



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-15E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263306
 Longitude: -107.830836
 Ground Level: 7212.0
 well @ 7242.0usft (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 0994-24-15E, True North
 Vertical (TVD) Reference: well @ 7242.0usft (H&P #522)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: well @ 7242.0usft (H&P #522)
 Calculation Method: Minimum Curvature

WELL DETAILS: Nichols 0994-24-15E

+N/-S	+E/-W	Northings	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1529258.61	2340134.86	39.263306	-107.830836

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

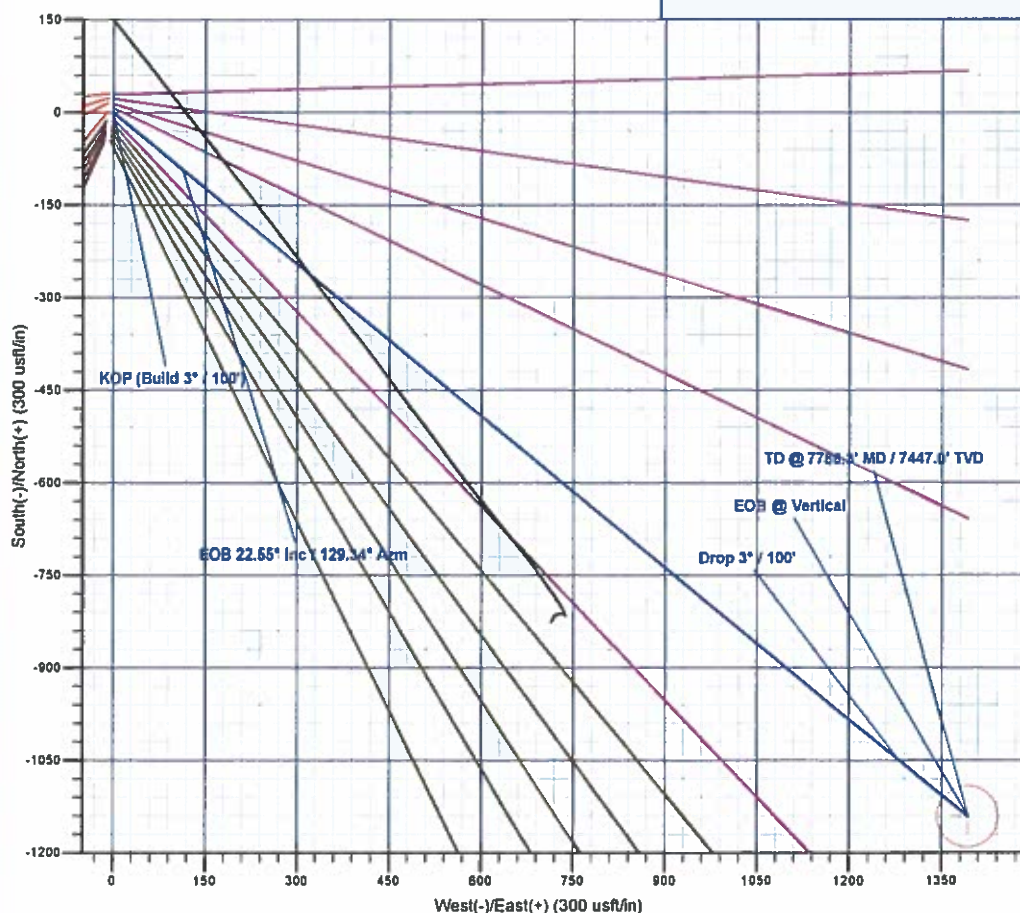
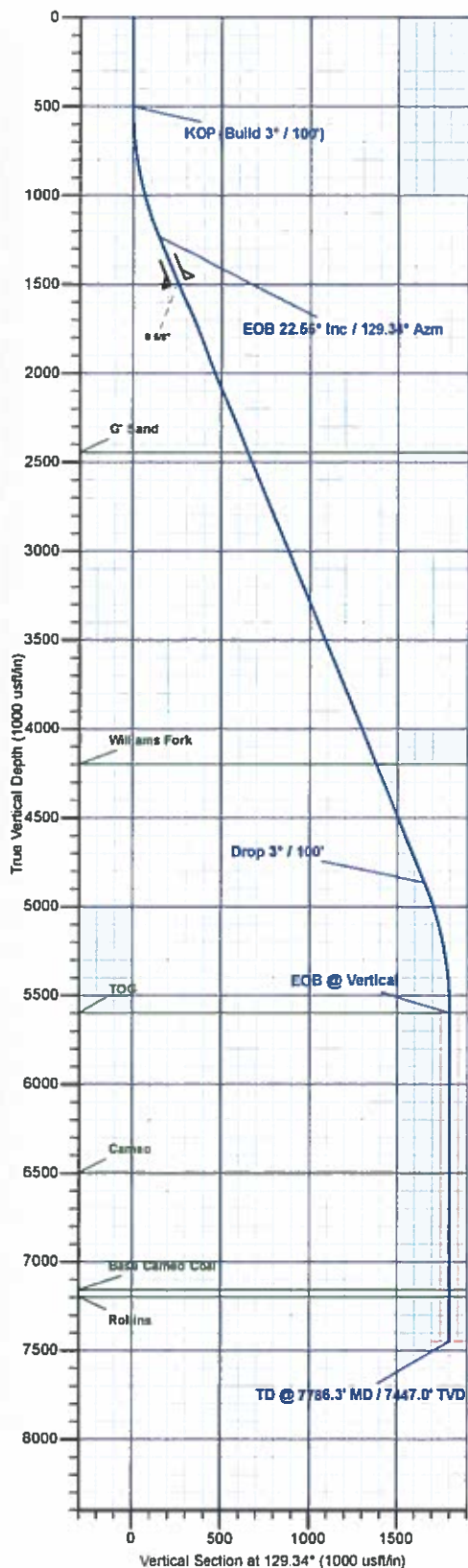
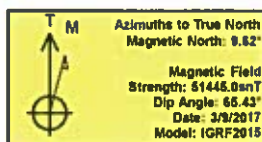
Name	TVD	+N/-S	+E/-W	Northings	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-15E	7447.0	-1141.4	1392.5	1528081.85	2341497.83	39.260172	-107.825918

