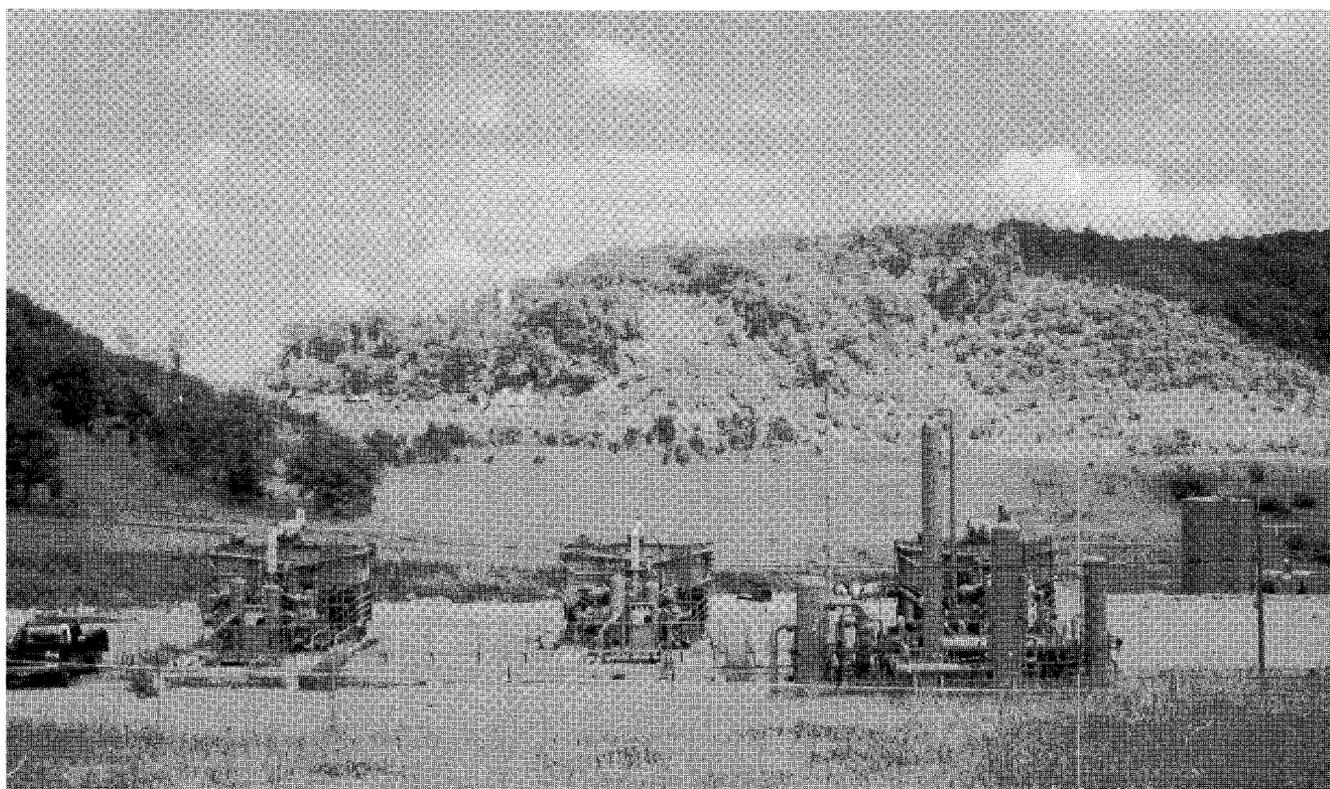


VIRGINIA DIVISION OF MINERAL RESOURCES

PUBLICATION 150

**COAL, OIL AND GAS, AND INDUSTRIAL AND METALLIC
MINERALS INDUSTRIES IN VIRGINIA, 1996**

Palmer C. Sweet and Jack E. Nolde



**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF MINES, MINERALS AND ENERGY
DIVISION OF MINERAL RESOURCES
Stanley S. Johnson, State Geologist**

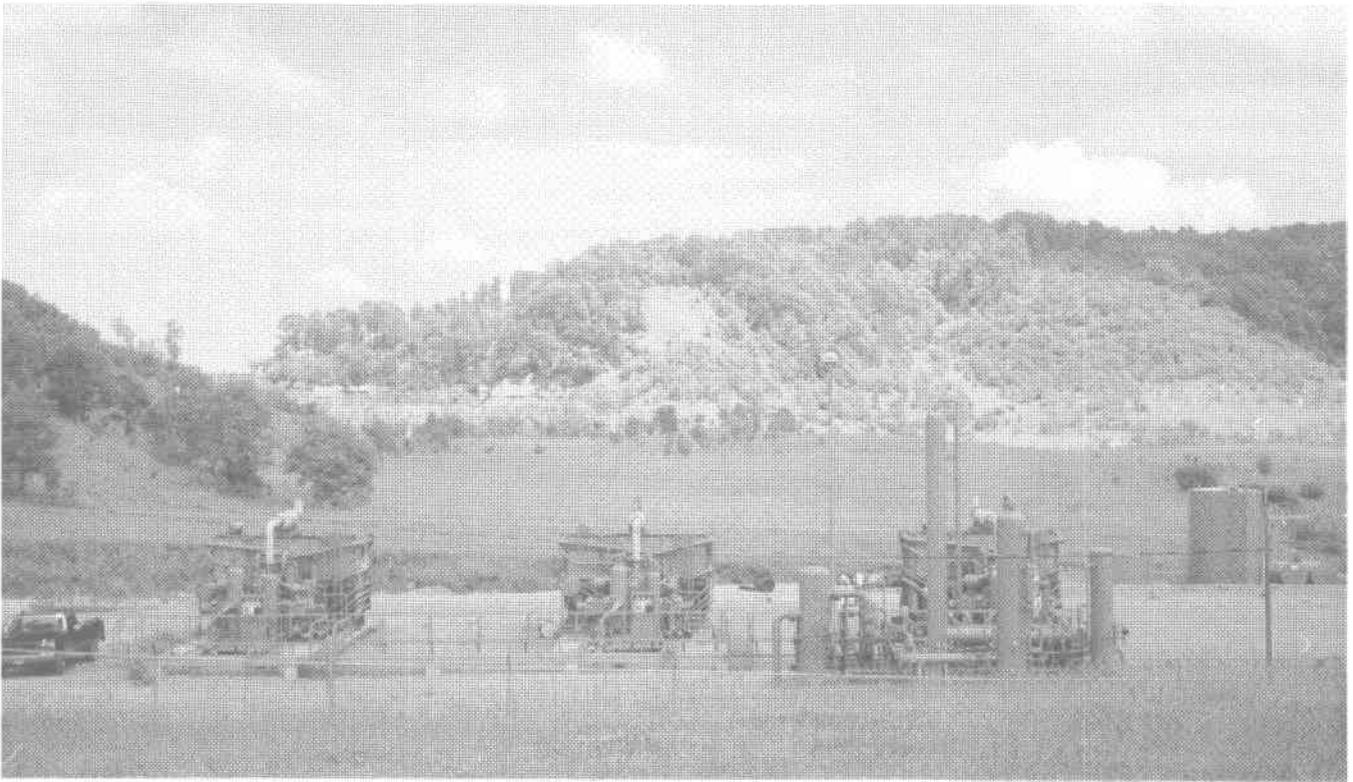
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1997**

DEPARTMENT OF MINES, MINERALS AND ENERGY
RICHMOND, VIRGINIA
O.Gene Dishner, Director

DIVISION OF MINERAL RESOURCES
CHARLOTTESVILLE, VIRGINIA
Stanley S. Johnson, State Geologist and Division Director
804-963-2308

STAFF

Kay T. Hasenauer, Executive Secretary
804-963-2309

ECONOMIC MINERALS AND ENERGY SECTION

Palmer C. Sweet, Section Head, 804-963-2313
Jack E. Nolde, Geologist Senior, 804-963-2318
Roy S. Sites, Geologist Senior, 804-963-2320
Michael L. Upchurch, Geologist Senior, 804-963-2322

SOUTHWEST MINERALS AND GEOLOGY SECTION

Alfred R. Taylor, Section Head, 540-676-5577
James A. Lovett, Geologist Senior, 540-676-5577
William W. Whitlock, Geologist Senior, 540-676-5577

SALES AND SUPPORT SECTION

Delores J. Green, Office Manager, 804-963-2315
Edwin W. Marshall, Geologist Technician, 804-963-2316
Paige S. Roach, Store Operations Supervisor, 804-963-2305
Antoinette Arsic, Office Services Specialist, 804-963-2270

SPATIAL DATA AND EASTERN GEOLOGY

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C. R. Berquist, Jr., Geologist Senior, 757-221-2448
Elizabeth V. M. Campbell, Geologist Senior, 804-963-2311
Nick H. Evans, Geologist Senior, 804-963-2317
William S. Henika, Geologist Senior, 540-231-4298
Karen K. Hostettler, Geologist Senior, 804-963-2312
David B. Spears, Geologist Senior, 804-963-2319

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David A. Hubbard, Jr., Geologist Senior, 804-963-2314
John D. Marr, Jr., Geologist Senior, 804-963-2306
Vernon N. Morris, Cartographic Drafter Assist., 804-963-2324
Gerald P. Wilkes, Geologist Senior, 804-963-2323

SALES: 804-293-5121

INFORMATION: 804-963-2306

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FRONT COVER: Compressor Station "I" located in the northeast corner of the Norton 7.5-minute quadrangle. Compressor stations are used to move gas through the pipelines.

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**CHARLOTTESVILLE, VIRGINIA
1997**

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COAL, OIL AND GAS, AND INDUSTRIAL AND METALLIC MINERALS INDUSTRIES IN VIRGINIA, 1996

Palmer C. Sweet and Jack E. Nolde

INTRODUCTION

The total value of mineral production in Virginia in 1996 was almost 1,654.87-million dollars (Table 1; Figure 1). About 974.36-million dollars resulted from coal sales, a 2.09 percent increase in value from the 1995 sales of 1,555.82-million dollars. About 151.72-million dollars was produced from the sale of crude oil and natural gas, with the remaining 528.79-million dollars from production of industrial rocks and minerals (Tables 2, 3 and 4). This represents a 11.9-million dollar increase for 1996, when compared with 1995. The value of crushed stone was down 0.8 percent, the value of sand and gravel was up 29.1 percent, and the value of lime was down 3.1 percent.

Crude oil production was up 5.6 percent, while natural gas production was up almost 8.9 percent. On a slight increase was the production of clay materials. Virginia led the nation in the production of kyanite; was the only producer of a feldspar, marketed as "Virginia aplite"; and was one of two states mining vermiculite. Virginia also ranked seventh in crushed stone production, ninth in lime production, and 32nd in the production of sand and gravel. Granite was the most extensively mined material in 1996, followed by limestone, diabase, sand and gravel, and sand. These five mineral commodities accounted for 89.5 percent of the total nonfuel mineral production in 1996. Several mineral commodities, including iron oxide, lithium carbonate, manganese, mica, perlite, and phosphate rock were imported for processing.

The number of producers and the number of processing plants remained constant during the year for cement, feldspar, gemstones, gypsum, industrial sand, iron-oxide pigments, kyanite, ornamental aggregate, sand and gravel, and vermiculite.

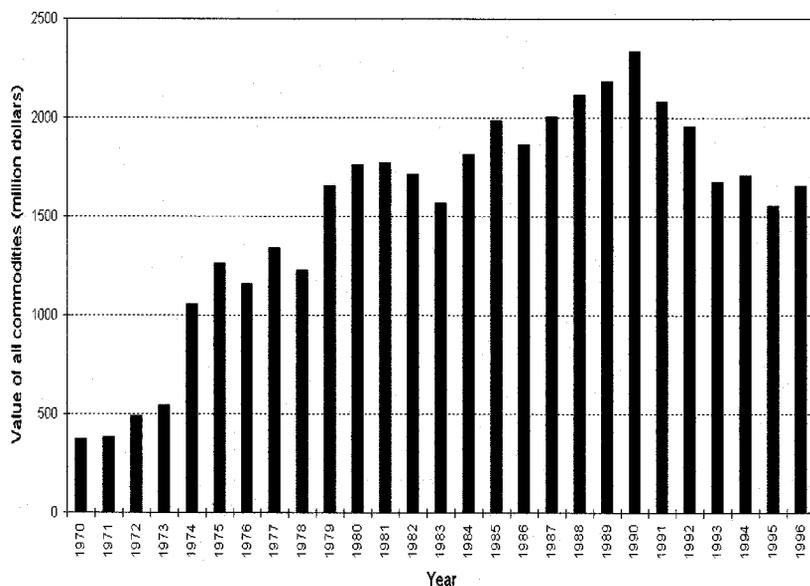


Figure 1. Total value of mineral production in Virginia, 1970-1996.

Table 1. Mineral resources production in Virginia, 1996.

MINERAL COMMODITY	QUANTITY	VALUE (thousand)
Clay ¹ ————— short tons —————	1,005,595	\$2,890
Coal (bituminous) ² (\$26.49/ton) -thousand short tons-	36,782	\$974,355
Lime ¹ ————— thousand short ton —————	825	\$42,843
Natural gas ² (\$2.79/Mcf) — million cubic feet —	54,290	\$151,469
Petroleum (oil) ² (\$18.53/barrel) — 42-gallon barrel—	13,363	\$247
Sand and Gravel ¹ ————— thousand short tons —————	11,133	\$44,945
Stone:		
Crushed ¹ ————— thousand short tons —————	62,831	\$339,200
Combined value of cement, clay (fuller's earth), dimension stone, feldspar, gemstones, gypsum, industrial sand and gravel, iron oxide pigments (crude), kyanite, sulfur, and vermiculite ¹	XX	\$98,918
TOTAL —————	XX	\$1,654,867

XX, Not applicable, p/preliminary, NA, Not available

¹ Measured by mine shipments, sales, or marketable production (includes consumption by producers) - from U.S. Geological Survey.

² Virginia Department of Mines, Minerals and Energy

FUEL COMMODITIES

COAL

Coal production in Virginia increased from 35.9-million short tons in 1995 to 36.7-million short tons in 1996 a 2.2 percent increase (Table 1; Figure 2). Forty-one coal beds were mined in the southwest Virginia coalfield in 1996. These coals occur in the Appalachian Plateaus province. The coals are contained in the Pennsylvanian Wise, Norton, Norton-Lee-New River, and Pocahontas Formations. The highest stratigraphically mined coal bed was the High Splint of the Wise Formation (188,040 short tons) in western Wise County (Table 5). Coal mined from the Wise Formation accounted for 40.9 percent of the state production. The Norton and Norton-Lee-New River coal mined accounted for 37.6 percent. Coal mined from the Pocahontas Formation accounted for 21.5 percent. The Pocahontas No. 3 coal was the most extensively mined bed, followed by the Jawbone, Splash Dam, Clintwood, and Imboden coal beds. Coal produced from these five beds constituted 44.1 percent of the total 1996 production. Coal was produced from 331 surface and underground mines in Buchanan, Dickenson, Lee, Russell, Tazewell, and Wise Counties (Table 6). Total production from 246 underground mines was 27,179,944 short tons and from 85 surface mines was 9,602,118 short tons. In underground mining, 81.4 percent of the coal was mined by continuous miners and 18.1 percent was produced

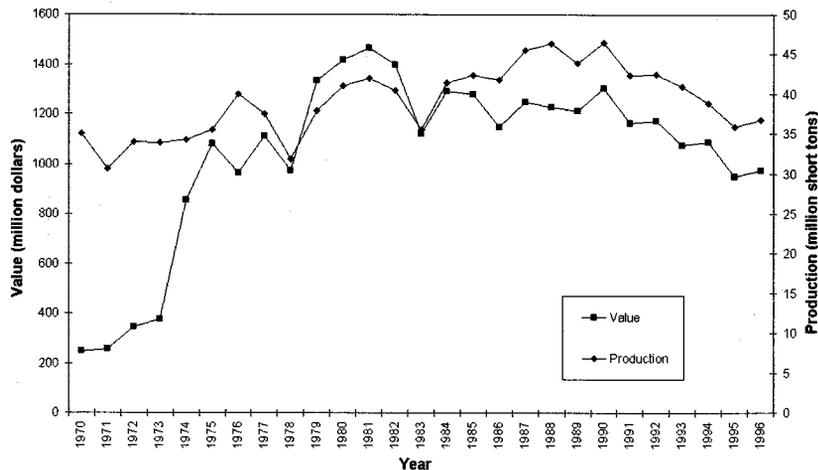


Figure 2. Trend in coal production and value, 1970-1996.

by longwall mining; 0.5 percent of the coal was produced by conventional mining in 1996. In surface operations, 3.3 percent of the coal was auger mined and 96.7 percent was mined by conventional surface methods. Total value was \$974.36-million; estimated mine price was \$26.49 per short ton.

