



Project: Mesa County, CO
 Site: Nichols 24-06A
 Well: Nichols 0994-24-07W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.264578
 Longitude: -107.830644
 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 0994-24-07W, 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 0994-24-07W

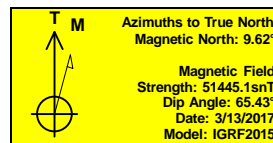
+N-S	+E-W	Northing	Ground Level: Easting	7137.0 Latitude	Longitude
0.0	0.0	1529720.35	2340201.09	39.264578	-107.830644

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

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-07W	7355.0	207.3	-1301.8	1529960.96	2338905.02	39.265147	-107.835242

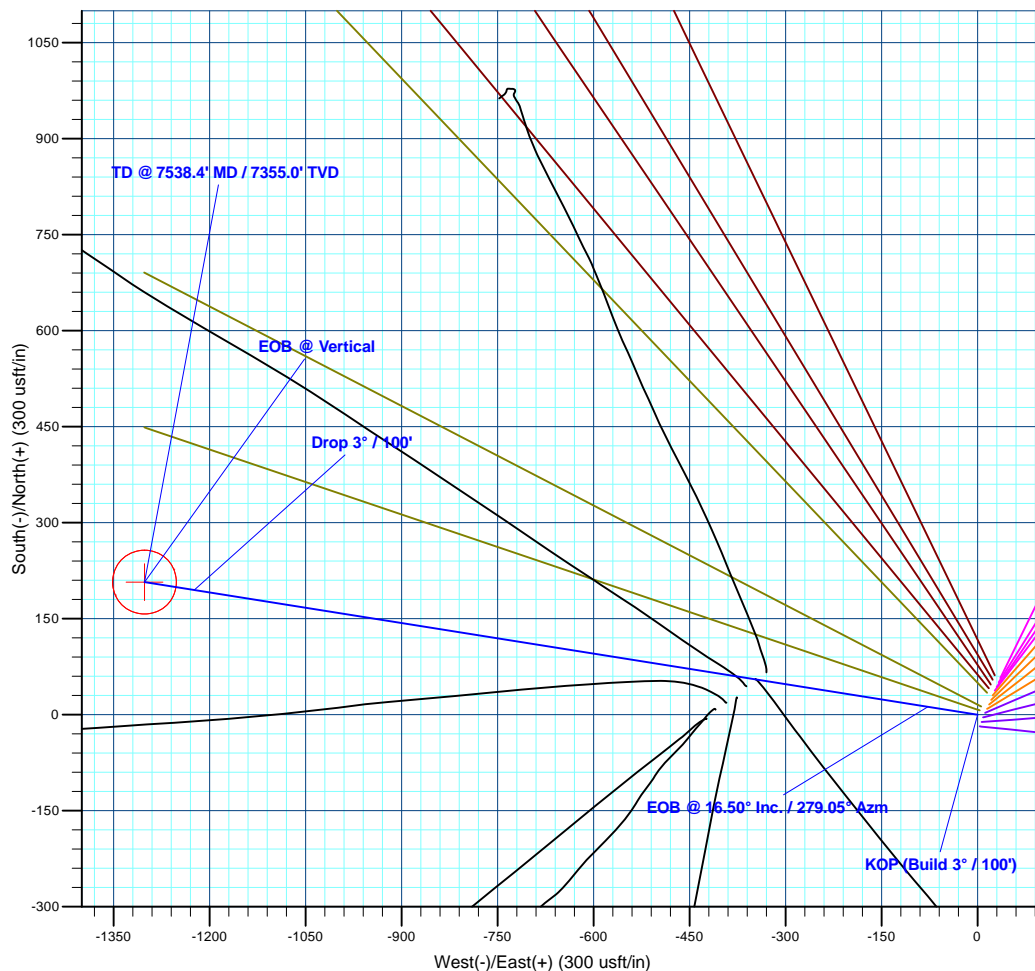
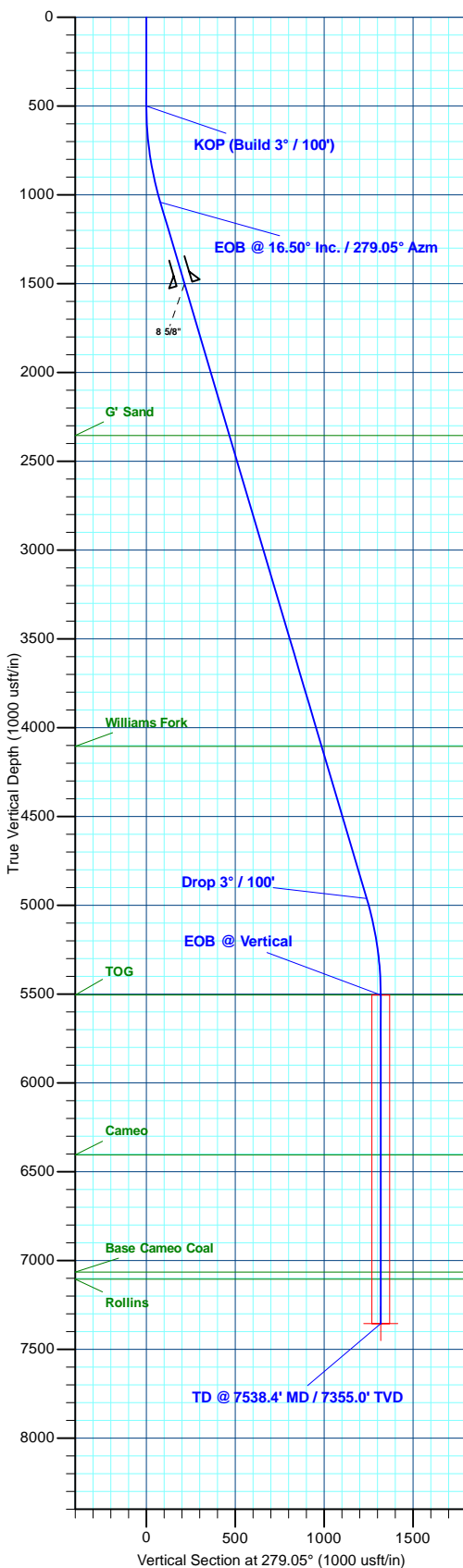
SECTION DETAILS

