

# **Vanguard Natural Resources**

**Garfield County, Co**

**MPD 25**

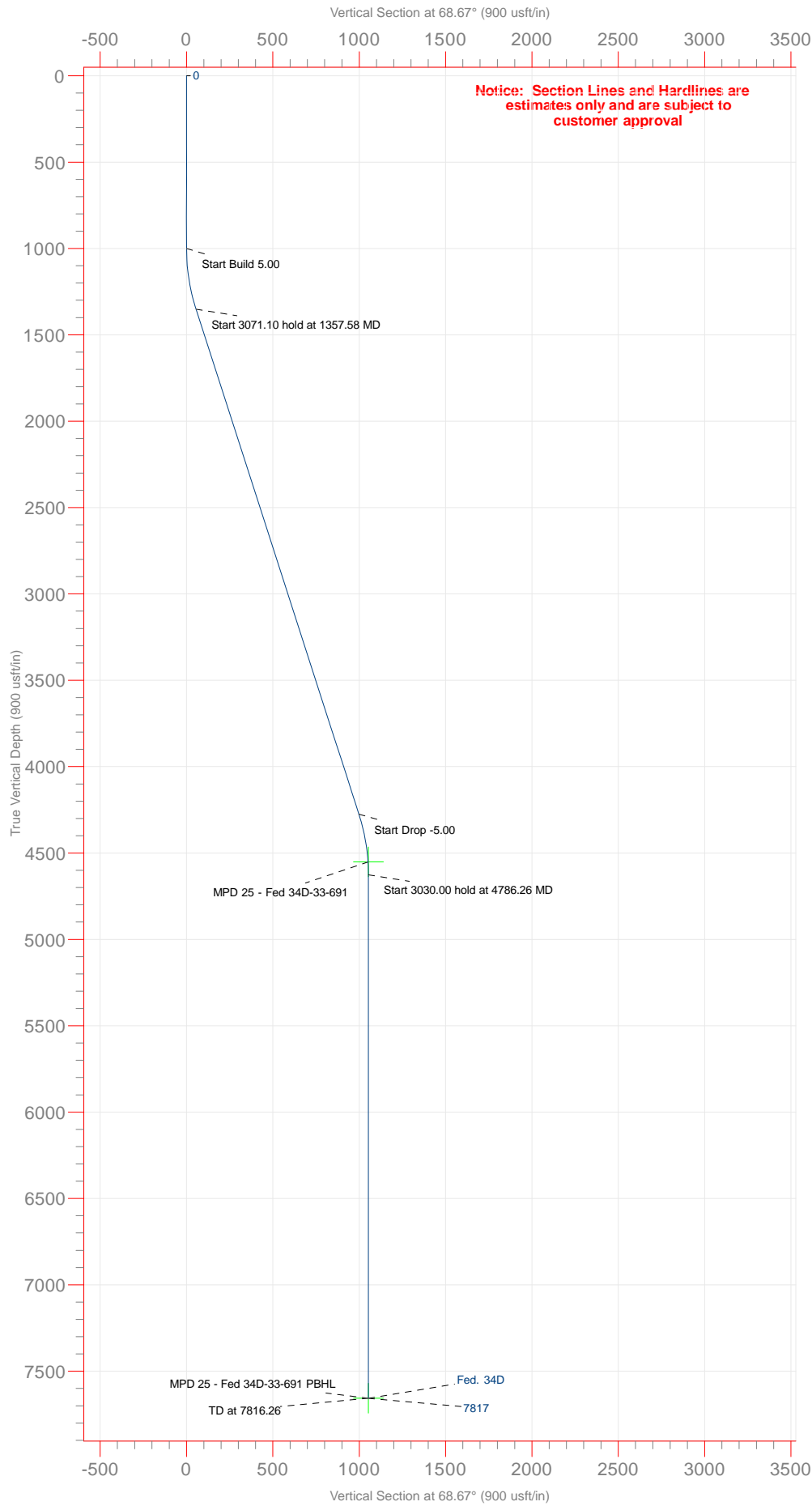
**Fed. 34D-33-691**

**Fed. 34D**

**Plan: Design #1**

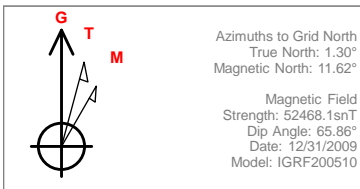
## **Standard Planning Report**

**07 February, 2017**



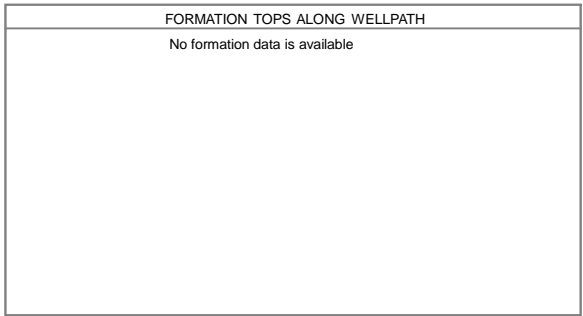
PROJECT DETAILS: Garfield County, Co

Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: Colorado Central Zone  
North Reference: Grid  
System Datum: Mean Sea Level  
To convert a Magnetic Direction to a Grid Direction, Add 11.62°  
To convert a Magnetic Direction to a True Direction, Add 10.32° East  
To convert a True Direction to a Grid Direction, Add 1.30°

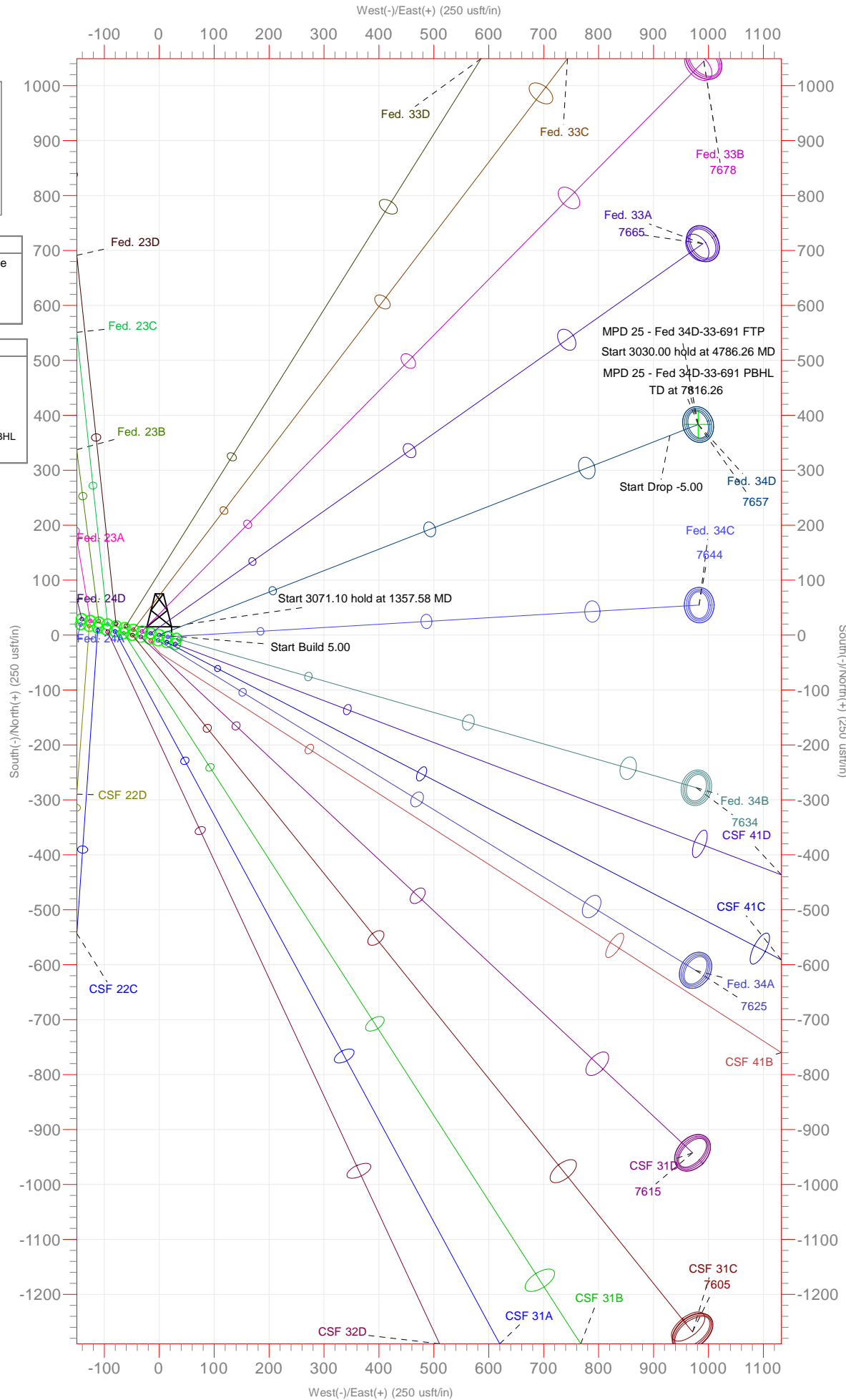
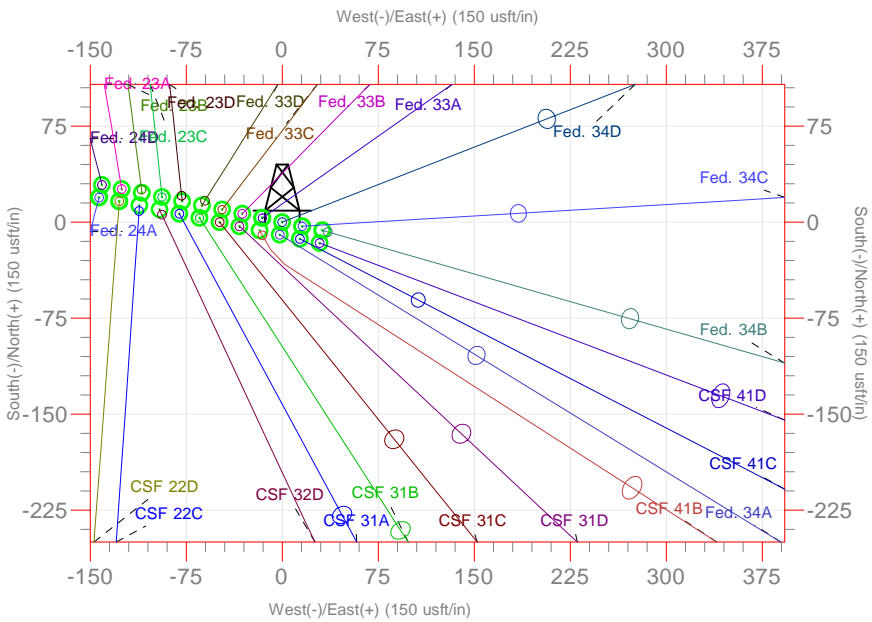


