



Project: Mesa County, CO
 Site: Nichols 24-06A
 Well: Nichols 0994-13-21E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.264697
 Longitude: -107.830539
 Ground Level: 7137.0
 well @ 7167.0usft (H&P #522)



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 Nichols 0994-13-21E, True North
 Vertical (TVD) Reference: well @ 7167.0usft (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7167.0usft (H&P #522)
 Calculation Method: Minimum Curvature

WELL DETAILS:

Nichols 0994-13-21E

+N/-S	+E/-W	North	Ground Level:	7137.0	Latitude	Longitude
0.0	0.0	1529762.91	Easting	2340231.92	39.264697	-107.830539

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

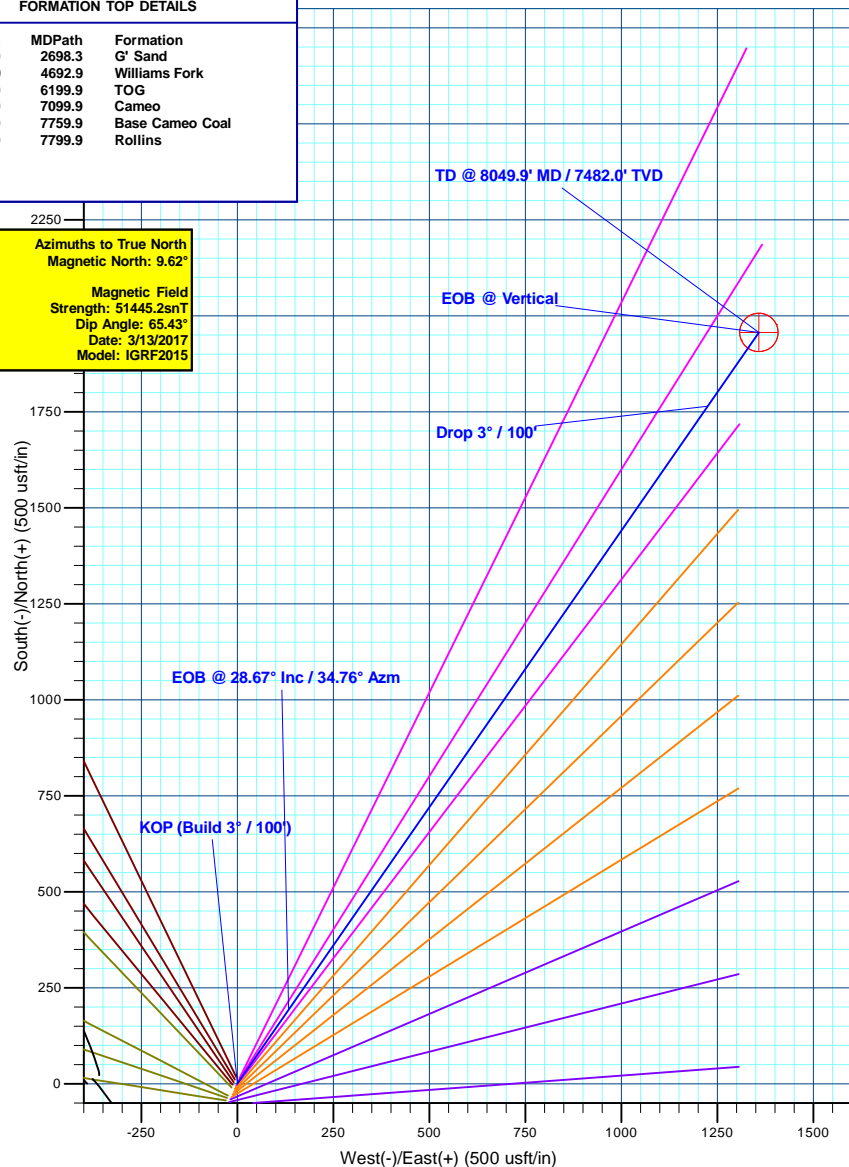
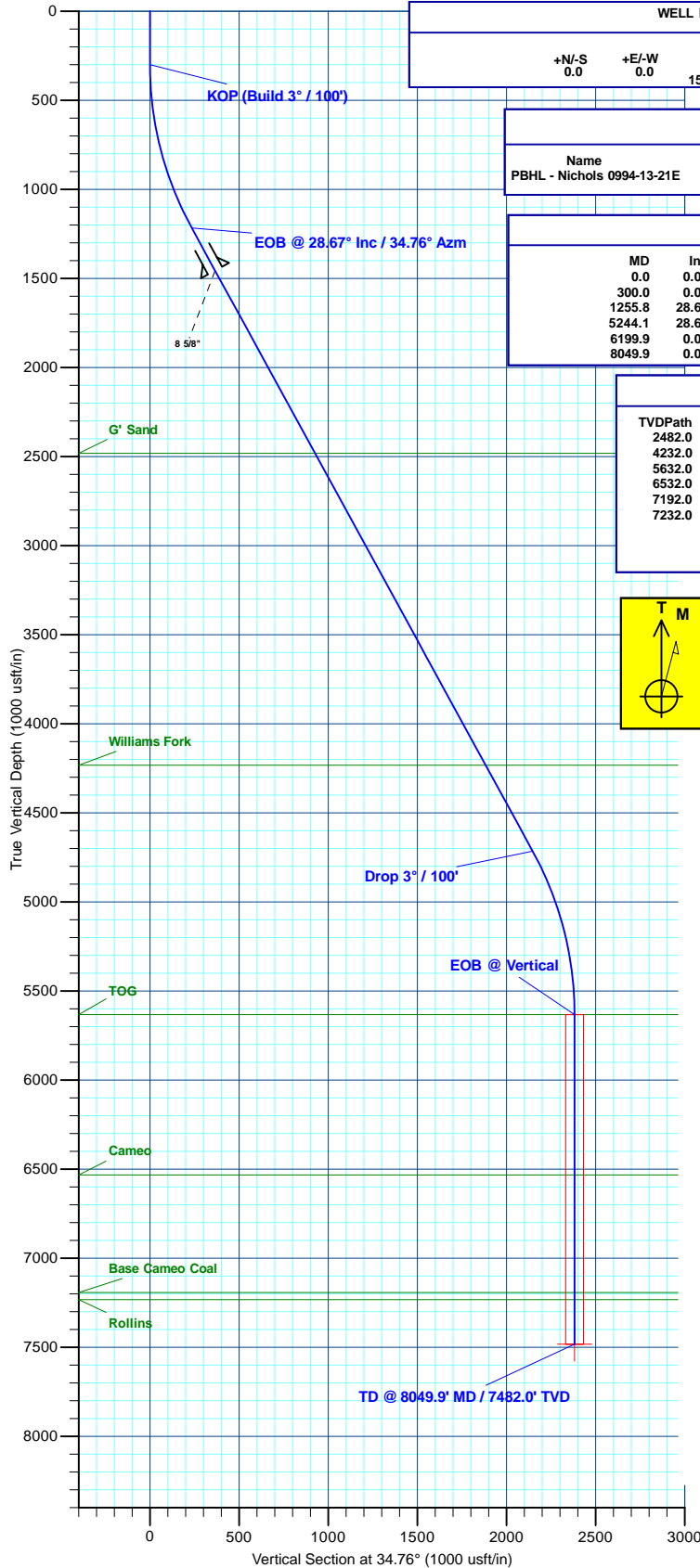
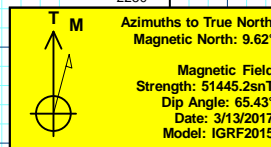
Name	TVD	+N/-S	+E/-W	North	Easting	Latitude	Longitude
PBHL - Nichols 0994-13-21E	7482.0	1957.0	1358.3	1531684.42	2341640.02	39.270070	-107.825741

