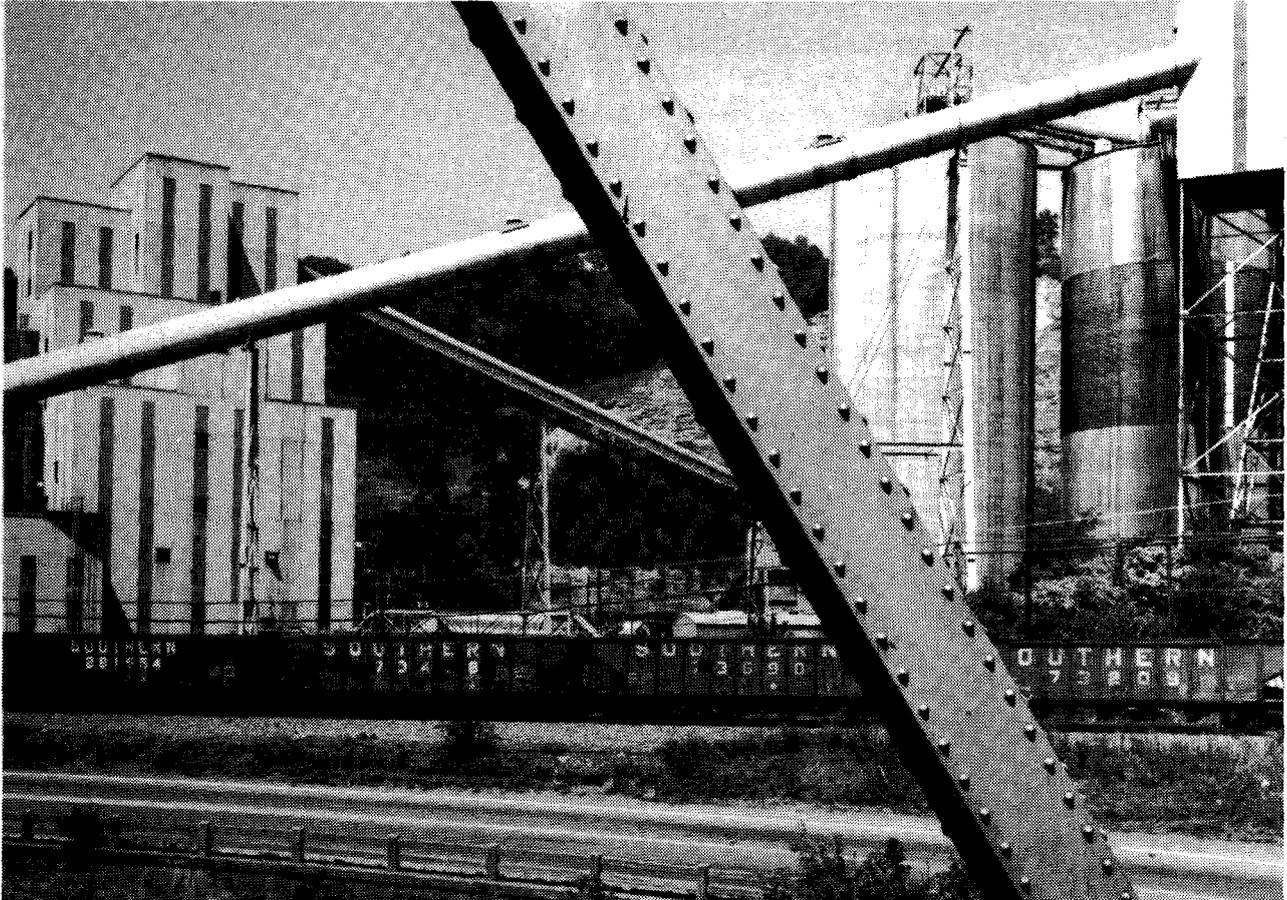


VIRGINIA DIVISION OF MINERAL RESOURCES PUBLICATION 82

COAL, OIL AND GAS, AND INDUSTRIAL AND METALLIC MINERALS INDUSTRIES IN VIRGINIA, 1985

Edited by Palmer C. Sweet



COMMONWEALTH OF VIRGINIA

DEPARTMENT OF MINES, MINERALS AND ENERGY
DIVISION OF MINERAL RESOURCES

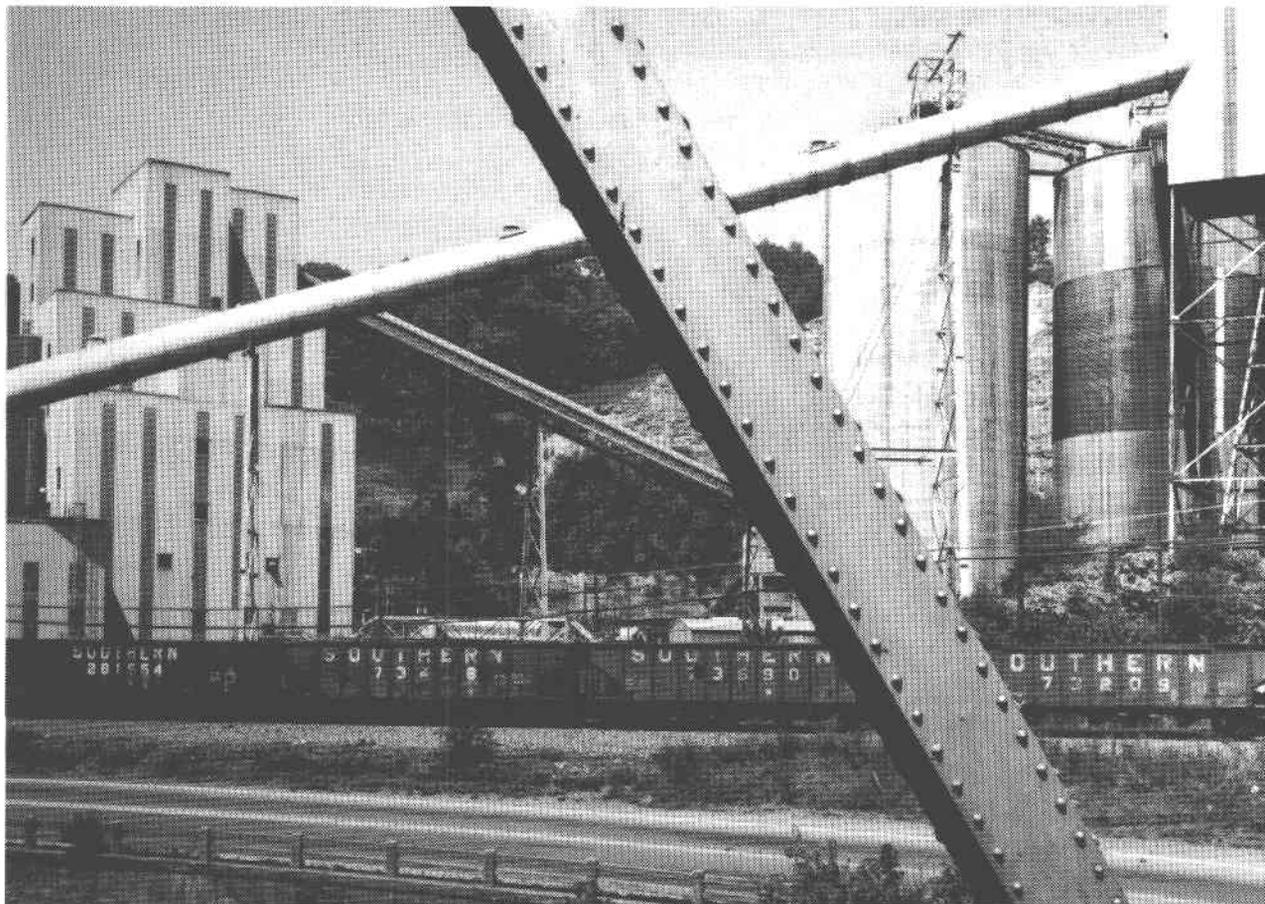
Robert C. Milici, Commissioner of Mineral Resources and State Geologist

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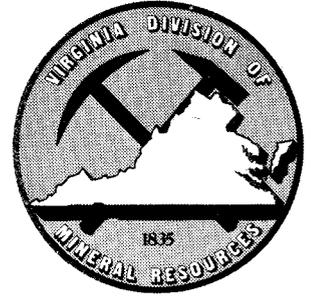
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FRONT COVER: Coal preparation plant at the Bullitt Mine, Westmoreland Coal Co., taken from Southern Railway System (L & N) bridge, looking northwest (photo taken July, 1987, T. M. Gathright, II).

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CHARLOTTESVILLE, VIRGINIA
1988

DEPARTMENT OF MINES, MINERALS AND ENERGY
O. GENE DISHNER, Director

Commonwealth of Virginia
Department of Purchases and Supply
Richmond

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FOREWORD

A new Department of Mines, Minerals and Energy was formed on January 1, 1985 by reorganizing and combining several organizational elements from the Department of Labor and Industry, the Department of Conservation and Economic Development, and the State Office of Emergency Services. The new department consisted of four divisions, Energy, Mined Land Reclamation, Mineral Resources, and Mines, until April, 1987 when two new Divisions were formed. The Division of Mineral Mining was established by merging the safety and reclamation functions of the Division of Mines with the Division of Mined Land Reclamation for non-coal mineral resources. Also during April, 1987 the Division of Gas and Oil was formed from the Division of Mines.

The Division of Energy was previously in the State Office of Emergency Services. Its major responsibilities are to promote the efficient use and conservation of energy through the administration of federal grants, educational programs, and coordination of the energy activities of other state and local government agencies, and to develop and shape state energy policy.

The Division of Mined Land Reclamation was formerly in the Department of Conservation and Economic Development. This Division's role is to assure that lands disturbed by the surface mining of coal are restored to the maximum extent possible, so as to minimize environmental degradation and to allow for reasonable post-mining use of such lands.

The Division of Mineral Resources was also previously in the Department of Conservation and Economic Development. The Division's major responsibilities include identifying, locating, and studying the nature and distribution of Virginia's mineral resources so they may be wisely utilized and conserved. The major method of achieving this involves geological field studies and laboratory research by the staff. They correlate rock strata and interpret geologic structure in order to prepare numerous geologic reports and maps on Virginia. The results of these studies are made known through publications of the Division, which are prepared for distribution to industrial, educational, and governmental users and the public.

The Division of Mines was formerly the Division of Mines and Quarries in the Department of Labor and Industry. This division is charged with the administration and enforcement of the mining laws of Virginia. Its role and primary mission is to protect the lives and physical well-being of all persons employed at coal mines through the regular inspection of these sites, and to enforce operator compliance with Virginia's mine safety requirements. The Division is also charged with the responsibility, and given authority, to administer and enforce laws pertaining to the exploration and production of coal resources within the Commonwealth. Pursuant to these statutory responsibilities, the Division investigates accidents and fatalities, and provides information relative to mining and production of coal and for exploration of uranium.

The Division of Mineral Mining issues mining licenses, reclamation permits, and conducts reclamation and safety inspections of all non-coal mining sites to insure regulatory compliance.

The Division of Gas and Oil reviews applications for the drilling of gas and oil wells and for geothermal resource exploration. Scheduled inspections pertaining to all phases of well operation are conducted by the Division.

