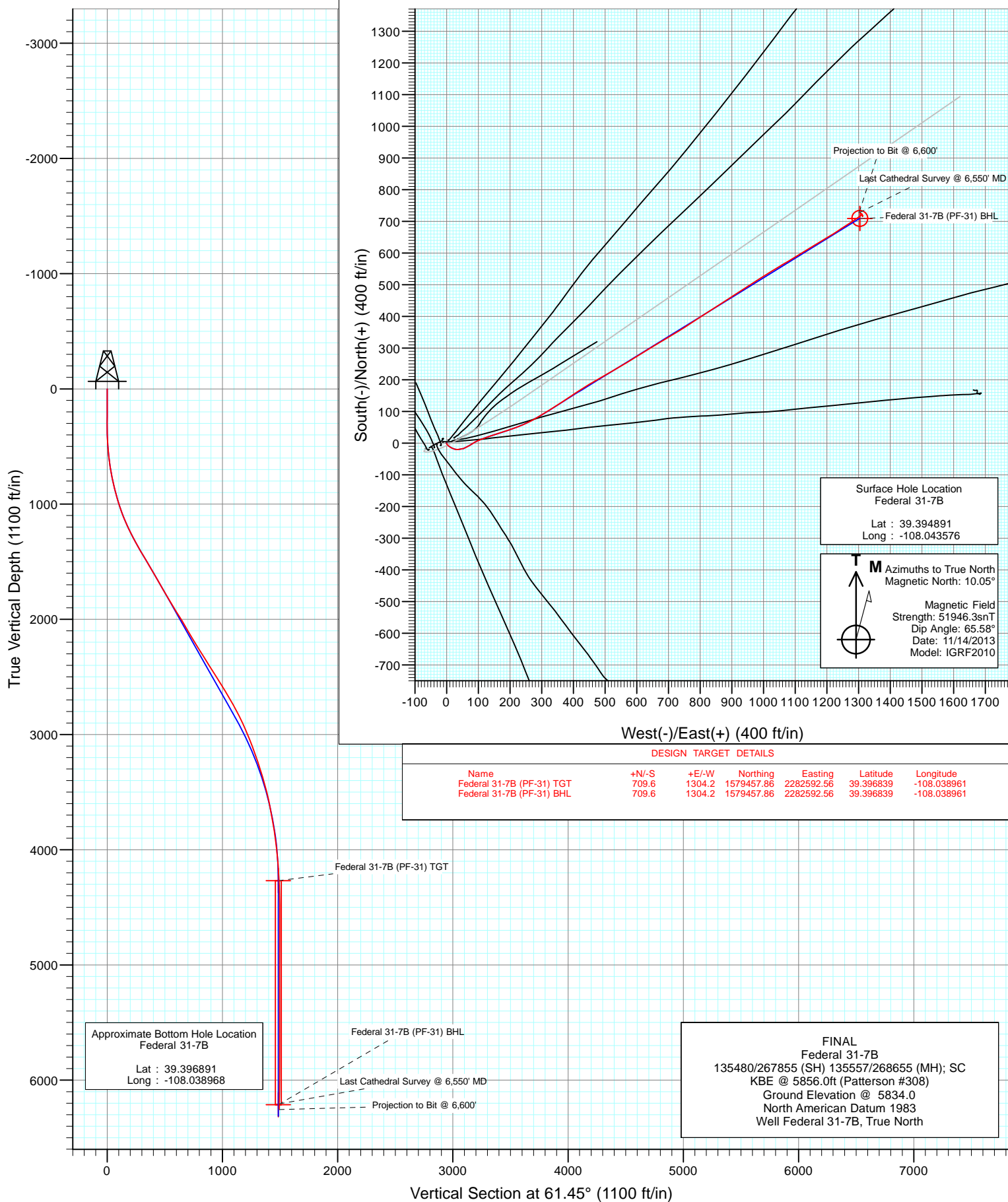


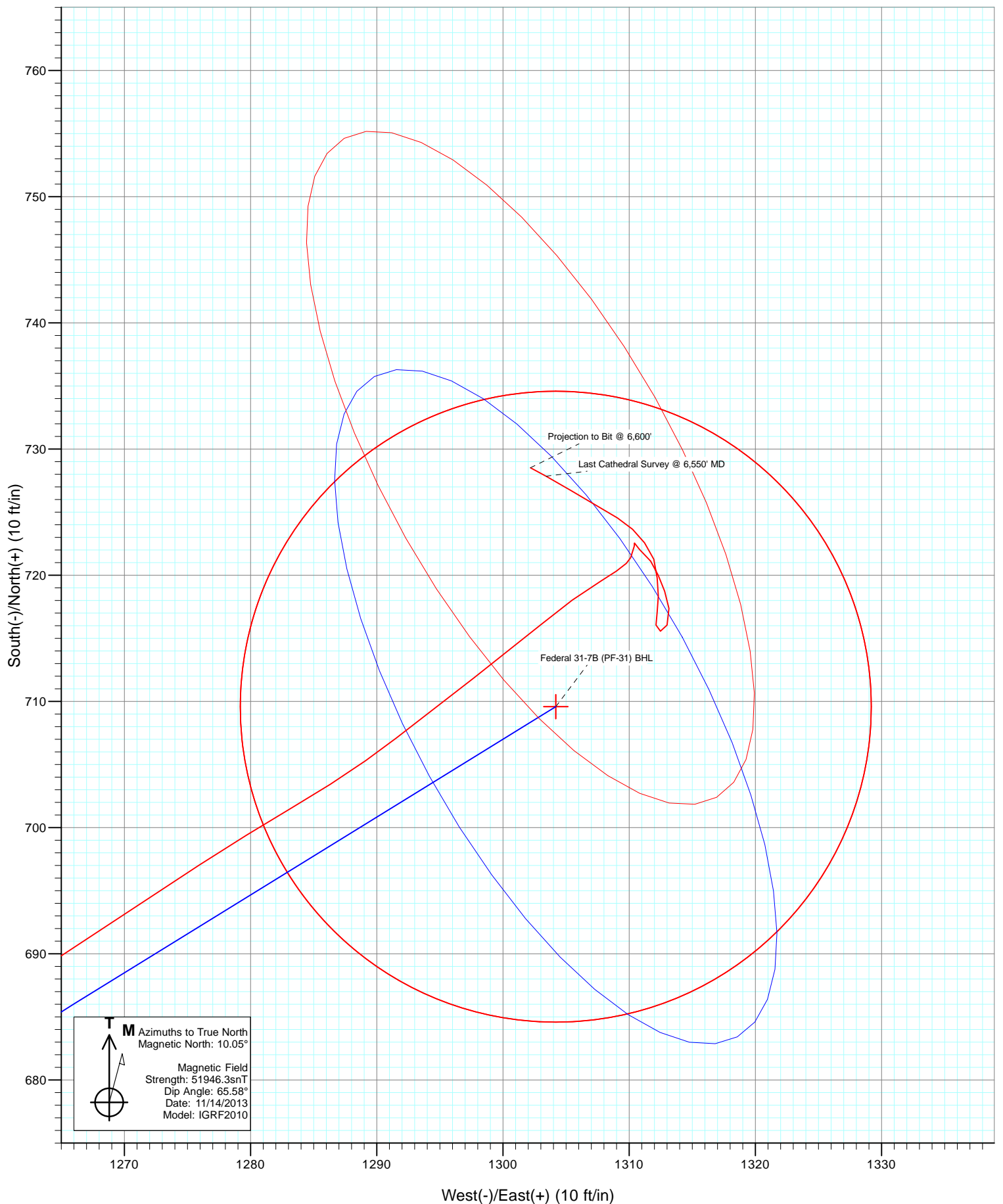


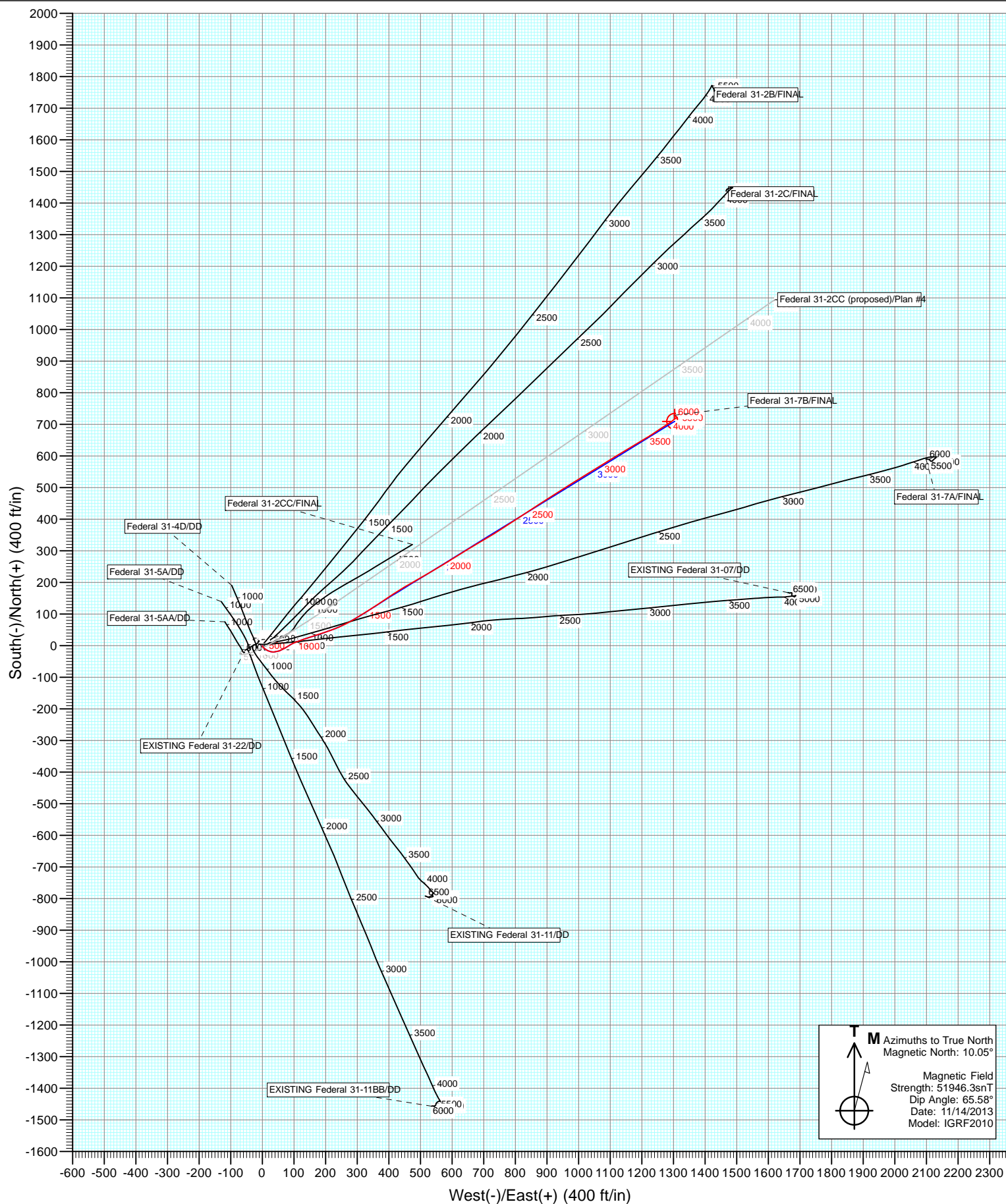
Project: S. Piceance (Parachute)
 Site: PF-31 Pad - S31-T7S-R95W
 Well: Federal 31-7B
 Wellbore: DD
 Design: FINAL





Project: S. Piceance (Parachute)
Site: PF-31 Pad - S31-T7S-R95W
Well: Federal 31-7B
Wellbore: DD
Design: FINAL





Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-7B
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 31-7B	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 31-7B					
Well Position	+N/-S	0.0 ft	Northing:	1,578,785.06 ft	Latitude:	39.394891
	+E/-W	0.0 ft	Easting:	2,281,269.01 ft	Longitude:	-108.043576
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	11/14/2013	10.05	65.58	51,946

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	61.45	

Survey Program	Date	11/23/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
181.0	6,600.0	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		
181.0	0.30	173.70	181.0	-0.5	0.1	-0.2	0.17	0.17		
211.0	1.10	182.30	211.0	-0.8	0.0	-0.4	2.68	2.67		
241.0	1.20	150.30	241.0	-1.4	0.2	-0.5	2.14	0.33		
271.0	1.60	153.50	271.0	-2.0	0.5	-0.5	1.36	1.33		
302.0	2.10	150.50	302.0	-2.9	1.0	-0.5	1.64	1.61		
333.0	2.90	140.00	332.9	-4.0	1.8	-0.3	2.96	2.58		
363.0	3.70	140.80	362.9	-5.4	2.9	0.0	2.67	2.67		
