THE MINERAL INDUSTRY OF VIRGINIA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Virginia Department of Mines, Minerals and Energy for collecting information on all nonfuel minerals.

In 2000, the estimated value[1] of nonfuel mineral production for Virginia was $692 million, based upon preliminary U.S. Geological Survey (USGS) data. This was a 6.5% increase from that of 1999[2] and followed a 2.2% increase from 1998 to 1999. Virginia was 22d in rank among the 50 States in total nonfuel mineral production value, of which the State accounted for more than 1.5% of the U.S. total.

Crushed stone was, by value, Virginia's leading raw nonfuel mineral, accounting for 60% of the State's total mineral production value. From 1990 through 2000, the State produced more than 628 million metric tons of crushed stone, or an average of almost 57 million metric tons per year. Cement (masonry and portland) was the second leading nonfuel mineral commodity, followed by construction sand and gravel and lime. These four construction material commodities represented nearly 88% of the State's nonfuel mineral value. In 2000, increases in the values of crushed stone, cement, construction sand and gravel, zirconium concentrates, and fuller's earth led Virginia's increase in value for the year (table 1). (All listings by value are in descending order of change.) Relatively small yet significant decreases occurred in gypsum (production ceased) and lime. In 1999, the increased values of titanium, masonry cement, and zirconium concentrates (all up about $5 million each), fuller's earth (up more than $3 million), and vermiculite and feldspar (up about $1 million each) led the State's increase in value. Lime was the only mineral commodity having a decrease of more than $1million; all other changes were on the order of $1million or less.

Based upon USGS estimates of quantities produced in the 50 States during 2000, Virginia remained the only State to mine kyanite; 2d in feldspar; 2d in both titanium (ilmenite) and zircon concentrates, which were produced only in Virginia and Florida; 2d of 2 vermiculite-producing States; 5th in iron oxide pigments; 6th in fuller's earth; 9th in crushed stone; and 10th in lime. The State increased to 7th from 9th in the production of common clays. Although the only producing kyanite mine and calcined kyanite (mullite) facilities in the United States were in Virginia, synthetic mullite, which is a calcined bauxite, was produced in one other State. About 90% of the U.S. kyanite and mullite output is used in refractories for the smelting and processing of a variety of metals and in glass and in high-temperature ceramics manufacturing.

The following narrative information was provided by the Virginia Division of Mineral Resources[3] (VDMR). Some production data in the text that follows are those reported by the VDMR and are based on that agency's own surveys and estimates. They may differ from production figures reported to the USGS, some of which also may be withheld from USGS data in this publication to avoid disclosing company proprietary data. During 2000, some reconnaissance work for base and precious metals took place in the southern Piedmont province of Virginia. Gold Crown Mining Co. continued to renew permits and to intermittently work the Kentuck Mine east of Danville in Pittsylvania County, and the Southern Piedmont Mining Co. continued to renew permits at the Moss Mine in Goochland County.

Golden Cat, a Division of Ralston Purina Co. about 40 kilometers northeast of Richmond in King William County, continued producing cat box litter. Clay was used as the raw material at this site since the operation opened in the late summer of 1997. Production has totaled 294,000 metric tons (t) through 1999.

Iluka Resources, Inc., formerly RGC (USA) Mineral Sands, Inc., continued titanium mining and initial processing operations in Dinwiddie County and final processing near the town of Stony Creek in adjacent Sussex County. The company expanded its operations in 2000. Since production started in the fall of 1997, 339,000 t of titanium and zirconium concentrates have been produced through 1999.

In October, Titan Cement Co. completed the purchase of Tarmac America, Inc. Following this transaction, Titan sold Tarmac's construction aggregate operations to Vulcan Materials Co. The acquisition of Tarmac's Curles Neck Plant, Dale Quarry, Jack Quarry, Kingsland Plant, New Post Plant, Puddledock Plant, and Richmond Quarry gave Vulcan 17 active operations in the Commonwealth. Vulcan Materials Co. was renamed Vulcan Construction Materials, LP.

