

Vanguard Natural Resources

Garfield County, Co

Kaufman

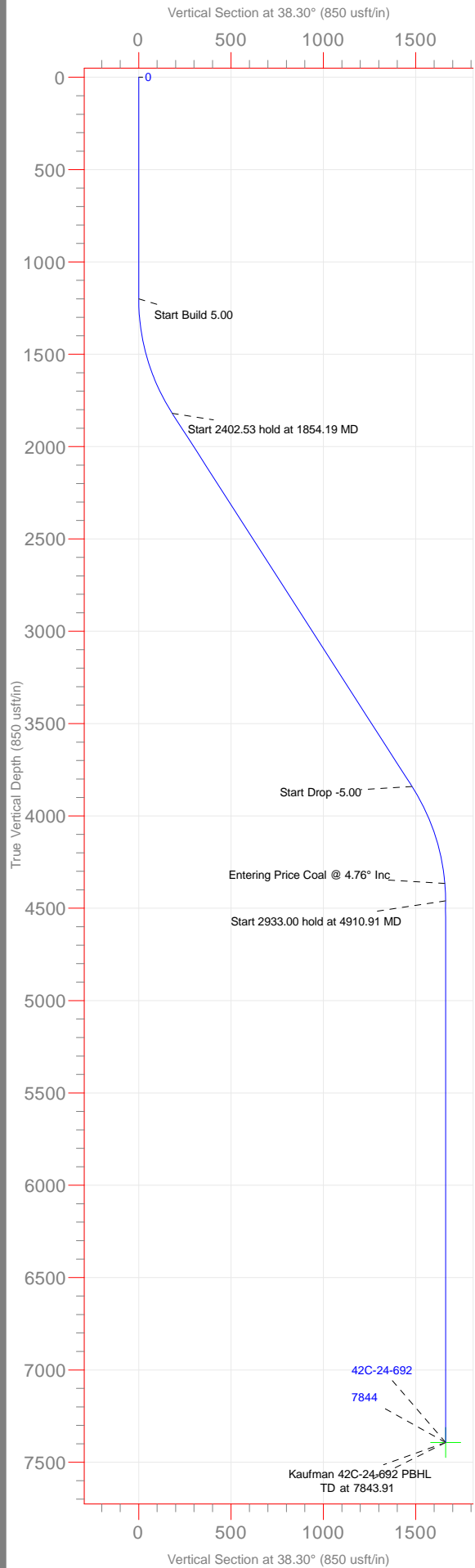
42C-24-692

42C-24-692

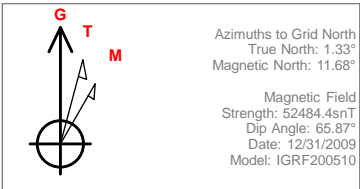
Plan: Design #1

Standard Planning Report

23 March, 2017



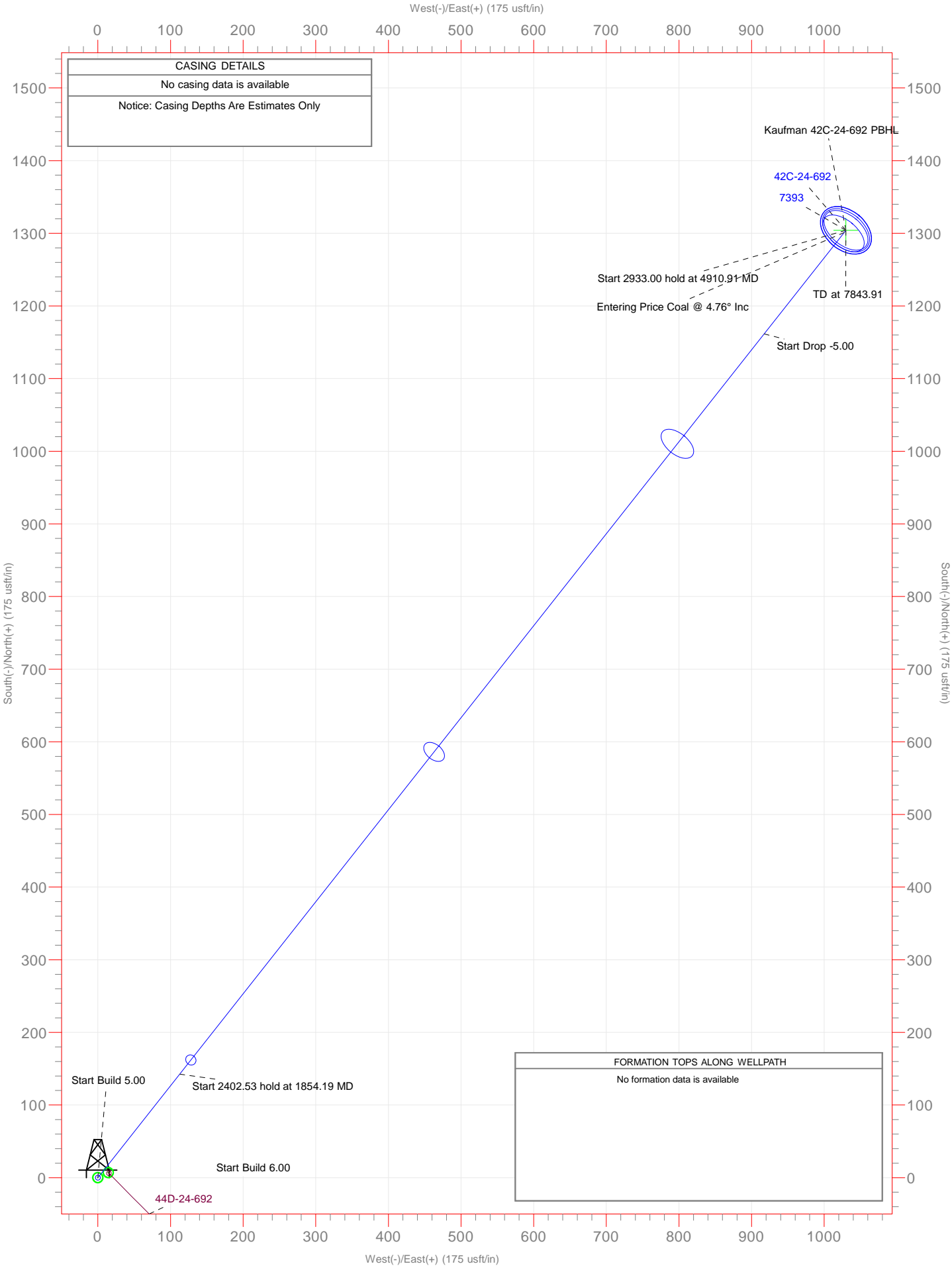
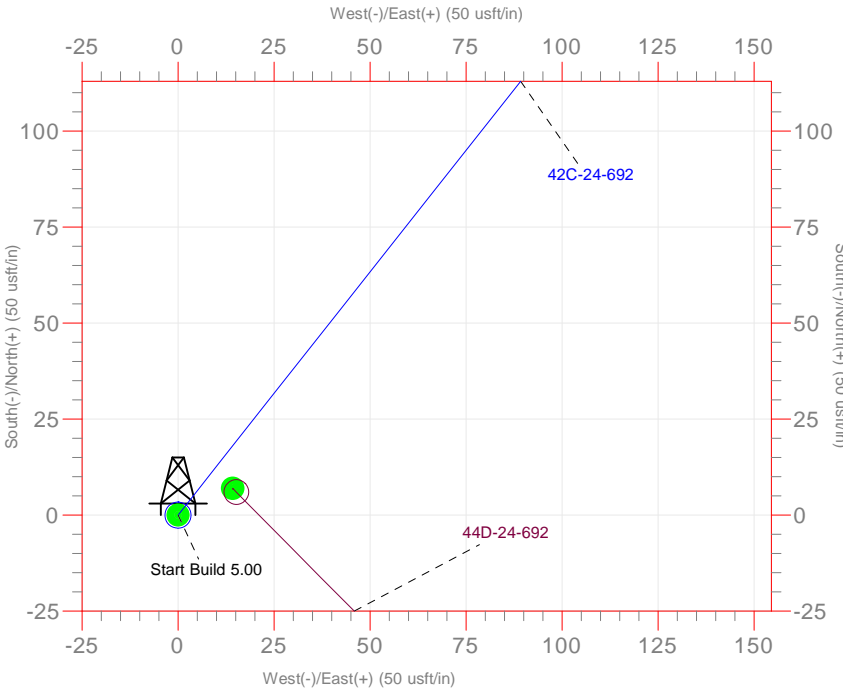
PROJECT DETAILS: Garfield County, Co	
Geodetic System:	US State Plane 1983
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	Colorado Central Zone
North Reference:	Grid
System Datum:	Mean Sea Level
To convert a Magnetic Direction to a Grid Direction, Add 11.68°	
To convert a Magnetic Direction to a True Direction, Add 10.35° East	
To convert a True Direction to a Grid Direction, Add 1.33°	



