



Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep Federal 25-14W
 Wellbore: A-8
 Design: Design #1
 Latitude: 39.244799
 Longitude: -107.723412
 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	Build 3.00°/100'
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0	EOB @ 5.00° Inc / 200.00° Azm (Build 3.00°/100')
466.7	5.00	200.00	466.5	-5.8	-2.5	3.00	200.00	5.0	EOB @ 14.88° Inc / 246.89° Azm
860.9	14.88	246.89	854.9	-42.7	-54.5	3.00	64.51	67.1	Drop @ 3.00°/100'
8587.3	14.88	246.89	8375.0	-610.3	-1384.5	0.00	0.00	1513.1	EOD @ Vertical
7056.6	0.00	0.00	6859.0	-634.8	-1441.8	3.00	180.00	1575.4	TD @ 8606.6° MD / 8609.0° TVD
8806.6	0.00	0.00	8609.0	-634.8	-1441.8	0.00	0.00	1575.4	

DESIGN TARGET DETAILS

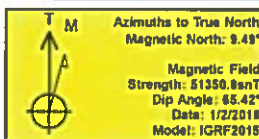
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - SUP & SHEP FEDERAL 25-14W	8609.0	-634.8	-1441.8	1521158.46	2365918.73	39.243056	-107.728503

WELL DETAILS: Sup & Shep Federal 25-14W

+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1521757.76	2370376.68	39.244799	-107.723412

