

# **Noble Energy**

Weld County, CO (NAD 83)

Sec. 15-T4N-R64W (Stockley 15 PAD)

Stockley C22-79HN - A2

Design: MWD Surveys

## **Sperry Drilling Services**

### **Final Survey Report**

31 October, 2011

Well Coordinates: 1,355,735.81 N, 3,266,279.84 E (40° 18' 21.46" N, 104° 32' 42.79" W)

Ground Level: 4,676.00 ft

Local Coordinate Origin: Centered on Well Stockley C22-79HN - Slot A2

Viewing Datum: KB @ 4700.00ft (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**

## Survey Report for Stockley C22-79HN - Sperry MWD Surveys

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
834.00	0.50	68.09	833.99	1.36	3.38	-1.49	0.06
First MWD Survey							
879.00	0.49	344.17	878.99	1.62	3.51	-1.76	1.47
970.00	1.42	272.93	969.98	2.05	2.27	-2.14	1.48
1,159.00	1.64	268.21	1,158.91	2.08	-2.77	-1.97	0.13
1,253.00	3.20	251.79	1,252.82	1.22	-6.61	-0.95	1.80
1,347.00	6.01	245.61	1,346.51	-1.63	-13.58	2.18	3.03
1,442.00	7.82	232.79	1,440.82	-7.59	-23.26	8.53	2.49
1,536.00	7.32	227.94	1,534.00	-15.47	-32.80	16.80	0.86
1,630.00	8.49	234.54	1,627.11	-23.51	-42.90	25.24	1.57
1,724.00	8.19	231.19	1,720.12	-31.73	-53.77	33.89	0.61
1,819.00	6.95	228.50	1,814.29	-39.78	-63.34	42.33	1.36
1,913.00	7.15	230.62	1,907.58	-47.26	-72.12	50.16	0.35
2,010.00	8.32	232.01	2,003.69	-55.41	-82.32	58.72	1.22
2,105.00	8.28	229.99	2,097.70	-64.04	-92.98	67.77	0.31
2,200.00	7.24	225.51	2,191.83	-72.63	-102.49	76.75	1.27
2,296.00	8.12	236.98	2,286.97	-80.57	-112.49	85.08	1.84
2,391.00	8.38	228.87	2,380.99	-88.78	-123.33	93.73	1.25
2,486.00	7.82	233.35	2,475.04	-97.19	-133.73	102.55	0.89
2,675.00	8.34	230.60	2,662.17	-113.57	-154.64	119.77	0.34
2,771.00	8.69	228.23	2,757.11	-122.82	-165.43	129.45	0.52
2,866.00	8.24	226.27	2,851.07	-132.30	-175.70	139.34	0.56
2,961.00	7.67	225.52	2,945.16	-141.45	-185.14	148.87	0.61
3,056.00	6.96	228.44	3,039.39	-149.71	-193.97	157.48	0.84
3,151.00	5.65	223.81	3,133.81	-156.90	-201.52	164.98	1.48
3,246.00	3.64	212.64	3,228.50	-162.82	-206.38	171.09	2.31
3,341.00	2.75	225.66	3,323.35	-166.95	-209.64	175.35	1.20
3,436.00	1.64	209.74	3,418.28	-169.72	-211.94	178.21	1.32
3,531.00	1.20	199.23	3,513.25	-171.84	-212.94	180.37	0.54
3,626.00	1.50	176.29	3,608.22	-174.02	-213.19	182.56	0.64
3,721.00	1.67	196.21	3,703.19	-176.59	-213.50	185.14	0.60
3,816.00	1.97	182.63	3,798.14	-179.56	-213.96	188.12	0.55
3,911.00	1.90	105.68	3,893.10	-181.61	-212.52	190.11	2.53
4,006.00	1.79	105.74	3,988.05	-182.44	-209.57	190.82	0.12
4,101.00	1.54	89.82	4,083.01	-182.84	-206.87	191.11	0.55
4,196.00	1.09	109.83	4,177.99	-183.14	-204.74	191.32	0.67
4,291.00	1.04	133.48	4,272.97	-184.04	-203.27	192.16	0.46
4,387.00	0.61	155.84	4,368.96	-185.11	-202.42	193.19	0.55
4,481.00	0.64	186.67	4,462.95	-186.08	-202.28	194.16	0.35
4,576.00	1.61	197.36	4,557.93	-187.89	-202.74	195.98	1.04
4,671.00	1.20	148.84	4,652.91	-190.01	-202.62	198.10	1.28
4,766.00	1.39	144.46	4,747.89	-191.80	-201.44	199.84	0.23
4,861.00	1.36	101.95	4,842.86	-192.97	-199.67	200.94	1.05
4,956.00	1.90	61.44	4,937.82	-192.45	-197.18	200.32	1.30
5,051.00	1.33	90.62	5,032.79	-191.71	-194.69	199.48	1.03
5,147.00	2.39	164.31	5,128.75	-193.65	-193.04	201.35	2.49
5,242.00	0.41	34.91	5,223.72	-195.28	-192.31	202.94	2.81
5,337.00	0.54	20.94	5,318.72	-194.58	-191.95	202.23	0.18
5,432.00	0.60	19.79	5,413.71	-193.70	-191.63	201.33	0.06



