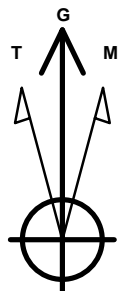
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Vince State B13-63HN well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide 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. 18-T5N-R63W  
Well: Vince State B13-63HN

# Noble Energy

**HALLIBURTON**  
Sperry Drilling



Azimuths to Grid North  
True North:  $-0.66^\circ$   
Magnetic North:  $7.91^\circ$

Magnetic Field  
Strength: 53006.9snT  
Dip Angle:  $67.04^\circ$   
Date: 6/5/2012  
Model: BGGM2011

## LEGEND

- Vince State B13-63HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

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