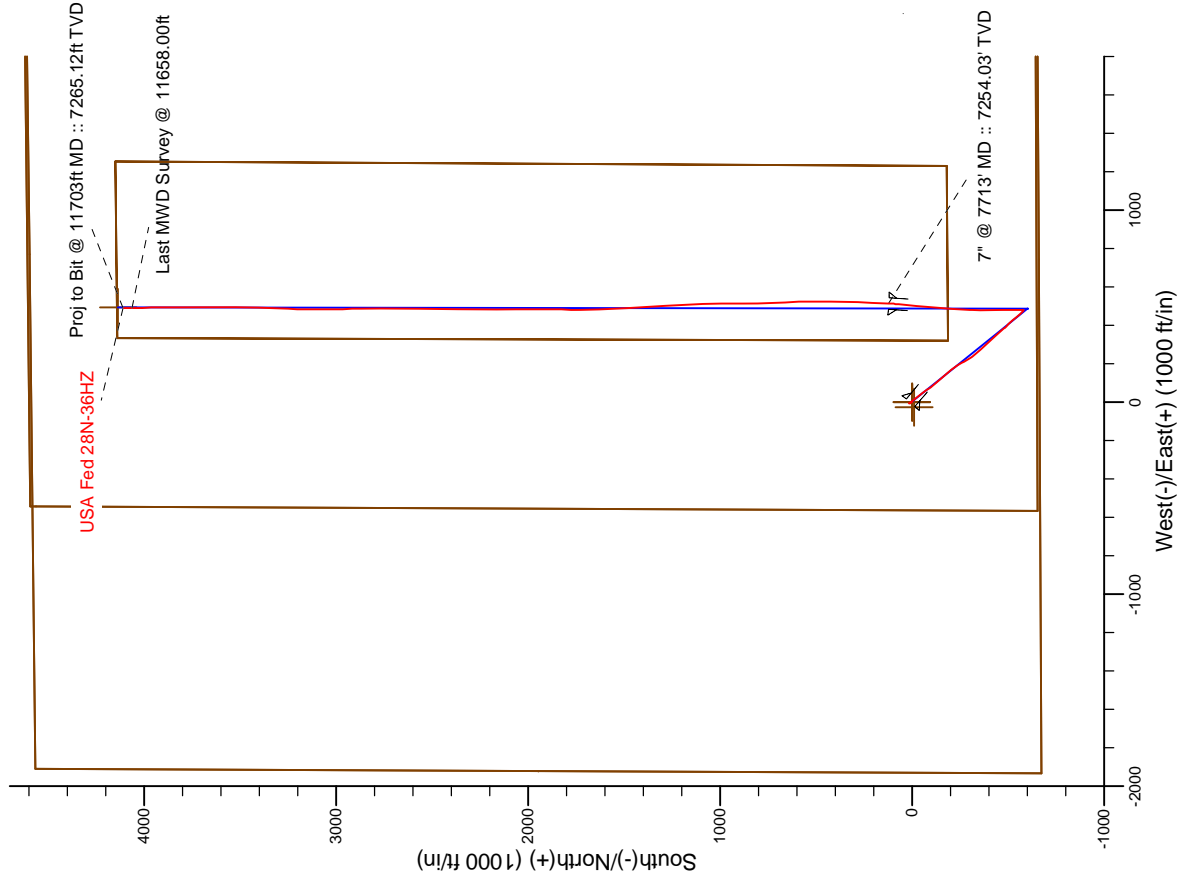
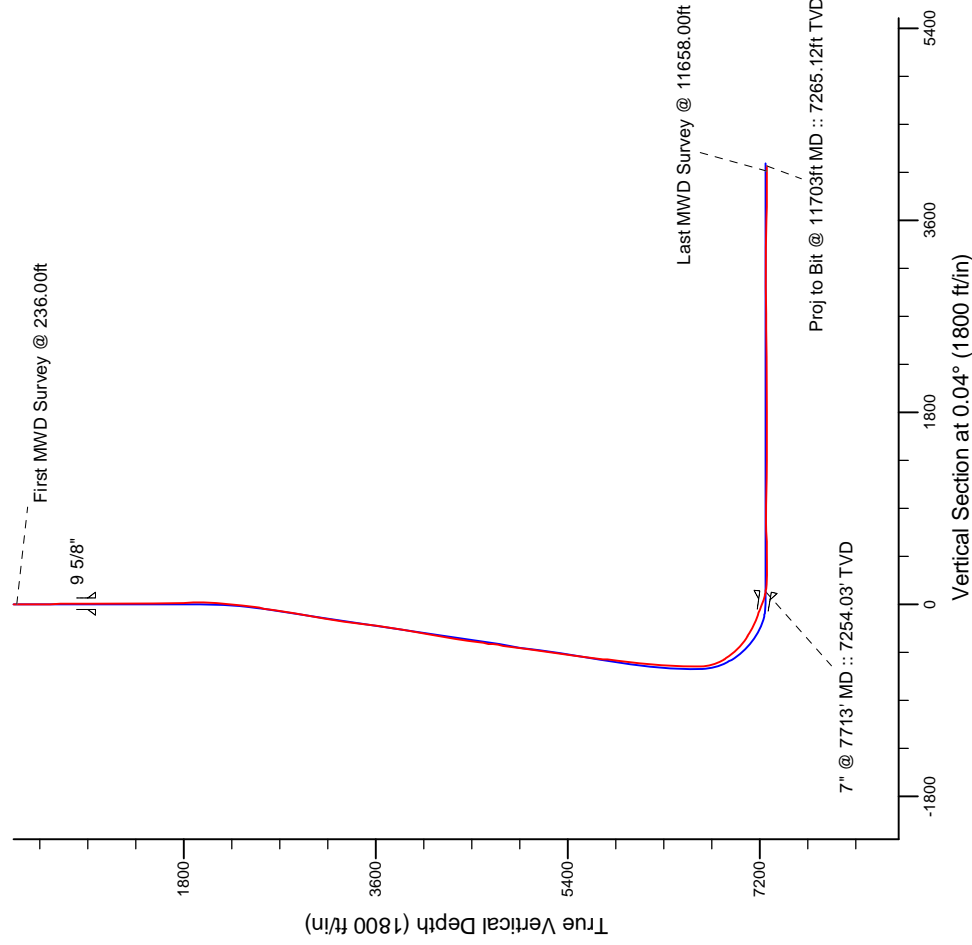


