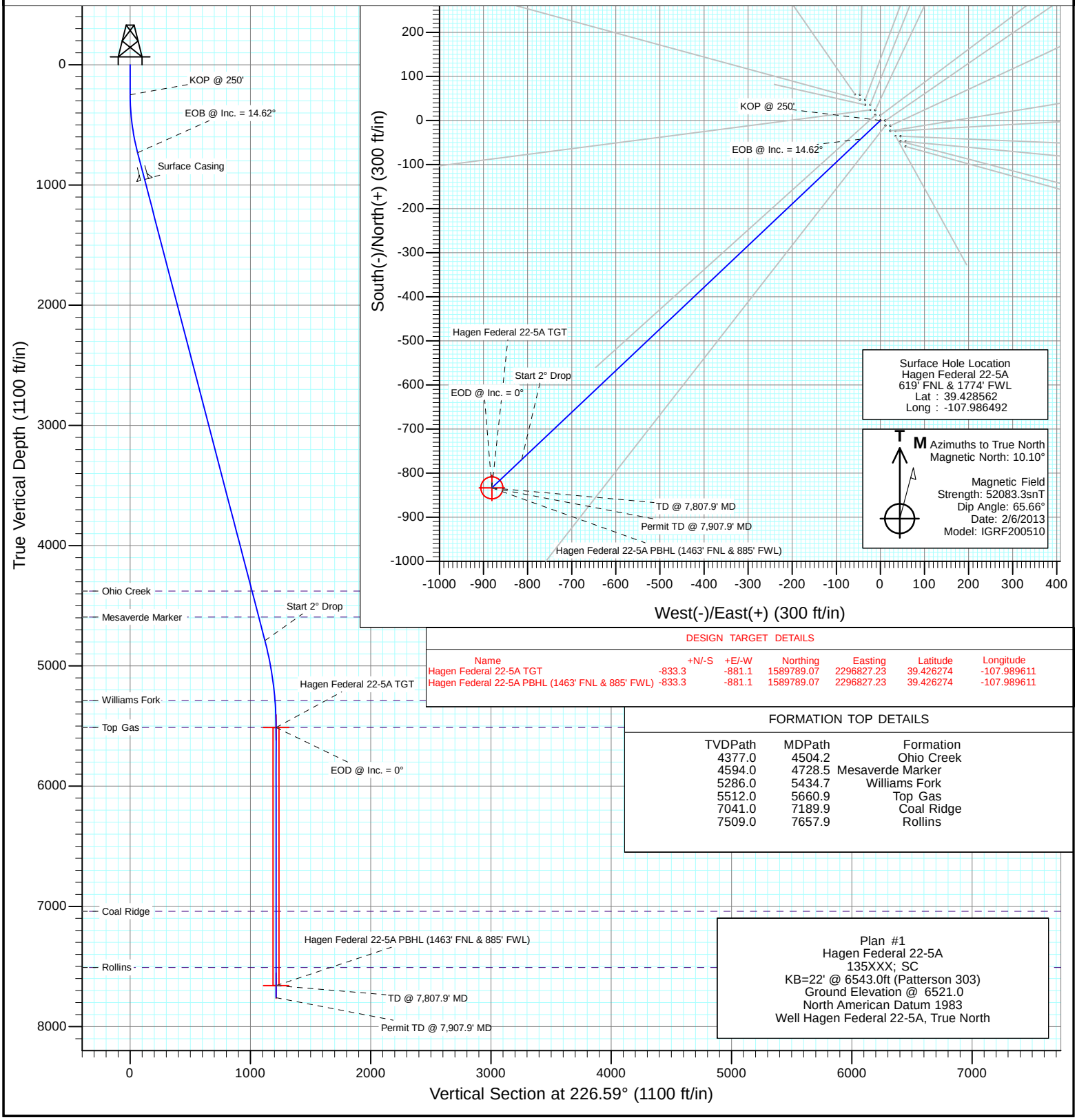
Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 22-5A
Wellbore: OH
Design: Plan #1

