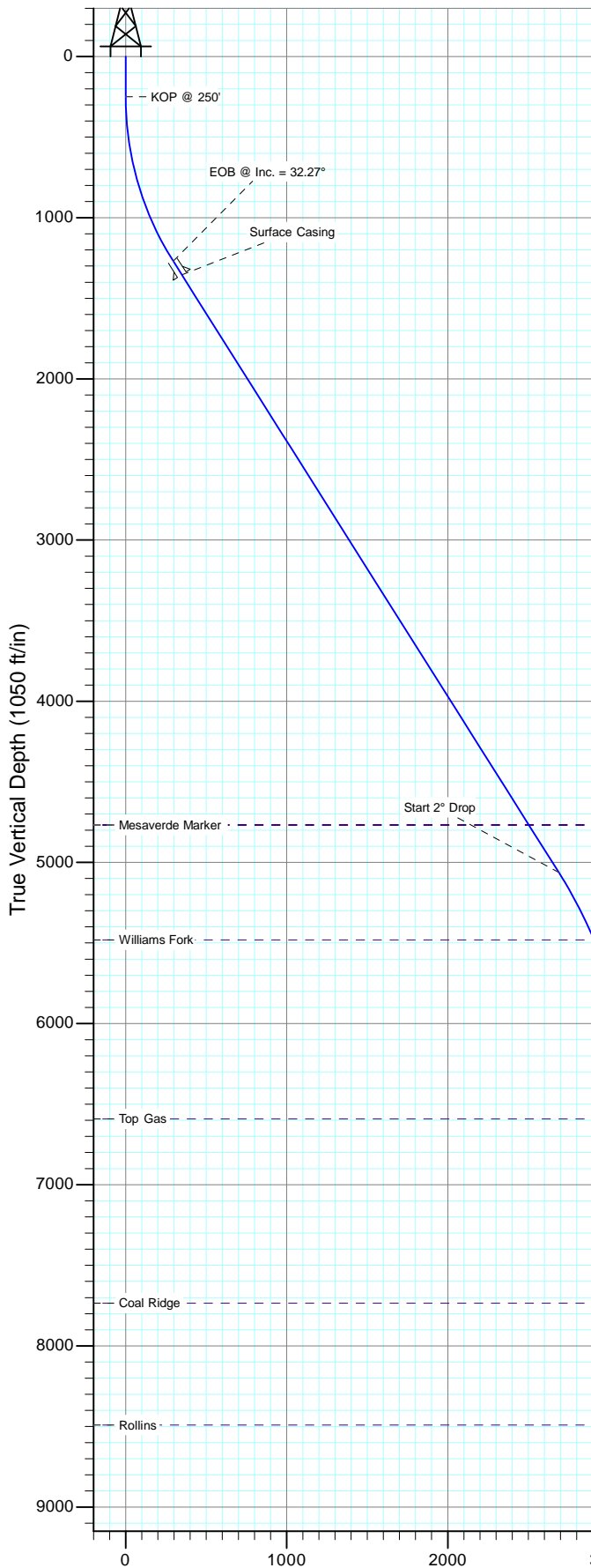
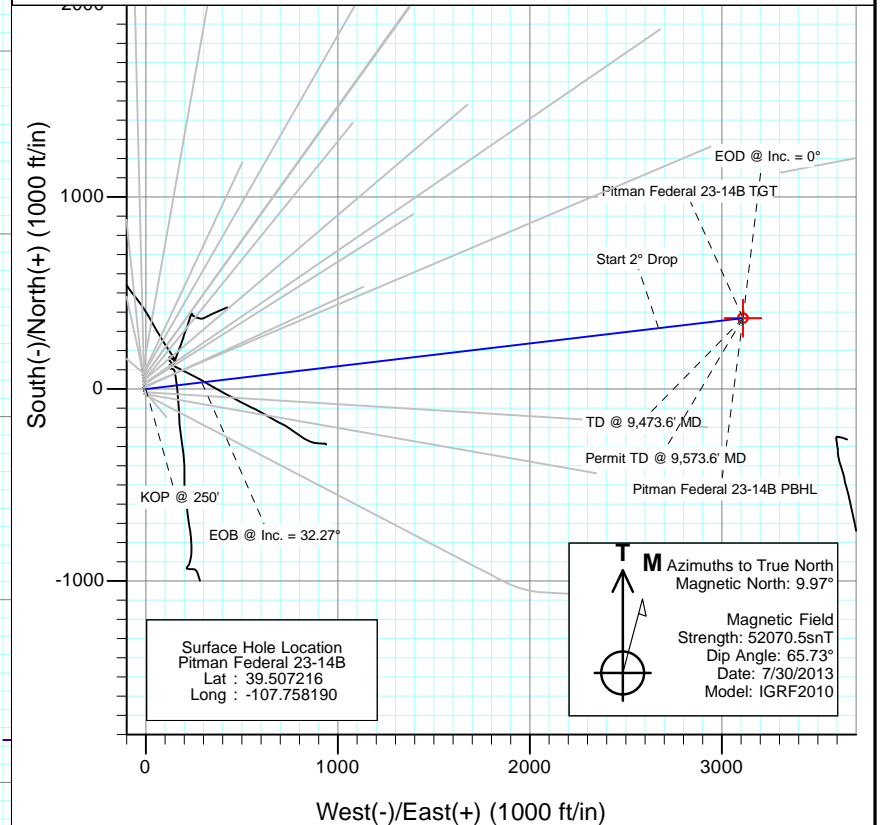




