



Project: Mesa County, CO
 Site: Nichols 24-07 Pad
 Well: Nichols 0994-24-16W
 Wellbore: Wellbore #1
 Design: Design #1
 Latitude: 39.263308
 Longitude: -107.830872
 Ground Level: 7212.0
 well @ 7242.0usft (H&P #522)

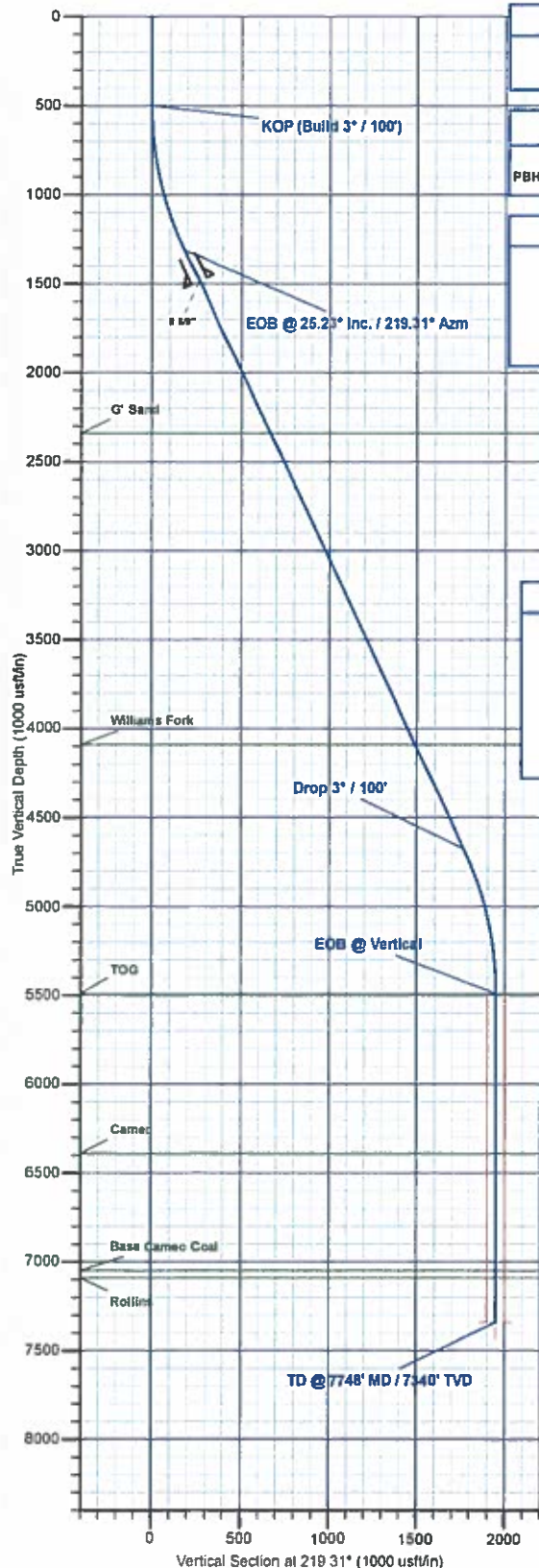


PROJECT DETAILS: Mesa County, CO

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 0994-24-16W, 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 0994-24-16W

+N/-S	+E/-W	Northing	Ground Level: Easting	7212.0 Latitude	Longitude
0.0	0.0	1829289.60	2340124.69	39.263308	-107.830872

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

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL - Nichols 0994-24-16W	7340.0	-1507.5	-1234.3	1827784.30	2338852.17	39.259169	-107.835231

