

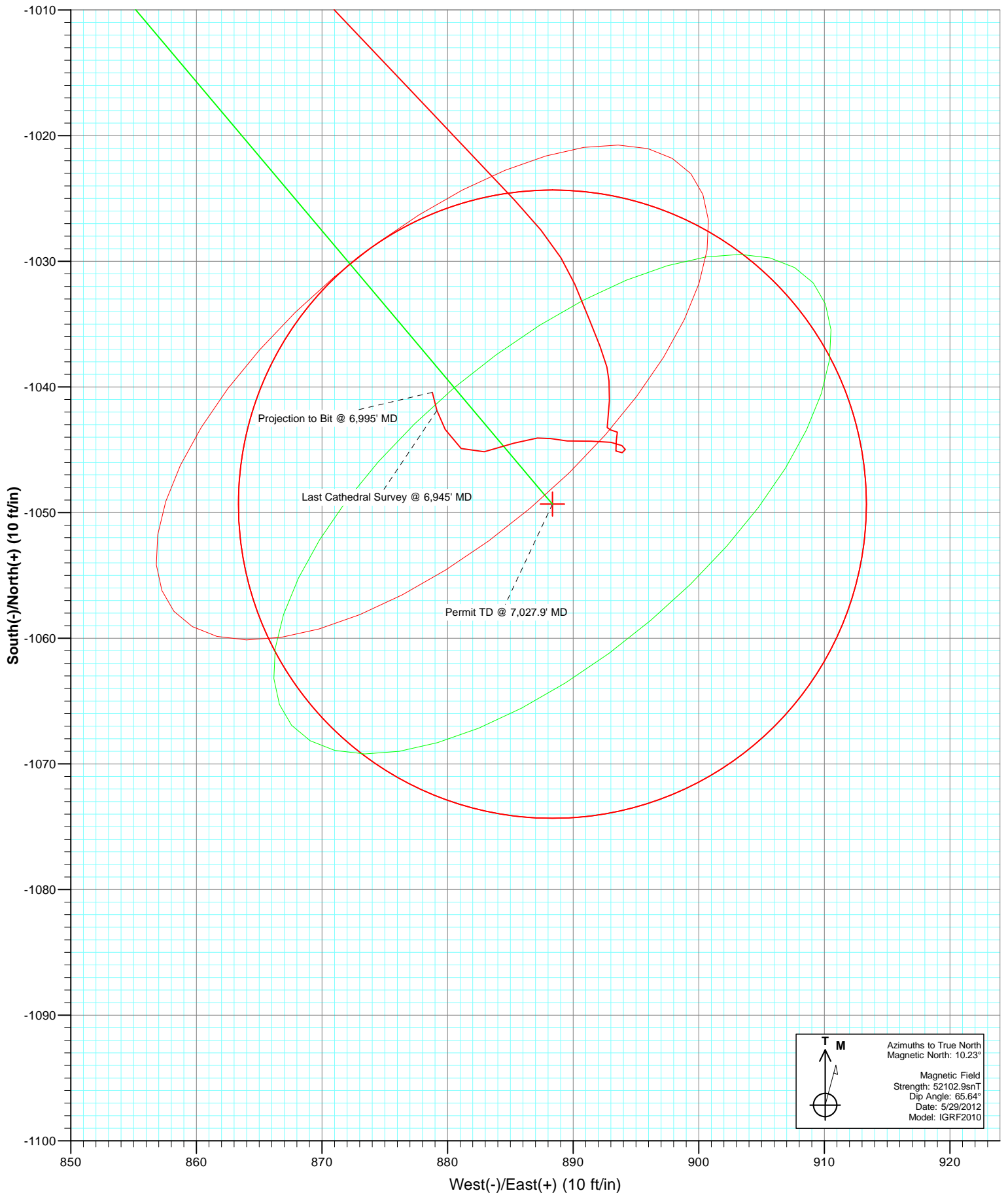
Azimuths to True North
 Magnetic North: 10.23°

Magnetic Field
 Strength: 52102.9snT
 Dip Angle: 65.64°
 Date: 5/29/2012
 Model: IGRF2010

