

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well FEDERAL 7007E-2
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	22' KB @ 7428.00usft (PATT 303)
Project:	S. Piceance (Parachute)	MD Reference:	22' KB @ 7428.00usft (PATT 303)
Site:	S2-T8S-R93W (H2SW)	North Reference:	True
Well:	FEDERAL 7007E-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

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		S2-T8S-R93W (H2SW)			
Site Position:		Northing:	1,577,208.80 usft	Latitude:	39.396865
From:	Lat/Long	Easting:	2,368,401.95 usft	Longitude:	-107.735196
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.41 °

Well	FEDERAL 7007E-2					
Well Position	+N/-S	0.00 usft	Northing:	1,577,208.79 usft	Latitude:	39.396865
	+E/-W	0.00 usft	Easting:	2,368,401.95 usft	Longitude:	-107.735196
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	7,406.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/14/2016	9.23	65.52	51,685

Design	PLAN #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	271.36

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,013.32	10.27	271.36	1,010.58	1.09	-45.85	2.00	2.00	0.00	271.36	
5,342.48	10.27	271.36	5,270.42	19.34	-817.20	0.00	0.00	0.00	0.00	
5,855.80	0.00	0.00	5,781.00	20.42	-863.05	2.00	-2.00	0.00	180.00	
12,979.80	0.00	0.00	12,905.00	20.42	-863.05	0.00	0.00	0.00	0.00	FED 7007E-2 PBHL
13,079.80	0.00	0.00	13,005.00	20.42	-863.05	0.00	0.00	0.00	0.00	

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Project:	S. Piceance (Parachute)	MD Reference:	22' KB @ 7428.00usft (PATT 303)
Site:	S2-T8S-R93W (H2SW)	North Reference:	True
Well:	FEDERAL 7007E-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	KOP @ 500'
600.00	2.00	271.36	599.98	0.04	-1.74	1.75	2.00	2.00	
700.00	4.00	271.36	699.84	0.17	-6.98	6.98	2.00	2.00	
800.00	6.00	271.36	799.45	0.37	-15.69	15.69	2.00	2.00	
900.00	8.00	271.36	898.70	0.66	-27.87	27.88	2.00	2.00	
1,000.00	10.00	271.36	997.47	1.03	-43.51	43.52	2.00	2.00	
1,013.32	10.27	271.36	1,010.58	1.09	-45.85	45.87	2.00	2.00	EOB; INC=10.27°
1,100.00	10.27	271.36	1,095.87	1.45	-61.30	61.31	0.00	0.00	
1,200.00	10.27	271.36	1,194.27	1.87	-79.11	79.14	0.00	0.00	
1,300.00	10.27	271.36	1,292.67	2.29	-96.93	96.96	0.00	0.00	
1,400.00	10.27	271.36	1,391.07	2.72	-114.75	114.78	0.00	0.00	
1,500.00	10.27	271.36	1,489.47	3.14	-132.57	132.60	0.00	0.00	
1,600.00	10.27	271.36	1,587.86	3.56	-150.38	150.43	0.00	0.00	
1,700.00	10.27	271.36	1,686.26	3.98	-168.20	168.25	0.00	0.00	
1,800.00	10.27	271.36	1,784.66	4.40	-186.02	186.07	0.00	0.00	
1,900.00	10.27	271.36	1,883.06	4.82	-203.84	203.89	0.00	0.00	
2,000.00	10.27	271.36	1,981.46	5.25	-221.65	221.72	0.00	0.00	
2,100.00	10.27	271.36	2,079.86	5.67	-239.47	239.54	0.00	0.00	
2,200.00	10.27	271.36	2,178.26	6.09	-257.29	257.36	0.00	0.00	
2,300.00	10.27	271.36	2,276.66	6.51	-275.11	275.18	0.00	0.00	
2,400.00	10.27	271.36	2,375.06	6.93	-292.92	293.01	0.00	0.00	
2,500.00	10.27	271.36	2,473.46	7.35	-310.74	310.83	0.00	0.00	
2,600.00	10.27	271.36	2,571.85	7.78	-328.56	328.65	0.00	0.00	
2,700.00	10.27	271.36	2,670.25	8.20	-346.38	346.47	0.00	0.00	
2,800.00	10.27	271.36	2,768.65	8.62	-364.19	364.30	0.00	0.00	
2,900.00	10.27	271.36	2,867.05	9.04	-382.01	382.12	0.00	0.00	
3,000.00	10.27	271.36	2,965.45	9.46	-399.83	399.94	0.00	0.00	
3,100.00	10.27	271.36	3,063.85	9.88	-417.65	417.76	0.00	0.00	
3,200.00	10.27	271.36	3,162.25	10.31	-435.46	435.59	0.00	0.00	
3,300.00	10.27	271.36	3,260.65	10.73	-453.28	453.41	0.00	0.00	
3,400.00	10.27	271.36	3,359.05	11.15	-471.10	471.23	0.00	0.00	
3,500.00	10.27	271.36	3,457.45	11.57	-488.92	489.05	0.00	0.00	
3,600.00	10.27	271.36	3,555.84	11.99	-506.73	506.88	0.00	0.00	
3,700.00	10.27	271.36	3,654.24	12.41	-524.55	524.70	0.00	0.00	
3,800.00	10.27	271.36	3,752.64	12.84	-542.37	542.52	0.00	0.00	
3,900.00	10.27	271.36	3,851.04	13.26	-560.19	560.34	0.00	0.00	
4,000.00	10.27	271.36	3,949.44	13.68	-578.00	578.17	0.00	0.00	
4,100.00	10.27	271.36	4,047.84	14.10	-595.82	595.99	0.00	0.00	
4,200.00	10.27	271.36	4,146.24	14.52	-613.64	613.81	0.00	0.00	
4,300.00	10.27	271.36	4,244.64	14.94	-631.46	631.63	0.00	0.00	
4,400.00	10.27	271.36	4,343.04	15.37	-649.27	649.46	0.00	0.00	
4,500.00	10.27	271.36	4,441.44	15.79	-667.09	667.28	0.00	0.00	
4,600.00	10.27	271.36	4,539.83	16.21	-684.91	685.10	0.00	0.00	
4,700.00	10.27	271.36	4,638.23	16.63	-702.73	702.92	0.00	0.00	
4,800.00	10.27	271.36	4,736.63	17.05	-720.54	720.75	0.00	0.00	
4,900.00	10.27	271.36	4,835.03	17.47	-738.36	738.57	0.00	0.00	
5,000.00	10.27	271.36	4,933.43	17.90	-756.18	756.39	0.00	0.00	

