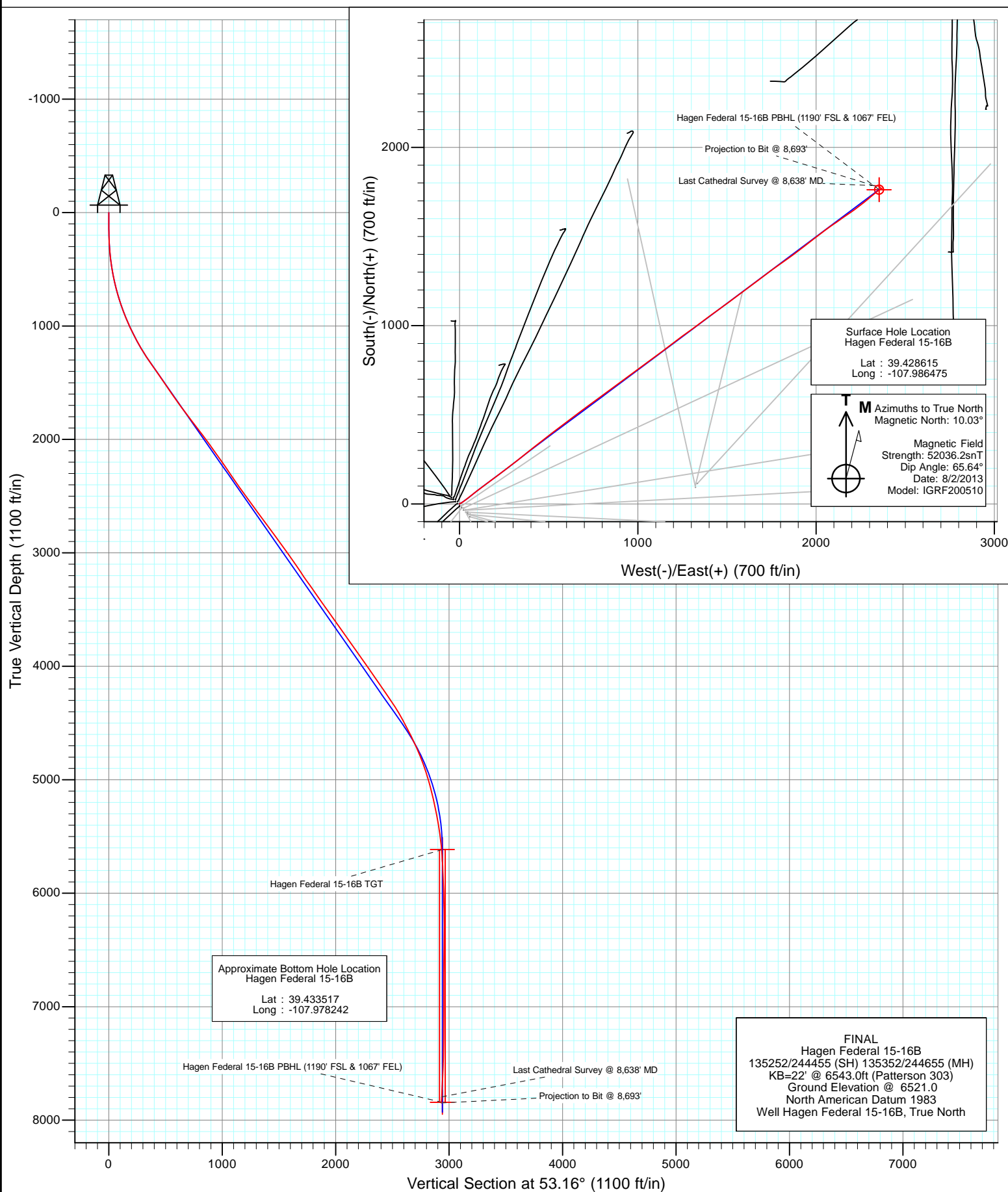


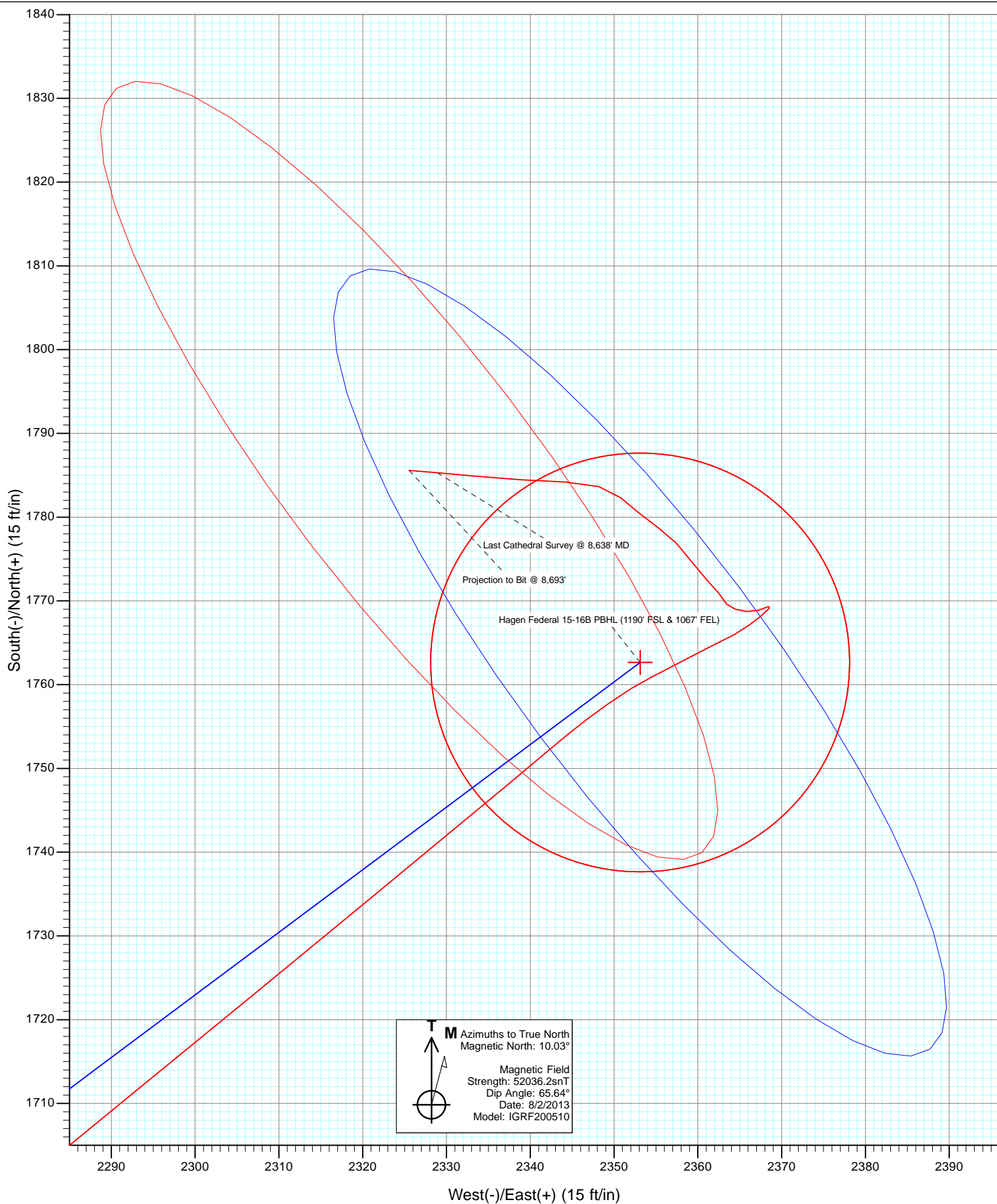


Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 15-16B
Wellbore: OH
Design: FINAL



