THE MINERAL INDUSTRY OF VIRGINIA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Bureau of Mines, U.S. Department of the Interior, and the Virginia Division of Mineral Resources for collecting information on all nonfuel minerals.

Virginia ranked 22d among the 50 States in total nonfuel mineral value[1] in 1994, moving up from of 23rd in 1993, according to the U.S. Bureau of Mines. The estimated value for 1994 was almost $513 million, a more than 10% increase compared with that of 1993. This followed a less than 1% increase in 1993 over that of 1992. In 1994, the State accounted for approximately 1.5% of the U.S. total mineral value. Virginia mines are exclusively producers of industrial minerals and coal; the last significant metal production occurred in 1981 when the State's last remaining active metal mine, an underground zinc operation, closed down due to the recession and a depressed market. While producing a diverse selection of minerals, crushed stone accounted for 65% of the State's nonfuel mineral value. During the past 5 years, 1990-94, the State has produced about 250 million metric tons of crushed stone or an average of 50 million tons per year. Compared with 1993, the value of the following commodities increased: crushed stone, portland cement, lime, construction and industrial sand and gravel, vermiculite, gypsum, and common clays. The values of the following decreased: masonry cement, fuller's earth clays, feldspar, dimension stone, iron oxide pigments, and gemstones.

Based on a comparison of estimated quantities of mineral produced in the 50 States during 1994, Virginia remained second in feldspar, second of two States that produce vermiculite, and fourth in iron oxide pigments. The State moved up from seventh to sixth in the production of crushed stone. While the only producing kyanite mine in the United States was located in Virginia mullite, a calcined kyanite, was synthetically produced in three other States. Ninety percent of U.S. kyanite and mullite output is used in refractories for the smelting and processing of a variety of metals and in glass and high-temperature ceramics manufacturing.

According to the Virginia Division of Mineral Resources (DMR), the stone industry was especially active in relation to both new and existing operations. Vulcan Minerals Co. was in the process of planning the opening of a quarry in southern Stafford County. Vulcan also acquired a former quarry near Pilot Mountain in western Bedford County for nonpolishing aggregates. In addition, the company proposed a quarry north of Boydton in Mecklenburg County to produce nonpolishing crushed stone. Two proposed mining operations were being planned at yearend in southern Culpeper County to quarry diabase rock, which is commonly used as crushed stone or in the making of monuments. In June, Martin Marietta Aggregates purchased Solite Corp.'s Caroline Stone Co., north of Richmond. Culpeper Stone Co. sold its Fredericksburg Sand and Gravel operation, near Fredericksburg, and its Haymarket quarry in Prince William County to Atlantic States Materials Corp. Luck Stone Co. acquired Virginia Trap Rock, Inc.'s diabase quarry in Loudoun County, near Leesburg, and began

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN VIRGINIA[1]

Mineral		1992		1993		1994[p]	
		Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Clays[2]	thousand metric tons	754	$3,367	775	$2,950	846	$3,000
Lime	do.	764	40,271	756	40,039	785	41,600
Sand and gravel (construction)	do.	8,659	37,336	[e]9,000	[e]40,500	8,900	40,900
Stone (crushed)	do.	[e]43,091	[e]261,300	50,998	292,345	[e]56,000	[e]333,000
Combined value of cement, clays (bentonite, fuller's earth), feldspar, gemstones, gypsum (crude), iron oxide (crude), kyanite, sand and gravel (industrial), stone (dimension), talc and pyrophyllite, and vermiculite		XX	119,589	XX	88,913	XX	94,900
Total		XX	461,863	XX	464,747	XX	[3]513,000

[e]Estimated. [p]Preliminary. XX Not applicable.
[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2]Excludes certain clays; kind and value included with "Combined value" data.
[3]Data do not add to total shown because of independent rounding.

