



Project: Mesa County, CO
 Site: Nichols 24-06A
 Well: Nichols 0994-24-05W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.264614
 Longitude: -107.830625
 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 0994-24-05W, 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 0994-24-05W

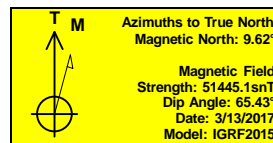
+N/-S	+E/-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529733.32	2340206.81	39.264614	-107.830625

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-05W	7372.0	677.9	-1307.7	1530444.49	2338916.89	39.266475	-107.835244

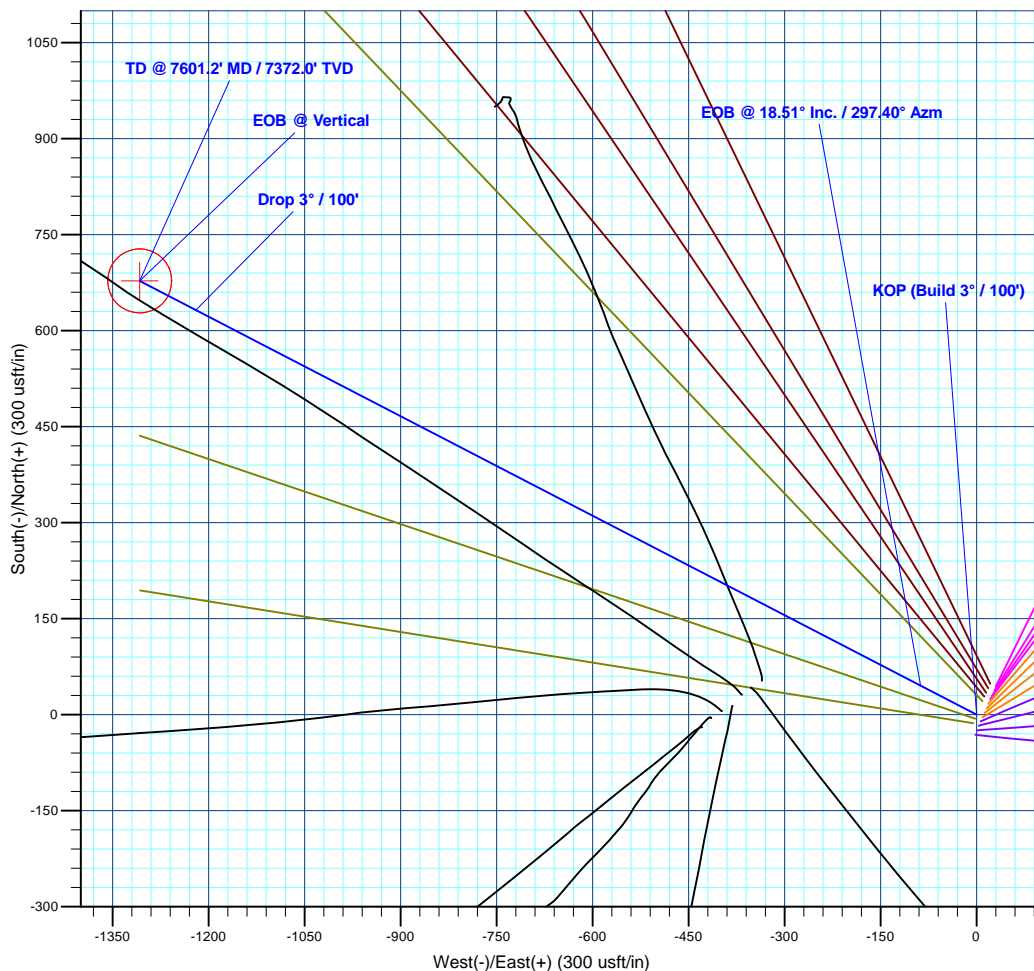
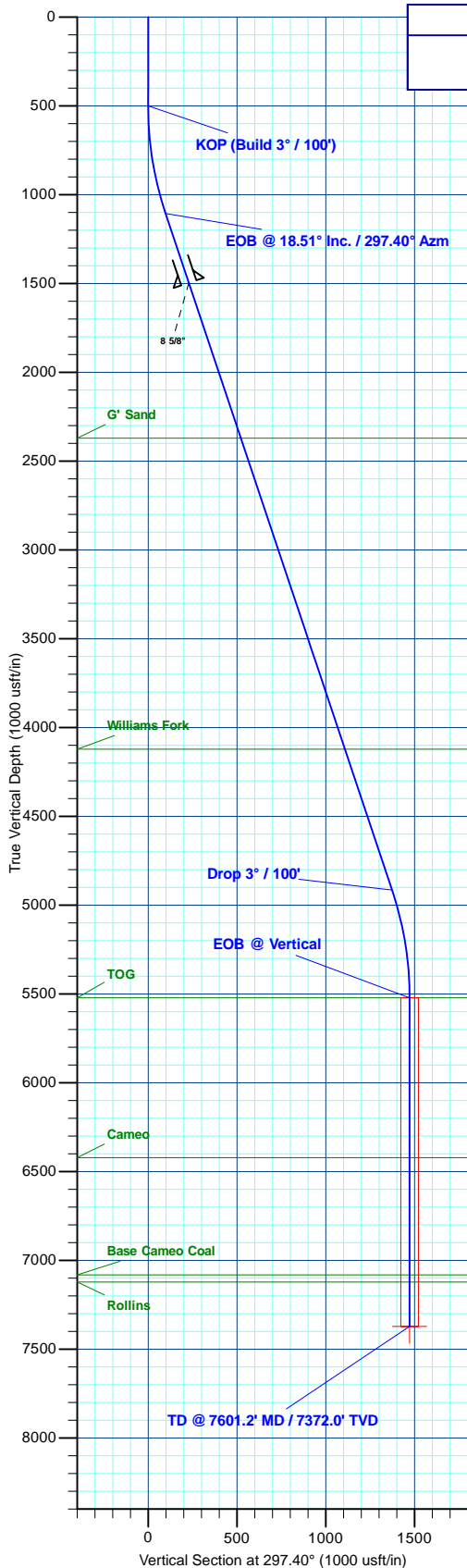
SECTION DETAILS

