

LE -159

(FOR OFFICE API Well No. 45 - -
(USE ONLY: State County Permit

Date: _____, 19__

Operator's
Well No. 8708

VIRGINIA OIL AND GAS INSPECTOR
DEPARTMENT OF LABOR AND INDUSTRY
DIVISION OF MINES
219 Wood Avenue
Big Stone Gap, Virginia 24219-1799
Phone 703-523-0335

7,425'

WELL PLAT

+ Denotes location of well on United States Topographic Maps, scale 1 to 24,000. Latitude and longitude lines are represented by border lines as shown.

This plat is new X / updated ___ /

This plat is ___ / is not X / based on a mine coordinate system established for the areas of the well location.

Well operator PENN VIRGINIA RESOURCES CORPORATION

Address P.O. BOX 386 DUFFIELD, VIRGINIA 24244

Farm JACKIE AND DOREEN INGLE

Tract _____ Acres 110.00 Lease No. 45-0239

Elevation 1636.83'

Quadrangle ROSE HILL

County LEE District ROSE HILL

Registered Engineer X Registration No. 11439

Certified Land Surveyor _____ Cert. No. _____

File No. _____ Drawing No. _____

Date _____ Scale 1" = 400'

Certification of Well Plat

I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief, and shows all the information required by law and the regulations of the Virginia Well Review Board.

Registered Engineer or Certified Land Surveyor
in Charge

4,850'
Latitude 36° 40' 00"

REFERENCES FROM PROPOSED WELL 8708 SITE

- A-14 251° 09' 2300' (APPROX.)
- A-73 154° 20' 2550' (APPROX.)
- 6 111° 25' 1600' (APPROX.)
- A-32 109° 20' 1800' (APPROX.)
- A-53 111° 15' 2000' (APPROX.)
- A-54 74° 40' 1600' (APPROX.)
- 128 20° 30' 11" 2125.96'
- A-71 133° 37' 14" 1827.94'
- A-58 74° 15' 02" 2217.75'
- A-70 124° 46' 06" 1747.15'
- A-64 123° 13' 48" 1735.06'
- A-69 110° 05' 12" 1634.51'
- 49 214° 58' 52" 2569.75'
- 59 207° 25' 02" 2445.60'

IRON PIN
N 08-18-46 E
861.14'
PROPOSED WELL 8708
EL. 1636.83'
P.V.R.C. STAKE 11209

JACKIE AND DOREEN INGLE et al
50 AC.

IRON PIN
N 35-00-19 E
625.40'

JACKIE AND DOREEN INGLE et al
110 AC.

JACKIE AND DOREEN INGLE et al
29 AC.

UNIT BOUNDARY
± 235 AC.

MABLE MORROW et al
25 AC.

WAYNE AND JOANN BURGAN et al
28 AC.

GERALD AND ROSIE LEE et al
4.2 AC.

