

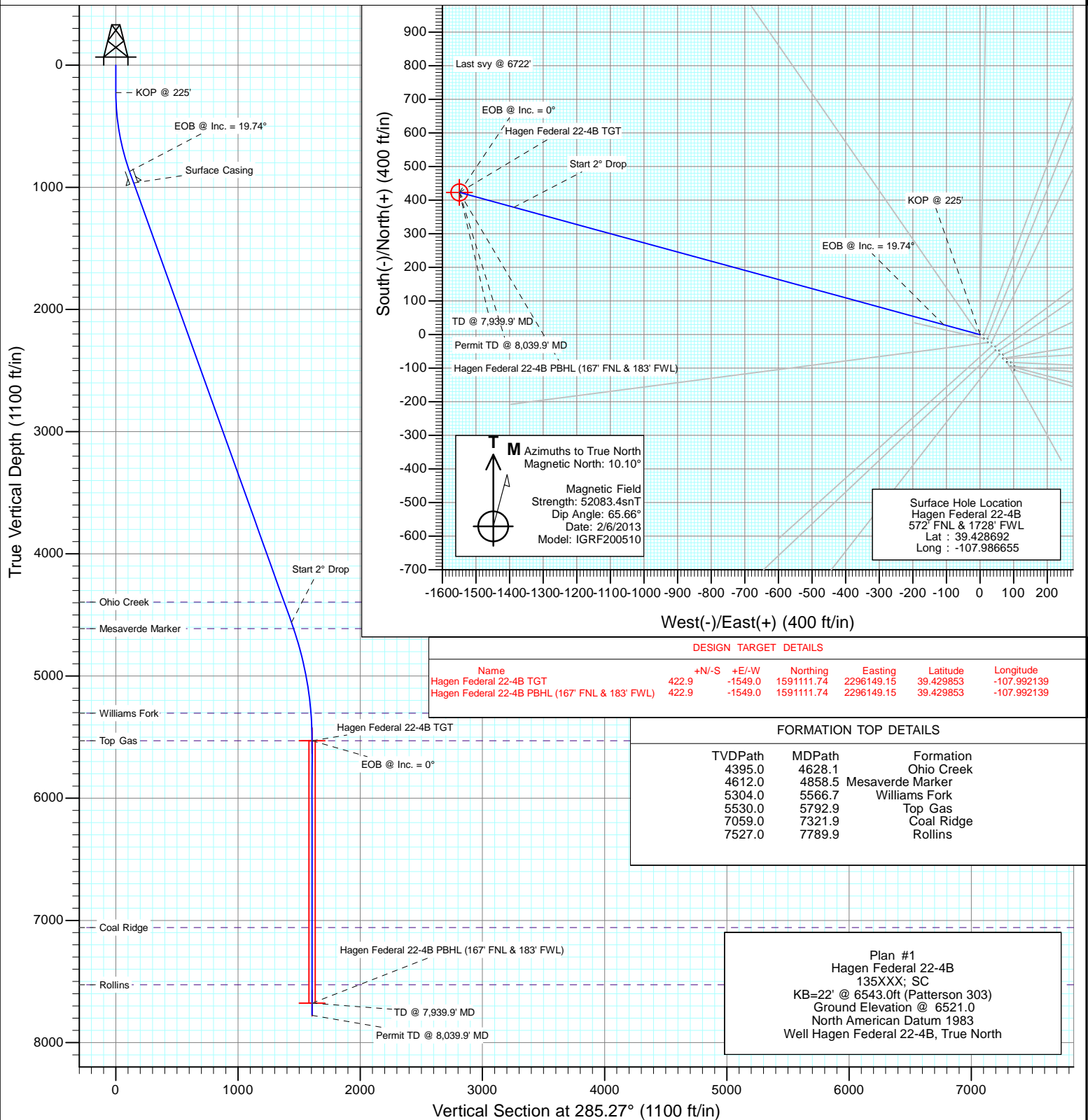


Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 22-4B
Wellbore: OH
Design: Plan #1



