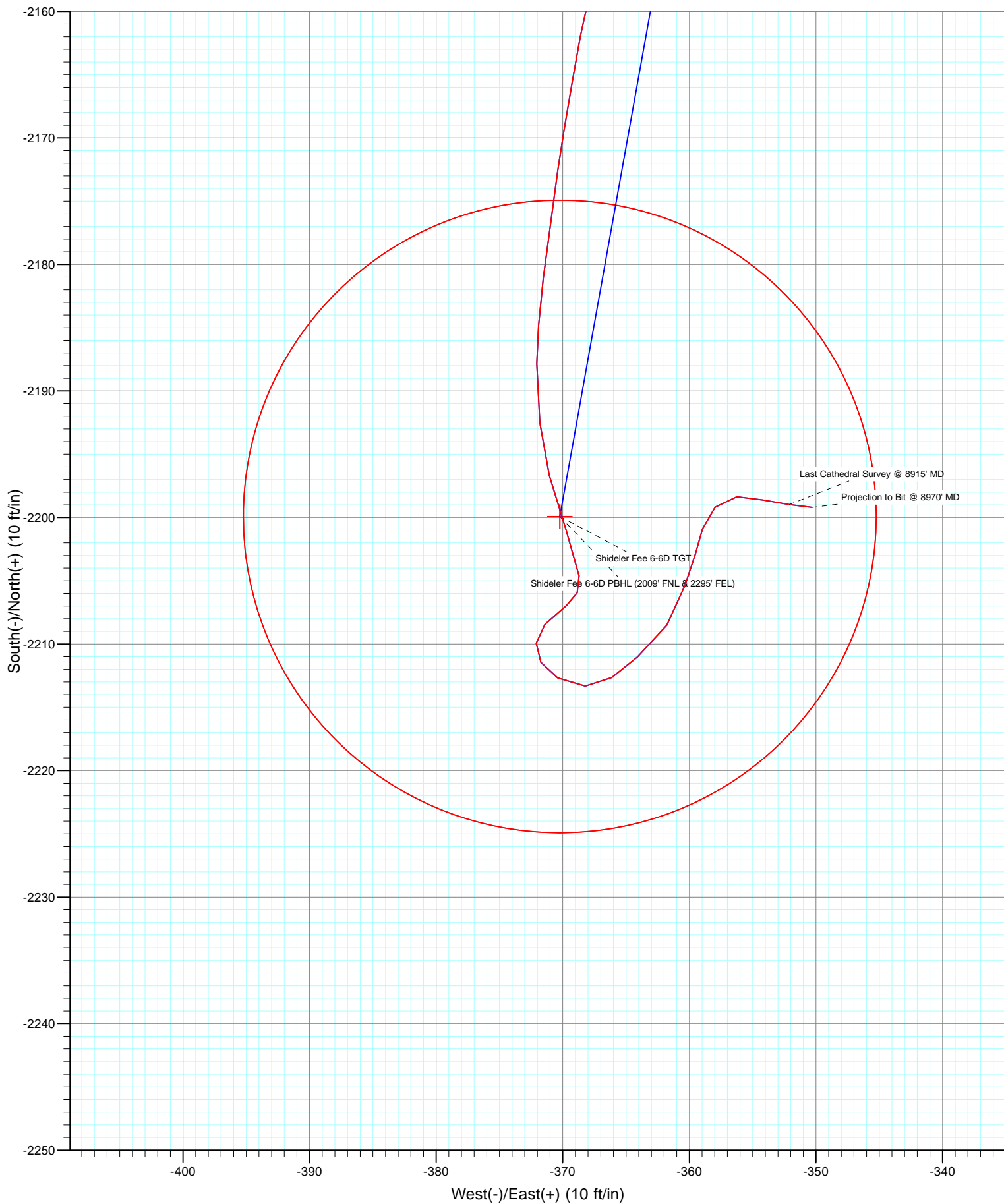




Project: Mamm Creek
Site: O31E Pad
Well: Shideler Fee 6-6D
Wellbore: DD
Design: DD



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Shideler Fee 6-6D
Project:	Mamm Creek	TVD Reference:	KB = 22' @ 7129.0ft
Site:	O31E Pad	MD Reference:	KB = 22' @ 7129.0ft
Well:	Shideler Fee 6-6D	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Project	Mamm Creek		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		O31E Pad			
Site Position:		Northing:	1,577,012.73 ft	Latitude:	39.396873
From:	Lat/Long	Easting:	2,376,675.10 ft	Longitude:	-107.705929
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.39 °