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')
1117.0	18.51	297.40	1106.3	45.5	-87.7	3.00	297.40	98.8	EOB @ 18.51° Inc. / 297.40° Azm
5134.2	18.51	297.40	4915.7	632.4	-1220.0	0.00	0.00	1374.2	Drop 3° / 100'
5751.2	0.00	0.00	5522.0	677.9	-1307.7	3.00	180.00	1473.0	EOB @ Vertical
7601.2	0.00	0.00	7372.0	677.9	-1307.7	0.00	0.00	1473.0	TD @ 7601.2' MD / 7372.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2372.0	2451.7	G' Sand
4122.0	4297.2	Williams Fork
5522.0	5751.2	TOG
6422.0	6651.2	Cameo
7082.0	7311.2	Base Cameo Coal
7122.0	7351.2	Rollins



Plan: Design #1 (Nichols 0994-24-05W/Wellbore #1)

Created By: Will Jircik Date: 16:33, March 13 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-05W

Wellbore #1

Plan: Design #1

QES Well Planning Report

13 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-05W
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 0994-24-05W	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 0994-24-05W				
Well Position	+N/-S	31.3 usft	Northing:	1,529,733.32 usft	Latitude:	39.264614
	+E/-W	2.3 usft	Easting:	2,340,206.81 usft	Longitude:	-107.830625
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	297.40

