

Noble Energy

Weld County, CO (NAD 83)

Sec. 21-T9N-R60W

Rohn LB22-62HN

Design: MWD Survey

Sperry Drilling Services

Final Survey Report

13 April, 2013

Well Coordinates: 1,511,531.36 N, 3,391,049.13 E (40° 43' 44.41" N, 104° 05' 20.47" W)

Ground Level: 4,982.00 ft

Local Coordinate Origin:

Centered on Well Rohn LB22-62HN

Viewing Datum:

KB=24' @ 5006.00ft (H&P 322)

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 Rohn LB22-62HN - 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
756.00	0.00	0.00	756.00	0.00	0.00	0.00	0.00
Surface Casing Assumed Vertical at 756.00ft							
825.00	0.55	98.04	825.00	-0.05	0.33	0.32	0.80
First MWD Survey							
1,104.00	0.31	26.91	1,103.99	0.44	2.00	2.03	0.19
1,383.00	0.96	41.45	1,382.97	2.86	3.88	4.16	0.24
1,476.00	1.76	42.34	1,475.95	4.50	5.36	5.80	0.86
1,571.00	3.94	41.91	1,570.82	8.01	8.52	9.32	2.29
1,666.00	5.71	37.32	1,665.48	14.20	13.57	14.98	1.91
1,761.00	6.90	42.67	1,759.91	22.15	20.30	22.51	1.40
1,855.00	8.28	44.26	1,853.08	31.15	28.86	31.96	1.48
1,950.00	9.73	37.09	1,946.91	42.46	38.47	42.70	1.93
2,045.00	11.55	40.31	2,040.28	56.11	49.47	55.07	2.01
2,140.00	12.74	39.43	2,133.15	71.46	62.27	69.41	1.27
2,235.00	13.46	38.13	2,225.68	88.25	75.75	84.57	0.82
2,330.00	14.82	39.41	2,317.79	106.33	90.29	100.92	1.47
2,425.00	16.04	42.79	2,409.37	125.35	106.92	119.45	1.59
2,520.00	14.71	41.81	2,500.97	143.97	123.88	138.26	1.43
2,615.00	16.25	39.58	2,592.52	163.21	140.39	156.70	1.74
2,710.00	13.99	36.73	2,684.23	182.66	155.73	173.99	2.50
2,805.00	14.91	38.39	2,776.22	201.44	170.19	190.33	1.06
2,900.00	16.44	40.99	2,867.69	221.17	186.60	208.71	1.77
2,995.00	17.06	39.33	2,958.66	242.10	204.25	228.45	0.82
3,090.00	16.66	39.78	3,049.57	263.34	221.79	248.13	0.44
3,184.00	15.17	44.06	3,139.97	282.54	238.97	267.22	2.02
3,279.00	12.66	42.60	3,232.18	299.14	254.66	284.56	2.67
3,375.00	9.89	39.71	3,326.31	313.23	267.05	298.36	2.94
3,469.00	9.23	50.65	3,419.02	324.22	278.04	310.43	2.05
3,564.00	8.62	54.76	3,512.87	333.16	289.75	323.01	0.93
3,659.00	7.96	53.17	3,606.87	341.21	300.83	334.87	0.74
3,754.00	7.17	48.61	3,701.05	349.07	310.54	345.36	1.04
3,849.00	5.91	39.07	3,795.43	356.79	318.07	353.65	1.75
3,944.00	4.04	26.23	3,890.07	363.59	322.63	358.90	2.28
4,039.00	1.73	13.26	3,984.94	367.99	324.44	361.16	2.51
4,133.00	1.72	234.54	4,078.93	368.55	323.62	360.40	3.43
4,228.00	2.38	209.63	4,173.87	366.01	321.48	358.01	1.15
4,323.00	1.13	189.57	4,268.82	363.37	320.35	356.61	1.45
4,418.00	1.60	183.26	4,363.79	361.12	320.12	356.14	0.52
4,513.00	1.66	170.15	4,458.76	358.44	320.28	356.02	0.40
4,608.00	1.93	184.17	4,553.71	355.49	320.40	355.83	0.54
4,703.00	1.51	173.15	4,648.67	352.65	320.43	355.57	0.56
4,798.00	1.84	168.52	4,743.63	349.91	320.88	355.73	0.38
4,893.00	1.20	159.90	4,838.59	347.48	321.53	356.12	0.71
4,988.00	0.98	159.47	4,933.57	345.79	322.16	356.56	0.23
5,083.00	1.29	156.28	5,028.56	344.05	322.87	357.09	0.33
5,273.00	0.96	141.19	5,218.52	340.85	324.73	358.61	0.23
5,479.00	0.50	124.48	5,424.50	339.00	326.55	360.22	0.24
5,551.00	0.13	193.84	5,496.50	338.74	326.79	360.44	0.65
5,646.00	6.11	87.98	5,591.32	338.81	331.82	365.45	6.47