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')
1251.8	22.55	129.34	1232.5	-92.8	113.0	3.00	129.34	146.1	EOB 22.55° Inc / 129.34° Azm
6184.5	22.55	129.34	4864.5	-1048.8	1279.5	0.00	0.00	1654.5	Drop 3° / 100'
5936.3	0.00	0.00	5937.0	-1141.4	1392.5	3.00	180.00	1800.5	EOB @ Vertical
7786.3	0.00	0.00	7447.0	-1141.4	1392.5	0.00	0.00	1800.5	TD @ 7786.3' MD / 7447.0' TVD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2447.0	2566.8	G' Sand
4197.0	4481.8	Williams Fork
5597.0	5936.3	TOG
6497.0	6836.3	Cameo
7157.0	7496.3	Base Cameo Coal
7197.0	7536.3	Rollins



Plan: Design #1 (Nichols 0994-24-15E/Wellbore #1)

Created By: Will Jircik Date: 16:13, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-15E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-15E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7242.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7242.0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols 0994-24-15E	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 24-07 Pad			
Site Position:		Northing:	1,529,213.07 usft	Latitude: 39.263181
From:	Lat/Long	Easting:	2,340,128.94 usft	Longitude: -107.830853
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: -1.47 "

Well	Nichols 0994-24-15E			
Well Position	+N/-S	45.7 usft	Northing:	1,529,258.61 usft
	+E/-W	4.8 usft	Easting:	2,340,134.87 usft
Position Uncertainty	0.0 usft		Wellhead Elevation:	0.0 usft
			Ground Level:	7,212.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	3/9/2017	9.63	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	129.34

