

# THE MINERAL INDUSTRY OF PENNSYLVANIA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Pennsylvania Bureau of Topographic and Geologic Survey for collecting information on all nonfuel minerals.

In 1998, the preliminary estimated value<sup>1</sup> of nonfuel mineral production for Pennsylvania was \$1.28 billion, according to the U.S. Geological Survey (USGS). This was about a 7% increase from that of 1997,<sup>2</sup> and followed a 2.6% increase in 1997 from that of 1996. For the third consecutive year, the State ranked 11th in the Nation in nonfuel mineral production value, of which Pennsylvania accounted for more than 3% of the U.S. total.

Pennsylvania continued to be among the Nation's leading States that produce crushed stone, portland cement, lime, and masonry cement (by descending order of value); these four commodities accounted for close to 90% of the State's total nonfuel mineral production value. In 1998, most minerals increased in value, led by crushed stone with a \$28 million gain, portland cement up by \$25 million, and construction sand and gravel with an increase of almost \$19 million (table 1). Smaller yet significant gains occurred for dimension stone and masonry cement. The values of kaolin, peat, and gemstones were unchanged. In 1997, an increase of \$18 million in the value of crushed stone and smaller increases in masonry cement, construction sand and gravel, and portland cement (descending order of magnitude of change) accounted for most of the year's increase.

Based on USGS estimates of the quantities produced in the 50 States in 1998, Pennsylvania remained third<sup>2</sup> in portland cement; fourth of four States that produce tripoli; and fifth in lime and masonry cement. While the State rose to fourth from seventh in dimension stone, it dropped to second from first in crushed stone. Additionally, significant quantities of construction and industrial sand and gravel and common clays were produced in the State (descending order of value).

Pennsylvania is exclusively an industrial mineral- and coal-producing State; metals that were produced in the State in 1998, especially steel, were processed from materials acquired

<sup>1</sup>The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending on 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 1998 USGS mineral production data published in this chapter are preliminary estimates as of February 1999 and are expected to change. For some mineral commodities (for example, 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 for the specialists may be retrieved over the Internet at <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 <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

<sup>2</sup>Values, percentage calculations, and rankings for 1997 may vary from the *Minerals Yearbook, Area Reports: Domestic 1997, Volume II*, owing to the revision of preliminary 1997 to final 1997 data. Data for 1998 are preliminary and expected to change, while related rankings may also be subject to change.

from foreign and other domestic sources. Pennsylvania continued to be the Nation's third leading raw steel-manufacturing State with an estimated output of almost 7.4 million metric tons of raw steel, as reported by the American Iron and Steel Institute.

The following narrative information was provided by the Pennsylvania Bureau of Topographic and Geologic Survey<sup>3</sup> (PBTGS). A group of investors from Texas through a subsidiary in Virginia submitted a noncoal surface mine application to solution mine subsurface Salina salt beds in Tioga County (extreme northeastern/north central Pennsylvania) to create a gas storage facility. The salt will be mined leaving caverns for gas storage at depths exceeding several thousand feet. Based on the initial mining permit application, more than 810 hectares would be affected. Although company plans were not finalized, indications to the PBTGS were that some coarse salt would be recovered and marketed from the solution brines.

More than 2,000 hectares in new industrial mineral mining applications (not including the Tioga County solution-mining venture) were submitted to the Department of Environmental Protection (DEP). Many of these applications were for the expansion of nearby pits, quarries, and mines. Forty-eight percent of these applications were for carbonate properties, especially in the aggregate poor bituminous coal areas of western Pennsylvania. The cement industry of western Pennsylvania has been consolidating its mining operations, mostly through permit transfers. These operations produce crushed stone from relatively thin Carboniferous-age limestones and also produce incidental coal that can be used for kiln fuel. In central Pennsylvania, near two active operations and an existing lime plant, the thicker, high-calcium, Ordovician-age limestones accounted for potential underground mine expansions involving nearly 200 hectares.

