

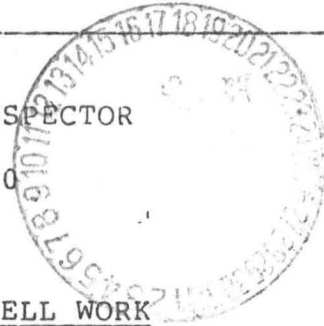
API WELL NO. 45 - 195 - 21030  
State County Permit

Date: 9/15/87  
Operator's Well Name 10216

*WS-231*

*ANR PROD. CO.  
PENN VA.  
10216  
EL.-2476.17  
FLAT GAP*

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 Gladeville District, Wise County, Virginia on 13 day, Sept. 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 \_\_\_  
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.

X Ninety days from the filing of this report  
OR  
Two years from \_\_\_\_\_, 19\_\_\_\_, 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: ANR Production Company  
BY: A.B. JENSEN  
ITS: District Operations Manager  
ADDRESS: 111 E. Capitol St., Ste 400  
TELEPHONE: 601/961-6315 Jackson, MS  
39201

Form 16  
Appendix A, Sheet 1 (Reverse)  
Continued from Obverse side

OTHER GENERAL INFORMATION

An electric log survey was   X  / was not   / conducted pursuant to Code of Virginia Section 45.1-333.B.2, at the coal owner's or operator's request.

An electric log survey was   X  / was not   / run for other purposes. This survey did   X  / did not   / disclose the vertical location of a coal seam.

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

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

Note: If deviation surveys were required, the survey results are attached.

A continuous survey was   / was not   X  / required under Code of Virginia Section 45.1-333.C.

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

CHANGES IN THE PERMITTED WELL WORK

The well operator did   / did not   X  / make any change(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.

FORM 16  
 APPENDIX A,  
 SHEET 1, (OBVERSE)

API WELL NO. 45 - 195 - 21030  
 State County Permit  
 Date: 9/15/87  
 Operator's Well  
 Name 10216

REPORT OF COMPLETION OF WELL WORK  
IF DRILLING, REDRILLING, OR DEEPENING IS INVOLVED

DRILLING CONTRACTOR Ray Resources  
 ADDRESS \_\_\_\_\_  
 TELEPHONE \_\_\_\_\_

GEOLOGICAL TARGET FORMATION Devonian Shale, Weir, Big Lime  
 DEPTH OF COMPLETED WELL 5,958' 598' FEET  
 DATE DRILLING COMMENCED 7/10/87  
 DATE DRILLING COMPLETED 7/21/87  
 DRILLING RIG: ROTARY X / CABLE TOOL \_\_\_\_\_ /

GEOLOGICAL DATA                      Depth                      Thickness  
                                             Top      Bottom

Fresh Water                                      127                      1/2"

Salt water                                                              Not Measured

	Name	MINING IN AREA			
		Yes	No	Mined	Cut
Coal Seams	284'      286.5      2.5      Dorcheat			X	
	1462      1463      1      Unknown			X	
	1904      1907      3      Unkown			X	
Oil	Formation				

None

Gas	Formation
5160-5550	Lower Devonian
4816-5136	Middle Devonian
4476-4774	Upper Devonian
3676-3686	Big Lime

below:                      The data on depth of strata is based on the source(s) checked

- X Applicant's own drilling experience in the area
- X Information supplied by the coal operator in the area
- Information already in possession of the Inspector
- Other (as follows) \_\_\_\_\_

CASING AND TUBING PROGRAM

PRELIMINARY INFORMATION

Is the subject well underlaid by the red shales? Yes X / No      /  
If Yes, was a coal protection string set to the red shales? Yes X / No     

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	
					FROM	TO
<u>CONDUCTOR:</u>						
<u>CASING CIRCULATED AND CEMENTED IN TO SURFACE:</u>	13-3/8"	Surf.	32.5	32.5		
<u>COAL PROTECTION CASING SET UNDER SPECIAL RULE OF CODE OF VIRGINIA 45.1-334.B:</u>	10-3/4"	Surf.	501	501		
	7"	Surf.	3359	3359		
	4-1/2"	Surf.	5964	5964		
<u>OTHER CASING AND TUBING LEFT IN WELL;</u>	7"	Surf.	3359	3359		
<u>LINERS LEFT IN WELL UNDER CODE OF VIRGINIA SECTION 45.1-336 OR OTHERWISE:</u>	4-1/2"	Surf.	5964	5964		

PACKERS OR BRIDGE PLUGS:      KIND                      SIZE                      SET AT  
N/A

REMARKS: SHUT DOWN DEPTHS, DATES; FISHING JOB DEPTHS, DATES; CAVING; ETC.)  
N/A

SAMPLES AND CUTTINGS

WILL X WILL NOT      BE AVAILABLE FOR EXAMINATION BY A MEMBER OF THE VIRGINIA DIVISION OF MINERAL RESOURCES  
WILL X WILL NOT      BE FURNISHED THE VIRGINIA DIVISION OF MINERAL RESOURCES UPON REQUEST  
WILL      WILL NOT      REQUIRE SACKS TO BE FURNISHED BY THE VIRGINIA DIVISION OF MINERAL RESOURCES.

