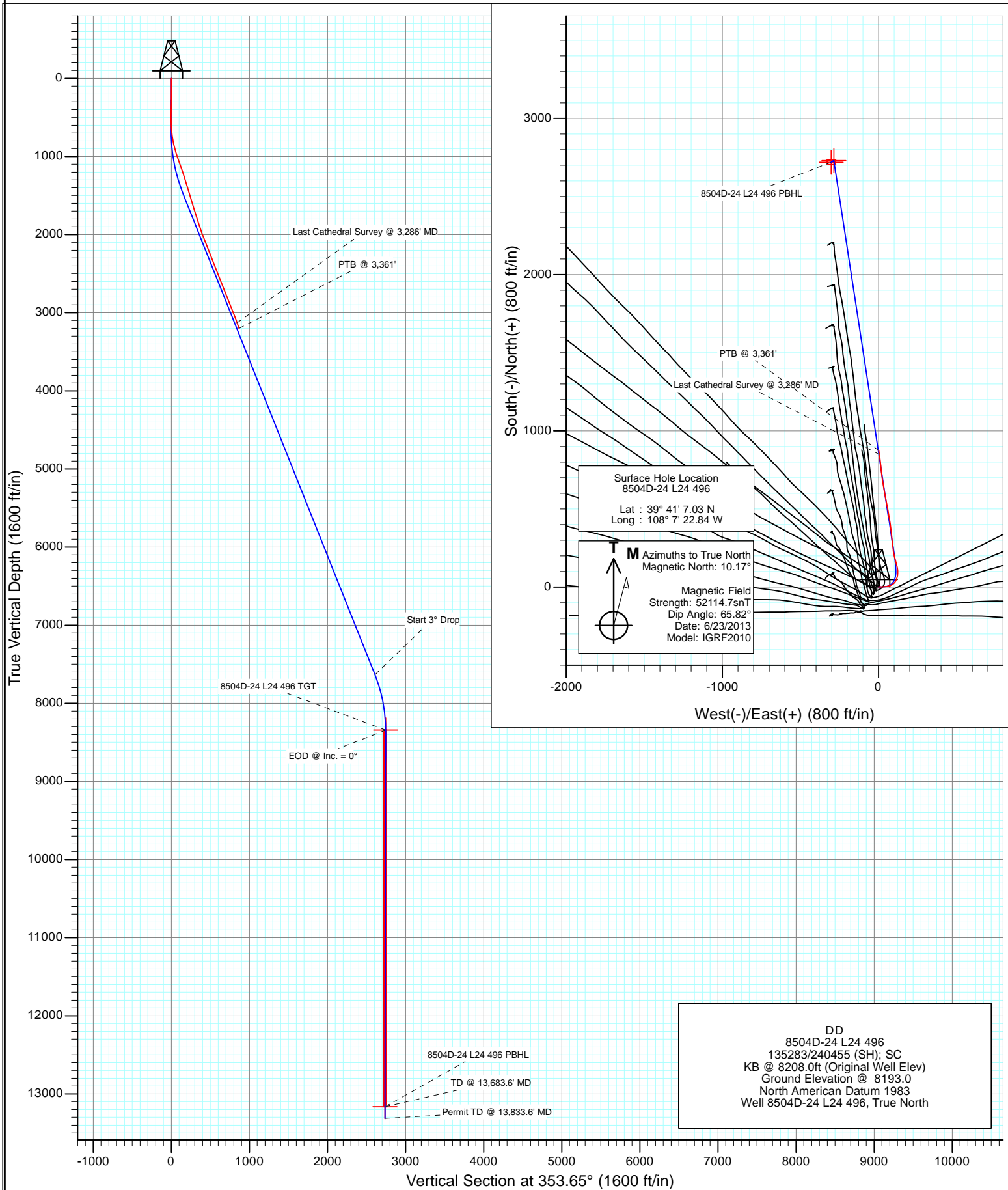




Project: Story Gulch  
Site: L24 496  
Well: 8504D-24 L24 496  
Wellbore: DD  
Design: DD



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well 8504D-24 L24 496
<b>Project:</b>	Story Gulch	<b>TVD Reference:</b>	KB @ 8208.0ft (Original Well Elev)
<b>Site:</b>	L24 496	<b>MD Reference:</b>	KB @ 8208.0ft (Original Well Elev)
<b>Well:</b>	8504D-24 L24 496	<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>	Story Gulch		
<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>	L24 496			
<b>Site Position:</b>		<b>Northing:</b>	1,685,024.52 ft	<b>Latitude:</b> 39° 41' 5.72 N
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,261,789.15 ft	<b>Longitude:</b> 108° 7' 23.99 W
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	13.200 in	<b>Grid Convergence:</b> -1.65 °

<b>Well</b>	8504D-24 L24 496			
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,685,154.40 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	2,261,882.85 ft
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b> 8,193.0 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	6/23/2013	10.17	65.82	52,115

<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 (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	353.65