More than 30% of the new aggregate applications (more than 365 hectares) represent sandstone operations in the eastern half of the State. The counties of Schuylkill and Berks in the moderately populated east-central portion of Pennsylvania accounted for more than 80% of this acreage. The PBTGS anticipated that much of this sandstone likely would be marketed for high friction road usage in populated areas. Regarding sand and gravel, generally located behind the glacial boundaries in the northwestern and northeastern portions of the State, 10 operators applied to mine on nearly 200 hectares, 70% of which occurred in northwestern Pennsylvania.

Expansions of or near existing aggregate and chemical operations were more common than "grass roots" ventures,

<sup>3</sup>Samuel W. Berkheiser, Jr., Chief of the Geological Resources Division, authored the text of State mineral industry information submitted by the Pennsylvania Bureau of Topographic and Geologic Survey.

however, both existed and opportunities in general were materials industry appeared to be reaching another cycle of significant activity. The United States' largest construction aggregates firm, Vulcan Materials Co., initiated modest plans to set up a crushing operation in an existing southern Pennsylvania refractory producer's quarry. The PBTGS anticipated that this symbiotic relationship between an aggregate producer and a chemical stone producer would likely affect a competitive portion of the market. Visibility of the bluestone/flagstone dimension stone industry of northeastern Pennsylvania was increasing, possibly owing more to the availability and requirement of relatively new "small general permit applications" than to an actual increase in the number of operations. Applications for nearly 90 new small quarries were filed with Susquehanna County in 1998, accounting for more than 60% of the new permit applications. (Ninety-seven percent was for "bluestone" (flagstone) operations in the extreme northeastern portion of the State.) This was largely the result of a new initiative of the State

plentiful. Consolidation and integration of the construction government regulatory body that enables small 0.4- to 0.8-hectare operations to apply for a simplified "General Small Noncoal Mining Permit." Nevertheless, the total known permitted "bluestone" quarries in Pennsylvania are close to 200 operations. These quarries are supported largely by the demand for natural paving materials in the populated portion of the Mid-Atlantic States having popular traditional colonial architecture. Elsewhere in the eastern part of the State, three dimension stone producers filed for small (less than 2 hectares [5 acres]) sandstone and quartzite mining permits in colluvium and bedrock.

The Pennsylvania Aggregates and Concrete Association presented the prestigious Associates Recognition Award for 1998 to the Western Division of Eastern Industries and State Aggregates. Criteria for bestowing this award include, but are not limited to reclamation, beautification, public service, community relations, and education projects, as well as any other action that is a credit to the producer and the industry.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1996		1997		1998 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Cement:</b>						
Masonry	274	28.000 e/	296	31.000 e/	301	32.600
Portland	5,670	418.000 e/	6,360	420.000 e/	6,590	445.000
<b>Clays:</b>						
Common	753	2,420	839	2,740	856	2,800
Kaolin	14	815	W	W	W	W
Gemstones	NA	1	NA	1	NA	1
Lime	1,530	105.000	1,510	103.000	1,570	103.000
Peat	4	166	3	126	W	W
Sand and gravel: Construction	15,100	85,600	15,700	88,500	18,400	107,000
<b>Stone:</b>						
Crushed	87,400	518,000	89,200	536,000	90,900	564,000
Dimension metric tons	54,300	11,800	53,900	10,800	89,100	15,700
Combined values of other industrial minerals	XX	(3/)	XX	10,700	XX	10,800
Total	XX	1,170,000 4/	XX	1,200,000	XX	1,280,000

e/ Estimated. p/ Preliminary. NA Not available. 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 three significant digits; may not add to totals shown.

3/ Value excluded to avoid disclosing company proprietary data.

4/ Partial total, excludes values that must be concealed to avoid disclosing company proprietary data.