DESIGN DETAILS: DD
 125344/169855 (SH) 125359/170455 (MH); SC

WELL @ 6058.0ft (Original Well Elev)
 Target Azimuth 139.75
 Federal 29-11A BHL

Origin Type	N/S	E/W
Slot	0.0	0.0



Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 29-11A
Project:	S. Piceance (Parachute)	TVD Reference:	WELL @ 6058.0ft (Original Well Elev)
Site:	S29-T7S-R95W (PF-29 Pad)	MD Reference:	WELL @ 6058.0ft (Original Well Elev)
Well:	Federal 29-11A	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	DD	Database:	USA EDM 5000 Multi Users DB

Project	S. Piceance (Parachute), Garfield County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	S29-T7S-R95W (PF-29 Pad)			
Site Position:		Northing:	1,584,347.66 ft	Latitude: 39.410580
From:	Lat/Long	Easting:	2,286,791.27 ft	Longitude: -108.024590
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence: -1.59 °

Well	Federal 29-11A			
Well Position	+N/-S	0.0 ft	Northing:	1,584,337.67 ft
	+E/-W	0.0 ft	Easting:	2,286,770.08 ft
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft
			Ground Level:	6,036.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/29/2012	10.23	65.64	52,103

Design	DD				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.0	0.0	0.0	139.75	

Survey Program	Date	6/18/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
143.0	1,032.0	Survey #1 (DD)	MWD	Geolink MWD	
1,100.0	6,995.0	Survey #2 (DD)	MWD	Geolink MWD	

Survey									
Measured	Vertical								Formations /
Depth	Inclination	Azimuth	Depth	+N/-S	+E/-W	Vertical	Dogleg	Build	Comments
(ft)	(°)	(°)	(ft)	(ft)	(ft)	Section (ft)	Rate (°/100ft)	Rate (°/100ft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
143.0	0.70	345.10	143.0	0.8	-0.2	-0.8	0.49	0.49	
173.0	0.40	339.50	173.0	1.1	-0.3	-1.1	1.01	-1.00	
204.0	0.10	186.20	204.0	1.2	-0.3	-1.1	1.59	-0.97	
235.0	0.90	147.00	235.0	1.0	-0.2	-0.9	2.66	2.58	
266.0	1.90	145.90	266.0	0.3	0.2	-0.1	3.23	3.23	
296.0	2.50	147.50	296.0	-0.6	0.8	1.0	2.01	2.00	
327.0	3.50	138.70	326.9	-1.9	1.8	2.6	3.54	3.23	
357.0	4.70	135.20	356.8	-3.5	3.3	4.8	4.08	4.00	
388.0	5.60	136.40	387.7	-5.5	5.2	7.6	2.92	2.90	
418.0	6.60	142.60	417.5	-7.9	7.3	10.7	3.99	3.33	
449.0	7.40	146.60	448.3	-11.0	9.5	14.5	3.02	2.58	

