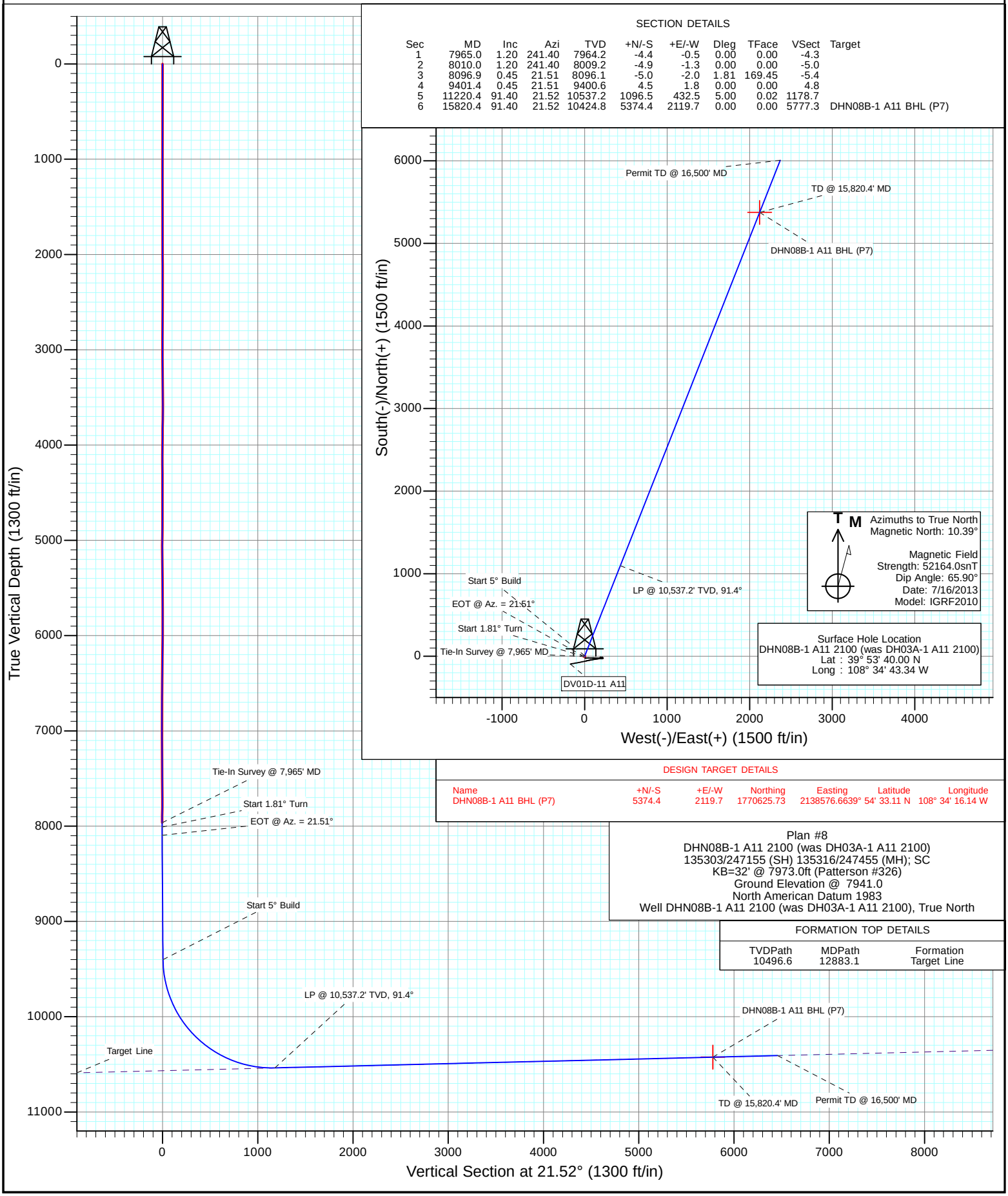
Project: Cathedral Bluffs
Site: Sec 11-2S-R100W
Well: DHN08B-1 A11 2100 (was DH03A-1 A11 2100)
Wellbore: Hz
Design: Plan #8

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	7965.0	1.20	241.40	7964.2	-4.4	-0.5	0.00	0.00	-4.3	
2	8010.0	1.20	241.40	8009.2	-4.9	-1.3	0.00	0.00	-5.0	
3	8096.9	0.45	21.51	8096.1	-5.0	-2.0	1.81	169.45	-5.4	
4	9401.4	0.45	21.51	9400.6	4.5	1.8	0.00	0.00	4.8	
5	11220.4	91.40	21.52	10537.2	1096.5	432.5	5.00	0.02	1178.7	
6	15820.4	91.40	21.52	10424.8	5374.4	2119.7	0.00	0.00	5777.3	DHN08B-1 A11 BHL (P7)



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
DHN08B-1 A11 BHL (P7)	5374.4	2119.7	1770625.73	2138576.6639°	54' 33.11 N	108° 34' 16.14 W