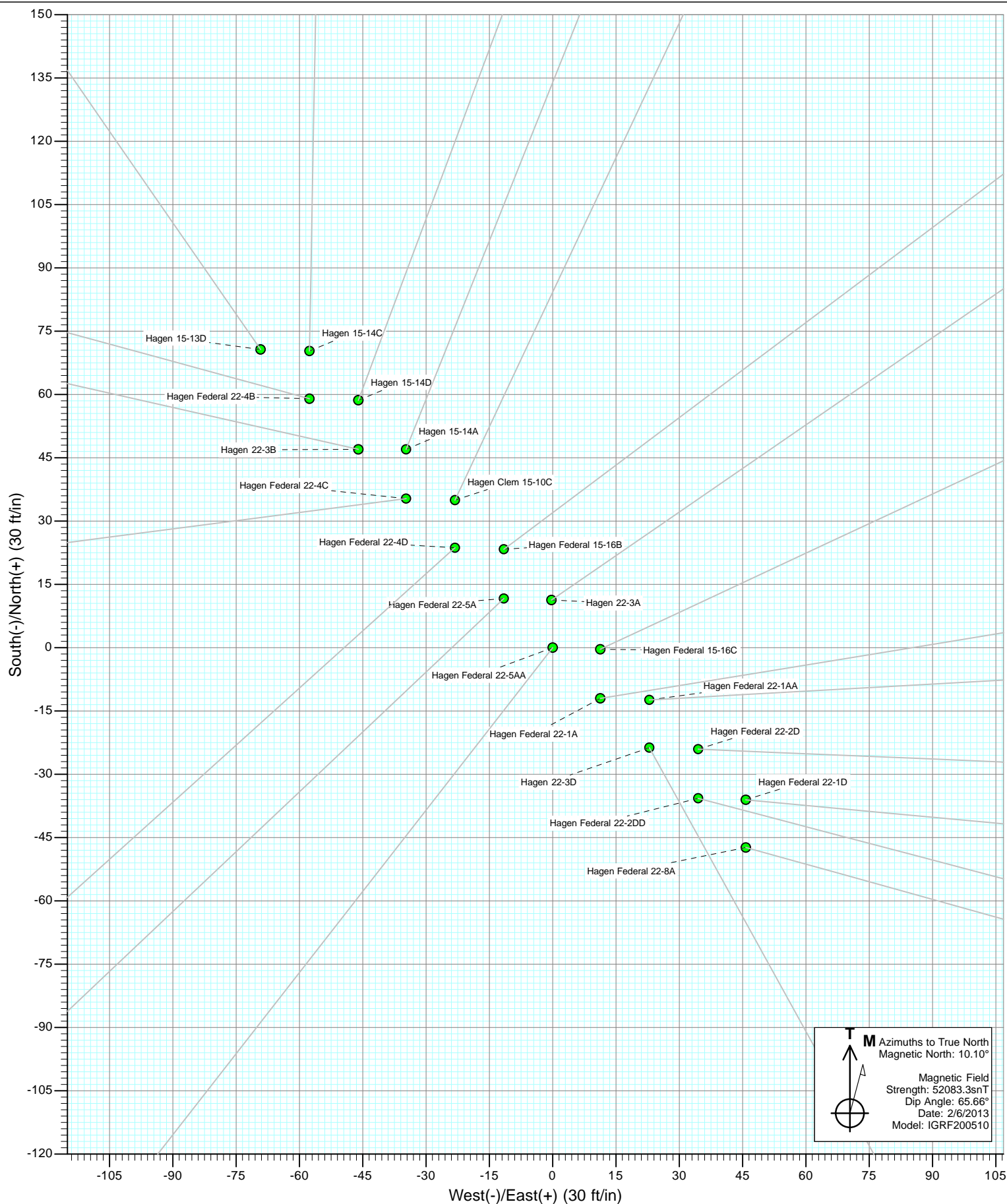
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.00	0.00	0.00	0.0	
2	225.0	0.00	0.00	225.0	0.0	0.00	0.00	0.00	0.0	
3	883.1	19.74	285.27	870.1	29.6	-108.3	3.00	285.27	112.3	
4	4805.8	19.74	285.27	4562.3	378.6	-1386.6	0.00	0.00	1437.3	
5	5792.9	0.00	0.00	5530.0	422.9	-1549.0	2.00	180.00	1605.7	Hagen Federal 22-4B TGT
6	7939.9	0.00	0.00	7677.0	422.9	-1549.0	0.00	0.00	1605.7	Hagen Federal 22-4B PBHL (167' FNL & 183' FWL)
7	8039.9	0.00	0.00	7777.0	422.9	-1549.0	0.00	0.00	1605.7	





