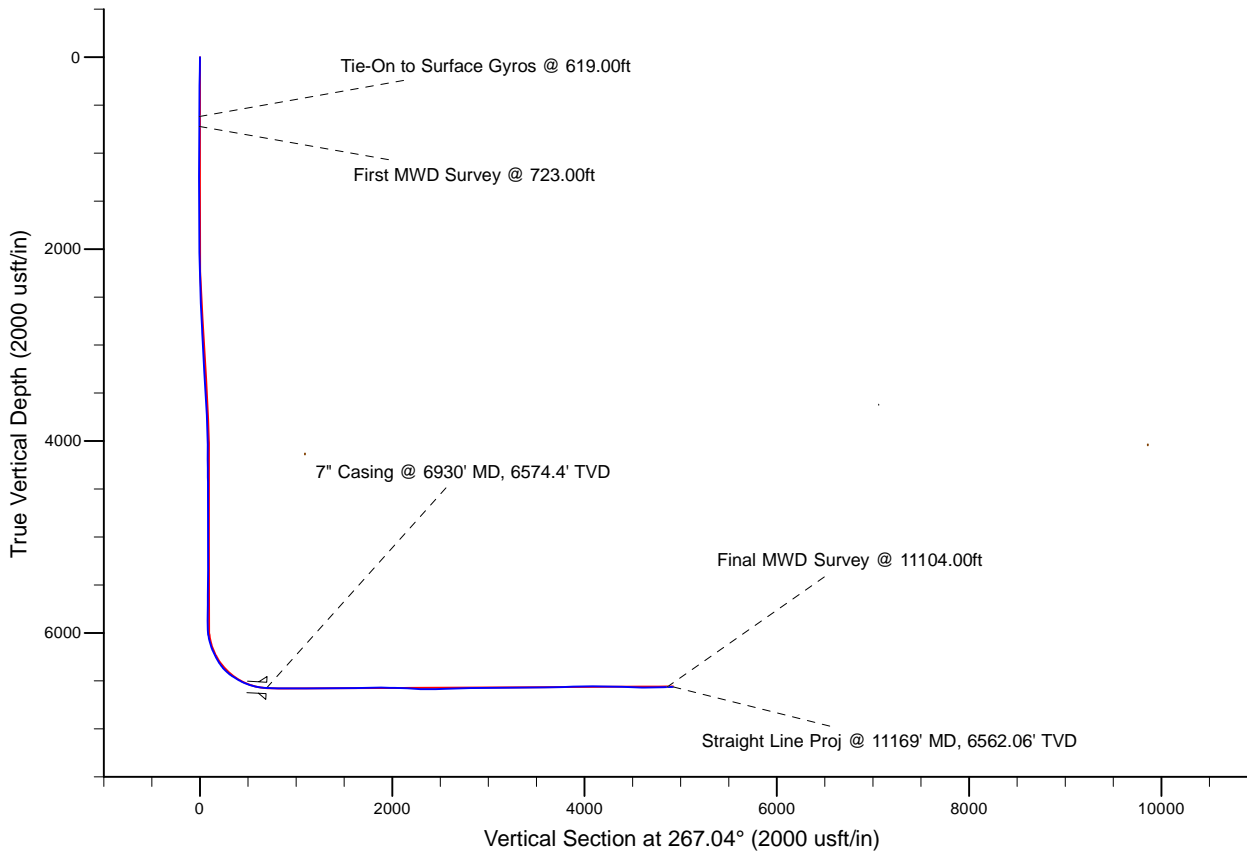
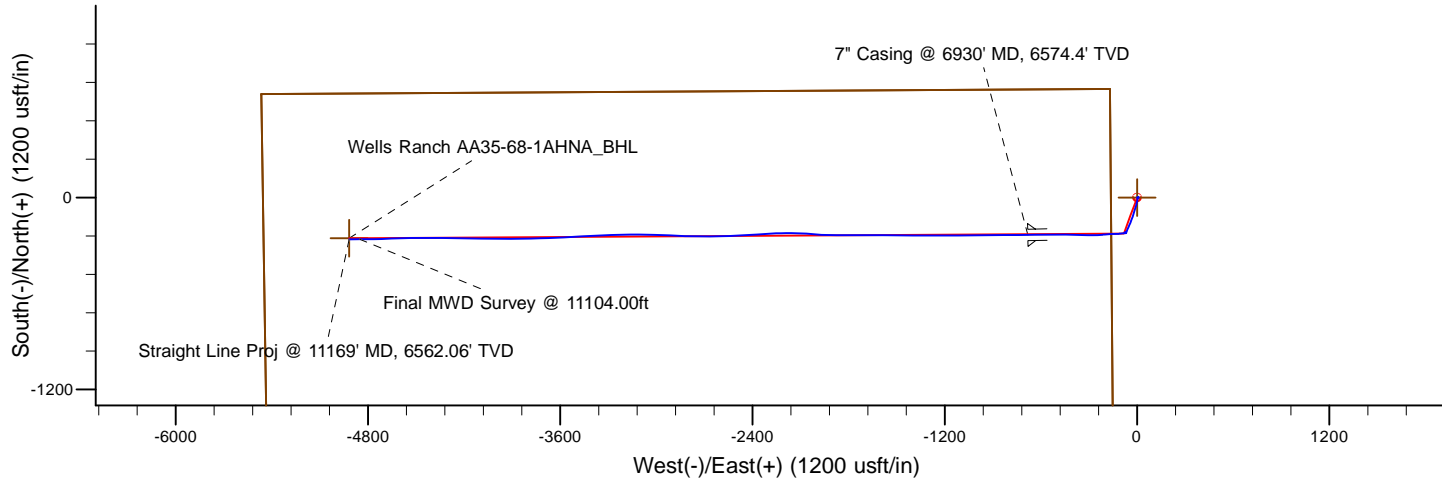


