

Noble Energy

Weld County, CO (NAD 83)

Sec. 30-T7N-R63W (Grigsby 30 PAD)

Grigsby PC AC30-73HN

MWD Surveys

Sperry Drilling Services

Final Survey Report

07 January, 2013

Well Coordinates: 1,445,395.53 N, 3,285,826.52 E (40° 33' 05.26" N, 104° 28' 17.08" W)

Ground Level: 4,756.00 ft

Local Coordinate Origin: Centered on Well Grigsby PC AC30-73HN - Slot A2

Viewing Datum: KB @ 4780.00ft (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 Grigsby PC AC30-73HN - MWD

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
630.00	0.00	0.00	630.00	0.00	0.00	0.00	0.00
Tie On To Surface Casing Assumed Vertical							
736.00	0.84	220.15	736.00	-0.59	-0.50	0.69	0.79
First MWD Survey							
830.00	0.81	199.85	829.99	-1.75	-1.17	1.95	0.31
924.00	0.69	209.89	923.98	-2.86	-1.68	3.15	0.19
1,019.00	0.61	220.09	1,018.97	-3.74	-2.29	4.14	0.15
1,112.00	0.44	222.35	1,111.97	-4.39	-2.85	4.88	0.18
1,204.00	4.87	276.54	1,203.85	-4.20	-6.97	5.56	5.03
1,297.00	4.36	249.44	1,296.56	-4.99	-14.20	7.85	2.38
1,390.00	6.47	227.69	1,389.15	-9.76	-21.39	14.01	3.13
1,481.00	9.08	226.72	1,479.31	-18.14	-30.41	24.08	2.87
1,573.00	11.38	232.36	1,569.84	-28.66	-42.88	36.97	2.72
1,665.00	12.84	230.83	1,659.79	-40.66	-58.00	51.86	1.62
1,758.00	14.66	235.37	1,750.12	-53.88	-75.69	68.48	2.27
1,850.00	17.14	248.04	1,838.62	-65.57	-97.86	84.53	4.62
1,943.00	18.08	262.97	1,927.31	-72.46	-124.90	96.92	4.95
2,035.00	19.29	276.13	2,014.50	-72.59	-154.19	103.15	4.76
2,127.00	18.10	287.39	2,101.67	-66.69	-182.95	103.38	4.12
2,218.00	17.96	292.43	2,188.21	-57.11	-209.41	99.53	1.72
2,311.00	17.97	291.80	2,276.67	-46.31	-235.99	94.51	0.21
2,404.00	17.40	291.85	2,365.28	-35.81	-262.21	89.71	0.61
2,499.00	16.50	290.03	2,456.15	-25.90	-288.07	85.41	1.10
2,594.00	17.24	289.42	2,547.06	-16.60	-314.02	81.73	0.80
2,689.00	19.28	295.11	2,637.28	-5.26	-341.51	76.37	2.85
2,784.00	18.88	292.09	2,727.06	7.17	-369.95	70.14	1.12
2,878.00	18.48	290.48	2,816.11	18.10	-398.00	65.30	0.69
2,973.00	18.34	290.26	2,906.25	28.55	-426.13	60.95	0.16
3,068.00	18.41	288.73	2,996.41	38.54	-454.35	57.06	0.51
3,163.00	19.21	287.00	3,086.33	47.93	-483.51	53.96	1.03
3,259.00	18.46	285.29	3,177.19	56.55	-513.27	51.73	0.97
3,354.00	18.39	284.02	3,267.32	64.15	-542.32	50.36	0.43
3,449.00	18.33	283.91	3,357.49	71.37	-571.36	49.35	0.07
3,544.00	17.15	283.26	3,447.97	78.18	-599.49	48.57	1.26
3,640.00	15.35	283.41	3,540.13	84.37	-625.63	47.96	1.88
3,735.00	17.68	278.49	3,631.21	89.42	-652.14	48.55	2.86
3,830.00	17.24	278.58	3,721.83	93.65	-680.32	50.29	0.46
3,924.00	18.68	280.09	3,811.25	98.36	-708.92	51.65	1.61
4,019.00	19.96	279.38	3,900.90	103.67	-739.90	52.91	1.37
4,114.00	20.66	277.69	3,989.99	108.56	-772.50	54.94	0.96
4,209.00	19.59	280.66	4,079.19	113.74	-804.77	56.59	1.56
4,305.00	17.33	281.26	4,170.25	119.51	-834.61	57.17	2.36
4,399.00	17.59	281.52	4,259.92	125.08	-862.26	57.49	0.29
4,494.00	13.90	281.70	4,351.34	130.27	-887.51	57.69	3.88
4,589.00	13.17	277.25	4,443.70	133.95	-909.42	58.66	1.34
4,684.00	13.17	276.75	4,536.20	136.58	-930.90	60.56	0.12
4,778.00	11.66	281.35	4,628.00	139.71	-950.85	61.66	1.92
4,873.00	8.42	283.65	4,721.54	143.24	-967.02	61.58	3.44
4,968.00	6.73	274.49	4,815.71	145.32	-979.33	62.11	2.18

