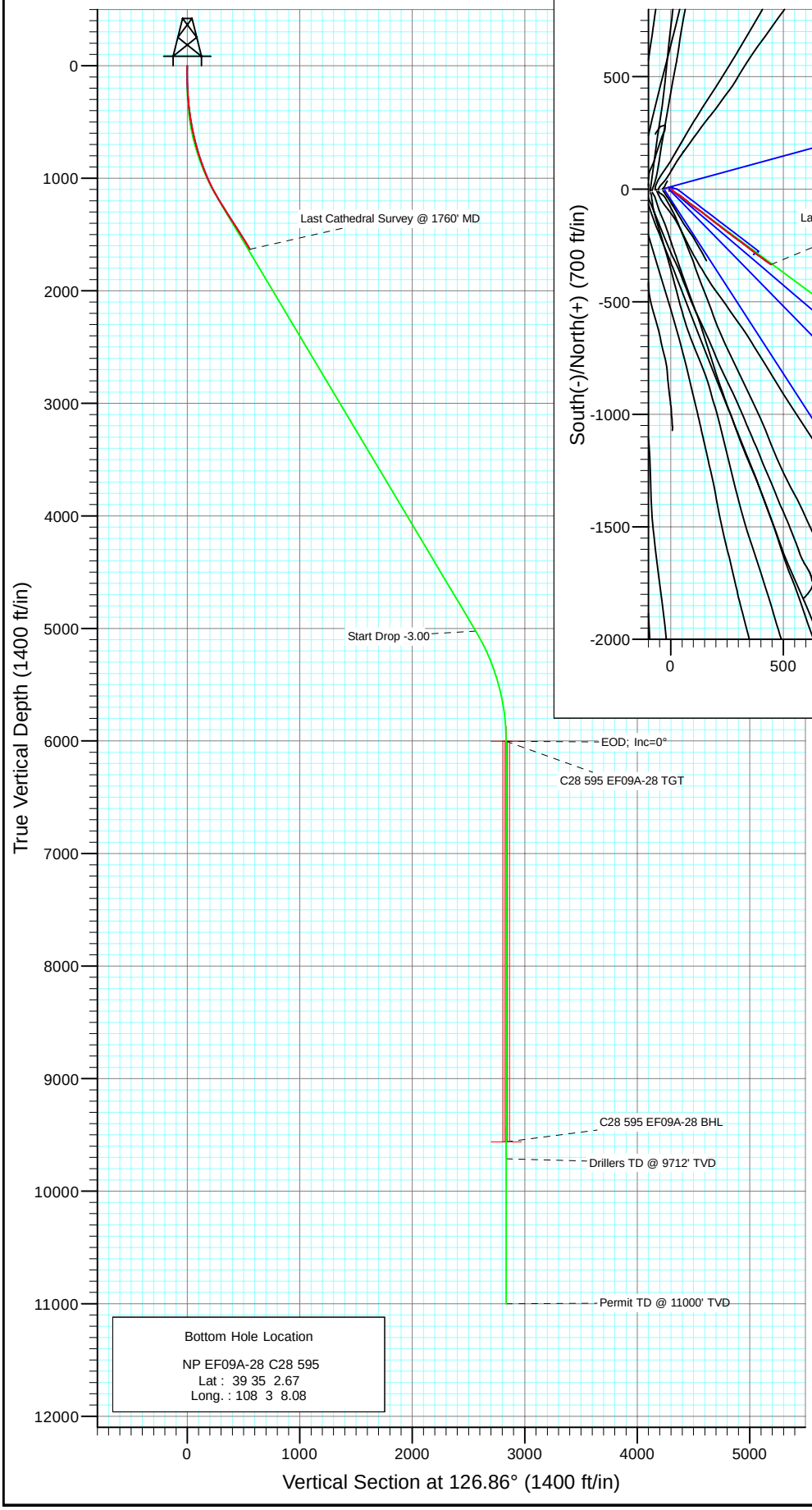
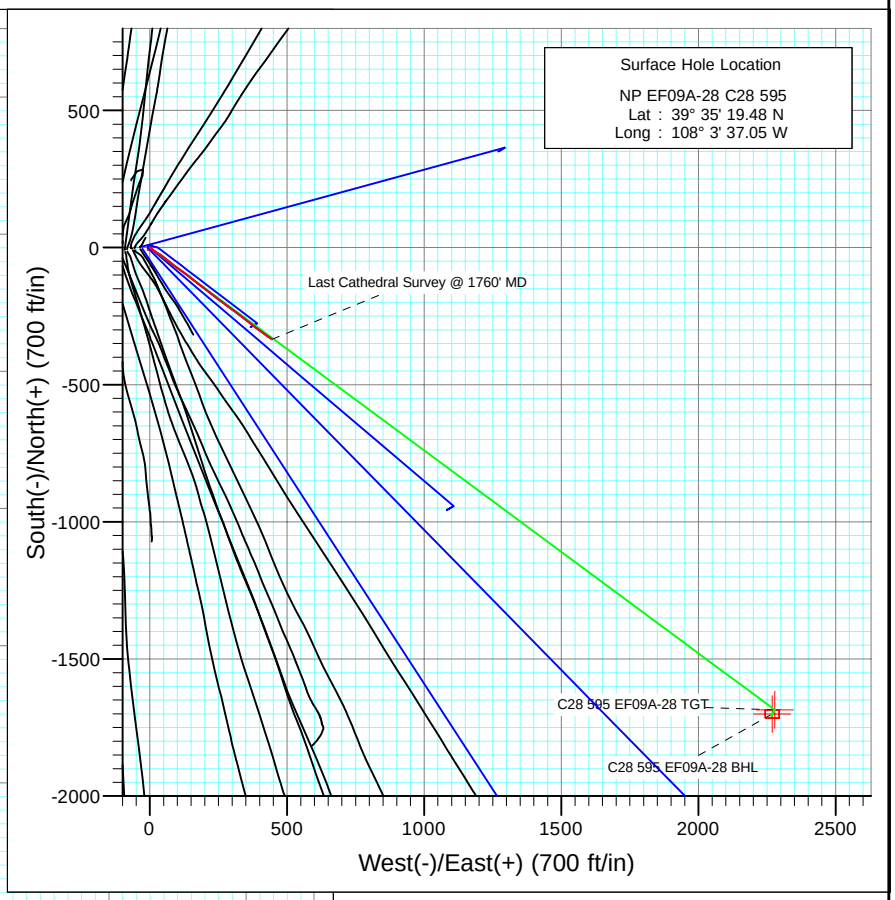
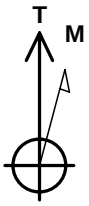
Project: North Piceance
Site: C28 595 (S28-T5S-R95W)
Well: NP EF09A-28 C28 595
Wellbore: DD
Design: DD







