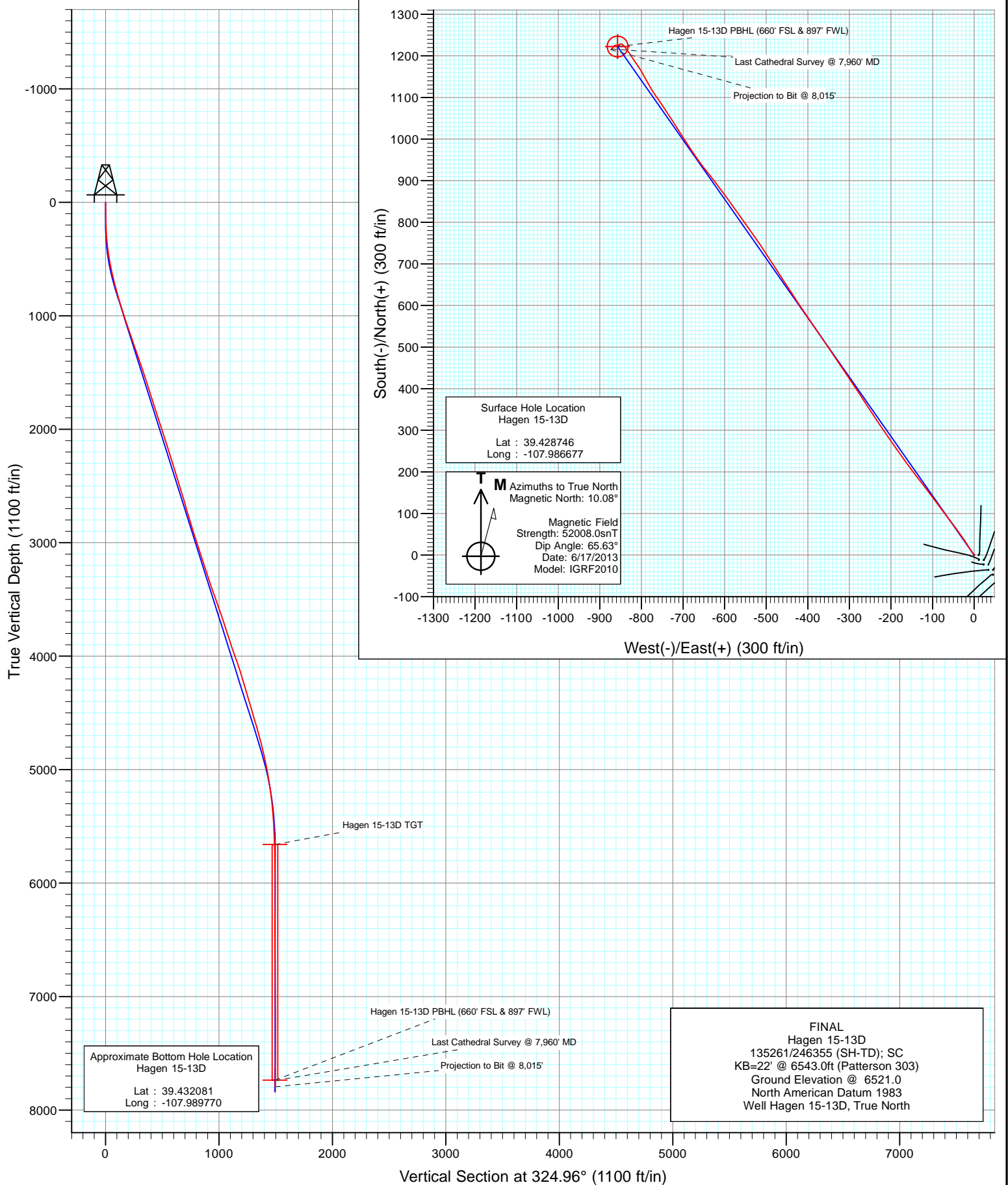


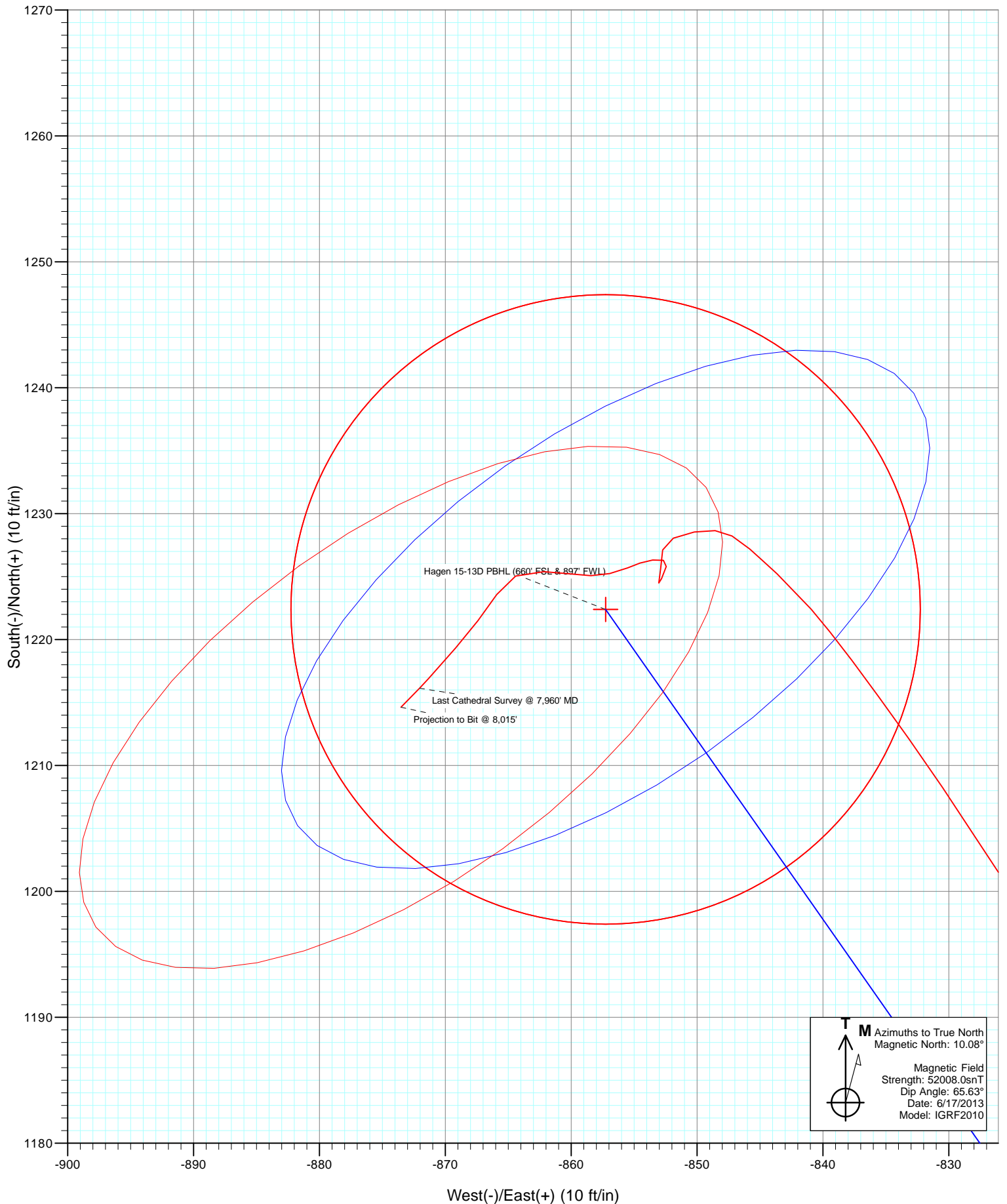


Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen 15-13D
Wellbore: OH
Design: FINAL



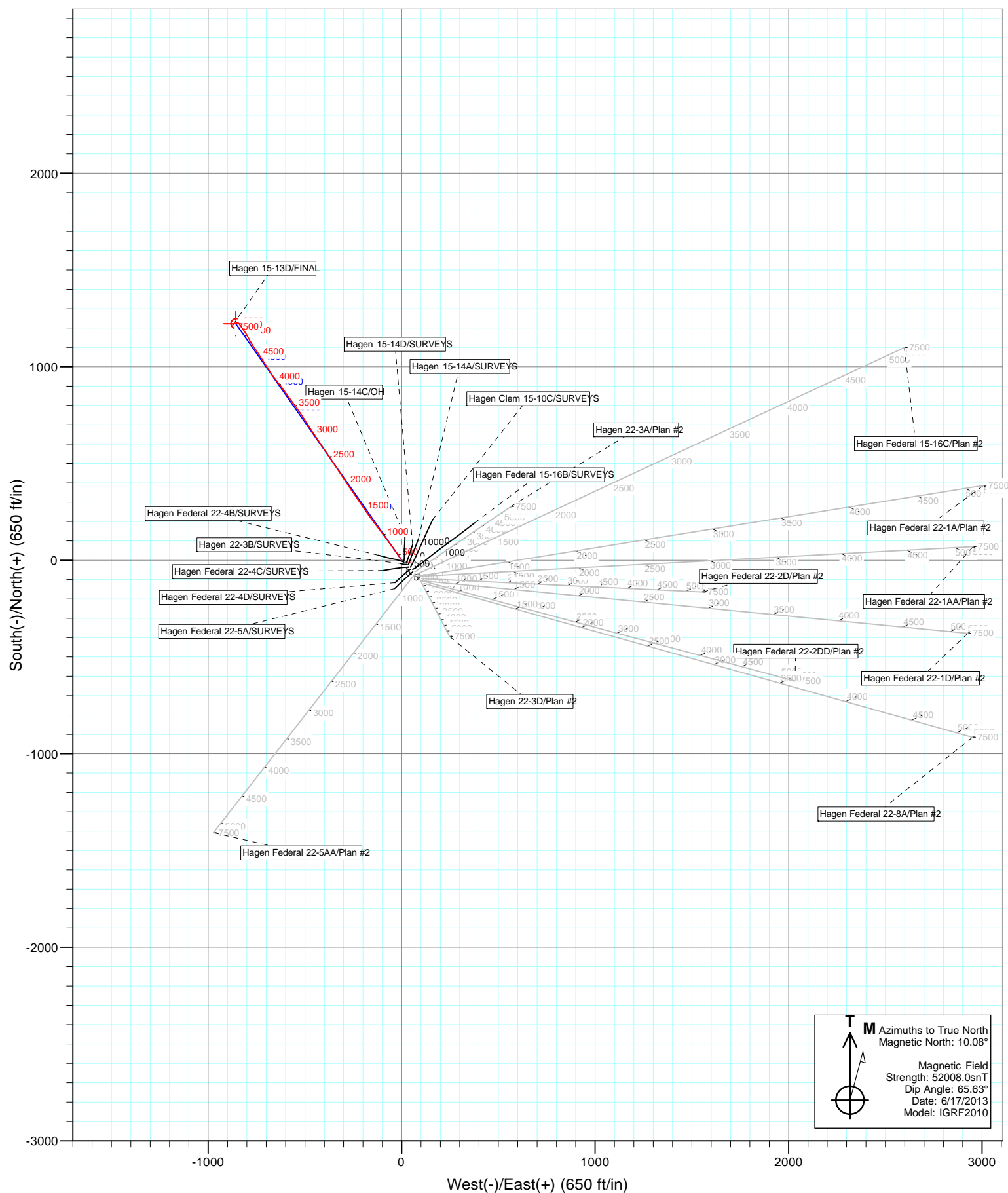


Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen 15-13D
Wellbore: OH
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Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen 15-13D
Wellbore: OH
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen 15-13D
Project:	S. Piceance (Parachute)	TVD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	MD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Well:	Hagen 15-13D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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		PC-22 Pad NENW 2 7S 95W			
Site Position:		Northing:	1,590,596.09 ft	Latitude:	39.428560
From:	Lat/Long	Easting:	2,297,773.66 ft	Longitude:	-107.986340
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.57 °

Well	Hagen 15-13D					
Well Position	+N/-S	0.0 ft	Northing:	1,590,666.40 ft	Latitude:	39.428746
	+E/-W	0.0 ft	Easting:	2,297,680.36 ft	Longitude:	-107.986677
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,521.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/17/2013	10.08	65.63	52,008

Design	OH				
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	324.96	

Survey Program	Date	6/23/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