Design Report for Rohn LB22-62HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,741.00	13.21	75.67	5,684.92	341.68	347.41	381.25	7.74
5,836.00	19.15	85.03	5,776.14	345.72	373.48	407.60	6.81
5,931.00	26.48	91.42	5,863.66	346.55	410.23	444.24	8.13
6,026.00	36.43	89.42	5,944.60	346.31	459.74	493.45	10.53
6,073.00	41.16	88.06	5,981.22	346.98	489.17	522.78	10.23
6,121.00	44.72	86.49	6,016.35	348.54	521.82	555.42	7.74
6,168.00	48.05	84.97	6,048.77	351.09	555.75	589.43	7.46
6,216.00	50.85	86.64	6,079.97	353.75	592.12	625.88	6.40
6,263.00	52.44	88.27	6,109.14	355.38	628.93	662.66	4.34
6,311.00	55.57	89.58	6,137.35	356.10	667.76	701.35	6.88
6,358.00	59.58	88.91	6,162.54	356.62	707.42	740.84	8.62
6,406.00	62.67	88.51	6,185.72	357.57	749.43	782.73	6.48
6,501.00	69.81	87.28	6,223.97	360.79	836.26	869.42	7.61
6,548.00	75.53	86.52	6,237.97	363.22	881.04	914.21	12.27
6,596.00	80.12	87.18	6,248.09	365.80	927.88	961.06	9.66
6,644.00	83.26	86.18	6,255.03	368.55	975.29	1,008.50	6.85
Estimated 7" Casing Point: 645' FSL, 705' FWL (Not a Survey Station)							
6,708.00	87.44	84.86	6,260.22	373.53	1,038.87	1,072.25	6.85
6,756.00	86.77	84.05	6,262.64	378.17	1,086.58	1,120.18	2.19
6,851.00	88.31	84.52	6,266.72	387.62	1,181.02	1,215.09	1.69
6,946.00	88.65	84.26	6,269.24	396.90	1,275.53	1,310.06	0.45
7,041.00	89.35	85.00	6,270.90	405.79	1,370.10	1,405.03	1.07
7,136.00	90.34	85.60	6,271.15	413.57	1,464.78	1,500.01	1.22
7,231.00	90.40	89.46	6,270.54	417.67	1,559.67	1,594.81	4.06
7,326.00	90.28	90.65	6,269.97	417.58	1,654.67	1,689.27	1.26
7,420.00	91.02	91.64	6,268.91	415.70	1,748.64	1,782.53	1.31
7,515.00	88.27	87.77	6,269.50	416.19	1,843.61	1,877.03	5.00
7,610.00	90.40	89.03	6,270.60	418.84	1,938.56	1,971.74	2.60
7,705.00	89.04	88.35	6,271.06	421.01	2,033.53	2,066.42	1.60
7,800.00	91.42	88.99	6,270.68	423.21	2,128.50	2,161.09	2.59
7,895.00	90.80	88.20	6,268.84	425.54	2,223.45	2,255.77	1.06
7,989.00	91.02	85.43	6,267.35	430.76	2,317.28	2,349.63	2.96
8,084.00	91.57	87.92	6,265.20	436.27	2,412.09	2,444.50	2.68
8,179.00	89.45	88.89	6,264.36	438.92	2,507.04	2,539.21	2.45
8,274.00	88.24	88.04	6,266.27	441.46	2,601.99	2,633.89	1.56
8,369.00	90.12	88.92	6,267.63	443.98	2,696.94	2,728.59	2.18
8,463.00	88.67	88.35	6,268.62	446.22	2,790.90	2,822.27	1.66
8,558.00	90.61	88.63	6,269.22	448.72	2,885.87	2,916.97	2.06
8,653.00	89.82	87.54	6,268.86	451.90	2,980.81	3,011.73	1.42
8,748.00	90.18	87.17	6,268.86	456.28	3,075.71	3,106.56	0.54
8,844.00	90.22	86.14	6,268.53	461.88	3,171.54	3,202.46	1.07
8,939.00	90.34	87.72	6,268.06	466.97	3,266.40	3,297.33	1.67
9,034.00	91.29	87.99	6,266.71	470.52	3,361.32	3,392.10	1.04
9,129.00	90.92	87.00	6,264.88	474.68	3,456.21	3,486.91	1.11
9,223.00	90.28	89.57	6,263.90	477.49	3,550.16	3,580.63	2.82
9,318.00	89.78	89.23	6,263.85	478.48	3,645.15	3,675.21	0.64
9,413.00	90.00	88.67	6,264.03	480.22	3,740.14	3,769.85	0.63
9,508.00	89.48	87.10	6,264.46	483.73	3,835.07	3,864.63	1.74
9,603.00	89.75	88.21	6,265.10	487.62	3,929.98	3,959.43	1.20
9,698.00	89.97	87.29	6,265.33	491.35	4,024.91	4,054.23	1.00
9,793.00	91.08	88.73	6,264.46	494.65	4,119.84	4,148.99	1.91