Notice: Section Lines and Hardlines are estimates only and are subject to customer approval

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	1200.00	0.00	0.00	1200.00	0.00	0.00	0.00	0.00	0.00	
3	1854.19	32.71	38.30	1819.23	142.61	112.62	5.00	38.30	181.72	
4	4256.72	32.71	38.30	3840.77	1161.49	917.26	0.00	0.00	1480.00	
5	4910.91	0.00	0.00	4460.00	1304.10	1029.88	5.00	180.00	1661.72	
6	7843.91	0.00	0.00	7393.00	1304.10	1029.88	0.00	0.00	1661.72	Kaufman 42C-24-692 PBHL

WELLBORE TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape Point
Kaufman 42C-24-692 PBHL	7393.00	1304.10	1029.88	1619441.71	2405131.93	



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

FORMATION TOPS ALONG WELLPATH
No formation data is available

Gyrodata Inc.

Planning Report

Database:	Gyrodata NWDB	Local Co-ordinate Reference:	Well 42C-24-692
Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 5860.90usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 5860.90usft (Original Well Elev)
Site:	Kaufman	North Reference:	Grid
Well:	42C-24-692	Survey Calculation Method:	Minimum Curvature
Wellbore:	42C-24-692		
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	Kaufman				
Site Position:		Northing:	1,621,238.68 usft	Latitude:	39° 31' 11.402 N
From:	Lat/Long	Easting:	2,400,596.12 usft	Longitude:	107° 37' 29.816 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.34 °

Well	42C-24-692					
Well Position	+N-S	-3,101.08 usft	Northing:	1,618,137.60 usft	Latitude:	39° 30' 41.569 N
	+E-W	3,505.94 usft	Easting:	2,404,102.06 usft	Longitude:	107° 36' 44.168 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	5,860.90 usft

Wellbore	42C-24-692				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/09	10.35	65.87	52,484.44748786

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	38.30

Plan Survey Tool Program	Date	03/23/17		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	7,843.92	Design #1 (42C-24-692)	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	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,854.19	32.71	38.30	1,819.23	142.61	112.62	5.00	5.00	0.00	38.30	
4,256.72	32.71	38.30	3,840.77	1,161.49	917.26	0.00	0.00	0.00	0.00	
4,910.92	0.00	0.00	4,460.00	1,304.10	1,029.88	5.00	-5.00	0.00	180.00	
7,843.92	0.00	0.00	7,393.00	1,304.10	1,029.88	0.00	0.00	0.00	0.00	Kaufman 42C-24-692

Gyrodatab Inc.

