

VIRGINIA OIL AND GAS CONSERVATION BOARD

Virginia Oil and Gas Inspector

P. O. Box 1416

Abingdon, Virginia 24210

703 628-8115

confidential

*6-10-88
Btf.*



NOTICE OF COMPLETION OF A WELL UNDER ARTICLE 2

Pursuant to Regulation 2.02 of the Regulations under the Virginia Oil and Gas Act, applicable to, "each jurisdictional well completed or recompleted...in a pay zone deeper than 3,000 feet from the surface", the undersigned well operator hereby notifies the Virginia Oil and Gas Conservation Board of the completion of the referenced well, as completion is defined in Regulation 1.02(4), on November 23, 1987, in Jonesville Magisterial District, Lee County, Virginia as follows:

The completion was to perform all those acts which resulted in the well being capable of producing oil or gas

The well proved to be incapable of commercial production, and was plugged and abandoned

The undersigned will also file with the Inspector a Report of Completion of Well Work (Form 16) within the time period provided in Regulation 4.06(a).

Other well operators, if any, who have an interest in the well have been mailed a copy of this Notice. The names and addresses of such other operators are typed below:

APPLICANT: Penn Virginia Resources Corporation

BY: William W. Kelly, Jr. *W. Kelly, Jr.*

ITS: Vice President - Exploration

ADDRESS: P.O. Box 386, Duffield, VA 24244

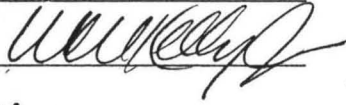
TELEPHONE: (703) 431-2831

VIRGINIA OIL AND GAS CONSERVATION BOARD
Virginia Oil and Gas Inspector
P. O. Box 1416
Abingdon, Virginia 24210
703 628-8115

INITIAL TEST OF A WELL UNDER ARTICLE 2

Pursuant to Regulation 2.02 (c) of the Regulations under the Virginia Oil and Gas Act, applicable to, "each jurisdictional well completed or recompleted...in a pay zone deeper than 3,000 feet from the surface", the undersigned well operator hereby reports to the Virginia Oil and Gas Conservation Board the initial tests of the referenced well, which was completed on 11-23-87 in Jonesville Magisterial District, Lee County, Virginia.

The results of (i) the initial indicated potential flow test and (ii) the initial gas/oil ratio test are set out on the following form. The names and addresses of such other operators are listed below.

APPLICANT Penn Virginia Resources Corporation
BY William W. Kelly, Jr. 
ITS Vice President - Exploration
ADDRESS P.O. Box 386, Duffield, VA 24244
TELEPHONE (703) 431-2831

API NO. 45 - 105 - 21123WELL NAME: 8709DATE 11-23-87

Virginia Oil and Gas Inspector

P. O. Box 1416

Abingdon, VA 24210

703 628-8115

REPORT OF COMPLETION OF WELL WORK

Pursuant to Regulation 4.06 of the Regulations under the Virginia Oil and Gas Act, the undersigned well operator reports completion of the type(s) of well work specified below on the referenced well in Jonesville Magisterial District Lee County, Virginia on 23rd day, November month, 19 87.

WELL TYPE: Oil ___ / Gas X / Enhanced Recovery ___ / Waste Disposal ___ / If Gas-Production X / Underground Storage ___ / Exempt by Code Section 45.1-300.B.1. from general Oil and Gas Conservation Law yes ___ / no X /

WELL WORK: Drill X / Deepen ___ / Redrill ___ / Stimulate X / Plug Off Old Formation ___ / Perforate New Formation X / Plug ___ / Replug ___ / Other physical change in well (specify) _____

The well work was done as shown in the Appendix(es) applicable to the type(s) of well work involved.

CONFIDENTIALITY STATUS UNDER CODE OF VIRGINIA SECTION 45.1-332

_____ Ninety days from the filing of this report

OR

X Two years from 11-23-87, the date on which the referenced well was completed, the well being an exploratory well as defined in Code of Virginia, Section 45.1-288.21.

AFFILICANT Penn Virginia Resources Corporation

BY William W. Kelly, Jr. 

