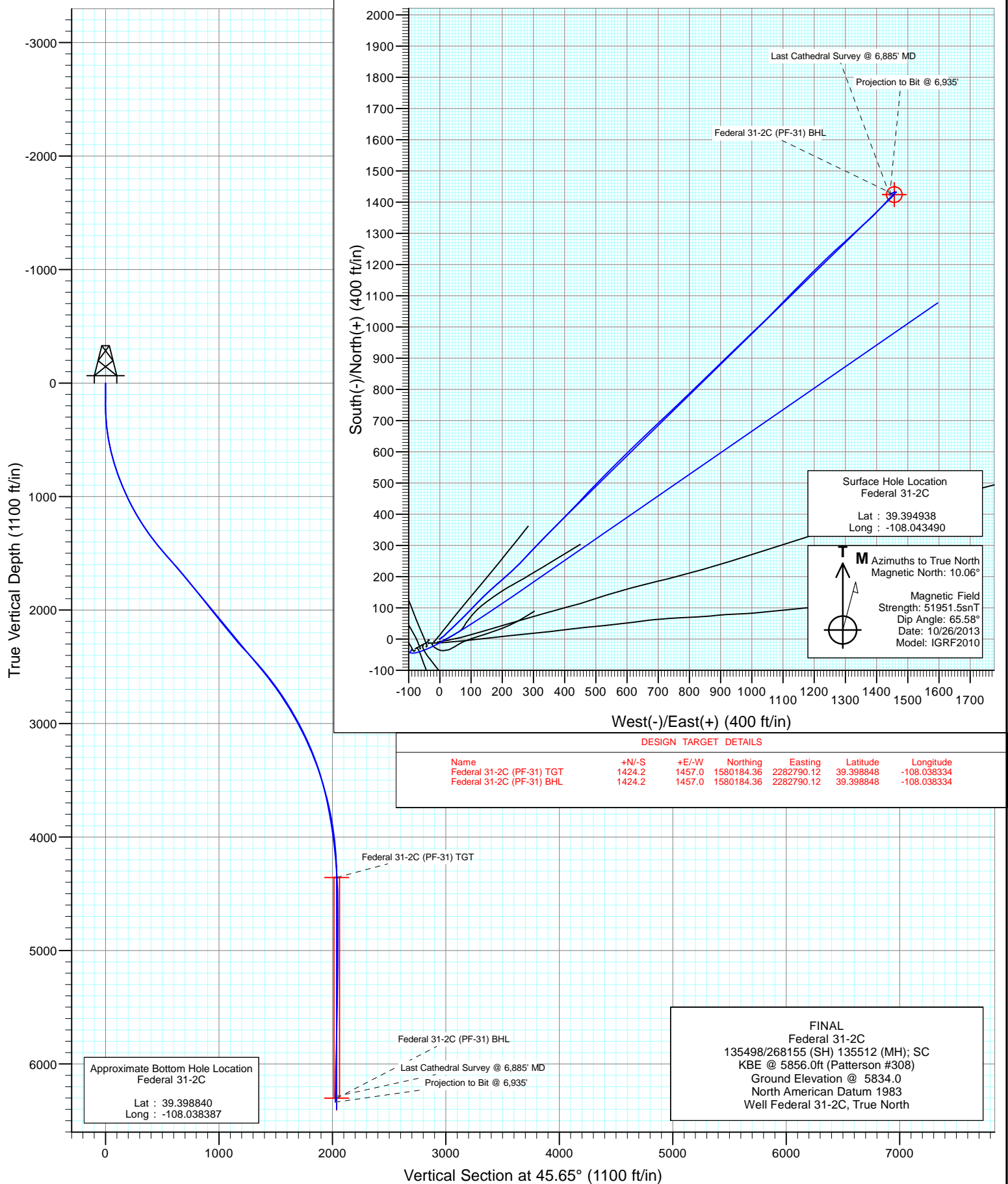


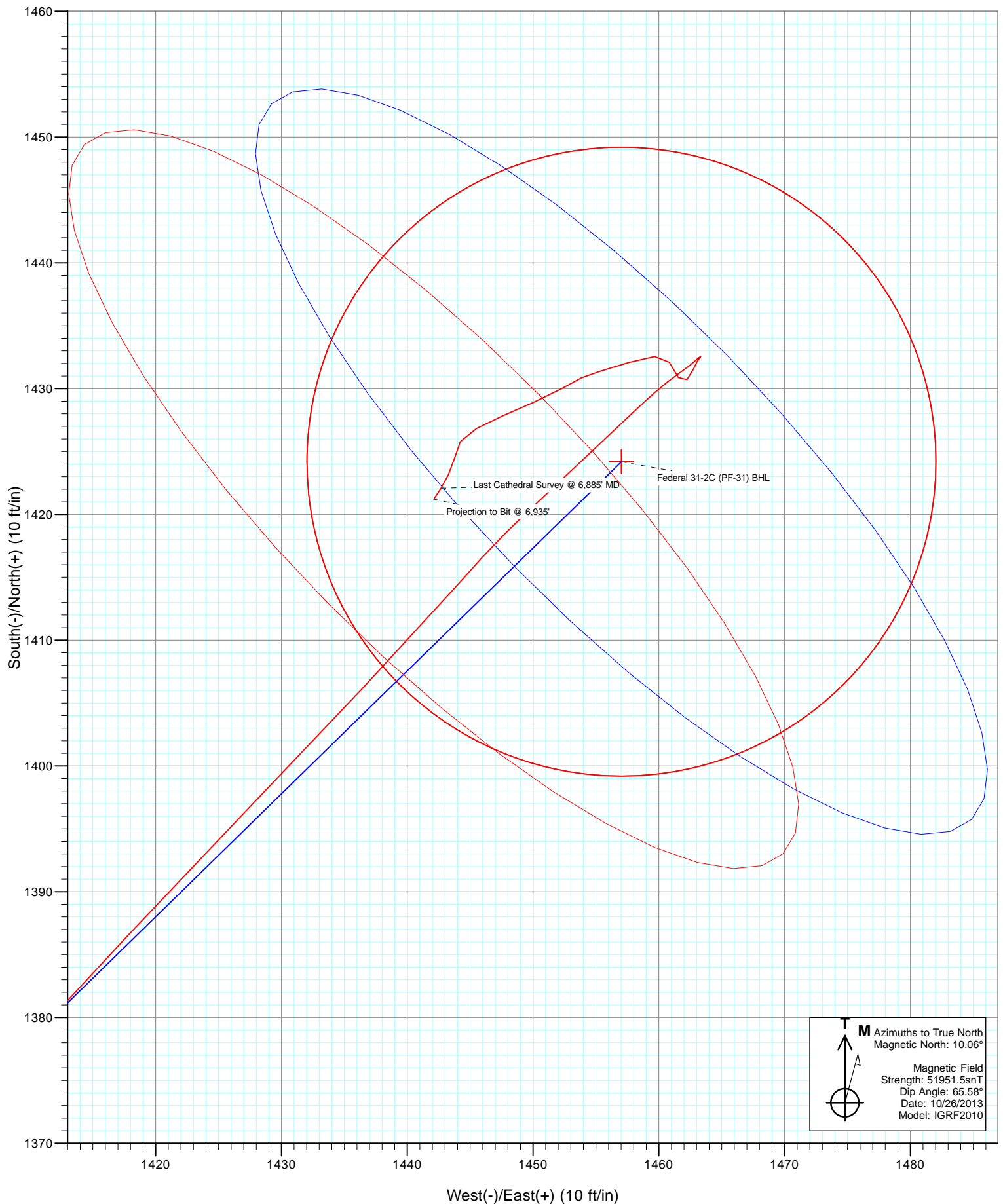


Project: S. Piceance (Parachute)
 Site: PF-31 Pad - S31-T7S-R95W
 Well: Federal 31-2C
 Wellbore: DD
 Design: FINAL



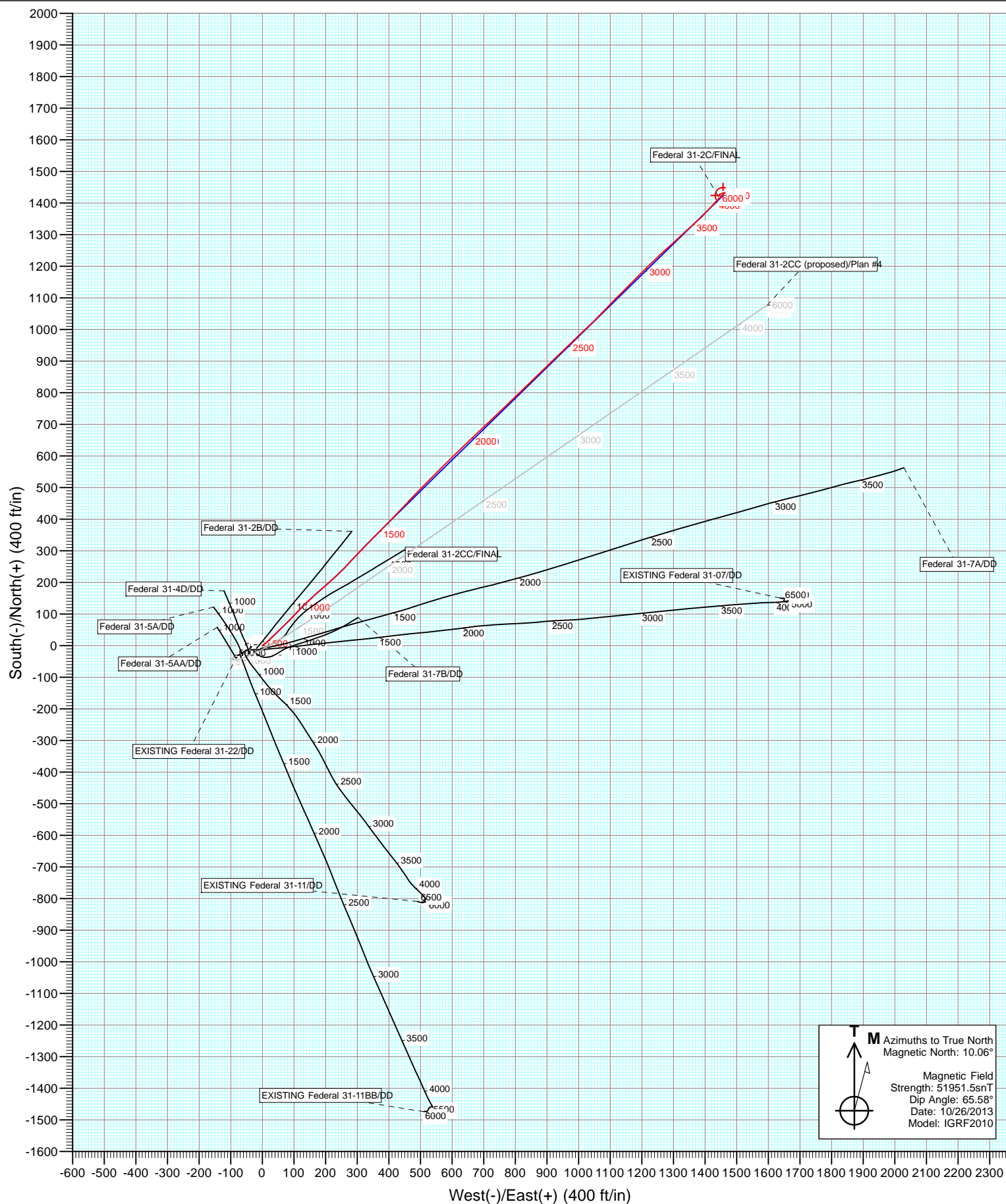


Project: S. Piceance (Parachute)
Site: PF-31 Pad - S31-T7S-R95W
Well: Federal 31-2C
Design: FINAL





Project: S. Piceance (Parachute)
Site: PF-31 Pad - S31-T7S-R95W
Well: Federal 31-2C
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-2C
Project:	S. Piceance (Parachute)	TVD Reference:	KBE @ 5856.0ft (Patterson #308)
Site:	PF-31 Pad - S31-T7S-R95W	MD Reference:	KBE @ 5856.0ft (Patterson #308)
Well:	Federal 31-2C	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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		PF-31 Pad - S31-T7S-R95W			
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:	13.200 in	Grid Convergence:	-1.60 °

Well	Federal 31-2C					
Well Position	+N/-S	0.0 ft	Northing:	1,578,801.51 ft	Latitude:	39.394938
	+E/-W	0.0 ft	Easting:	2,281,293.79 ft	Longitude:	-108.043490
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)
	IGRF2010	10/26/2013	10.06	65.58	51,952

Design	FINAL				
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	45.65	

Survey Program	Date	11/5/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
