

VIRGINIA DIVISION OF MINERAL RESOURCES

PUBLICATION 128

Coal, Oil and Gas, and Industrial and Metallic Minerals Industries in Virginia, 1991

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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Front Cover: Drilling of exploration test for natural gas near Nora, Dickenson County.

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COAL, OIL AND GAS, AND INDUSTRIAL AND METALLIC MINERALS INDUSTRIES IN VIRGINIA, 1991

Palmer C. Sweet and Jack E. Nolde

INTRODUCTION

The total value of mineral production in Virginia in 1991 was 2.08-billion dollars (Table 1). About 1.63-billion dollars resulted from coal sales, a 9 percent decrease in value from the 1990 figure of 1.79-billion dollars. About 28-million dollars resulted from the sale of petroleum and natural gas, with the remaining 415-million dollars from production of industrial rocks and minerals (Table 2 and 3). This represents a decrease of about 100-million dollars for 1991, when compared with 1990 statistics. Natural gas production was up slightly. Production of all other commodities in Virginia were on the decline, mainly due to the economy. Crushed stone production was down almost 23 percent and coal, down about 9 percent from 1990 figures.

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

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

COAL¹

About 42.3 million short tons (Table 1) of bituminous coal were produced from the southwest coalfields (Plate) in Buchanan, Dickenson, Lee, Russell, Scott, Tazewell, and Wise Counties from 484 surface and underground mines. Tables 4 through 7 provide production data by county, coal bed, employment statistics. Almost 42 percent of production was from the Pocahontas No. 3, Jawbone, and Dorchester coals. Included in this production total are 950 short tons of semianthracite coal produced near McCoy in the Valley Coal Field, Montgomery County.

Coal from Virginia is used for metallurgical purposes, electrical power generation (steam coal), industrial purposes, and residential heating. A large percentage of Virginia coal is contracted for export to overseas markets. The coal is exported through the ports in the Hampton Roads area in Virginia and at Wilmington in North Carolina.

OIL AND GAS²

INTRODUCTION

Crude oil and gas condensate production in Virginia totaled 12,161 barrels in 1991, a 17 percent decrease

from the 1990 production of 14,676 barrels. Production was by 9 companies from 34 wells in three fields (Table 8), the Ben Hur-Fleenortown and Rose Hill in Lee County (crude oil) and the Roaring Fork in western Wise County (gas condensate). Almost all of Virginia oil comes from the Ordovician Trenton Limestone and the gas condensate comes from the Mississippian Greenbrier Limestone ("Big Lime"). The average price for Virginia oil in 1991 was 19.30 dollars per barrel. Virginia oil production was valued at \$234,707.

Natural gas production increased 0.9 percent, from 14,773,584 Mcf in 1990 to 14,906,525 Mcf in 1991. Production was from 886 wells (Table 9). Coalbed methane wells produced 1,341,151 Mcf; 9 percent of the total production in the state. The average price paid to Virginia's natural gas producers in 1991 was 1.88 dollars per Mcf. The market value for Virginia's natural gas was \$28,024,267.

PERMITTING ACTIVITY

Overall permitting activity continued to increase. The Department of Mines, Minerals, and Energy, Division of Gas and Oil issued 292 permits in 1991, an increase of 8.5 percent from 1990. Of these, 112 permits were issued to drill new coalbed methane wells, 40 permits for new conventional wells, 78 permits were for pipeline construction, and the remaining 62 permits were for conversion, modification and transfers.

DRILLING ACTIVITY

In 1991, a total of 145 wells were drilled in Virginia (Table 10). This represents a 19.8 percent increase over the 121 wells drilled during 1990. Virginia oil and gas owners/operators submitted 62 well completion reports to the Division of Gas and Oil, representing 42.8 percent of the wells drilled in 1991. Of the 145 wells drilled, 34 were completed as conventional wells (23.4 percent), 39 were completed as coalbed methane (26.9 percent), and the remaining 72 (49.7 percent) were not completed as coalbed methane wells. Total footage drilled was 391,102 feet (Table 11), a 3.6 percent decrease over the total 405,511 feet drilled in 1990. Of the 1991 total footage 157,317 feet were for conventional wells and 233,785 were coalbed methane wells. In 1991, the average footage drilled for conventional wells was 4597 feet and coalbed methane wells was 2093 feet. The county with most active natural gas and coalbed methane well drilling was Buchanan with 77, followed by Dickenson with 56, and Russell with 12. One additional well for each county, drilled at the end of 1990, were completed during 1991. Completion zones ranged from the Pennsylvanian Lee Formation to

¹ Information supplied by Division of Mines, 219 Wood Avenue, Big Stone Gap, Virginia 24219.

² Information supplied by Division of Gas and Oil, P.O. Box 1416, Abingdon, Virginia 24210.

the Devonian-Mississippian Chattanooga Shale. Table 12 provides data on these wells drilled in Virginia in 1991.

Buchanan County

Conventional wells: Five development wells were completed with a total footage of 30,383 feet. Ashland Exploration completed one development well during 1991. Virginia Gas Company, formerly Edwards and Harding Petroleum Company, completed four development wells. Three Berea Sandstone wells were completed. The Berea and Greenbrier Limestone are co-producing formations in three additional wells. OXY USA drilled one service well. OXY has applied to the USEPA and the Division of Gas and Oil for a permit to complete this as an injection well for their coalbed methane field. The target formation for injection is the Mississippian Price Formation.

Coalbed methane wells: Seventy-one development wells were drilled by OXY USA in the Keen Mountain field with a total footage of 168,646. These wells are shut-in and are waiting for completion of a pipeline. Virginia Gas Company drilled one coalbed methane well in the Grundy area. The targets for coalbed methane are the Early Pennsylvanian Pocahontas and Lee Formations.

Dickenson County

Conventional wells: Twenty-eight development wells were drilled with a total footage of 127,034 feet. Of these 28 wells, 22 were completed during 1991. Five of these wells produce from the Berea Sandstone. The Berea is a co-producing formation in the remaining 17 wells. One well produces from the Ravenscliff member of the Hinton Formation. Five of the remaining 11 wells co-produced from the Ravenscliff.

Coalbed methane wells: EREX, Inc. drilled 27 coalbed methane wells in the Nora field. Total footage drilled was 63,696 feet. Of the 27 wells drilled, 18 were completed during the year in the Lee and Pocahontas Formations.

Russell County

Coalbed methane wells: EREX, Inc. successfully drilled 12 coalbed methane wells in the Nora field. Ten of which were development wells and two were exploratory wells. Total footage for ten of these new development wells was 23,297 feet. The two exploratory wells were completed with a total footage of 4,850 feet. Total footage drilled in the county was 28,146 feet. The targets for coalbed methane are the Early Pennsylvanian Pocahontas and Lee Formations.

INDUSTRIAL AND METALLIC COMMODITIES

CEMENT

Three companies produce cement in Virginia. Roanoke Cement Company operates a plant in western Botetourt County. The facility manufactures portland cement from locally mined limestone and shale and iron scale from

Roanoke Electric Steel Company. Burned calcium-and iron-aluminate-clinker is manufactured in five coal-fired kilns and ground into cement. Three-fourths of the cement is sold to ready-mix companies. The Riverton Corporation in Warren County produces masonry cement at its plant north of Front Royal. There, crushed limestone (Edinburg Formation) is calcined, hydrated, and mixed with portland cement from out-of-state sources to produce the masonry cement. Sales are made to building supply dealers in Virginia and surrounding states. LaFarge Calcium Aluminate, Inc. operates a cement manufacturing plant in the City of Chesapeake. Cement clinker is imported, 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 the capacity to be used under a wide range of temperatures.

CLAY MATERIALS

Residual and transported clay, weathered phyllite and schist, and shale are used as raw material to produce bricks in Virginia. Almost 745,000 metric tons of clay (exclusive of fuller's earth) were produced in Virginia in 1991. The clay-material industry in the western part of the State mines Paleozoic-age shale, with the primary end product being 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 and Precambrian-age schist and residual and transported clay in Amherst, Brunswick, Chesterfield, Greensville, and Henrico Counties. The annual total capacity of all the brick plants in Virginia is almost one-half-billion bricks.

Lightweight aggregate is produced in Botetourt, Buckingham, and Pittsylvania Counties. Weblite Corporation in Botetourt County mines shale from the Rome Formation to produce lightweight aggregate by the sintering process, using semi-anthracite waste coal from Montgomery County to fire the kilns. They utilize about 100 tons of coal per day to yield a lightweight-product having a weight as low as 31 lb/ft³ for particle sizes of 5/16 to 3/4 inches. Solite Corporation in northern Buckingham County utilizes the Arvonite Slate to produce lightweight aggregate. Triassic-age shale is used by Virginia Solite Company southwest of Danville, Pittsylvania County, to obtain 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 wastes as a fuel to dry the clay in a rotary kiln.

CONSTRUCTION SAND AND GRAVEL

Construction sand and gravel producers accounted for 10.5 million short tons of material produced in 1991 at a value of almost 40 million dollars. Sand and gravel is extracted from the terraces and dredged from the rivers in central and eastern Virginia. Large tonnages of construction sand and gravel, from southeast of Fredericksburg, are shipped by rail into 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 state. Construction sand (concrete and masonry) is also produced from operations that crush and process sandstone. An example is the Sayers Sand Company in Smyth County which produces construction sand from the Erwin Formation.

CRUSHED STONE

Crushed stone including limestone, dolomite, sandstone, quartzite, granite, gneiss, diabase, basalt, greenstone, slate, "Virginia aplite," and marble, was produced in Virginia in 1991. Virginia's crushed stone was valued at more than 247 million dollars and it was the fifth leading producer behind Pennsylvania, Texas, Florida and Illinois.

Producers of limestone, dolomite, shale, and sandstone and quartzite are located in the Valley and Ridge and Plateau provinces in the western portion of the state. Principal end uses for these commodities were for roadstone, concrete aggregate, asphalt stone, and agricultural application. Mine safety dust is produced in southwestern Virginia from limestone. Safety dust is used in coal mines to coat the roof, walls, and floor and prevent explosions. The dust should contain less than 5 percent SiO_2 and 100 percent should pass 20 mesh, with 70 percent passing minus 200 mesh. Finely-ground dolomite and limestone is also marketed by several operations 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 the production of roadstone, concrete aggregate, asphalt stone, and manufactured fine aggregate.

Granite, gneiss, diabase, basalt, slate, and marble are quarried in the central portion of Virginia. Major end uses are for roadstone, asphalt stone, and concrete aggregate. Waste slate is crushed near Arvonnia in Buckingham County by Solite Corporation for lightweight aggregate. Production of crushed slate, as a by-product of dimension slate operations, was increased by LeSueur Richmond Slate Corporation as a result of local highway construction. Appomattox Lime Company, Inc., mines a marble (Mt. Athos Formation) near Oakville in Appomattox County for agricultural lime.