ITS Vice President - Exploration

ADDRESS P.O. Box 386, Duffield, VA 24244

TELEPHONE (703) 431-2831

COMPLETION REPORT

WELL TYPE: Oil () Gas Production (X) Gas-Underground Storage () Enhanced Recovery () Waste Disposal ()

LOCATION

COUNTY Lee

DISTRICT Jonesville Magisterial

SURFACE ELEVATION 1807.20'

QUADRANGLE Ben Hur

LATITUDE 1160 'S 36° 45 ' 00 "

LONGITUDE 620 'S 83° 02 ' 30 "

DRILLING DATA

DATE DRILLING COMMENCED 9-29-87

DRILLING CONTRACTOR Ray Resources

DATE DRILLING COMPLETED 10-17-87

ADDRESS 600 Commerce Square, Charleston, WV 25301

DATE WELL COMPLETED 11-23-87

TELEPHONE NUMBER 304-344-8393

TOTAL DEPTH OF COMPLETED WELL 5110'

RIG TYPE ROTARY CABLE TOOL

GEOLOGICAL DATA

FRESH WATER AT (1) No record FEET _____ GPM: (2) _____ FEET _____ GPM
SALT WATER AT (1) N/A FEET _____ GPM: (2) _____ FEET _____ GPM

COAL SEAMS:

NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA		
				YES	NO	MINED OUT
<u>N/A</u>						

OIL AND GAS SHOWS:

FORMATION	TOP	BOTTOM	THICKNESS	IFF (MCFD/BOPD)	PRESSURE	HOURS TESTED
<u>Trenton</u>	<u>2180'</u>	<u>2196'</u>	<u>16'</u>	<u>Show Gas</u>	<u>Not gauged</u>	
<u>Eggleston</u>	<u>3000'</u>	<u>3015'</u>	<u>15'</u>	<u>Show Oil & Gas</u>	<u>Not gauged</u>	
<u>Stones River</u>	<u>4186'</u>	<u>4196'</u>	<u>10'</u>	<u>Show Gas</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>4604'</u>	<u>4612'</u>	<u>8'</u>	<u>Show Gas</u>	<u>Not gauged</u>	

STIMULATION RECORD

ZONE (1) Knox FORMATION STIMULATED WITH 42,000# 20/50 Sand, 626 bbl. X-link water frac 30. Breakdown with 2000 gallons 28% HCl.

PERFORATED 4602 TO 4612 NO. OF PERFORATIONS 20 PERFORATION SIZE .38
FORMATION BROKE DOWN AT 3200 PSIG AVERAGE INJECTED RATE 15 liquid BPM
INITIAL SHUT IN PRESSURE 3400 PSIG 15 MINUTE SHUT IN PRESSURE 2356 PSIG

STIMULATION RECORD

ZONE (2) Stones River FORMATION STIMULATED WITH See Attached

PERFORATED _____ TO _____ NO. OF PERFORATIONS _____ PERFORATION SIZE _____
FORMATION BROKE DOWN AT _____ PSIG AVERAGE INJECTED RATE _____ BPM
INITIAL SHUT IN PRESSURE _____ PSIG _____ MINUTE SHUT IN PRESSURE _____ PSIG

FINAL PRODUCTION: () NATURAL () AFTER STIMULATION

ZONE (1)	BOB	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
<u>Knox</u>		<u>21</u>	<u>4</u>	<u>900 psi</u>	<u>72</u>
<u>Stones River 5</u>		<u>119</u>	<u>8</u>	<u>880 psi</u>	<u>48</u>

FINAL PRODUCTION IF GAS ZONES ARE COMINGLED MCFD _____ HOURS TESTED _____ PSIG _____ HOURS TESTED

Zone (3) Stones River 1 44 6 230 psi 14

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	PACKERS OR BRIDGE PLUGS		
					FEET TO FEET	KIND	SIZE	SET AT
CONDUCTOR	20"	0'	60'	60'	----			
	13 3/8"	0'			----			

CASING Circulated and Cemented to Surface

9 5/8"	0'	1260'	1260'	----				
--------	----	-------	-------	------	--	--	--	--

WATER PROTECTION
(Casing Set According to Section 45.1-334)

Same as above

COAL PROTECTION
(Casing Set According to Section 45.1-334)

N/A

OTHER CASING AND Tubing Left In Well

4 1/2"	0'	4681'	4681'	4602'-4612'	20 holes	NC-1	B.P. left at 4320'
				4185'-4195'	22 holes		
				2999'-3009'	22 holes	NC-1	Bridge Plug left temporarily at 4000'

LINERS Remaining in well

N/A

OTHER used and not left

N/A

Is the well underlain by Red Shales Yes No, If Yes, was coal protection string set to Red Shales? Yes No

REMARKS: Shut down, fishing jobs, depths and dates, caving, etc.

Open hole cast iron Bridge Plug set at 4740', dumped 4 sacks of Calseal on top of it.

DRILLER'S LOG

Compiled by William W. Kelly, Jr.

