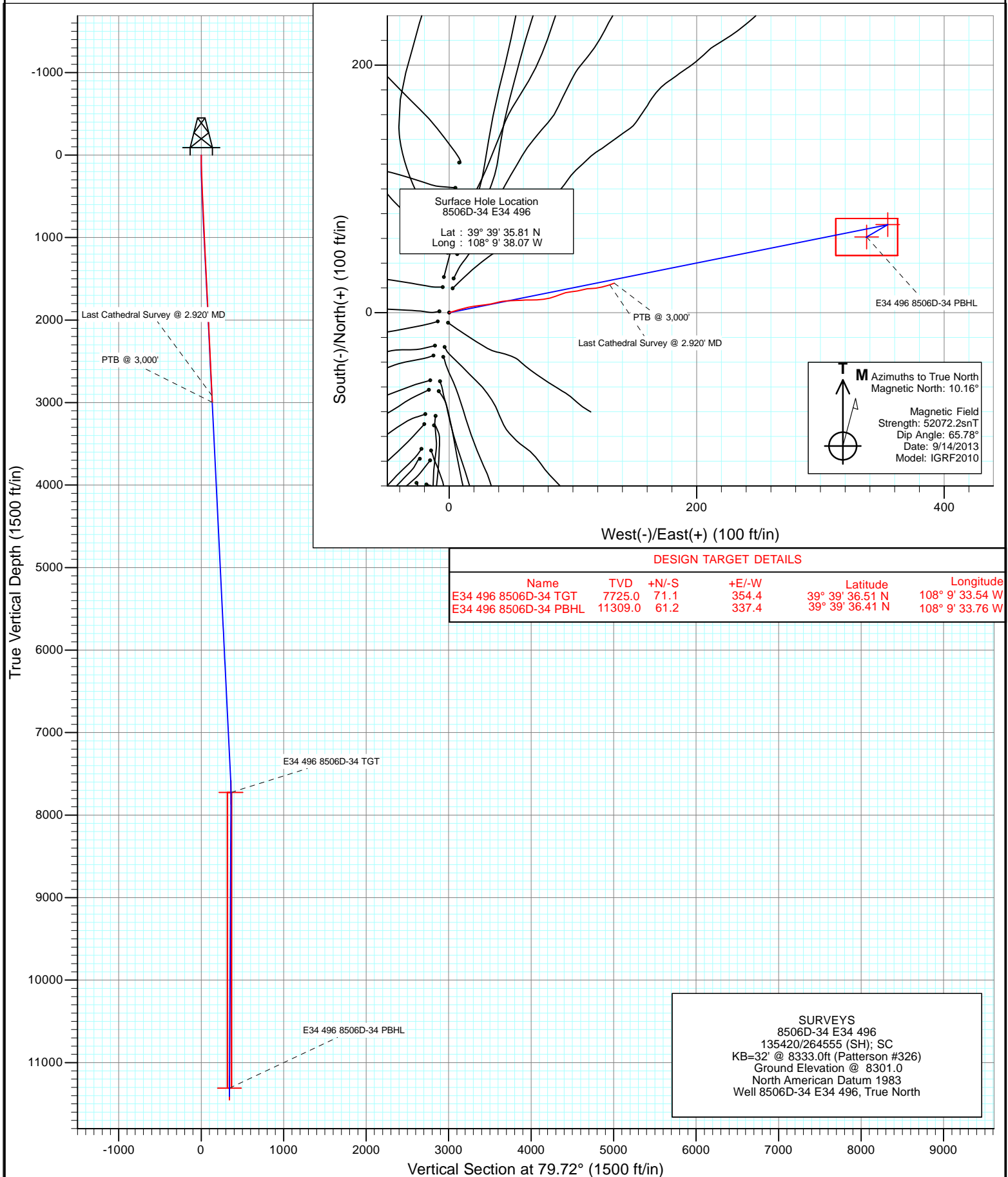




Project: Story Gulch  
Site: E34 496 S33-T4S-R96W  
Well: 8506D-34 E34 496  
Wellbore: DD  
Design: SURVEYS



# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well 8506D-34 E34 496
<b>Project:</b>	Story Gulch	<b>TVD Reference:</b>	KB=32' @ 8333.0ft (Patterson #326)
<b>Site:</b>	E34 496 S33-T4S-R96W	<b>MD Reference:</b>	KB=32' @ 8333.0ft (Patterson #326)
<b>Well:</b>	8506D-34 E34 496	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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		

Site		E34 496 S33-T4S-R96W			
Site Position:		Northing:	1,676,257.20 ft	Latitude:	39° 39' 36.02 N
From:	Lat/Long	Easting:	2,251,040.13 ft	Longitude:	108° 9' 38.14 W
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.68 °

Well	8506D-34 E34 496					
Well Position	+N/-S	0.0 ft	Northing:	1,676,235.77 ft	Latitude:	39° 39' 35.81 N
	+E/-W	0.0 ft	Easting:	2,251,044.70 ft	Longitude:	108° 9' 38.07 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	8,301.0 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	9/14/2013	10.16	65.78	52,072

