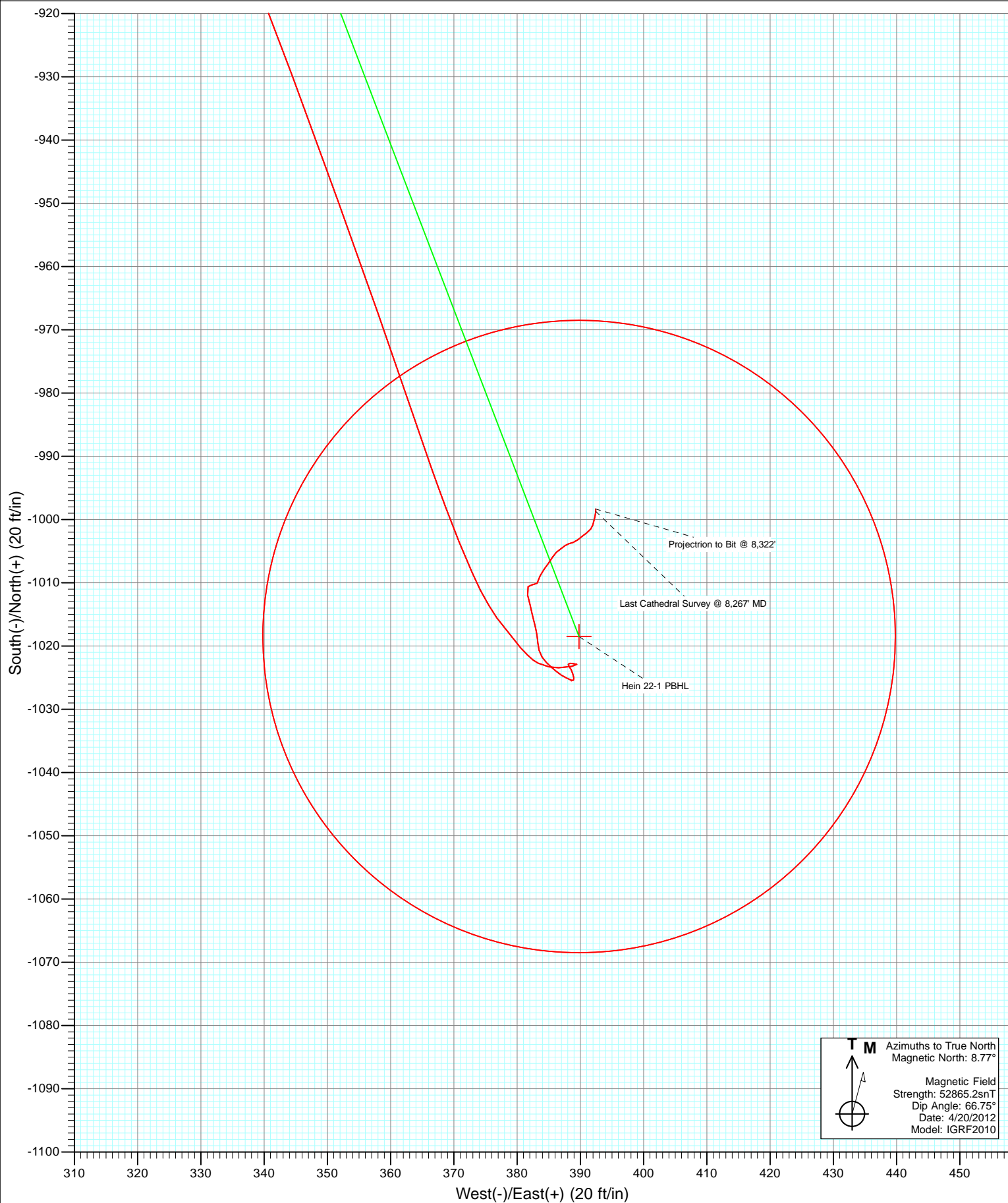


Azimuths to True North
Magnetic North: 8.77°

Magnetic Field
Strength: 52865.2snT
Dip Angle: 66.75°
Date: 4/20/2012
Model: IGRF2010

DD Hein 22-1 125291; 156655; DN 15' KB @ 4959.0ft (Xtreme 15) North American Datum 1983 Well Hein 22-1, True North					
Type Target	Target Hein 22-1 PBHL	Azimuth 159.06	Origin Type Slot	N/S 0.0	E/W 0.0
Name Hein 22-1 PBHL	TVD 8117.0	+N/-S -1018.5	+E/-W 389.8	Latitude 40.079856	Longitude -104.844040
		From TVD 0.0			



Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Hein 22-1
Project:	DJ Wattenberg	TVD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Site:	S01N-67W-01-22 (Hein 5-1 Pad)	MD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Well:	Hein 22-1	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		S01N-67W-01-22 (Hein 5-1 Pad)			
Site Position:		Northing:	1,273,693.57 ft	Latitude:	40.082817
From:	Lat/Long	Easting:	3,183,160.75 ft	Longitude:	-104.845435
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	0.42 °

Well	Hein 22-1					
Well Position	+N/-S	0.0 ft	Northing:	1,273,633.44 ft	Latitude:	40.082652
	+E/-W	0.0 ft	Easting:	3,183,161.75 ft	Longitude:	-104.845433
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	4/20/2012	8.77	66.75	52,865

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	159.06	

Survey Program	Date	4/24/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
104.0	8,322.0	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		
104.0	0.20	164.40	104.0	-0.2	0.0	0.2	0.19	0.19		
197.0	1.10	158.70	197.0	-1.2	0.4	1.2	0.97	0.97		
290.0	2.10	152.50	290.0	-3.5	1.5	3.8	1.09	1.08		
383.0	3.20	156.50	382.9	-7.4	3.3	8.1	1.20	1.18		
468.0	4.90	154.70	467.6	-12.9	5.8	14.1	2.01	2.00		
554.0	7.30	156.50	553.1	-21.2	9.6	23.2	2.80	2.79		
639.0	9.70	159.90	637.2	-32.9	14.2	35.8	2.88	2.82		
727.0	11.90	160.40	723.6	-48.4	19.8	52.3	2.50	2.50		
813.0	13.90	161.60	807.5	-66.5	26.0	71.4	2.35	2.33		
898.0	15.30	162.10	889.7	-86.9	32.7	92.8	1.65	1.65		
1,046.0	14.70	162.20	1,032.7	-123.4	44.5	131.1	0.41	-0.41		
1,131.0	15.80	167.10	1,114.7	-144.9	50.3	153.3	1.99	1.29		

Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Hein 22-1
Project:	DJ Wattenberg	TVD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Site:	S01N-67W-01-22 (Hein 5-1 Pad)	MD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Well:	Hein 22-1	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
1,217.0	16.90	169.40	1,197.2	-168.6	55.2	177.2	1.48	1.28	
1,302.0	18.90	168.60	1,278.1	-194.2	60.2	202.9	2.37	2.35	
1,388.0	21.70	165.80	1,358.7	-223.3	66.9	232.5	3.45	3.26	
1,473.0	25.00	161.60	1,436.8	-255.6	76.4	266.0	4.35	3.88	
1,559.0	28.60	158.30	1,513.5	-292.0	89.8	304.8	4.53	4.19	
1,644.0	31.20	156.00	1,587.2	-331.0	106.3	347.1	3.34	3.06	
1,730.0	30.70	155.70	1,661.0	-371.4	124.3	391.3	0.61	-0.58	
1,815.0	29.50	155.00	1,734.5	-410.1	142.1	433.8	1.47	-1.41	
1,901.0	27.80	152.70	1,810.0	-447.1	160.3	474.9	2.36	-1.98	
1,986.0	25.10	152.70	1,886.1	-480.8	177.6	512.5	3.18	-3.18	
2,072.0	23.90	152.90	1,964.3	-512.5	193.9	548.0	1.40	-1.40	
2,157.0	23.00	157.50	2,042.3	-543.2	208.1	581.7	2.40	-1.06	
2,243.0	21.70	159.10	2,121.8	-573.5	220.2	614.4	1.67	-1.51	
2,328.0	22.10	161.30	2,200.7	-603.4	231.0	646.1	1.07	0.47	
2,414.0	20.80	160.60	2,280.8	-633.1	241.2	677.5	1.54	-1.51	
2,499.0	20.70	159.90	2,360.2	-661.4	251.4	707.6	0.31	-0.12	
2,585.0	20.30	162.20	2,440.8	-689.9	261.2	737.7	1.05	-0.47	
2,671.0	20.80	166.20	2,521.3	-719.0	269.4	767.7	1.73	0.58	
2,756.0	20.80	165.70	2,600.8	-748.2	276.7	797.7	0.21	0.00	
2,842.0	20.60	161.10	2,681.2	-777.3	285.4	828.0	1.90	-0.23	
2,927.0	20.40	158.40	2,760.9	-805.3	295.7	857.8	1.14	-0.24	
3,013.0	20.20	158.10	2,841.5	-833.0	306.7	887.6	0.26	-0.23	
3,098.0	19.20	158.20	2,921.5	-859.6	317.4	916.2	1.18	-1.18	
3,184.0	17.80	159.10	3,003.1	-885.0	327.4	943.5	1.66	-1.63	
3,269.0	16.30	158.90	3,084.4	-908.3	336.3	968.5	1.77	-1.76	
3,355.0	14.90	159.70	3,167.2	-929.9	344.5	991.6	1.65	-1.63	
3,441.0	13.50	160.20	3,250.6	-949.7	351.7	1,012.7	1.63	-1.63	
3,526.0	12.30	160.60	3,333.4	-967.6	358.1	1,031.6	1.42	-1.41	
3,612.0	11.40	161.30	3,417.6	-984.3	363.8	1,049.3	1.06	-1.05	
3,697.0	8.30	159.50	3,501.3	-998.0	368.7	1,063.8	3.66	-3.65	
3,783.0	6.70	156.10	3,586.6	-1,008.4	372.9	1,075.0	1.93	-1.86	
3,868.0	4.40	144.10	3,671.2	-1,015.5	376.8	1,083.1	3.02	-2.71	
3,954.0	3.60	138.60	3,757.0	-1,020.2	380.5	1,088.9	1.03	-0.93	
4,039.0	1.50	113.70	3,841.9	-1,022.7	383.3	1,092.1	2.74	-2.47	
4,125.0	0.90	101.00	3,927.9	-1,023.3	385.0	1,093.3	0.76	-0.70	
4,210.0	1.20	91.00	4,012.8	-1,023.4	386.6	1,094.0	0.41	0.35	
4,296.0	1.60	79.10	4,098.8	-1,023.2	388.6	1,094.5	0.57	0.47	
4,381.0	0.50	285.40	4,183.8	-1,022.9	389.4	1,094.5	2.42	-1.29	
4,467.0	0.40	278.80	4,269.8	-1,022.7	388.8	1,094.1	0.13	-0.12	
4,552.0	0.20	257.00	4,354.8	-1,022.7	388.3	1,094.0	0.27	-0.24	
4,638.0	0.20	219.70	4,440.8	-1,022.9	388.1	1,094.0	0.15	0.00	
4,724.0	0.40	138.60	4,526.8	-1,023.2	388.2	1,094.4	0.49	0.23	
4,809.0	0.40	153.40	4,611.8	-1,023.7	388.5	1,095.0	0.12	0.00	
4,895.0	0.60	162.40	4,697.8	-1,024.4	388.8	1,095.7	0.25	0.23	
4,980.0	0.30	169.30	4,782.8	-1,025.0	389.0	1,096.4	0.36	-0.35	
5,066.0	0.20	221.80	4,868.8	-1,025.4	388.9	1,096.7	0.28	-0.12	
5,152.0	0.40	277.90	4,954.8	-1,025.5	388.5	1,096.6	0.39	0.23	
5,237.0	0.50	101.60	5,039.8	-1,025.5	388.6	1,096.6	1.06	0.12	
5,323.0	0.50	294.20	5,125.8	-1,025.4	388.6	1,096.6	1.16	0.00	
5,408.0	0.60	293.10	5,210.8	-1,025.1	387.9	1,096.0	0.12	0.12	
5,494.0	0.70	302.60	5,296.8	-1,024.6	387.0	1,095.3	0.17	0.12	
5,579.0	0.70	311.90	5,381.8	-1,024.0	386.2	1,094.4	0.13	0.00	
5,665.0	0.70	308.30	5,467.8	-1,023.3	385.4	1,093.5	0.05	0.00	

