Noble Energy

Weld County, CO (NAD 83)
Sec. 16-T3N-R64W
Guttersen State D16-63-1HN

MWD Survey

Sperry Drilling Services

Final Survey Report

06 January, 2013

Well Coordinates: 1,324,993.46 N, 3,266,091.44 E (40° 13' 17.69" N, 104° 32' 49.49" W)
Ground Level: 4,782.00 ft

Local Coordinate Origin:	Centered on Well Guttersen State D16-63-1HN
Viewing Datum:	KB @ 4795.00ft (Ensign 132)
TVDs to System:	N
North Reference:	Grid
Unit System:	API - US Survey Feet - Custom

Geodetic Scale Factor Applied
Version: 2003.16 Build: 43I

HALLIBURTON

Design Report for Guttersen State D16-63-1HN - 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
798.00	0.00	0.00	798.00	0.00	0.00	0.00	0.00
Tie On To Surface Casing Assumed Vertical							
918.00	0.47	146.42	918.00	-0.41	0.27	-0.24	0.39
First MWD Survey							
1,109.00	1.03	137.42	1,108.98	-2.33	1.87	-1.71	0.30
1,203.00	0.95	137.12	1,202.97	-3.52	2.97	-2.72	0.09
1,294.00	1.26	149.24	1,293.95	-4.93	3.99	-3.65	0.42
1,386.00	1.42	146.05	1,385.93	-6.75	5.15	-4.68	0.19
1,478.00	1.40	150.75	1,477.90	-8.67	6.33	-5.73	0.13
1,570.00	1.40	156.71	1,569.87	-10.69	7.33	-6.59	0.16
1,662.00	1.43	161.09	1,661.84	-12.80	8.14	-7.26	0.12
1,754.00	1.31	161.23	1,753.82	-14.89	8.85	-7.82	0.13
1,846.00	1.30	171.40	1,845.79	-16.91	9.35	-8.18	0.25
1,937.00	1.00	177.27	1,936.77	-18.73	9.54	-8.25	0.35
2,029.00	0.76	193.20	2,028.76	-20.12	9.44	-8.05	0.37
2,121.00	0.47	128.73	2,120.76	-20.95	9.59	-8.15	0.76
2,213.00	0.66	88.49	2,212.75	-21.18	10.42	-8.96	0.46
2,308.00	1.08	137.90	2,307.74	-21.83	11.57	-10.06	0.86
2,403.00	0.85	164.51	2,402.73	-23.17	12.35	-10.76	0.52
2,498.00	0.68	183.34	2,497.72	-24.41	12.51	-10.83	0.32
2,593.00	3.78	188.78	2,592.64	-28.07	12.00	-10.07	3.27
2,688.00	6.14	178.57	2,687.28	-36.24	11.65	-9.16	2.64
2,782.00	7.65	177.19	2,780.60	-47.52	12.08	-8.83	1.62
2,877.00	8.59	176.99	2,874.64	-60.92	12.76	-8.60	0.99
2,972.00	9.81	179.79	2,968.42	-76.10	13.16	-7.98	1.37
3,067.00	10.11	178.98	3,061.99	-92.53	13.34	-7.04	0.35
3,162.00	9.56	174.59	3,155.59	-108.72	14.23	-6.83	0.98
3,257.00	9.28	171.17	3,249.31	-124.14	16.15	-7.70	0.66
3,352.00	10.14	173.77	3,342.95	-140.03	18.24	-8.71	1.02
3,447.00	10.20	176.80	3,436.46	-156.74	19.61	-8.95	0.57
3,542.00	10.55	177.16	3,529.91	-173.82	20.52	-8.69	0.37
3,637.00	9.92	177.51	3,623.39	-190.68	21.30	-8.33	0.67
3,732.00	10.83	170.72	3,716.84	-207.67	23.10	-8.97	1.60
3,827.00	11.59	172.59	3,810.03	-225.94	25.77	-10.40	0.89
3,922.00	9.39	178.44	3,903.44	-243.15	27.21	-10.67	2.57
4,017.00	6.68	180.36	3,997.50	-256.43	27.38	-9.94	2.87
4,112.00	4.70	168.61	4,092.03	-265.77	28.12	-10.04	2.41
4,207.00	3.30	162.67	4,186.79	-272.20	29.70	-11.19	1.53
4,302.00	0.56	161.13	4,281.73	-275.25	30.67	-11.94	2.88
4,397.00	0.31	55.55	4,376.73	-275.54	31.03	-12.28	0.75
4,682.00	1.11	96.83	4,661.71	-275.43	34.41	-15.66	0.32
4,777.00	1.40	130.60	4,756.69	-276.30	36.20	-17.39	0.82
4,872.00	0.20	129.56	4,851.67	-277.16	37.21	-18.34	1.26
5,157.00	0.37	29.07	5,136.67	-276.67	38.04	-19.20	0.16
5,441.00	0.83	78.76	5,420.66	-275.47	40.50	-21.74	0.23
5,537.00	1.08	84.64	5,516.64	-275.25	42.09	-23.34	0.28
5,631.00	1.01	73.73	5,610.63	-274.93	43.76	-25.03	0.22
5,727.00	1.23	71.30	5,706.61	-274.36	45.55	-26.85	0.23
5,821.00	1.02	167.28	5,800.60	-274.86	46.69	-27.96	1.78