Project: Weld County, CO (NAD 83)  
Site: Sec. 36-T3N-R66W  
Well: USA Fed 28N-36HZ  
Wellbore: Plan B 0  
Design: Actual Field Surveys



# LEGEND

- USA Fed 28N-36HZ, Plan B 0, Plan B 0 - Proposal V0
- Actual Field Surveys



7" Casing: ~782.19' FSL, ~2442.97' FWL  
Lat/Long: 40.176816 N, -104.726249 E  
State Planes - CO Northern: 1,308,200.12' N, 3,216,204.31' E  
Location: Sec. 36-T3N-R66W

BHL: ~485.22' FNL, ~2401.84' FWL  
Lat/Long: 40.187761 N, -104.726335 E  
State Planes - CO Northern: 1,312,187.07' N, 3,216,145.60' E  
Location: Sec. 36-T3N-R66W

WELL DETAILS: USA Fed 28N-36HZ  
Ground Level: 5003.00  
RKB = 13 @ 5016.00ft (Ernsign 132)

Design: Actual Field Surveys (USA Fed 28N-36HZ/Plan B 0)  
Created By: Clint Eshelman Date: 08/27/2013  
Reviewed: Date:

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 36-T3N-R66W

USA Fed 28N-36HZ

Plan B 0

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

27 August, 2013

Well Coordinates: 1,308,074.44 N, 3,215,692.68 E (40° 10' 35.34" N, 104° 43' 41.10" W)

Ground Level: 5,003.00 ft

Local Coordinate Origin:

Centered on Well USA Fed 28N-36HZ

Viewing Datum:

RKB = 13 @ 5016.00ft (Ensign 132)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