Project: Mamm Creek
Site: O22NW
Well: Pitman Federal 23-14B
Wellbore: OH
Design: Plan #1



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	0.0	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	1325.6	32.27	83.22	1269.6	34.8	292.9	3.00	83.22	294.9	
4	5811.3	32.27	83.22	5062.6	317.7	2670.9	0.00	0.00	2689.7	
5	7424.6	0.00	0.00	6592.0	369.9	3110.2	2.00	180.00	3132.1	Pitman Federal 23-14B TGT
6	9473.6	0.00	0.00	8641.0	369.9	3110.2	0.00	0.00	3132.1	Pitman Federal 23-14B PBHL
7	9573.6	0.00	0.00	8741.0	369.9	3110.2	0.00	0.00	3132.1	



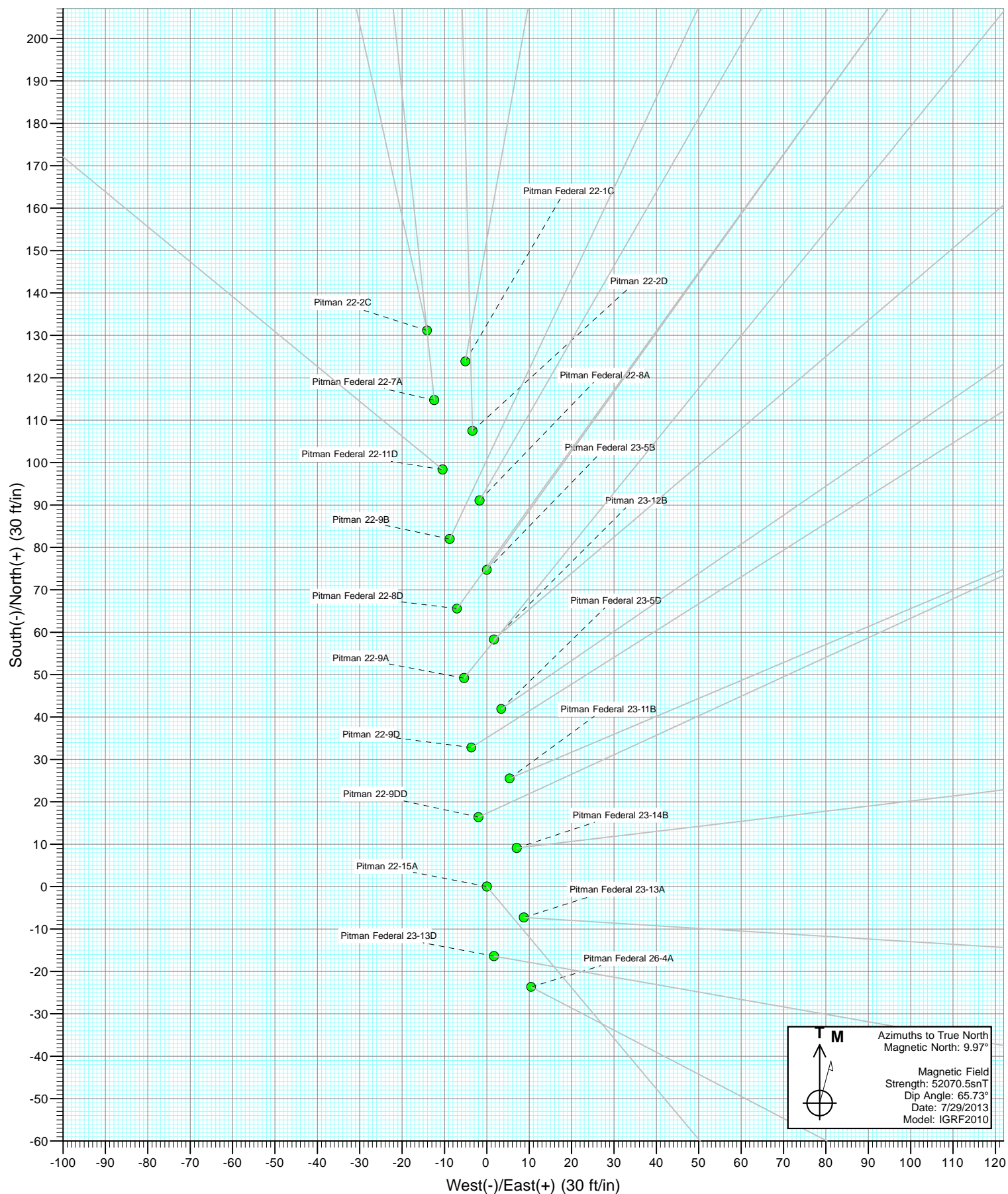
DESIGN TARGET DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Pitman Federal 23-14B TGT	369.9	3110.2	1617846.50	2366028.00	39.508231	-107.747167
Pitman Federal 23-14B PBHL	369.9	3110.2	1617846.50	2366028.00	39.508231	-107.747167

FORMATION TOP DETAILS			
TVDPPath	MDPath	Formation	
4768.0	5462.9	Mesaverde Marker	
4768.0	5462.9	Ohio Creek	
5481.0	6283.7	Williams Fork	
6592.0	7424.6	Top Gas	
7735.0	8567.6	Coal Ridge	
8491.0	9323.6	Rollins	

Plan #1
Pitman Federal 23-14B
135XXX; SC
KB=22' @ 6240.0ft (Patterson 308)
Ground Elevation @ 6240.0
North American Datum 1983
Well Pitman Federal 23-14B, True North