Plan #8
DHN08B-1 A11 2100 (was DH03A-1 A11 2100)
135303/247155 (SH) 135316/247455 (MH); SC
KB=32' @ 7973.0ft (Patterson #326)
Ground Elevation @ 7941.0
North American Datum 1983
Well DHN08B-1 A11 2100 (was DH03A-1 A11 2100), True North

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
10496.6	12883.1	Target Line

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11 21
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

Project Cathedral Bluffs

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

Site Sec 11-2S-R100W

Site Position:		**Northing:**	1,765,302.83 ft	**Latitude:**	39° 53' 39.77 N
From:	Lat/Long	**Easting:**	2,136,283.89 ft	**Longitude:**	108° 34' 43.23 W
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	-1.94 °

Well DHN08B-1 A11 2100 (was DH03A-1 A11 2100)

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,765,326.19 ft	**Latitude:**	39° 53' 40.00 N
	+E/-W	0.0 ft	**Easting:**	2,136,276.10 ft	**Longitude:**	108° 34' 43.34 W
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	7,941.0 ft

Wellbore Hz

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/16/2013	10.39	65.90	52,164

Design Plan #8

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	7,965.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	21.52

Plan Sections

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
7,965.0	1.20	241.40	7,964.2	-4.4	-0.5	0.00	0.00	0.00	0.00	
8,010.0	1.20	241.40	8,009.2	-4.9	-1.3	0.00	0.00	0.00	0.00	
8,096.9	0.45	21.51	8,096.1	-5.0	-2.0	1.81	-0.87	161.20	169.45	
9,401.4	0.45	21.51	9,400.6	4.5	1.8	0.00	0.00	0.00	0.00	
11,220.4	91.40	21.52	10,537.2	1,096.5	432.5	5.00	5.00	0.00	0.02	
15,820.4	91.40	21.52	10,424.8	5,374.4	2,119.7	0.00	0.00	0.00	0.00	DHN08B-1 A11 BHL (
16,500.0	91.40	21.52	10,408.2	6,006.4	2,368.9	0.00	0.00	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11 21
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

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	
209.0	0.70	286.60	209.0	0.4	-1.2	-0.1	0.33	0.33	
301.0	0.70	280.40	301.0	0.6	-2.3	-0.3	0.08	0.00	
393.0	0.00	280.40	393.0	0.7	-2.9	-0.4	0.76	-0.76	
485.0	0.30	62.20	485.0	0.8	-2.7	-0.2	0.33	0.33	
577.0	0.30	22.50	577.0	1.2	-2.3	0.2	0.22	0.00	
608.0	0.20	1.30	608.0	1.3	-2.3	0.4	0.43	-0.32	
703.0	0.30	331.40	703.0	1.7	-2.4	0.7	0.17	0.11	
798.0	0.40	285.80	798.0	2.0	-2.9	0.8	0.30	0.11	