TABLE 2

VIRGINIA: CRUSHED STONE[1] SOLD OR USED BY PRODUCERS IN 1993, BY USE

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Macadam	W	W	$4.16
Riprap and jetty stone	1,087	$7,057	6.49
Filter stone	742	4,312	5.81
Other coarse aggregate	268	1,323	4.94
Coarse aggregate, graded:			
Concrete aggregate, coarse	7,108	43,532	6.12
Bituminous aggregate, coarse	3,666	22,819	6.22
Bituminous surface-treatment aggregate	1,368	8,499	6.21
Railroad ballast	1,147	5,425	4.73
Other graded coarse aggregate	542	2,876	5.31
Fine aggregate (-3/8 inch):			
Stone sand, concrete	1,331	8,046	6.05
Stone sand, bituminous mix or seal	938	5,648	6.02
Screening, undesignated	2,881	14,879	5.16
Other fine aggregate	125	827	6.62
Coarse and fine aggregates:			
Graded road base or subbase	11,249	53,357	4.74
Unpaved road surfacing	1,135	6,748	5.95
Terrazzo and exposed aggregate	W	W	33.09
Crusher run or fill or waste	3,453	16,052	4.65
Other coarse and fine aggregates	528	2,833	5.37
Other construction materials[2]	1,035	5,389	5.21
Agricultural:			
Agricultural limestone	817	10,727	13.13
Poultry grit and mineral food	105	1,091	10.39
Other agricultural uses	69	762	11.04
Chemical and metallurgical:			
Lime manufacture[3]	3,057	17,249	5.64
Special:			
Mine dusting or acid water treatment	338	4,688	13.87
Asphalt fillers or extenders	305	2,767	9.07
Whiting or whiting substitute	(4)	(4)	28.43
Other fillers or extenders	166	1,533	9.23
Abrasives	13	78	6.00
Other specified uses not listed	(4)	(4)	8.34
Unspecified:[5]			
Actual	6,443	38,549	5.98
Estimated	1,031	4,168	4.04
Total[6]	50,998	292,345	5.73
Total[7 8]	56,216	292,345	5.20

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."
[1]Includes dolomite, granite, limestone, limestone-dolomite, miscellaneous stone, quartzite, sandstone, slate, and traprock.
[2]Includes drain fields and waste materials.
[3]Includes cement manufacture, flux stone, chemical stone, glass manufacture, and sulfur oxide removal.
[4]Withheld to avoid disclosing company proprietary data; included with "Total."
[5]Includes production reported without a breakdown by use and estimates for nonrespondents.
[6]Data may not add to totals shown because of independent rounding.
[7]One short ton is equal to 907 kilograms or 2,000 pounds. To convert metric tons to short tons, divide metric tons by 0.907185.
[8]Total shown in thousand short tons and thousand dollars.

operating under the name Goose Creek plant.

Significant activity also was occurring in the exploration for new mineral resources. Several companies conducted precious metals investigations in Virginia's Piedmont province in 1994, primarily in Buckingham and Goochland Counties. Southern Piedmont Mining Corp. conducted some core drilling at the former Moss Mine in Goochland County, while Minerals and Chemicals Corp. reportedly produced a few ounces of gold in Goochland County. Interest in heavy metals continued in southern Virginia. Two companies were holding leases on large tracts in Dinwiddie, Greensville, and Sussex Counties, where large tonnages of heavy mineral sands have been discovered. Ilmenite, leucoxene, rutile, and zircon comprised nearly 80% of the heavy-mineral concentrate. South East TiSand Co. held a permit to operate a pilot test plant in the Brink area of Greensville County to evaluate the content of various soil profiles and test the growth of several crops, such as corn and peanuts, in a post-mining situation. RGC (USA Minerals) was preparing for a similar pilot operation to evaluate the ore in its Old Hickory deposit in Dinwiddie County, near Stony Creek. The value of the material in this deposit was estimated during 1993 to be $200 million to $300 million.

The DMR conducted a host of activities, including geological mapping for individual counties as well as detailed 7.5-minute quadrangles and a compilation of mineral sources on 1:24,000 scale maps. Other mineral resource studies included carbonate occurrences being investigated statewide; barite in southwest Virginia; precious metals, epithermal hot springs, cadmium, gallium, and germanium resources in various locations; and oil and gas in Lee, Wise, and Dickenson Counties. In 1994, brochures were published on DMR products and services, the State's mineral resource statistics, diamonds, and currently available fieldtrip guides and geologic road logs. Also published by DMR were the results of numerous geologic, nonfuel and energy mineral resource, and environmental studies, and information about the mineral resources produced in Virginia.