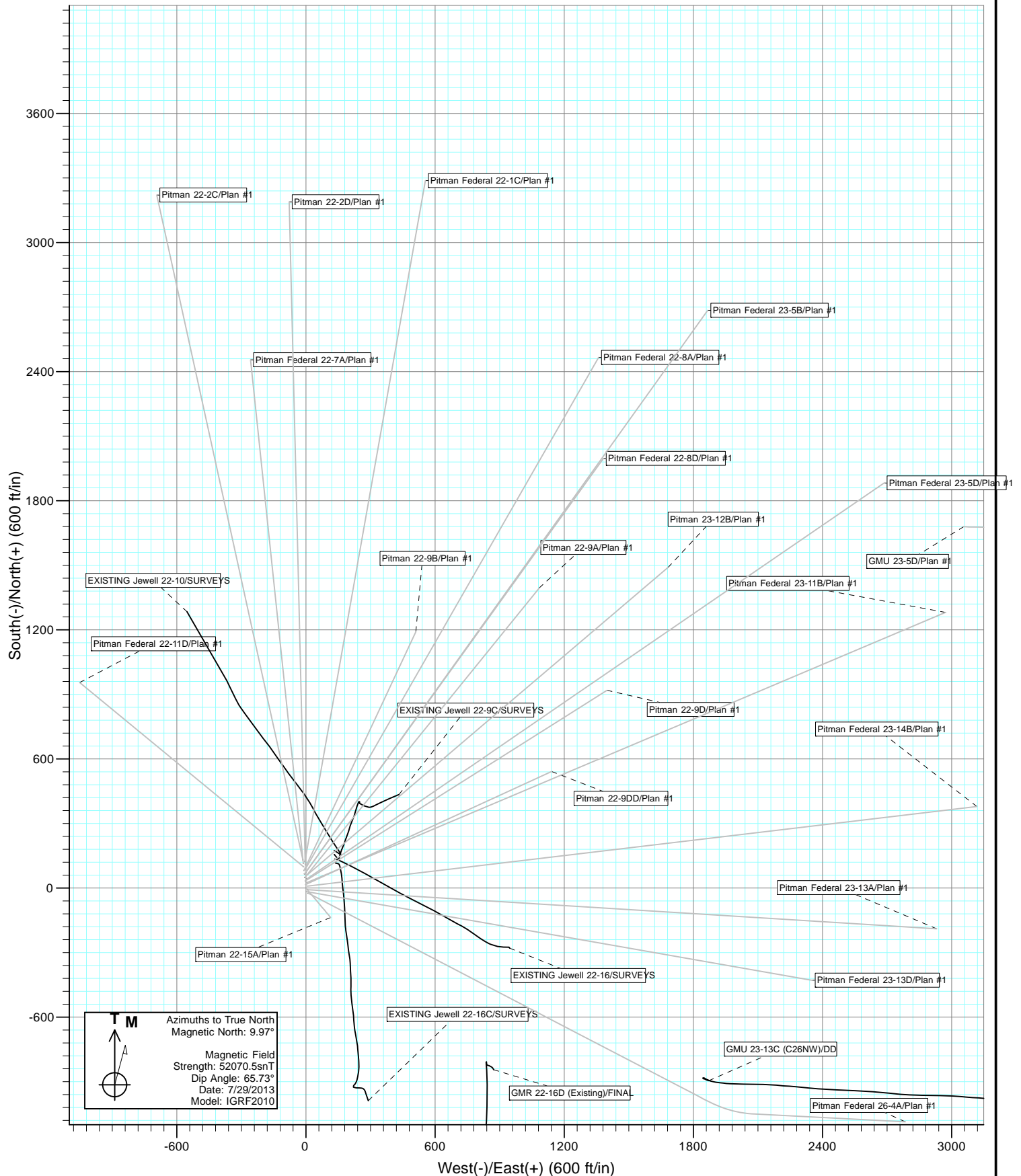


Project: Mamm Creek
Site: O22NW





Project: Mamm Creek
Site: O22NW



Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Pitman Federal 23-14B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Project:	Mamm Creek	MD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Site:	O22NW	North Reference:	True
Well:	Pitman Federal 23-14B	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1		

Project	Mamm Creek		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		O22NW			
Site Position:		Northing:	1,617,521.17 ft	Latitude:	39.507126
From:	Lat/Long	Easting:	2,362,912.18 ft	Longitude:	-107.758178
Position Uncertainty:	0.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.42 °

Well	Pitman Federal 23-14B					
Well Position	+N/-S	0.0 ft	Northing:	1,617,554.01 ft	Latitude:	39.507216
	+E/-W	0.0 ft	Easting:	2,362,909.61 ft	Longitude:	-107.758190
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	6,240.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/30/2013	9.97	65.73	52,070