892.0	0.30	287.90	892.0	2.2	-3.4	0.8	0.11	-0.11	
987.0	0.20	332.30	987.0	2.4	-3.7	0.8	0.22	-0.11	
1,081.0	0.40	145.70	1,081.0	2.3	-3.6	0.8	0.64	0.21	
1,176.0	0.90	148.80	1,176.0	1.3	-3.1	0.1	0.53	0.53	
1,271.0	0.80	147.80	1,271.0	0.1	-2.3	-0.7	0.11	-0.11	
1,365.0	0.50	120.30	1,365.0	-0.6	-1.6	-1.2	0.45	-0.32	
1,460.0	0.40	89.90	1,460.0	-0.8	-0.9	-1.1	0.27	-0.11	
1,555.0	0.20	63.10	1,555.0	-0.7	-0.4	-0.9	0.25	-0.21	
1,645.0	0.40	330.80	1,645.0	-0.4	-0.5	-0.5	0.50	0.22	
1,743.0	0.30	327.70	1,742.9	0.1	-0.8	-0.2	0.10	-0.10	
1,838.0	0.70	306.30	1,837.9	0.7	-1.4	0.1	0.46	0.42	
1,931.0	1.00	296.60	1,930.9	1.4	-2.5	0.3	0.36	0.32	
2,026.0	1.00	303.60	2,025.9	2.2	-4.0	0.6	0.13	0.00	
2,118.0	0.30	332.50	2,117.9	2.9	-4.8	0.9	0.82	-0.76	
2,215.0	0.40	101.00	2,214.9	3.0	-4.5	1.1	0.65	0.10	
2,309.0	0.40	117.00	2,308.9	2.8	-3.9	1.2	0.12	0.00	
2,404.0	0.10	119.20	2,403.9	2.6	-3.6	1.1	0.32	-0.32	
2,473.0	0.20	264.10	2,472.9	2.6	-3.6	1.1	0.42	0.14	
2,600.0	0.50	256.60	2,599.9	2.4	-4.4	0.6	0.24	0.24	
2,694.0	0.80	289.50	2,693.9	2.5	-5.4	0.4	0.50	0.32	
2,789.0	1.10	139.10	2,788.9	2.1	-5.4	-0.1	1.94	0.32	
2,883.0	0.50	138.70	2,882.9	1.1	-4.6	-0.7	0.64	-0.64	
2,977.0	0.60	166.30	2,976.9	0.3	-4.2	-1.3	0.30	0.11	
3,072.0	0.80	63.20	3,071.9	0.1	-3.5	-1.2	1.16	0.21	
3,167.0	1.00	59.30	3,166.9	0.8	-2.2	0.0	0.22	0.21	
3,261.0	0.50	22.40	3,260.9	1.6	-1.3	1.0	0.71	-0.53	
3,355.0	0.40	340.30	3,354.9	2.3	-1.3	1.7	0.36	-0.11	
3,450.0	1.10	75.40	3,449.9	2.9	-0.5	2.5	1.27	0.74	
3,544.0	0.70	100.40	3,543.8	3.0	1.0	3.1	0.59	-0.43	
3,639.0	1.00	90.80	3,638.8	2.9	2.4	3.5	0.35	0.32	
3,733.0	1.90	171.20	3,732.8	1.3	3.4	2.5	2.12	0.96	
3,828.0	0.30	198.30	3,827.8	-0.5	3.6	0.9	1.72	-1.68	
3,922.0	0.70	233.30	3,921.8	-1.0	3.0	0.1	0.52	0.43	
4,017.0	1.10	257.80	4,016.8	-1.6	1.7	-0.9	0.58	0.42	
4,111.0	1.50	270.20	4,110.8	-1.8	-0.4	-1.8	0.52	0.43	
4,205.0	2.10	302.10	4,204.7	-0.9	-3.1	-1.9	1.22	0.64	
4,299.0	1.00	317.00	4,298.7	0.7	-5.1	-1.3	1.24	-1.17	
4,394.0	0.30	308.70	4,393.7	1.4	-5.9	-0.8	0.74	-0.74	
4,488.0	1.00	298.00	4,487.7	2.0	-6.8	-0.7	0.75	0.74	
4,583.0	0.20	53.90	4,582.7	2.4	-7.4	-0.4	1.16	-0.84	
4,677.0	0.40	274.00	4,676.7	2.6	-7.6	-0.4	0.60	0.21	
4,772.0	0.80	280.40	4,771.6	2.7	-8.6	-0.6	0.43	0.42	
4,866.0	1.10	141.70	4,865.6	2.1	-8.7	-1.2	1.89	0.32	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11 21
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

