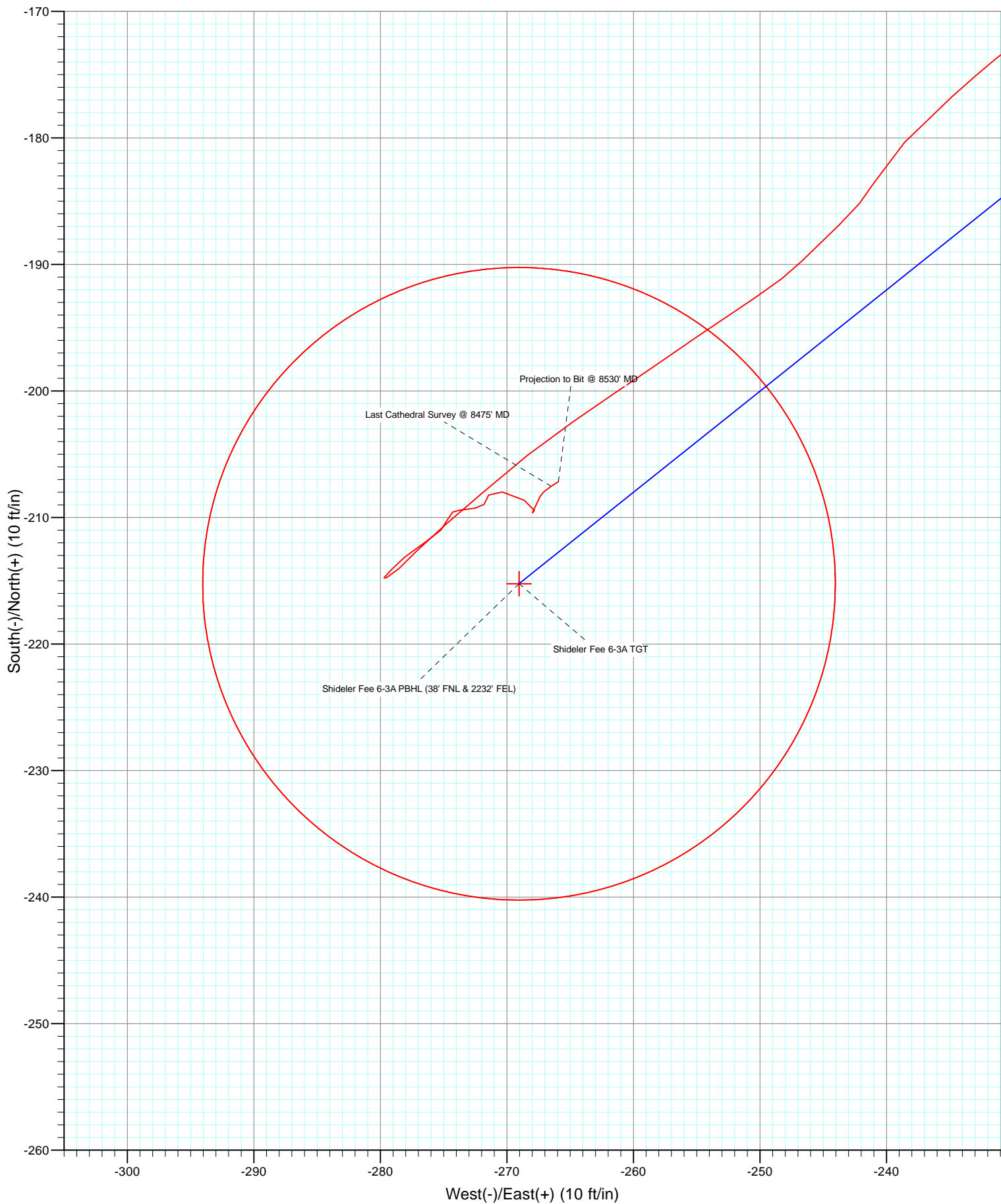




Project: Mamm Creek  
Site: O31E Pad  
Well: Shideler Fee 6-3A  
Wellbore: DD  
Design: FINAL