DRILLER'S LOG

#10216

Compiled by Roswell K. Barranco

<u>Geologic Age</u>	<u>Formation</u>	<u>General Lithology</u>	<u>Color</u>	<u>Depth (feet)</u>		<u>Thickness</u>	<u>Remarks</u>
				<u>Top</u>	<u>Bottom</u>		
Pennsylvanian	Wise & Norton	Sandstone		0	1286	1286	
	Lee	Sandstone & Shale		1286	2710	1424	
Mississippian	Bluestone	Sandstone & Shale		2710	2827	117	
	Ravencliff	Sandstone		2827	2920	93	
	Hinton	Sandstone & Shale		2920	3130	210	
	Maxton	Sandstone		3130	3295	165	
	Bluefield	Sandstone, Shale & Limestone		3295	3528	233	
	Greenbrier (Big Lime)	Limestone		3528	4044	516	
	Injun	Sandstone & Shale		4044	4044	0	
	Weir	Siltstone		4044	4254	210	
	Sunbury	Shale		4254	4462	208	
	Berea	Siltstone		4462	4528	66	
Devonian	Devonian	Shale		4528	5924	1396	
	Decollement			5084	5284	200	
Silurian	Corniferous	Limestone		5924	5981 (T.D.)	57	

(Complete on supplemental sheets as necessary).

APPENDIX TO REPORT OF COMPLETION OF WELL WORK  
ON A WELL DRILLED IN SEARCH OF OIL OR GAS

DISCOVERY OF OIL OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A BOD  
Gravity and grade: N/A

DISCOVERY OF GAS OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A MCFD  
Rock pressure: Not psig N/A hour test  
Measurable

RECORD OF STIMULATION

Full description of stimulation:

Zone 1: Lower Devonian Formation  
75 Quality Foam Frac; 42,500#s 20/40, 900,000 SCF of N<sub>2</sub>

Perforated 5160-5550 # Perfs. 73 Perf. Size .375  
Breakdown 5960 psig. Avg. Injection 4270 psig.  
Avg. I.R. 75 BPM Init. S.I.P. 2580 psig 15 Min. S.I.P. 180 psig

Zone 2: Middle Devonian Formation  
75 Quality Foam Frac; 30,000#s 20/40, 7,500#s 10/20  
1,200,000 SCF of N<sub>2</sub>  
Perforated 4816-5136 # Perfs. 69 Perf. Size .375  
Breakdown 3379 psig. Avg. Injection 4316 psig.  
Avg. I.R. 68 BPM Init. S.I.P. 2360 psig 15 Min. S.I.P. 2200 psig

Zone 3: Upper Devonian Formation  
75 Quality Foam Frac; 34,608#s 20/40, 7,392#s 10/20  
997,000 SCF of N<sub>2</sub>  
Perforated 4476-4774 # Perfs. 69 Perf. Size .375  
Breakdown 2398 psig. Avg. Injection 3985 psig.  
Avg. I.R. 90 BPM Init. S.I.P. 2160 psig 15 Min. S.I.P. 1542 psig

Final production ( ) natural ( X ) after stimulation

	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 1:	<u>Lower Devonian</u>	<u>Commingled</u>			
Zone 2:	<u>Middle Devonian</u>	<u>Commingled</u>			
Zone 3:	<u>Upper Devonian</u>	<u>179 MCFPD</u>			

Final production if gas zones are comingled: \_\_\_\_\_ MCFD

\_\_\_\_\_ hours tested: \_\_\_\_\_ psig. \_\_\_\_\_ hours tested

*Includes  
BOD, Dev. Sh →*

APPENDIX TO REPORT OF COMPLETION OF WELL WORK  
ON A WELL DRILLED IN SEARCH OF OIL OR GAS

DISCOVERY OF OIL OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A BOD  
Gravity and grade: N/A

DISCOVERY OF GAS OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A MCFD  
Rock pressure: Not psig N/A hour test  
Measurable

RECORD OF STIMULATION

Full description of stimulation:

Zone 1: Big Lime Formation  
My-T-Acid (Alpha) frac, 75 bbls 28% HCl and 120 Bbls Gel-H<sub>2</sub>O  
with 28 bbls H<sub>2</sub>O Flush  
Perforated 3676-3686 # Perfs. 3420 Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. 14 BPM Init. S.I.P. 3067 psig 15 Min. S.I.P. 2487 psig