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COAL, OIL AND GAS, AND INDUSTRIAL AND METALLIC MINERALS INDUSTRIES IN VIRGINIA, 1985

Edited by Palmer C. Sweet

INTRODUCTION

This report provides a summary of the almost two billion dollar mineral industry in Virginia and provides information on individual mineral commodities. Data on coal production and oil and gas information are from the Division of Mines and Division of Gas and Oil respectively; the coal production figure used in Table 1 was provided by the U.S. Department of Energy/Energy Information Administration. Data on industrial minerals are from the U.S. Bureau of Mines. The locations of producers of rock and mineral materials, exclusive of coal mines, are indicated on Plate 1.

Total mineral production in Virginia in 1985 was

1.98 billion dollars (Table 1); about 1.55 billion dollars of this amount was from coal and more than 50 million dollars from petroleum and natural gas. The remaining approximate 385 million dollars of non-coal production was from a variety of industrial rocks and minerals.

Virginia led the nation in the production of kyanite, was the only producer of feldspar marketed as "Virginia aplite," and was one of three states mining vermiculite. Several mineral commodities -- iron oxide pigments, lithium carbonate, magnetite, manganese, mica, perlite, and phosphate, were imported into the state for processing.

COAL

by Harry D. Childress¹

About 44.3 million tons (Table 1) of bituminous coal were produced from the southwest coal fields (Plate 1) in Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise counties from almost 700 strip or surface mines and underground mines. Tables 2 through 5 provide production data by county and coal seam, and employment statistics. More than 1300 tons of semi-anthracite coal were produced from a surface mine in Montgomery County in the Valley coal fields. Coals from Virginia are used for metallurgical purposes, electrical

power generation (steam coal), industrial purposes, and residential heating. A large percentage of Virginia coal is contracted for export to overseas markets; coal is exported through the ports of Hampton Roads in Virginia and through the ports in North Carolina. Data on inspections conducted in 1985, training, mine certificates issued, accident summary for metal and nonmetal operations, accident summary for coal mines and coal accident summary by county are provided in Tables 6 through 11.

Table 1. Mineral Production in Virginia, 1985₁

Mineral Material	Quantity	Value (thousands)
Clays-----thousand short tons-----	767	\$ 5,716
Coal (bituminous) _{3/} (\$35/ton)----do-----	44,290	1,550,150
Gem Stones-----	NA	20
Lime-----thousand short tons-----	605	26,426
Natural Gas _{2/} (\$3.30/1000 cu. ft.)--million cubic feet-	15,041	49,637
Petroleum (crude) _{2/} (\$25/bl.)-----42-gallon barrels--	26,654	666
Sand and Gravel-----thousand short tons-----	10,200	41,800
Stone:		
Crushed-----do-----	51,400	226,000
Dimension-----	10	2,071
Combined value of cement, feldspar, gypsum, iron oxide pigments (crude), kyanite, sulfur, talc (soapstone), vermiculite-----	XX	82,305
Total-----	XX	\$1,984,791

NA Not available. XX Not applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers) - from U. S. Bureau of Mines.

2/ Virginia Department of Mines, Minerals and Energy

3/ Department of Energy/Energy Information Administration

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 2. Summary of Coal Mining in Virginia, 1985.

	Buchanan	Dickenson	Lee	Montgomery	Russell	Scott	Tazewell	Wise	Total
<u>Tonnage</u>	15,377,816	7,063,363	1,775,807	1,324	1,001,865	105,126	2,947,530	14,103,653	42,376,484
Auger	159,581	48,203	7,230	0	0	0	0	184,935	399,949
Strip	761,207	936,488	12,778	1,324	96,003	5,620	38,731	4,856,379	6,708,530
Tipple	5,513,317	3,084,302	783,463	0	327,633	0	1,018,500	2,410,930	13,138,145
Truck	8,943,711	2,994,370	972,336	0	578,229	99,506	1,890,299	6,651,409	22,129,860
<u>Ions Mined by:</u>									
<u>Machine</u>	4,925,944	2,380,626	153,607	1,324	332,197	6,220	830,352	5,275,032	13,905,302
Auger	159,581	48,203	7,230	0	0	0	0	184,935	399,949
Strip	761,207	936,488	12,778	1,324	96,003	5,620	38,731	4,856,379	6,708,530
Tipple	183,094	0	0	0	0	0	0	0	183,094
Truck	3,822,062	1,395,935	133,599	0	236,194	600	791,621	233,718	6,613,729
<u>Continuous Miner</u>	7,234,297	3,763,404	1,412,073	0	669,668	98,906	2,117,178	8,184,328	23,479,854
Tipple	2,112,648	2,164,969	573,336	0	327,633	0	1,018,500	1,766,637	7,963,723
Truck	5,121,649	1,598,435	838,737	0	342,035	98,906	1,098,678	6,417,691	15,516,131
<u>Longwall</u>	3,217,575	919,333	210,127	0	0	0	0	644,293	4,991,328
Tipple	3,217,575	919,333	210,127	0	0	0	0	644,293	4,991,328
<u>Production Workers</u>	5,279	2,159	651	2	325	44	771	3,390	12,621
<u>Surface</u>	986	414	75	2	70	16	75	1,311	2,949
Auger	39	42	19	0	0	0	0	60	160
Strip	304	224	21	2	31	8	12	1,065	1,667
Tipple	299	42	6	0	7	0	22	25	401
Truck	344	106	29	0	32	8	41	161	721
<u>Underground</u>	4,293	1,745	576	0	255	28	696	2,079	9,672
Tipple	1,567	837	216	0	80	0	239	720	3,659
Truck	2,726	908	360	0	175	28	457	1,359	6,013

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<u>Production Wages</u>	119,026,098	54,935,341	14,951,144	2,800	6,863,825	610,744	17,165,138	81,429,557	294,984,647
Auger	333,551	966,328	438,516	0	0	0	0	1,171,102	2,909,497
Strip	4,999,377	4,750,735	525,306	2,800	789,090	87,000	731,931	21,813,752	33,699,991
Tipple	57,513,162	27,638,766	6,908,651	0	2,899,647	0	9,364,801	24,335,084	128,660,111
Truck	56,180,008	21,579,512	7,078,671	0	3,175,088	523,744	7,068,406	34,109,619	129,715,048
<u>Office Workers</u>	151	67	20	0	17	2	25	683	965
Auger	4	7	0	0	0	0	0	12	23
Strip	23	10	0	0	4	1	5	356	399
Tipple	19	11	6	0	1	0	6	25	68
Truck	105	39	14	0	12	1	14	290	475
<u>Office Wages</u>	1,823,737	591,416	426,063	0	100,146	3,040	377,605	8,045,576	11,367,583
Auger	16,427	1,000	0	0	0	0	0	293,078	310,505
Strip	534,248	107,857	0	0	41,330	3,040	0	3,809,232	4,495,707
Tipple	474,562	272,671	206,262	0	21,046	0	162,009	649,439	1,785,989
Truck	798,500	209,888	219,801	0	37,770	0	215,596	3,293,827	4,775,382
<u>Number of Mines</u>	269	108	34	1	27	7	40	195	681
Auger	13	8	4	0	2	0	1	23	51
Strip	26	19	6	1	4	4	1	89	150
Tipple	19	8	1	0	2	0	4	9	43
Truck	211	73	23	0	19	3	34	74	437

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 3. Summary of Coal Mining in Virginia, 1985, by coal beds (short tons).

	Buchanan	Dickenson	Lee	Montgomery	Russell	Scott	Tazewell	Wise
Aily	0	0	0	0	0	0	0	30,739
Big Fork	1,085	0	0	0	0	0	0	0
Blair	1,358,298	27,075	0	0	24,709	0	0	998,463
Burton's Ford	0	0	0	0	0	0	0	0
Campbell Creek	62,843	0	0	0	0	0	0	0
Cedar Grove	46,389	0	0	0	0	0	0	0
Clintwood	211,238	586,154	0	0	0	0	0	2,988,314
Cove Creek	0	0	0	0	0	98,906	0	0
Dorchester	224,314	203,880	0	0	0	0	0	2,020,249
Eagan	0	0	0	0	0	600	0	0
Eagle	604,390	115,260	0	0	0	0	0	0
Greasy Creek	0	0	0	0	0	0	520,598	0
Hagy	823,124	18,602	0	0	0	0	0	0
Harlan	0	0	100,590	0	0	0	0	0
High Splint	0	0	72,943	0	0	0	0	524,105
Imboden	0	0	22,741	0	0	0	0	872,033
Jawbone	1,843,226	1,353,274	0	0	373,292	0	0	165,389
Kelly	0	0	0	0	0	0	0	1,171,272
Kennedy	1,781,475	38,204	0	0	42,268	0	0	0
Kirk	0	0	0	0	0	0	0	0
Langhorne	0	0	0	1,324	0	0	0	0
Low Splint	0	0	79,411	0	0	0	0	603,175
Lower Banner	86,102	794,278	0	0	155,204	0	0	5,460
Lower Horsepen	0	0	0	0	0	0	39,318	0
Lower Seaboard	0	0	0	0	0	0	1,018,500	0
Lower St. Charles	0	0	269,992	0	0	0	0	0
Lyons	0	23,881	0	0	0	0	0	376,525
Marker	0	0	0	0	0	0	0	130,450
Middle Horsepen	0	0	0	0	0	0	0	0
Middle Seaboard	0	0	0	0	0	0	54,578	0
Morris	0	0	0	0	0	0	0	205,371
Norton	0	0	0	0	0	0	0	616,348
Pardee	0	0	0	0	0	0	0	1,144,166
Phillips	0	0	12,029	0	0	0	0	420
Pinhook	0	0	0	0	0	0	0	6,884
Pocahontas #3	4,676,671	0	0	0	0	0	224,687	0

<u>Number of Mines</u>	205	62	25	1	23	6	24	124	470
Auger	21	9	4	0	4	0	0	18	56
Strip	24	14	6	1	6	4	0	74	129
Tipple	9	0	0	0	0	0	1	5	15
Truck	151	39	15	0	13	2	23	27	270

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 5. Summary of Coal Mining in Virginia, Title II 1985 (More than 14 Employees) (short tons).

