





Azimuths to True North  
Magnetic North: 8.76°

Magnetic Field  
Strength: 52849.9snT  
Dip Angle: 66.74°  
Date: 6/7/2012  
Model: IGRF2010

DD Berger 4-2 125377/172755 15' KB @ 4977.0ft (Original Well Elev) North American Datum 1983 Well Berger 4-2, True North							
Type User	Target	No Target (Freehand)	Azimuth 329.03	Origin Type Slot	N/S 0.0	E/W 0.0	From TVD 0.0
Name		TVD	+N/-S	+E/-W	Latitude		Longitude
Berger 4-2 Legal Box 4		8147.0	685.3	-430.3	40.085690		-104.865290
Berger 4-2 BHL		8147.0	837.5	-576.7	40.086108		-104.865813

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Berger 4-2
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Site:</b>	S2 T1N R67W (Berger 8 Pad)	<b>MD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Well:</b>	Berger 4-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<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		

Site		S2 T1N R67W (Berger 8 Pad)			
Site Position:		Northing:	1,274,043.57 ft	Latitude:	40.083880
From:	Lat/Long	Easting:	3,178,047.58 ft	Longitude:	-104.863699
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.41 °

Well	Berger 4-2					
Well Position	+N/-S	0.0 ft	Northing:	1,274,017.61 ft	Latitude:	40.083809
	+E/-W	0.0 ft	Easting:	3,178,032.94 ft	Longitude:	-104.863752
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,962.0 ft

<b>Wellbore</b>	DD				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination</b>	<b>Dip Angle</b>	<b>Field Strength</b>
	IGRF2010	6/7/2012	(°)	(°)	(nT)
			8.76	66.74	52,850

<b>Design</b>	DD				
<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)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	329.03	

<b>Survey Program</b>	<b>Date</b>	6/11/2012			
<b>From</b>	<b>To</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
(ft)	(ft)				
90.0	8,274.0	Survey #1 (DD)	MWD	Geolink MWD	

<b>Survey</b>									
<b>Measured</b>	<b>Vertical</b>	<b>Vertical</b>	<b>Dogleg</b>	<b>Build</b>	<b>Formations /</b>				
<b>Depth</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Rate</b>	<b>Rate</b>	<b>Comments</b>				
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00		
90.0	1.10	232.90	90.0	-0.5	-0.7	-0.1	1.22	1.22	
178.0	1.70	305.60	178.0	-0.3	-2.4	1.0	1.96	0.68	
266.0	3.40	324.70	265.9	2.6	-5.0	4.8	2.13	1.93	
354.0	3.70	336.20	353.7	7.3	-7.6	10.2	0.88	0.34	
446.0	6.10	324.40	445.4	14.0	-11.7	18.1	2.82	2.61	
537.0	7.80	331.10	535.7	23.4	-17.5	29.0	2.07	1.87	
628.0	9.70	332.10	625.6	35.6	-24.1	42.9	2.09	2.09	
718.0	10.00	331.10	714.3	49.1	-31.4	58.3	0.38	0.33	
809.0	9.20	331.50	804.0	62.4	-38.7	73.4	0.88	-0.88	
899.0	9.10	331.70	892.9	75.0	-45.5	87.7	0.12	-0.11	
985.0	9.30	335.60	977.8	87.3	-51.6	101.4	0.76	0.23	
1,076.0	10.80	335.40	1,067.4	101.8	-58.2	117.2	1.65	1.65	