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

Kind	1996				1997			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	129 r/	53,900 r/	\$313,000 r/	\$5.81 r/	123	54,700	\$320,000	\$5.85
Dolomite	14	10,800	66,900	6.20	16	11,500	71,400	6.22
Sandstone and quartzite	34 r/	6,290 r/	37,200 r/	5.92	35	6,000	35,400	5.90
Traprock	8	2,810	22,400	7.99	9	2,970	22,600	7.62
Granite	7	4,030	25,800	6.40	7	4,210	28,500	6.76
Marble	1	464	2,860	6.17	1	390	2,370	6.07
Miscellaneous stone	19	9,100 r/	49,100 r/	5.40 r/	19	9,390	55,900	5.95
Total	XX	87,400	518,000	5.92	XX	89,200	536,000	6.01

r/ Revised. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes "limestone-dolomite" reported with no distinction between the two.

TABLE 3  
PENNSYLVANIA: CRUSHED STONE SOLD OR USED BY PRODUCERS  
IN 1997, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit Value
<u>Coarse aggregate (+1 1/2 inch):</u>			
Macadam	222	\$1.240	\$5.60
Riprap and jettv stone	770	5.560	7.22
Filter stone	425	3.000	7.05
Other coarse aggregate	361	2.580	7.15
<u>Coarse aggregate, graded:</u>			
Concrete aggregate, coarse	3,880	22.200	5.73
Bituminous aggregate, coarse	6,600	37.500	5.68
Bituminous surface-treatment aggregate	1,150	6.690	5.80
Railroad ballast	856	5.010	5.85
Other graded coarse aggregate	2,390	15.200	6.36
<u>Fine aggregate (-3/8 inch):</u>			
Stone sand, concrete	199	1.210	6.08
Stone sand, bituminous mix or seal	2,310	14.200	6.15
Screening, undesignated	1,220	7.350	6.04
Other fine aggregate	643	3.990	6.21
<u>Coarse and fine aggregates:</u>			
Graded road base or subbase	7,930	41.500	5.23
Unpaved road surfacing	1,780	8.410	4.74
Terrazzo and exposed aggregate	109	873	8.01
Crusher run or fill or waste	1,400	5.940	4.23
Other coarse and fine aggregates	5,750	36.600	6.35
Other construction materials	3,100	18.000	5.82
<u>Agricultural:</u>			
Agricultural limestone	332	2.050	6.16
Poultry grit and mineral food	10	119	11.90
<u>Chemical and metallurgical:</u>			
Cement manufacture	6,170	28.900	4.67
Lime manufacture	1,270	7.810	6.18
Flux stone	40	435	10.88
Chemical stone	(3/)	(3/)	6.10
Sulfur oxide removal	266	2.890	10.85
<u>Special:</u>			
Mine dusting or acid water treatment	6	39	6.50
Asphalt fillers or extenders	259	2.240	8.63
Whiting or whiting substitute	401	8.380	20.89
Other fillers or extenders	38	362	9.53
Roofing granules	420	9.260	22.06
<u>Other miscellaneous uses:</u>			
Building products	38	324	8.53
Other specified uses not listed	9	45	5.00
<u>Unspecified: 4/</u>			
Actual	24,500	142.000	5.79
Estimated	14,300	94.200	6.59
Total	89,200	536,000	6.01

1/ Includes dolomite, granite, limestone, limestone-dolomite, marble, miscellaneous stone, sandstone and quartzite, and traprock.

2/ Data are rounded to three significant digits, except unit value; may not add to totals shown.

3/ Less than 1/2 unit.

4/ Includes reported and estimated production without a breakdown by end use.