	Buchanan	Dickenson	Lee	Montgomery	Russell	Scott	Tazewell	Wise	Total
<u>Production Workers</u>	3,344	1,590	471	0	202	30	530	2,249	8,416
<u>Surface</u>	643	234	17	0	26	7	52	837	1,816
Auger	0	3	0	0	0	0	0	8	11
Strip	196	114	0	0	0	0	12	682	1,004
Tipple	276	42	6	0	7	0	20	16	367
Truck	171	75	11	0	19	7	20	131	434
<u>Underground</u>	2,701	1,356	454	0	176	23	478	1,412	6,600
Tipple	1,475	837	216	0	80	0	239	352	3,199
Truck	1,226	519	238	0	96	23	239	1,060	3,401
<u>Production Wages</u>	87,788,803	45,957,398	12,020,352	0	12,020,352	522,784	14,106,809	55,361,600	220,571,226
Auger	0	2,251	0	0	0	0	0	773,104	775,355
Strip	3,258,069	3,009,487	0	0	0	0	731,931	15,154,711	22,154,198
Tipple	54,181,476	27,638,766	6,908,651	0	2,899,647	0	9,294,911	11,621,943	112,545,394
Truck	30,349,258	15,306,894	5,111,701	0	1,913,833	522,784	4,079,967	27,811,842	85,096,279
<u>Tonnage</u>	10,030,592	5,564,509	1,334,926	0	744,290	98,906	2,061,951	10,604,470	30,439,644
<u>Tons Mined by:</u>									
<u>Machine</u>	1,853,992	1,193,213	94,907	0	133,899	0	443,475	3,566,697	7,286,183
Auger	0	372	0	0	0	0	0	94,263	94,635
Strip	458,842	514,743	0	0	0	0	38,731	3,443,559	4,455,875
Tipple	183,094	0	0	0	0	0	0	0	183,094
Truck	1,212,056	678,098	94,907	0	133,899	0	404,744	28,875	2,552,579
<u>Continuous Miner</u>	5,218,471	3,451,963	1,029,892	0	610,391	98,906	1,618,476	6,393,480	18,745,506
Tipple	2,095,907	2,164,969	573,336	0	327,633	0	1,018,500	868,034	7,048,379
Truck	3,122,564	1,286,994	456,556	0	282,758	98,906	599,976	5,525,446	11,697,127
<u>Longwall</u>	2,958,129	919,333	210,127	0	0	0	0	644,293	4,731,882

Tipple	2,958,129	919,333	210,127	0	0	0	0	0	0	644,293	4,731,882
<u>Number of Mines</u>	95	57	10	0	8	1	16	0	144	331	
Auger	0	1	0	0	0	0	1	1	11	13	
Strip	18	12	0	0	0	0	1	1	81	112	
Tipple	17	10	2	0	2	0	3	3	5	39	
Truck	60	34	8	0	6	1	11	11	47	167	

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 6. Inspections of coal and metal/nonmetal operations in 1985.

	COAL	SPECIALIST	METAL/NONMETAL
REGULAR	2,609		1,429
SPECIAL	618		329
ROOF	402		
INVESTIGATIONS	63		8
REFUSE	6		
ELECTRICAL		176	
ROOF EVALUATION		102	
VENTILATION		156	
TOTALS	3,698	434	1,766

5875 Violations and 192 Closures were issued to the Coal Operations in 1985.

904 Violations and 42 Closures were issued to the Metal/Nonmetal Operations in 1985.

Table 7. Miners education and training activities in 1985.

COURSES	ENROLLMENT
MINE FOREMANSHIP-UNDERGROUND	240
MINE FOREMANSHIP-SURFACE	174
ELECTRICAL TRAINING, UNDERGROUND & SURFACE	135
ELECTRICAL RETRAINING	163
UNDERGROUND SHOT FIRER	90
FIRST AID/NEW MINER TRAINING	166
ANNUAL REFRESHER TRAINING	274
SURFACE BLASTER	92
EMERGENCY MEDICAL TECHICIAN REFRESHER	51
EMERGENCY MEDICAL TECHICIAN TRAINING	111
CARDIO-PULMONARY RESUSCITATION INSTRUCTOR	128
GAS DETECTION	90
SURFACE FOREMANSHIP-RETRAINING	12
SUPERVISOR TRAINING	51
MINE SAFETY	49
MINE RESCUE	6
SELF CONTAINED SELF RESCUER	16
TOTALS:	1848

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 8. Mine certificates issued in 1985.

BOARD OF MINE EXAMINERS	
First Class Mine Foreman	342
Surface Foreman	104
Electrical	226
Fire Boss	19
Preparation Plant Foreman	33
Surface Blaster	64
Underground Shot Firer	157
Hoisting Engineer	8
Automatic Elevator Operator	18
Inspector	8
Dock Foreman	2
First Class Shaft Slope Foreman	2
Surface Foreman, Metal/Nonmetal	65
Surface Foreman, Open Pit	34
Underground, Metal/Nonmetal	6
Electrician, Metal/Nonmetal	2
Surface Blaster, Metal/Nonmetal	2
Total Certificates Issued	1092
APPROVED COMPETENT PERSON CARDS AND PERMITS IN 1985	
First Class Mine Foreman	10
Surface Foreman	15
Preparation Plant Foreman	2
Total Issued	27

Table 9. Accident summary for metal/nonmetal mining in 1985.

Commodity	Fatalities	Injuries	Lost Work Days	Total Hours	Frequency Rate	Severity Rate
Aplite	0	0	0	95,108	0	0
Granite	0	1	3	1,249,894	.16	.48
Greenstone	0	0	0	35,311	0	0
Gypsum	0	0	0	97,177	0	0
Kyanite	0	5	127	237,202	4.22	107.08
Limestone	0	31	395	2,337,093	2.65	33.80
Sand	0	0	0	222,855	0	0
Sand & Gravel	0	6	103	790,168	1.52	26.07
Sandstone	0	0	0	39,354	0	0
Shale	0	0	0	771,017	0	0
Slate	0	1	25	578,101	.35	.65
Soapstone	0	1	21	1,591	125.71	2,639.85
Treprock	0	0	0	348,139	0	0
Vermiculite	0	0	0	54,000	0	0
Miscellaneous	0	4	10	1,558,639	.51	1.28
Totals	0	49	684	8,415,649	1.16	16.26

Frequency and Severity Rates are calculated as follows:

$$F = \frac{\text{Number of Injuries}}{200,000 \text{ hrs}} \times \text{Total Man Hours}$$

$$S = \frac{\text{Number of Lost Work Days}}{\text{Total Man Hours}}$$

Table 10. Accident summary in coal mines for 1985.

TOTAL	6
Age:	
20 to 30	3
31 to 40	1
51 to 60	2
Family Status:	
Married	5
Single	1
Total Years Mining Experience:	
One year to ten years	3
Ten years and over	3
Experience with Present Company:	
Three months to two years	1
Two years to five years	1
Five years to fifteen years	2
More than fifteen years	2
Time of Accident:	
7 am to 3 pm	3
11 pm to 7 am	3
Cause:	
Haulage	2
Machinery	1
Roof Fall	2
Electrocution	1
Occupation:	
Continuous Miner Operator - Helper	1
Jacksetter	1
Mechanic	1
Outside Supply Man	1
Roof Bolter Operator	1
Scoop Operator	1

Table 11. Accident summary, by county, for 1985.

	BUCHANAN	DICKENSON	LEE	MONTGOMERY	RUSSELL	SCOTT	TAZEWELL	WISE
<u>Accidents</u>	157	93	26	0	12	0	45	165
<u>Fatalities</u>	5	0	0	0	0	0	0	1
<u>Injuries</u>	152	93	26	0	12	0	45	164
<u>Lost Work Days</u>	5,726	2,100	1,333	0	202	0	1,488	3,307
<u>Total Hours</u>	8,735,073	3,550,695	913,680	112	436,672	60,028	972,959	5,286,938
<u>Frequency Rate</u>	3.48	5.24	5.69	0	5.50	0	9.25	6.20
<u>Severity Rate</u>	131.10	118.29	291.79	0	92.52	0	305.87	125.10

Frequency and Severity Rates are calculated as follows:

$$F = (\text{Number of Injuries}) \times 200,000 \text{ hrs} / (\text{Total Man Hours})$$

$$S = (\text{Number of Lost Work Days}) \times 200,000 \text{ hrs} / (\text{Total Man Hours})$$

The 1985 Virginia Frequency Rate is 4.93
 The 1985 Virginia Severity Rate is 141.87

OIL AND GAS

by James A. Henderson, Jr.²

INTRODUCTION

Crude oil production totaled 26,654 barrels of petroleum in 1985, a decline of 19 percent from the 1984 production of 32,840 bbls. Production was by 12 companies from 58 wells in five fields (Plate 1, Table 12). The average price paid by refineries for Virginia oil in 1985 was \$24.00 per barrel.

Natural gas production in 1985 was a record 15,041,438 Mcf from 495 wells in Buchanan, Dickenson, Rockingham, Russell, Scott, Tazewell, Washington, and Wise counties. This reflects an increase of 68 percent over the 1984 production of 8.9 million Mcf. A sharp rise in Wise County and the Early

Grove field made up most of the increase. In Wise County, ANR Production Company's Roaring Fork project commenced production in late 1984; 1985 was the project's first full year of production. Production in Wise County increased from 0.6 million Mcf in 1984 to 6.5 million Mcf in 1985. The wells of the Early Grove field in 1985 produced 757 thousand Mcf of gas which is an increase of 242 percent over the 1984 production of 221 thousand Mcf. Total field and local use was 260,961 Mcf with the following distribution: Buchanan (5366 Mcf); Russell (1367 Mcf); Scott and Washington (660 Mcf); and Wise (253,568 Mcf).

TABLE 12. Oil production by company and field in 1985.

FIELD	COMPANY	PRODUCING WELLS	
		NUMBER	BBLs.
ROSE HILL	Pride Oil Company	1	2,088
	Stonewall Gas Company	2	1,713
	ARCO	1	1,043
BEN HUR	APACO Petroleum	5	3,213
	Ben Hur Oil	5	2,792
	Eastern States Exploration	1	5,988
	Mountain Empire Oil and Gas	1	2,003
	Penn Virginia Resources	5	2,615
	Raintree Oil	5	1,468
	Newton Steele	1	909
	Stonewall Gas Company	1	357
	Witt Oil and Gas	1	252
KNOX	Stonewall Gas Company	1	780
CLINCH	Whitt Oil and Gas	1	172
BIG LIME*	ANR Production	<u>27</u>	<u>1,261</u>
	TOTALS	<u>58</u>	<u>26,654</u>

*Oil associated in gas-producing formation
Roaring Fork field-Wise County

DRILLING ACTIVITY

In 1985, a total of 95 wells were drilled in Virginia (Table 13). This represents a 40 percent increase over the 68 wells drilled in 1984. The total footage drilled in 1985 was 507,628 feet (Table 14), a 48 percent increase over the 1984 total of 342,246 feet. In 1985 the average depth for the 87 development wells was 5507 feet and the average depth for the eight exploratory wells was 4236 feet. Of the 95 wells (87 development and 8 exploratory) drilled

during 1985, 91 were completed as producers and four were dry holes. Two of the dry holes were drilled in search of oil and two were drilled in search of gas. In exploratory drilling (8 wells) there were five wells completed or soon to be completed as producers and three wells were dry holes, a success rate of 63 percent. Development drilling had a success rate of 99 percent with 85 wells being completed as producers.

Table 13. Drilling activity for gas by county in 1985.

COUNTY	DEVELOPMENT	EXPLORATORY	TOTAL
	WELLS	WELLS	
Buchanan	2	2	4
Chesterfield	0	1	1
Craig	0	1	1
Dickenson	36	0	36
Pulaski	0	2	2
Scott	4	1	5
Tazewell	1	0	1
Wise	<u>44</u>	<u>1</u>	<u>45</u>
Total	87	8	95

Table 14. Footage drilled for gas in 1985.