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
4,961.0	0.90	174.20	4,960.6	0.7	-8.0	-2.3	0.62	-0.21	
5,056.0	0.80	210.80	5,055.6	-0.6	-8.3	-3.6	0.57	-0.11	
5,151.0	1.20	47.40	5,150.6	-0.5	-7.9	-3.4	2.08	0.42	
5,246.0	1.00	358.30	5,245.6	1.0	-7.2	-1.8	0.98	-0.21	
5,341.0	1.10	316.80	5,340.6	2.5	-7.9	-0.6	0.79	0.11	
5,435.0	0.70	78.80	5,434.6	3.2	-7.9	0.1	1.69	-0.43	
5,530.0	0.20	7.60	5,529.6	3.5	-7.3	0.6	0.70	-0.53	
5,625.0	1.00	91.50	5,624.6	3.6	-6.5	1.0	1.05	0.84	
5,719.0	0.30	54.00	5,718.6	3.8	-5.4	1.5	0.83	-0.74	
5,814.0	0.80	104.40	5,813.6	3.7	-4.6	1.8	0.69	0.53	
5,909.0	0.30	289.40	5,908.5	3.7	-4.2	1.9	1.16	-0.53	
6,004.0	0.80	115.20	6,003.5	3.5	-3.8	1.8	1.16	0.53	
6,098.0	0.80	279.50	6,097.5	3.3	-3.9	1.6	1.69	0.00	
6,193.0	1.10	244.60	6,192.5	3.0	-5.4	0.8	0.67	0.32	
6,287.0	1.70	162.40	6,286.5	1.3	-5.8	-0.9	2.02	0.64	
6,382.0	1.40	266.50	6,381.5	-0.1	-6.5	-2.5	2.58	-0.32	
6,477.0	2.20	285.90	6,476.4	0.3	-9.4	-3.2	1.05	0.84	
6,572.0	1.30	250.70	6,571.4	0.5	-12.2	-4.0	1.43	-0.95	
6,666.0	0.90	161.90	6,665.4	-0.6	-12.9	-5.3	1.67	-0.43	
6,760.0	1.20	179.20	6,759.4	-2.3	-12.7	-6.8	0.46	0.32	
6,855.0	1.50	82.00	6,854.4	-3.1	-11.5	-7.1	2.14	0.32	
6,950.0	0.80	96.40	6,949.3	-3.0	-9.6	-6.3	0.79	-0.74	
7,045.0	0.40	104.30	7,044.3	-3.2	-8.6	-6.1	0.43	-0.42	
7,139.0	1.40	68.90	7,138.3	-2.8	-7.2	-5.3	1.17	1.06	
7,233.0	0.60	49.40	7,232.3	-2.1	-5.8	-4.1	0.91	-0.85	
7,328.0	0.60	157.00	7,327.3	-2.2	-5.2	-4.0	1.02	0.00	
7,422.0	0.70	45.30	7,421.3	-2.3	-4.6	-3.8	1.15	0.11	
7,517.0	1.40	93.70	7,516.3	-2.0	-3.0	-2.9	1.13	0.74	
7,611.0	0.30	56.50	7,610.3	-1.9	-1.7	-2.4	1.25	-1.17	
7,705.0	0.20	128.00	7,704.3	-1.9	-1.3	-2.2	0.32	-0.11	
7,800.0	1.10	133.50	7,799.3	-2.6	-0.5	-2.6	0.95	0.95	
7,895.0	0.60	176.80	7,894.3	-3.7	0.2	-3.4	0.82	-0.53	
7,965.0	1.20	241.40	7,964.2	-4.4	-0.5	-4.3	1.55	0.86	Tie-In Survey @ 7,965' MD
8,000.0	1.20	241.40	7,999.2	-4.8	-1.1	-4.9	0.00	0.00	
8,010.0	1.20	241.40	8,009.2	-4.9	-1.3	-5.0	0.00	0.00	Start 1.81° Turn
8,096.9	0.45	21.51	8,096.1	-5.0	-2.0	-5.4	1.81	-0.87	EOT @ Az. = 21.51°
8,100.0	0.45	21.51	8,099.2	-5.0	-2.0	-5.3	0.00	0.00	
8,200.0	0.45	21.51	8,199.2	-4.2	-1.7	-4.6	0.00	0.00	
8,300.0	0.45	21.51	8,299.2	-3.5	-1.4	-3.8	0.00	0.00	
8,400.0	0.45	21.51	8,399.2	-2.8	-1.1	-3.0	0.00	0.00	
8,500.0	0.45	21.51	8,499.2	-2.1	-0.8	-2.2	0.00	0.00	
8,600.0	0.45	21.51	8,599.2	-1.3	-0.5	-1.4	0.00	0.00	
8,700.0	0.45	21.51	8,699.2	-0.6	-0.2	-0.7	0.00	0.00	
8,800.0	0.45	21.51	8,799.2	0.1	0.0	0.1	0.00	0.00	
8,900.0	0.45	21.51	8,899.2	0.8	0.3	0.9	0.00	0.00	
9,000.0	0.45	21.51	8,999.2	1.6	0.6	1.7	0.00	0.00	
9,100.0	0.45	21.51	9,099.2	2.3	0.9	2.5	0.00	0.00	
9,200.0	0.45	21.51	9,199.2	3.0	1.2	3.3	0.00	0.00	
9,300.0	0.45	21.51	9,299.2	3.8	1.5	4.0	0.00	0.00	
9,401.4	0.45	21.51	9,400.6	4.5	1.8	4.8	0.00	0.00	Start 5° Build
9,500.0	5.38	21.52	9,499.0	9.2	3.6	9.8	5.00	5.00	
9,600.0	10.38	21.52	9,598.1	21.9	8.6	23.5	5.00	5.00	

