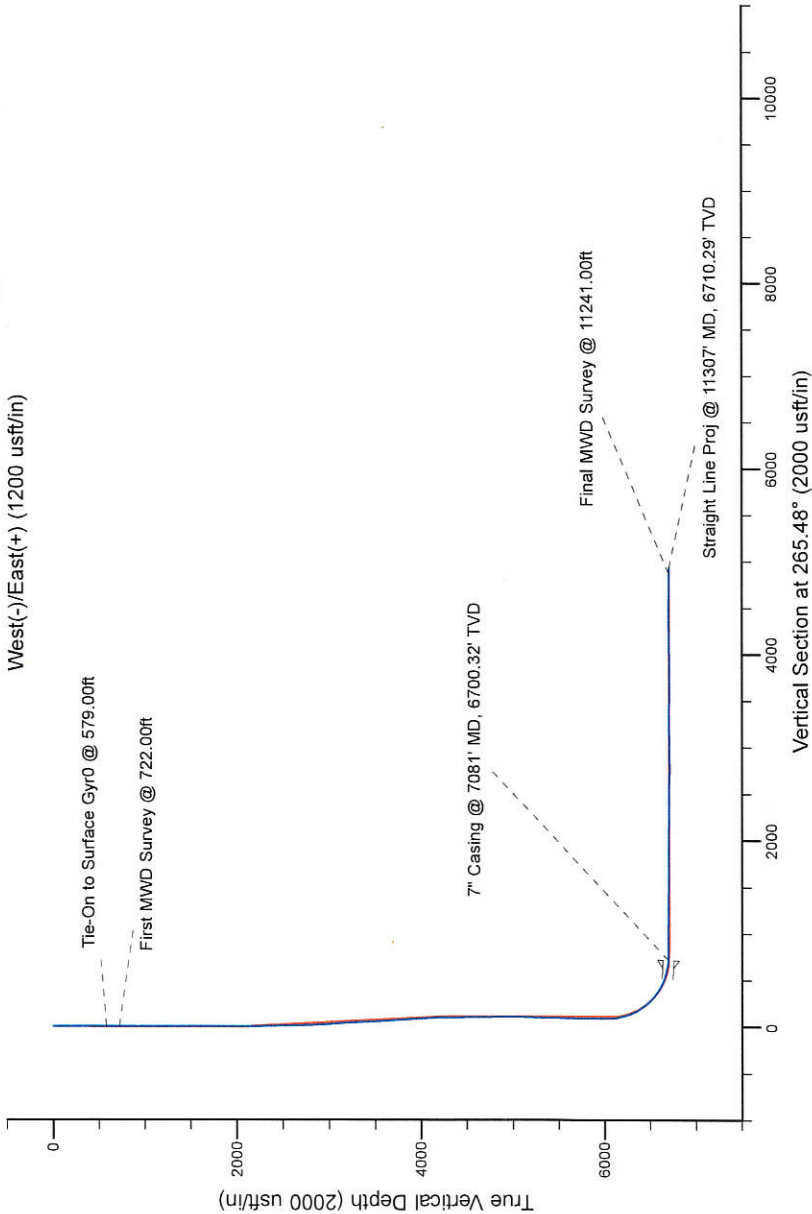
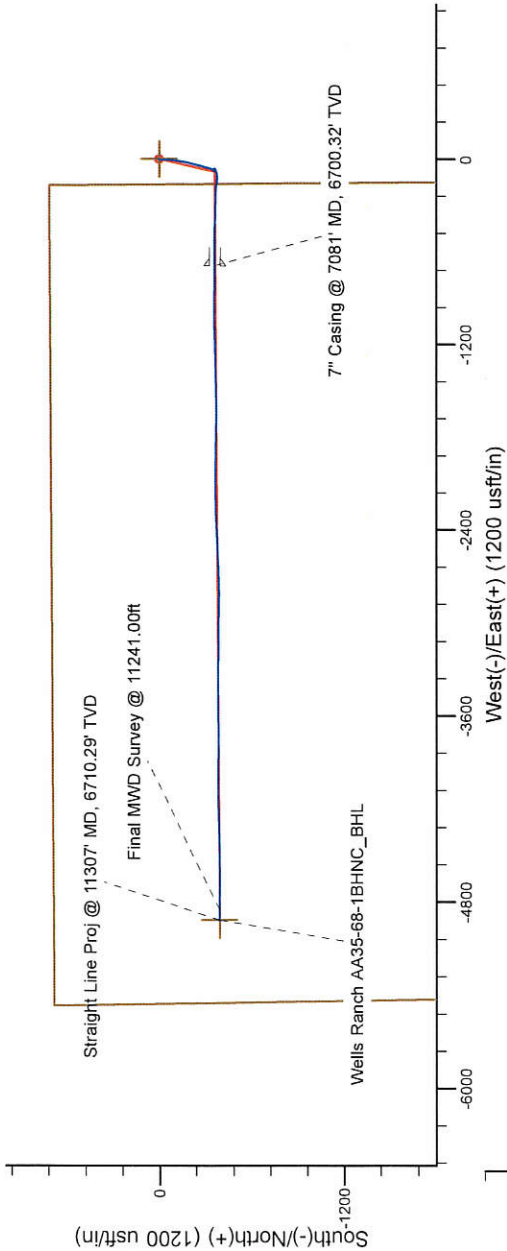