Design Report for Rohn LB22-62HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,888.00	90.03	89.32	6,263.54	496.26	4,214.82	4,243.61	1.27
9,983.00	90.52	88.44	6,263.08	498.12	4,309.80	4,338.27	1.06
10,078.00	88.15	87.27	6,264.19	501.67	4,404.72	4,433.04	2.78
10,172.00	88.43	87.28	6,266.99	506.14	4,498.57	4,526.84	0.30
10,267.00	89.57	87.06	6,268.65	510.83	4,593.44	4,621.68	1.22
10,362.00	88.95	85.81	6,269.88	516.74	4,688.25	4,716.58	1.47
10,457.00	91.39	85.66	6,269.59	523.80	4,782.98	4,811.53	2.57
10,552.00	90.49	84.65	6,268.04	531.82	4,877.62	4,906.50	1.42
Final MWD Survey							
10,617.00	90.49	84.65	6,267.48	537.88	4,942.34	4,971.49	0.00
Survey Projection to TD - Estimated BHL: 678' FSL, 666' FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
756.00	756.00	0.00	0.00	Surface Casing Assumed Vertical at 756.00ft
825.00	825.00	-0.05	0.33	First MWD Survey
6,644.00	6,255.03	368.55	975.29	Estimated 7" Casing Point: 645' FSL, 705' FWL (Not a Survey Station)
10,552.00	6,268.04	531.82	4,877.62	Final MWD Survey
10,617.00	6,267.48	537.88	4,942.34	Survey Projection to TD
10,617.00	6,267.48	537.88	4,942.34	Estimated BHL: 678' FSL, 666' FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Rohn LB22-62HN_PlanA - Rev0_BH	83.99	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
756.00	6,644.00	Sperry MWD Surveys	MWD
6,644.00	10,617.00	Sperry MWD Surveys	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
6,644.00	6,255.03	7" Csg	7	8-3/4

