

Noble Energy

Weld County, CO (NAD 83)

Sec. 2-T3N-R64W (Guttersen 02 PAD)

Tania D11-27D - A3

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

21 October, 2011

Well Coordinates: 1,334,571.19 N, 3,274,114.64 E (40° 14' 51.47" N, 104° 31' 04.69" W)

Ground Level: 4,708.00 ft

Local Coordinate Origin:

Centered on Well Tania D11-27D - Slot A3

Viewing Datum:

KB @ 4732.00ft (Rig KB)

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 Tania D11-27D - 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
739.00	0.32	87.97	739.00	0.07	2.06	2.05	0.04
First MWD Survey							
831.00	0.42	52.08	830.99	0.29	2.59	2.56	0.27
923.00	0.56	19.02	922.99	0.92	3.00	2.93	0.34
1,015.00	2.21	103.34	1,014.97	0.94	4.87	4.79	2.42
1,108.00	2.76	106.94	1,107.88	-0.13	8.76	8.74	0.61
1,202.00	5.93	97.83	1,201.60	-1.45	15.73	15.80	3.44
1,297.00	7.02	94.75	1,295.99	-2.60	26.38	26.50	1.20
1,391.00	8.84	90.33	1,389.09	-3.12	39.33	39.45	2.04
1,486.00	10.97	90.27	1,482.67	-3.20	55.67	55.76	2.24
1,580.00	12.74	88.76	1,574.66	-3.02	74.98	75.01	1.91
1,675.00	15.24	98.87	1,666.85	-4.72	97.79	97.89	3.67
1,770.00	19.06	96.79	1,757.61	-8.48	125.54	125.83	4.07
1,864.00	20.28	91.95	1,846.13	-10.85	157.07	157.44	2.16
1,959.00	19.10	90.55	1,935.57	-11.56	189.07	189.41	1.34
2,053.00	18.04	91.37	2,024.68	-12.05	219.00	219.30	1.16
2,148.00	19.58	94.29	2,114.60	-13.60	249.58	249.92	1.90
2,247.00	21.50	91.35	2,207.31	-15.26	284.26	284.64	2.20
2,342.00	21.60	91.20	2,295.66	-16.04	319.15	319.49	0.12
2,437.00	22.20	94.51	2,383.81	-17.82	354.52	354.90	1.44
2,533.00	22.81	93.20	2,472.50	-20.28	391.18	391.65	0.82
2,628.00	23.07	94.27	2,559.99	-22.70	428.13	428.67	0.52
2,724.00	24.71	95.58	2,647.76	-26.05	466.86	467.54	1.80
2,819.00	24.22	95.63	2,734.23	-29.89	506.02	506.87	0.52
2,914.00	22.83	95.23	2,821.33	-33.48	543.76	544.78	1.47
3,010.00	23.55	94.73	2,909.58	-36.76	581.42	582.57	0.78
3,105.00	21.54	92.62	2,997.31	-39.12	617.76	618.99	2.28
3,201.00	20.84	95.25	3,086.82	-41.49	652.37	653.68	1.23
3,296.00	19.55	97.20	3,175.98	-45.03	684.97	686.45	1.53
3,392.00	19.16	95.40	3,266.56	-48.53	716.59	718.23	0.74
3,487.00	20.95	94.68	3,355.79	-51.38	749.04	750.80	1.90
3,582.00	22.21	96.80	3,444.13	-54.89	783.80	785.72	1.56
3,678.00	24.08	97.95	3,532.40	-59.75	821.22	823.39	2.00
3,774.00	26.90	94.72	3,619.06	-64.25	862.27	864.65	3.27
3,869.00	27.26	94.08	3,703.64	-67.56	905.39	907.89	0.49
3,965.00	23.70	94.94	3,790.29	-70.79	946.55	949.18	3.73
4,060.00	20.83	94.70	3,878.20	-73.82	982.42	985.17	3.02
4,156.00	17.56	94.66	3,968.85	-76.39	1,013.87	1,016.73	3.41
4,251.00	16.35	94.04	4,059.72	-78.50	1,041.49	1,044.43	1.29
4,346.00	13.37	92.67	4,151.53	-79.95	1,065.81	1,068.79	3.16
4,442.00	11.32	90.31	4,245.31	-80.52	1,086.32	1,089.29	2.20
4,537.00	9.95	89.70	4,338.67	-80.53	1,103.85	1,106.78	1.45
4,633.00	8.07	89.67	4,433.48	-80.45	1,118.88	1,121.77	1.96
4,728.00	4.88	87.16	4,527.86	-80.21	1,129.59	1,132.43	3.37
4,824.00	3.96	110.45	4,623.59	-81.17	1,136.78	1,139.67	2.08
4,919.00	4.44	127.59	4,718.33	-84.55	1,142.76	1,145.88	1.41
5,014.00	3.95	131.55	4,813.08	-88.97	1,148.13	1,151.53	0.60
5,110.00	3.48	135.42	4,908.88	-93.24	1,152.65	1,156.34	0.55
5,205.00	2.37	116.51	5,003.75	-96.17	1,156.43	1,160.32	1.53

