







# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well 8814E-18 C19
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Project:</b>	Eureka Unit	<b>MD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Site:</b>	C19 Pad (S19-T3S-R97W)	<b>North Reference:</b>	True
<b>Well:</b>	8814E-18 C19	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

<b>Project</b>	Eureka Unit		
<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		C19 Pad (S19-T3S-R97W)			
Site Position:		Northing:	1,721,669.90 ft	Latitude:	39.780853
From:	Lat/Long	Easting:	2,205,630.31 ft	Longitude:	-108.326824
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.78 °

Well	8814E-18 C19					
Well Position	+N/-S	0.0 ft	Northing:	1,721,710.60 ft	Latitude:	39.780971
	+E/-W	0.0 ft	Easting:	2,205,699.90 ft	Longitude:	-108.326581
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	7,133.0 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>
	IGRF200510	7/12/2013	10.24	65.87	52,185

<b>Design</b>	Plan #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	322.47

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
375.0	0.00	0.00	375.0	0.0	0.0	0.00	0.00	0.00	0.00	
556.1	5.43	324.78	555.8	7.0	-4.9	3.00	3.00	0.00	324.78	
6,302.3	5.43	324.78	6,276.2	451.4	-318.7	0.00	0.00	0.00	0.00	
6,483.3	0.00	0.00	6,457.0	458.4	-323.6	3.00	-3.00	0.00	180.00	8814E-18 C19 VP
6,586.5	0.26	236.20	6,560.2	458.3	-323.8	0.25	0.25	-119.97	236.20	
10,532.4	0.26	236.20	10,506.0	448.4	-338.6	0.00	0.00	0.00	0.00	8814E-18 C19 PBHL
11,577.4	0.26	236.20	11,551.0	445.8	-342.5	0.00	0.00	0.00	0.00	

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<b>Project:</b>	Eureka Unit	<b>MD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Site:</b>	C19 Pad (S19-T3S-R97W)	<b>North Reference:</b>	True
<b>Well:</b>	8814E-18 C19	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
375.0	0.00	0.00	375.0	0.0	0.0	0.0	0.00	0.00	KOP @ 375'
400.0	0.75	324.78	400.0	0.1	-0.1	0.2	3.00	3.00	
500.0	3.75	324.78	499.9	3.3	-2.4	4.1	3.00	3.00	
556.1	5.43	324.78	555.8	7.0	-4.9	8.6	3.00	3.00	EOB @ Inc. = 5.43°
600.0	5.43	324.78	599.5	10.4	-7.3	12.7	0.00	0.00	
700.0	5.43	324.78	699.1	18.1	-12.8	22.2	0.00	0.00	
800.0	5.43	324.78	798.6	25.9	-18.3	31.6	0.00	0.00	
900.0	5.43	324.78	898.2	33.6	-23.7	41.1	0.00	0.00	
1,000.0	5.43	324.78	997.7	41.3	-29.2	50.6	0.00	0.00	
1,100.0	5.43	324.78	1,097.3	49.1	-34.6	60.0	0.00	0.00	
1,200.0	5.43	324.78	1,196.8	56.8	-40.1	69.5	0.00	0.00	
1,300.0	5.43	324.78	1,296.4	64.5	-45.6	78.9	0.00	0.00	
1,306.6	5.43	324.78	1,303.0	65.1	-45.9	79.6	0.00	0.00	A-Groove (TVD)
1,400.0	5.43	324.78	1,395.9	72.3	-51.0	88.4	0.00	0.00	
1,445.3	5.43	324.78	1,441.0	75.8	-53.5	92.7	0.00	0.00	B-Groove (TVD)
1,500.0	5.43	324.78	1,495.5	80.0	-56.5	97.9	0.00	0.00	
1,600.0	5.43	324.78	1,595.0	87.7	-61.9	107.3	0.00	0.00	
1,700.0	5.43	324.78	1,694.6	95.5	-67.4	116.8	0.00	0.00	
1,800.0	5.43	324.78	1,794.1	103.2	-72.9	126.2	0.00	0.00	
1,900.0	5.43	324.78	1,893.7	110.9	-78.3	135.7	0.00	0.00	
2,000.0	5.43	324.78	1,993.2	118.7	-83.8	145.1	0.00	0.00	
2,100.0	5.43	324.78	2,092.8	126.4	-89.2	154.6	0.00	0.00	
2,200.0	5.43	324.78	2,192.3	134.1	-94.7	164.1	0.00	0.00	
2,300.0	5.43	324.78	2,291.9	141.9	-100.2	173.5	0.00	0.00	
2,400.0	5.43	324.78	2,391.4	149.6	-105.6	183.0	0.00	0.00	
2,500.0	5.43	324.78	2,491.0	157.3	-111.1	192.4	0.00	0.00	
2,600.0	5.43	324.78	2,590.6	165.1	-116.5	201.9	0.00	0.00	
2,700.0	5.43	324.78	2,690.1	172.8	-122.0	211.4	0.00	0.00	
2,800.0	5.43	324.78	2,789.7	180.5	-127.5	220.8	0.00	0.00	
2,818.4	5.43	324.78	2,808.0	182.0	-128.5	222.6	0.00	0.00	Wasatch (TVD)
2,900.0	5.43	324.78	2,889.2	188.3	-132.9	230.3	0.00	0.00	
3,000.0	5.43	324.78	2,988.8	196.0	-138.4	239.7	0.00	0.00	
3,100.0	5.43	324.78	3,088.3	203.7	-143.8	249.2	0.00	0.00	
3,200.0	5.43	324.78	3,187.9	211.5	-149.3	258.7	0.00	0.00	
3,300.0	5.43	324.78	3,287.4	219.2	-154.7	268.1	0.00	0.00	
3,400.0	5.43	324.78	3,387.0	226.9	-160.2	277.6	0.00	0.00	
3,500.0	5.43	324.78	3,486.5	234.7	-165.7	287.0	0.00	0.00	
3,600.0	5.43	324.78	3,586.1	242.4	-171.1	296.5	0.00	0.00	
3,700.0	5.43	324.78	3,685.6	250.1	-176.6	305.9	0.00	0.00	
3,800.0	5.43	324.78	3,785.2	257.9	-182.0	315.4	0.00	0.00	
3,900.0	5.43	324.78	3,884.7	265.6	-187.5	324.9	0.00	0.00	
4,000.0	5.43	324.78	3,984.3	273.3	-193.0	334.3	0.00	0.00	
4,100.0	5.43	324.78	4,083.8	281.1	-198.4	343.8	0.00	0.00	
4,200.0	5.43	324.78	4,183.4	288.8	-203.9	353.2	0.00	0.00	
4,300.0	5.43	324.78	4,282.9	296.5	-209.3	362.7	0.00	0.00	
4,400.0	5.43	324.78	4,382.5	304.3	-214.8	372.2	0.00	0.00	
4,500.0	5.43	324.78	4,482.0	312.0	-220.3	381.6	0.00	0.00	
4,600.0	5.43	324.78	4,581.6	319.7	-225.7	391.1	0.00	0.00	

