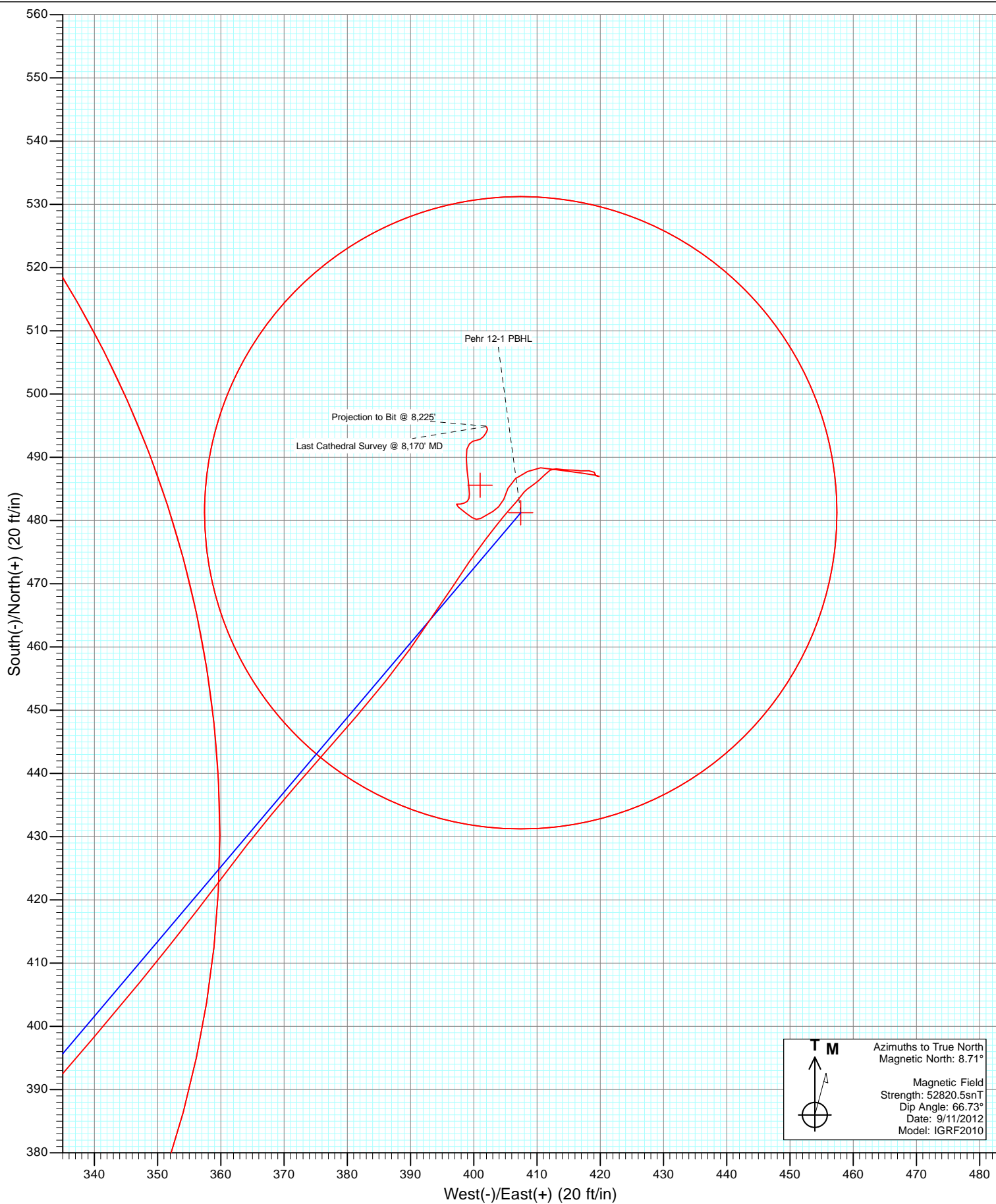


Azimuths to True North
Magnetic North: 8.71°

Magnetic Field
Strength: 52820.5nT
Dip Angle: 66.73°
Date: 9/11/2012
Model: IGRF2010