## Survey Report for Stockley C22-79HN - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,527.00	0.92	56.74	5,508.71	-192.81	-190.82	200.42	0.60
5,622.00	1.47	42.31	5,603.68	-191.49	-189.36	199.04	0.66
5,717.00	1.01	41.58	5,698.66	-189.96	-187.99	197.46	0.48
5,812.00	1.10	78.29	5,793.65	-189.15	-186.54	196.59	0.71
5,844.00	0.87	42.64	5,825.64	-188.91	-186.07	196.33	2.00
5,907.00	0.40	40.65	5,888.64	-188.39	-185.60	195.79	0.75
6,002.00	5.26	186.03	5,983.51	-192.47	-185.85	199.88	5.89
6,050.00	10.14	192.60	6,031.07	-198.79	-187.00	206.24	10.31
6,097.00	14.53	194.14	6,076.97	-208.55	-189.34	216.08	9.37
6,145.00	17.99	192.35	6,123.04	-221.63	-192.40	229.28	7.28
6,192.00	20.38	192.15	6,167.43	-236.72	-195.68	244.49	5.09
6,240.00	23.98	190.53	6,211.87	-254.49	-199.22	262.39	7.61
6,286.00	27.86	187.09	6,253.24	-274.36	-202.25	282.36	9.04
6,334.00	30.76	184.69	6,295.09	-297.72	-204.64	305.81	6.52
6,381.00	32.85	180.55	6,335.04	-322.46	-205.75	330.56	6.43
6,429.00	37.15	178.56	6,374.35	-349.98	-205.51	358.05	9.27
6,476.00	41.48	178.30	6,410.70	-379.74	-204.69	387.75	9.22
6,524.00	44.67	179.13	6,445.76	-412.51	-203.96	420.47	6.75
6,571.00	48.05	180.39	6,478.19	-446.51	-203.83	454.44	7.45
6,619.00	52.28	180.78	6,508.93	-483.36	-204.21	491.27	8.83
6,666.00	56.26	180.80	6,536.37	-521.50	-204.74	529.41	8.47
6,714.00	59.54	181.77	6,561.88	-562.15	-205.65	570.05	7.04
6,761.00	63.77	182.73	6,584.19	-603.47	-207.29	611.41	9.18
6,809.00	67.92	182.50	6,603.82	-647.21	-209.28	655.20	8.66
6,856.00	71.05	182.62	6,620.29	-691.18	-211.25	699.21	6.66
6,904.00	74.20	182.29	6,634.63	-736.95	-213.21	745.01	6.60
6,951.00	76.78	182.61	6,646.40	-782.40	-215.15	790.51	5.53
6,980.00	80.55	180.64	6,652.10	-810.82	-215.96	818.94	14.61
7,055.00	85.47	179.21	6,661.23	-885.23	-215.85	893.29	6.83
7,149.00	86.11	178.55	6,668.13	-978.96	-214.02	986.86	0.98
7,244.00	86.61	178.75	6,674.16	-1,073.74	-211.79	1,081.47	0.57
7,339.00	88.18	178.08	6,678.48	-1,168.61	-209.16	1,176.15	1.80
7,433.00	88.58	178.86	6,681.13	-1,262.53	-206.65	1,269.90	0.93
7,528.00	91.66	179.83	6,680.93	-1,357.51	-205.57	1,364.76	3.40
7,622.00	89.45	180.03	6,680.02	-1,451.50	-205.45	1,458.66	2.36
7,717.00	89.29	179.52	6,681.07	-1,546.50	-205.08	1,553.56	0.56
7,811.00	90.40	179.97	6,681.32	-1,640.49	-204.66	1,647.47	1.27
7,907.00	89.60	178.03	6,681.32	-1,736.47	-202.99	1,743.30	2.19
8,002.00	91.14	177.64	6,680.71	-1,831.40	-199.40	1,838.00	1.67
8,097.00	91.72	177.78	6,678.34	-1,926.30	-195.60	1,932.66	0.63
8,192.00	92.56	178.23	6,674.79	-2,021.17	-192.30	2,027.32	1.00
8,287.00	90.59	179.44	6,672.18	-2,116.11	-190.37	2,122.10	2.43
8,381.00	91.91	178.90	6,670.13	-2,210.07	-189.01	2,215.94	1.52
8,475.00	89.57	181.33	6,668.91	-2,304.05	-189.20	2,309.84	3.59
8,570.00	89.97	181.00	6,669.30	-2,399.03	-191.13	2,404.82	0.55
8,665.00	89.72	179.44	6,669.55	-2,494.03	-191.49	2,499.76	1.66
8,760.00	89.91	176.16	6,669.86	-2,588.94	-187.85	2,594.45	3.46
8,855.00	88.80	176.12	6,670.93	-2,683.72	-181.45	2,688.88	1.17
8,949.00	88.98	178.39	6,672.75	-2,777.59	-176.95	2,782.49	2.42
9,044.00	88.98	180.35	6,674.44	-2,872.56	-175.91	2,877.34	2.06
9,139.00	90.09	180.71	6,675.21	-2,967.56	-176.79	2,972.29	1.23

