



Project: Mesa County, CO
 Site: Nichols 24-06A
 Well: Nichols 0994-24-02W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.264672
 Longitude: -107.830592
 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 0994-24-02W, 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 0994-24-02W

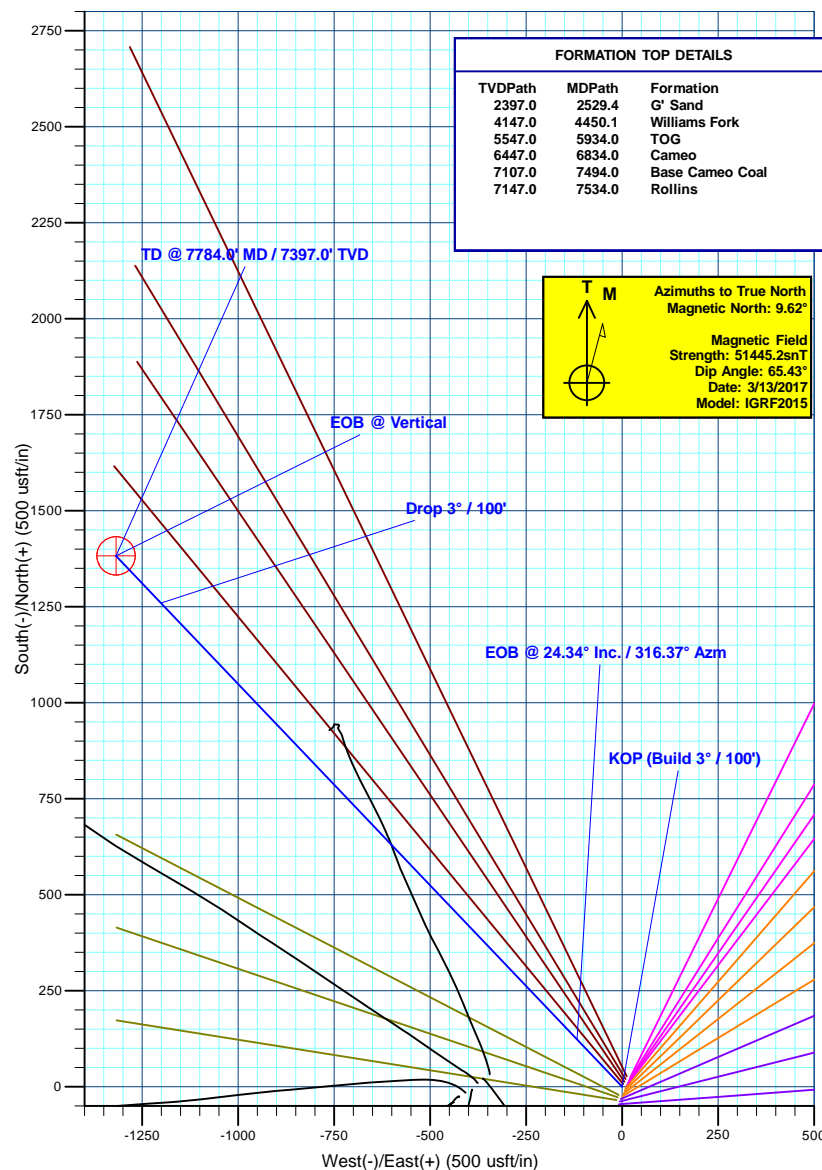
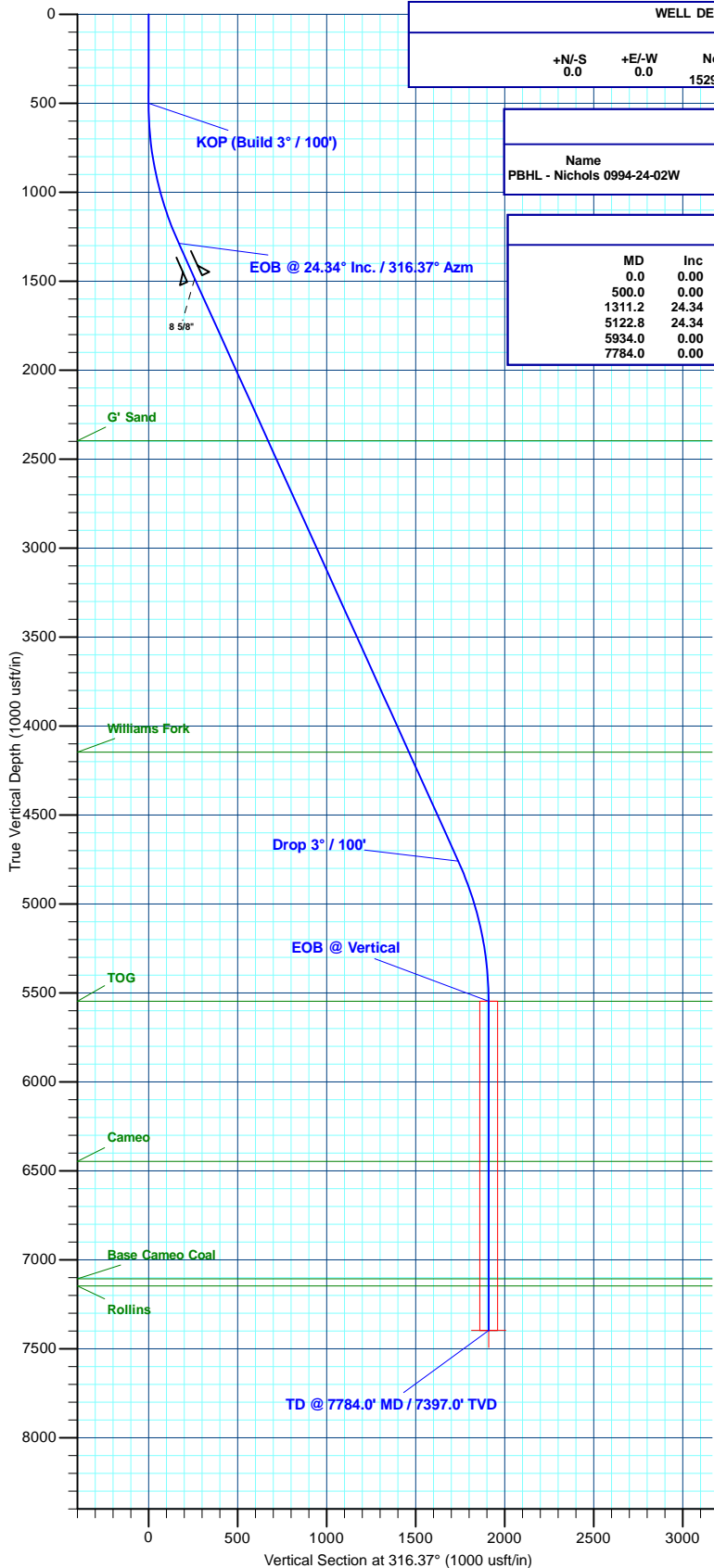
+N/-S	+E/-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529754.20	2340216.69	39.264672	-107.830592