Also in late October, Luck Stone Corp. proposed to open up a quarry in eastern Spotsylvania County near Massaponax. Luck withdrew a similar request in 1996 and was turned down by the county supervisors in 1997. The present plan received the go-ahead by the County Board of Supervisors and clearly addressed issues such as traffic, noise, and blast vibrations.

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[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2000 USGS mineral production data published in this chapter are preliminary estimates as of July 2001 and are expected to change. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. A telephone listing of the specialists may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html, by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists), or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals; facsimile copies may be obtained from MINES FaxBack.

[2]Values, percentage calculations, and rankings for 1999 may vary from the Minerals Yearbook, Area Reports: Domestic 1999, Volume II, owing to the revision of preliminary 1999 to final 1999 data. Data for 2000 are preliminary and are expected to change; related rankings may also change.

[3]Palmer C. Sweet, Geologist Supervisor–Economic Geology, Virginia Division of Mineral Resources, authored the text of mineral industry information submitted by that agency.

The New World Stone Co. began operating the former Tulikivi soapstone plant at Schuyler, Nelson County, in November 1998. The company continued to sell stocks of soapstone blocks in 2000 for construction applications. During 2000, business was good, and there continued to be a large number of orders to fill.

U. S. Gypsum Co. closed its Locust Cove Mine and wallboard plant in Smyth and Washington Counties in January 2000. The company closed its plant because of its high cost and inaccessibility of the plant to major markets.

Production of crushed stone for the year 2000 (reported by the USGS) was 69 million metric tons along with 12 million metric tons of sand and gravel (table 1). During the address on the biennial budget amendments in the latter part of the year, the Governor of Virginia announced that $3.2 billion will be provided for transportation projects statewide and that more than a half billion dollars will be provided for transportation projects in the northern Virginia area alone.

Government Activities and Programs

The VDMR continued geologic mapping in several counties at a detailed 1:24,000 scale and continued to map and compile 1:100,000-scale maps. It continued its digitizing of 1:24,000- and 1:100,000-scale-maps. Field studies and compilation of mineral resources on 1:24,000-scale maps continued, and a project to prepare county geology and mineral resources data began. In 2000, the VDMR published a report on the geology of the Glasgow and Buena Vista quadrangles, mostly in eastern Rockbridge County, and the geologic map of the Virginia portion of the Elkins 30 x 60 minute quadrangle. Also, 15 maps-on-demand depicting the mined portion and extent of coalbeds in southwest Virginia were prepared during the year. Articles published in the quarterly Virginia Minerals pertained to the geology and history of the Confederate coal mines in Montgomery County; mineral update of the Morefield Pegmatite in Amelia County; a fulgurite created by lightning; and a field trip road log to the eastern Blue Ridge and western Piedmont near Martinsville.

A program to digitize all previously published VDMR geologic maps continued in 2000, with all maps in some stage of completion. Plans were being made to scan all of the reports published since 1905. These will be made available as PDF (Portable Document Format) files on CD-ROM. Aside from the convenience of having all of the maps and reports available in digital form, previously out-of-print publications would be permanently available at the end of the project.

The Geologic Map of Virginia (1:500,000 scale) had been digitized and was in the final stage of editing in 2000. It will be issued on CD-ROM as a color raster image accompanied by digital vector data in a variety of standard formats. In 1999, the VDMR, in cooperation with Radford University, produced and released a CD-ROM entitled "The Geology of Virginia," which described the basics of rocks, minerals, fossils, etc; it emphasized the Virginia Standards of Learning in Earth Science. A Teacher's Guide accompanied the CD-ROM. During 2000, two additional CD-ROMs in the planned set of four were produced and released on the detailed geology of the coastal plain and the Piedmont and Blue Ridge physiographic provinces. A Teacher's guide was available for the Coastal Plain, and the guide for the Piedmont and Blue Ridge was released.