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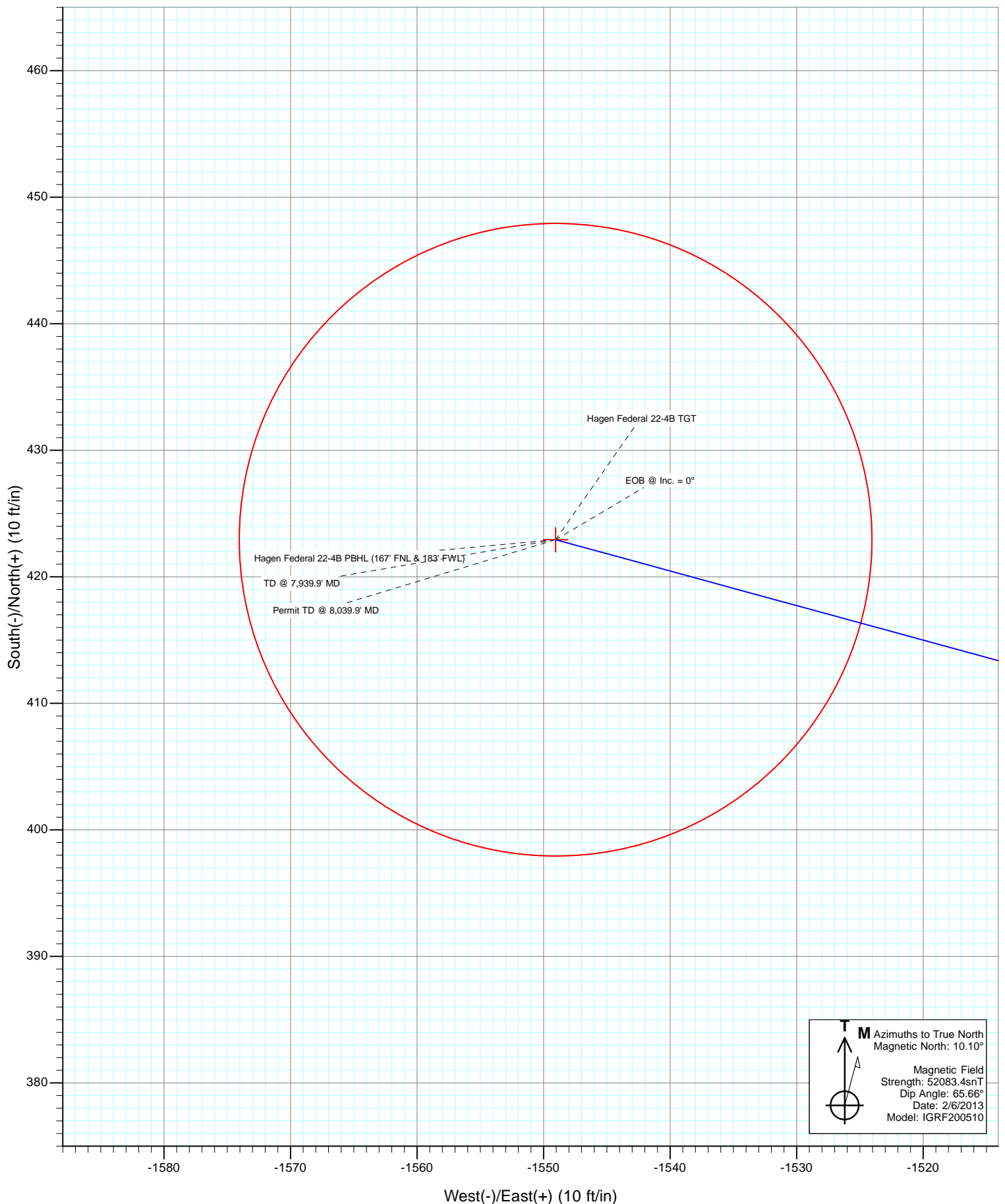