Project: Weld County, CO (NAD 83)  
Site: Sec. 36-T6N-R63W (Wells Ranch AA35)  
Well: Wells Ranch AA35-68-1BHNC  
Wellbore: Plan B  
Design: Final Surveys

# Noble Energy



## LEGEND

- Wells Ranch AA35-68-1BHNC, Plan B, Rev B0 - PROPOSAL V0
- Final Surveys

Platted SHL: 718' FNL, 164' FWL  
Platted Lat/Long: 40.44818 N, 104.39409 W  
Location: Sec. 36-T6N-R63W

7" Casing: ~1071.41' FNL, ~530.25' FEL  
Lat/Long: 40.447218 N, 104.396592 W  
State Planes - CO Northern: 1,407,672.53' N, 3,307,088.77' E  
Location: Sec. 35-T6N-R63W

BHL: ~1071.85' FNL, ~534.49' FWL  
Lat/Long: 40.447289 N, 104.411770 W  
State Planes - CO Northern: 1,407,646.04' N, 3,302,864.46' E  
Location: Sec. 35-T6N-R63W

WELL DETAILS: Wells Ranch AA35-68-1BHNC

Ground Level: 4808.00  
RKB = 30 @ 4838.00usft (H&F 321)

Created By: Fred Hartmann  
Created On: 03/25/2014

# Noble Energy

Weld County, CO (NAD 83)

Sec. 36-T6N-R63W (Wells Ranch AA35)

Wells Ranch AA35-68-1BHNC

Design: Final Surveys

## Sperry Drilling Services

Final Survey Report

25 March, 2014

Well Coordinates: 1,408,031.56 N, 3,307,780.51 E (40° 26' 53.45" N, 104° 23' 38.72" W)

Ground Level: 4,808.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Wells Ranch AA35-68-1BHNC

