

FINAL  
 USA Fed 27N West-36HZ  
 135447/267255; SC  
 KB=13' @ 5008.0ft (Ensign #123)  
 Ground Elevation @ 4995.0  
 North American Datum 1983  
 Well USA Fed 27N West-36HZ, Grid North

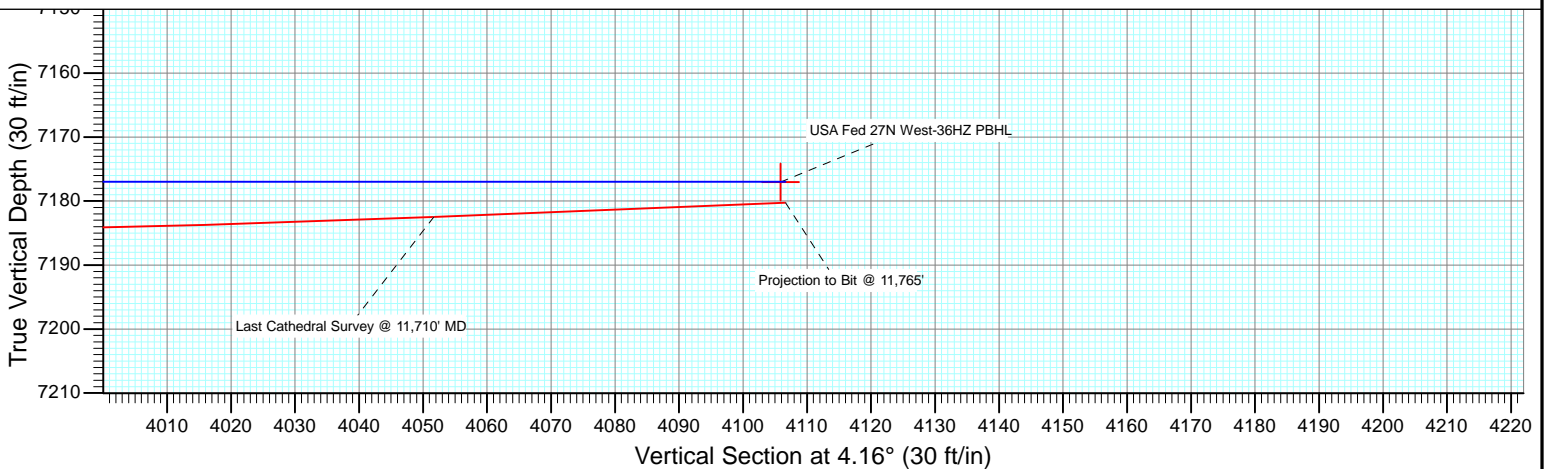
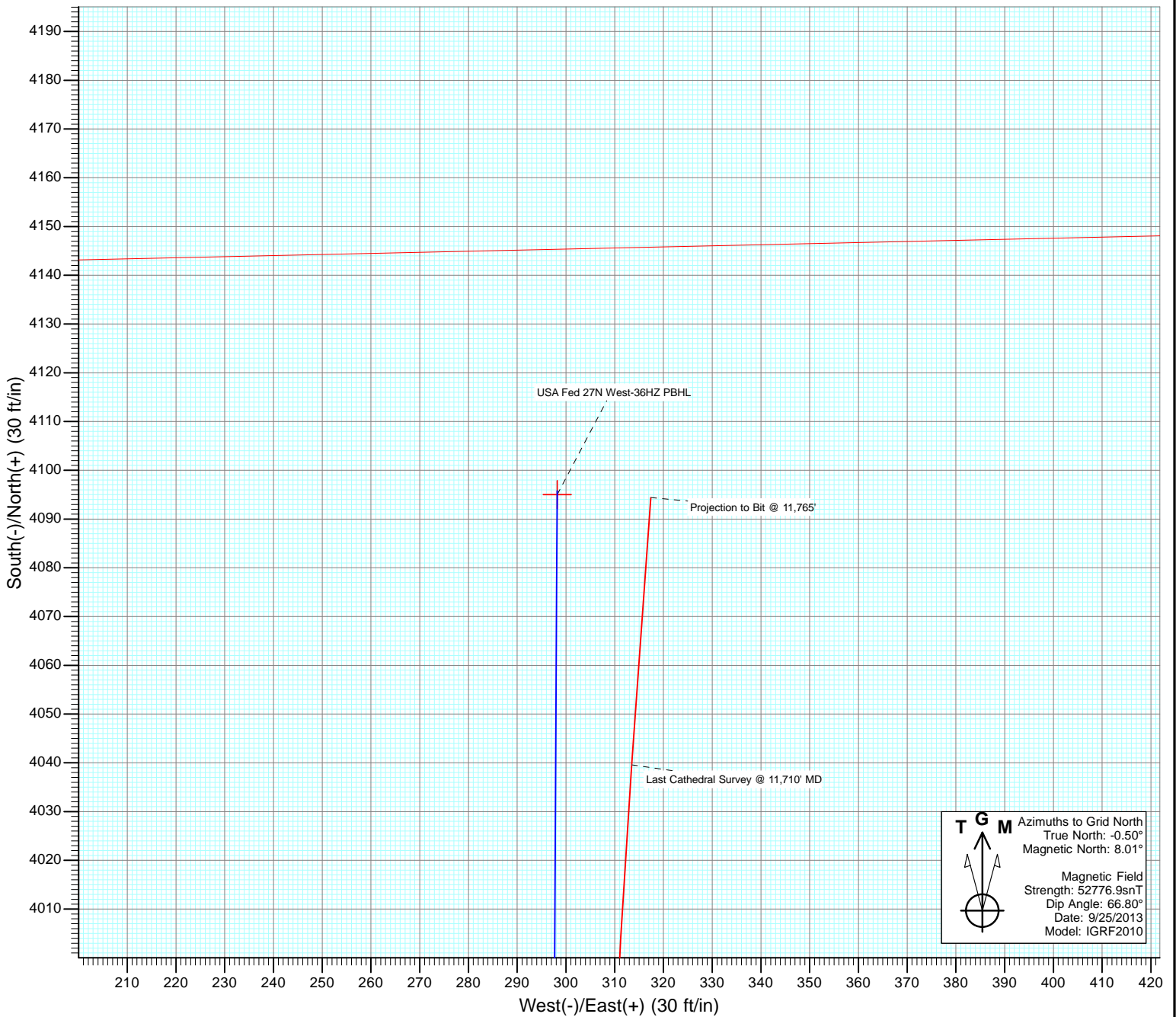
Surface Hole Location  
 USA Fed 27N West-36HZ  
 Lat : 40.176496  
 Long : -104.722742