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')
1049.9	16.50	279.05	1042.3	12.4	-77.6	3.00	279.05	78.6	EOB @ 16.50° Inc. / 279.05° Azm
5138.6	16.50	279.05	4962.7	194.9	-1224.2	0.00	0.00	1239.6	Drop 3° / 100'
5688.4	0.00	0.00	5505.0	207.3	-1301.8	3.00	180.00	1318.2	EOB @ Vertical
7538.4	0.00	0.00	7355.0	207.3	-1301.8	0.00	0.00	1318.2	TD @ 7538.4' MD / 7355.0' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2355.0	2418.9	G' Sand
4105.0	4244.0	Williams Fork
5505.0	5688.4	TOG
6405.0	6588.4	Cameo
7065.0	7248.4	Base Cameo Coal
7105.0	7288.4	Rollins



Plan: Design #1 (Nichols 0994-24-07W/Wellbore #1)

Created By: Will Jircik Date: 17:10, March 13 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-06A

Nichols 0994-24-07W

Wellbore #1

Plan: Design #1

QES Well Planning Report

13 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-07W
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 0994-24-07W	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 0994-24-07W					
Well Position	+N/-S	18.2 usft	Northing:	1,529,720.35 usft	Latitude:	39.264578
	+E/-W	-3.1 usft	Easting:	2,340,201.09 usft	Longitude:	-107.830644
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	279.05