<b>Survey Program</b>	<b>Date</b>	2/21/2014		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
243.0	3,361.0	Survey #1 (DD)	Geolink 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	
243.0	4.30	79.20	242.8	1.7	9.0	0.7	1.77	1.77	
273.0	5.40	83.10	272.7	2.1	11.5	0.8	3.83	3.67	
303.0	6.20	100.20	302.5	2.0	14.5	0.4	6.32	2.67	
333.0	7.30	96.00	332.3	1.5	17.9	-0.5	4.02	3.67	
364.0	8.20	87.30	363.0	1.4	22.1	-1.1	4.76	2.90	
395.0	9.10	83.60	393.7	1.8	26.8	-1.2	3.41	2.90	
425.0	10.10	85.30	423.2	2.2	31.7	-1.3	3.46	3.33	
455.0	10.60	87.10	452.8	2.6	37.1	-1.5	1.98	1.67	
485.0	11.00	84.60	482.2	3.0	42.7	-1.7	2.05	1.33	
516.0	11.30	81.90	512.6	3.7	48.7	-1.7	1.94	0.97	
564.0	11.90	78.50	559.7	5.4	58.2	-1.1	1.89	1.25	
610.0	12.60	74.20	604.6	7.7	67.7	0.1	2.50	1.52	

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<b>Site:</b>	L24 496	<b>MD Reference:</b>	KB @ 8208.0ft (Original Well Elev)
<b>Well:</b>	8504D-24 L24 496	<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
656.0	13.40	67.10	649.4	11.1	77.4	2.5	3.88	1.74	
702.0	13.80	60.20	694.2	15.9	87.1	6.2	3.63	0.87	
748.0	14.10	50.50	738.8	22.2	96.1	11.4	5.12	0.65	
794.0	14.60	39.20	783.4	30.3	104.1	18.6	6.17	1.09	
840.0	15.00	28.20	827.9	40.0	110.6	27.5	6.16	0.87	
886.0	15.70	20.50	872.2	51.1	115.6	38.0	4.68	1.52	
932.0	17.10	15.30	916.4	63.4	119.6	49.8	4.41	3.04	
978.0	18.00	8.70	960.2	77.0	122.4	63.0	4.74	1.96	
1,024.0	18.80	2.40	1,003.9	91.4	123.8	77.2	4.66	1.74	
1,070.0	19.60	355.80	1,047.3	106.5	123.6	92.2	5.03	1.74	
1,162.0	19.70	344.70	1,134.0	136.9	118.3	123.0	4.05	0.11	
1,254.0	18.40	343.90	1,220.9	165.8	110.2	152.6	1.44	-1.41	
1,346.0	17.10	346.30	1,308.6	192.9	103.0	180.3	1.62	-1.41	
1,437.0	17.20	350.30	1,395.5	219.1	97.6	207.0	1.30	0.11	
1,529.0	17.30	353.20	1,483.4	246.1	93.6	234.3	0.94	0.11	
1,621.0	16.50	353.80	1,571.4	272.7	90.6	261.0	0.89	-0.87	
1,713.0	16.70	352.90	1,659.6	298.8	87.6	287.3	0.35	0.22	
1,805.0	17.70	353.60	1,747.5	325.8	84.4	314.5	1.11	1.09	
1,897.0	18.30	356.20	1,835.0	354.1	81.9	342.9	1.09	0.65	
1,988.0	18.40	353.40	1,921.3	382.7	79.3	371.6	0.97	0.11	
2,080.0	19.90	349.30	2,008.2	412.5	74.7	401.7	2.19	1.63	
2,172.0	21.60	349.60	2,094.3	444.5	68.7	434.2	1.85	1.85	
2,264.0	22.20	350.00	2,179.6	478.3	62.6	468.4	0.67	0.65	
2,356.0	21.90	349.20	2,264.9	512.3	56.4	502.9	0.46	-0.33	
2,448.0	22.10	349.20	2,350.2	546.1	50.0	537.2	0.22	0.22	
2,540.0	21.50	348.30	2,435.6	579.6	43.3	571.3	0.75	-0.65	
2,632.0	21.30	350.70	2,521.3	612.6	37.2	604.8	0.98	-0.22	
2,724.0	21.40	352.20	2,607.0	645.7	32.2	638.2	0.60	0.11	
2,816.0	21.40	351.30	2,692.6	679.0	27.4	671.8	0.36	0.00	
2,998.0	21.60	353.20	2,862.0	745.0	18.4	738.4	0.40	0.11	
3,090.0	22.10	354.00	2,947.4	779.1	14.6	772.7	0.63	0.54	
3,182.0	21.20	353.00	3,032.9	812.8	10.7	806.6	1.06	-0.98	
3,286.0	19.80	351.60	3,130.3	848.9	5.9	843.0	1.43	-1.35	Last Cathedral Survey @ 3,286' MD
3,361.0	19.80	351.60	3,200.8	874.0	2.2	868.4	0.00	0.00	PTB @ 3,361'

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<b>Site:</b>	L24 496	<b>MD Reference:</b>	KB @ 8208.0ft (Original Well Elev)
<b>Well:</b>	8504D-24 L24 496	<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	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
8504D-24 L24 496 TGT	0.00	0.00	8,343.0	2,729.8	-285.5	1,687,891.31	2,261,676.27	39° 41' 34.01 N	108° 7' 26.49 W
- actual wellpath misses target center by 5474.3ft at 3361.0ft MD (3200.8 TVD, 874.0 N, 2.2 E)									
- Point									
8504D-24 L24 496 PBHI	0.00	0.00	13,165.0	2,719.9	-302.5	1,687,881.85	2,261,658.97	39° 41' 33.91 N	108° 7' 26.71 W
- actual wellpath misses target center by 10138.3ft at 3361.0ft MD (3200.8 TVD, 874.0 N, 2.2 E)									
- Rectangle (sides W30.0 H50.0 D0.0)									

Design Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S (ft)	+E/-W (ft)	
3,286.0	3,130.3	848.9	5.9	Last Cathedral Survey @ 3,286' MD
3,361.0	3,200.8	874.0	2.2	PTB @ 3,361'

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