<b>Design</b>	SURVEYS				
<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	79.72	

<b>Survey Program</b>	<b>Date</b>	2/10/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
325.0	3,000.0	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		
325.0	2.70	73.30	324.9	2.2	7.3	7.6	0.83	0.83		
417.0	2.60	74.60	416.8	3.4	11.4	11.8	0.13	-0.11		
508.0	2.50	78.50	507.7	4.3	15.4	15.9	0.22	-0.11		
602.0	3.20	81.50	601.6	5.1	20.0	20.6	0.76	0.74		
694.0	3.20	81.90	693.4	5.9	25.0	25.7	0.02	0.00		
785.0	2.60	82.80	784.3	6.5	29.6	30.3	0.66	-0.66		
877.0	2.40	79.80	876.2	7.1	33.6	34.3	0.26	-0.22		
968.0	2.20	74.90	967.2	7.9	37.1	37.9	0.31	-0.22		
1,059.0	2.20	78.00	1,058.1	8.7	40.5	41.4	0.13	0.00		
1,151.0	3.20	83.00	1,150.0	9.4	44.8	45.8	1.12	1.09		
1,243.0	3.30	88.60	1,241.8	9.7	50.0	50.9	0.36	0.11		
1,334.0	2.60	88.00	1,332.7	9.9	54.7	55.6	0.77	-0.77		

# Cathedral Energy Services

## Survey Report

<b>Company:</b>	EnCana Oil & Gas (USA) Inc	<b>Local Co-ordinate Reference:</b>	Well 8506D-34 E34 496
<b>Project:</b>	Story Gulch	<b>TVD Reference:</b>	KB=32' @ 8333.0ft (Patterson #326)
<b>Site:</b>	E34 496 S33-T4S-R96W	<b>MD Reference:</b>	KB=32' @ 8333.0ft (Patterson #326)
<b>Well:</b>	8506D-34 E34 496	<b>North Reference:</b>	True
<b>Wellbore:</b>	DD	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	SURVEYS	<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
1,426.0	2.00	86.40	1,424.6	10.1	58.4	59.2	0.66	-0.65	
1,517.0	2.50	86.00	1,515.6	10.3	61.9	62.8	0.55	0.55	
1,609.0	2.90	93.70	1,607.5	10.3	66.3	67.0	0.59	0.43	
1,700.0	3.20	84.70	1,698.3	10.4	71.1	71.8	0.62	0.33	
1,791.0	3.30	85.40	1,789.2	10.8	76.2	76.9	0.12	0.11	
1,883.0	3.20	74.00	1,881.0	11.7	81.3	82.1	0.71	-0.11	
1,974.0	3.10	71.10	1,971.9	13.2	86.1	87.1	0.21	-0.11	
2,066.0	2.50	67.50	2,063.8	14.8	90.3	91.5	0.68	-0.65	
2,157.0	2.60	74.70	2,154.7	16.1	94.1	95.5	0.37	0.11	
2,248.0	3.00	84.40	2,245.6	16.9	98.5	99.9	0.68	0.44	
2,340.0	3.20	80.10	2,337.5	17.6	103.4	104.9	0.33	0.22	
2,431.0	2.70	75.90	2,428.3	18.5	108.0	109.6	0.60	-0.55	
2,523.0	2.00	78.20	2,520.3	19.4	111.7	113.3	0.77	-0.76	
2,614.0	1.90	95.30	2,611.2	19.6	114.7	116.4	0.65	-0.11	
2,706.0	2.70	81.40	2,703.1	19.7	118.4	120.0	1.05	0.87	
2,797.0	3.50	77.10	2,794.0	20.7	123.2	124.9	0.91	0.88	
2,889.0	3.00	71.60	2,885.9	22.1	128.2	130.1	0.64	-0.54	
2,920.0	2.80	71.10	2,916.8	22.6	129.7	131.7	0.65	-0.65	Last Cathedral Survey @ 2.920' MD
3,000.0	2.80	71.10	2,996.7	23.8	133.4	135.5	0.00	0.00	PTB @ 3,000'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
E34 496 8506D-34 PBH	0.00	0.00	11,309.0	61.2	337.4	1,676,287.02	2,251,383.70	39° 39' 36.41 N	108° 9' 33.76 W
- hit/miss target									
- Shape									
- actual wellpath misses target center by 8314.9ft at 3000.0ft MD (2996.7 TVD, 23.8 N, 133.4 E)									
- Rectangle (sides W30.0 H50.0 D0.0)									
E34 496 8506D-34 TGT	0.00	0.00	7,725.0	71.1	354.4	1,676,296.47	2,251,401.03	39° 39' 36.51 N	108° 9' 33.54 W
- actual wellpath misses target center by 4733.7ft at 3000.0ft MD (2996.7 TVD, 23.8 N, 133.4 E)									
- Point									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
2,920.0	2,916.8	22.6	129.7	Last Cathedral Survey @ 2.920' MD	
3,000.0	2,996.7	23.8	133.4	PTB @ 3,000'	

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