



Project: Mesa County CO
 Site: Sup & Shep 25-11 Pad
 Well: Sup & Shep 0993-25-19W
 Wellbore: A-2
 Design: Design #1
 Latitude: 39.244873
 Longitude: -107.723223
 Ground Level: 8077.0
 well @ 8107.0ush (30' RKB)



SECTION DETAILS										
MD	Inc	Azi	TVD	+N-S	+E-W	Dieg	TFace	Vsect	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 @ 19.30° Inc / 188.63° Azm	
943.5	19.30	188.63	931.3	-106.2	-16.1	3.00	188.63	107.4	Drop @ 3.00"/100'	
6526.6	19.30	188.63	6200.7	-1930.9	-293.2	0.00	0.00	1953.0	EOD @ Vertical	
7170.1	0.00	0.00	6832.0	-2037.0	-309.3	3.00	180.00	2060.4	TD @ 8920.1' MD / 8582.0' TVD	
8920.1	0.00	0.00	6582.0	-2037.0	-309.3	0.00	0.00	2060.4		

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Sup & Shep 0993-25-19W	6582.0	-2037.0	-309.3	1519754.52	2370070.80	39.239280	-107.724315

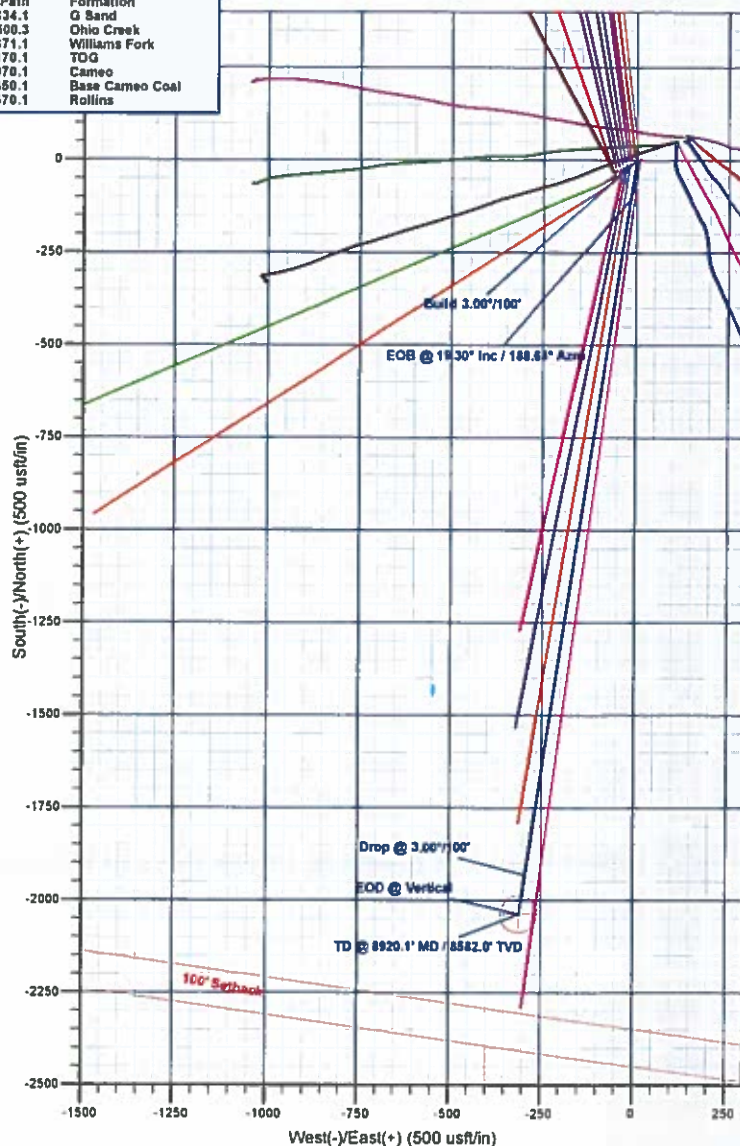
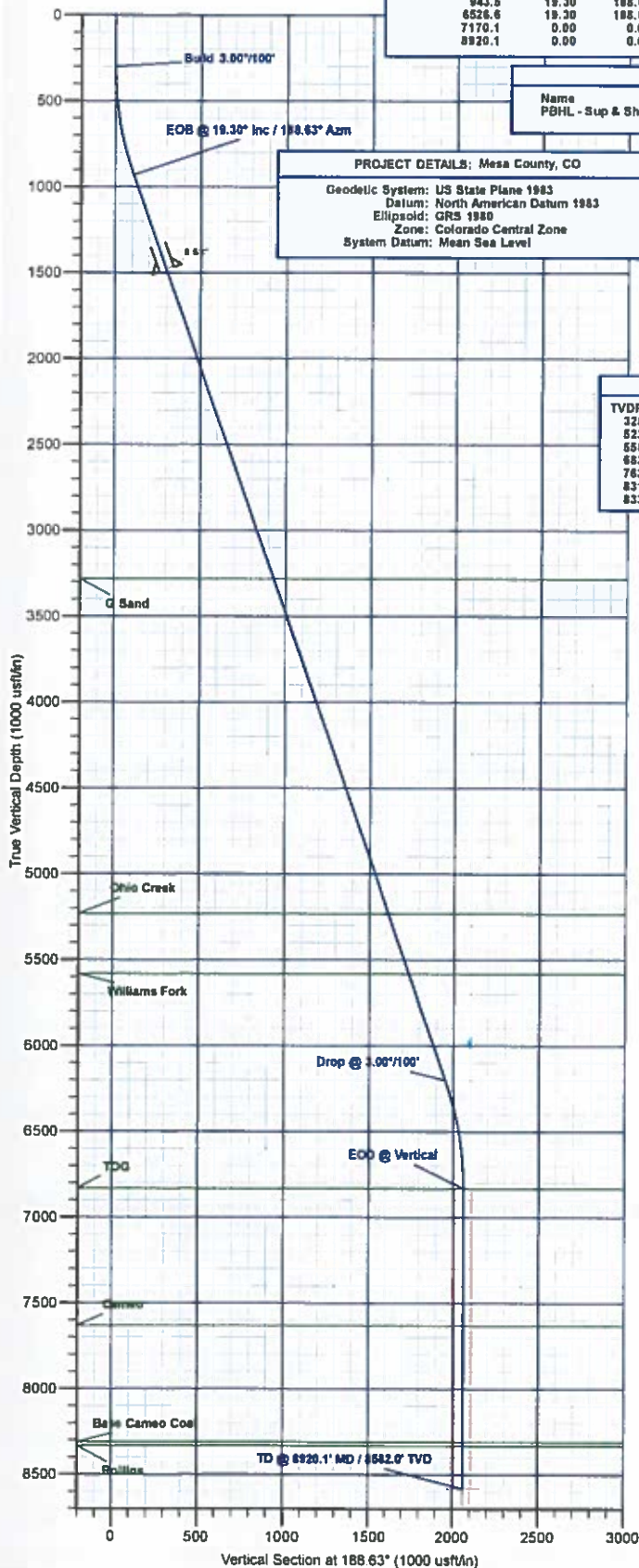
WELL DETAILS: Sup & Shep 0993-25-19W					
+N-S	+E-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1521783.39	2370429.84	39.244873	-107.723223

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

Admuths to True North
 Magnetic North: 9.49°
 Magnetic Field
 Strength: 51360.9nT
 Dip Angle: 66.42°
 Date: 1/2/2018
 Model: IGRF2015

REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Well Sup & Shep 0993-25-19W, True North
 Vertical (TVD) Reference: well @ 8107.0ush (30' RKB)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 8107.0ush (30' RKB)
 Calculation Method: Minimum Curvature

FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3282.0	3434.1	G Sand
5232.0	5500.3	Ohio Creek
5582.0	5871.1	Williams Fork
6832.0	7170.1	TOG
7632.0	7870.1	Cameo
8312.0	8650.1	Base Cameo Coal
8332.0	8670.1	Rollins





Laramie Energy, LLC

Mesa County, CO

Sup & Shep 25-11 Pad

Sup & Shep 0993-25-19W

A-2

Plan: Design #1

QES Well Planning Report

02 April, 2018





Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-19W
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 0993-25-19W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-2		
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 0993-25-19W			
Well Position	+N/-S	34.2 usft	Northing:	1,521,783.39 usft
	+E/-W	22.1 usft	Easting:	2,370,429.85 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	Ground Level: 8,077.0 usft

