

#### FORMATION TOP DETAILS

No formation data is available



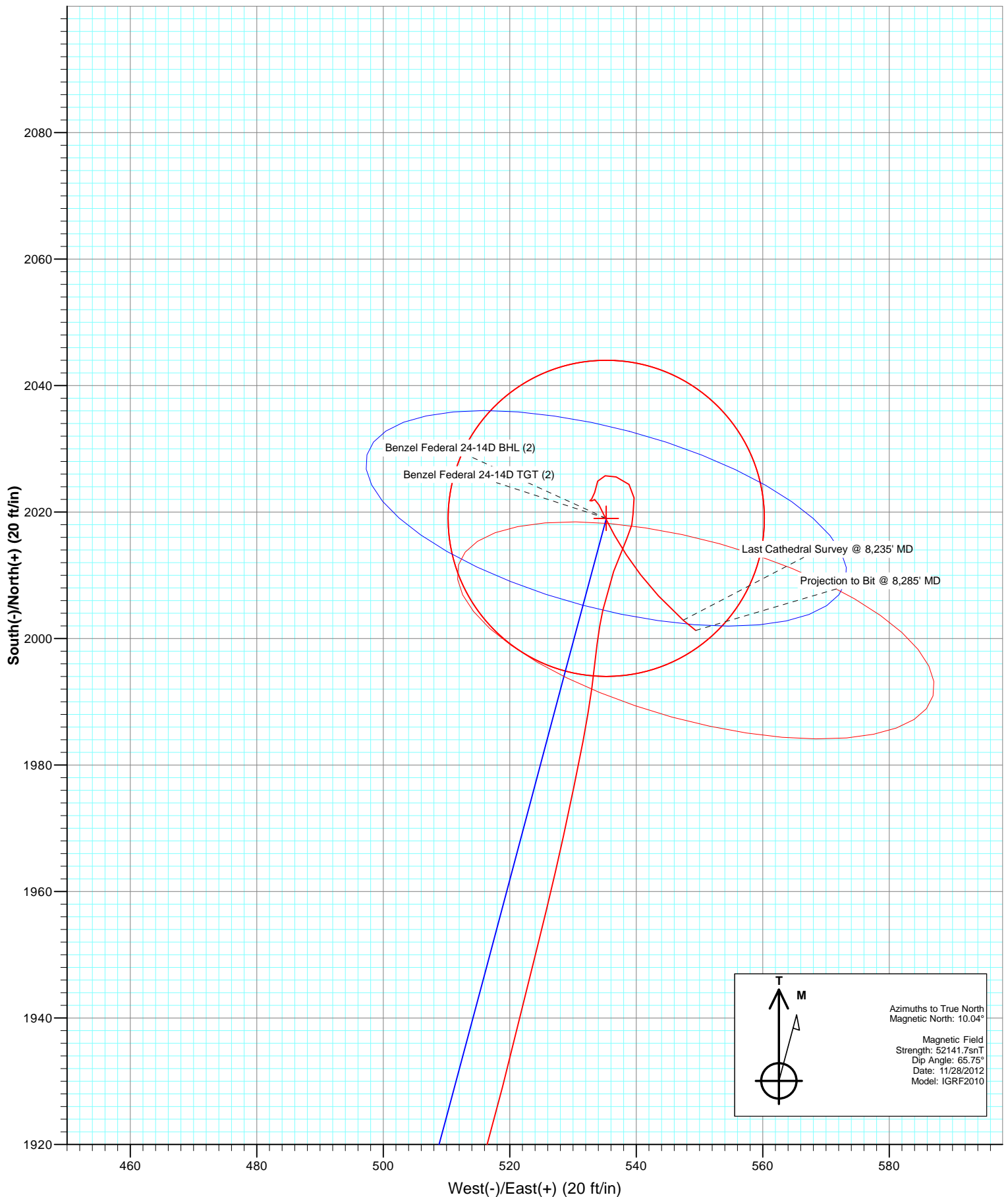
Azimuths to True North  
 Magnetic North: 10.04°

Magnetic Field  
 Strength: 52141.7nT  
 Dip Angle: 65.75°  
 Date: 11/28/2012  
 Model: IGRF2010

