

Vanguard Natural Resources

Garfield County, Co

MPD 25

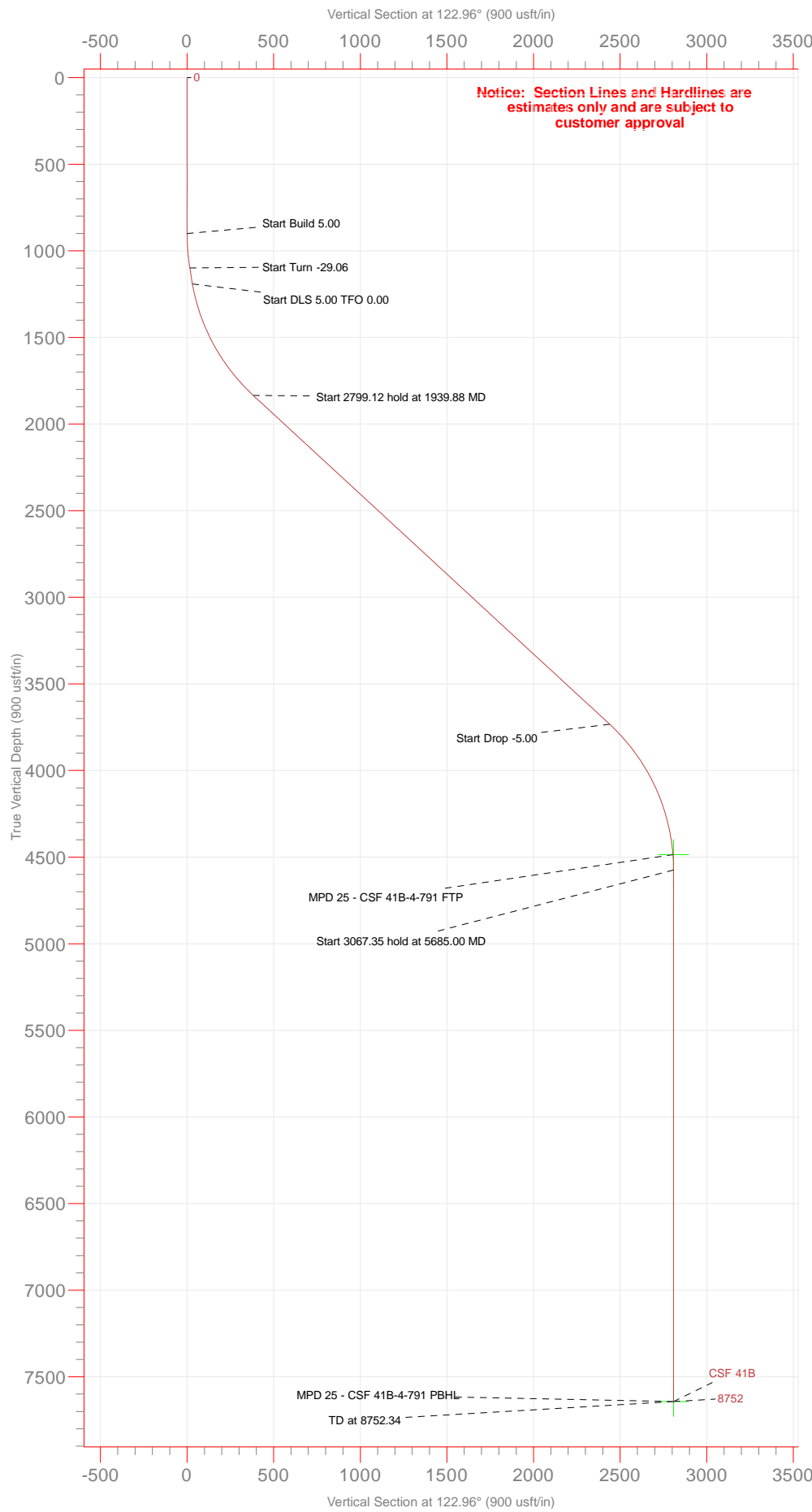
CSF 41B-4-791

CSF 41B

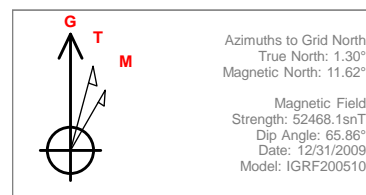
Plan: Design #1

Standard Planning Report

07 February, 2017



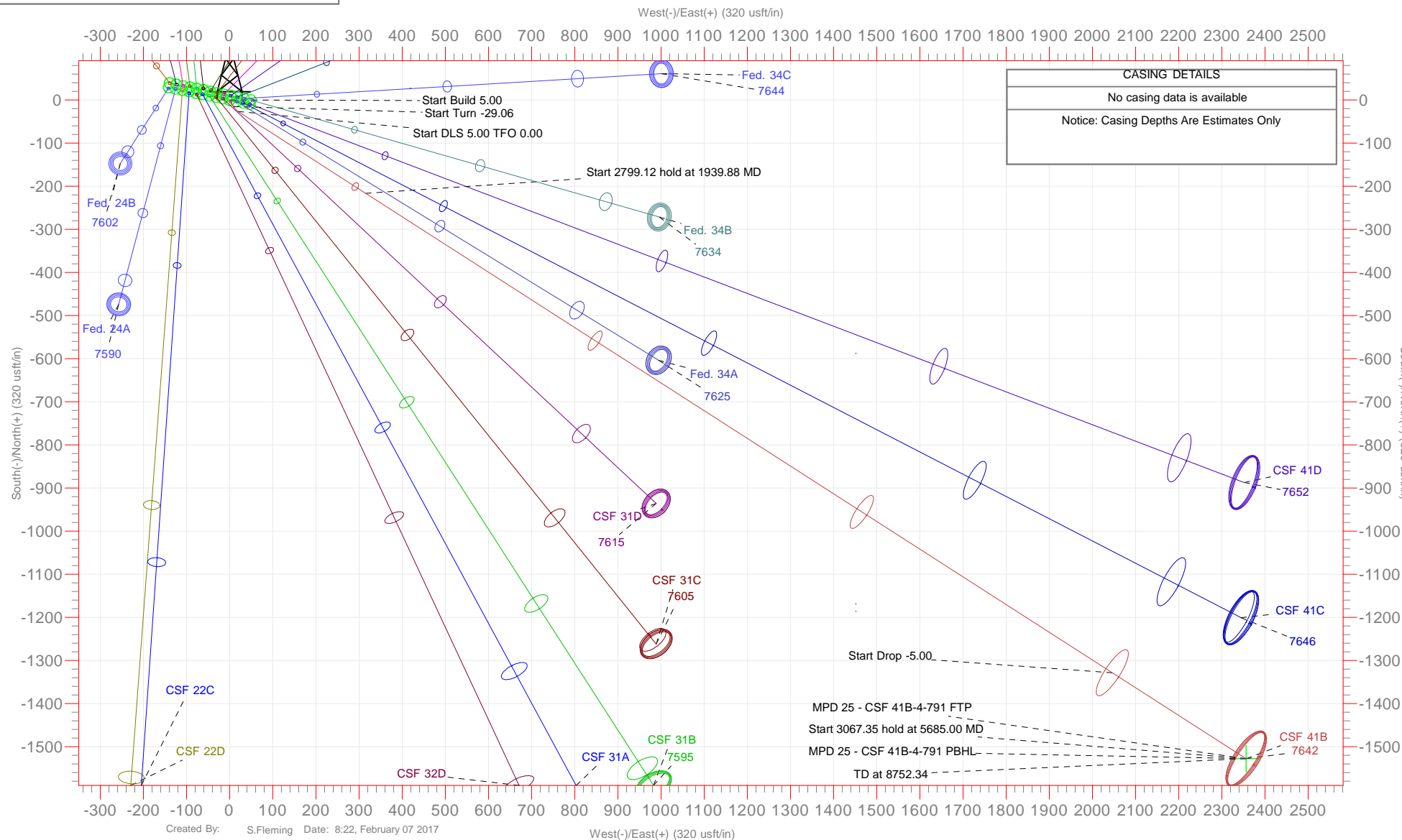
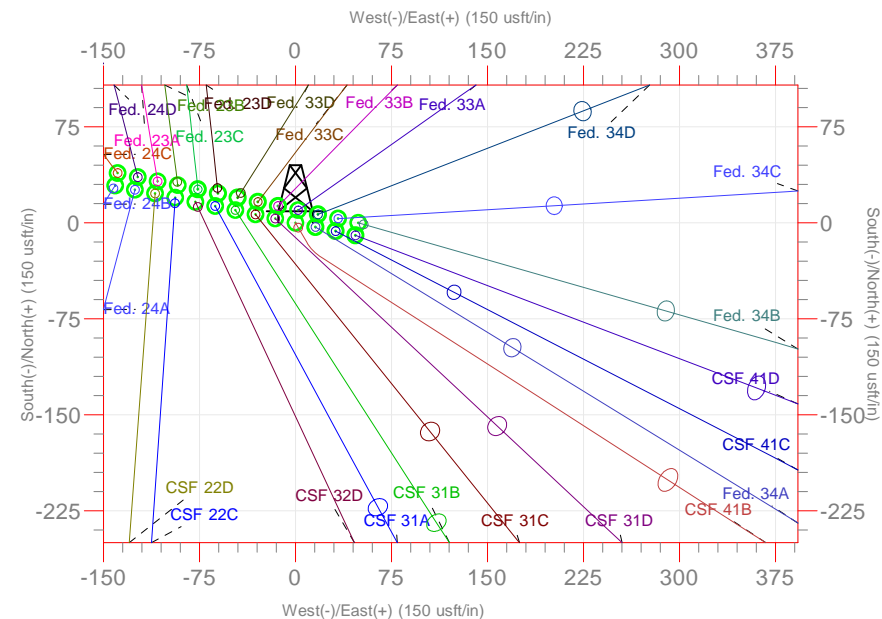
PROJECT DETAILS: Garfield County, Co	
Geodetic System:	US State Plane 1983
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	Colorado Central Zone
North Reference:	Grid
System Datum:	Mean Sea Level
To convert a Magnetic Direction to a Grid Direction, Add 11.62°	
To convert a Magnetic Direction 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 41B-4-791 FTP	4485.40	-1527.74	2356.35	1604515.03	2420907.58	Point
Vanguard MPD 25 - CSF 41B-4-791 PBHL	7642.40	-1527.75	2356.34	1604515.03	2420907.58	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	1100.00	10.00	150.00	1098.99	-15.08	8.70	5.00	150.00	15.51	
4	1193.88	10.00	122.72	1191.49	-26.55	19.64	5.00	-103.44	30.93	MPD 25 - CSF 41B-4-791 FTP
5	1939.88	47.30	122.72	1834.66	-216.49	315.28	5.00	0.00	382.31	
6	4739.00	47.30	122.72	3732.91	-1328.43	2045.98	0.00	0.00	2439.41	
7	5685.00	0.00	0.00	4575.05	-1527.78	2356.26	5.00	180.00	2808.21	MPD 25 - CSF 41B-4-791 PBHL
8	8752.34	0.00	0.00	7642.40	-1527.75	2356.34	0.00	0.00	2808.27	