Fines produced at granite quarries in the Petersburg and Red Oak Granites, in the southern part of Virginia have been trucked to central Virginia for low-grade fertilizer (D. Via, personal communication). Chemical analyses for granitic materials from Brunswick and Nottoway Counties in the southern Piedmont province indicate K_2O (potash) percentages higher than 10 percent. Potassium silicates (orthoclase feldspar) common in igneous and metamorphic rocks release potassium from the minerals upon weathering.

DIMENSION STONE

Slate, diabase, quartzite, and soapstone were quarried in the Piedmont province for dimension stone in 1991. Slate

was the leading stone type quarried, in terms of cubic feet and value; LeSueur-Richmond Slate Corporation mines slate from two quarries in the Arvonnia area of Buckingham County. Arvonnia slate production dates from the late 1700s when slate was quarried for use as roofing shingles for the State Capitol in Richmond. Slate producers supply the building trade with a variety of products ranging from material for exterior applications, such as roofing shingles and flooring tile, hearths and sills. Diabase for use as monument stone is produced by New England Stone in southern Culpeper County. Quartzite used as flagging material was extracted from two quarries: Carter Stone Company in Campbell County, south of Lynchburg, and Mower Quarries in Fauquier County, north of Warrenton (Figures 1 and 2). The New Alberene Stone Company, Inc. began quarrying soapstone at Alberene in Nelson County and opened a new quarry site in late 1989 in Albemarle County, just to the north. Their products include soapstone fireplaces, woodstoves, cooking ware, and other products of solid soapstone.

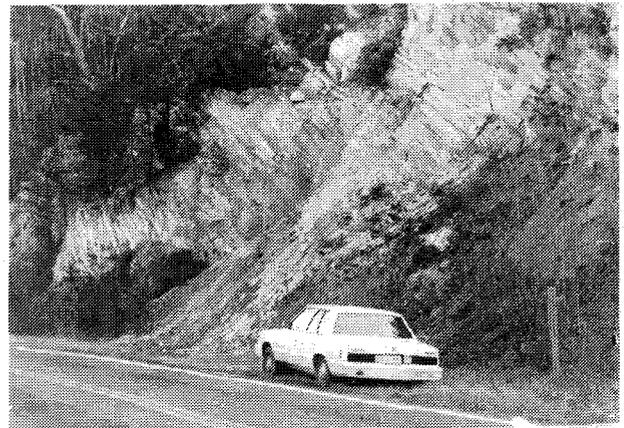


Figure 1. Mount Athos Formation quartzite, being quarried for dimension stone by Carter Stone Co., Lynch Station, Campbell County.

FELDSPAR

The Feldspar Corporation operates a mine and plant near Montpelier in Hanover County in east-central Virginia and produces a material marketed as "Virginia aplite," which is sold to the glass industry. The "aplite" improves the workability of the molten glass and imparts a chemical stability to the finished glassware. Feldspar is mined from medium- to coarse-grained meta-anorthosite by open pit methods. The rock is trucked to the plant adjacent to the mine for crushing, grinding, classifying, and drying. After processing, the aplite is stored in silos. Clay minerals are removed by gravity concentration. The heavy minerals in the feldspar (ilmenite, rutile, and sphene) are removed by electrostatic processes and by magnets. These minerals were stockpiled until the early 1980s but are currently being placed in settling ponds. The processed feldspar is shipped by truck and rail to markets in New Jersey, Pennsylvania, Ohio, and Indiana.

In Amherst County, feldspar is marketed as aggregate by the W.W. Boxley Company, The Blue Ridge Stone Corporation, and the Piney River Quarry (Figure 3). The fines that

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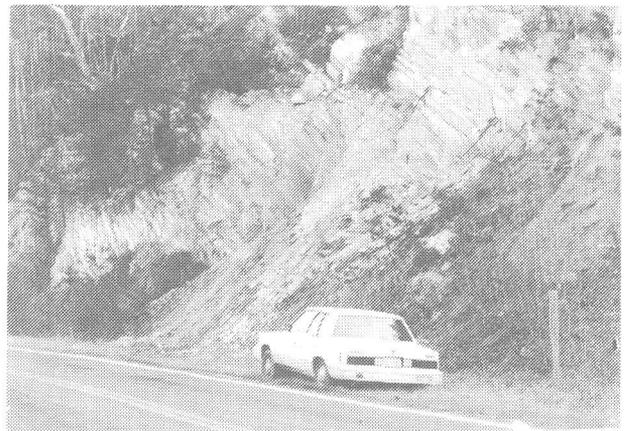


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Figure 2. Quartzite of Weaverton Formation, quarried at Mowers Quarries, The Plains, Fauquier County, for dimension stone.

result from the crushing of feldspar are stockpiled. In the past, feldspar has been mined from several pegmatite bodies in the Piedmont province including those in Amelia and Bedford Counties.

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



Figure 3. Feldspar crushed stone quarry area of W.W. Boxley Co., Blue Ridge Stone Corp., Piney River Plant, Piney River, Amherst County.

GEM STONES

In 1991, mineral collectors and mining operations in Virginia generated natural gem stones with an estimated value of \$35,000. The Morefield pegmatite, operated by Piedmont Mining Company; 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 of the minerals found in the pegmatite. The company also mines and sells "hand picked" mica. Stone Cross Mountain operates a fee basis collecting operation north of Stuart, Patrick County in southern Virginia. At this site mica pseudomorphs after staurolite crystals (fairystone crosses) are the main interest of collectors and for a fee the collectors can sift through and wash a bucket of material.

GYPSUM

U.S. Gypsum Company operates an underground mine and plant at Locust Cove, Smyth County in the southwestern part of the state and a processing plant in Norfolk. 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. The gypsum, after being run through a primary crusher, is trucked to their processing plant at Plasterco, near Saltville, in adjacent Washington County. At Plasterco, the gypsum is ground into "landplaster" ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). The material is calined to remove the water and produce "stucco". Water is then added to the stucco with additional ingredients (sugar, starch, etc.) and poured, molded and dried between sheets of paper to produce wallboard. Eight-three different kinds of wallboard are produced at Saltville; average daily production at the plant could make 80 three-bedroom homes.

The Norfolk plant processes crude gypsum from Nova Scotia to produce wallboard and other gypsum-based products. The plant also produces a fertilizer (land plaster) for the peanut industry. The Norfolk facility 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.

INDUSTRIAL SAND

Traction sand is produced in Dickenson County by Howard L. Daniels Sand Company. Glass sand is produced by Unimin Corporation near Gore in Frederick County from the Ridgeley Sandstone of Devonian-age. CED Enterprises, in Frederick County, recrystallizes purchased sand in a rotary kiln to produce cristobalite, which is marketed as a fine grit.

IRON-OXIDE PIGMENTS

Virginia is one of four states that produce natural iron-oxide pigments. Hoover Color Corporation, located in Hiwassee, Pulaski County, produces ocher, umber, and sienna. The company is the only operation in the United States producing sienna. Raw materials are mined by open pit methods from deposits near the contact of the Erwin Formation with the overlying Shady Dolomite. Deposits, which may be associated with Cambrian age gossans, are concentrated as pockets composed of insoluble clay and iron oxide. Some iron is also concentrated by precipitation from groundwater. The raw material is trucked to the company plant at



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GYPSUM

U.S. Gypsum Company operates an underground mine and plant at Locust Cove, Smyth County in the southwestern part of the state and a processing plant in Norfolk. 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. The gypsum, after being run through a primary crusher, is trucked to their processing plant at Plasterco, near Saltville, in adjacent Washington County. At Plasterco, the gypsum is ground into "landplaster" ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). The material is calined to remove the water and produce "stucco". Water is then added to the stucco with additional ingredients (sugar, starch, etc.) and poured, molded and dried between sheets of paper to produce wallboard. Eight-three different kinds of wallboard are produced at Saltville; average daily production at the plant could make 80 three-bedroom homes.

The Norfolk plant processes crude gypsum from Nova Scotia to produce wallboard and other gypsum-based products. The plant also produces a fertilizer (land plaster) for the peanut industry. The Norfolk facility 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.

INDUSTRIAL SAND

Traction sand is produced in Dickenson County by Howard L. Daniels Sand Company. Glass sand is produced by Unimin Corporation near Gore in Frederick County from the Ridgeley Sandstone of Devonian-age. CED Enterprises, in Frederick County, recrystallizes purchased sand in a rotary kiln to produce cristobalite, which is marketed as a fine grit.

IRON-OXIDE PIGMENTS

Virginia is one of four states that produce natural iron-oxide pigments. Hoover Color Corporation, located in Hiwassee, Pulaski County, produces ocher, umber, and sienna. The company is the only operation in the United States producing sienna. Raw materials are mined by open pit methods from deposits near the contact of the Erwin Formation with the overlying Shady Dolomite. Deposits, which may be associated with Cambrian age gossans, are concentrated as pockets composed of insoluble clay and iron oxide. Some iron is also concentrated by precipitation from groundwater. The raw material is trucked to the company plant at

Hiwassee where it is pulverized, dried, ground, air separated, blended, and packaged prior to 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 (Crayola crayons, chalk, water colors) as well as building products (colored cinderblock, brick, etc.). The pigments are shipped throughout the United States and to Canada and Mexico. Virginia Earth Pigments Company mines a small quantity of iron oxide from the Brubaker #1 mine in southeastern Wythe County. The majority of this material is sold to the Hoover Color Corporation.

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. The majority of the world's kyanite is produced by Kyanite Mining Corporation from their deposit in Buckingham County. The company produces a concentrate with a maximum of 61.8 percent alumina and a minimum iron content of 0.16 percent. By calcining, the kyanite is converted to mullite at temperatures greater than 3000 degrees Fahrenheit. The mullite is a super-duty refractory with a pyrometric cone equivalent of 36 to 37. Products, which are sold in 35, 48, 100, 200, and 325 mesh sizes, are used in the refractory, ceramic, glass, metallurgical, and foundry industries. Mullite aids ceramics and glass to resist cracking, warping, slagging, and deforming from high temperatures.

Kyanite Mining Corporation operates two surface mines and processing plants in central Buckingham County, one at Willis Mountain and one at East Ridge. At this location, kyanite-bearing quartzite is quarried from open pits; this is run through primary crushers, a log washer to remove clay, and onto the 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 the kyanite is skimmed off. The kyanite is dewatered and dried; the high temperature of the drier converts any sulfide minerals that are present to oxides. Pyrite is converted to ferrous iron oxide (Fe_3O_4) or magnetite, which is then removed by magnetic separators and stockpiled.

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

Approximately 40 percent of the production is shipped through the ports in the Hampton Roads area to customers worldwide. 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 other applications such as for sand blasting.

