

# Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T3N-R64W (Guttersen 04 PAD)

Guttersen D04-69HN

MWD Survey

## Sperry Drilling Services Final Survey Report

07 January, 2013

Well Coordinates: 1,339,327.00 N, 3,261,122.97 E (40° 15' 39.85" N, 104° 33' 51.59" W)

Ground Level: 4,747.00 ft

Local Coordinate Origin: Centered on Well Guttersen D04-69HN - Slot A1

Viewing Datum: KB @ 4760.00ft (Ensign 132)

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 Guttersen D04-69HN - 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
761.00	0.00	0.00	761.00	0.00	0.00	0.00	0.00
Tie On To Surface Casing Assumed Vertical							
830.00	0.70	134.59	830.00	-0.30	0.30	0.27	1.01
First MWD Survey							
1,114.00	1.09	154.59	1,113.96	-3.95	2.69	2.36	0.17
1,395.00	1.21	172.53	1,394.91	-9.31	4.23	3.44	0.13
1,488.00	0.97	338.51	1,487.90	-9.55	4.07	3.26	2.33
1,673.00	1.80	350.33	1,672.85	-5.23	3.00	2.56	0.47
1,765.00	4.18	12.55	1,764.72	-0.53	3.49	3.43	2.83
1,856.00	6.02	358.09	1,855.36	7.48	4.05	4.66	2.45
1,948.00	6.38	353.74	1,946.82	17.38	3.33	4.76	0.64
2,040.00	6.97	354.21	2,038.20	28.01	2.21	4.53	0.64
2,132.00	6.44	354.24	2,129.57	38.70	1.13	4.34	0.58
2,227.00	5.19	356.64	2,224.08	48.29	0.35	4.35	1.34
2,323.00	4.90	359.58	2,319.70	56.73	0.06	4.76	0.40
2,418.00	5.25	355.21	2,414.33	65.11	-0.33	5.06	0.55
2,513.00	4.82	353.78	2,508.96	73.41	-1.13	4.96	0.47
2,608.00	5.81	351.74	2,603.55	82.14	-2.25	4.56	1.06
2,703.00	5.63	347.69	2,698.08	91.45	-3.93	3.66	0.47
2,798.00	5.66	11.33	2,792.63	100.60	-4.01	4.34	2.43
2,893.00	5.94	14.67	2,887.15	109.95	-1.84	7.27	0.46
2,988.00	5.14	6.75	2,981.70	118.93	-0.10	9.76	1.16
3,083.00	4.88	8.91	3,076.34	127.15	1.03	11.56	0.34
3,178.00	4.20	8.51	3,171.04	134.58	2.17	13.31	0.72
3,273.00	4.60	352.54	3,265.77	141.80	2.19	13.93	1.35
3,368.00	4.67	338.81	3,360.46	149.18	0.30	12.66	1.17
3,463.00	3.61	353.07	3,455.21	155.76	-1.46	11.45	1.55
3,558.00	5.97	9.65	3,549.88	163.60	-0.99	12.56	2.86
3,653.00	5.64	358.81	3,644.39	173.13	-0.26	14.08	1.20
3,748.00	5.84	9.15	3,738.92	182.57	0.41	15.53	1.11
3,843.00	6.13	9.09	3,833.40	192.35	1.98	17.91	0.31
3,938.00	5.98	8.55	3,927.87	202.26	3.52	20.26	0.17
4,033.00	4.86	6.36	4,022.45	211.15	4.70	22.17	1.20
4,128.00	4.47	359.94	4,117.13	218.85	5.14	23.25	0.69
4,223.00	4.23	348.95	4,211.86	225.99	4.46	23.17	0.91
4,318.00	5.06	344.65	4,306.55	233.47	2.68	22.02	0.95
4,413.00	5.60	343.39	4,401.14	241.95	0.25	20.29	0.58
4,508.00	5.87	354.75	4,495.66	251.23	-1.52	19.30	1.23
4,603.00	5.04	357.44	4,590.23	260.24	-2.15	19.42	0.91
4,698.00	5.51	354.98	4,684.83	268.95	-2.74	19.55	0.55
4,793.00	4.21	345.44	4,779.49	276.87	-4.01	18.94	1.61
4,887.00	4.20	337.73	4,873.24	283.40	-6.18	17.32	0.60
4,983.00	3.71	353.35	4,969.01	289.73	-7.88	16.15	1.23
5,078.00	4.81	10.16	5,063.75	296.71	-7.53	17.08	1.74
5,173.00	5.45	9.73	5,158.37	305.07	-6.06	19.23	0.67
5,268.00	5.28	351.10	5,252.96	313.84	-5.98	20.04	1.83
5,363.00	1.92	306.02	5,347.77	319.10	-7.94	18.52	4.37
5,458.00	0.64	347.08	5,442.75	320.55	-9.35	17.24	1.58
5,553.00	0.96	345.25	5,537.74	321.84	-9.67	17.03	0.34