**T G M** Azimuths to Grid North  
 True North: -0.50°  
 Magnetic North: 8.01°  
 Magnetic Field  
 Strength: 52776.9snT  
 Dip Angle: 66.80°  
 Date: 9/25/2013  
 Model: IGRF2010

7" Casing: 568' FSL, 1581' FEL  
 Lat/Long: 40.176234 / -104.721517  
 State Plan - CO Northern: 1,308,002.31 / 3,217,534.92  
 Location: S36-T3N-R66W

BHL: 514' FNL, 1594' FEL  
 Lat/Long: 40.187727 / -104.721478  
 State Plan - CO Northern: 1,312,189.21 / 3,217,509.12  
 Location: S36-T3N-R66W

USA Fed 27N West-36HZ PBHL  
 Projection to Bit @ 11,765'  
 Last Cathedral Survey @ 11,710' MD



# Cathedral Energy Services

## Survey Report

<b>Company:</b> Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b> Well USA Fed 27N West-36HZ
<b>Project:</b> DJ Wattenberg	<b>TVD Reference:</b> KB=13' @ 5008.0ft (Ensign #123)
<b>Site:</b> USA FED 3 Pad (S36-T3N-R66W)	<b>MD Reference:</b> KB=13' @ 5008.0ft (Ensign #123)
<b>Well:</b> USA Fed 27N West-36HZ	<b>North Reference:</b> Grid
<b>Wellbore:</b> HZ	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> FINAL	<b>Database:</b> USA EDM 5000 Multi Users DB

<b>Project</b> DJ Wattenberg		
<b>Map System:</b> US State Plane 1983	<b>System Datum:</b> Mean Sea Level	
<b>Geo Datum:</b> North American Datum 1983		
<b>Map Zone:</b> Colorado Northern Zone		

<b>Site</b> USA FED 3 Pad (S36-T3N-R66W)				
<b>Site Position:</b>	<b>Northing:</b> 1,308,044.64 ft	<b>Latitude:</b> 40.176359		
<b>From:</b> Lat/Long	<b>Easting:</b> 3,217,159.19 ft	<b>Longitude:</b> -104.722860		
<b>Position Uncertainty:</b> 0.0 ft	<b>Slot Radius:</b> 13.200 in	<b>Grid Convergence:</b> 0.50 °		

