

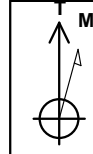


REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GGU 24B-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 24B-28-691
Wellbore: Federal GGU 24B-28-691
Design: Design #1

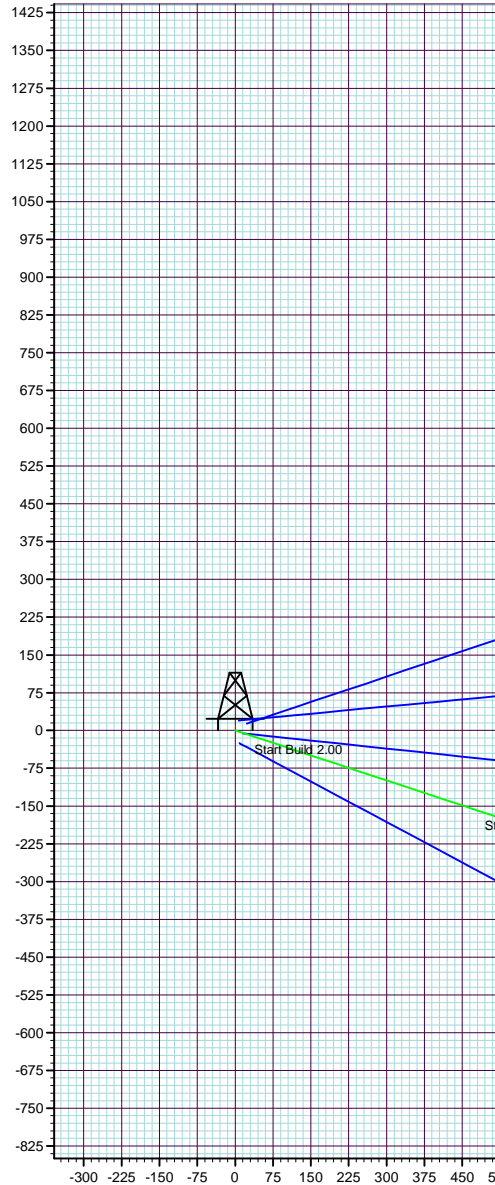


Azimuths to True North
Magnetic North: 9.43°
Magnetic Field

Strength: 51792.2nT
Dip Angle: 65.60°
Date: 12/31/2016
Model: HDGM

WELL DETAILS: Federal GGU 24B-28-691

+N/-S	+E/-W	Northing	Ground Level:	6130.60	Latitude	Longitude
0.00	0.00	1611622.412	Easting	2416873.453	39.494471	-107.566489



ANNOTATIONS

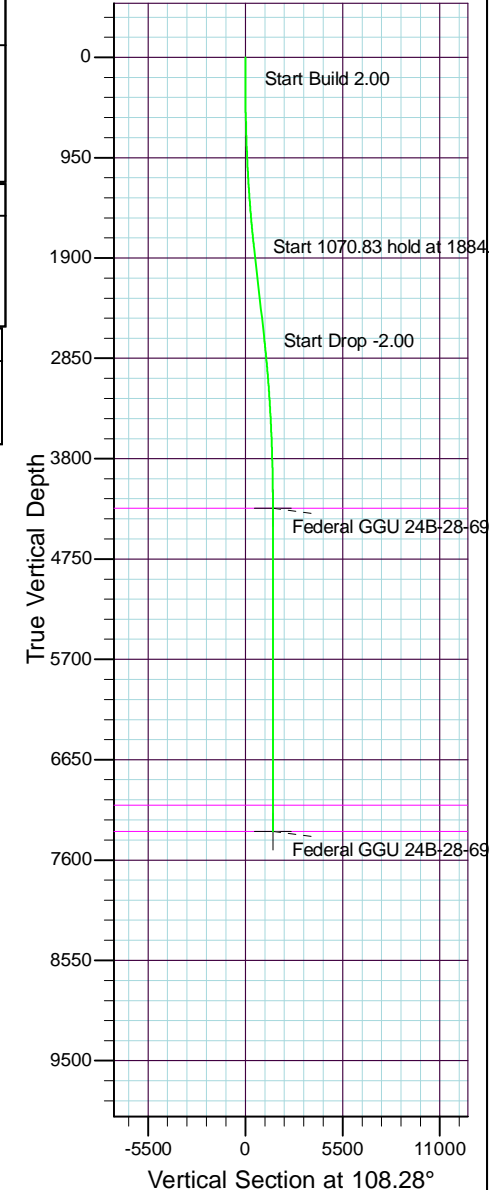
MD	TVD	Inc	Azi	+N/-S	+E/-W	V/Sect	Departure	Annotation
200.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	Start Build 2.00
1884.10	1788.76	33.68	108.28	-150.87	456.64	480.92	480.92	Start 1070.83 hold at 1884.10 MD
2954.93	2679.84	33.68	108.28	-337.18	1020.52	1074.78	1074.78	Start Drop -2.00
4639.03	4268.60	0.00	0.00	-488.05	1477.16	1555.70	1555.70	Start 3061.00 hold at 4639.03 MD
7700.03	7329.60	0.00	0.00	-488.05	1477.16	1555.70	1555.70	TD at 7700.03

