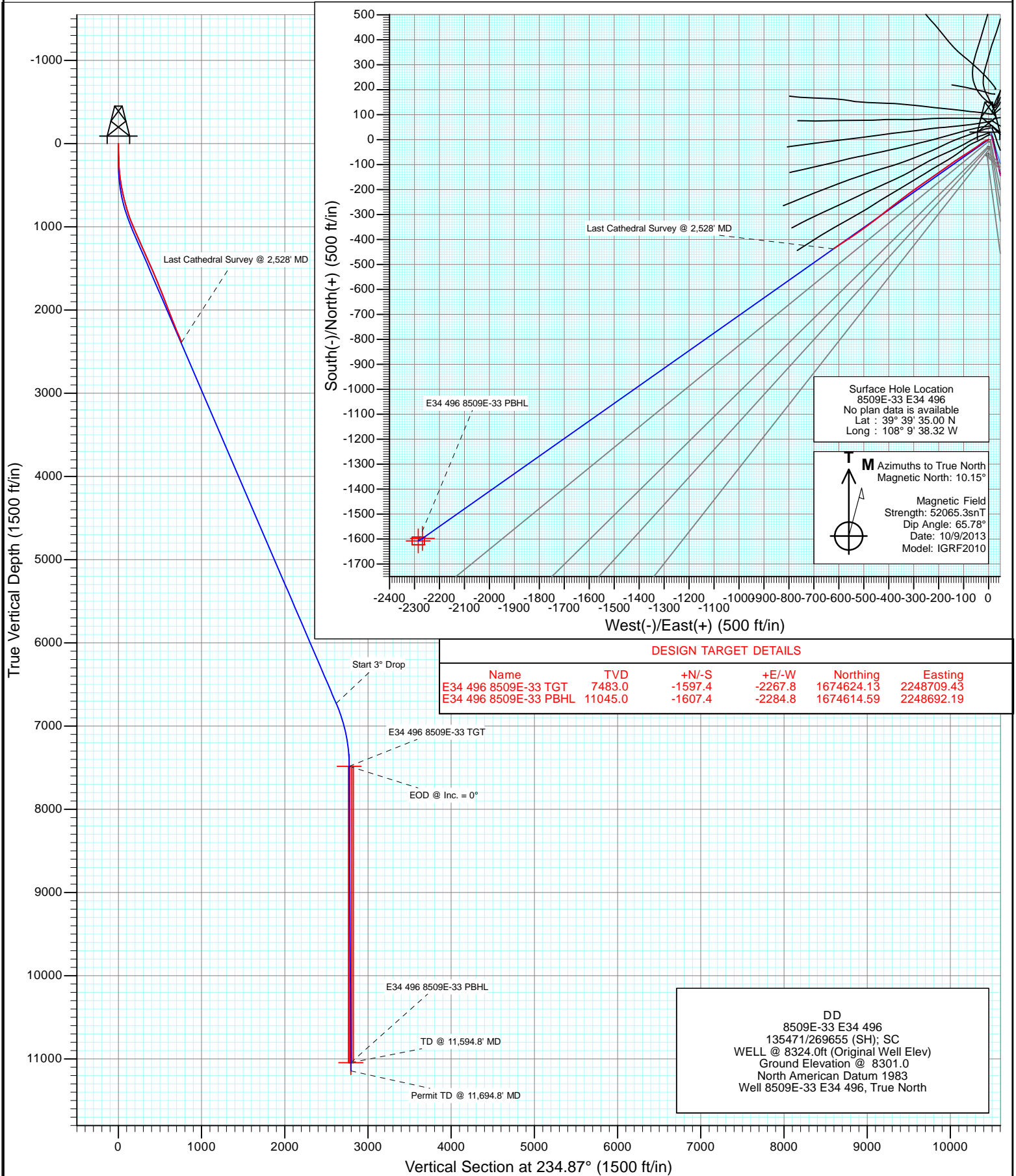




Project: Story Gulch
 Site: E34 496 S33-T4S-R96W
 Well: 8509E-33 E34 496
 Wellbore: DD
 Design: DD



Surface Hole Location
 8509E-33 E34 496
 No plan data is available
 Lat : 39° 39' 35.00 N
 Long : 108° 9' 38.32 W

M Azimuths to True North
 Magnetic North: 10.15°
 Magnetic Field
 Strength: 52065.3snT
 Dip Angle: 65.78°
 Date: 10/9/2013
 Model: IGRF2010

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting
E34 496 8509E-33 TGT	7483.0	-1597.4	-2267.8	1674624.13	2248709.43
E34 496 8509E-33 PBHL	11045.0	-1607.4	-2284.8	1674614.59	2248692.19

DD
 8509E-33 E34 496
 135471/269655 (SH); SC
 WELL @ 8324.0ft (Original Well Elev)
 Ground Elevation @ 8301.0
 North American Datum 1983
 Well 8509E-33 E34 496, True North

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well 8509E-33 E34 496
Project: Story Gulch	TVD Reference: WELL @ 8324.0ft (Original Well Elev)
Site: E34 496 S33-T4S-R96W	MD Reference: WELL @ 8324.0ft (Original Well Elev)
Well: 8509E-33 E34 496	North Reference: True
Wellbore: DD	Survey Calculation Method: Minimum Curvature
Design: DD	Database: USA EDM 5000 Multi Users DB

