

# **Rocky Mountain Nat Gas LLC**

**Wolf Creek**

**Wolf Creek**

**Wolf Creek 9-D3**

**Wolf Creek 9-D3**

**Plan: Primary**

## **Standard Planning Report**

**30 January, 2019**

# REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Wolf Creek 9-D3, True North  
 Vertical (TVD) Reference: RKB @ 10175.00ft (Original Well Elev)  
 Section (VS) Reference: Slot - (0.00N, 0.00E)  
 Measured Depth Reference: RKB @ 10175.00ft (Original Well Elev)  
 Calculation Method: Minimum Curvature



DIRECTIONAL DRILLING SPECIALISTS

Project: Wolf Creek  
 Site: Wolf Creek  
 Well: Wolf Creek 9-D3  
 Wellbore: Wolf Creek 9-D3  
 Design: Primary

Asimuth to True North  
 Magnetic North 9.24°  
 Magnetic Field  
 Strength: 51292.65nT  
 Declination: 12.02019°  
 Date: 12/20/19  
 Model: IGR2015



WELL DETAILS: Wolf Creek 9-D3

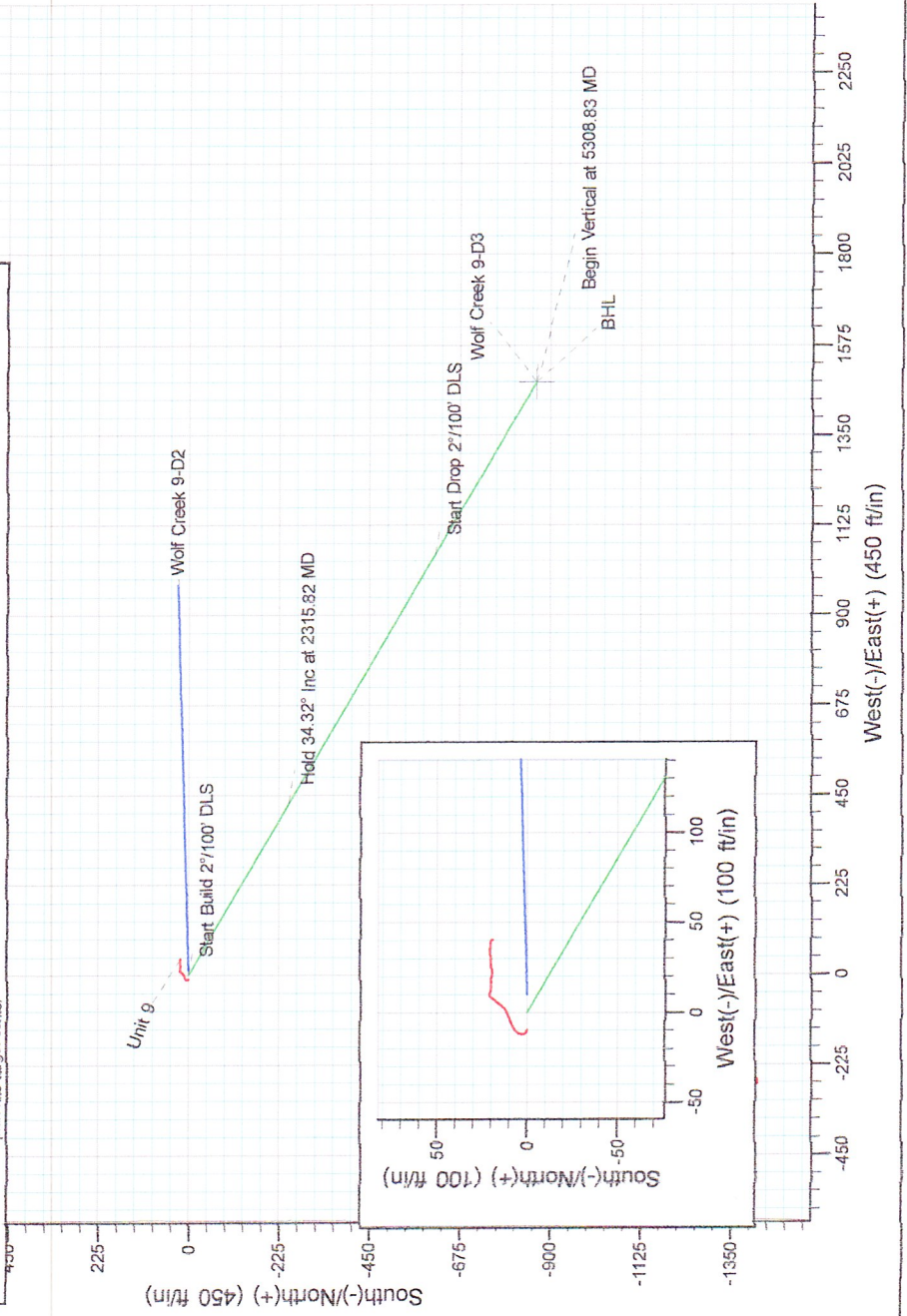
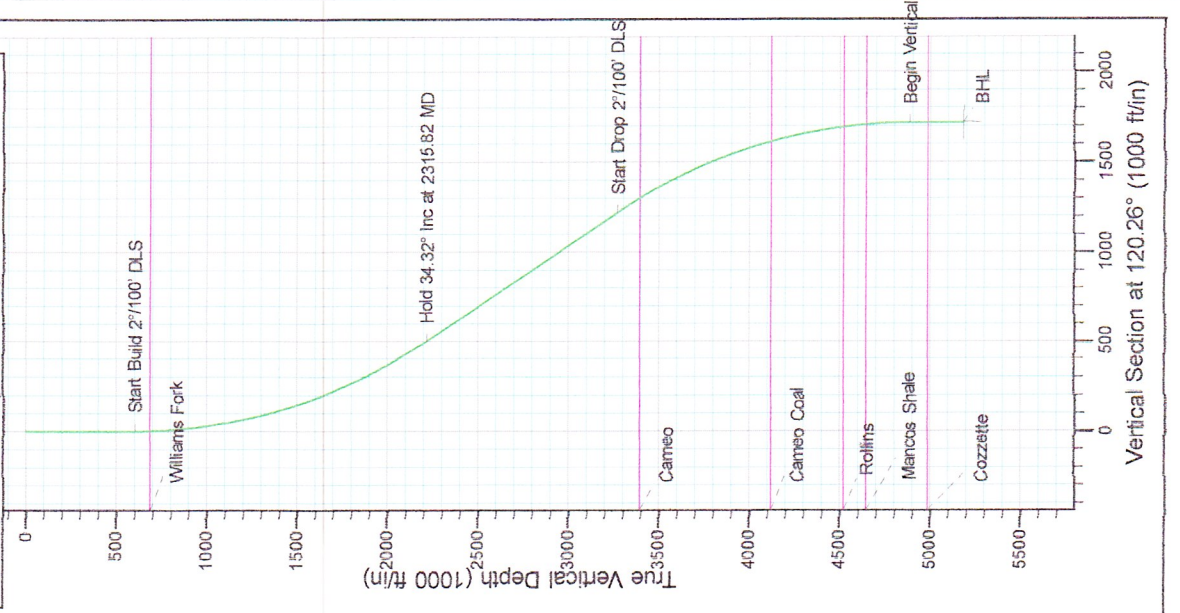
Ground Level: 10163.00  
 Easting: 2463754.203  
 Latitude: 39.312845  
 Longitude: -107.395436

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Dieg	TFace	VSec	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	Start Build 2°/100' DLS
3	2315.82	34.32	120.26	2215.06	-251.26	430.72	2.00	120.26	498.65	Hold 34.32° Inc at 2315.82 MD
4	3503.01	34.32	120.26	3289.84	-514.07	1052.66	0.00	0.00	1218.68	Start Drop 2°/100' DLS
5	5308.83	0.00	0.00	4885.00	-385.33	1483.39	2.00	180.00	1717.34	Begin Vertical at 5308.83 MD
6	5308.83	0.00	0.00	5185.00	-385.33	1483.39	0.00	0.00	1717.34	TD at 5308.83