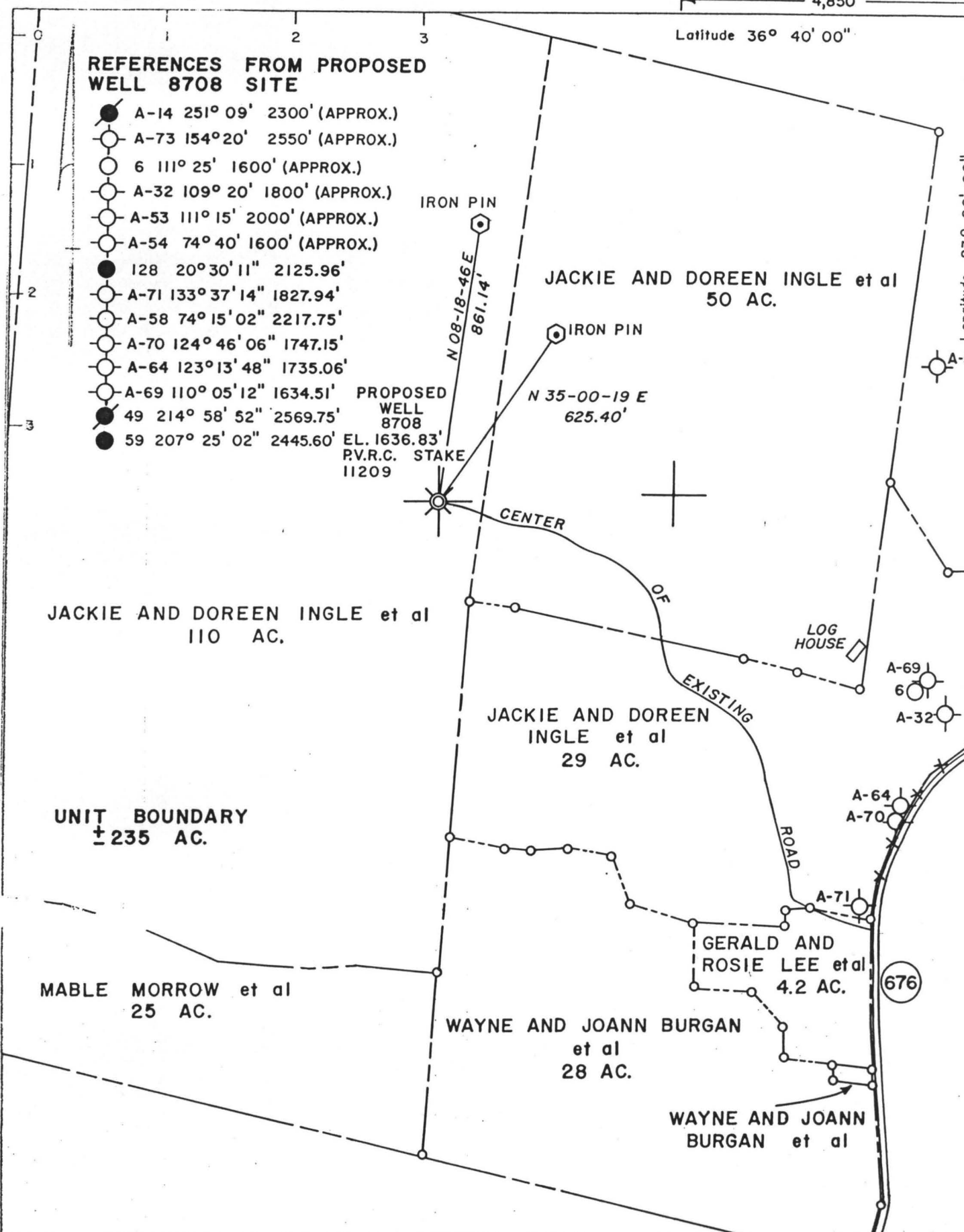
WAYNE AND JOANN BURGAN et al

LOG HOUSE

EXISTING ROAD

676

Longitude 83° 20' 00"



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
BET*



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 March 23, 1988, in Rose Hill 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. *William W. Kelly, Jr.*

ITS: Vice President - Exploration

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


TELEPHONE: (703) 431-2831

API NUMBER: 45 - 105 - 21141
WELL NAME: 8708VIRGINIA 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 March 23, 1988 in Rose Hill 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- 21141
 WELL NAME: 8708
 DATE 3-23-88

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 Rose Hill District
Lee County, Virginia on 23rd day, March month, 19 88.

WELL TYPE: Oil ___ / Gas / Enhanced Recovery ___ / Waste Disposal ___ / If Gas-Production / Underground Storage ___ /
 Exempt by Code Section 45.1-300.9.1. from general Oil and Gas Conservation Law yes ___ / no /
 WELL WORK: Drill / Deepen ___ / Redrill ___ / Stimulate / Plug Off Old Formation ___ / Perforate New Formation /
 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.

