



Project: Mesa County, CO  
 Site: Nichols 24-06A  
 Well: Nichols 0994-13-18W  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.264747  
 Longitude: -107.830550  
 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 0994-13-18W, 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 0994-13-18W

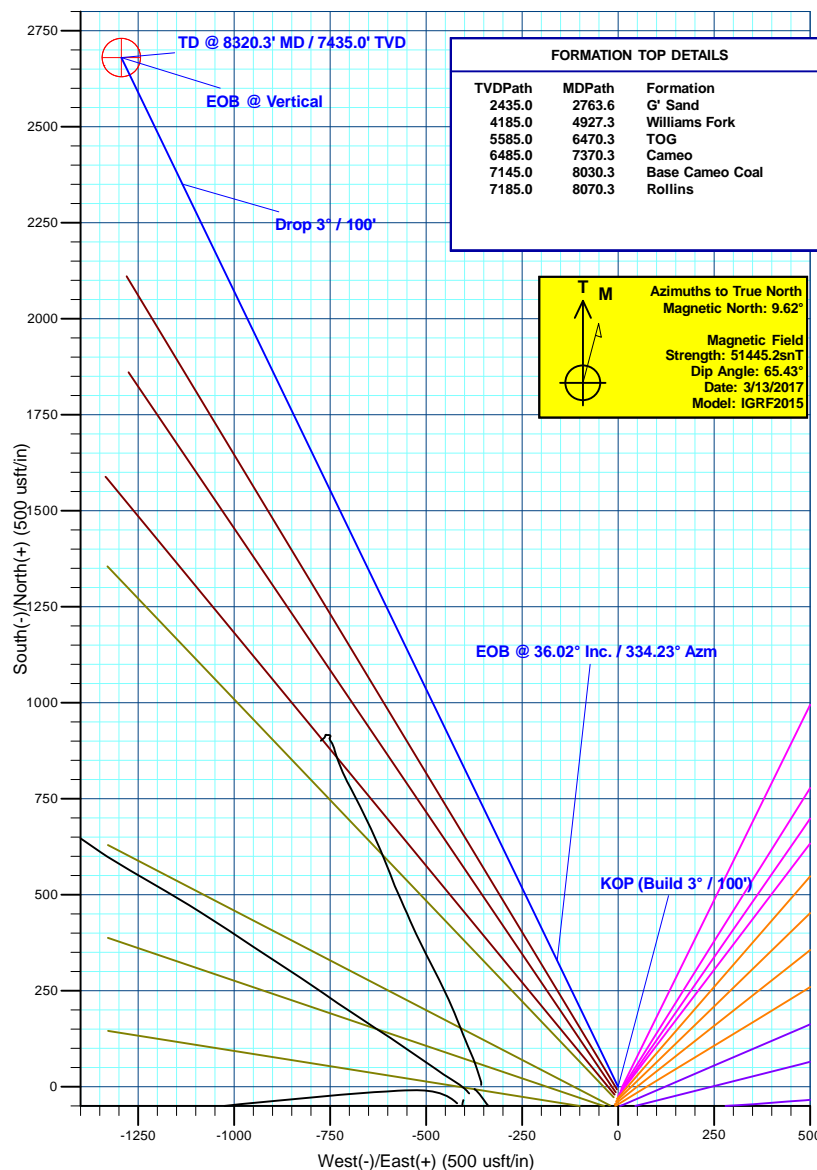
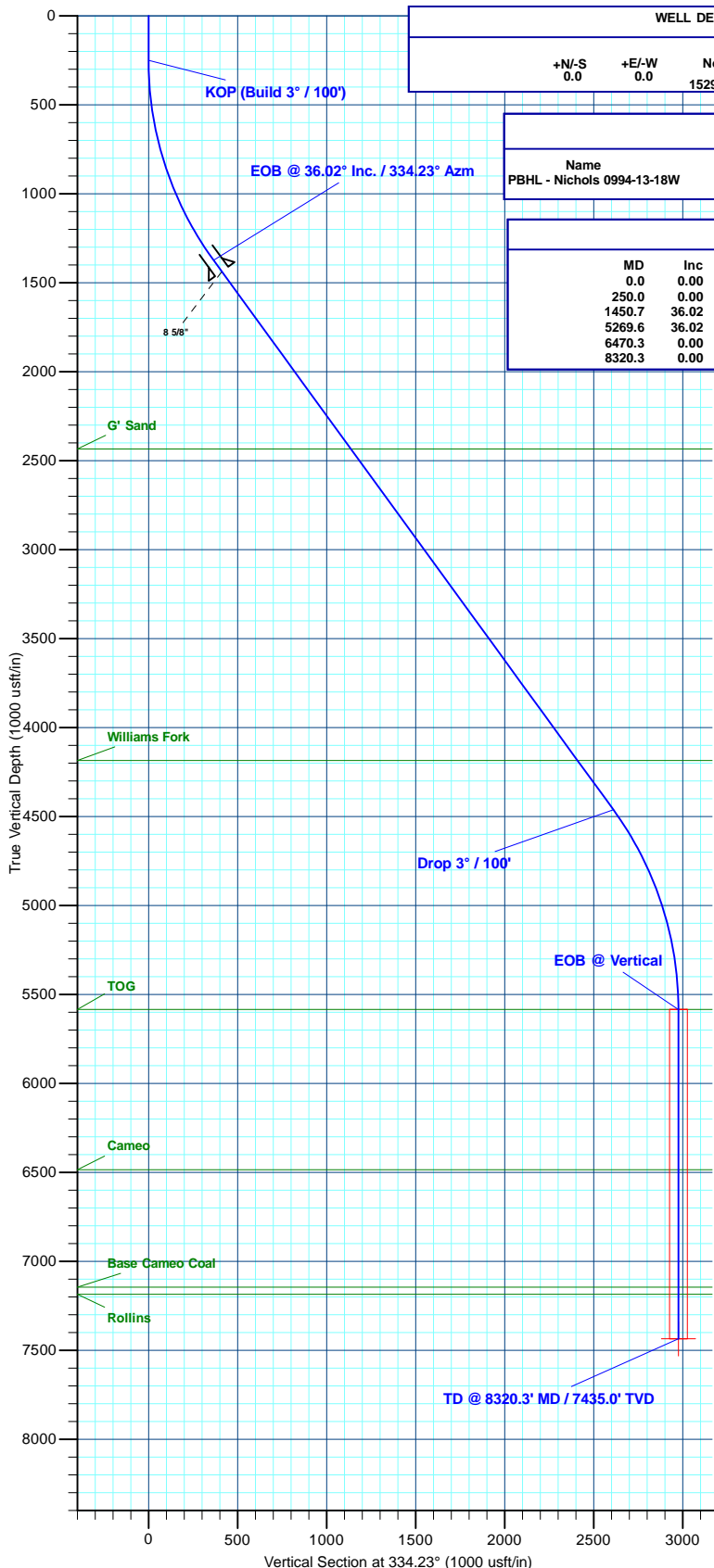
+N/-S	+E/-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529781.20	2340229.28	39.264747	-107.830550