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Site: PC-22 Pad NENW 2 7S 95W





Project: S. Piceance (Parachute)
Site: PC-22 Pad NENW 2 7S 95W
Well: Hagen Federal 22-4B
Wellbore: OH
Design: Plan #1



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Hagen Federal 22-4B
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 22-4B	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 22-4B					
Well Position	+N/-S	0.0 ft	Northing:	1,590,646.58 ft	Latitude:	39.428692
	+E/-W	0.0 ft	Easting:	2,297,686.04 ft	Longitude:	-107.986655
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	285.27

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	
225.0	0.00	0.00	225.0	0.0	0.0	0.00	0.00	0.00	0.00	
883.1	19.74	285.27	870.1	29.6	-108.3	3.00	3.00	0.00	285.27	
4,805.8	19.74	285.27	4,562.3	378.6	-1,386.6	0.00	0.00	0.00	0.00	
5,792.9	0.00	0.00	5,530.0	422.9	-1,549.0	2.00	-2.00	0.00	180.00	Hagen Federal 22-4B
7,939.9	0.00	0.00	7,677.0	422.9	-1,549.0	0.00	0.00	0.00	0.00	Hagen Federal 22-4B
8,039.9	0.00	0.00	7,777.0	422.9	-1,549.0	0.00	0.00	0.00	0.00	