151.0	6,935.0	Survey #1 (DD)	Geolink 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		
151.0	0.50	228.90	151.0	-0.4	-0.5	-0.7	0.33	0.33		
181.0	0.10	224.00	181.0	-0.5	-0.6	-0.8	1.33	-1.33		
211.0	0.70	70.40	211.0	-0.5	-0.5	-0.7	2.64	2.00		
241.0	1.60	49.90	241.0	-0.2	0.0	-0.1	3.25	3.00		
271.0	2.60	46.10	271.0	0.6	0.8	1.0	3.36	3.33		
302.0	3.40	46.80	301.9	1.7	2.0	2.6	2.58	2.58		
333.0	4.40	53.70	332.9	3.0	3.7	4.7	3.56	3.23		
363.0	5.70	54.50	362.7	4.6	5.8	7.3	4.34	4.33		
394.0	6.60	56.00	393.6	6.5	8.5	10.6	2.95	2.90		
424.0	7.90	61.30	423.3	8.4	11.8	14.3	4.87	4.33		
455.0	8.80	34.50	454.0	11.4	15.0	18.7	12.76	2.90		
485.0	9.60	48.80	483.6	14.9	18.2	23.4	8.05	2.67		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-2C
Project:	S. Piceance (Parachute)	TVD Reference:	KBE @ 5856.0ft (Patterson #308)
Site:	PF-31 Pad - S31-T7S-R95W	MD Reference:	KBE @ 5856.0ft (Patterson #308)
Well:	Federal 31-2C	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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
576.0	12.50	45.80	572.9	26.8	30.9	40.9	3.25	3.19	
667.0	15.30	46.20	661.3	42.0	46.7	62.7	3.08	3.08	
759.0	18.30	45.40	749.3	60.5	65.7	89.3	3.27	3.26	
851.0	20.30	44.90	836.1	82.0	87.3	119.7	2.18	2.17	
942.0	23.30	43.40	920.6	106.2	110.8	153.5	3.35	3.30	
1,033.0	25.40	45.30	1,003.5	133.0	137.0	191.0	2.46	2.31	