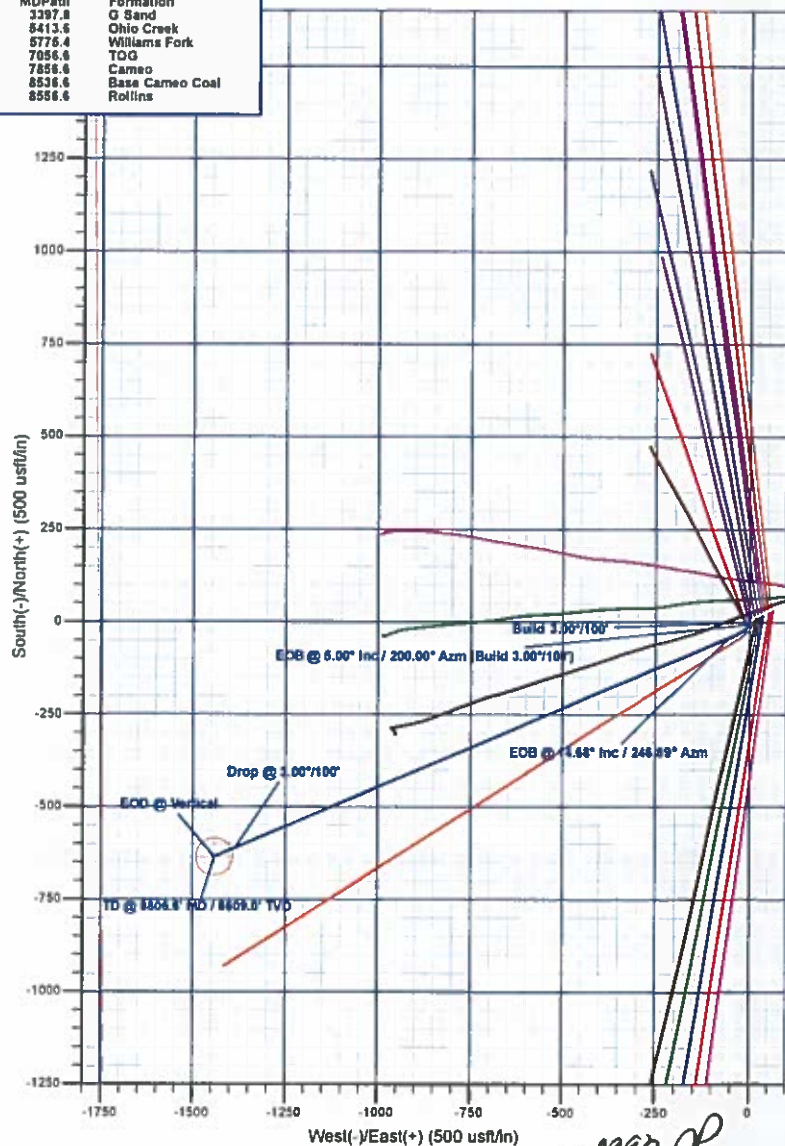
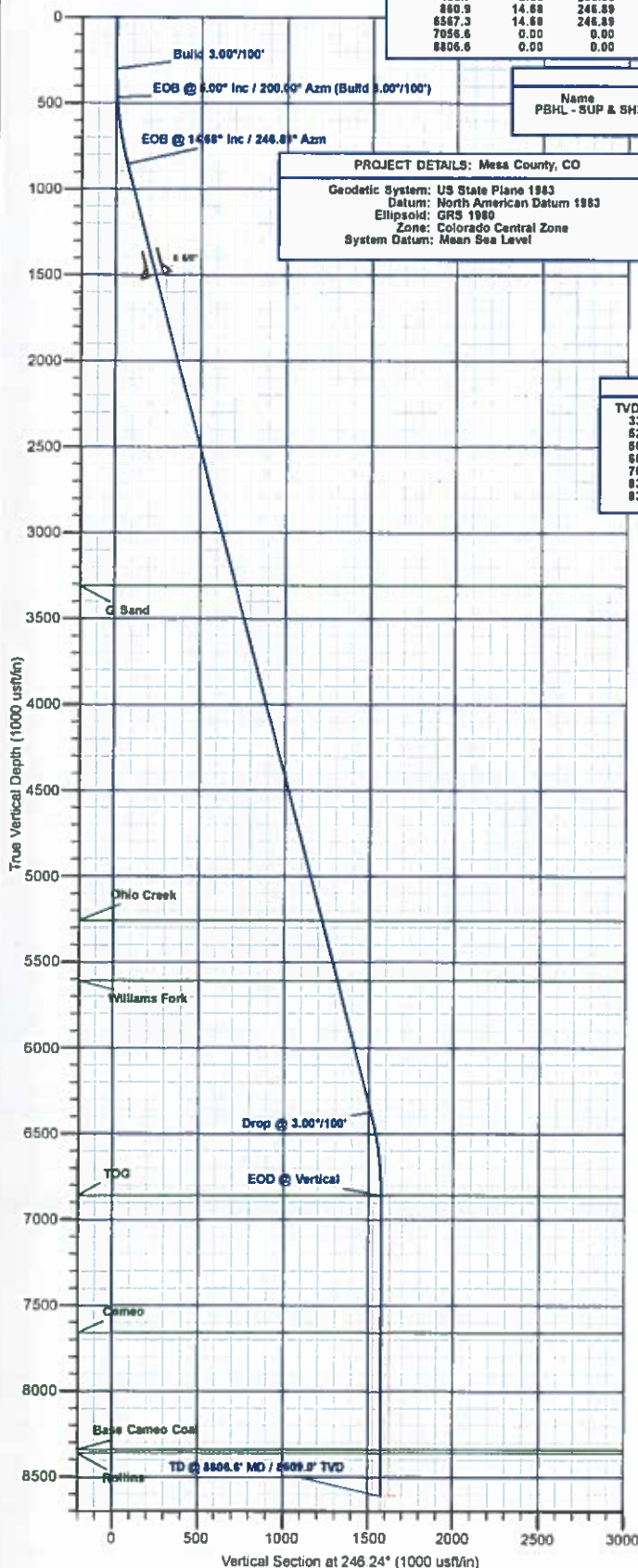
REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Sup & Shep Federal 25-14W, True North
 Vertical (TVD) Reference: well @ 8107.0usft (30' RKB)
 Section (VS) Reference: Slot - (0.5N, 0.0E)
 Measured Depth Reference: well @ 8107.0usft (30' RKB)
 Calculation Method: Minimum Curvature



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3109.0	3107.0	O Sand
5259.0	5413.5	Ohio Creek
5609.0	5775.4	Williams Fork
6859.0	7056.6	TOG
7859.0	7856.6	Cameo
8339.0	8536.6	Base Cameo Coal
8359.0	8556.6	Rollins



Plan: Design #1 (Sup & Shep Federal 25-14W/A-8)

Created By: Will Jircik Date: 11:24, March 04 2018



Laramie Energy, LLC

Mesa County, CO

Sup & Shep 25-11 Pad

Sup & Shep Federal 25-14W

A-8

0993 *Q*

Plan: Design #1

QES Well Planning Report

04 March, 2018





Well Planning Report



0993

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep Federal 25-14W
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 Federal 25-14W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-8		
Design:	Design #1		