COUNTY	DEVELOPMENT	EXPLORATORY	TOTAL
	FOOTAGE	FOOTAGE	FOOTAGE
Buchanan	11,978	11,680	23,658
Chesterfield	0	4,650	4,650
Craig	0	2,961	2,961
Dickenson	194,108	0	194,108
Pulaski	0	6,168	6,168
Scott	16,569	4,035	20,604
Tazewell	4,855	0	4,855
Wise	<u>246,227</u>	<u>4,397</u>	<u>250,624</u>
Totals	473,737	33,891	507,628

Buchanan County

Ashland Exploration drilled two development wells with a total footage of 11,987 feet. Cabot Oil and Gas completed two exploratory wells as producers for a total of 11,680 feet.

Chesterfield County

Shore Exploration tested a 4650 foot wildcat well in the Richmond Triassic basin. This well will be abandoned.

Craig County

ARCO Exploration temporarily plugged and abandoned a wildcat well in the Eastern Overthrust Belt at a depth of 2961 feet.

Dickenson County

Philadelphia Oil Company drilled 36 development wells. The total footage drilled for these wells was 194,108 feet.

Pulaski County

New River Gas Company drilled two wildcats in the Valley Coal field area of Pulaski County. One of the wells was abandoned due to hole problems and the other well was still undergoing testing. The total footage drilled for these two wells was 6168 feet.

Scott County

Early Grove Gas Company continued to develop the Early Grove gas field with four development wells having a total footage drilled of 16,569 feet. ANR Production Company drilled one wildcat test to a depth of 4036 feet, on the south side of the Powell Valley anticline, that was successfully completed as a producer and capped.

Tazewell County

CNG Development Corporation drilled one development well to a total of 4855 feet.

Wise County

There were 45 wells drilled by ANR Production Company in Wise County. Of the 45 wells drilled, 44 were completed as producers and one was abandoned due to hole problems. One well was drilled to a depth of 4397 feet as a wildcat and was successfully completed and capped. The total footage for the 44 development wells of ANR was 246,227 feet.

Data on natural gas production by company in each county, pipeline gas data, reserves of natural gas, acreage leased by oil and gas companies, and 1985 well completion information, are provided in Tables 15 through 19.

Table 15. Natural gas production by company in each county in 1985.

COUNTY	COMPANY	WELLS	VOLUME PRODUCED (Mcf)
BUCHANAN	Ashland Exploration	41	539,455
	Cabot Oil & Gas	1	16,887
	Columbia Natural Resources	96	1,895,868
	NRM Petroleum	6	144,168
	P&S Oil & Gas Corporation	6	40,910
	Panther Creek Ltd.	2	50,484
	Peake Operating	1	30,719
		<u>153</u>	<u>2,718,491</u>
DICKENSON	Columbia Natural Resources	32	793,746
	W. E. Elliott	2	17,848
	Philadelphia Oil Company	145	3,371,644
	Pine Mountain Oil & Gas	8	184,323
		<u>187</u>	<u>4,367,561</u>
ROCKINGHAM	Yankee Exploration	3	803
RUSSELL	Pine Mountain Oil & Gas	1	1,367
SCOTT	Early Grove Gas Company	9	578,091
TAZEWELL	CNG Development Corporation	1	9,612
	Columbia Natural Resources	6	188,051
	Consol-Ray Resources	14	319,036
	R&B Petroleum	2	7,893
	James F. Scott Oil and Gas Company	2	134,750
		<u>25</u>	<u>659,342</u>
WASHINGTON	Early Grove Gas Company	6	179,267
WISE	ANR Production Company	103	6,176,342
	Philadelphia Oil Company	8	360,174
		<u>111</u>	<u>6,536,516</u>
Total		495	15,041,438

VIRGINIA DIVISION OF MINERAL RESOURCES

Table 16. Natural gas delivery to pipelines in 1985; gas volume reported in Mcf.

QUARTER	COLUMBIA NATURAL RESOURCES	CONSOLIDATED GAS SUPPLY	EAST TENNESSEE NATURAL GAS COMPANY	KENTUCKY-WEST VIRGINIA GAS CORPORATION
First	2,880,058	197,685	144,978	963,713
Second	2,094,055	207,116	270,491	951,874
Third	2,379,736	209,845	176,928	934,259
Fourth	1,957,639	181,502	164,301	1,066,295
TOTAL	9,311,488	796,148	756,698	3,916,141

Table 17. Reported estimated reserves of natural gas.

COUNTY	PRODUCING WELLS		SHUT-IN WELLS		TOTAL	
	NO. OF WELLS	REMAINING RESERVES (Mcf)	NO. OF WELLS	REMAINING RESERVES (Mcf)	NO. OF WELLS	REMAINING RESERVES (Mcf)
BUCHANAN	153	37,956,664	12	3,483,943	165	41,440,607
DICKENSON	187	58,227,951	31	8,750,000	218	66,977,951
LEE	0	0	5	414,848	5	414,848
ROCKINGHAM	3	500,422	2	200,000	5	700,422
RUSSELL	1	93,414	0	0	1	93,414
SCOTT	9	2,192,271	1	163,000	10	2,355,271
TAZEWELL	25	2,848,748	0	0	25	2,848,748
WASHINGTON	6	723,249	1	8,665	7	731,914
WISE	111	114,257,000	13	6,000,000	124	120,257,000
Total	495	216,799,719	65	19,020,456	560	235,820,175

Table 18. Acreage leased by oil and gas companies.

COMPANY NAME	DEVELOPED ACRES	UNDEVELOPED ACRES	FEDERAL UNDEVELOPED ACRES	TOTAL
AMOCO	0	145,000	0	145,000
ANR PRODUCTION COMPANY	36,956	101,344	7,168	145,468
APACO PETROLEUM	250	2,000	0	2,250
ARCO	0	196,182	43,500	239,682
ASHLAND EXPLORATION COMPANY	9,000	4,760	0	13,780
BARTLETT ENERGY CORPORATION	0	194	0	194
CNG DEVELOPMENT CORPORATION	0	6,864	0	6,864
CABOT OIL AND GAS CORPORATION	630	17,047	0	17,677
CHEVRON U.S.A., INCORPORATED	0	226,514	0	226,514
CITIES SERVICE	2,845	3,624	0	6,469
COLUMBIA NATURAL RESOURCES	46,639	220,035	0	266,674
CONSOLIDATED GAS SUPPLY	8,190	73	0	8,263
EARLY GROVE GAS COMPANY	1,280	47,601	0	48,881
EASTERN STATES EXPLORATION	80	0	0	80
W E ELLIOTT	192	160	0	352
EXXON CORPORATION	0	118,211	0	118,211
HOWARD BROTHERS	0	7,000	0	7,000
KETAL OIL	0	32,320	0	32,320
MOUNTAIN EMPIRE OIL & GAS	15	4,985	0	5,000
NRM PETROLEUM	3,708	0	0	3,708
NEW RIVER GAS COMPANY	0	32,534	0	32,534
PENN-VA RESOURCES	258	5,593	0	5,851
PENNZOIL	150	1,064	0	1,214
PEAKE OPERATING	107	101	0	208
PHILADELPHIA OIL COMPANY	202,073	36,360	0	238,433
PHILLIPS PETROLEUM	0	199,569	0	199,569
PINE MOUNTAIN OIL AND GAS	3,010	0	0	3,010
PRIDE OIL AND GAS COMPANY	0	8,253	0	8,253
R & B PETROLEUM	400	2,500	0	2,900
ROYAL RESOURCES	0	56,286	0	56,286
JAMES F. SCOTT OIL AND GAS	46	210	0	256
SHELL OIL CORPORATION	0	68,000	0	68,000
SHORE EXPLORATION	0	22,000	0	22,000
SONAT EXPLORATION	0	1,435	0	1,435
STEELE BROTHERS	22	448	0	470
STONEWALL GAS COMPANY	345	9,190	17,663	27,198
SUN EXPLORATION	0	132,313	0	132,313
TENNESSEE LAND & EXPLORATION	0	7,000	0	7,000
TEXACO	0	100,460	0	100,460
UNION TEXAS	0	289,043	82,581	371,624
WITT OIL AND GAS	40	30	0	70
WYATT & SALTZSTEIN	2	498	0	500
YANKEE EXPLORATION	155	11,600	0	11,755
TOTALS	316,393	2,118,421	150,912	2,585,726

Table 19. Virginia Well Completions, 1985.

File No.	County	Permit No.	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
BU-218	Buchanan	765	Cabot Oil Oil & Gas	Bradshaw	12300'S. 37° 17' 30"	10850'W. 81° 45' 00"	W.C.	5450	Berea	Berea	231	298	
BU-219	Buchanan	797	Ashland Exploration	Patterson	5920'S. 37° 20' 00"	1140'W. 81° 55' 00"	Dev.	6962	Devonian	Berea Devonian	492	492	Comingled
BU-221	Buchanan	811	Ashland Exploration	Clinchfield Rodgers #1	11720'S. 37° 20' 00"	7920'W. 81° 50' 00"	Dev.	5016	Devonian	Berea Big Lime RavencLiff	730	730	Comingled
BU-222	Buchanan	832	Cabot Oil	Bradshaw	14950'S. 37° 17' 30"	3000'W. 81° 45' 00"	W.C.	6230	Devonian	Gordon(?)	1021		
00-16	Chester- field	769	Shore Exploration	Hallsboro	10467'S. 37° 27' 30"	2768'W. 77° 42' 30"	W.C.	4650	Carolina Slate (?)				To be plugged
CR-1	Craig	804	ARCO Oil & Gas	Potts Creek	13000'S. 37° 35' 00"	4300'W. 80° 12' 30"	W.C.	2961	Knox				PSA
DI-109	Dickenson	176	Philadel- phia Oil	Nora	14800'S. 37° 07' 30"	9800'W. 82° 17' 30"	Dev.	5129	Devonian	Berea Big Lime	169	365 1508	
DI-199	Dickenson	482	Philadel- phia Oil	Caney Ridge	11775'S. 37° 05' 00"	4300'W. 82° 25' 00"	Dev.	4751	Devonian	Berea	492	492	

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
DI-200	Dickenson	483	Philadel-phia Oil	P-144	Caney Ridge	12950'S. 37° 05' 00"	6500'W. 82° 25' 00"	Dev.	4693	Devonian	Berea	60	539	
DI-202	Dickenson	485	Philadel-phia Oil	P-142	Nora	7300'S. 37° 05' 00"	7050'W. 82° 15' 00"	Dev.	5390	Devonian	Berea Weir	84	60 94	
DI-204	Dickenson	487	Philadel-phia Oil	P-150	Nora	2650'S. 37° 05' 00"	3250'W. 82° 15' 00"	Dev.	6311	Devonian	Berea Weir Devonian	47	434 258 220	
DI-212	Dickenson	516	Philadel-phia Oil	P-138	Caney Ridge	10550'S. 37° 05' 00"	10200'W. 82° 15' 00"	Dev.	5810	Devonian	Berea Devonian	84	984 220	
DI-215	Dickenson	519	Philadel-phia Oil	P-153	Caney Ridge	12400'S. 37° 05' 00"	9850'W. 82° 22' 30"	Dev.	5025	Devonian	Berea		421	
DI-216	Dickenson	520	Philadel-phia Oil	P-154	Nora	6075'S. 37° 07' 30"	1650'W. 82° 20' 00"	Dev.	4872	Devonian	Berea Big Lime		421 353	
DI-217	Dickenson	521	Philadel-phia Oil	P-155	Nora	5175'S. 37° 07' 30"	6550'W. 82° 15' 00"	Dev.	5535	Devonian	Berea		440	
DI-218	Dickenson	522	Philadel-phia Oil	P-157	Nora	3600'S. 37° 07' 30"	4850'W. 82° 20' 00"	Dev.	4874	Devonian	Berea		146	
DI-220	Dickenson	531	Philadel-phia Oil	P-148	Nora	9250'S. 37° 05' 00"	3650'W. 82° 15' 00"	Dev.	5395	Devonian	Berea Weir		231	