[1]The term value, throughout this document refers to the monetary value of nonfuel minerals as represented by either mine shipments, mineral commodity sales, or marketable production as is applicable to the individual mineral commodities.

TABLE 3
VIRGINIA: CRUSHED STONE SOLD OR USED, BY KIND

Kind	1991				1993			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone[1]	46	r13,832	r$73,387	r$5.30	r43	14,807	$85,876	$5.79
Dolomite	r10	r2,639	r25,217	r9.55	11	3,428	27,081	7.89
Granite	29	17,404	101,034	5.80	33	20,690	115,536	5.58
Traprock	10	8,319	51,105	6.14	10	10,554	55,477	5.25
Sandstone	r6	r1,439	r8,173	r5.67	4	695	3,861	5.55
Quartzite	r2	W	W	4.77	3	524	2,769	5.28
Slate	1	W	W	2.41	1	W	W	2.65
Miscellaneous stone	1	W	W	5.86	1	W	W	5.32
Total[2]	XX	r44,378	r262,577	r5.92	XX	50,998	292,345	5.73
Total[3 4]	XX	r48,918	r262,577	r5.37	XX	56,216	292,345	5.20

rRevised. W Withheld to avoid disclosing company proprietary data; included with "Total." XX Not applicable.
[1]Includes "Limestone-dolomite," reported with no distinction between the two.
[2]Data may not add to totals shown because of independent rounding.
[3]One short ton is equal to 907 kilograms or 2,000 pounds. To convert metric tons to short tons, divide metric tons by 0.907185.
[4]Total shown in thousand short tons and thousand dollars.

TABLE 4

VIRGINIA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1993, BY USE AND DISTRICT

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:						
Coarse aggregate (+1 1/2 inch)[1]	841	4,315	433	2,882	983	6,158
Coarse aggregate, graded[2]	2,293	12,857	2,421	15,793	9,118	54,501
Fine aggregate (-3/8 inch)[3]	1,363	8,339	764	4,622	3,148	16,438
Coarse and fine aggregate[4]	3,699	18,477	3,002	14,786	9,663	45,741
Other construction materials[5]	(6)	(6)	(6)	(6)	(6)	(6)
Agricultural[7]	853	(6)	129	(6)	(6)	(6)
Chemical and metallurgical[8]	3,057	17,249	—	—	—	—
Special[9]	840	(6)	17	(6)	—	—
Other miscellaneous uses	(6)	(6)	(6)	(6)	—	—
Unspecified:[10]						
Actual	2,576	15,992	982	5,954	2,885	16,603
Estimated	924	3,569	108	599	—	—
Total[11]	16,496	101,976	8,039	46,631	26,463	143,738
Total[12 13]	18,184	101,976	8,861	46,631	29,170	143,738

[1]Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.
[2]Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.
[3]Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregate.
[4]Includes graded road base or subbase, terrazzo and exposed aggregate, unpaved road surfacing, crusher run (select material or fill), and other coarse and fine aggregates.
[5]Includes drain fields and waste materials.
[6]Withheld to avoid disclosing company proprietary data; included with "Total."
[7]Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.
[8]Includes cement manufacture, chemical stone for alkali works, flux stone, glass manufacture, lime manufacture, and sulfur oxide removal.
[9]Includes abrasives, asphalt fillers or extenders, mine dusting or acid water treatment, other fillers or extenders, whiting or whiting substitute, and other specified uses not listed.
[10]Includes production reported without a breakdown by use and estimates for nonrespondents.
[11]Data may not add to totals shown because of independent rounding.
[12]One short ton is equal to 907 kilograms or 2,000 pounds. To convert metric tons to short tons, divide metric tons by 0.907185.
[13]Total shown in thousand short tons and thousand dollars.