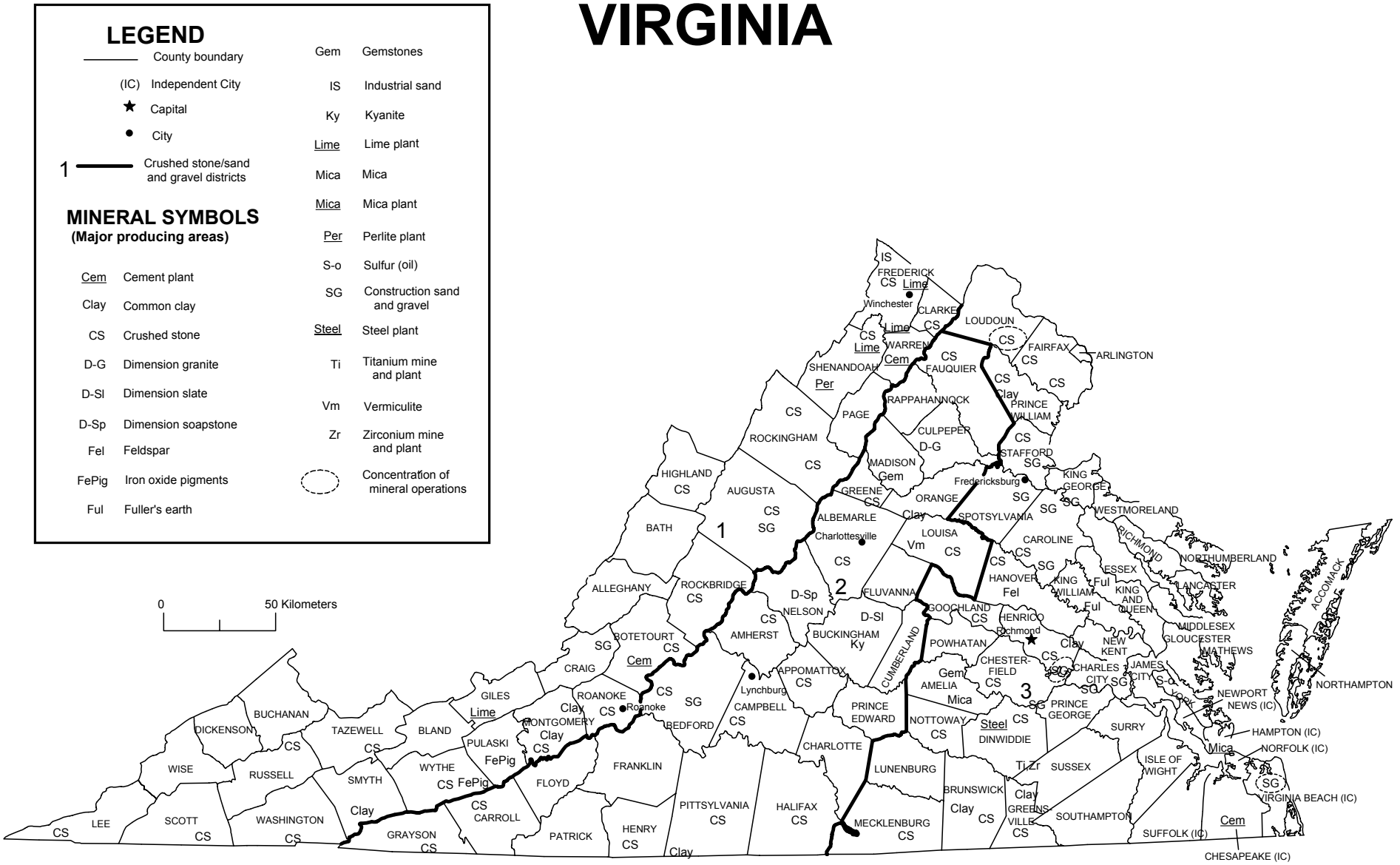
VIRGINIA



Source: Virginia Department of Mines, Minerals and Energy/U.S. Geological Survey (2002)

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 2002, the estimated value[1] of nonfuel raw mineral production for Virginia was $697 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 5% decrease from that of 2001[2] and followed a 4.1% increase from 2000 to 2001. Virginia remained 20th in rank among the 50 States in total nonfuel raw mineral production value, of which the State accounted for nearly 2% of the U.S. total.