Type	Target	Azimuth	Origin	Type	N/S	E/W	From TVD
Legal Box #12	Pehr 12-1 PBHL	40.25	485.6	401.0	0.0	0.0	0.0
Pehr 12-1 PBHL		8117.0	481.2	407.4	40.078188	-104.846387	

DD
Pehr 12-1
198965 125503; LR
KB-15 @ 4853.0ft (Xtreme 11)
GL @ 4944.0
North American Datum 1983
Well Pehr 12-1, True North



Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pehr 12-1
Project:	DJ Wattenberg	TVD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Site:	NWSW Sec1-T1N-R67W (Pehr 33-1)	MD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Well:	Pehr 12-1	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		NWSW Sec1-T1N-R67W (Pehr 33-1)			
Site Position:		Northing:	1,271,518.81 ft	Latitude:	40.076861
From:	Lat/Long	Easting:	3,182,472.99 ft	Longitude:	-104.847950
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.42 °

Well	Pehr 12-1					
Well Position	+N/-S	0.0 ft	Northing:	1,271,521.20 ft	Latitude:	40.076867
	+E/-W	0.0 ft	Easting:	3,182,502.91 ft	Longitude:	-104.847843
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,944.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/11/2012	8.71	66.73	52,821

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	40.25	

Survey Program	Date	10/12/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
77.0	8,225.0	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		
77.0	0.20	80.40	77.0	0.0	0.1	0.1	0.26	0.26		
165.0	0.20	133.00	165.0	-0.1	0.4	0.2	0.20	0.00		
253.0	1.50	50.30	253.0	0.6	1.4	1.3	1.69	1.48		
341.0	2.90	43.40	340.9	2.9	3.8	4.7	1.62	1.59		
417.0	4.40	39.60	416.8	6.6	7.0	9.5	2.00	1.97		
508.0	6.10	43.60	507.4	12.8	12.5	17.8	1.91	1.87		
599.0	8.20	38.40	597.7	21.4	19.9	29.2	2.41	2.31		
690.0	10.00	38.50	687.5	32.6	28.9	43.5	1.98	1.98		
780.0	13.30	42.50	775.7	46.4	40.7	61.7	3.77	3.67		
871.0	14.10	41.00	864.1	62.5	55.1	83.3	0.96	0.88		
889.0	14.20	41.90	881.5	65.8	58.0	87.7	1.34	0.56		
1,022.0	13.80	41.20	1,010.6	89.8	79.3	119.8	0.33	-0.30		

Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pehr 12-1
Project:	DJ Wattenberg	TVD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Site:	NWSW Sec1-T1N-R67W (Pehr 33-1)	MD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Well:	Pehr 12-1	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
1,112.0	15.60	40.90	1,097.6	107.1	94.3	142.7	2.00	2.00	
1,203.0	17.20	37.10	1,184.9	127.0	110.5	168.3	2.12	1.76	
1,294.0	16.70	35.40	1,272.0	148.4	126.1	194.8	0.77	-0.55	
1,385.0	16.60	34.30	1,359.1	169.8	141.0	220.7	0.36	-0.11	
1,476.0	16.60	40.90	1,446.4	190.4	156.9	246.7	2.07	0.00	
1,566.0	15.30	44.90	1,532.9	208.5	173.7	271.4	1.89	-1.44	
1,657.0	15.20	43.40	1,620.7	225.7	190.4	295.2	0.45	-0.11	
1,748.0	13.80	41.90	1,708.8	242.4	205.8	318.0	1.59	-1.54	
1,839.0	14.60	41.60	1,797.0	259.1	220.7	340.3	0.88	0.88	
1,929.0	14.50	40.10	1,884.1	276.2	235.4	362.9	0.43	-0.11	
2,020.0	15.20	41.70	1,972.1	293.8	250.7	386.2	0.89	0.77	
2,111.0	16.50	41.90	2,059.6	312.3	267.3	411.1	1.43	1.43	
2,202.0	16.10	39.30	2,147.0	331.7	283.9	436.6	0.91	-0.44	
2,293.0	15.80	40.20	2,234.5	351.0	299.9	461.6	0.43	-0.33	
2,383.0	15.50	39.50	2,321.1	369.6	315.5	485.9	0.39	-0.33	
2,474.0	16.20	41.20	2,408.7	388.5	331.6	510.8	0.92	0.77	
2,565.0	14.70	39.30	2,496.4	407.0	347.2	535.0	1.74	-1.65	
2,656.0	12.50	36.80	2,584.8	423.8	360.4	556.4	2.50	-2.42	
2,747.0	10.00	41.20	2,674.1	437.7	371.5	574.1	2.90	-2.75	
2,837.0	9.40	40.90	2,762.8	449.1	381.5	589.3	0.67	-0.67	
2,928.0	7.80	35.60	2,852.8	459.7	390.0	602.9	1.96	-1.76	
3,019.0	6.90	33.00	2,943.0	469.3	396.5	614.4	1.05	-0.99	
3,109.0	5.10	37.30	3,032.5	477.1	401.9	623.8	2.06	-2.00	
3,200.0	2.50	41.80	3,123.3	481.8	405.7	629.8	2.87	-2.86	
3,290.0	0.70	35.20	3,213.3	483.7	407.3	632.3	2.01	-2.00	
3,381.0	0.60	41.40	3,304.3	484.5	407.9	633.4	0.13	-0.11	
3,472.0	0.30	58.40	3,395.3	485.0	408.5	634.1	0.36	-0.33	
3,562.0	0.80	53.50	3,485.3	485.5	409.2	634.9	0.56	0.56	
3,653.0	0.80	53.20	3,576.2	486.2	410.2	636.1	0.00	0.00	
3,744.0	0.90	39.90	3,667.2	487.2	411.2	637.5	0.24	0.11	
3,835.0	0.70	60.20	3,758.2	488.0	412.1	638.7	0.38	-0.22	
3,925.0	0.60	98.70	3,848.2	488.2	413.0	639.5	0.49	-0.11	
4,016.0	0.40	92.00	3,939.2	488.1	413.8	639.9	0.23	-0.22	
4,107.0	0.20	98.70	4,030.2	488.1	414.3	640.2	0.22	-0.22	
4,198.0	0.40	93.20	4,121.2	488.0	414.8	640.5	0.22	0.22	
4,288.0	0.40	94.10	4,211.2	488.0	415.4	640.8	0.01	0.00	
4,379.0	0.40	87.10	4,302.2	488.0	416.0	641.2	0.05	0.00	
4,470.0	0.70	104.20	4,393.2	487.8	416.9	641.7	0.37	0.33	
4,561.0	1.00	79.10	4,484.2	487.9	418.2	642.6	0.52	0.33	
4,651.0	0.50	170.10	4,574.2	487.6	419.1	642.9	1.25	-0.56	
4,742.0	0.30	123.70	4,665.2	487.1	419.3	642.7	0.40	-0.22	
4,833.0	0.40	88.20	4,756.2	487.0	419.8	642.9	0.26	0.11	
4,924.0	1.20	280.40	4,847.2	487.2	419.2	642.7	1.75	0.88	
5,014.0	1.40	278.70	4,937.2	487.5	417.2	641.6	0.23	0.22	
5,105.0	1.40	276.00	5,028.1	487.8	415.0	640.4	0.07	0.00	
5,196.0	1.40	278.70	5,119.1	488.1	412.8	639.2	0.07	0.00	
5,287.0	1.40	274.80	5,210.1	488.3	410.6	638.0	0.10	0.00	
5,377.0	1.50	235.70	5,300.1	487.8	408.5	636.2	1.08	0.11	
5,468.0	1.30	243.90	5,391.0	486.6	406.6	634.1	0.31	-0.22	
5,559.0	1.40	194.00	5,482.0	485.1	405.4	632.2	1.26	0.11	
5,650.0	1.00	209.80	5,573.0	483.3	404.7	630.4	0.57	-0.44	
5,740.0	0.80	221.60	5,663.0	482.2	403.9	629.0	0.30	-0.22	
5,831.0	0.70	240.80	5,754.0	481.4	403.0	627.9	0.30	-0.11	

Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Pehr 12-1
Project:	DJ Wattenberg	TVD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Site:	NWSW Sec1-T1N-R67W (Pehr 33-1)	MD Reference:	KB=15' @ 4959.0ft (Xtreme 11)
Well:	Pehr 12-1	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
5,922.0	0.80	239.00	5,845.0	480.8	402.0	626.7	0.11	0.11	
6,013.0	0.50	243.30	5,935.9	480.3	401.1	625.8	0.33	-0.33	
6,103.0	0.40	278.70	6,025.9	480.2	400.4	625.2	0.32	-0.11	
6,194.0	0.50	299.40	6,116.9	480.4	399.8	625.0	0.21	0.11	
6,285.0	1.00	308.00	6,207.9	481.1	398.8	624.9	0.56	0.55	
6,376.0	1.00	310.40	6,298.9	482.1	397.6	624.9	0.05	0.00	
6,467.0	0.40	98.70	6,389.9	482.6	397.3	625.0	1.49	-0.66	
6,557.0	0.40	77.50	6,479.9	482.6	397.9	625.4	0.16	0.00	
6,648.0	0.40	74.00	6,570.9	482.8	398.5	626.0	0.03	0.00	
6,739.0	0.30	47.40	6,661.9	483.0	399.0	626.5	0.21	-0.11	
6,830.0	0.40	13.70	6,752.9	483.5	399.3	627.0	0.25	0.11	
6,920.0	0.50	356.60	6,842.9	484.2	399.3	627.5	0.18	0.11	
7,011.0	0.70	357.70	6,933.9	485.1	399.3	628.2	0.22	0.22	
7,102.0	0.90	351.20	7,024.9	486.4	399.1	629.1	0.24	0.22	
7,193.0	1.10	356.40	7,115.9	488.0	399.0	630.2	0.24	0.22	
7,283.0	1.20	355.50	7,205.9	489.8	398.8	631.5	0.11	0.11	
7,374.0	0.70	15.80	7,296.8	491.3	398.9	632.7	0.65	-0.55	
7,465.0	0.50	37.40	7,387.8	492.1	399.3	633.6	0.33	-0.22	
7,556.0	0.40	71.20	7,478.8	492.5	399.8	634.3	0.31	-0.11	
7,647.0	0.40	81.80	7,569.8	492.7	400.5	634.8	0.08	0.00	
7,737.0	0.40	62.10	7,659.8	492.9	401.0	635.3	0.15	0.00	
7,828.0	0.40	38.60	7,750.8	493.3	401.5	635.9	0.18	0.00	
7,919.0	0.50	36.00	7,841.8	493.8	402.0	636.6	0.11	0.11	
8,010.0	0.30	357.90	7,932.8	494.4	402.2	637.2	0.35	-0.22	
8,100.0	0.20	313.40	8,022.8	494.7	402.1	637.4	0.23	-0.11	
8,170.0	0.10	326.90	8,092.8	494.9	401.9	637.4	0.15	-0.14	Last Cathedral Survey @ 8,170' MD
8,225.0	0.02	337.51	8,147.8	494.9	401.9	637.4	0.15	-0.15	Projection to Bit @ 8,225'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Pehr 12-1 PBHL	0.00	0.00	8,117.0	481.2	407.4	1,272,005.41	3,182,906.80	40.078188	-104.846387
- hit/miss target									
- Shape									
- actual wellpath misses target center by 28.3ft at 8170.0ft MD (8092.8 TVD, 494.9 N, 401.9 E)									
- Circle (radius 50.0)									
Legal Box #12	0.00	0.00	-5,000.0	485.6	401.0	1,272,009.72	3,182,900.35	40.078200	-104.846410
- actual wellpath misses target center by 5039.5ft at 0.0ft MD (0.0 TVD, 0.0 N, 0.0 E)									
- Rectangle (sides W400.0 H400.0 D0.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment	
8,170.0	8,092.8	494.9	401.9	Last Cathedral Survey @ 8,170' MD	
8,225.0	8,147.8	494.9	401.9	Projection to Bit @ 8,225'	

Checked By: _____ Approved By: _____ Date: _____