



# **Ursa Operating Company, LLC**

**Rockies Region**

**BMC B**

**BMC B 23C-18-07-95**

**Wellbore #1**

**Plan: Design #1**

## **Standard Planning Report**

**22 November, 2016**



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well BMC B 23C-18-07-95
<b>Company:</b>	Ursa Operating Company, LLC	<b>TVD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Project:</b>	Rockies Region	<b>MD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Site:</b>	BMC B	<b>North Reference:</b>	True
<b>Well:</b>	BMC B 23C-18-07-95	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

<b>Project</b>	Rockies Region		
<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	BMC B				
Site Position:		Northing:	1,594,816.33 usft	Latitude:	39.438867241
From:	Lat/Long	Easting:	2,280,886.96 usft	Longitude:	-108.046501442
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.61 °

Well	BMC B 23C-18-07-95, SHL 39.438803600 -108.046587650					
Well Position	+N/-S	-23.2 usft	Northing:	1,594,793.85 usft	Latitude:	39.438803600
	+E/-W	-24.3 usft	Easting:	2,280,861.97 usft	Longitude:	-108.046587650
Position Uncertainty		0.0 usft	Wellhead Elevation:	5,117.0 usft	Ground Level:	5,100.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	11/18/2016	9.78	65.54	51,563

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	136.50

<b>Plan Sections</b>										
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	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,562.5	33.69	136.50	1,508.0	-199.4	189.2	3.50	3.50	0.00	136.50	
3,870.0	33.69	136.50	3,428.0	-1,127.8	1,070.3	0.00	0.00	0.00	0.00	
4,832.5	0.00	0.00	4,336.0	-1,327.2	1,259.5	3.50	-3.50	0.00	180.00	
6,808.5	0.00	0.00	6,312.0	-1,327.2	1,259.5	0.00	0.00	0.00	0.00	

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well BMC B 23C-18-07-95
<b>Company:</b>	Ursa Operating Company, LLC	<b>TVD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Project:</b>	Rockies Region	<b>MD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Site:</b>	BMC B	<b>North Reference:</b>	True
<b>Well:</b>	BMC B 23C-18-07-95	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

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
0.1	0.00	0.00	0.1	0.0	0.0	0.0	0.00	0.00	0.00
<b>SHL: 39.438803600 -108.046587650</b>									
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
<b>Start Build 3.50</b>									
700.0	3.50	136.50	699.9	-2.2	2.1	3.1	3.50	3.50	0.00
800.0	7.00	136.50	799.5	-8.9	8.4	12.2	3.50	3.50	0.00
900.0	10.50	136.50	898.3	-19.9	18.9	27.4	3.50	3.50	0.00
1,000.0	14.00	136.50	996.0	-35.3	33.5	48.6	3.50	3.50	0.00
1,100.0	17.50	136.50	1,092.3	-55.0	52.2	75.8	3.50	3.50	0.00
1,200.0	21.00	136.50	1,186.7	-78.9	74.8	108.7	3.50	3.50	0.00
1,300.0	24.50	136.50	1,278.9	-106.9	101.5	147.4	3.50	3.50	0.00
1,400.0	28.00	136.50	1,368.5	-139.0	131.9	191.6	3.50	3.50	0.00
1,500.0	31.50	136.50	1,455.3	-175.0	166.1	241.2	3.50	3.50	0.00
1,562.5	33.69	136.50	1,508.0	-199.4	189.2	274.9	3.50	3.50	0.00
<b>Start 2307.5 hold at 1562.5 MD</b>									
1,600.0	33.69	136.50	1,539.2	-214.5	203.6	295.7	0.00	0.00	0.00
1,700.0	33.69	136.50	1,622.4	-254.7	241.7	351.2	0.00	0.00	0.00
1,793.3	33.69	136.50	1,700.0	-292.2	277.3	402.9	0.00	0.00	0.00
<b>Surface Casing</b>									
1,800.0	33.69	136.50	1,705.6	-295.0	279.9	406.6	0.00	0.00	0.00
1,900.0	33.69	136.50	1,788.8	-335.2	318.1	462.1	0.00	0.00	0.00
2,000.0	33.69	136.50	1,872.0	-375.4	356.3	517.6	0.00	0.00	0.00
2,100.0	33.69	136.50	1,955.2	-415.7	394.5	573.0	0.00	0.00	0.00
2,200.0	33.69	136.50	2,038.4	-455.9	432.7	628.5	0.00	0.00	0.00
2,300.0	33.69	136.50	2,121.6	-496.1	470.8	684.0	0.00	0.00	0.00
2,400.0	33.69	136.50	2,204.9	-536.4	509.0	739.4	0.00	0.00	0.00
2,500.0	33.69	136.50	2,288.1	-576.6	547.2	794.9	0.00	0.00	0.00
2,600.0	33.69	136.50	2,371.3	-616.8	585.4	850.4	0.00	0.00	0.00
2,700.0	33.69	136.50	2,454.5	-657.1	623.6	905.8	0.00	0.00	0.00
2,800.0	33.69	136.50	2,537.7	-697.3	661.7	961.3	0.00	0.00	0.00
2,900.0	33.69	136.50	2,620.9	-737.5	699.9	1,016.8	0.00	0.00	0.00
3,000.0	33.69	136.50	2,704.1	-777.8	738.1	1,072.2	0.00	0.00	0.00
3,100.0	33.69	136.50	2,787.3	-818.0	776.3	1,127.7	0.00	0.00	0.00
3,200.0	33.69	136.50	2,870.5	-858.2	814.5	1,183.2	0.00	0.00	0.00
3,300.0	33.69	136.50	2,953.7	-898.5	852.7	1,238.6	0.00	0.00	0.00
3,361.6	33.69	136.50	3,005.0	-923.3	876.2	1,272.8	0.00	0.00	0.00
<b>Williams Fork</b>									
3,400.0	33.69	136.50	3,036.9	-938.7	890.8	1,294.1	0.00	0.00	0.00
3,500.0	33.69	136.50	3,120.1	-978.9	929.0	1,349.6	0.00	0.00	0.00
3,600.0	33.69	136.50	3,203.3	-1,019.2	967.2	1,405.1	0.00	0.00	0.00
3,700.0	33.69	136.50	3,286.5	-1,059.4	1,005.4	1,460.5	0.00	0.00	0.00
3,800.0	33.69	136.50	3,369.7	-1,099.6	1,043.6	1,516.0	0.00	0.00	0.00
3,870.0	33.69	136.50	3,428.0	-1,127.8	1,070.3	1,554.8	0.00	0.00	0.00
<b>Start Drop -3.50</b>									
3,900.0	32.64	136.50	3,453.1	-1,139.7	1,081.6	1,571.2	3.50	-3.50	0.00
4,000.0	29.14	136.50	3,538.9	-1,176.9	1,116.9	1,622.6	3.50	-3.50	0.00
4,100.0	25.64	136.50	3,627.7	-1,210.3	1,148.6	1,668.5	3.50	-3.50	0.00