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.0	
3	737.3	14.62	226.59	732.0	-42.5	-44.9	3.00	226.59	61.8	
4	4930.0	14.62	226.59	4789.0	-769.6	-813.7	0.00	0.00	1120.0	
5	5660.9	0.00	0.00	5512.0	-833.3	-881.1	2.00	180.00	1212.7	Hagen Federal 22-5A TGT
6	7807.9	0.00	0.00	7659.0	-833.3	-881.1	0.00	0.00	1212.7	Hagen Federal 22-5A PBHL (1463' FNL & 885' FWL)
7	7907.9	0.00	0.00	7759.0	-833.3	-881.1	0.00	0.00	1212.7	



Surface Hole Location
Hagen Federal 22-5A
619' FNL & 1774' FWL
Lat : 39.428562
Long : -107.986492

Azimuths to True North
Magnetic North: 10.10°

Magnetic Field
Strength: 52083.3snT
Dip Angle: 65.66°
Date: 2/6/2013
Model: IGRF200510

DESIGN TARGET DETAILS

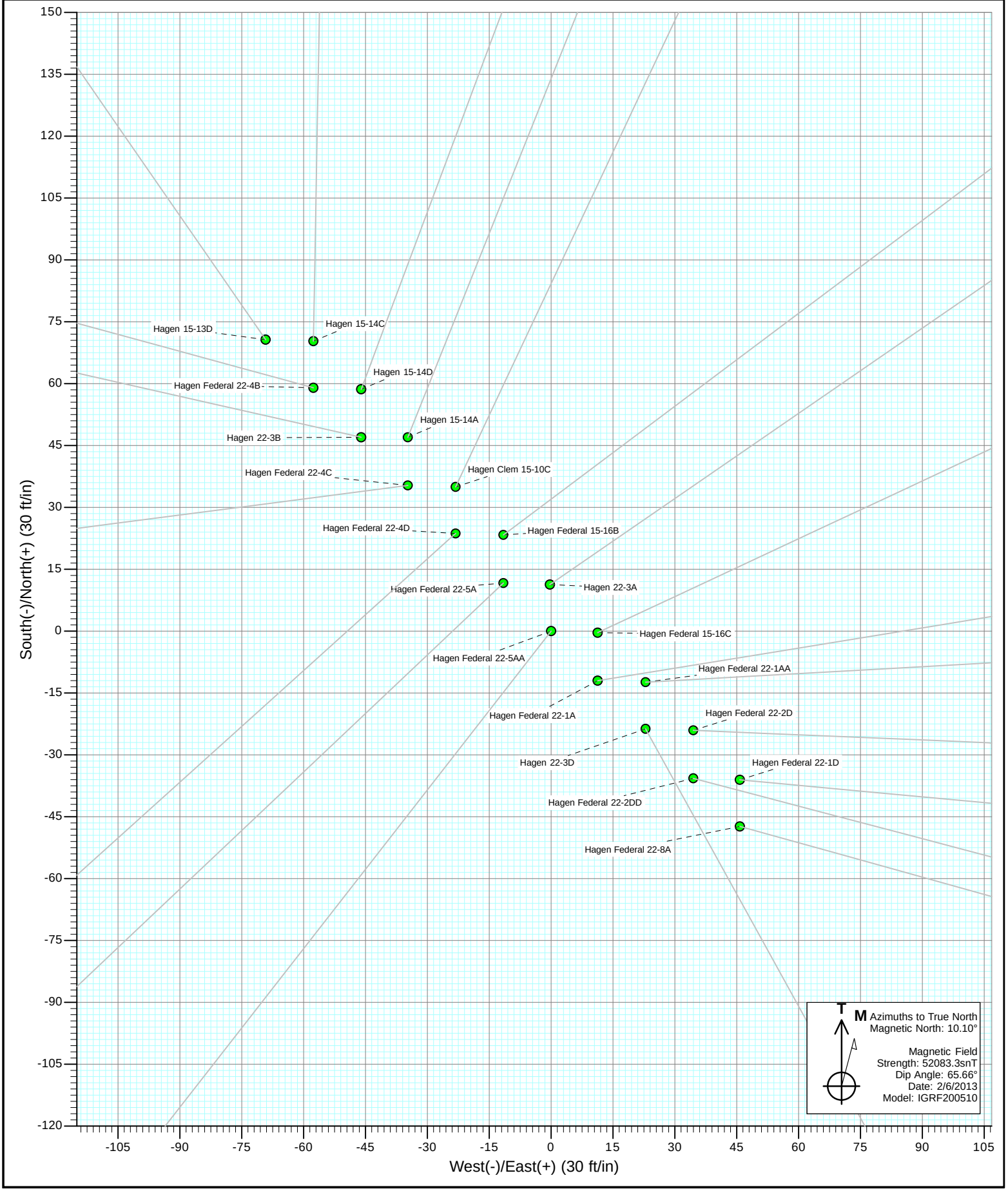
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Hagen Federal 22-5A TGT	-833.3	-881.1	1589789.07	2296827.23	39.426274	-107.989611
Hagen Federal 22-5A PBHL (1463' FNL & 885' FWL)	-833.3	-881.1	1589789.07	2296827.23	39.426274	-107.989611