LIME

Virginia's lime industry is from six companies located in Frederick, Giles, Shenandoah, and Warren Counties. Production in 1991 was 818,000 short tons valued at more than 33-million dollars. The paper industry uses lime for regen-

eration of sodium hydroxide and for the neutralization of sulfate water. Lime is used in iron furnaces to remove impurities and to purify water. During the last few years, lime has been used to neutralize acid mine water. It is used also for mason's lime, sewage treatment, and agricultural purposes. One of the more important uses in the 1990s will be to abate the SO_2 and NO_x emissions from coal fired boilers. Two companies, in northwestern Virginia, W.S. Frey Company, Inc. and Chemstone Corporation quarry calcine the high-calcium New Market Limestone (Figure 4). The Riverton Corporation in Warren County quarries and calcines limestone from the Edinburg Formation. Shenvalley Lime Corporation in Stephens City, Frederick County purchases quicklime and produces a hydrated lime. Two companies in western Giles County, APG Lime Corporation and Virginia Lime Company operate underground mines in the Five Oaks Limestone. Both companies calcine the limestone in rotary kilns. Principal sales are to the paper and steel industries.

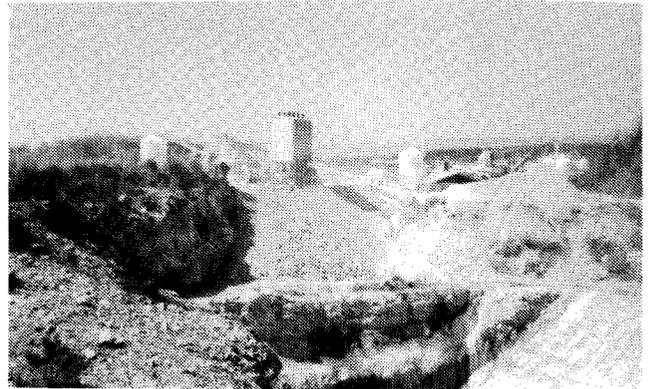


Figure 4. Lime plant site of Chemstone Corporation, Strasburg, Shenandoah County, looking southwest from east rim of old quarry.

LITHIUM

At their Sunbright plant in Scott County, Cyprus Foote Mineral Company processes lithium carbonate (derived from brines in Nevada) with calcium hydroxide (from Virginia sources) to produce lithium hydroxide. Some lithium carbonate is also imported from Chile. Lithium hydroxide is used in multipurpose grease. In the past, limestone from an underground mine at the Sunbright site was utilized 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 CaCO_3 , 3 to 6 percent $\text{Ca}(\text{OH})_2$, and 40 to 80 percent H_2O .

MAGNETITE

Reiss Viking Corporation in Tazewell County processes out-of-state magnetite for use in cleaning coal. In the coal cleaning process, magnetite is mixed with water to form a heavy-media slurry into which raw coal is fed. The heavier impurities sink with the magnetite whereas the lighter coal

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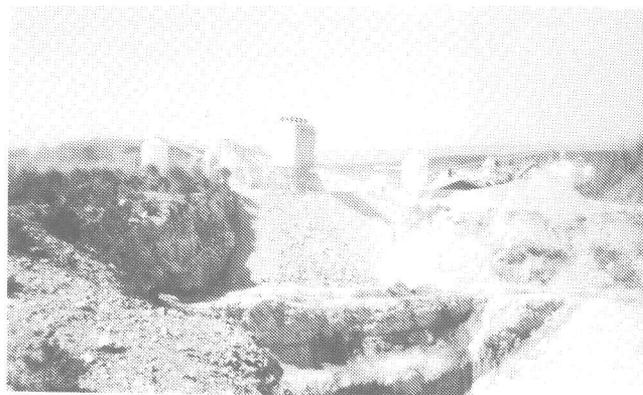


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floats and is recovered. About two pounds of magnetite are used for every ton of coal that is cleaned. The magnetite is obtained from various sources including Missouri, with minor amounts being imported. Magnetite is dried, ground in a ball mill, classified, and graded by percentage of material passing a 325-mesh sieve; grades produced are 40, 70, 90, 96.5, and 99. The magnetite is marketed in Virginia and Kentucky.

MANGANESE

Eveready Battery Company, Inc., operates a manganese processing facility in the City of Newport News. 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; quality control of the manganese content and potential contaminants are maintained through continual chemical/mineralogical analyses. The manganese is dried in a gas-fired rotary kiln and crushed with jaw and ball crushers into two basic sizes. Ground ore is shipped in bulk, bulk bags or in bags to plants in Iowa, Ohio and North Carolina. The product is used in the manufacture of commercial and dry cell batteries in the midwest.

MICA

Plate mica is marketed for use in hair dryers and for other electrical applications; reconstituted built-up mica is used in washers for terminals and as shields in lithium batteries. Asheville Mica Company an affiliate, Mica Company of Canada, process several grades of crude mica, which are purchased from Madagascar, India and Brazil, at facilities in the City of Newport News. Asheville Mica Company produces fabricated plate-mica; Mica Company of Canada uses splittings from Asheville Mica Company to produce reconstituted plate-mica. Presently no domestic mica is being produced. Mica has been produced in the past from pegmatite bodies in several counties in Virginia, including Amelia, Henry and Powhatan.

ORNAMENTAL AGGREGATE

Dolomite 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. Exposaic Industries, Inc. in Spotsylvania County utilizes a variety of rock materials for exposed panels, including greenstone from Albemarle County and Triassic-age sandstone from Culpeper County.

Several rock types have been utilized for ornamental aggregate in past years. Vein quartz was quarried in Albemarle, Buckingham, Fauquier, Fluvanna, Greene, and Rappahannock Counties, and quartz pebbles were extracted from the flood plain 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 Grants, New Mexico. Expanded perlite is used in the manufacture of roof insulation board, which is marketed throughout the eastern United States.

PHOSPHATE ROCK

TexasGulf, Inc. ships phosphate rock from its Lee Creek operation in North Carolina to Glade Spring, Washington County. It is then transported by truck to the TexasGulf 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 the southern and midwestern states.

SULFUR

Elemental sulfur is recovered from hydrogen sulfide gas by the Claus process during crude-oil refining by Amoco Oil Company. The refinery is adjacent to the York River, near Yorktown. Crude oil is heated in a furnace and fed under pressure into a cylinder where it vaporizes, expands, and condenses into liquid. Hydrogen sulfide is produced and is converted into elemental sulfur. About 42 short tons of sulfur are produced per day and are marketed for use in fertilizer.

VERMICULITE

Virginia is one of three states in which vermiculite, a hydrated magnesium-iron-aluminum silicate, is mined. Virginia Vermiculite, Ltd. operates an open-pit mine and processing facility near Boswells Tavern in Louisa County. The vermiculite is mined with a backhoe and front-end loader. The vermiculite is then trucked to the adjacent plant where pieces greater than four inches across are removed. They are washed and run through a rod mill to shear the vermiculite into thin platelets. Biotite, feldspar, and other impurities are removed by washing over a riffle table. The vermiculite is further concentrated by flotation cells, dewatered, dried in a rotary kiln, and screened to produce four basic sized products. Most of the crude vermiculite is shipped by rail in unexfoliated form to North Carolina, West Virginia, Ohio, and other eastern states. James River Limestone Co., Inc., near Zion Crossroads, Louisa County, purchases some of the vermiculite which they exfoliate and market in 4 cubic foot bags. They also pre-mix exfoliated vermiculite with purchased cement and market as "Poolcrete". Uses for the exfoliated material include packing, insulation, lightweight aggregate, and potting material.

Table 1. Mineral Resource Production in Virginia - 1991 ^{1/p}

Mineral Commodity	Quantity	Value (thousands)
Clay ————— metric tons —————	744,584	3,288
Coal (bituminous) _{2/} (\$38.55/ton) _{3/} — thousand short tons —————	42,336	1,632,058
Gemstones —————	NA	35
Lime ————— thousand short tons —————	818	38,424
Natural Gas _{2/} (\$1.88/1000 cu. ft. — million cubic feet —————	14,907	28,024
Petroleum (crude) _{2/} (\$19.30/bl) _{4/} — 42-gallon barrels —————	12,161	235
Sand and gravel ————— thousand short tons —————	10,500	39,900
Stone:		
Crushed ————— thousand short tons —————	45,900	247,400
Dimension ————— short tons —————	W	W
Combined value of cement, clay (fuller's earth), dimension stone, feldspar, gypsum, industrial sand and gravel, iron oxide pigments (crude), kyanite, sulfur, vermiculite —————	XX	<u>86,092</u>
Total —————	XX	2,075,456

NA, Not available. XX, Not Applicable p, Preliminary e, Estimated

W Withheld to avoid disclosing company proprietary data.

1/ Measured by mine shipments, sales, or marketable production (includes consumption by producers) - from U.S. Bureau of Mines.

2/ Virginia Department of Mines, Minerals, and Energy

3/ DOE/EIA, Average Export - Import Price

4/ Oil and Gas Journal - official sales/estimated term price (NON-OPEC)

Table 2. Summary of metal/nonmetal mining by commodity, 1991.

COMMODITY	ANNUAL TONNAGE	OFFICE WORKERS	OFFICE HOURS	OFFICE WAGES	PLANT WORKERS	QUARRY WORKERS
APLITE	356,193.00	2	4,666	\$52,070	0	7
BASALT	614,223.00	2	3,532	\$32,803	0	19
CLAY	211,356.00	9	8,646	\$47,982	0	20
COAL REFUSE	26,719.00	0	0	\$0	0	1
DIORITE	292,033.00	5	8,879	\$171,016	13	6
DOLOMITE	1,301,594.00	13	27,040	\$1,191,744	18	13
FELDSPAR	159,051.00	4	7,529	\$152,655	27	4
FULLERS EARTH	54,480.00	9	19,250	\$190,402	41	2
GRANITE	20,947,814.00	141	259,257	\$3,848,411	357	316
GRAVEL	195,460.00	2	326	\$3,221	0	8
GREENSTONE	181,002.00	2	5,577	\$47,718	7	3
GYPSUM	285,238.00	9	18,680	\$306,637	119	64
IRON OXIDE	200.00	3	488	\$0	0	2
KYANITE	750,800.00	17	33,593	\$724,277	115	38
LIMESTONE	17,879,641.00	258	512,681	\$8,982,169	743	511
LIMONITE	514.00	12	23,968	\$456,020	23	1
MARL	11,706.00	5	9,160	\$123,716	0	7
QUARTZ	17,790.00	1	5	\$70	0	1
QUARTZITE	849,813.00	5	9,102	\$112,664	40	8
SAND	7,290,053.00	104	82,326	\$1,035,341	40	200
SAND & GRAVEL	9,365,890.00	62	108,355	\$1,100,374	182	176
SANDSTONE	859,000.00	8	13,499	\$211,213	16	31
SHALE	709,118.00	54	80,558	\$1,335,189	289	44
SLATE	356,208.00	26	46,888	\$840,329	120	20
SOAPSTONE	5,817.00	8	20,488	\$199,534	18	5
TITANIUM	0.00	14	17,803	\$424,655	0	0
TRAPROCK	8,082,516.00	45	86,151	\$1,581,201	105	134
VERMICULITE	<u>32,250.00</u>	<u>3</u>	<u>7,037</u>	<u>\$74,997</u>	<u>13</u>	<u>6</u>
	70,836,479.00	823	1,415,484	\$23,246,408	2,286	1,647

Table 3. Summary of metal/nonmetal mining by county/city, 1991.