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	
1,117.0	18.51	297.40	1,106.3	45.5	-87.7	3.00	3.00	0.00	297.40	
5,134.2	18.51	297.40	4,915.7	632.4	-1,220.0	0.00	0.00	0.00	0.00	
5,751.2	0.00	0.00	5,522.0	677.9	-1,307.7	3.00	-3.00	0.00	180.00	
7,601.2	0.00	0.00	7,372.0	677.9	-1,307.7	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-05W
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 0994-24-05W	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	297.40	600.0	1.2	-2.3	2.6	3.00	3.00	0.00
700.0	6.00	297.40	699.6	4.8	-9.3	10.5	3.00	3.00	0.00
800.0	9.00	297.40	798.8	10.8	-20.9	23.5	3.00	3.00	0.00
900.0	12.00	297.40	897.1	19.2	-37.1	41.7	3.00	3.00	0.00
1,000.0	15.00	297.40	994.3	29.9	-57.8	65.1	3.00	3.00	0.00
1,100.0	18.00	297.40	1,090.2	43.0	-83.0	93.5	3.00	3.00	0.00
EOB @ 18.51° Inc. / 297.40° Azm									
1,117.0	18.51	297.40	1,106.3	45.5	-87.7	98.8	3.00	3.00	0.00
1,200.0	18.51	297.40	1,185.0	57.6	-111.1	125.2	0.00	0.00	0.00
1,300.0	18.51	297.40	1,279.9	72.2	-139.3	156.9	0.00	0.00	0.00
1,400.0	18.51	297.40	1,374.7	86.8	-167.5	188.6	0.00	0.00	0.00
1,500.0	18.51	297.40	1,469.5	101.4	-195.7	220.4	0.00	0.00	0.00
8 5/8"									
1,530.0	18.51	297.40	1,498.0	105.8	-204.1	229.9	0.00	0.00	0.00
1,600.0	18.51	297.40	1,564.3	116.0	-223.9	252.1	0.00	0.00	0.00
1,700.0	18.51	297.40	1,659.2	130.6	-252.0	283.9	0.00	0.00	0.00
1,800.0	18.51	297.40	1,754.0	145.3	-280.2	315.6	0.00	0.00	0.00
1,900.0	18.51	297.40	1,848.8	159.9	-308.4	347.4	0.00	0.00	0.00
2,000.0	18.51	297.40	1,943.6	174.5	-336.6	379.1	0.00	0.00	0.00
2,100.0	18.51	297.40	2,038.5	189.1	-364.8	410.9	0.00	0.00	0.00
2,200.0	18.51	297.40	2,133.3	203.7	-393.0	442.6	0.00	0.00	0.00
2,300.0	18.51	297.40	2,228.1	218.3	-421.2	474.4	0.00	0.00	0.00
2,400.0	18.51	297.40	2,322.9	232.9	-449.3	506.1	0.00	0.00	0.00
G' Sand									
2,451.7	18.51	297.40	2,372.0	240.5	-463.9	522.5	0.00	0.00	0.00
2,500.0	18.51	297.40	2,417.8	247.5	-477.5	537.9	0.00	0.00	0.00
2,600.0	18.51	297.40	2,512.6	262.1	-505.7	569.6	0.00	0.00	0.00
2,700.0	18.51	297.40	2,607.4	276.7	-533.9	601.4	0.00	0.00	0.00
2,800.0	18.51	297.40	2,702.3	291.4	-562.1	633.1	0.00	0.00	0.00
2,900.0	18.51	297.40	2,797.1	306.0	-590.3	664.9	0.00	0.00	0.00
3,000.0	18.51	297.40	2,891.9	320.6	-618.5	696.6	0.00	0.00	0.00
3,100.0	18.51	297.40	2,986.7	335.2	-646.7	728.4	0.00	0.00	0.00
3,200.0	18.51	297.40	3,081.6	349.8	-674.8	760.1	0.00	0.00	0.00
3,300.0	18.51	297.40	3,176.4	364.4	-703.0	791.9	0.00	0.00	0.00
3,400.0	18.51	297.40	3,271.2	379.0	-731.2	823.6	0.00	0.00	0.00
3,500.0	18.51	297.40	3,366.0	393.6	-759.4	855.4	0.00	0.00	0.00
3,600.0	18.51	297.40	3,460.9	408.2	-787.6	887.1	0.00	0.00	0.00
3,700.0	18.51	297.40	3,555.7	422.8	-815.8	918.9	0.00	0.00	0.00
3,800.0	18.51	297.40	3,650.5	437.5	-844.0	950.6	0.00	0.00	0.00
3,900.0	18.51	297.40	3,745.3	452.1	-872.1	982.3	0.00	0.00	0.00
4,000.0	18.51	297.40	3,840.2	466.7	-900.3	1,014.1	0.00	0.00	0.00
4,100.0	18.51	297.40	3,935.0	481.3	-928.5	1,045.8	0.00	0.00	0.00
4,200.0	18.51	297.40	4,029.8	495.9	-956.7	1,077.6	0.00	0.00	0.00
Williams Fork									
4,297.2	18.51	297.40	4,122.0	510.1	-984.1	1,108.5	0.00	0.00	0.00
4,300.0	18.51	297.40	4,124.7	510.5	-984.9	1,109.3	0.00	0.00	0.00
4,400.0	18.51	297.40	4,219.5	525.1	-1,013.1	1,141.1	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 0994-24-05W	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	18.51	297.40	4,314.3	539.7	-1,041.3	1,172.8	0.00	0.00	0.00
4,600.0	18.51	297.40	4,409.1	554.3	-1,069.5	1,204.6	0.00	0.00	0.00
4,700.0	18.51	297.40	4,504.0	569.0	-1,097.6	1,236.3	0.00	0.00	0.00
4,800.0	18.51	297.40	4,598.8	583.6	-1,125.8	1,268.1	0.00	0.00	0.00