FORMATION TOP DETAILS

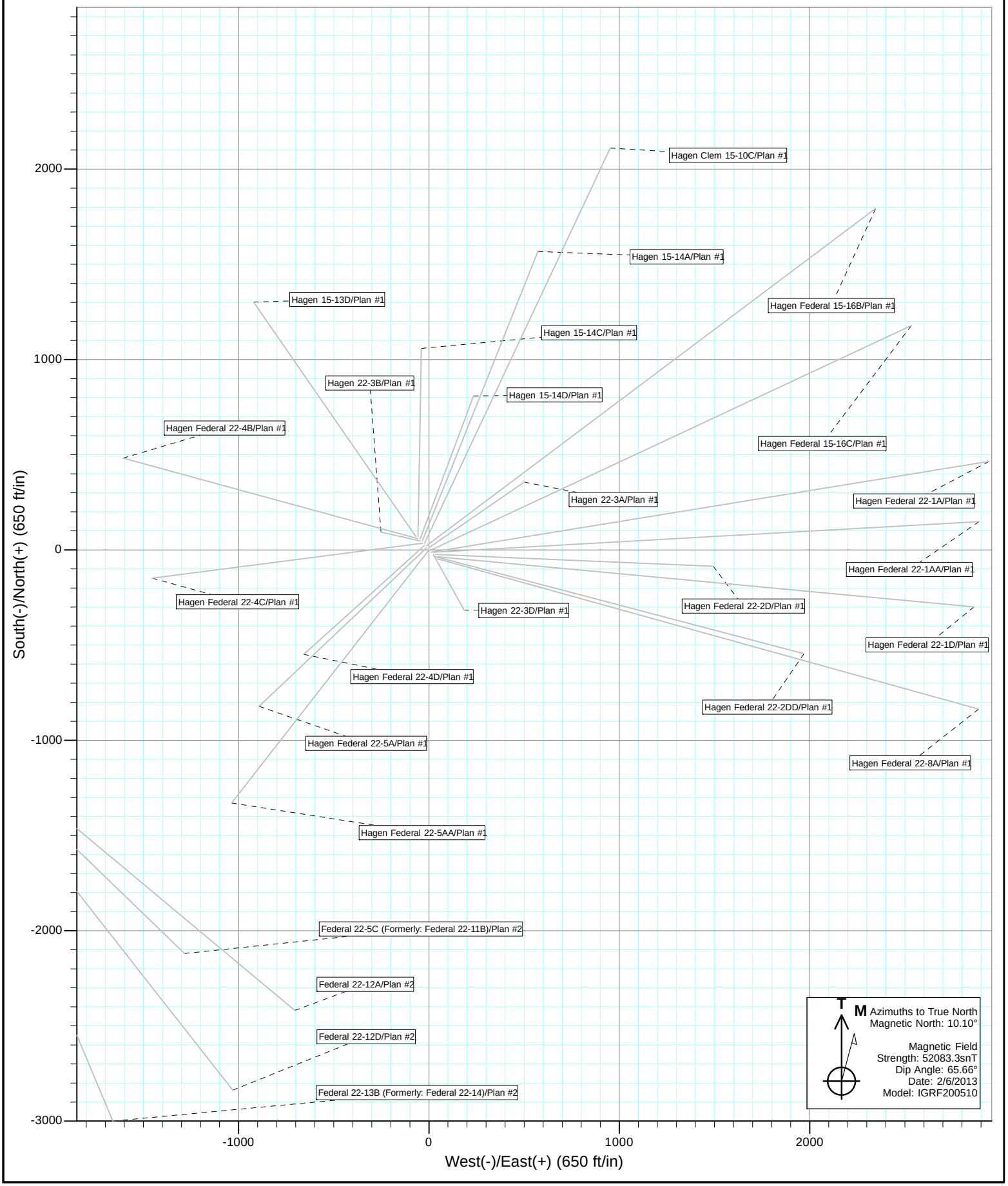
TVDPath	MDPath	Formation
4377.0	4504.2	Ohio Creek
4594.0	4728.5	Mesaverde Marker
5286.0	5434.7	Williams Fork
5512.0	5660.9	Top Gas
7041.0	7189.9	Coal Ridge
7509.0	7657.9	Rollins