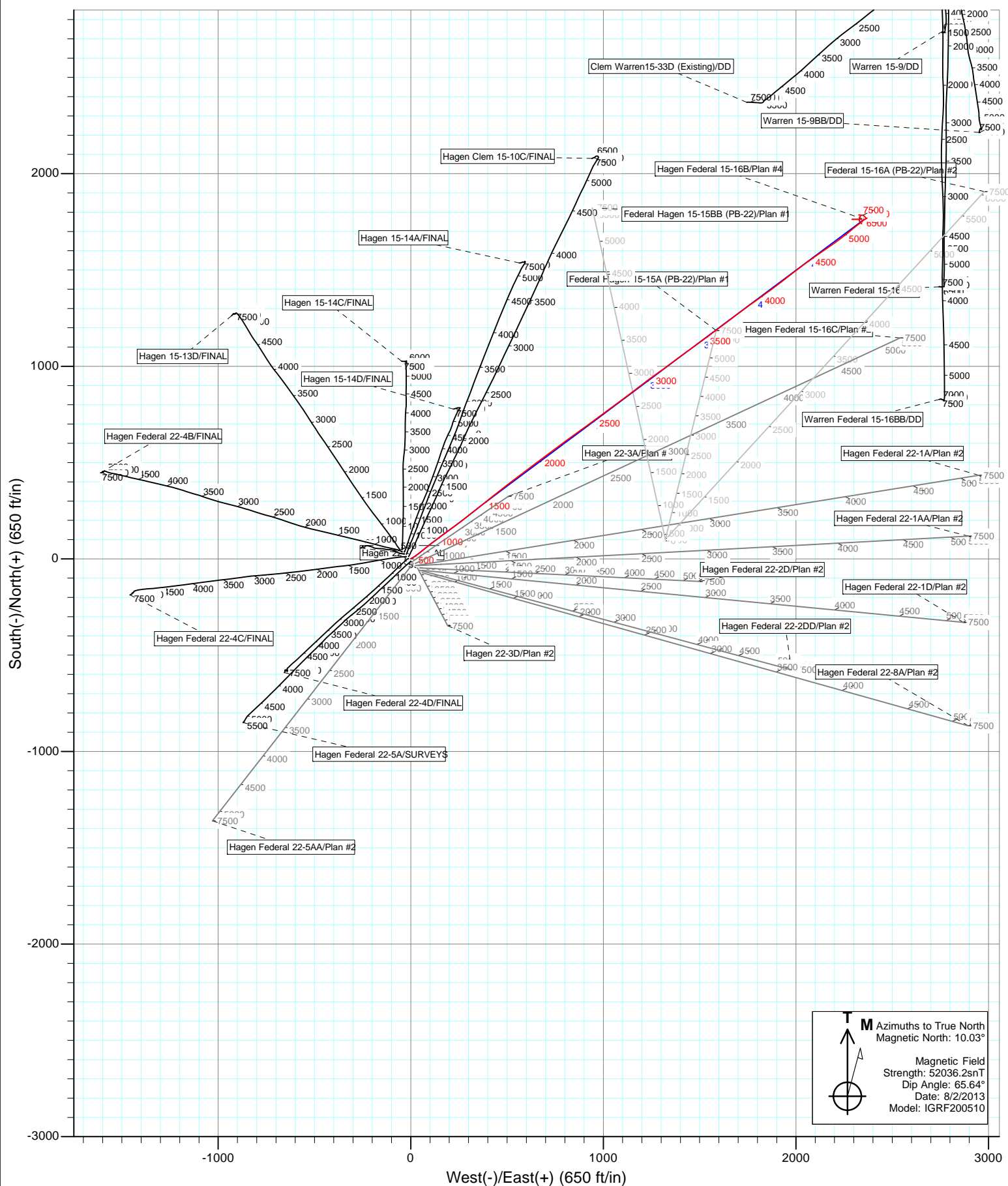


Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
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Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 15-16B
Wellbore: OH
Design: FINAL



Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen Federal 15-16B
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 Federal 15-16B	North Reference:	True
Wellbore:	OH	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	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 Federal 15-16B			
Well Position	+N/-S	0.0 ft	Northing:	1,590,617.15 ft
	+E/-W	0.0 ft	Easting:	2,297,736.09 ft
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)
	IGRF200510	8/2/2013	10.03	65.64	52,036