## Design Report for Guttersen D04-69HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,838.00	1.15	332.68	5,822.69	326.69	-11.59	15.51	0.10
5,933.00	1.23	329.92	5,917.67	328.42	-12.54	14.71	0.10
6,029.00	1.36	330.45	6,013.65	330.30	-13.62	13.79	0.14
6,077.00	2.12	35.69	6,061.63	331.52	-13.38	14.13	4.13
6,124.00	7.31	74.64	6,108.46	333.01	-9.99	17.64	12.37
6,172.00	12.63	77.84	6,155.72	334.93	-1.91	25.85	11.14
6,219.00	16.65	82.00	6,201.18	336.95	9.79	37.67	8.84
6,267.00	20.41	86.69	6,246.69	338.39	24.96	52.91	8.42
6,314.00	23.27	90.24	6,290.31	338.83	42.43	70.36	6.70
6,362.00	26.08	90.40	6,333.93	338.71	62.47	90.31	5.86
6,409.00	27.14	89.16	6,375.95	338.80	83.52	111.30	2.55
6,457.00	29.24	87.48	6,418.25	339.47	106.18	133.94	4.68
6,504.00	32.27	90.51	6,458.64	339.87	130.20	157.91	7.24
6,552.00	34.43	90.15	6,498.73	339.72	156.59	184.19	4.52
6,599.00	37.64	90.98	6,536.74	339.44	184.23	211.72	6.91
6,647.00	43.50	91.49	6,573.18	338.76	215.43	242.75	12.23
6,694.00	48.42	91.55	6,605.85	337.86	249.19	276.33	10.47
6,742.00	51.15	90.62	6,636.83	337.17	285.83	312.79	5.88
6,789.00	54.66	89.42	6,665.18	337.17	323.32	350.14	7.74
6,837.00	59.39	88.12	6,691.30	338.04	363.56	390.32	10.11
6,884.00	63.76	88.49	6,713.66	339.26	404.87	431.58	9.32
6,932.00	67.30	88.71	6,733.54	340.33	448.54	475.19	7.39
6,979.00	70.41	90.69	6,750.50	340.55	492.36	518.88	7.70
7,027.00	75.30	91.94	6,764.64	339.49	538.20	564.48	10.49
7,074.00	80.04	92.21	6,774.68	337.83	584.08	610.06	10.10
7,087.00	81.06	91.61	6,776.81	337.40	596.89	622.79	9.07
7,162.00	84.07	90.19	6,786.52	336.24	671.24	696.79	4.43
7,205.00	84.41	90.73	6,790.83	335.89	714.02	739.40	1.48
7,300.00	85.21	90.94	6,799.42	334.51	808.62	833.56	0.87
7,395.00	87.78	90.62	6,805.23	333.22	903.43	927.93	2.73
7,490.00	90.12	89.44	6,806.97	333.17	998.40	1,022.57	2.76
7,585.00	90.31	86.58	6,806.62	336.47	1,093.34	1,117.45	3.02
7,680.00	90.62	84.75	6,805.84	343.65	1,188.06	1,212.44	1.95
7,775.00	90.28	84.63	6,805.10	352.44	1,282.65	1,307.44	0.38
7,870.00	90.31	88.00	6,804.61	358.55	1,377.43	1,402.40	3.55
7,965.00	90.74	92.32	6,803.74	358.28	1,472.41	1,497.03	4.57
8,060.00	90.09	91.16	6,803.05	355.40	1,567.36	1,591.41	1.40
8,155.00	90.80	89.19	6,802.31	355.11	1,662.35	1,686.06	2.20
8,249.00	89.94	91.64	6,801.71	354.43	1,756.34	1,779.66	2.76
8,344.00	89.26	92.12	6,802.37	351.31	1,851.28	1,874.02	0.88
8,440.00	89.88	91.82	6,803.09	348.01	1,947.22	1,969.36	0.72
8,535.00	89.69	92.03	6,803.45	344.82	2,042.17	2,063.72	0.30
8,630.00	89.97	92.28	6,803.73	341.25	2,137.10	2,158.03	0.40
8,725.00	90.09	91.57	6,803.68	338.06	2,232.05	2,252.38	0.76
8,820.00	90.43	92.55	6,803.25	334.64	2,326.98	2,346.71	1.09
8,915.00	88.77	88.18	6,803.91	334.04	2,421.95	2,441.30	4.92
9,010.00	89.60	86.30	6,805.26	338.61	2,516.83	2,536.23	2.16
9,105.00	90.43	88.60	6,805.24	342.84	2,611.73	2,631.15	2.57
9,200.00	91.45	89.09	6,803.68	344.75	2,706.69	2,725.95	1.19
9,295.00	91.79	87.70	6,800.99	347.41	2,801.62	2,820.77	1.51
9,391.00	90.15	87.18	6,799.37	351.70	2,897.50	2,916.68	1.79