Design Report for Rohn LB22-62HN - MWD Survey

Targets

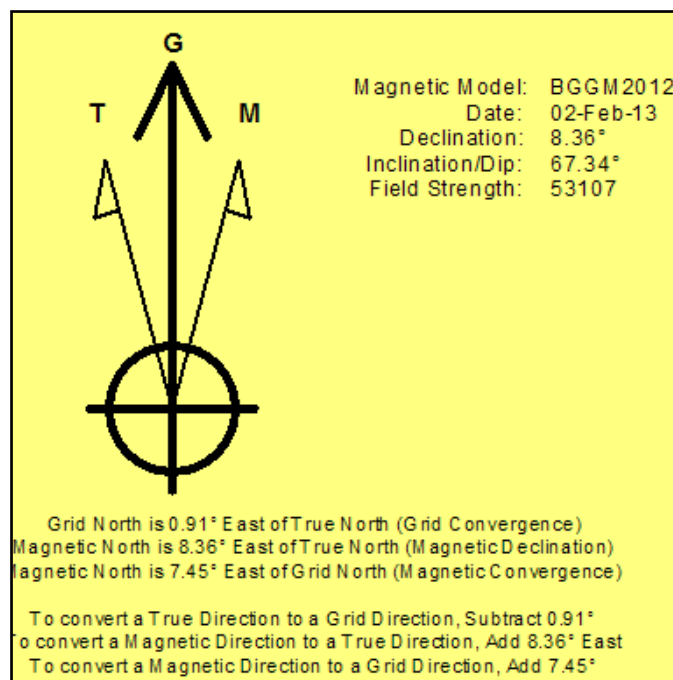
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Rohn	0.00	0.00	0.00	0.00	0.00	1,511,531.36	3,391,049.13	40.72900	-104.08902
- actual wellpath hits target center									
- Polygon									
Point 1				-320.00	299.00	1,511,830.36	3,390,729.13		
Point 2				-2,407.00	191.00	1,511,722.36	3,388,642.15		
Point 3				-4,494.00	83.00	1,511,614.36	3,386,555.17		
Point 4				-4,558.00	2,114.00	1,513,645.34	3,386,491.17		
Point 5				-4,622.00	4,144.00	1,515,675.32	3,386,427.17		
Point 6				-2,511.00	4,269.00	1,515,800.32	3,388,538.15		
Point 7				-400.00	4,394.00	1,515,925.32	3,390,649.13		
Point 8				-360.00	2,347.00	1,513,878.34	3,390,689.13		
Point 9				-341.00	1,022.00	1,512,553.35	3,390,708.13		
Point 10				-320.00	299.00	1,511,830.36	3,390,729.13		
Rohn	0.00	0.00	6,244.91	520.50	4,947.89	1,512,051.85	3,395,996.98	40.73021	-104.07114
- actual wellpath misses target center by 29.02ft at 10617.00ft MD (6267.48 TVD, 537.88 N, 4942.34 E)									
- Point									
Rohn	0.00	0.00	0.00	0.00	0.00	1,511,531.36	3,391,049.13	40.72900	-104.08902
- actual wellpath hits target center									
- Polygon									
Point 1				280.00	-301.00	1,511,230.36	3,391,329.13		
Point 2				259.00	1,022.00	1,512,553.35	3,391,308.13		
Point 3				240.00	2,347.00	1,513,878.34	3,391,289.13		
Point 4				200.00	4,994.00	1,516,525.32	3,391,249.13		
Point 5				2,859.00	5,112.00	1,516,643.32	3,393,908.10		
Point 6				5,518.00	5,191.00	1,516,722.32	3,396,567.08		
Point 7				5,576.00	2,538.00	1,514,069.34	3,396,625.08		