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	83.22

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	
1,325.6	32.27	83.22	1,269.6	34.8	292.9	3.00	3.00	0.00	83.22	
5,811.3	32.27	83.22	5,062.6	317.7	2,670.9	0.00	0.00	0.00	0.00	
7,424.6	0.00	0.00	6,592.0	369.9	3,110.2	2.00	-2.00	0.00	180.00	Pitman Federal 23-14
9,473.6	0.00	0.00	8,641.0	369.9	3,110.2	0.00	0.00	0.00	0.00	Pitman Federal 23-14
9,573.6	0.00	0.00	8,741.0	369.9	3,110.2	0.00	0.00	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Pitman Federal 23-14B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Project:	Mamm Creek	MD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Site:	O22NW	North Reference:	True
Well:	Pitman Federal 23-14B	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	83.22	300.0	0.1	0.6	0.7	3.00	3.00	
400.0	4.50	83.22	399.8	0.7	5.8	5.9	3.00	3.00	
500.0	7.50	83.22	499.3	1.9	16.2	16.3	3.00	3.00	
600.0	10.50	83.22	598.0	3.8	31.8	32.0	3.00	3.00	
700.0	13.50	83.22	695.8	6.2	52.4	52.8	3.00	3.00	
800.0	16.50	83.22	792.4	9.3	78.1	78.6	3.00	3.00	
900.0	19.50	83.22	887.5	12.9	108.8	109.5	3.00	3.00	
1,000.0	22.50	83.22	980.9	17.2	144.4	145.4	3.00	3.00	
1,100.0	25.50	83.22	1,072.2	22.0	184.7	186.0	3.00	3.00	
1,200.0	28.50	83.22	1,161.3	27.3	229.8	231.4	3.00	3.00	
1,300.0	31.50	83.22	1,247.9	33.2	279.5	281.4	3.00	3.00	
1,325.6	32.27	83.22	1,269.6	34.8	292.9	294.9	3.00	3.00	EOB @ Inc. = 32.27°
1,400.0	32.27	83.22	1,332.5	39.5	332.3	334.7	0.00	0.00	
1,425.6	32.27	83.22	1,354.2	41.1	345.9	348.3	0.00	0.00	Surface Casing
1,500.0	32.27	83.22	1,417.1	45.8	385.3	388.1	0.00	0.00	
1,600.0	32.27	83.22	1,501.7	52.1	438.4	441.4	0.00	0.00	
1,700.0	32.27	83.22	1,586.2	58.4	491.4	494.8	0.00	0.00	
1,800.0	32.27	83.22	1,670.8	64.7	544.4	548.2	0.00	0.00	
1,900.0	32.27	83.22	1,755.3	71.1	597.4	601.6	0.00	0.00	
2,000.0	32.27	83.22	1,839.9	77.4	650.4	655.0	0.00	0.00	
2,100.0	32.27	83.22	1,924.4	83.7	703.4	708.4	0.00	0.00	
2,200.0	32.27	83.22	2,009.0	90.0	756.4	761.8	0.00	0.00	
2,300.0	32.27	83.22	2,093.6	96.3	809.4	815.2	0.00	0.00	
2,400.0	32.27	83.22	2,178.1	102.6	862.5	868.5	0.00	0.00	
2,500.0	32.27	83.22	2,262.7	108.9	915.5	921.9	0.00	0.00	
2,600.0	32.27	83.22	2,347.2	115.2	968.5	975.3	0.00	0.00	
2,700.0	32.27	83.22	2,431.8	121.5	1,021.5	1,028.7	0.00	0.00	
2,800.0	32.27	83.22	2,516.3	127.8	1,074.5	1,082.1	0.00	0.00	
2,900.0	32.27	83.22	2,600.9	134.1	1,127.5	1,135.5	0.00	0.00	
3,000.0	32.27	83.22	2,685.5	140.4	1,180.5	1,188.9	0.00	0.00	