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## Survey Report

<b>Company:</b>	Anadarko Petroleum Corporation	<b>Local Co-ordinate Reference:</b>	Well Berger 4-2
<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Site:</b>	S2 T1N R67W (Berger 8 Pad)	<b>MD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Well:</b>	Berger 4-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<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
1,167.0	12.30	330.60	1,156.5	118.0	-66.5	135.4	1.96	1.65	
1,257.0	11.70	318.80	1,244.6	133.2	-77.2	153.9	2.80	-0.67	
1,348.0	10.90	318.20	1,333.8	146.5	-89.0	171.5	0.89	-0.88	
1,439.0	11.10	318.20	1,423.2	159.5	-100.6	188.5	0.22	0.22	
1,530.0	10.90	314.50	1,512.5	172.0	-112.6	205.4	0.81	-0.22	
1,621.0	12.00	325.40	1,601.7	185.9	-124.1	223.2	2.66	1.21	
1,711.0	11.80	325.10	1,689.8	201.1	-134.6	241.7	0.23	-0.22	
1,802.0	11.00	324.80	1,779.0	215.8	-145.0	259.7	0.88	-0.88	
1,893.0	10.10	326.50	1,868.4	229.6	-154.4	276.3	1.05	-0.99	
1,983.0	9.10	330.60	1,957.2	242.4	-162.2	291.3	1.35	-1.11	
2,074.0	9.90	327.00	2,046.9	255.2	-170.0	306.3	1.09	0.88	
2,165.0	11.40	315.80	2,136.3	268.2	-180.6	322.9	2.80	1.65	
2,256.0	10.20	314.00	2,225.7	280.3	-192.6	339.4	1.37	-1.32	
2,347.0	11.50	323.10	2,315.1	293.1	-203.9	356.2	2.36	1.43	
2,437.0	11.10	324.50	2,403.4	307.3	-214.3	373.8	0.54	-0.44	
2,528.0	9.90	328.30	2,492.8	321.1	-223.5	390.3	1.52	-1.32	
2,619.0	11.90	330.60	2,582.2	336.0	-232.2	407.5	2.25	2.20	
2,710.0	10.70	328.10	2,671.4	351.3	-241.3	425.4	1.42	-1.32	
2,800.0	8.70	328.00	2,760.1	364.2	-249.3	440.5	2.22	-2.22	
2,891.0	10.50	331.40	2,849.9	377.3	-256.9	455.7	2.07	1.98	
2,982.0	12.60	330.40	2,939.0	393.2	-265.8	473.9	2.32	2.31	
3,072.0	11.70	328.00	3,027.0	409.5	-275.5	492.8	1.15	-1.00	
3,163.0	12.20	326.70	3,116.0	425.3	-285.6	511.7	0.62	0.55	
3,254.0	9.80	323.80	3,205.3	439.6	-295.5	529.0	2.71	-2.64	
3,345.0	10.40	319.60	3,294.9	452.1	-305.4	544.8	1.04	0.66	
3,435.0	12.70	319.60	3,383.1	465.8	-317.1	562.6	2.56	2.56	
3,526.0	11.20	320.80	3,472.1	480.3	-329.1	581.2	1.67	-1.65	
3,616.0	9.30	313.20	3,560.7	492.1	-340.0	596.9	2.59	-2.11	
3,707.0	10.40	321.80	3,650.4	503.6	-350.4	612.1	2.02	1.21	
3,798.0	10.70	326.50	3,739.8	517.1	-360.1	628.7	1.00	0.33	
3,889.0	11.30	334.00	3,829.2	532.1	-368.7	646.0	1.70	0.66	
3,979.0	9.80	332.60	3,917.6	546.8	-376.1	662.4	1.69	-1.67	
4,070.0	9.40	326.20	4,007.4	559.9	-383.8	677.6	1.25	-0.44	
4,342.0	8.60	320.60	4,276.0	594.1	-409.1	719.9	0.44	-0.29	
4,433.0	7.60	325.30	4,366.1	604.3	-416.8	732.6	1.32	-1.10	
4,524.0	8.70	321.70	4,456.2	614.6	-424.5	745.4	1.33	1.21	
4,615.0	9.40	331.70	4,546.1	626.6	-432.3	759.7	1.89	0.77	
4,706.0	10.80	325.30	4,635.7	640.1	-440.7	775.6	1.97	1.54	
4,796.0	12.00	321.70	4,723.9	654.4	-451.3	793.3	1.55	1.33	
4,887.0	11.80	324.10	4,812.9	669.4	-462.6	812.0	0.59	-0.22	
4,978.0	12.90	323.80	4,901.8	685.1	-474.0	831.4	1.21	1.21	
5,068.0	11.90	323.10	4,989.7	700.6	-485.6	850.6	1.12	-1.11	
5,159.0	11.00	326.70	5,078.9	715.4	-496.0	868.6	1.26	-0.99	
5,250.0	10.40	326.50	5,168.3	729.5	-505.3	885.5	0.66	-0.66	
5,341.0	9.80	326.80	5,257.9	742.8	-514.0	901.4	0.66	-0.66	
5,431.0	9.40	327.60	5,346.6	755.4	-522.2	916.4	0.47	-0.44	
5,522.0	8.20	325.30	5,436.6	767.0	-529.8	930.3	1.37	-1.32	
5,613.0	8.00	330.70	5,526.7	777.9	-536.6	943.1	0.86	-0.22	
5,704.0	6.50	325.30	5,616.9	787.7	-542.7	954.6	1.81	-1.65	
5,794.0	6.50	325.70	5,706.4	796.1	-548.4	964.8	0.05	0.00	
5,885.0	5.00	316.60	5,796.9	803.2	-554.1	973.8	1.92	-1.65	
5,976.0	4.40	317.50	5,887.6	808.6	-559.1	981.1	0.66	-0.66	
6,066.0	3.70	326.40	5,977.4	813.6	-563.1	987.4	1.04	-0.78	

