



Project: Mesa County, CO  
 Site: Sup & Shep 25-11 Pad  
 Well: Sup & Shep 0993-25-09W  
 Wellbore: B-9  
 Design: Design #1  
 Latitude: 39.244812  
 Longitude: -107.723460  
 Ground Level: 8077.0  
 well @ 8107.0usft (30' RKB)



SECTION DETAILS									
MD	Inc	Azi	TVD	+N-S	+E-W	Diag	TFace	VSecl	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.0	Build 3.00"/100'
1048.1	7.44	340.77	1047.4	15.2	-5.3	3.00	340.77	18.1	EOB @ 7.44" Inc / 340.77" Azm
6885.1	7.44	340.77	6877.6	704.9	-248.9	0.00	0.00	746.5	Drop @ 3.00"/100'
6833.9	0.00	0.00	6885.0	720.1	-251.2	3.00	180.00	762.6	EOD @ Vertical
8683.9	0.00	0.00	8635.0	720.1	-251.2	0.00	0.00	762.6	TD @ 8683.9' MD / 8635.0' TVD

DESIGN TARGET DETAILS									
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude		
PBHL - SUP & SHEP 0993-25-09W	8635.0	720.1	-251.2	1522486.83	2370128.70	39.246789	-107.724347		

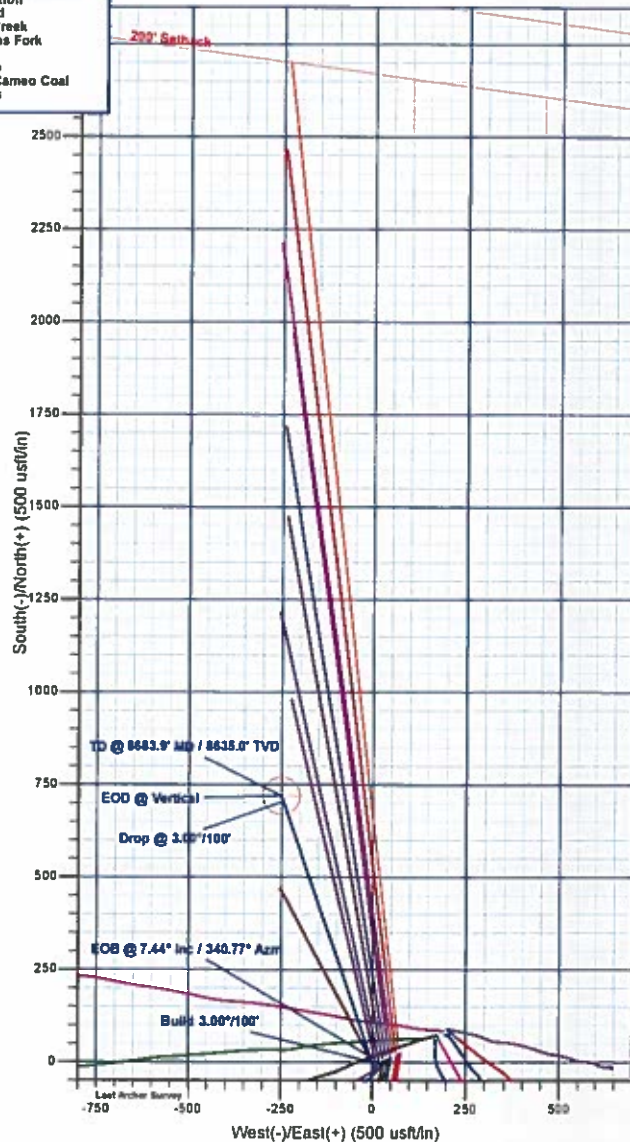
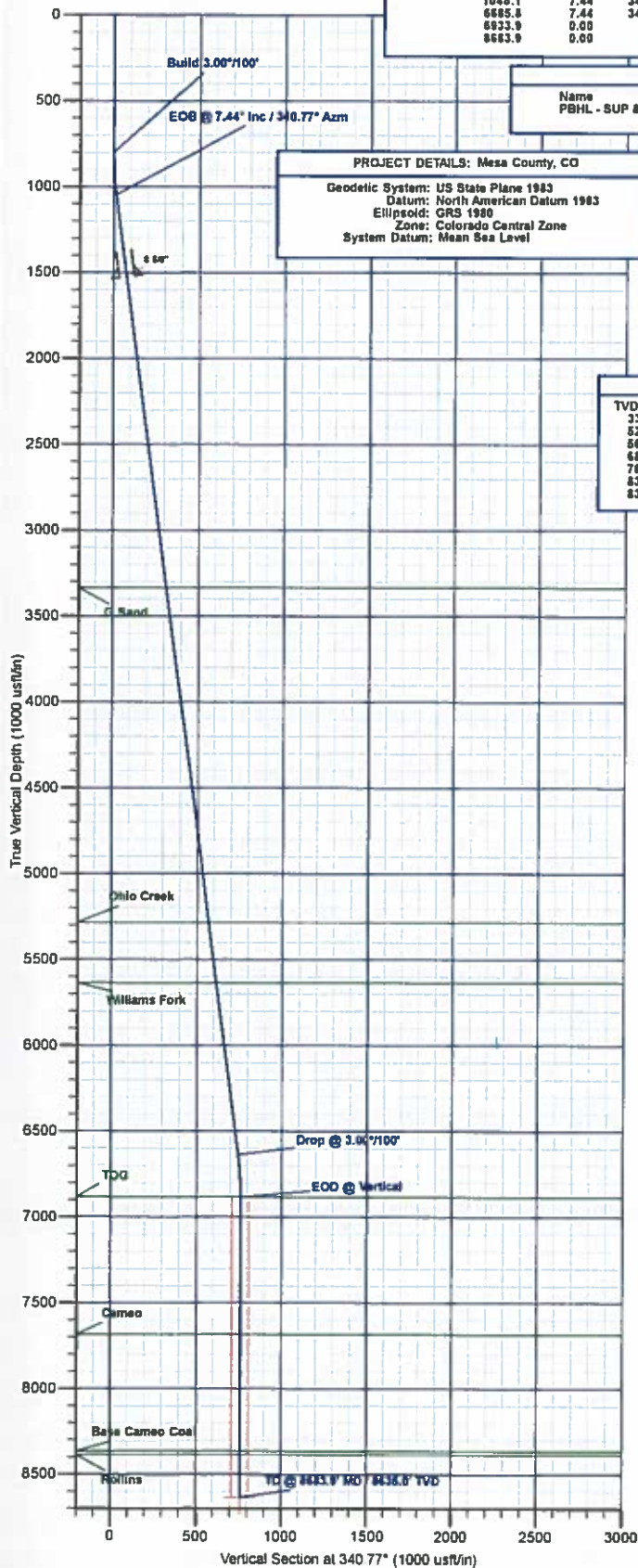
PROJECT DETAILS: Mesa County, CO  
 Geodetic System: US State Plane 1983  
 Datum: North American Datum 1983  
 Ellipsoid: GRS 1980  
 Zone: Colorado Central Zone  
 System Datum: Mean Sea Level