Geological Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		

(ATTACH DRILLER'S LOG IN THIS FORMAT)

Samples and Cuttings

Will Will not _____ be available for examination by a member of the Virginia Division of Mineral Resources
 Will Will not _____ be furnished to the Virginia Division of Mineral Resources upon request
 Will _____ Will not require sacks to be furnished by the Virginia Division of Mineral Resources

Electric Logs and Surveys:

Type of Electric Log(s) Ran: GR-LDT-SNP, DIL, Temperature, Audio, Noise, Cement Bond Log, Sonic Seismogram

Did log disclose vertical location of a coal seam? Yes _____ No

Was log made at request of coal owner according to Section 45.1-333.B.1 of the Virginia Code? Yes _____ No

Note: If a coal seam was located, the part of the survey from the surface through the coal is attached in accordance with Section 45.1-333.B.3 of the Virginia Code

Deviation Surveys:

Deviation surveys were _____ were not required under Section 45.1-333.C of the Virginia Code "to the bottom of the lowest published coal seam depth."

Note: If a deviation survey(s) was/were required, the survey results are as follows:

<u>Depth of Survey</u>	<u>Feet/Degree Deviated From True Vertical</u>	<u>Depth of Survey</u>	<u>Feet/Degree Deviated From True Vertical</u>	<u>Depth of Survey</u>	<u>Feet/Degree Deviated From True Vertical</u>
_____	<u>N/A</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

A continuous survey was _____ was not required, under Section 45.1-333.C of the Virginia Code.

Note: If a continuous survey was required, the survey results are attached.

Changes in the Permitted Well Work:

The well operator did _____ did not make any changes(s) in the permitted well work, verbally approved by the Inspector or Assistant Inspector under Regulation 4.03 of the Regulations under the Virginia Oil and Gas Act, for the purpose of insuring successful completion of the well work.

NOTE: The nature and purpose of each such change, if any, is set out below or on additional sheets if such are required.

Confidentiality Status:

Confidentiality status under Section 45.1-332 of the Virginia Code:

The operator requests that information herein and log(s) be kept confidential (after COMPLETION DATE of the well) for a period of

_____ Ninety (90) days
 _____ (2) years, if the well is exploratory

COMPLETION PROCEDURE

- 11-10-87 Stones River: Perforated 4185'-4195'. 22 holes. Set NC-1 Bridge Plug at 4320'. Breakdown with 48 bbls 28% HCl. Breakdown 3000 psi, ISIP 2800 psi. Swab and cleanup - Gas guaged 119 Mcfd with show of oil.
- 11-12-87 Acidize with 15,000 gallons gelled acid with gel pads, foamed with 912,000 Scf Nitrogen. Average treatment pressure 4025 psi, Average rate 8.3 BPM, ISIP 3700 psi, 15 minute SIP 3414 psi. Results after cleanup 119 Mcfd 5 BOPD.
- 11-20-87 Stones River: Perforated 2999'-3009'. 22 holes. Set NC-1 (Eggleston) Bridge Plug at 4000'. Acidize with 6000 gallons 15% HCl foamed to 50 Q with 247,000 Scf Nitrogen. Breakdown 3200 psi, ATP 2600 psi, Average rate 10 BPM.
- 11-23-87 Final openflow after cleanup 44 Mcfd, 1 BOPD Shut in.

WELL 8709

<u>Geological</u> <u>Age</u>	<u>Formation</u>	<u>General</u>		<u>Depth</u>		<u>Thickness</u>	<u>Remarks</u>
		<u>Lithology</u>	<u>Color</u>	<u>Top</u>	<u>Bottom</u>		
Cambrian	Overthrust	Dolomite	Tan-gray	0'	635'	635'	
Silurian	Hancock	Dolomite	Gray	635'	735'	100'	
Silurian	Clinton	Shale	Gray-green	735'	1010'	275'	
Silurian	Clinch	Sandstone	White	1010'	1290'	280'	
Silurian	Hagan	Shale	Gray	1290'	1326'	36'	
Ordovician	Sequatchie	Silty Limestone	Red-gray	1326'	1726'	400'	
Ordovician	Reedsville	Lime/Shale	Gray	1726'	2180'	454'	
Ordovician	Trenton	Limestone	Gray-brown	2180'	2912'	732'	
Ordovician	Eggleston	Limestone	Tan	2912'	3070'	158'	
Ordovician	Stones River	Limestone	Gray	3070'	4432'	1362'	
Ordovician	Knox	Limestone	Tan	4432'	5110'	678'	

Samples and Cuttings

Will Will not _____ be available for examination by a member of the Virginia Division of Mineral Resources
Will Will not _____ be furnished to the Virginia Division of Mineral Resources upon request
Will _____ Will not require sacks to be furnished by the Virginia Division of Mineral Resources