COUNTY	ANNUAL TONNAGE	OFFICE WORKERS	OFFICE HOURS	OFFICE WAGES	PLANT WORKERS	QUARRY WORKERS
ACCOMACK	45,768.00	4	241	\$1,412	1	10
ALBEMARLE	939,623.00	5	9,247	\$136,803	19	19
ALLEGHANY	0.00	0	0	\$0	0	0
AMELIA	0.00	0	0	\$0	0	0
AMHERST	356,193.00	3	4,766	\$53,395	3	7
APPOMATTOX	168,129.00	3	5,246	\$79,337	8	6
AUGUSTA	1,143,623.00	9	17,349	\$219,809	12	50
BEDFORD	838,585.00	14	16,115	\$223,007	18	24
BLAND	129,443.00	1	2,235	\$19,004	7	2
BOTETOURT	2,264,480.00	33	65,902	\$1,405,687	107	47
BRUNSWICK	1,896,310.00	22	44,220	\$744,044	128	13
BUCHANAN	0.00	0	0	\$0	0	0
BUCKINGHAM	990,165.00	32	61,315	\$1,293,559	194	58
CAMPBELL	1,486,461.00	12	9,279	\$170,792	37	16
CAROLINE	767,327.00	10	19,205	\$210,273	11	13
CARROLL	0.00	0	0	\$0	0	0
CHARLES CITY	886,744.00	4	9,881	\$101,485	10	9
CHARLOTTE	9,358.00	0	0	\$0	3	0
CHEASPEAKE	2,436,510.00	13	23,411	\$186,134	3	38
CHESTERFIELD	2,779,213.00	27	49,033	\$401,922	51	43
CLARKE	75,057.00	2	4,045	\$50,451	3	7
CRAIG	96,192.00	5	4,698	\$126,914	0	8
CULPEPER	495,674.00	6	9,284	\$131,371	16	15
DANVILLE CITY	10,785.00	1	300	\$2,640	1	1
DINWIDDIE	1,866,277.00	10	24,294	\$293,000	38	13
ESSEX	38,907.00	0	0	\$0	0	0
FAIRFAX	3,056,050.00	14	26,684	\$464,696	17	39
FAUQUIER	753,162.00	6	10,647	\$185,737	7	18
FLOYD	0.00	0	0	\$0	0	0
FLUVANNA	0.00	0	0	\$0	0	0
FRANKLIN	10,800.00	1	1,755	\$30,000	2	6
FREDERICK	2,132,795.00	34	62,403	\$848,298	116	66
GILES	989,977.00	27	47,786	\$840,011	134	64
GLOUCESTER	1,235,011.00	6	3,118	\$54,421	1	6
GOOCHLAND	2,601,811.00	12	22,416	\$349,209	14	45
GRAYSON	346,033.00	5	8,797	\$88,917	13	11
GREENE	505,763.00	2	2,376	\$25,443	0	13
GREENSVILLE	773,226.00	46	62,713	\$1,183,224	155	29
HALIFAX	657,306.00	6	11,619	\$221,130	10	9
HAMPTON	56,315.00	0	0	\$0	0	2
HANOVER	2,065,506.00	10	16,612	\$303,235	65	30
HENRICO	3,177,997.00	10	19,907	\$175,916	36	52
HENRY	818,594.00	11	17,878	\$322,260	23	18
HIGHLAND	5,208.00	1	1,733	\$7,173	0	2
ISLE OF WIGHT	381,947.00	22	40,058	\$516,933	2	29
JAMES CITY	69,052.00	5	655	\$4,148	0	7
KING AND QUEEN	231,017.00	11	23,670	\$249,144	56	5
KING GEORGE	639,751.00	5	14,040	\$142,192	17	20
KING WILLIAM	287,549.00	4	8,890	\$53,862	2	11
LANCASTER	17,207.00	1	52	\$416	0	15
LEE	512,708.00	7	6,594	\$67,305	12	17
LOUDOUN	3,712,242.00	29	51,524	\$965,617	74	77
LOUISA	290,675.00	6	12,992	\$157,368	21	19
MATHEWS	8,864.00	1	15	\$56	0	3
MECKLENBURG	229,094.00	5	8,760	\$100,471	12	6
MIDDLESEX	77,350.00	2	45	\$360	0	9
MONTGOMERY	1,125,005.00	11	24,534	\$285,112	16	24
NELSON	7,417.00	8	20,488	\$199,534	18	6
NEW KENT	810.00	2	9	\$50	2	2
NORTHAMPTON	5,294.00	1	240	\$1,860	0	8
NORTHUMBERLAN	23,962.00	6	372	\$2,200	1	7
NOTTOWAY	562,502.00	1	2,280	\$26,572	0	15
ORANGE	71,535.00	2	2,785	\$41,125	0	1
PATRICK	15.00	1	400	\$1,200	0	0
PITTSYLVANIA	182,830.00	14	17,801	\$254,275	26	15
POWHATAN	528,833.00	1	2,078	\$17,901	0	14
PRINCE EDWARD	0.00	1	1,542	\$15,591	17	0

Table 3. Summary of metal/nonmetal mining by county/city, 1991 (continued).

COUNTY	ANNUAL TONNAGE	OFFICE WORKERS	OFFICE HOURS	OFFICE WAGES	PLANT WORKERS	QUARRY WORKERS
PRINCE GEORGE	1,049,549.00	4	8,256	\$120,000	27	18
PRINCE WILLIAM	2,638,314.00	15	28,045	\$626,132	31	24
PULASKI	413,659.00	17	32,239	\$497,860	35	5
RICHMOND	4,973.00	1	8	\$0	0	1
RICHMOND CITY	2,580,939.00	6	12,958	\$182,299	32	27
ROANOKE	1,349,594.00	18	36,890	\$1,256,744	75	15
ROCKBRIDGE	327,435.00	11	17,279	\$258,027	8	23
ROCKINGHAM	1,646,643.00	18	37,770	\$577,375	49	53
RUSSELL	1,591,718.00	19	43,526	\$564,227	63	30
SCOTT	283,236.00	3	4,725	\$28,544	5	19
SHENANDOAH	998,013.00	33	68,498	\$1,282,814	66	22
SMYTH	587,829.00	15	25,622	\$400,669	123	79
SOUTHAMPTON	244,372.00	3	2,711	\$18,611	14	7
SPOTSYLVANIA	1,106,753.00	4	9,111	\$141,258	27	24
STAFFORD	1,637,621.00	11	20,996	\$357,851	16	18
SUFFOLK	1,956,690.00	5	7,040	\$24,747	0	10
SURRY	702.00	0	0	\$0	0	0
SUSSEX	33,816.00	2	635	\$2,000	3	3
TAZEWELL	1,173,415.00	8	18,265	\$324,707	31	32
VIRGINIA BEACH	322,717.00	12	9,309	\$230,165	2	15
WARREN	422,672.00	38	65,110	\$1,902,030	58	28
WASHINGTON	509,431.00	3	7,684	\$172,471	11	9
WESTMORELAND	91,465.00	0	0	\$0	0	8
WISE	756,529.00	3	2,765	\$24,901	13	24
WYTHE	1,159,882.00	11	19,508	\$197,575	58	29
YORK	76,475.00	10	200	\$1,400	0	1
	68,198,165.00	823	1,415,484	\$23,246,408	2,286	1,643

Table 4: Summary of coal mine production in Virginia, 1991.

	BUCHANAN	DICKENSON	LEE	MONTGOMERY	RUSSELL	SCOTT	TAZEWELL	WISE	TOTAL
NUMBER OF MINES									
AUGER	3	11	2	0	1	0	0	24	41
STRIP	31	24	5	1	5	0	1	47	114
SURF TOTAL	34	35	7	1	6	0	1	71	155
TIPPLE	13	9	1	0	3	0	3	3	32
TRUCK	144	46	20	0	11	1	30	45	297
UNDG TOTAL	157	55	21	0	14	1	33	48	329
TOTAL	191	90	28	1	20	1	34	119	484
TONNAGES									
AUGER	38,540	56,481	20,620	0	2,061	0	0	202,990	320,692
STRIP	1,112,077	1,399,624	293,892	950	395,374	0	1,351	4,563,408	7,766,676
SURF TOTAL	1,150,617	1,456,104	314,512	950	397,435	0	1,351	4,766,399	8,087,367
TIPPLE	8,582,948	1,892,952	583,436	0	0	0	615,836	1,115,725	12,790,897
TRUCK	8,289,895	2,934,689	1,127,695	0	501,080	27,144	2,472,865	6,104,503	21,457,872
UNDG TOTAL	16,872,843	4,827,641	1,711,131	0	501,080	27,144	3,088,701	7,220,228	34,248,769
TOTAL	18,023,461	6,283,745	2,025,643	950	898,515	27,144	3,090,052	11,986,626	42,336,136
MINING METHODS:									
UNDERGROUND:									
LONGWALL									
TIPPLE	6,244,380	828,005	399,509	0	0	0	0	831,424	8,303,318
TRUCK	0	0	0	0	0	0	0	0	0
TOTAL	6,244,380	828,005	399,509	0	0	0	0	831,424	8,303,318
CONT. MINER									
TIPPLE	2,338,568	1,064,947	183,927	0	0	0	615,836	284,301	4,487,579
TRUCK	7,824,917	2,570,995	1,127,695	0	450,499	0	2,472,865	6,088,912	20,535,882
TOTAL	10,163,485	3,635,942	1,311,622	0	450,499	0	3,088,701	6,373,213	25,023,461
OTHER									
TIPPLE	0	0	0	0	0	0	0	0	0
TRUCK	464,979	363,694	0	0	50,582	27,144	0	15,591	921,990
TOTAL	464,979	363,694	0	0	50,582	27,144	0	15,591	921,990
TOTAL UNDG	16,872,843	4,827,641	1,711,131	0	501,080	27,144	3,088,701	7,220,228	34,248,769
SURFACE:									
AUGER	38,540	56,481	20,620	0	2,061	0	0	202,990	320,692
STRIP	1,112,077	1,399,624	293,892	950	395,374	0	1,351	4,563,408	7,766,676
TOTAL SURF	1,150,617	1,456,104	314,512	950	397,435	0	1,351	4,766,399	8,087,367

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Table 5. Summary of coal mining in Virginia by coal bed, 1991 (short tons).*