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	53.16

Survey Program	Date	8/13/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
110.0	8,693.0	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	
110.0	0.00	10.10	110.0	0.0	0.0	0.0	0.00	0.00	
141.0	0.30	57.30	141.0	0.0	0.1	0.1	0.97	0.97	
171.0	0.90	48.10	171.0	0.2	0.3	0.4	2.02	2.00	
201.0	1.50	55.60	201.0	0.6	0.8	1.0	2.06	2.00	
232.0	2.10	55.80	232.0	1.2	1.6	2.0	1.94	1.94	
263.0	2.90	59.40	262.9	1.9	2.8	3.3	2.63	2.58	
293.0	3.80	61.30	292.9	2.8	4.3	5.1	3.02	3.00	
324.0	4.70	61.00	323.8	3.9	6.3	7.4	2.90	2.90	
416.0	6.70	59.00	415.3	8.5	14.2	16.4	2.18	2.17	
509.0	9.40	53.60	507.4	15.8	25.0	29.4	3.01	2.90	
601.0	12.40	51.90	597.8	26.3	38.8	46.8	3.28	3.26	
692.0	15.10	52.00	686.1	39.6	55.8	68.4	2.97	2.97	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen Federal 15-16B
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 Federal 15-16B	North Reference:	True
Wellbore:	OH	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
784.0	17.80	52.00	774.4	55.7	76.3	94.5	2.93	2.93	
876.0	20.30	51.80	861.3	74.2	100.0	124.5	2.72	2.72	
968.0	22.90	52.60	946.9	95.0	126.7	158.4	2.84	2.83	
1,060.0	25.40	53.10	1,030.8	117.7	156.7	196.0	2.73	2.72	
1,152.0	28.20	53.90	1,112.9	142.3	190.1	237.5	3.07	3.04	
1,244.0	30.50	53.50	1,193.1	169.0	226.4	282.6	2.51	2.50	
1,336.0	33.20	52.30	1,271.2	198.3	265.1	331.1	3.01	2.93	
1,428.0	35.00	52.30	1,347.4	229.9	305.9	382.7	1.96	1.96	
1,459.0	35.30	52.00	1,372.8	240.8	320.0	400.5	1.12	0.97	
1,614.0	34.00	50.90	1,500.3	295.7	389.0	488.6	0.93	-0.84	
1,705.0	34.90	51.00	1,575.3	328.2	428.9	540.0	0.99	0.99	
1,797.0	35.00	53.00	1,650.7	360.6	470.5	592.7	1.25	0.11	
1,889.0	36.40	52.80	1,725.4	393.0	513.3	646.4	1.53	1.52	
1,980.0	37.80	52.80	1,798.0	426.2	557.0	701.3	1.54	1.54	
2,071.0	37.00	52.00	1,870.3	459.9	600.8	756.6	1.03	-0.88	
2,163.0	37.10	53.80	1,943.7	493.3	645.0	812.0	1.18	0.11	
2,254.0	36.80	53.50	2,016.4	525.7	689.1	866.7	0.38	-0.33	
2,345.0	35.40	53.50	2,090.0	557.6	732.2	920.3	1.54	-1.54	
2,437.0	35.10	52.70	2,165.1	589.5	774.6	973.4	0.60	-0.33	