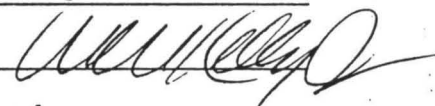
CONFIDENTIALITY STATUS UNDER CODE OF VIRGINIA SECTION 45.1-332

_____ Ninety days from the filing of this report

OR

Two years from March 23, 1988, 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.

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

COMPLETION REPORT

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

LOCATION

COUNTY Lee

DISTRICT Rose Hill

SURFACE ELEVATION 1636.83'

QUADRANGLE Rose Hill

LATITUDE 7425 'S 36° 40' 00"

LONGITUDE 4850 'S 83° 20' 00"

DRILLING DATA

DATE DRILLING COMMENCED 12-9-87

DRILLING CONTRACTOR Ray Resources

DATE DRILLING COMPLETED 12-20-87

ADDRESS 600 Commerce Square, Charleston, WV 25301

DATE WELL COMPLETED 3-23-88

TELEPHONE NUMBER 304-344-8393

TOTAL DEPTH OF COMPLETED WELL 3800'

RIG TYPE X ROTARY CABLE TOOL

GEOLOGICAL DATA

FRESH WATER AT (1) 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/BOPD)	PRESSURE	HOURS TESTED
<u>Stones River</u>	<u>2903'</u>	<u>2828'</u>	<u>25'</u>	<u>200 McfD</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3454'</u>	<u>3465'</u>	<u>11'</u>	<u>Show</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3498'</u>	<u>3506'</u>	<u>8'</u>	<u>Show</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3548'</u>	<u>3559'</u>	<u>11'</u>	<u>Show</u>	<u>Not gauged</u>	

See Log for other minor shows

STIMULATION RECORD

ZONE (1) *See Attached FORMATION STIMULATED WITH

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

STIMULATION RECORD

ZONE (2) FORMATION STIMULATED WITH

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 (X) AFTER STIMULATION

ZONE	FORMATION	BOP	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
<u>ZONE (1)</u>	<u>Knox</u>		<u>311</u>	<u>6</u>	<u>840 psi</u>	<u>38</u>
<u>ZONE (2)</u>	<u>Stones River</u>		<u>1750</u>	<u>9.5</u>	<u>1150 psi</u>	<u>40</u>

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

COMPLETION PROCEDURES

- 2-4-88 Knox: Perforated 3547'-3553'. 13 holes. Breakdown with 1500 gallons 15% HCl. Breakdown - 2017 psi, ISIP 1692 psi, 5 minute SIP 1075 psi. Maximum injection rate 8.6 BPM. Frac gradient .92.
- 2-8-88 Final openflow after cleanup 381 Mcfd.
- 2-9-88 Knox: Perforated 3492'-3504'. 13 holes. Set NC-1 Bridge Plug at 3520'. Guaged 220 Mcf after perforating indicating possible connection with lower zone. Breakdown with 1500 gallons 15% HCl. Breakdown 1217 psi, ISIP 1075 psi, 5 minute SIP 0 psi. Maximum injection rate 8 BPM.
- 2-11-88 Final openflow after cleanup 146 Mcfd. Suspect zone is connected with lower zone.
- 2-13-88 Drill out plug at 3620' and commingle zones and clean up. Shut-in until 2-19-88.
- 2-19-88 Blow well down and swab. Gas guage 220 Mcf.
- 2-23-88 Suspect that zones may have a fines or water blockage. Treat with 4,000 gallons 25% methanol foamed with 310,000 Scf Nitrogen.
- 2-26-88 Finish cleaning up with no increase in gas. Still guaging 220 Mcfd. Shut-in.
- 3-2-88 Knox: Perforated 3456'-3462'. 7 holes. Set NC-1 Bridge Plug at 3480'. Gas flow after perforation indicated this zone also connected to lower zones.
- 3-7-88 Drill out plug and commingle zones without any further treatment.
- 3-9-88 Cement 4 1/2" casing over Stones River zone: Set NC-1 Bridge Plug at 3000'. Perforate 2 squeeze holes at 2870'. Cement 4 1/2" casing with 75 sacks Class A with 3% CaCl₂.
- 3-11-88 to
3-14-88 Drill out cement and Bridge Plug.

