

Vanguard Natural Resources

Garfield County, Co

MPD 25

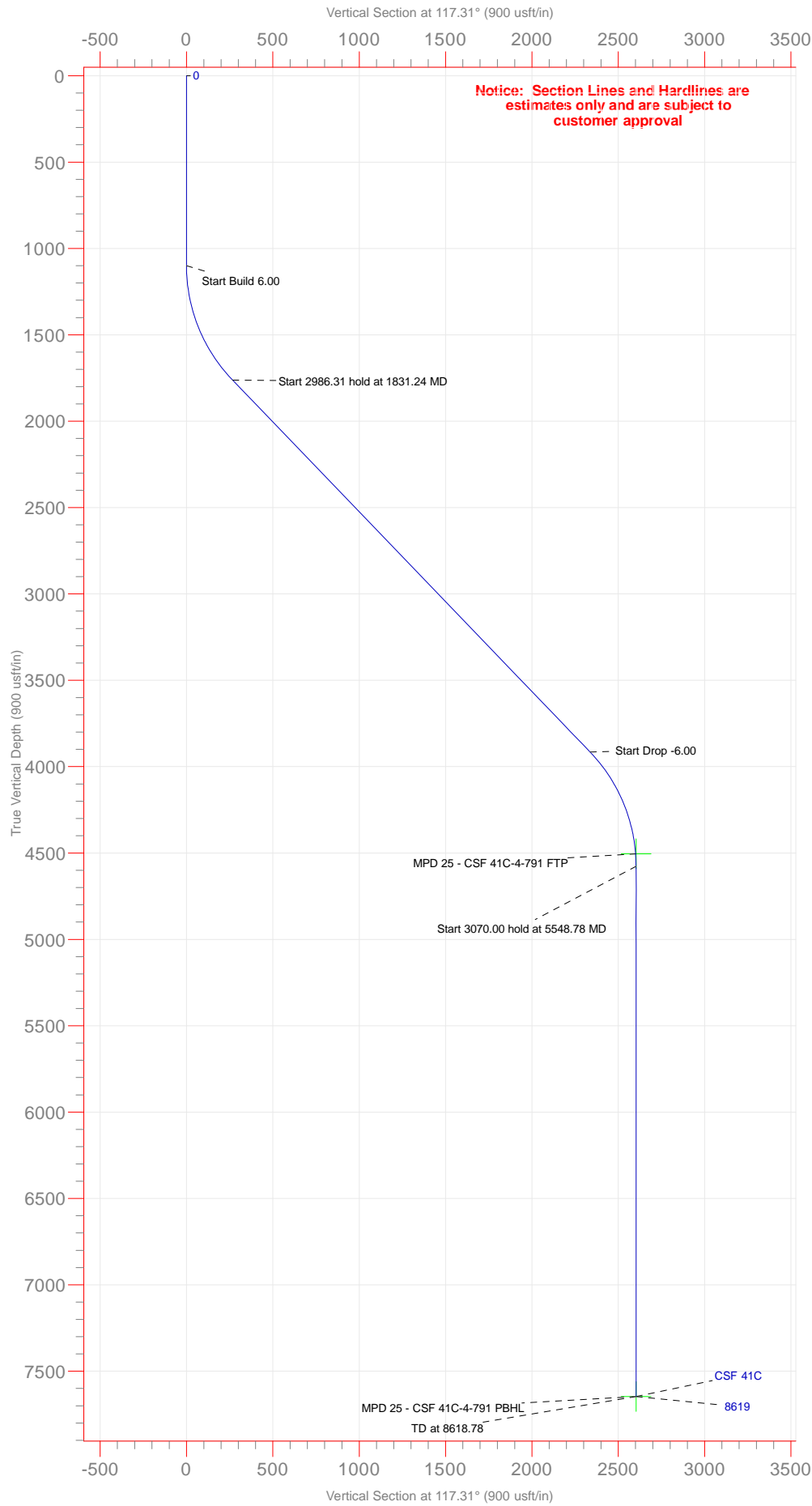
CSF 41C-4-791

CSF 41C

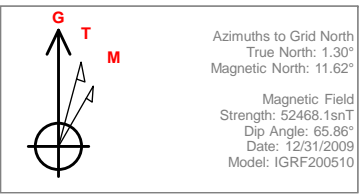
Plan: Design #1

Standard Planning Report

07 February, 2017



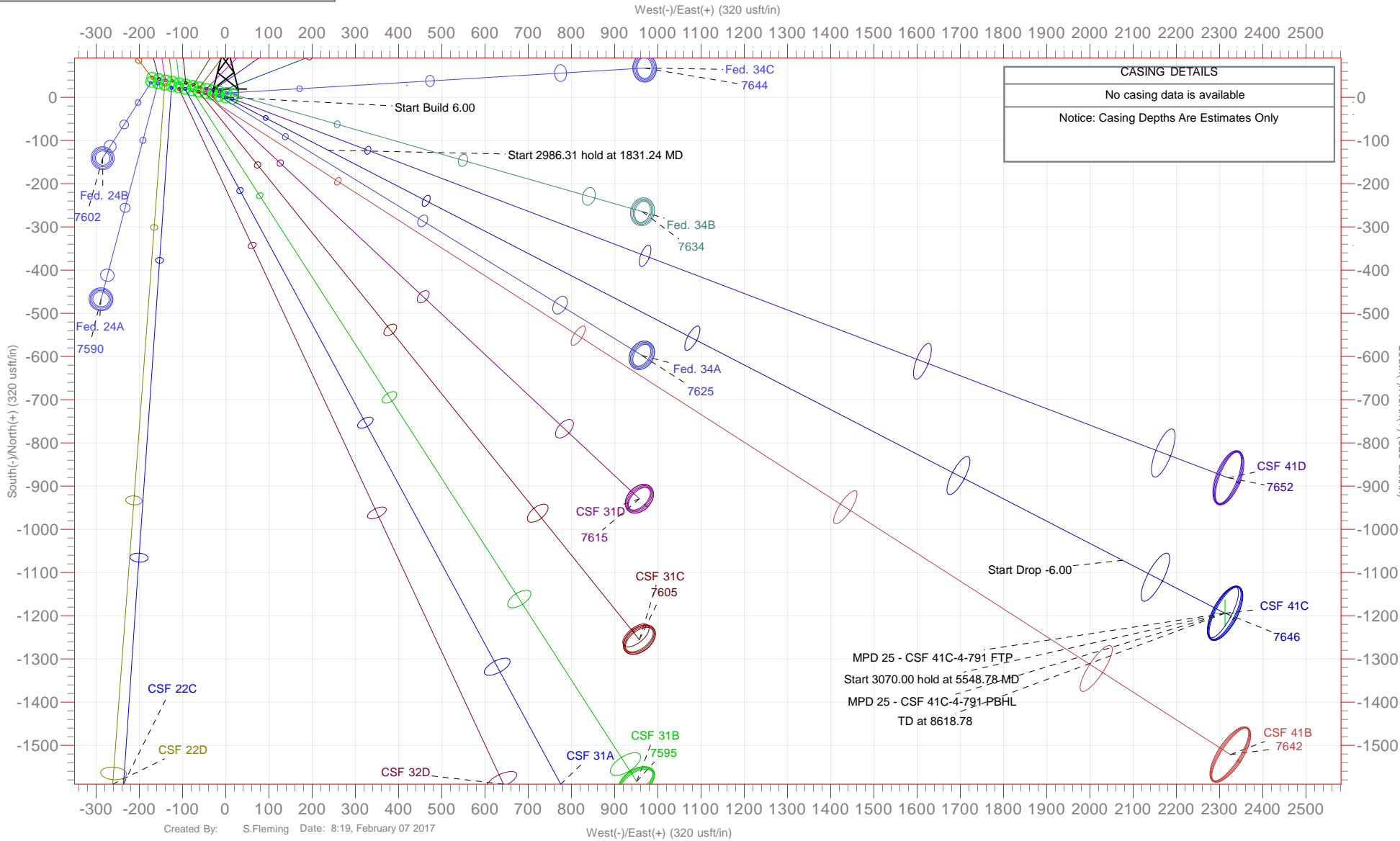
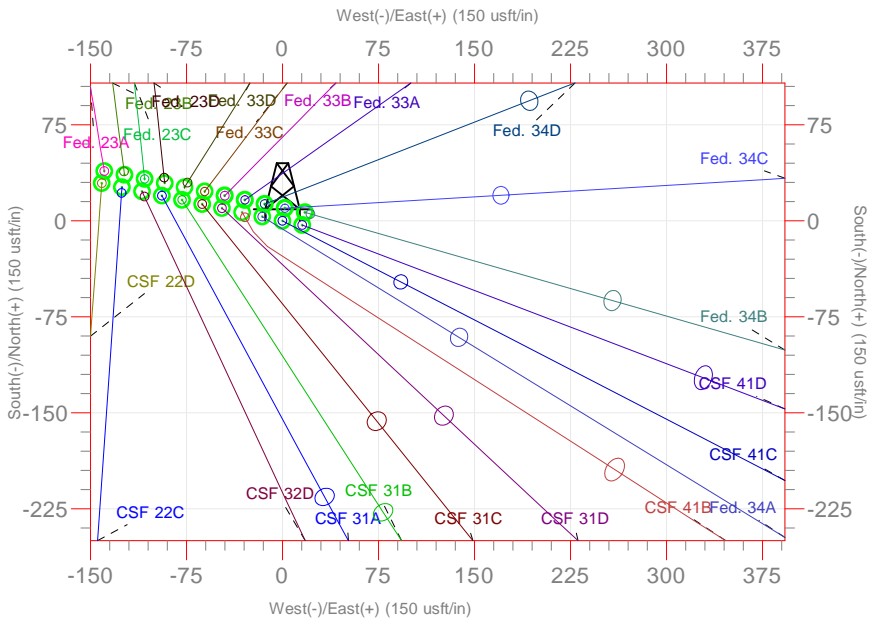
PROJECT DETAILS: Garfield County, Co	
Geodetic System:	US State Plane 1983
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	Colorado Central Zone
North Reference:	Grid
System Datum:	Mean Sea Level
To convert a Magnetic Direction to a Grid Direction, Add 11.62°	
To convert a Magnetic Direction 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 - CSF 41C-4-791 FTP	4504.40	-1194.13	2312.77	1604842.10	2420895.48	Point	
Vanguard - MPD 25 - CSF 41C-4-791 PBHL	7646.40	-1194.12	2312.78	1604842.10	2420895.48	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	1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	0.00	0.00	
3	1831.24	43.87	117.31	1761.84	-122.29	236.85	6.00	117.31	266.56	
4	4817.55	43.87	117.31	3914.56	-1071.84	2075.93	0.00	0.00	2336.30	
5	5548.78	0.00	360.00	4576.40	-1194.12	2312.78	6.00	180.00	2602.86	
6	8618.78	0.00	360.00	7646.40	-1194.12	2312.78	0.00	0.00	2602.86	MPD 25 - CSF 41C-4-791 PBHL