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	
300.0	0.00	0.00	300.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1255.8	28.67	34.76	1216.4	192.4	133.6	3.00	34.76	234.2	EOB @ 28.67° Inc / 34.76° Azm
5244.1	28.67	34.76	4715.6	1764.6	1224.8	0.00	0.00	2148.0	Drop 3° / 100'
6199.9	0.00	0.00	5632.0	1957.0	1358.3	3.00	180.00	2382.2	EOB @ Vertical
8049.9	0.00	0.00	7482.0	1957.0	1358.3	0.00	0.00	2382.2	TD @ 8049.9' MD / 7482.0' TVD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2482.0	2698.3	G' Sand
4232.0	4692.9	Williams Fork
5632.0	6199.9	TOG
6532.0	7099.9	Cameo
7192.0	7759.9	Base Cameo Coal
7232.0	7799.9	Rollins



Plan: Design #1 (Nichols 0994-13-21E/Wellbore #1)

Created By: Will Jircik Date: 18:27, March 13 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-13-21E

Wellbore #1

Plan: Design #1

QES Well Planning Report

13 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-13-21E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-13-21E	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		Nichols 24-06A			
Site Position:		Northing:	1,529,702.08 usft	Latitude:	39° 15' 52.301 N
From:	Lat/Long	Easting:	2,340,203.74 usft	Longitude:	107° 49' 50.279 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Nichols 0994-13-21E					
Well Position	+N/-S	61.5 usft	Northing:	1,529,762.92 usft	Latitude:	39° 15' 52.909 N
	+E/-W	26.6 usft	Easting:	2,340,231.92 usft	Longitude:	107° 49' 49.940 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	7,137.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/13/2017	9.62	65.43	51,445