Azimuths to True North
Magnetic North: 10.52°

Magnetic Field
Strength: 52392.1snT
Dip Angle: 65.83°
Date: 6/13/2010
Model: IGRF2010

DESIGN DETAILS: DD

105248; LR
KBE @ 6197.0ft (Nabors M13)

Target	Azimuth	Origin	N/S	E/W	From TVD
C28 595 EF09A-28 BHL	126.86	Slot	0.0	0.0	0.0

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well NP EF09A-28 C28 595
Project:	North Piceance	**TVD Reference:**	KBE @ 6197.0ft (Nabors M13)
Site:	C28 595 (S28-T5S-R95W)	**MD Reference:**	KBE @ 6197.0ft (Nabors M13)
Well:	NP EF09A-28 C28 595	**North Reference:**	True
Wellbore:	DD	**Survey Calculation Method:**	Minimum Curvature
Design:	DD	**Database:**	EDM 5000.1 US Multi Users Db

Project North Piceance

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site C28 595 (S28-T5S-R95W)

Site Position:		**Northing:**	1,649,466.64 ft	**Latitude:**	39° 35' 19.10 N
From:	Lat/Long	**Easting:**	2,278,319.64 ft	**Longitude:**	108° 3' 39.81 W
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-1.62 °

Well NP EF09A-28 C28 595

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,649,498.78 ft	**Latitude:**	39° 35' 19.48 N
	+E/-W	0.0 ft	**Easting:**	2,278,536.24 ft	**Longitude:**	108° 3' 37.05 W
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	6,175.0 ft