1,125.0	27.60	48.30	1,085.9	161.1	167.0	232.0	2.80	2.39	
1,217.0	30.70	48.70	1,166.2	190.8	200.5	276.8	3.38	3.37	
1,308.0	32.70	47.30	1,243.6	222.8	236.0	324.5	2.34	2.20	
1,399.0	35.00	42.90	1,319.2	258.6	271.9	375.2	3.69	2.53	
1,491.0	38.60	43.50	1,392.9	298.8	309.6	430.2	3.93	3.91	
1,582.0	40.30	44.90	1,463.1	340.2	349.9	488.0	2.11	1.87	
1,655.0	41.00	45.10	1,518.5	373.8	383.5	535.6	0.98	0.96	
1,752.0	41.70	42.80	1,591.3	420.0	428.0	599.6	1.72	0.72	
1,798.0	41.70	43.00	1,625.7	442.4	448.8	630.2	0.29	0.00	
1,889.0	39.40	44.30	1,694.8	485.2	489.7	689.3	2.69	-2.53	
1,981.0	38.90	45.00	1,766.2	526.5	530.5	747.4	0.73	-0.54	
2,072.0	38.30	45.00	1,837.3	566.7	570.6	804.2	0.66	-0.66	
2,161.0	39.00	45.90	1,906.8	605.6	610.2	859.7	1.01	0.79	
2,253.0	37.90	46.20	1,978.8	645.3	651.4	916.9	1.21	-1.20	
2,344.0	39.70	46.30	2,049.7	684.8	692.6	974.0	1.98	1.98	
2,435.0	37.50	46.50	2,120.9	723.9	733.7	1,030.7	2.42	-2.42	
2,527.0	40.50	46.50	2,192.4	763.8	775.7	1,088.6	3.26	3.26	
2,618.0	39.00	46.10	2,262.3	804.0	817.8	1,146.8	1.67	-1.65	
2,709.0	43.80	45.60	2,330.6	845.9	860.9	1,207.0	5.29	5.27	
2,801.0	42.50	45.70	2,397.7	889.9	905.9	1,269.9	1.41	-1.41	
2,892.0	41.30	46.50	2,465.4	932.0	949.7	1,330.6	1.44	-1.32	
2,984.0	40.50	46.50	2,534.9	973.5	993.4	1,390.9	0.87	-0.87	
3,075.0	37.70	45.80	2,605.6	1,013.2	1,034.8	1,448.3	3.11	-3.08	