Design Report for Tania D11-27D - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,300.00	1.84	134.58	5,098.69	-98.11	1,159.27	1,163.29	0.89
5,491.00	1.16	133.10	5,289.62	-101.59	1,162.87	1,167.12	0.36
5,778.00	1.38	133.81	5,576.55	-105.96	1,167.48	1,172.03	0.08
6,064.00	1.36	142.45	5,862.47	-111.04	1,172.04	1,176.92	0.07
6,350.00	1.64	138.05	6,148.37	-116.77	1,176.84	1,182.12	0.11
6,637.00	1.98	133.36	6,435.23	-123.23	1,183.19	1,188.90	0.13
6,924.00	2.10	131.80	6,722.05	-130.14	1,190.72	1,196.89	0.05
7,148.00	0.91	157.78	6,945.97	-134.52	1,194.45	1,200.92	0.60
Final MWD Survey							
7,200.00	0.91	157.78	6,997.96	-135.29	1,194.76	1,201.28	0.00
Survey Projection to TD - Estimated BHL: 32' FSL, 1326' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
739.00	739.00	0.07	2.06	First MWD Survey
7,148.00	6,945.97	-134.52	1,194.45	Final MWD Survey
7,200.00	6,997.96	-135.29	1,194.76	Survey Projection to TD
7,200.00	6,997.96	-135.29	1,194.76	Estimated BHL: 32' FSL, 1326' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Tania D11-27D_PlanA - Rev0_BHL Tgt	93.99	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
739.00	7,200.00	Sperry MWD Surveys	MWD

Design Report for Tania D11-27D - 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
Tania	0.00	0.00	6,997.00	-81.73	1,170.61	1,334,489.46	3,275,285.20	40.247370	-104.513780
- actual wellpath misses target center by 58.73ft at 7198.10ft MD (6996.07 TVD, -135.26 N, 1194.75 E)									
- Point									
Tania	0.00	0.00	4,800.00	-81.73	1,170.61	1,334,489.46	3,275,285.20	40.247370	-104.513780
- actual wellpath misses target center by 24.08ft at 5001.89ft MD (4801.00 TVD, -88.41 N, 1147.49 E)									
- Circle (radius 75.00)									
Guttersen	0.00	0.00	-1.00	-0.49	-44.67	1,334,570.70	3,274,069.98	40.247630	-104.518130
- actual wellpath misses target center by 44.68ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			2,059.33	309.51	1,334,880.68	3,276,173.89			
Point 2			-2,284.67	258.51	1,334,829.69	3,271,830.07			
Point 3			-2,303.67	4,657.51	1,339,228.50	3,271,811.07			
Point 4			2,036.33	4,708.51	1,339,279.49	3,276,150.89			
Point 5			2,059.33	309.51	1,334,880.68	3,276,173.89			
Guttersen	0.00	0.00	-1.00	-0.49	-44.67	1,334,570.70	3,274,069.98	40.247630	-104.518130
- actual wellpath misses target center by 44.68ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1			2,519.33	-150.49	1,334,420.70	3,276,633.87			
Point 2			-2,744.67	-201.49	1,334,369.71	3,271,370.09			
Point 3			-2,763.67	5,117.51	1,339,688.48	3,271,351.09			
Point 4			2,496.33	5,168.51	1,339,739.47	3,276,610.87			
Point 5			2,519.33	-150.49	1,334,420.70	3,276,633.87			

North Reference Sheet for Sec. 2-T3N-R64W (Guttersen 02 PAD) - Tania D11-27D - 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 @ 4732.00ft (Rig KB). Northing and Easting are relative to Tania D11-27D - Slot A3

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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995685

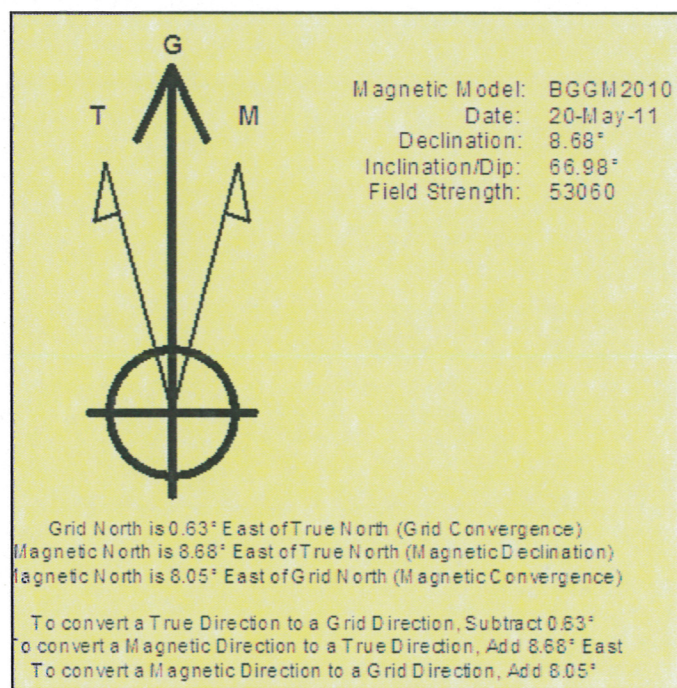
Grid Coordinates of Well: 1,334,571.19 ft N, 3,274,114.64 ft E

Geographical Coordinates of Well: 40° 14' 51.47" N, 104° 31' 04.69" W

Grid Convergence at Surface is: 0.63°

Based upon Minimum Curvature type calculations, at a Measured Depth of 7,200.00ft the Bottom Hole Displacement is 1,202.40ft in the Direction of 96.46° (Grid).