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well BMC B 23C-18-07-95
<b>Company:</b>	Ursa Operating Company, LLC	<b>TVD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Project:</b>	Rockies Region	<b>MD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Site:</b>	BMC B	<b>North Reference:</b>	True
<b>Well:</b>	BMC B 23C-18-07-95	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

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	22.14	136.50	3,719.1	-1,239.6	1,176.5	1,709.0	3.50	-3.50	0.00
4,261.0	20.00	136.50	3,776.0	-1,255.6	1,191.6	1,731.0	3.50	-3.50	0.00
<b>Top of Gas</b>									
4,293.7	18.86	136.50	3,806.8	-1,263.4	1,199.0	1,741.8	3.50	-3.50	0.00
<b>23C-18-07-95 TGT</b>									
4,300.0	18.64	136.50	3,812.8	-1,264.9	1,200.4	1,743.9	3.50	-3.50	0.00
4,400.0	15.14	136.50	3,908.5	-1,286.0	1,220.4	1,772.9	3.50	-3.50	0.00
4,500.0	11.64	136.50	4,005.8	-1,302.8	1,236.4	1,796.1	3.50	-3.50	0.00
4,600.0	8.14	136.50	4,104.3	-1,315.2	1,248.2	1,813.2	3.50	-3.50	0.00
4,700.0	4.64	136.50	4,203.6	-1,323.3	1,255.9	1,824.4	3.50	-3.50	0.00
4,800.0	1.14	136.50	4,303.5	-1,327.0	1,259.3	1,829.4	3.50	-3.50	0.00
4,832.5	0.00	0.00	4,336.0	-1,327.2	1,259.5	1,829.7	3.50	-3.50	0.00
<b>Start 1976.0 hold at 4832.5 MD - Back to Vertical</b>									
4,900.0	0.00	0.00	4,403.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,000.0	0.00	0.00	4,503.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,100.0	0.00	0.00	4,603.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,200.0	0.00	0.00	4,703.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,300.0	0.00	0.00	4,803.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,400.0	0.00	0.00	4,903.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,500.0	0.00	0.00	5,003.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,600.0	0.00	0.00	5,103.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,700.0	0.00	0.00	5,203.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,303.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
5,890.5	0.00	0.00	5,394.0	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
<b>Cameo</b>									
5,900.0	0.00	0.00	5,403.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,503.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,100.0	0.00	0.00	5,603.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,200.0	0.00	0.00	5,703.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,300.0	0.00	0.00	5,803.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,308.5	0.00	0.00	5,812.0	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
<b>Rollins</b>									
6,400.0	0.00	0.00	5,903.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,003.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,600.0	0.00	0.00	6,103.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,700.0	0.00	0.00	6,203.5	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
6,808.5	0.00	0.00	6,312.0	-1,327.2	1,259.5	1,829.7	0.00	0.00	0.00
<b>BHL: 39.4351599 -108.0421284 - TD at 6808.5</b>									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
23C-18-07-95 TGT	0.00	0.00	3,776.0	-1,327.2	1,259.5	1,593,431.94	2,282,083.77	39.435159900	-108.042128400
- plan misses target center by 93.1usft at 4293.7usft MD (3806.8 TVD, -1263.4 N, 1199.0 E)									
- Rectangle (sides W100.0 H40.0 D2,536.0)									