Project: Weld County, CO (NAD 83)  
 Site: Sec. 36-T6N-R63W (Wells Ranch AA35)  
 Well: Wells Ranch AA35-68-1AHNA  
 Wellbore: Plan C  
 Design: Final Surveys

# Noble Energy



**LEGEND**

- Wells Ranch AA35-68-1AHNA, Plan C, Rev C0 - PROPOSAL V0
- Final Surveys

Platted SHL: 680' FNL, 164' FWL  
 Platted Lat/Long: 40.44828 N, 104.39409 W  
 Location: Sec. 36-T6N-R63W

7" Casing: ~909.31' FNL, ~519.27' FEL  
 Lat/Long: 40.447663 N, 104.396550 W  
 State Planes - CO Northern: 1,407,834.70' N, 3,307,098.41' E  
 Location: Sec. 35-T6N-R63W

BHL: ~911.52' FNL, ~535.28' FWL  
 Lat/Long: 40.447729 N, 104.411768 W  
 State Planes - CO Northern: 1,407,806.37' N, 3,302,862.87' E  
 Location: Sec. 35-T6N-R63W

WELL DETAILS: Wells Ranch AA35-68-1AHNA

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

Created By: Fred Hartmann  
 Created On: 03/13/2014

# Noble Energy

Weld County, CO (NAD 83)

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

Wells Ranch AA35-68-1AHNA

Design: Final Surveys

## Sperry Drilling Services

### Final Survey Report

13 March, 2014

Well Coordinates: 1,408,068.00 N, 3,307,780.06 E (40° 26' 53.81" 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 AA35-68-1AHNA

