

# **Vanguard Natural Resources**

**Garfield County, Co**

**MPD 25**

**Fed. 34B-33-691**

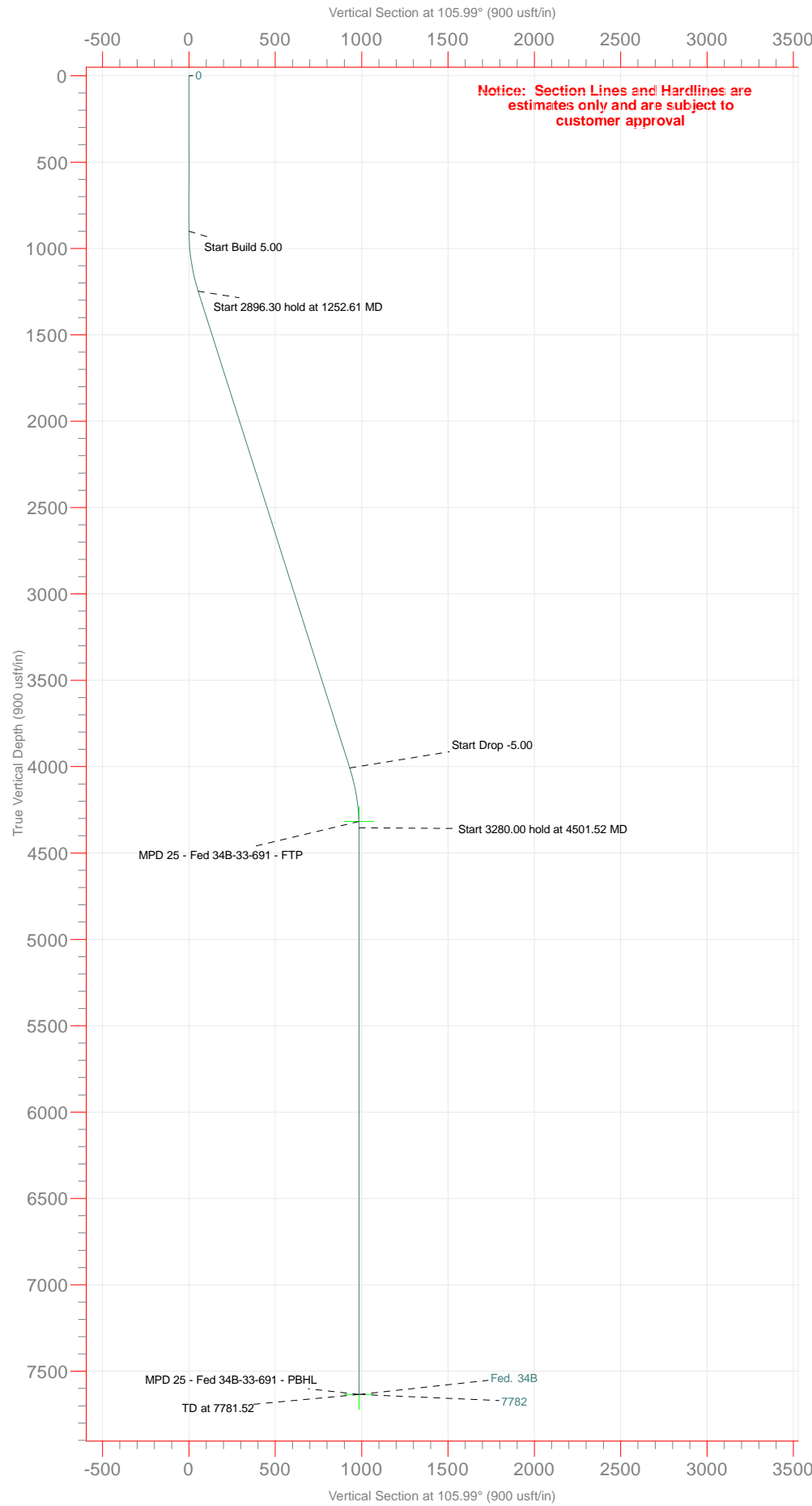
**Fed. 34B**

**Plan: Design #1**

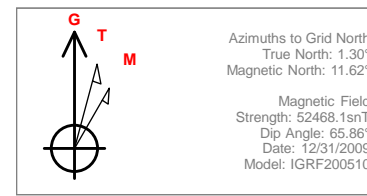
## **Standard Planning Report**

**07 February, 2017**

Plan: Design #1 (Fed. 34B-33-691/Fed. 34B)  
WELL @ 6540.40usft (Original Well Elev)