Plan #1
Hagen Federal 22-5A
135XXX; SC
KB=22' @ 6543.0ft (Patterson 303)
Ground Elevation @ 6521.0
North American Datum 1983
Well Hagen Federal 22-5A, True North

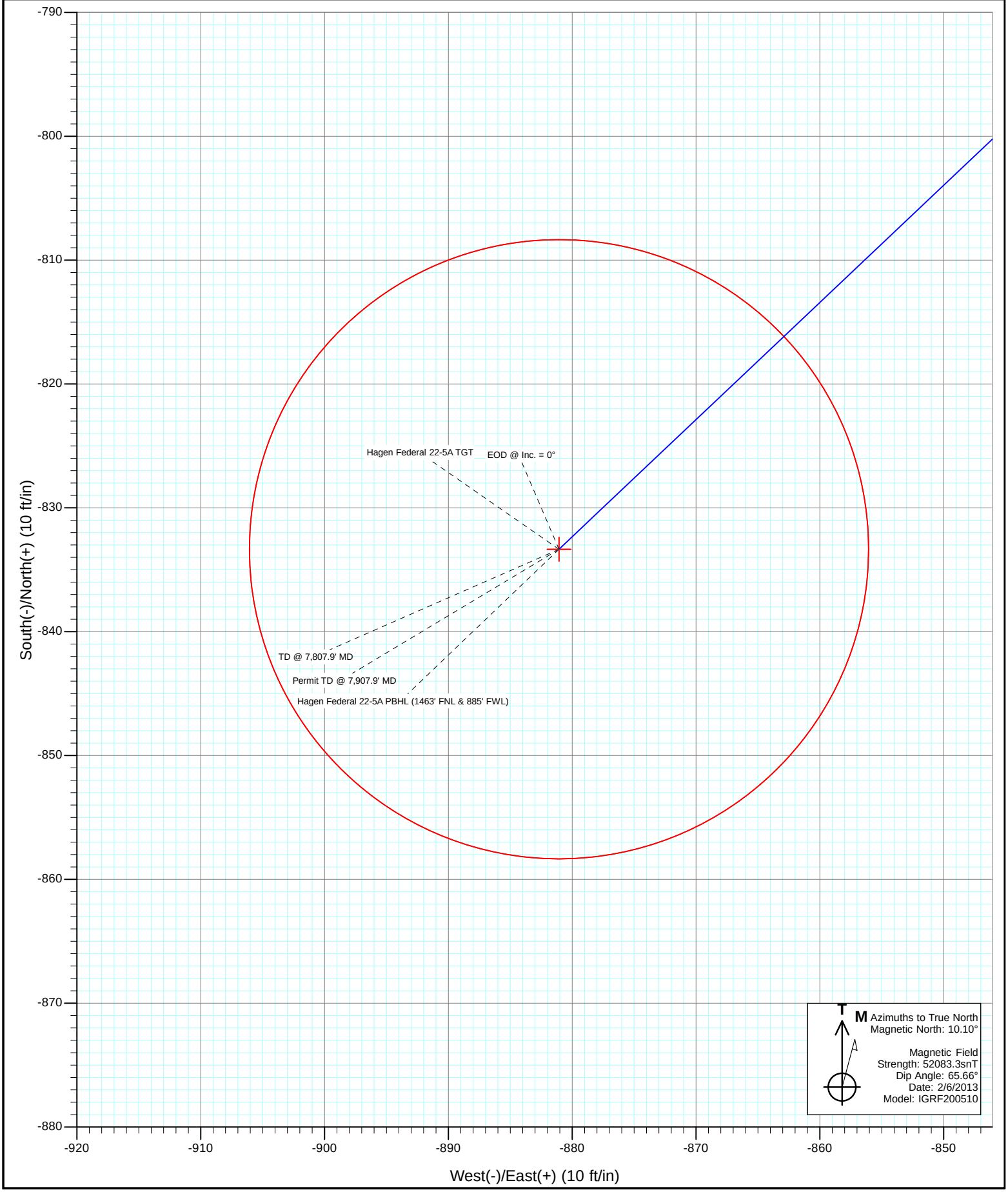
Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W



Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W



Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 22-5A
Wellbore: OH
Design: Plan #1



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hagen Federal 22-5A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Project:	S. Piceance (Parachute)	**MD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	**North Reference:**	True
Well:	Hagen Federal 22-5A	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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 22-5A

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,590,597.98 ft	**Latitude:**	39.428562
	+E/-W	0.0 ft	**Easting:**	2,297,730.77 ft	**Longitude:**	-107.986492
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	2/6/2013	10.10	65.66	52,083

Design Plan #1

Audit Notes:

Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	226.59

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.00	0.00	
737.3	14.62	226.59	732.0	-42.5	-44.9	3.00	3.00	0.00	226.59	
4,930.0	14.62	226.59	4,789.0	-769.6	-813.7	0.00	0.00	0.00	0.00	
5,660.9	0.00	0.00	5,512.0	-833.3	-881.1	2.00	-2.00	0.00	180.00	Hagen Federal 22-5A
7,807.9	0.00	0.00	7,659.0	-833.3	-881.1	0.00	0.00	0.00	0.00	Hagen Federal 22-5A
7,907.9	0.00	0.00	7,759.0	-833.3	-881.1	0.00	0.00	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hagen Federal 22-5A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Project:	S. Piceance (Parachute)	**MD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	**North Reference:**	True
Well:	Hagen Federal 22-5A	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	KOP @ 250'
300.0	1.50	226.59	300.0	-0.4	-0.5	0.7	3.00	3.00	
400.0	4.50	226.59	399.8	-4.0	-4.3	5.9	3.00	3.00	
500.0	7.50	226.59	499.3	-11.2	-11.9	16.3	3.00	3.00	
600.0	10.50	226.59	598.0	-22.0	-23.2	32.0	3.00	3.00	
700.0	13.50	226.59	695.8	-36.3	-38.3	52.8	3.00	3.00	
737.3	14.62	226.59	732.0	-42.5	-44.9	61.8	3.00	3.00	EOB @ Inc. = 14.62°
800.0	14.62	226.59	792.7	-53.4	-56.4	77.7	0.00	0.00	
900.0	14.62	226.59	889.5	-70.7	-74.8	102.9	0.00	0.00	
967.7	14.62	226.59	955.0	-82.5	-87.2	120.0	0.00	0.00	Surface Casing
1,000.0	14.62	226.59	986.2	-88.0	-93.1	128.1	0.00	0.00	
1,100.0	14.62	226.59	1,083.0	-105.4	-111.4	153.4	0.00	0.00	
1,200.0	14.62	226.59	1,179.8	-122.7	-129.8	178.6	0.00	0.00	
1,300.0	14.62	226.59	1,276.5	-140.1	-148.1	203.8	0.00	0.00	
1,400.0	14.62	226.59	1,373.3	-157.4	-166.4	229.1	0.00	0.00	
1,500.0	14.62	226.59	1,470.0	-174.8	-184.8	254.3	0.00	0.00	
1,600.0	14.62	226.59	1,566.8	-192.1	-203.1	279.6	0.00	0.00	
1,700.0	14.62	226.59	1,663.6	-209.4	-221.4	304.8	0.00	0.00	
1,800.0	14.62	226.59	1,760.3	-226.8	-239.8	330.0	0.00	0.00	
1,900.0	14.62	226.59	1,857.1	-244.1	-258.1	355.3	0.00	0.00	
2,000.0	14.62	226.59	1,953.9	-261.5	-276.4	380.5	0.00	0.00	
2,100.0	14.62	226.59	2,050.6	-278.8	-294.8	405.8	0.00	0.00	
2,200.0	14.62	226.59	2,147.4	-296.2	-313.1	431.0	0.00	0.00	
2,300.0	14.62	226.59	2,244.1	-313.5	-331.5	456.2	0.00	0.00	
2,400.0	14.62	226.59	2,340.9	-330.8	-349.8	481.5	0.00	0.00	
2,500.0	14.62	226.59	2,437.7	-348.2	-368.1	506.7	0.00	0.00	
2,600.0	14.62	226.59	2,534.4	-365.5	-386.5	531.9	0.00	0.00	
2,700.0	14.62	226.59	2,631.2	-382.9	-404.8	557.2	0.00	0.00	
2,800.0	14.62	226.59	2,728.0	-400.2	-423.1	582.4	0.00	0.00	
2,900.0	14.62	226.59	2,824.7	-417.6	-441.5	607.7	0.00	0.00	
3,000.0	14.62	226.59	2,921.5	-434.9	-459.8	632.9	0.00	0.00	
3,100.0	14.62	226.59	3,018.2	-452.2	-478.1	658.1	0.00	0.00	
3,200.0	14.62	226.59	3,115.0	-469.6	-496.5	683.4	0.00	0.00	
3,300.0	14.62	226.59	3,211.8	-486.9	-514.8	708.6	0.00	0.00	
3,400.0	14.62	226.59	3,308.5	-504.3	-533.1	733.9	0.00	0.00	
3,500.0	14.62	226.59	3,405.3	-521.6	-551.5	759.1	0.00	0.00	
3,600.0	14.62	226.59	3,502.1	-539.0	-569.8	784.3	0.00	0.00	