## Design Report for Guttersen D04-69HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,486.00	89.88	89.01	6,799.34	354.86	2,992.45	3,011.56	1.95
9,581.00	90.12	87.92	6,799.34	357.40	3,087.41	3,106.41	1.17
9,676.00	89.66	89.06	6,799.52	359.91	3,182.38	3,201.25	1.29
9,771.00	89.54	88.96	6,800.19	361.55	3,277.36	3,296.04	0.16
9,866.00	89.97	91.24	6,800.59	361.38	3,372.35	3,390.70	2.44
9,961.00	89.88	92.77	6,800.72	358.06	3,467.29	3,485.03	1.61
10,056.00	90.06	91.98	6,800.77	354.12	3,562.21	3,579.30	0.85
10,151.00	89.85	89.84	6,800.84	352.61	3,657.19	3,673.83	2.26
10,246.00	90.49	90.37	6,800.56	352.44	3,752.19	3,768.49	0.87
10,341.00	89.97	88.77	6,800.18	353.15	3,847.18	3,863.21	1.77
10,436.00	87.84	87.41	6,802.00	356.32	3,942.10	3,958.07	2.66
10,531.00	87.99	87.46	6,805.45	360.56	4,036.95	4,052.94	0.17
10,626.00	88.80	87.90	6,808.11	364.41	4,131.83	4,147.82	0.97
10,721.00	89.78	89.04	6,809.29	366.95	4,226.79	4,242.66	1.58
10,816.00	90.49	88.92	6,809.07	368.64	4,321.77	4,337.45	0.76
10,848.00	91.26	89.01	6,808.58	369.21	4,353.76	4,369.38	2.42
Final MWD Survey							
10,917.00	91.26	89.01	6,807.06	370.41	4,422.73	4,438.22	0.00
Bit Projection - Estimated BHL 77°FSL 535°FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
761.00	761.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
830.00	830.00	-0.30	0.30	First MWD Survey
10,848.00	6,808.58	369.21	4,353.76	Final MWD Survey
10,917.00	6,807.06	370.41	4,422.73	Bit Projection
10,917.00	6,807.06	370.41	4,422.73	Estimated BHL 77°FSL 535°FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	+N/-S (ft)	+E/-W (ft)	Start TVD (ft)
Target	Guttersen D04-69HN_PlanC - Rev0_BHL	85.25	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
761.00	10,917.00	Sperry MWD Surveys	MWD