<b>Well</b> USA Fed 27N West-36HZ				
<b>Well Position</b>	<b>+N/-S</b> 0.0 ft	<b>Northing:</b> 1,308,094.81 ft	<b>Latitude:</b> 40.176496	
	<b>+E/-W</b> 0.0 ft	<b>Easting:</b> 3,217,191.72 ft	<b>Longitude:</b> -104.722742	
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b> ft	<b>Ground Level:</b> 4,995.0 ft	

<b>Wellbore</b> HZ					
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	9/25/2013	8.52	66.80	52,777

<b>Design</b> FINAL				
<b>Audit Notes:</b>				
<b>Version:</b> 1.0	<b>Phase:</b> ACTUAL	<b>Tie On Depth:</b> 0.0		
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	4.16

<b>Survey Program</b>		<b>Date</b> 10/29/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
113.0	813.0	Survey #1 (HZ)	Gyro	Gyro	
984.0	11,765.0	Survey #2 (HZ)	MWD	Geolink MWD	

<b>Survey</b>									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
113.0	0.20	342.91	113.0	0.2	-0.1	0.2	0.18	0.18	
213.0	0.33	329.71	213.0	0.6	-0.3	0.6	0.14	0.13	
313.0	0.52	331.78	313.0	1.3	-0.6	1.2	0.19	0.19	
413.0	0.55	335.01	413.0	2.1	-1.0	2.0	0.04	0.03	
513.0	0.47	322.48	513.0	2.8	-1.5	2.7	0.14	-0.08	
613.0	0.33	284.28	613.0	3.2	-2.0	3.1	0.29	-0.14	
713.0	0.21	263.01	713.0	3.3	-2.5	3.1	0.15	-0.12	
813.0	0.29	257.36	813.0	3.2	-2.9	3.0	0.08	0.08	Last Gyro Survey @ 800' MD
984.0	0.70	167.70	984.0	2.1	-3.1	1.9	0.44	0.24	
1,077.0	2.90	159.70	1,076.9	-0.7	-2.2	-0.8	2.38	2.37	
1,171.0	4.50	164.10	1,170.7	-6.4	-0.3	-6.4	1.73	1.70	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well USA Fed 27N West-36HZ
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	KB=13' @ 5008.0ft (Ensign #123)
<b>Site:</b>	USA FED 3 Pad (S36-T3N-R66W)	<b>MD Reference:</b>	KB=13' @ 5008.0ft (Ensign #123)
<b>Well:</b>	USA Fed 27N West-36HZ	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
1,264.0	6.40	171.20	1,263.3	-15.1	1.5	-14.9	2.16	2.04	
1,358.0	6.90	172.50	1,356.7	-25.8	3.0	-25.6	0.56	0.53	
1,451.0	8.50	164.80	1,448.8	-38.0	5.5	-37.5	2.04	1.72	
1,545.0	10.20	162.00	1,541.6	-52.6	9.9	-51.8	1.87	1.81	
1,638.0	11.50	156.00	1,632.9	-68.9	16.2	-67.6	1.85	1.40	
1,732.0	13.80	155.30	1,724.6	-87.7	24.7	-85.7	2.45	2.45	
1,825.0	14.50	153.20	1,814.8	-108.2	34.6	-105.4	0.93	0.75	
1,919.0	16.00	151.20	1,905.5	-130.0	46.2	-126.3	1.69	1.60	
2,099.0	14.30	148.90	2,079.2	-170.8	69.6	-165.3	1.00	-0.94	
2,189.0	15.50	155.00	2,166.2	-191.2	80.4	-184.9	2.19	1.33	
2,279.0	16.60	155.90	2,252.7	-213.8	90.8	-206.7	1.25	1.22	
2,369.0	14.50	151.50	2,339.4	-235.5	101.4	-227.5	2.67	-2.33	
2,549.0	15.10	153.30	2,513.4	-276.2	122.7	-266.6	0.42	0.33	
2,639.0	16.40	155.90	2,600.1	-298.3	133.1	-287.9	1.64	1.44	
2,819.0	13.60	153.10	2,773.9	-340.4	153.1	-328.4	1.61	-1.56	
2,999.0	16.20	155.10	2,947.8	-382.0	173.2	-368.5	1.47	1.44	
3,179.0	17.00	153.30	3,120.3	-428.3	195.6	-413.0	0.53	0.44	
3,359.0	15.10	154.40	3,293.3	-473.0	217.6	-456.0	1.07	-1.06	