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-13-18W	7435.0	2680.3	-1293.8	1532493.83	2339004.70	39.272106	-107.835120

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	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1450.7	36.02	334.23	1373.2	328.9	-158.7	3.00	334.23	365.2	EOB @ 36.02° Inc. / 334.23° Azm
5269.6	36.02	334.23	4461.8	2351.4	-1135.0	0.00	0.00	2611.0	Drop 3° / 100'
6470.3	0.00	0.00	5585.0	2680.3	-1293.8	3.00	180.00	2976.2	EOB @ Vertical
8320.3	0.00	0.00	7435.0	2680.3	-1293.8	0.00	0.00	2976.2	TD @ 8320.3' MD / 7435.0' TVD



Plan: Design #1 (Nichols 0994-13-18W/Wellbore #1)

Created By: Will Jircik Date: 15:24, March 13 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-06A**

**Nichols 0994-13-18W**

**Wellbore #1**

**Plan: Design #1**

## **QES Well Planning Report**

**13 March, 2017**





# Well Planning Report



<b>Database:</b>	EDM5002	<b>Local Co-ordinate Reference:</b>	Well Nichols 0994-13-18W
<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Site:</b>	Nichols 24-06A	<b>North Reference:</b>	True
<b>Well:</b>	Nichols 0994-13-18W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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:	39.264528
From:	Lat/Long	Easting:	2,340,203.74 usft	Longitude:	-107.830633
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-1.47 °