Design Report for Guttersen State D16-63-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,106.00	1.70	110.26	6,085.53	-278.80	51.22	-32.20	0.50
6,201.00	5.06	258.76	6,180.43	-280.10	48.43	-29.33	6.92
6,249.00	11.41	263.33	6,227.91	-281.07	41.63	-22.48	13.29
6,296.00	15.31	264.19	6,273.63	-282.24	30.83	-11.63	8.31
6,344.00	16.81	265.22	6,319.75	-283.46	17.61	1.64	3.18
6,391.00	20.85	268.58	6,364.23	-284.23	2.47	16.80	8.90
6,439.00	25.07	267.37	6,408.42	-284.91	-16.24	35.51	8.85
6,486.00	28.09	266.06	6,450.44	-286.13	-37.23	56.53	6.55
6,534.00	31.42	266.83	6,492.11	-287.59	-61.00	80.35	6.98
6,581.00	33.72	267.80	6,531.72	-288.77	-86.27	105.64	5.02
6,629.00	37.35	269.59	6,570.77	-289.39	-114.16	133.51	7.87
6,676.00	42.80	268.84	6,606.72	-289.81	-144.40	163.71	11.64
6,724.00	47.93	267.80	6,640.44	-290.83	-178.53	197.83	10.80
6,771.00	50.71	268.59	6,671.07	-291.95	-214.15	233.44	6.05
6,819.00	53.22	268.81	6,700.64	-292.80	-251.94	271.21	5.24
6,866.00	56.91	268.61	6,727.55	-293.67	-290.46	309.69	7.86
6,914.00	61.17	268.21	6,752.24	-294.82	-331.59	350.81	8.90
6,961.00	66.54	268.26	6,772.94	-296.12	-373.75	392.96	11.43
7,009.00	71.38	269.06	6,790.17	-297.16	-418.52	437.70	10.20
7,056.00	72.36	270.32	6,804.80	-297.40	-463.19	482.28	3.29
7,104.00	74.56	270.98	6,818.46	-296.87	-509.20	528.14	4.77
7,151.00	77.41	268.66	6,829.84	-297.02	-554.79	573.64	7.73
7,166.00	79.17	268.22	6,832.89	-297.42	-569.47	588.32	12.08
7,238.00	84.09	267.45	6,843.36	-300.12	-640.63	659.50	6.91
7,285.00	84.38	266.99	6,848.08	-302.38	-687.34	706.25	1.15
7,333.00	85.59	268.83	6,852.28	-304.13	-735.12	754.04	4.58
7,380.00	85.96	269.57	6,855.74	-304.78	-781.99	800.84	1.76
7,428.00	86.88	270.90	6,858.74	-304.59	-829.89	848.62	3.36
7,475.00	88.15	271.07	6,860.78	-303.78	-876.84	895.41	2.73
7,523.00	88.83	270.78	6,862.04	-303.00	-924.81	943.22	1.54
7,570.00	90.25	270.59	6,862.42	-302.44	-971.81	990.07	3.05
7,618.00	90.25	270.27	6,862.21	-302.08	-1,019.81	1,037.93	0.67
7,665.00	90.68	270.76	6,861.83	-301.66	-1,066.80	1,084.79	1.39
7,713.00	90.68	270.62	6,861.26	-301.08	-1,114.80	1,132.64	0.29
7,760.00	90.87	270.60	6,860.62	-300.58	-1,161.79	1,179.49	0.41
7,855.00	91.39	270.70	6,858.75	-299.50	-1,256.76	1,274.17	0.56
7,950.00	89.57	269.76	6,857.96	-299.12	-1,351.75	1,368.92	2.16
8,045.00	90.25	269.70	6,858.10	-299.57	-1,446.75	1,463.73	0.72
8,140.00	90.74	269.68	6,857.28	-300.08	-1,541.75	1,558.54	0.52
8,235.00	91.29	270.48	6,855.60	-299.95	-1,636.73	1,653.30	1.02
8,330.00	90.12	270.01	6,854.43	-299.54	-1,731.72	1,748.04	1.33
8,425.00	90.49	268.45	6,853.93	-300.82	-1,826.71	1,842.90	1.69
8,520.00	89.48	267.57	6,853.95	-304.12	-1,921.65	1,937.84	1.41
8,615.00	89.57	268.15	6,854.74	-307.67	-2,016.58	2,032.79	0.62
8,710.00	90.31	269.65	6,854.84	-309.49	-2,111.56	2,127.68	1.76
8,805.00	90.00	268.56	6,854.58	-310.98	-2,206.54	2,222.55	1.19
8,900.00	90.28	267.74	6,854.35	-314.04	-2,301.49	2,317.49	0.91
8,995.00	88.86	271.66	6,855.06	-314.54	-2,396.47	2,412.28	4.39
9,090.00	90.62	272.94	6,855.49	-310.73	-2,491.39	2,506.72	2.29
9,185.00	89.69	271.48	6,855.24	-307.06	-2,586.31	2,601.17	1.82
9,279.00	90.49	270.46	6,855.09	-305.47	-2,680.30	2,694.84	1.38