The total average annual employment reported in 1996 was 6,406 employees; 6,171 of these were production employees (Table 7). Production employees worked an average of 234 days producing coal in 1996. The average annual wage earned by all production employees was \$33,202, based on those employees for whom wages were reported. The average annual wage for surface-mine production employees was \$33,418, and the average annual wage for underground production employees was \$33,153. Wages earned by all employees totaled \$204,888,784 in 1996.

Coal from Virginia is used for metallurgical purposes, electrical power generation (steam coal), industrial purposes, and residential heating. Most Virginia coal is exported through ports at Hampton Roads, Virginia and at Wilmington, North Carolina to overseas markets.

OIL AND GAS

Crude oil production in Virginia totaled 13,363 barrels in 1996, which was a 5.6 percent increase from the 1995 production of 12,654 barrels (Figure 3). Oil production comes from the Ben Hur-Fleenortown and Rose Hill oil fields in the Valley and Ridge province and the Roaring Fork and an unnamed gas field in the Appalachian Plateaus province. Production was by nine companies from 39 wells (Table 8) in the Ben Hur-Fleenortown and Rose Hill oil fields in Lee County (6,436.94 barrels) and the Roaring Fork gas field in western Wise County (6,926.36 barrels). Fifteen wells in the Ben Hur-Fleenortown oil field yielded 4406.03 barrels of oil; average 24.48 barrels per well per month. Two wells in the Rose Hill oil field yielded 1842.78 barrels of oil. Oil in Virginia comes from the Ordovician Trenton Limestone in Lee County and the Mississippian Greenbrier Limestone in Wise County. The value of oil produced in 1996 was \$247,616; estimated unit value was \$18.53 per barrel.

Natural gas production increased 8.8 percent, from 49,867,443 Mcf in 1995 from 1671 wells to 54,290,353 Mcf in 1996 from 1819 wells (Table 9; Figure 4). Conventional and shale gas production was 20,136,769 Mcf from 1005 wells; 37.1 percent of the total production. Coalbed methane production was 34,153,584 Mcf from 814 wells; 62.2 percent of the total natural gas production in the Commonwealth. Natural gas production came from Buchanan County (30,673,132 Mcf), Dickenson County (13,374,276 Mcf), Lee County (3,315 Mcf), Russell County (523,662 Mcf), Scott County (15,326 Mcf), Tazewell County (419,745 Mcf) and Wise County (9,281,077 Mcf). The average price paid to Virginia's natural gas producers in 1996 was \$2.79 per Mcf. The market value for Virginia's natural gas was \$151,470,085, an increase of 73.5 percent from 1995.

Permitting Activity

The Department of Mines, Minerals and Energy, Division of Gas and Oil, issued 269 permits in 1996, an increase of 40.1 percent from 1995. Of these, 190 permits were issued to drill new coalbed methane wells, 7 permits were for new conventional and shale gas wells, and 25 permits were for new pipeline construction. The remaining 47 permits were for modifications (37), transfer (2), gas/cbm (1), and conversion (7). Coal-bed methane well permitting was highest in Buchanan County at 70.0 percent followed by Dickenson County at 22.1 percent, Russell County at 2.6 percent, and Wise County at 2.1 percent. Conventional and shale gas well permitting was highest in Wise County at 85.7 percent, followed by Dickenson at 14.3 percent.

Drilling and Completion Activity

In 1996, 162 holes were drilled in Virginia (Table 10). Of the 162 holes drilled, 16 were for conventional and shale gas, 144 were for coalbed methane, and one each for underground storage and waste disposal. One hundred and ninety-six wells were completed in 1996. Thirty-six of these wells were drilled prior to 1996. Of the 36 wells drilled before 1996, 31 were for coalbed methane, four were for conventional gas, and one was for underground storage. Total footage drilled in 1996 was 422,778 feet (Table 11), a 67.6 percent increase from 252,179 feet drilled in 1995. Of the 1996 total footage, 87,468 feet were for conventional and shale gas wells, 321,793 feet were for coalbed methane wells, 4,175 feet were for underground storage, and 9,342 feet were for waste disposal. In 1996, the average conventional and shale gas well was drilled 5466 feet and drilling depth for coalbed methane was 2234 feet. The county with the most active natural gas and coalbed methane wells drilled was Buchanan with 103, followed by Dickenson with 38, and Wise with 10. Six wells were drilled in Tazewell County, two each in Russell and Scott Counties, and one in Smyth County. Completion zones ranged from the Pennsylvanian Pocahontas Formation to the Mississippian-Devonian Chattanooga Shale. Table 12 provides data on the wells drilled and/or completed in Virginia in 1996. Location coordinates for the wells drilled or completed during 1996 can be obtained from the Division of Gas and Oil in Abingdon.

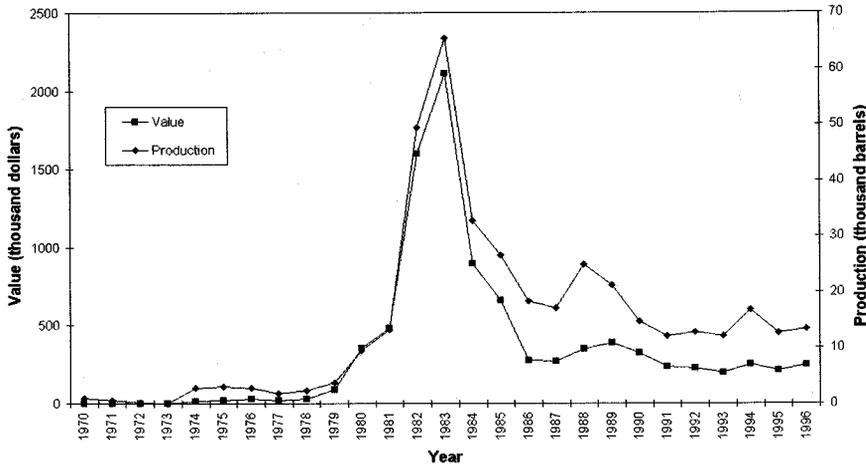


Figure 3. Trend in oil production and value, 1970-1996.

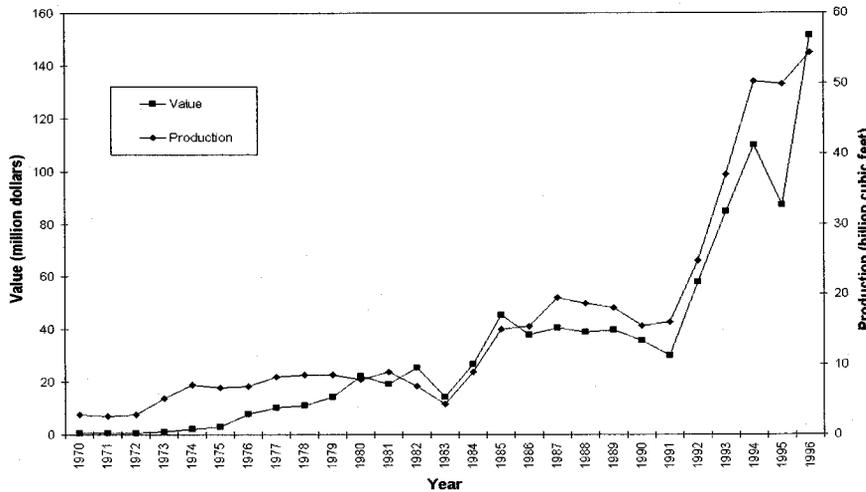


Figure 4. Trend in natural gas production and value, 1970-1996.

Buchanan County

Conventional and shale gas wells: Ashland Exploration completed one well in the Glick-Keen Mountain gas field in 1996. The well was drilled to a total depth of 5411 feet. Gas production in the well is from the Mississippian Berea Sandstone and Greenbrier Limestone.

Coalbed methane wells: One Hundred and three coalbed methane wells were drilled in 1996. One hundred and twenty-seven coalbed methane wells were completed during 1996 with a total footage of 221,504 feet; average depth 1717 feet. Of these 127 wells, Consol, Inc. completed 78 development wells with a total footage of 141,015 feet; average depth of 1808 feet. Pocahontas Gas Partnership completed 45 development wells with a total footage of 80,079 feet; average depth of 1779 feet. Also three Pocahontas Gas wells that were drilled in 1992, 1994, and 1996 were plugged and abandoned in 1996.

Equitable Resources Energy Company completed four coalbed methane wells with a total footage of 8496 feet; average depth of 2124 feet. Completion zones in the Consol, Inc.,

Pocahontas Gas Partnership, and Equitable Resources Energy Co. wells are the coal beds and associated strata in the Pennsylvanian Pocahontas and Lee Formations.

Dickenson County

Conventional and shale gas wells: Equitable Resources Energy Company drilled and completed two conventional and shale gas wells in 1996. All the wells are in the Nora gas field. Total footage drilled was 10,738 feet; average depth 5369 feet. All wells were drilled into the Mississippian-Devonian Chattanooga Shale. Producing formation in the two wells is the Chattanooga Shale, Berea Sandstone, and Greenbrier Limestone.

Coalbed Methane Wells: Thirty-six coalbed methane wells were drilled by Equitable Resources Energy Company in 1996 with a total footage of 87,124 feet; average depth 2420 feet. The wells were drilled into the Pennsylvanian Pocahontas Formation. During the year they completed 40 wells with a total footage of 87,124 feet; average depth 2178 feet. One of the wells completed was drilled in 1991 and the remaining three were drilled in 1995. All 40 wells were drilled into the Pocahontas Formation. All the wells are located in the Nora gas field. Gas production from the wells is by commingling of gas from coal beds and associated strata in the Pocahontas and Lee Formations.

Russell County

Coalbed Methane Wells: Equitable Resources Energy Company drilled and completed two coalbed methane wells during 1996. The wells were completed in the Skeen Creek gas field. Total footage drilled in the wells was 4709 feet with an average depth of 2354 feet. Production comes from commingling of gas associated with coal beds and associated strata in the Pocahontas and Lee Formations.

Scott County

Conventional and shale gas wells: Equitable Resources Energy Company drilled and completed one conventional and shale gas well in 1996. The well was drilled in the High Knob gas field. Total footage drilled was 4460 feet. The well was drilled into the Mississippian-Devonian Chattanooga Shale. Producing formation in the well is the Chattanooga Shale.

Underground Storage wells: The Early Grove Gas Storage Project remained fully operational during 1996. Virginia Gas Company drilled one development well and completed two wells in 1996. Total footage drilled was 8635 feet with an average depth of 4317 feet.

Smyth County

Waste Disposal wells: Virginia Gas Company drilled a 9342 foot waste disposal well at the Saltville Storage Project. The well will be used as an injection well for disposal of brine-fluids produced from the solution mining process of salt from the Mississippian Maccrady Formation. Fluid injection is limited to the Cloyd member of the Price Formation, interval 5610 to 5884 feet. Formation at total depth is the Silurian Clinch Sandstone. The well will be completed in early 1997.

Tazewell County

Conventional and shale gas wells: Cabot Oil & Gas Company drilled 6 wells in the Berwind gas field with a total footage of 31,970, average depth of 5328 feet. Five of the wells are producing gas from the Berea Sandstone. One of the wells was plugged and abandoned.

Wise County

Conventional and shale gas wells: Equitable Resources Energy Company drilled seven conventional and shale gas wells and completed ten wells. Four of the wells were completed in the Roaring Fork gas field, three were completed in the Nora gas field, and three were completed in the High Knob gas field. Total footage drilled in the county was 40,300 feet; average depth was 4030 feet. Total footage drilled in the Roaring Fork gas field was 21,404 feet; average depth 5351 feet. Total footage drilled in the Nora gas field was 13,945 feet; average 4648 feet and in the High Knob gas field total footage drilled was 12,849 feet, average depth of 4283 feet. Formation at total depth in all the wells drilled is the Devonian-Mississippian Chattanooga Shale.

Coalbed methane wells: Equitable Resources Energy Company drilled and completed three coalbed methane wells in the Nora gas field in 1996. Total footage drilled was 8456 feet; average depth 2818 feet. Producing zones in the three wells are the coal beds and associated strata in the Pocahontas and Lee Formations.

INDUSTRIAL AND METALLIC
COMMODITIES

Industrial minerals and rocks, other than mineral fuels, were produced in a total of 88 Virginia counties/cities in 1996. The combined value of all nonfuel commodities sold in 1996 was 528.8-million dollars. In 1996, 248 companies operated 355 industrial-mineral mining operations. Fourteen of the 248 companies produced more than one mineral commodity from 71 operations. Of the 71 multiple industrial-mineral operations, 4 operations produced sand, 8 operations produced limestone, 10 operations produced sand and gravel, 26 operations produced granite, 6 operations produced diabase, 3 operations produced sandstone, 5 operations produced shale, 1 operations produced clay, 1 operation produced basalt, 1 operation produced greenstone, 1 operation produced feldspar, 1 operation produced quartz, 1 operation produced quartzite, 1 operation produced

dolomite, and 2 operations produced slate.

The total average annual employment reported in 1996 for industrial mineral and rock operations was 5,101 people. Industrial mineral and rock production employees worked an average of 260 days in 1996. Total wages of \$117,456,729 were paid to a total of 5,101 employees (4,305 production employees and 796 nonproduction employees). The average annual wage earned by all employees was \$23,026, based on those employees for whom wages were reported. The average annual wage for production employees was \$22,131 and for nonproduction employees was \$27,868.

CEMENT

Three companies produce cement in Virginia. Roanoke Cement Company operates a plant in western Botetourt County and manufactures portland cement from locally mined limestone and shale and purchased iron scale from Roanoke Electric Steel Company. Calcium-and iron-aluminate-clinker is manufactured in five coal-fired kilns and ground into cement. Three-fourths of the cement is sold to local ready-mix companies. The Riverton Corporation in Warren County produces masonry cement at its plant north of Front Royal. Limestone from the Edinburg Formation is crushed, calcined, hydrated, and mixed with portland cement from out-of-state sources to produce masonry cement that is sold to building supply dealers in Virginia and surrounding states. LaFarge Calcium Aluminate, Inc. operates a cement manufacturing plant in the City of Chesapeake using imported cement clinker from France. The clinker is ground and made into six types of calcium-aluminate cement at the facility. The advantages of this cement include rapid hardening, resistance to wear and corrosion, and it can be used under a wide range of temperatures.

CLAY MATERIALS

Residual and transported clay, weathered phyllite and schist, and shales are used as raw material to produce bricks in Virginia. About 1,005,595 short tons of clay (exclusive of fuller's earth) was produced in Virginia in 1996 (Figure 5). The annual total capacity of all brick plants in the Commonwealth is almost one-half-billion bricks. The clay material industry in the west-

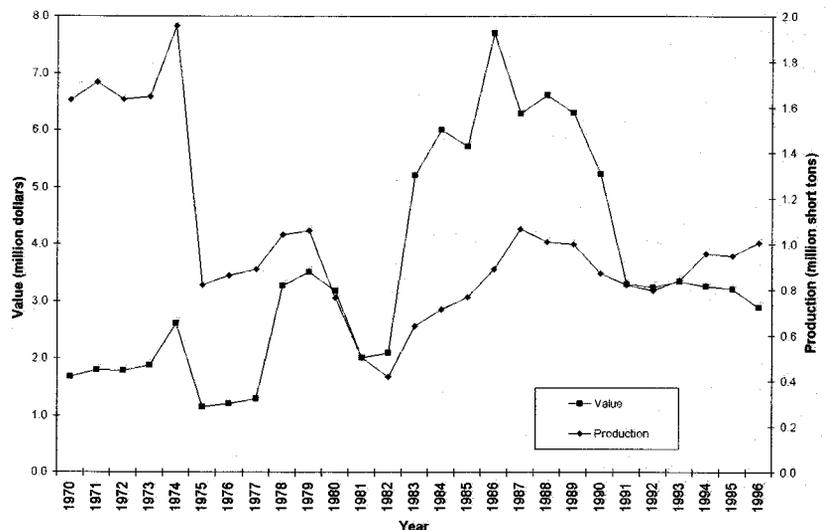


Figure 5. Trend in clay material production and value, 1970-1996.

ern part of the state mines Paleozoic-age shale primarily to produce face-brick. Face-brick producers, in the central-to-eastern part of Virginia, mine Triassic-age shale and clay residuum in Orange and Prince William Counties. They also mine Precambrian-age schist and residual and transported clay in Amherst, Brunswick, Chesterfield, and Greensville Counties.