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-02W	7397.0	1382.6	-1317.9	1531170.16	2338934.70	39.268468	-107.835247

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1311.2	24.34	316.37	1287.0	122.8	-117.1	3.00	316.37	169.7	EOB @ 24.34° Inc. / 316.37° Azm
5122.8	24.34	316.37	4760.0	1259.8	-1200.8	0.00	0.00	1740.4	Drop 3° / 100'
5934.0	0.00	0.00	5547.0	1382.6	-1317.9	3.00	180.00	1910.1	EOB @ Vertical
7784.0	0.00	0.00	7397.0	1382.6	-1317.9	0.00	0.00	1910.1	TD @ 7784.0' MD / 7397.0' TVD



Formations to True North
 Magnetic North: 9.62°
 Magnetic Field
 Strength: 51445.2snT
 Dip Angle: 65.43°
 Date: 3/13/2017
 Model: IGRF2015

Plan: Design #1 (Nichols 0994-24-02W/Wellbore #1)

Created By: Will Jircik Date: 16:12, March 13 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-02W

Wellbore #1

Plan: Design #1

QES Well Planning Report

13 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-02W
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 0994-24-02W	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:	39.264528
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 0994-24-02W				
Well Position	+N/-S	52.4 usft	Northing:	1,529,754.20 usft	Latitude:	39.264672
	+E/-W	11.6 usft	Easting:	2,340,216.69 usft	Longitude:	-107.830592
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	316.37