Design Report for Grigsby PC AC30-73HN - MWD

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,063.00	4.21	261.21	4,910.27	145.22	-988.33	64.08	2.95
5,159.00	1.15	249.65	5,006.15	144.35	-992.72	65.85	3.22
5,254.00	1.00	266.06	5,101.14	143.96	-994.44	66.59	0.36
5,349.00	0.65	261.55	5,196.13	143.83	-995.80	67.01	0.37
5,444.00	0.80	251.85	5,291.12	143.54	-996.96	67.53	0.20
5,539.00	0.43	242.39	5,386.11	143.17	-997.91	68.09	0.40
5,634.00	0.49	133.90	5,481.11	142.72	-997.93	68.53	0.79
5,729.00	0.44	189.06	5,576.11	142.08	-997.70	69.11	0.46
5,824.00	0.19	1.73	5,671.11	141.88	-997.75	69.32	0.66
5,919.00	0.12	129.40	5,766.11	141.97	-997.67	69.21	0.29
6,014.00	0.25	180.84	5,861.11	141.70	-997.59	69.46	0.21
6,109.00	0.46	125.95	5,956.11	141.27	-997.29	69.82	0.40
6,140.00	0.60	153.66	5,987.11	141.05	-997.11	70.00	0.93
6,204.00	1.82	150.14	6,051.09	139.87	-996.46	71.02	1.91
6,249.00	6.02	169.91	6,095.98	136.93	-995.69	73.74	9.67
6,299.00	9.65	172.94	6,145.50	130.18	-994.72	80.13	7.30
6,344.00	12.05	181.62	6,189.70	121.74	-994.38	88.31	6.44
6,394.00	15.05	188.20	6,238.30	110.10	-995.46	99.93	6.74
6,439.00	17.76	189.04	6,281.47	97.53	-997.37	112.61	6.05
6,490.00	20.65	187.97	6,329.62	80.94	-999.84	129.35	5.71
6,535.00	23.52	180.92	6,371.32	64.10	-1,001.08	146.08	8.67
6,585.00	27.38	178.19	6,416.47	42.62	-1,000.88	167.05	8.07
6,630.00	30.86	176.12	6,455.77	20.76	-999.77	188.20	8.05
6,680.00	34.22	172.96	6,497.92	-6.00	-997.18	213.83	7.53
6,725.00	39.23	176.59	6,533.98	-32.78	-994.78	239.52	12.13
6,775.00	45.16	177.39	6,571.01	-66.30	-993.03	271.94	11.91
6,820.00	49.53	177.93	6,601.49	-99.36	-991.69	303.99	9.75
6,870.00	52.51	178.27	6,632.94	-138.20	-990.40	341.71	5.98
6,915.00	54.63	177.37	6,659.66	-174.38	-989.02	376.81	4.98
6,965.00	57.58	180.50	6,687.55	-215.86	-988.27	417.22	7.86
7,016.00	61.47	181.30	6,713.41	-259.80	-988.97	460.34	7.75
7,060.00	63.30	182.87	6,733.80	-298.76	-990.39	498.74	5.22
7,155.00	72.00	184.71	6,769.90	-386.34	-996.23	585.61	9.33
7,250.00	81.36	184.95	6,791.76	-478.35	-1,004.01	677.22	9.86
7,266.00	83.35	184.60	6,793.89	-494.16	-1,005.33	692.95	12.63
7,346.00	87.56	186.09	6,800.23	-573.54	-1,012.76	772.14	5.58
7,409.00	88.00	185.90	6,802.67	-636.15	-1,019.34	834.74	0.76
7,504.00	88.49	184.93	6,805.58	-730.68	-1,028.30	929.06	1.14
7,599.00	92.25	184.24	6,804.96	-825.35	-1,035.89	1,023.24	4.02
7,694.00	95.77	180.76	6,798.32	-920.00	-1,040.03	1,116.67	5.20
7,788.00	92.35	178.99	6,791.66	-1,013.75	-1,039.82	1,208.31	4.09
7,883.00	89.11	175.60	6,790.45	-1,108.61	-1,035.34	1,300.15	4.94
7,978.00	87.75	174.66	6,793.06	-1,203.22	-1,027.28	1,391.01	1.74
8,073.00	86.85	173.48	6,797.53	-1,297.61	-1,017.47	1,481.27	1.56
8,168.00	87.20	173.71	6,802.46	-1,391.89	-1,006.89	1,571.27	0.44
8,263.00	86.79	175.44	6,807.44	-1,486.33	-997.92	1,661.76	1.87
8,358.00	88.21	177.30	6,811.59	-1,581.04	-991.91	1,753.14	2.46
8,453.00	89.35	179.33	6,813.61	-1,675.97	-989.12	1,845.40	2.45
8,548.00	89.63	180.40	6,814.46	-1,770.97	-988.90	1,938.26	1.16
8,642.00	91.42	177.55	6,813.59	-1,864.93	-987.22	2,029.81	3.58
8,737.00	91.42	177.75	6,811.24	-1,959.83	-983.32	2,121.80	0.21