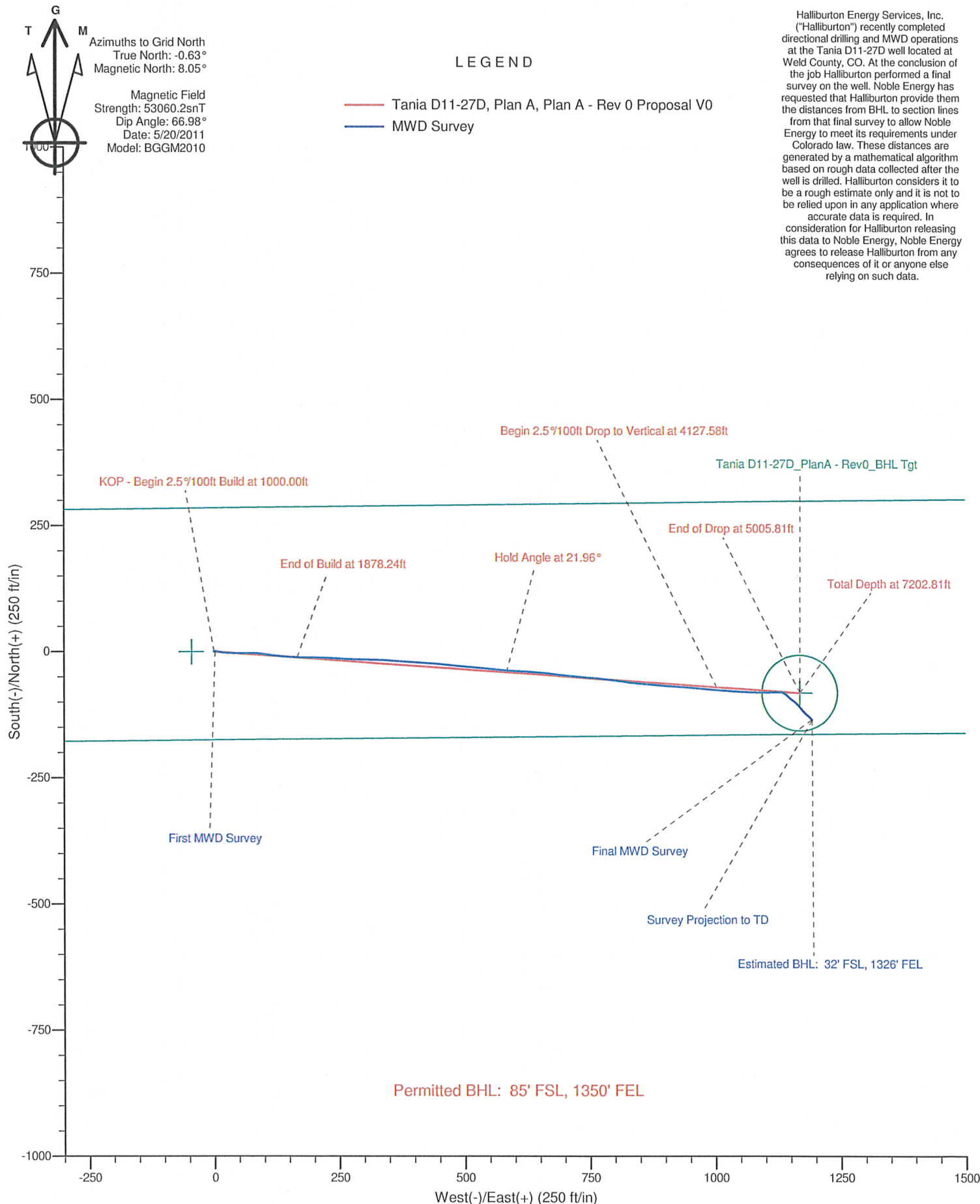
Magnetic Convergence at surface is: -8.05° (20 May 2011, , BGGM2010)



LEGEND

- Tania D11-27D, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

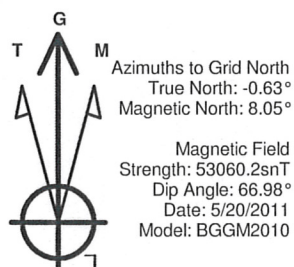
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Tania D11-27D well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them the 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.



Noble Energy

HALLIBURTON

Sperry Drilling



LEGEND

— Tania D11-27D, Plan A, Plan A - Rev 0 Proposal V0

— MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Tania D11-27D 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.