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	
1,049.9	16.50	279.05	1,042.3	12.4	-77.6	3.00	3.00	0.00	279.05	
5,138.6	16.50	279.05	4,962.7	194.9	-1,224.2	0.00	0.00	0.00	0.00	
5,688.4	0.00	0.00	5,505.0	207.3	-1,301.8	3.00	-3.00	0.00	180.00	
7,538.4	0.00	0.00	7,355.0	207.3	-1,301.8	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-07W
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 0994-24-07W	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	279.05	600.0	0.4	-2.6	2.6	3.00	3.00	0.00
700.0	6.00	279.05	699.6	1.6	-10.3	10.5	3.00	3.00	0.00
800.0	9.00	279.05	798.8	3.7	-23.2	23.5	3.00	3.00	0.00
900.0	12.00	279.05	897.1	6.6	-41.2	41.7	3.00	3.00	0.00
1,000.0	15.00	279.05	994.3	10.2	-64.3	65.1	3.00	3.00	0.00
EOB @ 16.50° Inc. / 279.05° Azm									
1,049.9	16.50	279.05	1,042.3	12.4	-77.6	78.6	3.00	3.00	0.00
1,100.0	16.50	279.05	1,090.4	14.6	-91.7	92.8	0.00	0.00	0.00
1,200.0	16.50	279.05	1,186.3	19.1	-119.7	121.2	0.00	0.00	0.00
1,300.0	16.50	279.05	1,282.1	23.5	-147.8	149.6	0.00	0.00	0.00
1,400.0	16.50	279.05	1,378.0	28.0	-175.8	178.0	0.00	0.00	0.00
1,500.0	16.50	279.05	1,473.9	32.5	-203.9	206.4	0.00	0.00	0.00
8 5/8"									
1,530.0	16.50	279.05	1,502.7	33.8	-212.3	214.9	0.00	0.00	0.00
1,600.0	16.50	279.05	1,569.8	36.9	-231.9	234.8	0.00	0.00	0.00
1,700.0	16.50	279.05	1,665.7	41.4	-259.9	263.2	0.00	0.00	0.00
1,800.0	16.50	279.05	1,761.6	45.9	-288.0	291.6	0.00	0.00	0.00
1,900.0	16.50	279.05	1,857.4	50.3	-316.0	320.0	0.00	0.00	0.00
2,000.0	16.50	279.05	1,953.3	54.8	-344.1	348.4	0.00	0.00	0.00
2,100.0	16.50	279.05	2,049.2	59.2	-372.1	376.8	0.00	0.00	0.00
2,200.0	16.50	279.05	2,145.1	63.7	-400.2	405.2	0.00	0.00	0.00
2,300.0	16.50	279.05	2,241.0	68.2	-428.2	433.6	0.00	0.00	0.00
2,400.0	16.50	279.05	2,336.9	72.6	-456.2	462.0	0.00	0.00	0.00
G' Sand									
2,418.9	16.50	279.05	2,355.0	73.5	-461.5	467.4	0.00	0.00	0.00
2,500.0	16.50	279.05	2,432.7	77.1	-484.3	490.4	0.00	0.00	0.00
2,600.0	16.50	279.05	2,528.6	81.6	-512.3	518.8	0.00	0.00	0.00
2,700.0	16.50	279.05	2,624.5	86.0	-540.4	547.2	0.00	0.00	0.00
2,800.0	16.50	279.05	2,720.4	90.5	-568.4	575.6	0.00	0.00	0.00
2,900.0	16.50	279.05	2,816.3	95.0	-596.4	604.0	0.00	0.00	0.00
3,000.0	16.50	279.05	2,912.2	99.4	-624.5	632.4	0.00	0.00	0.00
3,100.0	16.50	279.05	3,008.0	103.9	-652.5	660.7	0.00	0.00	0.00
3,200.0	16.50	279.05	3,103.9	108.4	-680.6	689.1	0.00	0.00	0.00
3,300.0	16.50	279.05	3,199.8	112.8	-708.6	717.5	0.00	0.00	0.00
3,400.0	16.50	279.05	3,295.7	117.3	-736.7	745.9	0.00	0.00	0.00
3,500.0	16.50	279.05	3,391.6	121.8	-764.7	774.3	0.00	0.00	0.00
3,600.0	16.50	279.05	3,487.5	126.2	-792.7	802.7	0.00	0.00	0.00
3,700.0	16.50	279.05	3,583.4	130.7	-820.8	831.1	0.00	0.00	0.00
3,800.0	16.50	279.05	3,679.2	135.2	-848.8	859.5	0.00	0.00	0.00
3,900.0	16.50	279.05	3,775.1	139.6	-876.9	887.9	0.00	0.00	0.00
4,000.0	16.50	279.05	3,871.0	144.1	-904.9	916.3	0.00	0.00	0.00
4,100.0	16.50	279.05	3,966.9	148.5	-932.9	944.7	0.00	0.00	0.00
4,200.0	16.50	279.05	4,062.8	153.0	-961.0	973.1	0.00	0.00	0.00
Williams Fork									
4,244.0	16.50	279.05	4,105.0	155.0	-973.3	985.6	0.00	0.00	0.00
4,300.0	16.50	279.05	4,158.7	157.5	-989.0	1,001.5	0.00	0.00	0.00
4,400.0	16.50	279.05	4,254.5	161.9	-1,017.1	1,029.9	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-07W
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 0994-24-07W	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	16.50	279.05	4,350.4	166.4	-1,045.1	1,058.3	0.00	0.00	0.00
4,600.0	16.50	279.05	4,446.3	170.9	-1,073.2	1,086.7	0.00	0.00	0.00
4,700.0	16.50	279.05	4,542.2	175.3	-1,101.2	1,115.1	0.00	0.00	0.00