Design Report for Grigsby PC AC30-73HN - MWD

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,832.00	88.98	177.26	6,810.91	-2,054.73	-979.19	2,213.76	2.62
8,928.00	90.31	178.14	6,811.50	-2,150.65	-975.34	2,306.76	1.66
9,023.00	90.83	179.85	6,810.56	-2,245.62	-973.67	2,399.30	1.88
9,118.00	89.29	179.20	6,810.46	-2,340.62	-972.88	2,492.04	1.76
9,213.00	89.51	180.56	6,811.45	-2,435.61	-972.68	2,584.90	1.45
9,308.00	90.77	179.18	6,811.22	-2,530.60	-972.47	2,677.77	1.97
9,403.00	90.19	178.14	6,810.42	-2,625.57	-970.25	2,770.18	1.25
9,498.00	91.51	178.49	6,809.02	-2,720.52	-967.45	2,862.46	1.44
9,593.00	92.00	177.64	6,806.11	-2,815.42	-964.25	2,954.60	1.03
9,688.00	90.92	178.75	6,803.69	-2,910.34	-961.26	3,046.81	1.63
9,783.00	92.10	178.40	6,801.18	-3,005.27	-958.89	3,139.17	1.30
9,878.00	91.94	179.47	6,797.83	-3,100.20	-957.13	3,231.64	1.14
9,973.00	91.66	180.08	6,794.85	-3,195.15	-956.76	3,324.42	0.71
10,068.00	91.20	180.45	6,792.48	-3,290.12	-957.20	3,417.40	0.62
10,163.00	90.46	179.88	6,791.10	-3,385.11	-957.47	3,510.35	0.98
10,258.00	91.79	178.73	6,789.24	-3,480.08	-956.32	3,603.00	1.85
10,353.00	88.12	178.15	6,789.31	-3,575.02	-953.73	3,695.32	3.91
10,448.00	85.71	179.36	6,794.42	-3,669.86	-951.67	3,787.63	2.84
10,543.00	87.38	181.24	6,800.15	-3,764.67	-952.17	3,880.47	2.64
10,638.00	90.65	182.78	6,801.78	-3,859.59	-955.50	3,973.99	3.80
10,702.00	92.69	182.75	6,799.92	-3,923.48	-958.58	4,037.12	3.19
10,789.00	90.80	181.81	6,797.27	-4,010.37	-962.04	4,122.82	2.43
10,829.00	91.42	181.71	6,796.49	-4,050.34	-963.27	4,162.17	1.57
10,924.00	90.40	181.21	6,794.98	-4,145.30	-965.69	4,255.54	1.20
11,019.00	90.34	180.33	6,794.37	-4,240.28	-966.97	4,348.71	0.93
11,114.00	92.32	180.39	6,792.17	-4,335.25	-967.57	4,441.71	2.09
11,209.00	93.42	179.77	6,787.41	-4,430.13	-967.70	4,534.53	1.33
11,284.00	94.75	179.85	6,782.07	-4,504.94	-967.45	4,607.64	1.78
Final MWD Survey							
11,340.00	94.75	179.85	6,777.43	-4,560.75	-967.30	4,662.19	0.00
Bit Projection - Estimated BHL 536°FSL 1314°FEL							

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
630.00	630.00	0.00	0.00	Tie On To Surface Casing Assumed Vertical
736.00	736.00	-0.59	-0.50	First MWD Survey
11,284.00	6,782.07	-4,504.94	-967.45	Final MWD Survey
11,340.00	6,777.43	-4,560.75	-967.30	Bit Projection
11,340.00	6,777.43	-4,560.75	-967.30	Estimated BHL 536°FSL 1314°FEL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Grigsby PC AC30-73HN_PlanA - Rev1_BH L Tgt	192.04	Slot	0.00	0.00	0.00