Lightweight aggregate is produced in Buckingham and Pittsylvania Counties. Solite Corporation, in northern Buckingham County, uses the Arvonite Slate to produce lightweight aggregate. Virginia Solite Company mines Triassic-age shale southwest of Danville in Pittsylvania County, to produce a similar product.

Bennett Mineral Company, in the Walkerton area of King and Queen County, in eastern Virginia, mines and processes montmorillonite clay to produce an industrial and sanitary absorbent. The facility uses wood waste as a fuel to dry the clay in a rotary kiln. Near the end of 1995, Virginia Clay Co., Inc., in King William County, negotiated with Ralston Purina to begin building a cat litter plant on their property during the first quarter of 1996. Plant construction was well underway by the end of the year, with a proposed mid-1997 completion date. The Golden Cat plant of Ralston will produce Tidy Cat, Tidy Scoop, and Scamp brands of cat litter. Increased tax revenues for the county are expected to be more than \$50,000 a year. The plant will hire about 80 people when it opens.

CONSTRUCTION SAND AND GRAVEL

Construction sand and gravel producers accounted for 11.1 million short tons of material in 1996 at a value of more than 44.9 million dollars (Figure 6). The construction sand and gravel production figures were almost 18.8 percent higher than in 1995. Sand and gravel are extracted from river terraces and dredged from the rivers in eastern, central, and western Virginia. Some construction sand is also produced from Carroll, Craig, Rockbridge, Smyth, and Warren Counties in the western part of the State, in the Blue Ridge and Valley and Ridge provinces. Large tonnages of construction sand and gravel, from southeast of Fredericksburg, are shipped by rail to the northern Virginia-Washington, D.C. market area. A large portion of the production by Tidewater Quarries, Inc. and Tarmac Mid Atlantic, Inc., near Richmond is barged down the James River to the Norfolk area. Shipments are also made by rail and truck to the western part of the Commonwealth. Construction sand (concrete and masonry) is also produced from operations that crush and process sandstone.

CRUSHED STONE

More than 62 million tons of crushed stone including limestone, dolostone, sandstone, quartzite, granite, gneiss, diabase, basalt, greenstone, slate, "Virginia aplite," and marble, were produced in Virginia in 1996 (Figure 7). Virginia's crushed stone production was valued at 339 million dollars and it was

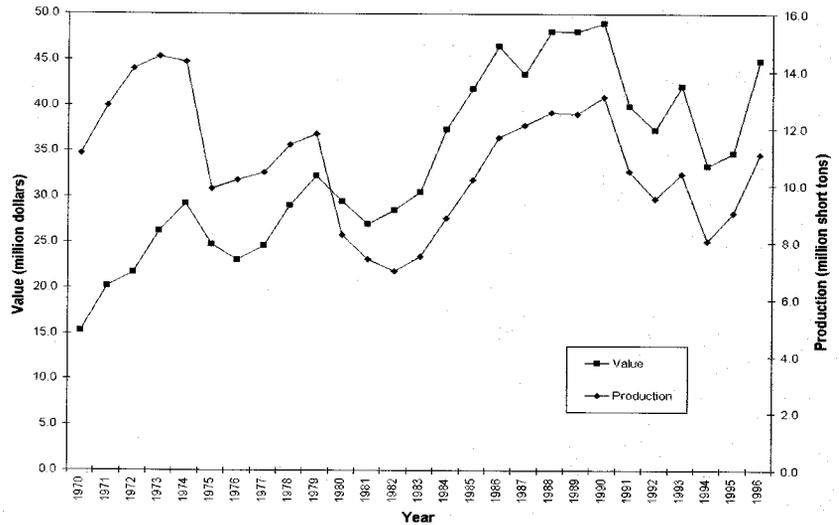


Figure 6. Trend in sand and gravel production and value, 1970-1996.

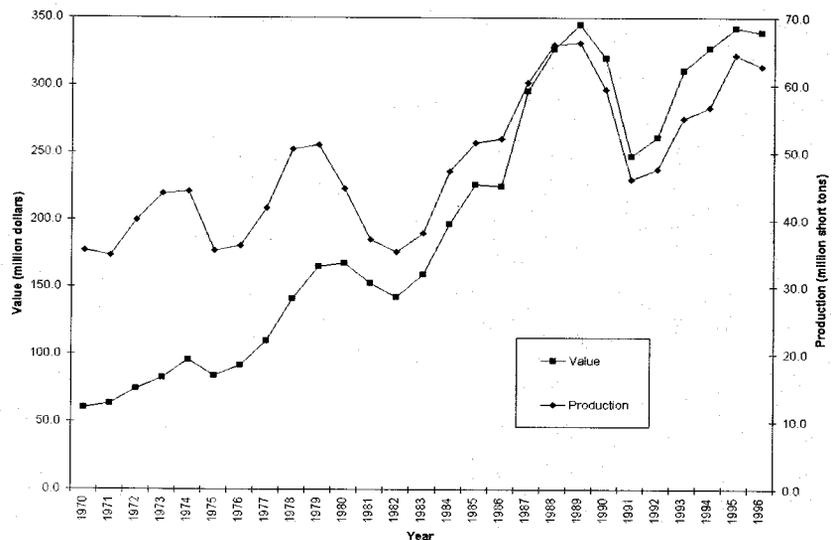


Figure 7. Trend in crushed stone production and value, 1970-1996.

the seventh leading producer in the United States. Crushed stone production figures for 1996 in Virginia were 2.5 percent lower than figures for 1995.

Producers of limestone, dolostone, shale, sandstone, and quartzite are in the Valley and Ridge and Appalachian Plateaus provinces in the western part of the Commonwealth. Principal end uses for these commodities were for roadstone, concrete aggregate, asphalt stone, and agricultural application. Mine safety dust is produced in southwest Virginia from limestone. Safety dust is used in coal mines to coat the roof, walls, and floor to prevent coal dust explosions. The safety dust should contain less than 5 percent SiO₂ and 100 percent should pass 20 mesh, with 70 percent passing minus 200 mesh. Several operations also market finely-ground dolostone and limestone for use as a filler material.

Shale is excavated in Frederick and Rockingham Counties for use as local roadstone and fill material. Sandstone and quartzite are quarried in Carroll, Culpeper, Pittsylvania, Rockbridge, and Wythe Counties for production of roadstone, concrete aggregate, asphalt stone, and manufactured fine aggregate.

Granite, gneiss, diabase, slate, and marble are quarried in the

central part of Virginia. Major uses of these materials are for roadstone, concrete aggregate, and asphalt stone. The Solite Corporation crushes slate for lightweight aggregate near Arvonias in Buckingham County. LeSueur-Richmond Slate Corporation increased production of crushed slate, as a by-product of dimension slate operations, for local highway construction. Appomattox Lime Company, Inc. mines marble (Mt. Athos Formation) near Oakville in Appomattox County for agricultural lime.

Fines produced at quarries in the Petersburg and Red Oak Granites, in the southern part of Virginia have been used for low-grade fertilizer (Figure 8). Chemical analyses of these granitic materials from Brunswick and Nottoway Counties in the southern Piedmont province, show a K₂O (potash) content higher than 10 percent. Potassium-aluminum feldspars (orthoclase and microcline), common in igneous and metamorphic rocks, release potassium upon weathering. Additional uses for these fines are for roads, bedding for concrete pipe, and for warning tracks for baseball fields.



Figure 8. Stockpiles of granite fines, Luck Stone Corporation, Burkeville Plant, Nottoway County.

DIMENSION STONE

Slate, diabase, quartzite, and soapstone were quarried for dimension stone in the Piedmont province in 1996. Slate was the leading type of dimension stone quarried, in terms of cubic feet and value. LeSueur-Richmond Slate Corporation mines slate from two quarries in the Arvonias area of Buckingham County. Arvonias slate production dates from the late 1700s when slate was quarried for use as roofing shingles for the state capital in Richmond. Slate producers supply the building trade with a variety of products ranging from material for exterior applications, such as roofing shingles and for flooring tile, hearths and sills. Diabase is produced by New England Stone and Virginia Black Granite in southern Culpeper County for use as monument stone and other ornamental uses. The quarried blocks are trucked to South Carolina and Georgia finishing plants; some stone is exported out of South Carolina ports to overseas markets. Quartzite, used as flagging material was extracted from the Mower Quarry in Fauquier County, north of Warrenton.

On March 31, Tulikivi, Inc., a Finnish company discontinued producing soapstone stoves at their New Alberene Stone Co., Inc. plant in Schuyler, Nelson County. Although more effi-

cient than the standard cast iron wood-burning stove, stoves produced from soapstone were not economically competitive. A sales office in Charlottesville continued taking domestic orders for stoves that are produced in Finland. The plant remained open, producing architectural stone by special order.

FELDSPAR

U.S. Silica Corporation operates a mine and plant near Montpelier in Hanover County in east-central Virginia. They produce a feldspar-rich material marketed as "Virginia aplite," which is sold to the glass industry. The "aplite" improves the work-ability of the molten glass and imparts a chemical stability to the finished glassware. Medium- to coarse-grained meta-anorthosite is mined by open pit methods to produce feldspar. The rock is trucked to the plant next to the mine for crushing, grinding, classifying, and drying. After processing, the feldspar is stored in silos. Gravity concentration removes clay minerals. Electrostatic and magnetic processes remove the heavy minerals (ilmenite, rutile, and sphene) in the feldspar. These minerals contain titanium and were stockpiled until the early 1980s, but are currently being placed in setting ponds. The processed feldspar is shipped by truck and rail to markets in New Jersey, Pennsylvania, Ohio, Indiana, and Virginia.

In Amherst County, feldspar is marketed as aggregate at the Piney River Quarry of the W.W. Boxley Company, Blue Ridge Stone Corporation. The company stockpiles the fines that result from the crushing of the feldspar. In the past, feldspar was mined from several pegmatite bodies in the Piedmont province. These pegmatite bodies occur in Amelia and Bedford Counties.

Clay and silt, with a high percentage of kaolinite and mica, have accumulated in setting ponds at the Feldspar Corporation operation in Hanover County. About 75,000 to 100,000 tons of this material are added to settling ponds per year. The waste "tailings" were evaluated in the mid-1960s and were found suitable for use in face brick and drain tile; the material fires dark brown to gray.

GEMSTONES

In 1996, mineral collectors and mining operations in Virginia produced natural gemstones. The Morefield pegmatite, operated as the Morefield Gem Mine in Amelia County, is open to the public for collecting on a fee basis. Blue-green amazonstone, beryl, topaz, tantalite, tourmaline, and zircon are some minerals found in this pegmatite. The Rutherford pegmatite mine, located just northwest of Amelia Court House, is open on Labor Day weekend.

GYPSUM

U.S. Gypsum Company operates an underground mine and plant at Locust Cove, Smyth County in the southwestern part of Virginia and a processing plant in Norfolk in the eastern part of the state. The Locust Cove Mine is a slope-entry, multilevel operation. Isolated masses of gypsum in the Maccrady Formation are mined by a modified stoping system. After being run through a primary crusher, the gypsum is trucked to their processing plant at Plasterco, near Saltville, in adjacent Washington County. At

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Plasterco, the gypsum is ground into "land plaster" ($\text{CaSO}_4 + 2\text{H}_2\text{O}$). The material is calcined to remove the water and produce "stucco." Water is then added to the stucco with additional ingredients (sugar and starch) and poured, molded and dried between sheets of paper to produce a wallboard. Eighty-three kinds of wallboard are produced at Plasterco; average daily production at the plant could supply the needs in construction of 80 three-bedroom homes.

The Norfolk plant processes crude gypsum from Little Narrows and Windsor, Nova Scotia to produce wallboard and other gypsum-based products (Figure 9). The plant also produces fertilizer for the peanut industry. The Norfolk facility also receives a few shipments of anhydrite from Nova Scotia for sale to cement manufacturers. The anhydrite is used as a source of sulfur in producing cement clinker.



Figure 9. U.S. Gypsum Company quarry located near the village of Little Narrows, Cape Breton Island, Nova Scotia.

INDUSTRIAL SAND

Unimin Corporation produces glass sand near Gore in Frederick County. The glass sand is produced from the Ridgeley Sandstone of Devonian-age. CED Enterprises, in Frederick County, recrystallizes purchased sand in a rotary kiln to produce cristobalite. Cristobalite, which is sized and bagged on the site, is marketed as a fine grit, and used mainly as a filler in paint and in commercial casting molds. It is trucked to the Great Lakes area and to the western United States. Some is shipped overseas through the Port of Baltimore.

IRON-OXIDE PIGMENTS

Virginia is one of four states that produce pigments from natural iron oxide. Hoover Color Corporation, in Hiwassee, Pulaski County, produces ocher, umber, and sienna. The company is the only operation in the United States producing sienna. Open pit methods are used to mine natural iron oxide from deposits that occur near the contact of the Erwin Formation with the overlying Shady Dolomite. Deposits, associated with gossans in Cambrian-age rocks, are concentrated as small bodies or pockets composed of insoluble clay and iron oxide. Precipitation from groundwater also concentrates some iron oxide. The raw material is trucked to the plant at Hiwassee where it is pulverized, dried,

ground, air separated, blended, and packaged before shipping. The finished product is used as a coloring agent in a variety of products. The largest market continues to be for paint; additional markets are art supplies (crayons, chalk, water colors) and building products (colored cinder blocks and bricks). The pigments are shipped throughout the United States, Canada, and Mexico. Virginia Earth Pigments Company mines a small quantity of iron oxide from the Brubaker #1 mine in southeastern Wythe County. The Hoover Color Corporation buys most of the material.

Blue Ridge Talc Co., Inc. located in Henry County, purchases iron oxide from Cleveland-Cliffs Iron Co. in Michigan. The company dries the iron ore, pulverizes it, and sizes the material, which is marketed as a colorant for paint and cement and to the fertilizer industry.

KYANITE

Kyanite, an aluminum silicate, was first produced in Prince Edward County in the 1920s. Since September 1986 Virginia is the only state producing kyanite. Kyanite Mining Corporation produces most of the world's kyanite from its deposit in Buckingham County. The company produces a concentrate with a maximum of 61.8 percent alumina and a minimum iron content 0.16 percent. The kyanite is converted to mullite by calcining at temperatures greater than 3000 degrees Fahrenheit. Mullite is a superduty 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 aids ceramics and glass to resist cracking, warping, slagging, and deforming at high temperatures.

Kyanite Mining Corporation operates two surface mines and three processing plants in Central Buckingham County. The two mines are located at Willis Mountain and East Ridge. At the Willis Mountain and East Ridge mines, kyanite-bearing quartzite is quarried from open pits; this material is run through primary crushers, a log washer to remove clay, and onto classifiers to remove kyanite. The material then passes through a rod mill, which reduces it to a minus 35-mesh size, and through froth flotation cells where additional kyanite is skimmed off. The kyanite is dewatered and dried; the high temperature of the drier converts any sulfide minerals that are present to magnetic 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, some of which is then trucked to East Ridge facility for calcining; the mullite product is ground and bagged at the company's Dillwyn Plant (Figure 10). Raw kyanite is ground and bagged at Willis Mountain.

Approximately 40 percent of the production is shipped through ports at Hampton Roads to customers worldwide. Most of the mullite and kyanite shipped from the port at Norfolk is destined for Japan, Korea, United Kingdom, Netherlands, Italy, and Australia. The company also markets sand as a by-product from the processing of kyanite. This sand is used for golf courses, masonry and concrete sand, and for applications such as sand for blasting.