111.0	8,015.0	Survey #1 (OH)	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		
111.0	0.50	336.90	111.0	0.4	-0.2	0.5	0.45	0.45		
203.0	2.30	331.20	203.0	2.4	-1.2	2.7	1.96	1.96		
233.0	2.90	321.40	232.9	3.6	-2.0	4.1	2.48	2.00		
264.0	3.80	318.40	263.9	4.9	-3.2	5.9	2.96	2.90		
295.0	4.40	319.10	294.8	6.6	-4.6	8.1	1.94	1.94		
325.0	5.40	328.30	324.7	8.7	-6.1	10.6	4.23	3.33		
387.0	6.40	326.80	386.4	14.0	-9.6	17.0	1.63	1.61		
479.0	8.70	326.50	477.6	24.1	-16.2	29.1	2.50	2.50		
571.0	11.00	326.70	568.2	37.3	-24.9	44.8	2.50	2.50		
663.0	13.00	324.10	658.2	53.0	-35.7	63.9	2.25	2.17		
755.0	15.60	323.00	747.3	71.3	-49.3	86.6	2.84	2.83		
846.0	16.30	322.80	834.8	91.2	-64.3	111.6	0.77	0.77		

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen 15-13D
Project:	S. Piceance (Parachute)	TVD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	MD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Well:	Hagen 15-13D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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
938.0	17.40	323.90	922.9	112.6	-80.3	138.3	1.24	1.20	
965.0	17.70	323.50	948.6	119.2	-85.1	146.4	1.20	1.11	
1,071.0	18.50	322.70	1,049.4	145.5	-104.9	179.3	0.79	0.75	
1,163.0	18.80	322.30	1,136.5	168.8	-122.8	208.7	0.35	0.33	
1,254.0	19.20	322.00	1,222.6	192.2	-140.9	238.3	0.45	0.44	
1,345.0	18.70	324.60	1,308.7	215.9	-158.6	267.8	1.08	-0.55	
1,436.0	19.30	324.00	1,394.7	240.0	-175.9	297.5	0.69	0.66	