2,528.0	35.00	54.30	2,239.6	620.6	816.6	1,025.7	1.02	-0.11	
2,620.0	34.20	53.80	2,315.3	651.3	858.9	1,077.9	0.92	-0.87	
2,712.0	34.90	55.00	2,391.1	681.6	901.3	1,130.0	1.06	0.76	
2,803.0	35.30	53.70	2,465.6	712.1	943.9	1,182.4	0.93	0.44	
2,894.0	37.30	52.80	2,538.9	744.4	987.0	1,236.2	2.27	2.20	
2,986.0	35.70	52.60	2,612.8	777.5	1,030.5	1,290.9	1.74	-1.74	
3,078.0	35.50	54.20	2,687.7	809.5	1,073.5	1,344.5	1.04	-0.22	
3,169.0	37.40	53.60	2,760.8	841.3	1,117.2	1,398.6	2.12	2.09	
3,261.0	36.70	52.90	2,834.3	874.5	1,161.6	1,454.0	0.89	-0.76	
3,353.0	35.90	52.10	2,908.4	907.6	1,204.8	1,508.4	1.01	-0.87	
3,445.0	35.70	54.60	2,983.0	939.8	1,248.0	1,562.3	1.60	-0.22	
3,537.0	35.20	54.00	3,058.0	970.9	1,291.3	1,615.6	0.66	-0.54	
3,628.0	33.30	52.90	3,133.2	1,001.4	1,332.5	1,666.8	2.20	-2.09	
3,720.0	34.80	53.40	3,209.4	1,032.3	1,373.7	1,718.3	1.66	1.63	
3,812.0	35.80	54.30	3,284.5	1,063.6	1,416.6	1,771.5	1.23	1.09	
3,903.0	34.50	53.60	3,358.9	1,094.4	1,459.0	1,823.9	1.50	-1.43	
3,994.0	35.10	54.60	3,433.6	1,124.9	1,501.1	1,875.8	0.91	0.66	
4,086.0	35.30	53.60	3,508.8	1,156.0	1,544.0	1,928.8	0.66	0.22	
4,178.0	35.90	53.20	3,583.6	1,187.9	1,587.0	1,982.4	0.70	0.65	
4,269.0	35.20	52.90	3,657.7	1,219.7	1,629.3	2,035.3	0.79	-0.77	
4,360.0	35.90	52.70	3,731.7	1,251.7	1,671.4	2,088.2	0.78	0.77	
4,451.0	34.90	52.50	3,805.9	1,283.7	1,713.3	2,140.9	1.11	-1.10	
4,542.0	35.30	54.90	3,880.3	1,314.7	1,755.5	2,193.2	1.58	0.44	
4,634.0	34.30	54.50	3,955.9	1,345.0	1,798.3	2,245.7	1.11	-1.09	
4,725.0	35.00	53.40	4,030.7	1,375.5	1,840.2	2,297.4	1.03	0.77	
4,817.0	35.20	53.40	4,106.0	1,407.0	1,882.6	2,350.3	0.22	0.22	
4,908.0	35.50	53.00	4,180.2	1,438.6	1,924.8	2,403.0	0.42	0.33	
5,000.0	34.00	52.40	4,255.8	1,470.3	1,966.5	2,455.4	1.67	-1.63	
5,092.0	33.10	51.60	4,332.5	1,501.6	2,006.6	2,506.2	1.09	-0.98	
5,183.0	31.10	53.50	4,409.6	1,531.1	2,044.9	2,554.6	2.46	-2.20	
5,275.0	28.20	54.90	4,489.5	1,557.7	2,081.8	2,600.1	3.24	-3.15	
5,367.0	26.70	55.60	4,571.2	1,581.9	2,116.7	2,642.5	1.67	-1.63	
5,459.0	25.00	55.30	4,654.0	1,604.6	2,149.7	2,682.5	1.85	-1.85	
5,550.0	24.60	55.30	4,736.6	1,626.4	2,181.1	2,720.7	0.44	-0.44	