3,100.0	32.27	83.22	2,770.0	146.7	1,233.5	1,242.2	0.00	0.00	
3,200.0	32.27	83.22	2,854.6	153.0	1,286.6	1,295.6	0.00	0.00	
3,300.0	32.27	83.22	2,939.1	159.3	1,339.6	1,349.0	0.00	0.00	
3,400.0	32.27	83.22	3,023.7	165.6	1,392.6	1,402.4	0.00	0.00	
3,500.0	32.27	83.22	3,108.3	171.9	1,445.6	1,455.8	0.00	0.00	
3,600.0	32.27	83.22	3,192.8	178.2	1,498.6	1,509.2	0.00	0.00	
3,700.0	32.27	83.22	3,277.4	184.5	1,551.6	1,562.6	0.00	0.00	
3,800.0	32.27	83.22	3,361.9	190.8	1,604.6	1,615.9	0.00	0.00	
3,900.0	32.27	83.22	3,446.5	197.2	1,657.6	1,669.3	0.00	0.00	
4,000.0	32.27	83.22	3,531.0	203.5	1,710.7	1,722.7	0.00	0.00	
4,100.0	32.27	83.22	3,615.6	209.8	1,763.7	1,776.1	0.00	0.00	
4,200.0	32.27	83.22	3,700.2	216.1	1,816.7	1,829.5	0.00	0.00	
4,300.0	32.27	83.22	3,784.7	222.4	1,869.7	1,882.9	0.00	0.00	
4,400.0	32.27	83.22	3,869.3	228.7	1,922.7	1,936.3	0.00	0.00	
4,500.0	32.27	83.22	3,953.8	235.0	1,975.7	1,989.6	0.00	0.00	
4,600.0	32.27	83.22	4,038.4	241.3	2,028.7	2,043.0	0.00	0.00	
4,700.0	32.27	83.22	4,122.9	247.6	2,081.7	2,096.4	0.00	0.00	
4,800.0	32.27	83.22	4,207.5	253.9	2,134.8	2,149.8	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Pitman Federal 23-14B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Project:	Mamm Creek	MD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Site:	O22NW	North Reference:	True
Well:	Pitman Federal 23-14B	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
4,900.0	32.27	83.22	4,292.1	260.2	2,187.8	2,203.2	0.00	0.00	
5,000.0	32.27	83.22	4,376.6	266.5	2,240.8	2,256.6	0.00	0.00	
5,100.0	32.27	83.22	4,461.2	272.8	2,293.8	2,310.0	0.00	0.00	
5,200.0	32.27	83.22	4,545.7	279.1	2,346.8	2,363.3	0.00	0.00	
5,300.0	32.27	83.22	4,630.3	285.4	2,399.8	2,416.7	0.00	0.00	
5,400.0	32.27	83.22	4,714.8	291.7	2,452.8	2,470.1	0.00	0.00	
5,462.9	32.27	83.22	4,768.0	295.7	2,486.2	2,503.7	0.00	0.00	Ohio Creek - Mesaverde Marker
5,500.0	32.27	83.22	4,799.4	298.0	2,505.8	2,523.5	0.00	0.00	
5,600.0	32.27	83.22	4,884.0	304.3	2,558.9	2,576.9	0.00	0.00	
5,700.0	32.27	83.22	4,968.5	310.6	2,611.9	2,630.3	0.00	0.00	
5,800.0	32.27	83.22	5,053.1	316.9	2,664.9	2,683.7	0.00	0.00	
5,811.3	32.27	83.22	5,062.6	317.7	2,670.9	2,689.7	0.00	0.00	Start 2° Drop
5,900.0	30.49	83.22	5,138.3	323.1	2,716.7	2,735.9	2.00	-2.00	
6,000.0	28.49	83.22	5,225.4	328.9	2,765.6	2,785.1	2.00	-2.00	
6,100.0	26.49	83.22	5,314.1	334.4	2,811.5	2,831.3	2.00	-2.00	
6,200.0	24.49	83.22	5,404.3	339.5	2,854.2	2,874.3	2.00	-2.00	