Electric Logs and Surveys:

Type of Electric Log(s) Ran: GR-LDT-SNP, DIL, Temperature, Audio, Noise, Cement Bond Log, Sonic Seismogram

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_____	<u>N/A</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

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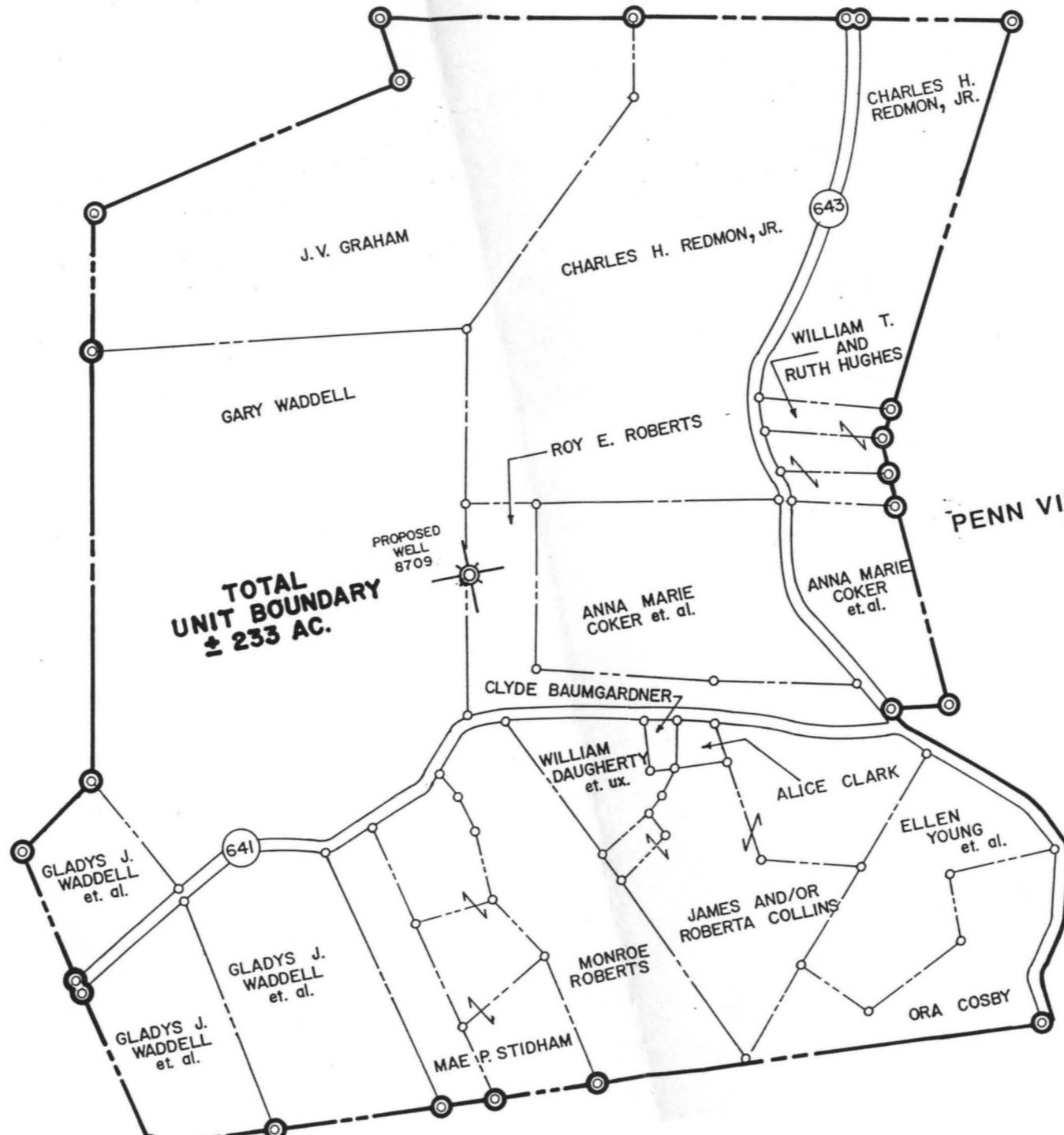
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_____ Ninety (90) days
 _____ (2) years, if the well is exploratory



**TOTAL
UNIT BOUNDARY
± 233 AC.**

PROPOSED
WELL
8709

PENN VIRGINIA RESOURCES CORPORATION
MAP SHOWING
DRILLING UNIT
FOR
WELL 8709

SCALE: 1" = 400'

