

Target	Federal 31-2C (PF-31)	BHW370	Azimuth	Origin Type	N/S	E/W
			1555.3	Slot	0.0	0.0
			1555.3			0.0
Name	TVD	+N/-S	+E/-W	Latitude	Longitude	
Federal 31-2C (PF-31)	TQ950.0	1555.3	1486.4	39.399190	-108.038290	
Federal 31-2C (PF-31)	BHW283.0	1555.3	1486.4	39.399190	-108.038290	

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well Federal 31-2C (PF-31)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KBE @ 5856.0ft (Original Well Elev)
Project:	S. Piceance (Parachute)	MD Reference:	KBE @ 5856.0ft (Original Well Elev)
Site:	SENW S31-T7S-R95W (PF-31 Pad)	North Reference:	True
Well:	Federal 31-2C (PF-31)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

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	SENW S31-T7S-R95W (PF-31 Pad)				
Site Position:		Northing:	1,578,802.25 ft	Latitude:	39.394940
From:	Lat/Long	Easting:	2,281,293.81 ft	Longitude:	-108.043490
Position Uncertainty:	0.0 ft	Slot Radius:	13.200in	Grid Convergence:	-1.60 °

Well	Federal 31-2C (PF-31)					
Well Position	+N/-S	0.0 ft	Northing:	1,578,795.44 ft	Latitude:	39.394920
	+E/-W	0.0 ft	Easting:	2,281,276.65 ft	Longitude:	-108.043550
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	5,834.0 ft

Wellbore	DD				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/21/2010	10.40	65.67	52,270

Design	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	43.70

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,290.7	32.72	43.70	1,232.4	219.1	209.4	3.00	3.00	0.00	43.70	
3,868.9	32.72	43.70	3,401.4	1,226.6	1,172.3	0.00	0.00	0.00	0.00	
5,505.0	0.00	0.00	4,950.0	1,555.3	1,486.4	2.00	-2.00	0.00	180.00	Federal 31-2C (PF-31)
6,838.0	0.00	0.00	6,283.0	1,555.3	1,486.4	0.00	0.00	0.00	0.00	Federal 31-2C (PF-31)
6,938.0	0.00	0.00	6,383.0	1,555.3	1,486.4	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database: EDM 5000.1 US Multi Users DB
 Company: EnCana Oil & Gas (USA) Inc
 Project: S. Piceance (Parachute)
 Site: SENW S31-T7S-R95W (PF-31 Pad)
 Well: Federal 31-2C (PF-31)
 Wellbore: DD
 Design: Plan #1

Local Co-ordinate Reference: Well Federal 31-2C (PF-31)
 TVD Reference: KBE @ 5856.0ft (Original Well Elev)
 MD Reference: KBE @ 5856.0ft (Original Well Elev)
 North Reference: True
 Survey Calculation Method: Minimum Curvature