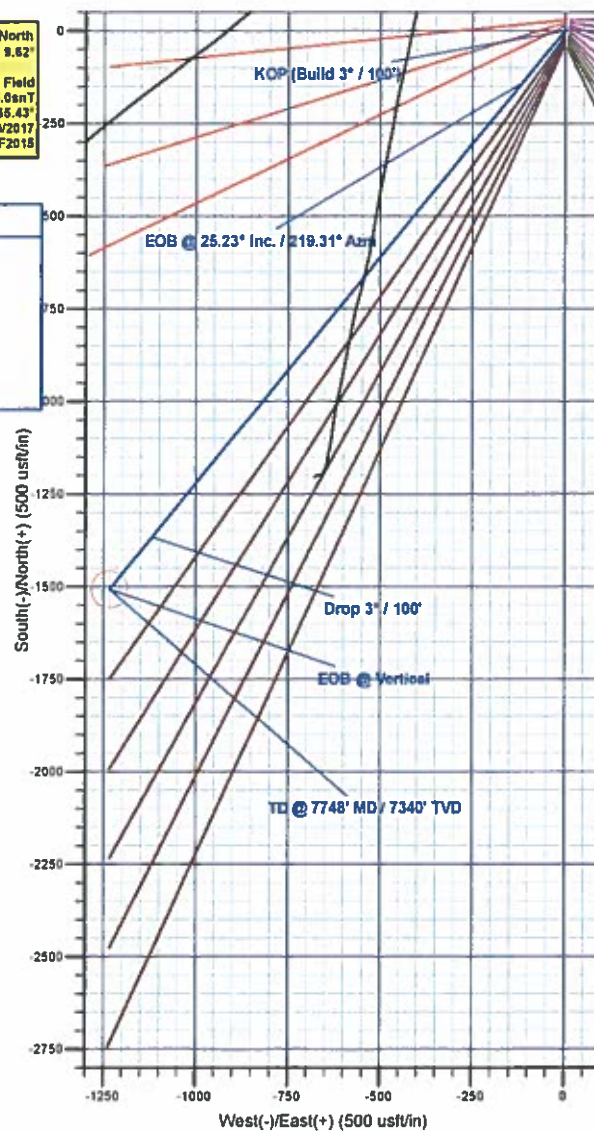
SECTION DETAILS

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	
560.0	0.00	0.00	500.0	0.0	0.0	0.00	0.00	0.0	KOP (Build 3° / 100')
1340.9	25.23	219.31	1314.0	-140.9	-115.4	3.00	219.31	182.2	EOB @ 25.23° Inc. / 219.31° Azm
5057.4	25.23	219.31	4676.0	-1366.5	-1118.9	0.00	0.00	1766.1	Drop 3° / 100'
5898.3	0.00	0.00	6490.0	-1507.5	-1234.3	3.00	180.00	1948.3	EOB @ Vertical
7748.3	0.00	0.00	7340.0	-1507.5	-1234.3	0.00	0.00	1948.3	TD @ 7748' MD / 7340' TVD



FORMATION TOP DETAILS

TVDPath	MDPath	Formation
2340.0	2475.1	G' Sand
4090.0	4409.6	Williams Fork
5490.0	5898.3	TOG
6390.0	6798.3	Cameo
7050.0	7458.3	Base Cameo Coal
7090.0	7498.3	Rollins



Plan: Design #1 (Nichols 0994-24-16W/Wellbore #1)

Created By: Will Jirick Date: 17:18, March 10 2017



Laramie Energy, LLC

Mesa County, CO

Nichols 24-07 Pad

Nichols 0994-24-16W

Wellbore #1

Plan: Design #1

QES Well Planning Report

10 March, 2017





Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-16W
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 0994-24-16W	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	Nicho's 0994-24-16W					
Well Position	+N/-S	46.4 usft	Northing:	1,529,259.60 usft	Latitude:	39.263308
	+E/-W	-5.4 usft	Easting:	2,340,124.69 usft	Longitude:	-107.830872
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	219.31

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usft)	Builde 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	
1,340.9	25.23	219.31	1,314.0	-140.9	-115.4	3.00	3.00	0.00	219.31	
5,057.4	25.23	219.31	4,676.0	-1,366.5	-1,118.9	0.00	0.00	0.00	0.00	
5,898.3	0.00	0.00	5,490.0	-1,507.5	-1,234.3	3.00	-3.00	0.00	180.00	
7,748.3	0.00	0.00	7,340.0	-1,507.5	-1,234.3	0.00	0.00	0.00	0.00	PBHL - Nichols 0994-