Well	Nichols 0994-13-18W					
Well Position	+N/-S	79.8 usft	Northing:	1,529,781.20 usft	Latitude:	39.264747
	+E/-W	23.5 usft	Easting:	2,340,229.28 usft	Longitude:	-107.830550
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	334.23

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	
250.0	0.00	0.00	250.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,450.7	36.02	334.23	1,373.2	328.9	-158.7	3.00	3.00	0.00	334.23	
5,269.6	36.02	334.23	4,461.8	2,351.4	-1,135.0	0.00	0.00	0.00	0.00	
6,470.3	0.00	0.00	5,585.0	2,680.3	-1,293.8	3.00	-3.00	0.00	180.00	
8,320.3	0.00	0.00	7,435.0	2,680.3	-1,293.8	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



# Well Planning Report



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<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Site:</b>	Nichols 24-06A	<b>North Reference:</b>	True
<b>Well:</b>	Nichols 0994-13-18W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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
<b>KOP (Build 3° / 100')</b>									
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	1.50	334.23	300.0	0.6	-0.3	0.7	3.00	3.00	0.00
400.0	4.50	334.23	399.8	5.3	-2.6	5.9	3.00	3.00	0.00
500.0	7.50	334.23	499.3	14.7	-7.1	16.3	3.00	3.00	0.00
600.0	10.50	334.23	598.0	28.8	-13.9	32.0	3.00	3.00	0.00
700.0	13.50	334.23	695.8	47.5	-22.9	52.8	3.00	3.00	0.00
800.0	16.50	334.23	792.4	70.8	-34.2	78.6	3.00	3.00	0.00
900.0	19.50	334.23	887.5	98.7	-47.6	109.5	3.00	3.00	0.00
1,000.0	22.50	334.23	980.9	130.9	-63.2	145.4	3.00	3.00	0.00
1,100.0	25.50	334.23	1,072.2	167.6	-80.9	186.0	3.00	3.00	0.00
1,200.0	28.50	334.23	1,161.3	208.4	-100.6	231.4	3.00	3.00	0.00
1,300.0	31.50	334.23	1,247.9	253.5	-122.3	281.4	3.00	3.00	0.00
1,400.0	34.50	334.23	1,331.8	302.5	-146.0	335.9	3.00	3.00	0.00
<b>EOB @ 36.02° Inc. / 334.23° Azm</b>									
1,450.7	36.02	334.23	1,373.2	328.9	-158.7	365.2	3.00	3.00	0.00
1,500.0	36.02	334.23	1,413.0	355.0	-171.3	394.2	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	36.02	334.23	1,437.3	370.9	-179.0	411.8	0.00	0.00	0.00
1,600.0	36.02	334.23	1,493.9	407.9	-196.9	453.0	0.00	0.00	0.00
1,700.0	36.02	334.23	1,574.8	460.9	-222.5	511.8	0.00	0.00	0.00
1,800.0	36.02	334.23	1,655.7	513.9	-248.0	570.6	0.00	0.00	0.00
1,900.0	36.02	334.23	1,736.5	566.8	-273.6	629.4	0.00	0.00	0.00
2,000.0	36.02	334.23	1,817.4	619.8	-299.2	688.2	0.00	0.00	0.00
2,100.0	36.02	334.23	1,898.3	672.7	-324.7	747.0	0.00	0.00	0.00
2,200.0	36.02	334.23	1,979.2	725.7	-350.3	805.8	0.00	0.00	0.00
2,300.0	36.02	334.23	2,060.1	778.7	-375.9	864.6	0.00	0.00	0.00
2,400.0	36.02	334.23	2,140.9	831.6	-401.4	923.4	0.00	0.00	0.00
2,500.0	36.02	334.23	2,221.8	884.6	-427.0	982.3	0.00	0.00	0.00
2,600.0	36.02	334.23	2,302.7	937.6	-452.5	1,041.1	0.00	0.00	0.00
2,700.0	36.02	334.23	2,383.6	990.5	-478.1	1,099.9	0.00	0.00	0.00
<b>G' Sand</b>									
2,763.6	36.02	334.23	2,435.0	1,024.2	-494.4	1,137.3	0.00	0.00	0.00
2,800.0	36.02	334.23	2,464.5	1,043.5	-503.7	1,158.7	0.00	0.00	0.00
2,900.0	36.02	334.23	2,545.3	1,096.4	-529.2	1,217.5	0.00	0.00	0.00
3,000.0	36.02	334.23	2,626.2	1,149.4	-554.8	1,276.3	0.00	0.00	0.00
3,100.0	36.02	334.23	2,707.1	1,202.4	-580.4	1,335.1	0.00	0.00	0.00
3,200.0	36.02	334.23	2,788.0	1,255.3	-605.9	1,393.9	0.00	0.00	0.00
3,300.0	36.02	334.23	2,868.8	1,308.3	-631.5	1,452.7	0.00	0.00	0.00
3,400.0	36.02	334.23	2,949.7	1,361.3	-657.1	1,511.5	0.00	0.00	0.00
3,500.0	36.02	334.23	3,030.6	1,414.2	-682.6	1,570.4	0.00	0.00	0.00
3,600.0	36.02	334.23	3,111.5	1,467.2	-708.2	1,629.2	0.00	0.00	0.00
3,700.0	36.02	334.23	3,192.4	1,520.2	-733.8	1,688.0	0.00	0.00	0.00
3,800.0	36.02	334.23	3,273.2	1,573.1	-759.3	1,746.8	0.00	0.00	0.00
3,900.0	36.02	334.23	3,354.1	1,626.1	-784.9	1,805.6	0.00	0.00	0.00
4,000.0	36.02	334.23	3,435.0	1,679.0	-810.5	1,864.4	0.00	0.00	0.00
4,100.0	36.02	334.23	3,515.9	1,732.0	-836.0	1,923.2	0.00	0.00	0.00
4,200.0	36.02	334.23	3,596.8	1,785.0	-861.6	1,982.0	0.00	0.00	0.00
4,300.0	36.02	334.23	3,677.6	1,837.9	-887.1	2,040.8	0.00	0.00	0.00
4,400.0	36.02	334.23	3,758.5	1,890.9	-912.7	2,099.6	0.00	0.00	0.00
4,500.0	36.02	334.23	3,839.4	1,943.9	-938.3	2,158.5	0.00	0.00	0.00