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	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	KOP @ 200' MD
300.0	3.00	43.70	300.0	1.9	1.8	2.6	3.00	3.00	
400.0	6.00	43.70	399.6	7.6	7.2	10.5	3.00	3.00	
500.0	9.00	43.70	498.8	17.0	16.2	23.5	3.00	3.00	
600.0	12.00	43.70	597.1	30.2	28.8	41.7	3.00	3.00	
700.0	15.00	43.70	694.3	47.0	45.0	65.1	3.00	3.00	
800.0	18.00	43.70	790.2	67.6	64.6	93.5	3.00	3.00	
900.0	21.00	43.70	884.4	91.7	87.6	126.9	3.00	3.00	
1,000.0	24.00	43.70	976.8	119.4	114.1	165.1	3.00	3.00	
1,100.0	27.00	43.70	1,067.1	150.5	143.8	208.2	3.00	3.00	
1,120.0	27.60	43.70	1,084.8	157.1	150.2	217.3	3.00	3.00	Surface Casing
1,200.0	30.00	43.70	1,154.9	185.0	176.8	255.9	3.00	3.00	
1,290.7	32.72	43.70	1,232.4	219.1	209.4	303.1	3.00	3.00	EOB; Inc=32.72°
1,300.0	32.72	43.70	1,240.2	222.7	212.9	308.1	0.00	0.00	
1,400.0	32.72	43.70	1,324.3	261.8	250.2	362.2	0.00	0.00	
1,500.0	32.72	43.70	1,408.5	300.9	287.6	416.2	0.00	0.00	
1,600.0	32.72	43.70	1,492.6	340.0	324.9	470.3	0.00	0.00	
1,700.0	32.72	43.70	1,576.7	379.1	362.3	524.3	0.00	0.00	
1,800.0	32.72	43.70	1,660.8	418.1	399.6	578.4	0.00	0.00	
1,900.0	32.72	43.70	1,745.0	457.2	437.0	632.4	0.00	0.00	
2,000.0	32.72	43.70	1,829.1	496.3	474.3	686.5	0.00	0.00	
2,100.0	32.72	43.70	1,913.2	535.4	511.7	740.6	0.00	0.00	
2,200.0	32.72	43.70	1,997.4	574.5	549.0	794.6	0.00	0.00	
2,300.0	32.72	43.70	2,081.5	613.5	586.4	848.7	0.00	0.00	
2,400.0	32.72	43.70	2,165.6	652.6	623.7	902.7	0.00	0.00	
2,500.0	32.72	43.70	2,249.8	691.7	661.1	956.8	0.00	0.00	
2,600.0	32.72	43.70	2,333.9	730.8	698.4	1,010.8	0.00	0.00	
2,700.0	32.72	43.70	2,418.0	769.8	735.7	1,064.9	0.00	0.00	
2,800.0	32.72	43.70	2,502.1	808.9	773.1	1,118.9	0.00	0.00	
2,900.0	32.72	43.70	2,586.3	848.0	810.4	1,173.0	0.00	0.00	
3,000.0	32.72	43.70	2,670.4	887.1	847.8	1,227.1	0.00	0.00	
3,100.0	32.72	43.70	2,754.5	926.2	885.1	1,281.1	0.00	0.00	
3,200.0	32.72	43.70	2,838.7	965.2	922.5	1,335.2	0.00	0.00	
3,300.0	32.72	43.70	2,922.8	1,004.3	959.8	1,389.2	0.00	0.00	
3,384.6	32.72	43.70	2,994.0	1,037.4	991.4	1,435.0	0.00	0.00	Ohio Creek
3,400.0	32.72	43.70	3,006.9	1,043.4	997.2	1,443.3	0.00	0.00	
3,500.0	32.72	43.70	3,091.1	1,082.5	1,034.5	1,497.3	0.00	0.00	
3,600.0	32.72	43.70	3,175.2	1,121.6	1,071.9	1,551.4	0.00	0.00	
3,644.9	32.72	43.70	3,213.0	1,139.1	1,088.7	1,575.7	0.00	0.00	Mesaverde
3,700.0	32.72	43.70	3,259.3	1,160.6	1,109.2	1,605.5	0.00	0.00	
3,800.0	32.72	43.70	3,343.4	1,199.7	1,146.6	1,659.5	0.00	0.00	
3,868.9	32.72	43.70	3,401.4	1,226.6	1,172.3	1,696.7	0.00	0.00	Start Drop -2.00
3,900.0	32.10	43.70	3,427.7	1,238.7	1,183.8	1,713.4	2.00	-2.00	
4,000.0	30.10	43.70	3,513.3	1,276.0	1,219.5	1,765.1	2.00	-2.00	
4,100.0	28.10	43.70	3,600.7	1,311.2	1,253.1	1,813.7	2.00	-2.00	
4,200.0	26.10	43.70	3,689.7	1,344.1	1,284.6	1,859.3	2.00	-2.00	
4,300.0	24.10	43.70	3,780.2	1,374.8	1,313.9	1,901.7	2.00	-2.00	
4,400.0	22.10	43.70	3,872.2	1,403.2	1,341.0	1,940.9	2.00	-2.00	
4,456.7	20.96	43.70	3,925.0	1,418.2	1,355.4	1,961.7	2.00	-2.00	Williams Fork
4,500.0	20.10	43.70	3,965.5	1,429.2	1,365.9	1,976.9	2.00	-2.00	

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well Federal 31-2C (PF-31)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KBE @ 5856.0ft (Original Well Elev)
Project:	S. Piceance (Parachute)	MD Reference:	KBE @ 5856.0ft (Original Well Elev)
Site:	SENW S31-T7S-R95W (PF-31 Pad)	North Reference:	True
Well:	Federal 31-2C (PF-31)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