- 3-15-88 Clean up hole and set NC-1 Bridge Plug at 3410'.
- 3-16-88 Stones Perforated 2900'-2920'. 21 holes. Gas guaged 223
River Mcf natural.
- 3-17-88 Breakdown with 500 gallons 15% HCl. Breakdown 3300
psi, ISIP 3125 psi. Maximum injection rate 8.2 BPM.
Cleaned up and guaged 220 Mcf.
- 3-18-88 Stimulated with 6000 gallons 20% HCl followed by 4,000
gallons 15% HCl, all foamed with 609,000 Scf Nitrogen.
Average injection rate 16.5 BPM, Average treatment
pressure 3565 psi, ISIP 3080 psi, 5 minute SIP 2961
psi.
- 3-21-88 Final openflow after cleanup 1750 Mcf. Left Bridge
Plug set to separate Knox and Stones River.

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	PACKERS OR BRIDGE PLUGS		
					FEET TO FEET	KIND	SIZE	SET AT
<u>CONDUCTOR</u>	20"	0'	8'	8'	----			
	16"	0'	36'	36'	----			
<u>CASING</u> Circulated and Cemented to Surface	13 3/8"	0'	115'	115'	----			
<u>WATER PROTECTION</u> (Casing Set According to Section 45.1-334)	9 5/8"	0'	609'	609'	----			
<u>COAL PROTECTION</u> (Casing Set According to Section 45.1-334)	N/A							
<u>OTHER CASING AND</u> Tubing Left In Well	4 1/2"	0'	3680'	3680'				
	2 3/8"	0'	2914'	2914'	2900'-2910'	14 holes		
<u>LINEERS</u> Remaining in well	N/A							
<u>OTHER</u> used and not left	N/A							

4 1/2" Csg. Perforation:
 3547'-3552' 13 holes
 3492'-3504' 13 holes
 3456'-3462' 7 holes
 Set NC-1 Baker Plug at 3410'
 2900'-2920' 21 holes

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

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

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 8708

<u>Geological Age</u>	<u>Formation</u>	<u>General Lithology</u>	<u>Color</u>	<u>Depth</u>		<u>Thickness</u>	<u>Remarks</u>
				<u>Top</u>	<u>Bottom</u>		
Cambrian	Overthrust	Dolomite	Tan-gray	0'	- 119'	119'	
Silurian	Clinton	Shale	Gray-green	119'	- 463'	344'	
Silurian	Clinch	Sandstone	White	463'	- 620'	157'	
Silurian	Hagan	Shale	Gray	620'	- 650'	30'	
Ordovician	Sequatchie	Silty Limestone	Red-gray	650'	- 926'	276'	
Ordovician	Reedsville	Lime/Shale	Gray	926'	- 1284'	358'	
Ordovician	Trenton	Limestone	Gray-brown	1284'	- 1850'	566'	
Ordovician	Eggleston	Limestone	Tan	1850'	- 1994'	144'	
Ordovician	Stones River	Limestone	Gray	1994'	- 3229'	1235'	
Ordovician	Knox	Limestone	Tan	3229'	- 3800'	571'	

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, Audio, Temperature, 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>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

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:

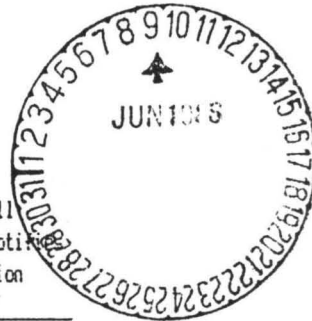
The operator requests that information herein and log(s) be kept confidential (after COMPLETION DATE of the well) for a period of

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

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
Bjt*



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 March 23, 1988, in Rose Hill 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. *William W. Kelly, Jr.*