COAL BED	BUCHANAN DICKENSON LEE			MONTGOMERY	RUSSELL	SCOTT	TAZEWELL	WISE	TOTAL
AILEY	1,581	0	0	0	0	0	0	0	1,581
BIG FORK	0	0	0	0	18,396	0	0	0	18,396
BLAIR	629,664	19,767	0	0	0	0	429,595	0	1,079,026
CAMPBELL CREEK	0	0	0	0	0	0	377,698	0	377,698
CEDAR GROVE	0	0	0	0	0	0	129,573	0	129,573
CLINTWOOD	104,354	777,907	6,569	0	0	0	1,100,221	0	1,989,050
COVE CREEK	0	0	0	0	0	27,144	0	0	27,144
DORCHESTER	195,113	662,030	0	0	0	0	3,240,789	0	4,097,932
EAGLE	216,401	138,933	0	0	0	0	0	0	355,334
GREASY CREEK	0	0	0	0	0	0	895,997	0	895,997
HAGY	1,080,306	0	0	0	0	0	0	0	1,080,306
HIGH SPLINT	0	0	0	0	0	0	397,697	0	397,697
JAWBONE	2,293,066	1,618,510	0	0	409,529	0	496,822	0	4,817,926
KELLY	0	0	57,350	0	0	0	1,263,010	0	1,320,360
KENNEDY	1,277,883	0	0	0	373,321	0	1,351	0	1,652,555
LOW SPLINT	0	0	0	0	0	0	581,831	0	581,831
LOWER BANNER	34,910	919,885	0	0	0	0	2,466	0	957,261
LOWER HORSEPEN	0	0	0	0	0	0	94,357	0	94,357
LOWER ST. CHARLES	0	0	521,261	0	0	0	0	0	521,261
LOWER SEABOARD	0	0	0	0	0	0	659,893	0	659,893
LYONS	0	0	0	0	0	0	498,593	0	498,593
MERRIMAC	0	0	0	950	0	0	0	0	950
MORRIS	0	0	0	0	0	0	91,021	0	91,021
MIDDLE SEABOARD	0	0	0	0	0	0	26,202	0	26,202
PARDEE	0	0	0	0	0	0	914,119	0	914,119
PHILLIPS	0	0	428,214	0	0	0	112,527	0	540,741
PINHOOK	0	0	0	0	0	0	10,217	0	10,217
POCAHONTAS #3	8,582,948	0	0	0	0	0	92,056	0	8,675,004
POCAHONTAS #5	0	0	0	0	0	0	218,500	0	218,500
RAVEN	1,059,032	403,344	0	0	87,660	0	255,170	157,269	1,962,475
SPLASH DAM	2,283,945	684,359	0	0	0	0	267,732	0	3,236,037
TAGGART	0	0	716,181	0	0	0	440,840	0	1,157,021
TAGGART MARKER	0	0	3,535	0	0	0	0	0	3,535
TILLER	264,256	174,468	0	0	0	0	131,568	0	570,292
UPPER BANNER	0	884,542	0	0	9,610	0	720,190	0	1,614,341
UPPER HORSEPEN	0	0	0	0	0	0	714,957	0	714,957
UPPER STANDIFORD	0	0	292,533	0	0	0	754,418	0	1,046,951
	18,023,459	6,283,745	2,025,643	950	898,516	27,144	3,090,051	11,986,628	42,336,134

* Coal bed and county totals may differ slightly, because of rounding.

Table 6. Summary of coal mine employment in Virginia, 1991.

	BUCHANAN	DICKENSON	LEE	MONTGOMERY	RUSSELL	SCOTT	TAZEWELL	WISE	TOTAL
PROD. EMPLOYEES									
AUGER	14	42	13	0	3	0	0	68	140
STRIP	236	332	116	0	94	0	4	692	1,475
SURF TOTAL	250	374	129	1	97	0	4	760	1,615
TIPPLE	1,568	521	199	0	0	0	164	264	2,716
TRUCK	2,200	803	355	0	135	11	475	1,446	5,425
UNDG TOTAL	3,768	1,324	554	0	135	11	639	1,710	8,141
TOTAL	4,018	1,698	683	1	232	11	643	2,470	9,756
MAN DAYS									
AUGER	1,408	4,379	100	0	99	0	0	2,418	8,404
STRIP	35,273	60,044	22,776	100	16,594	0	256	147,938	282,981
SURF TOTAL	36,681	64,423	22,876	100	16,693	0	256	150,356	291,385
TIPPLE	367,836	161,989	48,158	0	0	0	52,310	63,888	694,181
TRUCK	413,040	142,330	57,861	0	24,424	1,807	98,071	336,263	1,073,796
UNDG TOTAL	780,876	304,319	106,019	0	24,424	1,807	150,381	400,151	1,767,977
TOTAL	817,557	368,742	128,895	100	41,117	1,807	150,637	550,507	2,059,362
MAN HOURS									
AUGER	9,192	43,607	1,531	0	864	0	0	20,288	75,482
STRIP	339,737	497,609	260,605	800	128,401	0	2,242	1,501,840	2,731,234
SURF TOTAL	348,929	541,216	262,136	800	129,265	0	2,242	1,522,128	2,806,716
TIPPLE	3,513,740	1,016,999	382,339	0	0	0	317,065	499,304	5,729,447
TRUCK	3,345,103	1,180,173	457,241	0	177,408	13,757	758,744	2,493,650	8,426,076
UNDG TOTAL	6,858,843	2,197,172	839,580	0	177,408	13,757	1,075,809	2,992,954	14,155,523
TOTAL	7,207,772	2,738,388	1,101,716	800	306,673	13,757	1,078,051	4,515,082	16,962,239
PROD. WAGES									
AUGER	58,621	530,896	8,800	0	19,861	0	0	393,561	1,011,739
STRIP	4,408,950	5,817,272	1,828,112	0	1,755,196	0	23,543	23,257,239	37,090,312
SURF TOTAL	4,467,571	6,348,168	1,836,912	0	1,775,057	0	23,543	23,650,800	38,102,051
TIPPLE	60,900,002	19,466,178	8,277,592	0	0	0	6,217,173	10,839,524	105,700,469
TRUCK	47,612,472	17,890,640	7,503,936	0	2,965,526	100,065	10,671,593	37,630,529	124,374,761
UNDG TOTAL	108,512,474	37,356,818	15,781,528	0	2,965,526	100,065	16,888,766	48,470,053	230,075,230
TOTAL	112,980,045	43,704,986	17,618,440	0	4,740,583	100,065	16,912,309	72,120,853	268,177,281

Table 6. Summary of coal mine employment in Virginia, 1991 (continued).

	BUCHANAN	DICKENSON	LEE	MONTGOMERY	RUSSELL	SCOTT	TAZEWELL	WISE	TOTAL
OFFICE EMPLOYEES									
AUGER	1	0	0	0	0	0	0	1	2
STRIP	4	11	0	0	4	0	0	32	51
SURF TOTAL	5	11	0	0	4	0	0	33	53
TIPPLE	23	0	4	0	0	0	2	6	35
TRUCK	163	22	9	0	2	1	14	37	248
UNDG TOTAL	186	22	13	0	2	1	16	43	283
TOTAL	191	33	13	0	6	1	16	76	336
OFFICE WAGES									
AUGER	2,200	0	0	0	0	0	0	3,240	5,440
STRIP	35,092	122,737	0	0	117,455	0	0	1,301,642	1,576,926
SURF TOTAL	37,292	122,737	0	0	117,455	0	0	1,304,882	1,582,366
TIPPLE	758,557	0	143,625	0	0	0	80,651	242,148	1,224,981
TRUCK	2,260,462	577,664	67,118	0	5,425	4,900	358,983	1,203,832	4,478,384
UNDG TOTAL	3,019,019	577,664	210,743	0	5,425	4,900	439,634	1,445,980	5,703,365
TOTAL	3,056,311	700,401	210,743	0	122,880	4,900	439,634	2,750,862	7,285,731

Table 7. Fatality summary report for coal mines, in Virginia, 1991.

COMPANY NAME	VICTIM NAME/AGE	TOTAL EXPERIENCE COMPANY EXPERIENC	OCCUPATION EXPERIENCE	ACCIDENT OCCUPATION USUAL OCCUPATON
Brent Coal Corporation 13650AB/ #2	Taylor, T. 31	13Y/00M 01Y/01M	01Y/01M	Mechanic-UGF Mechanic-UGF
Dominion Coal Corporation 04644AA/ Youngs Branch # 15	McCowan, R.G. 49	27Y/00M 15Y/08M	15Y/08M	Mechanic-SUR Mechanic-SUR
Jamb Mining Inc. 11752AC/ # 2	Mullins, T.W. 41	04Y/00M 01Y/09M	00Y/08M	Roof Bolt Hel/SH-UGF Beltman-UGF
LJ S Coal Corporation 12311AB/ # 1	Mosley, H.W. 38	19Y/00M 09Y/00M	10Y/00M	Section Foreman-UGF Section Foreman-UGF
LJ S Coal Corporation 12311AB/ # 1	Roberts, D.E. 30	11Y/06M 01Y/06M	04Y/00M	Roof Bolter-UGNF Roof Bolter-UGNF
LJ S Coal Corporation 12311AB/ # 1	Dowell, H.D. 51	23Y/00M 03Y/00M	15Y/00M	Section Foreman-UGF Section Foreman-UGF
LJ S Coal Corporation 12311AB/ #1	Varble, F.N. 26	02Y/06M 01Y/06M	02Y/06M	Roof Bolter-UGNF Roof Bolter-UGNF
Old Dominion Energy Corp. 14163AA/ # 4	Gibson, L. 25	00Y/04M Y M	Y M	Watchman-SUR Watchman-SUR
Westmoreland Coal Company 04303AA/Wentz # 1	Collins, H.E. 38	17Y/00M 17Y/00M	17Y/00M	Welder/S-SUR Welder/S-SUR

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Table 8. Oil production by county and company, 1991.

COUNTY	COMPANY	PRODUCING NUMBER	WELLS BBLs
Lee	APACO Petroleum	4	622.50
	Ben Hur Oil	6	1,537.00
	Eastern States	1	1,560.00
	Maverick Oil	5	3127.55
	Pride Oil	1	1674.58
	Southern Exploration	1	28.00
	Stonewall Gas	4	1,628.00
	Witt Oil	1	240.00
Total		23	10,417.63
Wise	EREX, Inc.	11	1,743.71
GRAND TOTAL		34	12,161.00

Table 9. Gas production by county and company, 1991.

COUNTY	COMPANY	PRODUCING NUMBER	VOLUME MCF
Buchanan	Ashland Exploration	52	533,087
	Berea Oil & Gas	1	49,246
	Cabot Oil & Gas	3	12,640
	CD & G Development	2	43,993
	Columbia Natural Resources	92	1,518,739
	Edisto Resources	4	148,031
	P & S Corporation	6	123,073
	Panther Creek	2	8,560
	Peake Operating	1	23,705
	Virginia Gas Co.	19	425,165
Total		182	2,686,239
Dickenson	Columbia Natural Resources	32	623,171
	W. E. Elliott	2	26,773
	EREX, Inc.	391	6,478,315
	Pine Mountain	9	80,567
	Virginia Gas Co.	8	101,753
TOTAL		442	7,310,579
Russell	EREX, Inc.	11	181,579
	Pine Mountain	1	17,978
TOTAL		12	199,557
Scott	EREX, Inc.	1	320
	Virginia Gas Co.	12	114,482
TOTAL		13	114,802
Tazewell	CNP Development	1	8,978
	Columbia Natural Resources	6	117,735
	Consol-Ray	13	161,292
	EMAX Oil	2	24,466
	Excel Energy	1	29,987
	R & B Petroleum	2	15,344
	TOTAL		25

Table 9. Gas production by county and company, 1991 (continued).