## Survey Report for Stockley C22-79HN - Sperry MWD Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,233.00	90.15	181.96	6,675.02	-3,061.53	-178.98	3,066.28	1.33
9,328.00	89.57	181.21	6,675.25	-3,156.49	-181.60	3,161.27	1.00
9,423.00	90.06	181.34	6,675.55	-3,251.47	-183.72	3,256.25	0.53
9,518.00	90.59	180.94	6,675.02	-3,346.45	-185.61	3,351.23	0.70
9,613.00	90.25	179.70	6,674.32	-3,441.44	-186.14	3,446.16	1.35
9,707.00	91.23	180.96	6,673.11	-3,535.43	-186.68	3,540.10	1.70
9,802.00	90.86	180.84	6,671.37	-3,630.40	-188.17	3,635.05	0.41
9,897.00	89.69	182.53	6,670.92	-3,725.35	-190.96	3,730.04	2.16
9,992.00	90.86	182.09	6,670.46	-3,820.27	-194.79	3,825.03	1.32
10,087.00	89.60	182.24	6,670.08	-3,915.20	-198.38	3,920.03	1.34
10,182.00	89.97	183.57	6,670.44	-4,010.08	-203.20	4,015.02	1.45
10,277.00	88.61	182.40	6,671.61	-4,104.94	-208.14	4,110.01	1.89
10,372.00	89.35	179.67	6,673.30	-4,199.90	-209.86	4,204.96	2.98
10,468.00	91.60	179.37	6,672.51	-4,295.88	-209.05	4,300.83	2.36
10,563.00	89.38	180.08	6,671.70	-4,390.87	-208.60	4,395.72	2.45
10,658.00	90.37	180.30	6,671.90	-4,485.87	-208.91	4,490.66	1.07
10,753.00	88.86	179.87	6,672.54	-4,580.86	-209.05	4,585.58	1.65
10,848.00	91.73	180.04	6,672.05	-4,675.85	-208.98	4,680.48	3.03
10,943.00	92.50	180.57	6,668.55	-4,770.79	-209.49	4,775.36	0.98
11,039.00	91.76	179.99	6,664.98	-4,866.72	-209.95	4,871.23	0.98
11,134.00	90.93	179.72	6,662.75	-4,961.69	-209.71	4,966.11	0.92
11,179.00	91.39	179.27	6,661.84	-5,006.68	-209.32	5,011.05	1.43
Final MWD Survey							
11,235.00	91.39	179.27	6,660.48	-5,062.66	-208.60	5,066.95	0.00

Survey Projection to TD - Estimated BHL: 511' FSL 71' FWL

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
834.00	833.99	1.36	3.38	First MWD Survey
11,179.00	6,661.84	-5,006.68	-209.32	Final MWD Survey
11,235.00	6,660.48	-5,062.66	-208.60	Survey Projection to TD
11,235.00	6,660.48	-5,062.66	-208.60	Estimated BHL: 511' FSL 71' FWL