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

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

Well	Sup & Shep Federal 25-14W					
Well Position	+N/-S	7.3 usft	Northing:	1,521,757.77 usft	Latitude:	39.244799
	+E/-W	-31.4 usft	Easting:	2,370,375.68 usft	Longitude:	-107.723412
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	8,077.0 usft

Wellbore	A-8
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/2/2018	9.49	65.42	51,350.82612789

Design	Design #1
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Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	246.24

Plan Sections	
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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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
466.7	5.00	200.00	466.5	-6.8	-2.5	3.00	3.00	0.00	200.00	
860.9	14.68	246.89	854.9	-42.7	-54.5	3.00	2.46	11.89	64.51	
6,567.3	14.68	246.89	6,375.0	-610.3	-1,384.5	0.00	0.00	0.00	0.00	
7,056.6	0.00	0.00	6,859.0	-634.8	-1,441.8	3.00	-3.00	0.00	180.00	
8,806.6	0.00	0.00	8,609.0	-634.8	-1,441.8	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 Federal 25-14W
 Wellbore: A-8
 Design: Design #1

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

Well Sup & Shep Federal 25-14W
 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
Build 3.00°/100'									
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	3.00	200.00	400.0	-2.5	-0.9	1.8	3.00	3.00	0.00
EOB @ 5.00° Inc / 200.00° Azm (Build 3.00°/100')									
466.7	5.00	200.00	466.5	-6.8	-2.5	5.0	3.00	3.00	0.00
500.0	5.50	209.45	499.6	-9.6	-3.8	7.3	3.00	1.51	28.36
600.0	7.63	228.32	599.0	-18.2	-11.1	17.5	3.00	2.12	18.87
700.0	10.20	238.41	697.8	-27.2	-23.6	32.6	3.00	2.57	10.09
800.0	12.96	244.36	795.7	-36.7	-41.2	52.5	3.00	2.76	5.95
EOB @ 14.68° Inc / 246.89° Azm									
860.9	14.68	246.89	854.9	-42.7	-54.5	67.1	3.00	2.83	4.15
900.0	14.68	246.89	892.7	-46.6	-63.6	77.0	0.00	0.00	0.00
1,000.0	14.68	246.89	989.4	-56.5	-86.9	102.3	0.00	0.00	0.00
1,100.0	14.68	246.89	1,086.2	-66.5	-110.2	127.7	0.00	0.00	0.00
1,200.0	14.68	246.89	1,182.9	-76.4	-133.5	153.0	0.00	0.00	0.00
1,300.0	14.68	246.89	1,279.7	-86.4	-156.8	178.3	0.00	0.00	0.00
1,400.0	14.68	246.89	1,376.4	-96.3	-180.1	203.7	0.00	0.00	0.00
1,500.0	14.68	246.89	1,473.1	-106.3	-203.4	229.0	0.00	0.00	0.00
8 5/8"									
1,530.0	14.68	246.89	1,502.1	-109.3	-210.4	236.6	0.00	0.00	0.00
1,600.0	14.68	246.89	1,569.9	-116.2	-226.8	254.4	0.00	0.00	0.00
1,700.0	14.68	246.89	1,666.6	-126.2	-250.1	279.7	0.00	0.00	0.00
1,800.0	14.68	246.89	1,763.3	-136.1	-273.4	305.0	0.00	0.00	0.00
1,900.0	14.68	246.89	1,860.1	-146.1	-296.7	330.4	0.00	0.00	0.00
2,000.0	14.68	246.89	1,956.8	-156.0	-320.0	355.7	0.00	0.00	0.00
2,100.0	14.68	246.89	2,053.5	-166.0	-343.3	381.1	0.00	0.00	0.00
2,200.0	14.68	246.89	2,150.3	-175.9	-366.6	406.4	0.00	0.00	0.00
2,300.0	14.68	246.89	2,247.0	-185.9	-389.9	431.7	0.00	0.00	0.00
2,400.0	14.68	246.89	2,343.7	-195.8	-413.2	457.1	0.00	0.00	0.00
2,500.0	14.68	246.89	2,440.5	-205.7	-436.5	482.4	0.00	0.00	0.00
2,600.0	14.68	246.89	2,537.2	-215.7	-459.8	507.8	0.00	0.00	0.00
2,700.0	14.68	246.89	2,634.0	-225.6	-483.1	533.1	0.00	0.00	0.00
2,800.0	14.68	246.89	2,730.7	-235.6	-506.4	558.4	0.00	0.00	0.00
2,900.0	14.68	246.89	2,827.4	-245.5	-529.8	583.8	0.00	0.00	0.00
3,000.0	14.68	246.89	2,924.2	-255.5	-553.1	609.1	0.00	0.00	0.00
3,100.0	14.68	246.89	3,020.9	-265.4	-576.4	634.5	0.00	0.00	0.00
3,200.0	14.68	246.89	3,117.6	-275.4	-599.7	659.8	0.00	0.00	0.00
3,300.0	14.68	246.89	3,214.4	-285.3	-623.0	685.1	0.00	0.00	0.00
G Sand									
3,397.8	14.68	246.89	3,309.0	-295.0	-645.8	709.9	0.00	0.00	0.00
3,400.0	14.68	246.89	3,311.1	-295.3	-646.3	710.5	0.00	0.00	0.00
3,500.0	14.68	246.89	3,407.8	-305.2	-669.6	735.8	0.00	0.00	0.00
3,600.0	14.68	246.89	3,504.6	-315.2	-692.9	761.2	0.00	0.00	0.00
3,700.0	14.68	246.89	3,601.3	-325.1	-716.2	786.5	0.00	0.00	0.00
3,800.0	14.68	246.89	3,698.0	-335.1	-739.5	811.8	0.00	0.00	0.00
3,900.0	14.68	246.89	3,794.8	-345.0	-762.8	837.2	0.00	0.00	0.00
4,000.0	14.68	246.89	3,891.5	-354.9	-786.1	862.5	0.00	0.00	0.00
4,100.0	14.68	246.89	3,988.3	-364.9	-809.4	887.9	0.00	0.00	0.00
4,200.0	14.68	246.89	4,085.0	-374.8	-832.7	913.2	0.00	0.00	0.00
4,300.0	14.68	246.89	4,181.7	-384.8	-856.1	938.5	0.00	0.00	0.00
4,400.0	14.68	246.89	4,278.5	-394.7	-879.4	963.9	0.00	0.00	0.00



