



Project: Mesa County, CO
 Site: Bruton 30-10 Pad
 Well: Bruton Federal 30-18W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.248083
 Longitude: -107.808867
 Ground Level: 7643.0
 well @ 7665.0usft (H&P #290)



DIRECTIONAL DRILLING

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

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Bruton Federal 30-18W, True North
 Vertical (TVD) Reference: well @ 7665.0usft (H&P #290)
 Section (VS) Reference: Slot - (0.0ft, 0.0ft)
 Measured Depth Reference: well @ 7665.0usft (H&P #290)
 Calculation Method: Minimum Curvature

WELL DETAILS: Bruton Federal 30-18W

Ground Level: 7643.0
 +N-S +E-W Northing Easting Latitude Longitude
 0.0 0.0 1523557.10 2346212.00 39.248083 -107.808867

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Bruton Federal 30-18W	7665.0	-1731.7	-2117.3	1521879.71	2344051.47	39.243328	-107.816343

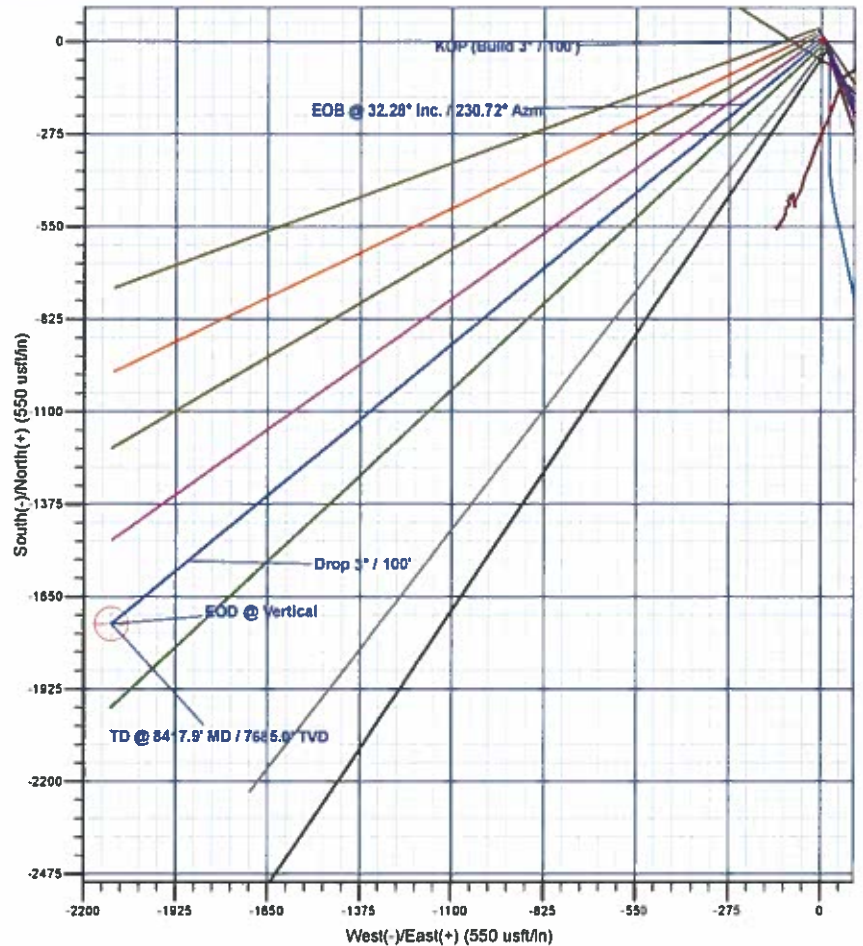
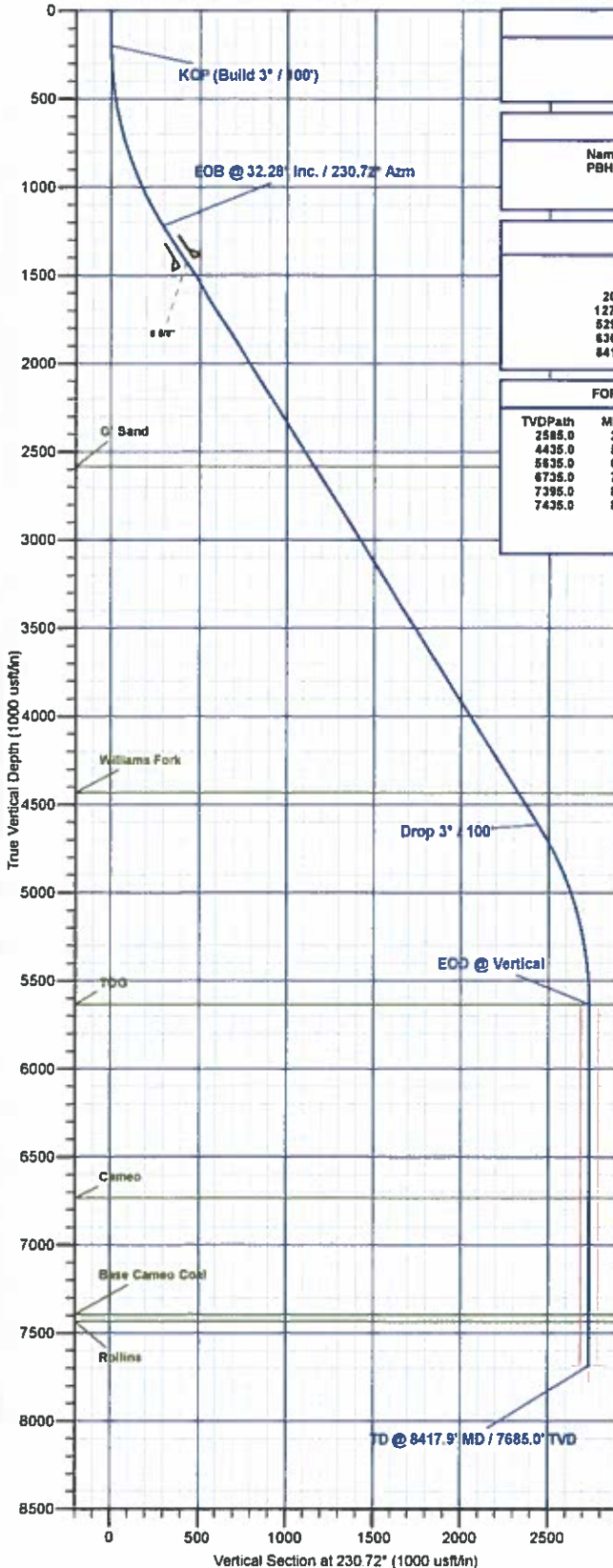
SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSect	Annotation
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3' / 100')
1276.1	32.28	230.72	1220.1	-188.9	-228.5	3.00	230.72	295.3	EOB @ 32.28° Inc. / 230.72° Azm
5291.7	32.28	230.72	4814.9	-1544.8	-1888.9	0.00	0.00	2440.1	Drop 3' / 100'
6367.9	0.00	0.00	6365.0	-1731.7	-2117.3	3.00	180.00	2735.3	EOD @ Vertical
8417.9	0.00	0.00	7665.0	-1731.7	-2117.3	0.00	0.00	2735.3	TD @ 8417.9' MD / 7665.0' TVD

FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION
2585.0	2890.5	C Sand
4435.0	5078.9	Williams Fork
5835.0	6367.9	TOG
6735.0	7467.9	Cameo
7395.0	8127.9	Base Cameo Coal
7435.0	8167.9	Rollins

Azimuths to True North
 Magnetic North: 3.58°
 Magnetic Field
 Strength: 51397.6nT
 Dip Angle: 65.42°
 Date: 7/14/2017
 Model: IGRF2015



Plan: Design #1 (Bruton Federal 30-18W/Wellbore #1)

Created By: Will Jircik Date: 7:13, July 17 2017



Laramie Energy, LLC

Mesa County, CO

Bruton 30-10 Pad

Bruton Federal 30-18W

Wellbore #1

Plan: Design #1

QES Well Planning Report

17 July, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Bruton Federal 30-18W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7665.0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7665.0usft (H&P #290)
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton Federal 30-18W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
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	Bruton 30-10 Pad				
Site Position:		Northing:	1,523,424.58 usft	Latitude:	39.247725
From:	Map	Easting:	2,346,291.81 usft	Longitude:	-107.808574
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.46 °

Well	Bruton Federal 30-18W					
Well Position	+N-S	130.4 usft	Northing:	1,523,557.10 usft	Latitude:	39.248083
	+E-W	-83.1 usft	Easting:	2,346,212.10 usft	Longitude:	-107.808867
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,643.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/14/2017	9.58	65.42	51,398

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	230.72

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,276.1	32.28	230.72	1,220.1	-186.9	-228.5	3.00	3.00	0.00	230.72	
5,291.7	32.28	230.72	4,614.9	-1,544.8	-1,888.8	0.00	0.00	0.00	0.00	
6,367.9	0.00	0.00	5,635.0	-1,731.7	-2,117.3	3.00	-3.00	0.00	180.00	
8,417.9	0.00	0.00	7,685.0	-1,731.7	-2,117.3	0.00	0.00	0.00	0.00	PBHL - Bruton Federz



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Bruton Federal 30-18W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7665.0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7665.0usft (H&P #290)
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton Federal 30-18W	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	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00	
KOP (Build 3° / 100')										
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00	
300.0	3.00	230.72	300.0	-1.7	-2.0	2.6	3.00	3.00	0.00	
400.0	6.00	230.72	399.6	-6.6	-8.1	10.5	3.00	3.00	0.00	
500.0	9.00	230.72	498.8	-14.9	-18.2	23.5	3.00	3.00	0.00	
600.0	12.00	230.72	597.1	-26.4	-32.3	41.7	3.00	3.00	0.00	
700.0	15.00	230.72	694.3	-41.2	-50.4	65.1	3.00	3.00	0.00	
800.0	18.00	230.72	790.2	-59.2	-72.4	93.5	3.00	3.00	0.00	
900.0	21.00	230.72	884.4	-80.3	-98.2	126.9	3.00	3.00	0.00	