WELLBORE TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape Point
Vanguard MPD 25 - Federal 34D-33-691	4551.40	383.28	981.33	1606432.59	2419550.22	Point
Vanguard MPD 25 - Federal 34D-33-691 PBHL	656.40	383.28	981.34	1606432.59	2419550.22	Point

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSection	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	0.00	
3	1357.58	17.88	68.67	1351.80	20.13	51.55	5.00	68.67	55.34	
4	4428.68	17.88	68.67	4274.60	363.15	929.79	0.00	0.00	998.19	
5	4786.26	0.00	0.00	4626.40	383.28	981.34	5.00	180.00	1053.53	
6	7816.26	0.00	0.00	7656.40	383.28	981.34	0.00	0.00	1053.53	MPD 25 - Fed 34D-33-691 PBHL



CASING DETAILS	
No casing data is available	
Notice: Casing Depths Are Estimates Only	



## Gyrodata Inc.

## Planning Report

<b>Database:</b>	Gyrodata NWDB	<b>Local Co-ordinate Reference:</b>	Well Fed. 34D-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Project:</b>	Garfield County, Co	<b>MD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed. 34D-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34D		
<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		

Site	MPD 25				
Site Position:		Northing:	1,606,081.66 usft	Latitude:	39° 28' 45.692 N
From:	Lat/Long	Easting:	2,418,412.36 usft	Longitude:	107° 33' 38.131 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.30 °