Wellbore DD

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/13/2010	10.52	65.83	52,392

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	126.86

Survey Program **Date** 6/17/2010

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
169.0	1,760.0	Survey #1 (DD)	MWD	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	
169.0	1.00	91.40	169.0	0.0	1.5	1.2	0.59	0.59	
199.0	1.40	114.60	199.0	-0.2	2.1	1.8	2.07	1.33	
230.0	2.40	136.40	230.0	-0.8	2.9	2.8	3.92	3.23	
260.0	3.90	132.90	259.9	-2.0	4.0	4.4	5.04	5.00	
291.0	4.60	134.60	290.8	-3.6	5.7	6.7	2.29	2.26	
321.0	5.10	137.20	320.7	-5.4	7.5	9.2	1.82	1.67	
352.0	6.30	134.60	351.6	-7.6	9.6	12.2	3.96	3.87	
382.0	7.00	133.20	381.4	-10.0	12.1	15.7	2.39	2.33	
413.0	8.00	125.50	412.1	-12.5	15.2	19.7	4.57	3.23	
443.0	8.70	123.50	441.8	-15.0	18.8	24.1	2.53	2.33	
473.0	9.00	122.10	471.4	-17.5	22.7	28.7	1.23	1.00	
565.0	11.20	121.40	562.0	-26.0	36.4	44.7	2.39	2.39	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well NP EF09A-28 C28 595
Project:	North Piceance	**TVD Reference:**	KBE @ 6197.0ft (Nabors M13)
Site:	C28 595 (S28-T5S-R95W)	**MD Reference:**	KBE @ 6197.0ft (Nabors M13)
Well:	NP EF09A-28 C28 595	**North Reference:**	True
Wellbore:	DD	**Survey Calculation Method:**	Minimum Curvature
Design:	DD	**Database:**	EDM 5000.1 US 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
659.0	13.60	129.30	653.8	-37.7	52.8	64.9	3.12	2.55	
691.0	14.40	128.90	684.9	-42.6	58.8	72.6	2.52	2.50	
786.0	17.20	128.20	776.3	-58.7	79.0	98.5	2.95	2.95	
881.0	19.60	125.20	866.4	-76.6	103.1	128.4	2.72	2.53	
976.0	22.00	126.70	955.2	-96.4	130.4	162.2	2.59	2.53	
1,071.0	24.80	128.70	1,042.4	-119.5	160.2	199.9	3.06	2.95	
1,166.0	29.30	127.20	1,127.0	-146.1	194.3	243.1	4.79	4.74	
1,262.0	31.00	128.30	1,210.0	-175.6	232.4	291.3	1.86	1.77	
1,357.0	32.60	126.00	1,290.7	-205.8	272.3	341.3	2.11	1.68	
1,453.0	33.70	126.80	1,371.1	-236.9	314.6	393.8	1.23	1.15	
1,548.0	32.40	128.40	1,450.7	-268.5	355.6	445.6	1.65	-1.37	
1,644.0	31.10	127.00	1,532.4	-299.4	395.6	496.1	1.56	-1.35	
1,739.0	31.50	123.80	1,613.5	-328.0	435.8	545.4	1.80	0.42	
1,760.0	31.60	123.20	1,631.4	-334.1	445.0	556.4	1.57	0.48	

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
C28 595 EF09A-28 BHL	0.00	0.00	9,562.0	-1,700.6	2,268.5	1,647,734.96	2,280,755.88	39° 35' 2.67 N	108° 3' 8.08 W
- survey misses target center by 8251.5ft at 1760.0ft MD (1631.4 TVD, -334.1 N, 445.0 E)									
- Rectangle (sides W30.0 H50.0 D0.0)									
C28 595 EF09A-28 TGT	0.00	0.00	6,002.0	-1,685.6	2,278.5	1,647,749.65	2,280,766.33	39° 35' 2.82 N	108° 3' 7.95 W
- survey misses target center by 4928.5ft at 1760.0ft MD (1631.4 TVD, -334.1 N, 445.0 E)									
- Point									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
1,760.0	1,631.4	-334.1	445.0	Last Cathedral Survey @ 1760' MD

Checked By: _____ Approved By: _____ Date: _____