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-3A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-3A	<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>	Mamm Creek		
<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 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 6-3A					
Well Position	+N/-S	0.0 ft	Northing:	1,576,792.46 ft	Latitude:	39.396261
	+E/-W	0.0 ft	Easting:	2,376,562.89 ft	Longitude:	-107.706307
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,107.0 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 (nT)</b>
	IGRF2010	1/20/2013	10.00	65.67	52,063

<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	231.34	

<b>Survey Program</b>	<b>Date</b>	1/26/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
111.0	8,530.0	Survey #1 (DD)	MWD	Geolink MWD	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Formations / Comments</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
111.0	0.20	223.10	111.0	-0.1	-0.1	0.2	0.18	0.18		
141.0	0.50	238.20	141.0	-0.2	-0.3	0.4	1.04	1.00		
172.0	0.70	245.00	172.0	-0.4	-0.6	0.7	0.68	0.65		
203.0	0.80	236.50	203.0	-0.6	-0.9	1.1	0.48	0.32		
234.0	0.80	244.60	234.0	-0.8	-1.3	1.5	0.36	0.00		
265.0	1.10	236.30	265.0	-1.1	-1.7	2.0	1.06	0.97		
295.0	1.60	232.80	295.0	-1.5	-2.3	2.7	1.69	1.67		
387.0	3.30	225.70	386.9	-4.1	-5.2	6.6	1.87	1.85		
479.0	3.70	224.90	478.7	-8.1	-9.2	12.2	0.44	0.43		
571.0	3.20	228.30	570.6	-11.9	-13.2	17.7	0.59	-0.54		
662.0	3.30	226.50	661.4	-15.4	-17.0	22.9	0.16	0.11		
753.0	3.50	234.80	752.2	-18.8	-21.2	28.3	0.58	0.22		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-3A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-3A	<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
844.0	3.50	233.70	843.1	-22.0	-25.7	33.8	0.07	0.00	
937.0	3.50	231.20	935.9	-25.5	-30.2	39.5	0.16	0.00	
995.0	3.40	237.30	993.8	-27.5	-33.0	43.0	0.66	-0.17	
1,065.0	3.40	238.30	1,063.7	-29.7	-36.5	47.1	0.08	0.00	
1,156.0	3.50	238.10	1,154.5	-32.6	-41.2	52.5	0.11	0.11	
1,248.0	3.00	234.40	1,246.4	-35.5	-45.5	57.7	0.59	-0.54	
1,339.0	2.20	229.00	1,337.3	-38.0	-48.8	61.9	0.92	-0.88	
1,431.0	3.10	251.90	1,429.2	-40.0	-52.5	66.0	1.49	0.98	
1,522.0	2.80	251.00	1,520.1	-41.4	-56.9	70.3	0.33	-0.33	
1,614.0	4.30	243.80	1,611.9	-43.7	-62.2	75.8	1.70	1.63	
1,706.0	4.00	240.10	1,703.6	-46.8	-68.0	82.4	0.44	-0.33	
1,797.0	3.80	240.00	1,794.4	-49.9	-73.4	88.5	0.22	-0.22	
1,888.0	3.50	237.00	1,885.2	-52.9	-78.3	94.2	0.39	-0.33	
1,980.0	3.50	236.70	1,977.1	-56.0	-83.0	99.8	0.02	0.00	
2,070.0	3.30	234.70	2,066.9	-59.0	-87.4	105.1	0.26	-0.22	
2,162.0	3.10	232.30	2,158.8	-62.1	-91.6	110.3	0.26	-0.22	
2,254.0	2.90	230.50	2,250.6	-65.1	-95.3	115.1	0.24	-0.22	