3,700.0	14.62	226.59	3,598.8	-556.3	-588.2	809.6	0.00	0.00	
3,800.0	14.62	226.59	3,695.6	-573.6	-606.5	834.8	0.00	0.00	
3,900.0	14.62	226.59	3,792.3	-591.0	-624.8	860.0	0.00	0.00	
4,000.0	14.62	226.59	3,889.1	-608.3	-643.2	885.3	0.00	0.00	
4,100.0	14.62	226.59	3,985.9	-625.7	-661.5	910.5	0.00	0.00	
4,200.0	14.62	226.59	4,082.6	-643.0	-679.8	935.8	0.00	0.00	
4,300.0	14.62	226.59	4,179.4	-660.4	-698.2	961.0	0.00	0.00	
4,400.0	14.62	226.59	4,276.2	-677.7	-716.5	986.2	0.00	0.00	
4,500.0	14.62	226.59	4,372.9	-695.0	-734.8	1,011.5	0.00	0.00	
4,504.2	14.62	226.59	4,377.0	-695.8	-735.6	1,012.5	0.00	0.00	Ohio Creek
4,600.0	14.62	226.59	4,469.7	-712.4	-753.2	1,036.7	0.00	0.00	
4,700.0	14.62	226.59	4,566.4	-729.7	-771.5	1,062.0	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hagen Federal 22-5A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Project:	S. Piceance (Parachute)	**MD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	**North Reference:**	True
Well:	Hagen Federal 22-5A	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Comments / Formations
4,728.5	14.62	226.59	4,594.0	-734.7	-776.7	1,069.1	0.00	0.00	Mesaverde Marker
4,800.0	14.62	226.59	4,663.2	-747.1	-789.8	1,087.2	0.00	0.00	
4,900.0	14.62	226.59	4,760.0	-764.4	-808.2	1,112.4	0.00	0.00	
4,930.0	14.62	226.59	4,789.0	-769.6	-813.7	1,120.0	0.00	0.00	Start 2° Drop
5,000.0	13.22	226.59	4,856.9	-781.2	-825.9	1,136.8	2.00	-2.00	
5,100.0	11.22	226.59	4,954.7	-795.7	-841.3	1,158.0	2.00	-2.00	
5,200.0	9.22	226.59	5,053.1	-807.9	-854.2	1,175.7	2.00	-2.00	
5,300.0	7.22	226.59	5,152.1	-817.7	-864.6	1,190.0	2.00	-2.00	
5,400.0	5.22	226.59	5,251.5	-825.2	-872.4	1,200.9	2.00	-2.00	
5,434.7	4.52	226.59	5,286.0	-827.2	-874.6	1,203.8	2.00	-2.00	Williams Fork
5,500.0	3.22	226.59	5,351.2	-830.2	-877.8	1,208.2	2.00	-2.00	
5,600.0	1.22	226.59	5,451.1	-832.9	-880.6	1,212.1	2.00	-2.00	
5,660.9	0.00	0.00	5,512.0	-833.3	-881.1	1,212.7	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
5,700.0	0.00	0.00	5,551.1	-833.3	-881.1	1,212.7	0.00	0.00	
5,800.0	0.00	0.00	5,651.1	-833.3	-881.1	1,212.7	0.00	0.00	
5,900.0	0.00	0.00	5,751.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,000.0	0.00	0.00	5,851.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,100.0	0.00	0.00	5,951.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,200.0	0.00	0.00	6,051.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,300.0	0.00	0.00	6,151.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,400.0	0.00	0.00	6,251.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,500.0	0.00	0.00	6,351.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,600.0	0.00	0.00	6,451.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,700.0	0.00	0.00	6,551.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,800.0	0.00	0.00	6,651.1	-833.3	-881.1	1,212.7	0.00	0.00	
6,900.0	0.00	0.00	6,751.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,000.0	0.00	0.00	6,851.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,100.0	0.00	0.00	6,951.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,189.9	0.00	0.00	7,041.0	-833.3	-881.1	1,212.7	0.00	0.00	Coal Ridge
7,200.0	0.00	0.00	7,051.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,300.0	0.00	0.00	7,151.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,400.0	0.00	0.00	7,251.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,500.0	0.00	0.00	7,351.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,600.0	0.00	0.00	7,451.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,657.9	0.00	0.00	7,509.0	-833.3	-881.1	1,212.7	0.00	0.00	Rollins
7,700.0	0.00	0.00	7,551.1	-833.3	-881.1	1,212.7	0.00	0.00	
7,807.9	0.00	0.00	7,659.0	-833.3	-881.1	1,212.7	0.00	0.00	TD @ 7,807.9' MD
7,907.9	0.00	0.00	7,759.0	-833.3	-881.1	1,212.7	0.00	0.00	Permit TD @ 7,907.9' MD