VIRGINIA DIVISION OF MINERAL RESOURCES
 Box 3667, Charlottesville, VA 22903

INTERVAL SHEET

Page 1 of 3

Well Repository No.: W- 7203

Date rec'd: Date Processed:

Sample Interval: from 300' to: 4300'

PROPERTY: Roy E. Roberts LE-156

Number of samples: 383

COMPANY: Penn-Virginia-Resources

Total Depth: 5110'

COUNTY: Lee

Oil or Gas: Water: Exploratory:
 Well # 8709

From-To	From-To	From-To	From-To	From-To
300 - 10	650 - 60	1010 - 20	1260 - 70	1410 - 20
10 - 20	60 - 70	20 - 30	70 - 80	20 - 30
20 - 30	70 - 80	30 - 40	80 - 90	30 - 40
30 - 40	80 - 90	40 - 50	90 - 1300	40 - 50
40 - 50	90 - 700	50 - 60	1300 - 10	50 - 60
50 - 60	700 - 10	60 - 70	10 - 20	60 - 70
60 - 70	10 - 20	70 - 80	20 - 30	70 - 80
70 - 80	20 - 30	80 - 90	30 - 40	80 - 90
380 - 390	30 - 40	90 - 1100	40 - 50	90 - 1700
390 - 400	40 - 50	1100 - 10	50 - 60	1700 - 10
400 - 10	50 - 60	10 - 20	60 - 70	10 - 20
10 - 20	60 - 70	20 - 30	70 - 80	20 - 30
20 - 30	70 - 80	30 - 40	80 - 90	30 - 40
30 - 40	80 - 90	40 - 50	90 - 1400	40 - 50
40 - 50	90 - 800	50 - 60	1400 - 10	50 - 60
50 - 60	800 - 10	60 - 70	10 - 20	60 - 70
60 - 70	10 - 20	70 - 80	20 - 30	70 - 80
70 - 80	20 - 30	80 - 90	30 - 40	80 - 90
80 - 90	30 - 40	90 - 1100	40 - 50	90 - 1800
90 - 500	40 - 50	1100 - 1110	50 - 60	1800 - 10
500 - 10	50 - 60	10 - 20	60 - 70	10 - 20
10 - 20	60 - 70	20 - 30	70 - 80	20 - 30
20 - 30	70 - 80	30 - 40	80 - 90	30 - 40
30 - 40	80 - 90	40 - 50	90 - 1500	40 - 50
40 - 50	90 - 900	50 - 60	1500 - 10	50 - 60
50 - 60	900 - 10	60 - 70	10 - 20	60 - 70
60 - 70	10 - 20	70 - 80	20 - 30	70 - 80
70 - 80	20 - 30	80 - 90	30 - 40	80 - 1880
80 - 90	30 - 40	90 - 1200	40 - 50	90 - 1900
90 - 600	50 - 60	1200 - 1210	50 - 60	1900 - 10
600 - 10	60 - 70	1210 - 20	60 - 70	10 - 20
10 - 20	70 - 80	20 - 30	70 - 80	20 - 30
20 - 30	80 - 90	30 - 40	80 - 90	30 - 40
30 - 40	90 - 1000	40 - 50	90 - 1600	40 - 50
40 - 50	1000 - 10	50 - 60	1600 - 10	50 - 60