ITS: Vice President - Exploration

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

TELEPHONE: (703) 431-2831

API NUMBER: 43 - 105 - 21141
WELL NAME: 8708VIRGINIA 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 March 23, 1988 in Rose Hill 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 CorporationBY William W. Kelly, Jr. ITS Vice President - ExplorationADDRESS P.O. Box 386, Duffield, VA 24244TELEPHONE (703) 431-2831

API NO. 45 - 105- 21141
 WELL NAME: 8708
 DATE 3-23-88

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 Rose Hill District
Lee County, Virginia on 23rd day, March month, 19 88.

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 March 23, 1988, 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.

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

COMPLETION REPORT

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

LOCATION

COUNTY Lee

DISTRICT Rose Hill

SURFACE ELEVATION 1636.83'

QUADRANGLE Rose Hill

LATITUDE 7425 'S 36° 40' 00"

LONGITUDE 4850 'S 83° 20' 00"

DRILLING DATA

DATE DRILLING COMMENCED 12-9-87

DRILLING CONTRACTOR Ray Resources

DATE DRILLING COMPLETED 12-20-87

ADDRESS 600 Commerce Square, Charleston, WV 25301

DATE WELL COMPLETED 3-23-88

TELEPHONE NUMBER 304-344-8393

TOTAL DEPTH OF COMPLETED WELL 3800'

RIG TYPE X ROTARY CABLE TOOL

GEOLOGICAL DATA

FRESH WATER AT (1) 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
<u>N/A</u>					

OIL AND GAS SHOWS:

FORMATION	TOP	BOTTOM	THICKNESS	IPF (MCFD/BOPD)	PRESSURE	HOURS TESTED
<u>Stones River</u>	<u>2903'</u>	<u>- 2828'</u>	<u>25'</u>	<u>200 Mcfd</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3454'</u>	<u>- 3465'</u>	<u>11'</u>	<u>Show</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3498'</u>	<u>- 3506'</u>	<u>8'</u>	<u>Show</u>	<u>Not gauged</u>	
<u>Knox</u>	<u>3548'</u>	<u>- 3559'</u>	<u>11'</u>	<u>Show</u>	<u>Not gauged</u>	

See Log for other minor shows

STIMULATION RECORD

ZONE (1) *See Attached FORMATION STIMULATED WITH

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

STIMULATION RECORD

ZONE (2) FORMATION STIMULATED WITH

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 (X) AFTER STIMULATION

	BOP	MCFD	HOURS TESTED	ROCK PRESSURE	HOURS TESTED
ZONE (1) <u>Knox</u>	<u>311</u>	<u>6</u>	<u>840 psi</u>	<u>38</u>	
ZONE (2) <u>Stones River</u>	<u>1750</u>	<u>9.5</u>	<u>1150 psi</u>	<u>40</u>	

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

COMPLETION PROCEDURES

- 2-4-88 Knox: Perforated 3547'-3553'. 13 holes. Breakdown with 1500 gallons 15% HCl. Breakdown - 2017 psi, ISIP 1692 psi, 5 minute SIP 1075 psi. Maximum injection rate 8.6 BPM. Frac gradient .92.
- 2-8-88 Final openflow after cleanup 381 Mcfd.
- 2-9-88 Knox: Perforated 3492'-3504'. 13 holes. Set NC-1 Bridge Plug at 3520'. Guaged 220 Mcf after perforating indicating possible connection with lower zone. Breakdown with 1500 gallons 15% HCl. Breakdown 1217 psi, ISIP 1075 psi, 5 minute SIP 0 psi. Maximum injection rate 8 BPM.
- 2-11-88 Final openflow after cleanup 146 Mcfd. Suspect zone is connected with lower zone.
- 2-13-88 Drill out plug at 3620' and commingle zones and clean up. Shut-in until 2-19-88.
- 2-19-88 Blow well down and swab. Gas guage 220 Mcf.
- 2-23-88 Suspect that zones may have a fines or water blockage. Treat with 4,000 gallons 25% methanol foamed with 310,000 Scf Nitrogen.
- 2-26-88 Finish cleaning up with no increase in gas. Still guaging 220 Mcfd. Shut-in.
- 3-2-88 Knox: Perforated 3456'-3462'. 7 holes. Set NC-1 Bridge Plug at 3480'. Gas flow after perforation indicated this zone also connected to lower zones.
- 3-7-88 Drill out plug and commingle zones without any further treatment.
- 3-9-88 Cement 4 1/2" casing over Stones River zone: Set NC-1 Bridge Plug at 3000'. Perforate 2 squeeze holes at 2870'. Cement 4 1/2" casing with 75 sacks Class A with 3% CaCl₂.
- 3-11-88 to
3-14-88 Drill out cement and Bridge Plug.