Crushed stone was, by value, Virginia's leading raw nonfuel mineral, accounting for about 60% of the State's total nonfuel mineral value. From 1990 through 2002, the State produced nearly 760 million metric tons of crushed stone, or an average of more than 58 million metric tons per year during that 13-year period. During the past 5 years, on average, Virginia's quarries have annually produced about 66 million metric tons of crushed stone per year. Cement (masonry and portland) was the second leading nonfuel mineral commodity, followed by construction sand and gravel and lime. These four mineral commodities represented about 87% of the State's total nonfuel mineral value.

In 2002, zirconium concentrates led Virginia's nonfuel mineral commodities with the largest increase, about $7 million, but this was significantly offset by a decrease in the production and value of crushed stone and smaller drops in the production and value of construction sand and gravel, resulting in a net decrease for the year. In 2001, a rise in the production and value of crushed stone (up $28 million) and increases in construction sand and gravel and titanium (ilmenite) concentrates (about $1 million each) accounted for most of the State's increase in value. All other changes in value in 2001 and 2002 were on the order of $1 million or less (table 1).

Based upon USGS estimates of the quantities produced in the 50 States during 2002, Virginia remained the only State to mine kyanite; second in feldspar; second in both zirconium concentrates (zircon) and titanium (ilmenite) (listed in descending order of value), each being produced only in Virginia and Florida; second of 2 vermiculite-producing States; fifth in iron oxide pigments; and sixth in fuller's earth. While the State continued to be 10th in lime, it was 10th in crushed stone (9th in 2001). Additionally, significant quantities of common clays, construction sand and gravel, industrial sand and gravel, and portland cement were produced in the State. 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 was used in refractories for the smelting and processing of a variety of metals and in glass and 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, based on that agency's own surveys and estimates; data may differ from some USGS preliminary estimates and production figures as reported to and estimated by the USGS.

Commodity Review

Industrial Minerals

Clay.—Nestle Purina Petcare (formerly Golden Cat, a Division of Ralston Purina Co.), which was about 40 kilometers northeast of Richmond in King William County, continued producing cat box litter. The production of fuller's earth clay, mined as a raw material at this site since the operation opened in the late summer of 1997, totaled 617,000 metric tons (t) through 2001.

Crushed Stone.—In June, Luck Stone Corp. acquired a granite quarry in Spotsylvania County and a Triassic sandstone quarry in Culpeper County from Martin Marietta Materials, Inc.; both operations produced crushed stone. As part of the transaction, Luck Stone sold a quarry near Burlington, NC, to Martin Marietta Materials. In June, Luck Stone purchased a diabase quarry owned by Bull Run Stone Co. in southern Loudoun County. Luck Stone provided support to the historic 1804 Oatlands Plantation, a popular tourist site south of Leesburg in Loudoun County, to enable the purchase of 28 hectares adjacent to the plantation that was planned for a housing development.

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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 2002 USGS mineral production data published in this chapter are preliminary estimates as of July 2003 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. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2001 may differ from the Minerals Yearbook, Area Reports: Domestic 2001, Volume II, owing to the revision of preliminary 2001 to final 2001 data. Data for 2002 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 the State mineral industry information provided by that agency.

In June, Vulcan Materials Co. sold its limestone quarry near Lowmoor, Alleghany County, to an asphalt company from West Virginia, which will partner with W.W. Boxley Co. The quarry will operate as Boxley Materials Co.

Titanium.—Iluka Resources, Inc., Virginia Old Hickory Operations, continued with its heavy-mineral mining and initial processing operations in Dinwiddie County. The $23 million expansion was complete, and, with production from two areas simultaneously, production will increase by about 50% per year. Since production started in the fall of 1997, 756,000 t of titanium concentrates (ilmenite) and zirconium concentrates were produced through 2001.

Metals

Gold.—During 2002, Gold Crown Mining Co. continued to permit the Kentuck gold mine, which was east of Danville in Pittsylvania County.