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Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
DI-224	Dickenson	584	Philadel-phia Oil	P-163	Nora	15700'S. 37° 05' 00"	11750'W. 82° 20' 00"	Dev.	3102	Maxon	Ravencliff		919	
DI-225	Dickenson	633	Philadel-phia Oil	P-156	Nora	3000'S. 37° 07' 30"	6450'W. 82° 15' 00"	Dev.	5905	Devonian	Berea Devonian	189	582 103	
DI-226	Dickenson	636	Philadel-phia Oil	P-161	Nora	7740'S. 37° 07' 30"	3375'W. 82° 20' 00"	Dev.	5439	Devonian	Berea Big Lime	215	850 1841	
SI-227	Dickenson	710	Philadel-phia Oil	P-174	Nora	8300'S. 37° 07' 30"	800'W. 82° 20' 00"	Dev.	5285	Devonian	Berea	21	189	
DI-229	Dickenson	724	Philadel-phia Oil	P-173	Nora	10220'S. 37° 07' 30"	2475'W. 82° 20' 00"	Dev.	5429	Devonian	Berea Big Lime	267	959 896	
DI-230	Dickenson	733	Philadel-phia Oil	P-171	Nora	12900'S. 37° 07' 30"	6900'W. 82° 15' 00"	Dev.	6271	Devonian	Berea Weir Big Lime Devonian	47	822	Comingled
DI-231	Dickenson	738	Philadel-phia Oil	P-175	Nora	6700'S. 37° 07' 30"	10880'W. 82° 17' 30"	Dev.	6152	Devonian	Berea Big Lime Devonian	332 539 318		
DI-232	Dickenson	774	Philadel-phia Oil	P-158	Nora	9800'S. 37° 05' 00"	2500'W. 82° 15' 00"	Dev.	6345	Devonian	Berea Weir	103	211 112	
DI-233	Dickenson	775	Philadel-phia Oil	P-159	Nora	8400'S. 37° 05' 00"	1300'W. 82° 15' 00"	Dev.	5503	Devonian	Berea Weir Big Lime	146	852	Comingled

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
DI-234	Dickenson	776	Philadel-phia Oil	P-178	Nora	12°25'S. 37°05'00"	94°75'W. 82°15'00"	Dev.	5454	Devonian	Berea	343	696	
DI-235	Dickenson	777	Philadel-phia Oil	P-182	Nora	25°00'S. 37°05'00"	74°00'W. 82°15'00"	Dev.	5284	Devonian	Berea Weir Big Lime	26	762	ComingLed
DI-236	Dickenson	778	Philadel-phia Oil	P-181	Nora	44°00'S. 37°05'00"	64°00'W. 82°15'00"	Dev.	5374	Devonian	Berea Weir Big Lime		539	ComingLed
DI-237	Dickenson	787	Philadel-phia Oil	P-177	Nora	99°00'S. 37°05'00"	107°00'W. 82°15'00"	Dev.	5369	Devonian	Berea Weir		492 158	
DI-238	Dickenson	788	Philadel-phia Oil	P-183	Haysi	66°70'S. 37°10'00"	96°25'W. 82°20'00"	Dev.	4497	Devonian	Berea Big Lime	207	311 361	
DI-239	Dickenson	789	Philadel-phia Oil	P-184	Haysi	124°30'S. 37°10'00"	79°00'W. 82°20'00"	Dev.	4594	Devonian	Berea	94	467	
DI-240	Dickenson	802	Philadel-phia Oil	P-188	Nora	22°30'S. 37°07'30"	87°00'W. 82°17'30"	Dev.	5124	Devonian	Berea Big Lime	119	361 1880	
DI-241	Dickenson	803	Philadel-phia Oil	P-187	Nora	14°50'S. 37°07'30"	34°25'W. 82°17'30"	Dev.	5922	Devonian	Berea Devonian	133	310 94	
DI-242	Dickenson	813	Philadel-phia Oil	P-196	Nora	11°00'S. 37°07'30"	43°25'W. 82°20'00"	Dev.	6100	Devonian	Berea Big Lime Devonian	133	267	ComingLed
DI-243	Dickenson	814	Philadel-phia Oil	P-189	Nora	28°20'S. 37°05'00"	55°30'W. 82°17'30"	Dev.	5222	Devonian	Berea Ravenclyff	15	481 60	

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
DI-244	Dickenson	816	Philadel-phia Oil	P-191	Nora	8370'S 37° 07' 30"	5980'W 82° 17' 30"	Dev.	6462	Devonian	Berea Big Lime Devonian	67	400	Comingled
DI-245	Dickenson	815	Philadel-phia Oil	P-197	Nora	7415'S. 37° 05' 00"	10760'W. 82° 17' 30"	Dev.	8053	Devonian	Berea Devonian	40	1320 169	
DI-246	Dickenson	824	Philadel-phia Oil	P-185	Clintwood	6920'S. 37° 10' 00"	1900'W. 82° 22' 30"	Dev.	5646	Devonian	Berea Devonian	84	1391	
DI-247	Dickenson	825	Philadel-phia Oil	P-186	Clintwood	10540'S. 37° 10' 00"	700'W. 82° 22' 30"	Dev.	4465	Devonian	Berea Big Lime	94	984 492	
DI-248	Dickenson	832	Philadel-phia Oil	P-190	Nora	3750'S. 37° 05' 00"	8100'W. 82° 17' 30"	Dev.	5267	Devonian	Berea	103	169	
DI-249	Dickenson	837	Philadel-phia Oil	P-205	Ervington	10725'S. 37° 07' 30"	7325'W. 82° 15' 00"	Dev.	8153	Devonian	Berea Devonian	30	220	
PU-4	Putaski	723	Toms Creek Energy	Kegley #1	Putaski	2890'S. 37° 07' 30"	10690'W. 80° 45' 00"	W.C.	1513	Elbrook				P&A

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
PU-5	Pulaski	739	Toms Creek Energy	# 1 Neuhoﬀ	Radford North	900°S. 37°10'00"	11930°W. 80°35'00"	W.C.	4655	Price	Merrimac Langhorne	158	700	Awaiting Evaluation
SC-14	Scott	656	Early Grove Gas Co.	G. B. Hensley	Mendota	7790°S. 36°40'00"	12150°W. 82°17'30"	Dev.	4024	Price	Price	158	700	
C-18	Scott	784	Early Grove Gas Co.	N. L. Baker #1	Mendota	8650°S. 36°40'00"	9680°W. 82°17'30"	Dev.	4135	Price	Little Valley	12	500	
SC-19	Scott	786	Early Grove Gas Company	Meade #1	Mendota	7180°S. 36°40'00"	11150°W. 82°17'30"	Dev.	4210	Price	Price	96		
SC-20	Scott	791	Early Grove Gas Company	Carl Hensley #1	Mendota	7190°S. 36°40'00"	7225°W. 82°17'30"	Dev.	4200	Price	Price	1250		Ltl. Valley
SC-21	Scott	830	ANR Production	20000	Wise	15000°S. 36°55'00"	9800°W. 82°35'00"	W.C.	4035	Devonian Big Lime U&L Devonian	Berea	581		Comingled
TA-36	Tazewell	736	CNG Development	CNGD 995	Bramwell	14500°S. 37°22'30"	9300°W. 81°20'00"	Dev.	4855	Sunbury	Weir	882		
WS-112	Wise	700	ANR Production	10047	Appalachia	3450°S. 36°55'00"	4550°W. 82°47'30"	Dev.	5469	Corniferous Weir Berea Big Lime U&L Devonian	Weir Berea Big Lime U&L Devonian	1138		Comingled

VIRGINIA DIVISION OF MINERAL RESOURCES

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcf/d)	Final Flow (Mcf/d)	Remarks
WS-113	Wise	701	ANR Production	10049	Appalachia	6350'S. 36° 57' 30"	5400'W. 82° 47' 30"	Dev.	5615	Corniferous Weir	Big Lime U&L Devonian	1517	1517	ComingLed
WS-114	Wise	684	ANR Production	10080	Flat Gap	3500'S. 37° 02' 30"	4000'W. 82° 42' 30"	Dev.	1575	Norton				P&A due to Deviation
WS-118	Wise	706	ANR Production	10088	Appalachia	4100'S. 36° 57' 30"	9100'W. 82° 45' 00"	Dev.	5627	Corniferous Weir	Big Lime U&L Devonian	474	474	ComingLed
WS-120	Wise	708	ANR Production	10087	Appalachia	3900'S. 36° 57' 30"	11850'W 82° 45' 00"	Dev.	5483	Corniferous Weir	Big Lime U&L Devonian	1750	1750	ComingLed
WS-122	Wise	740	ANR Production	10026	Appalachia	9500'S. 36° 57' 30"	3100'W. 82° 47' 30"	Dev.	5637	Corniferous Weir	Big Lime U&L Devonian	581	581	ComingLed
WS-123	Wise	741	ANR Production	10037	Appalachia	2900'S. 36° 57' 30"	5300'W. 82° 47' 30"	Dev.	5553	Corniferous Weir	Big Lime U&L Devonian	539	539	ComingLed
WS-124	Wise	742	ANR Production	10038	Appalachia	550'S. 36° 57' 30"	8100'W. 82° 47' 30"	Dev.	5485	Corniferous Weir	Big Lime U&L Devonian	487	487	ComingLed

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcf/d)	Final Flow (Mcf/d)	Remarks
WS-127	Wise	745	ANR Production	10098	Appalachia	3800'S. 36° 57' 30"	5700'W. 82° 50' 00"	Dev.	6334	Corr-iferous	Weir Berea Big Lime U&L Devonian	2054		Comingled
WS-129	Wise	748	ANR Production	10108	Flat Gap	7450'S. 37° 02' 30"	3000'W. 82° 42' 30"	Dev.	6060	Corr-iferous	Weir Berea U&L Devonian	365		Comingled
WS-130	Wise	749	ANR Production	10016	Norton	12700'S. 37° 00' 00"	9600'W. 82° 42' 30"	Dev.	5723	Corr-iferous	Weir Berea U&L Devonian	1210		Comingled
WS-131	Wise	750	ANR Production	10110	Flat Gap	11600'S. 37° 02' 30"	8300'W. 82° 40' 00"	Dev.	5990	Corr-iferous	Weir Berea U&L Devonian	207		Comingled
WS-132	Wise	751	ANR Production	10083	Flat Gap	9850'S. 37° 02' 30"	1700'W. 82° 42' 30"	Dev.	6106	Corr-iferous	Weir Berea U&L Devonian	581		Comingled
WS-133	Wise	752	ANR Production	10082	Flat Gap	10500'S. 37° 02' 30"	6500'W. 82° 41' 30"	Dev.	5505	Corr-iferous	Weir Berea Big Lime U&L Devonian	1237		Comingled
WS-134	Wise	753	ANR Production	10084	Flat Gap	13000'S. 37° 02' 30"	10250'W. 82° 40' 00"	Dev.	6448	Corr-iferous	Weir Berea U&L Devonian	789		Comingled