Wellbore	A-2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	1/2/2018	9.49	65.42	51,350.88982638

Design	Design #1			
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	188.63

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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.00	0.00	
943.5	19.30	188.63	931.3	-106.2	-16.1	3.00	3.00	0.00	188.63	
6,526.6	19.30	188.63	6,200.7	-1,930.9	-293.2	0.00	0.00	0.00	0.00	
7,170.1	0.00	0.00	6,832.0	-2,037.0	-309.3	3.00	-3.00	0.00	180.00	
8,920.1	0.00	0.00	8,582.0	-2,037.0	-309.3	0.00	0.00	0.00	0.00	PBHL - Sup & Shep 0



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-19W
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 0993-25-19W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-2		
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
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	188.63	400.0	-2.6	-0.4	2.6	3.00	3.00	0.00
500.0	6.00	188.63	498.6	-10.3	-1.6	10.5	3.00	3.00	0.00
600.0	9.00	188.63	598.8	-23.2	-3.5	23.5	3.00	3.00	0.00
700.0	12.00	188.63	697.1	-41.3	-8.3	41.7	3.00	3.00	0.00
800.0	15.00	188.63	794.3	-64.3	-9.8	65.1	3.00	3.00	0.00
900.0	18.00	188.63	890.2	-92.4	-14.0	93.5	3.00	3.00	0.00
EOB @ 19.30° Inc / 188.63° Azm									
943.5	19.30	188.63	931.3	-108.2	-16.1	107.4	3.00	3.00	0.00
1,000.0	19.30	188.63	984.7	-124.6	-18.9	126.1	0.00	0.00	0.00
1,100.0	19.30	188.63	1,079.1	-157.3	-23.9	159.1	0.00	0.00	0.00
1,200.0	19.30	188.63	1,173.5	-190.0	-28.8	192.2	0.00	0.00	0.00
1,300.0	19.30	188.63	1,267.9	-222.7	-33.8	225.2	0.00	0.00	0.00
1,400.0	19.30	188.63	1,362.2	-255.4	-38.8	258.3	0.00	0.00	0.00
1,500.0	19.30	188.63	1,456.6	-288.0	-43.7	291.4	0.00	0.00	0.00
8 5/8"									
1,530.0	19.30	188.63	1,484.9	-297.9	-45.2	301.3	0.00	0.00	0.00
1,600.0	19.30	188.63	1,551.0	-320.7	-48.7	324.4	0.00	0.00	0.00
1,700.0	19.30	188.63	1,645.4	-353.4	-53.7	357.5	0.00	0.00	0.00
1,800.0	19.30	188.63	1,739.7	-386.1	-58.6	390.5	0.00	0.00	0.00
1,900.0	19.30	188.63	1,834.1	-418.8	-63.6	423.6	0.00	0.00	0.00
2,000.0	19.30	188.63	1,928.5	-451.5	-68.5	456.6	0.00	0.00	0.00
2,100.0	19.30	188.63	2,022.9	-484.1	-73.5	489.7	0.00	0.00	0.00
2,200.0	19.30	188.63	2,117.3	-516.8	-78.5	522.8	0.00	0.00	0.00
2,300.0	19.30	188.63	2,211.6	-549.5	-83.4	555.8	0.00	0.00	0.00
2,400.0	19.30	188.63	2,306.0	-582.2	-88.4	588.9	0.00	0.00	0.00
2,500.0	19.30	188.63	2,400.4	-614.9	-93.4	621.9	0.00	0.00	0.00
2,600.0	19.30	188.63	2,494.8	-647.6	-98.3	655.0	0.00	0.00	0.00
2,700.0	19.30	188.63	2,589.1	-680.2	-103.3	688.0	0.00	0.00	0.00
2,800.0	19.30	188.63	2,683.5	-712.9	-108.2	721.1	0.00	0.00	0.00
2,900.0	19.30	188.63	2,777.9	-745.6	-113.2	754.2	0.00	0.00	0.00
3,000.0	19.30	188.63	2,872.3	-778.3	-118.2	787.2	0.00	0.00	0.00
3,100.0	19.30	188.63	2,966.7	-811.0	-123.1	820.3	0.00	0.00	0.00
3,200.0	19.30	188.63	3,061.0	-843.7	-128.1	853.3	0.00	0.00	0.00
3,300.0	19.30	188.63	3,155.4	-876.3	-133.1	886.4	0.00	0.00	0.00
3,400.0	19.30	188.63	3,249.8	-909.0	-138.0	919.4	0.00	0.00	0.00
G Sand									
3,434.1	19.30	188.63	3,282.0	-920.2	-139.7	930.7	0.00	0.00	0.00
3,500.0	19.30	188.63	3,344.2	-941.7	-143.0	952.5	0.00	0.00	0.00
3,600.0	19.30	188.63	3,438.5	-974.4	-147.9	985.6	0.00	0.00	0.00
3,700.0	19.30	188.63	3,532.9	-1,007.1	-152.9	1,018.6	0.00	0.00	0.00
3,800.0	19.30	188.63	3,627.3	-1,039.8	-157.9	1,051.7	0.00	0.00	0.00
3,900.0	19.30	188.63	3,721.7	-1,072.4	-162.8	1,084.7	0.00	0.00	0.00
4,000.0	19.30	188.63	3,816.1	-1,105.1	-167.8	1,117.8	0.00	0.00	0.00
4,100.0	19.30	188.63	3,910.4	-1,137.8	-172.8	1,150.8	0.00	0.00	0.00
4,200.0	19.30	188.63	4,004.8	-1,170.5	-177.7	1,183.9	0.00	0.00	0.00
4,300.0	19.30	188.63	4,099.2	-1,203.2	-182.7	1,217.0	0.00	0.00	0.00
4,400.0	19.30	188.63	4,193.6	-1,235.8	-187.6	1,250.0	0.00	0.00	0.00
4,500.0	19.30	188.63	4,287.9	-1,268.5	-192.6	1,283.1	0.00	0.00	0.00
4,600.0	19.30	188.63	4,382.3	-1,301.2	-197.6	1,316.1	0.00	0.00	0.00