Cathedral Energy Services

Survey Report

Company:	Anadarko Petroleum Corporation	Local Co-ordinate Reference:	Well Hein 22-1
Project:	DJ Wattenberg	TVD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Site:	S01N-67W-01-22 (Hein 5-1 Pad)	MD Reference:	15' KB @ 4959.0ft (Xtreme 15)
Well:	Hein 22-1	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
5,750.0	0.70	317.40	5,552.8	-1,022.6	384.6	1,092.5	0.13	0.00	
5,836.0	0.80	325.90	5,638.8	-1,021.7	383.9	1,091.5	0.17	0.12	
5,921.0	0.80	347.50	5,723.8	-1,020.7	383.5	1,090.3	0.35	0.00	
6,007.0	0.80	352.80	5,809.7	-1,019.5	383.3	1,089.1	0.09	0.00	
6,092.0	0.70	352.40	5,894.7	-1,018.4	383.1	1,088.0	0.12	-0.12	
6,178.0	0.70	349.90	5,980.7	-1,017.3	383.0	1,087.0	0.04	0.00	
6,263.0	0.80	344.00	6,065.7	-1,016.3	382.7	1,085.9	0.15	0.12	
6,349.0	1.00	348.00	6,151.7	-1,014.9	382.4	1,084.6	0.24	0.23	
6,434.0	1.10	345.30	6,236.7	-1,013.4	382.0	1,083.0	0.13	0.12	
6,520.0	0.90	348.30	6,322.7	-1,012.0	381.7	1,081.5	0.24	-0.23	
6,605.0	1.00	14.00	6,407.7	-1,010.6	381.7	1,080.3	0.51	0.12	
6,691.0	0.90	128.50	6,493.7	-1,010.3	382.4	1,080.2	1.86	-0.12	
6,776.0	0.90	16.40	6,578.7	-1,010.1	383.1	1,080.3	1.76	0.00	
6,862.0	0.80	28.40	6,664.7	-1,008.9	383.6	1,079.4	0.24	-0.12	
6,947.0	0.80	35.30	6,749.6	-1,007.9	384.2	1,078.6	0.11	0.00	
7,033.0	0.80	36.50	6,835.6	-1,006.9	384.9	1,078.0	0.02	0.00	
7,118.0	0.70	29.90	6,920.6	-1,006.0	385.6	1,077.3	0.16	-0.12	
7,204.0	0.70	48.90	7,006.6	-1,005.2	386.2	1,076.8	0.27	0.00	
7,289.0	0.60	53.90	7,091.6	-1,004.6	387.0	1,076.5	0.14	-0.12	
7,375.0	0.40	51.50	7,177.6	-1,004.1	387.6	1,076.3	0.23	-0.23	
7,460.0	0.50	73.20	7,262.6	-1,003.8	388.2	1,076.3	0.23	0.12	
7,546.0	0.50	71.60	7,348.6	-1,003.6	388.9	1,076.3	0.02	0.00	
7,631.0	0.60	51.00	7,433.6	-1,003.2	389.6	1,076.2	0.26	0.12	
7,717.0	0.60	52.90	7,519.6	-1,002.7	390.3	1,075.9	0.02	0.00	
7,802.0	0.60	52.20	7,604.6	-1,002.1	391.0	1,075.7	0.01	0.00	
7,888.0	0.60	38.70	7,690.6	-1,001.5	391.6	1,075.3	0.16	0.00	
7,973.0	0.40	13.60	7,775.6	-1,000.8	392.0	1,074.8	0.34	-0.24	
8,058.0	0.50	13.50	7,860.6	-1,000.2	392.1	1,074.3	0.12	0.12	
8,144.0	0.40	17.50	7,946.6	-999.5	392.3	1,073.7	0.12	-0.12	
8,267.0	0.40	358.70	8,069.6	-998.7	392.4	1,073.0	0.11	0.00	Last Cathedral Survey @ 8,267' MD
8,322.0	0.40	358.70	8,124.6	-998.3	392.4	1,072.6	0.00	0.00	Projection to Bit @ 8,322'

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude Longitude
Hein 22-1 PBHL		0.00	0.42	8,117.0	-1,018.5	389.8	1,272,617.86	3,183,559.06	40.079856 -104.844040
- survey misses target center by 20.3ft at 8314.3ft MD (8116.9 TVD, -998.4 N, 392.4 E)									
- Circle (radius 50.0)									

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
8,267.0	8,069.6	-998.7	392.4	Last Cathedral Survey @ 8,267' MD	
8,322.0	8,124.6	-998.3	392.4	Projection to Bit @ 8,322'	

Checked By: _____ Approved By: _____ Date: _____