WELL DETAILS: Sup & Shep 0993-25-09W					
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1522486.83	2370362.20	39.244812	-107.723460

Azimuths to True North  
 Magnetic North: 9.49°  
 Magnetic Field  
 Strength: 51350.5nT  
 Dip Angle: 66.42°  
 Date: 1/2/2018  
 Model: IGRF2015

REFERENCE INFORMATION  
 Co-ordinate (NE) Reference: Well Sup & Shep 0993-25-09W, True North  
 Vertical (TVD) Reference: well @ 8107.0usft (30' RKB)  
 Section (VS) Reference: Slnt - (0.0N, 0.0E)  
 Measured Depth Reference: well @ 8107.0usft (30' RKB)  
 Calculation Method: Minimum Curvature

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3335.0	3355.1	G Sand
5285.0	5321.7	Ohio Creek
5635.0	5674.7	Williams Fork
6885.0	6933.9	TOG
7685.0	7733.9	Cameo
8365.0	8413.9	Base Cameo Coal
8365.0	8433.9	Rollins





# **Laramie Energy, LLC**

Mesa County, CO

Sup & Shep 25-11 Pad

Sup & Shep 0993-25-09W

B-9

Plan: Design #1

## **QES Well Planning Report**

04 March, 2018





# Well Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well Sup & Shep 0993-25-09W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 8107.0usft (30' RKB)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 8107.0usft (30' RKB)
<b>Site:</b>	Sup & Shep 25-11 Pad	<b>North Reference:</b>	True
<b>Well:</b>	Sup & Shep 0993-25-09W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	B-9		
<b>Design:</b>	Design #1		

<b>Project</b>	Mesa County, CO		
<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>	Sup & Shep 25-11 Pad			
<b>Site Position:</b>		<b>Northing:</b>	1,521,749.72 usft	<b>Latitude:</b> 39.244779
<b>From:</b>	Lat/Long	<b>Easting:</b>	2,370,406.93 usft	<b>Longitude:</b> -107.723301
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "	<b>Grid Convergence:</b> -1.40 "

