



Project: Mesa County, CO  
 Site: Nichols 24-06A  
 Well: Nichols 0994-24-01E  
 Wellbore: Wellbore #1  
 Design: Design #1  
 Latitude: 39.264681  
 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 0994-24-01E, 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 0994-24-01E

+N/-S	+E/-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529757.17	2340228.66	39.264681	-107.830550

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

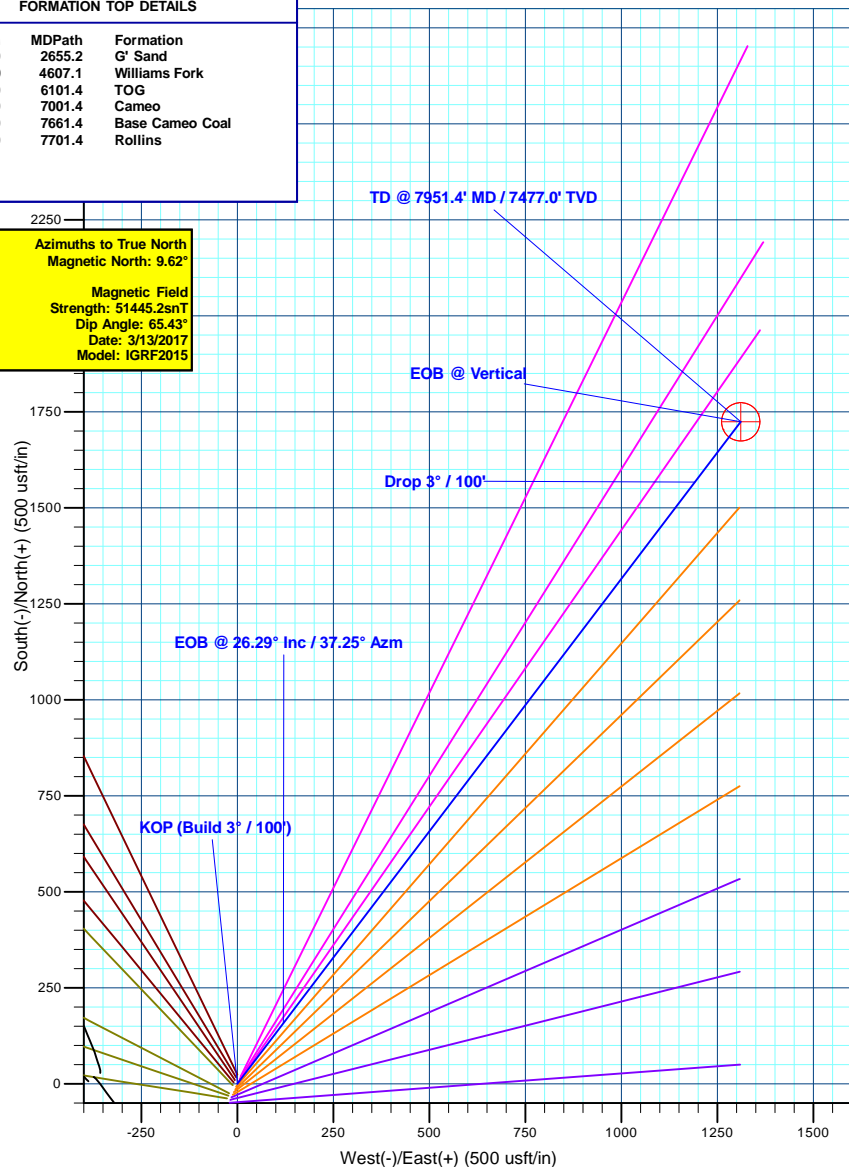
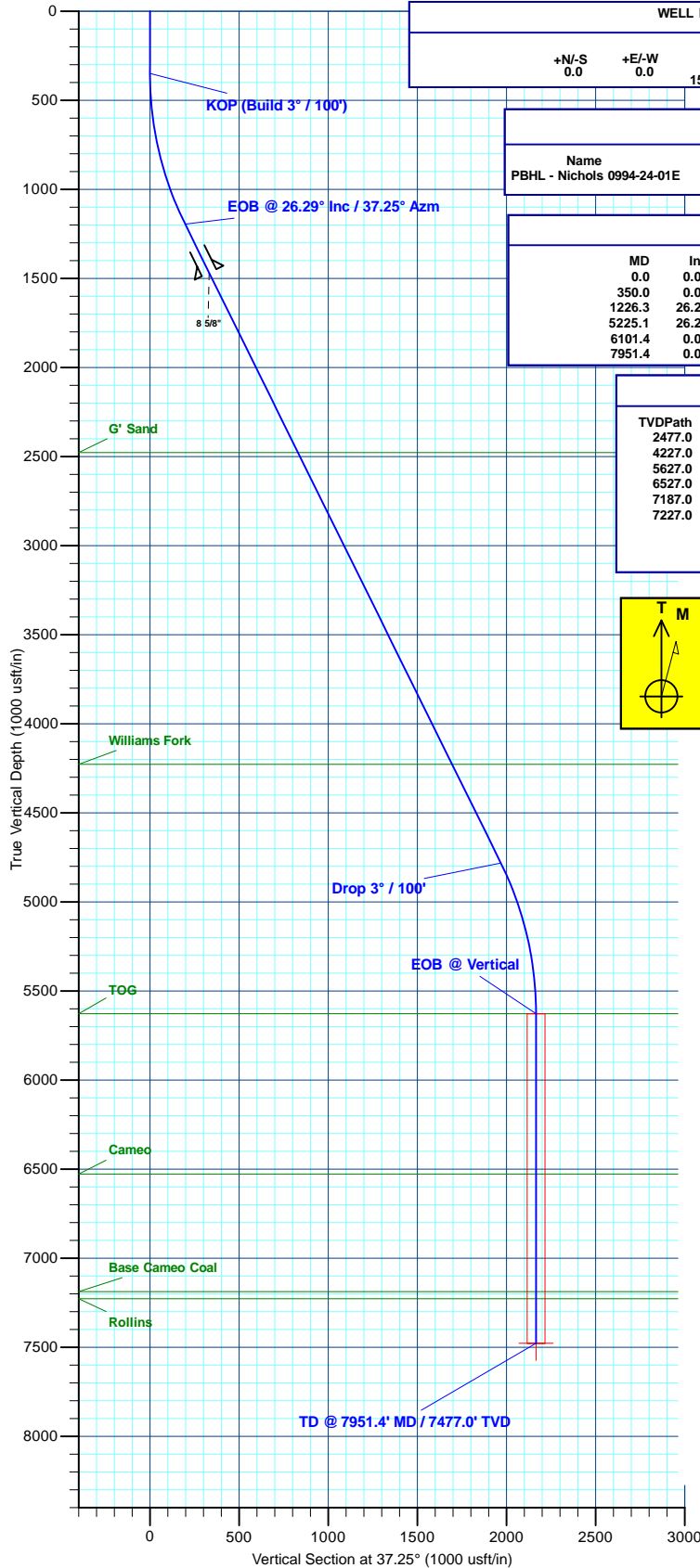
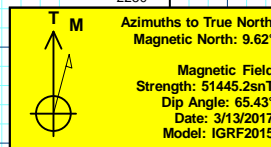
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-01E	7477.0	1724.3	1311.1	1531447.22	2341583.53	39.269415	-107.825919