FINAL  
 Benzel Federal 24-14D (F25NWB Pad)  
 125600/200955 (SH) 125631/204455 (MH); SC

kbe @ 5851.0ft (Patterson 308)  
 North American Datum 1983  
 Well Benzel Federal 24-14D (F25NWB Pad), True North

Target	Azimuth	Origin Type	N/S		
User	Benzel Federal 24-15F (F25NWB) BHL.32	Slot	0.0		
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
Benzel Federal 24-14D TGT (2)	6121.5	1953.8	650.4	39.506186107.724399	
Benzel Federal 24-14D BHL (2)	7826.0	2019.0	535.3	39.506186107.724399	
		1953.8	650.4		



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Benzel Federal 24-14D (F25NWB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Site:</b>	F25NWB Pad	<b>MD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Well:</b>	Benzel Federal 24-14D (F25NWB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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		

<b>Site</b>	F25NWB Pad			
<b>Site Position:</b>		<b>Northing:</b>	1,614,821.30 ft	<b>Latitude:</b> 39.500328
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,371,946.03 ft	<b>Longitude:</b> -107.725936
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> -1.40 °

<b>Well</b>	Benzel Federal 24-14D (F25NWB Pad)			
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,614,938.48 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	2,371,847.29 ft
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	ft
			<b>Ground Level:</b>	5,829.0 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	11/28/2012	10.04	65.75	52,142

<b>Design</b>	FINAL			
<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	18.32

