

Comet Ridge

Lincoln Co., CO

Sec.8 - T12S - R53W

Tornado 12-53-8-2

Wellbore #1

Plan: Plan #2 (S-Well)

Standard Planning Report

22 April, 2013

Gyrodata, Inc.

Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Tornado 12-53-8-2
Company:	Comet Ridge	TVD Reference:	WELL @ 4886.0usft (Original Well Elev)
Project:	Lincoln Co., CO	MD Reference:	WELL @ 4886.0usft (Original Well Elev)
Site:	Sec.8 - T12S - R53W	North Reference:	True
Well:	Tornado 12-53-8-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (S-Well)		

Project	Lincoln Co., CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		Sec.8 - T12S - R53W			
Site Position:		Northing:	1,440,511.19 usft	Latitude:	39° 1' 23.412 N
From:	Lat/Long	Easting:	3,608,650.78 usft	Longitude:	103° 21' 26.604 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.35 °

Well	Tornado 12-53-8-2					
Well Position	+N/-S	0.0 usft	Northing:	1,440,511.18 usft	Latitude:	39° 1' 23.412 N
	+E/-W	0.0 usft	Easting:	3,608,650.78 usft	Longitude:	103° 21' 26.604 W
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	4,869.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/22/2013	7.74	66.09	52,349

Design	Plan #2 (S-Well)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	71.31

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,344.9	25.35	71.31	3,317.6	58.9	174.1	3.00	3.00	0.00	71.31	
6,016.9	25.35	71.31	5,732.4	425.5	1,257.7	0.00	0.00	0.00	0.00	
6,861.8	0.00	0.00	6,550.0	484.4	1,431.8	3.00	-3.00	0.00	180.00	PBHL Tornado 12-53-
7,411.8	0.00	0.00	7,100.0	484.4	1,431.8	0.00	0.00	0.00	0.00	

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Company:	Comet Ridge	TVD Reference:	WELL @ 4886.0usft (Original Well Elev)
Project:	Lincoln Co., CO	MD Reference:	WELL @ 4886.0usft (Original Well Elev)
Site:	Sec.8 - T12S - R53W	North Reference:	True
Well:	Tornado 12-53-8-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (S-Well)		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,049.0	0.00	0.00	2,049.0	0.0	0.0	0.0	0.00	0.00	0.00
Niobrara									
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,250.0	0.00	0.00	2,250.0	0.0	0.0	0.0	0.00	0.00	0.00
8 5/8" Surface Casing									
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
Start Build 3.00°									
2,600.0	3.00	71.31	2,600.0	0.8	2.5	2.6	3.00	3.00	0.00
2,700.0	6.00	71.31	2,699.6	3.4	9.9	10.5	3.00	3.00	0.00
2,800.0	9.00	71.31	2,798.8	7.5	22.3	23.5	3.00	3.00	0.00
2,900.0	12.00	71.31	2,897.1	13.4	39.5	41.7	3.00	3.00	0.00
3,000.0	15.00	71.31	2,994.3	20.9	61.6	65.1	3.00	3.00	0.00
3,038.1	16.14	71.31	3,031.0	24.1	71.3	75.3	3.00	3.00	0.00
Dakota									
3,100.0	18.00	71.31	3,090.2	30.0	88.5	93.5	3.00	3.00	0.00
3,200.0	21.00	71.31	3,184.4	40.7	120.2	126.9	3.00	3.00	0.00
3,300.0	24.00	71.31	3,276.8	52.9	156.4	165.1	3.00	3.00	0.00
3,344.9	25.35	71.31	3,317.6	58.9	174.1	183.8	3.00	3.00	0.00
Start 2672.1' hold at 3344.9' MD									
3,379.6	25.35	71.31	3,349.0	63.7	188.2	198.7	0.00	0.00	0.00
Morrison									
3,400.0	25.35	71.31	3,367.4	66.5	196.5	207.4	0.00	0.00	0.00
3,500.0	25.35	71.31	3,457.8	80.2	237.1	250.3	0.00	0.00	0.00
3,600.0	25.35	71.31	3,548.2	93.9	277.6	293.1	0.00	0.00	0.00
3,700.0	25.35	71.31	3,638.5	107.6	318.2	335.9	0.00	0.00	0.00
3,800.0	25.35	71.31	3,728.9	121.4	358.7	378.7	0.00	0.00	0.00
3,900.0	25.35	71.31	3,819.3	135.1	399.3	421.5	0.00	0.00	0.00
4,000.0	25.35	71.31	3,909.6	148.8	439.8	464.3	0.00	0.00	0.00
4,100.0	25.35	71.31	4,000.0	162.5	480.4	507.1	0.00	0.00	0.00