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	
350.0	0.00	0.00	350.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1226.3	26.29	37.25	1195.9	157.2	119.6	3.00	37.25	197.5	EOB @ 26.29° Inc / 37.25° Azm
5225.1	26.29	37.25	4781.1	1567.0	1191.5	0.00	0.00	1968.6	Drop 3° / 100'
6101.4	0.00	0.00	5627.0	1724.3	1311.1	3.00	180.00	2166.1	EOB @ Vertical
7951.4	0.00	0.00	7477.0	1724.3	1311.1	0.00	0.00	2166.1	TD @ 7951.4' MD / 7477.0' TVD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2477.0	2655.2	G' Sand
4227.0	4607.1	Williams Fork
5627.0	6101.4	TOG
6527.0	7001.4	Cameo
7187.0	7661.4	Base Cameo Coal
7227.0	7701.4	Rollins



Created By: Will Jircik Date: 18:29, March 13 2017



# **Laramie Energy, LLC**

**Mesa County, CO**

**Nichols 24-06A**

**Nichols 0994-24-01E**

**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 0994-24-01E
<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 0994-24-01E	<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° 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 0994-24-01E					
Well Position	+N/-S	55.7 usft	Northing:	1,529,757.17 usft	Latitude:	39° 15' 52.851 N
	+E/-W	23.5 usft	Easting:	2,340,228.66 usft	Longitude:	107° 49' 49.980 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	37.25