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Hagen Federal 22-5A PE - plan hits target center - Circle (radius 25.0)	0.00	0.00	7,659.0	-833.3	-881.1	1,589,789.07	2,296,827.23	39.426274	-107.989611
Hagen Federal 22-5A TC - plan hits target center - Point	0.00	0.00	5,512.0	-833.3	-881.1	1,589,789.07	2,296,827.23	39.426274	-107.989611

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hagen Federal 22-5A
Company:	EnCana Oil & Gas (USA) Inc	**TVD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Project:	S. Piceance (Parachute)	**MD Reference:**	KB=22' @ 6543.0ft (Patterson 303)
Site:	PC-22 Pad NENW 2 7S 95W	**North Reference:**	True
Well:	Hagen Federal 22-5A	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
967.7	955.0	Surface Casing		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,504.2	4,377.0	Ohio Creek			
4,728.5	4,594.0	Mesaverde Marker			
5,434.7	5,286.0	Williams Fork			
5,660.9	5,512.0	Top Gas			
7,189.9	7,041.0	Coal Ridge			
7,657.9	7,509.0	Rollins			

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
250.0	250.0	0.0	0.0	KOP @ 250'
737.3	732.0	-42.5	-44.9	EOB @ Inc. = 14.62°
4,930.0	4,789.0	-769.6	-813.7	Start 2° Drop
5,660.9	5,512.0	-833.3	-881.1	EOD @ Inc. = 0°
7,807.9	7,659.0	-833.3	-881.1	TD @ 7,807.9' MD
7,907.9	7,759.0	-833.3	-881.1	Permit TD @ 7,907.9' MD