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Well:	FEDERAL 7007E-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
5,100.00	10.27	271.36	5,031.83	18.32	-774.00	774.21	0.00	0.00	
5,200.00	10.27	271.36	5,130.23	18.74	-791.81	792.04	0.00	0.00	
5,300.00	10.27	271.36	5,228.63	19.16	-809.63	809.86	0.00	0.00	
5,342.48	10.27	271.36	5,270.42	19.34	-817.20	817.43	0.00	0.00	Start Drop -2.00
5,400.00	9.12	271.36	5,327.13	19.57	-826.88	827.11	2.00	-2.00	
5,500.00	7.12	271.36	5,426.12	19.90	-840.99	841.23	2.00	-2.00	
5,600.00	5.12	271.36	5,525.54	20.15	-851.64	851.88	2.00	-2.00	
5,700.00	3.12	271.36	5,625.28	20.32	-858.82	859.06	2.00	-2.00	
5,800.00	1.12	271.36	5,725.21	20.41	-862.51	862.75	2.00	-2.00	
5,855.80	0.00	0.00	5,781.00	20.42	-863.05	863.30	2.00	-2.00	EOD; INC=0°
5,900.00	0.00	0.00	5,825.20	20.42	-863.05	863.30	0.00	0.00	
5,955.80	0.00	0.00	5,881.00	20.42	-863.05	863.30	0.00	0.00	Mesaverde Marker
6,000.00	0.00	0.00	5,925.20	20.42	-863.05	863.30	0.00	0.00	
6,100.00	0.00	0.00	6,025.20	20.42	-863.05	863.30	0.00	0.00	
6,200.00	0.00	0.00	6,125.20	20.42	-863.05	863.30	0.00	0.00	
6,300.00	0.00	0.00	6,225.20	20.42	-863.05	863.30	0.00	0.00	
6,389.80	0.00	0.00	6,315.00	20.42	-863.05	863.30	0.00	0.00	Williams Fork
6,400.00	0.00	0.00	6,325.20	20.42	-863.05	863.30	0.00	0.00	
6,500.00	0.00	0.00	6,425.20	20.42	-863.05	863.30	0.00	0.00	
6,600.00	0.00	0.00	6,525.20	20.42	-863.05	863.30	0.00	0.00	
6,700.00	0.00	0.00	6,625.20	20.42	-863.05	863.30	0.00	0.00	
6,800.00	0.00	0.00	6,725.20	20.42	-863.05	863.30	0.00	0.00	
6,900.00	0.00	0.00	6,825.20	20.42	-863.05	863.30	0.00	0.00	
7,000.00	0.00	0.00	6,925.20	20.42	-863.05	863.30	0.00	0.00	
7,100.00	0.00	0.00	7,025.20	20.42	-863.05	863.30	0.00	0.00	
7,200.00	0.00	0.00	7,125.20	20.42	-863.05	863.30	0.00	0.00	
7,300.00	0.00	0.00	7,225.20	20.42	-863.05	863.30	0.00	0.00	
7,375.80	0.00	0.00	7,301.00	20.42	-863.05	863.30	0.00	0.00	Top Gas
7,400.00	0.00	0.00	7,325.20	20.42	-863.05	863.30	0.00	0.00	
7,500.00	0.00	0.00	7,425.20	20.42	-863.05	863.30	0.00	0.00	
7,600.00	0.00	0.00	7,525.20	20.42	-863.05	863.30	0.00	0.00	
7,700.00	0.00	0.00	7,625.20	20.42	-863.05	863.30	0.00	0.00	
7,800.00	0.00	0.00	7,725.20	20.42	-863.05	863.30	0.00	0.00	
7,900.00	0.00	0.00	7,825.20	20.42	-863.05	863.30	0.00	0.00	
8,000.00	0.00	0.00	7,925.20	20.42	-863.05	863.30	0.00	0.00	
8,100.00	0.00	0.00	8,025.20	20.42	-863.05	863.30	0.00	0.00	
8,200.00	0.00	0.00	8,125.20	20.42	-863.05	863.30	0.00	0.00	
8,300.00	0.00	0.00	8,225.20	20.42	-863.05	863.30	0.00	0.00	
8,400.00	0.00	0.00	8,325.20	20.42	-863.05	863.30	0.00	0.00	
8,500.00	0.00	0.00	8,425.20	20.42	-863.05	863.30	0.00	0.00	
8,518.80	0.00	0.00	8,444.00	20.42	-863.05	863.30	0.00	0.00	Coal Ridge
8,600.00	0.00	0.00	8,525.20	20.42	-863.05	863.30	0.00	0.00	
8,700.00	0.00	0.00	8,625.20	20.42	-863.05	863.30	0.00	0.00	
8,800.00	0.00	0.00	8,725.20	20.42	-863.05	863.30	0.00	0.00	
8,900.00	0.00	0.00	8,825.20	20.42	-863.05	863.30	0.00	0.00	
9,000.00	0.00	0.00	8,925.20	20.42	-863.05	863.30	0.00	0.00	
9,100.00	0.00	0.00	9,025.20	20.42	-863.05	863.30	0.00	0.00	
9,200.00	0.00	0.00	9,125.20	20.42	-863.05	863.30	0.00	0.00	
9,252.80	0.00	0.00	9,178.00	20.42	-863.05	863.30	0.00	0.00	Rollins
9,300.00	0.00	0.00	9,225.20	20.42	-863.05	863.30	0.00	0.00	
9,400.00	0.00	0.00	9,325.20	20.42	-863.05	863.30	0.00	0.00	
9,500.00	0.00	0.00	9,425.20	20.42	-863.05	863.30	0.00	0.00	