6,283.7	22.82	83.22	5,481.0	343.4	2,887.5	2,907.9	2.00	-2.00	Williams Fork
6,300.0	22.49	83.22	5,496.1	344.2	2,893.8	2,914.2	2.00	-2.00	
6,400.0	20.49	83.22	5,589.1	348.5	2,930.1	2,950.8	2.00	-2.00	
6,500.0	18.49	83.22	5,683.4	352.4	2,963.3	2,984.2	2.00	-2.00	
6,600.0	16.49	83.22	5,778.7	356.0	2,993.1	3,014.2	2.00	-2.00	
6,700.0	14.49	83.22	5,875.1	359.1	3,019.6	3,040.9	2.00	-2.00	
6,800.0	12.49	83.22	5,972.3	361.9	3,042.8	3,064.3	2.00	-2.00	
6,900.0	10.49	83.22	6,070.3	364.3	3,062.6	3,084.2	2.00	-2.00	
7,000.0	8.49	83.22	6,168.9	366.2	3,079.0	3,100.7	2.00	-2.00	
7,100.0	6.49	83.22	6,268.1	367.7	3,091.9	3,113.7	2.00	-2.00	
7,200.0	4.49	83.22	6,367.6	368.9	3,101.4	3,123.3	2.00	-2.00	
7,300.0	2.49	83.22	6,467.4	369.6	3,107.5	3,129.4	2.00	-2.00	
7,400.0	0.49	83.22	6,567.4	369.9	3,110.1	3,132.0	2.00	-2.00	
7,424.6	0.00	0.00	6,592.0	369.9	3,110.2	3,132.1	2.00	-2.00	EOD @ Inc. = 0° - Top Gas
7,500.0	0.00	0.00	6,667.4	369.9	3,110.2	3,132.1	0.00	0.00	
7,600.0	0.00	0.00	6,767.4	369.9	3,110.2	3,132.1	0.00	0.00	
7,700.0	0.00	0.00	6,867.4	369.9	3,110.2	3,132.1	0.00	0.00	
7,800.0	0.00	0.00	6,967.4	369.9	3,110.2	3,132.1	0.00	0.00	
7,900.0	0.00	0.00	7,067.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,000.0	0.00	0.00	7,167.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,100.0	0.00	0.00	7,267.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,200.0	0.00	0.00	7,367.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,300.0	0.00	0.00	7,467.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,400.0	0.00	0.00	7,567.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,500.0	0.00	0.00	7,667.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,567.6	0.00	0.00	7,735.0	369.9	3,110.2	3,132.1	0.00	0.00	Coal Ridge
8,600.0	0.00	0.00	7,767.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,700.0	0.00	0.00	7,867.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,800.0	0.00	0.00	7,967.4	369.9	3,110.2	3,132.1	0.00	0.00	
8,900.0	0.00	0.00	8,067.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,000.0	0.00	0.00	8,167.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,100.0	0.00	0.00	8,267.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,200.0	0.00	0.00	8,367.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,300.0	0.00	0.00	8,467.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,323.6	0.00	0.00	8,491.0	369.9	3,110.2	3,132.1	0.00	0.00	Rollins
9,400.0	0.00	0.00	8,567.4	369.9	3,110.2	3,132.1	0.00	0.00	