Well Planning Report



Database: EOM 5000.1 Single User Db
 Company: Laramie Energy, LLC
 Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep Federal 25-14W
 Wellbore: A-8
 Design: Design #1

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

Well Sup & Shep Federal 25-14W
 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)
4,500.0	14.68	246.89	4,375.2	-404.7	-902.7	989.2	0.00	0.00	0.00
4,600.0	14.68	246.89	4,471.9	-414.6	-926.0	1,014.6	0.00	0.00	0.00
4,700.0	14.68	246.89	4,568.7	-424.6	-949.3	1,039.9	0.00	0.00	0.00
4,800.0	14.68	246.89	4,665.4	-434.5	-972.6	1,065.2	0.00	0.00	0.00
4,900.0	14.68	246.89	4,762.1	-444.5	-995.9	1,090.6	0.00	0.00	0.00
5,000.0	14.68	246.89	4,858.9	-454.4	-1,019.2	1,115.9	0.00	0.00	0.00
5,100.0	14.68	246.89	4,955.6	-464.4	-1,042.5	1,141.2	0.00	0.00	0.00
5,200.0	14.68	246.89	5,052.3	-474.3	-1,065.8	1,166.6	0.00	0.00	0.00
5,300.0	14.68	246.89	5,149.1	-484.3	-1,089.1	1,191.9	0.00	0.00	0.00
5,400.0	14.68	246.89	5,245.8	-494.2	-1,112.4	1,217.3	0.00	0.00	0.00
Ohio Creek									
5,413.6	14.68	246.89	5,259.0	-495.6	-1,115.6	1,220.7	0.00	0.00	0.00
5,500.0	14.68	246.89	5,342.6	-504.1	-1,135.7	1,242.6	0.00	0.00	0.00
5,600.0	14.68	246.89	5,439.3	-514.1	-1,159.1	1,267.9	0.00	0.00	0.00
5,700.0	14.68	246.89	5,536.0	-524.0	-1,182.4	1,293.3	0.00	0.00	0.00
Williams Fork									
5,775.4	14.68	246.89	5,609.0	-531.5	-1,199.9	1,312.4	0.00	0.00	0.00
5,800.0	14.68	246.89	5,632.8	-534.0	-1,205.7	1,318.6	0.00	0.00	0.00
5,900.0	14.68	246.89	5,729.5	-543.9	-1,229.0	1,344.0	0.00	0.00	0.00
6,000.0	14.68	246.89	5,826.2	-553.9	-1,252.3	1,369.3	0.00	0.00	0.00
6,100.0	14.68	246.89	5,923.0	-563.8	-1,275.6	1,394.6	0.00	0.00	0.00
6,200.0	14.68	246.89	6,019.7	-573.8	-1,298.9	1,420.0	0.00	0.00	0.00
6,300.0	14.68	246.89	6,116.4	-583.7	-1,322.2	1,445.3	0.00	0.00	0.00
6,400.0	14.68	246.89	6,213.2	-593.7	-1,345.5	1,470.7	0.00	0.00	0.00
6,500.0	14.68	246.89	6,309.9	-603.6	-1,368.8	1,496.0	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,567.3	14.68	246.89	6,375.0	-610.3	-1,384.5	1,513.1	0.00	0.00	0.00
6,600.0	13.70	246.89	6,406.7	-613.5	-1,391.9	1,521.1	3.00	-3.00	0.00
6,700.0	10.70	246.89	6,504.5	-621.7	-1,411.3	1,542.2	3.00	-3.00	0.00
6,800.0	7.70	246.89	6,603.2	-628.0	-1,426.0	1,558.2	3.00	-3.00	0.00
6,900.0	4.70	246.89	6,702.6	-632.3	-1,435.9	1,569.0	3.00	-3.00	0.00
7,000.0	1.70	246.89	6,802.4	-634.5	-1,441.1	1,574.6	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,056.6	0.00	0.00	6,859.0	-634.8	-1,441.8	1,575.4	3.00	-3.00	0.00
7,100.0	0.00	0.00	6,902.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,200.0	0.00	0.00	7,002.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,102.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,202.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,302.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,402.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,502.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,602.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
Cameo									
7,856.6	0.00	0.00	7,659.0	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,702.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,802.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,902.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,200.0	0.00	0.00	8,002.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,300.0	0.00	0.00	8,102.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,202.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,302.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
Base Cameo Coal									
8,536.6	0.00	0.00	8,339.0	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00



Well Planning Report



Database: EDM 5000.1 Single User Db
 Company: Laramie Energy, LLC
 Project: Mesa County, CO
 Site: Sup & Shep 25-11 Pad
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 Wellbore: A-8
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Local Co-ordinate Reference:
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 Survey Calculation Method:

Well Sup & Shep Federal 25-14W
 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)
Rollins									
8,556.6	0.00	0.00	8,359.0	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,402.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,502.4	-634.8	-1,441.8	1,575.4	0.00	0.00	0.00
TD @ 8806.6' MD / 8609.0' TVD									
8,806.6	0.00	0.00	8,609.0	-634.8	-1,441.8	1,575.4	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 FE	0.00	0.00	8,609.0	-634.8	-1,441.8	1,521,158.46	2,368,918.73	39.243056	-107.728503
- plan hits target center									
- Circle (radius 50.0)									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,502.1	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,397.8	3,309.0	G Sand			
5,413.6	5,259.0	Ohio Creek			
5,775.4	5,609.0	Williams Fork			
7,056.6	6,859.0	TOG			
7,856.6	7,659.0	Cameo			
8,536.6	8,339.0	Base Cameo Coal			
8,556.6	8,359.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.0	300.0	0.0	0.0	Build 3.00°/100'
466.7	466.5	-6.8	-2.5	EOB @ 5.00° Inc / 200.00° Azm (Build 3.00°/100')
860.9	854.9	-42.7	-54.5	EOB @ 14.68° Inc / 246.89° Azm
6,567.3	6,375.0	-610.3	-1,384.5	Drop @ 3.00°/100'
7,056.6	6,859.0	-634.8	-1,441.8	EOD @ Vertical
8,806.6	8,609.0	-634.8	-1,441.8	TD @ 8806.6' MD / 8609.0' TVD