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	
350.0	0.00	0.00	350.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,226.3	26.29	37.25	1,195.9	157.2	119.6	3.00	3.00	0.00	37.25	
5,225.1	26.29	37.25	4,781.1	1,567.0	1,191.5	0.00	0.00	0.00	0.00	
6,101.4	0.00	0.00	5,627.0	1,724.3	1,311.1	3.00	-3.00	0.00	180.00	
7,951.4	0.00	0.00	7,477.0	1,724.3	1,311.1	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 0994-24-01E	<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
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP (Build 3° / 100')</b>									
350.0	0.00	0.00	350.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	1.50	37.25	400.0	0.5	0.4	0.7	3.00	3.00	0.00
500.0	4.50	37.25	499.8	4.7	3.6	5.9	3.00	3.00	0.00
600.0	7.50	37.25	599.3	13.0	9.9	16.3	3.00	3.00	0.00
700.0	10.50	37.25	698.0	25.5	19.4	32.0	3.00	3.00	0.00
800.0	13.50	37.25	795.8	42.0	31.9	52.8	3.00	3.00	0.00
900.0	16.50	37.25	892.4	62.6	47.6	78.6	3.00	3.00	0.00
1,000.0	19.50	37.25	987.5	87.2	66.3	109.5	3.00	3.00	0.00
1,100.0	22.50	37.25	1,080.9	115.7	88.0	145.4	3.00	3.00	0.00
1,200.0	25.50	37.25	1,172.2	148.1	112.6	186.0	3.00	3.00	0.00
<b>EOB @ 26.29° Inc / 37.25° Azm</b>									
1,226.3	26.29	37.25	1,195.9	157.2	119.6	197.5	3.00	3.00	0.00
1,300.0	26.29	37.25	1,262.0	183.2	139.3	230.2	0.00	0.00	0.00
1,400.0	26.29	37.25	1,351.6	218.5	166.1	274.5	0.00	0.00	0.00
1,500.0	26.29	37.25	1,441.3	253.7	192.9	318.8	0.00	0.00	0.00
<b>8 5/8"</b>									
1,530.0	26.29	37.25	1,468.2	264.3	201.0	332.0	0.00	0.00	0.00
1,600.0	26.29	37.25	1,530.9	289.0	219.7	363.0	0.00	0.00	0.00
1,700.0	26.29	37.25	1,620.6	324.2	246.5	407.3	0.00	0.00	0.00
1,800.0	26.29	37.25	1,710.2	359.5	273.4	451.6	0.00	0.00	0.00
1,900.0	26.29	37.25	1,799.9	394.8	300.2	495.9	0.00	0.00	0.00
2,000.0	26.29	37.25	1,889.6	430.0	327.0	540.2	0.00	0.00	0.00
2,100.0	26.29	37.25	1,979.2	465.3	353.8	584.5	0.00	0.00	0.00
2,200.0	26.29	37.25	2,068.9	500.5	380.6	628.8	0.00	0.00	0.00
2,300.0	26.29	37.25	2,158.5	535.8	407.4	673.1	0.00	0.00	0.00
2,400.0	26.29	37.25	2,248.2	571.0	434.2	717.4	0.00	0.00	0.00
2,500.0	26.29	37.25	2,337.8	606.3	461.0	761.6	0.00	0.00	0.00
2,600.0	26.29	37.25	2,427.5	641.5	487.8	805.9	0.00	0.00	0.00
<b>G' Sand</b>									
2,655.2	26.29	37.25	2,477.0	661.0	502.6	830.4	0.00	0.00	0.00
2,700.0	26.29	37.25	2,517.2	676.8	514.6	850.2	0.00	0.00	0.00
2,800.0	26.29	37.25	2,606.8	712.0	541.4	894.5	0.00	0.00	0.00
2,900.0	26.29	37.25	2,696.5	747.3	568.2	938.8	0.00	0.00	0.00
3,000.0	26.29	37.25	2,786.1	782.6	595.0	983.1	0.00	0.00	0.00
3,100.0	26.29	37.25	2,875.8	817.8	621.8	1,027.4	0.00	0.00	0.00
3,200.0	26.29	37.25	2,965.4	853.1	648.6	1,071.7	0.00	0.00	0.00
3,300.0	26.29	37.25	3,055.1	888.3	675.5	1,115.9	0.00	0.00	0.00
3,400.0	26.29	37.25	3,144.8	923.6	702.3	1,160.2	0.00	0.00	0.00
3,500.0	26.29	37.25	3,234.4	958.8	729.1	1,204.5	0.00	0.00	0.00
3,600.0	26.29	37.25	3,324.1	994.1	755.9	1,248.8	0.00	0.00	0.00
3,700.0	26.29	37.25	3,413.7	1,029.3	782.7	1,293.1	0.00	0.00	0.00
3,800.0	26.29	37.25	3,503.4	1,064.6	809.5	1,337.4	0.00	0.00	0.00
3,900.0	26.29	37.25	3,593.1	1,099.8	836.3	1,381.7	0.00	0.00	0.00
4,000.0	26.29	37.25	3,682.7	1,135.1	863.1	1,426.0	0.00	0.00	0.00
4,100.0	26.29	37.25	3,772.4	1,170.4	889.9	1,470.3	0.00	0.00	0.00
4,200.0	26.29	37.25	3,862.0	1,205.6	916.7	1,514.5	0.00	0.00	0.00
4,300.0	26.29	37.25	3,951.7	1,240.9	943.5	1,558.8	0.00	0.00	0.00
4,400.0	26.29	37.25	4,041.3	1,276.1	970.3	1,603.1	0.00	0.00	0.00
4,500.0	26.29	37.25	4,131.0	1,311.4	997.1	1,647.4	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 0994-24-01E	<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	26.29	37.25	4,220.7	1,346.6	1,023.9	1,691.7	0.00	0.00	0.00
<b>Williams Fork</b>									
4,607.1	26.29	37.25	4,227.0	1,349.1	1,025.8	1,694.8	0.00	0.00	0.00
4,700.0	26.29	37.25	4,310.3	1,381.9	1,050.7	1,736.0	0.00	0.00	0.00
