



Azimuths to True North
Magnetic North: 8.80°

Magnetic Field
Strength: 52915.1snT
Dip Angle: 66.81°
Date: 3/5/2012
Model: IGRF2010

Type Target		Target		DD		Strear 21-10		148455 125217; DN		KBE @ 4939.0ft (Xtreme 14)		North American Datum 1983		Well Strear 21-10, True North	
Name		Strear 21-10 PBHL		TVD		8063.0		+N/-S		-305.9		+E/-W		-1519.1	
Azimuth		258.61		Origin Type		Slot		N/S		0.0		E/W		0.0	
From TVD		0.0		Latitude		40.156264		Longitude		-104.876677					

Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Strear 21-10
Project:	DJ Wattenberg	TVD Reference:	KBE @ 4939.0ft (Xtreme 14)
Site:	NENE Sec10-T2N-R67W (Strear 17-10-9F)	MD Reference:	KBE @ 4939.0ft (Xtreme 14)
Well:	Strear 21-10	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

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

Site		NENE Sec10-T2N-R67W (Strear 17-10-9F)			
Site Position:		Northing:	1,300,712.08 ft	Latitude:	40.157132
From:	Lat/Long	Easting:	3,175,747.83 ft	Longitude:	-104.871242
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.41 °

Well	Strear 21-10					
Well Position	+N/-S	0.0 ft	Northing:	1,300,701.87 ft	Latitude:	40.157104
	+E/-W	0.0 ft	Easting:	3,175,747.90 ft	Longitude:	-104.871242
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,924.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/5/2012	8.80	66.81	52,915

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	258.61	

Survey Program	Date	3/10/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
152.0	8,292.0	Survey #1 (DD)	MWD	Geolink MWD	

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	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
152.0	0.90	235.60	152.0	-0.7	-1.0	1.1	0.59	0.59		
245.0	1.80	239.20	245.0	-1.8	-2.8	3.1	0.97	0.97		
338.0	3.60	240.20	337.9	-4.0	-6.6	7.3	1.94	1.94		
416.0	4.90	240.20	415.6	-6.9	-11.6	12.8	1.67	1.67		
504.0	6.50	247.50	503.2	-10.7	-19.5	21.2	1.99	1.82		
592.0	7.70	251.90	590.5	-14.4	-29.7	32.0	1.50	1.36		
684.0	9.30	254.30	681.5	-18.3	-42.7	45.5	1.78	1.74		
738.0	8.50	251.20	734.9	-20.8	-50.7	53.8	1.73	-1.48		
843.0	9.90	250.40	838.5	-26.3	-66.6	70.5	1.34	1.33		
931.0	12.20	260.40	924.9	-30.4	-82.9	87.2	3.39	2.61		
1,019.0	13.40	261.10	1,010.7	-33.6	-102.1	106.7	1.37	1.36		
1,106.0	14.20	259.70	1,095.2	-37.0	-122.6	127.5	1.00	0.92		