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Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 5860.90usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 5860.90usft (Original Well Elev)
Site:	Kaufman	North Reference:	Grid
Well:	42C-24-692	Survey Calculation Method:	Minimum Curvature
Wellbore:	42C-24-692		
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	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 5.00									
1,300.00	5.00	38.30	1,299.87	3.42	2.70	4.36	5.00	5.00	0.00
1,400.00	10.00	38.30	1,398.99	13.66	10.79	17.41	5.00	5.00	0.00
1,500.00	15.00	38.30	1,496.58	30.64	24.20	39.05	5.00	5.00	0.00
1,600.00	20.00	38.30	1,591.93	54.23	42.83	69.11	5.00	5.00	0.00
1,700.00	25.00	38.30	1,684.28	84.26	66.54	107.36	5.00	5.00	0.00
1,800.00	30.00	38.30	1,772.96	120.48	95.15	153.52	5.00	5.00	0.00
1,854.19	32.71	38.30	1,819.23	142.61	112.62	181.72	5.00	5.00	0.00
Start 2402.53 hold at 1854.19 MD									
1,900.00	32.71	38.30	1,857.78	162.04	127.97	206.47	0.00	0.00	0.00
2,000.00	32.71	38.30	1,941.92	204.45	161.46	260.51	0.00	0.00	0.00
2,100.00	32.71	38.30	2,026.06	246.85	194.95	314.55	0.00	0.00	0.00
2,200.00	32.71	38.30	2,110.20	289.26	228.44	368.59	0.00	0.00	0.00
2,300.00	32.71	38.30	2,194.34	331.67	261.93	422.63	0.00	0.00	0.00
2,400.00	32.71	38.30	2,278.49	374.08	295.42	476.66	0.00	0.00	0.00
2,500.00	32.71	38.30	2,362.63	416.49	328.91	530.70	0.00	0.00	0.00
2,600.00	32.71	38.30	2,446.77	458.90	362.40	584.74	0.00	0.00	0.00
2,700.00	32.71	38.30	2,530.91	501.30	395.89	638.78	0.00	0.00	0.00
2,800.00	32.71	38.30	2,615.05	543.71	429.38	692.82	0.00	0.00	0.00
2,900.00	32.71	38.30	2,699.20	586.12	462.88	746.85	0.00	0.00	0.00
3,000.00	32.71	38.30	2,783.34	628.53	496.37	800.89	0.00	0.00	0.00
3,100.00	32.71	38.30	2,867.48	670.94	529.86	854.93	0.00	0.00	0.00
3,200.00	32.71	38.30	2,951.62	713.35	563.35	908.97	0.00	0.00	0.00
3,300.00	32.71	38.30	3,035.76	755.76	596.84	963.01	0.00	0.00	0.00
3,400.00	32.71	38.30	3,119.91	798.16	630.33	1,017.05	0.00	0.00	0.00
3,500.00	32.71	38.30	3,204.05	840.57	663.82	1,071.08	0.00	0.00	0.00
3,600.00	32.71	38.30	3,288.19	882.98	697.31	1,125.12	0.00	0.00	0.00
3,700.00	32.71	38.30	3,372.33	925.39	730.80	1,179.16	0.00	0.00	0.00
3,800.00	32.71	38.30	3,456.47	967.80	764.29	1,233.20	0.00	0.00	0.00
3,900.00	32.71	38.30	3,540.62	1,010.21	797.79	1,287.24	0.00	0.00	0.00
4,000.00	32.71	38.30	3,624.76	1,052.61	831.28	1,341.27	0.00	0.00	0.00
4,100.00	32.71	38.30	3,708.90	1,095.02	864.77	1,395.31	0.00	0.00	0.00
4,200.00	32.71	38.30	3,793.04	1,137.43	898.26	1,449.35	0.00	0.00	0.00
4,256.72	32.71	38.30	3,840.77	1,161.49	917.26	1,480.00	0.00	0.00	0.00
Start Drop -5.00									
4,300.00	30.55	38.30	3,877.62	1,179.30	931.32	1,502.70	5.00	-5.00	0.00
4,400.00	25.55	38.30	3,965.85	1,216.18	960.45	1,549.70	5.00	-5.00	0.00
4,500.00	20.55	38.30	4,057.84	1,246.90	984.70	1,588.83	5.00	-5.00	0.00
4,600.00	15.55	38.30	4,152.89	1,271.20	1,003.90	1,619.80	5.00	-5.00	0.00
4,700.00	10.55	38.30	4,250.27	1,288.91	1,017.88	1,642.37	5.00	-5.00	0.00

Gyrodata Inc.