1,528.0	18.90	325.10	1,481.6	264.5	-193.4	327.6	0.58	-0.43	
1,620.0	17.70	325.70	1,569.0	288.3	-209.8	356.5	1.32	-1.30	
1,712.0	17.80	326.00	1,656.6	311.5	-225.5	384.5	0.15	0.11	
1,803.0	18.30	325.60	1,743.1	334.8	-241.4	412.7	0.57	0.55	
1,894.0	17.40	327.40	1,829.7	358.1	-256.8	440.6	1.16	-0.99	
1,986.0	17.70	326.80	1,917.5	381.3	-271.8	468.3	0.38	0.33	
2,077.0	18.10	326.40	2,004.0	404.7	-287.2	496.3	0.46	0.44	
2,169.0	17.50	326.80	2,091.6	428.2	-302.7	524.4	0.67	-0.65	
2,261.0	17.80	326.00	2,179.3	451.4	-318.2	552.3	0.42	0.33	
2,352.0	18.20	325.30	2,265.9	474.6	-334.0	580.4	0.50	0.44	
2,444.0	16.70	325.80	2,353.6	497.4	-349.6	608.0	1.64	-1.63	
2,535.0	17.00	326.50	2,440.7	519.3	-364.3	634.3	0.40	0.33	
2,627.0	17.20	326.20	2,528.7	541.8	-379.3	661.4	0.24	0.22	
2,719.0	16.40	325.40	2,616.7	563.8	-394.3	688.0	0.91	-0.87	
2,811.0	15.60	324.60	2,705.2	584.6	-408.8	713.3	0.90	-0.87	
2,902.0	17.20	326.70	2,792.5	605.8	-423.3	739.0	1.87	1.76	
2,994.0	17.90	327.20	2,880.2	629.0	-438.4	766.7	0.78	0.76	
3,085.0	17.50	327.10	2,966.9	652.3	-453.4	794.4	0.44	-0.44	
3,176.0	17.30	326.50	3,053.7	675.0	-468.3	821.6	0.30	-0.22	
3,268.0	18.80	327.10	3,141.2	698.9	-483.9	850.1	1.64	1.63	
3,359.0	17.90	327.20	3,227.5	723.0	-499.5	878.7	0.99	-0.99	
3,451.0	18.10	326.00	3,315.0	746.7	-515.1	907.1	0.46	0.22	
3,542.0	19.20	324.70	3,401.3	770.6	-531.7	936.2	1.29	1.21	
3,633.0	19.40	324.40	3,487.1	795.1	-549.1	966.3	0.25	0.22	