Well	Shideler Fee 6-6D					
Well Position	+N/-S	0.0 ft	Northing:	1,576,805.07 ft	Latitude:	39.396298
	+E/-W	0.0 ft	Easting:	2,376,598.53 ft	Longitude:	-107.706182
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,107.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/21/2012	10.01	65.67	52,071

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	189.55	

Survey Program	Date	12/27/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,970.0	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		
111.0	0.10	316.70	111.0	0.1	-0.1	-0.1	0.09	0.09		
141.0	0.10	104.40	141.0	0.1	-0.1	-0.1	0.64	0.00		
172.0	0.80	147.00	172.0	-0.1	0.1	0.1	2.35	2.26		
203.0	1.50	157.30	203.0	-0.7	0.4	0.6	2.35	2.26		
234.0	2.00	144.20	234.0	-1.5	0.8	1.3	2.06	1.61		
265.0	3.30	159.20	264.9	-2.7	1.5	2.5	4.72	4.19		
295.0	4.30	159.00	294.9	-4.6	2.2	4.2	3.33	3.33		
326.0	5.00	156.90	325.8	-6.9	3.1	6.3	2.32	2.26		
356.0	5.70	157.70	355.6	-9.5	4.2	8.7	2.35	2.33		
387.0	6.30	159.10	386.5	-12.5	5.4	11.5	1.99	1.94		
479.0	8.60	165.10	477.7	-23.9	9.0	22.1	2.64	2.50		
571.0	10.10	174.20	568.5	-38.6	11.5	36.1	2.28	1.63		