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Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

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
9,700.0	15.38	21.52	9,695.5	42.6	16.8	45.8	5.00	5.00	
9,800.0	20.38	21.52	9,790.7	71.2	28.1	76.5	5.00	5.00	
9,900.0	25.38	21.52	9,882.8	107.3	42.3	115.4	5.00	5.00	
10,000.0	30.38	21.52	9,971.1	150.8	59.5	162.1	5.00	5.00	
10,100.0	35.38	21.52	10,055.1	201.3	79.4	216.4	5.00	5.00	
10,200.0	40.38	21.52	10,134.0	258.4	101.9	277.8	5.00	5.00	
10,300.0	45.38	21.52	10,207.2	321.7	126.9	345.8	5.00	5.00	
10,400.0	50.38	21.52	10,274.3	390.7	154.1	420.0	5.00	5.00	
10,500.0	55.38	21.52	10,334.6	464.8	183.3	499.7	5.00	5.00	
10,600.0	60.38	21.52	10,387.8	543.6	214.4	584.3	5.00	5.00	
10,700.0	65.38	21.52	10,433.3	626.3	247.0	673.3	5.00	5.00	
10,800.0	70.38	21.52	10,471.0	712.5	281.0	765.9	5.00	5.00	
10,900.0	75.38	21.52	10,500.4	801.4	316.1	861.5	5.00	5.00	
11,000.0	80.38	21.52	10,521.4	892.3	351.9	959.2	5.00	5.00	
11,100.0	85.38	21.52	10,533.8	984.6	388.3	1,058.4	5.00	5.00	
11,200.0	90.38	21.52	10,537.5	1,077.5	425.0	1,158.3	5.00	5.00	
11,220.4	91.40	21.52	10,537.2	1,096.5	432.5	1,178.7	5.00	5.00	LP @ 10,537.2' TVD, 91.4°
11,300.0	91.40	21.52	10,535.2	1,170.5	461.6	1,258.3	0.00	0.00	
11,400.0	91.40	21.52	10,532.8	1,263.5	498.3	1,358.2	0.00	0.00	
11,500.0	91.40	21.52	10,530.4	1,356.5	535.0	1,458.2	0.00	0.00	
11,600.0	91.40	21.52	10,527.9	1,449.5	571.7	1,558.2	0.00	0.00	
11,700.0	91.40	21.52	10,525.5	1,542.5	608.4	1,658.1	0.00	0.00	
11,800.0	91.40	21.52	10,523.0	1,635.5	645.0	1,758.1	0.00	0.00	
11,900.0	91.40	21.52	10,520.6	1,728.5	681.7	1,858.1	0.00	0.00	
12,000.0	91.40	21.52	10,518.1	1,821.5	718.4	1,958.1	0.00	0.00	
12,100.0	91.40	21.52	10,515.7	1,914.5	755.1	2,058.0	0.00	0.00	
12,200.0	91.40	21.52	10,513.3	2,007.5	791.8	2,158.0	0.00	0.00	
12,300.0	91.40	21.52	10,510.8	2,100.5	828.4	2,258.0	0.00	0.00	
12,400.0	91.40	21.52	10,508.4	2,193.5	865.1	2,357.9	0.00	0.00	
12,500.0	91.40	21.52	10,505.9	2,286.5	901.8	2,457.9	0.00	0.00	
12,600.0	91.40	21.52	10,503.5	2,379.5	938.5	2,557.9	0.00	0.00	
12,700.0	91.40	21.52	10,501.0	2,472.5	975.1	2,657.8	0.00	0.00	
12,800.0	91.40	21.52	10,498.6	2,565.5	1,011.8	2,757.8	0.00	0.00	
12,883.1	91.40	21.52	10,496.6	2,642.8	1,042.3	2,840.9	0.00	0.00	Target Line
12,900.0	91.40	21.52	10,496.2	2,658.5	1,048.5	2,857.8	0.00	0.00	
13,000.0	91.40	21.52	10,493.7	2,751.5	1,085.2	2,957.8	0.00	0.00	
13,100.0	91.40	21.52	10,491.3	2,844.5	1,121.9	3,057.7	0.00	0.00	
13,200.0	91.40	21.52	10,488.8	2,937.5	1,158.5	3,157.7	0.00	0.00	
13,300.0	91.40	21.52	10,486.4	3,030.5	1,195.2	3,257.7	0.00	0.00	
13,400.0	91.40	21.52	10,483.9	3,123.5	1,231.9	3,357.6	0.00	0.00	
13,500.0	91.40	21.52	10,481.5	3,216.5	1,268.6	3,457.6	0.00	0.00	
13,600.0	91.40	21.52	10,479.1	3,309.5	1,305.3	3,557.6	0.00	0.00	
13,700.0	91.40	21.52	10,476.6	3,402.5	1,341.9	3,657.5	0.00	0.00	
13,800.0	91.40	21.52	10,474.2	3,495.5	1,378.6	3,757.5	0.00	0.00	
13,900.0	91.40	21.52	10,471.7	3,588.5	1,415.3	3,857.5	0.00	0.00	
14,000.0	91.40	21.52	10,469.3	3,681.5	1,452.0	3,957.5	0.00	0.00	
14,100.0	91.40	21.52	10,466.8	3,774.5	1,488.6	4,057.4	0.00	0.00	
14,200.0	91.40	21.52	10,464.4	3,867.5	1,525.3	4,157.4	0.00	0.00	
14,300.0	91.40	21.52	10,462.0	3,960.5	1,562.0	4,257.4	0.00	0.00	
14,400.0	91.40	21.52	10,459.5	4,053.5	1,598.7	4,357.3	0.00	0.00	
14,500.0	91.40	21.52	10,457.1	4,146.5	1,635.4	4,457.3	0.00	0.00	
14,600.0	91.40	21.52	10,454.6	4,239.5	1,672.0	4,557.3	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11 21
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