Point 8				5,618.00	-117.00	1,511,414.36	3,396,667.08		
Point 9				2,948.00	-209.00	1,511,322.36	3,393,997.10		
Point 10				280.00	-301.00	1,511,230.36	3,391,329.13		
Rohn	0.00	0.00	0.00	0.00	0.00	1,511,531.36	3,391,049.13	40.72900	-104.08902
- actual wellpath hits target center									
- Polygon									
Point 1				280.00	-301.00	1,511,230.36	3,391,329.13		
Point 2				-2,407.00	-409.00	1,511,122.36	3,388,642.15		
Point 3				-5,094.00	-517.00	1,511,014.36	3,385,955.17		
Point 4				-5,158.00	2,114.00	1,513,645.34	3,385,891.17		
Point 5				-5,222.00	4,744.00	1,516,275.32	3,385,827.17		
Point 6				-2,511.00	4,869.00	1,516,400.32	3,388,538.15		
Point 7				200.00	4,994.00	1,516,525.32	3,391,249.13		
Point 8				240.00	2,347.00	1,513,878.34	3,391,289.13		
Point 9				259.00	1,022.00	1,512,553.35	3,391,308.13		
Point 10				280.00	-301.00	1,511,230.36	3,391,329.13		
Rohn	0.00	0.00	0.00	0.00	0.00	1,511,531.36	3,391,049.13	40.72900	-104.08902
- actual wellpath hits target center									
- Polygon									
Point 1				880.00	299.00	1,511,830.36	3,391,929.12		
Point 2				859.00	1,022.00	1,512,553.35	3,391,908.12		
Point 3				840.00	2,347.00	1,513,878.34	3,391,889.12		
Point 4				800.00	4,394.00	1,515,925.32	3,391,849.12		
Point 5				2,859.00	4,512.00	1,516,043.32	3,393,908.10		
Point 6				4,918.00	4,591.00	1,516,122.32	3,395,967.09		
Point 7				4,976.00	2,538.00	1,514,069.34	3,396,025.09		
Point 8				5,018.00	483.00	1,512,014.36	3,396,067.09		
Point 9				2,948.00	391.00	1,511,922.36	3,393,997.10		
Point 10				880.00	299.00	1,511,830.36	3,391,929.12		