4,800.0	16.50	279.05	4,638.1	179.8	-1,129.2	1,143.5	0.00	0.00	0.00
4,900.0	16.50	279.05	4,734.0	184.3	-1,157.3	1,171.9	0.00	0.00	0.00
5,000.0	16.50	279.05	4,829.8	188.7	-1,185.3	1,200.3	0.00	0.00	0.00
5,100.0	16.50	279.05	4,925.7	193.2	-1,213.4	1,228.7	0.00	0.00	0.00
Drop 3° / 100'									
5,138.6	16.50	279.05	4,962.7	194.9	-1,224.2	1,239.6	0.00	0.00	0.00
5,200.0	14.65	279.05	5,021.9	197.5	-1,240.5	1,256.1	3.00	-3.00	0.00
5,300.0	11.65	279.05	5,119.2	201.1	-1,262.9	1,278.8	3.00	-3.00	0.00
5,400.0	8.65	279.05	5,217.7	203.9	-1,280.3	1,296.5	3.00	-3.00	0.00
5,500.0	5.65	279.05	5,316.9	205.8	-1,292.6	1,308.9	3.00	-3.00	0.00
5,600.0	2.65	279.05	5,416.6	207.0	-1,299.8	1,316.2	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,688.4	0.00	0.00	5,505.0	207.3	-1,301.8	1,318.2	3.00	-3.00	0.00
5,700.0	0.00	0.00	5,516.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
5,800.0	0.00	0.00	5,616.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
5,900.0	0.00	0.00	5,716.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,000.0	0.00	0.00	5,816.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,100.0	0.00	0.00	5,916.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,200.0	0.00	0.00	6,016.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,300.0	0.00	0.00	6,116.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,400.0	0.00	0.00	6,216.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,500.0	0.00	0.00	6,316.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
Cameo									
6,588.4	0.00	0.00	6,405.0	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,600.0	0.00	0.00	6,416.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,700.0	0.00	0.00	6,516.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,800.0	0.00	0.00	6,616.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
6,900.0	0.00	0.00	6,716.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,000.0	0.00	0.00	6,816.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,100.0	0.00	0.00	6,916.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,200.0	0.00	0.00	7,016.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
Base Cameo Coal									
7,248.4	0.00	0.00	7,065.0	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
Rollins									
7,288.4	0.00	0.00	7,105.0	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,300.0	0.00	0.00	7,116.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,400.0	0.00	0.00	7,216.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
7,500.0	0.00	0.00	7,316.6	207.3	-1,301.8	1,318.2	0.00	0.00	0.00
TD @ 7538.4' MD / 7355.0' TVD									
7,538.4	0.00	0.00	7,355.0	207.3	-1,301.8	1,318.2	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-07W
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 0994-24-07W	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	7,355.0	207.3	-1,301.8	1,529,960.96	2,338,905.03	39.265147	-107.835242
- plan hits target center									
- Circle (radius 50.0)									

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,502.7	8 5/8"	8-5/8	11

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
2,418.9	2,355.0	G' Sand				
4,244.0	4,105.0	Williams Fork				
5,688.4	5,505.0	TOG				
6,588.4	6,405.0	Cameo				
7,248.4	7,065.0	Base Cameo Coal				
7,288.4	7,105.0	Rollins				

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
500.0	500.0	0.0	0.0	KOP (Build 3° / 100')	
1,049.9	1,042.3	12.4	-77.6	EOB @ 16.50° Inc. / 279.05° Azm	
5,138.6	4,962.7	194.9	-1,224.2	Drop 3° / 100'	
5,688.4	5,505.0	207.3	-1,301.8	EOB @ Vertical	
7,538.4	7,355.0	207.3	-1,301.8	TD @ 7538.4' MD / 7355.0' TVD	