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
14,700.0	91.40	21.52	10,452.2	4,332.5	1,708.7	4,657.2	0.00	0.00	
14,800.0	91.40	21.52	10,449.7	4,425.5	1,745.4	4,757.2	0.00	0.00	
14,900.0	91.40	21.52	10,447.3	4,518.5	1,782.1	4,857.2	0.00	0.00	
15,000.0	91.40	21.52	10,444.9	4,611.5	1,818.7	4,957.2	0.00	0.00	
15,100.0	91.40	21.52	10,442.4	4,704.5	1,855.4	5,057.1	0.00	0.00	
15,200.0	91.40	21.52	10,440.0	4,797.5	1,892.1	5,157.1	0.00	0.00	
15,300.0	91.40	21.52	10,437.5	4,890.5	1,928.8	5,257.1	0.00	0.00	
15,400.0	91.40	21.52	10,435.1	4,983.5	1,965.5	5,357.0	0.00	0.00	
15,500.0	91.40	21.52	10,432.6	5,076.5	2,002.1	5,457.0	0.00	0.00	
15,600.0	91.40	21.52	10,430.2	5,169.4	2,038.8	5,557.0	0.00	0.00	
15,700.0	91.40	21.52	10,427.8	5,262.4	2,075.5	5,656.9	0.00	0.00	
15,800.0	91.40	21.52	10,425.3	5,355.4	2,112.2	5,756.9	0.00	0.00	
15,820.4	91.40	21.52	10,424.8	5,374.4	2,119.7	5,777.3	0.00	0.00	TD @ 15,820.4' MD
15,900.0	91.40	21.52	10,422.9	5,448.4	2,148.9	5,856.9	0.00	0.00	
16,000.0	91.40	21.52	10,420.4	5,541.4	2,185.5	5,956.9	0.00	0.00	
16,100.0	91.40	21.52	10,418.0	5,634.4	2,222.2	6,056.8	0.00	0.00	
16,200.0	91.40	21.52	10,415.5	5,727.4	2,258.9	6,156.8	0.00	0.00	
16,300.0	91.40	21.52	10,413.1	5,820.4	2,295.6	6,256.8	0.00	0.00	
16,400.0	91.40	21.52	10,410.7	5,913.4	2,332.2	6,356.7	0.00	0.00	
16,500.0	91.40	21.52	10,408.2	6,006.4	2,368.9	6,456.7	0.00	0.00	Permit TD @ 16,500' 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
DHN08B-1 A11 LP (3)	0.00	0.00	9,866.1	993.4	391.8	1,766,305.70	2,136,701.31	39° 53' 49.82 N	108° 34' 38.31 W
- plan misses target center by 664.5ft at 10968.6ft MD (10515.7 TVD, 863.6 N, 340.6 E)									
- Point									
DHN08B-1 A11 LP (P7)	0.00	0.00	10,539.9	993.4	391.8	1,766,305.70	2,136,701.31	39° 53' 49.82 N	108° 34' 38.31 W
- plan misses target center by 5.4ft at 11109.7ft MD (10534.5 TVD, 993.5 N, 391.8 E)									
- Point									
DHN08B-1 A11 BHL (P7	0.00	0.00	10,424.8	5,374.4	2,119.7	1,770,625.73	2,138,576.66	39° 54' 33.11 N	108° 34' 16.14 W
- plan hits target center									
- Point									
DHN08B-1 A11 BHL (3)	0.00	0.00	10,188.0	5,374.4	2,119.7	1,770,625.73	2,138,576.66	39° 54' 33.11 N	108° 34' 16.14 W
- plan misses target center by 236.7ft at 15826.2ft MD (10424.7 TVD, 5379.8 N, 2121.8 E)									
- Point									

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
12,883.1	10,566.0	Target Line		-1.40	21.52

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11 21
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Project:	Cathedral Bluffs	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site:	Sec 11-2S-R100W	**North Reference:**	True
Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Hz		
Design:	Plan #8		

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
7,965.0	7,964.2	-4.4	-0.5	Tie-In Survey @ 7,965' MD
8,010.0	8,009.2	-4.9	-1.3	Start 1.81° Turn
8,096.9	8,096.1	-5.0	-2.0	EOT @ Az. = 21.51°
9,401.4	9,400.6	4.5	1.8	Start 5° Build
11,220.4	10,537.2	1,096.5	432.5	LP @ 10,537.2' TVD, 91.4°
15,820.4	10,424.8	5,374.4	2,119.7	TD @ 15,820.4' MD
16,500.0	10,408.2	6,006.4	2,368.9	Permit TD @ 16,500' MD

EnCana Oil & Gas (USA) Inc

Cathedral Bluffs
Sec 11-2S-R100W
DHN08B-1 A11 2100 (was DH03A-1 A11 2100)
Hz
Plan #8

Anticollision Report

24 July, 2013

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11
Project:	Cathedral Bluffs	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Reference Site:	Sec 11-2S-R100W	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Hz	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #8	**Offset TVD Reference:**	Offset Datum

Reference Plan #8

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	Systematic Ellipse
Depth Range:	7,965.0 to 99,999.0ft	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**		

Survey Tool Program **Date** 7/24/2013

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
209.0	7,965.0	Survey #1 (Hz)	Geolink MWD	Geolink MWD
7,965.0	16,500.0	Plan #8 (Hz)	Geolink MWD	Geolink MWD

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Sec 11-2S-R100W						
DV01D-11 A11 - DD - DD	9,692.3	9,713.4	123.0	89.3	3.648	CC, ES, SF
DV01D-11 A11 - DD - Plan #9	9,692.3	9,713.4	123.0	89.3	3.648	CC, ES, SF