3,167.0	35.00	44.00	2,679.7	1,051.8	1,073.3	1,502.8	3.16	-2.93	
3,259.0	34.70	44.30	2,755.2	1,089.5	1,109.9	1,555.3	0.38	-0.33	
3,350.0	32.30	44.60	2,831.0	1,125.4	1,145.1	1,605.5	2.64	-2.64	
3,441.0	29.50	46.00	2,909.1	1,158.3	1,178.3	1,652.3	3.18	-3.08	
3,533.0	28.00	45.10	2,989.8	1,189.3	1,209.9	1,696.5	1.70	-1.63	
3,624.0	27.60	45.10	3,070.3	1,219.2	1,239.9	1,738.9	0.44	-0.44	
3,716.0	23.90	48.20	3,153.1	1,246.7	1,268.9	1,778.9	4.28	-4.02	
3,807.0	23.20	48.00	3,236.5	1,271.0	1,296.0	1,815.2	0.77	-0.77	
3,899.0	20.00	46.80	3,322.1	1,293.9	1,320.9	1,849.1	3.51	-3.48	
3,991.0	18.10	47.40	3,409.0	1,314.3	1,342.9	1,879.1	2.08	-2.07	
4,082.0	15.30	48.50	3,496.2	1,331.9	1,362.3	1,905.2	3.10	-3.08	
4,173.0	14.50	48.60	3,584.1	1,347.3	1,379.9	1,928.6	0.88	-0.88	
4,265.0	11.80	43.10	3,673.7	1,361.8	1,394.9	1,949.5	3.23	-2.93	
4,356.0	10.60	42.20	3,763.0	1,374.8	1,406.9	1,967.1	1.33	-1.32	
4,447.0	9.70	43.70	3,852.5	1,386.6	1,417.8	1,983.1	1.03	-0.99	
4,539.0	8.40	43.20	3,943.4	1,397.1	1,427.8	1,997.6	1.42	-1.41	
4,630.0	7.30	43.90	4,033.5	1,406.1	1,436.4	2,010.0	1.21	-1.21	
4,722.0	6.50	41.20	4,124.9	1,414.2	1,443.8	2,021.1	0.94	-0.87	
4,813.0	4.00	47.60	4,215.5	1,420.2	1,449.6	2,029.4	2.82	-2.75	
4,904.0	4.00	46.00	4,306.3	1,424.6	1,454.2	2,035.7	0.12	0.00	
4,996.0	3.40	47.50	4,398.1	1,428.6	1,458.5	2,041.6	0.66	-0.65	