# Well Planning Report



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<b>Company:</b>	Laramie Energy, LLC	<b>TVD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Site:</b>	Nichols 24-06A	<b>North Reference:</b>	True
<b>Well:</b>	Nichols 0994-13-18W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	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)
4,600.0	36.02	334.23	3,920.3	1,996.8	-963.8	2,217.3	0.00	0.00	0.00
4,700.0	36.02	334.23	4,001.1	2,049.8	-989.4	2,276.1	0.00	0.00	0.00
4,800.0	36.02	334.23	4,082.0	2,102.7	-1,015.0	2,334.9	0.00	0.00	0.00
4,900.0	36.02	334.23	4,162.9	2,155.7	-1,040.5	2,393.7	0.00	0.00	0.00
<b>Williams Fork</b>									
4,927.3	36.02	334.23	4,185.0	2,170.2	-1,047.5	2,409.8	0.00	0.00	0.00
5,000.0	36.02	334.23	4,243.8	2,208.7	-1,066.1	2,452.5	0.00	0.00	0.00
5,100.0	36.02	334.23	4,324.7	2,261.6	-1,091.7	2,511.3	0.00	0.00	0.00
5,200.0	36.02	334.23	4,405.5	2,314.6	-1,117.2	2,570.1	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,269.6	36.02	334.23	4,461.8	2,351.4	-1,135.0	2,611.0	0.00	0.00	0.00
5,300.0	35.11	334.23	4,486.6	2,367.4	-1,142.7	2,628.7	3.00	-3.00	0.00
5,400.0	32.11	334.23	4,569.8	2,417.2	-1,166.8	2,684.1	3.00	-3.00	0.00
5,500.0	29.11	334.23	4,655.9	2,463.1	-1,188.9	2,735.0	3.00	-3.00	0.00
5,600.0	26.11	334.23	4,744.5	2,504.8	-1,209.0	2,781.3	3.00	-3.00	0.00
5,700.0	23.11	334.23	4,835.4	2,542.3	-1,227.1	2,823.0	3.00	-3.00	0.00
5,800.0	20.11	334.23	4,928.4	2,575.5	-1,243.1	2,859.8	3.00	-3.00	0.00
5,900.0	17.11	334.23	5,023.1	2,604.2	-1,257.0	2,891.7	3.00	-3.00	0.00
6,000.0	14.11	334.23	5,119.4	2,628.4	-1,268.7	2,918.6	3.00	-3.00	0.00
6,100.0	11.11	334.23	5,217.0	2,648.1	-1,278.2	2,940.4	3.00	-3.00	0.00
6,200.0	8.11	334.23	5,315.6	2,663.1	-1,285.5	2,957.1	3.00	-3.00	0.00
6,300.0	5.11	334.23	5,414.9	2,673.5	-1,290.5	2,968.6	3.00	-3.00	0.00
6,400.0	2.11	334.23	5,514.7	2,679.2	-1,293.2	2,974.9	3.00	-3.00	0.00
<b>EOB @ Vertical - TOG</b>									
6,470.3	0.00	0.00	5,585.0	2,680.3	-1,293.8	2,976.2	3.00	-3.00	0.00
6,500.0	0.00	0.00	5,614.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
6,600.0	0.00	0.00	5,714.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
6,700.0	0.00	0.00	5,814.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
6,800.0	0.00	0.00	5,914.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
6,900.0	0.00	0.00	6,014.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,000.0	0.00	0.00	6,114.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,214.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,200.0	0.00	0.00	6,314.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,300.0	0.00	0.00	6,414.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
<b>Cameo</b>									
7,370.3	0.00	0.00	6,485.0	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,400.0	0.00	0.00	6,514.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,500.0	0.00	0.00	6,614.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,600.0	0.00	0.00	6,714.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,700.0	0.00	0.00	6,814.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,800.0	0.00	0.00	6,914.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
7,900.0	0.00	0.00	7,014.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
8,000.0	0.00	0.00	7,114.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
8,030.3	0.00	0.00	7,145.0	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
<b>Rollins</b>									
8,070.3	0.00	0.00	7,185.0	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
8,100.0	0.00	0.00	7,214.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
8,200.0	0.00	0.00	7,314.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
8,300.0	0.00	0.00	7,414.7	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00
<b>TD @ 8320.3' MD / 7435.0' TVD</b>									
8,320.3	0.00	0.00	7,435.0	2,680.3	-1,293.8	2,976.2	0.00	0.00	0.00



# Well Planning Report



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<b>Project:</b>	Mesa County, CO	<b>MD Reference:</b>	well @ 7167.0usft (H&P #522)
<b>Site:</b>	Nichols 24-06A	<b>North Reference:</b>	True
<b>Well:</b>	Nichols 0994-13-18W	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Design #1		

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 - Nichols 0994-13	0.00	0.00	7,435.0	2,680.3	-1,293.8	1,532,493.83	2,339,004.70	39.272106	-107.835120
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,437.3	8 5/8"	8-5/8	11

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,763.6	2,435.0	G' Sand			
4,927.3	4,185.0	Williams Fork			
6,470.3	5,585.0	TOG			
7,370.3	6,485.0	Cameo			
8,030.3	7,145.0	Base Cameo Coal			
8,070.3	7,185.0	Rollins			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
250.0	250.0	0.0	0.0	KOP (Build 3° / 100')
1,450.7	1,373.2	328.9	-158.7	EOB @ 36.02° Inc. / 334.23° Azm
5,269.6	4,461.8	2,351.4	-1,135.0	Drop 3° / 100'
6,470.3	5,585.0	2,680.3	-1,293.8	EOB @ Vertical
8,320.3	7,435.0	2,680.3	-1,293.8	TD @ 8320.3' MD / 7435.0' TVD