<b>Survey Program</b>	<b>Date</b>	12/8/2012			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
205.0	1,490.0	Survey #1 (DD)	MWD	Geolink MWD	
1,625.0	8,285.0	Survey #2 (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	
205.0	0.20	74.20	205.0	0.1	0.3	0.2	0.10	0.10	
236.0	0.40	100.10	236.0	0.1	0.5	0.2	0.76	0.65	
266.0	0.50	116.70	266.0	0.0	0.7	0.2	0.54	0.33	
297.0	0.50	105.20	297.0	-0.1	1.0	0.2	0.32	0.00	
328.0	0.80	96.50	328.0	-0.1	1.3	0.3	1.02	0.97	
358.0	1.30	61.60	358.0	0.0	1.8	0.6	2.63	1.67	
389.0	2.80	35.80	389.0	0.8	2.6	1.6	5.56	4.84	
419.0	3.60	31.30	418.9	2.2	3.5	3.2	2.79	2.67	
450.0	5.30	23.80	449.8	4.3	4.6	5.5	5.78	5.48	
481.0	6.60	19.80	480.7	7.3	5.8	8.7	4.40	4.19	
511.0	8.00	17.80	510.4	10.9	7.0	12.6	4.74	4.67	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Benzel Federal 24-14D (F25NWB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Site:</b>	F25NWB Pad	<b>MD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Well:</b>	Benzel Federal 24-14D (F25NWB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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
541.0	9.40	16.70	540.1	15.3	8.3	17.1	4.70	4.67	
572.0	10.90	15.70	570.6	20.5	9.8	22.6	4.87	4.84	
602.0	11.80	15.50	600.0	26.2	11.4	28.5	3.00	3.00	
633.0	12.60	14.70	630.3	32.5	13.1	35.0	2.64	2.58	
664.0	13.40	15.30	660.5	39.2	14.9	42.0	2.62	2.58	
695.0	14.00	13.70	690.6	46.4	16.8	49.3	2.29	1.94	
726.0	14.50	13.20	720.7	53.8	18.6	56.9	1.66	1.61	
757.0	15.10	13.00	750.6	61.5	20.4	64.8	1.94	1.94	
787.0	15.50	12.80	779.6	69.2	22.1	72.6	1.34	1.33	
818.0	15.50	11.90	809.4	77.3	23.9	80.9	0.78	0.00	
849.0	14.50	11.70	839.4	85.1	25.5	88.9	3.23	-3.23	
879.0	13.10	13.20	868.5	92.1	27.1	96.0	4.82	-4.67	
910.0	12.50	16.10	898.8	98.8	28.8	102.8	2.84	-1.94	
941.0	13.20	17.40	929.0	105.4	30.8	109.7	2.44	2.26	
972.0	14.70	18.80	959.1	112.5	33.1	117.2	4.96	4.84	
1,002.0	16.90	17.90	987.9	120.2	35.7	125.4	7.38	7.33	
1,033.0	18.50	16.70	1,017.5	129.2	38.5	134.8	5.29	5.16	
1,064.0	20.70	15.10	1,046.7	139.2	41.3	145.2	7.30	7.10	
1,093.0	22.70	13.40	1,073.6	149.6	44.0	155.9	7.23	6.90	
1,124.0	23.80	13.00	1,102.1	161.5	46.7	168.1	3.58	3.55	
1,215.0	24.70	13.10	1,185.1	198.0	55.2	205.3	0.99	0.99	
1,306.0	25.60	12.80	1,267.4	235.6	63.9	243.8	1.00	0.99	
1,398.0	24.50	13.20	1,350.8	273.6	72.6	282.6	1.21	-1.20	
1,490.0	24.10	13.50	1,434.6	310.4	81.4	320.3	0.46	-0.43	Last Cathedral Survey @ 1,490' MD
1,625.0	24.70	13.80	1,557.6	364.6	94.5	375.9	0.45	0.44	
1,716.0	25.20	13.10	1,640.1	402.0	103.4	414.1	0.64	0.55	
1,808.0	24.00	11.90	1,723.7	439.3	111.7	452.2	1.41	-1.30	
1,899.0	22.70	12.70	1,807.3	474.6	119.4	488.1	1.47	-1.43	
1,991.0	21.80	16.70	1,892.4	508.3	128.2	522.8	1.91	-0.98	
2,083.0	21.80	15.90	1,977.8	541.1	137.8	557.0	0.32	0.00	
2,174.0	21.40	16.60	2,062.5	573.2	147.2	590.4	0.52	-0.44	
2,266.0	20.80	16.10	2,148.3	605.0	156.5	623.5	0.68	-0.65	
2,357.0	22.30	17.30	2,232.9	637.0	166.1	656.9	1.72	1.65	
2,449.0	23.80	15.50	2,317.6	671.6	176.3	692.9	1.80	1.63	
2,541.0	23.40	14.90	2,401.9	707.1	185.9	729.7	0.51	-0.43	
2,632.0	23.10	15.20	2,485.5	741.8	195.3	765.6	0.35	-0.33	
2,724.0	22.80	15.20	2,570.2	776.4	204.7	801.4	0.33	-0.33	
2,816.0	21.80	15.40	2,655.3	810.1	213.9	836.3	1.09	-1.09	
2,907.0	23.40	15.50	2,739.3	843.8	223.2	871.2	1.76	1.76	
2,999.0	23.30	16.00	2,823.8	878.9	233.1	907.6	0.24	-0.11	
3,091.0	23.10	15.20	2,908.4	913.8	242.8	943.8	0.41	-0.22	
3,183.0	22.70	15.20	2,993.1	948.3	252.2	979.6	0.43	-0.43	
3,274.0	22.10	15.30	3,077.2	981.8	261.4	1,014.2	0.66	-0.66	
3,366.0	21.40	15.80	3,162.7	1,014.6	270.5	1,048.2	0.79	-0.76	
3,457.0	22.50	13.80	3,247.1	1,047.5	279.2	1,082.2	1.46	1.21	
3,548.0	21.60	13.40	3,331.4	1,080.7	287.2	1,116.2	1.00	-0.99	
3,641.0	22.40	18.10	3,417.7	1,114.2	296.7	1,151.0	2.08	0.86	
3,732.0	23.10	13.20	3,501.6	1,148.1	306.1	1,186.1	2.22	0.77	
3,824.0	22.20	14.20	3,586.5	1,182.5	314.5	1,221.4	1.06	-0.98	
3,915.0	23.10	13.80	3,670.5	1,216.5	323.0	1,256.4	1.00	0.99	
4,007.0	21.80	15.30	3,755.5	1,250.5	331.8	1,291.4	1.54	-1.41	
4,098.0	22.80	17.40	3,839.7	1,283.7	341.5	1,325.9	1.40	1.10	
4,190.0	23.10	18.30	3,924.4	1,317.8	352.5	1,361.8	0.50	0.33	