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	34.76

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	
1,255.8	28.67	34.76	1,216.4	192.4	133.6	3.00	3.00	0.00	34.76	
5,244.1	28.67	34.76	4,715.6	1,764.6	1,224.8	0.00	0.00	0.00	0.00	
6,199.9	0.00	0.00	5,632.0	1,957.0	1,358.3	3.00	-3.00	0.00	180.00	
8,049.9	0.00	0.00	7,482.0	1,957.0	1,358.3	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-13-21E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-13-21E	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
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 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	34.76	400.0	2.2	1.5	2.6	3.00	3.00	0.00
500.0	6.00	34.76	499.6	8.6	6.0	10.5	3.00	3.00	0.00
600.0	9.00	34.76	598.8	19.3	13.4	23.5	3.00	3.00	0.00
700.0	12.00	34.76	697.1	34.3	23.8	41.7	3.00	3.00	0.00
800.0	15.00	34.76	794.3	53.5	37.1	65.1	3.00	3.00	0.00
900.0	18.00	34.76	890.2	76.8	53.3	93.5	3.00	3.00	0.00
1,000.0	21.00	34.76	984.4	104.2	72.3	126.9	3.00	3.00	0.00
1,100.0	24.00	34.76	1,076.8	135.6	94.1	165.1	3.00	3.00	0.00
1,200.0	27.00	34.76	1,167.1	171.0	118.7	208.2	3.00	3.00	0.00
EOB @ 28.67° Inc / 34.76° Azm									
1,255.8	28.67	34.76	1,216.4	192.4	133.6	234.2	3.00	3.00	0.00
1,300.0	28.67	34.76	1,255.2	209.8	145.6	255.4	0.00	0.00	0.00
1,400.0	28.67	34.76	1,342.9	249.3	173.0	303.4	0.00	0.00	0.00
1,500.0	28.67	34.76	1,430.6	288.7	200.4	351.4	0.00	0.00	0.00
8 5/8"									
1,530.0	28.67	34.76	1,457.0	300.5	208.6	365.8	0.00	0.00	0.00
1,600.0	28.67	34.76	1,518.4	328.1	227.7	399.4	0.00	0.00	0.00
1,700.0	28.67	34.76	1,606.1	367.5	255.1	447.4	0.00	0.00	0.00
1,800.0	28.67	34.76	1,693.9	406.9	282.4	495.3	0.00	0.00	0.00
1,900.0	28.67	34.76	1,781.6	446.3	309.8	543.3	0.00	0.00	0.00
2,000.0	28.67	34.76	1,869.3	485.8	337.2	591.3	0.00	0.00	0.00
2,100.0	28.67	34.76	1,957.1	525.2	364.5	639.3	0.00	0.00	0.00
2,200.0	28.67	34.76	2,044.8	564.6	391.9	687.3	0.00	0.00	0.00
2,300.0	28.67	34.76	2,132.5	604.0	419.3	735.3	0.00	0.00	0.00
2,400.0	28.67	34.76	2,220.3	643.4	446.6	783.3	0.00	0.00	0.00
2,500.0	28.67	34.76	2,308.0	682.9	474.0	831.2	0.00	0.00	0.00
2,600.0	28.67	34.76	2,395.7	722.3	501.3	879.2	0.00	0.00	0.00
G' Sand									
2,698.3	28.67	34.76	2,482.0	761.0	528.2	926.4	0.00	0.00	0.00
2,700.0	28.67	34.76	2,483.5	761.7	528.7	927.2	0.00	0.00	0.00
2,800.0	28.67	34.76	2,571.2	801.1	556.1	975.2	0.00	0.00	0.00
2,900.0	28.67	34.76	2,658.9	840.5	583.4	1,023.2	0.00	0.00	0.00
3,000.0	28.67	34.76	2,746.7	880.0	610.8	1,071.2	0.00	0.00	0.00
3,100.0	28.67	34.76	2,834.4	919.4	638.1	1,119.1	0.00	0.00	0.00
3,200.0	28.67	34.76	2,922.2	958.8	665.5	1,167.1	0.00	0.00	0.00
3,300.0	28.67	34.76	3,009.9	998.2	692.9	1,215.1	0.00	0.00	0.00
3,400.0	28.67	34.76	3,097.6	1,037.6	720.2	1,263.1	0.00	0.00	0.00
3,500.0	28.67	34.76	3,185.4	1,077.1	747.6	1,311.1	0.00	0.00	0.00
3,600.0	28.67	34.76	3,273.1	1,116.5	774.9	1,359.1	0.00	0.00	0.00
3,700.0	28.67	34.76	3,360.8	1,155.9	802.3	1,407.0	0.00	0.00	0.00
3,800.0	28.67	34.76	3,448.6	1,195.3	829.7	1,455.0	0.00	0.00	0.00
3,900.0	28.67	34.76	3,536.3	1,234.7	857.0	1,503.0	0.00	0.00	0.00
4,000.0	28.67	34.76	3,624.0	1,274.1	884.4	1,551.0	0.00	0.00	0.00
4,100.0	28.67	34.76	3,711.8	1,313.6	911.7	1,599.0	0.00	0.00	0.00
4,200.0	28.67	34.76	3,799.5	1,353.0	939.1	1,647.0	0.00	0.00	0.00
4,300.0	28.67	34.76	3,887.2	1,392.4	966.5	1,694.9	0.00	0.00	0.00
4,400.0	28.67	34.76	3,975.0	1,431.8	993.8	1,742.9	0.00	0.00	0.00
4,500.0	28.67	34.76	4,062.7	1,471.2	1,021.2	1,790.9	0.00	0.00	0.00
4,600.0	28.67	34.76	4,150.5	1,510.7	1,048.5	1,838.9	0.00	0.00	0.00



