

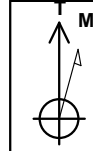


## REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GGU 23A-28-691, True North  
Vertical (TVD) Reference: WELL @ 6130.60ft (Original Well Elev)  
Section (VS) Reference: Slot - (0.00N, 0.00E)  
Measured Depth Reference: WELL @ 6130.60ft (Original Well Elev)  
Calculation Method: Minimum Curvature



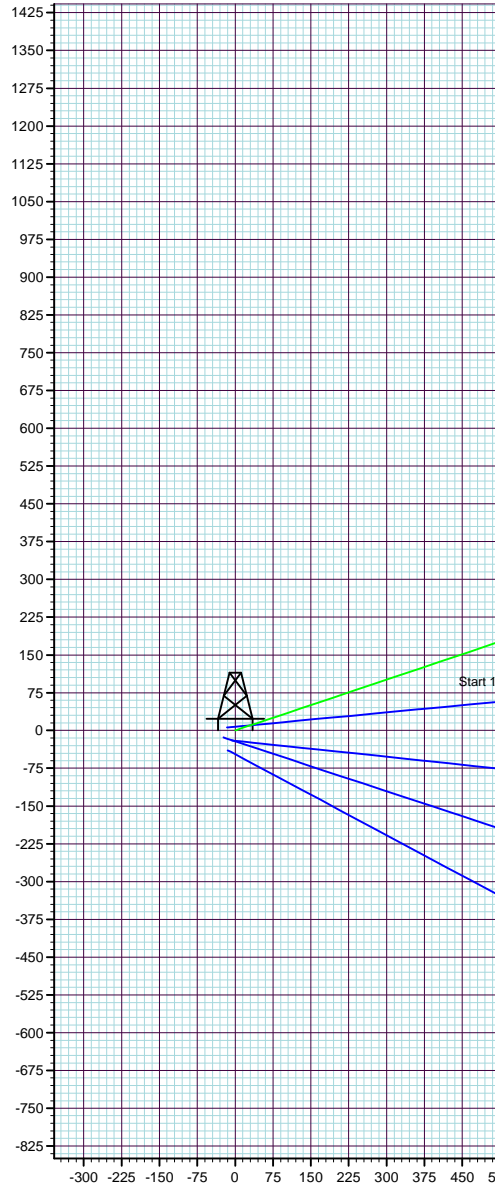
Project: GGU 13-28  
Site: GGU 13-28  
Well: Federal GGU 23A-28-691  
Wellbore: Federal GGU 23A-28-691  
Design: Design #1



Azimuths to True North  
Magnetic North: 9.43°  
Magnetic Field  
  
Strength: 51793.8nT  
Dip Angle: 65.60°  
Date: 12/31/2016  
Model: HDGM

## WELL DETAILS: Federal GGU 23A-28-691

+N/-S	+E/-W	Northing	Easting	Ground Level:	6130.60	Latitude	Longitude
0.00	0.00	1611635.732	2416896.903			39.494509	-107.566407