FORMATION TOPS ALONG WELLPATH	
No formation data is available	



Gyrodatab Inc.

Planning Report

Database:	Gyrodatab NWDB	Local Co-ordinate Reference:	Well CSF 41C-4-791
Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 6540.40usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 6540.40usft (Original Well Elev)
Site:	MPD 25	North Reference:	Grid
Well:	CSF 41C-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41C		
Design:	Design #1		

Project	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	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	CSF 41C-4-791					
Well Position	+N-S	-45.43 usft	Northing:	1,606,036.23 usft	Latitude:	39° 28' 45.282 N
	+E-W	170.35 usft	Easting:	2,418,582.71 usft	Longitude:	107° 33' 35.946 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	6,540.40 usft

Wellbore	CSF 41C				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/09	10.32	65.86	52,468.10990321

Design	Design #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	117.31

Plan Survey Tool Program	Date	02/07/17		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	8,618.78	Design #1 (CSF 41C)	MWD - OSWG
				OWSG MWD - Standard

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,831.24	43.87	117.31	1,761.84	-122.29	236.85	6.00	6.00	0.00	117.31	
4,817.55	43.87	117.31	3,914.56	-1,071.84	2,075.93	0.00	0.00	0.00	0.00	
5,548.78	0.00	360.00	4,576.40	-1,194.12	2,312.78	6.00	-6.00	0.00	180.00	
8,618.78	0.00	360.00	7,646.40	-1,194.12	2,312.78	0.00	0.00	0.00	0.00	Vanguard - MPD 25

Gyrodatab Inc.