Zone 2: \_\_\_\_\_ Formation

Perforated \_\_\_\_\_ # Perfs. \_\_\_\_\_ Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. \_\_\_\_\_ BPM Init. S.I.P. \_\_\_\_\_ psig 15 Min. S.I.P. \_\_\_\_\_ psig

Zone 3: \_\_\_\_\_ Formation

Perforated \_\_\_\_\_ # Perfs. \_\_\_\_\_ Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. \_\_\_\_\_ BPM Init. S.I.P. \_\_\_\_\_ psig 15 Min. S.I.P. \_\_\_\_\_ psig

Final production ( ) natural ( ) after stimulation

Zone	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
<del>Zone 1:</del> <u>Big Lime</u>		<u>189</u>	_____	_____	_____
Zone 2:	_____	_____	_____	_____	_____
Zone 3:	_____	_____	_____	_____	_____

Final production if gas zones are comingled: 531 MCFD

3 hours tested: \_\_\_\_\_ psig. \_\_\_\_\_ hours tested

DEVIATION SURVEY

#10216

Results

Depth From	Depth To	Survey
SURFACE	2619'	2-1/4°
	2960'	3-1/4°
	3331'	5-1/2°
	3486'	4-1/2°
	3526'	4-1/4°
	4198'	3-1/4°
	4490'	10-1/4°
	4510'	9-1/4°
	4774'	12-3/4°
	4920'	11-3/4°
	5074'	13°
	5480'	17°
	5789'	22°
	5910'	23°



Stratigraphic Data Source (E. Log) 7 Jackson

Formation.	Top	Datum (Subsea)	Thickness
Little Linn	3528	-1042	126
Top Greenbrier	3654	-1168	389
Base Greenbrier	4043	-1557	211
Sunbury	4254	-1768	208
Berea	4462	-1976	116
Dev. Shale (Cleveland)	4578	-2092	13
Three Lick	4591	-2105	77
U. Huron	4668	-2182	41
M. Huron	4709	-2223	312
L. Huron	5021	-2535	260
Olean/angry	5281	-2795	641
Remarks <u>Carboniferous</u>	5922	-3436	59
	TD 5981	-3495	

References \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Released to Open File: Completion \_\_\_\_\_  
Samples \_\_\_\_\_

(Note: UTM measurements in meters, all others in feet)

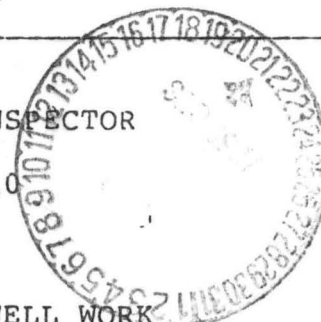
API WELL NO. 45 - 195 - 21030  
State County Permit

Date: 9/15/87  
Operator's Well  
Name 10216

*WS-231*

*ANR PRODUCTION CO.  
PENN VIRGINIA  
10216  
FLAT GAP 7 1/2'  
EL-2476.17*

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 Gladeville District, Wise County, Virginia on 13 day, Sept. 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 \_\_\_/ 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.

X Ninety days from the filing of this report  
OR  
Two years from \_\_\_\_\_, 19\_\_\_\_, 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: ANR Production Company  
BY: A.B. Jernice  
ITS: District Operations Manager  
ADDRESS: 111 E. Capitol St., Ste 400  
TELEPHONE: 601/961-6315 Jackson, MS  
39201

Form 16  
Appendix A, Sheet 1 (Reverse)  
Continued from Obverse side

OTHER GENERAL INFORMATION

An electric log survey was X / was not \_\_\_ / conducted pursuant to Code of Virginia Section 45.1-333.B.2, at the coal owner's or operator's request.

An electric log survey was X / was not \_\_\_ / run for other purposes. This survey did X / did not \_\_\_ / disclose the vertical location of a coal seam.

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

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

Note: If deviation surveys were required, the survey results are attached.

A continuous survey was \_\_\_ / was not X / required under Code of Virginia Section 45.1-333.C.

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

CHANGES IN THE PERMITTED WELL WORK

The well operator did \_\_\_ / did not X / make any change(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.

FORM 16  
APPENDIX A,  
SHEET 1, (OBVERSE)

API WELL NO. 45 - 195 - 21030  
State County Permit  
Date: 9/15/87  
Operator's Well  
Name 10216

REPORT OF COMPLETION OF WELL WORK  
IF DRILLING, REDRILLING, OR DEEPENING IS INVOLVED

DRILLING CONTRACTOR Ray Resources  
ADDRESS \_\_\_\_\_  
TELEPHONE \_\_\_\_\_

GEOLOGICAL TARGET FORMATION Devonian Shale, Weir, Big Lime  
DEPTH OF COMPLETED WELL 5,958' FEET  
DATE DRILLING COMMENCED 7/10/87  
DATE DRILLING COMPLETED 7/21/87  
DRILLING RIG: ROTARY X / CABLE TOOL \_\_\_\_\_ /