Planning Report

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Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 5860.90usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 5860.90usft (Original Well Elev)
Site:	Kaufman	North Reference:	Grid
Well:	42C-24-692	Survey Calculation Method:	Minimum Curvature
Wellbore:	42C-24-692		
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)
4,800.00	5.55	38.30	4,349.26	1,299.89	1,026.55	1,656.36	5.00	-5.00	0.00
4,815.81	4.76	38.30	4,365.00	1,301.00	1,027.43	1,657.78	5.00	-5.00	0.00
Entering Price Coal @ 4.76° Inc									
4,900.00	0.55	38.30	4,449.09	1,304.06	1,029.85	1,661.67	5.00	-5.00	0.00
4,910.92	0.00	0.00	4,460.00	1,304.10	1,029.88	1,661.72	5.00	-5.00	0.00
Start 2933.00 hold at 4910.91 MD									
5,000.00	0.00	0.00	4,549.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,100.00	0.00	0.00	4,649.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,200.00	0.00	0.00	4,749.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,300.00	0.00	0.00	4,849.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,400.00	0.00	0.00	4,949.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,500.00	0.00	0.00	5,049.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,600.00	0.00	0.00	5,149.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,700.00	0.00	0.00	5,249.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,800.00	0.00	0.00	5,349.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
5,900.00	0.00	0.00	5,449.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,000.00	0.00	0.00	5,549.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,100.00	0.00	0.00	5,649.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,200.00	0.00	0.00	5,749.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,300.00	0.00	0.00	5,849.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,400.00	0.00	0.00	5,949.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,500.00	0.00	0.00	6,049.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,600.00	0.00	0.00	6,149.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,700.00	0.00	0.00	6,249.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,800.00	0.00	0.00	6,349.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
6,900.00	0.00	0.00	6,449.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,000.00	0.00	0.00	6,549.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,100.00	0.00	0.00	6,649.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,200.00	0.00	0.00	6,749.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,300.00	0.00	0.00	6,849.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,400.00	0.00	0.00	6,949.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,500.00	0.00	0.00	7,049.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,600.00	0.00	0.00	7,149.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,700.00	0.00	0.00	7,249.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,800.00	0.00	0.00	7,349.09	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
7,843.92	0.00	0.00	7,393.00	1,304.10	1,029.88	1,661.72	0.00	0.00	0.00
TD at 7843.91									

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									
Kaufman 42C-24-692	0.00	0.00	7,393.00	1,304.10	1,029.88	1,619,441.70	2,405,131.94	39° 30' 54.691 N	107° 36' 31.417 W
- plan hits target center									
- Point									

Database:	Gyrodata NWDB	Local Co-ordinate Reference:	Well 42C-24-692
Company:	Vanguard Natural Resources	TVD Reference:	WELL @ 5860.90usft (Original Well Elev)
Project:	Garfield County, Co	MD Reference:	WELL @ 5860.90usft (Original Well Elev)
Site:	Kaufman	North Reference:	Grid
Well:	42C-24-692	Survey Calculation Method:	Minimum Curvature
Wellbore:	42C-24-692		
Design:	Design #1		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,200.00	1,200.00	0.00	0.00	Start Build 5.00
1,854.19	1,819.23	142.61	112.62	Start 2402.53 hold at 1854.19 MD
4,256.72	3,840.77	1,161.49	917.26	Start Drop -5.00
4,815.81	4,365.00	1,301.00	1,027.43	Entering Price Coal @ 4.76° Inc
4,910.92	4,460.00	1,304.10	1,029.88	Start 2933.00 hold at 4910.91 MD
7,843.92	7,393.00	1,304.10	1,029.88	TD at 7843.91