COUNTY	COMPANY	PRODUCING NUMBER	VOLUME MCF
Washington	Virginia Gas Co.	7	19,895
Wise	Amvest Oil and Gas EREX, Inc.	6 198	26,682 4,190,969
TOTAL		204	4,217,651
GRAND TOTAL		885	14,906,525

Table 10. Well type drilled, 1991.

COUNTY	CONVENTIONAL		COALBED METH		NOT COMP.		TOTAL WELLS
	DEV.	EXPL.	DEV.	EXPL.	DEV.	EXPL.	
Buchanan	5	0	0	0	72	0	77
Dickenson	28	1	27	0	0	0	56
Russell	0	0	11	1	0	0	12
TOTAL	33	1	38	1	72	0	145
PERCENT	(22.7)	(0.7)	(26.2)	(0.7)	(49.7)	(0)	(100)

Table 11. Footage drilled for gas, 1991.

COUNTY	CONVENTIONAL		COALBED METHA		TOTAL FOOTAGE
	DEV.	EXPL.	DEV.	EXPL.	
Buchanan	30,383	0	138,363	0	168,646
Dickenson	127,034	3,579	63,696	0	194,309
Russell	0	0	23,297	4,850	28,147
TOTAL	157,417	3,579	225,356	4,850	391,102
PERCENT	(40.2)	(0.9)	(57.6)	(1.3)	(100)

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Table 12 . Wells Drilled or Completed in Virginia, 1991.

File Number (Mcfd)	Permit Number	Operator	Well Name	7.5-minute Quadrangle	Latitude	Longitude	Well Class	Total Depth/(feet)	Formation at T. D.	Producing Formation	Initial Flow/(Mcfd)	Final Flow/
Buchanan County												
BU-260	1370	OXY USA	CBM BB-9	Vansant	6850' S. 3710'00"	7620' W. 8202'30"	Dev.	2326	Pocahontas			
BU-261	1371	OXY USA	CBM BB-12	Vansant	6080' S. 3710'00"	3100' W. 8202'30"	Dev.	2196	Pocahontas			
BU-265	1402	OXY USA	CBM L-24	Keen Mountain	6660' S. 3715'00"	5200' W. 8152'30"	Dev.	1885	Pocahontas			
BU-281	1489	Va. Gas Co.	EH-033	Keen Mountain	4050' S. 3715'00"	5550' W. 8152'30"	Dev.	5221	Chattanooga Sh	Berea Ss		158
BU-292	1502	Ashland Expl.	ROGERS #32	Patterson	7140' S. 3717'30"	3610' W. 8152'30"	Dev.	5251	Chattanooga Sh	Greenbrier Ls, Berea Ss		319
BU-299	1516	Va. Gas Co.	EH-32	Keen Mountain	2815' S. 3715'00"	9175' W. 8152'30"	Dev.	4677	Chattanooga Sh	Greenbrier Ls, Berea Ss	103	140 539
BU-308	1533	OXY USA	CBM U-3	Vansant	8150' S. 3712'30"	7675' W. 8205'00"	Dev.	2022	Pocahontas			
BU-311	1539	OXY USA	CBM U-33	Keen Mountain	8390' S. 37 12'30"	12150' W. 81 52'30"	Dev.	1542	Pocahontas			
BU-314	1542	Va. Gas Co.	EH-36	Patterson	14800' S. 37 17'30"	1700' W. 81 52'30"	Dev.	4914	Chattanooga Sh	Berea Ss		713
BU-316	1545	Va. Gas Co.	EH-29	Keen Mountain	422' S. 37 15'00"	9825' W. 81 52'30"	Dev.	5404	Chattanooga Sh	Greenbrier Ls Berea Ss	220 161	808 880
BU-318	1554	OXY USA	CBM N-34	Keen Mountain	10740' S. 37 15'00"	9580' W. 81 52'30"	Dev.	2040	Pocahontas			
BU-319	1555	OXY USA	CBM L-32	Keen Mountain	7540' S. 37 15'00"	1400' W. 81 55'00"	Dev.	2140	Pocahontas			
BU-320	1556	OXY USA	CBM L-33	Keen Mountain	6980' S. 37 15'00"	12100' W. 81 52'30"	Dev.	2020	Pocahontas			
BU-321	1557	OXY USA	CBM W-11	Vansant	11520' S. 37 12'30"	5380' W. 82 02'30"	Dev.	1651	Pocahontas			
BU-322	1558	OXY USA	CBM Q-31	Keen Mountain	1220' S. 37 12'30"	2970' W. 81 55'00"	Dev.	1603	Pocahontas			
BU-323	1559	OXY USA	CBM P-35	Keen Mountain	14000' S. 37 15'00"	8040' W. 81 52'30"	Dev.	1853	Pocahontas			
BU-324	1560	OXY USA	CBM P-34	Keen Mountain	14740' S. 37 15'00"	10400' W. 81 52'30"	Dev.	1905	Pocahontas			
BU-325	1561	Va. Gas Co.	EH-31	Keen Mountain	1260' S. 37 15'00"	4461' W. 81 52'30"	Dev.	4828	Chattanooga Sh	Berea Ss	15	492
BU-326	1562	OXY USA	CBM M-33	Keen Mountain	9320' S. 37 15'00"	11780' W. 81 52'30"	Dev.	1960	Pocahontas			
BU-327	1565	OXY USA	CBM Q-33	Keen Mountain	16850' S. 37 15'00"	12150' W. 81 52'30"	Dev.	2009	Pocahontas			
BU-328	1566	OXY USA	CBM V-11	Vansant	10910' S. 37 12'30"	4120' W. 82 02'30"	Dev.	1748	Pocahontas			
BU-330	1568	OXY USA	CBM O-32	Keen Mountain	11780' S. 37 15'00"	2440' W. 81 55'00"	Dev.	2217	Pocahontas			
BU-331	1569	OXY USA	CBM W-10	Vansant	11750' S. 37 12'30"	7110' W. 82 02'30"	Dev.	1530	Pocahontas			
BU-334	1584	OXY USA	CBM O-34	Keen Mountain	12260' S. 37 15'00"	9700' W. 81 52'30"	Dev.	2072	Pocahontas			
BU-335	1585	OXY USA	CBM L-31	Keen Mountain	7900' S. 37 15'00"	3420' W. 81 55'00"	Dev.	2292	Pocahontas			
BU-337	1594	OXY USA	CBM Q-34	Keen Mountain	15800' S. 37 10'00"	10100' W. 81 52'30"	Dev.	1912	Pocahontas			
BU-338	1598	OXY USA	CBM K-30	Keen Mountain	5020' S. 37 15'00"	5400' W. 81 55'00"	Dev.	2348	Pocahontas			
BU-339	1599	OXY USA	CBM O-31	Keen Mountain	12560' S. 37 15'00"	3040' W. 81 55'00"	Dev.	2060	Pocahontas			
BU-340	1600	OXY USA	CBM M-34	Keen Mountain	8440' S. 37 15'00"	9960' W. 81 52'30"	Dev.	1447	Pocahontas			
BU-341	1601	OXY USA	CBM S-32	Keen Mountain	4280' S. 37 12'30"	1640' W. 81 55'00"	Dev.	1700	Pocahontas			
BU-343	1603	OXY USA	CBM O-33	Keen Mountain	12920' S. 37 15'00"	200' W. 81 15'00"	Dev.	2041	Pocahontas			
BU-344	1604	OXY USA	CBM Q-35	Keen Mountain	15600' S. 37 15'00"	8800' W. 81 52'30"	Dev.	1916	Pocahontas			
BU-345	1606	OXY USA	CBM Y-10	Vansant	1500' S. 37 10'00"	7320' W. 82 02'30"	Dev.	1730	Pocahontas			
BU-346	1611	OXY USA	CBM V-10	Vansant	11280' S. 37 12'30"	6150' W. 82 02'30"	Dev.	1627	Pocahontas			
BU-347	1612	OXY USA	CBM AA-9	Vansant	4640' S. 37 10'00"	7820' W. 82 02'30"	Dev.	2220	Pocahontas			
BU-348	1613	OXY USA	CBM AA-1	Vansant	4880' S. 37 10'00"	4420' W. 82 02'30"	Dev.	1895	Pocahontas			
BU-349	1617	OXY USA	CBM Y-8	Vansant	1560' S. 37 10'00"	11020' W. 82 02'30"	Dev.	1765	Pocahontas			
BU-350	1618	OXY USA	CBM Z-9	Keen Mountain	2580' S. 37 10'00"	8200' W. 82 02'30"	Dev.	1558	Pocahontas			
BU-351	1622	OXY USA	CBM U-10	Vansant	8510' S. 37 12'30"	6790' W. 82 02'30"	Dev.	1700	Pocahontas			
BU-352	1623	OXY USA	CBM M-32	Keen Mountain	8820' S. 37 15'00"	1520' W. 81 55'00"	Dev.	2235	Pocahontas			
BU-353	1624	OXY USA	CBM K-32	Keen Mountain	4640' S. 37 15'00"	2420' W. 81 55'00"	Dev.	2175	Pocahontas			

Table 12 . Wells Drilled or Completed in Virginia, 1991 (continued).