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	
500.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,311.2	24.34	316.37	1,287.0	122.8	-117.1	3.00	3.00	0.00	316.37	
5,122.8	24.34	316.37	4,760.0	1,259.8	-1,200.8	0.00	0.00	0.00	0.00	
5,934.0	0.00	0.00	5,547.0	1,382.6	-1,317.9	3.00	-3.00	0.00	180.00	
7,784.0	0.00	0.00	7,397.0	1,382.6	-1,317.9	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-02W
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 0994-24-02W	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
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP (Build 3° / 100')									
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	3.00	316.37	600.0	1.9	-1.8	2.6	3.00	3.00	0.00
700.0	6.00	316.37	699.6	7.6	-7.2	10.5	3.00	3.00	0.00
800.0	9.00	316.37	798.8	17.0	-16.2	23.5	3.00	3.00	0.00
900.0	12.00	316.37	897.1	30.2	-28.8	41.7	3.00	3.00	0.00
1,000.0	15.00	316.37	994.3	47.1	-44.9	65.1	3.00	3.00	0.00
1,100.0	18.00	316.37	1,090.2	67.7	-64.5	93.5	3.00	3.00	0.00
1,200.0	21.00	316.37	1,184.4	91.8	-87.5	126.9	3.00	3.00	0.00
1,300.0	24.00	316.37	1,276.8	119.5	-113.9	165.1	3.00	3.00	0.00
EOB @ 24.34° Inc. / 316.37° Azm									
1,311.2	24.34	316.37	1,287.0	122.8	-117.1	169.7	3.00	3.00	0.00
1,400.0	24.34	316.37	1,367.9	149.3	-142.3	206.3	0.00	0.00	0.00
1,500.0	24.34	316.37	1,459.1	179.2	-170.8	247.5	0.00	0.00	0.00
8 5/8"									
1,530.0	24.34	316.37	1,486.4	188.1	-179.3	259.9	0.00	0.00	0.00
1,600.0	24.34	316.37	1,550.2	209.0	-199.2	288.7	0.00	0.00	0.00
1,700.0	24.34	316.37	1,641.3	238.8	-227.6	329.9	0.00	0.00	0.00
1,800.0	24.34	316.37	1,732.4	268.6	-256.1	371.1	0.00	0.00	0.00
1,900.0	24.34	316.37	1,823.5	298.5	-284.5	412.3	0.00	0.00	0.00
2,000.0	24.34	316.37	1,914.6	328.3	-312.9	453.5	0.00	0.00	0.00
2,100.0	24.34	316.37	2,005.7	358.1	-341.4	494.8	0.00	0.00	0.00
2,200.0	24.34	316.37	2,096.9	388.0	-369.8	536.0	0.00	0.00	0.00
2,300.0	24.34	316.37	2,188.0	417.8	-398.2	577.2	0.00	0.00	0.00
2,400.0	24.34	316.37	2,279.1	447.6	-426.7	618.4	0.00	0.00	0.00
2,500.0	24.34	316.37	2,370.2	477.4	-455.1	659.6	0.00	0.00	0.00
G' Sand									
2,529.4	24.34	316.37	2,397.0	486.2	-463.4	671.7	0.00	0.00	0.00
2,600.0	24.34	316.37	2,461.3	507.3	-483.5	700.8	0.00	0.00	0.00
2,700.0	24.34	316.37	2,552.4	537.1	-511.9	742.0	0.00	0.00	0.00
2,800.0	24.34	316.37	2,643.5	566.9	-540.4	783.2	0.00	0.00	0.00
2,900.0	24.34	316.37	2,734.7	596.7	-568.8	824.4	0.00	0.00	0.00
3,000.0	24.34	316.37	2,825.8	626.6	-597.2	865.6	0.00	0.00	0.00
3,100.0	24.34	316.37	2,916.9	656.4	-625.7	906.8	0.00	0.00	0.00
3,200.0	24.34	316.37	3,008.0	686.2	-654.1	948.0	0.00	0.00	0.00
3,300.0	24.34	316.37	3,099.1	716.1	-682.5	989.2	0.00	0.00	0.00
3,400.0	24.34	316.37	3,190.2	745.9	-711.0	1,030.5	0.00	0.00	0.00
3,500.0	24.34	316.37	3,281.3	775.7	-739.4	1,071.7	0.00	0.00	0.00
3,600.0	24.34	316.37	3,372.5	805.5	-767.8	1,112.9	0.00	0.00	0.00
3,700.0	24.34	316.37	3,463.6	835.4	-796.3	1,154.1	0.00	0.00	0.00
3,800.0	24.34	316.37	3,554.7	865.2	-824.7	1,195.3	0.00	0.00	0.00
3,900.0	24.34	316.37	3,645.8	895.0	-853.1	1,236.5	0.00	0.00	0.00
4,000.0	24.34	316.37	3,736.9	924.9	-881.6	1,277.7	0.00	0.00	0.00
4,100.0	24.34	316.37	3,828.0	954.7	-910.0	1,318.9	0.00	0.00	0.00
4,200.0	24.34	316.37	3,919.2	984.5	-938.4	1,360.1	0.00	0.00	0.00
4,300.0	24.34	316.37	4,010.3	1,014.3	-966.9	1,401.3	0.00	0.00	0.00
4,400.0	24.34	316.37	4,101.4	1,044.2	-995.3	1,442.5	0.00	0.00	0.00
Williams Fork									
4,450.1	24.34	316.37	4,147.0	1,059.1	-1,009.5	1,463.2	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 0994-24-02W	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)
4,500.0	24.34	316.37	4,192.5	1,074.0	-1,023.7	1,483.7	0.00	0.00	0.00
4,600.0	24.34	316.37	4,283.6	1,103.8	-1,052.2	1,525.0	0.00	0.00	0.00