2,345.0	4.00	233.50	2,341.5	-68.4	-99.7	120.6	1.22	1.21	
2,437.0	3.90	231.80	2,433.3	-72.3	-104.7	126.9	0.17	-0.11	
2,528.0	3.70	227.00	2,524.1	-76.2	-109.3	132.9	0.41	-0.22	
2,620.0	3.30	226.00	2,615.9	-80.0	-113.4	138.5	0.44	-0.43	
2,711.0	3.10	222.80	2,706.7	-83.7	-116.9	143.6	0.29	-0.22	
2,803.0	2.90	218.90	2,798.6	-87.3	-120.1	148.3	0.31	-0.22	
2,895.0	3.40	223.00	2,890.5	-91.1	-123.4	153.3	0.60	0.54	
2,986.0	3.10	217.10	2,981.3	-95.0	-126.7	158.3	0.49	-0.33	
3,077.0	3.40	227.60	3,072.2	-98.8	-130.2	163.4	0.73	0.33	
3,169.0	2.90	229.00	3,164.0	-102.2	-134.0	168.4	0.55	-0.54	
3,261.0	3.60	243.60	3,255.9	-105.0	-138.3	173.6	1.17	0.76	
3,352.0	3.50	244.10	3,346.7	-107.5	-143.4	179.1	0.12	-0.11	
3,444.0	2.90	246.30	3,438.6	-109.6	-148.0	184.1	0.67	-0.65	
3,536.0	4.00	245.00	3,530.4	-111.9	-153.1	189.4	1.20	1.20	
3,628.0	4.70	238.60	3,622.1	-115.3	-159.2	196.3	0.92	0.76	
3,719.0	4.40	236.50	3,712.9	-119.1	-165.3	203.5	0.38	-0.33	
3,811.0	4.20	235.80	3,804.6	-123.0	-171.0	210.4	0.22	-0.22	
3,902.0	4.10	236.70	3,895.4	-126.6	-176.5	216.9	0.13	-0.11	
3,994.0	3.70	227.70	3,987.1	-130.4	-181.4	223.2	0.79	-0.43	
4,085.0	3.40	225.20	4,078.0	-134.3	-185.5	228.8	0.37	-0.33	
4,177.0	3.10	223.10	4,169.8	-138.0	-189.2	233.9	0.35	-0.33	
4,268.0	2.70	234.70	4,260.7	-141.1	-192.6	238.5	0.78	-0.44	
4,360.0	2.20	233.00	4,352.6	-143.4	-195.8	242.4	0.55	-0.54	
4,451.0	3.00	228.20	4,443.5	-146.0	-198.9	246.6	0.91	0.88	
4,543.0	2.90	231.00	4,535.4	-149.1	-202.5	251.3	0.19	-0.11	
4,635.0	3.90	230.20	4,627.2	-152.6	-206.7	256.8	1.09	1.09	
4,726.0	3.40	228.40	4,718.1	-156.3	-211.1	262.5	0.56	-0.55	
4,818.0	3.00	225.90	4,809.9	-159.8	-214.9	267.7	0.46	-0.43	
4,910.0	2.20	218.70	4,901.8	-162.9	-217.7	271.8	0.94	-0.87	
5,001.0	3.30	233.50	4,992.7	-165.8	-220.9	276.1	1.43	1.21	
5,093.0	2.50	231.60	5,084.6	-168.6	-224.6	280.8	0.88	-0.87	
5,185.0	2.80	233.90	5,176.5	-171.2	-228.0	285.0	0.35	0.33	
5,277.0	2.30	230.90	5,268.4	-173.7	-231.3	289.1	0.56	-0.54	
5,368.0	3.60	228.30	5,359.3	-176.7	-234.8	293.8	1.44	1.43	
5,460.0	2.90	223.00	5,451.1	-180.4	-238.6	299.0	0.83	-0.76	
5,552.0	2.20	209.40	5,543.0	-183.6	-241.0	302.9	1.00	-0.76	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-3A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-3A	<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
5,644.0	3.10	226.80	5,634.9	-186.8	-243.7	307.0	1.30	0.98	
5,735.0	2.20	224.50	5,725.8	-189.8	-246.7	311.2	1.00	-0.99	
5,827.0	3.60	236.70	5,817.7	-192.6	-250.4	315.8	1.65	1.52	
5,918.0	3.30	235.30	5,908.6	-195.7	-254.9	321.3	0.34	-0.33	
6,010.0	2.60	235.70	6,000.4	-198.4	-258.8	326.0	0.76	-0.76	
6,101.0	1.90	235.80	6,091.4	-200.4	-261.8	329.6	0.77	-0.77	