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Benzel Federal 24-14D (F25NWB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Site:</b>	F25NWB Pad	<b>MD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Well:</b>	Benzel Federal 24-14D (F25NWB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<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
4,281.0	23.50	16.40	4,008.0	1,352.1	363.3	1,397.8	0.94	0.44	
4,373.0	22.90	16.20	4,092.6	1,386.9	373.4	1,434.0	0.66	-0.65	
4,464.0	22.10	16.50	4,176.6	1,420.4	383.2	1,468.8	0.89	-0.88	
4,556.0	22.10	14.20	4,261.9	1,453.7	392.4	1,503.4	0.94	0.00	
4,647.0	20.90	14.50	4,346.5	1,486.0	400.7	1,536.7	1.32	-1.32	
4,739.0	21.10	14.70	4,432.4	1,517.9	409.0	1,569.6	0.23	0.22	
4,830.0	23.20	12.90	4,516.7	1,551.3	417.1	1,603.8	2.42	2.31	
4,921.0	21.10	13.90	4,601.0	1,584.6	425.1	1,637.9	2.34	-2.31	
5,013.0	23.20	14.30	4,686.2	1,618.3	433.5	1,672.5	2.29	2.28	
5,104.0	22.90	14.30	4,769.9	1,652.8	442.3	1,708.1	0.33	-0.33	
5,195.0	21.80	15.80	4,854.1	1,686.2	451.3	1,742.6	1.36	-1.21	
5,287.0	23.00	13.50	4,939.2	1,720.1	460.2	1,777.6	1.61	1.30	
5,379.0	22.00	14.50	5,024.2	1,754.3	468.7	1,812.7	1.16	-1.09	
5,470.0	22.20	14.30	5,108.5	1,787.5	477.2	1,846.8	0.23	0.22	
5,562.0	20.80	15.30	5,194.1	1,820.1	485.8	1,880.5	1.57	-1.52	
5,654.0	19.30	17.30	5,280.5	1,850.3	494.6	1,912.0	1.79	-1.63	
5,745.0	18.40	18.50	5,366.6	1,878.3	503.6	1,941.4	1.08	-0.99	
5,837.0	16.90	16.90	5,454.3	1,904.9	512.1	1,969.3	1.71	-1.63	
5,928.0	15.20	13.90	5,541.7	1,929.1	518.8	1,994.4	2.08	-1.87	
6,019.0	12.90	14.10	5,630.0	1,950.5	524.2	2,016.5	2.53	-2.53	
6,111.0	10.60	12.30	5,720.1	1,968.8	528.5	2,035.1	2.53	-2.50	
6,202.0	8.80	10.80	5,809.8	1,983.8	531.6	2,050.3	2.00	-1.98	
6,294.0	6.50	5.80	5,900.9	1,995.9	533.4	2,062.4	2.60	-2.50	
6,385.0	4.40	12.70	5,991.5	2,004.4	534.7	2,070.9	2.41	-2.31	
6,476.0	3.70	18.90	6,082.3	2,010.6	536.4	2,077.3	0.91	-0.77	
6,515.6	3.52	21.23	6,121.8	2,012.9	537.3	2,079.8	0.58	-0.45	Benzel Federal 24-14D TGT (2)
6,568.0	3.30	24.70	6,174.1	2,015.8	538.5	2,082.9	0.58	-0.43	
6,659.0	1.80	355.90	6,265.0	2,019.6	539.5	2,086.8	2.12	-1.65	
6,751.0	1.50	12.90	6,357.0	2,022.2	539.7	2,089.4	0.62	-0.33	
6,843.0	1.80	311.60	6,449.0	2,024.4	538.8	2,091.1	1.85	0.33	
6,935.0	1.20	283.60	6,540.9	2,025.6	536.8	2,091.6	1.01	-0.65	
7,027.0	1.00	265.90	6,632.9	2,025.7	535.1	2,091.2	0.43	-0.22	
7,118.0	1.10	206.90	6,723.9	2,024.9	533.9	2,090.1	1.14	0.11	
7,209.0	1.30	184.40	6,814.9	2,023.1	533.4	2,088.2	0.56	0.22	
7,301.0	0.50	274.90	6,906.9	2,022.1	533.0	2,087.1	1.52	-0.87	
7,392.0	0.40	157.30	6,997.9	2,021.8	532.7	2,086.8	0.85	-0.11	
7,484.0	0.40	36.90	7,089.9	2,021.8	533.0	2,086.8	0.75	0.00	
7,575.0	0.30	100.00	7,180.9	2,022.0	533.4	2,087.2	0.41	-0.11	
7,667.0	1.20	150.20	7,272.9	2,021.1	534.1	2,086.6	1.12	0.98	
7,758.0	1.60	157.00	7,363.8	2,019.1	535.1	2,085.0	0.48	0.44	
7,850.0	2.30	149.70	7,455.8	2,016.3	536.5	2,082.8	0.81	0.76	
7,941.0	2.20	147.50	7,546.7	2,013.3	538.4	2,080.5	0.15	-0.11	
8,033.0	2.70	141.90	7,638.6	2,010.1	540.7	2,078.2	0.60	0.54	
8,125.0	2.80	137.80	7,730.5	2,006.7	543.5	2,075.9	0.24	0.11	
8,199.7	2.86	133.13	7,805.1	2,004.1	546.1	2,074.2	0.32	0.09	Benzel Federal 24-14D BHL (2)
8,235.0	2.90	131.00	7,840.4	2,002.9	547.4	2,073.5	0.32	0.10	Last Cathedral Survey @ 8,235' MD
8,285.0	2.95	127.90	7,890.3	2,001.3	549.4	2,072.5	0.33	0.10	Projection to Bit @ 8,285' MD