394.0	4.50	134.80	393.8	-7.0	4.4	0.5	2.92	2.58		
424.0	5.10	126.20	423.7	-8.6	6.3	1.4	3.12	2.00		
455.0	5.90	124.90	454.6	-10.3	8.7	2.7	2.61	2.58		
485.0	6.90	123.40	484.4	-12.2	11.5	4.3	3.38	3.33		
515.0	7.70	119.90	514.1	-14.2	14.7	6.2	3.05	2.67		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-7B
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 31-7B	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
546.0	8.00	114.70	544.8	-16.1	18.5	8.5	2.49	0.97	
576.0	8.40	109.60	574.5	-17.7	22.5	11.2	2.77	1.33	
667.0	10.30	89.50	664.3	-19.9	36.9	22.9	4.12	2.09	
759.0	11.80	71.00	754.7	-16.8	54.0	39.4	4.16	1.63	
851.0	12.90	55.10	844.6	-7.8	71.3	58.9	3.87	1.20	
942.0	15.40	61.60	932.8	3.7	90.3	81.1	3.25	2.75	
1,033.0	18.40	69.60	1,019.9	14.5	114.4	107.4	4.16	3.30	
1,125.0	22.10	72.60	1,106.2	24.7	144.5	138.8	4.18	4.02	
1,217.0	25.00	72.10	1,190.5	35.9	179.5	174.8	3.16	3.15	
1,308.0	27.60	69.60	1,272.1	49.1	217.6	214.6	3.11	2.86	
1,399.0	29.00	64.50	1,352.2	66.0	257.3	257.5	3.07	1.54	
1,491.0	30.30	58.80	1,432.2	87.6	297.3	303.0	3.37	1.41	
1,560.0	31.00	58.00	1,491.5	106.1	327.2	338.1	1.17	1.01	
1,709.0	30.50	55.40	1,619.6	147.9	390.9	414.0	0.95	-0.34	
1,801.0	29.40	58.30	1,699.3	173.0	429.3	459.8	1.98	-1.20	
1,892.0	30.40	59.80	1,778.2	196.3	468.2	505.1	1.37	1.10	
1,984.0	31.60	60.70	1,857.1	219.8	509.4	552.5	1.40	1.30	
2,075.0	32.40	59.20	1,934.2	244.0	551.1	600.7	1.24	0.88	
