



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-13E
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263325
 Longitude: -107.830833
 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 0994-24-13E, 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 0994-24-13E

+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1629265.50	2340135.89	39.263325	-107.830833

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

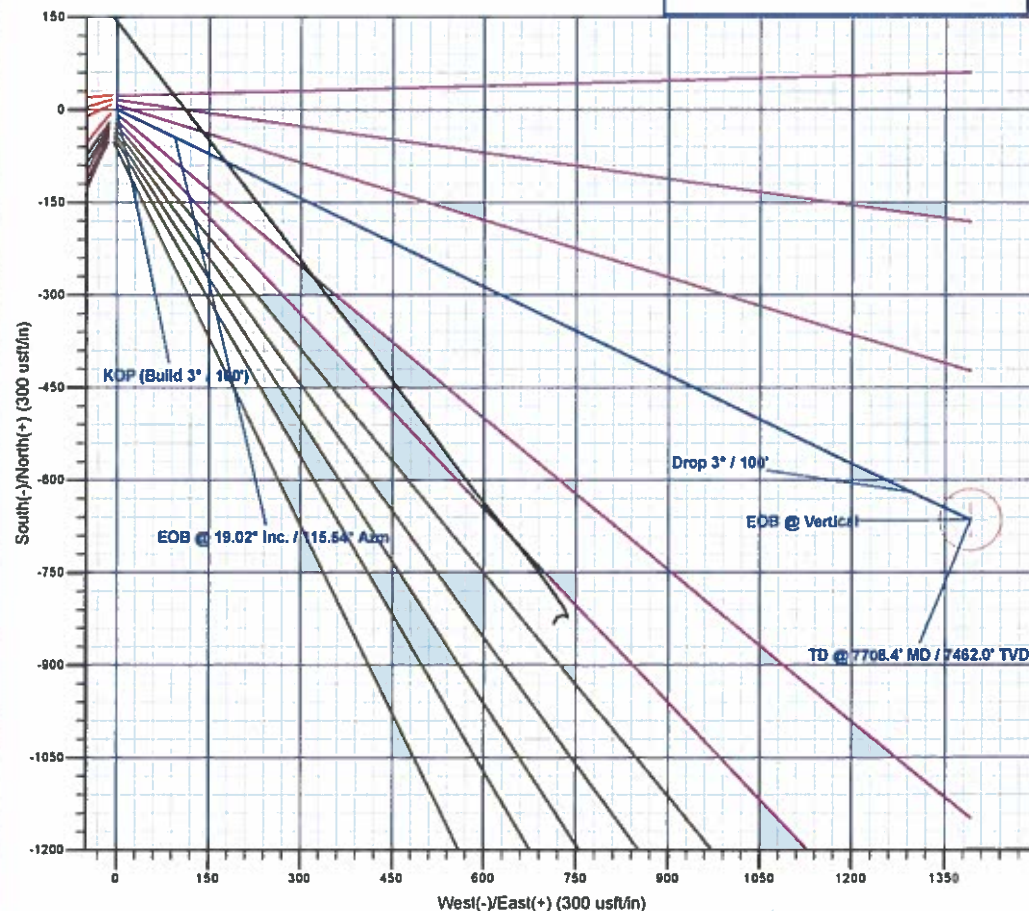
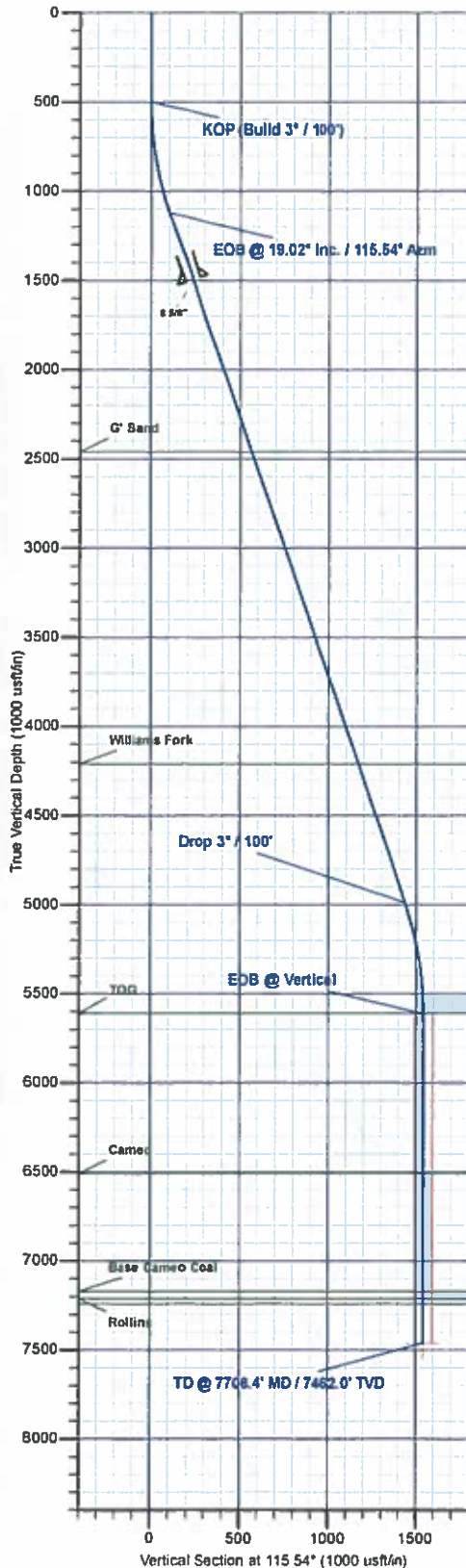
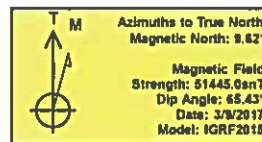
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-13E	7462.0	-664.6	1390.8	1526585.40	2341509.17	39.261500	-107.825921