**Design Report for USA Fed 28N-36HZ - Actual Field 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
236.00	0.44	351.96	236.00	0.90	-0.13	0.90	0.19
<b>First MWD Survey @ 236.00ft</b>							
360.00	0.35	356.32	359.99	1.75	-0.22	1.75	0.08
451.00	0.49	339.56	450.99	2.39	-0.37	2.39	0.20
545.00	0.52	348.96	544.99	3.18	-0.59	3.18	0.09
638.00	0.83	341.51	637.98	4.24	-0.89	4.24	0.35
731.00	0.58	329.53	730.98	5.28	-1.34	5.28	0.31
825.00	0.90	305.50	824.97	6.12	-2.18	6.12	0.47
917.00	0.85	301.99	916.96	6.90	-3.35	6.90	0.08
973.60	0.72	310.18	973.55	7.35	-3.98	7.35	0.31
<b>9 5/8"</b>							
1,066.00	0.55	331.25	1,065.95	8.11	-4.63	8.11	0.31
1,158.00	0.56	357.05	1,157.94	8.95	-4.87	8.95	0.27
1,250.00	0.46	345.90	1,249.94	9.76	-4.98	9.75	0.15
1,341.00	0.50	347.90	1,340.93	10.50	-5.15	10.50	0.05
1,433.00	0.62	346.00	1,432.93	11.38	-5.36	11.37	0.13
1,617.00	0.65	342.14	1,616.92	13.33	-5.92	13.33	0.03
1,708.00	0.77	346.30	1,707.91	14.42	-6.22	14.42	0.14
1,800.00	0.91	335.43	1,799.90	15.68	-6.67	15.68	0.23
1,891.00	0.90	326.65	1,890.89	16.94	-7.36	16.93	0.15
1,986.00	1.19	152.29	1,985.89	16.69	-7.32	16.68	2.20
2,081.00	3.59	138.98	2,080.80	13.57	-4.90	13.57	2.58
2,176.00	5.65	145.37	2,175.48	7.48	-0.29	7.48	2.23
2,272.00	7.53	141.68	2,270.84	-1.35	6.29	-1.34	2.01
2,367.00	9.21	143.56	2,364.83	-12.35	14.67	-12.34	1.79
2,462.00	11.00	141.60	2,458.35	-25.57	24.81	-25.55	1.92
2,557.00	9.37	139.94	2,551.85	-38.59	35.42	-38.56	1.74
2,652.00	10.37	144.64	2,645.45	-51.48	45.35	-51.45	1.35
2,747.00	11.31	145.99	2,738.75	-66.18	55.51	-66.14	1.02
2,842.00	10.80	145.92	2,831.99	-81.27	65.70	-81.23	0.54
2,937.00	11.85	141.67	2,925.14	-96.30	76.74	-96.24	1.41
3,032.00	13.28	139.45	3,017.86	-112.24	89.89	-112.18	1.59
3,127.00	13.05	139.27	3,110.36	-128.66	103.98	-128.58	0.25
3,223.00	12.76	138.73	3,203.94	-144.84	118.04	-144.76	0.33
3,318.00	11.62	138.89	3,296.80	-159.93	131.25	-159.84	1.20
3,413.00	11.15	140.09	3,389.93	-174.19	143.44	-174.09	0.55
3,508.00	9.73	141.86	3,483.35	-187.55	154.29	-187.44	1.53
3,603.00	9.09	137.52	3,577.07	-199.40	164.32	-199.28	1.01
3,698.00	9.12	141.85	3,670.88	-210.85	174.03	-210.73	0.72
3,793.00	10.80	145.51	3,764.44	-224.11	183.73	-223.98	1.89
3,888.00	10.31	145.20	3,857.84	-238.43	193.62	-238.29	0.52
3,984.00	10.98	154.73	3,952.19	-253.75	202.42	-253.61	1.96
4,079.00	11.46	150.81	4,045.38	-270.17	210.89	-270.02	0.95
4,174.00	11.72	150.73	4,138.44	-286.83	220.21	-286.67	0.27
4,269.00	12.70	145.22	4,231.29	-303.82	230.88	-303.66	1.60
4,364.00	12.30	139.69	4,324.04	-320.12	243.39	-319.95	1.33
4,459.00	11.57	141.80	4,416.99	-335.32	255.83	-335.14	0.90
4,554.00	9.81	141.63	4,510.34	-349.15	266.74	-348.97	1.85
4,650.00	10.42	137.81	4,604.85	-362.00	277.65	-361.80	0.94