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Site:	S29-T7S-R95W (PF-29 Pad)	MD Reference:	WELL @ 6058.0ft (Original Well Elev)
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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
479.0	8.30	147.30	478.0	-14.4	11.7	18.6	3.02	3.00	
510.0	9.40	145.60	508.7	-18.4	14.3	23.3	3.65	3.55	
541.0	10.80	143.70	539.2	-22.8	17.5	28.7	4.64	4.52	
572.0	12.00	142.70	569.6	-27.7	21.2	34.8	3.92	3.87	
602.0	13.20	141.10	598.8	-32.9	25.2	41.4	4.17	4.00	
633.0	14.30	140.10	629.0	-38.6	29.9	48.7	3.63	3.55	
664.0	15.20	139.30	658.9	-44.6	35.0	56.6	2.98	2.90	
695.0	16.50	139.40	688.8	-51.0	40.5	65.1	4.19	4.19	
756.0	18.60	139.00	746.9	-64.9	52.5	83.5	3.45	3.44	
849.0	19.60	139.40	834.8	-88.0	72.4	113.9	1.08	1.08	
940.0	20.40	138.30	920.3	-111.4	92.9	145.0	0.97	0.88	
1,032.0	20.80	137.00	1,006.4	-135.3	114.7	177.4	0.66	0.43	
1,100.0	21.80	136.50	1,069.8	-153.3	131.6	202.0	1.49	1.47	
1,195.0	21.10	136.20	1,158.2	-178.4	155.6	236.7	0.75	-0.74	
1,290.0	19.90	140.00	1,247.2	-203.2	177.8	270.0	1.89	-1.26	
1,386.0	18.90	139.50	1,337.7	-227.5	198.4	301.9	1.06	-1.04	
1,480.0	17.90	139.00	1,426.9	-250.0	217.8	331.5	1.08	-1.06	
1,575.0	19.30	142.10	1,517.0	-273.4	237.0	361.8	1.80	1.47	
1,671.0	18.30	138.30	1,607.8	-297.2	256.8	392.7	1.65	-1.04	
1,766.0	19.70	140.70	1,697.7	-320.7	276.9	423.6	1.69	1.47	
1,861.0	18.60	137.10	1,787.4	-344.2	297.3	454.8	1.70	-1.16	
1,956.0	20.10	139.10	1,877.0	-367.6	318.3	486.3	1.73	1.58	
2,052.0	19.30	138.60	1,967.4	-392.0	339.6	518.6	0.85	-0.83	
2,147.0	20.20	141.80	2,056.8	-416.7	360.1	550.7	1.48	0.95	
2,243.0	19.30	142.40	2,147.2	-442.3	380.1	583.1	0.96	-0.94	
2,339.0	18.60	141.50	2,238.0	-466.8	399.3	614.3	0.79	-0.73	
2,434.0	19.80	143.70	2,327.7	-491.6	418.2	645.5	1.47	1.26	
2,530.0	18.80	143.40	2,418.3	-517.2	437.1	677.1	1.05	-1.04	
2,625.0	19.30	140.80	2,508.1	-541.6	456.1	708.1	1.04	0.53	
2,721.0	18.50	140.80	2,598.9	-565.7	475.8	739.2	0.83	-0.83	
2,816.0	20.60	140.30	2,688.4	-590.3	496.0	771.0	2.22	2.21	
2,911.0	20.20	140.20	2,777.5	-615.7	517.2	804.1	0.42	-0.42	
3,007.0	21.20	135.70	2,867.3	-640.9	539.9	838.0	1.96	1.04	
3,103.0	20.60	137.20	2,957.0	-665.7	563.5	872.2	0.84	-0.62	
3,198.0	19.70	136.70	3,046.2	-689.6	585.8	904.8	0.96	-0.95	
3,293.0	20.50	137.10	3,135.4	-713.4	608.1	937.5	0.85	0.84	
3,389.0	19.70	138.20	3,225.5	-737.8	630.4	970.4	0.92	-0.83	
3,484.0	20.50	138.90	3,314.7	-762.3	652.0	1,003.1	0.88	0.84	
3,579.0	19.90	138.70	3,403.9	-787.0	673.6	1,035.9	0.64	-0.63	
3,675.0	18.60	138.60	3,494.5	-810.7	694.5	1,067.5	1.35	-1.35	
3,770.0	19.30	137.20	3,584.4	-833.6	715.2	1,098.3	0.88	0.74	
3,865.0	17.60	136.60	3,674.5	-855.6	735.7	1,128.4	1.80	-1.79	
3,961.0	17.20	138.50	3,766.1	-876.7	755.1	1,157.0	0.72	-0.42	
4,056.0	18.20	137.20	3,856.6	-898.2	774.5	1,185.9	1.13	1.05	
4,150.0	16.90	136.40	3,946.2	-918.8	793.9	1,214.2	1.41	-1.38	
4,245.0	14.70	140.80	4,037.6	-938.2	811.0	1,240.1	2.64	-2.32	
4,340.0	13.00	142.20	4,129.9	-955.9	825.2	1,262.8	1.82	-1.79	
4,436.0	11.30	141.30	4,223.7	-971.8	837.7	1,283.0	1.78	-1.77	
4,531.0	10.50	141.10	4,317.0	-985.8	848.9	1,300.9	0.84	-0.84	
4,626.0	8.50	136.60	4,410.7	-997.7	859.2	1,316.6	2.24	-2.11	
4,721.0	7.80	135.90	4,504.7	-1,007.4	868.5	1,330.0	0.74	-0.74	
4,816.0	7.70	137.00	4,598.9	-1,016.7	877.3	1,342.8	0.19	-0.11	
4,912.0	6.20	136.10	4,694.2	-1,025.1	885.3	1,354.4	1.57	-1.56	