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Project:	S. Piceance (Parachute)	MD Reference:	22' KB @ 7428.00usft (PATT 303)
Site:	S2-T8S-R93W (H2SW)	North Reference:	True
Well:	FEDERAL 7007E-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100u)	Comments / Formations
9,600.00	0.00	0.00	9,525.20	20.42	-863.05	863.30	0.00	0.00	
9,700.00	0.00	0.00	9,625.20	20.42	-863.05	863.30	0.00	0.00	
9,800.00	0.00	0.00	9,725.20	20.42	-863.05	863.30	0.00	0.00	
9,900.00	0.00	0.00	9,825.20	20.42	-863.05	863.30	0.00	0.00	
10,000.00	0.00	0.00	9,925.20	20.42	-863.05	863.30	0.00	0.00	
10,100.00	0.00	0.00	10,025.20	20.42	-863.05	863.30	0.00	0.00	
10,200.00	0.00	0.00	10,125.20	20.42	-863.05	863.30	0.00	0.00	
10,300.00	0.00	0.00	10,225.20	20.42	-863.05	863.30	0.00	0.00	
10,400.00	0.00	0.00	10,325.20	20.42	-863.05	863.30	0.00	0.00	
10,500.00	0.00	0.00	10,425.20	20.42	-863.05	863.30	0.00	0.00	
10,600.00	0.00	0.00	10,525.20	20.42	-863.05	863.30	0.00	0.00	
10,700.00	0.00	0.00	10,625.20	20.42	-863.05	863.30	0.00	0.00	
10,771.80	0.00	0.00	10,697.00	20.42	-863.05	863.30	0.00	0.00	Prairie Canyon
10,800.00	0.00	0.00	10,725.20	20.42	-863.05	863.30	0.00	0.00	
10,900.00	0.00	0.00	10,825.20	20.42	-863.05	863.30	0.00	0.00	
11,000.00	0.00	0.00	10,925.20	20.42	-863.05	863.30	0.00	0.00	
11,100.00	0.00	0.00	11,025.20	20.42	-863.05	863.30	0.00	0.00	
11,200.00	0.00	0.00	11,125.20	20.42	-863.05	863.30	0.00	0.00	
11,300.00	0.00	0.00	11,225.20	20.42	-863.05	863.30	0.00	0.00	
11,400.00	0.00	0.00	11,325.20	20.42	-863.05	863.30	0.00	0.00	
11,500.00	0.00	0.00	11,425.20	20.42	-863.05	863.30	0.00	0.00	
11,600.00	0.00	0.00	11,525.20	20.42	-863.05	863.30	0.00	0.00	
11,700.00	0.00	0.00	11,625.20	20.42	-863.05	863.30	0.00	0.00	
11,800.00	0.00	0.00	11,725.20	20.42	-863.05	863.30	0.00	0.00	
11,869.80	0.00	0.00	11,795.00	20.42	-863.05	863.30	0.00	0.00	Niobrara
11,900.00	0.00	0.00	11,825.20	20.42	-863.05	863.30	0.00	0.00	
12,000.00	0.00	0.00	11,925.20	20.42	-863.05	863.30	0.00	0.00	
12,100.00	0.00	0.00	12,025.20	20.42	-863.05	863.30	0.00	0.00	
12,200.00	0.00	0.00	12,125.20	20.42	-863.05	863.30	0.00	0.00	
12,300.00	0.00	0.00	12,225.20	20.42	-863.05	863.30	0.00	0.00	
12,400.00	0.00	0.00	12,325.20	20.42	-863.05	863.30	0.00	0.00	
12,500.00	0.00	0.00	12,425.20	20.42	-863.05	863.30	0.00	0.00	
12,600.00	0.00	0.00	12,525.20	20.42	-863.05	863.30	0.00	0.00	
12,700.00	0.00	0.00	12,625.20	20.42	-863.05	863.30	0.00	0.00	
12,800.00	0.00	0.00	12,725.20	20.42	-863.05	863.30	0.00	0.00	
12,900.00	0.00	0.00	12,825.20	20.42	-863.05	863.30	0.00	0.00	
12,979.80	0.00	0.00	12,905.00	20.42	-863.05	863.30	0.00	0.00	TD @ 12,905' MD - TD
13,000.00	0.00	0.00	12,925.20	20.42	-863.05	863.30	0.00	0.00	
13,079.80	0.00	0.00	13,005.00	20.42	-863.05	863.30	0.00	0.00	PERMIT TD @ 13,005' MD - PERMIT TD