3,725.0	19.90	324.40	3,573.8	820.3	-567.1	997.2	0.54	0.54	
3,816.0	18.10	324.40	3,659.8	844.4	-584.4	1,026.8	1.98	-1.98	
3,908.0	18.50	324.00	3,747.2	867.8	-601.3	1,055.7	0.46	0.43	
3,999.0	18.00	322.40	3,833.6	890.6	-618.3	1,084.2	0.78	-0.55	
4,091.0	18.70	322.10	3,920.9	913.5	-636.0	1,113.1	0.77	0.76	
4,182.0	19.60	322.00	4,006.9	937.1	-654.4	1,143.0	0.99	0.99	
4,274.0	18.60	325.40	4,093.8	961.3	-672.2	1,173.0	1.63	-1.09	
4,365.0	16.90	328.20	4,180.5	984.5	-687.5	1,200.8	2.09	-1.87	
4,457.0	16.40	327.50	4,268.6	1,006.8	-701.5	1,227.1	0.59	-0.54	
4,549.0	16.40	327.50	4,356.9	1,028.7	-715.4	1,253.0	0.00	0.00	
4,641.0	16.60	326.90	4,445.1	1,050.7	-729.6	1,279.1	0.29	0.22	
4,732.0	16.20	325.60	4,532.4	1,072.0	-743.9	1,304.8	0.60	-0.44	
4,823.0	16.40	325.40	4,619.7	1,093.1	-758.3	1,330.4	0.23	0.22	
4,915.0	15.20	327.80	4,708.3	1,114.0	-772.1	1,355.4	1.48	-1.30	
5,006.0	13.80	330.50	4,796.4	1,133.5	-783.8	1,378.1	1.71	-1.54	
5,097.0	12.60	331.10	4,885.0	1,151.7	-794.0	1,398.8	1.33	-1.32	
5,189.0	11.30	328.80	4,975.0	1,168.2	-803.5	1,417.8	1.50	-1.41	
5,280.0	10.00	324.70	5,064.4	1,182.2	-812.7	1,434.6	1.65	-1.43	
5,372.0	8.00	325.10	5,155.2	1,194.0	-821.0	1,449.0	2.17	-2.17	
5,464.0	6.90	327.10	5,246.5	1,203.9	-827.6	1,460.9	1.23	-1.20	
5,555.0	5.60	324.60	5,336.9	1,212.1	-833.2	1,470.8	1.46	-1.43	
5,647.0	4.00	323.10	5,428.6	1,218.3	-837.7	1,478.5	1.74	-1.74	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen 15-13D