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well Benzel Federal 24-14D (F25NWB Pad)
<b>Project:</b>	Mamm Creek	<b>TVD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Site:</b>	F25NWB Pad	<b>MD Reference:</b>	kbe @ 5851.0ft (Patterson 308)
<b>Well:</b>	Benzel Federal 24-14D (F25NWB Pad)	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	FINAL	<b>Database:</b>	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									
Interp @ 1180.7 (Benzel - actual wellpath misses target center by 230.1ft at 1112.7ft MD (1091.8 TVD, 157.2 N, 45.7 E) - Point	0.00	0.00	1,181.8	-53.9	28.2	1,614,883.94	2,371,874.13	39.500495	-107.726196
Benzel Federal 24-15F ( - actual wellpath misses target center by 122.7ft at 6117.5ft MD (5726.5 TVD, 1969.9 N, 528.7 E) - Circle (radius 25.0)	0.00	0.00	5,725.0	1,953.8	650.4	1,616,875.77	2,372,545.35	39.506007	-107.723991
Benzel Federal 24-14D <sup>+</sup> - actual wellpath misses target center by 6.4ft at 6515.6ft MD (6121.8 TVD, 2012.9 N, 537.3 E) - Point	0.00	0.00	6,121.5	2,019.0	535.3	1,616,943.77	2,372,431.86	39.506186	-107.724399
Benzel Federal 24-14D I - actual wellpath misses target center by 18.5ft at 8199.7ft MD (7805.1 TVD, 2004.1 N, 546.1 E) - Circle (radius 25.0)	0.00	0.00	7,806.0	2,019.0	535.3	1,616,943.77	2,372,431.86	39.506186	-107.724399
Benzel Federal 24-15F ( - actual wellpath misses target center by 114.6ft at 8226.1ft MD (7831.5 TVD, 2003.2 N, 547.1 E) - Circle (radius 40.0)	0.00	0.00	7,826.0	1,953.8	650.4	1,616,875.77	2,372,545.35	39.506007	-107.723991

Design Annotations					
Measured Depth	Vertical	Local Coordinates			
Depth	Depth	+N/-S	+E/-W		
(ft)	(ft)	(ft)	(ft)	Comment	
1,490.0	1,434.6	310.4	81.4	Last Cathedral Survey @ 1,490' MD	
8,235.0	7,840.4	2,002.9	547.4	Last Cathedral Survey @ 8,235' MD	
8,285.0	7,890.3	2,001.3	549.4	Projection to Bit @ 8,285' MD	

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