VIRGINIA DIVISION OF MINERAL RESOURCES

Virginia Well Completions-1985

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcf)	Final Flow (Mcf)	Remarks
WS-135	Wise	754	ANR Production	10089	Norton	5875'S. 36° 57'30"	7950'W. 82° 42'30"	Dev.	5587	Corniferous	Weir Berea Big Lime	700		Comingled
WS-136	Wise	755	ANR Production	10097	Appalachia	7000'S. 36° 57'30"	10800'W. 82° 47'30"	Dev.	5557	Corniferous	Weir Berea USL Devonian	8349		Comingled
WS-137	Wise	756	ANR Production	10115	Norton	7050'S. 36° 57'30"	5500'W. 82° 42'30"	Dev.	5609	Corniferous	Weir Berea USL Devonian	1384		Comingled
WS-138	Wise	757	ANR Production	10105	Norton	5600'S. 36° 57'30"	2000'W. 82° 42'30"	Dev.	5775	Corniferous	Weir Berea USL Devonian	163		Comingled
WS-139	Wise	758	ANR Production	10104	Norton	8800'S. 36° 57'30"	4000'W. 82° 42'30"	Dev.	5301	Corniferous	Weir Berea Big Lime USL Devonian	353		Comingled
WS-140	Wise	759	ANR Production	10091	Norton	14750'S. 37° 00'00"	1700'W. 82° 42'30"	Dev.	5550	Corniferous	Weir Berea USL Devonian	211		Comingled

Virginia Well Completions, 1985.

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W-141	Wise	760	ANR Production	10073	Norton	6900'S 37°00'00"	11300'W. 82°42'30"	Dev.	5618	Corniferous	Weir Berea U&L Devonian	1244	1244	Comingled
WS-142	Wise	761	ANR Production	10042	Appalachia	550'S. 36°57'30"	8200'W. 82°47'30"	Dev.	5445	Corniferous	Weir Berea Big Lime U&L Devonian	380	380	Comingled
WS-143	Wise	762	ANR Production	10101	Appalachia	15100'S. 37°00'00"	12100'W. 82°47'30"	Dev.	5320	Corniferous	Weir Berea U&L Devonian	1913	1913	Comingled
WS-144	Wise	763	ANR Production	10102	Appalachia	13 50'S. 37°00'00"	750'W. 82°50'00"	Dev.	5296	Corniferous	Weir Berea U&L Devonian	949	949	Comingled
WS-147	Wise	767	ANR Production	10057	Norton	10550'S. 37°00'00"	12000'W. 82°42'30"	Dev.	5580	Corniferous	Weir Berea U&L Devonian	1639	1639	Comingled
WS-148	Wise	768	ANR Production	10093	Norton	200'S. 36°57'30"	10100'W. 82°40'00"	Dev.	5662	Corniferous	Weir Berea U&L Devonian	628	628	Comingled
WS-150	Wise	771	ANR Production	10092	Norton	10200'S. 37°00'00"	11050'W. 82°40'00"	Dev.	5554	Corniferous	Weir Berea U&L Devonian	127	127	Comingled

VIRGINIA DIVISION OF MINERAL RESOURCES

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	7.5' Quadrangle	Latitude	Longitude	Well Total Depth [feet]	Formation at T.D.	Producing Formation	Initial Flow [Mcf/d]	Final Flow [Mcf/d]	Remarks
WS-151	Wise	779	ANR Production	10046	Appalachia	13500'S. 37° 00' 00"	4000'W. 82° 45' 00"	Dev. 5773	Corniferous Weir	Berea Big Lime USL Devonian	750		Comingled
WS-152	Wise	780	ANR Production	10099	Appalachia	5100'S. 36° 57' 30"	10075'W. 82° 47' 30"	Dev. 5746	Corniferous Weir	Berea Big Lime Devonian	2398		Comingled
WS-156	Wise	785	ANR Production	10041	Appalachia	13700'S. 37° 00' 00"	7335'W. 82° 47' 30"	Dev. 5430	Corniferous Weir	Berea Big Lime USL Devonian			Comingled
WS-158	Wise	793	ANR Production	10094	Appalachia	10300'S. 36° 57' 30"	5650'W. 82° 50' 00"	Dev. 6556	Corniferous Weir	Berea USL Devonian	872		Comingled
WS-159	Wise	749	ANR Production	10095	Appalachia	8400'S. 36° 57' 30"	8400'W. 82° 47' 30"	Dev. 5591	Corniferous Weir	Berea USL Devonian	1255		Comingled
WS-160	Wise	795	ANR Production	10106	Norton	14360'S. 36° 57' 30"	2300'W. 82° 41' 30"	Dev. 5470	Corniferous Weir	Berea USL Devonian	189		Comingled
WS-165	Wise	805	ANR Production	10186	Norton	4200'S. 36° 57' 30"	9300'W. 82° 42' 30"	Dev. 5530	Corniferous Weir	Berea Big Lime USL Devonian	1517		Comingled

Virginia Well Completions, 1985.

File No.	County	Permit No.	Operator	Well Name	Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T.D.	Producing Formation	Initial Flow (Mcfd)	Final Flow (Mcfd)	Remarks
WS-166	Wise	806	ANR Production	10185	Norton	8400'S. 36° 57' 30"	12050'W. 82° 42' 30"	Dev.	5551	Corniferous	Weir Berea Big Lime U&L Devonian	441	441	Comingled
WS-167	Wise	807	ANR Production	10184	Norton	5950'S. 36° 57' 30"	11100'W. 82° 42' 30"	Dev.	5506	Corniferous	Weir Berea Big Lime U&L Devonian	327	327	Comingled
WS-168	Wise	808	ANR Production	10183	Norton	7850'S. 36° 57' 30"	10050'W. 82° 42' 30"	Dev.	5491	Corniferous	Weir Berea Big Lime U&L Devonian	198	198	Comingled
WS-170	Wise	810	ANR Production	10182	Norton	8100'S. 36° 57' 30"	7750'W. 82° 42' 30"	Dev.	5630	Corniferous	Weir Berea U&L Devonian	1205	1205	Comingled
WS-171	Wise	817	ANR Production	10172	Appalachia	350'S. 36° 57' 30"	3300'W. 82° 45' 00"	Dev.	5753	Corniferous	Weir Berea Big Lime U&L Devonian	1268	1268	Comingled

PIPELINE CONSTRUCTION

ANR Production Company connected 42 of its Wise County wells with a total of 140,000 feet of four-inch pipeline.

Philadelphia Oil Company added nearly 17,000 feet of two-inch-, 2375 feet of three-inch-, 35,500 feet of four-inch-, and 4400 feet of six-inch-diameter pipe to its existing facilities in Dickenson and Wise counties.

Early Grove Gas Company laid 31,000 feet of three-inch plastic pipe to test a wildcat strike in Washington County and also added 2856 feet of one-and-a-half-inch pipe for one well in the existing Early Grove field.

Ashland Exploration added 5500 feet of two-inch pipe to connect one well to its existing system in Buchanan County.

CNG Development Corporation laid 1100 feet of two-inch pipe to tie in a development well in Tazewell County to its system in West Virginia.

INDUSTRIAL AND METALLIC MINERALS

by Palmer C. Sweet³

CEMENT

Virginia's cement industry consists of three companies, located in Warren and Botetourt counties and in the City of Chesapeake. Riverton Corporation in Warren County produces masonry cement at their plant north of Front Royal. Crushed limestone (Edinburg Formation) is calcined, hydrated, and mixed with portland cement from out-of-state sources. Sales are made to building supply dealers in Virginia and surrounding states. Tarmac-LoneStar, Inc. operates a plant in western Botetourt County; this is the largest operation owned by the company. The facility produces portland cement from locally mined limestone, shale, and iron scale from Roanoke Electric Steel Company. Clinker is manufactured in five coal-fired kilns and ground into cement. Three-quarters of the cement is sold to ready-mix companies. LaFarge Calcium Aluminate, Inc. operates a cement manufacturing plant in the City of Chesapeake. Cement clinker is imported and ground into low- and medium-calcium aluminate cement. Advantages of this cement include rapid hardening as well as resistance to wear, high and low temperatures, and corrosion.

CLAY MATERIALS

Residual and transported clay, weathered phylites and schists, and shale are used as raw material

to produce almost one-half billion bricks, annually, when all the plants in the state are working at full capacity. The clay-material industry in the western part of the state mines Paleozoic shales, with the primary end-products being common and face brick. Tazewell Clay Products Company in Tazewell County extrudes clay to produce clay dummies used by the coal industry to tamp shot holes. Face brick producers mine residual clays, Triassic shale and clay residuum in Orange County (Figure 1) as well as Prince William County, Precambrian schists and transported clays in Brunswick, Chesterfield, Greensville, and Henrico counties.

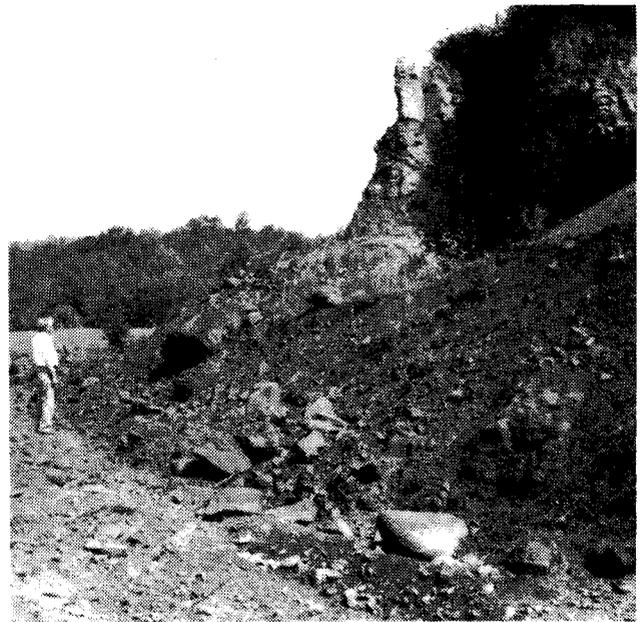


Figure 1. Triassic shale and clay residuum, Webster Brick Co., Inc., North Pit, Somerset.

Lightweight aggregate is produced by three different companies in Botetourt, Buckingham, and Pittsylvania counties. Weblite Corporation in Botetourt County mines shale from the Rome Formation to produce lightweight aggregate by the sintering process, using semi-anthracite coal from Montgomery County to fire the kilns. They utilize about 100 tons of coal per day to yield a lightweight-product having a weight as low as 31 lb/cu ft for 5/16 to 3/4 inch particle sizes. Triassic shale is used by Virginia Solite Company southwest of Danville, Pittsylvania County, to obtain a similar product. Solite Corporation in northern Buckingham County uses the Arvonite Slate of Ordovician age to produce lightweight aggregate.