3,539.0	10.20	165.40	3,468.9	-509.6	231.7	-491.4	3.02	-2.72	
3,719.0	6.90	176.30	3,646.9	-535.8	236.5	-517.2	2.03	-1.83	
3,899.0	3.00	181.50	3,826.2	-551.3	237.0	-532.7	2.18	-2.17	
4,080.0	1.90	128.50	4,007.1	-557.9	239.3	-539.1	1.32	-0.61	
4,260.0	1.60	119.60	4,187.0	-561.0	243.8	-541.8	0.22	-0.17	
4,440.0	1.10	315.00	4,367.0	-561.0	244.7	-541.8	1.49	-0.28	
4,620.0	2.80	298.90	4,546.8	-557.7	239.7	-538.8	0.98	0.94	
4,710.0	2.90	249.00	4,636.7	-557.4	235.6	-538.9	2.67	0.11	
4,800.0	3.30	253.10	4,726.6	-559.0	231.0	-540.8	0.51	0.44	
4,890.0	3.60	261.80	4,816.4	-560.2	225.7	-542.3	0.67	0.33	
4,980.0	2.60	214.00	4,906.3	-562.3	221.8	-544.7	2.97	-1.11	
5,070.0	0.80	126.80	4,996.3	-564.3	221.2	-546.8	2.98	-2.00	
5,160.0	1.80	29.10	5,086.3	-563.5	222.4	-545.8	2.29	1.11	
5,340.0	1.50	347.50	5,266.2	-558.7	223.2	-541.0	0.67	-0.17	
5,430.0	0.40	78.50	5,356.2	-557.5	223.3	-539.8	1.73	-1.22	
5,610.0	1.20	223.50	5,536.2	-558.7	222.6	-541.1	0.86	0.44	
5,700.0	0.60	260.40	5,626.2	-559.5	221.5	-541.9	0.89	-0.67	
5,790.0	0.40	124.60	5,716.2	-559.7	221.3	-542.2	1.03	-0.22	
5,880.0	2.50	136.80	5,806.1	-561.3	222.9	-543.7	2.35	2.33	
5,970.0	1.10	127.00	5,896.1	-563.3	224.9	-545.5	1.59	-1.56	
6,060.0	2.50	152.90	5,986.0	-565.6	226.5	-547.6	1.76	1.56	
6,150.0	2.60	147.70	6,076.0	-569.0	228.5	-551.0	0.28	0.11	
6,240.0	3.40	130.80	6,165.8	-572.5	231.6	-554.2	1.32	0.89	
6,330.0	2.00	132.20	6,255.7	-575.3	234.8	-556.8	1.56	-1.56	
6,420.0	2.50	115.20	6,345.7	-577.2	237.7	-558.4	0.92	0.56	
6,510.0	3.00	115.60	6,435.6	-579.1	241.6	-560.0	0.56	0.56	
6,600.0	1.90	117.50	6,525.5	-580.8	245.1	-561.5	1.23	-1.22	
6,645.0	1.50	102.20	6,570.5	-581.2	246.3	-561.8	1.34	-0.89	
6,690.0	3.20	61.20	6,615.4	-580.7	248.0	-561.2	5.09	3.78	
6,735.0	6.20	50.40	6,660.3	-578.6	251.0	-558.9	6.92	6.67	
6,780.0	9.80	48.30	6,704.8	-574.5	255.7	-554.4	8.02	8.00	
6,825.0	12.70	38.30	6,749.0	-568.1	261.6	-547.6	7.74	6.44	
6,870.0	15.90	32.30	6,792.6	-559.0	268.0	-538.1	7.83	7.11	
6,915.0	19.20	27.20	6,835.5	-547.2	274.7	-525.8	8.08	7.33	
6,960.0	22.20	28.00	6,877.6	-533.1	282.0	-511.2	6.70	6.67	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well USA Fed 27N West-36HZ
<b>Project:</b>	DJ Wattenberg	<b>MD Reference:</b>	KB=13' @ 5008.0ft (Ensign #123)
<b>Site:</b>	USA FED 3 Pad (S36-T3N-R66W)	<b>TVD Reference:</b>	KB=13' @ 5008.0ft (Ensign #123)
<b>Well:</b>	USA Fed 27N West-36HZ	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
7,007.0	26.20	23.80	6,920.4	-515.7	290.4	-493.3	9.26	8.51	
7,052.0	30.00	20.90	6,960.1	-496.1	298.4	-473.2	8.97	8.44	
7,097.0	29.60	20.20	6,999.2	-475.2	306.3	-451.7	1.18	-0.89	
7,142.0	34.60	20.00	7,037.3	-452.7	314.5	-428.7	11.11	11.11	
7,187.0	40.20	18.10	7,073.0	-426.9	323.4	-402.3	12.70	12.44	
7,232.0	45.90	15.40	7,105.9	-397.5	332.2	-372.4	13.31	12.67	