Well	Fed. 34D-33-691					
Well Position	+N-S	-32.35 usft	Northing:	1,606,049.31 usft	Latitude:	39° 28' 45.408 N
	+E-W	156.53 usft	Easting:	2,418,568.89 usft	Longitude:	107° 33' 36.126 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	6,540.40 usft

<b>Wellbore</b>	Fed. 34D				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF200510	12/31/09	10.32	65.86	52,468.12252677

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	68.67

<b>Plan Survey Tool Program</b>	<b>Date</b>	02/07/17		
<b>Depth From (usft)</b>	<b>Depth To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Remarks</b>
1	0.00	7,816.26	Design #1 (Fed. 34D)	MWD - OSWG
				OWSG MWD - Standard

<b>Plan Sections</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	<b>TFO (°)</b>	<b>Target</b>
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,357.58	17.88	68.67	1,351.80	20.13	51.55	5.00	5.00	0.00	68.67	
4,428.68	17.88	68.67	4,274.60	363.15	929.79	0.00	0.00	0.00	0.00	
4,786.26	0.00	0.00	4,626.40	383.28	981.34	5.00	-5.00	0.00	180.00	
7,816.26	0.00	0.00	7,656.40	383.28	981.34	0.00	0.00	0.00	0.00	Vanguard MPD 25

# Gyrodatab Inc.

## Planning Report

<b>Database:</b>	Gyrodatab NWDB	<b>Local Co-ordinate Reference:</b>	Well Fed. 34D-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Project:</b>	Garfield County, Co	<b>MD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed. 34D-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34D		
<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 (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	5.00	68.67	1,099.87	1.59	4.06	4.36	5.00	5.00	0.00
1,200.00	10.00	68.67	1,198.99	6.33	16.22	17.41	5.00	5.00	0.00
1,300.00	15.00	68.67	1,296.58	14.21	36.37	39.05	5.00	5.00	0.00
1,357.58	17.88	68.67	1,351.80	20.13	51.55	55.34	5.00	5.00	0.00
1,400.00	17.88	68.67	1,392.18	24.87	63.68	68.36	0.00	0.00	0.00
1,500.00	17.88	68.67	1,487.35	36.04	92.28	99.06	0.00	0.00	0.00
1,600.00	17.88	68.67	1,582.52	47.21	120.87	129.76	0.00	0.00	0.00
1,700.00	17.88	68.67	1,677.69	58.38	149.47	160.47	0.00	0.00	0.00
1,800.00	17.88	68.67	1,772.86	69.55	178.07	191.17	0.00	0.00	0.00
1,900.00	17.88	68.67	1,868.03	80.72	206.66	221.87	0.00	0.00	0.00
2,000.00	17.88	68.67	1,963.20	91.89	235.26	252.57	0.00	0.00	0.00
2,100.00	17.88	68.67	2,058.37	103.05	263.86	283.27	0.00	0.00	0.00
2,200.00	17.88	68.67	2,153.54	114.22	292.45	313.97	0.00	0.00	0.00
2,300.00	17.88	68.67	2,248.71	125.39	321.05	344.67	0.00	0.00	0.00
2,400.00	17.88	68.67	2,343.88	136.56	349.65	375.37	0.00	0.00	0.00
2,500.00	17.88	68.67	2,439.05	147.73	378.25	406.07	0.00	0.00	0.00
2,600.00	17.88	68.67	2,534.22	158.90	406.84	436.77	0.00	0.00	0.00
2,700.00	17.88	68.67	2,629.40	170.07	435.44	467.47	0.00	0.00	0.00
2,800.00	17.88	68.67	2,724.57	181.24	464.04	498.17	0.00	0.00	0.00
2,900.00	17.88	68.67	2,819.74	192.41	492.63	528.87	0.00	0.00	0.00
3,000.00	17.88	68.67	2,914.91	203.58	521.23	559.58	0.00	0.00	0.00
3,100.00	17.88	68.67	3,010.08	214.75	549.83	590.28	0.00	0.00	0.00
3,200.00	17.88	68.67	3,105.25	225.91	578.42	620.98	0.00	0.00	0.00
3,300.00	17.88	68.67	3,200.42	237.08	607.02	651.68	0.00	0.00	0.00
3,400.00	17.88	68.67	3,295.59	248.25	635.62	682.38	0.00	0.00	0.00
3,500.00	17.88	68.67	3,390.76	259.42	664.22	713.08	0.00	0.00	0.00
3,600.00	17.88	68.67	3,485.93	270.59	692.81	743.78	0.00	0.00	0.00
3,700.00	17.88	68.67	3,581.10	281.76	721.41	774.48	0.00	0.00	0.00
3,800.00	17.88	68.67	3,676.27	292.93	750.01	805.18	0.00	0.00	0.00
3,900.00	17.88	68.67	3,771.44	304.10	778.60	835.88	0.00	0.00	0.00
4,000.00	17.88	68.67	3,866.61	315.27	807.20	866.58	0.00	0.00	0.00
4,100.00	17.88	68.67	3,961.79	326.44	835.80	897.28	0.00	0.00	0.00
4,200.00	17.88	68.67	4,056.96	337.61	864.39	927.99	0.00	0.00	0.00
4,300.00	17.88	68.67	4,152.13	348.77	892.99	958.69	0.00	0.00	0.00
4,400.00	17.88	68.67	4,247.30	359.94	921.59	989.39	0.00	0.00	0.00
4,428.68	17.88	68.67	4,274.60	363.15	929.79	998.19	0.00	0.00	0.00
4,500.00	14.31	68.67	4,343.11	370.34	948.21	1,017.96	5.00	-5.00	0.00
4,600.00	9.31	68.67	4,440.96	377.79	967.27	1,038.43	5.00	-5.00	0.00
4,700.00	4.31	68.67	4,540.22	382.10	978.32	1,050.29	5.00	-5.00	0.00
4,711.30	3.75	68.67	4,551.49	382.39	979.06	1,051.08	5.00	-5.00	0.00
Vanguard MPD 25 - Federal 34D-33-691									
4,786.26	0.00	0.00	4,626.40	383.28	981.34	1,053.53	5.00	-5.00	0.00
4,800.00	0.00	0.00	4,640.14	383.28	981.34	1,053.53	0.00	0.00	0.00