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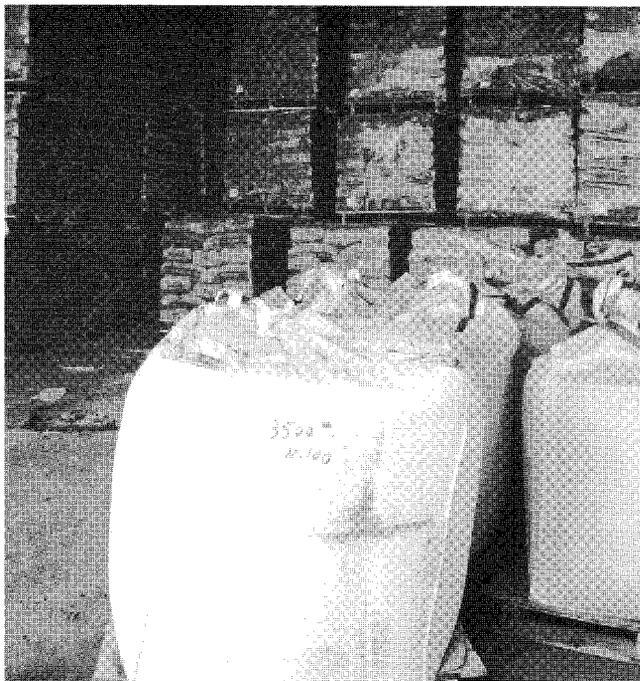


Figure 10. Bulk bags (3,500 pounds) of 100-mesh mullite, ready for export, Kyanite Mining Corporation, Dillwyn, Buckingham County.

LIME

Virginia's lime production, ranked ninth in the United States, is from six companies in Frederick, Giles, Shenandoah, and Warren Counties. Production in 1996 was 825,000 short tons valued at 42.8 million dollars (Figure 11). The paper industry uses lime for regeneration of sodium hydroxide and for neutralization of sulphate water. Lime is used for water purification and in iron furnaces to remove impurities. During the last few years, lime has been used to neutralize acid mine water. It is also used for masons' lime, sewage treatment, and agriculture purposes. One of the most important uses in the 1990s will be to abate the SO₂ and NO_x emissions from coal-fired boilers. Lime is presently supplied to several cogeneration coal-fired plants in southern Virginia. Two companies, in northwestern Virginia, W.S. Frey Company, Inc. and Chemstone Corporation quarry and calcine the high-calcium New Market Limestone. The Riverton Corporation, in Warren County, quarries and calcines limestone from the Edinburg Formation. Shenvalley Lime Corporation in Stephens City, Frederick County buys quicklime and produces a hydrated lime. Two companies in western Giles County, APG Lime Corporation and East Ridge Lime Company, operate underground mines in the Five Oaks Limestone. The limestone is calcined in rotary kilns. Principal sales are to the paper and steel industries.

APG Lime Corporation also markets lime kiln dust to neutralize and stabilize coal refuse from preparation plants in West Virginia (Figure 12).

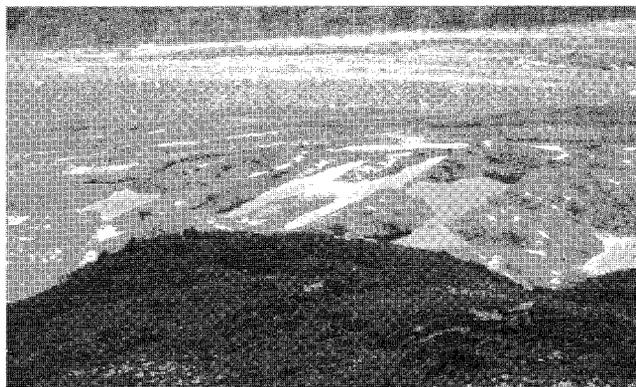


Figure 12. Lime kiln dust from APG Lime Corporation, Giles County, mixed with coal refuse resulting in a stabilized surface (in foreground), Nicholas County, West Virginia.

LITHIUM CARBONATE

Cyprus Foote Mineral Company, at its Sunbright plant in Scott County, processed lithium carbonate (derived from brine deposits at Silver Peak, Nevada) with calcium hydroxide (from Virginia sources) to produce lithium hydroxide. Some lithium carbonate was also imported from Chile into the port at Charleston, South Carolina and transported in bulk bags by truck to Sunbright. Production ceased in August, 1996, due to a new plant facility in Silver Peak, Nevada. Lithium hydroxide is used in multipurpose grease. For use in the grease industry, lithium hydroxide is converted to lithium stearate, a lithium soap that is combined with lubricating oil. In the past, limestone from an underground mine at the Sunbright site was used in the manufacturing process and a calcium carbonate precipitate was formed as a waste product. This material remains on the site. The approximate analysis of the material is 43 to 50 percent CaCO₃, 3 to 6 percent Ca(OH)₂, and 40 to 80 percent H₂O.

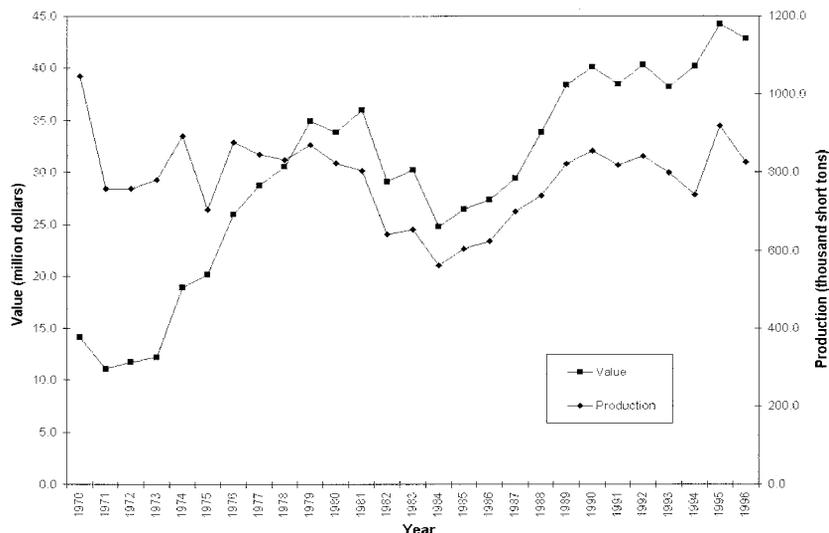


Figure 11. Trend in lime production and value, 1970-1996.



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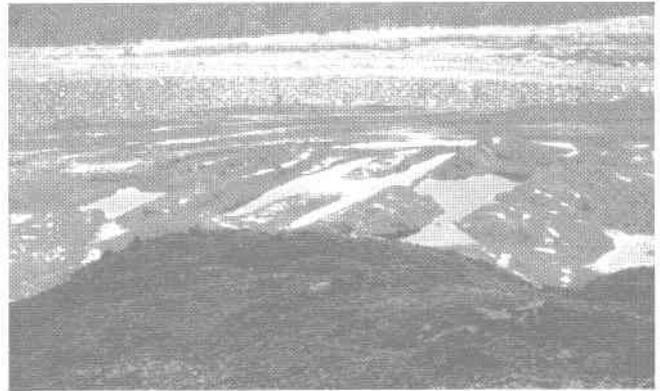


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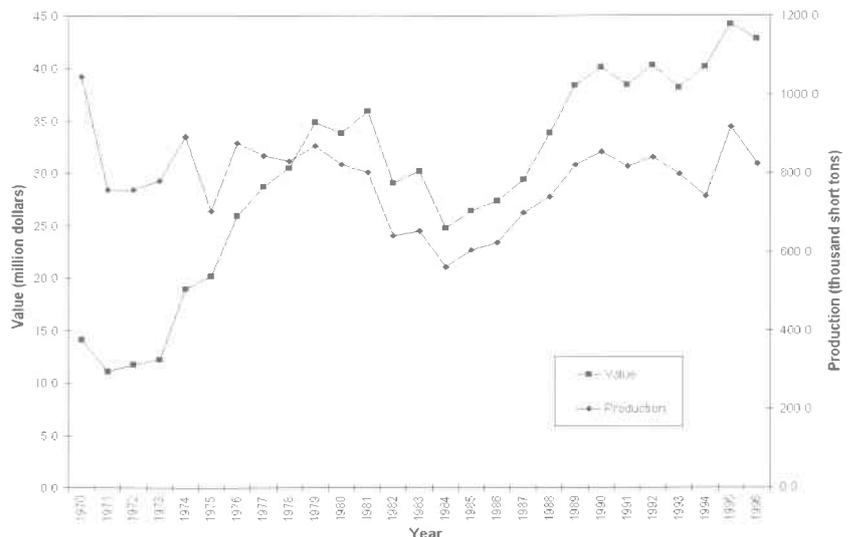


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MANGANESE

Eveready Battery Company, Inc. operates a manganese processing facility in the City of Newport News (Figure 13). Manganese ore, imported from Ghana, Africa, and Mexico, is shipped to the Elizabeth River terminals in the City of Chesapeake. The ore is trucked to the processing plant. Manganese content and potential contaminants are monitored through continual chemical and mineralogical analysis. The manganese is dried in a gas-fired rotary kiln and crushed with jaw and ball crushers into two basic sizes. Ground product is then shipped in bulk, bulk bags, or in bags to plants in Iowa, Ohio, and North Carolina. The product is used in the manufacture of dry cell batteries.

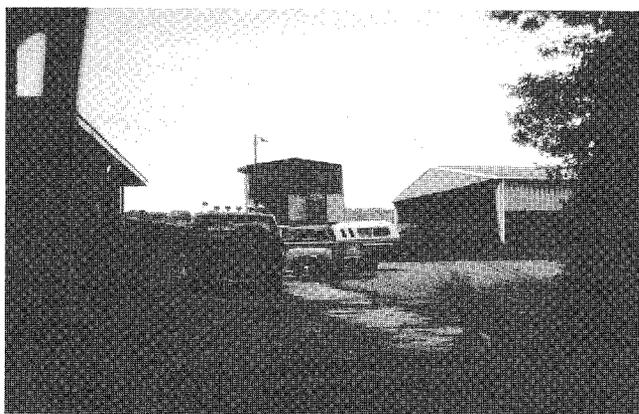


Figure 13. Manganese grinding facility of Eveready Battery Company, Inc., City of Newport News.

MICA

Presently no domestic mica is being produced. In the past, it was produced from pegmatite bodies in several counties in Virginia, including Amelia, Henry, and Powhatan. Asheville Mica Company, an affiliate of the Mica Company of Canada, imports several grades of crude mica from Madagascar and India, then processes the mica in Newport News, Virginia. The Asheville Mica Company also produces fabricated plate mica. Mica Company of Canada uses splittings from Asheville Mica Company to produce reconstituted plate mica. Plate mica is marketed for use in hair dryers and other electrical applications; reconstituted mica, composed of built-up mica plates, is used to manufacture mica washers for terminals and as shields in lithium batteries.

MINERAL SAND

Interest in heavy minerals continues along the western edge of the Coastal Plain province in southern Virginia. In Dinwiddie, Greensville, and Sussex Counties, more than 8.8 million short tons of heavy mineral sands have been discovered. Large acreages remain under lease by RGC (USA Minerals). Ilmenite, leucoxene, rutile, and zircon make up nearly 80 percent of the heavy-mineral concentrate.

RGC mined a one-acre site in a pilot operation during the year to evaluate the ore from the Old Hickory deposit near Bolsters Store in Dinwiddie and Sussex Counties. Production of titanium during the year was reported to be 1,328 short tons. Dur-

ing September and October, the boards of supervisors in both counties approved conditional-use permits for RGC to conduct titanium mining. The company said it plans to invest about \$20 million in the dry-mining venture. The planning commission already approved zoning permits in Sussex County. Mining permits from the Virginia Division of Mineral Mining have been applied for. The company presently plans to begin producing at the site by mid-1997.

ORNAMENTAL AGGREGATE

Dolostone and quartzite from Botetourt and Rockbridge Counties are 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 as aggregate for terrazzo. Exposiac Industries, Inc. in Spotsylvania County uses a variety of rock materials for exposed panels, including greenstone from Albemarle County and Triassic-age sandstone from Culpeper County.

Many rock types have been used in the past for ornamental aggregate. Vein quartz was quarried in Albemarle, Buckingham, Fauquier, Fluvanna, Greene, and Rappahannock Counties, and quartz pebbles were extracted from floodplain deposits along the Mattaponi River in Caroline County.

PERLITE

Manville Sales Corporation operates a plant at Woodstock in Shenandoah County to expand perlite (volcanic glass with high water content and "onion" skin appearance) obtained from Taos, New Mexico. Raw material is trucked north from Taos County to the railhead at Antonito, Colorado, where it is loaded and shipped by rail to Virginia. Expanded perlite is used in manufacture of roof insulation board, which is marketed throughout the eastern United States.

PHOSPHATE ROCK

Texas Gulf, Inc. ships phosphate rock by rail from its Lee Creek operation in North Carolina to Glade Spring, Washington County. It is then transported by truck to the Texas Gulf plant in Saltville, Smyth County. A coal-fired rotary kiln is used to defluorinate the phosphate rock. The product is marketed as a poultry and animal feed supplement in southern and midwestern states.

SULFUR

Amoco Oil Company operates a crude oil refinery next to the York River, near Yorktown (Figure 14). They recover elemental sulfur from hydrogen sulfide gas during crude-oil refining. During the refining process, within the fluid catalytic cracking unit, hydrogen sulfide gas is formed. The hydrogen sulfide gas is converted to elemental sulfur using the modified-Claus process. In this process the hydrogen sulfide gas is heated in a combustion chamber and fed under pressure into a cylinder where it vaporizes. The gas is then fed into a condenser where it is cooled to form a liquid. An in-line acid-gas burner reheats the total gas stream and it is then fed into a catalytic converter where more hydrogen sulfide gas reacts with sulfur dioxide to produce sulfur and water vapor. Sulfur vapor is then passed through another condenser and scrubber. The elemental sulfur, marketed for production of sulfuric acid, mainly at E.I. DuPont Company in Richmond, Virginia. The sulfuric acid is then used in the manufacture of chemicals, dyes, paints, and other products.

MANGANESE

Eveready Battery Company, Inc. operates a manganese processing facility in the City of Newport News (Figure 13). Manganese ore, imported from Ghana, Africa, and Mexico, is shipped to the Elizabeth River terminals in the City of Chesapeake. The ore is trucked to the processing plant. Manganese content and potential contaminants are monitored through continual chemical and mineralogical analysis. The manganese is dried in a gas-fired rotary kiln and crushed with jaw and ball crushers into two basic sizes. Ground product is then shipped in bulk, bulk bags, or in bags to plants in Iowa, Ohio, and North Carolina. The product is used in the manufacture of dry cell batteries.



Figure 13. Manganese grinding facility of Eveready Battery Company, Inc., City of Newport News.

MICA

Presently no domestic mica is being produced. In the past, it was produced from pegmatite bodies in several counties in Virginia, including Amelia, Henry, and Powhatan. Asheville Mica Company, an affiliate of the Mica Company of Canada, imports several grades of crude mica from Madagascar and India, then processes the mica in Newport News, Virginia. The Asheville Mica Company also produces fabricated plate mica. Mica Company of Canada uses splittings from Asheville Mica Company to produce reconstituted plate mica. Plate mica is marketed for use in hair dryers and other electrical applications; reconstituted mica, composed of built-up mica plates, is used to manufacture mica washers for terminals and as shields in lithium batteries.

MINERAL SAND

Interest in heavy minerals continues along the western edge of the Coastal Plain province in southern Virginia. In Dinwiddie, Greensville, and Sussex Counties, more than 8.8 million short tons of heavy mineral sands have been discovered. Large acreages remain under lease by RGC (USA Minerals). Ilmenite, leucosene, rutile, and zircon make up nearly 80 percent of the heavy-mineral concentrate.

RGC mined a one-acre site in a pilot operation during the year to evaluate the ore from the Old Hickory deposit near Bolsters Store in Dinwiddie and Sussex Counties. Production of titanium during the year was reported to be 1,328 short tons. Dur-

ing September and October, the boards of supervisors in both counties approved conditional-use permits for RGC to conduct titanium mining. The company said it plans to invest about \$20 million in the dry-mining venture. The planning commission already approved zoning permits in Sussex County. Mining permits from the Virginia Division of Mineral Mining have been applied for. The company presently plans to begin producing at the site by mid-1997.

ORNAMENTAL AGGREGATE

Dolostone and quartzite from Botetourt and Rockbridge Counties are 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 as aggregate for terrazzo. Expositac Industries, Inc. in Spotsylvania County uses a variety of rock materials for exposed panels, including greenstone from Albemarle County and Triassic-age sandstone from Culpeper County.

Many rock types have been used in the past for ornamental aggregate. Vein quartz was quarried in Albemarle, Buckingham, Fauquier, Fluvanna, Greene, and Rappahannock Counties, and quartz pebbles were extracted from floodplain deposits along the Mattaponi River in Caroline County.