Design Report for Grigsby PC AC30-73HN - MWD

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
630.00	11,340.00	Sperry MWD Surveys	MWD

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
Grigsby PC	0.00	0.00	6,787.40	-4,561.93	-972.77	1,440,833.73	3,284,853.78	40° 32' 20.292 N	104° 28' 30.360 W
- actual wellpath misses target center by 11.43ft at 11340.00ft MD (6777.43 TVD, -4560.75 N, -967.30 E)									
- Point									
Grigsby	0.00	0.00	0.00	4.06	36.09	1,445,399.59	3,285,862.60	40° 33' 5.292 N	104° 28' 16.608 W
- actual wellpath misses target center by 36.31ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				277.09	269.06	1,445,664.58	3,286,103.60		
Point 2				353.09	-5,074.94	1,440,320.74	3,286,179.60		
Point 3				-4,881.91	-5,218.94	1,440,176.74	3,280,944.75		
Point 4				-4,738.91	44.06	1,445,439.59	3,281,087.75		
Point 5				277.09	269.06	1,445,664.58	3,286,103.60		
Grigsby	0.00	0.00	0.00	4.06	36.09	1,445,399.59	3,285,862.60	40° 33' 5.292 N	104° 28' 16.608 W
- actual wellpath misses target center by 36.31ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-182.91	-190.94	1,445,204.60	3,285,643.61		
Point 2				-106.91	-4,614.94	1,440,780.73	3,285,719.61		
Point 3				-4,421.91	-4,758.94	1,440,636.73	3,281,404.74		
Point 4				-4,278.91	-415.94	1,444,979.60	3,281,547.73		
Point 5				-182.91	-190.94	1,445,204.60	3,285,643.61		

**North Reference Sheet for Sec. 30-T7N-R63W (Grigsby 30 PAD) - Grigsby PC
AC30-73HN**

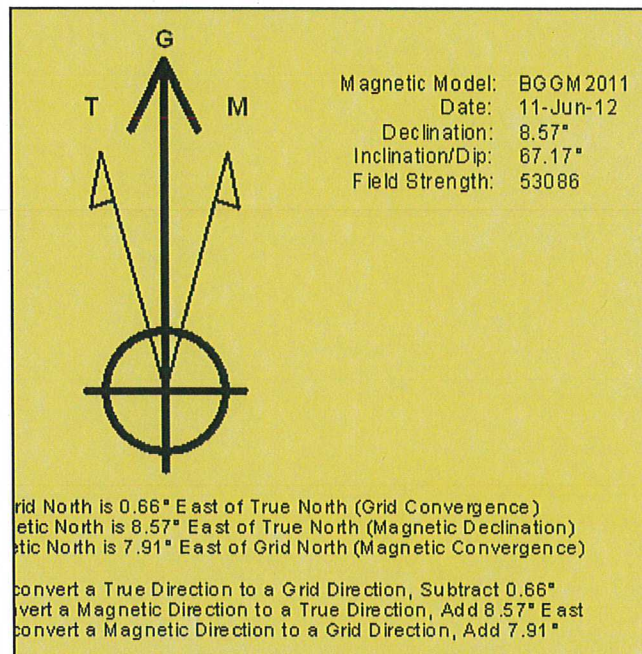
All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB @ 4780.00ft (H&P 322). Northing and Easting are relative to Grigsby PC AC30-73HN - Slot A2
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: 0.99997059

Grid Coordinates of Well: 1,445,395.53 ft N, 3,285,826.52 ft E
Geographical Coordinates of Well: 40° 33' 05.26" N, 104° 28' 17.08" W
Grid Convergence at Surface is: 0.66°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,340.00ft
the Bottom Hole Displacement is 4,662.20ft in the Direction of 191.97° (Grid).