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

Database:	Gyrodata NWDB	Local Co-ordinate Reference:	Well CSF 41B-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 41B-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41B		
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 41B-4-791					
Well Position	+N-S	-38.89 usft	Northing:	1,606,042.77 usft	Latitude:	39° 28' 45.339 N
	+E-W	138.88 usft	Easting:	2,418,551.24 usft	Longitude:	107° 33' 36.349 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	6,540.40 usft

Wellbore	CSF 41B				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/09	10.32	65.86	52,468.10421909

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	122.96

Plan Survey Tool Program	Date	02/07/17		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	8,752.25	Design #1 (CSF 41B)	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	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	10.00	150.00	1,098.99	-15.08	8.70	5.00	5.00	0.00	150.00	
1,193.88	10.00	122.72	1,191.49	-26.55	19.64	5.00	0.00	-29.06	-103.44	Vanguard MPD 25
1,939.88	47.30	122.72	1,834.66	-216.49	315.28	5.00	5.00	0.00	0.00	
4,739.00	47.30	122.72	3,732.91	-1,328.43	2,045.98	0.00	0.00	0.00	0.00	
5,685.00	0.00	0.00	4,575.05	-1,527.78	2,356.26	5.00	-5.00	0.00	180.00	
8,752.34	0.00	0.00	7,642.40	-1,527.75	2,356.34	0.00	0.00	0.00	0.00	Vanguard MPD 25