PERLITE

Manville Sales Corporation operates a plant at Woodstock in Shenandoah County to expand perlite (volcanic glass with high water content and "onion" skin appearance) obtained from Taos, New Mexico. Raw material is trucked north from Taos County to the railhead at Antonito, Colorado, where it is loaded and shipped by rail to Virginia. Expanded perlite is used in manufacture of roof insulation board, which is marketed throughout the eastern United States.

PHOSPHATE ROCK

Texas Gulf, Inc. ships phosphate rock by rail from its Lee Creek operation in North Carolina to Glade Spring, Washington County. It is then transported by truck to the Texas Gulf plant in Saltville, Smyth County. A coal-fired rotary kiln is used to defluorinate the phosphate rock. The product is marketed as a poultry and animal feed supplement in southern and midwestern states.

SULFUR

Amoco Oil Company operates a crude oil refinery next to the York River, near Yorktown (Figure 14). They recover elemental sulfur from hydrogen sulfide gas during crude-oil refining. During the refining process, within the fluid catalytic cracking unit, hydrogen sulfide gas is formed. The hydrogen sulfide gas is converted to elemental sulfur using the modified-Claus process. In this process the hydrogen sulfide gas is heated in a combustion chamber and fed under pressure into a cylinder where it vaporizes. The gas is then fed into a condenser where it is cooled to form a liquid. An in-line acid-gas burner reheats the total gas stream and it is then fed into a catalytic converter where more hydrogen sulfide gas reacts with sulfur dioxide to produce sulfur and water vapor. Sulfur vapor is then passed through another condenser and scrubber. The elemental sulfur, marketed for production of sulfuric acid, mainly at E.I. DuPont Company in Richmond, Virginia. The sulfuric acid is then used in the manufacture of chemicals, dyes, paints, and other products.



Figure 14. Tanker truck carrying molten elemental sulfur, AMOCO refining facility, York County.

VERMICULITE

Virginia is one of two states that mine vermiculite, a hydrated magnesium-iron-aluminum silicate. Virginia Vermiculite, Ltd. operates an open-pit mine and processing facility near Boswells Tavern in Louisa County. The vermiculite is mined with a backhoe and a front-end loader and trucked to the adjacent plant where pieces greater than four inches across are removed. These pieces are washed and processed in a rod mill to shear the vermiculite into thin platelets. Biotite, feldspar, and other impurities are further concentrated and removed by froth flotation. The vermiculite is then dewatered, dried in a kiln, and screened to produce four basic sized products. Most of the crude vermiculite is shipped by rail in unexfoliated form to North Carolina, Ohio, West Virginia, other eastern states, and North Dakota.



Figure 14. Tanker truck carrying molten elemental sulfur, AMOCO refining facility, York County.

VERMICULITE

Virginia is one of two states that mine vermiculite, a hydrated magnesium-iron-aluminum silicate. Virginia Vermiculite, Ltd. operates an open-pit mine and processing facility near Boswells Tavern in Louisa County. The vermiculite is mined with a backhoe and a front-end loader and trucked to the adjacent plant where pieces greater than four inches across are removed. These pieces are washed and processed in a rod mill to shear the vermiculite into thin platelets. Biotite, feldspar, and other impurities are further concentrated and removed by froth flotation. The vermiculite is then dewatered, dried in a kiln, and screened to produce four basic sized products. Most of the crude vermiculite is shipped by rail in unexfoliated form to North Carolina, Ohio, West Virginia, other eastern states, and North Dakota.

Table 2.-Metal/nonmetal production by county/city and commodity, 1996, source: Virginia Division of Mineral Mining.

County/City	Basalt	Clay	Diabase	Diorite	Dolostone	Feldspar	Fullers Earth	Granite	Gravel	Greenstone	Gypsum
Albemarle	769,672	0	0	0	0	0	0	438,000	0	0	0
Amherst	0	22,788	0	0	0	437,306	0	0	0	0	0
Botetourt	0	138,132	0	0	0	0	0	0	0	0	0
Brunswick	0	0	0	0	0	0	0	2,030,935	0	0	0
Campbell	0	0	0	0	0	0	0	0	0	416,941	0
Caroline	0	0	0	0	0	0	0	356,000	0	0	0
Chesterfield	0	3,660	0	0	0	0	0	1,623,500	0	0	0
Culpeper	0	0	271,448	0	0	0	0	5,857	0	0	0
Dinwiddie	0	0	0	0	0	0	0	1,244,400	0	0	0
Fairfax	0	0	1,978,297	0	0	0	0	1,896,198	0	0	0
Fauquier	0	0	753,189	0	0	0	0	767,759	0	0	0
Franklin	0	0	0	0	0	0	0	41,230	0	0	0
Goochland	0	0	0	0	0	0	0	4,027,004	0	0	0
Grayson	0	0	0	0	0	0	0	286,937	0	0	0
Greene	0	0	0	0	0	0	0	837,643	0	0	0
Greensville	0	0	0	0	0	0	0	1,578,997	0	0	0
Halifax	0	0	0	0	0	0	0	676,097	0	0	0
Hanover	0	19,500	0	0	0	156,829	0	1,854,526	75,840	0	0
Henrico	0	0	0	0	0	0	0	1,152,564	36,000	0	0
Henry	0	0	0	389,183	0	0	0	633,079	0	0	0
King & Queen	0	0	0	0	0	0	53,596	0	0	0	0
Louisa	0	0	0	0	0	0	0	398,188	0	0	0
Loudoun	0	0	5,699,872	0	0	0	0	0	0	0	0
Mecklenburg	0	0	0	0	0	0	0	415,498	0	0	0
Northumberland	0	0	0	0	0	0	0	0	18,000	0	0
Nottoway	0	0	0	0	0	0	0	589,982	0	0	0
Powhatan	0	0	0	0	0	0	0	786,480	0	0	0
Prince George	0	17,390	0	0	0	0	0	0	0	0	0
Prince William	0	0	2,836,676	0	0	0	0	0	0	0	0
Richmond (City)	0	0	0	0	0	0	0	2,974,263	0	0	0
Roanoke	0	0	0	0	1,400,319	0	0	0	0	0	0
Rockbridge	0	0	0	0	250,859	0	0	0	0	0	0
Rockingham	0	48,739	0	0	0	0	0	0	0	0	0
Smyth	0	0	0	0	0	0	0	0	0	0	331,931
Spotsylvania	0	0	0	0	0	0	0	1,132,000	37,912	0	0
Stafford	0	0	0	0	0	0	0	1,352,613	0	0	0
Warren	0	0	0	0	0	0	0	0	41,230	0	0
Total	769,672	250,209	11,539,482	389,183	1,651,178	594,135	53,596	27,099,750	208,982	416,941	331,931

Table 2. (continued) Metal/nonmetal production by county/city and commodity, 1996; source: Virginia Division of Mineral Mining.

County/City	Iron Oxide Pigment	Kyanite	Limestone	Quartzite	Sand	Sand and Gravel	Shale	State	Vermiculite
Accomack	0	0	0	0	121,428	0	0	0	0
Albermarle	0	0	0	0	0	2,400	0	0	0
Amelia	0	0	0	0	169,533	0	0	0	0
Amherst	0	0	0	0	3,839	0	0	0	0
Appomattox	0	0	249,581	0	0	0	0	0	0
Augusta	0	0	1,062,567	0	80,419	326,748	0	0	0
Bedford	0	0	998,246	0	26,845	0	0	0	0
Bland	0	0	243,193	0	16,470	0	0	0	0
Botetourt	0	0	1,765,226	0	0	0	0	0	0
Brunswick	0	0	0	0	6,480	0	85,935	0	0
Buckingham	0	857,620	0	0	0	0	349,460	0	0
Campbell	0	0	1,447,823	0	48,273	0	0	0	0
Caroline	0	0	0	0	0	737,002	0	0	0
Charles City	0	0	0	0	255,061	0	0	0	0
Charlotte	0	0	0	0	4	0	0	0	0
Chesapeake (City)	0	0	0	0	31,410	0	0	0	0
Chesapeake	0	0	0	0	232,469	0	0	0	0
Chesterfield	0	0	0	0	19,200	0	300	0	0
Clarke	0	0	221,660	0	0	0	1,040	0	0
Craig	0	0	0	0	125,146	0	0	0	0
Culpeper	0	0	0	0	0	395,000	0	0	0
Danville (City)	0	0	0	0	49,133	0	0	0	0
Essex	0	0	0	0	0	0	0	0	0
Fauquier	0	0	0	0	20,000	125	0	0	0
Fluvanna	0	0	0	0	6,116	0	0	0	0
Franklin	0	0	0	0	1,200	0	0	0	0
Frederick	0	0	2,050,380	404,564	2,874	0	10,640	0	0
Giles	0	0	992,403	0	0	0	0	0	0
Gloucester	0	0	0	0	41,703	278,693	0	0	0
Grayson	0	0	0	0	20,547	0	0	0	0
Greensville	0	0	0	0	0	210,376	85,935	0	0
Halifax	0	0	0	0	32,838	0	0	0	0
Hampton (City)	0	0	0	0	56,924	0	0	0	0
Hanover	0	0	0	0	95,026	0	0	0	0
Henrico	0	0	0	0	5,400	155,416	0	0	0
Henry	0	0	0	0	2,000	2,688,271	0	0	0
Highland	0	0	46,450	0	0	0	0	0	0
Isle of Wight	0	0	0	0	1,066,647	0	0	0	0
James City	0	0	0	0	112,340	0	0	0	0
King & Queen	0	0	0	0	4,230	1,450	0	0	0

Table 2. (continued) Metal/nonmetal production by county/city and commodity, 1996; source: Virginia Division of Mineral Mining.

County/City	Iron Oxide Pigment	Kyanite	Limestone	Quartzite	Sand	Sand and Gravel	Sandstone and Gravel	Shale	Slate	Vermiculite
King George	0	0	0	0	0	0	0	0	0	0
King William	0	0	0	0	90	0	0	0	0	0
Lancaster	0	0	0	0	8,025	0	0	0	0	0
Lee	60	0	1,264,916	0	0	10,465	0	0	0	0
Louisa	0	0	0	0	0	0	0	0	0	42,000
Mathews	0	0	0	0	5,270	0	0	0	0	0
Mecklenburg	0	0	0	0	1,475	0	0	0	0	0
Middlesex	0	0	0	0	55,315	0	0	0	0	0
Montgomery	0	0	1,610,914	0	0	0	9,209	0	0	0
Nelson	0	0	0	0	0	125	0	0	0	0
New Kent	0	0	0	0	0	210,917	0	0	0	0
Northampton	0	0	0	0	38,457	0	0	0	0	0
Northumberland	0	0	0	0	8,758	10	0	0	0	0
Orange	0	0	0	0	0	0	95,292	0	0	0
Page	0	0	0	0	0	0	750	0	0	0
Pittsylvania	0	0	0	0	75,042	0	0	75,042	0	0
Prince George	0	0	0	0	0	0	0	0	0	0
Prince William	0	0	0	0	0	0	87,699	0	0	0
Pulaski	336	0	439,169	0	0	0	0	0	0	0
Richmond	0	0	0	0	6,582	0	0	0	0	0
Roanoke	0	0	0	0	0	0	766,100	0	0	0
Rockbridge	0	0	400,971	0	0	0	0	0	0	0
Rockingham	0	0	1,675,703	0	0	0	268,264	0	0	0
Russell	0	0	1,771,412	0	0	0	0	0	0	0
Scott	0	0	477,093	0	0	0	0	0	0	0
Shenandoah	0	0	2,233,325	0	420	0	1,900	0	0	0
Smyth	0	0	52,720	0	10,280	0	82,732	0	0	0
Southampton	0	0	0	0	211,459	0	0	0	0	0
Spotsylvania	0	0	0	0	0	42,102	0	0	0	0
Stafford	0	0	0	0	0	703,500	0	0	0	0
Suffolk (City)	0	0	0	0	100,197	40,747	0	0	0	0
Sussex	0	0	0	0	3,139	87,155	0	0	0	0
Tazewell	0	0	1,217,376	0	0	0	0	0	0	0
Virginia Beach (City)	0	0	0	0	1,268,384	0	0	0	0	0
Warren	0	0	412,125	0	0	0	0	0	0	0
Washington	0	0	740,370	0	0	0	0	0	0	0
Westmoreland	0	0	0	0	81,080	7,636	0	0	0	0
Wise	0	0	410,633	0	0	0	0	0	0	0
Wythe	600	0	717,059	571,298	108,903	18,238	126,287	63,126	0	0
York	0	0	0	0	5,739	0	0	0	0	0
Total	996	857,620	22,501,315	975,862	4,181,106	9,812,705	858,625	1,558,922	424,502	42,000

Table 3. Summary of metal/nonmetal mining by commodity, 1996; source: Virginia Division of Mineral Mining.

Commodity	Annual Tonnage	Office Workers	Office Hours	Office Wages	Plant Workers	Quarry Workers	Production Hours	Production Wages
Basalt	769,672.00	2	4,800	\$63,353	9	5	52,264	\$571,415
Clay	250,208.76	10	6,997	\$226,855	0	49	48,256	\$612,722
Diabase	11,539,482.00	54	105,837	\$2,282,692	213	109	736,797	\$9,548,893
Diorite	389,183.00	7	11,842	\$119,925	16	8	48,728	\$485,539
Dolostone	1,651,178.00	16	30,987	\$903,652	41	27	141,558	\$1,583,496
Feldspar	594,135.00	9	17,958	\$351,844	27	8	77,200	\$1,004,447
Fullers Earth	53,596.00	7	13,316	\$202,595	68	2	86,030	\$849,035
Gemstones	0.00	0	208	\$1,664	0	1	208	\$1,664
Gold	0.00	1	40	\$480	1	1	275	\$3,300
Granite	27,099,749.82	81	187,416	\$2,776,424	386	279	1,670,162	\$21,418,040
Gravel	196,687.00	4	96	\$891	0	16	3,583	\$47,057
Greenstone	416,941.00	4	8,515	\$147,257	5	6	28,220	\$266,868
Gypsum	331,931.00	9	17,880	\$335,597	64	0	132,947	\$1,583,823
Iron Oxide Pigment	660.00	1	12	\$120	0	4	148	\$9,050
Kyanite	857,620.00	21	39,181	\$761,279	222	28	309,155	\$5,204,513
Limestone	22,500,977.51	271	497,737	\$8,425,266	882	519	3,915,094	\$33,993,636
Limonite	336.00	14	21,600	\$562,883	40	0	58,482	\$550,579
Marl	20,229.00	1	1,270	\$7,496	0	1	1,300	\$12,000
Quartz	17,795.00	1	2	\$30	1	1	1,310	\$12,746
Quartzite	975,862.00	5	11,938	\$186,561	44	8	106,439	\$1,397,742
Sand	4,181,106.09	102	56,028	\$722,291	62	254	204,106	\$2,334,369
Sand and Clay	200.00	0	0	\$0	0	1	16	\$712
Sand and Gravel	9,872,705.02	70	88,221	\$1,255,194	192	185	661,862	\$7,584,932
Sandstone	858,625.00	8	16,121	\$290,728	24	13	86,800	\$1,174,557
Shale	1,558,922.00	31	44,465	\$761,667	98	80	259,855	\$1,905,839
Slate	537,600.00	44	71,702	\$1,135,303	232	22	264,636	\$2,440,565
Soapstone	295.00	0	0	\$0	3	0	6,000	\$66,977
Titanium	0.00	18	16,970	\$434,971	26	0	5,473	\$82,095
Vermiculite	42,000.00	5	12,350	\$226,000	14	8	47,290	\$527,100
Total	84,717,696.20	796	1,283,489	\$22,183,018	2,670	1,635	8,954,194	\$95,272,711

Table 4. Summary of metal/nonmetal mining by county/city, 1996; source: Virginia Division of Mineral Mining.