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	
1,251.8	22.55	129.34	1,232.5	-92.6	113.0	3.00	3.00	0.00	129.34	
5,184.5	22.55	129.34	4,864.5	-1,048.8	1,279.5	0.00	0.00	0.00	0.00	
5,936.3	0.00	0.00	5,597.0	-1,141.4	1,392.5	3.00	-3.00	0.00	180.00	
7,786.3	0.00	0.00	7,447.0	-1,141.4	1,392.5	0.00	0.00	0.00	0.00	0.00 PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-15E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7242.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7242.0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols 0994-24-15E	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	129.34	600.0	-1.7	2.0	2.6	3.00	3.00	0.00
700.0	6.00	129.34	699.6	-6.6	8.1	10.5	3.00	3.00	0.00
800.0	9.00	129.34	798.8	-14.9	18.2	23.5	3.00	3.00	0.00
900.0	12.00	129.34	897.1	-26.5	32.3	41.7	3.00	3.00	0.00
1,000.0	15.00	129.34	994.3	-41.3	50.3	65.1	3.00	3.00	0.00
1,100.0	18.00	129.34	1,090.2	-59.3	72.3	93.5	3.00	3.00	0.00
1,200.0	21.00	129.34	1,184.4	-80.4	98.1	126.9	3.00	3.00	0.00
EOB 22.65° Inc / 129.34° Azm									
1,251.8	22.55	129.34	1,232.5	-92.6	113.0	146.1	3.00	3.00	0.00
1,300.0	22.55	129.34	1,277.0	-104.3	127.3	164.6	0.00	0.00	0.00
1,400.0	22.55	129.34	1,369.4	-128.6	156.9	202.9	0.00	0.00	0.00
1,500.0	22.55	129.34	1,461.8	-152.9	186.6	241.3	0.00	0.00	0.00
8 5/8"									
1,530.0	22.55	129.34	1,489.5	-160.2	195.5	252.8	0.00	0.00	0.00
1,600.0	22.55	129.34	1,554.1	-177.3	216.3	279.6	0.00	0.00	0.00
1,700.0	22.55	129.34	1,646.5	-201.6	245.9	318.0	0.00	0.00	0.00
1,800.0	22.55	129.34	1,738.8	-225.9	275.6	356.3	0.00	0.00	0.00
1,900.0	22.55	129.34	1,831.2	-250.2	305.2	394.7	0.00	0.00	0.00
2,000.0	22.55	129.34	1,923.5	-274.5	334.9	433.0	0.00	0.00	0.00
2,100.0	22.55	129.34	2,015.9	-298.8	364.6	471.4	0.00	0.00	0.00
2,200.0	22.55	129.34	2,108.2	-323.1	394.2	509.8	0.00	0.00	0.00
2,300.0	22.55	129.34	2,200.6	-347.5	423.9	548.1	0.00	0.00	0.00
2,400.0	22.55	129.34	2,292.9	-371.8	453.6	586.5	0.00	0.00	0.00
2,500.0	22.55	129.34	2,385.3	-396.1	483.2	624.8	0.00	0.00	0.00
G' Sand									
2,566.8	22.55	129.34	2,447.0	-412.3	503.1	650.5	0.00	0.00	0.00
2,600.0	22.55	129.34	2,477.6	-420.4	512.9	663.2	0.00	0.00	0.00
2,700.0	22.55	129.34	2,570.0	-444.7	542.6	701.5	0.00	0.00	0.00
2,800.0	22.55	129.34	2,662.3	-469.0	572.2	739.9	0.00	0.00	0.00
2,900.0	22.55	129.34	2,754.7	-493.3	601.9	778.2	0.00	0.00	0.00
3,000.0	22.55	129.34	2,847.0	-517.7	631.5	816.6	0.00	0.00	0.00
3,100.0	22.55	129.34	2,939.4	-542.0	661.2	854.9	0.00	0.00	0.00
3,200.0	22.55	129.34	3,031.7	-566.3	690.9	893.3	0.00	0.00	0.00
3,300.0	22.55	129.34	3,124.1	-590.6	720.5	931.7	0.00	0.00	0.00
3,400.0	22.55	129.34	3,216.4	-614.9	750.2	970.0	0.00	0.00	0.00
3,500.0	22.55	129.34	3,308.8	-639.2	779.9	1,008.4	0.00	0.00	0.00
3,600.0	22.55	129.34	3,401.1	-663.5	809.5	1,046.7	0.00	0.00	0.00
3,700.0	22.55	129.34	3,493.5	-687.9	839.2	1,085.1	0.00	0.00	0.00
3,800.0	22.55	129.34	3,585.8	-712.2	868.9	1,123.4	0.00	0.00	0.00
3,900.0	22.55	129.34	3,678.2	-736.5	898.5	1,161.8	0.00	0.00	0.00
4,000.0	22.55	129.34	3,770.6	-760.8	928.2	1,200.1	0.00	0.00	0.00
4,100.0	22.55	129.34	3,862.9	-785.1	957.8	1,238.5	0.00	0.00	0.00
4,200.0	22.55	129.34	3,955.3	-809.4	987.5	1,276.9	0.00	0.00	0.00
4,300.0	22.55	129.34	4,047.6	-833.7	1,017.2	1,315.2	0.00	0.00	0.00
4,400.0	22.55	129.34	4,140.0	-858.1	1,046.8	1,353.6	0.00	0.00	0.00
Williams Fork									
4,461.8	22.55	129.34	4,197.0	-873.1	1,065.2	1,377.3	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-15E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7242 0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7242 0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols 0994-24-15E	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	22.55	129.34	4,232.3	-882.4	1,076.5	1,391.9	0.00	0.00	0.00
4,600.0	22.55	129.34	4,324.7	-906.7	1,106.2	1,430.3	0.00	0.00	0.00
4,700.0	22.55	129.34	4,417.0	-931.0	1,135.8	1,468.6	0.00	0.00	0.00
4,800.0	22.55	129.34	4,509.4	-955.3	1,165.5	1,507.0	0.00	0.00	0.00