Magnetic Convergence at surface is: -7.91° (11 June 2012, , BGGM2011)

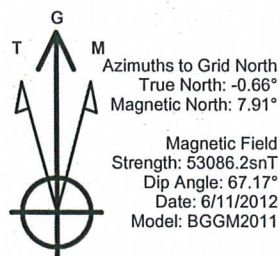


Project: Weld County, CO (NAD 83)
 Site: Sec. 30-T7N-R63W (Grigsby 30 PAD)
 Well: Grigsby PC AC30-73HN

Noble Energy

HALLIBURTON

Sperry Drilling

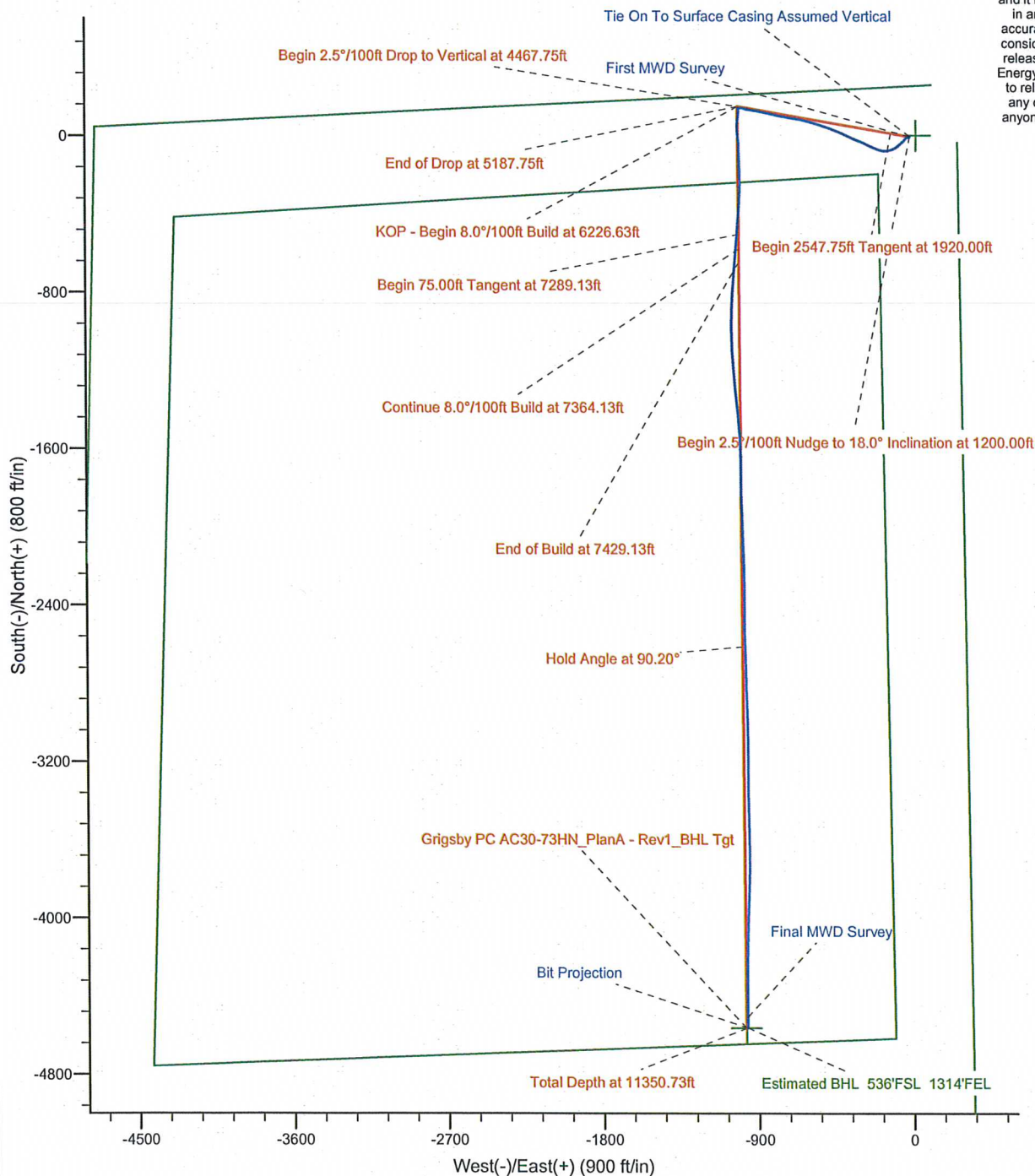


LEGEND

- Grigsby PC AC30-73HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD

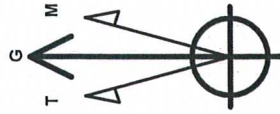
Permitted BHL: 535' FSL,
 1320' FEL

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Grigsby PC AC30-73HN 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. 30-T7N-R63W (Grigsby 30 PAD)
Well: Grigsby PC AC30-73HN

Noble Energy



Azimuths to Grid North
True North: -0.66°
Magnetic North: 7.91°
Magnetic Field
Strength: 53086.2snT
Dip Angle: 67.17°
Date: 6/11/2012
Model: BGGM2011

LEGEND

- Grigsby PC AC30-73HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Grigsby PC AC30-73HN 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.