County/City	Annual Tonnage	Office Workers	Office Hours	Office Wages	Plant Workers	Quarry Workers	Production Hours	Production Wages
Accomack	121,428.00	6	1,010	\$6,880	1	20	4,564	\$77,975
Albemarle	1,210,072.00	7	11,578	\$210,653	16	15	84,726	\$1,110,715
Amelia	169,533.15	1	2,708	\$22,464	8	1	11,047	\$159,764
Amherst	463,932.76	4	6,225	\$120,637	9	7	28,277	\$286,693
Appomattox	249,581.00	3	6,112	\$92,537	8	9	35,333	\$407,815
Augusta	1,519,657.79	15	19,030	\$206,857	33	23	105,114	\$1,121,139
Bedford	1,059,356.17	12	18,447	\$285,758	33	14	81,018	\$877,425
Bland	243,193.00	1	2,508	\$23,391	4	7	17,550	\$301,982
Botetourt	1,903,358.00	72	108,383	\$2,287,365	247	46	471,747	\$7,921,974
Brunswick	2,123,350.00	6	8,555	\$94,303	30	36	150,173	\$1,671,305
Buckingham	1,207,080.00	52	85,324	\$1,458,050	412	50	485,101	\$6,822,044
Campbell	1,913,036.72	19	26,165	\$489,360	21	27	107,773	\$1,175,030
Caroline	1,093,001.79	8	14,023	\$233,826	22	9	64,889	\$821,450
Charles City	255,065.00	3	2,686	\$27,596	5	11	27,076	\$308,308
Charlotte	31,409.83	1	110	\$770	6	0	3,603	\$33,649
Chesapeake (City)	232,469.00	11	6,860	\$41,532	2	9	12,060	\$97,238

Table 4. (continued) Summary of metal/nonmetal mining by county/city, 1996; source: Virginia Division of Mineral Mining.

County/City	Annual Tonnage	Office Workers	Office Hours	Office Wages	Plant Workers	Quarry Workers	Production Hours	Production Wages
Chesterfield	1,646,660.00	14	17,558	\$360,121	24	35	112,173	\$1,631,902
Clarke	222,700.00	2	2,515	\$25,489	5	11	23,855	\$259,988
Craig	125,145.62	1	2,228	\$15,240	2	3	13,682	\$120,469
Culpeper	672,305.00	6	12,254	\$219,449	8	44	104,523	\$1,356,824
Danville (City)	49,133.00	1	12	\$2,000	0	3	5,192	\$41,538
Dinwiddie	1,244,400.00	21	23,765	\$527,728	42	8	60,449	\$832,584
Essex	20,000.00	2	52	\$250	0	1	480	\$24,000
Fairfax	3,874,495.00	8	23,537	\$269,178	50	30	222,154	\$3,026,804
Fauquier	1,521,073.00	3	6,241	\$80,097	20	12	92,401	\$1,158,337
Fluvanna	6,116.01	0	0	\$0	0	2	431	\$5,282
Franklin	42,430.00	1	1	\$10	7	13	24,564	\$280,393
Frederick	2,468,458.00	34	59,021	\$911,401	103	72	309,297	\$3,650,702
Giles	992,402.65	22	47,144	\$836,704	133	59	1,629,690	\$5,245,613
Gloucester	320,396.04	9	2,380	\$24,485	1	17	19,670	\$211,688
Goochland	4,027,004.00	9	22,675	\$318,993	48	25	209,484	\$2,541,597
Grayson	307,484.02	3	2,893	\$24,762	16	8	38,299	\$366,775
Greene	837,643.00	2	4,800	\$67,679	10	5	50,968	\$553,014
Greensville	1,875,308.00	4	6,635	\$68,316	29	29	134,697	\$1,480,794
Halifax	708,934.80	2	6,644	\$73,719	17	11	54,879	\$670,656
Hampton (City)	56,924.10	1	1,924	\$20,756	0	4	4,639	\$51,516
Hanover	2,357,137.00	14	20,556	\$368,445	55	48	165,147	\$2,536,324
Henrico	3,882,235.07	14	22,757	\$311,028	43	52	206,986	\$2,405,915
Henry	1,024,262.00	14	25,797	\$421,743	28	17	98,261	\$1,041,788
Highland	46,450.00	2	2,943	\$30,575	1	2	4,334	\$47,177
Isle of Wight	1,086,876.00	7	15,857	\$198,095	3	10	26,375	\$217,745
James City	112,340.00	1	20	\$400	0	6	2,640	\$30,967
King & Queen	59,276.00	11	13,322	\$202,655	68	7	86,414	\$853,564
King George	1,107,013.00	5	7,686	\$130,494	26	17	64,951	\$698,795
King William	726,213.73	13	19,312	\$392,087	42	38	106,591	\$1,255,631
Lancaster	21,969.00	4	50	\$455	10	13	642	\$9,494
Lee	1,275,440.27	8	12,581	\$194,380	10	31	70,495	\$762,050
Loudoun	5,699,872.00	44	81,308	\$2,001,567	128	54	365,602	\$4,813,064
Louisa	440,188.00	8	15,639	\$265,280	22	17	83,845	\$888,227
Mathews	19,291.00	1	260	\$2,080	0	4	782	\$48,300
Mecklenburg	416,973.00	3	5,395	\$46,215	12	12	45,588	\$460,905
Middlesex	55,315.00	7	332	\$3,500	0	13	2,666	\$34,728
Montgomery	1,620,123.00	11	22,172	\$301,007	22	21	104,924	\$1,216,330
Nelson	420.00	2	2	\$40	3	1	6,012	\$67,073
New Kent	210,917.00	2	5,144	\$97,371	3	6	17,261	\$180,866
Northampton	38,457.00	1	450	\$4,500	0	8	2,791	\$23,488
Northumberland	26,768.00	1	0	\$0	2	9	2,627	\$20,895
Nottoway	589,982.00	1	2,400	\$38,945	12	6	50,138	\$518,700
Orange	95,292.00	2	3,152	\$53,711	0	1	1,576	\$15,366
Page	750.00	0	0	\$0	0	4	100	\$750
Pittsylvania	263,182.17	21	26,319	\$442,998	42	14	76,342	\$693,631
Powhatan	786,480.00	2	4,800	\$58,286	8	4	40,206	\$409,269
Prince Edward	0.00	1	1,537	\$16,346	9	0	23,862	\$286,522
Prince George	1,287,490.00	4	11,159	\$155,556	16	15	81,892	\$1,141,945
Prince William	2,924,375.00	5	9,549	\$109,821	52	23	185,022	\$2,626,194
Pulaski	439,169.00	16	26,823	\$600,802	47	19	97,407	\$833,349
Richmond	6,582.00	2	7	\$70	0	6	137	\$3,212
Richmond (City)	2,974,263.00	7	16,914	\$243,351	27	21	115,734	\$1,494,170
Roanoke	2,166,419.00	28	62,480	\$1,475,986	129	23	350,200	\$2,962,573

Table 4. (continued) Summary of metal/nonmetal mining by county/city, 1996; source: Virginia Division of Mineral Mining.

County/City	Annual Tonnage	Office Workers	Office Hours	Office Wages	Plant Workers	Quarry Workers	Production Hours	Production Wages
Rockbridge	651,830.00	6	8,920	\$107,120	11	19	54,420	\$490,486
Rockingham	2,267,531.24	17	30,586	\$309,438	28	47	145,570	\$1,360,412
Russell	1,771,412.00	17	36,241	\$512,588	66	35	226,910	\$2,128,468
Scott	477,093.18	5	7,807	\$75,429	0	18	37,184	\$437,649
Shenandoah	2,235,645.00	13	27,568	\$621,061	75	32	222,465	\$3,157,887
Smyth	477,662.54	11	20,440	\$378,068	68	7	150,917	\$1,746,646
Southampton	253,561.12	4	715	\$26,150	5	13	14,987	\$172,486
Spotsylvania	1,873,412.00	9	16,204	\$288,051	26	26	119,510	\$1,788,524
Stafford	2,124,465.00	5	10,913	\$128,443	19	21	103,781	\$1,390,345
Suffolk (City)	140,944.25	6	2,789	\$35,375	0	16	6,623	\$61,173
Sussex	90,294.04	3	530	\$2,100	3	9	10,538	\$91,185
Tazewell	1,217,376.00	10	22,755	\$520,768	30	31	118,068	\$1,522,259
Virginia Beach (City)	1,268,383.70	10	13,752	\$283,155	3	46	43,497	\$575,748
Warren	441,060.00	23	42,428	\$798,083	40	21	128,858	\$1,822,927
Washington	740,369.66	3	8,230	\$70,369	4	26	46,423	\$565,000
Westmoreland	88,716.36	2	3,230	\$14,920	0	9	3,058	\$80,365
Wise	410,633.00	1	2,681	\$33,284	0	14	27,223	\$379,790
Wythe	1,605,511.42	22	28,558	\$359,143	100	46	204,202	\$2,190,052
York	5,739.00	1	416	\$3,328	0	1	832	\$8,320
Total	84,717,696.20	796	1,283,489	\$22,183,018	2,670	1,635	8,954,194	\$95,273,711

Table 5. Coal mine production in Virginia by county and coal bed, 1996; source: Virginia Division of Mines.

Formation/Coal bed	Buchanan	Dickenson	Lee	Russell	Tazewell	Wise	Total
Wise	1,639,873	754,087	2,090,702	0	0	10,576,930	15,061,592
High Splint	0	0	0	0	0	188,040	188,040
Pardee	0	0	0	0	0	322,024	322,024
Wax	0	0	0	0	0	16,072	16,072
Phillips/Wallins Creek	0	0	745,775	0	0	537,210	1,282,985
Little Red	0	0	0	0	0	51,342	51,342
Owl	0	0	0	0	0	79,098	79,098
34 inch	0	0	0	0	0	114,195	114,195
Low Splint	0	0	0	0	0	1,299,229	1,299,229
Taggart/Darby	2,886	0	132,813	0	0	719,442	852,255
Taggart Marker	0	0	0	0	0	269,170	269,170
Harlan Rider	0	0	98,422	0	0	0	98,422
Wilson/Harlan/Standford	0	0	448,651	0	0	1,525,538	1,974,189
Pinhook	0	0	0	0	0	206,429	206,429
Kelly	0	0	153,239	0	0	977,258	1,130,497
Imboden/Upper Mason/ Campbell Creek	105,010	0	411,075	0	0	1,023,635	1,539,720
Lower Mason	0	0	100,727	0	0	6,868	107,595
Clintwood	6,052	477,660	0	0	0	1,409,512	1,893,224
Lower Clintwood	0	185,526	0	0	0	0	185,526
Clintwood Marker	0	658	0	0	0	15,712	16,370
Eagle	856,393	4,314	0	0	0	0	860,707
Blair	592,547	15,318	0	0	0	599,948	1,207,813
Lyons	0	15,968	0	0	0	371,222	387,190
Dorchester	76,985	54,643	0	0	0	844,986	976,614

Table 5. (continued) Coal mine production in Virginia by county and coal bed, 1996; source: Virginia Division of Mines.

Formation/Coal bed	Buchanan	Dickenson	Lee	Russell	Tazewell	Wise	Total
Norton	3,096,684	1,679,941	0	646,434	0	2,097,131	7,520,190
Norton	0	2,674	0	0	0	1,422,280	1,424,954
Hagy	514,328	1,235	0	0	0	0	515,563
Splash Dam	2,084,804	2,443	0	0	0	0	2,087,247
Upper Banner	0	667,657	0	424,960	0	501,371	1,593,988
Lower Banner	32,938	1,005,932	0	49,884	0	173,480	1,262,234
Kennedy	464,614	0	0	171,590	0	0	636,204
Norton/New River	2,039,711	439,476	0	528,526	2,442,677	825,136	6,275,526
Aily	11,777	2,300	0	0	0	2,289	16,366
Raven/Red Ash	900,218	65,222	0	0	118,034	0	1,083,474
Jawbone Rider	26,110	3,640	0	0	0	0	29,750
Jawbone	1,000,530	368,314	0	528,526	56,932	822,847	2,777,149
Tiller	101,076	0	0	0	213,255	0	314,331
Greasy Creek	0	0	0	0	250,888	0	250,888
Lower Seaboard	0	0	0	0	819,939	0	819,939
Upper Horsepen	0	0	0	0	708,524	0	708,524
Lower Horsepen	0	0	0	0	250,657	0	250,657
Pocahontas No. 8	0	0	0	0	24,448	0	24,448
Pocahontas							7,924,754
Pocahontas No. 3	7,924,754	0	0	0	0	0	7,924,754
Total	14,701,022	2,873,504	2,090,702	1,174,960	2,442,677	13,499,197	36,782,062

Table 6. Coal mine production in Virginia by county and mining method, 1996; source: Virginia Division of Mines.

	Buchanan	Dickenson	Lee	Russell	Scott	Tazewell	Wise	Total
Number of Mines								
Auger	4	7	2	1	0	0	15	29
Strip	10	10	2	7	0	1	26	56
Underground	112	21	15	11	1	32	54	246
Total	126	38	19	19	1	33	95	331
Mining Method (tonnage)								
Underground								
Longwall	4,887,330	0	0	0	0	0	25,344	4,912,674
Continuous miner	8,328,639	1,488,236	1,531,109	731,928	0	2,442,677	7,610,510	22,133,099
Other	67,797	66,374	0	0	0	0	0	134,171
Undg. total	13,283,766	1,554,610	1,531,109	731,928	0	2,442,677	7,635,854	27,179,944
Surface								
Auger	12,486	53,575	54,624	6,396	0	0	180,543	307,624
Strip	1,404,770	1,265,319	504,969	436,636	0	0	5,682,800	9,294,494
Total	14,701,022	2,873,504	2,090,702	1,174,960	0	2,442,677	13,499,197	36,782,062

Table 7. Coal mine employment in Virginia by county and mining method, 1996; source: Virginia Division of Mines.

	Buchanan	Dickenson	Lee	Russell	Tazewell	Wise	Total
Prod. Employees							
Auger	14	18	15	3	0	30	80
Strip	179	181	92	63	1	545	1,061
Underground	2,221	363	383	141	513	1,409	5,030
Total	2,414	562	490	207	514	1,984	6,171
Man days							
Auger	300	970	716	86	0	806	2,878
Strip	3,446	3,336	906	998	80	8,074	16,840
Underground	26,776	4,916	2,344	1,580	6,394	12,080	54,090
Total	30,522	9,222	3,966	2,664	6,474	20,960	73,808
Man Hours							
Auger	5,512	11,409	11,000	1,718	0	22,156	51,795
Strip	388,321	357,871	181,095	100,776	400	1,415,904	2,444,367
Underground	4,421,820	595,460	639,272	246,542	828,772	2,326,402	9,058,268
Total	4,815,653	964,740	831,367	349,036	829,172	3,764,462	11,554,430
Prod. Wages							
Auger	44,783	93,727	63,722	17,180	0	277,614	497,026
Strip	6,352,884	6,821,057	438,953	2,167,322	4,500	21,848,646	37,633,362
Underground	85,095,034	11,194,582	11,634,384	4,822,133	14,088,816	39,923,447	166,758,396
Total	91,492,701	18,109,366	12,137,059	7,006,635	14,093,316	62,049,707	204,888,784
Office Employees							
Auger	1	3	0	1	0	0	5
Strip	2	1	8	3	0	54	68
Undg. total	86	3	3	2	26	42	162
Total	89	7	11	6	26	96	235
Office Wages							
Auger	2,850	4,128	0	480	0	0	7,458
Strip	42,600	6,000	369,624	3,480	0	2,166,574	2,588,278
Underground	4,109,457	21,100	47,468	18,192,344	705,006	1,587,842	24,663,217
Total	4,154,907	31,228	417,092	18,196,304	705,006	3,754,416	27,258,953

Table 8. Oil production by county and company, 1996; source: Virginia Division of Gas and Oil.

County	Field Company	Number of Producing Wells	Volume (barrels)
Lee	Ben Hur-Fleenortown Oil		
	APACO Oil and Gas Co.	4	408.33
	Ben Hur Oil Co.	5	1,228.00
	Eastern States Exploration	1	1,148.70
	Maverick Oil and Gas Co.	3	714.00
	United Well Services	1	696.00
	Witt Oil Drilling	1	211.00
Subtotal		15	4,406.03
	Rose Hill Oil		
	Maverick Oil and Gas Co.	1	388.00
	Pride Oil Company	1	1,454.78
Subtotal		2	1,842.78
	Unnamed		
	AMVEST Oil and Gas Co.	1	188.13
Lee Total		18	6436.94
Wise	Roaring Fork Gas		
	Equitable Resources Energy Co.	21	6,926.36
Wise Total		21	6,926.36
State Total		39	13,363.30

Table 9. Natural gas production by county and company, 1996; source: Virginia Division of Gas and Oil.