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<b>Project:</b>	Eureka Unit	<b>MD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Site:</b>	C19 Pad (S19-T3S-R97W)	<b>North Reference:</b>	True
<b>Well:</b>	8814E-18 C19	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,700.0	5.43	324.78	4,681.1	327.5	-231.2	400.5	0.00	0.00	
4,800.0	5.43	324.78	4,780.7	335.2	-236.6	410.0	0.00	0.00	
4,900.0	5.43	324.78	4,880.2	342.9	-242.1	419.4	0.00	0.00	
4,906.8	5.43	324.78	4,887.0	343.5	-242.5	420.1	0.00	0.00	Wasatch G (TVD)
5,000.0	5.43	324.78	4,979.8	350.7	-247.6	428.9	0.00	0.00	
5,100.0	5.43	324.78	5,079.3	358.4	-253.0	438.4	0.00	0.00	
5,200.0	5.43	324.78	5,178.9	366.1	-258.5	447.8	0.00	0.00	
5,300.0	5.43	324.78	5,278.4	373.9	-263.9	457.3	0.00	0.00	
5,400.0	5.43	324.78	5,378.0	381.6	-269.4	466.7	0.00	0.00	
5,500.0	5.43	324.78	5,477.5	389.3	-274.9	476.2	0.00	0.00	
5,600.0	5.43	324.78	5,577.1	397.1	-280.3	485.7	0.00	0.00	
5,660.2	5.43	324.78	5,637.0	401.7	-283.6	491.4	0.00	0.00	Molina Base (TVD)
5,700.0	5.43	324.78	5,676.6	404.8	-285.8	495.1	0.00	0.00	
5,800.0	5.43	324.78	5,776.2	412.5	-291.2	504.6	0.00	0.00	
5,900.0	5.43	324.78	5,875.7	420.3	-296.7	514.0	0.00	0.00	
6,000.0	5.43	324.78	5,975.3	428.0	-302.2	523.5	0.00	0.00	
6,100.0	5.43	324.78	6,074.8	435.7	-307.6	533.0	0.00	0.00	
6,200.0	5.43	324.78	6,174.4	443.5	-313.1	542.4	0.00	0.00	
6,302.3	5.43	324.78	6,276.2	451.4	-318.7	552.1	0.00	0.00	Start 3° Drop
6,400.0	2.50	324.78	6,373.7	456.9	-322.6	558.8	3.00	-3.00	
6,483.3	0.00	0.00	6,457.0	458.4	-323.6	560.7	3.00	-3.00	EOD @ Inc. = 0° - Williams Fork (TVD)
6,500.0	0.04	236.20	6,473.7	458.4	-323.6	560.7	0.25	0.25	
6,586.5	0.26	236.20	6,560.2	458.3	-323.8	560.7	0.25	0.25	
6,600.0	0.26	236.20	6,573.7	458.2	-323.8	560.7	0.00	0.00	
6,700.0	0.26	236.20	6,673.7	458.0	-324.2	560.7	0.00	0.00	
6,800.0	0.26	236.20	6,773.7	457.7	-324.6	560.7	0.00	0.00	
6,900.0	0.26	236.20	6,873.6	457.5	-325.0	560.8	0.00	0.00	
7,000.0	0.26	236.20	6,973.6	457.2	-325.3	560.8	0.00	0.00	
7,100.0	0.26	236.20	7,073.6	457.0	-325.7	560.8	0.00	0.00	
7,200.0	0.26	236.20	7,173.6	456.7	-326.1	560.9	0.00	0.00	
7,300.0	0.26	236.20	7,273.6	456.5	-326.5	560.9	0.00	0.00	
7,400.0	0.26	236.20	7,373.6	456.2	-326.8	560.9	0.00	0.00	
7,500.0	0.26	236.20	7,473.6	456.0	-327.2	560.9	0.00	0.00	
7,600.0	0.26	236.20	7,573.6	455.7	-327.6	561.0	0.00	0.00	
7,700.0	0.26	236.20	7,673.6	455.5	-328.0	561.0	0.00	0.00	
7,800.0	0.26	236.20	7,773.6	455.2	-328.3	561.0	0.00	0.00	
7,900.0	0.26	236.20	7,873.6	455.0	-328.7	561.1	0.00	0.00	
8,000.0	0.26	236.20	7,973.6	454.7	-329.1	561.1	0.00	0.00	
8,100.0	0.26	236.20	8,073.6	454.5	-329.5	561.1	0.00	0.00	
8,200.0	0.26	236.20	8,173.6	454.2	-329.8	561.1	0.00	0.00	
8,300.0	0.26	236.20	8,273.6	454.0	-330.2	561.2	0.00	0.00	
8,400.0	0.26	236.20	8,373.6	453.7	-330.6	561.2	0.00	0.00	
8,500.0	0.26	236.20	8,473.6	453.5	-331.0	561.2	0.00	0.00	
8,600.0	0.26	236.20	8,573.6	453.2	-331.3	561.3	0.00	0.00	
8,700.0	0.26	236.20	8,673.6	453.0	-331.7	561.3	0.00	0.00	
8,800.0	0.26	236.20	8,773.6	452.7	-332.1	561.3	0.00	0.00	
8,900.0	0.26	236.20	8,873.6	452.5	-332.4	561.3	0.00	0.00	
9,000.0	0.26	236.20	8,973.6	452.2	-332.8	561.4	0.00	0.00	
9,100.0	0.26	236.20	9,073.6	452.0	-333.2	561.4	0.00	0.00	
9,200.0	0.26	236.20	9,173.6	451.7	-333.6	561.4	0.00	0.00	
9,300.0	0.26	236.20	9,273.6	451.5	-333.9	561.5	0.00	0.00	
9,400.0	0.26	236.20	9,373.6	451.2	-334.3	561.5	0.00	0.00	