Cathedral Energy Services

Anticollision Report

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11
Project:	Cathedral Bluffs	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Reference Site:	Sec 11-2S-R100W	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Hz	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #8	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 11-2S-R100W - DV01D-11 A11 - DD - DD

Offset Site Error: 0.0 ft

Survey Program: 144-Geolink MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
7,965.0	7,964.2	7,969.4	7,961.1	13.8	14.3	-146.54	-23.4	223.2	224.4	196.7	27.69	8.104	
8,065.0	8,064.2	8,070.2	8,061.9	14.0	14.5	173.85	-22.8	225.1	227.8	199.7	28.05	8.120	
8,165.0	8,164.2	8,174.7	8,166.4	14.2	14.7	73.22	-23.2	224.2	226.7	198.3	28.41	7.981	
8,265.0	8,264.2	8,277.4	8,269.1	14.4	14.9	73.41	-23.1	223.4	225.8	197.0	28.76	7.849	
8,365.0	8,364.2	8,374.9	8,366.6	14.5	15.0	73.66	-23.1	220.9	223.0	193.9	29.11	7.661	
8,414.0	8,413.2	8,421.1	8,412.7	14.6	15.1	73.92	-23.8	220.7	222.8	193.5	29.27	7.611	
8,465.0	8,464.2	8,472.1	8,463.8	14.7	15.2	74.07	-24.0	220.8	222.8	193.3	29.45	7.564	
8,565.0	8,564.2	8,580.9	8,572.5	14.9	15.4	73.96	-22.6	219.5	221.3	191.5	29.82	7.421	
8,665.0	8,664.2	8,677.8	8,669.4	15.1	15.5	74.19	-22.4	216.3	217.8	187.6	30.16	7.221	
8,765.0	8,764.2	8,781.4	8,772.9	15.2	15.7	74.89	-24.0	213.0	214.5	184.0	30.52	7.030	
8,865.0	8,864.2	8,888.7	8,880.0	15.4	15.8	75.64	-25.1	206.1	208.0	177.1	30.88	6.737	
8,965.0	8,964.2	8,988.2	8,979.2	15.6	16.0	76.38	-26.0	198.4	200.3	169.1	31.23	6.416	
9,065.0	9,064.2	9,089.0	9,079.7	15.8	16.1	77.20	-26.9	190.6	192.6	161.0	31.58	6.099	
9,165.0	9,164.2	9,194.8	9,184.9	15.9	16.2	78.34	-28.1	179.9	182.6	150.7	31.94	5.718	
9,265.0	9,264.2	9,296.4	9,285.6	16.1	16.4	79.90	-29.7	166.9	170.2	137.9	32.29	5.271	
9,365.0	9,364.2	9,395.6	9,384.0	16.3	16.5	81.82	-31.7	153.8	157.6	125.0	32.64	4.829	
9,465.0	9,464.1	9,495.4	9,482.9	16.5	16.7	85.22	-33.5	140.2	144.6	111.6	32.99	4.382	
9,565.0	9,563.5	9,593.3	9,579.7	16.6	16.8	93.00	-35.5	126.2	131.5	98.2	33.34	3.945	
9,665.0	9,661.6	9,687.9	9,673.4	16.8	16.9	105.37	-37.8	113.0	123.5	89.8	33.65	3.669	
9,692.3	9,688.1	9,713.4	9,698.6	16.9	17.0	109.31	-38.4	109.6	123.0	89.3	33.72	3.648	CC, ES, SF
9,765.0	9,757.7	9,780.3	9,765.0	17.0	17.1	120.27	-39.7	101.4	126.8	93.0	33.77	3.755	
9,865.0	9,850.9	9,870.4	9,854.5	17.3	17.2	134.39	-41.2	91.6	145.7	112.1	33.52	4.345	
9,965.0	9,940.7	9,956.7	9,940.4	17.6	17.4	145.54	-42.5	82.9	179.8	146.8	32.94	5.457	
10,065.0	10,026.2	10,037.2	10,020.3	18.0	17.5	153.86	-44.4	73.4	227.4	195.2	32.14	7.074	
10,165.0	10,107.0	10,111.8	10,094.3	18.4	17.6	159.77	-46.5	63.7	286.1	254.9	31.21	9.166	
10,265.0	10,182.3	10,179.8	10,161.6	19.0	17.7	163.88	-48.7	54.3	353.9	323.7	30.21	11.716	
10,365.0	10,251.6	10,239.9	10,221.0	19.6	17.8	166.67	-50.8	45.5	429.3	400.2	29.16	14.722	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11
Project:	Cathedral Bluffs	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Reference Site:	Sec 11-2S-R100W	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Hz	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #8	**Offset TVD Reference:**	Offset Datum