Project Story Gulch		
Map System: US State Plane 1983	System Datum: Mean Sea Level	
Geo Datum: North American Datum 1983		
Map Zone: 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 8509E-33 E34 496					
Well Position	+N/-S 0.0 ft	Northing: 1,676,154.44 ft	Latitude: 39° 39' 35.00 N		
	+E/-W 0.0 ft	Easting: 2,251,023.04 ft	Longitude: 108° 9' 38.32 W		
Position Uncertainty	0.0 ft	Wellhead Elevation: ft	Ground Level: 8,301.0 ft		

Wellbore DD					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/9/2013	10.15	65.78	52,065

Design DD					
Audit Notes:					
Version: 1.0	Phase: ACTUAL	Tie On Depth: 0.0			
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	234.87	

Survey Program		Date 10/11/2013
From (ft)	To (ft)	Survey (Wellbore)
267.0	2,528.0	Survey #1 (DD)
		Tool Name Geolink MWD
		Description Geolink MWD

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
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
267.0	2.90	251.00	266.9	-2.2	-6.4	6.5	1.09	1.09	
297.0	4.20	256.40	296.8	-2.7	-8.2	8.2	4.47	4.33	
328.0	4.80	245.20	327.7	-3.5	-10.5	10.6	3.42	1.94	
420.0	8.10	238.10	419.1	-8.6	-19.5	20.8	3.68	3.59	
511.0	10.10	233.10	509.0	-16.7	-31.3	35.2	2.36	2.20	
606.0	12.30	233.70	602.2	-27.7	-46.1	53.7	2.32	2.32	
697.0	14.50	237.20	690.7	-39.6	-63.5	74.7	2.58	2.42	
789.0	16.40	236.60	779.4	-53.0	-84.0	99.2	2.07	2.07	
880.0	18.90	237.80	866.1	-68.0	-107.2	126.8	2.78	2.75	
972.0	22.30	234.80	952.2	-86.0	-134.1	159.1	3.87	3.70	
1,063.0	23.70	234.80	1,035.9	-106.5	-163.1	194.7	1.54	1.54	
1,155.0	22.90	234.80	1,120.4	-127.4	-192.9	231.1	0.87	-0.87	

Cathedral Energy Services

Survey Report

Company: EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference: Well 8509E-33 E34 496
Project: Story Gulch	TVD Reference: WELL @ 8324.0ft (Original Well Elev)
Site: E34 496 S33-T4S-R96W	MD Reference: WELL @ 8324.0ft (Original Well Elev)
Well: 8509E-33 E34 496	North Reference: True
Wellbore: DD	Survey Calculation Method: Minimum Curvature
Design: DD	Database: 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
1,246.0	24.10	234.90	1,203.9	-148.3	-222.6	267.4	1.32	1.32	
1,337.0	24.30	235.40	1,286.9	-169.6	-253.2	304.7	0.31	0.22	
1,429.0	23.70	235.10	1,370.9	-191.0	-283.9	342.1	0.67	-0.65	
1,520.0	24.00	233.40	1,454.2	-212.5	-313.8	378.9	0.82	0.33	
1,612.0	23.70	233.10	1,538.3	-234.7	-343.6	416.1	0.35	-0.33	
1,703.0	22.50	232.50	1,622.0	-256.3	-372.0	451.7	1.34	-1.32	
1,795.0	22.20	231.50	1,707.1	-277.8	-399.6	486.7	0.53	-0.33	
1,886.0	21.50	232.00	1,791.6	-298.8	-426.2	520.5	0.80	-0.77	
1,978.0	21.60	231.10	1,877.1	-319.8	-452.6	554.2	0.38	0.11	
2,070.0	21.20	233.70	1,962.8	-340.3	-479.2	587.8	1.12	-0.43	
2,161.0	20.80	235.10	2,047.8	-359.3	-505.7	620.4	0.71	-0.44	
2,253.0	21.40	234.70	2,133.6	-378.3	-532.8	653.5	0.67	0.65	
2,345.0	22.10	236.90	2,219.0	-397.5	-561.0	687.6	1.17	0.76	
2,436.0	23.10	237.30	2,303.0	-416.5	-590.4	722.5	1.11	1.10	
2,528.0	24.70	235.40	2,387.2	-437.1	-621.4	759.8	1.93	1.74	Last Cathedral Survey @ 2,528' MD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
E34 496 8509E-33 TGT - hit/miss target - Shape	0.00	0.00	7,483.0	-1,597.4	-2,267.8	1,674,624.13	2,248,709.43	39° 39' 19.21 N	108° 10' 7.32 W
- survey misses target center by 5479.5ft at 2528.0ft MD (2387.2 TVD, -437.1 N, -621.4 E)									
- Point									
E34 496 8509E-33 PBH - survey misses target center by 8893.5ft at 2528.0ft MD (2387.2 TVD, -437.1 N, -621.4 E)	0.00	0.00	11,045.0	-1,607.4	-2,284.8	1,674,614.59	2,248,692.19	39° 39' 19.11 N	108° 10' 7.53 W
- Rectangle (sides W30.0 H50.0 D0.0)									

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
2,528.0	2,387.2	-437.1	-621.4	Last Cathedral Survey @ 2,528' MD

Checked By: _____	Approved By: _____	Date: _____
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