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-16W
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 0994-24-16W	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	219.31	600.0	-2.0	-1.7	2.6	3.00	3.00	0.00
700.0	6.00	219.31	699.6	-8.1	-6.6	10.5	3.00	3.00	0.00
800.0	9.00	219.31	798.8	-18.2	-14.9	23.5	3.00	3.00	0.00
900.0	12.00	219.31	897.1	-32.3	-26.4	41.7	3.00	3.00	0.00
1,000.0	15.00	219.31	994.3	-50.4	-41.2	65.1	3.00	3.00	0.00
1,100.0	18.00	219.31	1,090.2	-72.3	-59.2	93.5	3.00	3.00	0.00
1,200.0	21.00	219.31	1,184.4	-98.2	-80.4	126.9	3.00	3.00	0.00
1,300.0	24.00	219.31	1,276.8	-127.8	-104.6	165.1	3.00	3.00	0.00
EOB @ 25.23° Inc. / 219.31° Azm									
1,340.9	25.23	219.31	1,314.0	-140.9	-115.4	182.2	3.00	3.00	0.00
1,400.0	25.23	219.31	1,367.5	-160.4	-131.4	207.3	0.00	0.00	0.00
1,500.0	25.23	219.31	1,457.9	-193.4	-158.4	250.0	0.00	0.00	0.00
8 5/8"									
1,530.0	25.23	219.31	1,485.1	-203.3	-166.5	262.7	0.00	0.00	0.00
1,600.0	25.23	219.31	1,548.4	-226.4	-185.4	292.6	0.00	0.00	0.00
1,700.0	25.23	219.31	1,638.8	-259.4	-212.4	335.2	0.00	0.00	0.00
1,800.0	25.23	219.31	1,729.3	-292.3	-239.4	377.8	0.00	0.00	0.00
1,900.0	25.23	219.31	1,819.8	-325.3	-266.4	420.4	0.00	0.00	0.00
2,000.0	25.23	219.31	1,910.2	-358.3	-293.4	463.1	0.00	0.00	0.00
2,100.0	25.23	219.31	2,000.7	-391.3	-320.4	505.7	0.00	0.00	0.00
2,200.0	25.23	219.31	2,091.2	-424.2	-347.4	548.3	0.00	0.00	0.00
2,300.0	25.23	219.31	2,181.6	-457.2	-374.4	590.9	0.00	0.00	0.00
2,400.0	25.23	219.31	2,272.1	-490.2	-401.4	633.5	0.00	0.00	0.00
G' Sand									
2,475.1	25.23	219.31	2,340.0	-515.0	-421.6	665.6	0.00	0.00	0.00
2,500.0	25.23	219.31	2,362.5	-523.2	-428.4	676.2	0.00	0.00	0.00
2,600.0	25.23	219.31	2,453.0	-556.2	-455.4	718.8	0.00	0.00	0.00
2,700.0	25.23	219.31	2,543.5	-589.1	-482.4	761.4	0.00	0.00	0.00
2,800.0	25.23	219.31	2,633.9	-622.1	-509.4	804.0	0.00	0.00	0.00
2,900.0	25.23	219.31	2,724.4	-655.1	-536.4	846.6	0.00	0.00	0.00
3,000.0	25.23	219.31	2,814.9	-688.1	-563.4	889.3	0.00	0.00	0.00
3,100.0	25.23	219.31	2,905.3	-721.0	-590.4	931.9	0.00	0.00	0.00
3,200.0	25.23	219.31	2,995.8	-754.0	-617.4	974.5	0.00	0.00	0.00
3,300.0	25.23	219.31	3,086.2	-787.0	-644.4	1,017.1	0.00	0.00	0.00
3,400.0	25.23	219.31	3,176.7	-820.0	-671.4	1,059.8	0.00	0.00	0.00
3,500.0	25.23	219.31	3,267.2	-852.9	-698.4	1,102.4	0.00	0.00	0.00
3,600.0	25.23	219.31	3,357.6	-885.9	-725.4	1,145.0	0.00	0.00	0.00
3,700.0	25.23	219.31	3,448.1	-918.9	-752.4	1,187.6	0.00	0.00	0.00
3,800.0	25.23	219.31	3,538.6	-951.9	-779.4	1,230.2	0.00	0.00	0.00
3,900.0	25.23	219.31	3,629.0	-984.9	-806.4	1,272.9	0.00	0.00	0.00
4,000.0	25.23	219.31	3,719.5	-1,017.8	-833.4	1,315.5	0.00	0.00	0.00
4,100.0	25.23	219.31	3,809.9	-1,050.8	-860.4	1,358.1	0.00	0.00	0.00
4,200.0	25.23	219.31	3,900.4	-1,083.8	-887.4	1,400.7	0.00	0.00	0.00
4,300.0	25.23	219.31	3,990.9	-1,116.8	-914.4	1,443.3	0.00	0.00	0.00
4,400.0	25.23	219.31	4,081.3	-1,149.7	-941.4	1,486.0	0.00	0.00	0.00
Williams Fork									
4,409.6	25.23	219.31	4,090.0	-1,152.9	-944.0	1,490.0	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 0994-24-16W	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	25.23	219.31	4,171.8	-1,182.7	-968.4	1,528.6	0.00	0.00	0.00
4,600.0	25.23	219.31	4,262.3	-1,215.7	-995.4	1,571.2	0.00	0.00	0.00
4,700.0	25.23	219.31	4,352.7	-1,248.7	-1,022.4	1,613.8	0.00	0.00	0.00
4,800.0	25.23	219.31	4,443.2	-1,281.6	-1,049.4	1,656.4	0.00	0.00	0.00
4,900.0	25.23	219.31	4,533.6	-1,314.6	-1,076.4	1,699.1	0.00	0.00	0.00
5,000.0	25.23	219.31	4,624.1	-1,347.6	-1,103.4	1,741.7	0.00	0.00	0.00