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen Federal 15-16B
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 Federal 15-16B	North Reference:	True
Wellbore:	OH	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
5,642.0	20.60	53.60	4,821.5	1,646.9	2,209.9	2,756.0	4.41	-4.35	
5,733.0	19.20	53.30	4,907.0	1,665.3	2,234.8	2,787.0	1.54	-1.54	
5,825.0	16.40	51.60	4,994.6	1,682.4	2,257.1	2,815.1	3.10	-3.04	
5,916.0	14.10	50.70	5,082.4	1,697.4	2,275.7	2,839.0	2.54	-2.53	
6,007.0	12.90	50.70	5,170.9	1,710.9	2,292.2	2,860.3	1.32	-1.32	
6,098.0	11.60	50.80	5,259.8	1,723.1	2,307.1	2,879.5	1.43	-1.43	
6,190.0	10.50	50.10	5,350.1	1,734.3	2,320.7	2,897.2	1.20	-1.20	
6,282.0	8.50	50.70	5,440.9	1,744.0	2,332.4	2,912.3	2.18	-2.17	
6,373.0	7.00	49.60	5,531.0	1,751.9	2,341.8	2,924.6	1.66	-1.65	
6,464.0	4.80	55.00	5,621.5	1,757.6	2,349.2	2,933.9	2.49	-2.42	
6,556.0	2.90	63.90	5,713.3	1,760.9	2,354.4	2,940.1	2.16	-2.07	
6,647.0	2.50	60.90	5,804.2	1,762.8	2,358.2	2,944.3	0.47	-0.44	
6,739.0	2.20	64.90	5,896.1	1,764.6	2,361.6	2,948.0	0.37	-0.33	
6,830.0	1.70	61.00	5,987.1	1,766.0	2,364.3	2,951.0	0.57	-0.55	
6,922.0	1.10	51.60	6,079.1	1,767.2	2,366.2	2,953.3	0.70	-0.65	
7,014.0	1.00	52.60	6,171.1	1,768.2	2,367.5	2,955.0	0.11	-0.11	
7,105.0	0.70	38.40	6,262.0	1,769.1	2,368.5	2,956.3	0.40	-0.33	
7,197.0	0.60	241.30	6,354.0	1,769.3	2,368.5	2,956.4	1.39	-0.11	
7,288.0	1.10	253.60	6,445.0	1,768.9	2,367.2	2,955.1	0.58	0.55	
7,380.0	0.70	282.80	6,537.0	1,768.7	2,365.8	2,953.9	0.65	-0.43	
7,471.0	1.00	280.10	6,628.0	1,769.0	2,364.5	2,953.0	0.33	0.33	
7,563.0	0.70	330.30	6,720.0	1,769.6	2,363.4	2,952.5	0.84	-0.33	
7,654.0	1.20	321.70	6,811.0	1,770.9	2,362.5	2,952.5	0.57	0.55	
7,745.0	1.70	315.70	6,902.0	1,772.6	2,361.0	2,952.3	0.57	0.55	
7,837.0	1.70	324.60	6,993.9	1,774.7	2,359.3	2,952.2	0.29	0.00	
7,929.0	1.90	316.70	7,085.9	1,776.9	2,357.4	2,952.1	0.35	0.22	
8,020.0	1.80	304.10	7,176.8	1,778.8	2,355.2	2,951.4	0.46	-0.11	
8,111.0	1.80	310.50	7,267.8	1,780.5	2,352.9	2,950.7	0.22	0.00	
8,203.0	1.70	309.00	7,359.7	1,782.3	2,350.8	2,950.0	0.12	-0.11	
8,295.0	2.00	286.80	7,451.7	1,783.6	2,348.2	2,948.7	0.84	0.33	
8,386.0	3.10	272.30	7,542.6	1,784.2	2,344.2	2,945.9	1.39	1.21	
8,478.0	3.60	273.30	7,634.4	1,784.5	2,338.8	2,941.7	0.55	0.54	
8,569.0	3.60	275.80	7,725.3	1,784.9	2,333.1	2,937.4	0.17	0.00	
8,638.0	3.50	274.70	7,794.1	1,785.3	2,328.9	2,934.3	0.18	-0.14	Last Cathedral Survey @ 8,638' MD
8,693.0	3.50	274.70	7,849.0	1,785.6	2,325.5	2,931.8	0.00	0.00	Projection to Bit @ 8,693'

Cathedral Energy Services

Survey Report

Company:	EnCana Oil & Gas (USA) Inc	Local Co-ordinate Reference:	Well Hagen Federal 15-16B
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 Federal 15-16B	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
- Shape									
Hagen Federal 15-16B T	0.00	0.00	5,614.0	1,762.6	2,353.1	1,592,314.74	2,300,136.56	39.433454	-107.978144
- actual wellpath misses target center by 7.0ft at 6457.1ft MD (5614.7 TVD, 1757.3 N, 2348.7 E)									
- Point									
Hagen Federal 15-16B F	0.00	0.00	7,843.0	1,762.6	2,353.1	1,592,314.74	2,300,136.56	39.433454	-107.978144
- actual wellpath misses target center by 35.5ft at 8685.2ft MD (7841.2 TVD, 1785.5 N, 2326.0 E)									
- Circle (radius 25.0)									

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W		
		(ft)	(ft)	Comment	
8,638.0	7,794.1	1,785.3	2,328.9	Last Cathedral Survey @ 8,638' MD	
8,693.0	7,849.0	1,785.6	2,325.5	Projection to Bit @ 8,693'	

Checked By: _____ Approved By: _____ Date: _____