The Mineral Resources of Virginia database, which contains location and identification information on mines, quarries, prospects, pits, and occurrences, was being updated as field work was completed. Checking and verification of data was also being accomplished as the project continued. Pilot projects to develop water well databases were underway in four counties in an effort to establish the relationship between bedrock geology and water well yields.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN VIRGINIA 1/ 2/

(Thousand metric tons and thousand dollars)

Mineral		1998		1999		2000 p/	
		Quantity	Value	Quantity	Value	Quantity	Value
Clays, common		872	3,310	881	3,240	881	3,240
Kyanite e/		90	13,200	90	12,700	90,000	13,400
Lime		859	51,700	W	W	W	W
Sand and gravel, construction		11,900	54,800	11,300	53,800	11,600	56,000
Stone:							
Crushed		65,900	390,000	66,400	389,000	69,000	415,000
Dimension	metric tons	5,430	600	5,640	624	6,080	668
Titanium, ilmenite	do	W	W	139,000	13,900	W	W
Combined values of cement, clays (fuller's earth), feldspar, gemstones, gypsum (crude), iron oxide pigments (crude), sand and gravel (industrial), vermiculite, zirconium concentrates, and values indicated by symbol W		XX	122,000	XX	176,000	XX	204,000
Total		XX	636,000	XX	650,000	XX	692,000

e/ Estimated. p/ Preliminary. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.
1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2/ Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
VIRGINIA: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1998				1999			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	45 r/	19,500 r/	$108,000 r/	$5.52 r/	48	20,600	$108,000	$5.24
Dolomite	9 r/	3,180 r/	20,600 r/	6.47 r/	10	3,470	22,000	6.34
Granite	37 r/	27,200 r/	178,000 r/	6.52 r/	35	25,400	162,000	6.39
Marble	1	W	W	W	1	W	W	W
Sandstone and quartzite	8	2,460	12,000	4.90	6	1,620	7,100	4.39
Traprock	10 r/	12,100 r/	63,800 r/	5.28 r/	10	13,800	80,100	5.78
Slate	1	W	W	W	1	W	W	W
Miscellaneous stone	4	954	5,960	6.25	17	1,010	5,980	5.94
Total or average	XX	65,900	390,000	5.92	XX	66,400	389,000	5.86

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes limestone-dolomite reported with no distinction between the two.

TABLE 3
VIRGINIA: CRUSHED STONE SOLD OR USED BY PRODUCERS
IN 1999, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	W
Riprap and jetty stone	943	$8,480	$9.00
Filter stone	699	4,320	6.18
Other coarse aggregate	739	4,080	5.51
Coarse aggregate, graded:			
Concrete aggregate, coarse	7,980	52,600	6.60
Bituminous aggregate, coarse	3,230	23,300	7.22
Bituminous surface-treatment aggregate	2,540	18,700	7.39
Railroad ballast	952	5,980	6.28
Other graded coarse aggregate	3,330	17,900	5.40
Fine aggregate (-3/8 inch):			
Stone sand, concrete	830	6,230	7.51
Stone sand, bituminous mix or seal	606	3,750	6.18
Screening, undesignated	2,630	14,800	5.61
Other fine aggregate	1,400	6,280	4.49
Coarse and fine aggregates:			
Graded road base or subbase	9,860	54,300	5.51
Unpaved road surfacing	1,220	8,960	7.35
Terrazzo and exposed aggregate	W	W	W
Crusher run or fill or waste	3,670	17,800	4.84
Other coarse and fine aggregates	2,120	8,770	4.14
Other construction materials	(3/)	(3/)	(3/)
Agricultural:			
Agricultural limestone	969	5,350	5.52
Poultry grit and mineral food	W	W	W
Other agricultural uses	754	5,660	7.50
Chemical and metallurgical:			
Cement manufacture	W	W	W
Lime manufacture	701	3,670	5.23
Flux stone	W	W	W
Other chemical and metallurgical	1,490	4,960	3.33
Special:			
Mine dusting or acid water treatment	(3/)	(3/)	(3/)
Other fillers or extenders	(3/)	(3/)	(3/)
Other miscellaneous uses:			
Lightweight aggregate (slate)	(3/)	(3/)	(3/)
Other specified uses not listed	(3/)	(3/)	(3/)
Unspecified: 4/			
Reported	12,500	70,800	5.68
Estimated	6,600	37,000	5.64
Total or average	66,400	389,000	5.86