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<b>Project:</b>	Eureka Unit	<b>MD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Site:</b>	C19 Pad (S19-T3S-R97W)	<b>North Reference:</b>	True
<b>Well:</b>	8814E-18 C19	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
9,500.0	0.26	236.20	9,473.6	451.0	-334.7	561.5	0.00	0.00	
9,600.0	0.26	236.20	9,573.6	450.7	-335.1	561.6	0.00	0.00	
9,700.0	0.26	236.20	9,673.6	450.5	-335.4	561.6	0.00	0.00	
9,732.4	0.26	236.20	9,706.0	450.4	-335.6	561.6	0.00	0.00	Cameo Coals (TVD)
9,800.0	0.26	236.20	9,773.6	450.2	-335.8	561.6	0.00	0.00	
9,900.0	0.26	236.20	9,873.6	450.0	-336.2	561.6	0.00	0.00	
10,000.0	0.26	236.20	9,973.6	449.7	-336.6	561.7	0.00	0.00	
10,100.0	0.26	236.20	10,073.6	449.5	-336.9	561.7	0.00	0.00	
10,200.0	0.26	236.20	10,173.6	449.2	-337.3	561.7	0.00	0.00	
10,300.0	0.26	236.20	10,273.6	449.0	-337.7	561.8	0.00	0.00	
10,400.0	0.26	236.20	10,373.6	448.7	-338.1	561.8	0.00	0.00	
10,432.4	0.26	236.20	10,406.0	448.6	-338.2	561.8	0.00	0.00	Rollins (TVD)
10,500.0	0.26	236.20	10,473.6	448.5	-338.4	561.8	0.00	0.00	
10,532.4	0.26	236.20	10,506.0	448.4	-338.6	561.8	0.00	0.00	TD @ 10,532.4' MD
10,592.4	0.26	236.20	10,566.0	448.2	-338.8	561.8	0.00	0.00	Cozzette (SSTVD)
10,600.0	0.26	236.20	10,573.6	448.2	-338.8	561.8	0.00	0.00	
10,700.0	0.26	236.20	10,673.6	448.0	-339.2	561.9	0.00	0.00	
10,792.4	0.26	236.20	10,766.0	447.7	-339.5	561.9	0.00	0.00	Corcoran (TVD)
10,800.0	0.26	236.20	10,773.6	447.7	-339.6	561.9	0.00	0.00	
10,900.0	0.26	236.20	10,873.6	447.5	-339.9	561.9	0.00	0.00	
11,000.0	0.26	236.20	10,973.6	447.2	-340.3	562.0	0.00	0.00	
11,077.4	0.26	236.20	11,051.0	447.0	-340.6	562.0	0.00	0.00	Sego (TVD)
11,100.0	0.26	236.20	11,073.6	447.0	-340.7	562.0	0.00	0.00	
11,200.0	0.26	236.20	11,173.6	446.7	-341.1	562.0	0.00	0.00	
11,300.0	0.26	236.20	11,273.6	446.5	-341.4	562.1	0.00	0.00	
11,400.0	0.26	236.20	11,373.6	446.2	-341.8	562.1	0.00	0.00	
11,500.0	0.26	236.20	11,473.6	446.0	-342.2	562.1	0.00	0.00	
11,577.4	0.26	236.20	11,551.0	445.8	-342.5	562.1	0.00	0.00	Permit TD @ 11,577.4' MD

### Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
8814E-18 C19 VP - plan hits target center - Point	0.00	0.00	6,457.0	458.4	-323.6	1,722,178.85	2,205,390.72	39.782229	-108.327732
8814E-18 C19 PBHL - plan hits target center - Rectangle (sides W30.0 H50.0 D0.0)	0.00	0.00	10,506.0	448.4	-338.6	1,722,169.31	2,205,375.46	39.782202	-108.327785

# Cathedral Energy Services

## Planning Report

<b>Database:</b>	USA EDM 5000 Multi Users DB	<b>Local Co-ordinate Reference:</b>	Well 8814E-18 C19
<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>TVD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Project:</b>	Eureka Unit	<b>MD Reference:</b>	WELL @ 7166.0ft (Original Well Elev)
<b>Site:</b>	C19 Pad (S19-T3S-R97W)	<b>North Reference:</b>	True
<b>Well:</b>	8814E-18 C19	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	DD		
<b>Design:</b>	Plan #1		

### Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,306.6	1,303.0	A-Groove (TVD)			
1,445.3	1,441.0	B-Groove (TVD)			
2,818.4	2,808.0	Wasatch (TVD)			
4,906.8	4,887.0	Wasatch G (TVD)			
5,660.2	5,637.0	Molina Base (TVD)			
6,483.3	6,457.0	Williams Fork (TVD)			
9,732.4	9,706.0	Cameo Coals (TVD)			
10,432.4	10,406.0	Rollins (TVD)			
10,592.4	10,566.0	Cozzette (SSTVD)			
10,792.4	10,766.0	Corcoran (TVD)			
11,077.4	11,051.0	Sego (TVD)			

### Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
375.0	375.0	0.0	0.0	KOP @ 375'
556.1	555.8	7.0	-4.9	EOB @ Inc. = 5.43°
6,302.3	6,276.2	451.4	-318.7	Start 3° Drop
6,483.3	6,457.0	458.4	-323.6	EOD @ Inc. = 0°
10,532.4	10,506.0	448.4	-338.6	TD @ 10,532.4' MD
11,577.4	11,551.0	445.8	-342.5	Permit TD @ 11,577.4' MD