Cathedral Energy Services

Survey Report

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Site:	O31E Pad	MD Reference:	KB = 22' @ 7129.0ft
Well:	Shideler Fee 6-6D	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
662.0	12.80	181.50	657.7	-56.6	12.1	53.8	3.36	2.97	
753.0	15.50	187.90	745.9	-78.7	10.2	75.9	3.42	2.97	
844.0	18.40	189.70	832.9	-104.9	6.1	102.5	3.24	3.19	
937.0	20.60	189.50	920.6	-135.5	0.9	133.5	2.37	2.37	
1,029.0	20.40	188.60	1,006.8	-167.3	-4.2	165.7	0.41	-0.22	
1,085.0	20.50	188.20	1,059.2	-186.7	-7.0	185.3	0.31	0.18	
1,242.0	21.60	187.20	1,205.8	-242.6	-14.6	241.6	0.74	0.70	
1,334.0	22.30	188.20	1,291.1	-276.7	-19.2	276.0	0.86	0.76	
1,425.0	22.50	187.70	1,375.2	-311.0	-24.0	310.7	0.30	0.22	
1,517.0	23.90	189.70	1,459.8	-346.8	-29.5	346.9	1.75	1.52	
1,608.0	23.60	189.20	1,543.1	-383.0	-35.5	383.6	0.40	-0.33	
1,700.0	23.70	188.20	1,627.4	-419.5	-41.1	420.5	0.45	0.11	
1,792.0	23.90	188.50	1,711.5	-456.2	-46.5	457.6	0.25	0.22	
1,883.0	23.60	189.30	1,794.8	-492.4	-52.2	494.2	0.48	-0.33	
1,974.0	23.90	188.60	1,878.1	-528.6	-57.9	530.9	0.45	0.33	
2,066.0	23.30	191.80	1,962.4	-564.8	-64.4	567.7	1.54	-0.65	
2,157.0	23.60	190.20	2,045.9	-600.4	-71.3	603.9	0.77	0.33	
2,249.0	23.70	188.10	2,130.2	-636.8	-77.1	640.8	0.92	0.11	
2,340.0	23.20	191.60	2,213.7	-672.5	-83.3	677.0	1.63	-0.55	
2,432.0	23.20	190.90	2,298.2	-708.0	-90.4	713.2	0.30	0.00	
2,524.0	23.20	191.50	2,382.8	-743.6	-97.4	749.4	0.26	0.00	
2,615.0	23.10	191.20	2,466.5	-778.7	-104.5	785.2	0.17	-0.11	
2,707.0	22.80	190.20	2,551.2	-813.9	-111.1	821.1	0.53	-0.33	
2,798.0	22.60	190.80	2,635.1	-848.4	-117.5	856.2	0.34	-0.22	
2,890.0	22.70	189.30	2,720.0	-883.3	-123.7	891.6	0.64	0.11	
2,981.0	21.90	192.90	2,804.2	-917.2	-130.3	926.1	1.74	-0.88	
3,073.0	22.00	191.20	2,889.6	-950.8	-137.5	960.4	0.70	0.11	
3,165.0	22.10	190.90	2,974.8	-984.7	-144.1	995.0	0.16	0.11	
3,256.0	22.30	190.20	3,059.1	-1,018.5	-150.4	1,029.4	0.36	0.22	
3,348.0	21.00	191.50	3,144.6	-1,051.8	-156.8	1,063.3	1.51	-1.41	
3,439.0	20.70	190.50	3,229.6	-1,083.6	-163.0	1,095.7	0.51	-0.33	
3,531.0	20.40	189.20	3,315.8	-1,115.5	-168.5	1,128.0	0.59	-0.33	
3,622.0	21.60	191.20	3,400.7	-1,147.5	-174.3	1,160.6	1.54	1.32	
3,714.0	21.50	190.10	3,486.3	-1,180.8	-180.5	1,194.3	0.45	-0.11	
3,806.0	21.60	187.90	3,571.9	-1,214.1	-185.8	1,228.1	0.89	0.11	
3,897.0	22.60	190.40	3,656.2	-1,247.9	-191.3	1,262.4	1.51	1.10	
3,989.0	22.50	189.60	3,741.2	-1,282.7	-197.4	1,297.6	0.35	-0.11	
4,080.0	23.30	192.70	3,825.0	-1,317.4	-204.3	1,333.0	1.59	0.88	
4,172.0	22.90	191.90	3,909.6	-1,352.6	-212.0	1,369.1	0.55	-0.43	
4,263.0	22.50	191.50	3,993.6	-1,387.0	-219.1	1,404.2	0.47	-0.44	
4,355.0	21.80	190.40	4,078.8	-1,421.1	-225.7	1,438.8	0.88	-0.76	
4,447.0	22.20	192.40	4,164.1	-1,454.9	-232.5	1,473.3	0.92	0.43	
4,538.0	22.20	191.90	4,248.3	-1,488.5	-239.7	1,507.6	0.21	0.00	
4,630.0	22.20	190.50	4,333.5	-1,522.6	-246.5	1,542.4	0.57	0.00	
4,721.0	21.70	191.20	4,417.9	-1,556.0	-252.9	1,576.4	0.62	-0.55	
4,813.0	21.60	188.30	4,503.4	-1,589.4	-258.6	1,610.3	1.17	-0.11	
4,905.0	21.80	190.70	4,588.9	-1,623.0	-264.3	1,644.3	0.99	0.22	
4,996.0	21.20	189.80	4,673.6	-1,655.8	-270.2	1,677.7	0.75	-0.66	
5,088.0	21.40	191.80	4,759.3	-1,688.6	-276.5	1,711.1	0.82	0.22	
5,179.0	22.60	194.00	4,843.7	-1,721.8	-284.1	1,745.1	1.60	1.32	
5,271.0	21.50	193.70	4,928.9	-1,755.4	-292.3	1,779.5	1.20	-1.20	
5,362.0	22.60	194.00	5,013.3	-1,788.5	-300.5	1,813.6	1.22	1.21	
5,454.0	22.30	193.40	5,098.3	-1,822.7	-308.9	1,848.6	0.41	-0.33	