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well BMC B 23C-18-07-95
<b>Company:</b>	Ursa Operating Company, LLC	<b>TVD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Project:</b>	Rockies Region	<b>MD Reference:</b>	BMC B 23C-18-07-95 @ 5117.0usft (Est KB)
<b>Site:</b>	BMC B	<b>North Reference:</b>	True
<b>Well:</b>	BMC B 23C-18-07-95	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,361.6	3,005.0	Williams Fork		0.00	
4,261.0	3,776.0	Top of Gas		0.00	
5,890.5	5,394.0	Cameo		0.00	
6,308.5	5,812.0	Rollins		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.1	0.1	0.0	0.0	SHL: 39.438803600 -108.046587650
600.0	600.0	0.0	0.0	Start Build 3.50
1,562.5	1,508.0	-199.4	189.2	Start 2307.5 hold at 1562.5 MD
1,793.3	1,700.0	-292.2	277.3	Surface Casing
3,870.0	3,428.0	-1,127.8	1,070.3	Start Drop -3.50
4,832.5	4,336.0	-1,327.2	1,259.5	Start 1976.0 hold at 4832.5 MD
4,832.5	4,336.0	-1,327.2	1,259.5	Back to Vertical
6,808.5	6,312.0	-1,327.2	1,259.5	BHL: 39.4351599 -108.0421284
6,808.5	6,312.0	-1,327.2	1,259.5	TD at 6808.5



Well Name: BMC B 23C-18-07-95  
Surface Location: BMC B  
North American Datum 1983, US State Plane 1983, Colorado Central Zone  
Ground Elevation: 5100.0  
+N/-S +E/-W Northing Easting Latitude Longitude  
0.0 0.0 1594793.85 2280861.97 39.438803600 -108.046587650  
Est KB BMC B 23C-18-07-95 @ 5117.0usft (Est KB)



Azimuths to True North  
Magnetic North: 9.78°  
Magnetic Field  
Strength: 51562.8nT  
Dip Angle: 65.54°  
Date: 11/18/2016  
Model: IGRF2015

BMC B  
BMC B 23C-18-07-95  
Design #1  
13:33, November 22 2016

#### WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
23C-18-07-95 TGT	3776.0	-1327.2	1259.5	1593431.95	2282083.77	39.435159900	-108.042128400	Rectangle (Sides: L40.0 W100.0)

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	
3	1562.5	33.69	136.50	1508.0	-199.4	189.2	3.50	136.50	274.9	
4	3870.0	33.69	136.50	3428.0	-1127.8	1070.3	0.00	0.00	1554.8	
5	4832.5	0.00	0.00	4336.0	-1327.2	1259.5	3.50	180.00	1829.7	
6	6808.5	0.00	0.00	6312.0	-1327.2	1259.5	0.00	0.00	1829.7	

#### ANNOTATIONS

TVD	MD	Annotation
0.1	0.1	SHL: 39.438803600 -108.046587650
600.0	600.0	Start Build 3.50
1508.0	1562.5	Start 2307.5 hold at 1562.5 MD
1700.0	1793.3	Surface Casing
3428.0	3870.0	Start Drop -3.50
4336.0	4832.5	Start 1976.0 hold at 4832.5 MD
4336.0	4832.5	Back to Vertical
6312.0	6808.5	BHL: 39.4351599 -108.0421284
6312.0	6808.5	TD at 6808.5

#### FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
3005.0	3361.6	Williams Fork	0.00	
3776.0	4261.0	Top of Gas	0.00	
5394.0	5890.5	Cameo	0.00	
5812.0	6308.5	Rollins	0.00	