GEOLOGICAL DATA                      Depth                      Thickness  
                                            Top                      Bottom

Fresh Water                                      127                      1/2"

Salt water                                      Not Measured

	Name	MINING IN AREA		
		Yes	No	Mined Out
Coal Seams	284'                      286.5                      2.5                      Dorcheat		X	
	1462                      1463                      1                      Unknown		X	
	1904                      1907                      3                      Unkown		X	
Oil	Formation			

None

Gas	Formation
5160-5550	Lower Devonian
4816-5136	Middle Devonian
4476-4774	Upper Devonian
3676-3686	Big Lime

The data on depth of strata is based on the source(s) checked below:

- Applicant's own drilling experience in the area  
 Information supplied by the coal operator in the area  
 Information already in possession of the Inspector  
 Other (as follows) \_\_\_\_\_

CASING AND TUBING PROGRAM

PRELIMINARY INFORMATION

Is the subject well underlaid by the red shales? Yes X / No      /  
If Yes, was a coal protection string set to the red shales? Yes X / No     

	SIZE	TOP	BOTTOM	LENGTH	PERFORATIONS	
					FROM	TO
<u>CONDUCTOR:</u>						
<u>CASING CIRCULATED AND CEMENTED IN TO SURFACE:</u>	13-3/8"	Surf.	32.5	32.5		
<u>COAL PROTECTION CASING SET UNDER SPECIAL RULE OF CODE OF VIRGINIA 45.1-334.B:</u>	10-3/4"	Surf.	501	501		
	7"	Surf.	3359	3359		
	4-1/2"	Surf.	5964	5964		
<u>OTHER CASING AND TUBING LEFT IN WELL;</u>	7"	Surf.	3359	3359		
<u>LINERS LEFT IN WELL UNDER CODE OF VIRGINIA SECTION 45.1-336 OR OTHERWISE:</u>	4-1/2"	Surf.	5964	5964		

PACKERS OR BRIDGE PLUGS:      KIND                      SIZE                      SET AT

N/A

REMARKS: SHUT DOWN DEPTHS, DATES; FISHING JOB DEPTHS, DATES; CAVING; ETC.)

N/A

SAMPLES AND CUTTINGS

WILL X WILL NOT      BE AVAILABLE FOR EXAMINATION BY A MEMBER OF THE VIRGINIA DIVISION OF MINERAL RESOURCES  
WILL X WILL NOT      BE FURNISHED THE VIRGINIA DIVISION OF MINERAL RESOURCES UPON REQUEST  
WILL      WILL NOT      REQUIRE SACKS TO BE FURNISHED BY THE VIRGINIA DIVISION OF MINERAL RESOURCES.

DRILLER'S LOG

#10216

Compiled by Roswell K. Barranco

<u>Geologic Age</u>	<u>Formation</u>	<u>General Lithology</u>	<u>Color</u>	<u>Depth (feet)</u>		<u>Thickness</u>	<u>Remarks</u>
				<u>Top</u>	<u>Bottom</u>		
Pennsylvanian	Wise & Norton	Sandstone		0	1286	1286	
	Lee	Sandstone & Shale		1286	2710	1424	
Mississippian	Bluestone	Sandstone & Shale		2710	2827	117	
	Ravencliff	Sandstone		2827	2920	93	
	Hinton	Sandstone & Shale		2920	3130	210	
	Maxton	Sandstone		3130	3295	165	
	Bluefield	Sandstone, Shale & Limestone		3295	3528	233	
	Greenbrier (Big Lime)	Limestone		3528	4044	516	
	Injun	Sandstone & Shale		4044	4044	0	
	Weir	Siltstone		4044	4254	210	
	Sunbury	Shale		4254	4462	208	
	Berea	Siltstone		4462	4528	66	
Devonian	Devonian	Shale		4528	5924	1396	
	Decollement			5084	5284	200	
Silurian	Corniferous	Limestone		5924	5981 (T.D.)	57	

(Complete on supplemental sheets as necessary).

APPENDIX TO REPORT OF COMPLETION OF WELL WORK  
ON A WELL DRILLED IN SEARCH OF OIL OR GAS

DISCOVERY OF OIL OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A BOD  
Gravity and grade: N/A

DISCOVERY OF GAS OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A MCFD  
Rock pressure: Not psig N/A hour test  
Measurable

RECORD OF STIMULATION

Full description of stimulation:

Zone 1: Lower Devonian Formation  
75 Quality Foam Frac; 42,500#s 20/40, 900,000 SCF of N<sub>2</sub>

Perforated 5160-5550 # Perfs. 73 Perf. Size .375  
Breakdown 5960 psig. Avg. Injection 4270 psig.  
Avg. I.R. 75 BPM Init. S.I.P. 2580 psig 15 Min. S.I.P. 2180 psig

