



Ursa Operating Company, LLC

Rockies Region

BMC B

BMC B 23D-18-07-95

Wellbore #1

Plan: Design #1

Standard Planning Report

28 October, 2015



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

Project	Rockies Region		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site	BMC B				
Site Position:		Northing:	1,594,816.33 usft	Latitude:	39° 26' 19.922 N
From:	Lat/Long	Easting:	2,280,886.96 usft	Longitude:	108° 2' 47.405 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.61 °

Well	BMC B 23D-18-07-95, SHL LAT: 39.438801293 LONG: -108.046693777					
Well Position	+N/-S	-24.0 usft	Northing:	1,594,793.84 usft	Latitude:	39° 26' 19.685 N
	+E/-W	-54.3 usft	Easting:	2,280,831.98 usft	Longitude:	108° 2' 48.098 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	5,117.0 usft	Ground Level:	5,100.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/23/2015	9.81	65.56	51,780

Design	Design #1			
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	142.03

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,593.0	38.25	142.03	1,513.6	-277.1	216.3	3.50	3.50	0.00	142.03	
3,850.6	38.25	142.03	3,286.4	-1,379.1	1,076.3	0.00	0.00	0.00	0.00	
4,943.6	0.00	0.00	4,300.0	-1,656.2	1,292.6	3.50	-3.50	0.00	180.00	
6,952.6	0.00	0.00	6,309.0	-1,656.2	1,292.6	0.00	0.00	0.00	0.00	

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well BMC B 23D-18-07-95
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Project:	Rockies Region	MD Reference:	BMC B 23D-18-07-95 @ 5117.0usft (PLAN KB)
Site:	BMC B	North Reference:	True
Well:	BMC B 23D-18-07-95	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	
SHL: 39.438801293 -108.046693777										
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	
Start Build 3.50										
600.0	3.50	142.03	599.9	-2.4	1.9	3.1	3.50	3.50	0.00	
700.0	7.00	142.03	699.5	-9.6	7.5	12.2	3.50	3.50	0.00	
800.0	10.50	142.03	798.3	-21.6	16.9	27.4	3.50	3.50	0.00	
900.0	14.00	142.03	896.0	-38.3	29.9	48.6	3.50	3.50	0.00	
1,000.0	17.50	142.03	992.3	-59.7	46.6	75.8	3.50	3.50	0.00	
1,100.0	21.00	142.03	1,086.7	-85.7	66.9	108.7	3.50	3.50	0.00	
1,200.0	24.50	142.03	1,178.9	-116.2	90.7	147.4	3.50	3.50	0.00	
1,300.0	28.00	142.03	1,268.5	-151.1	117.9	191.6	3.50	3.50	0.00	
1,400.0	31.50	142.03	1,355.3	-190.2	148.4	241.2	3.50	3.50	0.00	
1,500.0	35.00	142.03	1,439.0	-233.4	182.1	296.1	3.50	3.50	0.00	
1,593.0	38.25	142.03	1,513.6	-277.1	216.3	351.5	3.50	3.50	0.00	
Start 2257.6 hold at 1593.0 MD										
1,600.0	38.25	142.03	1,519.1	-280.5	218.9	355.9	0.00	0.00	0.00	
1,700.0	38.25	142.03	1,597.6	-329.3	257.0	417.8	0.00	0.00	0.00	
1,800.0	38.25	142.03	1,676.1	-378.2	295.1	479.7	0.00	0.00	0.00	
1,830.4	38.25	142.03	1,700.0	-393.0	306.7	498.5	0.00	0.00	0.00	
Surface Casing										
1,900.0	38.25	142.03	1,754.7	-427.0	333.2	541.6	0.00	0.00	0.00	
2,000.0	38.25	142.03	1,833.2	-475.8	371.3	603.5	0.00	0.00	0.00	
2,100.0	38.25	142.03	1,911.7	-524.6	409.4	665.4	0.00	0.00	0.00	
2,200.0	38.25	142.03	1,990.2	-573.4	447.5	727.4	0.00	0.00	0.00	
2,300.0	38.25	142.03	2,068.8	-622.2	485.6	789.3	0.00	0.00	0.00	
2,400.0	38.25	142.03	2,147.3	-671.0	523.7	851.2	0.00	0.00	0.00	
2,500.0	38.25	142.03	2,225.8	-719.8	561.8	913.1	0.00	0.00	0.00	
2,600.0	38.25	142.03	2,304.3	-768.6	599.9	975.0	0.00	0.00	0.00	
2,700.0	38.25	142.03	2,382.9	-817.5	638.0	1,036.9	0.00	0.00	0.00	
2,800.0	38.25	142.03	2,461.4	-866.3	676.1	1,098.9	0.00	0.00	0.00	
2,900.0	38.25	142.03	2,539.9	-915.1	714.2	1,160.8	0.00	0.00	0.00	
3,000.0	38.25	142.03	2,618.5	-963.9	752.3	1,222.7	0.00	0.00	0.00	
3,100.0	38.25	142.03	2,697.0	-1,012.7	790.3	1,284.6	0.00	0.00	0.00	
3,200.0	38.25	142.03	2,775.5	-1,061.5	828.4	1,346.5	0.00	0.00	0.00	
3,300.0	38.25	142.03	2,854.0	-1,110.3	866.5	1,408.4	0.00	0.00	0.00	
3,400.0	38.25	142.03	2,932.6	-1,159.1	904.6	1,470.3	0.00	0.00	0.00	
3,488.4	38.25	142.03	3,002.0	-1,202.3	938.3	1,525.1	0.00	0.00	0.00	
Williams Fork										
3,500.0	38.25	142.03	3,011.1	-1,207.9	942.7	1,532.3	0.00	0.00	0.00	
3,600.0	38.25	142.03	3,089.6	-1,256.7	980.8	1,594.2	0.00	0.00	0.00	
3,700.0	38.25	142.03	3,168.1	-1,305.6	1,018.9	1,656.1	0.00	0.00	0.00	
3,800.0	38.25	142.03	3,246.7	-1,354.4	1,057.0	1,718.0	0.00	0.00	0.00	
3,850.6	38.25	142.03	3,286.4	-1,379.1	1,076.3	1,749.4	0.00	0.00	0.00	
Start Drop -3.50										
3,900.0	36.53	142.03	3,325.6	-1,402.7	1,094.7	1,779.3	3.50	-3.50	0.00	