## Design Report for Guttersen D04-69HN - 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
Guttersen	0.00	0.00	6,805.00	367.67	4,422.73	1,339,694.66	3,265,545.51	40° 15' 43.020 N	104° 32' 54.492 W
- actual wellpath misses target center by 3.42ft at 10916.99ft MD (6807.06 TVD, 370.41 N, 4422.73 E)									
- Point									
Guttersen	0.00	0.00	-11.00	-25.50	0.27	1,339,301.50	3,261,123.24	40° 15' 39.600 N	104° 33' 51.588 W
- actual wellpath misses target center by 27.77ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				170.27	701.50	1,340,028.47	3,261,293.23		
Point 2				136.27	2,878.50	1,342,205.38	3,261,259.24		
Point 3				106.27	5,059.50	1,344,386.28	3,261,229.24		
Point 4				2,282.27	5,083.50	1,344,410.28	3,263,405.14		
Point 5				4,459.27	5,108.50	1,344,435.28	3,265,582.05		
Point 6				4,479.27	2,934.50	1,342,261.38	3,265,602.05		
Point 7				4,499.27	760.50	1,340,087.47	3,265,622.05		
Point 8				170.27	701.50	1,340,028.47	3,261,293.23		
Guttersen	0.00	0.00	-11.00	-25.50	0.27	1,339,301.50	3,261,123.24	40° 15' 39.600 N	104° 33' 51.588 W
- actual wellpath misses target center by 27.77ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				170.27	-218.50	1,339,108.51	3,261,293.23		
Point 2				4,499.27	-159.50	1,339,167.51	3,265,622.05		
Point 3				4,530.27	-4,510.50	1,334,816.70	3,265,653.05		
Point 4				2,367.27	-4,553.50	1,334,773.70	3,263,490.14		
Point 5				200.27	-4,592.50	1,334,734.70	3,261,323.23		
Point 6				184.27	-2,400.50	1,336,926.61	3,261,307.23		
Point 7				170.27	-218.50	1,339,108.51	3,261,293.23		
Guttersen	0.00	0.00	-11.00	-25.50	0.27	1,339,301.50	3,261,123.24	40° 15' 39.600 N	104° 33' 51.588 W
- actual wellpath misses target center by 27.77ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-289.73	241.50	1,339,568.49	3,260,833.25		
Point 2				4,959.27	300.50	1,339,627.49	3,266,082.03		
Point 3				4,990.27	-4,970.50	1,334,356.72	3,266,113.03		
Point 4				2,367.27	-5,013.50	1,334,313.72	3,263,490.14		
Point 5				-259.73	-5,052.50	1,334,274.72	3,260,863.25		
Point 6				-275.73	-2,400.50	1,336,926.61	3,260,847.25		
Point 7				-289.73	241.50	1,339,568.49	3,260,833.25		
Guttersen	0.00	0.00	-11.00	-25.50	0.27	1,339,301.50	3,261,123.24	40° 15' 39.600 N	104° 33' 51.588 W
- actual wellpath misses target center by 27.77ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-289.73	241.50	1,339,568.49	3,260,833.25		
Point 2				-323.73	2,878.50	1,342,205.38	3,260,799.26		
Point 3				-353.73	5,519.50	1,344,846.27	3,260,769.26		
Point 4				2,282.27	5,543.50	1,344,870.26	3,263,405.14		
Point 5				4,919.27	5,568.50	1,344,895.26	3,266,042.03		
Point 6				4,939.27	2,934.50	1,342,261.38	3,266,062.03		
Point 7				4,959.27	300.50	1,339,627.49	3,266,082.03		
Point 8				-289.73	241.50	1,339,568.49	3,260,833.25		