Survey Report

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Well:	Federal 29-11A	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
4,955.5	5.07	143.44	4,737.5	-1,028.4	888.1	1,358.7	3.08	-2.60	Federal 29-11A ToG
5,007.0	3.90	157.30	4,788.8	-1,031.8	890.1	1,362.6	3.08	-2.27	
5,103.0	2.50	158.80	4,884.6	-1,036.8	892.1	1,367.7	1.46	-1.46	
5,198.0	1.00	182.80	4,979.6	-1,039.5	892.9	1,370.3	1.72	-1.58	
5,293.0	0.90	173.80	5,074.6	-1,041.1	892.9	1,371.5	0.19	-0.11	
5,388.0	1.00	194.50	5,169.6	-1,042.6	892.8	1,372.6	0.37	0.11	
5,484.0	0.50	85.80	5,265.6	-1,043.4	893.0	1,373.3	1.31	-0.52	
5,580.0	0.30	148.30	5,361.6	-1,043.6	893.5	1,373.8	0.47	-0.21	
5,675.0	0.60	204.60	5,456.6	-1,044.3	893.4	1,374.3	0.53	0.32	
5,770.0	0.50	157.00	5,551.6	-1,045.1	893.4	1,374.9	0.48	-0.11	
5,865.0	0.50	54.90	5,646.6	-1,045.2	893.9	1,375.3	0.82	0.00	
5,928.0	0.20	12.30	5,709.6	-1,045.0	894.2	1,375.3	0.60	-0.48	
6,024.0	0.40	294.70	5,805.6	-1,044.7	893.9	1,374.9	0.42	0.21	
6,119.0	0.70	282.70	5,900.5	-1,044.4	893.0	1,374.1	0.34	0.32	
6,215.0	1.20	267.50	5,996.5	-1,044.3	891.4	1,373.0	0.58	0.52	
6,310.0	1.10	274.20	6,091.5	-1,044.3	889.5	1,371.8	0.18	-0.11	
6,406.0	0.50	287.20	6,187.5	-1,044.1	888.2	1,370.8	0.65	-0.62	
6,502.0	0.80	262.20	6,283.5	-1,044.1	887.2	1,370.1	0.42	0.31	
6,597.0	1.50	255.40	6,378.5	-1,044.5	885.3	1,369.2	0.75	0.74	
6,691.0	1.50	252.20	6,472.4	-1,045.2	882.9	1,368.2	0.09	0.00	
6,786.0	1.10	314.50	6,567.4	-1,044.9	881.1	1,366.8	1.46	-0.42	
6,881.0	1.30	324.10	6,662.4	-1,043.4	879.8	1,364.8	0.30	0.21	
6,922.4	1.54	339.51	6,703.7	-1,042.5	879.3	1,363.8	1.08	0.57	Federal 29-11A BHL
6,945.0	1.70	345.90	6,726.4	-1,041.9	879.2	1,363.2	1.08	0.73	Last Cathedral Survey @ 6,945' MD
6,995.0	1.70	345.90	6,776.4	-1,040.4	878.8	1,361.9	0.00	0.00	Projection to Bit @ 6,995' MD

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	
- Shape									Latitude Longitude
Federal 29-11A ToG		0.00	0.00	4,736.0	-1,049.3	888.4	1,583,264.07	2,287,628.93	39.407670 -108.021520
- actual wellpath misses target center by 21.0ft at 4955.5ft MD (4737.5 TVD, -1028.4 N, 888.1 E)									
- Point									
Federal 29-11A BHL		0.00	0.00	6,704.0	-1,049.3	888.4	1,583,264.07	2,287,628.93	39.407670 -108.021520
- actual wellpath misses target center by 11.3ft at 6922.4ft MD (6703.7 TVD, -1042.5 N, 879.3 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
6,945.0	6,726.4	-1,041.9	879.2	Last Cathedral Survey @ 6,945' MD	
6,995.0	6,776.4	-1,040.4	878.8	Projection to Bit @ 6,995' MD	

Checked By: _____ Approved By: _____ Date: _____