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
4,600.0	18.10	43.70	4,060.0	1,452.8	1,388.5	2,009.6	2.00	-2.00	
4,700.0	16.10	43.70	4,155.6	1,474.1	1,408.8	2,039.0	2.00	-2.00	
4,800.0	14.10	43.70	4,252.1	1,492.9	1,426.8	2,065.1	2.00	-2.00	
4,900.0	12.10	43.70	4,349.5	1,509.3	1,442.4	2,087.7	2.00	-2.00	
5,000.0	10.10	43.70	4,447.6	1,523.2	1,455.7	2,107.0	2.00	-2.00	
5,010.5	9.89	43.70	4,458.0	1,524.5	1,457.0	2,108.8	2.00	-2.00	Top of Gas
5,100.0	8.10	43.70	4,546.4	1,534.7	1,466.7	2,122.8	2.00	-2.00	
5,200.0	6.10	43.70	4,645.6	1,543.6	1,475.2	2,135.2	2.00	-2.00	
5,300.0	4.10	43.70	4,745.2	1,550.0	1,481.4	2,144.1	2.00	-2.00	
5,400.0	2.10	43.70	4,845.0	1,553.9	1,485.1	2,149.5	2.00	-2.00	
5,500.0	0.10	43.70	4,945.0	1,555.3	1,486.4	2,151.4	2.00	-2.00	
5,505.0	0.00	0.00	4,950.0	1,555.3	1,486.4	2,151.4	2.00	-2.00	EOD; Inc=0° - Federal 31-2C (PF-31) TGT
5,600.0	0.00	0.00	5,045.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
5,700.0	0.00	0.00	5,145.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
5,800.0	0.00	0.00	5,245.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
5,900.0	0.00	0.00	5,345.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,000.0	0.00	0.00	5,445.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,100.0	0.00	0.00	5,545.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,200.0	0.00	0.00	5,645.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,300.0	0.00	0.00	5,745.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,321.0	0.00	0.00	5,766.0	1,555.3	1,486.4	2,151.4	0.00	0.00	Coal Ridge
6,400.0	0.00	0.00	5,845.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,500.0	0.00	0.00	5,945.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,600.0	0.00	0.00	6,045.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,638.0	0.00	0.00	6,083.0	1,555.3	1,486.4	2,151.4	0.00	0.00	Rollins SS
6,700.0	0.00	0.00	6,145.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,800.0	0.00	0.00	6,245.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,838.0	0.00	0.00	6,283.0	1,555.3	1,486.4	2,151.4	0.00	0.00	TD @ 6838.0' MD - Federal 31-2C (PF-31) BHL
6,900.0	0.00	0.00	6,345.0	1,555.3	1,486.4	2,151.4	0.00	0.00	
6,938.0	0.00	0.00	6,383.0	1,555.3	1,486.4	2,151.4	0.00	0.00	Permit TD @ 6938.0' MD

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Federal 31-2C (PF-31) T	0.00	0.00	4,950.0	1,555.3	1,486.4	1,580,308.53	2,282,806.03	39.399190	-108.038290
- plan hits target center									
- Circle (radius 25.0)									
Federal 31-2C (PF-31) E	0.00	0.00	6,283.0	1,555.3	1,486.4	1,580,308.53	2,282,806.03	39.399190	-108.038290
- plan hits target center									
- Circle (radius 25.0)									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
1,120.0	1,084.8	Surface Casing	0.000	0.000

Cathedral Energy Services

Planning Report

Database:	EDM 5000.1 US Multi Users DB	Local Co-ordinate Reference:	Well Federal 31-2C (PF-31)
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KBE @ 5856.0ft (Original Well Elev)
Project:	S. Piceance (Parachute)	MD Reference:	KBE @ 5856.0ft (Original Well Elev)
Site:	SEW S31-T7S-R95W (PF-31 Pad)	North Reference:	True
Well:	Federal 31-2C (PF-31)	Survey Calculation Method:	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,384.6	2,994.0	Ohio Creek		0.00	
3,644.9	3,213.0	Mesaverde		0.00	
4,456.7	3,925.0	Williams Fork		0.00	
5,010.5	4,458.0	Top of Gas		0.00	
6,321.0	5,766.0	Coal Ridge		0.00	
6,638.0	6,083.0	Rollins SS		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.0	200.0	0.0	0.0	KOP @ 200' MD
1,290.7	1,232.4	219.1	209.4	EOB; Inc=32.72°
3,868.9	3,401.4	1,226.6	1,172.3	Start Drop -2.00
5,505.0	4,950.0	1,555.3	1,486.4	EOD; Inc=0°
6,838.0	6,283.0	1,555.3	1,486.4	TD @ 6838.0' MD
6,938.0	6,383.0	1,555.3	1,486.4	Permit TD @ 6938.0' MD