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°	

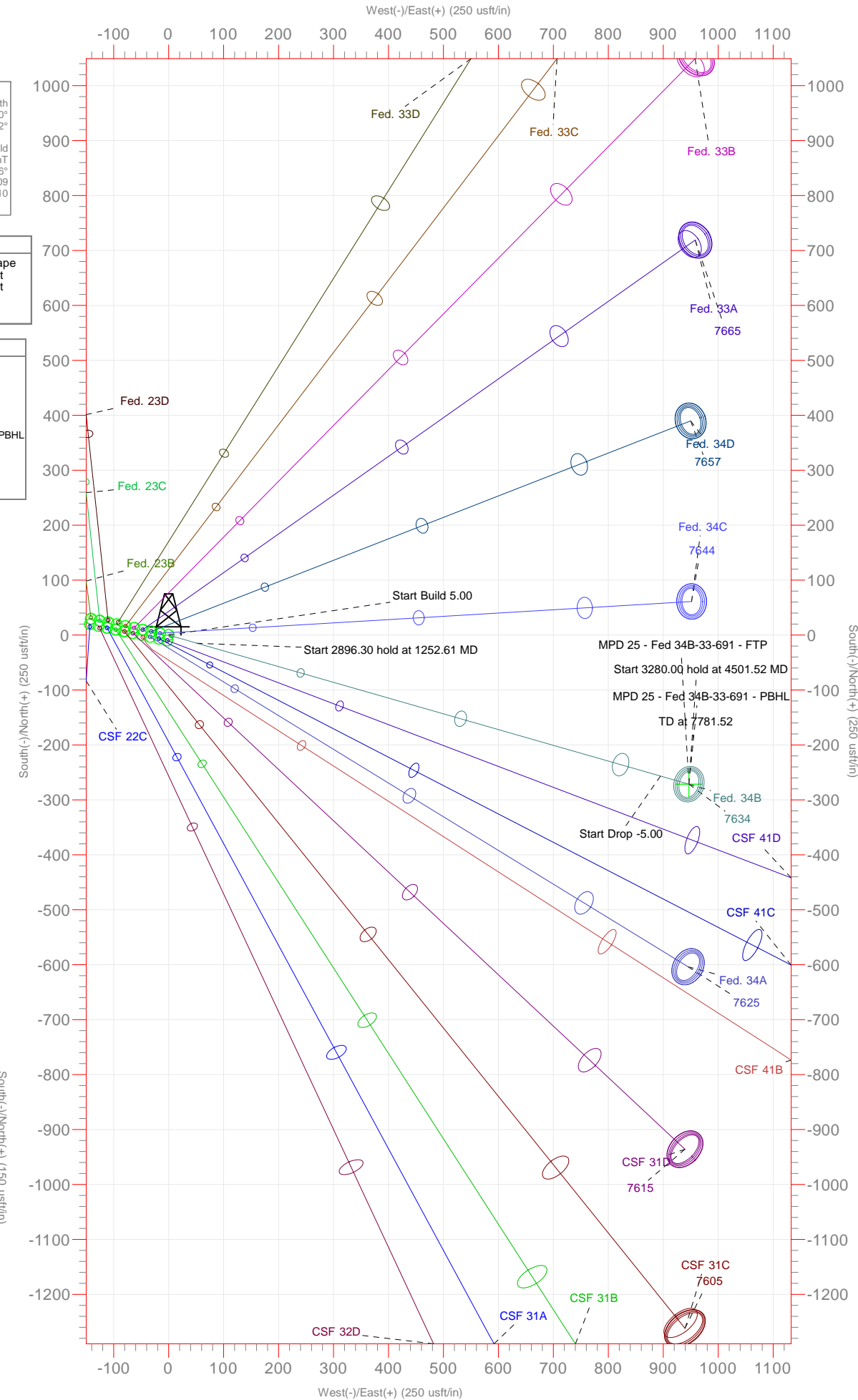
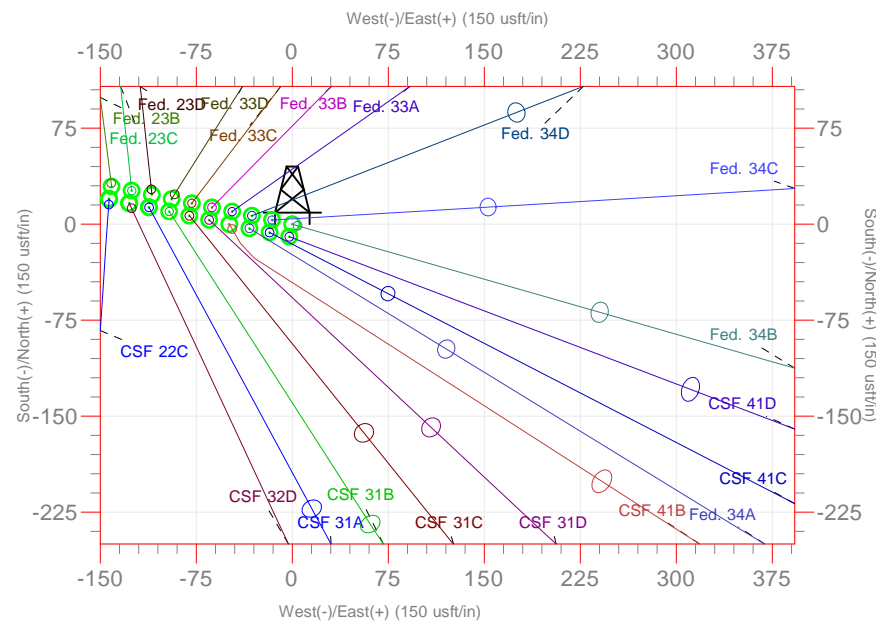