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Stockley C22-79HN_PlanA - Rev1_BHL	182.33	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
834.00	11,235.00	Sperry MWD Surveys	MWD

## Survey Report for Stockley C22-79HN - Sperry MWD Surveys

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
Stockley - survey misses target center by 4.61ft at 11209.51ft MD (6661.10 TVD, -5037.18 N, -208.93 E) - Point	0.00	0.00	6,663.84	-5,037.20	-205.22	1,350,698.83	3,266,074.63	40° 17' 31.704 N	104° 32' 46.140 W
Stockley - survey misses target center by 21.86ft at 0.03ft MD (0.03 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	21.85	-0.24	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
Stockley - survey misses target center by 21.86ft at 0.03ft MD (0.03 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	21.85	-0.24	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
Stockley - survey misses target center by 21.86ft at 0.03ft MD (0.03 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	21.85	-0.24	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W
Stockley - survey misses target center by 21.86ft at 0.03ft MD (0.03 TVD, 0.00 N, 0.00 E) - Polygon	0.00	0.00	0.00	21.85	-0.24	1,355,757.66	3,266,279.60	40° 18' 21.672 N	104° 32' 42.792 W



## North Reference Sheet for Sec. 15-T4N-R64W (Stockley 15 PAD) - Stockley C22-79HN

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

Vertical Depths are relative to KB @ 4700.00ft (Rig KB). Northing and Easting are relative to Stockley C22-79HN - 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: 0.99995731

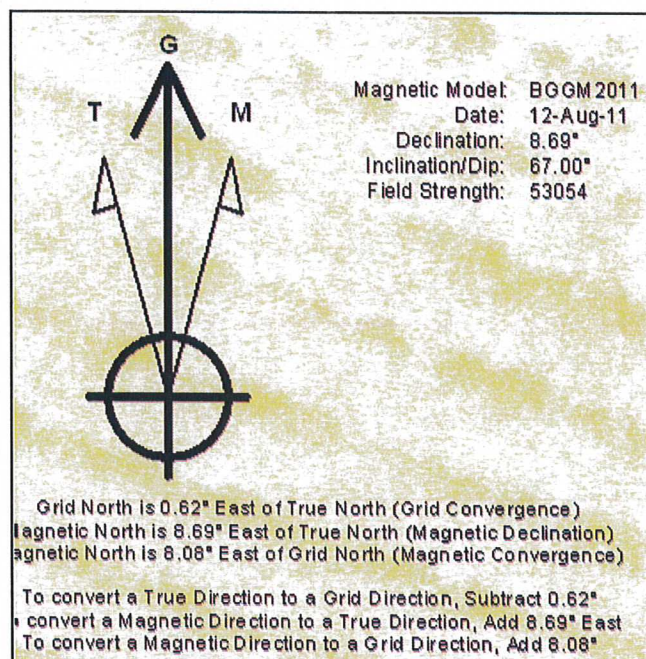
Grid Coordinates of Well: 1,355,735.81 ft N, 3,266,279.84 ft E

Geographical Coordinates of Well: 40° 18' 21.46" N, 104° 32' 42.79" W

Grid Convergence at Surface is: 0.62°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,235.00ft  
the Bottom Hole Displacement is 5,066.95ft in the Direction of 182.36° (Grid).

Magnetic Convergence at surface is: -8.08° (12 August 2011, , BGGM2011)

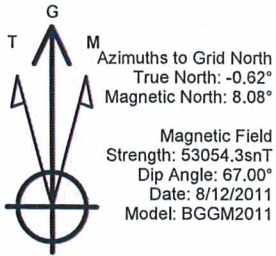


Project: Weld County, CO (NAD 83)  
 Site: Sec. 15-T4N-R64W (Stockley 15 PAD)  
 Well: Stockley C22-79HN