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

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

**Design Report for Wells Ranch AA35-68-1AHNA - 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
298.00	1.20	53.82	297.98	1.84	2.52	-2.61	0.40
619.00	0.90	207.22	618.96	1.58	4.08	-4.16	0.64
<b>Tie-On to Surface Gyros @ 619.00ft</b>							
723.00	0.68	124.49	722.95	0.51	4.21	-4.23	1.02
<b>First MWD Survey @ 723.00ft</b>							
815.00	0.72	98.62	814.94	0.11	5.24	-5.23	0.34
907.00	0.79	104.04	906.94	-0.13	6.42	-6.41	0.11
999.00	0.80	117.48	998.93	-0.58	7.61	-7.57	0.20
1,091.00	0.94	113.23	1,090.92	-1.17	8.87	-8.80	0.17
1,182.00	0.88	8.65	1,181.91	-0.78	9.66	-9.61	1.58
1,274.00	0.96	356.81	1,273.90	0.69	9.73	-9.75	0.22
1,365.00	0.99	352.73	1,364.88	2.23	9.58	-9.69	0.08
1,458.00	0.61	237.14	1,457.88	2.76	9.07	-9.20	1.47
1,553.00	0.71	223.16	1,552.87	2.06	8.24	-8.33	0.20
1,647.00	0.75	239.80	1,646.87	1.32	7.31	-7.37	0.23
1,742.00	0.80	241.51	1,741.86	0.69	6.19	-6.22	0.06
1,837.00	0.83	220.36	1,836.85	-0.15	5.16	-5.14	0.32
1,932.00	0.48	224.06	1,931.84	-0.96	4.44	-4.38	0.37
2,026.00	0.97	193.72	2,025.83	-2.01	3.97	-3.87	0.65
2,119.00	3.18	185.12	2,118.77	-5.35	3.56	-3.28	2.39
2,214.00	4.79	194.77	2,213.54	-11.81	2.31	-1.70	1.83
2,309.00	6.00	193.92	2,308.11	-20.46	0.11	0.95	1.28
2,404.00	8.37	191.79	2,402.36	-32.05	-2.50	4.15	2.51
2,499.00	7.70	188.96	2,496.43	-45.11	-4.91	7.23	0.82
2,594.00	7.94	198.33	2,590.55	-57.62	-7.96	10.92	1.36
2,688.00	7.09	199.73	2,683.74	-69.25	-11.96	15.52	0.92
2,783.00	7.52	200.13	2,777.97	-80.60	-16.08	20.21	0.46
2,878.00	8.60	196.91	2,872.03	-93.23	-20.29	25.07	1.23
2,972.00	8.24	193.84	2,965.02	-106.50	-23.94	29.40	0.61
3,067.00	8.60	200.23	3,058.99	-119.77	-28.03	34.16	1.05
3,162.00	7.59	199.60	3,153.05	-132.35	-32.59	39.37	1.07
3,257.00	8.56	200.31	3,247.10	-144.89	-37.15	44.57	1.03
3,352.00	6.46	201.72	3,341.28	-156.49	-41.58	49.59	2.22
3,447.00	8.90	207.22	3,435.43	-167.99	-46.92	55.52	2.68
3,542.00	7.42	199.08	3,529.46	-180.32	-52.28	61.51	1.97
3,636.00	6.89	204.43	3,622.73	-191.19	-56.60	66.38	0.91
3,731.00	7.48	205.13	3,716.99	-201.98	-61.58	71.92	0.63
3,826.00	5.64	196.70	3,811.36	-212.05	-65.55	76.40	2.18
3,921.00	3.55	197.87	3,906.05	-219.32	-67.80	79.01	2.20
4,016.00	0.22	269.15	4,000.99	-222.12	-68.88	80.24	3.67
4,111.00	0.44	284.51	4,095.99	-222.04	-69.42	80.77	0.25
4,206.00	0.85	324.64	4,190.98	-221.37	-70.18	81.50	0.62
4,300.00	1.42	325.32	4,284.96	-219.84	-71.24	82.49	0.61
4,395.00	1.65	329.57	4,379.93	-217.70	-72.61	83.74	0.27
4,490.00	0.44	353.08	4,474.91	-216.15	-73.34	84.39	1.33
4,584.00	1.03	330.76	4,568.90	-215.06	-73.80	84.79	0.69
4,679.00	0.65	92.72	4,663.90	-214.34	-73.68	84.63	1.56
4,774.00	0.56	186.24	4,758.89	-214.83	-73.19	84.17	0.93
4,869.00	0.92	279.25	4,853.89	-215.16	-73.99	84.99	1.16