WELLBORE TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape Point
Vanguard MPD 25 - Federal 34B-33-691 - FTP	317.40	-271.37	946.75	1605771.40	2419547.11	Point
Vanguard MPD 25 - Federal 34B-33-691 - PBHL	34.40	-271.37	946.75	1605771.40	2419547.11	Point

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	
3	1252.61	17.63	105.99	1247.07	-14.83	51.74	5.00	105.99	53.82	
4	4148.91	17.63	105.99	4007.33	-256.54	895.01	0.00	0.00	931.05	
5	4501.52	0.00	360.00	4354.40	-271.37	946.75	5.00	180.00	984.88	
6	7781.52	0.00	360.00	7634.40	-271.37	946.75	0.00	0.00	984.88	MPD 25 - Fedl 34B-33-691 - PBHL

FORMATION TOPS ALONG WELLPATH	
No formation data is available	

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. 34B-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. 34B-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34B		
<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. 34B-33-691					
Well Position	+N-S	-38.89 usft	Northing:	1,606,042.77 usft	Latitude:	39° 28' 45.350 N
	+E-W	188.00 usft	Easting:	2,418,600.36 usft	Longitude:	107° 33' 35.723 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	6,540.40 usft

<b>Wellbore</b>	Fed. 34B				
<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	52,468.12821085