6,193.0	2.50	235.40	6,183.3	-202.4	-264.7	333.1	0.65	0.65	
6,285.0	3.20	232.10	6,275.2	-205.1	-268.4	337.7	0.78	0.76	
6,377.0	2.60	228.10	6,367.1	-208.1	-271.9	342.3	0.69	-0.65	
6,468.0	2.20	230.90	6,458.0	-210.5	-274.8	346.1	0.46	-0.44	
6,560.0	1.60	222.90	6,549.9	-212.6	-277.1	349.2	0.71	-0.65	
6,651.0	1.00	229.10	6,640.9	-214.0	-278.5	351.2	0.68	-0.66	
6,743.0	0.50	242.50	6,732.9	-214.8	-279.5	352.4	0.57	-0.54	
6,835.0	0.30	42.30	6,824.9	-214.8	-279.7	352.6	0.86	-0.22	
6,926.0	0.80	42.50	6,915.9	-214.1	-279.1	351.7	0.55	0.55	
7,017.0	1.00	49.60	7,006.9	-213.1	-278.1	350.3	0.25	0.22	
7,109.0	1.50	56.80	7,098.9	-212.0	-276.5	348.3	0.57	0.54	
7,200.0	0.50	37.80	7,189.9	-211.0	-275.2	346.7	1.14	-1.10	
7,292.0	0.80	29.20	7,281.8	-210.1	-274.7	345.7	0.34	0.33	
7,384.0	0.10	100.00	7,373.8	-209.6	-274.3	345.1	0.84	-0.76	
7,475.0	0.60	70.50	7,464.8	-209.4	-273.7	344.6	0.57	0.55	
7,567.0	1.00	89.90	7,556.8	-209.3	-272.5	343.5	0.52	0.43	
7,659.0	0.40	339.40	7,648.8	-209.0	-271.8	342.8	1.30	-0.65	
7,750.0	0.80	46.70	7,739.8	-208.2	-271.4	342.0	0.82	0.44	
7,842.0	0.80	108.70	7,831.8	-208.0	-270.4	341.1	0.90	0.00	
7,934.0	1.50	111.30	7,923.8	-208.6	-268.6	340.1	0.76	0.76	
8,026.0	0.60	218.90	8,015.8	-209.4	-267.8	340.0	1.93	-0.98	
8,118.0	0.30	34.30	8,107.8	-209.6	-268.0	340.2	0.98	-0.33	
8,209.0	0.60	22.00	8,198.8	-209.0	-267.7	339.6	0.34	0.33	
8,300.0	0.30	31.50	8,289.8	-208.3	-267.4	338.9	0.34	-0.33	
8,392.0	0.30	44.70	8,381.8	-208.0	-267.1	338.5	0.07	0.00	
8,475.0	0.70	57.10	8,464.8	-207.5	-266.5	337.7	0.50	0.48	Last Cathedral Survey @ 8475' MD Projection to Bit @ 8530' MD
8,530.0	0.70	57.10	8,519.8	-207.2	-265.9	337.1	0.00	0.00	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Shideler Fee 6-3A
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	KB = 22' @ 7129.0ft
<b>Site:</b>	O31E Pad	<b>MD Reference:</b>	KB = 22' @ 7129.0ft
<b>Well:</b>	Shideler Fee 6-3A	<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

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
Shideler Fee 6-3A TGT	0.00	0.00	6,598.0	-215.2	-269.0	1,576,583.82	2,376,288.71	39.395670	-107.707259
- survey misses target center by 9.1ft at 6608.0ft MD (6597.9 TVD, -213.5 N, -277.9 E)									
- Point									
Shideler Fee 6-3A PBHL	0.00	0.00	8,484.0	-215.2	-269.0	1,576,583.82	2,376,288.71	39.395670	-107.707259
- survey misses target center by 20.9ft at 8475.0ft MD (8464.8 TVD, -207.5 N, -266.5 E)									
- Circle (radius 25.0)									

Survey Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	Comment	
8,475.0	8,464.8	-207.5	-266.5	Last Cathedral Survey @ 8475' MD	
8,530.0	8,519.8	-207.2	-265.9	Projection to Bit @ 8530' MD	

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