VIRGINIA DIVISION OF MINERAL RESOURCES
 Box 3667, Charlottesville, VA 22903

INTERVAL SHEET
 Continued

Page 2 of 3

Well Repository No.: W- 7203

From-To	From-To	From-To	From-To	From-To
1960-70	60-70	2760-70	3170-80	3570-80
70-80	70-80	70-80	80-90	80-90
80-90	80-90	80-90	90-3200	90-3600
90-2000	2390-2400	90-2800	3200-10	3600-10
2000-10	2400-10	2800-10	10-20	10-20
10-20	10-20	10-20	20-30	20-30
20-30	20-30	20-30	30-40	30-40
30-40	30-40	30-40	40-50	40-50
40-50	40-50	40-50	50-60	50-60
50-60	50-60	50-60	60-70	60-70
60-70	60-70	60-70	70-80	70-80
70-80	70-80	70-80	80-90	80-90
80-90	80-90	80-90	90-3300	90-3700
90-2100	90-2500	90-2900	3300-10	3700-10
2100-10	2500-10	2900-10	10-20	10-20
10-20	10-20	10-20	20-30	20-30
20-30	20-30	20-30	30-40	30-40
30-40	30-40	30-40	40-50	40-50
40-50	40-50	40-50	50-60	50-60
50-60	50-60	50-60	60-70	60-70
60-70	60-70	60-70	70-80	70-80
70-80	70-80	70-80	80-90	80-90
80-90	80-90	80-90	90-3400	90-3800
90-2200	90-2600	90-3000	3400-10	3800-10
2200-10	2600-10	3000-10	10-20	10-20
10-20	10-20	10-20	20-30	20-30
20-30	20-30	20-30	30-40	30-40
30-40	30-40	40-50	40-50	40-50
40-50	40-50	50-60	50-60	50-60
50-60	50-60	60-70	60-70	60-70
60-70	60-70	70-80	70-80	70-80
70-80	70-80	80-90	80-90	80-90
80-90	80-90	90-3100	90-3500	90-3900
90-2300	90-2700	3100-10	3500-10	3900-10
2300-10	2700-10	10-20	10-20	10-20
10-20	10-20	20-30	20-30	20-30
20-30	20-30	30-40	30-40	30-40
30-40	30-40	40-50	40-50	40-50
40-50	40-50	50-60	50-60	50-60
50-60	50-60	60-70	60-70	60-70

VIRGINIA OIL AND GAS CONSERVATION BOARD
Virginia Oil and Gas Inspector
P. O. Box 1416
Abingdon, Virginia 24210
703 628-8115

PENN VIRGINIA RESOURCES
ROY E. ROBERTS
8709
BSN HUC-7 1/2
LE-156

6-10-87
Ref.



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- The well proved to be incapable of commercial production, and was plugged and abandoned

The undersigned will also file with the Inspector a Report of Completion of Well Work (Form 16) within the time period provided in Regulation 4.06(a).

Other well operators, if any, who have an interest in the well have been mailed a copy of this Notice. The names and addresses of such other operators are typed below:

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BY: William W. Kelly, Jr. *William W. Kelly, Jr.*

ITS: Vice President - Exploration

ADDRESS: P.O. Box 386, Duffield, VA 24244

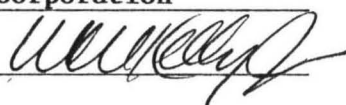
TELEPHONE: (703) 431-2831

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The results of (i) the initial indicated potential flow test and (ii) the initial gas/oil ratio test are set out on the following form. The names and addresses of such other operators are listed below.

AFFILIANT Penn Virginia Resources Corporation
BY William W. Kelly, Jr. 
ITS Vice President - Exploration
ADDRESS P.O. Box 386, Duffield, VA 24244
TELEPHONE (703) 431-2831

API NO. 45 - 105 - 21123
WELL NAME: 8709
DATE 11-23-87

Virginia Oil and Gas Inspector
P. O. Box 1416
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REPORT OF COMPLETION OF WELL WORK

Pursuant to Regulation 4.06 of the Regulations under the Virginia Oil and Gas Act, the undersigned well operator reports completion of the type(s) of well work specified below on the referenced well in Jonesville Magisterial District
Lee County, Virginia on 23rd day, November month, 19 87.

WELL TYPE: Oil ___ / Gas X / Enhanced Recovery ___ / Waste Disposal ___ / If Gas-Production X / Underground Storage ___ /
Exempt by Code Section 45.1-300.B.1. from general Oil and Gas Conservation Law yes ___ / no X /
WELL WORK: Drill X / Deepen ___ / Redrill ___ / Stimulate X / Plug Off Old Formation ___ / Perforate New Formation X /
Plug ___ / Replug ___ / Other physical change in well (specify) _____

The well work was done as shown in the Appendix(es) applicable to the type(s) of well work involved.

CONFIDENTIALITY STATUS UNDER CODE OF VIRGINIA SECTION 45.1-332

_____ Ninety days from the filing of this report

OR

X Two years from 11-23-87, the date on which the referenced well was completed, the well being an exploratory well as defined in Code of Virginia, Section 45.1-288.21.

AFFLICANT Penn Virginia Resources Corporation

BY William W. Kelly, Jr. 