<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	105.99

<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	7,781.52	Design #1 (Fed. 34B)	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	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,252.61	17.63	105.99	1,247.07	-14.83	51.74	5.00	5.00	0.00	105.99	
4,148.91	17.63	105.99	4,007.33	-256.54	895.01	0.00	0.00	0.00	0.00	
4,501.52	0.00	360.00	4,354.40	-271.37	946.75	5.00	-5.00	0.00	180.00	
7,781.52	0.00	360.00	7,634.40	-271.37	946.75	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. 34B-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. 34B-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34B		
<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	5.00	105.99	999.87	-1.20	4.19	4.36	5.00	5.00	0.00
1,100.00	10.00	105.99	1,098.99	-4.80	16.74	17.41	5.00	5.00	0.00
1,200.00	15.00	105.99	1,196.58	-10.76	37.53	39.05	5.00	5.00	0.00
1,252.61	17.63	105.99	1,247.07	-14.83	51.74	53.82	5.00	5.00	0.00
1,300.00	17.63	105.99	1,292.24	-18.79	65.54	68.18	0.00	0.00	0.00
1,400.00	17.63	105.99	1,387.54	-27.13	94.65	98.47	0.00	0.00	0.00
1,500.00	17.63	105.99	1,482.84	-35.48	123.77	128.75	0.00	0.00	0.00
1,600.00	17.63	105.99	1,578.14	-43.82	152.89	159.04	0.00	0.00	0.00
1,700.00	17.63	105.99	1,673.45	-52.17	182.00	189.33	0.00	0.00	0.00
1,800.00	17.63	105.99	1,768.75	-60.51	211.12	219.62	0.00	0.00	0.00
1,900.00	17.63	105.99	1,864.05	-68.86	240.23	249.91	0.00	0.00	0.00
2,000.00	17.63	105.99	1,959.36	-77.20	269.35	280.19	0.00	0.00	0.00
2,100.00	17.63	105.99	2,054.66	-85.55	298.46	310.48	0.00	0.00	0.00
2,200.00	17.63	105.99	2,149.96	-93.89	327.58	340.77	0.00	0.00	0.00
2,300.00	17.63	105.99	2,245.26	-102.24	356.69	371.06	0.00	0.00	0.00
2,400.00	17.63	105.99	2,340.57	-110.58	385.81	401.34	0.00	0.00	0.00
2,500.00	17.63	105.99	2,435.87	-118.93	414.92	431.63	0.00	0.00	0.00
2,600.00	17.63	105.99	2,531.17	-127.27	444.04	461.92	0.00	0.00	0.00
2,700.00	17.63	105.99	2,626.48	-135.62	473.16	492.21	0.00	0.00	0.00
2,800.00	17.63	105.99	2,721.78	-143.97	502.27	522.50	0.00	0.00	0.00
2,900.00	17.63	105.99	2,817.08	-152.31	531.39	552.78	0.00	0.00	0.00
3,000.00	17.63	105.99	2,912.39	-160.66	560.50	583.07	0.00	0.00	0.00
3,100.00	17.63	105.99	3,007.69	-169.00	589.62	613.36	0.00	0.00	0.00
3,200.00	17.63	105.99	3,102.99	-177.35	618.73	643.65	0.00	0.00	0.00
3,300.00	17.63	105.99	3,198.29	-185.69	647.85	673.94	0.00	0.00	0.00
3,400.00	17.63	105.99	3,293.60	-194.04	676.96	704.22	0.00	0.00	0.00
3,500.00	17.63	105.99	3,388.90	-202.38	706.08	734.51	0.00	0.00	0.00
3,600.00	17.63	105.99	3,484.20	-210.73	735.19	764.80	0.00	0.00	0.00
3,700.00	17.63	105.99	3,579.51	-219.07	764.31	795.09	0.00	0.00	0.00
3,800.00	17.63	105.99	3,674.81	-227.42	793.43	825.38	0.00	0.00	0.00
3,900.00	17.63	105.99	3,770.11	-235.76	822.54	855.66	0.00	0.00	0.00
4,000.00	17.63	105.99	3,865.41	-244.11	851.66	885.95	0.00	0.00	0.00
4,100.00	17.63	105.99	3,960.72	-252.46	880.77	916.24	0.00	0.00	0.00
4,148.91	17.63	105.99	4,007.33	-256.54	895.01	931.05	0.00	0.00	0.00
4,200.00	15.08	105.99	4,056.35	-260.50	908.84	945.44	5.00	-5.00	0.00
4,300.00	10.08	105.99	4,153.92	-266.50	929.76	967.20	5.00	-5.00	0.00
4,400.00	5.08	105.99	4,253.01	-270.13	942.43	980.38	5.00	-5.00	0.00
4,464.54	1.85	105.99	4,317.43	-271.20	946.18	984.28	5.00	-5.00	0.00
Vanguard MPD 25 - Federal 34B-33-691 - FTP									
4,500.00	0.08	105.99	4,352.88	-271.37	946.75	984.88	5.00	-5.00	0.00
4,501.52	0.00	360.00	4,354.40	-271.37	946.75	984.88	5.00	-5.00	0.00
4,600.00	0.00	0.00	4,452.88	-271.37	946.75	984.88	0.00	0.00	0.00
4,700.00	0.00	0.00	4,552.88	-271.37	946.75	984.88	0.00	0.00	0.00
4,800.00	0.00	0.00	4,652.88	-271.37	946.75	984.88	0.00	0.00	0.00

# Gyrodata Inc.

## Planning Report

<b>Database:</b>	Gyrodata NWDB	<b>Local Co-ordinate Reference:</b>	Well Fed. 34B-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. 34B-33-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Fed. 34B		
<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	4,752.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,000.00	0.00	0.00	4,852.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,100.00	0.00	0.00	4,952.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,200.00	0.00	0.00	5,052.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,152.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,252.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,352.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,452.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,552.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,652.88	-271.37	946.75	984.88	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,752.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,852.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,100.00	0.00	0.00	5,952.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,052.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,152.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,252.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,352.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,452.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,552.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,652.88	-271.37	946.75	984.88	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,752.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,852.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,100.00	0.00	0.00	6,952.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,200.00	0.00	0.00	7,052.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,300.00	0.00	0.00	7,152.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,400.00	0.00	0.00	7,252.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,500.00	0.00	0.00	7,352.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,452.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,700.00	0.00	0.00	7,552.88	-271.37	946.75	984.88	0.00	0.00	0.00	
7,781.52	0.00	360.00	7,634.40	-271.37	946.75	984.88	0.00	0.00	0.00	
Vanguard MPD 25 - Federal 34B-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	
- hit/miss target										
- Shape										
Vanguard MPD 25 - F	0.00	360.00	4,317.40	-271.37	946.75	1,605,771.40	2,419,547.11	39° 28' 42.881 N	107° 33' 23.573 W	
- plan misses target center by 0.60usft at 4464.54usft MD (4317.43 TVD, -271.20 N, 946.18 E)										
- Point										
Vanguard MPD 25 - F	0.00	0.00	7,634.40	-271.37	946.75	1,605,771.40	2,419,547.12	39° 28' 42.881 N	107° 33' 23.573 W	
- plan hits target center										
- Point										