Cathedral Energy Services

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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 22-4B	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	
225.0	0.00	0.00	225.0	0.0	0.0	0.0	0.00	0.00	KOP @ 225'
300.0	2.25	285.27	300.0	0.4	-1.4	1.5	3.00	3.00	
400.0	5.25	285.27	399.8	2.1	-7.7	8.0	3.00	3.00	
500.0	8.25	285.27	499.1	5.2	-19.1	19.8	3.00	3.00	
600.0	11.25	285.27	597.6	9.7	-35.4	36.7	3.00	3.00	
700.0	14.25	285.27	695.1	15.5	-56.7	58.8	3.00	3.00	
800.0	17.25	285.27	791.4	22.6	-82.9	85.9	3.00	3.00	
883.1	19.74	285.27	870.1	29.6	-108.3	112.3	3.00	3.00	EOB @ Inc. = 19.74°
900.0	19.74	285.27	886.1	31.1	-113.8	118.0	0.00	0.00	
983.1	19.74	285.27	964.3	38.5	-140.9	146.0	0.00	0.00	Surface Casing
1,000.0	19.74	285.27	980.2	40.0	-146.4	151.8	0.00	0.00	
1,100.0	19.74	285.27	1,074.3	48.9	-179.0	185.5	0.00	0.00	
1,200.0	19.74	285.27	1,168.4	57.8	-211.6	219.3	0.00	0.00	
1,300.0	19.74	285.27	1,262.5	66.7	-244.2	253.1	0.00	0.00	
1,400.0	19.74	285.27	1,356.7	75.6	-276.7	286.9	0.00	0.00	
1,500.0	19.74	285.27	1,450.8	84.5	-309.3	320.7	0.00	0.00	
1,600.0	19.74	285.27	1,544.9	93.4	-341.9	354.4	0.00	0.00	
1,700.0	19.74	285.27	1,639.0	102.3	-374.5	388.2	0.00	0.00	
1,800.0	19.74	285.27	1,733.2	111.1	-407.1	422.0	0.00	0.00	
1,900.0	19.74	285.27	1,827.3	120.0	-439.7	455.8	0.00	0.00	
2,000.0	19.74	285.27	1,921.4	128.9	-472.3	489.6	0.00	0.00	
2,100.0	19.74	285.27	2,015.5	137.8	-504.9	523.3	0.00	0.00	
2,200.0	19.74	285.27	2,109.6	146.7	-537.4	557.1	0.00	0.00	
2,300.0	19.74	285.27	2,203.8	155.6	-570.0	590.9	0.00	0.00	
2,400.0	19.74	285.27	2,297.9	164.5	-602.6	624.7	0.00	0.00	
2,500.0	19.74	285.27	2,392.0	173.4	-635.2	658.5	0.00	0.00	
2,600.0	19.74	285.27	2,486.1	182.3	-667.8	692.2	0.00	0.00	
2,700.0	19.74	285.27	2,580.3	191.2	-700.4	726.0	0.00	0.00	
2,800.0	19.74	285.27	2,674.4	200.1	-733.0	759.8	0.00	0.00	
2,900.0	19.74	285.27	2,768.5	209.0	-765.5	793.6	0.00	0.00	
3,000.0	19.74	285.27	2,862.6	217.9	-798.1	827.3	0.00	0.00	
3,100.0	19.74	285.27	2,956.7	226.8	-830.7	861.1	0.00	0.00	
3,200.0	19.74	285.27	3,050.9	235.7	-863.3	894.9	0.00	0.00	
3,300.0	19.74	285.27	3,145.0	244.6	-895.9	928.7	0.00	0.00	
3,400.0	19.74	285.27	3,239.1	253.5	-928.5	962.5	0.00	0.00	
3,500.0	19.74	285.27	3,333.2	262.4	-961.1	996.2	0.00	0.00	
3,600.0	19.74	285.27	3,427.4	271.3	-993.7	1,030.0	0.00	0.00	
3,700.0	19.74	285.27	3,521.5	280.2	-1,026.2	1,063.8	0.00	0.00	
3,800.0	19.74	285.27	3,615.6	289.1	-1,058.8	1,097.6	0.00	0.00	
3,900.0	19.74	285.27	3,709.7	298.0	-1,091.4	1,131.4	0.00	0.00	
4,000.0	19.74	285.27	3,803.8	306.9	-1,124.0	1,165.1	0.00	0.00	
4,100.0	19.74	285.27	3,898.0	315.8	-1,156.6	1,198.9	0.00	0.00	
4,200.0	19.74	285.27	3,992.1	324.7	-1,189.2	1,232.7	0.00	0.00	
4,300.0	19.74	285.27	4,086.2	333.6	-1,221.8	1,266.5	0.00	0.00	
4,400.0	19.74	285.27	4,180.3	342.5	-1,254.4	1,300.3	0.00	0.00	
4,500.0	19.74	285.27	4,274.4	351.4	-1,286.9	1,334.0	0.00	0.00	
4,600.0	19.74	285.27	4,368.6	360.3	-1,319.5	1,367.8	0.00	0.00	
4,628.1	19.74	285.27	4,395.0	362.8	-1,328.7	1,377.3	0.00	0.00	Ohio Creek
4,700.0	19.74	285.27	4,462.7	369.2	-1,352.1	1,401.6	0.00	0.00	