Government Programs

The Virginia Division of Mineral Resources (geological survey) continued geologic mapping in several counties at a detailed 1:24,000 scale and continued to compile 1:100,000-scale maps. Field studies and the compilation of mineral resources on 1:24,000-scale maps continued. Published during the year were the geologic map of the western portion of the Richmond 30 x 60-minute quadrangle, the geologic map of the Virginia portion of the Danville 30 x 60-minute quadrangle; and the geologic map of the Virginia portion of the Lewisburg 30 x 60-minute quadrangle. Articles published in the quarterly journal Virginia Minerals discussed the use of coal combustion products in Virginia and presented a guide to the educational rock and mineral garden.

The Mineral Resources of Virginia database, which contains location and identification information on mines, quarries, prospects, pits, and occurrences, was updated as field work was completed. Data were checked and verified as the project continued.

TABLE 1

NONFUEL RAW MINERAL PRODUCTION IN VIRGINIA[1, 2]

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2000		2001		2002[p]	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	1,010	2,380	937	1,840	779	2,310
Kyanite[e]	90	13,400	90	13,400	90	13,400
Sand and gravel, construction	12,100	63,200	11,800	64,400	11,100	61,700
Stone:						
Crushed	67,600 [r]	418,000 [r]	69,100	446,000	62,000	409,000
Dimension metric tons	W	W	5,590	626	5,930	659
Combined values of cement, clays (fuller's earth), feldspar, gemstones, iron oxide pigments (crude), lime, sand and gravel (industrial), titanium (ilmenite), vermiculite, zirconium concentrates, and values indicated by symbol W	XX	207,000 [r]	XX	206,000	XX	210,000
Total	XX	703,000 [r]	XX	732,000	XX	697,000

[e]Estimated. [p]Preliminary. [r]Revised. W Withheld to avoid disclosing company proprietary data; values 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	2000				2001			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone[2]	47 r	22,000 r	$123,000 r	$5.62 r	46	20,100	$113,000	$5.63
Dolomite	5 r	2,050 r	11,100 r	5.44 r	7	2,480	14,300	5.77
Granite	25 r	25,400 r	175,000 r	6.91 r	24	25,500	180,000	7.07
Sandstone and quartzite	6 r	1,940 r	8,510 r	4.40	5	1,540	6,680	4.35
Traprock	12 r	15,300 r	92,800 r	6.08 r	12	18,100	124,000	6.87
Slate	1	W	W	5.50	1	W	W	5.62
Miscellaneous stone	4	W	W	6.05	3	W	W	5.37
Total or average	XX	67,600 r	418,000 r	6.17 r	XX	69,100	446,000	6.46

rRevised. 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, except unit value; 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 2001, BY USE[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	$4.56
Riprap and jetty stone	1,010	$9,570	9.51
Filter stone	877	6,930	7.91
Other coarse aggregates	984	6,260	6.36
Total or average	2,870	22,800	7.94
Coarse aggregate, graded:			
Concrete aggregate, coarse	9,940	75,600	7.60
Bituminous aggregate, coarse	3,210	25,400	7.91
Bituminous surface-treatment aggregate	2,800	22,000	7.86
Railroad ballast	W	W	6.23
Other graded coarse aggregates	3,240	12,500	3.85
Total or average	19,200	135,000	7.58
Fine aggregate (-3/8 inch):			
Stone sand, concrete	834	6,690	8.02
Stone sand, bituminous mix or seal	504	4,100	8.13
Screening, undesignated	2,610	15,900	6.10
Other fine aggregates	1,720	8,830	5.14
Total or average	5,670	35,600	6.27
Coarse and fine aggregates:			
Graded road base or subbase	12,800	80,700	6.32
Unpaved road surfacing	1,380	10,600	7.73
Terrazzo and exposed aggregate	W	W	9.93
Crusher run or fill or waste	2,460	13,500	5.50
Other coarse and fine aggregates	3,350	14,900	4.43
Total or average	20,000	120,000	6.00
Other construction materials	365	2,270	6.23
Agricultural:			
Agricultural limestone	(2)	(2)	8.05
Poultry grit and mineral food	(2)	(2)	9.67
Other agricultural uses	(2)	(2)	8.45
Chemical and metallurgical:			
Lime manufacture	519	2,810	5.42
Flux stone	(2)	(2)	8.82
Chemical stone for alkali works	(2)	(2)	9.67
Sulfur oxide removal	(2)	(2)	7.33
Special:			
Mine dusting or acid water treatment	(2)	(2)	3.53
Asphalt fillers or extenders	(2)	(2)	11.57
Other fillers or extenders	(2)	(2)	22.94
Other miscellaneous uses and other specified uses not listed	39	185	4.74
Unspecified:[3]			
Reported	12,100	72,300	5.95
Estimated	7,100	34,000	4.84
Total or average	19,200	107,000	5.54
Grand total or average	69,100	446,000	6.46