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Project:	Garfield County, Co	MD Reference:	WELL @ 6540.40usft (Original Well Elev)
Site:	MPD 25	North Reference:	Grid
Well:	CSF 41B-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41B		
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	5.00	150.00	999.87	-3.78	2.18	3.88	5.00	5.00	0.00
1,100.00	10.00	150.00	1,098.99	-15.08	8.70	15.51	5.00	5.00	0.00
1,193.88	10.00	122.72	1,191.49	-26.55	19.64	30.93	5.00	0.00	-29.06
1,200.00	10.31	122.72	1,197.52	-27.13	20.55	32.00	5.00	5.00	0.00
1,300.00	15.31	122.72	1,295.00	-39.11	39.19	54.16	5.00	5.00	0.00
1,400.00	20.31	122.72	1,390.18	-55.63	64.91	84.73	5.00	5.00	0.00
1,500.00	25.31	122.72	1,482.33	-76.58	97.51	123.48	5.00	5.00	0.00
1,600.00	30.31	122.72	1,570.76	-101.78	136.75	170.11	5.00	5.00	0.00
1,700.00	35.31	122.72	1,654.78	-131.06	182.32	224.27	5.00	5.00	0.00
1,800.00	40.31	122.72	1,733.76	-164.18	233.87	285.55	5.00	5.00	0.00
1,900.00	45.31	122.72	1,807.11	-200.90	291.02	353.48	5.00	5.00	0.00
1,939.88	47.30	122.72	1,834.66	-216.49	315.28	382.31	5.00	5.00	0.00
2,000.00	47.30	122.72	1,875.43	-240.37	352.45	426.50	0.00	0.00	0.00
2,100.00	47.30	122.72	1,943.24	-280.09	414.28	499.99	0.00	0.00	0.00
2,200.00	47.30	122.72	2,011.06	-319.82	476.11	573.48	0.00	0.00	0.00
2,300.00	47.30	122.72	2,078.87	-359.54	537.94	646.97	0.00	0.00	0.00
2,400.00	47.30	122.72	2,146.69	-399.27	599.77	720.46	0.00	0.00	0.00
2,500.00	47.30	122.72	2,214.51	-438.99	661.60	793.95	0.00	0.00	0.00
2,600.00	47.30	122.72	2,282.32	-478.72	723.43	867.44	0.00	0.00	0.00
2,700.00	47.30	122.72	2,350.14	-518.44	785.26	940.93	0.00	0.00	0.00
2,800.00	47.30	122.72	2,417.95	-558.17	847.09	1,014.42	0.00	0.00	0.00
2,900.00	47.30	122.72	2,485.77	-597.89	908.92	1,087.92	0.00	0.00	0.00
3,000.00	47.30	122.72	2,553.59	-637.61	970.75	1,161.41	0.00	0.00	0.00
3,100.00	47.30	122.72	2,621.40	-677.34	1,032.58	1,234.90	0.00	0.00	0.00
3,200.00	47.30	122.72	2,689.22	-717.06	1,094.41	1,308.39	0.00	0.00	0.00
3,300.00	47.30	122.72	2,757.03	-756.79	1,156.24	1,381.88	0.00	0.00	0.00
3,400.00	47.30	122.72	2,824.85	-796.51	1,218.07	1,455.37	0.00	0.00	0.00
3,500.00	47.30	122.72	2,892.67	-836.24	1,279.90	1,528.86	0.00	0.00	0.00
3,600.00	47.30	122.72	2,960.48	-875.96	1,341.73	1,602.35	0.00	0.00	0.00
3,700.00	47.30	122.72	3,028.30	-915.69	1,403.56	1,675.84	0.00	0.00	0.00
3,800.00	47.30	122.72	3,096.11	-955.41	1,465.39	1,749.33	0.00	0.00	0.00
3,900.00	47.30	122.72	3,163.93	-995.14	1,527.22	1,822.82	0.00	0.00	0.00
4,000.00	47.30	122.72	3,231.75	-1,034.86	1,589.05	1,896.31	0.00	0.00	0.00
4,100.00	47.30	122.72	3,299.56	-1,074.59	1,650.88	1,969.80	0.00	0.00	0.00
4,200.00	47.30	122.72	3,367.38	-1,114.31	1,712.71	2,043.30	0.00	0.00	0.00
4,300.00	47.30	122.72	3,435.19	-1,154.04	1,774.54	2,116.79	0.00	0.00	0.00
4,400.00	47.30	122.72	3,503.01	-1,193.76	1,836.37	2,190.28	0.00	0.00	0.00
4,500.00	47.30	122.72	3,570.83	-1,233.48	1,898.20	2,263.77	0.00	0.00	0.00
4,600.00	47.30	122.72	3,638.64	-1,273.21	1,960.03	2,337.26	0.00	0.00	0.00
4,700.00	47.30	122.72	3,706.46	-1,312.93	2,021.86	2,410.75	0.00	0.00	0.00
4,739.00	47.30	122.72	3,732.91	-1,328.43	2,045.98	2,439.41	0.00	0.00	0.00
4,800.00	44.25	122.72	3,775.45	-1,352.05	2,082.75	2,483.12	5.00	-5.00	0.00
4,900.00	39.25	122.72	3,850.03	-1,388.03	2,138.75	2,549.69	5.00	-5.00	0.00
5,000.00	34.25	122.72	3,930.13	-1,420.36	2,189.07	2,609.50	5.00	-5.00	0.00

