THE MINERAL INDUSTRY OF PENNSYLVANIA

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 Pennsylvania Bureau of Topographic and Geologic Survey, Department of Environmental Resources, for collecting information on all nonfuel minerals.

Pennsylvania ranked 11th in total nonfuel mineral value[1] in 1994, down from 10th in 1993, according to the U.S. Bureau of Mines. The estimated value for 1994 was $964 million, a 6% increase over that of 1993. This followed a 4% increase in 1993 from 1992. The State accounted for 3% of the U.S. total. Pennsylvania is exclusively an industrial mineral and coal producing State; any metals, especially steel, produced in the State are processed from materials received from other domestic or foreign sources. Pennsylvania continued to be among the Nation's top producers of crushed stone, cement, and lime; those three commodities represented 87% of the State's total nonfuel mineral value. The State remained second in the United States in the production of crushed stone; third in portland cement and climbed from fifth to fourth in the production of lime. Although production of masonry cement in Pennsylvania marginally increased in 1994, significant increases occurred in two other States, dropping Pennsylvania from fourth to sixth. Compared with 1993, the value of crushed stone, portland cement, construction sand and gravel, masonry cement, and peat increased in 1994. Decreases occurred in the value of lime, dimension stone, and common clays.

According to the Pennsylvania Geological Survey, a significant number of surface mine permit applications were received by the State during 1993, a trend that continued into 1994. In 1993, approximately 35 operators applied for more than 1,200 hectares (3,000 acres) of new and expansion mining permits. Most mine expansion areas were limited to carbonate rock producers in various locations throughout the State, accounting for about 20% of the total area under application. A new marble quarry in the south-central portion of the State was a notable exception. Significant exploration developments included the following: approximately one-half of the new aggregate applications were sought for sandstone production; a new, Ordovician-age, potentially high-quality, high-friction sandstone source was being developed in the central portion of the State; and two traditional high-quality, high-friction sandstone sources were under development in the State's anthracite region. Additionally, 13 producers applied for about 325 hectares (800 acres) of new sand and gravel resources,principally located in the extreme northwestern glaciated portion of the State. Because aggregate quality has, of late, become increasingly important, many producers have begun development of in-

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN PENNSYLVANIA[1]

Mineral		1992		1993		1994[p]	
		Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:							
Masonry	thousand metric tons	296	$21,924	248	$18,741	254	$19,200
Portland	do.	5,016	258,887	5,365	282,630	5,800	305,000
Clays[2]	do.	649	3,455	765	3,777	686	2,930
Gemstones		NA	1	NA	1	—	—
Lime	thousand metric tons	1,506	94,543	1,535	95,377	1,530	94,900
Peat	do.	15	250	9	249	13	319
Sand and gravel (construction)	do.	17,540	94,643	[e]16,100	[e]83,900	16,400	86,500
Stone:							
Crushed[3]	do.	[e]64,954	[e]380,200	69,361	405,346	[e]73,000	[e]434,000
Dimension	metric tons	[e]37,855	[e]10,822	35,665	9,892	[e]28,300	[e]5,890
Combined value of sand and gravel (industrial), stone [crushed limestone, dolomite, and quartzite (1992), crushed quartzite (1993-94)], and tripoli (1992-93)		XX	[r]16,218	XX	13,249	XX	14,300
Total		XX	[r]880,943	XX	913,162	XX	[4]964,000

[e]Estimated. [p]Preliminary. [r]Revised. NA Not available. 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]Excludes certain stones; kind and value included with "Combined value" data.
[4]Data do not add to shown because of independent rounding.

TABLE 2

PENNSYLVANIA: 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	97	$649	$6.69
Riprap and jetty stone	867	5,606	6.47
Filter stone	233	1,251	5.37
Other coarse aggregate	275	1,682	6.12
Coarse aggregate, graded:			
Concrete aggregate, coarse	5,183	28,900	5.58
Bituminous aggregate, coarse	6,205	33,824	5.45
Bituminous surface-treatment aggregate	2,734	16,295	5.96
Railroad ballast	735	4,128	5.62
Other graded coarse aggregate	2,762	16,472	5.96
Fine aggregate (-3/8 inch):			
Stone sand, concrete	937	6,454	6.89
Stone sand, bituminous mix or seal	2,988	16,318	5.46
Screening, undesignated	1,136	6,278	5.53
Other fine aggregate	265	1,714	6.47
Coarse and fine aggregates:			
Graded road base or subbase	11,995	60,437	5.04
Unpaved road surfacing	1,556	7,433	4.78
Terrazzo and exposed aggregate	30	459	15.30
Crusher run or fill or waste	1,776	7,143	4.02
Other coarse and fine aggregates	2,143	12,211	5.70
Other construction materials	4,082	24,102	5.90
Roofing granules	W	W	6.68
Agricultural:			
Agricultural limestone[2]	734	8,201	11.17
Chemical and metallurgical:			
Cement manufacture	6,462	36,028	5.58
Lime manufacture	566	4,722	8.34
Dead-burned dolomite manufacture	([3])	([3])	6.00
Flux stone	10	108	10.80
Sulfur oxide removal	298	3,440	11.54
Special:			
Mine dusting or acid water treatment	34	845	24.85
Asphalt fillers or extenders	420	4,690	11.17
Whiting or whiting substitute	([3])	([3])	36.94
Other fillers or extenders	125	961	7.69
Other specified uses not listed	244	2,617	10.73
Unspecified:[4]			
Actual	7,737	49,596	6.41
Estimated	6,731	42,765	6.35
Total[5]	69,361	405,346	5.84
Total[6 7]	76,457	405,346	5.30