7,277.0	51.90	12.20	7,135.4	-364.6	340.2	-338.9	14.37	13.33	
7,322.0	58.40	8.50	7,161.2	-328.3	346.8	-302.3	15.94	14.44	
7,367.0	64.20	4.80	7,182.8	-289.1	351.3	-262.8	14.77	12.89	
7,412.0	69.10	359.90	7,200.6	-247.8	353.0	-221.6	14.78	10.89	
7,457.0	74.70	356.20	7,214.6	-205.1	351.5	-179.1	14.69	12.44	
7,502.0	82.20	355.50	7,223.6	-161.2	348.3	-135.5	16.74	16.67	
7,530.0	87.80	355.70	7,226.0	-133.4	346.2	-107.9	20.01	20.00	
7,623.0	90.60	356.10	7,227.3	-40.6	339.5	-15.9	3.04	3.01	
7,713.0	91.90	355.40	7,225.4	49.1	332.9	73.1	1.64	1.44	
7,803.0	90.20	353.70	7,223.7	138.7	324.3	161.8	2.67	-1.89	
7,893.0	91.60	354.30	7,222.3	228.2	314.9	250.4	1.69	1.56	
7,983.0	91.10	353.40	7,220.2	317.6	305.3	338.9	1.14	-0.56	
8,073.0	93.90	353.70	7,216.2	407.0	295.2	427.3	3.13	3.11	
8,163.0	93.10	353.00	7,210.8	496.2	284.8	515.5	1.18	-0.89	
8,253.0	93.10	354.50	7,205.9	585.5	275.0	603.9	1.66	0.00	
8,343.0	93.00	356.90	7,201.1	675.1	268.3	692.8	2.67	-0.11	
8,433.0	93.50	358.40	7,196.0	764.9	264.6	782.1	1.75	0.56	
8,523.0	93.50	0.90	7,190.5	854.7	264.0	871.6	2.77	0.00	
8,613.0	92.20	2.30	7,186.0	944.6	266.5	961.4	2.12	-1.44	
8,703.0	91.70	2.20	7,183.0	1,034.4	270.1	1,051.3	0.57	-0.56	
8,793.0	94.00	2.40	7,178.5	1,124.3	273.7	1,141.1	2.57	2.56	
8,883.0	92.60	1.30	7,173.3	1,214.1	276.6	1,230.9	1.98	-1.56	
8,973.0	91.30	0.70	7,170.2	1,304.0	278.1	1,320.7	1.59	-1.44	
9,063.0	91.10	1.00	7,168.4	1,394.0	279.5	1,410.6	0.40	-0.22	
9,153.0	91.20	0.20	7,166.6	1,483.9	280.4	1,500.4	0.90	0.11	
9,244.0	90.60	0.10	7,165.1	1,574.9	280.7	1,591.1	0.67	-0.66	
9,334.0	90.00	359.50	7,164.7	1,664.9	280.3	1,680.9	0.94	-0.67	
9,424.0	89.80	359.30	7,164.8	1,754.9	279.4	1,770.6	0.31	-0.22	
9,514.0	89.40	358.70	7,165.4	1,844.9	277.8	1,860.2	0.80	-0.44	
9,604.0	88.70	359.80	7,166.9	1,934.9	276.6	1,949.9	1.45	-0.78	
9,694.0	89.90	359.90	7,168.0	2,024.9	276.4	2,039.6	1.34	1.33	
9,784.0	90.20	359.20	7,168.0	2,114.9	275.7	2,129.3	0.85	0.33	
9,874.0	90.30	358.30	7,167.6	2,204.8	273.7	2,218.9	1.01	0.11	
9,964.0	91.10	359.00	7,166.5	2,294.8	271.6	2,308.5	1.18	0.89	
10,054.0	90.90	0.00	7,164.9	2,384.8	270.8	2,398.2	1.13	-0.22	
10,144.0	89.10	1.10	7,164.9	2,474.8	271.7	2,488.0	2.34	-2.00	
10,234.0	88.90	0.40	7,166.5	2,564.8	272.9	2,577.8	0.81	-0.22	
10,324.0	89.10	0.00	7,168.0	2,654.7	273.2	2,667.6	0.50	0.22	
10,414.0	89.30	3.10	7,169.3	2,744.7	275.6	2,757.5	3.45	0.22	
10,504.0	89.40	1.70	7,170.3	2,834.6	279.4	2,847.4	1.56	0.11	
10,594.0	89.40	1.30	7,171.2	2,924.6	281.8	2,937.3	0.44	0.00	
10,684.0	90.60	0.10	7,171.2	3,014.6	282.9	3,027.1	1.89	1.33	
10,774.0	91.00	2.20	7,170.0	3,104.5	284.7	3,117.0	2.38	0.44	
10,864.0	89.60	2.80	7,169.5	3,194.4	288.6	3,207.0	1.69	-1.56	
10,954.0	89.10	1.50	7,170.5	3,284.4	292.0	3,296.9	1.55	-0.56	
11,044.0	88.90	1.00	7,172.1	3,374.3	293.9	3,386.8	0.60	-0.22	
11,134.0	88.90	0.20	7,173.8	3,464.3	294.9	3,476.6	0.89	0.00	