County	Company	Number of Producing Wells	Volume (Mcf)	
Buchanan	Conventional and Shale Gas			
	Ashland Exploration	58	893,007	
	Cabot Oil & Gas Corporation	7	81,856	
	Columbia Natural Resources	105	1,409,876	
	Eastern American Energy	4	55,842	
	Peake Operating	1	31,551	
	Penn Virginia Resources	2	16,500	
	Pocahontas Gas Partnership	2	26,346	
	Virginia Gas Company	28	365,556	
		207	2,880,534	
		Coal-bed Methane		
		Consol, Inc.	202	14,154,482
		Equitable Resources Energy	7	49,992
		Island Creek Coal Company	60	1,230,615
		Pocahontas Gas Partnership	258	12,301,207
		Ratliff Gas Company	1	2,356
Virginia Gas Company		5	53,946	
	533	27,792,598		
Buchanan Total		740	30,673,132	

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Table 9. (continued) Natural gas production by county and company, 1996; source: Virginia Division of Gas and Oil.

County	Company	Number of Producing Wells	Volume (Mcf)
Dickenson	Conventional and Shale Gas		
	Columbia Natural Resources	33	584,503
	Elliott Production	2	24,695
	Equitable Resources Energy	358	6,311,510
	Pine Mountain Oil and Gas	9	137,275
	Virginia Gas Company	26	938,618
		428	7,996,601
	Coal-bed Methane		
	Equitable Resources Energy	230	5,377,675
		230	5,377,675
Dickenson Total		658	13,374,276
Lee	Conventional and Shale Gas		
	Amvest Oil and Gas Co.	1	3,135
Lee Total		1	3,135
Russell	Conventional and Shale Gas		
	Pine Mountain Oil and Gas	2	5,247
	Coal-bed Methane		
Equitable Resources Energy	27	518,415	
Russell Total		29	523,662
Scott	Conventional and Shale Gas		
	Equitable Resources Energy	4	15,326
Scott Total		4	15,326
Tazewell	Conventional and Shale Gas		
	Cabot Oil & Gas Corporation	19	243,812
	Columbia Natural Resources	6	87,556
	CNG Producing	2	7,812
	Exploration Partners	1	29,683
	Gas Exploration	2	38,138
	R & B Petroleum	2	12,744
	Tazewell Total		32
Wise	Conventional and Shale Gas		
	Amvest Oil and Gas	6	27,175
	Equitable Resources Energy	325	8,789,006
		331	8,816,181
	Coal-bed Methane		
Equitable Resources Energy	24	464,896	
Wise Total		355	9,281,077
SUBTOTAL	Conventional and Shale Gas		
	Coal-bed Methane	814	34,153,584
STATE TOTAL		1,819	54,290,353

Table 10. Drilling and completion activity by well type and county, 1996: source: Virginia Division of Gas and Oil.

County	Wells Drilled				Wells Completed				Wells Plugged				
	Gas	Coal-bed Methane	Uderground Storage	Waste Disposal	Total	Gas	Coal-bed Methane	Uderground Storage	Waste Disposal	Total	Gas	Coal-bed Methane	Total
Buchanan	0	103	0	0	103	1	127	0	0	128	0	3	3
Dickenson	2	36	0	0	38	2	40	0	0	42	0	0	0
Russell	0	2	0	0	2	0	2	0	0	2	0	0	0
Scott	1	0	1	0	2	0	1	2	0	3	0	0	0
Smyth	0	0	0	1	1	0	0	0	1	1	0	0	0
Tazewell	6	0	0	0	6	5	0	0	0	5	1	0	1
Wise	7	3	0	0	10	10	3	0	0	13	0	0	0
Total	16	144	1	1	162	18	173	2	1	194	1	3	4

Table 11. Total footage drilled for natural gas by well type and county, 1996; source: Virginia Division of Gas and Oil.

County	Gas	Coal-bed Methane	Underground Storage	Waste Disposal	Total
Buchanan	0	221,504	0	0	221,504
Dickenson	10,738	87,124	0	0	97,862
Russell	0	4,709	0	0	4,709
Scott	4,460	0	0	4,175	8,635
Smyth	0	0	9,342	0	9,342
Tazewell	31,970	0	0	0	31,970
Wise	40,300	8,456	0	0	48,756
Total	87,468	321,793	9,342	4,175	422,778

Table 12. Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
Wells Drilled Prior to 1996										
Buchanan County										
BU-0424	1795	Pocahontas Gas Partnership	PGP-071	Keen Mountain	dev.	conver	1/2/92	6/16/96	2070	gas
BU-0433	1820	Pocahontas Gas Partnership	PGP-070	Keen Mountain	dev.	conver	12/6/90	5/11/96	1693	gas
BU-0556	2062	Pocahontas Gas Partnership	PGP-128	Keen Mountain	dev.	conver	8/19/92	7/7/96	1405	gas
BU-0590	2127	Pocahontas Gas Partnership	PGP-133	Keen Mountain	dev.	cbm	12/3/92	12/1/96	1550	gas
BU-0626	2184	Pocahontas Gas Partnership	PGP-134	Keen Mountain	dev.	cbm	12/17/92	3/3/96	1998	gas-PA
BU-0657	2257	Pocahontas Gas Partnership	PGP-127C	Keen Mountain	dev.	cbm	2/17/93	6/4/96	1540	gas
BU-0664	2269	Pocahontas Gas Partnership	PGP-070A	Keen Mountain	dev.	cbm	12/23/92	5/21/96	2025	gas
BU-0739	2463	Pocahontas Gas Partnership	PGP-71A	Keen Mountain	dev.	cbm	10/2/93	5/29/96	1567	gas
BU-0760	2587	Pocahontas Gas Partnership	PGP-127B	Keen Mountain	dev.	cbm	6/15/94	4/8/96	1505	gas-PA
BU-0771	2645	Pocahontas Gas Partnership	PGP-126B	Keen Mountain	dev.	cbm	3/30/94	2/14/96	1445	gas
BU-0773	2652	Pocahontas Gas Partnership	PGP-130A	Keen Mountain	dev.	cbm	6/28/94	10/4/96	1895	gas
BU-0774	2654	Pocahontas Gas Partnership	PGP-131A	Keen Mountain	dev.	cbm	5/21/94	10/10/96	1715	gas
BU-0775	2655	Pocahontas Gas Partnership	PGP-129A	Keen Mountain	dev.	cbm	9/12/94	9/12/96	1715	gas
BU-0859	2914	Pocahontas Gas Partnership	PGP-145	Keen Mountain	dev.	cbm	9/1/95	1/24/96	1727	gas
BU-0862	2917	Pocahontas Gas Partnership	PGP-152	Keen Mountain	dev.	cbm	8/31/95	2/13/96	1952	gas
BU-0893	2964	Pocahontas Gas Partnership	PGP X33A	Keen Mountain	dev.	cbm	11/3/95	6/6/96	1896	gas
BU-0898	2969	Pocahontas Gas Partnership	PGP-Y33C	Keen Mountain	dev.	cbm	12/27/95	6/5/96	1996	gas
BU-0899	2970	Pocahontas Gas Partnership	PGP-Y33A	Keen Mountain	dev.	cbm	10/20/95	5/9/96	1811	gas
BU-0903	2974	Pocahontas Gas Partnership	PGP-X33B	Keen Mountain	dev.	cbm	11/1/95	5/21/96	1865	gas
BU-0907	2985	Consol, Inc.	U-30A	Keen Mountain	dev.	cbm	12/5/95	3/27/96	2021	gas
BU-0911	2991	Pocahontas Gas Partnership	PGP-Y33B	Keen Mountain	dev.	cbm	12/8/95	5/21/96	1819	gas
BU-0913	2999	Pocahontas Gas Partnership	PGP-X33D	Keen Mountain	dev.	cbm	12/1/95	6/6/96	1749	gas
BU-0916	3003	Consol, Inc.	V-29C	Keen Mountain	dev.	cbm	12/5/95	3/12/96	1811	gas
BU-0918	3005	Consol, Inc.	T-31B	Keen Mountain	dev.	cbm	12/13/95	4/19/96	2032	gas
BU-0920	3007	Consol, Inc.	T-31A	Keen Mountain	dev.	cbm	12/1/95	3/27/96	2085	gas
BU-0749	2535	Ashland Exploration	35-PKJ-18	Patterson	dev.	gas	10/9/95	2/6/96	5411	gas
BU-0841	2893	Consol, Inc.	U-18A	Vansant	dev.	cbm	1/11/95	1/2/96	2445	gas
BU-0892	2959	Consol, Inc.	V-14	Vansant	dev.	cbm	12/7/95	1/23/96	2082	gas
Dickenson County										
DI-0605	1748	Equitable Resources Energy C	VC-2114	Duty	dev.	cbm	11/1/91	12/13/96	1863	gas
DI-0776	2908	Equitable Resources Energy C	VC-3327	Caney Ridge	dev.	cbm	12/18/95	2/24/96	2087	gas
DI-0778	2942	Equitable Resources Energy C	VC-2473	Nora	dev.	cbm	12/22/95	6/13/96	2002	gas
DI-0779	2946	Equitable Resources Energy C	VC-2473	Duty	dev.	cbm	12/31/95	3/5/96	1421	gas

Table 12 (continued). Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
Scott County										
SC-0046	2771	Virginia Gas Co.	EH-071	Mendota	dev.	ust	11/12/95	1/24/96	3992	ust
Wise County										
WS-0459	2845	Equitable Resources Energy C	V-3199	Flat Gap	dev.	gas	12/13/94	4/8/96	5000	gas
WS-0467	2923	Equitable Resources Energy C	V-3187	Coeburn	dev.	gas	12/30/95	1/24/96	5760	gas
WS-0474	2995	Equitable Resources Energy C	VD-2374	Coeburn	dev.	gas	12/14/95	1/29/96	5430	gas
Wells drilled in 1996										
Buchanan County										
BU-0923	3010	Equitable Resources Energy C	VC-3431	Big A Mountain	dev.	cbm	8/6/96	8/16/96	1644	gas
BU-1027	3189	Equitable Resources Energy C	VC-3598	Big A Mountain	dev.	cbm	10/18/96	10/28/96	1560	gas
BU-0970	3097	Pocahontas Gas Partnership	PGP-128C	Keen Mountain	dev.	cbm	7/11/96	7/16/96	1383	gas
BU-0904	2975	Pocahontas Gas Partnership	PGP-AA33A	Keen Mountain	dev.	cbm	5/1/96	7/18/96	2206	gas
BU-0905	2976	Pocahontas Gas Partnership	PGP-Z33C	Keen Mountain	dev.	cbm	7/12/96	10/28/96	2044	gas
BU-0906	2979	Pocahontas Gas Partnership	PGP-AA33B	Keen Mountain	dev.	cbm	6/14/96	7/17/96	2053	gas
BU-0910	2990	Consol, Inc.	cbm V-29A	Keen Mountain	dev.	cbm	7/22/96	9/11/96	1545	gas
BU-0912	2992	Pocahontas Gas Partnership	PGP-Z33B	Keen Mountain	dev.	cbm	8/14/96	10/24/96	1777	gas
BU-0919	3006	Pocahontas Gas Partnership	PGP-Z33A	Keen Mountain	dev.	cbm	8/14/96	10/23/96	1798	gas
BU-0931	3022	Pocahontas Gas Partnership	PGP-68B	Keen Mountain	dev.	cbm	2/15/96	2/15/96	2309	gas
BU-0933	3024	Pocahontas Gas Partnership	PGP-125D	Keen Mountain	dev.	cbm	1/24/96	1/24/96	1716	gas
BU-0934	3025	Pocahontas Gas Partnership	PGP-125C	Keen Mountain	dev.	cbm	2/29/96	1/19/96	1595	gas
BU-0935	3028	Consol, Inc.	V-28B	Keen Mountain	dev.	cbm	6/24/96	8/22/96	1617	gas
BU-0945	3042	Pocahontas Gas Partnership	PGP-69B	Keen Mountain	dev.	cbm	3/13/96	3/13/96	2188	gas
BU-0948	3048	Pocahontas Gas Partnership	PGP-127A	Keen Mountain	dev.	cbm	3/21/96	3/21/96	1304	gas-PA
BU-0954	3058	Pocahontas Gas Partnership	PGP-69C	Keen Mountain	dev.	cbm	4/24/96	4/24/96	2266	gas
BU-0955	3059	Pocahontas Gas Partnership	PGP-70B	Keen Mountain	dev.	cbm	4/24/96	5/2/96	1929	gas
BU-0956	3060	Pocahontas Gas Partnership	PGP-71B	Keen Mountain	dev.	cbm	5/8/96	6/8/96	1466	gas
BU-0957	3069	Pocahontas Gas Partnership	PGP-127D	Keen Mountain	dev.	cbm	5/13/96	5/13/96	1290	gas
BU-0969	3094	Pocahontas Gas Partnership	PGP-128B	Keen Mountain	dev.	cbm	7/2/96	7/11/96	1339	gas
BU-0971	3099	Pocahontas Gas Partnership	PGP-129B	Keen Mountain	dev.	cbm	7/23/96	8/5/96	1490	gas
BU-0972	3102	Consol, Inc.	T-29B	Keen Mountain	dev.	cbm	9/20/96	9/20/96	2035	gas
BU-0973	3103	Consol, Inc.	V-28D	Keen Mountain	dev.	cbm	7/2/96	8/22/96	1642	gas
BU-0975	3105	Pocahontas Gas Partnership	PGP-128A	Keen Mountain	dev.	cbm	6/17/96	6/25/96	1342	gas

Table 12 (continued). Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
BU-0979	3115	Pocahontas Gas Partnership	PGP X33C	Keen Mountain	dev.	cbm	9/27/96	11/21/96	1578	gas
BU-0980	3118	Consol, Inc.	T-30C	Keen Mountain	dev.	cbm	9/11/96	9/11/96	2083	gas
BU-0981	3119	Consol, Inc.	T-30D	Keen Mountain	dev.	cbm	7/31/96	12/5/96	2070	gas
BU-0986	3129	Consol, Inc.	V-29D	Keen Mountain	dev.	cbm	8/14/96	8/14/96	1545	gas
BU-0987	2130	Consol, Inc.	V-28C	Keen Mountain	dev.	cbm	8/21/96	10/21/96	1712	gas
BU-0994	3138	Pocahontas Gas Partnership	PGP-71C	Keen Mountain	dev.	cbm	9/5/96	9/18/96	1957	gas
BU-1015	3170	Pocahontas Gas Partnership	PGP-130B	Keen Mountain	dev.	cbm	10/5/96	10/16/96	1571	gas
BU-1016	3171	Pocahontas Gas Partnership	PGP-FF22	Keen Mountain	dev.	cbm	8/27/96	12/4/96	2275	gas
BU-1017	3172	Pocahontas Gas Partnership	PGP-129C	Keen Mountain	dev.	cbm	9/18/96	9/26/96	1688	gas
BU-1032	3198	Pocahontas Gas Partnership	PGP-Z34D	Keen Mountain	dev.	cbm	10/15/96	10/18/96	1786	gas
BU-1046	3224	Pocahontas Gas Partnership	PGP AA30A	Keen Mountain	dev.	cbm	12/23/96	12/31/96	1442	gas
BU-1048	3227	Pocahontas Gas Partnership	PGP AA33C	Keen Mountain	dev.	cbm	12/11/96	12/11/96	2240	gas
BU-1054	3238	Pocahontas Gas Partnership	PGP Z33F	Keen Mountain	dev.	cbm	12/19/96	12/19/96	1916	gas
BU-0284	1492	Consol, Inc.	C-27	Patterson	dev.	cbm	1/4/96	1/4/96	1720	gas
BU-0929	3019	Consol, Inc.	C-22	Patterson	dev.	cbm	4/15/96	5/22/96	2360	gas
BU-0978	3113	Consol, Inc.	B-22	Patterson	dev.	cbm	7/3/96	7/30/96	2485	gas
BU-0984	3124	Consol, Inc.	D-28	Patterson	dev.	cbm	7/16/96	9/10/96	2317	gas
BU-0821	2857	Equitable Resources Energy C	VC-2400	Prater	dev.	cbm	10/17/96	10/23/96	2702	gas
BU-0909	2988	Equitable Resources Energy C	VC-3432	Prater	dev.	cbm	6/10/96	6/14/96	2590	gas
BU-0838	2890	Consol, Inc.	U-17B	Vansant	dev.	cbm	1/31/96	1/31/96	2131	gas
BU-0876	2935	Consol, Inc.	U-17C	Vansant	dev.	cbm	1/25/96	1/25/96	2132	gas
BU-0900	2971	Consol, Inc.	V-11A	Vansant	dev.	cbm	3/13/96	3/13/96	2369	gas
BU-0901	2972	Consol, Inc.	V-10D	Vansant	dev.	cbm	3/7/96	3/7/96	2380	gas
BU-0902	2973	Consol, Inc.	V-10C	Vansant	dev.	cbm	2/14/96	2/14/96	2381	gas
BU-0914	3001	Consol, Inc.	V-16B	Vansant	dev.	cbm	1/12/96	2/29/96	2052	gas
BU-0924	3014	Consol, Inc.	M-1	Vansant	dev.	cbm	1/27/96	3/11/96	2352	gas
BU-0925	3015	Consol, Inc.	L-2	Vansant	dev.	cbm	1/23/96	3/11/96	2277	gas
BU-0926	3016	Consol, Inc.	Q-2B	Vansant	dev.	cbm	3/20/96	3/20/96	1980	gas
BU-0927	3017	Consol, Inc.	Q-2C	Vansant	dev.	cbm	4/3/96	4/3/96	1675	gas
BU-0930	3020	Consol, Inc.	W-16A	Vansant	dev.	cbm	1/30/96	3/26/96	2053	gas
BU-0932	3023	Consol, Inc.	U-12D	Vansant	dev.	cbm	1/20/96	1/20/96	2093	gas
BU-0938	3032	Consol, Inc.	U-2A	Vansant	dev.	cbm	2/22/96	2/22/96	2232	gas
BU-0939	3036	Consol, Inc.	V-12E	Vansant	dev.	cbm	4/15/96	4/15/96	2414	gas
BU-0940	3037	Consol, Inc.	V-11B	Vansant	dev.	cbm	2/26/96	2/26/96	2061	gas
BU-0942	3039	Consol, Inc.	V-12D	Vansant	dev.	cbm	4/6/96	4/6/96	2485	gas
BU-0944	3041	Consol, Inc.	M-3	Vansant	dev.	cbm	3/5/96	3/11/96	2262	gas
BU-0946	3043	Consol, Inc.	W-14	Vansant	dev.	cbm	11/1/96	11/1/96	2402	gas
BU-0947	3046	Consol, Inc.	W-18A	Vansant	dev.	cbm	10/27/96	11/22/96	2048	gas
BU-0949	3050	Consol, Inc.	U-17D	Vansant	dev.	cbm	3/29/96	3/29/96	1650	gas