W Withheld to avoid disclosing company proprietary data; included with "Other."

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Withheld to avoid disclosing company proprietary data; included in "Grand total."

[3]Reported and estimated production without a breakdown by end use.

TABLE 4

VIRGINIA : CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, 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]	W	W	W	W	1,790	16,000
Coarse aggregate, graded[3]	W	W	W	W	14,300	112,000
Fine aggregate (-3/8 inch)[4]	1,940	11,000	W	W	W	W
Coarse and fine aggregate[5]	W	W	W	W	13,000	84,300
Other construction materials	163	1,020	128	848	74	408
Agricultural[6]	W	W	W	W	W	W
Chemical and metallurgical[7]	W	W	--	--	--	--
Special[8]	W	W	--	--	W	W
Other miscellaneous uses[9]	--	--	39	185	--	--
Unspecified:[10]						
Reported	1,420	9,410	3,910	23,100	6,800	39,700
Estimated	6,200	29,300	890	5,000	--	--
Total	19,100	103,000	10,800	69,500	39,200	274,000

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 aggregates.

[3]Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), and other graded coarse aggregates.

[4]Includes screening (undesignated), stone sand bituminous mix or seal, stone sand (concrete), and other fine aggregates.

[5]Includes crusher run (select material or fill), graded road base or subbase, terrazzo and exposed aggregate, unpaved road surfacing, and other coarse and fine aggregates.

[6]Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

[7]Includes chemical stone for alkali works, flux stone, lime manufacture, and sulfur oxide removal.

[8]Includes asphalt fillers or extenders, mine dusting or acid water treatment, and other fillers or extenders.

[9]Includes other uses not listed.

[10]Reported and estimated production without a breakdown by end use.

TABLE 5

VIRGINIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregates (including concrete sand)	6,230	$40,900	$6.57
Concrete products (blocks, bricks, pipe, decorative, etc.)	128	1,150	8.98
Asphaltic concrete aggregates and other bituminous mixtures	990	5,450	5.51
Road base and coverings	321	1,740	5.43
Fill	2,260	6,520	2.88
Snow and ice control	32	164	5.13
Other miscellaneous uses[2]	28	261	9.32
Unspecified:[3]			
Reported	27	161	5.96
Estimated	1,800	8,000	4.50
Total or average	11,800	64,400	5.46

[1]Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

[2]Includes filtration, railroad ballast, and roofing granules.

[3]Reported and estimated production without a breakdown by end use.

TABLE 6

VIRGINIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, 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 aggregates and concrete products	W	W	--	--	W	W
Asphaltic concrete aggregates and other bituminous mixtures	155	1,270	71	576	764	3,610
Road base and coverings	W	W	W	W	213	954
Fill	W	W	W	W	2,240	6,410
Filtration	--	--	--	--	21	194
Other miscellaneous uses[2]	280	2,350	3	28	6,240	40,800
Unspecified:[3]						
Reported	18	113	5	27	4	21
Estimated	250	1,400	380	2,000	1,200	4,600
Total	698	5,120	457	2,600	10,600	56,700

W Withheld to avoid disclosing company proprietary data; included with "Other miscellaneous uses." -- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes railroad ballast, roofing granules, and snow and ice control.

[3]Reported and estimated production without a breakdown by end use.