Planning Report

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Project:	Garfield County, Co	MD Reference:	WELL @ 6540.40usft (Original Well Elev)
Site:	MPD 25	North Reference:	Grid
Well:	CSF 41C-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41C		
Design:	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	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	6.00	117.31	1,199.82	-2.40	4.65	5.23	6.00	6.00	0.00
1,300.00	12.00	117.31	1,298.54	-9.57	18.54	20.87	6.00	6.00	0.00
1,400.00	18.00	117.31	1,395.09	-21.44	41.53	46.74	6.00	6.00	0.00
1,500.00	24.00	117.31	1,488.40	-37.88	73.36	82.56	6.00	6.00	0.00
1,600.00	30.00	117.31	1,577.46	-58.69	113.68	127.94	6.00	6.00	0.00
1,700.00	36.00	117.31	1,661.29	-83.67	162.05	182.38	6.00	6.00	0.00
1,800.00	42.00	117.31	1,738.97	-112.53	217.94	245.28	6.00	6.00	0.00
1,831.24	43.87	117.31	1,761.84	-122.29	236.85	266.56	6.00	6.00	0.00
1,900.00	43.87	117.31	1,811.41	-144.15	279.20	314.21	0.00	0.00	0.00
2,000.00	43.87	117.31	1,883.50	-175.95	340.78	383.52	0.00	0.00	0.00
2,100.00	43.87	117.31	1,955.58	-207.75	402.36	452.83	0.00	0.00	0.00
2,200.00	43.87	117.31	2,027.67	-239.54	463.95	522.14	0.00	0.00	0.00
2,300.00	43.87	117.31	2,099.75	-271.34	525.53	591.45	0.00	0.00	0.00
2,400.00	43.87	117.31	2,171.84	-303.14	587.11	660.75	0.00	0.00	0.00
2,500.00	43.87	117.31	2,243.93	-334.93	648.70	730.06	0.00	0.00	0.00
2,600.00	43.87	117.31	2,316.01	-366.73	710.28	799.37	0.00	0.00	0.00
2,700.00	43.87	117.31	2,388.10	-398.53	771.87	868.68	0.00	0.00	0.00
2,800.00	43.87	117.31	2,460.19	-430.32	833.45	937.98	0.00	0.00	0.00
2,900.00	43.87	117.31	2,532.27	-462.12	895.03	1,007.29	0.00	0.00	0.00
3,000.00	43.87	117.31	2,604.36	-493.92	956.62	1,076.60	0.00	0.00	0.00
3,100.00	43.87	117.31	2,676.44	-525.71	1,018.20	1,145.91	0.00	0.00	0.00
3,200.00	43.87	117.31	2,748.53	-557.51	1,079.78	1,215.22	0.00	0.00	0.00
3,300.00	43.87	117.31	2,820.62	-589.31	1,141.37	1,284.52	0.00	0.00	0.00
3,400.00	43.87	117.31	2,892.70	-621.10	1,202.95	1,353.83	0.00	0.00	0.00
3,500.00	43.87	117.31	2,964.79	-652.90	1,264.53	1,423.14	0.00	0.00	0.00
3,600.00	43.87	117.31	3,036.88	-684.70	1,326.12	1,492.45	0.00	0.00	0.00
3,700.00	43.87	117.31	3,108.96	-716.49	1,387.70	1,561.75	0.00	0.00	0.00
3,800.00	43.87	117.31	3,181.05	-748.29	1,449.28	1,631.06	0.00	0.00	0.00
3,900.00	43.87	117.31	3,253.13	-780.09	1,510.87	1,700.37	0.00	0.00	0.00
4,000.00	43.87	117.31	3,325.22	-811.88	1,572.45	1,769.68	0.00	0.00	0.00
4,100.00	43.87	117.31	3,397.31	-843.68	1,634.04	1,838.99	0.00	0.00	0.00
4,200.00	43.87	117.31	3,469.39	-875.48	1,695.62	1,908.29	0.00	0.00	0.00
4,300.00	43.87	117.31	3,541.48	-907.27	1,757.20	1,977.60	0.00	0.00	0.00
4,400.00	43.87	117.31	3,613.57	-939.07	1,818.79	2,046.91	0.00	0.00	0.00
4,500.00	43.87	117.31	3,685.65	-970.87	1,880.37	2,116.22	0.00	0.00	0.00
4,600.00	43.87	117.31	3,757.74	-1,002.66	1,941.95	2,185.52	0.00	0.00	0.00
4,700.00	43.87	117.31	3,829.83	-1,034.46	2,003.54	2,254.83	0.00	0.00	0.00
4,800.00	43.87	117.31	3,901.91	-1,066.26	2,065.12	2,324.14	0.00	0.00	0.00
4,817.55	43.87	117.31	3,914.56	-1,071.84	2,075.93	2,336.30	0.00	0.00	0.00
4,900.00	38.93	117.31	3,976.39	-1,096.84	2,124.36	2,390.81	6.00	-6.00	0.00
5,000.00	32.93	117.31	4,057.33	-1,123.75	2,176.47	2,449.46	6.00	-6.00	0.00
5,100.00	26.93	117.31	4,143.96	-1,146.63	2,220.78	2,499.33	6.00	-6.00	0.00