## ANNOTATIONS

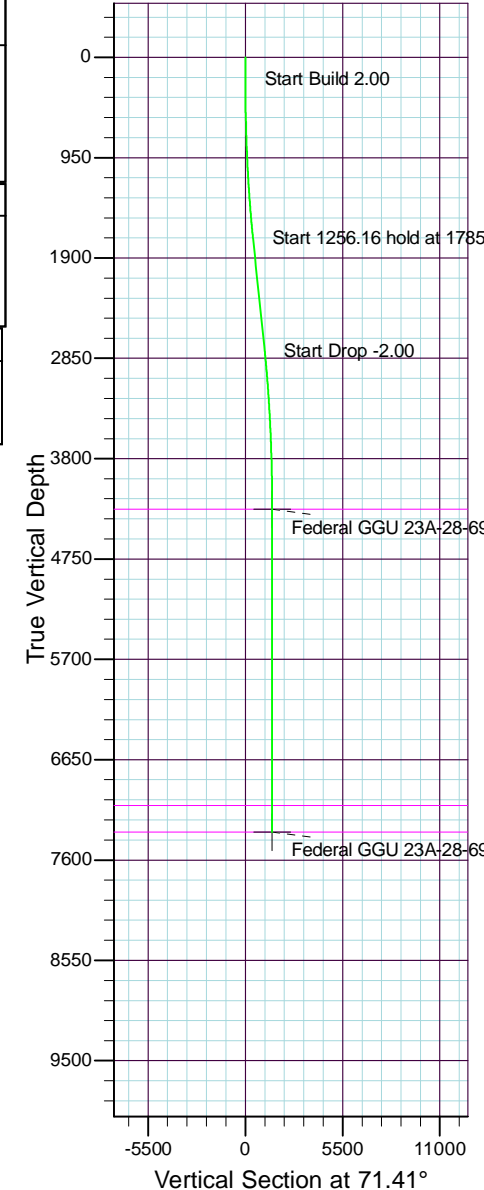
MD	TVD	Inc	Azi	+N/-S	+E/-W	VSec	Departure	Annotation
200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
1785.08	1705.43	31.70	71.41	136.29	405.12	427.43	427.43	Start 1256.16 hold at 1785.08 MD
3041.24	2774.17	31.70	71.41	346.76	1030.78	1087.54	1087.54	Start Drop -2.00
4626.31	4279.60	0.00	0.00	483.04	1435.90	1514.97	1514.97	Start 3055.00 hold at 4626.31 MD
7681.31	7334.60	0.00	0.00	483.04	1435.90	1514.97	1514.97	TD at 7681.31

## DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Federal GGU 23A-28-691 DT	4279.60	483.04	1435.90	1612085.972	2418343.357	39.495835	-107.561319	Point
- plan hits target center								
Federal GGU 23A-28-691 BHL7334.60	483.04	1435.90	1612085.972	2418343.357	39.495835	-107.561319	-107.561319	Point
- plan hits target center								

## FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4279.60	4626.31	Price Coal
7084.60	7431.31	Rollins
7334.60	7681.31	TD





# **Vanguard Natural Resources, LLC**

**GGU 13-28**

**GGU 13-28**

**Federal GGU 23A-28-691**

**Federal GGU 23A-28-691**

**Plan: Design #1**

## **Standard Planning Report**

**07 February, 2017**

<b>Database:</b>	Compass DB Connection	<b>Local Co-ordinate Reference:</b>	Well Federal GGU 23A-28-691
<b>Company:</b>	Vanguard Natural Resources, LLC	<b>TVD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Project:</b>	GGU 13-28	<b>MD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Site:</b>	GGU 13-28	<b>North Reference:</b>	True
<b>Well:</b>	Federal GGU 23A-28-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Federal GGU 23A-28-691		
<b>Design:</b>	Design #1		

<b>Project</b>	GGU 13-28		
<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		Using geodetic scale factor

Site	GGU 13-28				
Site Position:		Northing:	1,611,635.732 usft	Latitude:	39.494509
From:	Lat/Long	Easting:	2,416,896.904 usft	Longitude:	-107.566407
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.30

Well	Federal GGU 23A-28-691					
Well Position	+N/-S	0.00 ft	Northing:	1,611,635.732 usft	Latitude:	39.494509
	+E/-W	0.00 ft	Easting:	2,416,896.904 usft	Longitude:	-107.566407
Position Uncertainty		0.00 ft	Wellhead Elevation:	6,130.60 ft	Ground Level:	6,130.60 ft

<b>Wellbore</b>	Federal GGU 23A-28-691				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	12/31/2016	9.43	65.60	51,794

<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) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	71.41

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	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	
1,785.08	31.70	71.41	1,705.43	136.29	405.12	2.00	2.00	0.00	71.41	
3,041.24	31.70	71.41	2,774.17	346.76	1,030.78	0.00	0.00	0.00	0.00	
4,626.31	0.00	0.00	4,279.60	483.04	1,435.90	2.00	-2.00	0.00	180.00	Federal GGU 23A-28-
7,681.31	0.00	0.00	7,334.60	483.04	1,435.90	0.00	0.00	0.00	0.00	Federal GGU 23A-28-