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Planning Report

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Site:	MPD 25	North Reference:	Grid
Well:	CSF 41B-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41B		
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)
5,100.00	29.25	122.72	4,015.14	-1,448.80	2,233.33	2,662.10	5.00	-5.00	0.00
5,200.00	24.25	122.72	4,104.41	-1,473.12	2,271.19	2,707.10	5.00	-5.00	0.00
5,300.00	19.25	122.72	4,197.26	-1,493.14	2,302.35	2,744.14	5.00	-5.00	0.00
5,400.00	14.25	122.72	4,292.99	-1,508.72	2,326.59	2,772.95	5.00	-5.00	0.00
5,500.00	9.25	122.72	4,390.86	-1,519.72	2,343.72	2,793.31	5.00	-5.00	0.00
5,595.67	4.47	122.72	4,485.82	-1,525.90	2,353.33	2,804.73	5.00	-5.00	0.00
Vanguard - MPD 25 - CSF 41B-4-791 FTP									
5,600.00	4.25	122.72	4,490.13	-1,526.07	2,353.60	2,805.06	5.00	-5.00	0.00
5,685.00	0.00	0.00	4,575.05	-1,527.78	2,356.26	2,808.21	5.00	-5.00	0.00
5,700.00	0.00	0.00	4,590.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
5,800.00	0.00	0.00	4,690.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
5,900.00	0.00	0.00	4,790.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,000.00	0.00	0.00	4,890.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,100.00	0.00	0.00	4,990.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,200.00	0.00	0.00	5,090.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,300.00	0.00	0.00	5,190.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,400.00	0.00	0.00	5,290.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,500.00	0.00	0.00	5,390.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,600.00	0.00	0.00	5,490.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,700.00	0.00	0.00	5,590.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,800.00	0.00	0.00	5,690.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
6,900.00	0.00	0.00	5,790.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,000.00	0.00	0.00	5,890.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,100.00	0.00	0.00	5,990.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,200.00	0.00	0.00	6,090.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,300.00	0.00	0.00	6,190.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,400.00	0.00	0.00	6,290.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,500.00	0.00	0.00	6,390.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,600.00	0.00	0.00	6,490.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,700.00	0.00	0.00	6,590.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,800.00	0.00	0.00	6,690.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
7,900.00	0.00	0.00	6,790.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,000.00	0.00	0.00	6,890.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,100.00	0.00	0.00	6,990.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,200.00	0.00	0.00	7,090.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,300.00	0.00	0.00	7,190.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,400.00	0.00	0.00	7,290.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,500.00	0.00	0.00	7,390.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,600.00	0.00	0.00	7,490.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,700.00	0.00	0.00	7,590.06	-1,527.78	2,356.26	2,808.21	0.00	0.00	0.00
8,752.34	0.00	0.00	7,642.40	-1,527.75	2,356.34	2,808.27	0.00	0.00	0.00
Vanguard MPD 25 - CSF 41B-4-791 PBHL									

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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 41B-4-791	Survey Calculation Method:	Minimum Curvature
Wellbore:	CSF 41B		
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 3.57usft at 5595.67usft MD (4485.82 TVD, -1525.90 N, 2353.33 E) - Point	0.00	0.00	4,485.40	-1,527.74	2,356.35	1,604,515.03	2,420,907.58	39° 28' 30.770 N	107° 33' 5.864 W
Vanguard MPD 25 - C - plan hits target center - Point	0.00	0.00	7,642.40	-1,527.75	2,356.34	1,604,515.02	2,420,907.58	39° 28' 30.770 N	107° 33' 5.864 W