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	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')
1133.9	19.02	115.54	1122.3	-44.9	94.1	3.00	115.54	104.2	EOB @ 19.02" Inc. / 115.54" Azm
5224.5	19.02	115.54	4989.7	-619.7	1296.7	0.00	0.00	1437.2	Drop 3" / 100'
5856.4	0.00	0.00	5612.0	-664.6	1390.8	3.00	180.00	1541.4	EOB @ Vertical
7708.4	0.00	0.00	7462.0	-664.6	1390.8	0.00	0.00	1541.4	TD @ 7708.4' MD / 7462.0' TVD

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2462.0	2580.9	G' Sand
4212.0	4402.0	Williams Fork
5612.0	5856.4	TOG
6512.0	6758.4	Cameo
7172.0	7418.4	Base Cameo Coal
7212.0	7458.4	Rollins
7242.0	7488.4	Corcoran
7242.0	7488.4	Cozzette



Plan: Design #1 (Nichols 0994-24-13E/Wellbore #1)

Created By: Will Jirck Date: 16:00, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-13E

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-13E
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 0994-24-13E	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 0994-24-13E					
Well Position	+N/-S	52.6 usft	Northing:	1,529,265.51 usft	Latitude:	39.263325
	+E/-W	5.6 usft	Easting:	2,340,135.89 usft	Longitude:	-107.830833
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	115.54