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
FED 7007E-2 PBHL	0.00	0.00	12,905.00	20.42	-863.05	1,577,250.44	2,367,539.66	39.396921	-107.738250
- plan hits target center									
- Circle (radius 50.00)									

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well FEDERAL 7007E-2
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	22' KB @ 7428.00usft (PATT 303)
Project:	S. Piceance (Parachute)	MD Reference:	22' KB @ 7428.00usft (PATT 303)
Site:	S2-T8S-R93W (H2SW)	North Reference:	True
Well:	FEDERAL 7007E-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2		

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
5,955.80	5,881.00	Mesaverde Marker				
6,389.80	6,315.00	Williams Fork				
7,375.80	7,301.00	Top Gas				
8,518.80	8,444.00	Coal Ridge				
9,252.80	9,178.00	Rollins				
10,771.80	10,697.00	Prairie Canyon				
11,869.80	11,795.00	Niobrara				
12,979.80	12,905.00	TD				
13,079.80	13,005.00	PERMIT TD				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
500.00	500.00	0.00	0.00	KOP @ 500'	
1,013.32	1,010.58	1.09	-45.85	EOB; INC=10.27°	
5,342.48	5,270.42	19.34	-817.20	Start Drop -2.00	
5,855.80	5,781.00	20.42	-863.05	EOD; INC=0°	
12,979.80	12,905.00	20.42	-863.05	TD @ 12,905' MD	
13,079.80	13,005.00	20.42	-863.05	PERMIT TD @ 13,005' MD	