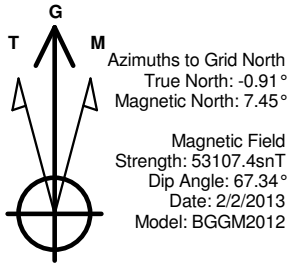
North Reference Sheet for Sec. 21-T9N-R60W - Rohn LB22-62HN

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' @ 5006.00ft (H&P 322). Northing and Easting are relative to Rohn LB22-62HN
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 -105.50000°, Longitude Origin:0.00000°, Latitude Origin:40.78333°
False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99999164

Grid Coordinates of Well: 1,511,531.36 ft N, 3,391,049.13 ft E
Geographical Coordinates of Well: 40° 43' 44.41" N, 104° 05' 20.47" W
Grid Convergence at Surface is: 0.91°

Based upon Minimum Curvature type calculations, at a Measured Depth of 10,617.00ft
the Bottom Hole Displacement is 4,971.52ft in the Direction of 83.79° (Grid).
Magnetic Convergence at surface is: -7.45° (2 February 2013, , BGGM2012)



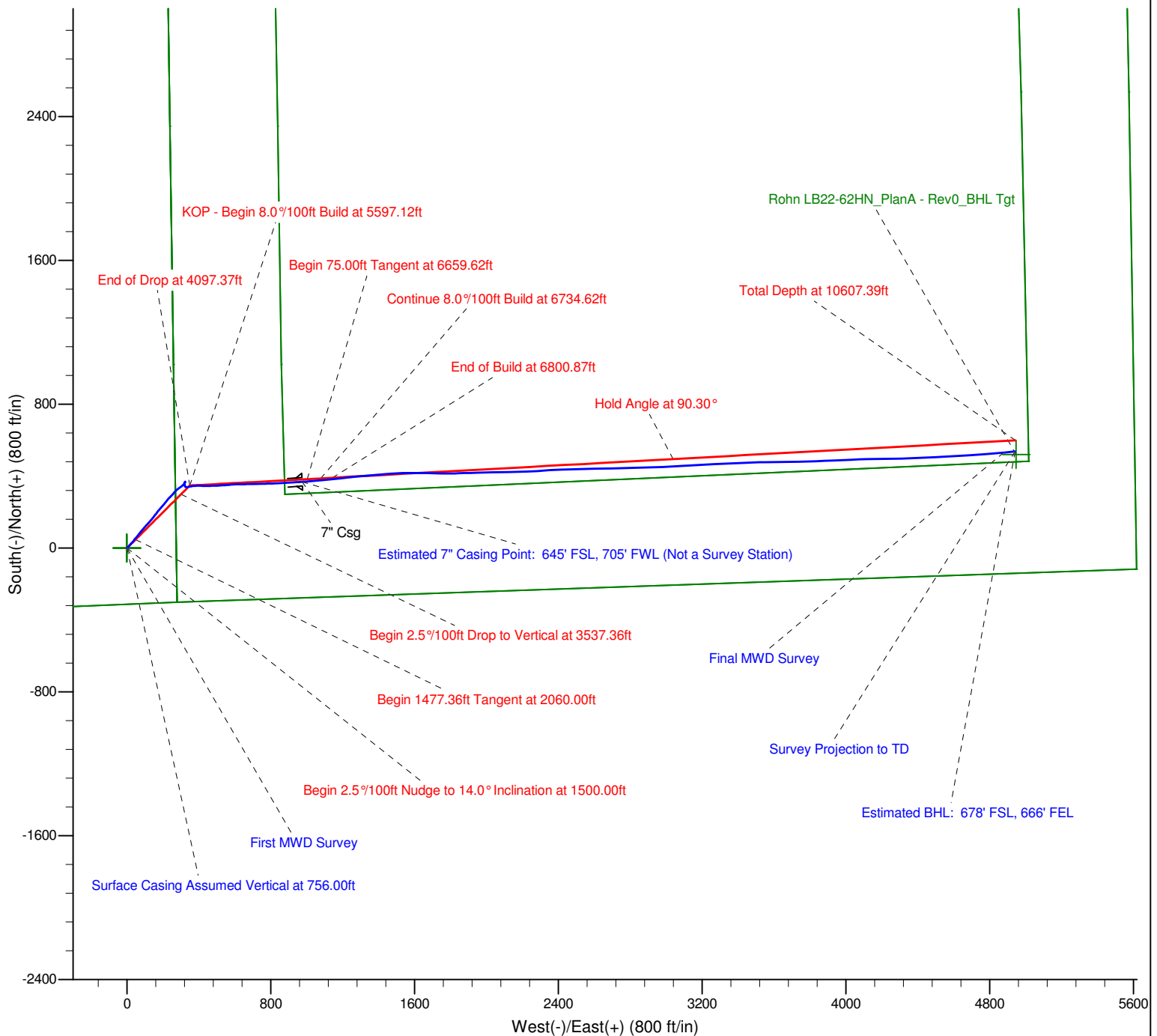


LEGEND

- Rohn LB22-62HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Rohn LB22-62HN 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.

Permitted BHL: 660' FSL, 660' FEL

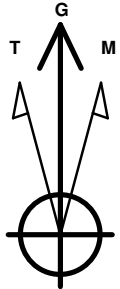


Project: Weld County, CO (NAD 83)
Site: Sec. 21-T9N-R60W
Well: Rohn LB22-62HN

Noble Energy

HALLIBURTON

Sperry Drilling



Azimuths to Grid North
True North: -0.91°
Magnetic North: 7.45°

Magnetic Field
Strength: 53107.4snT
Dip Angle: 67.34°
Date: 2/2/2013
Model: BGGM2012

LEGEND

- Rohn LB22-62HN, Plan A, Plan A - Rev 0 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Rohn LB22-62HN 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.