## DESIGN TARGET DETAILS

Name	TVD	+N/S	+E/W	North	East	Latitude	Longitude	Shape
BHL	5185.00	-865.33	1483.39	1543534.458	2465219.211	39.310469	-107.350193	Point
- plan his target center								





# Planning Report

<b>Database:</b>	Compass DB	<b>Local Co-ordinate Reference:</b>	Well Wolf Creek 9-D3
<b>Company:</b>	Rocky Mountain Nat Gas LLC	<b>TVD Reference:</b>	RKB @ 10175.00ft (Original Well Elev)
<b>Project:</b>	Wolf Creek	<b>MD Reference:</b>	RKB @ 10175.00ft (Original Well Elev)
<b>Site:</b>	Wolf Creek	<b>North Reference:</b>	True
<b>Well:</b>	Wolf Creek 9-D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wolf Creek 9-D3		
<b>Design:</b>	Primary		

<b>Project</b>	Wolf Creek		
<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		

<b>Site</b>	Wolf Creek		
<b>Site Position:</b>		<b>Northing:</b>	1,543,047.456 usft
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,463,450.728 usft
<b>Position Uncertainty:</b>	0.00 ft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	39.309031
		<b>Longitude:</b>	-107.396406
		<b>Grid Convergence:</b>	-1.20 °

Well	Wolf Creek 9-D3					
Well Position	+N/-S	1,389.13 ft	Northing:	1,544,430.550 usft	Latitude:	39.312845
	+E/-W	274.54 ft	Easting:	2,463,754.203 usft	Longitude:	-107.395436
Position Uncertainty	0.00 ft	Wellhead Elevation:	10,163.00 ft	Ground Level:	10,163.00 ft	

Wellbore	Wolf Creek 9-D3				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/29/2019	9.24	65.51	51,293

Design	Primary			
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	120.26

<b>Plan Sections</b>										
<b>Measured</b>	<b>Inclination</b>	<b>Azimuth</b>	<b>Vertical</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Dogleg</b>	<b>Build</b>	<b>Turn</b>	<b>TFO</b>	<b>Target</b>
<b>Depth</b>	<b>(°)</b>	<b>(°)</b>	<b>Depth</b>	<b>(ft)</b>	<b>(ft)</b>	<b>Rate</b>	<b>Rate</b>	<b>Rate</b>	<b>(°)</b>	
<b>(ft)</b>			<b>(ft)</b>			<b>(°/100usft)</b>	<b>(°/100usft)</b>	<b>(°/100usft)</b>		
0.00	0.00	0.00	0.00	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	
2,315.82	34.32	120.26	2,215.06	-251.26	430.72	2.00	2.00	0.00	120.26	
3,593.01	34.32	120.26	3,269.94	-614.07	1,052.66	0.00	0.00	0.00	0.00	
5,308.83	0.00	0.00	4,885.00	-865.33	1,483.39	2.00	-2.00	0.00	180.00	
5,608.83	0.00	0.00	5,185.00	-865.33	1,483.39	0.00	0.00	0.00	0.00 BHL	

# Planning Report

Database: Compass DB  
 Company: Rocky Mountain Nat Gas LLC  
 Project: Wolf Creek  
 Site: Wolf Creek  
 Well: Wolf Creek 9-D3  
 Wellbore: Wolf Creek 9-D3  
 Design: Primary

Local Co-ordinate Reference: Well Wolf Creek 9-D3  
 TVD Reference: RKB @ 10175.00ft (Original Well Elev)  
 MD Reference: RKB @ 10175.00ft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature

## 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	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
<b>Start Build 2°/100' DLS</b>									
700.00	2.00	120.26	699.98	-0.88	1.51	1.75	2.00	2.00	0.00
800.00	4.00	120.26	799.84	-3.52	6.03	6.98	2.00	2.00	0.00
900.00	6.00	120.26	899.45	-7.91	13.56	15.69	2.00	2.00	0.00
1,000.00	8.00	120.26	998.70	-14.05	24.08	27.88	2.00	2.00	0.00
1,100.00	10.00	120.26	1,097.47	-21.93	37.59	43.52	2.00	2.00	0.00
1,200.00	12.00	120.26	1,195.62	-31.54	54.07	62.60	2.00	2.00	0.00
1,300.00	14.00	120.26	1,293.06	-42.88	73.50	85.10	2.00	2.00	0.00
1,400.00	16.00	120.26	1,389.64	-55.92	95.86	110.98	2.00	2.00	0.00
1,500.00	18.00	120.26	1,485.27	-70.65	121.11	140.21	2.00	2.00	0.00
1,600.00	20.00	120.26	1,579.82	-87.05	149.23	172.77	2.00	2.00	0.00
1,700.00	22.00	120.26	1,673.17	-105.11	180.19	208.60	2.00	2.00	0.00
1,800.00	24.00	120.26	1,765.21	-124.80	213.93	247.67	2.00	2.00	0.00
1,900.00	26.00	120.26	1,855.84	-146.09	250.44	289.93	2.00	2.00	0.00
2,000.00	28.00	120.26	1,944.94	-168.97	289.65	335.33	2.00	2.00	0.00
2,100.00	30.00	120.26	2,032.39	-193.39	331.52	383.81	2.00	2.00	0.00
2,200.00	32.00	120.26	2,118.11	-219.34	376.01	435.31	2.00	2.00	0.00
2,300.00	34.00	120.26	2,201.97	-246.79	423.05	489.77	2.00	2.00	0.00
2,315.82	34.32	120.26	2,215.06	-251.26	430.72	498.65	2.00	2.00	0.00
<b>Hold 34.32° Inc at 2315.82 MD</b>									
2,400.00	34.32	120.26	2,284.59	-275.18	471.72	546.11	0.00	0.00	0.00
2,500.00	34.32	120.26	2,367.18	-303.58	520.41	602.49	0.00	0.00	0.00
2,600.00	34.32	120.26	2,449.78	-331.99	569.11	658.86	0.00	0.00	0.00
2,700.00	34.32	120.26	2,532.37	-360.40	617.80	715.24	0.00	0.00	0.00
2,800.00	34.32	120.26	2,614.96	-388.80	666.50	771.61	0.00	0.00	0.00
2,900.00	34.32	120.26	2,697.56	-417.21	715.20	827.99	0.00	0.00	0.00
3,000.00	34.32	120.26	2,780.15	-445.62	763.89	884.37	0.00	0.00	0.00
3,100.00	34.32	120.26	2,862.74	-474.02	812.59	940.74	0.00	0.00	0.00
3,200.00	34.32	120.26	2,945.34	-502.43	861.28	997.12	0.00	0.00	0.00
3,300.00	34.32	120.26	3,027.93	-530.84	909.98	1,053.50	0.00	0.00	0.00
3,400.00	34.32	120.26	3,110.53	-559.24	958.68	1,109.87	0.00	0.00	0.00
3,500.00	34.32	120.26	3,193.12	-587.65	1,007.37	1,166.25	0.00	0.00	0.00
3,593.01	34.32	120.26	3,269.94	-614.07	1,052.66	1,218.68	0.00	0.00	0.00
<b>Start Drop 2°/100' DLS</b>									
3,600.00	34.18	120.26	3,275.72	-616.05	1,056.06	1,222.62	2.00	-2.00	0.00
3,700.00	32.18	120.26	3,359.41	-643.63	1,103.33	1,277.34	2.00	-2.00	0.00
3,800.00	30.18	120.26	3,444.97	-669.71	1,148.04	1,329.10	2.00	-2.00	0.00
3,900.00	28.18	120.26	3,532.27	-694.27	1,190.15	1,377.85	2.00	-2.00	0.00
4,000.00	26.18	120.26	3,621.23	-717.29	1,229.60	1,423.52	2.00	-2.00	0.00
4,100.00	24.18	120.26	3,711.73	-738.72	1,266.34	1,466.06	2.00	-2.00	0.00
4,200.00	22.18	120.26	3,803.65	-758.55	1,300.33	1,505.41	2.00	-2.00	0.00
4,300.00	20.18	120.26	3,896.89	-776.75	1,331.54	1,541.54	2.00	-2.00	0.00
4,400.00	18.18	120.26	3,991.34	-793.30	1,359.91	1,574.38	2.00	-2.00	0.00
4,500.00	16.18	120.26	4,086.87	-808.18	1,385.42	1,603.91	2.00	-2.00	0.00
4,600.00	14.18	120.26	4,183.38	-821.37	1,408.03	1,630.09	2.00	-2.00	0.00
4,700.00	12.18	120.26	4,280.74	-832.86	1,427.72	1,652.88	2.00	-2.00	0.00