1,000.0	24.00	230.72	976.8	-104.5	-127.8	165.1	3.00	3.00	0.00	
1,100.0	27.00	230.72	1,067.1	-131.8	-161.1	208.2	3.00	3.00	0.00	
1,200.0	30.00	230.72	1,154.9	-162.0	-198.1	255.9	3.00	3.00	0.00	
EOB @ 32.28° Inc. / 230.72° Azm										
1,276.1	32.28	230.72	1,220.1	-186.9	-228.5	295.3	3.00	3.00	0.00	
1,300.0	32.28	230.72	1,240.3	-195.0	-238.4	308.0	0.00	0.00	0.00	
1,400.0	32.28	230.72	1,324.8	-228.8	-279.7	361.4	0.00	0.00	0.00	
1,500.0	32.28	230.72	1,409.3	-262.6	-321.1	414.8	0.00	0.00	0.00	
8 5/8"										
1,522.0	32.28	230.72	1,427.9	-270.1	-330.2	426.6	0.00	0.00	0.00	
1,600.0	32.28	230.72	1,493.9	-296.4	-362.4	468.2	0.00	0.00	0.00	
1,700.0	32.28	230.72	1,578.4	-330.3	-403.8	521.6	0.00	0.00	0.00	
1,800.0	32.28	230.72	1,663.0	-364.1	-445.1	575.1	0.00	0.00	0.00	
1,900.0	32.28	230.72	1,747.5	-397.9	-486.5	628.5	0.00	0.00	0.00	
2,000.0	32.28	230.72	1,832.0	-431.7	-527.8	681.9	0.00	0.00	0.00	
2,100.0	32.28	230.72	1,916.6	-465.5	-569.2	735.3	0.00	0.00	0.00	
2,200.0	32.28	230.72	2,001.1	-499.3	-610.5	788.7	0.00	0.00	0.00	
2,300.0	32.28	230.72	2,085.7	-533.1	-651.8	842.1	0.00	0.00	0.00	
2,400.0	32.28	230.72	2,170.2	-567.0	-693.2	895.5	0.00	0.00	0.00	
2,500.0	32.28	230.72	2,254.8	-600.8	-734.5	948.9	0.00	0.00	0.00	
2,600.0	32.28	230.72	2,339.3	-634.6	-775.9	1,002.3	0.00	0.00	0.00	
2,700.0	32.28	230.72	2,423.8	-668.4	-817.2	1,055.8	0.00	0.00	0.00	
2,800.0	32.28	230.72	2,508.4	-702.2	-858.6	1,109.2	0.00	0.00	0.00	
G' Sand										
2,890.6	32.28	230.72	2,585.0	-732.9	-896.0	1,157.6	0.00	0.00	0.00	
2,900.0	32.28	230.72	2,592.9	-736.0	-899.9	1,162.6	0.00	0.00	0.00	
3,000.0	32.28	230.72	2,677.5	-769.9	-941.3	1,216.0	0.00	0.00	0.00	
3,100.0	32.28	230.72	2,762.0	-803.7	-982.6	1,269.4	0.00	0.00	0.00	
3,200.0	32.28	230.72	2,846.5	-837.5	-1,023.9	1,322.8	0.00	0.00	0.00	
3,300.0	32.28	230.72	2,931.1	-871.3	-1,065.3	1,376.2	0.00	0.00	0.00	
3,400.0	32.28	230.72	3,015.6	-905.1	-1,106.6	1,429.6	0.00	0.00	0.00	
3,500.0	32.28	230.72	3,100.2	-938.9	-1,148.0	1,483.1	0.00	0.00	0.00	
3,600.0	32.28	230.72	3,184.7	-972.8	-1,189.3	1,536.5	0.00	0.00	0.00	
3,700.0	32.28	230.72	3,269.2	-1,006.6	-1,230.7	1,589.9	0.00	0.00	0.00	
3,800.0	32.28	230.72	3,353.8	-1,040.4	-1,272.0	1,643.3	0.00	0.00	0.00	
3,900.0	32.28	230.72	3,438.3	-1,074.2	-1,313.4	1,696.7	0.00	0.00	0.00	
4,000.0	32.28	230.72	3,522.9	-1,108.0	-1,354.7	1,750.1	0.00	0.00	0.00	
4,100.0	32.28	230.72	3,607.4	-1,141.8	-1,396.0	1,803.5	0.00	0.00	0.00	
4,200.0	32.28	230.72	3,691.9	-1,175.6	-1,437.4	1,856.9	0.00	0.00	0.00	
4,300.0	32.28	230.72	3,776.5	-1,209.5	-1,478.7	1,910.4	0.00	0.00	0.00	
4,400.0	32.28	230.72	3,861.0	-1,243.3	-1,520.1	1,963.8	0.00	0.00	0.00	
4,500.0	32.28	230.72	3,945.6	-1,277.1	-1,561.4	2,017.2	0.00	0.00	0.00	
4,600.0	32.28	230.72	4,030.1	-1,310.9	-1,602.8	2,070.6	0.00	0.00	0.00	