2,167.0	30.50	58.00	2,012.7	269.0	592.1	648.6	2.17	-2.07	
2,259.0	30.40	59.30	2,092.0	293.2	631.9	695.2	0.72	-0.11	
2,350.0	30.90	58.10	2,170.3	317.3	671.5	741.5	0.87	0.55	
2,441.0	31.80	59.90	2,248.0	341.7	712.1	788.8	1.43	0.99	
2,533.0	32.50	56.50	2,325.9	367.5	753.7	837.7	2.11	0.76	
2,625.0	31.60	57.10	2,403.9	394.2	794.5	886.3	1.04	-0.98	
2,716.0	32.80	57.20	2,480.9	420.5	835.3	934.7	1.32	1.32	
2,808.0	31.90	56.40	2,558.6	447.5	876.5	983.7	1.08	-0.98	
2,899.0	31.20	57.50	2,636.2	473.5	916.4	1,031.2	1.00	-0.77	
2,991.0	29.60	57.80	2,715.5	498.4	955.7	1,077.7	1.75	-1.74	
3,082.0	28.00	57.50	2,795.3	521.8	992.7	1,121.4	1.77	-1.76	
3,174.0	25.90	57.70	2,877.3	544.2	1,027.9	1,163.0	2.28	-2.28	
3,265.0	23.20	60.40	2,960.0	563.6	1,060.3	1,200.8	3.21	-2.97	
3,357.0	22.30	58.70	3,044.9	581.7	1,091.0	1,236.3	1.21	-0.98	
3,448.0	19.80	57.80	3,129.8	598.8	1,118.8	1,269.0	2.77	-2.75	
3,540.0	18.40	58.40	3,216.7	614.8	1,144.3	1,299.0	1.54	-1.52	
3,631.0	17.50	58.80	3,303.3	629.4	1,168.3	1,327.0	1.00	-0.99	
3,722.0	16.80	58.90	3,390.3	643.3	1,191.2	1,353.8	0.77	-0.77	
3,814.0	14.90	59.80	3,478.8	656.1	1,212.9	1,378.9	2.08	-2.07	
3,905.0	11.70	55.70	3,567.3	667.2	1,230.6	1,399.8	3.66	-3.52	
3,997.0	10.70	56.80	3,657.6	677.1	1,245.4	1,417.6	1.11	-1.09	
4,089.0	9.80	57.10	3,748.1	686.0	1,259.2	1,433.9	0.98	-0.98	