4,700.0	24.34	316.37	4,374.7	1,133.7	-1,080.6	1,566.2	0.00	0.00	0.00
4,800.0	24.34	316.37	4,465.8	1,163.5	-1,109.0	1,607.4	0.00	0.00	0.00
4,900.0	24.34	316.37	4,557.0	1,193.3	-1,137.5	1,648.6	0.00	0.00	0.00
5,000.0	24.34	316.37	4,648.1	1,223.1	-1,165.9	1,689.8	0.00	0.00	0.00
5,100.0	24.34	316.37	4,739.2	1,253.0	-1,194.3	1,731.0	0.00	0.00	0.00
Drop 3° / 100'									
5,122.8	24.34	316.37	4,760.0	1,259.8	-1,200.8	1,740.4	0.00	0.00	0.00
5,200.0	22.02	316.37	4,830.9	1,281.8	-1,221.8	1,770.8	3.00	-3.00	0.00
5,300.0	19.02	316.37	4,924.6	1,307.1	-1,245.9	1,805.8	3.00	-3.00	0.00
5,400.0	16.02	316.37	5,019.9	1,328.9	-1,266.7	1,835.9	3.00	-3.00	0.00
5,500.0	13.02	316.37	5,116.7	1,347.1	-1,284.0	1,861.0	3.00	-3.00	0.00
5,600.0	10.02	316.37	5,214.7	1,361.5	-1,297.8	1,881.0	3.00	-3.00	0.00
5,700.0	7.02	316.37	5,313.6	1,372.3	-1,308.0	1,895.8	3.00	-3.00	0.00
5,800.0	4.02	316.37	5,413.1	1,379.2	-1,314.6	1,905.4	3.00	-3.00	0.00
5,900.0	1.02	316.37	5,513.0	1,382.4	-1,317.7	1,909.8	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,934.0	0.00	0.00	5,547.0	1,382.6	-1,317.9	1,910.1	3.00	-3.00	0.00
6,000.0	0.00	0.00	5,613.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,100.0	0.00	0.00	5,713.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,200.0	0.00	0.00	5,813.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,300.0	0.00	0.00	5,913.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,400.0	0.00	0.00	6,013.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,500.0	0.00	0.00	6,113.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,600.0	0.00	0.00	6,213.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,700.0	0.00	0.00	6,313.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,800.0	0.00	0.00	6,413.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
Cameo									
6,834.0	0.00	0.00	6,447.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
6,900.0	0.00	0.00	6,513.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,000.0	0.00	0.00	6,613.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,100.0	0.00	0.00	6,713.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,200.0	0.00	0.00	6,813.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,300.0	0.00	0.00	6,913.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,400.0	0.00	0.00	7,013.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
Base Cameo Coal									
7,494.0	0.00	0.00	7,107.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,500.0	0.00	0.00	7,113.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
Rollins									
7,534.0	0.00	0.00	7,147.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,600.0	0.00	0.00	7,213.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
7,700.0	0.00	0.00	7,313.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00
TD @ 7784.0' MD / 7397.0' TVD									
7,784.0	0.00	0.00	7,397.0	1,382.6	-1,317.9	1,910.1	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-02W
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 0994-24-02W	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	7,397.0	1,382.6	-1,317.9	1,531,170.17	2,338,934.70	39.268468	-107.835247
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,486.4	8 5/8"	8-5/8	11

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,529.4	2,397.0	G' Sand			
4,450.1	4,147.0	Williams Fork			
5,934.0	5,547.0	TOG			
6,834.0	6,447.0	Cameo			
7,494.0	7,107.0	Base Cameo Coal			
7,534.0	7,147.0	Rollins			

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
500.0	500.0	0.0	0.0	KOP (Build 3° / 100')
1,311.2	1,287.0	122.8	-117.1	EOB @ 24.34° Inc. / 316.37° Azm
5,122.8	4,760.0	1,259.8	-1,200.8	Drop 3° / 100'
5,934.0	5,547.0	1,382.6	-1,317.9	EOB @ Vertical
7,784.0	7,397.0	1,382.6	-1,317.9	TD @ 7784.0' MD / 7397.0' TVD