Design Report for Guttersen State D16-63-1HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,374.00	89.48	270.14	6,855.11	-304.98	-2,775.29	2,789.58	1.12
9,470.00	90.37	270.82	6,855.24	-304.17	-2,871.29	2,885.30	1.17
9,565.00	89.63	269.49	6,855.24	-303.91	-2,966.29	2,980.06	1.60
9,660.00	89.94	270.83	6,855.60	-303.65	-3,061.28	3,074.82	1.45
9,754.00	91.17	270.19	6,854.69	-302.81	-3,155.27	3,168.54	1.48
9,849.00	90.93	270.12	6,852.94	-302.56	-3,250.25	3,263.29	0.26
9,944.00	90.77	268.81	6,851.54	-303.44	-3,345.24	3,358.11	1.39
10,039.00	90.83	269.41	6,850.21	-304.92	-3,440.22	3,452.97	0.63
10,134.00	89.69	270.42	6,849.78	-305.06	-3,535.21	3,547.76	1.60
10,229.00	90.40	269.44	6,849.70	-305.17	-3,630.21	3,642.55	1.27
10,324.00	89.51	269.27	6,849.78	-306.24	-3,725.20	3,737.39	0.95
10,419.00	89.48	268.30	6,850.62	-308.26	-3,820.18	3,832.29	1.02
10,514.00	89.17	268.23	6,851.73	-311.13	-3,915.13	3,927.21	0.33
10,609.00	90.03	268.06	6,852.40	-314.21	-4,010.07	4,022.15	0.92
10,704.00	89.81	269.02	6,852.53	-316.63	-4,105.04	4,117.06	1.04
10,799.00	92.68	271.63	6,850.47	-316.09	-4,200.00	4,211.77	4.08
10,894.00	92.52	270.72	6,846.16	-314.15	-4,294.88	4,306.30	0.97
10,989.00	91.14	270.52	6,843.12	-313.12	-4,389.83	4,400.95	1.47
11,085.00	89.32	270.71	6,842.74	-312.09	-4,485.82	4,496.65	1.91
11,178.00	89.75	270.52	6,843.49	-311.09	-4,578.81	4,589.36	0.51
Final MWD Survey							
11,243.00	89.75	270.52	6,843.78	-310.50	-4,643.80	4,654.17	0.00
Bit Projection - Estimated BHL		**994'FSL**	**535'FWL**				

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
798.00	798.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
918.00	918.00	-0.41	0.27	First MWD Survey
11,178.00	6,843.49	-311.09	-4,578.81	Final MWD Survey
11,243.00	6,843.78	-310.50	-4,643.80	Bit Projection
11,243.00	6,843.78	-310.50	-4,643.80	Estimated BHL 994'FSL 535'FWL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Guttersen State D16-63-1HN_PlanC - Rev0_B HL Tgt	266.11	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
798.00	11,243.00	Sperry MWD Surveys	MWD