RKB = 30 @ 4838.00usft (H&P 321)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Wells Ranch AA35-68-1BHNC - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
579.00	0.80	253.82	578.98	-1.13	-3.88	3.96	0.14
<b>Tie-On to Surface Gyr0 @ 579.00ft</b>							
722.00	0.19	331.75	721.98	-1.20	-4.95	5.03	0.55
<b>First MWD Survey @ 722.00ft</b>							
815.00	0.07	263.86	814.98	-1.07	-5.08	5.15	0.19
907.00	0.29	179.50	906.98	-1.30	-5.14	5.22	0.32
998.00	0.09	186.60	997.97	-1.61	-5.14	5.25	0.22
1,090.00	0.19	131.15	1,089.97	-1.78	-5.04	5.16	0.17
1,182.00	0.14	139.48	1,181.97	-1.96	-4.85	4.99	0.06
1,274.00	0.09	43.49	1,273.97	-2.00	-4.73	4.87	0.19
1,365.00	0.42	116.50	1,364.97	-2.09	-4.38	4.53	0.44
1,457.00	0.16	178.89	1,456.97	-2.37	-4.07	4.25	0.41
1,552.00	0.12	191.15	1,551.97	-2.60	-4.09	4.28	0.05
1,647.00	0.28	197.54	1,646.97	-2.92	-4.18	4.40	0.17
1,742.00	0.45	217.37	1,741.97	-3.44	-4.48	4.73	0.22
1,837.00	1.33	185.93	1,836.96	-4.83	-4.82	5.18	1.03
1,931.00	1.99	173.16	1,930.92	-7.54	-4.73	5.31	0.80
2,026.00	2.90	177.52	2,025.83	-11.58	-4.43	5.33	0.98
2,119.00	3.98	182.47	2,118.66	-17.15	-4.47	5.81	1.20
2,214.00	5.34	182.22	2,213.35	-24.86	-4.78	6.73	1.43
2,308.00	6.53	181.21	2,306.84	-34.58	-5.07	7.78	1.27
2,403.00	7.29	179.99	2,401.15	-46.01	-5.18	8.79	0.81
2,498.00	8.50	188.39	2,495.25	-58.98	-6.20	10.83	1.76
2,593.00	10.55	179.70	2,588.94	-74.63	-7.18	13.04	2.63
2,688.00	10.55	183.30	2,682.34	-92.01	-7.64	14.87	0.69
2,783.00	11.70	186.79	2,775.55	-110.25	-9.28	17.94	1.40
2,877.00	11.63	188.88	2,867.61	-129.08	-11.87	22.00	0.46
2,972.00	12.89	194.35	2,960.44	-148.81	-15.97	27.65	1.80
3,067.00	11.88	193.60	3,053.23	-168.58	-20.90	34.12	1.08
3,162.00	10.02	191.97	3,146.50	-186.17	-24.91	39.51	1.98
3,256.00	9.66	193.80	3,239.12	-201.83	-28.49	44.31	0.51
3,351.00	8.50	192.34	3,332.92	-216.43	-31.89	48.85	1.24
3,446.00	8.44	191.94	3,426.89	-230.11	-34.83	52.86	0.09
3,541.00	9.42	196.89	3,520.74	-244.37	-38.53	57.67	1.31
3,636.00	11.38	195.63	3,614.17	-260.83	-43.32	63.74	2.08
3,731.00	12.88	192.41	3,707.05	-280.20	-48.12	70.05	1.73
3,826.00	13.44	193.65	3,799.55	-301.27	-53.00	76.58	0.66
3,921.00	11.76	197.39	3,892.26	-321.24	-58.50	83.64	1.97
4,016.00	8.99	198.43	3,985.70	-337.52	-63.74	90.15	2.92
4,110.00	6.07	201.00	4,078.88	-349.13	-67.84	95.15	3.13
4,205.00	2.97	203.49	4,173.57	-356.08	-70.63	98.47	3.27
4,300.00	1.10	207.36	4,268.51	-359.15	-72.03	100.11	1.97
4,395.00	0.77	313.97	4,363.50	-359.52	-72.90	101.01	1.59
4,489.00	1.31	302.50	4,457.49	-358.50	-74.27	102.29	0.61
4,584.00	1.66	302.78	4,552.45	-357.17	-76.34	104.25	0.37
4,679.00	1.03	325.33	4,647.43	-355.72	-77.98	105.78	0.85
4,773.00	0.69	27.84	4,741.42	-354.53	-78.20	105.90	1.00
4,868.00	1.90	306.87	4,836.40	-353.08	-79.19	106.77	2.02
4,963.00	0.58	295.07	4,931.37	-351.93	-80.89	108.37	1.41