Drop 3° / 100'									
5,057.4	25.23	219.31	4,676.0	-1,366.5	-1,118.9	1,766.1	0.00	0.00	0.00
5,100.0	23.95	219.31	4,714.8	-1,380.2	-1,130.1	1,783.9	3.00	-3.00	0.00
5,200.0	20.95	219.31	4,807.2	-1,409.8	-1,154.3	1,822.1	3.00	-3.00	0.00
5,300.0	17.95	219.31	4,901.5	-1,435.5	-1,175.4	1,855.3	3.00	-3.00	0.00
5,400.0	14.95	219.31	4,997.4	-1,457.5	-1,193.3	1,883.7	3.00	-3.00	0.00
5,500.0	11.95	219.31	5,084.6	-1,475.4	-1,208.0	1,906.9	3.00	-3.00	0.00
5,600.0	8.95	219.31	5,192.9	-1,489.5	-1,219.5	1,925.0	3.00	-3.00	0.00
5,700.0	5.95	219.31	5,292.1	-1,499.5	-1,227.7	1,938.0	3.00	-3.00	0.00
5,800.0	2.95	219.31	5,391.8	-1,505.5	-1,232.6	1,945.8	3.00	-3.00	0.00
EOB @ Vertical - TOG									
5,898.3	0.00	0.00	5,490.0	-1,507.5	-1,234.3	1,948.3	3.00	-3.00	0.00
5,900.0	0.00	0.00	5,491.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,591.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,100.0	0.00	0.00	5,691.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,200.0	0.00	0.00	5,791.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,300.0	0.00	0.00	5,891.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,400.0	0.00	0.00	5,991.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,091.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,600.0	0.00	0.00	6,191.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,700.0	0.00	0.00	6,291.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
Cameo									
6,798.3	0.00	0.00	6,390.0	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,800.0	0.00	0.00	6,391.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
6,900.0	0.00	0.00	6,491.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,000.0	0.00	0.00	6,591.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,100.0	0.00	0.00	6,691.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,200.0	0.00	0.00	6,791.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,300.0	0.00	0.00	6,891.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,400.0	0.00	0.00	6,991.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
Base Cameo Coal									
7,458.3	0.00	0.00	7,050.0	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
Rollins									
7,498.3	0.00	0.00	7,090.0	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,500.0	0.00	0.00	7,091.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,600.0	0.00	0.00	7,191.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
7,700.0	0.00	0.00	7,291.7	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00
TD @ 7748' MD / 7340' TVD									
7,748.3	0.00	0.00	7,340.0	-1,507.5	-1,234.3	1,948.3	0.00	0.00	0.00



Well Planning Report



Database:	EDM5002	Local Co-ordinate Reference:	Well Nichols 0994-24-16W
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 0994-24-16W	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	7,340.0	-1,507.5	-1,234.3	1,527,784.31	2,338,852.18	39.259169	-107.835231
- plan hits target center									
- Point									

Casing Points

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,530.0	1,485.1	8 5/8"	8-5/8	11

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,475.1	2,340.0	G' Sand			
4,409.6	4,090.0	Williams Fork			
5,898.3	5,490.0	TOG			
6,798.3	6,390.0	Cameo			
7,458.3	7,050.0	Base Cameo Coal			
7,498.3	7,090.0	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')
1,340.9	1,314.0	-140.9	-115.4	EOB @ 25.23° Inc. / 219.31° Azm
5,057.4	4,676.0	-1,366.5	-1,118.9	Drop 3" / 100'
5,898.3	5,490.0	-1,507.5	-1,234.3	EOB @ Vertical
7,748.3	7,340.0	-1,507.5	-1,234.3	TD @ 7748' MD / 7340' TVD