4,180.0	9.50	56.30	3,837.8	694.4	1,271.9	1,449.1	0.36	-0.33	
4,271.0	7.30	59.50	3,927.8	701.5	1,283.2	1,462.4	2.47	-2.42	
4,363.0	5.30	51.90	4,019.3	707.1	1,291.5	1,472.4	2.35	-2.17	
4,454.0	4.50	52.70	4,109.9	711.8	1,297.7	1,480.1	0.88	-0.88	
4,546.0	4.10	50.20	4,201.7	716.1	1,303.1	1,486.9	0.48	-0.43	
4,637.0	3.20	58.90	4,292.5	719.5	1,307.8	1,492.6	1.16	-0.99	
4,729.0	0.70	17.90	4,384.4	721.4	1,310.1	1,495.6	2.95	-2.72	
4,820.0	0.50	16.90	4,475.4	722.3	1,310.4	1,496.3	0.22	-0.22	
4,912.0	0.20	217.00	4,567.4	722.6	1,310.4	1,496.4	0.75	-0.33	
5,003.0	0.80	128.60	4,658.4	722.0	1,310.8	1,496.5	0.90	0.66	
5,095.0	0.80	144.60	4,750.4	721.1	1,311.7	1,496.8	0.24	0.00	
5,186.0	0.80	158.70	4,841.4	720.0	1,312.3	1,496.8	0.22	0.00	
5,278.0	0.90	156.90	4,933.4	718.7	1,312.8	1,496.7	0.11	0.11	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Federal 31-7B
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 31-7B	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
5,369.0	0.90	175.20	5,024.4	717.4	1,313.2	1,496.3	0.31	0.00	
5,460.0	0.80	199.60	5,115.4	716.1	1,313.0	1,495.6	0.41	-0.11	
5,552.0	0.40	289.50	5,207.4	715.6	1,312.5	1,494.9	0.97	-0.43	
5,642.0	0.50	351.60	5,297.4	716.1	1,312.1	1,494.8	0.52	0.11	
5,735.0	0.80	13.30	5,390.3	717.1	1,312.2	1,495.4	0.41	0.32	
5,827.0	0.80	354.70	5,482.3	718.4	1,312.3	1,496.1	0.28	0.00	