ITS Vice President - Exploration

ADDRESS P.O. Box 386, Duffield, VA 24244

TELEPHONE (703) 431-2831

COMPLETION REPORT

WELL TYPE: Oil () Gas Production (X) Gas-Underground Storage () Enhanced Recovery () Waste Disposal ()

LOCATION

COUNTY Lee

DISTRICT Jonesville Magisterial

SURFACE ELEVATION 1807.20'

QUADRANGLE Ben Hur

LATITUDE 1160 'S 36° 45 ' 00 "

LONGITUDE 620 'S 83° 02 ' 30 "

DRILLING DATA

DATE DRILLING COMMENCED 9-29-87
DATE DRILLING COMPLETED 10-17-87
DATE WELL COMPLETED 11-23-87
TOTAL DEPTH OF COMPLETED WELL 5110'

DRILLING CONTRACTOR Ray Resources
ADDRESS 600 Commerce Square, Charleston, WV 25301
TELEPHONE NUMBER 304-344-8393
RIG TYPE X ROTARY _____ CABLE TOOL _____

GEOLOGICAL DATA

FRESH WATER AT (1) No record FEET _____ GPM: (2) _____ FEET _____ GPM
SALT WATER AT (1) N/A FEET _____ GPM: (2) _____ FEET _____ GPM

COAL SEAMS:

NAME	TOP	BOTTOM	THICKNESS	MINING IN AREA		
				YES	NO	MINED OUT
<u>N/A</u>						

OIL AND GAS SHOWS:

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOFD)	PRESSURE	HOURS TESTED
<u>Trenton</u>	<u>2180'</u>	<u>2196'</u>	<u>16'</u>	<u>Show Gas</u>	<u>Not guaged</u>	
<u>Eggleston</u>	<u>3000'</u>	<u>3015'</u>	<u>15'</u>	<u>Show Oil & Gas</u>	<u>Not guaged</u>	
<u>Stones River</u>	<u>4186'</u>	<u>4196'</u>	<u>10'</u>	<u>Show Gas</u>	<u>Not guaged</u>	
<u>Knox</u>	<u>4604'</u>	<u>4612'</u>	<u>8'</u>	<u>Show Gas</u>	<u>Not guaged</u>	

STIMULATION RECORD

ZONE (1) Knox FORMATION STIMULATED WITH 42,000# 20/50 Sand, 626 bbl.
X-link water frac 30. Breakdown with 2000 gallons 28% HCl.
PERFORATED 4602 TO 4612 NO. OF PERFORATIONS 20 PERFORATION SIZE .38
FORMATION BROKE DOWN AT 3200 PSIG AVERAGE INJECTED RATE 15 liquid BPM
INITIAL SHUT IN PRESSURE 3400 PSIG 15 MINUTE SHUT IN PRESSURE 2356 PSIG

STIMULATION RECORD

ZONE (2) Stones River FORMATION STIMULATED WITH See Attached
PERFORATED _____ TO _____ NO. OF PERFORATIONS _____ PERFORATION SIZE _____
FORMATION BROKE DOWN AT _____ PSIG AVERAGE INJECTED RATE _____ BPM
INITIAL SHUT IN PRESSURE _____ PSIG _____ MINUTE SHUT IN PRESSURE _____ PSIG

FINAL PRODUCTION: () NATURAL () AFTER STIMULATION

ZONE (1)	BOB	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
<u>Knox</u>		<u>21</u>	<u>4</u>	<u>900 psi</u>	<u>72</u>
<u>Stones River</u>	<u>5</u>	<u>119</u>	<u>8</u>	<u>880 psi</u>	<u>48</u>
FINAL PRODUCTION IF GAS ZONES ARE COMINGLED _____ MCFD _____ HOURS TESTED _____ PSIG _____ HOURS TESTED					
<u>Zone (3) Stones River</u>	<u>1</u>	<u>44</u>	<u>6</u>	<u>230 psi</u>	<u>14</u>

COMPLETION PROCEDURE

- 11-10-87 Stones River: Perforated 4185'-4195'. 22 holes. Set NC-1 Bridge Plug at 4320'. Breakdown with 48 bbls 28% HCl. Breakdown 3000 psi, ISIP 2800 psi. Swab and cleanup - Gas guaged 119 Mcfd with show of oil.
- 11-12-87 Acidize with 15,000 gallons gelled acid with gel pads, foamed with 912,000 Scf Nitrogen. Average treatment pressure 4025 psi, Average rate 8.3 BPM, ISIP 3700 psi, 15 minute SIP 3414 psi. Results after cleanup 119 Mcfd 5 BOPD.
- 11-20-87 Stones River: Perforated 2999'-3009'. 22 holes. Set NC-1 (Eggleston) Bridge Plug at 4000'. Acidize with 6000 gallons 15% HCl foamed to 50 Q with 247,000 Scf Nitrogen. Breakdown 3200 psi, ATP 2600 psi, Average rate 10 BPM.
- 11-23-87 Final openflow after cleanup 44 Mcfd, 1 BOPD Shut in.