**North Reference Sheet for Sec. 4-T3N-R64W (Guttersen 04 PAD) - Guttersen D04-69HN**

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

Vertical Depths are relative to KB @ 4760.00ft (Ensign 132). Northing and Easting are relative to Guttersen D04-69HN - Slot A1

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: 0.99995686

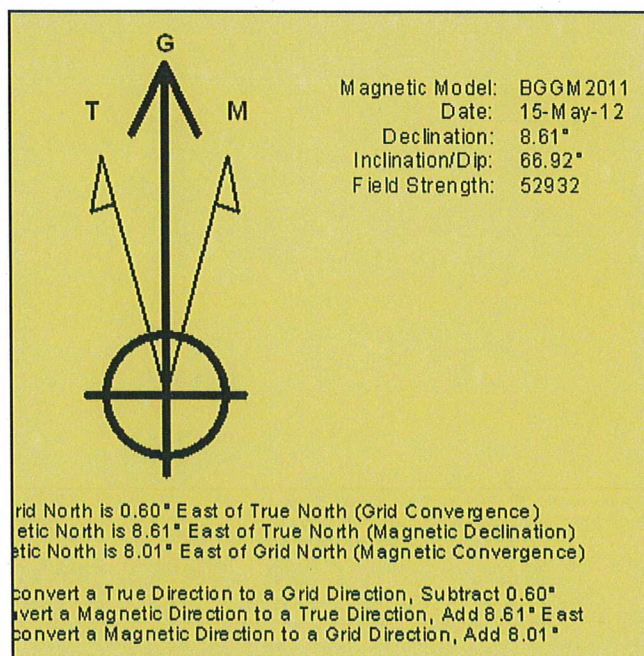
Grid Coordinates of Well: 1,339,327.00 ft N, 3,261,122.97 ft E

Geographical Coordinates of Well: 40° 15' 39.85" N, 104° 33' 51.59" W

Grid Convergence at Surface is: 0.60°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,917.00ft the Bottom Hole Displacement is 4,438.22ft in the Direction of 85.21° (Grid).

Magnetic Convergence at surface is: -8.01° (15 May 2012, , BGGM2011)

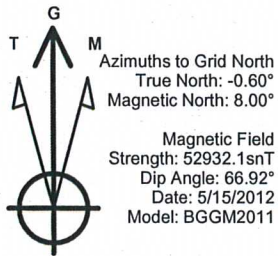


Project: Weld County, CO (NAD 83)  
Site: Sec. 4-T3N-R64W (Guttersen 04 PAD)  
Well: Guttersen D04-69HN