Well Planning Report



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Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-13-21E	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)
Williams Fork									
4,692.9	28.67	34.76	4,232.0	1,547.3	1,074.0	1,883.5	0.00	0.00	0.00
4,700.0	28.67	34.76	4,238.2	1,550.1	1,075.9	1,886.9	0.00	0.00	0.00
4,800.0	28.67	34.76	4,325.9	1,589.5	1,103.3	1,934.9	0.00	0.00	0.00
4,900.0	28.67	34.76	4,413.7	1,628.9	1,130.6	1,982.9	0.00	0.00	0.00
5,000.0	28.67	34.76	4,501.4	1,668.3	1,158.0	2,030.8	0.00	0.00	0.00
5,100.0	28.67	34.76	4,589.1	1,707.8	1,185.4	2,078.8	0.00	0.00	0.00
5,200.0	28.67	34.76	4,676.9	1,747.2	1,212.7	2,126.8	0.00	0.00	0.00
Drop 3° / 100'									
5,244.1	28.67	34.76	4,715.6	1,764.6	1,224.8	2,148.0	0.00	0.00	0.00
5,300.0	27.00	34.76	4,765.0	1,786.0	1,239.7	2,174.1	3.00	-3.00	0.00
5,400.0	24.00	34.76	4,855.2	1,821.4	1,264.2	2,217.1	3.00	-3.00	0.00
5,500.0	21.00	34.76	4,947.6	1,852.8	1,286.0	2,255.4	3.00	-3.00	0.00
5,600.0	18.00	34.76	5,041.9	1,880.2	1,305.1	2,288.7	3.00	-3.00	0.00
5,700.0	15.00	34.76	5,137.7	1,903.5	1,321.2	2,317.1	3.00	-3.00	0.00
5,800.0	12.00	34.76	5,235.0	1,922.7	1,334.6	2,340.5	3.00	-3.00	0.00
5,900.0	9.00	34.76	5,333.3	1,937.7	1,344.9	2,358.7	3.00	-3.00	0.00
6,000.0	6.00	34.76	5,432.4	1,948.4	1,352.4	2,371.7	3.00	-3.00	0.00
6,100.0	3.00	34.76	5,532.1	1,954.8	1,356.9	2,379.6	3.00	-3.00	0.00
EOB @ Vertical - TOG									
6,199.9	0.00	0.00	5,632.0	1,957.0	1,358.3	2,382.2	3.00	-3.00	-34.78
6,200.0	0.00	0.00	5,632.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,300.0	0.00	0.00	5,732.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,400.0	0.00	0.00	5,832.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,500.0	0.00	0.00	5,932.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,600.0	0.00	0.00	6,032.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,700.0	0.00	0.00	6,132.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,800.0	0.00	0.00	6,232.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
6,900.0	0.00	0.00	6,332.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,000.0	0.00	0.00	6,432.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
Cameo									
7,099.9	0.00	0.00	6,532.0	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,532.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,200.0	0.00	0.00	6,632.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,300.0	0.00	0.00	6,732.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,400.0	0.00	0.00	6,832.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,500.0	0.00	0.00	6,932.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,600.0	0.00	0.00	7,032.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,700.0	0.00	0.00	7,132.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
Base Cameo Coal									
7,759.9	0.00	0.00	7,192.0	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
Rollins									
7,799.9	0.00	0.00	7,232.0	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,800.0	0.00	0.00	7,232.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
7,900.0	0.00	0.00	7,332.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,432.1	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00
TD @ 8049.9' MD / 7482.0' TVD									
8,049.9	0.00	0.00	7,482.0	1,957.0	1,358.3	2,382.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-13-21E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7167.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7167.0usft (H&P #522)
Site:	Nichols 24-06A	North Reference:	True
Well:	Nichols 0994-13-21E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
PBHL - Nichols 0994-13	0.00	0.00	7,482.0	1,957.0	1,358.3	1,531,684.42	2,341,640.02	39° 16' 12.252 N	107° 49' 32.668 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,530.0	1,457.0	8 5/8"	8-5/8	11

Formations					
Measured Depth	Vertical Depth			Dip	Dip Direction
(usft)	(usft)	Name	Lithology	(°)	(°)
2,698.3	2,482.0	G' Sand			
4,692.9	4,232.0	Williams Fork			
6,199.9	5,632.0	TOG			
7,099.9	6,532.0	Cameo			
7,759.9	7,192.0	Base Cameo Coal			
7,799.9	7,232.0	Rollins			

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		
(usft)	(usft)	+N/-S	+E/-W	Comment
(usft)	(usft)	(usft)	(usft)	
300.0	300.0	0.0	0.0	KOP (Build 3° / 100')
1,255.8	1,216.4	192.4	133.6	EOB @ 28.67° Inc / 34.76° Azm
5,244.1	4,715.6	1,764.6	1,224.8	Drop 3° / 100'
6,199.9	5,632.0	1,957.0	1,358.3	EOB @ Vertical
8,049.9	7,482.0	1,957.0	1,358.3	TD @ 8049.9' MD / 7482.0' TVD