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Survey Report

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Site:	NENE Sec10-T2N-R67W (Strear 17-10-9F)	MD Reference:	KBE @ 4939.0ft (Xtreme 14)
Well:	Strear 21-10	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	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
1,195.0	15.70	260.20	1,181.2	-41.0	-145.2	150.4	1.69	1.69	
1,283.0	17.90	263.30	1,265.4	-44.6	-170.3	175.8	2.70	2.50	
1,373.0	18.40	265.90	1,350.9	-47.3	-198.2	203.7	1.06	0.56	
1,461.0	17.70	264.30	1,434.6	-49.6	-225.4	230.8	0.97	-0.80	
1,550.0	18.50	264.30	1,519.2	-52.3	-252.9	258.3	0.90	0.90	
1,639.0	18.30	261.00	1,603.7	-55.9	-280.8	286.3	1.19	-0.22	
1,729.0	17.50	258.20	1,689.3	-60.9	-308.0	313.9	1.31	-0.89	
1,817.0	17.30	258.30	1,773.3	-66.3	-333.7	340.2	0.23	-0.23	
1,907.0	17.40	256.40	1,859.2	-72.1	-359.9	367.1	0.64	0.11	
1,993.0	16.90	257.10	1,941.3	-77.9	-384.6	392.4	0.63	-0.58	
2,083.0	18.00	257.40	2,027.2	-83.9	-410.9	419.4	1.23	1.22	
2,172.0	17.60	257.70	2,111.9	-89.8	-437.5	446.6	0.46	-0.45	
2,262.0	17.40	257.30	2,197.8	-95.6	-463.9	473.7	0.26	-0.22	
2,350.0	16.70	256.90	2,281.9	-101.4	-489.1	499.5	0.81	-0.80	
2,439.0	15.50	257.50	2,367.4	-106.9	-513.1	524.1	1.36	-1.35	
2,527.0	17.30	258.40	2,451.8	-112.0	-537.4	549.0	2.07	2.05	
2,616.0	17.00	258.30	2,536.9	-117.3	-563.1	575.2	0.34	-0.34	
2,703.0	17.80	259.00	2,619.9	-122.4	-588.6	601.2	0.95	0.92	
2,793.0	18.50	261.90	2,705.4	-127.1	-616.3	629.2	1.27	0.78	
2,882.0	16.70	260.30	2,790.3	-131.2	-642.9	656.1	2.09	-2.02	
2,969.0	17.40	260.90	2,873.4	-135.4	-668.0	681.6	0.83	0.80	
3,058.0	18.40	263.20	2,958.1	-139.2	-695.1	708.9	1.38	1.12	
3,147.0	17.40	260.60	3,042.8	-143.0	-722.2	736.2	1.44	-1.12	
3,236.0	17.60	261.50	3,127.7	-147.2	-748.6	763.0	0.38	0.22	
3,325.0	18.40	259.80	3,212.3	-151.6	-775.8	790.4	1.08	0.90	
3,414.0	18.00	259.00	3,296.9	-156.7	-803.1	818.2	0.53	-0.45	
3,502.0	17.60	257.10	3,380.7	-162.3	-829.4	845.1	0.80	-0.45	
3,592.0	18.40	255.20	3,466.3	-169.0	-856.4	872.9	1.10	0.89	
3,680.0	18.70	255.40	3,549.7	-176.1	-883.5	900.9	0.35	0.34	
3,768.0	18.30	258.50	3,633.2	-182.4	-910.7	928.8	1.21	-0.45	
3,854.0	17.40	257.40	3,715.0	-187.9	-936.5	955.1	1.12	-1.05	
3,944.0	18.60	255.70	3,800.6	-194.4	-963.5	982.9	1.46	1.33	
4,030.0	17.80	259.30	3,882.3	-200.2	-989.7	1,009.8	1.60	-0.93	
4,120.0	17.70	255.40	3,968.0	-206.2	-1,016.5	1,037.2	1.33	-0.11	
4,210.0	18.90	260.00	4,053.5	-212.2	-1,044.1	1,065.4	2.09	1.33	
4,298.0	17.40	258.00	4,137.1	-217.4	-1,071.0	1,092.8	1.85	-1.70	
4,387.0	17.10	256.60	4,222.1	-223.2	-1,096.7	1,119.2	0.58	-0.34	
4,475.0	16.50	260.30	4,306.3	-228.3	-1,121.6	1,144.6	1.39	-0.68	
4,562.0	17.70	261.50	4,389.5	-232.3	-1,146.9	1,170.2	1.44	1.38	
4,651.0	17.20	261.90	4,474.4	-236.2	-1,173.3	1,196.8	0.58	-0.56	
4,739.0	18.10	259.60	4,558.3	-240.5	-1,199.6	1,223.5	1.29	1.02	
4,826.0	19.20	261.70	4,640.7	-245.0	-1,227.1	1,251.3	1.48	1.26	
4,913.0	18.50	257.60	4,723.0	-250.0	-1,254.7	1,279.4	1.72	-0.80	
5,000.0	16.90	259.80	4,805.9	-255.2	-1,280.6	1,305.8	1.99	-1.84	
5,087.0	17.90	255.90	4,888.9	-260.7	-1,306.0	1,331.8	1.77	1.15	
5,175.0	18.50	255.60	4,972.5	-267.5	-1,332.7	1,359.3	0.69	0.68	
5,263.0	16.40	253.00	5,056.5	-274.6	-1,358.1	1,385.6	2.54	-2.39	
5,352.0	16.10	256.20	5,141.9	-281.2	-1,382.1	1,410.4	1.06	-0.34	
5,440.0	13.00	254.70	5,227.1	-286.7	-1,403.5	1,432.5	3.55	-3.52	
5,529.0	10.80	255.10	5,314.2	-291.5	-1,421.2	1,450.8	2.47	-2.47	
5,617.0	10.10	256.40	5,400.7	-295.5	-1,436.7	1,466.7	0.84	-0.80	
5,707.0	10.00	258.10	5,489.3	-298.9	-1,452.0	1,482.4	0.35	-0.11	
5,797.0	9.40	260.10	5,578.0	-301.8	-1,466.9	1,497.6	0.76	-0.67	