Cathedral Energy Services

Planning Report

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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 22-4B	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
4,805.8	19.74	285.27	4,562.3	378.6	-1,386.6	1,437.3	0.00	0.00	Start 2° Drop
4,858.5	18.69	285.27	4,612.0	383.1	-1,403.3	1,454.7	2.00	-2.00	Mesaverde Marker
4,900.0	17.86	285.27	4,651.4	386.6	-1,415.9	1,467.7	2.00	-2.00	
5,000.0	15.86	285.27	4,747.1	394.2	-1,443.9	1,496.7	2.00	-2.00	
5,100.0	13.86	285.27	4,843.8	401.0	-1,468.6	1,522.3	2.00	-2.00	
5,200.0	11.86	285.27	4,941.3	406.8	-1,490.1	1,544.6	2.00	-2.00	
5,300.0	9.86	285.27	5,039.5	411.8	-1,508.2	1,563.4	2.00	-2.00	
5,400.0	7.86	285.27	5,138.3	415.8	-1,523.1	1,578.8	2.00	-2.00	
5,500.0	5.86	285.27	5,237.6	419.0	-1,534.6	1,590.8	2.00	-2.00	
5,566.7	4.52	285.27	5,304.0	420.6	-1,540.4	1,596.8	2.00	-2.00	Williams Fork
5,600.0	3.86	285.27	5,337.2	421.2	-1,542.8	1,599.2	2.00	-2.00	
5,700.0	1.86	285.27	5,437.1	422.5	-1,547.6	1,604.2	2.00	-2.00	
5,792.9	0.00	0.00	5,530.0	422.9	-1,549.0	1,605.7	2.00	-2.00	EOB @ Inc. = 0° - Top Gas
5,800.0	0.00	0.00	5,537.1	422.9	-1,549.0	1,605.7	0.00	0.00	
5,900.0	0.00	0.00	5,637.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,000.0	0.00	0.00	5,737.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,100.0	0.00	0.00	5,837.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,200.0	0.00	0.00	5,937.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,300.0	0.00	0.00	6,037.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,400.0	0.00	0.00	6,137.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,500.0	0.00	0.00	6,237.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,600.0	0.00	0.00	6,337.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,700.0	0.00	0.00	6,437.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,800.0	0.00	0.00	6,537.1	422.9	-1,549.0	1,605.7	0.00	0.00	
6,900.0	0.00	0.00	6,637.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,000.0	0.00	0.00	6,737.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,100.0	0.00	0.00	6,837.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,200.0	0.00	0.00	6,937.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,300.0	0.00	0.00	7,037.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,321.9	0.00	0.00	7,059.0	422.9	-1,549.0	1,605.7	0.00	0.00	Coal Ridge
7,400.0	0.00	0.00	7,137.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,500.0	0.00	0.00	7,237.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,600.0	0.00	0.00	7,337.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,700.0	0.00	0.00	7,437.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,789.9	0.00	0.00	7,527.0	422.9	-1,549.0	1,605.7	0.00	0.00	Rollins
7,800.0	0.00	0.00	7,537.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,900.0	0.00	0.00	7,637.1	422.9	-1,549.0	1,605.7	0.00	0.00	
7,939.9	0.00	0.00	7,677.0	422.9	-1,549.0	1,605.7	0.00	0.00	TD @ 7,939.9' MD
8,000.0	0.00	0.00	7,737.1	422.9	-1,549.0	1,605.7	0.00	0.00	
8,039.9	0.00	0.00	7,777.0	422.9	-1,549.0	1,605.7	0.00	0.00	Permit TD @ 8,039.9' MD

Cathedral Energy Services

Planning Report

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Site:	PC-22 Pad NENW 2 7S 95W	North Reference:	True
Well:	Hagen Federal 22-4B	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

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									
Hagen Federal 22-4B TC - plan hits target center - Point	0.00	0.00	5,530.0	422.9	-1,549.0	1,591,111.74	2,296,149.15	39.429853	-107.992139
Hagen Federal 22-4B Pf - plan hits target center - Circle (radius 25.0)	0.00	0.00	7,677.0	422.9	-1,549.0	1,591,111.74	2,296,149.15	39.429853	-107.992139

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)
983.1	964.3	Surface Casing		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,628.1	4,395.0	Ohio Creek			
4,858.5	4,612.0	Mesaverde Marker			
5,566.7	5,304.0	Williams Fork			
5,792.9	5,530.0	Top Gas			
7,321.9	7,059.0	Coal Ridge			
7,789.9	7,527.0	Rollins			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
225.0	225.0	0.0	0.0	KOP @ 225'
883.1	870.1	29.6	-108.3	EOB @ Inc. = 19.74°
4,805.8	4,562.3	378.6	-1,386.6	Start 2° Drop
5,792.9	5,530.0	422.9	-1,549.0	EOB @ Inc. = 0°
7,939.9	7,677.0	422.9	-1,549.0	TD @ 7,939.9' MD
8,039.9	7,777.0	422.9	-1,549.0	Permit TD @ 8,039.9' MD