Project:	S. Piceance (Parachute)	TVD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	MD Reference:	KB=22' @ 6543.0ft (Patterson 303)
Well:	Hagen 15-13D	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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
5,739.0	2.50	318.80	5,520.5	1,222.4	-840.9	1,483.7	1.65	-1.63	
5,830.0	2.40	313.10	5,611.4	1,225.2	-843.6	1,487.5	0.29	-0.11	
5,921.0	1.30	311.50	5,702.3	1,227.2	-845.8	1,490.4	1.21	-1.21	
6,013.0	0.90	298.10	5,794.3	1,228.2	-847.2	1,492.0	0.51	-0.43	
6,104.0	0.90	277.10	5,885.3	1,228.7	-848.6	1,493.2	0.36	0.00	
6,196.0	1.20	258.40	5,977.3	1,228.5	-850.2	1,494.0	0.49	0.33	
6,287.0	1.00	247.50	6,068.3	1,228.1	-851.9	1,494.6	0.32	-0.22	
6,379.0	0.80	188.60	6,160.2	1,227.1	-852.7	1,494.3	0.98	-0.22	
6,471.0	1.10	184.90	6,252.2	1,225.6	-852.9	1,493.1	0.33	0.33	
6,562.0	0.30	196.20	6,343.2	1,224.5	-853.0	1,492.3	0.89	-0.88	
6,653.0	0.80	26.90	6,434.2	1,224.8	-852.8	1,492.5	1.20	0.55	
6,745.0	0.50	11.30	6,526.2	1,225.8	-852.4	1,493.1	0.38	-0.33	
6,836.0	0.40	289.40	6,617.2	1,226.3	-852.7	1,493.6	0.65	-0.11	
6,927.0	0.70	260.60	6,708.2	1,226.3	-853.5	1,494.1	0.44	0.33	
7,019.0	0.60	252.20	6,800.2	1,226.1	-854.5	1,494.5	0.15	-0.11	
7,111.0	0.70	245.80	6,892.2	1,225.7	-855.5	1,494.7	0.13	0.11	
7,202.0	1.20	256.70	6,983.2	1,225.2	-856.9	1,495.2	0.58	0.55	
7,294.0	0.70	275.30	7,075.2	1,225.1	-858.4	1,495.9	0.63	-0.54	
