

State of West Virginia  
Department of Environmental Protection  
Office of Oil and Gas

Well Operator's Report of Well Work

Farm name: Olen Archer Operator Well No.: HR 478  
 LOCATION: Elevation: 695' Quadrangle: Reedy WV 7.5'  
 District: Spring Creek County: Wirt  
 Latitude: 14002' Feet South of 38 Deg. 57 Min. 30 Sec.  
 Longitude 2997' Feet West of 81 Deg. 22 Min. 30 Sec.

Company: Hard Rock Exploration

	Casing & Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
Address: <u>1244 Martins Branch Road</u> <u>Charleston WV, 25312</u>				
Agent: <u>Marc Scholl</u>	<u>13 3/8"</u>	<u>40'</u>	<u>40'</u>	<u>N/A</u>
Inspector: <u>Joe Taylor</u>	<u>9 5/8"</u>	<u>546'</u>	<u>546'</u>	<u>294ft3 CTS</u>
Date Permit Issued: <u>12/21/12</u>	<u>7"</u>	<u>2325'</u>	<u>2325'</u>	<u>499ft3 CTS</u>
Date Well Work Commenced: <u>2/18/13</u>	<u>4.5"</u>	<u>7838'</u>	<u>7838'</u>	<u>65 ft3</u>
Date Well Work Completed: <u>4/12/13</u>				
Verbal Plugging:	<u>Gamma Log from (3545' MD, 4235'TVD) KOP-3660'</u>			
Date Permission granted on:	<u>Ran Gyro Log from (3549' - Surface)</u>			
Rotary x Cable Rig	<b>RECEIVED</b>			
Total Depth (feet): <u>8534'TMD, 4242'TVD</u>	<b>Office of Oil &amp; Gas</b>			
Fresh Water Depth (ft.): <u>170'</u>	<b>MAY 20 2013</b>			
Salt Water Depth (ft.): <u>1640'</u>	<b>WV Department of</b>			
Is coal being mined in area (N/Y)? <u>N</u>	<b>Environmental Protection</b>			
Coal Depths (ft.): <u>N/A</u>				

OPEN FLOW DATA

Producing formation Lower Huron Shale Pay zone depth (ft) 3877'MD- 8534'MD  
3865'TVD - 4242' TVD

Gas: Initial open flow 200 MCF/d Oil: Initial open flow        Bbl/d  
 Final open flow >2 MMCF/d Final open flow        Bbl/d  
 Time of open flow between initial and final tests 24 Hours  
 Static rock Pressure        psig (surface pressure) after        Hours

Second producing formation        Pay zone depth (ft)         
 Gas: Initial open flow        MCF/d Oil: Initial open flow        Bbl/d  
 Final open flow        MCF/d Final open flow        Bbl/d  
 Time of open flow between initial and final tests        Hours  
 Static rock Pressure        psig (surface pressure) after        Hours

NOTE: ON BACK OF THIS FORM PUT THE FOLLOWING: 1). DETAILS OF PERFORATED INTERVALS, FRACTURING OR STIMULATING, PHYSICAL CHANGE, ETC. 2). THE WELL LOG WHICH IS A SYSTEMATIC DETAILED GEOLOGICAL RECORD OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE.

Signed: James Taylor  
 By: President  
 Date: 5/17/2013

105-01366

<b>Formation:</b>	<b>Top:</b>	<b>Bottom:</b>
Soil/Sand/Shale	0	1586
Salt Sand	1586	1775
Big Lime	1775	1838
Big Injun	1838	1902
Dev. Shale	1902	2245
Coffee Shale	2245	2260
Devonian Shale	2260	4242
Lower Huron Section	4020	4242

**All depths shown As TVD**

2/27/13 Run 17 stg Packers Plus open hole hydraulic set packers and mechanical sleeves and 174 jts of 4.5" 11.6ppf R-3 casing to depth of 7842' KB and string stacked out. Try to move jt pulled 150klbs up and lost 4' on way back down. Call out Weatherford to place slips and cut pipe. Land and cut pipe making total pipe ran 7838' KB. RU and pump 3 bbl water ahead dropped 1.25" balls for shoe. Pump 5 bbl water behind and start pumping N2 at 5k scf/min. Land ball in shoe and pressure up at 7k scf/min with 128k scf N2 to 3000 psi. Packers shut off gas rate at 1800 psi. Hold 3000 psi for packer operation. Bleed pressure off. RU to perform annular squeeze. Pump 50sx type 1 3% CaCl mixed at 15ppg – pumped total of 10.5 bbls (5 bbls then allow air to escape – then additional 5.5 bbl). Follow cmt with 2-3 bbls water.