5,087.0	1.10	56.90	4,489.0	1,430.9	1,461.2	2,045.2	2.55	-2.53	
5,178.0	0.80	48.60	4,580.0	1,431.8	1,462.5	2,046.7	0.36	-0.33	
5,270.0	0.40	52.90	4,672.0	1,432.5	1,463.2	2,047.7	0.44	-0.43	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-2C
Project:	S. Piceance (Parachute)	TVD Reference:	KBE @ 5856.0ft (Patterson #308)
Site:	PF-31 Pad - S31-T7S-R95W	MD Reference:	KBE @ 5856.0ft (Patterson #308)
Well:	Federal 31-2C	North Reference:	True
Wellbore:	DD	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	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
5,361.0	0.20	227.70	4,763.0	1,432.5	1,463.3	2,047.8	0.66	-0.22	
5,452.0	0.40	210.40	4,854.0	1,432.2	1,463.1	2,047.3	0.24	0.22	
5,544.0	0.40	200.30	4,946.0	1,431.6	1,462.8	2,046.7	0.08	0.00	
5,635.0	0.90	216.10	5,037.0	1,430.7	1,462.2	2,045.8	0.58	0.55	
5,727.0	1.00	340.40	5,129.0	1,430.9	1,461.6	2,045.4	1.83	0.11	
5,818.0	0.80	316.20	5,219.9	1,432.1	1,460.8	2,045.7	0.47	-0.22	
5,910.0	0.90	269.80	5,311.9	1,432.6	1,459.7	2,045.2	0.73	0.11	
6,001.0	1.80	250.40	5,402.9	1,432.1	1,457.6	2,043.4	1.10	0.99	
6,093.0	1.10	258.40	5,494.9	1,431.4	1,455.4	2,041.3	0.79	-0.76	
6,184.0	1.00	241.80	5,585.9	1,430.9	1,453.8	2,039.8	0.35	-0.11	
6,276.0	1.20	240.80	5,677.8	1,430.0	1,452.3	2,038.1	0.22	0.22	
6,367.0	2.00	245.80	5,768.8	1,428.9	1,450.0	2,035.7	0.89	0.88	