**Design Report for Wells Ranch AA35-68-1AHNA - Final Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,963.00	1.55	196.75	4,947.87	-216.26	-75.10	86.16	1.80
5,058.00	1.42	198.21	5,042.84	-218.61	-75.84	87.01	0.14
5,153.00	0.65	162.05	5,137.83	-220.24	-76.04	87.30	1.03
5,248.00	0.46	103.96	5,232.82	-220.85	-75.51	86.80	0.59
5,343.00	0.67	92.50	5,327.82	-220.96	-74.58	85.88	0.25
5,438.00	0.48	109.33	5,422.81	-221.12	-73.65	84.96	0.27
5,532.00	0.66	108.51	5,516.81	-221.42	-72.77	84.09	0.19
5,627.00	0.80	106.74	5,611.80	-221.78	-71.61	82.96	0.15
5,722.00	0.39	105.85	5,706.79	-222.06	-70.67	82.02	0.43
5,841.00	0.33	79.16	5,825.79	-222.11	-69.94	81.30	0.15
5,910.00	0.12	284.26	5,894.79	-222.05	-69.82	81.17	0.64
5,958.00	0.81	275.96	5,942.79	-222.01	-70.20	81.56	1.44
6,005.00	5.29	270.62	5,989.71	-221.95	-72.70	84.05	9.54
6,053.00	10.33	263.55	6,037.25	-222.41	-79.19	90.56	10.67
6,100.00	14.25	263.68	6,083.17	-223.52	-89.13	100.54	8.34
6,148.00	17.55	263.59	6,129.32	-224.98	-102.20	113.67	6.88
6,195.00	21.35	266.03	6,173.63	-226.36	-117.78	129.30	8.27
6,243.00	25.97	270.18	6,217.59	-226.93	-137.02	148.54	10.23
6,289.00	27.96	265.75	6,258.59	-227.70	-157.85	169.38	6.14
6,337.00	31.79	266.63	6,300.21	-229.28	-181.70	193.29	8.03
6,384.00	35.72	263.93	6,339.28	-231.46	-207.72	219.38	8.95
6,479.00	48.19	268.81	6,409.80	-235.14	-270.96	282.72	13.56
6,527.00	55.12	272.35	6,439.57	-234.71	-308.57	320.26	15.55
6,573.00	58.23	271.89	6,464.84	-233.29	-346.97	358.54	6.81
6,621.00	58.54	270.26	6,490.00	-232.52	-387.84	399.31	2.96
6,668.00	64.24	271.15	6,512.50	-232.01	-429.08	440.47	12.24
6,716.00	69.35	270.69	6,531.41	-231.30	-473.18	484.47	10.68
6,763.00	72.23	270.57	6,546.87	-230.81	-517.55	528.77	6.13
6,811.00	76.65	269.36	6,559.74	-230.85	-563.78	574.93	9.52
6,857.00	82.18	268.72	6,568.19	-231.61	-608.97	620.11	12.10
6,886.00	85.38	268.48	6,571.33	-232.31	-637.79	648.92	11.07
6,930.00	86.63	268.93	6,574.40	-233.30	-681.67	692.79	3.00
<b>7" Casing @ 6930' MD, 6574.4' TVD</b>							
6,986.00	88.21	269.49	6,576.92	-234.08	-737.61	748.70	3.00
7,081.00	89.88	270.19	6,578.51	-234.34	-832.59	843.57	1.91
7,176.00	89.60	269.66	6,578.94	-234.47	-927.59	938.44	0.63
7,270.00	89.44	268.75	6,579.72	-235.77	-1,021.57	1,032.37	0.98
7,365.00	90.37	269.42	6,579.88	-237.29	-1,116.56	1,127.31	1.21
7,460.00	90.46	270.48	6,579.19	-237.37	-1,211.56	1,222.18	1.12
7,554.00	89.69	269.65	6,579.07	-237.26	-1,305.55	1,316.05	1.20
7,649.00	90.12	270.49	6,579.23	-237.15	-1,400.55	1,410.92	0.99
7,744.00	91.23	270.60	6,578.11	-236.24	-1,495.54	1,505.73	1.17
7,839.00	92.16	270.35	6,575.30	-235.46	-1,590.50	1,600.52	1.01
7,934.00	90.96	269.87	6,572.71	-235.28	-1,685.46	1,695.35	1.36
8,029.00	90.22	270.34	6,571.73	-235.10	-1,780.45	1,790.21	0.92
8,123.00	89.75	269.50	6,571.76	-235.23	-1,874.45	1,884.09	1.02
8,219.00	89.45	273.70	6,572.43	-232.55	-1,970.39	1,979.76	4.39
8,313.00	88.43	275.05	6,574.17	-225.38	-2,064.10	2,072.97	1.80
8,408.00	85.71	269.70	6,579.03	-221.45	-2,158.85	2,167.39	6.31
8,503.00	87.29	267.79	6,584.83	-223.53	-2,253.64	2,262.17	2.61
8,598.00	89.23	265.84	6,587.71	-228.80	-2,348.44	2,357.11	2.89