Clay from the Cold Spring kaolin deposit in southeastern Augusta County is intermittently utilized

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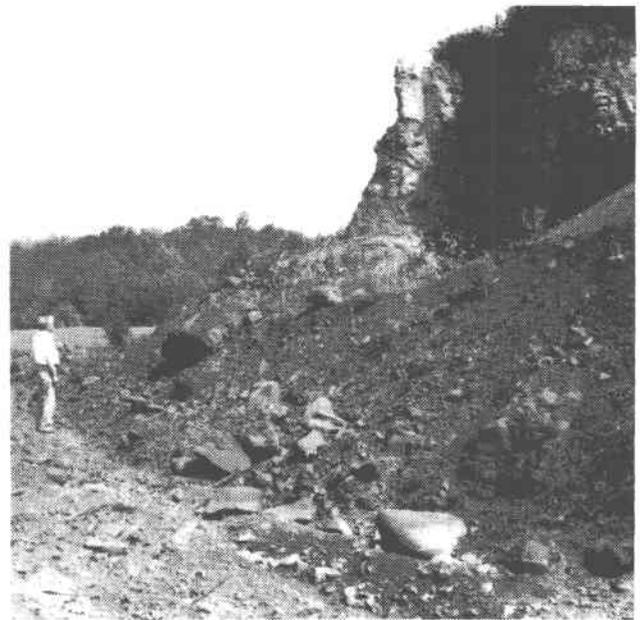


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3. Division of Mineral Resources, P. O. Box 3667, Charlottesville, VA 22903

by James River Limestone Co., Inc. to mix with the material at their operation near Buchanan to produce various grades of filler material and for an ingredient in white cement.

During early 1981, a large occurrence of montmorillonite clay materials was discovered in the Walkerton area of King and Queen County in eastern Virginia. Presently, Bennett Mineral Company mines and processes these clays to produce an industrial and sanitary absorbent. The facility uses wood wastes as a plant fuel to dry the clay in a rotary kiln.

FELDSPAR

The Feldspar Corporation operates a mine and plant near Montpelier in Hanover County in east-central Virginia and produces a material marketed as "Virginia aplite," which is sold to the glass industry to improve the workability of the molten material and impart a chemical stability to the finished glassware. International Minerals and Chemical Corporation (IMC) operated a mine at Piney River in Nelson County, extracting anorthosite (orthoclase feldspar as films and veinlets with albite (sodic) feldspar), until June 1980. Production ceased because of a problem with the deteriorating grade of feldspar.

The Feldspar Corporation mines feldspar from pegmatites by open pit methods. The rock is trucked to the plant adjacent to the mine for crushing, grinding, classifying, and drying. Processed feldspar is shipped by truck and rail to markets in New Jersey, Pennsylvania, Ohio, and Indiana. Clay minerals are removed by gravity concentration. An electrostatic process and magnets remove the heavy minerals which are then stockpiled. In 1971, about 6000 to 8000 tons of heavy-minerals were stockpiled, containing equal amounts of apatite, rutile, ilmenite, and sphene. Beginning in 1973, heavy minerals were no longer separated, but were put into the tailings pond; in 1977, the heavy minerals again were separated.

Clay and silt, with a high percentage of kaolinite and mica, has accumulated in these settling ponds. The material (accumulating at the rate of about 75,000 to 100,000 tons per year) was evaluated in the mid-1960s and was found to be suitable for face brick and drain tile; the material fires dark brown to gray. Fines may have potential as a flux material for the brick industry.

Feldspar in Amherst County is marketed as aggregate by the Dominion Stone Plant, Inc. Fines, resulting from the crushing of feldspar for use as road aggregate, are presently stockpiled. An unsuccessful attempt was made to market this as roofing

material in the past. Feldspar has been mined from several pegmatite bodies in the Piedmont province in the past, including those in Amelia and Bedford counties.

GYPSUM

United States Gypsum Company operates a mine and plant in the southwestern part of the state and a plant in Norfolk on the Atlantic coast. The underground mine is located at Locust Cove, Smyth County, and the plant is in Plasterco, near Saltville, in adjacent Washington County. The Locust Cove mine is a slope-entry, multilevel operation. Isolated masses of gypsum in the Maccrady Formation are mined by a modified underhand stoping system. Crude gypsum is trucked to the plant at Plasterco where it is made into wallboard.

The Norfolk operation processes crude gypsum from Nova Scotia to produce wallboard and other gypsum-based products as well as a "land plaster" for the peanut industry. The Norfolk facility receives a few shipments of anhydrite from the Nova Scotia operations for sale to coal cement manufacturers.

IRON OXIDE PIGMENTS

Virginia is one of four states producing iron oxide pigments. Hoover Color Corporation in Pulaski County produces ocher, umber, and sienna. The company is the only operation in the United States producing sienna. Raw materials are mined by open pit methods and trucked to the company plant at Hiwassee where they are pulverized, dried, ground, graded, blended, and packaged prior to shipping. The finished product, used as a coloring agent in a variety of products, is shipped throughout the United States and to Canada and Mexico.

Blue Ridge Talc Company, Inc. imports crude iron-oxide pigments from a midwest supplier. The pigments are ground and calcined for use in paints and fertilizers, and for cement and mortar coloring. Their markets are domestic and foreign.

KYANITE

Kyanite, an aluminum silicate, was first produced in Prince Edward County, Virginia, in the 1920s. Currently, Buckingham County produces approximately 45 percent of the world's kyanite, with a concentrate grade of a maximum of 61.8 percent alumina and a minimum iron content of 0.16 percent. Calcined kyanite is converted to mullite at greater than 3000 degrees Fahrenheit. The material is a super-duty refractory with a pyrometric cone equivalent of 36 to 37. Products, which are sold

in 35, 48, 100, 200, and 325 mesh sizes, are used in the refractory, ceramic, glass, metallurgical, and foundry industries. Mullite allows ceramics and glass to resist cracking, warping, slagging, and deforming from high temperatures.

Kyanite Mining Corporation operates two surface mines and processing plants in central Buckingham County. Kyanite-bearing quartzite is quarried from open pits, run through primary crushers, through a log washer to remove clay, and onto the classifiers to remove some kyanite. The material then passes through a rod mill which reduces it to a minus 35-mesh size, and then through froth flotation cells so that kyanite can be skimmed off. The kyanite is de-watered and then dried; the high temperature of the drier converts sulfides to oxides. Pyrite is converted to ferrous iron oxide (Fe_3O_4) or magnetite, which is then removed by magnetic separators and stockpiled.

The Willis Mountain plant processes the raw kyanite which is then trucked to the East Ridge facility for calcining. Mullite is ground and bagged at the Dillwyn Plant and raw kyanite is ground and bagged at Willis Mountain.

Approximately 40 percent of the output is shipped through the port of Hampton Roads to worldwide customers. The company also produces a by-product sand from kyanite processing. It is sold for golf course sand, masonry and concrete sand, and other applications.

LIME

Over the past 10 years, total lime production has added over \$200 million to the state's economy. Virginia's lime industry is situated in Frederick, Giles, Shenandoah, and Warren counties. In northern Virginia, two companies, W. S. Frey Company, Inc. and Chemstone Corporation (Figure 2), quarry and calcine the high-calcium New Market Limestone, and one company, Riverton Corporation in Warren County, quarry and calcine limestones from the Edinburg Formation. Two companies in western Giles County (USG Industries and Virginia Lime Company) operate underground mines in the Five Oaks Limestone. Principal sales are to the paper and steel industries. The paper industry uses lime for regeneration of sodium hydroxide and the neutralization of sulfate water. Lime is used by the steel industry to control slagging and for water purification, and in neutralization of acid mine water (over the last few years). It is also used for mason's lime, sewage treatment, and agricultural purposes.

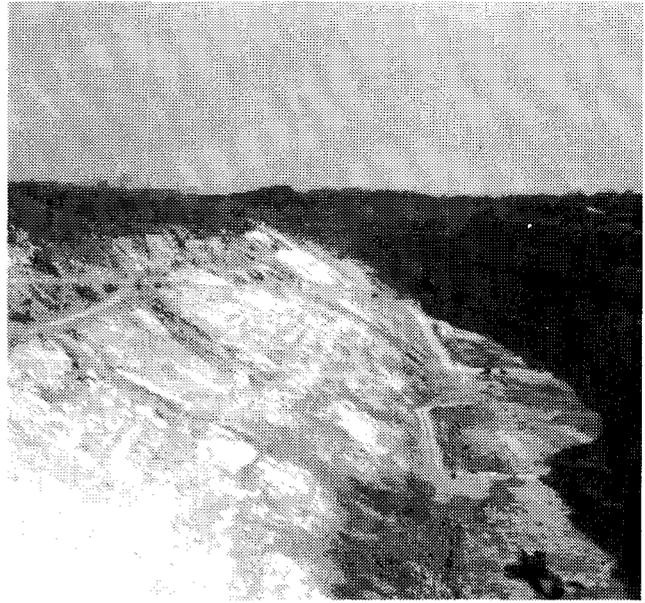


Figure 2. Quarry of Chemstone Corporation in high-calcium New Market Limestone, Strasburg; view looking north.

LITHIUM

Foote Mineral Company processes lithium carbonate from Spruce Pine, North Carolina, with calcium hydroxide from various sources to produce lithium hydroxide at their Sunbright plant in Scott County. Lithium hydroxide is used in multipurpose grease applications. In the past, limestone from an underground mine at the site was utilized in the process and a calcium carbonate precipitate was formed as a waste product. The material remains on the site and may have a potential value; approximate analysis is 43-50 percent $CaCO_3$, 3-6 percent $Ca(OH)_2$, and 40-48 percent water.

MAGNETITE

Reiss Viking Corporation in Tazewell County processes out-of-state magnetite for use in coal preparation. The material is marketed in New York and Pennsylvania.

MANGANESE

Eveready Battery Company, Inc. operates a manganese processing facility in the city of Newport News. Manganese ore, imported from Mexico and Africa, is dried, crushed, ground, and shipped to other company facilities for use in the manufacture of batteries.

in 35, 48, 100, 200, and 325 mesh sizes, are used in the refractory, ceramic, glass, metallurgical, and foundry industries. Mullite allows ceramics and glass to resist cracking, warping, slagging, and deforming from high temperatures.

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Reiss Viking Corporation in Tazewell County processes out-of-state magnetite for use in coal preparation. The material is marketed in New York and Pennsylvania.

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Eveready Battery Company, Inc. operates a manganese processing facility in the city of Newport News. Manganese ore, imported from Mexico and Africa, is dried, crushed, ground, and shipped to other company facilities for use in the manufacture of batteries.

MICA

Asheville Mica Company and an affiliate, Mica Company of Canada, process mica at facilities in Newport News. The crude mica is purchased from Madagascar and India. Asheville Mica Company produces fabricated plate-mica; Mica Company of Canada uses splittings from Asheville to produce reconstituted plate-mica. Mica has been produced in the past from pegmatite bodies in several counties in Virginia, including Amelia, Henry, and Powhatan.