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	PACKERS OR BRIDGE PLUGS		
					FEET TO FEET	KIND	SIZE	SET AT
<u>CONDUCTOR</u>	20"	0'	60'	60'	-----			
	13 3/8"	0'			-----			
<u>CASING</u> Circulated and Cemented to Surface	9 5/8"	0'	1260'	1260'	-----			
<u>WATER PROTECTION</u> (Casing Set According to Section 45.1-334)	Same as above							
<u>COAL PROTECTION</u> (Casing Set According to Section 45.1-334)	N/A							
<u>OTHER CASING AND</u> Tubing Left In Well					4602'-4612'	20 holes	NC-1 B.P. left at 4320'	
					4185'-4195'	22 holes		
	4 1/2"	0'	4681'	4681'	2999'-3009'	22 holes	NC-1 Bridge Plug left temporarily at 4000'	
<u>LINERS</u> Remaining in well	N/A							
<u>OTHER</u> used and not left	N/A							

Is the well underlain by Red Shales _____ Yes No, If Yes, was coal protection string set to Red Shales? _____ Yes _____ No

REMARKS: Shut down, fishing jobs, depths and dates, caving, etc.

Open hole cast iron Bridge Plug set at 4740', dumped 4 sacks of Calseal on top of it.

DRILLER'S LOG

Compiled by William W. Kelly, Jr.

Geological Age	Formation	General Lithology	Color	Depth		Thickness	Remarks
				Top	Bottom		

(ATTACH DRILLER'S LOG IN THIS FORMAT)

WELL 8709

<u>Geological Age</u>	<u>Formation</u>	<u>General</u>		<u>Depth</u>		<u>Thickness</u>	<u>Remarks</u>
		<u>Lithology</u>	<u>Color</u>	<u>Top</u>	<u>Bottom</u>		
Cambrian	Overthrust	Dolomite	Tan-gray	0'	635'	635'	
Silurian	Hancock	Dolomite	Gray	635'	735'	100'	
Silurian	Clinton	Shale	Gray-green	735'	1010'	275'	
Silurian	Clinch	Sandstone	White	1010'	1290'	280'	
Silurian	Hagan	Shale	Gray	1290'	1326'	36'	
Ordovician	Sequatchie	Silty Limestone	Red-gray	1326'	1726'	400'	
Ordovician	Reedsville	Lime/Shale	Gray	1726'	2180'	454'	
Ordovician	Trenton	Limestone	Gray-brown	2180'	2912'	732'	
Ordovician	Eggleston	Limestone	Tan	2912'	3070'	158'	
Ordovician	Stones River	Limestone	Gray	3070'	4432'	1362'	
Ordovician	Knox	Limestone	Tan	4432'	5110'	678'	

Samples and Cuttings

Will Will not _____ be available for examination by a member of the Virginia Division of Mineral Resources
Will Will not _____ be furnished to the Virginia Division of Mineral Resources upon request
Will _____ Will not require sacks to be furnished by the Virginia Division of Mineral Resources

Electric Logs and Surveys:

Type of Electric Log(s) Ran: GR-LDT-SNP, DIL, Temperature, Audio, Noise, Cement Bond Log, Sonic Seismogram

Did log disclose vertical location of a coal seam? Yes _____ No

Was log made at request of coal owner according to Section 45.1-333.B.1 of the Virginia Code? Yes _____ No

Note: If a coal seam was located, the part of the survey from the surface through the coal is attached in accordance with Section 45.1-333.B.3 of the Virginia Code

Deviation Surveys:

Deviation surveys were _____ were not required under Section 45.1-333.C of the Virginia Code "to the bottom of the lowest published coal seam depth."

Note: If a deviation survey(s) was/were required, the survey results are as follows:

Depth of Survey	Feet/Degree Deviated From True Vertical	Depth of Survey	Feet/Degree Deviated From True Vertical	Depth of Survey	Feet/Degree Deviated From True Vertical
_____	<u>N/A</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

A continuous survey was _____ was not required, under Section 45.1-333.C of the Virginia Code.

Note: If a continuous survey was required, the survey results are attached.

Changes in the Permitted Well Work:

The well operator did _____ did not make any changes(s) in the permitted well work, verbally approved by the Inspector or Assistant Inspector under Regulation 4.03 of the Regulations under the Virginia Oil and Gas Act, for the purpose of insuring successful completion of the well work.

NOTE: The nature and purpose of each such change, if any, is set out below or on additional sheets if such are required.

Confidentiality Status:

Confidentiality status under Section 45.1-332 of the Virginia Code:

The operator requests that information herein and log(s) be kept confidential (after COMPLETION DATE of the well) for a period of

_____ Ninety (90) days
 _____ (2) years, if the well is exploratory