5,918.0	1.00	357.80	5,573.3	719.8	1,312.2	1,496.7	0.23	0.22	
6,010.0	0.90	340.40	5,665.3	721.3	1,312.0	1,497.1	0.33	-0.11	
6,101.0	1.00	322.30	5,756.3	722.6	1,311.2	1,497.1	0.35	0.11	
6,193.0	0.80	313.80	5,848.3	723.6	1,310.3	1,496.8	0.26	-0.22	
6,284.0	1.10	302.00	5,939.3	724.5	1,309.1	1,496.2	0.39	0.33	
6,375.0	1.40	299.40	6,030.3	725.6	1,307.4	1,495.1	0.34	0.33	
6,467.0	1.50	301.60	6,122.2	726.7	1,305.4	1,494.0	0.12	0.11	
6,550.0	1.60	298.20	6,205.2	727.9	1,303.4	1,492.8	0.16	0.12	Last Cathedral Survey @ 6,550' MD
6,600.0	1.60	298.20	6,255.2	728.5	1,302.2	1,492.0	0.00	0.00	Projection to Bit @ 6,600'

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 31-7B (PF-31) T	0.00	0.00	4,269.0	709.6	1,304.2	1,579,457.86	2,282,592.56	39.396839	-108.038961
- actual wellpath misses target center by 9.5ft at 4613.0ft MD (4268.5 TVD, 718.8 N, 1306.6 E)									
- Point									
Federal 31-7B (PF-31) E	0.00	0.00	6,213.0	709.6	1,304.2	1,579,457.86	2,282,592.56	39.396839	-108.038961
- actual wellpath misses target center by 19.9ft at 6550.0ft MD (6205.2 TVD, 727.9 N, 1303.4 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
6,550.0	6,205.2	727.9	1,303.4	Last Cathedral Survey @ 6,550' MD	
6,600.0	6,255.2	728.5	1,302.2	Projection to Bit @ 6,600'	

Checked By: _____	Approved By: _____	Date: _____
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