Cathedral Energy Services

Planning Report

Database:	USA EDM 5000 Multi Users DB	Local Co-ordinate Reference:	Well Pitman Federal 23-14B
Company:	EnCana Oil & Gas (USA) Inc	TVD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Project:	Mamm Creek	MD Reference:	KB=22' @ 6240.0ft (Patterson 308)
Site:	O22NW	North Reference:	True
Well:	Pitman Federal 23-14B	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
9,473.6	0.00	0.00	8,641.0	369.9	3,110.2	3,132.1	0.00	0.00	TD @ 9,473.6' MD
9,500.0	0.00	0.00	8,667.4	369.9	3,110.2	3,132.1	0.00	0.00	
9,573.6	0.00	0.00	8,741.0	369.9	3,110.2	3,132.1	0.00	0.00	Permit TD @ 9,573.6' MD

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	
- Shape									Latitude Longitude
Pitman Federal 23-14B I	- plan hits target center - Circle (radius 25.0)	0.00	0.00	8,641.0	369.9	3,110.2	1,617,846.50	2,366,028.00	39.508231 -107.747167
Pitman Federal 23-14B ~	- plan hits target center - Point	0.00	0.00	6,592.0	369.9	3,110.2	1,617,846.50	2,366,028.00	39.508231 -107.747167

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,425.6	1,354.2	Surface Casing			

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,462.9	4,768.0	Mesaverde Marker			
5,462.9	4,768.0	Ohio Creek			
6,283.7	5,481.0	Williams Fork			
7,424.6	6,592.0	Top Gas			
8,567.6	7,735.0	Coal Ridge			
9,323.6	8,491.0	Rollins			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
250.0	250.0	0.0	0.0	KOP @ 250'
1,325.6	1,269.6	34.8	292.9	EOB @ Inc. = 32.27°
5,811.3	5,062.6	317.7	2,670.9	Start 2° Drop
7,424.6	6,592.0	369.9	3,110.2	EOD @ Inc. = 0°
9,473.6	8,641.0	369.9	3,110.2	TD @ 9,473.6' MD
9,573.6	8,741.0	369.9	3,110.2	Permit TD @ 9,573.6' MD