Gyrodata Inc.

Planning Report

Database:	Gyrodata NWDB	Local Co-ordinate Reference:	Well CSF 41C-4-791
Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 6540.40usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 6540.40usft (Original Well Elev)
Site:	MPD 25	North Reference:	Grid
Well:	CSF 41C-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41C		
Design:	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)
5,200.00	20.93	117.31	4,235.32	-1,165.23	2,256.81	2,539.87	6.00	-6.00	0.00
5,300.00	14.93	117.31	4,330.42	-1,179.34	2,284.14	2,570.63	6.00	-6.00	0.00
5,400.00	8.93	117.31	4,428.22	-1,188.82	2,302.50	2,591.29	6.00	-6.00	0.00
5,477.00	4.31	117.31	4,504.69	-1,192.89	2,310.38	2,600.16	6.00	-6.00	0.00
Vanguard - MPD 25 - CSF 41C-4-791 FTP									
5,500.00	2.93	117.31	4,527.64	-1,193.55	2,311.67	2,601.61	6.00	-6.00	0.00
5,548.78	0.00	360.00	4,576.40	-1,194.12	2,312.78	2,602.86	6.00	-6.00	0.00
5,600.00	0.00	0.00	4,627.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
5,700.00	0.00	0.00	4,727.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
5,800.00	0.00	0.00	4,827.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
5,900.00	0.00	0.00	4,927.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,000.00	0.00	0.00	5,027.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,100.00	0.00	0.00	5,127.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,200.00	0.00	0.00	5,227.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,300.00	0.00	0.00	5,327.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,400.00	0.00	0.00	5,427.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,500.00	0.00	0.00	5,527.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,600.00	0.00	0.00	5,627.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,700.00	0.00	0.00	5,727.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,800.00	0.00	0.00	5,827.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
6,900.00	0.00	0.00	5,927.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,000.00	0.00	0.00	6,027.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,100.00	0.00	0.00	6,127.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,200.00	0.00	0.00	6,227.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,300.00	0.00	0.00	6,327.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,400.00	0.00	0.00	6,427.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,500.00	0.00	0.00	6,527.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,600.00	0.00	0.00	6,627.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,700.00	0.00	0.00	6,727.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,800.00	0.00	0.00	6,827.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
7,900.00	0.00	0.00	6,927.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,000.00	0.00	0.00	7,027.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,100.00	0.00	0.00	7,127.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,200.00	0.00	0.00	7,227.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,300.00	0.00	0.00	7,327.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,400.00	0.00	0.00	7,427.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,500.00	0.00	0.00	7,527.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,600.00	0.00	0.00	7,627.62	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
8,618.78	0.00	360.00	7,646.40	-1,194.12	2,312.78	2,602.86	0.00	0.00	0.00
Vanguard - MPD 25 - CSF 41C-4-791 PBHL									

Gyrodata Inc.
Planning Report

Database:	Gyrodata NWDB	Local Co-ordinate Reference:	Well CSF 41C-4-791
Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 6540.40usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 6540.40usft (Original Well Elev)
Site:	MPD 25	North Reference:	Grid
Well:	CSF 41C-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41C		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
Vanguard - MPD 25 - - plan misses target center by 2.71usft at 5477.00usft MD (4504.69 TVD, -1192.89 N, 2310.38 E) - Point	0.00	360.00	4,504.40	-1,194.13	2,312.77	1,604,842.10	2,420,895.48	39° 28' 34.000 N	107° 33' 6.113 W
Vanguard - MPD 25 - - plan hits target center - Point	0.00	360.00	7,646.40	-1,194.12	2,312.78	1,604,842.10	2,420,895.49	39° 28' 34.000 N	107° 33' 6.113 W