4,900.0	22.55	129.34	4,601.7	-979.6	1,195.1	1,545.3	0.00	0.00	0.00
5,000.0	22.55	129.34	4,694.1	-1,003.9	1,224.8	1,583.7	0.00	0.00	0.00
5,100.0	22.55	129.34	4,786.4	-1,028.3	1,254.5	1,622.0	0.00	0.00	0.00
Drop 3° / 100'									
5,184.5	22.55	129.34	4,864.5	-1,048.8	1,279.5	1,654.5	0.00	0.00	0.00
5,200.0	22.09	129.34	4,878.8	-1,052.5	1,284.1	1,660.3	3.00	-3.00	0.00
5,300.0	19.09	129.34	4,972.4	-1,074.8	1,311.3	1,695.5	3.00	-3.00	0.00
5,400.0	16.09	129.34	5,067.7	-1,094.0	1,334.7	1,725.7	3.00	-3.00	0.00
5,500.0	13.09	129.34	5,164.5	-1,110.0	1,354.1	1,750.9	3.00	-3.00	0.00
5,600.0	10.09	129.34	5,262.4	-1,122.7	1,369.7	1,771.0	3.00	-3.00	0.00
5,700.0	7.09	129.34	5,361.3	-1,132.2	1,381.2	1,785.9	3.00	-3.00	0.00
5,800.0	4.09	129.34	5,460.8	-1,138.3	1,388.8	1,795.7	3.00	-3.00	0.00
5,900.0	1.09	129.34	5,560.7	-1,141.2	1,392.2	1,800.2	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,936.3	0.00	0.00	5,597.0	-1,141.4	1,392.5	1,800.5	3.00	-3.00	-356.26
6,000.0	0.00	0.00	5,660.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,100.0	0.00	0.00	5,760.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,200.0	0.00	0.00	5,860.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,300.0	0.00	0.00	5,960.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,400.0	0.00	0.00	6,060.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,500.0	0.00	0.00	6,160.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,600.0	0.00	0.00	6,260.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,700.0	0.00	0.00	6,360.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,800.0	0.00	0.00	6,460.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
Cameo									
6,836.3	0.00	0.00	6,497.0	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
6,900.0	0.00	0.00	6,560.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,000.0	0.00	0.00	6,660.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,100.0	0.00	0.00	6,760.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,200.0	0.00	0.00	6,860.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,300.0	0.00	0.00	6,960.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,400.0	0.00	0.00	7,060.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
Base Cameo Coal									
7,496.3	0.00	0.00	7,157.0	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,500.0	0.00	0.00	7,160.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
Rollins									
7,536.3	0.00	0.00	7,197.0	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,600.0	0.00	0.00	7,260.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
7,700.0	0.00	0.00	7,360.7	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00
TD @ 7786.3' MD / 7447.0' TVD									
7,786.3	0.00	0.00	7,447.0	-1,141.4	1,392.5	1,800.5	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-15E
Company:	Laramie Energy, LLC	TVD Reference:	well @ 7242.0usft (H&P #522)
Project:	Mesa County, CO	MD Reference:	well @ 7242.0usft (H&P #522)
Site:	Nichols 24-07 Pad	North Reference:	True
Well:	Nichols 0994-24-15E	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
- Shape									
PBHL - Nichols 0994-24- - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,447.0	-1,141.4	1,392.5	1,528,081.86	2,341,497.64	39.260172	-107.825918

Casing Points				
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(usft)	(usft)		(")	(")
1,530.0	1,489.5	8 5/8"	8-5/8	11

Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
2,566.8	2,447.0	G' Sand			
4,461.8	4,197.0	Williams Fork			
5,936.3	5,597.0	TOG			
6,836.3	6,497.0	Cameo			
7,496.3	7,157.0	Base Cameo Coal			
7,536.3	7,197.0	Rollins			

Plan Annotations				
Measured Depth	Vertical Depth	Local Coordinates		Comment
(usft)	(usft)	+N/-S	+E/-W	
(usft)	(usft)	(usft)	(usft)	
500.0	500.0	0.0	0.0	KOP (Build 3" / 100')
1,251.8	1,232.5	-92.6	113.0	EOB 22.55° Inc / 129.34° Azm
5,184.5	4,864.5	-1,048.8	1,279.5	Drop 3" / 100'
5,936.3	5,597.0	-1,141.4	1,392.5	EOB @ Vertical
7,786.3	7,447.0	-1,141.4	1,392.5	TD @ 7786.3' MD / 7447.0' TVD