Zone 2: Middle Devonian Formation  
75 Quality Foam Frac; 30,000#s 20/40, 7,500#s 10/20  
1,200,000 SCF of N<sub>2</sub>

Perforated 4816-5136 # Perfs. 69 Perf. Size .375  
Breakdown 3379 psig. Avg. Injection 4316 psig.  
Avg. I.R. 68 BPM Init. S.I.P. 2360 psig 15 Min. S.I.P. 2200 psig

Zone 3: Upper Devonian Formation  
75 Quality Foam Frac; 34,608#s 20/40, 7,392#s 10/20  
997,000 SCF of N<sub>2</sub>

Perforated 4476-4774 # Perfs. 69 Perf. Size .375  
Breakdown 2398 psig. Avg. Injection 3985 psig.  
Avg. I.R. 90 BPM Init. S.I.P. 2160 psig 15 Min. S.I.P. 1542 psig

Final production ( ) natural ( X ) after stimulation

	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 1:	<u>Lower Devonian</u>	<u>Commingled</u>	<u>          </u>	<u>          </u>	<u>          </u>
Zone 2:	<u>Middle Devonian</u>	<u>Commingled</u>	<u>          </u>	<u>          </u>	<u>          </u>
Zone 3:	<u>Upper Devonian</u>	<u>179 MCFD</u>	<u>          </u>	<u>          </u>	<u>          </u>

Final production if gas zones are comingled:            MCFD

           hours tested:            psig.            hours tested

APPENDIX TO REPORT OF COMPLETION OF WELL WORK  
ON A WELL DRILLED IN SEARCH OF OIL OR GAS

DISCOVERY OF OIL OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A BOD  
Gravity and grade: N/A

DISCOVERY OF GAS OR INDICATIONS THEREOF

Indicated potential flow before stimulation N/A MCFD  
Rock pressure: Not psig N/A hour test  
Measurable

RECORD OF STIMULATION

Full description of stimulation:

Zone 1: Big Lime Formation  
My-T-Acid (Alpha) frac, 75 bbls 28% HCL and 120 Bbls Gel-H<sub>2</sub>O  
with 28 bbls H<sub>2</sub>O Flush  
Perforated 3676-3686 # Perfs. 3420 Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. 14 BPM Init. S.I.P. 3067 psig 15 Min. S.I.P. 2487 psig

Zone 2: \_\_\_\_\_ Formation

Perforated \_\_\_\_\_ # Perfs. \_\_\_\_\_ Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. \_\_\_\_\_ BPM Init. S.I.P. \_\_\_\_\_ psig 15 Min. S.I.P. \_\_\_\_\_ psig

Zone 3: \_\_\_\_\_ Formation

Perforated \_\_\_\_\_ # Perfs. \_\_\_\_\_ Perf. Size \_\_\_\_\_  
Breakdown \_\_\_\_\_ psig. Avg. Injection \_\_\_\_\_ psig.  
Avg. I.R. \_\_\_\_\_ BPM Init. S.I.P. \_\_\_\_\_ psig 15 Min. S.I.P. \_\_\_\_\_ psig

Final production ( ) natural ( ) after stimulation

Zone	BOD	MCFD	Hours Tested	Rock Pressure	Hours Tested
Zone 4 <del>XXXXXX</del> <u>Big Lime</u> <del>XXXXXX</del>	<u>Big Lime</u>	<u>189</u>	_____	_____	_____
Zone 2:	_____	_____	_____	_____	_____
Zone 3:	_____	_____	_____	_____	_____

Final production if gas zones are comingled: 531 MCFD

3 hours tested: \_\_\_\_\_ psig. \_\_\_\_\_ hours tested



## Results

#10216

Depth From	Depth To	Survey
SURFACE	189' 369'	1° 1/2°
	572' 745'	3/4° 2°
	806' 866'	3° 2°
	928' 990'	2-1/2° 3°
	1051' 1113'	2° 1-3/4°
	1174' 1236'	2-1/4° 2-1/4°
	1297' 1483'	2-1/4° 2-3/4°
	1545' 1606'	2° 3°
	1808' 1972'	2° 3°
	2099' 2282'	2-1/4° 3°

## DEVIATION SURVEY

#10216

## Results

Depth From	Depth To	Survey
SURFACE	2619'	2-1/4°
	2960'	3-1/4°
	3331'	5-1/2°
	3486'	4-1/2°
	3526'	4-1/4°
	4198'	3-1/4°
	4490'	10-1/4°
	4510'	9-1/4°
	4774'	12-3/4°
	4920'	11-3/4°
	5074'	13°
	5480'	17°
	5789'	22°
	5910'	23°