7,386.0	1.10	275.20	7,167.2	1,225.2	-859.9	1,496.8	0.43	0.43	
7,477.0	1.80	274.10	7,258.1	1,225.4	-862.2	1,498.3	0.77	0.77	
7,567.0	1.20	241.80	7,348.1	1,225.0	-864.4	1,499.3	1.13	-0.67	
7,659.0	1.50	212.50	7,440.1	1,223.6	-865.9	1,499.0	0.81	0.33	
7,751.0	1.70	218.80	7,532.0	1,221.5	-867.4	1,498.1	0.29	0.22	
7,842.0	1.80	219.70	7,623.0	1,219.3	-869.2	1,497.4	0.11	0.11	
7,934.0	2.30	222.90	7,714.9	1,216.9	-871.3	1,496.6	0.56	0.54	
7,960.0	2.20	224.10	7,740.9	1,216.1	-872.0	1,496.4	0.43	-0.38	Last Cathedral Survey @ 7,960' MD
8,015.0	2.20	224.10	7,795.9	1,214.6	-873.5	1,496.0	0.00	0.00	Projection to Bit @ 8,015'

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Hagen 15-13D TGT	0.00	0.00	5,660.0	1,222.4	-857.3	1,591,911.80	2,296,856.88	39.432102	-107.989712
- hit/miss target									
- Shape									
- actual wellpath misses target center by 13.0ft at 5878.9ft MD (5660.2 TVD, 1226.4 N, -845.0 E)									
- Point									
Hagen 15-13D PBHL (6ft)	0.00	0.00	7,736.0	1,222.4	-857.3	1,591,911.80	2,296,856.88	39.432102	-107.989712
- actual wellpath misses target center by 15.9ft at 7954.5ft MD (7735.4 TVD, 1216.3 N, -871.9 E)									
- Circle (radius 25.0)									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Comment
7,960.0	7,740.9	1,216.1	-872.0	Last Cathedral Survey @ 7,960' MD
8,015.0	7,795.9	1,214.6	-873.5	Projection to Bit @ 8,015'

Checked By: _____ Approved By: _____ Date: _____