Offset Design Sec 11-2S-R100W - DV01D-11 A11 - DD - Plan #9

Offset Site Error: 0.0 ft

Survey Program: 144-Geolink MWD, 10404-Geolink MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
7,965.0	7,964.2	7,969.4	7,961.1	13.8	14.3	-146.54	-23.4	223.2	224.4	196.7	27.69	8.104	
8,065.0	8,064.2	8,070.2	8,061.9	14.0	14.5	173.85	-22.8	225.1	227.8	199.7	28.05	8.120	
8,165.0	8,164.2	8,174.7	8,166.4	14.2	14.7	73.22	-23.2	224.2	226.7	198.3	28.41	7.981	
8,265.0	8,264.2	8,277.4	8,269.1	14.4	14.9	73.41	-23.1	223.4	225.8	197.0	28.76	7.849	
8,365.0	8,364.2	8,374.9	8,366.6	14.5	15.0	73.66	-23.1	220.9	223.0	193.9	29.11	7.661	
8,414.0	8,413.2	8,421.1	8,412.7	14.6	15.1	73.92	-23.8	220.7	222.8	193.5	29.27	7.611	
8,465.0	8,464.2	8,472.1	8,463.8	14.7	15.2	74.07	-24.0	220.8	222.8	193.3	29.45	7.564	
8,565.0	8,564.2	8,580.9	8,572.5	14.9	15.4	73.96	-22.6	219.5	221.3	191.5	29.82	7.421	
8,665.0	8,664.2	8,677.8	8,669.4	15.1	15.5	74.19	-22.4	216.3	217.8	187.6	30.16	7.221	
8,765.0	8,764.2	8,781.4	8,772.9	15.2	15.7	74.89	-24.0	213.0	214.5	184.0	30.52	7.030	
8,865.0	8,864.2	8,888.7	8,880.0	15.4	15.8	75.64	-25.1	206.1	208.0	177.1	30.88	6.737	
8,965.0	8,964.2	8,988.2	8,979.2	15.6	16.0	76.38	-26.0	198.4	200.3	169.1	31.23	6.416	
9,065.0	9,064.2	9,089.0	9,079.7	15.8	16.1	77.20	-26.9	190.6	192.6	161.0	31.58	6.099	
9,165.0	9,164.2	9,194.8	9,184.9	15.9	16.2	78.34	-28.1	179.9	182.6	150.7	31.94	5.718	
9,265.0	9,264.2	9,296.4	9,285.6	16.1	16.4	79.90	-29.7	166.9	170.2	137.9	32.29	5.271	
9,365.0	9,364.2	9,395.6	9,384.0	16.3	16.5	81.82	-31.7	153.8	157.6	125.0	32.64	4.829	
9,465.0	9,464.1	9,495.4	9,482.9	16.5	16.7	85.22	-33.5	140.2	144.6	111.6	32.99	4.382	
9,565.0	9,563.5	9,593.3	9,579.7	16.6	16.8	93.00	-35.5	126.2	131.5	98.2	33.34	3.945	
9,665.0	9,661.6	9,687.9	9,673.4	16.8	16.9	105.37	-37.8	113.0	123.5	89.8	33.65	3.669	
9,692.3	9,688.1	9,713.4	9,698.6	16.9	17.0	109.31	-38.4	109.6	123.0	89.3	33.72	3.648	CC, ES, SF
9,765.0	9,757.7	9,780.3	9,765.0	17.0	17.1	120.27	-39.7	101.4	126.8	93.0	33.77	3.755	
9,865.0	9,850.9	9,870.4	9,854.5	17.3	17.2	134.39	-41.2	91.6	145.7	112.1	33.52	4.345	
9,965.0	9,940.7	9,956.7	9,940.4	17.6	17.4	145.54	-42.5	82.9	179.8	146.8	32.94	5.457	
10,065.0	10,026.2	10,037.2	10,020.3	18.0	17.5	153.86	-44.4	73.4	227.4	195.2	32.14	7.074	
10,165.0	10,107.0	10,111.8	10,094.3	18.4	17.6	159.77	-46.5	63.7	286.1	254.9	31.21	9.166	
10,265.0	10,182.3	10,179.8	10,161.6	19.0	17.7	163.88	-48.7	54.3	353.9	323.7	30.21	11.716	
10,365.0	10,251.6	10,239.9	10,221.0	19.6	17.8	166.67	-50.8	45.5	429.3	400.2	29.16	14.722	

Company:	EnCana Oil & Gas (USA) Inc	**Local Co-ordinate Reference:**	Well DHN08B-1 A11 2100 (was DH03A-1 A11
Project:	Cathedral Bluffs	**TVD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Reference Site:	Sec 11-2S-R100W	**MD Reference:**	KB=32' @ 7973.0ft (Patterson #326)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	DHN08B-1 A11 2100 (was DH03A-1 A11 2100)	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Hz	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #8	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to KB=32' @ 7973.0ft (Patterson #326)
Offset Depths are relative to Offset Datum
Central Meridian is 105° 30' 0.00 W °

Coordinates are relative to: DHN08B-1 A11 2100 (was DH03A-1 A11 2100)
Coordinate System is US State Plane 1983, Colorado Central Zone
Grid Convergence at Surface is: -1.94°