Design Report for Guttersen State D16-63-1HN - 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
Spike State	0.00	0.00	-11.00	91.10	1.81	1,325,084.55	3,266,093.25	40° 13' 18.588 N	104° 32' 49.452 W
- actual wellpath misses target center by 91.78ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				113.81	-1,266.90	1,323,726.61	3,266,205.25		
Point 2				-5,175.19	-1,311.90	1,323,681.61	3,260,916.47		
Point 3				-5,203.19	3,988.10	1,328,981.39	3,260,888.47		
Point 4				62.81	4,048.10	1,329,041.38	3,266,154.25		
Point 5				113.81	-1,266.90	1,323,726.61	3,266,205.25		
Spike State	0.00	0.00	-11.00	91.10	1.81	1,325,084.55	3,266,093.25	40° 13' 18.588 N	104° 32' 49.452 W
- actual wellpath misses target center by 91.78ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-346.19	-806.90	1,324,186.59	3,265,745.27		
Point 2				-4,715.19	-851.90	1,324,141.59	3,261,376.45		
Point 3				-4,743.19	3,528.10	1,328,521.41	3,261,348.45		
Point 4				-397.19	3,588.10	1,328,581.40	3,265,694.27		
Point 5				-346.19	-806.90	1,324,186.59	3,265,745.27		
Guttersen State	0.00	0.00	6,849.00	-315.42	-4,643.74	1,324,678.05	3,261,447.90	40° 13' 15.060 N	104° 33' 49.392 W
- actual wellpath misses target center by 7.18ft at 11242.91ft MD (6843.78 TVD, -310.50 N, -4643.72 E)									
- Point									

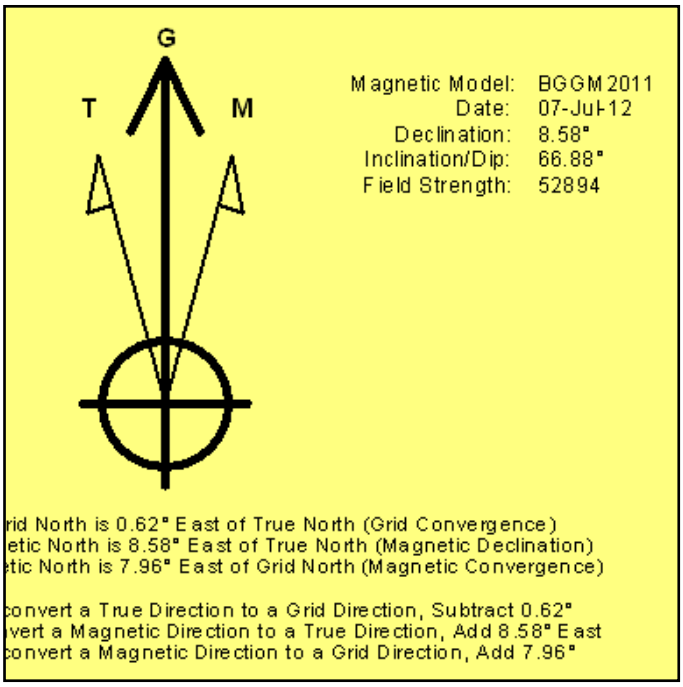
North Reference Sheet for Sec. 16-T3N-R64W - Guttersen State D16-63-1HN

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.
Vertical Depths are relative to KB @ 4795.00ft (Ensign 132). Northing and Easting are relative to Guttersen State D16-63-1HN
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: 0.99995697

Grid Coordinates of Well: 1,324,993.46 ft N, 3,266,091.44 ft E
Geographical Coordinates of Well: 40° 13' 17.69" N, 104° 32' 49.49" W
Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,243.00ft
the Bottom Hole Displacement is 4,654.17ft in the Direction of 266.17° (Grid).