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

Date: 9-16, 1987

Operator's Well No. 10216

*WS-231*

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

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 \_\_\_ / updated X /

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

Well operator ANR PRODUCTION COMPANY

Address JACKSON, MISSISSIPPI  
Farm P.V.R.C. MINERAL KENNETH WAMPLER SURFACE  
Tract 741 Acres 207.61 Lease No. \_\_\_\_\_  
Elevation 2482.62'  
Quadrangle FLAT GAP  
County WISE' District GLADEVILLE  
Registered Engineer X Registration No. 11439  
Certified Land Surveyor \_\_\_\_\_ Cert. No. \_\_\_\_\_  
File No. \_\_\_\_\_ Drawing No. \_\_\_\_\_  
Date 10-14-86 Scale 1" = 400'

Certification of Well Plat

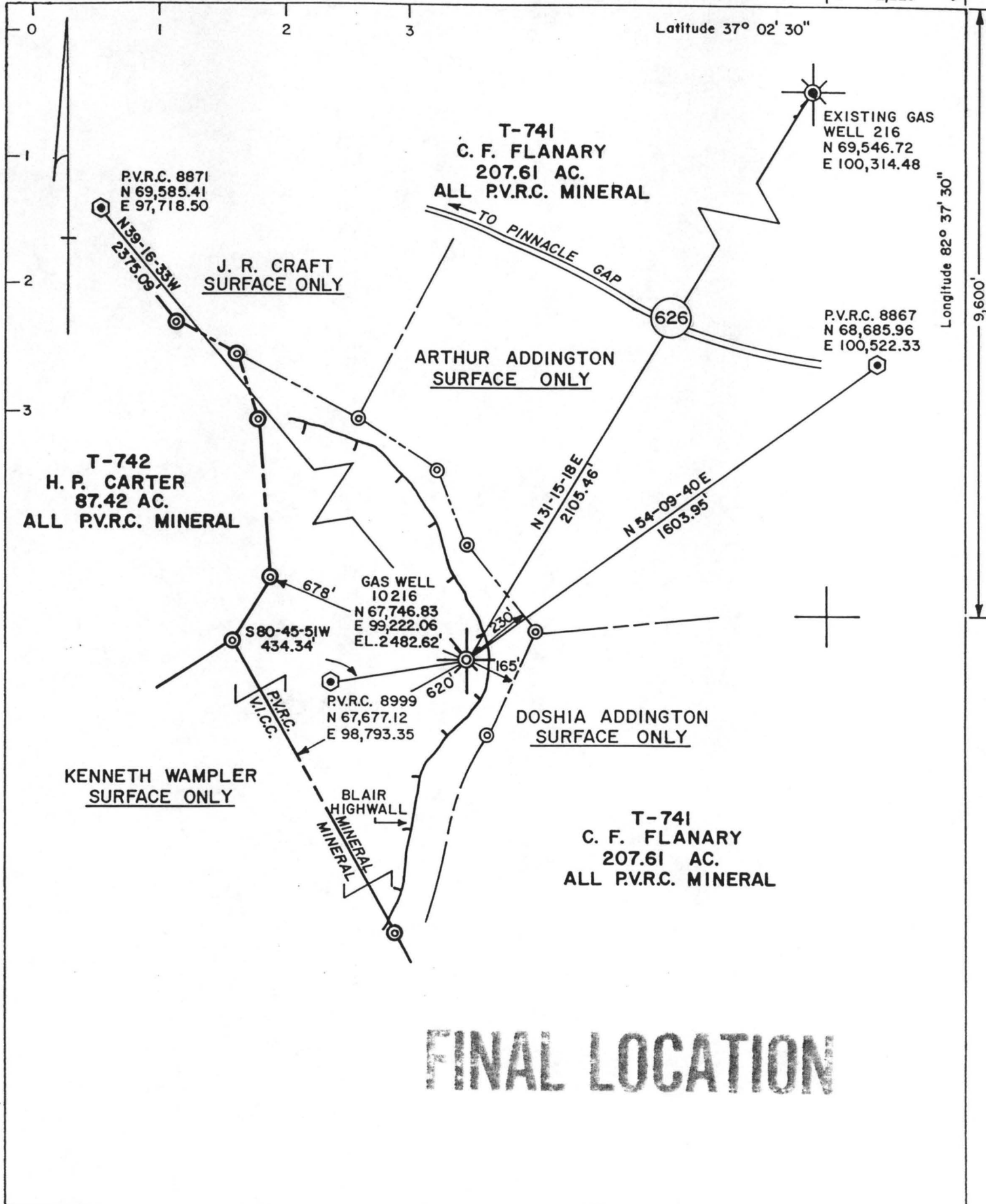
I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief, and shows all the information required by law and the regulations of the Virginia Well Review Board.

