



west virginia department of environmental protection

Office of Oil and Gas
601 57th Street
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

September 7, 2017

EQT Production Company
120 Professional Place, Building II
Bridgeport, WV 26330

Re: Mechanical Integrity Test Approval and Authorization for Injection

Dear Mr. Carmichael:

The mechanical integrity test performed June 28, 2017 on well API 47-047-01511 has been approved. Authorization is granted to resume injection. The maximum permitted injection pressure for this well has been reduced based on this test, and is set at 690 psig. If you have any questions then please feel free to contact Justin Nottingham via email at Justin.E.Nottingham@wv.gov or by phone at (304) 926-0499 ext. 1650.

Respectfully,

Melanie Hankins
Environmental Resources Specialist
WVDEP Office of Oil & Gas

Date: 6/28/2017

Operator's Well Number 506168

State	County	Permit
-------	--------	--------

API Well No.: 47- 047 - 01511

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENT-OFFICE OF OIL AND GAS
PRE-OPERATION CERTIFICATE
FOR LIQUID INJECTION OR WASTE DISPOSAL WELL

WELL OPERATOR EQT Production

Address 1710 Pennsylvania Ave

DESIGNATED AGENT

Address

GEOLOGICAL TARGET FORMATION Berea Depth 3400 feet(top) to 3450 feet(bottom)

Virgin reservoir pressure in target formation 859 psig

Source of information on virgin reservoir pressure: Offset Well: 47-047-00944

Perforation intervals 3412'-3468' Open-hole intervals N/A

MAXIMUM PERMITTED INJECTION OPERATIONS

Well head injection pressure: 847 690 psig Bottom hole pressure: 1550 psig

Volume per hour: 47.7

Bottom hole pressure: 1550 _____, psig

DETAILED IDENTIFICATION OF MATERIALS TO BE INJECTED

Liquids to be injected for oil recovery: Oil is gravity separated prior to injection. Injection fluid is filtered for oil as well.

Wastes to be disposed of: The fluid to be injected is brine

Received
Office of Oil & Gas
Injection fluid is filtered for oil as well
AUG 28 2017

Additives (Slurry mediums, inhibitors, solvents, oxidizers, deoxidizers, etc.)

Corrosion and Scale Inhibitors such as x-cide 370 and OSW5200.

SDS were included with permit renewal package

SPECIFICATIONS FOR CATHODIC PROTECTION AND OTHER CORROSION CONTROL

Injection tubing is PVC lined. Fluid in casing annulus is treated with a corrosion inhibitor.

Injection fluid will be treated with corrosion inhibitor as well.

ADDITIONAL DRILLING AS PART OF THE CONVERSION (Complete form WR-35)

DETAILS ON NEW CASING AND TUBING PROGRAM AS PART OF THE CONVERSION (To be completed below unless the new casing and tubing program is described on a form WR-35, submitted in connection with the permit to which this form WR-37 relates.)

[illegible]

MECHANICAL INTEGRITY TEST

Test Method

1. Barton Meter was installed on 5.5" csg
2. Csg was pressured to 1035'
3. Pressure was monitored and recorded on attached chart

The undersigned certifies that the test was performed on June 29th
mechanical integrity of the well. The test was witnessed by Brian Ferguson and demonstrated
the Office of Oil and Gas. representing

EQT Production

6/30/2017

Well Operator

Date

THIS WELL IS AUTHORIZED FOR INJECTION.

Signed

UIC PROGRAM DIRECTOR

Date

[NOTE: That the mechanical integrity of this well must be demonstrated again within ninety (90) days of five years from this date in order for injection to continue. Please notify the state inspector 24 hours in advance of the test.]

