



# **Vanguard Natural Resources**

**Garfield County, CO**

**MPD 25**

**Fed 34C-33-691**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**17 October, 2017**



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Fed 34C-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed 34C-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

<b>Project</b>	Garfield County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Central Zone		Using geodetic scale factor

<b>Site</b>	MPD 25		
<b>Site Position:</b>		<b>Northing:</b>	1,606,032.98 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,418,598.16 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39° 28' 45.253 N
		<b>Longitude:</b>	107° 33' 35.748 W
		<b>Grid Convergence:</b>	-1.30 °

<b>Well</b>	Fed 34C-33-691		
<b>Well Position</b>	<b>+N/-S</b>	28.1 usft	<b>Northing:</b>
	<b>+E/-W</b>	-24.7 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	6,561.0 usft
		<b>Latitude:</b>	39° 28' 45.525 N
		<b>Longitude:</b>	107° 33' 36.071 W
		<b>Ground Level:</b>	6,540.4 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	10/17/2017	9.47	65.64	51,533

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	87.50

<b>Plan Sections</b>										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
950.0	0.00	0.00	950.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,417.7	16.37	87.50	1,411.4	2.9	66.3	3.50	3.50	0.00	87.50	
4,422.2	16.37	87.50	4,294.1	39.9	912.3	0.00	0.00	0.00	0.00	
4,890.0	0.00	0.00	4,755.5	42.8	978.6	3.50	-3.50	0.00	180.00	34C-33-691 TGT
7,799.0	0.00	0.00	7,664.5	42.8	978.6	0.00	0.00	0.00	0.00	



# Payzone Directional Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Fed 34C-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed 34C-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
950.0	0.00	0.00	950.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 3.50									
1,000.0	1.75	87.50	1,000.0	0.0	0.8	0.8	3.50	3.50	0.00
1,100.0	5.25	87.50	1,099.8	0.3	6.9	6.9	3.50	3.50	0.00
1,200.0	8.75	87.50	1,199.0	0.8	19.0	19.1	3.50	3.50	0.00
1,300.0	12.25	87.50	1,297.3	1.6	37.2	37.3	3.50	3.50	0.00
1,400.0	15.75	87.50	1,394.4	2.7	61.4	61.5	3.50	3.50	0.00
1,417.7	16.37	87.50	1,411.4	2.9	66.3	66.4	3.50	3.50	0.00
Start 3004.5 hold at 1417.7 MD									
1,500.0	16.37	87.50	1,490.3	3.9	89.5	89.6	0.00	0.00	0.00
1,600.0	16.37	87.50	1,586.3	5.1	117.6	117.7	0.00	0.00	0.00
1,700.0	16.37	87.50	1,682.2	6.4	145.8	145.9	0.00	0.00	0.00
1,800.0	16.37	87.50	1,778.2	7.6	173.9	174.1	0.00	0.00	0.00
1,900.0	16.37	87.50	1,874.1	8.8	202.1	202.3	0.00	0.00	0.00
2,000.0	16.37	87.50	1,970.1	10.1	230.3	230.5	0.00	0.00	0.00
2,100.0	16.37	87.50	2,066.0	11.3	258.4	258.7	0.00	0.00	0.00
2,200.0	16.37	87.50	2,161.9	12.5	286.6	286.9	0.00	0.00	0.00
2,300.0	16.37	87.50	2,257.9	13.8	314.7	315.0	0.00	0.00	0.00
2,400.0	16.37	87.50	2,353.8	15.0	342.9	343.2	0.00	0.00	0.00
2,500.0	16.37	87.50	2,449.8	16.2	371.1	371.4	0.00	0.00	0.00
2,600.0	16.37	87.50	2,545.7	17.5	399.2	399.6	0.00	0.00	0.00
2,700.0	16.37	87.50	2,641.7	18.7	427.4	427.8	0.00	0.00	0.00
2,800.0	16.37	87.50	2,737.6	19.9	455.5	456.0	0.00	0.00	0.00
2,900.0	16.37	87.50	2,833.6	21.2	483.7	484.2	0.00	0.00	0.00
3,000.0	16.37	87.50	2,929.5	22.4	511.8	512.3	0.00	0.00	0.00
3,100.0	16.37	87.50	3,025.5	23.6	540.0	540.5	0.00	0.00	0.00
3,200.0	16.37	87.50	3,121.4	24.8	568.2	568.7	0.00	0.00	0.00
3,300.0	16.37	87.50	3,217.3	26.1	596.3	596.9	0.00	0.00	0.00
3,400.0	16.37	87.50	3,313.3	27.3	624.5	625.1	0.00	0.00	0.00
3,500.0	16.37	87.50	3,409.2	28.5	652.6	653.3	0.00	0.00	0.00
3,600.0	16.37	87.50	3,505.2	29.8	680.8	681.5	0.00	0.00	0.00
3,700.0	16.37	87.50	3,601.1	31.0	709.0	709.6	0.00	0.00	0.00
3,800.0	16.37	87.50	3,697.1	32.2	737.1	737.8	0.00	0.00	0.00
3,900.0	16.37	87.50	3,793.0	33.5	765.3	766.0	0.00	0.00	0.00
4,000.0	16.37	87.50	3,889.0	34.7	793.4	794.2	0.00	0.00	0.00
4,100.0	16.37	87.50	3,984.9	35.9	821.6	822.4	0.00	0.00	0.00
4,200.0	16.37	87.50	4,080.9	37.2	849.8	850.6	0.00	0.00	0.00
4,300.0	16.37	87.50	4,176.8	38.4	877.9	878.8	0.00	0.00	0.00
4,400.0	16.37	87.50	4,272.8	39.6	906.1	906.9	0.00	0.00	0.00
4,422.2	16.37	87.50	4,294.1	39.9	912.3	913.2	0.00	0.00	0.00
Start Drop -3.50									
4,500.0	13.65	87.50	4,369.2	40.8	932.5	933.3	3.50	-3.50	0.00
4,600.0	10.15	87.50	4,467.0	41.7	953.0	954.0	3.50	-3.50	0.00