*Jack J. Gembach Jr.*

Registered Engineer or Certified Land Surveyor  
in Charge



2,225'



**FINAL LOCATION**

WS-231

OIL AND GAS WELL  
SUMMARY REPORT

API No. 45-195-21030 VDMR Well Rep. No. \_\_\_\_\_

DMQ File No. WS-231

Operator ANR PRODUCTION COMPANY

Farm PENN-VIRGINIA

Co. Well No. 10216

County WISE Quadrangle FIAT GAP-7 112'

Location (UTM) N 4,097,600; E 354,750 UTM Zone 17

(Lat. and Long.) \_\_\_\_\_

Field \_\_\_\_\_ Province APPALACHIAN PLATAEUS

Elev. (specify) 2476.17' GR. TD 5981 Form. at TD CONIFEROUS

INITIAL FLOW: NONE Age DEVONIAN

Date compl. or abandoned SEPTEMBER 13, 1987

Result GAS WELL

Gas Shows \_\_\_\_\_

Gas Pays 5160-5550; 4816-5136; 4476-4774; 3676-3686

Main Production \_\_\_\_\_ Prod. Form. DEVONIAN; BIG LIME

FINAL FLOW: 531,000 CU. FT. Age DEVONIAN; MISSISSIPPIAN

Treatment: LOWER DEVONIAN-75 QUALITY FOAM FRAC, 42,5000 POUNDS OF 20/40 SAND, 900,000 SCF OF N2. MIDDLE-DEVONIAN-75 QUALITY FOAM FRAC, 30,000 POUNDS OF 20/40 SAND, 7500 POUNDS OF 10/20 SAND, 1,200,000 SCF OF N2. UPPER DEVONIAN-75 QUALITY FOAM FRAC, 34,608 POUNDS OF 20/40 SAND, 7392 POUNDS OF 10/20 SAND, 997,000 SCF OF N2. BIG LIME-MY-T-ACID FRAC, 75 BARRELS OF 28% HCL AND 120 BARRELS OF GEL WATER WITH 28 BARRELS OF WATER FLUID.

Oil shows \_\_\_\_\_

Water FW X at 127' at \_\_\_\_\_ at \_\_\_\_\_  
SW \_\_\_\_\_ at \_\_\_\_\_ at \_\_\_\_\_ at \_\_\_\_\_

Coal 284-286.5; 1462-1463; 1904-1907

Plat \_\_\_\_\_ Plotted \_\_\_\_\_ Completion Report X

Drillers Log X Geologic Log \_\_\_\_\_

Samples \_\_\_\_\_ Interval Sheet \_\_\_\_\_

Sample Interval \_\_\_\_\_

Remarks \_\_\_\_\_

Geophysical Logs S.P. \_\_\_\_\_ Res \_\_\_\_\_ Gamma \_\_\_\_\_ Neutron \_\_\_\_\_

Density \_\_\_\_\_ Sonic \_\_\_\_\_ Other \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Formation	Top	Datum (Subsea)	Thickness
WISE AND NORTON	0	+2476.17	1286
LEE	1286	+1190.17	1424
BLUESTONE	2710	-233.83	117
RAVENCLIFF	2827	-350.83	93
HINTON	2920	-433.83	210
MAXTON	3130	-653.83	165
BLUEFIELD	3295	-818.83	233
GREENBRIER	3528	-1051.83	516
INJUN	4044	-1567.83	0
WEIR	4044	-1567.83	210
SUNBURY	4254	-1777.83	208
BEREA	4462	-1985.83	66
<del>Remarks</del> DEVONIAN SHALE	4528	-2051.83	1896
DECOLLEMENT	5084		200
CORNIFEROUS	5924	-3647.83	57

References

Released to Open File: Completion DECEMBER 13, 1987

Sampler NONE

(Note: UTM measurements in meters, all others in feet)

OIL AND GAS WELL  
SUMMARY REPORT

API No. 45-195-21030

VDMR Well

Rep. No. \_\_\_\_\_

DMQ File No. WS-231

Operator ANR Production Company

Farm Penn Virginia

Co. Well No. 10216

County Wise

Quadrangle Flat Top - 7 1/2'

Location (UTM) N4,097,600 ; E354,750

UTM Zone 17

(Lat. and Long.) \_\_\_\_\_

Field \_\_\_\_\_

Province Appalachian Plateaus

Elev. (specify) 2476.17' Gr.

TD 5988

Form. at TD Carboniferous

Age Devonian

Date compl. or abandoned September 13, 1987

Result Gas well

Gas Shows 5140-5550; 4816-5136; 4476-4774; 3676-3686

Gas Pays \_\_\_\_\_

Main Production \_\_\_\_\_

Prod. Form. Big Lime, Devonian

Final Flow 1531,000 cu. ft.