NOTE: THERE ARE NO PERFORATED INTERVALS IN THIS STYLE OF COMPLETION. THE PACKERS WILL SERVE AS STAGE ISOLATION AND THE BALL ACTIVATED MECHANICAL SLEEVES SERVE AS THE MEANS OF COMMUNICATION FROM WELLBORE TO FORMATION. ALL DEPTHS ARE INDICATED BELOW.

Stage	Sleeve	Sleeve ID	Ball Size	Packer
1	7838.00	P/O Shoe	N/A	7692.24
2	7557.10	1.250	1.500	7460.50
3	7324.96	1.500	1.625	7186.46
4	7053.62	1.625	1.750	6912.92
5	6777.68	1.750	1.875	6681.08
6	6552.74	1.875	2.000	6412.04
7	6276.90	2.000	2.125	6180.90
8	6046.16	2.125	2.250	5949.66
9	5814.72	2.250	2.375	5674.12
10	5538.98	2.375	2.500	5442.48
11	5307.34	2.500	2.625	5166.64
12	5031.50	2.625	2.750	4891.80
13	4756.86	2.750	2.875	4661.06
14	4525.82	2.875	3.000	4429.32
15	4293.98	3.000	3.250	4153.18
16	4017.99	3.250	3.500	3877.29
17	3654.15	3.500	3.750	3513.55
Anchor				2047.80

**RECEIVED**  
Office of Oil & Gas

MAY 20 2013

WV Department of  
Environmental Protection

06/21/2013

04/10/13 MIRU Nabors Stim Crew. Start pumping N2 at 33k scf/min. Pressure up to 5351 psi with approx. 220k and open pump out shoe for Stg 1. Continue pumping and increase rate to 90k scf/min (max rate due to truck problems). Shut down. Make repairs 600k scf away. Resume pumping at 1:30pm. Increase rate to 103k scf/min and pump total of 1.5 MM scf N2. Shut down and load 1.5" ball for Stg 2. Drop ball and let fall. Start pumping ball to sleeve with N2 at 22k scf/min. Land ball at 128k, up rate, and open sleeve at 4070 psi. Up rate and pump total of 1 MMscf N2. Shut down. Load 1.625" ball for Stg 3. Drop ball. Start pumping ball to sleeve at 22k scf/min. Land ball at 133k scf. Open sleeve at 4113 psi. Up rate and pump total of 1 MM scf N2. Back rate down and drop 1.75" ball for Stg 4. Repeat process for Stgs 4- Stg 16 (did not pump stg 17 due to its placement in hole).

105-01366

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage 8
Max P	5016	4868	4648	4739	4430	4490	4413	4445
Avg P	4801	4766	4611	4612	4406	4385	4346	4415
Max R	103.0	103.1	104.2	106.3	103.6	105.5	101.6	101.8
Avg R	101.6	101.3	102.4	104.8	103.0	103.6	101.1	101.5
Shut In	1680-10min	2800-isip	N/A	N/A	1744-5min	N/A	N/A	1793-5min
	Stage 9	Stage 10	Stage 11	Stage 12	Stage 13	Stage 14	Stage 15	Stage 16
Max P	4509	4291	4124	4160	4236	3715	3573	3399
Avg P	4444	4283	4084	4113	4111	3656	3512	3378
Max R	103.3	102.6	102.3	107.0	105.5	105.3	105.0	108.0
Avg R	101.5	102.0	101.8	104.8	102.6	103.7	102.7	106.1
Shut In	N/A	N/A	1787-5min	N/A	N/A	N/A	1758-10min	1796-5min

**RECEIVED**  
Office of Oil & Gas

MAY 20 2013

WV Department of  
Environmental Protection

06/21/2013