3-15-88 Clean up hole and set NC-1 Bridge Plug at 3410'.

3-16-88 Stones River Perforated 2900'-2920'. 21 holes. Gas guaged 223 Mcf natural.

3-17-88 Breakdown with 500 gallons 15% HCl. Breakdown 3300 psi, ISIP 3125 psi. Maximum injection rate 8.2 BPM. Cleaned up and guaged 220 Mcf.

3-18-88 Stimulated with 6000 gallons 20% HCl followed by 4,000 gallons 15% HCl, all foamed with 609,000 Scf Nitrogen. Average injection rate 16.5 BPM, Average treatment pressure 3565 psi, ISIP 3080 psi, 5 minute SIP 2961 psi.

3-21-88 Final openflow after cleanup 1750 Mcf. Left Bridge Plug set to separate Knox and Stones River.

CASING AND TUBING

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	PACKERS OR BRIDGE PLUGS		
					FEET TO FEET	KIND	SIZE	SET AT
<u>CONDUCTOR</u>	20"	0'	8'	8'	----			
	16"	0'	36'	36'	----			
<u>CASING</u> Circulated and Cemented to Surface	13 3/8"	0'	115'	115'	----			
<u>WATER PROTECTION</u> (Casing Set According to Section 45.1-334)	9 5/8"	0'	609'	609'	----			
<u>COAL PROTECTION</u> (Casing Set According to Section 45.1-334)	N/A							
<u>OTHER CASING AND Tubing Left In Well</u>	4 1/2"	0'	3680'	3680'				
	2 3/8"	0'	2914'	2914'	2900'-2910'	14 holes		
<u>LINERS</u> Remaining in well	N/A							
<u>OTHER</u> used and not left	N/A							

4 1/2" Csg. Perforation
 3547'-3552' 13 holes
 3492'-3504' 13 holes
 3456'-3462' 7 holes
 Set NC-1 Baker Plug at 3410'
 2900'-2920' 21 holes

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.

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 8708

<u>Geological Age</u>	<u>Formation</u>	<u>General Lithology</u>	<u>Color</u>	<u>Depth</u>		<u>Thickness</u>	<u>Remarks</u>
				<u>Top</u>	<u>Bottom</u>		
Cambrian	Overthrust	Dolomite	Tan-gray	0'	119'	119'	
Silurian	Clinton	Shale	Gray-green	119'	463'	344'	
Silurian	Clinch	Sandstone	White	463'	620'	157'	
Silurian	Hagan	Shale	Gray	620'	650'	30'	
Ordovician	Sequatchie	Silty Limestone	Red-gray	650'	926'	276'	
Ordovician	Reedsville	Lime/Shale	Gray	926'	1284'	358'	
Ordovician	Trenton	Limestone	Gray-brown	1284'	1850'	566'	
Ordovician	Eggleston	Limestone	Tan	1850'	1994'	144'	
Ordovician	Stones River	Limestone	Gray	1994'	3229'	1235'	
Ordovician	Knox	Limestone	Tan	3229'	3800'	571'	

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, Audio, Temperature, 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>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

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