4,900.0	18.51	297.40	4,693.6	598.2	-1,154.0	1,299.8	0.00	0.00	0.00
5,000.0	18.51	297.40	4,788.4	612.8	-1,182.2	1,331.6	0.00	0.00	0.00
5,100.0	18.51	297.40	4,883.3	627.4	-1,210.4	1,363.3	0.00	0.00	0.00
Drop 3° / 100'									
5,134.2	18.51	297.40	4,915.7	632.4	-1,220.0	1,374.2	0.00	0.00	0.00
5,200.0	16.54	297.40	4,978.4	641.5	-1,237.6	1,394.0	3.00	-3.00	0.00
5,300.0	13.54	297.40	5,075.0	653.4	-1,260.6	1,419.9	3.00	-3.00	0.00
5,400.0	10.54	297.40	5,172.8	663.0	-1,279.1	1,440.8	3.00	-3.00	0.00
5,500.0	7.54	297.40	5,271.5	670.3	-1,293.1	1,456.5	3.00	-3.00	0.00
5,600.0	4.54	297.40	5,371.0	675.1	-1,302.4	1,467.0	3.00	-3.00	0.00
5,700.0	1.54	297.40	5,470.8	677.5	-1,307.1	1,472.3	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,751.2	0.00	0.00	5,522.0	677.9	-1,307.7	1,473.0	3.00	-3.00	122.31
5,800.0	0.00	0.00	5,570.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,670.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,000.0	0.00	0.00	5,770.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,100.0	0.00	0.00	5,870.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,200.0	0.00	0.00	5,970.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,300.0	0.00	0.00	6,070.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,400.0	0.00	0.00	6,170.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,500.0	0.00	0.00	6,270.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,600.0	0.00	0.00	6,370.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
Cameo									
6,651.2	0.00	0.00	6,422.0	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,470.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,800.0	0.00	0.00	6,570.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
6,900.0	0.00	0.00	6,670.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,000.0	0.00	0.00	6,770.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,100.0	0.00	0.00	6,870.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,200.0	0.00	0.00	6,970.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,300.0	0.00	0.00	7,070.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
Base Cameo Coal									
7,311.2	0.00	0.00	7,082.0	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
Rollins									
7,351.2	0.00	0.00	7,122.0	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,400.0	0.00	0.00	7,170.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,500.0	0.00	0.00	7,270.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
7,600.0	0.00	0.00	7,370.8	677.9	-1,307.7	1,473.0	0.00	0.00	0.00
TD @ 7601.2' MD / 7372.0' TVD									
7,601.2	0.00	0.00	7,372.0	677.9	-1,307.7	1,473.0	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-05W
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 0994-24-05W	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 0994-24	0.00	0.00	7,372.0	677.9	-1,307.7	1,530,444.50	2,338,916.89	39.266475	-107.835244
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth	Vertical Depth		Casing Diameter	Hole Diameter
(usft)	(usft)	Name	(")	(")
1,530.0	1,498.0	8 5/8"	8-5/8	11

Formations						
Measured Depth	Vertical Depth			Dip	Dip Direction	
(usft)	(usft)	Name	Lithology	(°)	(°)	
2,451.7	2,372.0	G' Sand				
4,297.2	4,122.0	Williams Fork				
5,751.2	5,522.0	TOG				
6,651.2	6,422.0	Cameo				
7,311.2	7,082.0	Base Cameo Coal				
7,351.2	7,122.0	Rollins				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
(usft)	(usft)	(usft)	(usft)		
500.0	500.0	0.0	0.0	KOP (Build 3° / 100')	
1,117.0	1,106.3	45.5	-87.7	EOB @ 18.51° Inc. / 297.40° Azm	
5,134.2	4,915.7	632.4	-1,220.0	Drop 3° / 100'	
5,751.2	5,522.0	677.9	-1,307.7	EOB @ Vertical	
7,601.2	7,372.0	677.9	-1,307.7	TD @ 7601.2' MD / 7372.0' TVD	