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Well:	BMC B 23D-18-07-95	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
4,000.0	33.03	142.03	3,407.8	-1,447.7	1,129.8	1,836.4	3.50	-3.50	0.00
4,100.0	29.53	142.03	3,493.2	-1,488.6	1,161.8	1,888.3	3.50	-3.50	0.00
4,200.0	26.03	142.03	3,581.7	-1,525.3	1,190.4	1,934.9	3.50	-3.50	0.00
4,300.0	22.53	142.03	3,672.8	-1,557.7	1,215.7	1,976.0	3.50	-3.50	0.00
4,400.0	19.03	142.03	3,766.3	-1,585.7	1,237.5	2,011.4	3.50	-3.50	0.00
4,407.1	18.78	142.03	3,773.0	-1,587.5	1,238.9	2,013.7	3.50	-3.50	0.00
Top of Gas									
4,500.0	15.53	142.03	3,861.8	-1,609.1	1,255.8	2,041.1	3.50	-3.50	0.00
4,600.0	12.03	142.03	3,958.9	-1,627.9	1,270.5	2,065.0	3.50	-3.50	0.00
4,700.0	8.53	142.03	4,057.3	-1,641.9	1,281.4	2,082.8	3.50	-3.50	0.00
4,800.0	5.03	142.03	4,156.6	-1,651.2	1,288.7	2,094.6	3.50	-3.50	0.00
4,900.0	1.53	142.03	4,256.4	-1,655.7	1,292.2	2,100.3	3.50	-3.50	0.00
4,943.6	0.00	0.00	4,300.0	-1,656.2	1,292.6	2,100.9	3.50	-3.50	0.00
Back to Vertical - Start 2009.0 hold at 4943.6 MD									
5,000.0	0.00	0.00	4,356.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,100.0	0.00	0.00	4,456.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,200.0	0.00	0.00	4,556.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,300.0	0.00	0.00	4,656.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,400.0	0.00	0.00	4,756.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,500.0	0.00	0.00	4,856.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,600.0	0.00	0.00	4,956.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,700.0	0.00	0.00	5,056.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,800.0	0.00	0.00	5,156.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
5,900.0	0.00	0.00	5,256.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,000.0	0.00	0.00	5,356.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,034.6	0.00	0.00	5,391.0	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
Cameo									
6,100.0	0.00	0.00	5,456.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,200.0	0.00	0.00	5,556.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,300.0	0.00	0.00	5,656.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,400.0	0.00	0.00	5,756.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,452.6	0.00	0.00	5,809.0	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
Rollins									
6,500.0	0.00	0.00	5,856.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,600.0	0.00	0.00	5,956.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,700.0	0.00	0.00	6,056.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,800.0	0.00	0.00	6,156.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,900.0	0.00	0.00	6,256.4	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
6,952.5	0.00	0.00	6,308.9	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
BHL: 39.4342541 -108.0421175									
6,952.6	0.00	0.00	6,309.0	-1,656.2	1,292.6	2,100.9	0.00	0.00	0.00
TD at 6952.6									