4,800.0	26.29	37.25	4,400.0	1,417.1	1,077.6	1,780.3	0.00	0.00	0.00
4,900.0	26.29	37.25	4,489.6	1,452.4	1,104.4	1,824.6	0.00	0.00	0.00
5,000.0	26.29	37.25	4,579.3	1,487.6	1,131.2	1,868.9	0.00	0.00	0.00
5,100.0	26.29	37.25	4,668.9	1,522.9	1,158.0	1,913.1	0.00	0.00	0.00
5,200.0	26.29	37.25	4,758.6	1,558.2	1,184.8	1,957.4	0.00	0.00	0.00
<b>Drop 3° / 100'</b>									
5,225.1	26.29	37.25	4,781.1	1,567.0	1,191.5	1,968.6	0.00	0.00	0.00
5,300.0	24.04	37.25	4,848.9	1,592.4	1,210.8	2,000.4	3.00	-3.00	0.00
5,400.0	21.04	37.25	4,941.2	1,622.9	1,234.0	2,038.7	3.00	-3.00	0.00
5,500.0	18.04	37.25	5,035.5	1,649.5	1,254.2	2,072.2	3.00	-3.00	0.00
5,600.0	15.04	37.25	5,131.3	1,672.2	1,271.5	2,100.7	3.00	-3.00	0.00
5,700.0	12.04	37.25	5,228.5	1,690.8	1,285.6	2,124.1	3.00	-3.00	0.00
5,800.0	9.04	37.25	5,326.8	1,705.4	1,296.7	2,142.4	3.00	-3.00	0.00
5,900.0	6.04	37.25	5,426.0	1,715.8	1,304.7	2,155.5	3.00	-3.00	0.00
6,000.0	3.04	37.25	5,525.6	1,722.1	1,309.4	2,163.4	3.00	-3.00	0.00
6,100.0	0.04	37.25	5,625.6	1,724.3	1,311.1	2,166.1	3.00	-3.00	0.00
<b>EOB @ Vertical - TOG</b>									
6,101.4	0.00	0.00	5,627.0	1,724.3	1,311.1	2,166.1	3.00	-3.00	-2,624.56
6,200.0	0.00	0.00	5,725.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,300.0	0.00	0.00	5,825.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,400.0	0.00	0.00	5,925.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,500.0	0.00	0.00	6,025.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,600.0	0.00	0.00	6,125.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,700.0	0.00	0.00	6,225.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,800.0	0.00	0.00	6,325.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
6,900.0	0.00	0.00	6,425.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,000.0	0.00	0.00	6,525.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
<b>Cameo</b>									
7,001.4	0.00	0.00	6,527.0	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,100.0	0.00	0.00	6,625.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,200.0	0.00	0.00	6,725.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,300.0	0.00	0.00	6,825.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,400.0	0.00	0.00	6,925.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,500.0	0.00	0.00	7,025.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,600.0	0.00	0.00	7,125.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
<b>Base Cameo Coal</b>									
7,661.4	0.00	0.00	7,187.0	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,700.0	0.00	0.00	7,225.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
<b>Rollins</b>									
7,701.4	0.00	0.00	7,227.0	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,800.0	0.00	0.00	7,325.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
7,900.0	0.00	0.00	7,425.6	1,724.3	1,311.1	2,166.1	0.00	0.00	0.00
<b>TD @ 7951.4' MD / 7477.0' TVD</b>									
7,951.4	0.00	0.00	7,477.0	1,724.3	1,311.1	2,166.1	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 0994-24-01E	<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 0994-24	0.00	0.00	7,477.0	1,724.3	1,311.1	1,531,447.23	2,341,583.54	39° 16' 9.894 N	107° 49' 33.308 W
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,468.2	8 5/8"	8-5/8	11

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,655.2	2,477.0	G' Sand			
4,607.1	4,227.0	Williams Fork			
6,101.4	5,627.0	TOG			
7,001.4	6,527.0	Cameo			
7,661.4	7,187.0	Base Cameo Coal			
7,701.4	7,227.0	Rollins			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
350.0	350.0	0.0	0.0	KOP (Build 3° / 100')
1,226.3	1,195.9	157.2	119.6	EOB @ 26.29° Inc / 37.25° Azm
5,225.1	4,781.1	1,567.0	1,191.5	Drop 3° / 100'
6,101.4	5,627.0	1,724.3	1,311.1	EOB @ Vertical
7,951.4	7,477.0	1,724.3	1,311.1	TD @ 7951.4' MD / 7477.0' TVD