**Design Report for Wells Ranch AA35-68-1AHNA - Final Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,693.00	91.91	266.04	6,586.77	-235.53	-2,443.19	2,452.08	2.83
8,787.00	91.64	268.43	6,583.86	-240.06	-2,537.03	2,546.03	2.56
8,882.00	91.88	269.54	6,580.94	-241.74	-2,631.97	2,640.93	1.19
8,977.00	91.67	269.70	6,577.99	-242.37	-2,726.92	2,735.79	0.28
9,072.00	91.79	272.05	6,575.13	-240.92	-2,821.86	2,830.53	2.48
9,166.00	90.99	273.27	6,572.85	-236.56	-2,915.72	2,924.04	1.55
9,261.00	88.95	271.51	6,572.90	-232.60	-3,010.63	3,018.62	2.84
9,356.00	90.83	270.51	6,573.08	-230.92	-3,105.61	3,113.39	2.24
9,451.00	90.43	268.63	6,572.03	-231.64	-3,200.60	3,208.29	2.02
9,546.00	91.23	267.83	6,570.66	-234.57	-3,295.54	3,303.25	1.19
9,641.00	90.37	267.82	6,569.33	-238.18	-3,390.46	3,398.24	0.91
9,735.00	89.54	265.61	6,569.40	-243.56	-3,484.30	3,492.23	2.51
9,830.00	90.68	268.04	6,569.22	-248.82	-3,579.15	3,587.22	2.83
9,925.00	91.48	267.56	6,567.43	-252.47	-3,674.06	3,682.19	0.98
10,020.00	92.07	268.70	6,564.49	-255.57	-3,768.96	3,777.13	1.35
10,114.00	91.45	269.29	6,561.60	-257.22	-3,862.90	3,871.03	0.91
10,209.00	91.54	270.41	6,559.12	-257.46	-3,957.87	3,965.88	1.18
10,304.00	89.26	270.28	6,558.46	-256.89	-4,052.86	4,060.71	2.40
10,399.00	90.03	271.24	6,559.05	-255.63	-4,147.85	4,155.51	1.30
10,494.00	89.38	270.96	6,559.54	-253.81	-4,242.83	4,250.27	0.74
10,588.00	88.15	271.07	6,561.56	-252.14	-4,336.79	4,344.02	1.31
10,683.00	87.41	269.51	6,565.24	-251.66	-4,431.71	4,438.79	1.82
10,778.00	88.09	268.87	6,568.97	-253.01	-4,526.63	4,533.65	0.98
10,872.00	90.25	267.94	6,570.34	-255.62	-4,620.58	4,627.61	2.50
10,967.00	91.39	268.37	6,568.98	-258.68	-4,715.52	4,722.58	1.28
11,062.00	92.00	269.86	6,566.17	-260.15	-4,810.46	4,817.47	1.69
11,104.00	92.25	269.04	6,564.61	-260.55	-4,852.43	4,859.41	2.04
<b>Final MWD Survey @ 11104.00ft</b>							
11,169.00	92.25	269.04	6,562.06	-261.64	-4,917.37	4,924.32	0.00
<b>Straight Line Proj @ 11169' MD, 6562.06' TVD</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
619.00	618.96	1.58	4.08	Tie-On to Surface Gyros @ 619.00ft
723.00	722.95	0.51	4.21	First MWD Survey @ 723.00ft
11,104.00	6,564.61	-260.55	-4,852.43	Final MWD Survey @ 11104.00ft
11,169.00	6,562.06	-261.64	-4,917.37	Straight Line Proj @ 11169' MD, 6562.06' TVD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Wells Ranch AA35-68-1AHNA_BHL	267.04	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
298.00	619.00	Surface Gyros	Flexi-Shot