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Survey Report

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Site:	NENE Sec10-T2N-R67W (Strear 17-10-9F)	MD Reference:	KBE @ 4939.0ft (Xtreme 14)
Well:	Strear 21-10	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	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
5,886.0	7.60	258.80	5,666.0	-304.2	-1,479.8	1,510.7	2.03	-2.02	
5,974.0	7.20	264.60	5,753.3	-305.8	-1,491.0	1,522.0	0.96	-0.45	
6,064.0	5.80	261.20	5,842.7	-307.1	-1,501.1	1,532.2	1.61	-1.56	
6,152.0	4.80	260.70	5,930.4	-308.3	-1,509.2	1,540.3	1.14	-1.14	
6,242.0	3.50	251.60	6,020.1	-309.8	-1,515.5	1,546.8	1.61	-1.44	
6,330.0	1.50	290.60	6,108.0	-310.3	-1,519.1	1,550.5	2.86	-2.27	
6,418.0	1.40	276.20	6,196.0	-309.7	-1,521.2	1,552.5	0.43	-0.11	
6,507.0	1.10	250.90	6,285.0	-309.9	-1,523.1	1,554.3	0.70	-0.34	
6,597.0	0.20	113.00	6,375.0	-310.2	-1,523.8	1,555.1	1.40	-1.00	
6,685.0	0.30	347.20	6,463.0	-310.1	-1,523.7	1,554.9	0.51	0.11	
6,774.0	0.20	62.90	6,552.0	-309.8	-1,523.6	1,554.8	0.36	-0.11	
6,864.0	0.30	2.30	6,642.0	-309.5	-1,523.5	1,554.6	0.30	0.11	
6,953.0	0.00	136.40	6,731.0	-309.2	-1,523.5	1,554.5	0.34	-0.34	
7,041.0	0.00	278.80	6,819.0	-309.2	-1,523.5	1,554.5	0.00	0.00	
7,129.0	0.40	246.50	6,907.0	-309.4	-1,523.8	1,554.8	0.45	0.45	
7,216.0	0.20	221.00	6,994.0	-309.6	-1,524.1	1,555.3	0.27	-0.23	
7,305.0	0.60	282.10	7,083.0	-309.6	-1,524.7	1,555.8	0.60	0.45	
7,392.0	0.30	249.10	7,170.0	-309.6	-1,525.3	1,556.5	0.44	-0.34	
7,480.0	0.20	298.80	7,258.0	-309.6	-1,525.7	1,556.8	0.26	-0.11	
7,570.0	0.50	264.40	7,348.0	-309.6	-1,526.2	1,557.3	0.39	0.33	
7,658.0	0.10	234.30	7,436.0	-309.7	-1,526.7	1,557.8	0.47	-0.45	
7,748.0	0.20	311.10	7,526.0	-309.6	-1,526.9	1,557.9	0.22	0.11	
7,836.0	0.30	308.90	7,614.0	-309.4	-1,527.1	1,558.2	0.11	0.11	
7,925.0	0.30	205.60	7,703.0	-309.4	-1,527.4	1,558.5	0.53	0.00	
8,014.0	0.20	231.80	7,792.0	-309.7	-1,527.7	1,558.7	0.17	-0.11	
8,104.0	0.20	341.30	7,882.0	-309.7	-1,527.8	1,558.9	0.36	0.00	
8,192.0	0.50	292.30	7,970.0	-309.4	-1,528.2	1,559.2	0.45	0.34	
8,242.0	0.50	304.50	8,020.0	-309.2	-1,528.6	1,559.6	0.21	0.00	
8,285.0	0.50	304.50	8,062.9	-309.0	-1,528.9	1,559.8	0.00	0.00	Strear 21-10 PBHL
8,292.0	0.50	304.50	8,070.0	-308.9	-1,529.0	1,559.9	0.00	0.00	Last Cathedral Survey @ 8,292' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Strear 21-10 PBHL	0.00	0.00	8,063.0	-305.9	-1,519.1	1,300,385.17	3,174,230.96	40.156264	-104.876677
- hit/miss target									
- Shape									
- actual wellpath misses target center by 10.2ft at 8285.0ft MD (8062.9 TVD, -309.0 N, -1528.9 E)									
- Circle (radius 50.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
8,292.0	8,070.0	-308.9	-1,529.0	Last Cathedral Survey @ 8,292' MD	

Checked By: _____ Approved By: _____ Date: _____