

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47-011-01003 County Cabell District Grant
Quad Milton 7.5' Pad Name n/a Field/Pool Name n/a
Farm name Lewis Well Number 1
Operator (as registered with the OOG) Keyrock Energy LLC
Address PO Box 2223 City Johnson City State TN Zip 37605

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4,249,999.096 Easting 393,981.198
Landing Point of Curve Northing _____ Easting _____
Bottom Hole Northing _____ Easting _____

Elevation (ft) 826 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
n/a

Date permit issued 9/20/2018 Date drilling commenced 10/30/2018 Date drilling ceased 11/4/2018
Date completion activities began 11/21/2018 Date completion activities ceased 11/21/2018
Verbal plugging (Y/N) _____ Date permission granted _____ Granted by _____

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft No fresh water shows Open mine(s) (Y/N) depths None
Salt water depth(s) ft 1,405', 1,490', 1,660', 1,920' Void(s) encountered (Y/N) depths None
Coal depth(s) ft None Cavern(s) encountered (Y/N) depths None
Is coal being mined in area (Y/N) No

Reviewed by:
AR. 8-29-19


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CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	12"	9 5/8"	32.5'	New			Sanded In
Surface	8 3/4"	7"	843'	New			Yes
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	6 3/8"	4 1/2"	2,695'	New			Did not circulate
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor							
Surface	Class A	145 sks	15.6 lb/gal	1.2 cuft/sk	174 cuft	0	8 hours
Coal							
Intermediate 1							
Intermediate 2							
Intermediate 3							
Production	Class A	139 sks	14.2 lb/gal	1.3 cuft/sk	180.7 cuft	650'	n/a
Tubing							

Drillers TD (ft) 2,732 Loggers TD (ft) 2,684

Deepest formation penetrated Devonian Shale Plug back to (ft) _____

Plug back procedure _____

Kick off depth (ft) _____

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____

7" - 810'

4-1/2" - 2614', 2389', 2196', 1971', 1778', 1585'

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS 20 total shots: 1 shot per foot from 2,457 - 2,462, 2 shots per foot from 2,463 - 2,469

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

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PERFORATION RECORD

Stage No	Perforation date	Perforated from MD ft	Perforated to MD ft	Number of Perforations	Formation(s)
1	11/14/2018	2,457'	2,469'	20	Berea

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
	11/20-21/2018	182 bpm	1,767 psi	2,881 psi	5 min ISIP 2,090	59,217 lbs	359 bbls	8,477 scf

Please insert additional pages as applicable.

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PRODUCING FORMATION(S)	DEPTHS
<u>Berea</u>	TVD <u>2,457-2,469'</u> MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface _____ psi Bottom Hole _____ psi DURATION OF TEST _____ hrs

OPEN FLOW Gas _____ mcfpd Oil _____ bpd NGL _____ bpd Water _____ bpd GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT SID	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H.S. ETC)
Shale & Slate	0	244	0	244	Hard Minor sand No water
Sand	244	319	244	319	Hard gray sand No water
Shale and Slate	319	814	319	814	Hard Gray Minor red shale breaks
Sand	814	1254	814	1254	Clean sand No water Shale breaks
White Sand	1004	1525	1004	1525	Salt water at 1,405 & 1,490
Shale	1525	1630	1525	1630	Dark Shale
Limestone	1630	1831	1630	1831	Little and Big Limes Water at 1,660
Shale	1831	1914	1831	1914	Gray Shale
Injun Sand	1914	1990	1914	1990	Injun Sand Water in top
Shale	1990	2455	1990	2455	Dark gray shale Minor silt
Berea	2455	2470	2455	2470	Berea Sand Oil and gas
Shale	2470	TD	2470	TD	

Please insert additional pages as applicable.

Drilling Contractor Cheyenne Drilling Inc
Address 60 Bosco Tipple Rd City Hueysville State KY Zip 41640

Logging Company Marshall Miller
Address 582 Industrial Park Rd City Bluefield State VA Zip 24605

Cementing Company C&J Energy Services
Address 580 Hawthorn Dr City Norton State VA Zip 24273

Stimulating Company Reliance Well Services
Address 1250 Tower Lane City Eric State PA Zip 16505

Please insert additional pages as applicable.

Completed by Morgan Pate Telephone 423-276-1116
Signature [Signature] Title Geologist Date 12-14-2018