<b>Well</b>	Sup & Shep 0993-25-09W			
<b>Well Position</b>	+N/-S	12.0 usft	<b>Northing:</b>	1,521,762.83 usft
	+E/-W	-45.0 usft	<b>Easting:</b>	2,370,362.20 usft
<b>Position Uncertainty</b>	0.0 usft		<b>Wellhead Elevation:</b>	<b>Ground Level:</b> 8,077.0 usft

<b>Wellbore</b>	B-9				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	1/2/2018	9.49	65.42	51,350.82709623

<b>Design</b>	Design #1			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<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	340.77

<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	
800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,048.1	7.44	340.77	1,047.4	15.2	-5.3	3.00	3.00	0.00	340.77	
6,685.8	7.44	340.77	6,637.6	704.9	-245.9	0.00	0.00	0.00	0.00	
6,933.9	0.00	0.00	6,885.0	720.1	-251.2	3.00	-3.00	0.00	180.00	
8,683.9	0.00	0.00	8,635.0	720.1	-251.2	0.00	0.00	0.00	0.00	PBHL - SUP & SHEP





## Well Planning Report



Database: EDM 5000 1 Single User Db  
 Company: Laramie Energy, LLC  
 Project: Mesa County, CO  
 Site: Sup & Shep 25-11 Pad  
 Well: Sup & Shep 0993-25-09W  
 Wellbore: B-9  
 Design: Design #1

Local Co-ordinate Reference:  
 TVD Reference:  
 MD Reference:  
 North Reference:  
 Survey Calculation Method:

Well Sup & Shep 0993-25-09W  
 well @ 8107.0usft (30' RKB)  
 well @ 8107.0usft (30' RKB)  
 True  
 Minimum Curvature

## 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
Build 3.00°/100'									
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	3.00	340.77	900.0	2.5	-0.9	2.6	3.00	3.00	0.00
1,000.0	6.00	340.77	999.6	9.9	-3.4	10.5	3.00	3.00	0.00
EOB @ 7.44° Inc / 340.77° Azm									
1,048.1	7.44	340.77	1,047.4	15.2	-5.3	16.1	3.00	3.00	0.00
1,100.0	7.44	340.77	1,098.9	21.5	-7.5	22.8	0.00	0.00	0.00
1,200.0	7.44	340.77	1,198.0	33.8	-11.8	35.8	0.00	0.00	0.00
1,300.0	7.44	340.77	1,297.2	46.0	-16.1	48.7	0.00	0.00	0.00
1,400.0	7.44	340.77	1,396.3	58.2	-20.3	61.7	0.00	0.00	0.00
1,500.0	7.44	340.77	1,495.5	70.5	-24.6	74.6	0.00	0.00	0.00
8 5/8"									
1,530.0	7.44	340.77	1,525.2	74.1	-25.9	78.5	0.00	0.00	0.00
1,600.0	7.44	340.77	1,594.7	82.7	-28.9	87.6	0.00	0.00	0.00
1,700.0	7.44	340.77	1,693.8	94.9	-33.1	100.6	0.00	0.00	0.00
1,800.0	7.44	340.77	1,793.0	107.2	-37.4	113.5	0.00	0.00	0.00
1,900.0	7.44	340.77	1,892.1	119.4	-41.7	128.5	0.00	0.00	0.00
2,000.0	7.44	340.77	1,991.3	131.6	-45.9	139.4	0.00	0.00	0.00
2,100.0	7.44	340.77	2,090.4	143.9	-50.2	152.4	0.00	0.00	0.00
2,200.0	7.44	340.77	2,189.6	156.1	-54.5	165.3	0.00	0.00	0.00
2,300.0	7.44	340.77	2,288.8	168.3	-58.7	178.3	0.00	0.00	0.00
2,400.0	7.44	340.77	2,387.9	180.6	-63.0	191.2	0.00	0.00	0.00
2,500.0	7.44	340.77	2,487.1	192.8	-67.3	204.2	0.00	0.00	0.00
2,600.0	7.44	340.77	2,586.2	205.0	-71.5	217.2	0.00	0.00	0.00
2,700.0	7.44	340.77	2,685.4	217.3	-75.8	230.1	0.00	0.00	0.00
2,800.0	7.44	340.77	2,784.5	229.5	-80.1	243.1	0.00	0.00	0.00
2,900.0	7.44	340.77	2,883.7	241.7	-84.3	256.0	0.00	0.00	0.00
3,000.0	7.44	340.77	2,982.9	254.0	-88.6	269.0	0.00	0.00	0.00
3,100.0	7.44	340.77	3,082.0	266.2	-92.9	281.9	0.00	0.00	0.00
3,200.0	7.44	340.77	3,181.2	278.4	-97.1	294.9	0.00	0.00	0.00
3,300.0	7.44	340.77	3,280.3	290.7	-101.4	307.9	0.00	0.00	0.00
G Sand									
3,355.1	7.44	340.77	3,335.0	297.4	-103.8	315.0	0.00	0.00	0.00
3,400.0	7.44	340.77	3,379.5	302.9	-105.7	320.8	0.00	0.00	0.00
3,500.0	7.44	340.77	3,478.6	315.1	-109.9	333.8	0.00	0.00	0.00
3,600.0	7.44	340.77	3,577.8	327.4	-114.2	346.7	0.00	0.00	0.00
3,700.0	7.44	340.77	3,677.0	339.6	-118.5	359.7	0.00	0.00	0.00
3,800.0	7.44	340.77	3,776.1	351.8	-122.7	372.6	0.00	0.00	0.00
3,900.0	7.44	340.77	3,875.3	364.1	-127.0	385.6	0.00	0.00	0.00
4,000.0	7.44	340.77	3,974.4	376.3	-131.3	398.5	0.00	0.00	0.00
4,100.0	7.44	340.77	4,073.6	388.5	-135.5	411.5	0.00	0.00	0.00
4,200.0	7.44	340.77	4,172.7	400.8	-139.8	424.5	0.00	0.00	0.00
4,300.0	7.44	340.77	4,271.9	413.0	-144.1	437.4	0.00	0.00	0.00
4,400.0	7.44	340.77	4,371.1	425.2	-148.3	450.4	0.00	0.00	0.00
4,500.0	7.44	340.77	4,470.2	437.5	-152.6	463.3	0.00	0.00	0.00
4,600.0	7.44	340.77	4,569.4	449.7	-156.9	476.3	0.00	0.00	0.00



## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-09W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8107.0usft (30' RKB)
Project:	Mesa County, CO	MD Reference:	well @ 8107.0usft (30' RKB)
Site:	Sup & Shep 25-11 Pad	North Reference:	True
Well:	Sup & Shep 0993-25-09W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-9		
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)
4,700.0	7.44	340.77	4,668.5	461.9	-161.2	489.2	0.00	0.00	0.00
4,800.0	7.44	340.77	4,767.7	474.2	-165.4	502.2	0.00	0.00	0.00
4,900.0	7.44	340.77	4,866.8	486.4	-169.7	515.2	0.00	0.00	0.00
5,000.0	7.44	340.77	4,966.0	498.6	-174.0	528.1	0.00	0.00	0.00
5,100.0	7.44	340.77	5,065.1	510.9	-178.2	541.1	0.00	0.00	0.00
5,200.0	7.44	340.77	5,164.3	523.1	-182.5	554.0	0.00	0.00	0.00
5,300.0	7.44	340.77	5,263.5	535.3	-186.8	567.0	0.00	0.00	0.00
Ohio Creek									
5,321.7	7.44	340.77	5,285.0	538.0	-187.7	569.8	0.00	0.00	0.00
5,400.0	7.44	340.77	5,362.6	547.6	-191.0	578.9	0.00	0.00	0.00
5,500.0	7.44	340.77	5,461.8	559.8	-195.3	592.9	0.00	0.00	0.00
5,600.0	7.44	340.77	5,560.9	572.0	-199.6	605.9	0.00	0.00	0.00
Williams Fork									
5,674.7	7.44	340.77	5,635.0	581.2	-202.7	615.5	0.00	0.00	0.00
5,700.0	7.44	340.77	5,660.1	584.3	-203.8	618.8	0.00	0.00	0.00
5,800.0	7.44	340.77	5,759.2	596.5	-208.1	631.8	0.00	0.00	0.00
5,900.0	7.44	340.77	5,858.4	608.7	-212.4	644.7	0.00	0.00	0.00
6,000.0	7.44	340.77	5,957.6	621.0	-216.6	657.7	0.00	0.00	0.00
6,100.0	7.44	340.77	6,056.7	633.2	-220.9	670.6	0.00	0.00	0.00
6,200.0	7.44	340.77	6,155.9	645.4	-225.2	683.6	0.00	0.00	0.00
6,300.0	7.44	340.77	6,255.0	657.7	-229.4	696.5	0.00	0.00	0.00
6,400.0	7.44	340.77	6,354.2	669.9	-233.7	709.5	0.00	0.00	0.00
6,500.0	7.44	340.77	6,453.3	682.1	-238.0	722.5	0.00	0.00	0.00
6,600.0	7.44	340.77	6,552.5	694.4	-242.2	735.4	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,685.8	7.44	340.77	6,637.6	704.9	-245.9	746.5	0.00	0.00	0.00
6,700.0	7.02	340.77	6,651.7	706.6	-246.5	748.3	3.00	-3.00	0.00
6,800.0	4.02	340.77	6,751.2	715.6	-249.7	757.9	3.00	-3.00	0.00
6,900.0	1.02	340.77	6,851.1	719.8	-251.1	762.3	3.00	-3.00	0.00
EOD @ Vertical - TDG									
6,933.9	0.00	0.00	6,885.0	720.1	-251.2	762.6	3.00	-3.00	56.71
7,000.0	0.00	0.00	6,951.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,100.0	0.00	0.00	7,051.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,200.0	0.00	0.00	7,151.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,300.0	0.00	0.00	7,251.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,400.0	0.00	0.00	7,351.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,500.0	0.00	0.00	7,451.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,600.0	0.00	0.00	7,551.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,700.0	0.00	0.00	7,651.1	720.1	-251.2	762.6	0.00	0.00	0.00
Cameo									
7,733.9	0.00	0.00	7,685.0	720.1	-251.2	762.6	0.00	0.00	0.00
7,800.0	0.00	0.00	7,751.1	720.1	-251.2	762.6	0.00	0.00	0.00
7,900.0	0.00	0.00	7,851.1	720.1	-251.2	762.6	0.00	0.00	0.00
8,000.0	0.00	0.00	7,951.1	720.1	-251.2	762.6	0.00	0.00	0.00
8,100.0	0.00	0.00	8,051.1	720.1	-251.2	762.6	0.00	0.00	0.00
8,200.0	0.00	0.00	8,151.1	720.1	-251.2	762.6	0.00	0.00	0.00
8,300.0	0.00	0.00	8,251.1	720.1	-251.2	762.6	0.00	0.00	0.00
8,400.0	0.00	0.00	8,351.1	720.1	-251.2	762.6	0.00	0.00	0.00
Base Cameo Coal									
8,413.9	0.00	0.00	8,365.0	720.1	-251.2	762.6	0.00	0.00	0.00
Rollins									
8,433.9	0.00	0.00	8,385.0	720.1	-251.2	762.6	0.00	0.00	0.00
8,500.0	0.00	0.00	8,451.1	720.1	-251.2	762.6	0.00	0.00	0.00



## Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-09W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 8107.0usft (30' RKB)
Project:	Mesa County, CO	MD Reference:	well @ 8107.0usft (30' RKB)
Site:	Sup & Shep 25-11 Pad	North Reference:	True
Well:	Sup & Shep 0993-25-09W	Survey Calculation Method:	Minimum Curvature
Wellbore:	B-9		
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)
8,600.0	0.00	0.00	8,551.1	720.1	-251.2	762.6	0.00	0.00	0.00
TD @ 8683.9' MD / 8635.0' TVD									
8,683.9	0.00	0.00	8,635.0	720.1	-251.2	762.6	0.00	0.00	0.00

## 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 - SUP & SHEP 09	0.00	0.00	8,635.0	720.1	-251.2	1,522,488.83	2,370,128.70	39.246789	-107.724347
- plan hits target center									
- Circle (radius 50.0)									

## Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,525.2	8 5/8"	8-5/8	11

## Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,355.1	3,335.0	G Sand			
5,321.7	5,285.0	Ohio Creek			
5,674.7	5,635.0	Williams Fork			
6,933.9	6,885.0	TOG			
7,733.9	7,685.0	Cameo			
8,413.9	8,365.0	Base Cameo Coal			
8,433.9	8,385.0	Rollins			

## Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
800.0	800.0	0.0	0.0	Build 3.00°/100'
1,048.1	1,047.4	15.2	-5.3	EOB @ 7.44° Inc / 340.77° Azm
6,685.8	6,637.6	704.9	-245.9	Drop @ 3.00°/100'
6,933.9	6,885.0	720.1	-251.2	EOD @ Vertical
8,683.9	8,635.0	720.1	-251.2	TD @ 8683.9' MD / 8635.0' TVD