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 7665 0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7665 0usft (H&P #290)
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton Federal 30-18W	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)	
4,700.0	32.28	230.72	4,114.6	-1,344.7	-1,644.1	2,124.0	0.00	0.00	0.00	
4,800.0	32.28	230.72	4,199.2	-1,378.5	-1,685.5	2,177.4	0.00	0.00	0.00	
4,900.0	32.28	230.72	4,283.7	-1,412.4	-1,726.8	2,230.8	0.00	0.00	0.00	
5,000.0	32.28	230.72	4,368.3	-1,446.2	-1,768.1	2,284.2	0.00	0.00	0.00	
Williams Fork										
5,078.9	32.28	230.72	4,435.0	-1,472.9	-1,800.8	2,326.4	0.00	0.00	0.00	
5,100.0	32.28	230.72	4,452.8	-1,480.0	-1,809.5	2,337.7	0.00	0.00	0.00	
5,200.0	32.28	230.72	4,537.4	-1,513.8	-1,850.8	2,391.1	0.00	0.00	0.00	
Drop 3° / 100'										
5,291.7	32.28	230.72	4,614.9	-1,544.8	-1,888.8	2,440.1	0.00	0.00	0.00	
5,300.0	32.04	230.72	4,621.9	-1,547.6	-1,892.2	2,444.5	3.00	-3.00	0.00	
5,400.0	29.04	230.72	4,708.0	-1,579.8	-1,931.5	2,495.3	3.00	-3.00	0.00	
5,500.0	26.04	230.72	4,796.7	-1,609.0	-1,967.3	2,541.5	3.00	-3.00	0.00	
5,600.0	23.04	230.72	4,887.6	-1,635.3	-1,999.4	2,583.0	3.00	-3.00	0.00	
5,700.0	20.04	230.72	4,980.7	-1,658.6	-2,027.8	2,619.7	3.00	-3.00	0.00	
5,800.0	17.04	230.72	5,075.5	-1,678.7	-2,052.4	2,651.5	3.00	-3.00	0.00	
5,900.0	14.04	230.72	5,171.8	-1,695.6	-2,073.2	2,678.3	3.00	-3.00	0.00	
6,000.0	11.04	230.72	5,269.4	-1,709.4	-2,090.0	2,700.0	3.00	-3.00	0.00	
6,100.0	8.04	230.72	5,368.0	-1,719.9	-2,102.8	2,716.6	3.00	-3.00	0.00	
6,200.0	5.04	230.72	5,467.3	-1,727.1	-2,111.6	2,727.9	3.00	-3.00	0.00	
6,300.0	2.04	230.72	5,567.1	-1,731.0	-2,116.4	2,734.1	3.00	-3.00	0.00	
EOD @ Vertical - TOG										
6,367.9	0.00	0.00	5,635.0	-1,731.7	-2,117.3	2,735.3	3.00	-3.00	0.00	
6,400.0	0.00	0.00	5,667.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
6,500.0	0.00	0.00	5,767.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
6,600.0	0.00	0.00	5,867.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
6,700.0	0.00	0.00	5,967.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,067.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,167.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,000.0	0.00	0.00	6,267.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,100.0	0.00	0.00	6,367.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,200.0	0.00	0.00	6,467.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,300.0	0.00	0.00	6,567.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,400.0	0.00	0.00	6,667.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
Cameo										
7,467.9	0.00	0.00	6,735.0	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,500.0	0.00	0.00	6,767.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,600.0	0.00	0.00	6,867.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,700.0	0.00	0.00	6,967.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,800.0	0.00	0.00	7,067.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
7,900.0	0.00	0.00	7,167.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
8,000.0	0.00	0.00	7,267.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
8,100.0	0.00	0.00	7,367.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
Base Cameo Coal										
8,127.9	0.00	0.00	7,395.0	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
Rollins										
8,167.9	0.00	0.00	7,435.0	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
8,200.0	0.00	0.00	7,467.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
8,300.0	0.00	0.00	7,567.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
8,400.0	0.00	0.00	7,667.1	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	
TD @ 8417.9' MD / 7665.0' TVD										
8,417.9	0.00	0.00	7,685.0	-1,731.7	-2,117.3	2,735.3	0.00	0.00	0.00	