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
Federal GGU 24B-28-691 DT	4268.60	-488.051477.16	1611100.912	2418339.068	39.493131	-107.561255	Point	
- plan hits target center								
Federal GGU 24B-28-691 BHL 7329.60		-488.051477.16	1611100.912	2418339.068	39.493131	-107.561255	Point	
- plan hits target center								

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
4268.60	4639.03	Price Coal
7079.60	7450.03	Rollins
7329.60	7700.03	TD





Vanguard Natural Resources, LLC

GGU 13-28

GGU 13-28

Federal GGU 24B-28-691

Federal GGU 24B-28-691

Plan: Design #1

Standard Planning Report

13 February, 2017

Database:	Compass DB Connection	Local Co-ordinate Reference:	Well Federal GGU 24B-28-691
Company:	Vanguard Natural Resources, LLC	TVD Reference:	WELL @ 6130.60ft (Original Well Elev)
Project:	GGU 13-28	MD Reference:	WELL @ 6130.60ft (Original Well Elev)
Site:	GGU 13-28	North Reference:	True
Well:	Federal GGU 24B-28-691	Survey Calculation Method:	Minimum Curvature
Wellbore:	Federal GGU 24B-28-691		
Design:	Design #1		

Project	GGU 13-28		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	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 24B-28-691					
Well Position	+N/-S	-13.85 ft	Northing:	1,611,622.412 usft	Latitude:	39.494471
	+E/-W	-23.14 ft	Easting:	2,416,873.454 usft	Longitude:	-107.566489
Position Uncertainty		0.00 ft	Wellhead Elevation:	6,130.60 ft	Ground Level:	6,130.60 ft

Wellbore	Federal GGU 24B-28-691				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/31/2016	9.43	65.60	51,792

Design	Design #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.00	0.00	0.00	108.28

Plan Sections										
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	
1,884.10	33.68	108.28	1,788.76	-150.87	456.64	2.00	2.00	0.00	108.28	
2,954.93	33.68	108.28	2,679.84	-337.18	1,020.52	0.00	0.00	0.00	0.00	
4,639.03	0.00	0.00	4,268.60	-488.05	1,477.16	2.00	-2.00	0.00	180.00	Federal GGU 24B-28-
7,700.04	0.00	0.00	7,329.60	-488.05	1,477.16	0.00	0.00	0.00	0.00	Federal GGU 24B-28-

Database:	Compass DB Connection	Local Co-ordinate Reference:	Well Federal GGU 24B-28-691
Company:	Vanguard Natural Resources, LLC	TVD Reference:	WELL @ 6130.60ft (Original Well Elev)
Project:	GGU 13-28	MD Reference:	WELL @ 6130.60ft (Original Well Elev)
Site:	GGU 13-28	North Reference:	True
Well:	Federal GGU 24B-28-691	Survey Calculation Method:	Minimum Curvature
Wellbore:	Federal GGU 24B-28-691		
Design:	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
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,884.10	33.68	108.28	1,788.76	-150.87	456.64	480.92	2.00	2.00	0.00
2,954.93	33.68	108.28	2,679.84	-337.18	1,020.52	1,074.78	0.00	0.00	0.00
4,639.03	0.00	0.00	4,268.60	-488.05	1,477.16	1,555.70	2.00	-2.00	0.00
7,700.04	0.00	0.00	7,329.60	-488.05	1,477.16	1,555.70	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 24B-28-69	0.00	0.00	4,268.60	-488.05	1,477.16	1,611,100.912	2,418,339.069	39.493131	-107.561255
- plan hits target center									
- Point									
Federal GGU 24B-28-69	0.00	0.00	7,329.60	-488.05	1,477.16	1,611,100.912	2,418,339.069	39.493131	-107.561255
- plan hits target center									
- Point									

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
4,639.03	4,268.60	Price Coal		0.00		
7,450.04	7,079.60	Rollins		0.00		
7,700.04	7,329.60	TD		0.00		

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
1,884.10	1,788.76	-150.87	456.64	Start 1070.83 hold at 1884.10 MD
2,954.93	2,679.84	-337.18	1,020.52	Start Drop -2.00
4,639.03	4,268.60	-488.05	1,477.16	Start 3061.00 hold at 4639.03 MD
7,700.04	7,329.60	-488.05	1,477.16	TD at 7700.03