Cathedral Energy Services

Survey Report

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Site:	O31E Pad	MD Reference:	KB = 22' @ 7129.0ft
Well:	Shideler Fee 6-6D	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
5,546.0	21.50	192.60	5,183.7	-1,856.1	-316.6	1,882.9	0.93	-0.87	
5,637.0	20.80	191.40	5,268.5	-1,888.2	-323.4	1,915.7	0.90	-0.77	
5,729.0	20.30	191.10	5,354.7	-1,919.9	-329.7	1,948.0	0.56	-0.54	
5,821.0	19.60	190.50	5,441.2	-1,950.7	-335.6	1,979.4	0.79	-0.76	
5,912.0	17.50	190.10	5,527.4	-1,979.2	-340.8	2,008.3	2.31	-2.31	
6,004.0	15.60	187.60	5,615.6	-2,005.1	-344.8	2,034.5	2.21	-2.07	
6,096.0	13.90	185.20	5,704.6	-2,028.3	-347.5	2,057.9	1.96	-1.85	
6,187.0	12.80	188.90	5,793.1	-2,049.2	-350.0	2,078.9	1.53	-1.21	
6,279.0	12.00	186.90	5,883.0	-2,068.8	-352.7	2,098.6	0.99	-0.87	
6,371.0	11.70	188.10	5,973.0	-2,087.5	-355.2	2,117.5	0.42	-0.33	
6,462.0	10.40	186.50	6,062.3	-2,104.8	-357.4	2,134.9	1.47	-1.43	
6,554.0	9.70	187.10	6,152.9	-2,120.7	-359.3	2,151.0	0.77	-0.76	
6,646.0	9.20	195.80	6,243.7	-2,135.5	-362.3	2,166.0	1.64	-0.54	
6,737.0	8.60	193.50	6,333.6	-2,149.1	-365.9	2,180.0	0.77	-0.66	
6,829.0	7.80	190.40	6,424.6	-2,161.9	-368.6	2,193.1	0.99	-0.87	
6,920.0	5.80	188.50	6,515.0	-2,172.6	-370.4	2,203.9	2.21	-2.20	
7,011.0	5.10	186.70	6,605.6	-2,181.1	-371.5	2,212.5	0.79	-0.77	
7,103.0	3.30	180.60	6,697.3	-2,187.8	-372.1	2,219.2	2.01	-1.96	
7,194.0	2.60	172.60	6,788.2	-2,192.5	-371.8	2,223.8	0.89	-0.77	
7,286.0	2.70	167.20	6,880.1	-2,196.7	-371.1	2,227.8	0.29	0.11	
7,378.0	2.90	158.90	6,972.0	-2,201.0	-369.7	2,231.8	0.49	0.22	
7,469.0	1.90	172.30	7,062.9	-2,204.6	-368.7	2,235.2	1.25	-1.10	
7,561.0	1.80	235.50	7,154.9	-2,206.9	-369.7	2,237.7	2.11	-0.11	
7,652.0	1.10	217.40	7,245.9	-2,208.4	-371.4	2,239.5	0.91	-0.77	
7,744.0	1.00	190.60	7,337.8	-2,209.9	-372.1	2,241.0	0.54	-0.11	
7,836.0	1.10	144.50	7,429.8	-2,211.4	-371.7	2,242.5	0.90	0.11	
7,928.0	1.20	121.90	7,521.8	-2,212.7	-370.4	2,243.5	0.50	0.11	
8,020.0	1.70	96.00	7,613.8	-2,213.3	-368.2	2,243.7	0.88	0.54	
8,111.0	1.40	42.40	7,704.7	-2,212.6	-366.1	2,242.7	1.56	-0.33	
8,202.0	1.90	58.30	7,795.7	-2,211.0	-364.1	2,240.8	0.74	0.55	
8,294.0	2.50	30.60	7,887.6	-2,208.5	-361.8	2,237.9	1.31	0.65	
8,386.0	1.80	16.30	7,979.6	-2,205.4	-360.4	2,234.6	0.95	-0.76	
8,477.0	1.50	20.80	8,070.5	-2,202.9	-359.5	2,232.0	0.36	-0.33	
8,569.0	1.10	8.90	8,162.5	-2,200.9	-359.0	2,230.0	0.52	-0.43	
8,661.0	1.50	45.70	8,254.5	-2,199.2	-358.0	2,228.1	0.98	0.43	
8,752.0	1.10	89.70	8,345.5	-2,198.4	-356.2	2,227.0	1.15	-0.44	
8,844.0	1.50	103.00	8,437.5	-2,198.6	-354.2	2,226.9	0.54	0.43	
8,915.0	1.90	97.10	8,508.4	-2,199.0	-352.1	2,226.9	0.61	0.56	Last Cathedral Survey @ 8915' MD
8,970.0	1.90	97.10	8,563.4	-2,199.2	-350.3	2,226.8	0.00	0.00	Projection to Bit @ 8970' MD

Cathedral Energy Services

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Site:	O31E Pad	MD Reference:	KB = 22' @ 7129.0ft
Well:	Shideler Fee 6-6D	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
Shideler Fee 6-6D TGT	0.00	0.00	6,677.0	-2,199.9	-370.2	1,574,614.78	2,376,174.98	39.390258	-107.707492
- survey misses target center by 13.4ft at 7083.6ft MD (6678.0 TVD, -2186.7 N, -372.0 E)									
- Point									
Shideler Fee 6-6D PBHL	0.00	0.00	8,517.0	-2,199.9	-370.2	1,574,614.78	2,376,174.98	39.390258	-107.707492
- survey misses target center by 20.1ft at 8915.0ft MD (8508.4 TVD, -2199.0 N, -352.1 E)									
- Circle (radius 25.0)									

Survey Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
8,915.0	8,508.4	-2,199.0	-352.1	Last Cathedral Survey @ 8915' MD
8,970.0	8,563.4	-2,199.2	-350.3	Projection to Bit @ 8970' MD

Checked By: _____ Approved By: _____ Date: _____