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."
[1]Includes dolomite, granite, limestone, limestone-dolomite, miscellaneous stone, sandstone, and traprock; excludes quartzite from State total to avoid disclosing company proprietary data.
[2]Includes poultry grit and mineral food, and other agricultural uses.
[3]Withheld to avoid disclosing company proprietary data; included with "Other specified uses not listed."
[4]Includes production reported without a breakdown by use and estimates for nonrespondents.
[5]Data may not add to totals shown because of independent rounding.
[6]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.
[7]Total shown in thousand short tons and thousand dollars.

house laboratories to test for both physical and chemical characteristics. Research into the effects of material handling processes on material quality was becoming an increasingly important subject for future research. Aggregate particle shape has been a primary concern with respect to durability in pavement performance. Carbonate reagent and some aggregate producers continued to identify and market resources capable of providing sorbent material that can be used for acid emission mitigation in coal-fired electric generating stations. Part of this effort included experimentation with various forms of carbonate beneficiation, principally to increase the calcium content of less pure limestones. Demand for dimension stone products was relatively strong. The northeastern part of the State contained approximately 80 permitted flagstone producers, and a new field stone (sandstone) source was located in central Pennsylvania.

[r]The term value means the total monetary value as represented by either mine shipments, mineral commodity sales, or marketable production as is applicable to the individual mineral commodities.

TABLE 3
PENNSYLVANIA: CRUSHED STONE SOLD OR USED, BY KIND[1]

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[2]	[r]105	[r]37,306	[r]$214,912	[r]$5.76	108	40,970	$238,762	$5.83
Dolomite	22	11,522	60,814	5.28	23	12,253	70,977	5.79
Granite	3	1,785	10,599	5.94	5	1,642	9,917	6.04
Traprock	10	3,727	22,609	6.07	11	3,202	19,651	6.14
Sandstone	[r]3	[r]4,613	[r]27,745	[r]6.01	34	5,443	35,742	6.57
Miscellaneous stone	15	5,655	29,680	5.25	16	5,851	30,296	5.18
Total[3]	XX	[r]64,608	[r]366,360	[r]5.67	XX	69,361	405,346	5.84
Total[4 5]	XX	71,218	[r]366,360	[r]5.14	XX	76,457	405,346	5.30

[r]Revised. XX Not applicable.
[1]Excludes Quartzite.
[2]Includes "Limestone-dolomite," reported with no distinction between the two.
[3]Data may not add to totals shown because of independent rounding.
[4]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.
[5]Total shown in thousand short tons and thousand dollars.

TABLE 4

PENNSYLVANIA: CRUSHED STONE[1] SOLD OR USED BY PRODUCERS IN 1993, BY USE AND DISTRICT

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:								
Coarse aggregate (+1 1/2 inch)[2]	([3])	([3])	W	W	434	3,007	725	4,434
Coarse aggregate, graded[4]	712	([3])	1,542	W	4,478	27,456	10,885	60,553
Fine aggregate (-3/8 inch)[5]	([3])	([3])	W	W	1,409	8,854	2,964	17,115
Coarse and fine aggregate[6]	1,097	5,515	2,250	10,793	4,470	23,997	10,074	49,983
Other construction materials[7]	([3])	([3])	965	14,006	([3])	([3])	1,877	10,595
Agricultural[8]	([3])	([3])	([9])	([9])	([3])	([3])	646	6,973
Chemical and metallurgical[10]	495	3,547	([9])	([9])	([9])	([9])	5,736	32,422
Special[11]	—	—	([9])	([9])	([9])	([9])	514	5,918
Other miscellaneous uses[12]	—	—	299	2,895	1,051	7,914	105	1,143
Unspecified:[13]								
Actual	20	77	582	3,618	963	5,811	6,172	40,089
Estimated	1,161	7,851	214	1,399	1,100	7,316	4,257	26,199
Total[14]	4,064	22,530	5,851	32,713	15,491	94,677	43,955	255,426
Total[15 16]	4,480	22,530	6,450	32,713	17,076	94,677	48,452	255,426

W Withheld to avoid disclosing company proprietary data; included with "Other construction materials."
[1]Excludes quartzite from State total to avoid disclosing company proprietary data.
[2]Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.
[3]Withheld to avoid disclosing company proprietary data; included with "Total."
[4]Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.
[5]Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregate.
[6]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.
[7]Includes roofing granules.
[8]Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.
[9]Withheld to avoid disclosing company proprietary data; included with "Other miscellaneous uses."
[10]Includes cement manufacture, dead-burned dolomite manufacture, flux stone, lime manufacture, and sulfur oxide removal.
[11]Includes asphalt fillers or extenders, mine dusting or acid water treatment, other fillers or extenders, and whiting or whiting substitute.
[12]Includes other specified uses not listed.
[13]Includes production reported without a breakdown by use and estimates for nonrespondents.
[14]Data may not add to totals shown because of independent rounding.
[15]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.
[16]Total shown in thousand short tons and thousand dollars.