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<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed 34C-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,689.5	7.02	87.50	4,555.5	42.3	966.4	967.3	3.50	-3.50	0.00
<b>Price Coal</b>									
4,700.0	6.65	87.50	4,565.9	42.3	967.6	968.6	3.50	-3.50	0.00
4,800.0	3.15	87.50	4,665.6	42.7	976.2	977.1	3.50	-3.50	0.00
4,890.0	0.00	0.00	4,755.5	42.8	978.6	979.6	3.50	-3.50	0.00
<b>Start 2909.0 hold at 4890.0 MD</b>									
4,900.0	0.00	0.00	4,765.5	42.8	978.6	979.6	0.00	0.00	0.00
5,000.0	0.00	0.00	4,865.5	42.8	978.6	979.6	0.00	0.00	0.00
5,100.0	0.00	0.00	4,965.5	42.8	978.6	979.6	0.00	0.00	0.00
5,200.0	0.00	0.00	5,065.5	42.8	978.6	979.6	0.00	0.00	0.00
5,300.0	0.00	0.00	5,165.5	42.8	978.6	979.6	0.00	0.00	0.00
5,400.0	0.00	0.00	5,265.5	42.8	978.6	979.6	0.00	0.00	0.00
5,423.2	0.00	0.00	5,288.7	42.8	978.6	979.6	0.00	0.00	0.00
<b>Top of Gas</b>									
5,500.0	0.00	0.00	5,365.5	42.8	978.6	979.6	0.00	0.00	0.00
5,600.0	0.00	0.00	5,465.5	42.8	978.6	979.6	0.00	0.00	0.00
5,700.0	0.00	0.00	5,565.5	42.8	978.6	979.6	0.00	0.00	0.00
5,800.0	0.00	0.00	5,665.5	42.8	978.6	979.6	0.00	0.00	0.00
5,900.0	0.00	0.00	5,765.5	42.8	978.6	979.6	0.00	0.00	0.00
6,000.0	0.00	0.00	5,865.5	42.8	978.6	979.6	0.00	0.00	0.00
6,100.0	0.00	0.00	5,965.5	42.8	978.6	979.6	0.00	0.00	0.00
6,200.0	0.00	0.00	6,065.5	42.8	978.6	979.6	0.00	0.00	0.00
6,300.0	0.00	0.00	6,165.5	42.8	978.6	979.6	0.00	0.00	0.00
6,400.0	0.00	0.00	6,265.5	42.8	978.6	979.6	0.00	0.00	0.00
6,500.0	0.00	0.00	6,365.5	42.8	978.6	979.6	0.00	0.00	0.00
6,600.0	0.00	0.00	6,465.5	42.8	978.6	979.6	0.00	0.00	0.00
6,700.0	0.00	0.00	6,565.5	42.8	978.6	979.6	0.00	0.00	0.00
6,800.0	0.00	0.00	6,665.5	42.8	978.6	979.6	0.00	0.00	0.00
6,900.0	0.00	0.00	6,765.5	42.8	978.6	979.6	0.00	0.00	0.00
7,000.0	0.00	0.00	6,865.5	42.8	978.6	979.6	0.00	0.00	0.00
7,100.0	0.00	0.00	6,965.5	42.8	978.6	979.6	0.00	0.00	0.00
7,200.0	0.00	0.00	7,065.5	42.8	978.6	979.6	0.00	0.00	0.00
7,300.0	0.00	0.00	7,165.5	42.8	978.6	979.6	0.00	0.00	0.00
7,400.0	0.00	0.00	7,265.5	42.8	978.6	979.6	0.00	0.00	0.00
7,500.0	0.00	0.00	7,365.5	42.8	978.6	979.6	0.00	0.00	0.00
7,549.0	0.00	0.00	7,414.5	42.8	978.6	979.6	0.00	0.00	0.00
<b>Rollins</b>									
7,600.0	0.00	0.00	7,465.5	42.8	978.6	979.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,565.5	42.8	978.6	979.6	0.00	0.00	0.00
7,799.0	0.00	0.00	7,664.5	42.8	978.6	979.6	0.00	0.00	0.00
<b>TD at 7799.0</b>									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
34C-33-691 TGT	0.00	360.00	4,755.5	42.8	978.6	1,606,103.90	2,419,552.10	39° 28' 46.167 N	107° 33' 23.605 W
- plan hits target center									
- Rectangle (sides W100.0 H40.0 D2,909.0)									