File Number (Mcfd)	Permit Number	Operator	Well Name	7.5-minute Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T. D.	Producing Formation	Initial Flow/(Mcfd)	Final Flow/
BU-354	1625	OXY USA	CBM CC-1	Vansant	8360' S. 37 10'00"	6420' W. 82 02'30"	Dev.	1868	Pocahontas			
BU-355	1626	OXY USA	CBM AA-1	Vansant	5300' S. 37 10'00"	940' W. 82 02'30"	Dev.	1775	Pocahontas			
BU-356	1627	OXY USA	CBM Y-12	Vansant	200' S. 37 10'00"	3320' W. 82 02'30"	Dev.	1815	Pocahontas			
BU-357	1635	OXY USA	CBM U-11	Vansant	9020' S. 37 12'30"	4275' W. 82 02'30"	Dev.	2425	Pocahontas			
BU-358	1639	OXY USA	CBM M-35	Keen Mountain	9680' S. 37 15'00"	8480' W. 81 52'30"	Dev.	1675	Pocahontas			
BU-359	1640	OXY USA	CBM N-35	Keen Mountain	10700' S. 37 15'00"	7650' W. 81 52'30"	Dev.	1774	Pocahontas			
BU-360	1641	OXY USA	CBM Z-8	Vansant	3220' S. 37 10'00"	9780' W. 82 02'30"	Dev.	1610	Pocahontas			
BU-361	1642	OXY USA	CBM U-12	Vansant	9210' S. 37 12'30"	3000' W. 82 02'30"	Dev.	2475	Pocahontas			
BU-362	1653	OXY USA	CBM P-32	Keen Mountain	14300' S. 37 15'00"	14200' W. 81 52'30"	Dev.	1875	Pocahontas			
BU-363	1651	OXY USA	CBM K-23	Keen Mountain	5060' S. 37 15'00"	5680' W. 81 57'30"	Dev.	1620	Pocahontas			
BU-364	1652	OXY USA	CBM P-31	Keen Mountain	14500' S. 37 15'00"	4000' W. 81 55'00"	Dev.	2035	Pocahontas			
BU-365	1654	OXY USA	CBM P-33	Keen Mountain	14000' S. 37 15'00"	11400' W. 81 15'00"	Dev.	1675	Pocahontas			
BU-366	1655	OXY USA	CBM V-12	Vansant	9900' S. 37 12'30"	1980' W. 82 02'30"	Dev.	2456	Pocahontas			
BU-367	1656	OXY USA	CBM G-20	Patterson	12950' S. 37 17'30"	11700' W. 81 57'30"	Dev.	2244	Pocahontas			
BU-368	1669	Va. Gas Co.	EH-74	Grundy	936' S. 37 17'30"	603' W. 82 05'00"	Dev.	2447	Pocahontas			
BU-370	1675	OXY USA	CBM I-22	Keen Mountain	2150' S. 37 15'00"	9100' W. 81 57'30"	Dev.	2370	Pocahontas			
BU-371	1676	OXY USA	CBM I-21	Keen Mountain	1650' S. 37 15'00"	10450' W. 81 57'30"	Dev.	2109	Pocahontas			
BU-372	1677	OXY USA	CBM H-21	Keen Mountain	15300' S. 37 17'30"	10400' W. 81 57'30"	Dev.	2359	Pocahontas			
BU-373	1679	OXY USA	CBM H-20	Patterson	13950' S. 37 17'30"	11500' W. 81 57'30"	Dev.	2210	Pocahontas			
BU-374	1680	OXY USA	CBM J-21	Keen Mountain	3100' S. 37 15'00"	9950' W. 81 57'30"	Dev.	2205	Pocahontas			
BU-376	1682	OXY USA	CBM I-20	Keen Mountain	16400' S. 37 17'30"	11700' W. 81 57'30"	Dev.	2360	Pocahontas			
BU-377	1683	OXY USA	CBM CC-8	Vansant	8400' S. 37 10'00"	10100' W. 82 02'30"	Dev.	1793	Pocahontas			
BU-378	1684	OXY USA	CBM CC-9	Vansant	7860' S. 37 10'00"	8840' W. 82 02'30"	Dev.	1800	Pocahontas			
BU-379	1689	OXY USA	CBM J-20	Keen Mountain	4000' S. 37 15'00"	11200' W. 81 57'30"	Dev.	1893	Pocahontas			
BU-380	1690	OXY USA	Ball A-1	Vansant	7820' S. 37 10'00"	11380' W. 82 02'30"	Dev.	5209	Chattanooga Sh	Greenbrier Ls Greenbrier Ls Price	50 98 165	
BU-382	1692	OXY USA	CBM U-2	Vansant	8500' S. 37 12'30"	8590' W. 82 05'00"	Dev.	1991	Pocahontas			
BU-383	1693	OXY USA	CBM S-7	Vansant	4800' S. 37 12'30"	11820' W. 82 02'30"	Dev.	1682	Pocahontas			
BU-385	1709	OXY USA	CBM S-8	Vansant	5600' S. 37 12'30"	10550' W. 82 02'30"	Dev.	1744	Pocahontas			
BU-406	1739	OXY USA	CBM R-29	Keen Mountain	2760' S. 37 12'30"	7440' W. 81 55'00"	Dev.	1586	Pocahontas			
BU-407	1740	OXY USA	CBM R-30	Keen Mountain	2460' S. 37 12'30"	5280' W. 81 55'00"	Dev.	1590	Pocahontas			
BU-408	1743	OXY USA	CBM X-12	Vansant	13950' S. 37 12'30"	1950' W. 82 02'30"	Dev.	2150	Pocahontas			
BU-410	1750	Va. Gas Co.	EH-43	Grundy	5590' S. 37 20'00"	8830' W. 82 02'30"	Dev.	2446	Bluestone			
BU-413	1763	Va. Gas Co.	EH-42	Grundy	13350' S. 37 17'30"	9730' W. 82 02'30"	Dev.	1906	Bluestone	Pocahontas Bluestone	11 15	
BU-414	1764	Va. Gas Co.	EH-44	Grundy	8810' S. 37 20'00"	500' W. 82 02'30"	Dev.	1693	Bluestone	Bluestone	82	
BU-415	1770	Va. Gas Co.	EH-47	Grundy	11600' S. 37 20'00"	20082' W. 82 02'30"	Dev.	1842	Bluestone	Pocahontas	30	
BU-419	1782	Va. Gas Co.	EH-46	Grundy	9457' S. 37 20'00"	6893' W. 82 02'30"	Dev.	1832	Bluestone			
BU-433	1820	Poca. Gas Partnership	CBM PGP-70	Keen Mountain	5663' S. 37 12'30"	3707' W. 81 57'30"	Dev.	1693	Pocahontas			
Dickenson County												
DI-310	930-1	EREX ,Inc	P-288	Haysi	6500' S. 37 10'00"	5710' W. 82 15'30"	Dev.	5054	Chattanooga Sh	Greenbrier Ls Maccardy Price Berea Ss Chattanooga Sh	60 60 60	561 582

Table 12. Wells Drilled or Completed in Virginia, 1991 (continued).

File Number (Mcfd)	Permit Number	Operator	Well Name	7.5-minute Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T. D.	Producing Formation	Initial Flow/(Mcfd)	Final Flow/
DI-358	1004	EREX ,inc	P-360	Caney Ridge	3800' S. 37 05'00"	2290' W. 82 25'00"	Dev.	4816	Chattanooga Sh	Greenbrier Ls Price Berea Ss Chattanooga Sh	29 33 26 37	
DI-379	1033	EREX ,inc	P-54	Caney Ridge	1920' S. 37 05'00"	1790' W. 82 25'00"	Dev.	5194	Chattanooga Sh	Hinton Bluefield, Greenbrier Ls, Maccrady/Price, Chattanooga Sh	118	
DI-402	1091	EREX ,inc	P-435	Caney Ridge	13790' S. 37 05'00"	11780' W. 82 22'30"	Dev.	5107	Chattanooga Sh	Berea Ss/Up. Sh.	84 660	
DI-408	1105	EREX ,inc	P-268	Caney Ridge	7750' S. 37 05'00"	1700' W. 82 22'30"	Dev.	5412	Chattanooga Sh	Hinton-Ravenclyff Berea Ss/Up Sh	127	332
DI-418	1131	EREX ,inc	P-235	Haysi	12700' S. 37 10'00"	3200' W. 82 17'30"	Dev.	4979	Chattanooga Sh	Greenbrier Ls, Berea Ss/Up Sh		1805
DI-441	1248	EREX ,inc	P-475	Haysi	4975' S. 37 12'30"	11475' W. 82 17'30"	Dev.	4464	Chattanooga Sh	Berea Ss Chattanooga Sh	15	959
DI-501	1462	EREX ,inc	P-502	Clintwood	7895' S. 37 12'30"	5315' W. 82 22'30"	Dev.	4572	Chattanooga Sh	Hinton Bluefield Greenbrier Ls Maccrady Sh Price Chattanooga Sh	119 189 158 158 119 189	
DI-504	1465	EREX ,inc	P-487	Haysi	1950' S. 37 12'30"	7800' W. 82 17'30"	Dev.	4466	Chattanooga Sh	Berea Ss/Up Sh		1292
DI-524	1500	EREX ,inc	P-486	Haysi	980' S. 37 12'30"	10850' W. 82 17'30"	Dev.	4504	Chattanooga Sh	Berea Ss		516
DI-526	1510	EREX ,inc	P-501	Haysi	15110' S. 37 12'30"	4690' W. 82 15'00"	Dev.	4871	Chattanooga Sh	Berea Ss		823
DI-530	1518	EREX ,inc	PC-158	Nora	4440' S. 37 05'00"	1675' W. 82 17'30"	Dev.	2786	Pocahontas	Lee Pocahontas	15 21	
DI-531	1519	EREX ,inc	PC-155	Nora	10800' S. 37 05'00"	8090' W. 82 17'30"	Dev.	2023	Bluestone			
DI-532	1520	EREX ,inc	PC-156	Nora	9915' S. 37 05'00"	9410' W. 82 17'30"	Dev.	2132	Bluestone	Pocahontas, Pocahontas Bluestone	103 84 84	68
DI-535	1536	EREX ,inc	P-507	Clintwood	4175' S. 37 12'30"	3425' W. 82 22'30"	Dev.	4368	Chattanooga Sh	Hinton-Ravenclyff Berea Ss/Up Sh	907	838
DI-536	1544	Va. Gas Co.	EH-25	Haysi	14800' S. 37 12'30"	2300' W. 82 17'30"	Dev.	4905	Chattanooga Sh	Berea Ss	440	
DI-541	1550	EREX ,inc	PC-13	Nora	525' S. 37 02'30"	11575' W. 82 20'00"	Dev.	2050	Bluestone	Lee, Pocahontas, Pocahontas	33 33 39	60
DI-548	1577	Va. Gas Co.	EH-14	Haysi	13700' S. 37 12'30"	100' W. 82 17'30"	Dev.	4923	Chattanooga Sh	Berea Ss	119	492
DI-550	1581	EREX ,inc	VC-1871	Caney Ridge	7275' S. 32 02'30"	2340' W. 82 22'30"	Dev.	2291	Bluestone	Lee/Pocahontas		30
DI-553	1588	EREX ,inc	PC-119	Nora	13990' S. 37 05'00"	5500' W. 82 15'00"	Dev.	2896	Bluestone	Lee/Pocahontas		32
DI-555	1590	Va. Gas Co.	EH-27	Haysi	3425' S. 37 12'30"	11375' W. 82 15'00"	Dev.	4654	Chattanooga Sh	Hinton-Ravenclyff, Hinton-Stony Gap Ss, Greenbrier Ls, Berea Ss	1476 223	1374C
DI-558	1593	Va. Gas Co.	EH-86	Haysi	15120' S. 37 12'30"	1950' W. 82 15'00"	Dev.	4849	Chattanooga Sh	Hinton-Ravenclyff Hinton-Stony Gap Ss Berea Ss	103, 133, 133	2903C
DI-559	1596	EREX ,inc	V-1940	Prater	1550' S. 37 10'00"	11720' W. 82 12'30"	Dev.	3347	Hinton	Hinton-Ravenclyff		2200
DI-560	1597	EREX ,inc	V-1941	Prater	13075' S. 37 10'00"	2900' W. 82 12'30"	Dev.	3282	Bluefield	Hinton-Ravenclyff Hinton-Stony Gap Ss		696 257
DI-561	1605	Va. Gas Co.	EH-50	Elkhorn City	13600' S. 37 17'30"	11700' W. 82 17'30"	Dev.	3855	Chattanooga Sh	Berea Ss/Up Sh	26	1966
DI-562	1607	Va. Gas Co.	EH-52	Elkhorn City	8430' S. 37 17'30"	10050' W. 82 17'30"	Dev.	4367	Chattanooga Sh	Berea Ss	15	
DI-563	1608	EREX ,inc	VC-1934	Nora	14700' S. 37 05'00"	10' W. 82 17'30"	Dev.	2406	Pocahontas	Lee		66
DI-565	1610	EREX ,inc	PC-118	Nora	12590' S. 37 05'00"	6850' W. 82 15'00"	Dev.	2894	Bluestone	Lee/Pocahontas		131
DI-567	1615	EREX ,inc	VC-1935	Nora	12760' S. 37 05'00"	1450' W. 82 17'30"	Dev.	2677	Bluestone	Lee		64
DI-568	1616	Va. Gas Co.	EH-54	Elkhorn City	6970' S. 37 17'30"	190' W. 82 20'00"	Expl.	3579	Price	Greenbrier Ls Hinton-Stony Gap Greenbrier Ls	4574 3223 2350	2300C
DI-569	1629	EREX ,inc	V-2000	Prater	10350' S. 37 10'00"	3510' W. 82 12'30"	Dev.	3706	Hinton	Hinton	11	
DI-570	1630	EREX ,inc	V-2001	Prater	13790' S. 37 10'00"	320' W. 82 12'30"	Dev.	4848	Chattanooga Sh	Hinton-Ravenclyff Hinton-Stony Gap Ss Bluefield Maccrady/Price Chattanooga Sh	47 60 21 26 26	246 163