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## Survey Report

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<b>Project:</b>	DJ Wattenberg	<b>TVD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Site:</b>	S2 T1N R67W (Berger 8 Pad)	<b>MD Reference:</b>	15' KB @ 4977.0ft (Original Well Elev)
<b>Well:</b>	Berger 4-2	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	DD	<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
6,157.0	2.90	323.50	6,068.2	817.9	-566.1	992.6	0.90	-0.88	
6,248.0	2.30	305.10	6,159.1	820.8	-568.9	996.6	1.12	-0.66	
6,339.0	2.70	319.10	6,250.0	823.5	-571.8	1,000.3	0.80	0.44	
6,430.0	1.60	302.70	6,341.0	825.8	-574.3	1,003.6	1.37	-1.21	
6,520.0	1.70	290.50	6,430.9	826.9	-576.6	1,005.8	0.40	0.11	
6,611.0	0.60	4.10	6,521.9	827.9	-577.8	1,007.2	1.80	-1.21	
6,702.0	0.20	326.40	6,612.9	828.5	-577.9	1,007.7	0.50	-0.44	
6,793.0	1.10	196.00	6,703.9	827.8	-578.2	1,007.3	1.36	0.99	
6,883.0	1.60	209.00	6,793.9	825.8	-579.1	1,006.1	0.65	0.56	
6,974.0	3.00	181.00	6,884.8	822.4	-579.7	1,003.4	1.93	1.54	
7,064.0	1.50	123.50	6,974.8	819.3	-578.8	1,000.4	2.81	-1.67	
7,156.0	1.60	97.50	7,066.7	818.5	-576.5	998.5	0.77	0.11	
7,246.0	1.60	114.10	7,156.7	817.8	-574.1	996.7	0.51	0.00	
7,337.0	1.10	73.90	7,247.7	817.6	-572.1	995.4	1.14	-0.55	
7,427.0	1.10	98.80	7,337.6	817.7	-570.4	994.6	0.53	0.00	
7,518.0	1.10	86.20	7,428.6	817.6	-568.7	993.7	0.27	0.00	
7,609.0	0.40	112.10	7,519.6	817.5	-567.5	993.0	0.84	-0.77	
7,699.0	0.90	92.20	7,609.6	817.4	-566.5	992.4	0.60	0.56	
7,790.0	0.70	59.30	7,700.6	817.6	-565.3	992.0	0.54	-0.22	
7,881.0	0.50	108.80	7,791.6	817.8	-564.5	991.7	0.59	-0.22	
7,972.0	0.10	264.40	7,882.6	817.7	-564.2	991.4	0.65	-0.44	
8,118.0	0.40	43.40	8,028.6	818.0	-564.0	991.6	0.33	0.21	
8,154.0	0.40	255.30	8,064.6	818.1	-564.0	991.7	2.14	0.00	
8,219.0	0.30	100.90	8,129.6	818.0	-564.1	991.6	1.05	-0.15	
8,274.0	0.30	92.30	8,184.6	818.0	-563.8	991.5	0.08	0.00	

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude Longitude
Berger 4-2 BHL	- survey misses target center by 29.0ft at 8219.0ft MD (8129.6 TVD, 818.0 N, -564.1 E)	0.00	0.41	8,147.0	837.5	-576.7	1,274,850.94	3,177,450.28	40.086108 -104.865813
	- Circle (radius 50.0)								
Berger 4-2 Legal Box 4	- survey misses target center by 189.2ft at 8219.0ft MD (8129.6 TVD, 818.0 N, -564.1 E)	0.00	0.00	8,147.0	685.3	-430.3	1,274,699.84	3,177,597.76	40.085690 -104.865290
	- Rectangle (sides W400.0 H400.0 D0.0)								

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment	
8,219.0	8,129.6	818.0	-564.1	Last Cathedral Survey @ 8219' MD	
8,274.0	8,184.6	818.0	-563.8	Projection to Bit @ 8274' MD	

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