# Planning Report

**Database:** Compass DB  
**Company:** Rocky Mountain Nat Gas LLC  
**Project:** Wolf Creek  
**Site:** Wolf Creek  
**Well:** Wolf Creek 9-D3  
**Wellbore:** Wolf Creek 9-D3  
**Design:** Primary

**Local Co-ordinate Reference:** Well Wolf Creek 9-D3  
**TVD Reference:** RKB @ 10175.00ft (Original Well Elev)  
**MD Reference:** RKB @ 10175.00ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature

## 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)
4,800.00	10.18	120.26	4,378.84	-842.62	1,444.46	1,672.27	2.00	-2.00	0.00
4,900.00	8.18	120.26	4,477.56	-850.66	1,458.23	1,688.21	2.00	-2.00	0.00
5,000.00	6.18	120.26	4,576.77	-856.95	1,469.02	1,700.71	2.00	-2.00	0.00
5,100.00	4.18	120.26	4,676.36	-861.50	1,476.82	1,709.73	2.00	-2.00	0.00
5,200.00	2.18	120.26	4,776.20	-864.29	1,481.60	1,715.27	2.00	-2.00	0.00
5,300.00	0.18	120.26	4,876.17	-865.33	1,483.38	1,717.32	2.00	-2.00	0.00
5,308.83	0.00	0.00	4,885.00	-865.33	1,483.39	1,717.34	2.00	-2.00	0.00
Begin Vertical at 5308.83 MD									
5,400.00	0.00	0.00	4,976.17	-865.33	1,483.39	1,717.34	0.00	0.00	0.00
5,500.00	0.00	0.00	5,076.17	-865.33	1,483.39	1,717.34	0.00	0.00	0.00
5,600.00	0.00	0.00	5,176.17	-865.33	1,483.39	1,717.34	0.00	0.00	0.00
5,608.83	0.00	0.00	5,185.00	-865.33	1,483.39	1,717.34	0.00	0.00	0.00
TD at 5608.83									

## Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
BHL - plan hits target center - Point	0.00	0.00	5,185.00	-865.33	1,483.39	1,543,534.459	2,465,219.211	39.310469	-107.390193

## Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
60.00	60.00	Conductor	20	26
1,200.00	1,195.62	9 5/8" Casing	9-5/8	13-1/2
5,603.83	5,180.00	7" Casing	7	8-3/4

## Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
685.01	685.00	Williams Fork		0.00	
3,741.85	3,395.00	Cameo		0.00	
4,533.39	4,119.00	Cameo Coal		0.00	
4,942.83	4,520.00	Rollins		0.00	
5,068.55	4,645.00	Mancos Shale		0.00	
5,408.83	4,985.00	Cozzette		0.00	

## Planning Report

<b>Database:</b>	Compass DB	<b>Local Co-ordinate Reference:</b>	Well Wolf Creek 9-D3
<b>Company:</b>	Rocky Mountain Nat Gas LLC	<b>TVD Reference:</b>	RKB @ 10175.00ft (Original Well Elev)
<b>Project:</b>	Wolf Creek	<b>MD Reference:</b>	RKB @ 10175.00ft (Original Well Elev)
<b>Site:</b>	Wolf Creek	<b>North Reference:</b>	True
<b>Well:</b>	Wolf Creek 9-D3	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wolf Creek 9-D3		
<b>Design:</b>	Primary		

### Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
600.00	600.00	0.00	0.00	Start Build 2°/100' DLS
2,315.82	2,215.06	-251.26	430.72	Hold 34.32° Inc at 2315.82 MD
3,593.01	3,269.94	-614.07	1,052.66	Start Drop 2°/100' DLS
5,308.83	4,885.00	-865.33	1,483.39	Begin Vertical at 5308.83 MD
5,608.83	5,185.00	-865.33	1,483.39	TD at 5608.83