# Payzone Directional Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Fed 34C-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Project:</b>	Garfield County, CO	<b>MD Reference:</b>	Fed 34C-33-691 @ 6561.0usft (New KB)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed 34C-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,689.5	4,555.5	Price Coal		0.00	
5,423.2	5,288.7	Top of Gas		0.00	
7,549.0	7,414.5	Rollins		0.00	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
950.0	950.0	0.0	0.0	Start Build 3.50	
1,417.7	1,411.4	2.9	66.3	Start 3004.5 hold at 1417.7 MD	
4,422.2	4,294.1	39.9	912.3	Start Drop -3.50	
4,890.0	4,755.5	42.8	978.6	Start 2909.0 hold at 4890.0 MD	
7,799.0	7,664.5	42.8	978.6	TD at 7799.0	



Well Name: Fed 34C-33-691  
Surface Location: MPD 25  
North American Datum 1983, US State Plane 1983, Colorado Central Zone  
Ground Elevation: 6540.4  
+N/-S +E/-W Northing Easting Latitude Longitude  
0.0 0.0 1606061.10 2418573.50 39° 28' 46.167 N 107° 33' 36.071 W  
New KB Fed 34C-33-691 @ 6561.0usft (New KB)

Slot



Azimuths to Grid North  
True North: 1.30°  
Magnetic North: 10.76°  
Magnetic Field  
Strength: 51533.1snT  
Dip Angle: 65.64°  
Date: 10/17/2017  
Model: IGRF2015

MPD 25  
Fed 34C-33-691  
Design #1  
12:28, October 17 2017

#### WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
34C-33-691 TGT	4755.5	42.8	978.6	1606103.90	2419552.10	39° 28' 46.167 N	107° 33' 23.605 W	Rectangle (Sides: L40.0 W100.0)

#### 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	950.0	0.00	0.00	950.0	0.0	0.0	0.00	0.00	0.0	
3	1417.7	16.37	87.50	1411.4	2.9	66.3	3.50	87.50	66.4	
4	4422.2	16.37	87.50	4294.1	39.9	912.3	0.00	0.00	913.2	
5	4890.0	0.00	0.00	4755.5	42.8	978.6	3.50	180.00	979.6	34C-33-691 TGT
6	7799.0	0.00	0.00	7664.5	42.8	978.6	0.00	0.00	979.6	

#### ANNOTATIONS

TVD	MD	Annotation
950.0	950.0	Start Build 3.50
1411.4	1417.7	Start 3004.5 hold at 1417.7 MD
4294.1	4422.2	Start Drop -3.50
4755.5	4890.0	Start 2909.0 hold at 4890.0 MD
7664.5	7799.0	TD at 7799.0

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4555.5	4689.5	Price Coal
5288.7	5423.2	Top of Gas
7414.5	7549.0	Rollins