Well Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-19W
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 0993-25-19W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-2		
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	19.30	188.63	4,476.7	-1,333.9	-202.5	1,349.2	0.00	0.00	0.00
4,800.0	19.30	188.63	4,571.1	-1,366.6	-207.5	1,382.2	0.00	0.00	0.00
4,900.0	19.30	188.63	4,665.5	-1,399.3	-212.5	1,415.3	0.00	0.00	0.00
5,000.0	19.30	188.63	4,759.8	-1,431.9	-217.4	1,448.4	0.00	0.00	0.00
5,100.0	19.30	188.63	4,854.2	-1,464.6	-222.4	1,481.4	0.00	0.00	0.00
5,200.0	19.30	188.63	4,948.6	-1,497.3	-227.3	1,514.5	0.00	0.00	0.00
5,300.0	19.30	188.63	5,043.0	-1,530.0	-232.3	1,547.5	0.00	0.00	0.00
5,400.0	19.30	188.63	5,137.4	-1,562.7	-237.3	1,580.6	0.00	0.00	0.00
5,500.0	19.30	188.63	5,231.7	-1,595.4	-242.2	1,613.6	0.00	0.00	0.00
Ohio Creek									
5,500.3	19.30	188.63	5,232.0	-1,595.5	-242.2	1,613.7	0.00	0.00	0.00
5,600.0	19.30	188.63	5,326.1	-1,628.0	-247.2	1,646.7	0.00	0.00	0.00
5,700.0	19.30	188.63	5,420.5	-1,660.7	-252.1	1,679.8	0.00	0.00	0.00
5,800.0	19.30	188.63	5,514.9	-1,693.4	-257.1	1,712.8	0.00	0.00	0.00
Williams Fork									
5,871.1	19.30	188.63	5,582.0	-1,716.7	-260.6	1,736.3	0.00	0.00	0.00
5,900.0	19.30	188.63	5,609.2	-1,726.1	-262.1	1,745.9	0.00	0.00	0.00
6,000.0	19.30	188.63	5,703.6	-1,758.8	-267.0	1,778.9	0.00	0.00	0.00
6,100.0	19.30	188.63	5,798.0	-1,791.5	-272.0	1,812.0	0.00	0.00	0.00
6,200.0	19.30	188.63	5,892.4	-1,824.1	-277.0	1,845.0	0.00	0.00	0.00
6,300.0	19.30	188.63	5,986.8	-1,856.8	-281.9	1,878.1	0.00	0.00	0.00
6,400.0	19.30	188.63	6,081.1	-1,889.5	-286.9	1,911.2	0.00	0.00	0.00
6,500.0	19.30	188.63	6,175.5	-1,922.2	-291.8	1,944.2	0.00	0.00	0.00
Drop @ 3.00°/100'									
6,526.6	19.30	188.63	6,200.7	-1,930.9	-293.2	1,953.0	0.00	0.00	0.00
6,600.0	17.10	188.63	6,270.3	-1,953.5	-296.6	1,975.9	3.00	-3.00	0.00
6,700.0	14.10	188.63	6,366.6	-1,980.1	-300.6	2,002.8	3.00	-3.00	0.00
6,800.0	11.10	188.63	6,464.2	-2,001.7	-303.9	2,024.6	3.00	-3.00	0.00
6,900.0	8.10	188.63	6,562.8	-2,018.2	-306.4	2,041.3	3.00	-3.00	0.00
7,000.0	5.10	188.63	6,662.1	-2,029.6	-308.2	2,052.8	3.00	-3.00	0.00
7,100.0	2.10	188.63	6,761.9	-2,035.8	-309.1	2,059.1	3.00	-3.00	0.00
EOD @ Vertical - TOG									
7,170.1	0.00	0.00	6,832.0	-2,037.0	-309.3	2,060.4	3.00	-3.00	0.00
7,200.0	0.00	0.00	6,861.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,300.0	0.00	0.00	6,961.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,061.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,161.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,261.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,361.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,800.0	0.00	0.00	7,461.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
7,900.0	0.00	0.00	7,561.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
Cameo									
7,970.1	0.00	0.00	7,632.0	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,000.0	0.00	0.00	7,661.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,100.0	0.00	0.00	7,761.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,200.0	0.00	0.00	7,861.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,300.0	0.00	0.00	7,961.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,400.0	0.00	0.00	8,061.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,500.0	0.00	0.00	8,161.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,600.0	0.00	0.00	8,261.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
Base Cameo Coal									
8,650.1	0.00	0.00	8,312.0	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
Rollins									