## Design Report for Wells Ranch AA35-68-1BHNC - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,058.00	0.72	91.41	5,026.37	-351.74	-80.72	108.20	1.34
5,153.00	2.43	92.72	5,121.33	-351.85	-78.12	105.61	1.80
5,248.00	1.72	103.95	5,216.27	-352.29	-74.72	102.25	0.86
5,342.00	1.55	111.75	5,310.23	-353.10	-72.17	99.78	0.30
5,437.00	1.25	114.58	5,405.20	-354.01	-70.03	97.72	0.32
5,532.00	1.09	118.45	5,500.18	-354.87	-68.30	96.06	0.19
5,627.00	1.08	116.15	5,595.17	-355.69	-66.70	94.53	0.05
5,721.00	0.81	133.78	5,689.15	-356.54	-65.42	93.32	0.42
5,816.00	0.61	142.38	5,784.15	-357.41	-64.63	92.60	0.24
5,911.00	0.63	151.77	5,879.14	-358.27	-64.08	92.11	0.11
5,984.00	0.46	160.48	5,952.14	-358.90	-63.79	91.88	0.26
6,046.00	0.13	156.77	6,014.14	-359.20	-63.68	91.79	0.53
6,099.00	1.01	230.15	6,067.13	-359.55	-64.01	92.15	1.85
6,147.00	7.01	241.35	6,114.99	-361.23	-66.91	95.17	12.55
6,194.00	13.40	246.83	6,161.23	-364.75	-74.44	102.96	13.74
6,242.00	15.64	248.50	6,207.69	-369.31	-85.58	114.42	4.75
6,289.00	17.05	258.70	6,252.80	-372.99	-98.23	127.32	6.79
6,337.00	21.14	269.09	6,298.16	-374.50	-113.80	142.96	11.05
6,384.00	26.88	273.47	6,341.08	-373.99	-132.89	161.96	12.78
6,432.00	32.48	276.27	6,382.77	-371.93	-156.56	185.38	12.02
6,479.00	36.46	275.57	6,421.51	-369.19	-183.01	211.54	8.51
6,527.00	38.44	274.38	6,459.62	-366.67	-212.09	240.33	4.39
6,573.00	42.48	273.36	6,494.61	-364.67	-241.86	269.85	8.90
6,621.00	46.23	270.52	6,528.93	-363.56	-275.39	303.19	8.84
6,668.00	50.09	269.66	6,560.27	-363.51	-310.40	338.08	8.32
6,716.00	56.44	271.07	6,588.97	-363.25	-348.84	376.39	13.44
6,763.00	61.90	273.09	6,613.05	-361.76	-389.15	416.46	12.19
6,811.00	64.24	272.42	6,634.79	-359.71	-431.90	458.90	5.03
6,857.00	67.77	270.47	6,653.49	-358.66	-473.90	500.69	8.60
6,905.00	71.88	269.72	6,670.04	-358.59	-518.94	545.59	8.69
6,952.00	76.87	269.32	6,682.70	-358.97	-564.19	590.73	10.65
7,000.00	80.47	269.85	6,692.13	-359.31	-611.25	637.66	7.58
7,037.00	83.85	270.30	6,697.17	-359.26	-647.89	674.19	9.21
7,081.00	87.94	270.26	6,700.32	-359.04	-691.77	717.92	9.31
<b>7" Casing @ 7081' MD, 6700.32' TVD</b>							
7,112.00	90.83	270.24	6,700.65	-358.91	-722.77	748.81	9.31
7,175.00	90.22	270.58	6,700.07	-358.46	-785.76	811.57	1.11
7,270.00	88.77	270.83	6,700.91	-357.29	-880.75	906.17	1.55
7,364.00	90.31	269.48	6,701.67	-357.03	-974.74	999.85	2.18
7,459.00	90.25	269.53	6,701.20	-357.85	-1,069.73	1,094.61	0.08
7,554.00	87.72	268.45	6,702.88	-359.53	-1,164.70	1,189.41	2.90
7,649.00	88.80	268.87	6,705.77	-361.75	-1,259.62	1,284.22	1.22
7,744.00	90.80	268.77	6,706.10	-363.70	-1,354.60	1,379.05	2.11
7,839.00	89.91	268.43	6,705.51	-366.03	-1,449.57	1,473.91	1.00
7,934.00	89.35	268.43	6,706.13	-368.63	-1,544.53	1,568.78	0.59
8,028.00	89.23	271.98	6,707.29	-368.29	-1,638.51	1,662.44	3.78
8,123.00	88.71	268.35	6,709.00	-368.02	-1,733.47	1,757.09	3.86
8,218.00	91.45	272.97	6,708.87	-366.92	-1,828.43	1,851.67	5.65
8,313.00	89.54	270.89	6,708.05	-363.73	-1,923.37	1,946.05	2.97
8,408.00	89.72	270.88	6,708.66	-362.26	-2,018.35	2,040.63	0.19
8,502.00	89.63	268.99	6,709.19	-362.37	-2,112.35	2,134.34	2.01