Approved
Jason Harmon
9/7/17

EQT Production

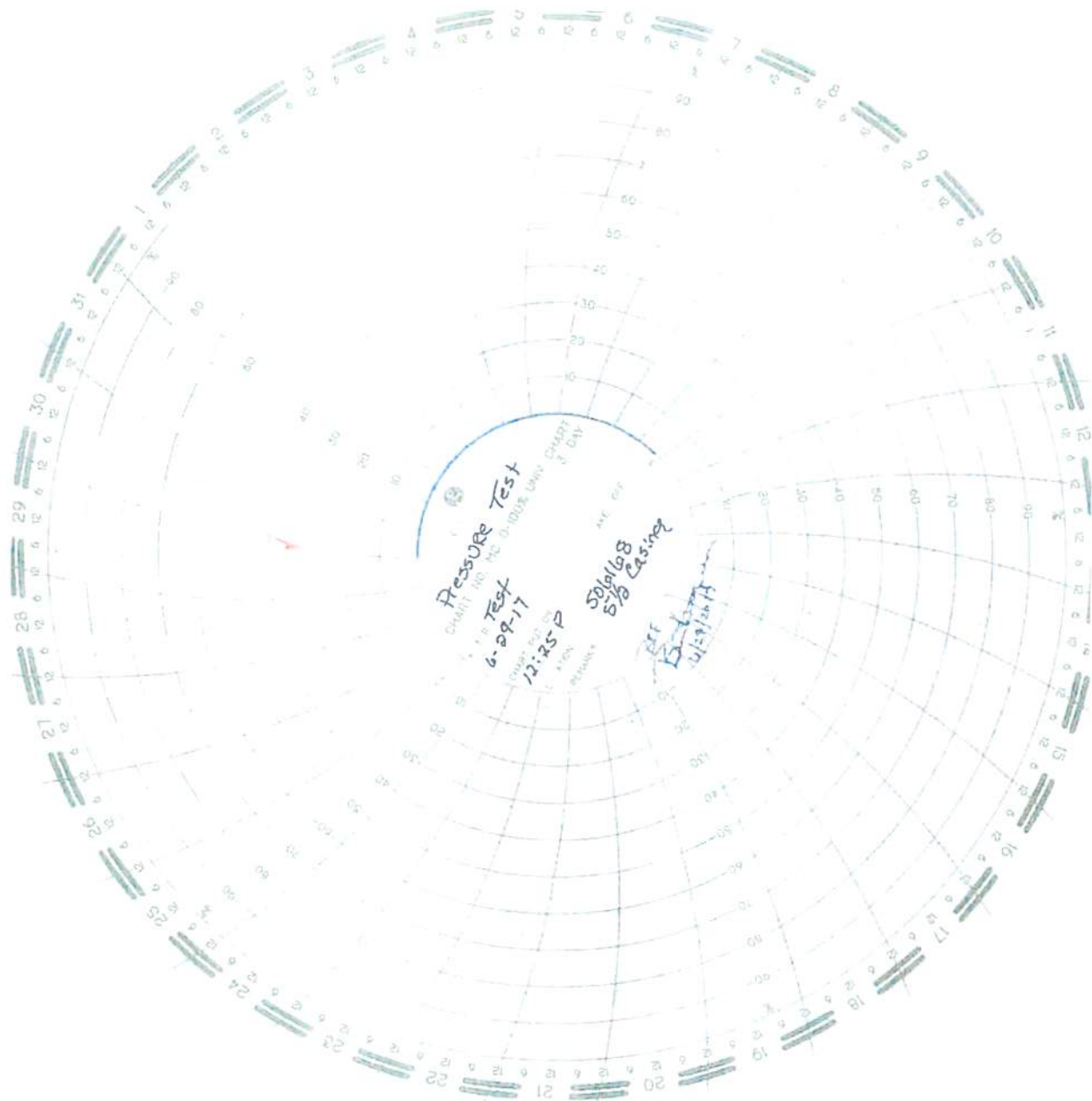
Well Operator

By:
Its

Anthony Kikemakal Assist. Sup.

Received
Office of Oil & Gas

AUG 23 2017



Received
Office of Oil & Gas
AUG 23 2017

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

DATE: 6/28/2017
API #: 47-047-01511

Farm name: Pocahontas Land Corporation

Operator Well No.: 506168

LOCATION: Elevation: 1165'

Quadrangle: Davy 7 5'

District: Browns Creek

County: McDowell

Latitude: 37 48 133 Feet South of Deg. Min. Sec.

Longitude: -81 66 656 Feet West of Deg. Min. Sec.