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	
1,133.9	19.02	115.54	1,122.3	-44.9	94.1	3.00	3.00	0.00	115.54	
5,224.5	19.02	115.54	4,989.7	-619.7	1,296.7	0.00	0.00	0.00	0.00	
5,858.4	0.00	0.00	5,612.0	-664.6	1,390.8	3.00	-3.00	0.00	180.00	
7,708.4	0.00	0.00	7,462.0	-664.6	1,390.8	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-13E
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 0994-24-13E	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	115.54	600.0	-1.1	2.4	2.6	3.00	3.00	0.00
700.0	6.00	115.54	699.6	-4.5	9.4	10.5	3.00	3.00	0.00
800.0	9.00	115.54	798.8	-10.1	21.2	23.5	3.00	3.00	0.00
900.0	12.00	115.54	897.1	-18.0	37.7	41.7	3.00	3.00	0.00
1,000.0	15.00	115.54	994.3	-28.1	58.7	65.1	3.00	3.00	0.00
1,100.0	18.00	115.54	1,090.2	-40.3	84.3	93.5	3.00	3.00	0.00
EOB @ 19.02° Inc. / 115.54° Azm									
1,133.9	19.02	115.54	1,122.3	-44.9	94.1	104.2	3.00	3.00	0.00
1,200.0	19.02	115.54	1,184.8	-54.2	113.5	125.8	0.00	0.00	0.00
1,300.0	19.02	115.54	1,279.4	-68.3	142.9	158.4	0.00	0.00	0.00
1,400.0	19.02	115.54	1,373.9	-82.3	172.3	190.9	0.00	0.00	0.00
1,500.0	19.02	115.54	1,468.4	-96.4	201.7	223.5	0.00	0.00	0.00
8 5/8"									
1,530.0	19.02	115.54	1,496.8	-100.6	210.5	233.3	0.00	0.00	0.00
1,600.0	19.02	115.54	1,563.0	-110.4	231.1	256.1	0.00	0.00	0.00
1,700.0	19.02	115.54	1,657.5	-124.5	260.5	288.7	0.00	0.00	0.00
1,800.0	19.02	115.54	1,752.1	-138.5	289.9	321.3	0.00	0.00	0.00
1,900.0	19.02	115.54	1,846.6	-152.6	319.3	353.9	0.00	0.00	0.00
2,000.0	19.02	115.54	1,941.2	-166.6	348.7	386.5	0.00	0.00	0.00
2,100.0	19.02	115.54	2,035.7	-180.7	378.1	419.0	0.00	0.00	0.00
2,200.0	19.02	115.54	2,130.2	-194.7	407.5	451.6	0.00	0.00	0.00
2,300.0	19.02	115.54	2,224.8	-208.8	436.9	484.2	0.00	0.00	0.00
2,400.0	19.02	115.54	2,319.3	-222.8	466.3	516.8	0.00	0.00	0.00
2,500.0	19.02	115.54	2,413.9	-236.9	495.7	549.4	0.00	0.00	0.00
G⁺ Sand									
2,550.9	19.02	115.54	2,462.0	-244.0	510.7	566.0	0.00	0.00	0.00
2,600.0	19.02	115.54	2,508.4	-250.9	525.1	582.0	0.00	0.00	0.00
2,700.0	19.02	115.54	2,602.9	-265.0	554.5	614.6	0.00	0.00	0.00
2,800.0	19.02	115.54	2,697.5	-279.0	583.9	647.2	0.00	0.00	0.00
2,900.0	19.02	115.54	2,792.0	-293.1	613.3	679.7	0.00	0.00	0.00
3,000.0	19.02	115.54	2,886.6	-307.1	642.7	712.3	0.00	0.00	0.00
3,100.0	19.02	115.54	2,981.1	-321.2	672.1	744.9	0.00	0.00	0.00
3,200.0	19.02	115.54	3,075.7	-335.2	701.5	777.5	0.00	0.00	0.00
3,300.0	19.02	115.54	3,170.2	-349.3	730.9	810.1	0.00	0.00	0.00
3,400.0	19.02	115.54	3,264.7	-363.3	760.3	842.7	0.00	0.00	0.00
3,500.0	19.02	115.54	3,359.3	-377.4	789.7	875.3	0.00	0.00	0.00
3,600.0	19.02	115.54	3,453.8	-391.4	819.1	907.8	0.00	0.00	0.00
3,700.0	19.02	115.54	3,548.4	-405.5	848.5	940.4	0.00	0.00	0.00
3,800.0	19.02	115.54	3,642.9	-419.5	877.9	973.0	0.00	0.00	0.00
3,900.0	19.02	115.54	3,737.4	-433.6	907.3	1,005.6	0.00	0.00	0.00
4,000.0	19.02	115.54	3,832.0	-447.6	936.7	1,038.2	0.00	0.00	0.00
4,100.0	19.02	115.54	3,926.5	-461.7	966.1	1,070.8	0.00	0.00	0.00
4,200.0	19.02	115.54	4,021.1	-475.7	995.5	1,103.4	0.00	0.00	0.00
4,300.0	19.02	115.54	4,115.6	-489.8	1,024.9	1,135.9	0.00	0.00	0.00
4,400.0	19.02	115.54	4,210.2	-503.9	1,054.3	1,168.5	0.00	0.00	0.00
Williams Fork									
4,402.0	19.02	115.54	4,212.0	-504.1	1,054.9	1,169.2	0.00	0.00	0.00