ORNAMENTAL AGGREGATE

Several materials have been utilized for ornamental aggregate in past years. Vein quartz has been quarried in Albemarle, Buckingham, Fauquier, Fluvanna, Greene, and Rappahannock counties, and quartz pebbles, extracted in Caroline County. Dolomite and quartzite from Botetourt and Rockbridge counties are presently marketed as exposed aggregate materials. Rock materials such as black limestone (Edinburg Formation) from the Valley and Ridge province and greenstone from the Piedmont province have been used for terrazzo in the past. Exposaic Industries, Inc. in Spotsylvania County utilizes a variety of rock materials for exposed panels (Figure 3).



Figure 3. Aggregate stockpiles of various colored materials at Exposaic Industries, Inc., south of Fredericksburg.

PERLITE

Manville Sales Corporation operates a plant at Woodstock, Shenandoah County to expand perlite (volcanic glass with high water content and "onion-skin" appearance) obtained from Grants, New Mexico. Expanded perlite is used in the manufacture of

roof insulation board which is marketed throughout the eastern United States. Product demand in 1985 for roofing installation and maintenance was strong.

PHOSPHATE ROCK

Texasgulf Chemicals Company ships phosphate rock from its Lee Creek operation in North Carolina to Glade Spring, Washington County. From Glade Spring the raw material is transported by truck to the Texasgulf plant in Saltville, Smyth County, Virginia. A coal-fired rotary kiln is used to defluorinate the phosphate rock. The product is marketed as a poultry and animal feed supplement in the southern and midwestern states.

SAND AND GRAVEL

Construction

Construction sand and gravel producers accounted for the majority of the more than 10 million tons of material produced in 1985. Sand and gravel was extracted from the terraces and dredged from the rivers of the major drainages in central and eastern Virginia. Large tonnages of construction sand and gravel, from southeast of Fredericksburg (Figure 4), are shipped by rail into the northern Virginia-Washington, D.C., market area. A large portion of the production by Sadler Materials Corporation and Tarmac-LoneStar, Inc. near Richmond is barged along the James River to the Norfolk area. Shipments are also made by rail and truck to the western part of the state.



Figure 4. Sand has been screened and here is being washed and conveyed to stockpile at Massaponax Sand and Gravel Corp., southeast of Fredericksburg.

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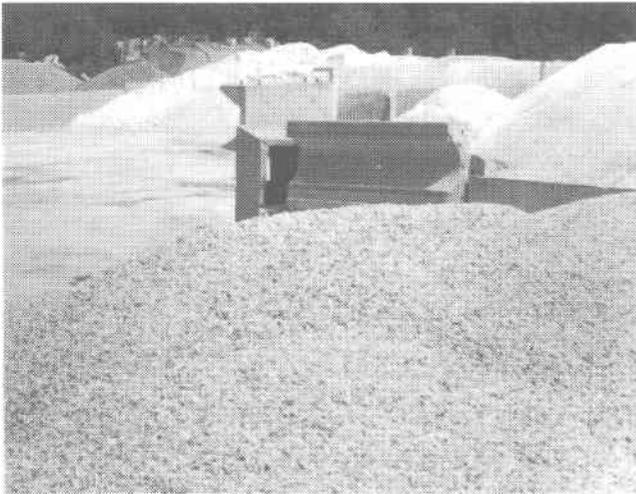


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Industrial Sand

J. C. Jones Sand Company mines industrial sand at Virginia Beach for use in foundry-casting applications and as a traction medium. Filter sand is produced in Caroline County and traction sand is also produced in Dickenson County. Glass sand is produced by Unimin Corporation near Gore in Frederick County, from the Ridgeley Sandstone of Devonian age. CED Process Minerals Inc., Gore, in Frederick County, recrystallizes purchased sand in a rotary kiln to produce cristobalite, which is marketed as a fine grit.

STONE

Crushed

Virginia was the fifth leading producer of crushed stone in the nation in 1985. Crushed limestone, dolomite, sandstone, quartzite, granite, gneiss, diabase, basalt, greenstone, amphibolite, slate, "Virginia aplite," marble, and marl valued at \$226 million was produced. Limestone, dolomite, and sandstone producers are located in the Valley and Ridge and Plateau provinces in the western portion of the state. Principal end uses were for road construction, concrete aggregate, asphalt stone, and agricultural application; production of limestone and dolomite in 1985 was more than 19 million tons. Mine safety dust (335,000 short tons in 1980) is produced at six quarries in southwest Virginia. More recent figures on safety dust are combined with those for acid-water treatment material. Dust is spread in coal mines to prevent explosions; it should contain less than 5 percent SiO_2 and 100 percent should pass 20 mesh with 70 percent minus 200 mesh. Finely-ground dolomite and limestone is also marketed by several operations for use as a filler material.

Sandstone was quarried for the production of roadstone, concrete aggregate, asphalt stone, and manufactured fine aggregate. Quartzite from the Antietam Formation is processed by Locher Silica Company in Wythe County and marketed as metallurgical flux. Similar material has been produced in Rockbridge County in the past. Figure 5 depicts Triassic sandstone in the quarry of Culpeper Stone Co., Culpeper County.

Granite, gneiss, diabase, basalt, amphibolite, slate, and marble are quarried in the central portion of Virginia. Virginia was the third-leading producer of granite and fifth-leading producer of trap rock (diabase and basalt) in 1985. Major end uses were for roadstone, asphalt stone, and concrete aggregate. Diabase, basalt, and amphibolite production (non-polishing aggregate) totaled about 6 million tons from four counties.

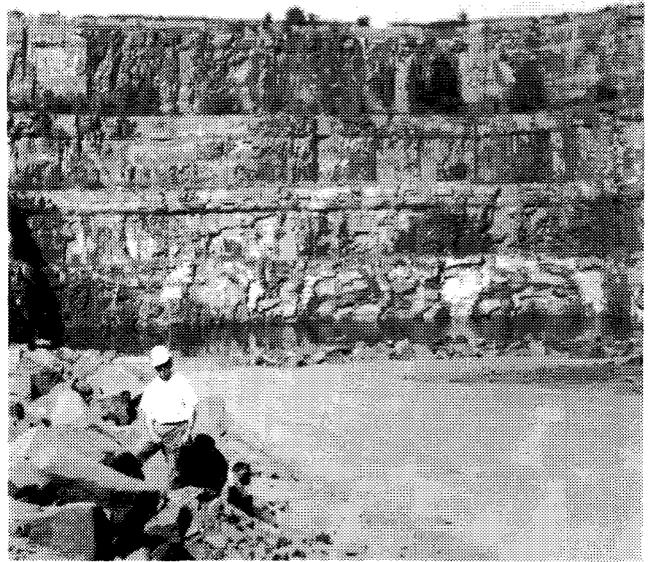


Figure 5. Horizontal bedded Triassic sandstone with very little overburden, Culpeper Stone Company quarry east of Culpeper.

Slate is mined and crushed by companies in Buckingham and Amherst counties. Virginia was the leading producer of crushed slate in 1985. Solite Corporation in Buckingham County also expands slate for lightweight aggregate production. Production of crushed slate, as a by-product of dimension slate operations, increased as a result of local highway construction.

One company, Appomattox Lime Company, Inc., mines a marble (Mt. Athos Formation) near Oakville in Appomattox County for agricultural lime. Sales, principally to the eastern coastal areas of Virginia and North Carolina, were severely curtailed because of drought conditions.

Dimension

Dimension stone production was valued at \$2.1 million in 1985. Slate, diabase, granite, quartzite, and soapstone were quarried in the Valley and Ridge and Piedmont provinces. Slate was the leading stone type quarried, in terms of cubic feet and value. LeSueur-Richmond Slate Corporation mined slate from two quarries in the Arvonnia area of Buckingham County. Arvonnia slate production dates from the late 1700s when slate was quarried for roofing tile for the State Capitol in Richmond. Slate producers supply the building trade with a variety of products ranging from material for exterior applications such as roofing tile and flooring to interior uses such as hearths and sills. Diabase for use as monument stone is produced at Virginia Granite Company in southern Culpeper County.

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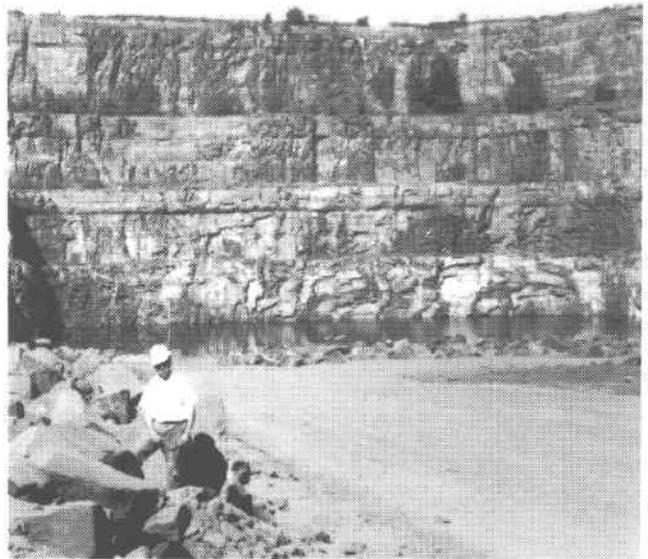


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Granite for dimension stone was quarried in Hanover County, and quartzite used as flagging material was extracted from three quarries, one in Campbell County, south of Lynchburg, and two in Fauquier County.

Alberene Stone Company in Albemarle and Nelson counties (Figure 6), provides soapstone for speciality laboratory materials and also for panels for the woodstove industry; a by-product is sold for flagstone. In the summer of 1986, this company was sold to a Finnish firm, which will expand operations as The New Alberene Stone Company, Inc. The new company proposes to make fireplaces, wood stoves, cooking ware, and other products of solid soapstone.



Figure 6. Soapstone quarry, with drilling equipment for extracting dimension stone, Schuyler, Nelson County.

TALC

Blue Ridge Talc Company, Inc. in Franklin and Henry counties produced talc for foundry applications through November. A talc-chlorite-dolomite schist was mined by open pit methods and trucked to the company's mill on the Franklin-Henry county border for grinding. Schist is ground in a hammer mill, dried, ground again in a Raymond mill and graded in an air separator. Talc is used in foundries as a releasing agent in mold coatings. Much of the ground talc was shipped to foundries in the western Pennsylvania area. Sales have recently been down

because of the depressed state of the steel industry. The material was formerly used in insecticides.

SULFUR

Elemental sulfur is recovered from hydrogen sulfide gas by the Claus process during crude-oil refining by Amoco Oil Company. The refinery is adjacent to the York River, near Yorktown. Crude oil is heated in a furnace and fed under pressure into a cylinder where it vaporizes, expands, and condenses into liquid. Hydrogen sulfide is produced and then converted into elemental sulfur. About 50 tons of sulfur is produced per day and is marketed to one buyer for eventual use in fertilizer.

VERMICULITE

Virginia is one three states in which vermiculite, a hydrated magnesium-iron-aluminum silicate, is mined. Virginia Vermiculite, Ltd. operates an open-pit mine and processing facility near Boswells Tavern in Louisa County. Material mined with a backhoe and front-end loader is trucked to the adjacent plant where desliming, flotation, drying, and screening are used to produce four basic size products. Most of the crude vermiculite is shipped by rail in unexfoliated form to North Carolina, West Virginia, Ohio, and other eastern states. Uses for the exfoliated material include packing, insulation, lightweight aggregate, and potting material.

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