## Design Report for Wells Ranch AA35-68-1BHNC - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,597.00	89.51	269.14	6,709.90	-363.92	-2,207.33	2,229.15	0.20
8,692.00	89.60	268.26	6,710.64	-366.07	-2,302.30	2,323.99	0.93
8,787.00	89.38	266.83	6,711.49	-370.14	-2,397.21	2,418.93	1.52
8,882.00	90.12	267.83	6,711.90	-374.56	-2,492.10	2,513.87	1.31
8,976.00	88.28	267.23	6,713.22	-378.62	-2,586.00	2,607.80	2.06
9,071.00	88.19	268.06	6,716.14	-382.52	-2,680.88	2,702.69	0.88
9,166.00	89.26	269.57	6,718.26	-384.48	-2,775.83	2,797.50	1.95
9,261.00	90.34	270.58	6,718.59	-384.36	-2,870.83	2,892.19	1.56
9,356.00	92.34	271.44	6,716.37	-382.68	-2,965.78	2,986.72	2.29
9,451.00	92.43	270.75	6,712.41	-380.87	-3,060.68	3,081.18	0.73
9,545.00	90.15	270.30	6,710.30	-380.01	-3,154.65	3,174.78	2.47
9,640.00	89.20	270.51	6,710.83	-379.34	-3,249.64	3,269.43	1.02
9,735.00	90.15	270.16	6,711.37	-378.78	-3,344.64	3,364.09	1.07
9,830.00	89.01	269.23	6,712.07	-379.29	-3,439.63	3,458.82	1.55
9,924.00	89.45	269.97	6,713.33	-379.94	-3,533.62	3,552.57	0.92
10,019.00	89.94	270.13	6,713.84	-379.86	-3,628.62	3,647.27	0.54
10,114.00	88.89	269.29	6,714.81	-380.34	-3,723.61	3,742.00	1.42
10,209.00	89.29	269.19	6,716.32	-381.60	-3,818.59	3,836.78	0.43
10,303.00	92.10	272.19	6,715.18	-380.47	-3,912.55	3,930.37	4.37
10,398.00	91.02	269.80	6,712.59	-378.82	-4,007.50	4,024.89	2.76
10,493.00	91.45	269.75	6,710.54	-379.19	-4,102.47	4,119.60	0.46
10,588.00	91.11	268.92	6,708.42	-380.30	-4,197.44	4,214.36	0.94
10,683.00	90.89	268.94	6,706.76	-382.07	-4,292.41	4,309.17	0.23
10,777.00	89.01	267.04	6,706.84	-385.37	-4,386.34	4,403.07	2.84
10,872.00	89.97	269.76	6,707.69	-388.02	-4,481.29	4,497.93	3.04
10,967.00	89.01	269.47	6,708.54	-388.66	-4,576.29	4,592.68	1.06
11,062.00	89.32	269.89	6,709.92	-389.19	-4,671.27	4,687.42	0.55
11,157.00	89.75	270.58	6,710.69	-388.80	-4,766.27	4,782.09	0.86
11,241.00	90.31	271.51	6,710.65	-387.27	-4,850.25	4,865.69	1.29
<b>Final MWD Survey @ 11241.00ft</b>							
11,307.00	90.31	271.51	6,710.29	-385.53	-4,916.23	4,931.32	0.00
<b>Straight Line Proj @ 11307' MD, 6710.29' TVD</b>							