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Bruton Federal 30-18W
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7665 0usft (H&P #290)
Project:	Mesa County, CO	MD Reference:	well @ 7665 0usft (H&P #290)
Site:	Bruton 30-10 Pad	North Reference:	True
Well:	Bruton Federal 30-18W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
PBHL - Bruton Federal 3 - plan hits target center - Point	0.00	0.00	7,665.0	-1,731.7	-2,117.3	1,521,879.72	2,344,051.47	39 243328	-107.816343

Casing Points				
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(usft)	(usft)		(")	(")
1,522.0	1,427.9	8 5/8"	8-5/8	11

Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
2,890.6	2,585.0	G' Sand			
5,078.9	4,435.0	Williams Fork			
6,367.9	5,635.0	TOG			
7,467.9	6,735.0	Cameo			
8,127.9	7,395.0	Base Cameo Coal			
8,167.9	7,435.0	Rollins			

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates		Comment	
(usft)	(usft)	+N/-S	+E/-W		
		(usft)	(usft)		
200.0	200.0	0.0	0.0	KOP (Build 3" / 100')	
1,276.1	1,220.1	-186.9	-228.5	EOB @ 32.28° Inc. / 230.72° Azm	
5,291.7	4,614.9	-1,544.8	-1,888.8	Drop 3" / 100'	
6,367.9	5,635.0	-1,731.7	-2,117.3	EOD @ Vertical	
8,417.9	7,685.0	-1,731.7	-2,117.3	TD @ 8417.9' MD / 7685.0' TVD	