**Design Report for USA Fed 28N-36HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
4,745.00	9.38	137.35	4,698.43	-374.06	288.66	-373.85	1.10
4,840.00	10.74	137.28	4,791.97	-386.25	299.91	-386.04	1.43
4,935.00	11.66	138.31	4,885.16	-399.93	312.31	-399.71	0.99
5,030.00	9.87	135.93	4,978.48	-412.95	324.35	-412.72	1.94
5,125.00	10.15	136.82	5,072.04	-424.90	335.75	-424.67	0.34
5,220.00	10.96	139.69	5,165.43	-437.89	347.32	-437.65	1.02
5,315.00	10.61	141.28	5,258.75	-451.60	358.63	-451.35	0.48
5,411.00	10.13	135.33	5,353.18	-464.50	370.09	-464.24	1.22
5,506.00	10.17	142.54	5,446.70	-477.10	381.07	-476.83	1.34
5,601.00	10.66	132.77	5,540.14	-489.73	392.62	-489.45	1.93
5,696.00	10.98	132.84	5,633.45	-501.84	405.70	-501.56	0.34
5,791.00	9.41	133.78	5,726.95	-513.37	417.95	-513.08	1.66
5,886.00	8.36	142.06	5,820.81	-524.19	427.80	-523.89	1.74
5,981.00	7.37	143.24	5,914.92	-534.52	435.69	-534.21	1.06
6,076.00	6.33	138.33	6,009.24	-543.31	442.82	-543.00	1.26
6,171.00	7.23	144.57	6,103.58	-552.10	449.77	-551.78	1.22
6,266.00	6.78	135.33	6,197.87	-560.95	457.18	-560.64	1.28
6,362.00	4.97	133.76	6,293.36	-567.86	464.16	-567.54	1.89
6,457.00	4.35	133.34	6,388.05	-573.18	469.76	-572.85	0.65
6,552.00	3.52	133.06	6,482.82	-577.64	474.51	-577.31	0.87
6,647.00	1.90	111.04	6,577.72	-580.20	478.11	-579.87	2.00
6,695.00	1.09	56.85	6,625.70	-580.24	479.23	-579.90	3.21
6,742.00	5.25	4.48	6,672.62	-577.85	479.78	-577.51	9.93
6,790.00	10.89	2.46	6,720.13	-571.12	480.14	-570.79	11.76
6,837.00	16.34	359.54	6,765.79	-560.07	480.28	-559.73	11.68
6,885.00	23.03	357.90	6,810.96	-543.91	479.88	-543.58	13.98
6,932.00	28.46	359.34	6,853.28	-523.51	479.42	-523.18	11.63
6,980.00	34.76	1.30	6,894.14	-498.37	479.59	-498.04	13.30
7,027.00	39.54	0.12	6,931.59	-470.00	479.93	-469.66	10.28
7,075.00	43.00	0.16	6,967.66	-438.34	480.01	-438.01	7.21
7,122.00	46.31	358.70	7,001.09	-405.32	479.67	-404.98	7.37
7,170.00	50.78	358.81	7,032.86	-369.36	478.89	-369.03	9.31
7,217.00	55.66	359.99	7,061.00	-331.73	478.51	-331.40	10.58
7,265.00	59.32	1.99	7,086.79	-291.27	479.22	-290.93	8.40
7,312.00	61.53	3.46	7,109.99	-250.44	481.17	-250.11	5.43
7,360.00	64.33	4.51	7,131.83	-207.81	484.14	-207.47	6.15
7,407.00	65.91	5.01	7,151.60	-165.32	487.68	-164.98	3.50
7,455.00	66.97	5.02	7,170.79	-121.49	491.53	-121.15	2.21
7,502.00	68.08	5.45	7,188.76	-78.24	495.49	-77.90	2.51
7,550.00	69.31	5.63	7,206.20	-33.73	499.81	-33.38	2.59
7,597.00	70.45	5.59	7,222.36	10.19	504.12	10.54	2.43
7,645.00	71.66	5.16	7,237.95	55.39	508.37	55.74	2.66
7,692.00	77.99	3.09	7,250.24	100.60	511.62	100.96	14.12
7,713.00	81.24	3.02	7,254.03	121.23	512.72	121.59	15.48
<b>7" @ 7713' MD :: 7254.03' TVD</b>							
7,802.00	87.44	2.91	7,262.80	209.63	517.30	209.99	6.97
7,897.00	88.71	1.67	7,265.99	304.50	521.10	304.86	1.87
7,992.00	90.65	1.00	7,266.52	399.47	523.31	399.83	2.16
8,087.00	91.45	359.58	7,264.78	494.45	523.79	494.81	1.72
8,182.00	91.76	357.98	7,262.12	589.38	521.77	589.75	1.71
8,277.00	90.80	357.27	7,260.00	684.28	517.83	684.64	1.26