<b>Database:</b>	Compass DB Connection	<b>Local Co-ordinate Reference:</b>	Well Federal GGU 23A-28-691
<b>Company:</b>	Vanguard Natural Resources, LLC	<b>TVD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Project:</b>	GGU 13-28	<b>MD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Site:</b>	GGU 13-28	<b>North Reference:</b>	True
<b>Well:</b>	Federal GGU 23A-28-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Federal GGU 23A-28-691		
<b>Design:</b>	Design #1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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	2.00	71.41	299.98	0.56	1.65	1.75	2.00	2.00	0.00
400.00	4.00	71.41	399.84	2.23	6.61	6.98	2.00	2.00	0.00
500.00	6.00	71.41	499.45	5.00	14.87	15.69	2.00	2.00	0.00
600.00	8.00	71.41	598.70	8.89	26.42	27.88	2.00	2.00	0.00
700.00	10.00	71.41	697.47	13.88	41.25	43.52	2.00	2.00	0.00
800.00	12.00	71.41	795.62	19.96	59.33	62.60	2.00	2.00	0.00
900.00	14.00	71.41	893.06	27.13	80.65	85.10	2.00	2.00	0.00
1,000.00	16.00	71.41	989.64	35.38	105.18	110.98	2.00	2.00	0.00
1,100.00	18.00	71.41	1,085.27	44.71	132.89	140.21	2.00	2.00	0.00
1,200.00	20.00	71.41	1,179.82	55.09	163.75	172.77	2.00	2.00	0.00
1,300.00	22.00	71.41	1,273.17	66.51	197.71	208.60	2.00	2.00	0.00
1,400.00	24.00	71.41	1,365.21	78.97	234.75	247.67	2.00	2.00	0.00
1,500.00	26.00	71.41	1,455.84	92.44	274.80	289.93	2.00	2.00	0.00
1,600.00	28.00	71.41	1,544.94	106.92	317.83	335.33	2.00	2.00	0.00
1,700.00	30.00	71.41	1,632.39	122.38	363.78	383.81	2.00	2.00	0.00
1,785.08	31.70	71.41	1,705.43	136.29	405.12	427.43	2.00	2.00	0.00
1,800.00	31.70	71.41	1,718.13	138.79	412.56	435.28	0.00	0.00	0.00
1,900.00	31.70	71.41	1,803.21	155.54	462.36	487.83	0.00	0.00	0.00
2,000.00	31.70	71.41	1,888.29	172.30	512.17	540.37	0.00	0.00	0.00
2,100.00	31.70	71.41	1,973.37	189.05	561.98	592.92	0.00	0.00	0.00
2,200.00	31.70	71.41	2,058.45	205.81	611.78	645.47	0.00	0.00	0.00
2,300.00	31.70	71.41	2,143.53	222.56	661.59	698.02	0.00	0.00	0.00
2,400.00	31.70	71.41	2,228.61	239.32	711.40	750.57	0.00	0.00	0.00
2,500.00	31.70	71.41	2,313.69	256.07	761.20	803.12	0.00	0.00	0.00
2,600.00	31.70	71.41	2,398.77	272.83	811.01	855.67	0.00	0.00	0.00
2,700.00	31.70	71.41	2,483.85	289.58	860.82	908.22	0.00	0.00	0.00
2,800.00	31.70	71.41	2,568.93	306.34	910.62	960.77	0.00	0.00	0.00
2,900.00	31.70	71.41	2,654.01	323.09	960.43	1,013.32	0.00	0.00	0.00
3,000.00	31.70	71.41	2,739.09	339.85	1,010.24	1,065.87	0.00	0.00	0.00
3,041.24	31.70	71.41	2,774.17	346.76	1,030.78	1,087.54	0.00	0.00	0.00
3,100.00	30.53	71.41	2,824.48	356.44	1,059.56	1,117.90	2.00	-2.00	0.00
3,200.00	28.53	71.41	2,911.49	372.15	1,106.26	1,167.18	2.00	-2.00	0.00
3,300.00	26.53	71.41	3,000.16	386.89	1,150.06	1,213.40	2.00	-2.00	0.00
3,400.00	24.53	71.41	3,090.40	400.63	1,190.91	1,256.49	2.00	-2.00	0.00
3,500.00	22.53	71.41	3,182.08	413.35	1,228.74	1,296.40	2.00	-2.00	0.00
3,600.00	20.53	71.41	3,275.10	425.05	1,263.51	1,333.09	2.00	-2.00	0.00
3,700.00	18.53	71.41	3,369.34	435.71	1,295.19	1,366.51	2.00	-2.00	0.00
3,800.00	16.53	71.41	3,464.70	445.31	1,323.73	1,396.63	2.00	-2.00	0.00
3,900.00	14.53	71.41	3,561.04	453.84	1,349.10	1,423.39	2.00	-2.00	0.00
4,000.00	12.53	71.41	3,658.26	461.30	1,371.27	1,446.78	2.00	-2.00	0.00
4,100.00	10.53	71.41	3,756.24	467.67	1,390.21	1,466.76	2.00	-2.00	0.00
4,200.00	8.53	71.41	3,854.86	472.95	1,405.89	1,483.31	2.00	-2.00	0.00
4,300.00	6.53	71.41	3,953.99	477.12	1,418.31	1,496.41	2.00	-2.00	0.00
4,400.00	4.53	71.41	4,053.52	480.19	1,427.43	1,506.04	2.00	-2.00	0.00
4,500.00	2.53	71.41	4,153.33	482.15	1,433.26	1,512.19	2.00	-2.00	0.00
4,600.00	0.53	71.41	4,253.29	483.00	1,435.79	1,514.85	2.00	-2.00	0.00
4,626.31	0.00	0.00	4,279.60	483.04	1,435.90	1,514.97	2.00	-2.00	0.00
4,700.00	0.00	0.00	4,353.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00
4,800.00	0.00	0.00	4,453.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00
4,900.00	0.00	0.00	4,553.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00
5,000.00	0.00	0.00	4,653.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00