Table 12. Wells Drilled or Completed in Virginia, 1991 (continued).

File Number (Mcf)	Permit Number	Operator	Well Name	7.5-minute Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T. D.	Producing Formation	Initial Flow/(Mcf/d)	Final Flow/
DI-572	1634	Va. Gas Co.	EH-65	Haysi	2700' S. 37 15'00"	9980' W. 82 17'30"	Dev.	4319	Chattanooga Sh	Hinton-Stony Gap Ss, Berea Ss	15	852C
DI-574	1644	EREX ,Inc	VC-2007	Nora	7190' S. 37 07'30"	9200' W. 82 17'30"	Dev.	2558	Bluestone	Lee Lee/Pocahontas Bluestone	119 146 158	131
DI-578	1661	EREX ,Inc	V-1913	Haysi	2490' S. 37 10'00"	5500' W. 82 15'00"	Dev.	4828	Chattanooga Sh	Hinton-Stony Gap Ss Berea Ss Chattanooga Sh Chattanooga Sh	18 18 18 30	
DI-579	1663	EREX ,Inc	VC-2005	Nora	5800' S. 37 07'30"	4500' W. 82 17'30"	Dev.	1802	Bluestone	Lee Lee Lee Pocahontas Pocahontas Bluestone	103 146 267 298 280 286	275C
DI-580	1664	EREX ,Inc	VC-2011	Duty	13010' S. 37 07'30"	8820' W. 82 10'00"	Dev.	2053	Pocahontas	Pocahontas	15	133
DI-581	1665	EREX ,Inc	VC-2012	Duty	130' S. 37 05'00"	7260' W. 82 10'00"	Dev.	2278	Bluestone	Lee/Pocahontas Bluestone	21	78C
DI-582	1666	EREX ,Inc	V-1998	Prater	14000' S. 37 12'30"	11700' W. 82 12'30"	Dev.	4550	Chattanooga Sh	Hinton Hinton Bluefield Price Berea Ss Chattanooga Sh	84 60 198 179 286 298	327
DI-584	1668	EREX ,Inc	V-1942	Haysi	8790' S. 37 12'30"	6390' W. 82 15'00"	Dev.	4722	Chattanooga Sh	Bluestone Price Chattanooga Sh	42 382 421	
DI-587	1686	EREX ,Inc	VC-2015	Nora	9780' S. 37 05'00"	8000' W. 82 20'00"	Dev.	1950	Pocahontas	Lee/Pocahontas	40C	
DI-588	1687	EREX ,Inc	VC-1936	Nora	14600' S. 37 05'00"	8825' W. 82 15'00"	Dev.	2908	Bluestone	Lee	56C	
DI-589	1672	EREX ,Inc	VC-2006	Nora	6780' S. 37 07'30"	6520' W. 82 17'30"	Dev.	2500	Bluestone	Lee Lee Pocahontas Bluestone	146 103 103 133	162C
DI-590	1673	EREX ,Inc	VC-2008	Nora	5880' S. 37 07'30"	10400' W. 82 17'30"	Dev.	2135	Bluestone	Lee Lee/Pocahontas Bluestone	26 60 60	91C
DI-599	1701	EREX ,Inc	VC-2020	Nora	9400' S. 37 05'00"	11200' W. 82 20'00"	Dev.	2028	Bluestone	Lee Bluestone	105	122C
DI-600	1710	EREX ,Inc	V-1999	Prater	5220' S. 37 10'00"	7420' W. 82 12'30"	Dev.	3759	Greenbrier Ls	Hinton-Ravenciff Hinton-Stony Gap Ss Bluefield Greenbrier Ls	60 60 60 84	304
DI-601	1711	EREX ,Inc	VC-2014	Nora	10600' S. 37 05'00"	10100' W. 82 20'00"	Dev.	2221	Pocahontas	Pocahontas Pocahontas Pocahontas Pocahontas	60 60 60 103	
DI-604	1747	EREX ,Inc	VC-2113	Duty	11800' S. 37 07'30"	10125' W. 82 10'00"	Dev.	2410	Bluestone			
DI-605	1748	EREX ,Inc	VC-2114	Duty	10100' S. 37 07'30"	12150' W. 82 10'00"	Dev.	1858	Bluestone	Pocahontas Pocahontas Pocahontas Bluestone	158 163 133 133	
DI-606	1749	EREX ,Inc	VC-2115	Duty	10225' S. 37 07'30"	9000' W. 82 10'00"	Dev.	1951	Bluestone	Lee Lee Pocahontas Bluestone	30 42 33 82	
DI-607	1752	EREX ,Inc	PC-157	Nora	6280' S. 37 05'00"	3190' W. 82 17'30"	Dev.	2221	Pocahontas	Lee/Pocahontas		76C
DI-608	1756	EREX ,Inc	VC-2149	Nora	10670' S. 37 07'30"	9100' W. 82 17'30"	Dev.	2652	Bluestone	Lee/Pocahontas Pocahontas Bluestone	42 33 21	26C
DI-609	1757	EREX ,Inc	VC-2150	Nora	8700' S. 37 07'30"	7900' W. 82 17'30"	Dev.	2565	Bluestone	Lee Lee Pocahontas Bluestone	21 26 26 26	42C
DI-610	1758	EREX ,Inc	VC-2120	Nora	11850' S. 37 07'30"	4620' W. 82 17'30"	Dev.	2646	Bluestone	Lee		35C
DI-613	1762	EREX ,Inc	VC-2121	Nora	13320' S. 37 07'30"	5800' W. 82 17'30"	Dev.	2628	Bluestone			
DI-614	1767	Va. Gas Co.	EH-53	9100' S.	833' W. 37 17'30"	Dev.	4313	Chattanooga Sh	Greenbrier Ls, Berea Ss	793C	2970C	
DI-616	1780	EREX ,Inc	VC-2201	Nora	8300' S. 37 07'30"	3925' W. 82 15'00"	Dev.	2660	Bluestone			

Table 12 . Wells Drilled or Completed in Virginia, 1991 (continued).

File Number (Mcfid)	Permit Number	Operator	Well Name	7.5-minute Quadrangle	Latitude	Longitude	Well Class	Total Depth (feet)	Formation at T. D.	Producing Formation	Initial Flow/(Mcfid)	Final Flow/
Russell County												
RU-009	1393	EREX ,Inc	PC-304	Duty	14600' S. 37 05'00"	3220' W. 82 07'30"	Dev.	2295	Bluestone	Lee/Pocahontas Bluestone	292 304	347C
RU-012	1514	EREX ,Inc	PC-311	Duty	5325' S. 37 02'30"	6505' W. 82 07'30"	Dev.	2075	Bluestone	Lee Lee/Pocahontas Pocahontas Pocahontas	68 119 33 37	150C
RU-013	1522	EREX ,Inc	PC-312	Duty	4155' S. 37 02'30"	5085' W. 82 07'30"	Expl.	2245	Bluestone	Lee Lee Lee/Pocahontas Pocahontas Pocahontas	103 146 189 174 158	150C
RU-014	1523	EREX ,Inc	PC-314	Duty	8270' S. 37 02'30"	7015' W. 82 07'30"	Expl.	2095	Bluestone	Lee/Pocahontas Bluestone	26 18	22C
RU-015	1524	EREX ,Inc	PC-317	Duty	2080' S. 37 02'30"	12970' W. 82 07'30"	Dev.	2605	Bluestone	Lee/Pocahontas		34C
RU-016	1537	EREX ,Inc	PC-318	Duty	6910' S. 37 02'30"	11740' W. 82 07'30"	Dev.	1964	Bluestone	Lee Lee/Pocahontas Bluestone	16 19 18	18C
RU-017	1551	EREX	VC-1874	Duty	2475' S. 37 02'30"	3160' W. 82 07'30"	Dev.	2427	Bluestone	Lee Lee/Pocahontas Bluestone	42 110 119	123C
RU-018	1552	EREX	VC-1873	Duty	220' S. 37 02'30"	2225' W. 82 07'30"	Dev.	2441	Bluestone	Lee Lee/Pocahontas	31 67	92C
RU-020	1576	EREX	PC-403	St. Paul	7650' S. 37 00'00"	8220' W. 82 15'00"	Dev.	2587	Bluestone	Lee/Pocahontas		3C
RU-023	1628	EREX	PC-303	Duty	710' S. 37 02'30"	5290' W. 82 07'30"	Dev.	2270	Bluestone	Lee Lee/Pocahontas Bluestone	251 260 337	292C
RU-024	1662	EREX	VC-1987	Duty	420' S. 37 02'30"	7060' W. 82 07'30"	Dev.	2464	Bluestone	Lee Lee/Pocahontas Bluestone	17 45 53	55C
RU-031	1714	EREX	VC-1857	Big A Mountain	3480' S. 37 02'30"	10700' W. 82 05'00"	Dev.	2552	Pocahontas			
RU-032	1759	EREX	VC-1992	Duty	5700' S. 37 02'30"	3610' W. 82 07'30"	Dev.	2422	Bluestone			