W Withheld to avoid disclosing company proprietary data; included with "Other."
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes dolomite, granite, limestone, limestone-dolomite, marble, miscellaneous stone sandstone and quartzite, slate, and traprock.
3/ Withheld to avoid disclosing company proprietary data; included in "Total."
4/ Reported and estimated production without a breakdown by end use.

TABLE 4
VIRGINIA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1999, BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) 2/	829	4,030	249	1,960	1,350	11,300
Coarse aggregate, graded 3/	4,560	26,600	1,560	11,600	12,000	81,500
Fine aggregate (-3/8 inch) 4/	1,860	9,640	442	3,220	3,180	18,200
Coarse and fine aggregate 5/	4,580	20,700	2,270	14,200	10,300	57,500
Other construction materials	--	--	W	W	W	W
Agricultural 6/	1,550	9,160	W	W	W	W
Chemical and metallurgical 7/	2,190	8,620	--	--	--	--
Special 8/	W	W	--	--	--	--
Other miscellaneous uses 9/	W	W	--	--	--	--
Unspecified: 10/						
Reported	348	2,010	4,740	27,300	7,360 11/	41,500 11/
Estimated	5,300	30,000	1,300	7,300	--	--
Total	21,600	113,000	10,800	67,300	34,400	211,000

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes filter stone, macadam, riprap and jetty stone and other coarse aggregate.
3/ Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast and other graded coarse aggregate.
4/ Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregate.
5/ Includes crusher run (select material or fill), graded road base or subbase, terrazzo and exposed aggregates, unpaved road surfacing, and other coarse and fine aggregates.
6/ Includes agricultural limestone, mineral food and poultry grit, and other agricultural uses.
7/ Includes cement manufacture, flux stone, and lime manufacture.
8/ Includes acid water treatment and mine dusting and other fillers or extenders.
9/ Includes lightweight aggregate (slate) and other specified uses not listed.
10/ Reported and estimated production without a breakdown by end use.
11/ Includes production from unspecified districts to avoid disclosing company proprietary data.

TABLE 5
VIRGINIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products 2/	5,910	$31,900	$5.41
Asphaltic concrete aggregates and other bituminous mixtures	560	2,740	4.89
Road base and coverings 3/	945	3,140	3.32
Fill	1,850	5,410	2.92
Other miscellaneous uses 4/	59	337	5.71
Unspecified: 5/			
Reported	320	1,900	5.93
Estimated	1,700	8,300	4.88
Total or average	11,300	53,800	4.75

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes gunite sands and plaster.
3/ Includes road and other stabilization (lime).
4/ Includes railroad ballast and ice and snow control.
5/ Reported and estimated production without a breakdown by end use.

TABLE 6
VIRGINIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	W	W	W	W	5,840	31,300
Asphaltic concrete and road base materials 3/	W	W	W	W	1,350	4,910
Fill	1	9	1	4	1,850	5,400
Other miscellaneous uses 4/	133	1,100	112	683	39	194
Unspecified: 5/						
Reported	189	1,160	18	108	113	629
Estimated	570	3,400	20	100	1,100	4,800
Total	896	5,630	147	918	10,300	47,200

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes gunite sands and plaster.
3/ Includes road and other stabilization (lime).
4/ Includes railroad ballast and ice and snow control.
5/ Reported and estimated production without a breakdown by end use.