# Noble Energy

**HALLIBURTON**

Sperry Drilling

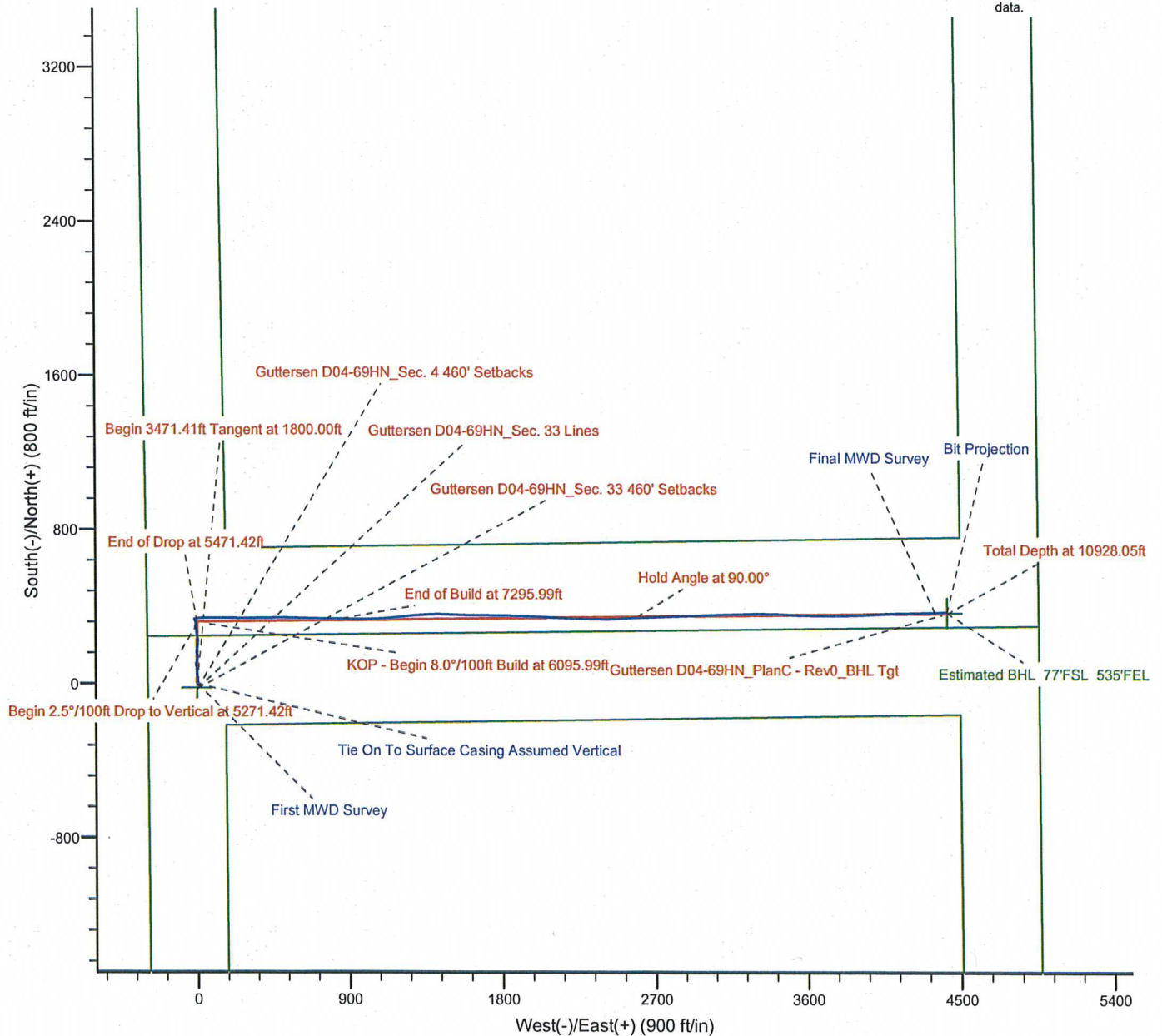


## LEGEND

- Guttersen D04-69HN, Plan C, Plan C - Rev 0 Proposal V0
- MWD Survey

Permitted BHL: 75' FSL, 535'  
FEL

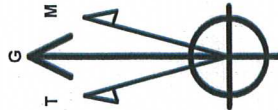
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Guttersen D04-69HN well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them 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. 4-T3N-R64W (Guttersen 04 PAD)  
Well: Guttersen D04-69HN

# Noble Energy



Azimuths to Grid North  
True North: -0.60°  
Magnetic North: 8.00°  
  
Magnetic Field  
Strength: 52932.1nT  
Dip Angle: 66.92°  
Date: 5/15/2012  
Model: BGGM2011

## LEGEND

- Guttersen D04-69HN, Plan C, Plan C - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Guttersen D04-69HN 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.