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
579.00	578.98	-1.13	-3.88	Tie-On to Surface Gyr0 @ 579.00ft
722.00	721.98	-1.20	-4.95	First MWD Survey @ 722.00ft
11,241.00	6,710.65	-387.27	-4,850.25	Final MWD Survey @ 11241.00ft
11,307.00	6,710.29	-385.53	-4,916.23	Straight Line Proj @ 11307' MD, 6710.29' TVD

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Wells Ranch AA35-68-1BHNC_BHL	265.48	Slot	0.00	0.00	0.00

## Design Report for Wells Ranch AA35-68-1BHNC - Final Surveys

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
579.00	579.00	Surface Gyro	Flexi-Shot
722.00	7,037.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
7,112.00	11,241.00	MWD Surveys - Production	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,081.00	6,700.32	7" Casing @ 7081' MD, 6700.32' TVD	7	8-3/4

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Wells Ranch AA35-68- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,408,031.56	3,307,780.51	40.448180	-104.394090
Point 1				0.00	682.99	-5,466.68	1,408,714.52	3,302,314.03	
Point 2				0.00	-4,635.42	-5,387.61	1,403,396.31	3,302,393.10	
Point 3				0.00	-4,577.70	-126.65	1,403,454.03	3,307,653.87	
Point 4				0.00	715.65	-170.36	1,408,747.18	3,307,610.16	
Point 5				0.00	682.99	-5,466.68	1,408,714.52	3,302,314.03	
Wells Ranch AA35-68- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,408,031.56	3,307,780.51	40.448180	-104.394090
Point 1				0.00	222.97	-5,006.67	1,408,254.52	3,302,774.03	
Point 2				0.00	-4,175.41	-4,927.59	1,403,856.31	3,302,853.10	
Point 3				0.00	-4,117.68	-586.66	1,403,914.03	3,307,193.87	
Point 4				0.00	255.63	-630.37	1,408,287.18	3,307,150.16	
Point 5				0.00	222.97	-5,006.67	1,408,254.52	3,302,774.03	
Wells Ranch AA35-68- - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,408,031.56	3,307,780.51	40.448180	-104.394090
Wells Ranch AA35-68- - actual wellpath misses target center by 3.20usft at 11307.00usft MD (6710.29 TVD, -385.53 N, -4916.23 E) - Point	0.00	0.00	6,710.00	-388.71	-4,916.35	1,407,642.86	3,302,864.35	40.447280	-104.411770

Directional Difficulty Index

Average Dogleg over Survey:	1.94 °/100usft	Maximum Dogleg over Survey:	13.74 °/100usft at 6,194.00 usft
Net Tortousity applicable to Plans:	0.97 °/100usft	Directional Difficulty Index:	6.289

Audit Info

## North Reference Sheet for Sec. 36-T6N-R63W (Wells Ranch AA35) - Wells Ranch AA35-68-1BHNC

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

Vertical Depths are relative to RKB = 30 @ 4838.00usft (H&P 321). Northing and Easting are relative to Wells Ranch AA35-68-1BHNC

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996277

Grid Coordinates of Well: 1,408,031.56 usft N, 3,307,780.51 usft E

Geographical Coordinates of Well: 40° 26' 53.45" N, 104° 23' 38.72" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,307.00usft  
the Bottom Hole Displacement is 4,931.32usft in the Direction of 265.52° (Grid).

Magnetic Convergence at surface is: -7.62° ( 8 March 2014, , BGGM2013)