Magnetic Convergence at surface is: -7.96° (7 July 2012, , BGGM2011)



Project: Weld County, CO (NAD 83)
Site: Sec. 16-T3N-R64W
Well: Guttersen State D16-63-1HN

Noble Energy

HALLIBURTON
Sperry Drilling

Azimuths to Grid North
True North: -0.62°
Magnetic North: 7.96°

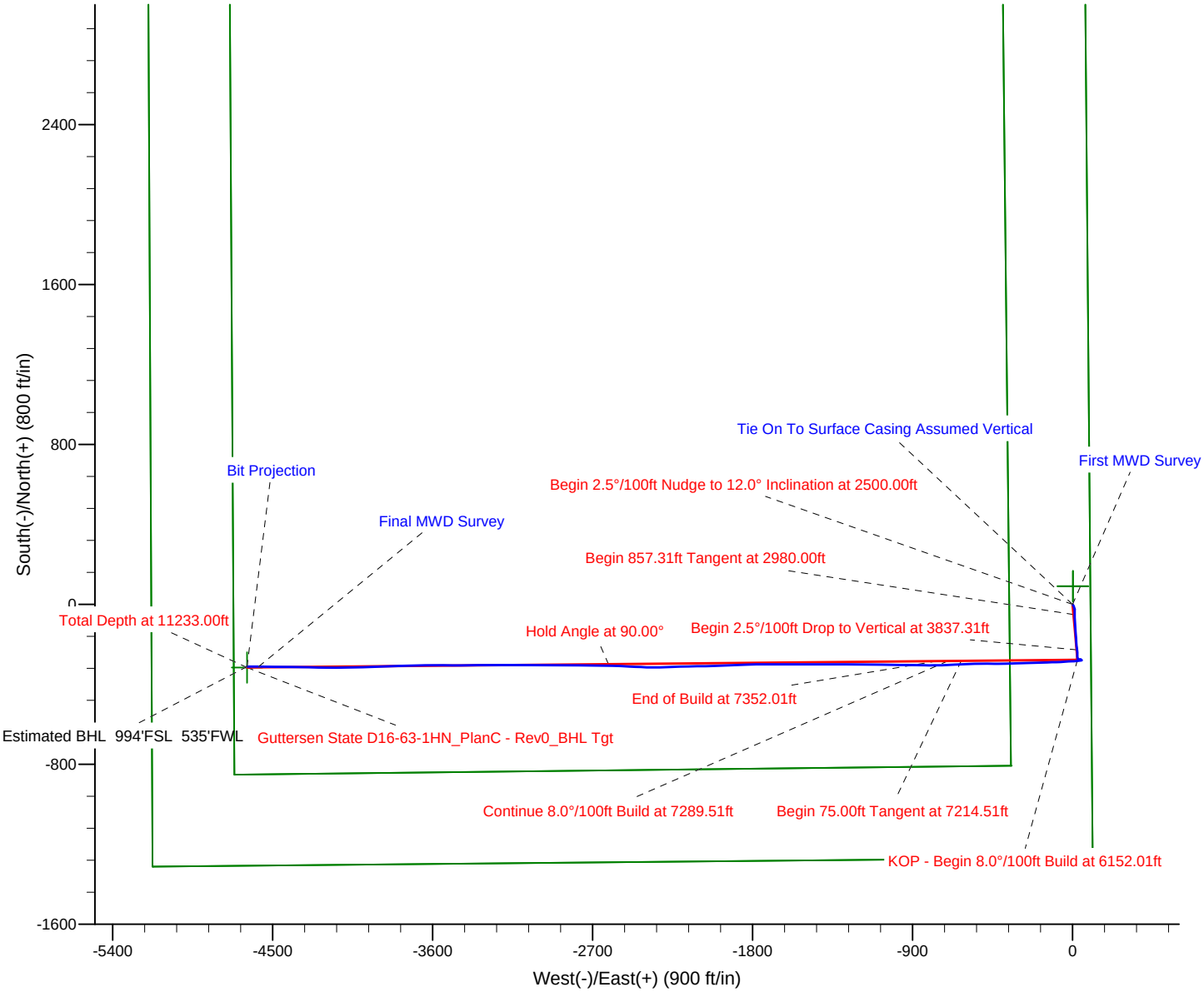
Magnetic Field
Strength: 52893.7snT
Dip Angle: 66.88°
Date: 7/7/2012
Model: BGGM2011

LEGEND

Guttersen State D16-63-1HN, Plan C, Plan C - Rev 0 Proposal V0
MWD Survey

Permitted BHL: 990' FSL, 535' FWL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Guttersen State D16-63-1HN 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. 16-T3N-R64W
Well: Guttersen State D16-63-1HN

Noble Energy

HALLIBURTON
Sperry Drilling

Azimuths to Grid North
True North: -0.62°
Magnetic North: 7.96°

Magnetic Field
Strength: 52893.7snT
Dip Angle: 66.88°
Date: 7/7/2012
Model: BGGM2011

LEGEND

Guttersen State D16-63-1HN, 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 State D16-63-1HN 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.