# Cathedral Energy Services

## Survey Report

<b>Company:</b> Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b> Well USA Fed 27N West-36HZ
<b>Project:</b> DJ Wattenberg	<b>TVD Reference:</b> KB=13' @ 5008.0ft (Ensign #123)
<b>Site:</b> USA FED 3 Pad (S36-T3N-R66W)	<b>MD Reference:</b> KB=13' @ 5008.0ft (Ensign #123)
<b>Well:</b> USA Fed 27N West-36HZ	<b>North Reference:</b> Grid
<b>Wellbore:</b> HZ	<b>Survey Calculation Method:</b> Minimum Curvature
<b>Design:</b> FINAL	<b>Database:</b> USA EDM 5000 Multi Users DB

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Formations / Comments
11,224.0	87.60	1.30	7,176.6	3,554.3	296.0	3,566.4	1.89	-1.44	
11,314.0	86.20	0.90	7,181.5	3,644.1	297.8	3,656.1	1.62	-1.56	
11,404.0	88.10	1.70	7,185.9	3,734.0	299.8	3,745.9	2.29	2.11	
11,494.0	90.70	2.50	7,186.9	3,823.9	303.1	3,835.8	3.02	2.89	
11,584.0	90.80	2.30	7,185.7	3,913.8	306.9	3,925.8	0.25	0.11	
11,674.0	91.70	3.20	7,183.7	4,003.7	311.2	4,015.7	1.41	1.00	
11,710.0	92.30	4.10	7,182.5	4,039.6	313.5	4,051.7	3.00	1.67	Last Cathedral Survey @ 11,710' MD
11,765.0	92.30	4.10	7,180.3	4,094.4	317.4	4,106.6	0.00	0.00	Projection to Bit @ 11,765'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
USA Fed 27N West-36H - hit/miss target - Shape	0.00	0.00	4,197.0	-608.5	271.7	1,307,486.31	3,217,463.42	40.174819	-104.721789
- actual wellpath misses target center by 54.9ft at 4270.2ft MD (4197.2 TVD, -561.1 N, 244.0 E)									
- Point									
USA Fed 27N West-36H - hit/miss target - Shape	0.00	0.00	7,177.0	4,095.0	298.2	1,312,189.81	3,217,489.92	40.187730	-104.721546
- actual wellpath misses target center by 19.5ft at 11764.4ft MD (7180.3 TVD, 4093.8 N, 317.4 E)									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
7,571.0	7,227.2	7" -			

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
813.0	813.0	3.2	-2.9	Last Gyro Survey @ 800' MD
11,710.0	7,182.5	4,039.6	313.5	Last Cathedral Survey @ 11,710' MD
11,765.0	7,180.3	4,094.4	317.4	Projection to Bit @ 11,765'

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_