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Site:	Sec.8 - T12S - R53W	North Reference:	True
Well:	Tornado 12-53-8-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (S-Well)		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,200.0	25.35	71.31	4,090.4	176.2	520.9	549.9	0.00	0.00	0.00
4,283.7	25.35	71.31	4,166.0	187.7	554.8	585.7	0.00	0.00	0.00
Blaine									
4,300.0	25.35	71.31	4,180.8	190.0	561.5	592.7	0.00	0.00	0.00
4,400.0	25.35	71.31	4,271.1	203.7	602.0	635.5	0.00	0.00	0.00
4,500.0	25.35	71.31	4,361.5	217.4	642.6	678.3	0.00	0.00	0.00
4,600.0	25.35	71.31	4,451.9	231.1	683.1	721.1	0.00	0.00	0.00
4,700.0	25.35	71.31	4,542.3	244.8	723.7	764.0	0.00	0.00	0.00
4,800.0	25.35	71.31	4,632.6	258.6	764.2	806.8	0.00	0.00	0.00
4,900.0	25.35	71.31	4,723.0	272.3	804.8	849.6	0.00	0.00	0.00
5,000.0	25.35	71.31	4,813.4	286.0	845.3	892.4	0.00	0.00	0.00
5,100.0	25.35	71.31	4,903.8	299.7	885.9	935.2	0.00	0.00	0.00
5,200.0	25.35	71.31	4,994.1	313.4	926.4	978.0	0.00	0.00	0.00
5,300.0	25.35	71.31	5,084.5	327.2	967.0	1,020.8	0.00	0.00	0.00
5,400.0	25.35	71.31	5,174.9	340.9	1,007.5	1,063.6	0.00	0.00	0.00
5,500.0	25.35	71.31	5,265.3	354.6	1,048.1	1,106.4	0.00	0.00	0.00
5,572.7	25.35	71.31	5,331.0	364.6	1,077.6	1,137.6	0.00	0.00	0.00
Virgil									
5,600.0	25.35	71.31	5,355.6	368.3	1,088.6	1,149.2	0.00	0.00	0.00
5,700.0	25.35	71.31	5,446.0	382.0	1,129.2	1,192.0	0.00	0.00	0.00
5,800.0	25.35	71.31	5,536.4	395.8	1,169.7	1,234.8	0.00	0.00	0.00
5,893.6	25.35	71.31	5,621.0	408.6	1,207.7	1,274.9	0.00	0.00	0.00
Lansing									
5,900.0	25.35	71.31	5,626.8	409.5	1,210.3	1,277.7	0.00	0.00	0.00
6,000.0	25.35	71.31	5,717.1	423.2	1,250.8	1,320.5	0.00	0.00	0.00
6,016.9	25.35	71.31	5,732.4	425.5	1,257.7	1,327.7	0.00	0.00	0.00
Start Drop -3.00°									
6,100.0	22.85	71.31	5,808.3	436.4	1,289.8	1,361.6	3.00	-3.00	0.00
6,200.0	19.85	71.31	5,901.4	448.1	1,324.3	1,398.0	3.00	-3.00	0.00
6,300.0	16.85	71.31	5,996.3	458.2	1,354.1	1,429.5	3.00	-3.00	0.00
6,342.4	15.58	71.31	6,037.0	461.9	1,365.3	1,441.4	3.00	-3.00	0.00
Pawnee									
6,400.0	13.85	71.31	6,092.7	466.6	1,379.2	1,456.0	3.00	-3.00	0.00
6,439.4	12.67	71.31	6,131.0	469.5	1,387.7	1,465.0	3.00	-3.00	0.00
Cherokee									
6,500.0	10.85	71.31	6,190.4	473.5	1,399.5	1,477.4	3.00	-3.00	0.00
6,600.0	7.85	71.31	6,289.0	478.7	1,414.8	1,493.6	3.00	-3.00	0.00
6,700.0	4.85	71.31	6,388.4	482.2	1,425.3	1,504.7	3.00	-3.00	0.00
6,800.0	1.85	71.31	6,488.2	484.1	1,430.9	1,510.6	3.00	-3.00	0.00
6,861.8	0.00	0.00	6,550.0	484.4	1,431.8	1,511.6	3.00	-3.00	-115.41
Start 550.0' hold at 6861.8' MD									
6,900.0	0.00	0.00	6,588.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
6,984.8	0.00	0.00	6,673.0	484.4	1,431.8	1,511.6	0.00	0.00	0.00
Morrow									
7,000.0	0.00	0.00	6,688.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
7,100.0	0.00	0.00	6,788.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
7,200.0	0.00	0.00	6,888.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
7,300.0	0.00	0.00	6,988.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
7,327.8	0.00	0.00	7,016.0	484.4	1,431.8	1,511.6	0.00	0.00	0.00
Mississippian									
7,400.0	0.00	0.00	7,088.2	484.4	1,431.8	1,511.6	0.00	0.00	0.00
7,411.8	0.00	0.00	7,100.0	484.4	1,431.8	1,511.6	0.00	0.00	0.00
TD at 7411.8' MD									

Gyrodata, Inc.

Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Tornado 12-53-8-2
Company:	Comet Ridge	TVD Reference:	WELL @ 4886.0usft (Original Well Elev)
Project:	Lincoln Co., CO	MD Reference:	WELL @ 4886.0usft (Original Well Elev)
Site:	Sec.8 - T12S - R53W	North Reference:	True
Well:	Tornado 12-53-8-2	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (S-Well)		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)

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									
PBHL Tornado 12-53-8-2	0.00	0.00	6,550.0	484.4	1,431.8	1,441,029.25	3,610,070.78	39° 1' 28.200 N	103° 21' 8.460 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points									
Measured Depth (usft)	Vertical Depth (usft)	Name			Casing Diameter (")	Hole Diameter (")			
2,250.0	2,250.0	8 5/8" Surface Casing			8-5/8	9			

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,049.0	2,049.0	Niobrara				
3,038.1	3,031.0	Dakota				
3,379.6	3,349.0	Morrison				
4,283.7	4,166.0	Blaine				
5,572.7	5,331.0	Virgil				
5,893.6	5,621.0	Lansing				
6,342.4	6,037.0	Pawnee				
6,439.4	6,131.0	Cherokee				
6,984.8	6,673.0	Morrow				
7,327.8	7,016.0	Mississippian				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
2,500.0	2,500.0	0.0	0.0	Start Build 3.00°	
3,344.9	3,317.6	58.9	174.1	Start 2672.1' hold at 3344.9' MD	
6,016.9	5,732.4	425.5	1,257.7	Start Drop -3.00°	
6,861.8	6,550.0	484.4	1,431.8	Start 550.0' hold at 6861.8' MD	
7,411.8	7,100.0	484.4	1,431.8	TD at 7411.8' MD	