<b>Database:</b>	Compass DB Connection	<b>Local Co-ordinate Reference:</b>	Well Federal GGU 23A-28-691
<b>Company:</b>	Vanguard Natural Resources, LLC	<b>TVD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Project:</b>	GGU 13-28	<b>MD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Site:</b>	GGU 13-28	<b>North Reference:</b>	True
<b>Well:</b>	Federal GGU 23A-28-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Federal GGU 23A-28-691		
<b>Design:</b>	Design #1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
5,100.00	0.00	0.00	4,753.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,200.00	0.00	0.00	4,853.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,300.00	0.00	0.00	4,953.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,053.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,153.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,253.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,353.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,453.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,553.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,653.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,100.00	0.00	0.00	5,753.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,200.00	0.00	0.00	5,853.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,300.00	0.00	0.00	5,953.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,053.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,153.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,253.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,353.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,453.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,553.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,653.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,100.00	0.00	0.00	6,753.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,200.00	0.00	0.00	6,853.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,300.00	0.00	0.00	6,953.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,400.00	0.00	0.00	7,053.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,500.00	0.00	0.00	7,153.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,600.00	0.00	0.00	7,253.29	483.04	1,435.90	1,514.97	0.00	0.00	0.00	
7,681.31	0.00	0.00	7,334.60	483.04	1,435.90	1,514.97	0.00	0.00	0.00	

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Federal GGU 23A-28-69	0.00	0.00	4,279.60	483.04	1,435.90	1,612,085.972	2,418,343.357	39.495835	-107.561319
- plan hits target center									
- Point									
Federal GGU 23A-28-69	0.00	0.00	7,334.60	483.04	1,435.90	1,612,085.972	2,418,343.357	39.495835	-107.561319
- plan hits target center									
- Point									

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,626.31	4,279.60	Price Coal		0.00		
7,431.31	7,084.60	Rollins		0.00		
7,681.31	7,334.60	TD		0.00		

<b>Database:</b>	Compass DB Connection	<b>Local Co-ordinate Reference:</b>	Well Federal GGU 23A-28-691
<b>Company:</b>	Vanguard Natural Resources, LLC	<b>TVD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Project:</b>	GGU 13-28	<b>MD Reference:</b>	WELL @ 6130.60ft (Original Well Elev)
<b>Site:</b>	GGU 13-28	<b>North Reference:</b>	True
<b>Well:</b>	Federal GGU 23A-28-691	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Federal GGU 23A-28-691		
<b>Design:</b>	Design #1		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.00	200.00	0.00	0.00	Start Build 2.00
1,785.08	1,705.43	136.29	405.12	Start 1256.16 hold at 1785.08 MD
3,041.24	2,774.17	346.76	1,030.78	Start Drop -2.00
4,626.31	4,279.60	483.04	1,435.90	Start 3055.00 hold at 4626.31 MD
7,681.31	7,334.60	483.04	1,435.90	TD at 7681.31