# Gyrodata Inc.

## Planning Report

<b>Database:</b>	Gyrodata NWDB	<b>Local Co-ordinate Reference:</b>	Well Fed. 34D-33-691
<b>Company:</b>	Vanguard Natural Resources	<b>TVD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Project:</b>	Garfield County, Co	<b>MD Reference:</b>	WELL @ 6540.40usft (Original Well Elev)
<b>Site:</b>	MPD 25	<b>North Reference:</b>	Grid
<b>Well:</b>	Fed. 34D-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34D		
<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 (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
4,900.00	0.00	0.00	4,740.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,000.00	0.00	0.00	4,840.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,100.00	0.00	0.00	4,940.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,040.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,140.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,240.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,340.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,440.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,540.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,640.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,740.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,840.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,100.00	0.00	0.00	5,940.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,040.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,140.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,240.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,340.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,440.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,540.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,640.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,740.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,840.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,100.00	0.00	0.00	6,940.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,200.00	0.00	0.00	7,040.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,300.00	0.00	0.00	7,140.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,400.00	0.00	0.00	7,240.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,500.00	0.00	0.00	7,340.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,440.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,700.00	0.00	0.00	7,540.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,800.00	0.00	0.00	7,640.14	383.28	981.34	1,053.53	0.00	0.00	0.00	
7,816.26	0.00	0.00	7,656.40	383.28	981.34	1,053.53	0.00	0.00	0.00	
Vanguard MPD 25 - Federal 34D-33-691 PBHL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
Vanguard MPD 25 - F - hit/miss target - Shape - Point	0.00	0.00	4,551.40	383.28	981.33	1,606,432.59	2,419,550.22	39° 28' 49.415 N	107° 33' 23.724 W	- plan misses target center by 2.45usft at 4711.30usft MD (4551.49 TVD, 382.39 N, 979.06 E)
Vanguard MPD 25 - F - plan hits target center - Point	0.00	360.00	7,656.40	383.28	981.34	1,606,432.59	2,419,550.23	39° 28' 49.415 N	107° 33' 23.724 W	