

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

API 47-039-06378 County Kanawha District South Charleston
Quad Charleston West Pad Name Harmon Field/Pool Name N/A
Farm name The Courtland Company Well Number #2A
Operator (as registered with the OOG) Reserve Oil and Gas Inc
Address 929 Charleston Road City Spencer State WV Zip 25276

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 494,974 NAD 83 Easting 1,765,052 NAD 83
Landing Point of Curve Northing 4245684 UTM NAD 83 Easting 0438009 UTM NAD 83
Bottom Hole Northing _____ Easting _____

Elevation (ft) 600 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)

Date permit issued 01/20/2016 Date drilling commenced 11/22/16 Date drilling ceased 2/12/16
Date completion activities began 5/6/2016 Date completion activities ceased 5/6/2016
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

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

Freshwater depth(s) ft 20, 96, 190, and 302 FT Open mine(s) (Y/N) depths No
Salt water depth(s) ft 1090 FT Void(s) encountered (Y/N) depths No
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths No

Is coal being mined in area (Y/N) No

APPROVED

NAME: Jackie Shunte
DATE: 5/6/16

RECEIVED
Office of Oil and Gas
JUL 06 2016
Reviewed by
WV Department of
Environmental Protection

07/08/2016

API 47-039-06370 Farm name The Courtland Company Well number Harmon # 2A

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	24"	24"	20'	New			
Surface	20"	20"	50'	New			Set with Excavator
Coal							Set with Excavator
Intermediate 1	17 1/2"	13 3/8"	70'	New			
Intermediate 2	12 3/8"	10 3/4"	348'	New			Circulated 6 BBL
Intermediate 3	8 7/8"	7"	1732'	New			No, Grouted Backside
Production	6 1/4"	4 1/2"	4516.45'	New		(1) 350'	Circulated 7 BBL
Tubing						4222-3917	YCS
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	Type I	100	15.6	1.88	118	Surface	8 hrs
Surface	Type I	182	15.6	1.18	215	Surface	8 hrs
Coal							8 hrs
Intermediate 1	Type I	250 sks	14.6	1.37	349	Surface	
Intermediate 2		182 sks	15.6	1.18	215	Surface	
Intermediate 3							
Production	Type I	120 sks	11.8	2.63	316	1440	
Tubing							

Drillers TD (ft) 4531 Loggers TD (ft) 4530
 Deepest formation penetrated 4531 Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) N/A

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 4 1/2 - 4401 - 4222 - 3917
3596 - 3279 - 2802

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS RECEIVED
Office of Oil and Gas

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS JUL 06 2016

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____
WV Department of Environmental Protection

API 47- 039-06378 Farm name The Courtland Company Well number Harmon # 2A

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	5/6/2016	4140	4502	50	Devonian Shale
2	5/6/2016	3331	4031	60	Brown Shale, Lower Huron

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)
1	5/6/16	55 CFM	1918	1400	1980	N/A	N/A	1,000,000 SCF
2	5/6/16	55 CFM	1918	1310	986	N/A	N/A	1,000,000 SCF

Please insert additional pages as applicable.

RECEIVED
Office of Oil and Gas
JUL 06 2016
WV Department of Environmental Protection

API 47- 039 06378 Farm name The Courtland Company Well number Harmon # 2A

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	<u>TVD</u>	<u>MD</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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 MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	0		0		
FlyAsh/River Sand			0	50	H ₂ O at 20 FT
Sand and Rock			58	60	
Sand stone			60	90	
Grey Shale			90	96	2 1/2" stream at 96 FT
Sand and Shale			96	190	7" stream at 190 FT
Black Shale			190	200	
Sand			200	368	
Sand and Shale			368	583	
Dark Shale			583	670	
Sand and Shale			670	1036	1/2" stream at 802 FT
Salt Sand			1036	1175	3" stream at 1090 FT "Salt Sand"
Maxton			1175	1402	
Little Line			1402	1436	

Please insert additional pages as applicable.

Drilling Contractor Contractor Services Inc (CONSO)
Address 929 Charleston Road City Spencer State WV Zip 25276

Logging Company _____
Address _____ Stat. _____ Zip _____

Cementing Company _____
Address _____ City _____ State _____ Zip _____

Stimulating Company _____
Address _____ City _____ State _____ Zip _____

Please insert additional pages as applicable.

Completed by Doug Douglas Telephone 304-927-5228
Signature [Signature] Title Land Manager Date 06/30/16

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

API 47- 039 - 06378 Farm name The Courtland Company Well number Harmon #2A

PRODUCING FORMATION(S)	DEPTHS	TVD	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

continued from previous page

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	0		0		
Big Line			1439	1623	
Injun			1623	1657	
Berea			2090	2102	
Sand and Shale			2102	2640	
Upper Huron			2640	3318	Gas check at 2693 FT "No Show"
Lower Huron			3318	3640	
Devonian Shale			3640	4531	

Please insert additional pages as applicable.

Drilling Contractor Conserv
 Address 929 Charleston Rd. City Spencer State WV Zip 25276

Logging Company KLX Energy Services
 Address 6072 W. Veterans Memorial Hwy City Bridgport State WV Zip 26330

Cementing Company C+J Energy Services
 Address 3990 Rogerdale City Houston State TX Zip 77042

Stimulating Company C+J Energy Services
 Address 3990 Rogerdale City Houston State TX Office Zip 77042

Please insert additional pages as applicable.

Completed by Doug Daiglass Telephone 304-483-8340
 Signature Dg Dye Title Land Manager Date 07/08/2016