**Design Report for USA Fed 28N-36HZ - Actual Field Surveys**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
8,372.00	89.63	358.61	7,259.64	779.21	514.42	779.57	1.87
8,467.00	89.85	359.99	7,260.07	874.20	513.26	874.56	1.47
8,562.00	90.74	0.93	7,259.59	969.19	514.02	969.55	1.36
8,658.00	88.09	358.06	7,260.57	1,065.17	513.17	1,065.53	4.07
8,753.00	88.03	357.07	7,263.78	1,160.03	509.14	1,160.38	1.04
8,848.00	89.29	356.52	7,266.00	1,254.85	503.83	1,255.20	1.45
8,943.00	88.61	356.04	7,267.74	1,349.63	497.67	1,349.98	0.88
9,038.00	90.52	357.01	7,268.47	1,444.45	491.91	1,444.79	2.25
9,133.00	90.43	356.62	7,267.68	1,539.30	486.63	1,539.64	0.42
9,228.00	91.08	358.00	7,266.43	1,634.18	482.17	1,634.52	1.61
9,323.00	90.77	0.07	7,264.89	1,729.15	480.58	1,729.49	2.20
9,418.00	90.03	1.09	7,264.23	1,824.14	481.54	1,824.48	1.33
9,513.00	90.49	0.95	7,263.80	1,919.13	483.23	1,919.46	0.51
9,608.00	90.68	0.36	7,262.83	2,014.12	484.31	2,014.45	0.65
9,703.00	90.31	358.90	7,262.01	2,109.11	483.70	2,109.44	1.59
9,798.00	90.25	1.03	7,261.54	2,204.10	483.64	2,204.44	2.24
9,894.00	90.43	0.59	7,260.97	2,300.09	485.00	2,300.43	0.50
9,989.00	89.75	359.56	7,260.82	2,395.09	485.12	2,395.42	1.30
10,084.00	90.65	0.35	7,260.49	2,490.08	485.05	2,490.42	1.26
10,179.00	89.97	0.07	7,259.98	2,585.08	485.40	2,585.42	0.77
10,274.00	89.75	0.75	7,260.21	2,680.08	486.08	2,680.42	0.75
10,369.00	90.99	0.27	7,259.60	2,775.07	486.92	2,775.41	1.40
10,464.00	90.93	358.51	7,258.01	2,870.05	485.91	2,870.39	1.85
10,559.00	91.05	0.31	7,256.36	2,965.03	484.93	2,965.36	1.90
10,654.00	90.56	358.66	7,255.03	3,060.01	484.08	3,060.35	1.81
10,749.00	90.12	0.99	7,254.47	3,155.00	483.79	3,155.34	2.50
10,844.00	90.43	2.24	7,254.01	3,249.96	486.47	3,250.30	1.36
10,939.00	89.72	1.92	7,253.89	3,344.90	489.91	3,345.24	0.82
11,034.00	89.05	0.98	7,254.90	3,439.86	492.32	3,440.20	1.22
11,129.00	88.67	0.21	7,256.79	3,534.83	493.30	3,535.18	0.90
11,224.00	87.84	359.52	7,259.69	3,629.79	493.08	3,630.13	1.14
11,320.00	88.92	359.32	7,262.40	3,725.74	492.11	3,726.08	1.14
11,415.00	89.72	359.71	7,263.53	3,820.73	491.31	3,821.07	0.94
11,510.00	90.12	0.08	7,263.66	3,915.73	491.13	3,916.07	0.57
11,605.00	89.54	359.13	7,263.94	4,010.73	490.48	4,011.07	1.17
11,658.00	89.23	358.92	7,264.51	4,063.72	489.58	4,064.06	0.71
<b>Last MWD Survey @ 11658.00ft</b>							
11,703.00	89.23	358.92	7,265.12	4,108.70	488.73	4,109.04	0.00
<b>Proj to Bit @ 11703ft MD :: 7265.12ft TVD</b>							