**Design Report for Wells Ranch AA35-68-1AHNA - Final Surveys**

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
723.00	6,886.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
6,986.00	11,104.00	MWD Surveys - Production	MWD+IFR1+MS_WY

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
6,930.00	6,574.40	7" Casing @ 6930' MD, 6574.4' 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	1,408,068.00	3,307,780.06	40.448280	-104.394090
Point 1				0.00	646.54	-5,466.23	1,408,714.52	3,302,314.03	
Point 2				0.00	-4,671.86	-5,387.16	1,403,396.31	3,302,393.10	
Point 3				0.00	-4,614.14	-126.19	1,403,454.03	3,307,653.87	
Point 4				0.00	679.21	-169.90	1,408,747.18	3,307,610.16	
Point 5				0.00	646.54	-5,466.23	1,408,714.52	3,302,314.03	
Wells Ranch AA35-68- - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	1,408,068.00	3,307,780.06	40.448280	-104.394090
Wells Ranch AA35-68- - actual wellpath hits target center - Polygon	0.00	0.00	0.00	0.00	0.00	1,408,068.00	3,307,780.06	40.448280	-104.394090
Point 1				0.00	186.53	-5,006.21	1,408,254.52	3,302,774.03	
Point 2				0.00	-4,211.85	-4,927.14	1,403,856.31	3,302,853.10	
Point 3				0.00	-4,154.12	-586.21	1,403,914.03	3,307,193.87	
Point 4				0.00	219.19	-629.92	1,408,287.18	3,307,150.16	
Point 5				0.00	186.53	-5,006.21	1,408,254.52	3,302,774.03	
Wells Ranch AA35-68- - actual wellpath misses target center by 8.23usft at 11169.00usft MD (6562.06 TVD, -261.64 N, -4917.37 E) - Point	0.00	0.00	6,559.21	-253.94	-4,917.99	1,407,814.07	3,302,862.25	40.447750	-104.411770

**Directional Difficulty Index**

Average Dogleg over Survey:	1.95 °/100usft	Maximum Dogleg over Survey:	15.55 °/100usft at 6,527.00 usft
Net Tortosity applicable to Plans:	1.00 °/100usft	Directional Difficulty Index:	6.278

**Audit Info**

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

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 AA35-68-1AHNA

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: 1,408,068.00 usft N, 3,307,780.06 usft E

Geographical Coordinates of Well: 40° 26' 53.81" N, 104° 23' 38.72" W

Grid Convergence at Surface is: 0.71°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,169.00usft  
the Bottom Hole Displacement is 4,924.32usft in the Direction of 266.95° (Grid).

Magnetic Convergence at surface is: -7.63° ( 1 March 2014, , BGGM2013)

Magnetic Model: BGGM2013  
Date: 01-Mar-14  
Declination: 8.34°  
Inclination/Dip: 67.04°  
Field Strength: 52829

Grid North is 0.71° East of True North (Grid Convergence)  
Magnetic North is 8.34° East of True North (Magnetic Declination)  
Magnetic North is 7.63° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 0.71°  
To convert a Magnetic Direction to a True Direction, Add 8.34° East  
To convert a Magnetic Direction to a Grid Direction, Add 7.63°