Table 12 (continued). Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
BU-0950	3051	Consol, Inc.	V-10B	Vansant	dev.	cbm	7/18/96	7/18/96	2380	gas
BU-0951	3052	Consol, Inc.	V-10A	Vansant	dev.	cbm	5/10/96	6/5/96	2085	gas
BU-0953	3057	Consol, Inc.	W-17B	Vansant	dev.	cbm	4/16/96	5/8/96	2334	gas
BU-0958	3071	Consol, Inc.	U-15F	Vansant	dev.	cbm	6/30/96	6/30/96	2438	gas
BU-0959	3072	Consol, Inc.	V-10G	Vansant	dev.	cbm	5/23/96	5/23/96	2067	gas
BU-0960	3073	Consol, Inc.	U-15D	Vansant	dev.	cbm	6/3/96	6/3/96	1998	gas
BU-0961	3074	Consol, Inc.	U-14B	Vansant	dev.	cbm	7/22/96	7/22/96	2602	gas
BU-0962	3075	Consol, Inc.	P-2A	Vansant	dev.	cbm	5/2/96	5/2/96	1432	gas
BU-0963	3076	Consol, Inc.	U-17E	Vansant	dev.	cbm	4/25/96	4/25/96	1665	gas
BU-0964	3081	Consol, Inc.	U-16A	Vansant	dev.	cbm	5/10/96	5/10/96	1642	gas
BU-0965	3082	Consol, Inc.	U-16B	Vansant	dev.	cbm	5/30/96	5/30/96	1972	gas
BU-0966	3088	Consol, Inc.	U-15E	Vansant	dev.	cbm	6/26/96	6/26/96	2477	gas
BU-0967	3090	Consol, Inc.	P-2C	Vansant	dev.	cbm	5/28/96	5/28/96	1276	gas
BU-0968	3092	Consol, Inc.	U-17F	Vansant	dev.	cbm	4/29/96	4/29/96	1543	gas
BU-0974	3104	Consol, Inc.	M-1	Vansant	dev.	cbm	1/27/96	7/22/96	2142	gas
BU-0977	3110	Consol, Inc.	M-0A	Vansant	dev.	cbm	6/26/96	7/25/96	2247	gas
BU-0982	3120	Consol, Inc.	V-10H	Vansant	dev.	cbm	7/3/96	7/3/96	2337	gas
BU-0983	3121	Consol, Inc.	U-16D	Vansant	dev.	conver	5/28/96	5/28/96	1630	gas
BU-0989	3132	Consol, Inc.	L(-1B)	Vansant	dev.	cbm	8/15/96	9/24/96	2009	gas
BU-0990	3133	Consol, Inc.	S-1C	Vansant	dev.	cbm	12/3/96	12/3/96	1811	gas
BU-0991	3134	Consol, Inc.	S-2C	Vansant	dev.	cbm	11/21/96	11/21/96	1841	gas
BU-0992	3135	Consol, Inc.	S-1B	Vansant	dev.	cbm	11/19/96	11/19/96	2034	gas
BU-0993	3136	Consol, Inc.	U-15J	Vansant	dev.	cbm	7/6/96	7/1/96	1990	gas
BU-0995	3142	Consol, Inc.	L-2A	Vansant	dev.	cbm	9/10/96	9/24/96	2056	gas
BU-0996	3143	Consol, Inc.	U-15I	Vansant	dev.	cbm	8/14/96	8/14/96	2587	gas
BU-0999	3146	Consol, Inc.	P-2B	Vansant	dev.	cbm	5/17/96	5/17/96	1358	gas
BU-1001	3148	Consol, Inc.	U-15H	Vansant	dev.	cbm	8/4/96	8/26/96	2203	gas
BU-1003	3150	Consol, Inc.	W-15B	Vansant	dev.	cbm	9/10/96	11/20/96	2041	gas
BU-1005	3157	Consol, Inc.	R-2D	Vansant	dev.	cbm	12/12/96	12/12/96	2020	gas
BU-1006	3158	Consol, Inc.	U-14C	Vansant	dev.	cbm	8/30/96	8/30/96	2549	gas
BU-1007	3159	Consol, Inc.	W-9	Vansant	dev.	cbm	9/25/96	11/11/96	1968	gas
BU-1008	3160	Consol, Inc.	V-18B	Vansant	dev.	cbm	10/17/96	10/17/96	1915	gas
BU-1011	3164	Consol, Inc.	V-10I	Vansant	dev.	cbm	8/26/96	8/26/96	2020	gas
BU-1012	3166	Consol, Inc.	V-17B	Vansant	dev.	cbm	10/10/96	10/10/96	1933	gas
BU-1013	3167	Consol, Inc.	V-17C	Vansant	dev.	cbm	9/17/96	9/17/96	1917	gas
BU-1020	3177	Consol, Inc.	R-2E	Vansant	dev.	cbm	12/30/96	12/31/96	1700	gas
BU-1024	3186	Consol, Inc.	V-10J	Vansant	dev.	cbm	9/22/96	9/22/96	2171	gas
BU-1030	3196	Consol, Inc.	V-11C	Vansant	dev.	cbm	10/6/96	10/6/96	2353	gas
BU-1037	3209	Consol, Inc.	V-11DD	Vansant	dev.	cbm	11/24/96	11/23/96	2115	gas

Table 12 (continued). Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
BU-1038	3213	Consol, Inc.	V-12C	Vansant	Dev.	cbm	12/12/96	12/12/96	1897	gas
Dickenson County										
DI-0772	2867	Equitable Resources Energy C	V-2026	Caney Ridge	dev.	gas	6/15/96	6/20/96	5095	gas
DI-0794	3070	Equitable Resources Energy C	P-392C	Caney Ridge	dev.	cbm	7/31/96	8/6/96	2763	gas
DI-0797	3080	Equitable Resources Energy C	VC-2938	Caney Ridge	dev.	cbm	7/26/96	8/6/96	2741	gas
DI-0804	3096	Equitable Resources Energy C	VC-3556	Caney Ridge	dev.	cbm	7/9/96	7/15/96	1747	gas
DI-0812	3155	Equitable Resources Energy C	VC-3575	Caney Ridge	dev.	cbm	11/9/96	11/15/96	2625	gas
DI-0813	3156	Equitable Resources Energy C	VC-2939	Caney Ridge	dev.	cbm	11/4/96	11/15/96	2605	gas
DI-0814	3163	Equitable Resources Energy C	P-446	Clintwood	dev.	gas	8/25/96	9/27/96	5643	gas
DI-0787	3033	Equitable Resources Energy C	VC-2586	Duty	dev.	cbm	5/14/96	5/20/96	2465	gas
DI-0788	3035	Equitable Resources Energy C	VC-2551	Duty	dev.	cbm	5/30/96	6/7/96	1351	gas
DI-0792	3066	Equitable Resources Energy C	VC-2550	Duty	dev.	cbm	5/26/96	5/31/96	1333	gas
DI-0798	3083	Equitable Resources Energy C	VC-2585	Duty	dev.	cbm	5/18/96	5/24/96	2470	gas
DI-0800	3086	Equitable Resources Energy C	VC-3557	Duty	dev.	cbm	8/13/96	8/23/96	2196	gas
DI-0805	3098	Equitable Resources Energy C	VC-3307	Duty	dev.	cbm	6/14/96	6/17/96	1735	gas
DI-0809	3114	Equitable Resources Energy C	VC-2594	Duty	dev.	cbm	10/7/96	10/21/96	2360	gas
DI-0811	3123	Equitable Resources Energy C	VC-2596	Duty	dev.	cbm	10/1/96	10/7/96	2700	gas
DI-0817	3184	Equitable Resources Energy C	VC-2588	Duty	dev.	cbm	10/12/96	10/21/96	2436	gas
DI-0775	2889	Equitable Resources Energy C	VC-3318	Nora	dev.	cbm	8/24/96	8/28/96	2290	gas
DI-0782	2988	Equitable Resources Energy C	VC-3320	Nora	dev.	cbm	1/6/96	1/24/96	1970	gas
DI-0783	2998	Equitable Resources Energy C	VC-3323	Nora	dev.	cbm	4/28/96	5/3/96	2343	gas
DI-0784	3011	Equitable Resources Energy C	VC-3319	Nora	dev.	cbm	5/2/96	5/7/96	2315	gas
DI-0785	3013	Equitable Resources Energy C	VC-3438	Nora	dev.	cbm	5/10/96	5/14/96	2084	gas
DI-0786	3021	Equitable Resources Energy C	VC-3317	Nora	dev.	cbm	8/14/96	8/26/96	2489	gas
DI-0789	3047	Equitable Resources Energy C	VC-3437	Nora	dev.	cbm	6/18/96	6/24/96	2270	gas
DI-0790	3061	Equitable Resources Energy C	VC-3176	Nora	dev.	cbm	5/11/96	5/14/96	2243	gas
DI-0791	3062	Equitable Resources Energy C	VC-3311	Nora	dev.	cbm	6/21/96	6/26/96	1485	gas
DI-0795	3077	Equitable Resources Energy C	VC-3568	Nora	dev.	cbm	9/5/96	9/9/96	2102	gas
DI-0796	3078	Equitable Resources Energy C	VC-3449	Nora	dev.	cbm	8/9/96	8/14/96	2329	gas
DI-0801	3087	Equitable Resources Energy C	VC-3567	Nora	dev.	cbm	7/13/96	7/23/96	2396	gas
DI-0802	3093	Equitable Resources Energy C	VC-3565	Nora	dev.	cbm	7/17/96	7/23/96	2269	gas
DI-0806	3100	Equitable Resources Energy C	VC-3563	Nora	dev.	cbm	8/29/96	9/9/96	2425	gas
DI-0808	3107	Equitable Resources Energy C	VC-3564	Nora	dev.	cbm	6/26/96	7/1/96	2195	gas
DI-0810	3116	Equitable Resources Energy C	VC-3562	Nora	dev.	cbm	6/30/96	7/5/96	2070	gas
DI-0815	3165	Equitable Resources Energy C	VC-3616	Nora	dev.	cbm	9/19/96	9/27/96	2371	gas

Table 12 (continued). Wells drilled and completed in Virginia by county, 1996. Abbreviations: dev., development; conver, conversion; cbm, coalbed methane; PA, plugged and abandoned; ust, underground storage; wd, waste disposal.

File Number	Permit Number	Operator	Well Number	Quadrangle	Well Class	Well Type	Drill date	Comp date	Total Depth	STATUS
DI-0816	3169	Equitable Resources Energy C	VC-3590	Nora	dev.	cbm	9/25/96	10/1/96	2825	gas
DI-0818	3185	Equitable Resources Energy C	VC-3589	Nora	dev.	cbm	10/29/96	11/4/96	2960	gas
DI-0820	3191	Equitable Resources Energy C	VC-3618	Nora	dev.	cbm	11/18/96	12/3/96	1800	gas
DI-0821	3192	Equitable Resources Energy C	VC-3619	Nora	dev.	cbm	10/17/96	10/31/96	2505	gas
DI-0824	3203	Equitable Resources Energy C	VC-3617	Nora	dev.	cbm	11/14/96	11/12/96	2460	gas
Russell County										
RU-0046	3034	Equitable Resources Energy C	VC-3305	Duty	dev.	cbm	6/5/96	6/13/96	2178	gas
RU-0047	3053	Equitable Resources Energy C	VC-3569	Duty	dev.	cbm	5/23/96	5/30/96	2531	gas
Scott County										
SC-0040	2756	Virginia Gas Co.	EH-122	Mendota	dev.	ust	1/6/96	1/22/96	4175	ust
SC-0048	2994	Equitable Resources Energy C	V-2731	Wise	dev.	gas	7/11/96	7/31/96	4460	gas
Smyth County										
SM-0003	2854	Virginia Gas Co.	EH-131	Glade Spring	dev.	wd	9/29/96	9342	wd	
Tazewell County										
TA-0040	3126	Cabot Oil & Gas	COGC #4	Amonate	dev.	gas	7/28/96	7/28/96	5077	gas
TA-0041	3128	Cabot Oil & Gas	COGC #9	Amonate	dev.	gas	8/13/96	9/11/96	5344	gas
TA-0042	3151	Cabot Oil & Gas	COGC #11	Amonate	dev.	gas	8/21/96	9/13/96	4858	gas
TA-0043	3173	Cabot Oil & Gas	COGC #1	Amonate	dev.	gas	9/26/96	10/10/96	5559	gas
TA-0044	3174	Cabot Oil & Gas	COGC #2	Amonate	dev.	gas	9/9/96	9/23/96	5566	gas
TA-0045	3182	Cabot Oil & Gas	COGC #5	Amonate	dev.	gas	11/10/96	5566	gas-PA	
Wise County										
WS-0482	3117	Equitable Resources Energy C	VC-3033	Caney Ridge	dev.	cbm	9/8/96	9/19/96	2792	gas
WS-0477	3000	Equitable Resources Energy C	V-2713	Coeburn	dev.	gas	4/12/96	5/2/96	2755	gas
WS-0478	3044	Equitable Resources Energy C	VC-3553	Coeburn	dev.	cbm	4/23/96	4/29/96	2755	gas
WS-0484	3141	Equitable Resources Energy C	VC-3604	Coeburn	dev.	cbm	9/14/96	9/20/96	2909	gas
WS-0483	1137	Equitable Resources Energy C	V-3576	Flat Gap	dev.	gas	7/31/96	8/19/96	5589	gas
WS-0485	3153	Equitable Resources Energy C	V-2763	Flat Gap	dev.	gas	9/15/96	10/11/96	5670	gas
WS-0475	2996	Equitable Resources Energy C	V-2760	Norton	dev.	gas	4/6/96	4/22/96	5145	gas
WS-0470	2978	Equitable Resources Energy C	V-2687	Wise	dev.	gas	6/22/96	7/15/96	4283	gas
WS-0472	2981	Equitable Resources Energy C	V-2730	Wise	dev.	gas	6/30/96	7/24/96	4406	gas
WS-0473	2982	Equitable Resources Energy C	V-2686	Wise	dev.	gas	7/17/96	7/29/96	4160	gas