Well Planning Report



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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 0994-24-13E	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)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
4,500.0	19.02	115.54	4,304.7	-517.9	1,083.7	1,201.1	0.00	0.00	0.00
4,600.0	19.02	115.54	4,399.2	-532.0	1,113.1	1,233.7	0.00	0.00	0.00
4,700.0	19.02	115.54	4,493.8	-546.0	1,142.5	1,266.3	0.00	0.00	0.00
4,800.0	19.02	115.54	4,588.3	-560.1	1,171.9	1,298.9	0.00	0.00	0.00
4,900.0	19.02	115.54	4,682.9	-574.1	1,201.3	1,331.5	0.00	0.00	0.00
5,000.0	19.02	115.54	4,777.4	-588.2	1,230.7	1,364.0	0.00	0.00	0.00
5,100.0	19.02	115.54	4,871.9	-602.2	1,260.1	1,396.6	0.00	0.00	0.00
5,200.0	19.02	115.54	4,966.5	-616.3	1,289.5	1,429.2	0.00	0.00	0.00
Drop 3° / 100'									
5,224.5	19.02	115.54	4,989.7	-619.7	1,296.7	1,437.2	0.00	0.00	0.00
5,300.0	16.75	115.54	5,061.5	-629.7	1,317.7	1,460.4	3.00	-3.00	0.00
5,400.0	13.75	115.54	5,158.0	-641.0	1,341.4	1,486.7	3.00	-3.00	0.00
5,500.0	10.75	115.54	5,255.7	-650.2	1,360.5	1,507.9	3.00	-3.00	0.00
5,600.0	7.75	115.54	5,354.4	-657.1	1,375.0	1,524.0	3.00	-3.00	0.00
5,700.0	4.75	115.54	5,453.8	-661.8	1,384.9	1,534.9	3.00	-3.00	0.00
5,800.0	1.75	115.54	5,553.6	-664.3	1,390.0	1,540.5	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,858.4	0.00	0.00	5,612.0	-664.6	1,390.8	1,541.4	3.00	-3.00	0.00
5,900.0	0.00	0.00	5,653.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,753.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,100.0	0.00	0.00	5,853.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,200.0	0.00	0.00	5,953.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,053.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,153.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,253.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,353.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,453.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
Cameo									
6,758.4	0.00	0.00	6,512.0	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,553.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,653.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,753.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,100.0	0.00	0.00	6,853.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,200.0	0.00	0.00	6,953.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,300.0	0.00	0.00	7,053.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,400.0	0.00	0.00	7,153.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
Base Cameo Coal									
7,418.4	0.00	0.00	7,172.0	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
Rollins									
7,458.4	0.00	0.00	7,212.0	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
Cozzette - Corcoran									
7,488.4	0.00	0.00	7,242.0	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,500.0	0.00	0.00	7,253.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,600.0	0.00	0.00	7,353.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
7,700.0	0.00	0.00	7,453.6	-664.6	1,390.8	1,541.4	0.00	0.00	0.00
TD @ 7708.4' MD / 7462.0' TVD									
7,708.4	0.00	0.00	7,462.0	-664.6	1,390.8	1,541.4	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-13E
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 0994-24-13E	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
PBHL - Nichols 0994-24 - plan hits target center - Point	0.00	0.00	7,462.0	-664.6	1,390.8	1,528,565.40	2,341,509.17	39.261500	-107.825921

Casing Points				
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,496.8	8 5/8"	8-5/8	11

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,550.9	2,462.0	G' Sand			
4,402.0	4,212.0	Williams Fork			
5,858.4	5,612.0	TOG			
6,758.4	6,512.0	Cameo			
7,418.4	7,172.0	Base Cameo Coal			
7,458.4	7,212.0	Rollins			
7,488.4	7,242.0	Cozzette			
7,488.4	7,242.0	Corcoran			

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')
1,133.9	1,122.3	-44.9	94.1	EOB @ 19.02° Inc / 115.54° Azm
5,224.5	4,989.7	-619.7	1,286.7	Drop 3° / 100'
5,858.4	5,612.0	-664.6	1,390.8	EOB @ Vertical
7,708.4	7,462.0	-664.6	1,390.8	TD @ 7708.4' MD / 7462.0' TVD