Age Mississippian, Devonian

Treatment: Lower Devonian - 75 quality foam frac, 42,500 pounds of 20/40 sand,

900,000 SCF of N2, Middle Devonian - 75 quality foam frac, 30,000 pounds of 20/40

sand, 7500 pounds of 10/20 sand, 1,200,000 SCF of N2, Upper Devonian - 75 quality foam

frac, 34,608 pounds of 20/40 sand, 7392 pounds of 10/20 sand, 997,000 SCF of N2,

Initial Production Big Lime - ~~acid~~ acid (alpha) frac, 15 barrels of 28% HCl

and 120 barrels of gel water.

Oil shows \_\_\_\_\_

Water FW Yes at 127' at \_\_\_\_\_ at \_\_\_\_\_

SH \_\_\_\_\_ at \_\_\_\_\_ at \_\_\_\_\_ at \_\_\_\_\_

Coal 284-286.5; 1462-1463; 1904-1907

Plat \_\_\_\_\_

Plotted \_\_\_\_\_

Completion Report

Drillers Log

Geologic Log \_\_\_\_\_

Samples \_\_\_\_\_

Interval Sheet \_\_\_\_\_

Sample Interval \_\_\_\_\_

Remarks \_\_\_\_\_

Geophysical Logs S.P. \_\_\_\_\_ Res \_\_\_\_\_ Gamma \_\_\_\_\_ Neutron \_\_\_\_\_

Density \_\_\_\_\_

Sonic \_\_\_\_\_

Other \_\_\_\_\_

Stratigraphic Data Source Moswell K. Barrance

Formation	Top	Datum (Subsea)	Thickness
Well and Norton	0	+2476.17	1286
Lee	1296	1190.17	1424
Bluestone	2710	-233.83	117
Barechiff	2827	-350.83	93
Hinton	2920	-443.83	210
Maxton	3130	-653.83	165
Bluefield	3295	-818.83	233
Greenbrier	3529	-1057.83	516
Jayins	4044	-1567.83	0
Weir	4044	-1567.83	210
Sunbury	4254	-1777.83	208
Remarks: Berea	4462	-1985.83	66
Alumina	4528	-2051.83	1396
Discollement	5084		200
Coniferous	5924	-3447.83	57

References \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Released to Open File: Completion December 21, 1987  
 Sample None

(Note: UTM measurements in meters, all others in feet)



FB-1-5

OIL AND GAS WELL SUMMARY REPORT

API No. 45-195-21030

VDMR Well Rep. No.

DMQ File No. WS-231

Operator ANR Production Company

Farm Penn - Virginia

Co. Well No. 10216

County WISE

Quadrangle Flat Gap-7 1/2'

Location (UTM) N 4,097,600 ; E 354,750

UTM Zone 17

(Lat. and Long.)

Field

Province Appalachian Plateaus

Elev. (specify) 2476.17' GR. TD 5958

Form. at TD ~~Devonian~~ Corniferous

Initial Flow - none

Age Devonian

Date compl. or abandoned September 13, 1987

Result Gas well

Gas Shows 5160-5550; 4816-5136; 4476-4774; 3676-3686

Gas Pays

Main Production

Prod. Form. Devonian; Big Lime

Final Flow - 531,000 CU.FT.

Age Devonian; Mississippian

Treatment: Lower Devonian - 75 quality foam frac, 42,500 pounds of 20/40 sand, 900,000 SCF of N2. Middle Devonian - 75 quality foam frac, 30,000 pounds of 20/40 sand, 7500 pounds of 10/20 sand, 1,200,000 SCF of N2. Upper Devonian - 75 quality foam frac, 34,000 pounds of 20/40 sand, 7392 pounds of 10/20 sand, 997,000 SCF of N2. Big Lime - 144-T-acid frac, 75 barrels of 28% HCL and 120 barrels of gel water with 28 barrels of water flush.

Initial Production

Oil shows

Water FW ~~127'~~ at 127' at at

SW at at at

Coal 284-286.5; 1462-1463; 1904-1907

Plat Plotted Completion Report X

Drillers Log X Geologic Log

Samples Interval Sheet

Sample Interval

Remarks

Geophysical Logs S.P. Res Gamma Neutron

Density Sonic Other

## Stratigraphic Data Source

Roswell Baranco

Formation	Top	Datum (Subsea)	Thickness
Wise and Norton	0	+2476.17	1286
Lee	1286	+1490.17	1424
Bluestone	2710	-233.83	117
Havenchiff	2927	-350.83	93
Horton	2920	-443.83	210
Maxton	3130	-653.83	165
Bluefield	3295	-818.83	233
Greenbrier	3528	-1051.83	516
Infum	4044	-1567.83	0
Weir	4044	-1567.83	210
Sunbury	4254	-1777.83	208
Remarks Berea	4462	-1985.83	66
Devonian shale	4528	-2051.83	1396
Decollement	5084	-3447.83	200
Coniferous	5924	-3647.83	57

## References

Released to Open File: Completion

December 13, 1987

Sampler

None

(Note: UTM measurements in meters, all others in feet)