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Project:	Rockies Region	MD Reference:	BMC B 23D-18-07-95 @ 5117.0usft (PLAN KB)
Site:	BMC B	North Reference:	True
Well:	BMC B 23D-18-07-95	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
23D-18-07-95 TGT	0.00	0.00	3,773.0	-1,656.2	1,292.6	1,593,102.06	2,282,077.61	39° 26' 3.315 N	108° 2' 31.623 W
- plan misses target center by 82.7usft at 4432.8usft MD (3797.4 TVD, -1593.9 N, 1243.9 E)									
- Rectangle (sides W100.0 H40.0 D2,536.0)									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,488.4	3,002.0	Williams Fork		0.00	
4,407.1	3,773.0	Top of Gas		0.00	
6,034.6	5,391.0	Cameo		0.00	
6,452.6	5,809.0	Rollins		0.00	

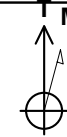
Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.1	0.1	0.0	0.0	SHL: 39.438801293 -108.046693777
500.0	500.0	0.0	0.0	Start Build 3.50
1,593.0	1,513.6	-277.1	216.3	Start 2257.6 hold at 1593.0 MD
1,830.4	1,700.0	-393.0	306.7	Surface Casing
3,850.6	3,286.4	-1,379.1	1,076.3	Start Drop -3.50
4,943.6	4,300.0	-1,656.2	1,292.6	Back to Vertical
4,943.6	4,300.0	-1,656.2	1,292.6	Start 2009.0 hold at 4943.6 MD
6,952.5	6,308.9	-1,656.2	1,292.6	BHL: 39.4342541 -108.0421175
6,952.6	6,309.0	-1,656.2	1,292.6	TD at 6952.6



Well Name: BMC B 23D-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 1594793.84 2280831.98 39° 26' 19.685 N 108° 2' 48.098 W
PLAN KB BMC B 23D-18-07-95 @ 5117.0usft (PLAN KB)

Slot



Azimuths to True North
Magnetic North: 9.81°
Magnetic Field
Strength: 51780.4snT
Dip Angle: 65.56°
Date: 10/23/2015
Model: IGRF2010

BMC B
BMC B 23D-18-07-95
Design #1
10:43, October 28 2015

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
23D-18-07-95 TGT	3773.0	-1656.2	1292.6	1593102.06	2282077.61	39° 26' 3.315 N	108° 2' 31.623 W	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	500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	
3	1593.0	38.25	142.03	1513.6	-277.1	216.3	3.50	142.03	351.5	
4	3850.6	38.25	142.03	3286.4	-1379.1	1076.3	0.00	0.00	1749.4	
5	4943.6	0.00	0.00	4300.0	-1656.2	1292.6	3.50	180.00	2100.9	
6	6952.6	0.00	0.00	6309.0	-1656.2	1292.6	0.00	0.00	2100.9	

ANNOTATIONS

TVD	MD	Annotation
0.1	0.1	SHL: 39.438801293 -108.046693777
500.0	500.0	Start Build 3.50
1513.6	1593.0	Start 2257.6 hold at 1593.0 MD
1700.0	1830.4	Surface Casing
3286.4	3850.6	Start Drop -3.50
4300.0	4943.6	Back to Vertical
4300.0	4943.6	Start 2009.0 hold at 4943.6 MD
6308.9	6952.5	BHL: 39.4342541 -108.0421175
6309.0	6952.6	TD at 6952.6

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
3002.0	3488.4	Williams Fork	0.00	
3773.0	4407.1	Top of Gas	0.00	
5391.0	6034.6	Cameo	0.00	
5809.0	6452.6	Rollins	0.00	