Well Planning Report



Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Well Sup & Shep 0993-25-19W
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 0993-25-19W	Survey Calculation Method:	Minimum Curvature
Wellbore:	A-2		
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)
8,670.1	0.00	0.00	8,332.0	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,700.0	0.00	0.00	8,361.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,800.0	0.00	0.00	8,461.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
8,900.0	0.00	0.00	8,561.9	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00
TO @ 8920.1' MD / 8582.0' TVD									
8,920.1	0.00	0.00	8,582.0	-2,037.0	-309.3	2,060.4	0.00	0.00	0.00

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL - Sup & Shep 099 - plan hits target center - Circle (radius 50.0)	0.00	0.00	8,582.0	-2,037.0	-309.3	1,519,754.53	2,370,070.81	39.239280	-107.724315

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,484.9	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,434.1	3,282.0	G Sand			
5,500.3	5,232.0	Ohio Creek			
5,871.1	5,582.0	Williams Fork			
7,170.1	6,832.0	TOG			
7,970.1	7,632.0	Cameo			
8,650.1	8,312.0	Base Cameo Coal			
8,670.1	8,332.0	Rollins			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
300.0	300.0	0.0	0.0	Build 3.00°/100'
943.5	931.3	-106.2	-16.1	EOB @ 19.30° Inc / 188.63° Azm
6,526.6	6,200.7	-1,930.9	-293.2	Drop @ 3.00°/100'
7,170.1	6,832.0	-2,037.0	-309.3	EOD @ Vertical
8,920.1	8,582.0	-2,037.0	-309.3	TD @ 8920.1' MD / 8582.0' TVD