6,458.0	1.30	247.30	5,859.8	1,427.8	1,447.6	2,033.3	0.77	-0.77	
6,550.0	1.60	241.70	5,951.7	1,426.8	1,445.5	2,031.1	0.36	0.33	
6,641.0	0.60	200.40	6,042.7	1,425.8	1,444.2	2,029.4	1.34	-1.10	
6,732.0	0.90	198.30	6,133.7	1,424.7	1,443.8	2,028.4	0.33	0.33	
6,824.0	1.10	202.60	6,225.7	1,423.2	1,443.3	2,026.9	0.23	0.22	
6,885.0	1.20	213.70	6,286.7	1,422.1	1,442.7	2,025.7	0.40	0.16	Last Cathedral Survey @ 6,885' MD
6,935.0	1.20	213.70	6,336.7	1,421.2	1,442.1	2,024.7	0.00	0.00	Projection to Bit @ 6,935'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Federal 31-2C (PF-31) T	0.00	0.00	4,357.0	1,424.2	1,457.0	1,580,184.36	2,282,790.12	39.398848	-108.038334
- hit/miss target									
- Shape									
- actual wellpath misses target center by 2.7ft at 4954.8ft MD (4356.9 TVD, 1426.9 N, 1456.7 E)									
- Point									
Federal 31-2C (PF-31) E	0.00	0.00	6,301.0	1,424.2	1,457.0	1,580,184.36	2,282,790.12	39.398848	-108.038334
- actual wellpath misses target center by 20.4ft at 6885.0ft MD (6286.7 TVD, 1422.1 N, 1442.7 E)									
- Circle (radius 25.0)									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
6,885.0	6,286.7	1,422.1	1,442.7	Last Cathedral Survey @ 6,885' MD
6,935.0	6,336.7	1,421.2	1,442.1	Projection to Bit @ 6,935'

Checked By: _____	Approved By: _____	Date: _____
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