**Design Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
236.00	236.00	0.90	-0.13	First MWD Survey @ 236.00ft
11,658.00	7,264.51	4,063.72	489.58	Last MWD Survey @ 11658.00ft
11,703.00	7,265.12	4,108.70	488.73	Proj to Bit @ 11703ft MD :: 7265.12ft TVD

## Design Report for USA Fed 28N-36HZ - Actual Field Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	0.04	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
236.00	7,713.00	Vertical Build	MWD+IFR1+SC
7,713.00	11,658.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
973.60	973.55	9 5/8"	9-5/8	13-1/2
7,713.00	7,254.03	7" @ 7713' MD :: 7254.03' TVD	7	8-3/4

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
USA Fed 28N-36HZ	0.00	0.00	0.00	-10.93	-27.94	1,308,063.27	3,215,664.83	40.176453	-104.728184
- actual wellpath misses target center by 30.01ft at 0.00ft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-1,911.31	4,565.29	1,312,622.73	3,213,741.78		
Point 2				769.30	4,597.34	1,312,678.11	3,216,421.90		
Point 3				3,449.93	4,629.41	1,312,733.51	3,219,102.03		
Point 4				3,435.25	1,991.66	1,310,095.84	3,219,110.31		
Point 5				3,419.62	-646.45	1,307,457.81	3,219,117.65		
Point 6				743.43	-659.82	1,307,421.14	3,216,441.79		
Point 7				-1,933.85	-673.58	1,307,384.08	3,213,764.84		
Point 8				-1,922.36	1,945.92	1,310,003.47	3,213,753.53		
USA Fed 28N-36HZ	0.00	0.00	0.00	0.00	0.00	1,308,074.44	3,215,692.68	40.176483	-104.728084
- actual wellpath hits target center									
- Polygon									
Point 1				-542.78	4,592.55	1,312,661.90	3,215,109.97		
Point 2				2,137.27	4,624.01	1,312,716.68	3,217,789.53		
Point 3				2,109.33	-642.88	1,307,449.97	3,217,807.44		
Point 4				-567.14	-655.31	1,307,414.25	3,215,131.29		
Point 5				-543.02	4,564.55	1,312,633.90	3,215,109.97		
USA Fed 28N-36HZ	0.00	0.00	0.00	0.00	0.00	1,308,074.44	3,215,692.68	40.176483	-104.728084
- actual wellpath hits target center									
- Point									
USA Fed 28N-36HZ	0.00	0.00	7,253.00	4,134.05	492.01	1,312,212.44	3,216,148.67	40.187831	-104.726323
- actual wellpath misses target center by 28.29ft at 11703.00ft MD (7265.12 TVD, 4108.70 N, 488.73 E)									
- Point									
USA Fed 28N-36HZ	0.00	0.00	0.00	0.00	0.00	1,308,074.44	3,215,692.68	40.176483	-104.728084
- actual wellpath hits target center									
- Polygon									
Point 1				334.01	4,140.88	1,312,217.89	3,215,990.62		
Point 2				1,252.43	4,151.67	1,312,236.68	3,216,908.87		
Point 3				1,230.36	-178.19	1,307,906.97	3,216,924.49		
Point 4				319.40	-187.98	1,307,889.25	3,216,013.69		
Point 5				334.02	4,140.88	1,312,217.89	3,215,990.63		

## North Reference Sheet for Sec. 36-T3N-R66W - USA Fed 28N-36HZ - Plan B 0

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

Vertical Depths are relative to RKB = 13 @ 5016.00ft (Ensign 132). Northing and Easting are relative to USA Fed 28N-36HZ

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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995768

Grid Coordinates of Well: 1,308,074.44 ft N, 3,215,692.68 ft E

Geographical Coordinates of Well: 40° 10' 35.34" N, 104° 43' 41.10" W

Grid Convergence at Surface is: 0.50°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,703.00ft  
the Bottom Hole Displacement is 4,137.67ft in the Direction of 6.78° (True).

Magnetic Convergence at surface is: -8.08° ( 9 July 2013, , BGGM2013)