Company:

Address: 1710 Pennsylvania Ave	Casing & Tubing	Used in drilling	Left in well	Cement fill up Cu. Ft.
Charleston, WV 25301	16"	23'	23'	CTS
Agent:	11 3/4"	360'	360'	CTS
Inspector:	8 5/8"	1020'	1020'	CTS
Date Permit Issued:	5 1/2"	3554'	3554'	510.3 cu. ft.
Date Well Work Commenced: 10/8/2001				
Date Well Work Completed: 11/7/2001	2 3/8"	3277.5'	3277.5'	
Verbal Plugging:				
Date Permission granted on:				
Rotary <input checked="" type="checkbox"/> Cable <input type="checkbox"/> Rig <input type="checkbox"/>				
Total Vertical Depth (ft): 3554'				
Total Measured Depth (ft): 3554'				
Fresh Water Depth (ft.): 85', 111', 250'				
Salt Water Depth (ft.): Not recorded				
Is coal being mined in area (N/Y)? Y				
Coal Depths (ft.): 115', 200', 350', 480', 1000'				
Void(s) encountered (N/Y) Depth(s) N				

OPEN FLOW DATA (If more than two producing formations please include additional data on separate sheet)

Producing formation Berea Injection Pay zone depth (ft) 3400'-3450'

Gas: Initial open flow N/A MCF/d Oil: Initial open flow N/A Bbl/d

Final open flow N/A MCF/d Final open flow N/A Bbl/d

Time of open flow between initial and final tests N/A Hours

Static rock Pressure N/A psig (surface pressure) after N/A Hours

Second producing formation N/A Pay zone depth (ft) N/A

Gas: Initial open flow N/A MCF/d Oil: Initial open flow N/A Bbl/d

Final open flow N/A MCF/d Final open flow N/A Bbl/d

Time of open flow between initial and final tests N/A Hours

Static rock Pressure N/A psig (surface pressure) after N/A Hours

Received
Office of Oil & Gas

AUG 23 2017

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete.

Signature

Date

8-23-17

Were core samples taken? Yes _____ No X

Were cuttings caught during drilling? Yes X No _____

Were Electrical, Mechanical or Geophysical logs recorded on this well? If yes, please list Electrical log only

NOTE: IN THE AREA BELOW 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 THE TOPS AND BOTTOMS OF ALL FORMATIONS, INCLUDING COAL ENCOUNTERED BY THE WELLBORE FROM SURFACE TO TOTAL DEPTH.

Perforated Intervals, Fracturing, or Stimulating:

3412'- 3468' with 108 holes, frac with linear gel water frac

Plug Back Details Including Plug Type and Depth(s): N/A

<u>Formations Encountered:</u>	<u>Top Depth</u>	<u>Bottom Depth</u>
<u>Surface:</u>		

See attached Driller's Log

Received
Office of Oil & Gas
AUG 28 2017

CASING DETAIL

16" csg @ 23'
TOC @ Surface (Class A cement)

11 3/4" csg @ 360'
Grade F-25, 42lb/ft,
0.3" wall thickness
TOC @ Surface (205 cu ft) Cl A

8 5/8" csg @ 1020'
Grade F-25, 24lb/ft
0.264" wall thickness
TOC @ Surface (333 cu ft) Cl A

WELL: 506168

API: 47-047-01511

Fresh Water @ 85', 1" stream
Fresh Water @ 111', 2" stre
Coal @ 115'-117'
Coal @ 200'-202'
Fresh Water @ 250', 6" stream

Coal @ 350'-351'

Coal @ 480'-481'

Coal @ 1000'-1002'

Silty Shales 2650'-3,380' (Additional Confining Zones)

2 3/8" 8rd 4.7lb/ft PVC lined tbg @ 3,277.5'
Retrievable AS I-XS (14lb to 17lb) 5 1/2" x 2 3/8"

Sunbury Shale 3,380' to 3,400' (Confining Zone)

Perforations: 3412'-3468' (16 Holes)

Perforations: 3449'-3458' (36 Holes)

Perforations: 3464'-3468' (16 Holes)

Berea 3,400' to 3,450'

Current TD @ 3454' (Formation and Frac Sand)

5 1/2" csg @ 3554'
Grade J-55, 15.5lb/ft
0.275" wall thickness
TOC @ 1874 (510 cu ft) Cl A
Drilled w/ 7 7/8" bit

Upper Huron Shale starting at 3,470' (Lower Confining Zone)

Received
Office of Oil & Gas
AUG 23 2017