# Noble Energy

**HALLIBURTON**

Sperry Drilling

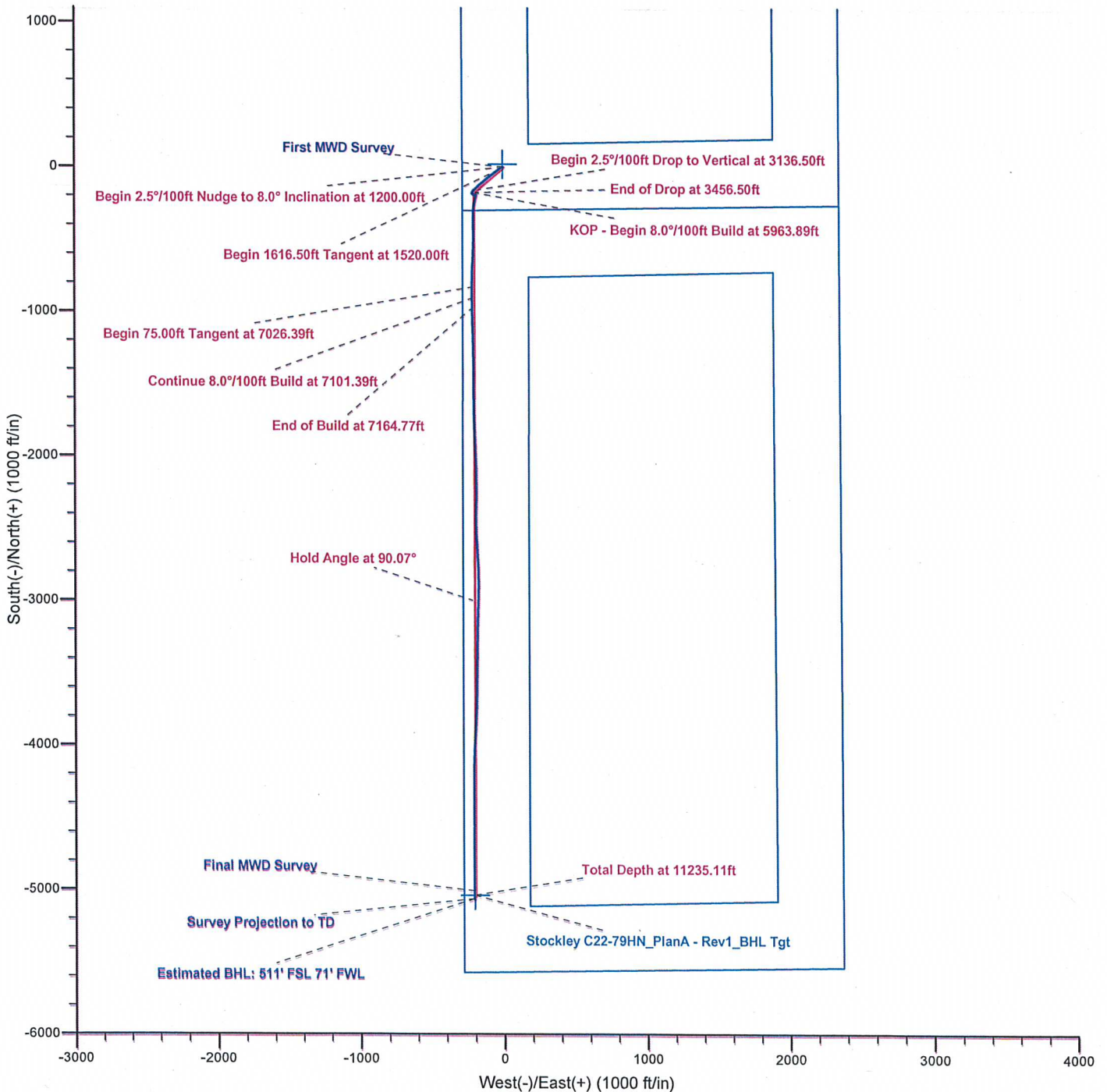


## LEGEND

- Stockley C22-79HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

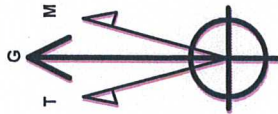
Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Stockley C22-79HN well located at Weld County, CO. At the conclusion of the job Halliburton performed a final survey on the well. Noble Energy has requested that Halliburton provide them 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: 535' FSL, 75' FWL



Project: Weld County, CO (NAD 83)  
 Site: Sec. 15-T4N-R64W (Stockley 15 PAD)  
 Well: Stockley C22-79HN

# Noble Energy



Azimuths to Grid North  
 True North: -0.62°  
 Magnetic North: 8.08°  
 Magnetic Field  
 Strength: 53054.3snT  
 Dip Angle: 67.00°  
 Date: 8/12/2011  
 Model: BGGM2011

## LEGEND

- Stockley C22-79HN, Plan A, Plan A - Rev 1 Proposal V0
- MWD Survey

Halliburton Energy Services, Inc. ("Halliburton") recently completed directional drilling and MWD operations at the Stockley C22-79HN 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.