TABLE 4  
PENNSYLVANIA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1997,  
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Construction aggregates:</b>						
Coarse aggregate (+1 1/2 inch) 2/	W	W	216	1,480	673	4,750
Coarse aggregate, graded 3/	W	W	493	3,120	3,850	24,500
Fine aggregate (-3/8 inch) 4/	W	W	338	2,210	1,020	6,340
Coarse and fine aggregate 5/	W	W	1,450	7,480	4,160	24,400
Other construction materials 6/	292	1,380	6	38	(7/)	(7/)
Agricultural 8/	(7/)	(7/)	(7/)	(7/)	(7/)	(7/)
Chemical and metallurgical 9/	895	5,590	155	1,970	2,950	14,900
Special 10/	1	12	10	159	(8/)	(8/)
Other miscellaneous use 11/	--	--	--	--	--	--
<b>Unspecified: 12/</b>						
Actual	(7/)	(7/)	(7/)	(7/)	639	4,420
Estimated	1,250	8,080	2,010	11,100	3,680	27,200
<b>Total</b>	<b>4,100</b>	<b>23,500</b>	<b>7,940</b>	<b>47,000</b>	<b>19,000</b>	<b>119,000</b>
	District 4		Unspecified districts			
	Quantity	Value	Quantity	Value		
<b>Construction aggregates:</b>						
Coarse aggregate (+1 1/2 inch) 2/	877	6,070	--	--		
Coarse aggregate, graded 3/	10,500	58,700	(13/)	2		
Fine aggregate (-3/8 inch) 4/	2,920	17,900	--	--		
Coarse and fine aggregate 5/	11,700	70,100	1	3		
Other construction materials 6/	1,070	6,160	2	11		
Agricultural 8/	257	1,110	--	--		
Chemical and metallurgical 9/	3,740	17,500	--	--		
Special 10/	(7/)	(7/)	--	--		
Other miscellaneous use 11/	(7/)	(7/)	--	--		
<b>Unspecified: 12/</b>						
Actual	19,000	111	--	--		
Estimated	7,340	47,800	--	--		
<b>Total</b>	<b>58,100</b>	<b>347,000</b>	<b>3</b>	<b>16</b>		

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

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.

3/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

4/ Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregate.

5/ 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.

6/ Includes building products and roofing granules.

7/ Withheld to avoid disclosing company proprietary data included in "Total."

8/ Includes agricultural limestone, poultry grit, and mineral food.

9/ Includes cement manufacture, chemical stone, flux stone, lime manufacture, and sulfur oxide removal.

10/ Includes asphalt fillers or extenders, mine dusting or acid water treatment, other fillers or extenders, and whitening or whitening

11/ Includes other specified uses not listed.

12/ Includes reported and estimated production without a breakdown by end use.

13/ Less than 1/2 unit.

TABLE 5  
PENNSYLVANIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	4,120	\$29,200	\$7.08
Plaster and gunite sands	19	191	10.05
Concrete products (blocks, bricks, pipe, decorative, etc.)	270	1,930	7.15
Asphaltic concrete aggregates and other bituminous mixtures	1,530	8,180	5.34
Road base and coverings	1,360	7,300	5.37
Fill	2,360	6,490	2.75
Snow and ice control	182	1,060	5.85
Roofing granules	5	49	9.80
Other miscellaneous uses	477	3,290	6.90
Unspecified: 2/			
Actual	3,310	18,800	5.69
Estimated	2,090	12,000	5.75
Total or average	15,700	88,500	5.63

1/ Data are rounded to three significant digits, except value per ton; may not add to totals shown.

2/ Includes reported and estimated production without a breakdown by end use.

TABLE 6  
PENNSYLVANIA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997, BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates	730	4,130	596	3,970	1,820	13,700	978	7,370
Concrete products 2/	W	W	34	331	W	W	W	W
Asphaltic concrete aggregates and other bituminous mixtures	W	W	332	1,490	985	5,480	W	W
Road base and coverings	606	3,240	137	729	551	2,940	65	393
Fill	91	385	144	620	306	1,370	1,820	4,120
Snow and ice control	86	478	26	236	52	235	18	114
Other miscellaneous uses 3/	485	2,700	16	110	325	2,200	125	1,320
Unspecified: 4/								
Actual	736	3,750	1,740	10,700	651	3,450	177	948
Estimated	1,280	6,310	123	638	326	1,960	358	3,100
Total	4,020	21,000	3,150	18,800	5,010	31,300	3,540	17,400

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

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes plaster and gunite sands.

3/ Includes roofing granules.

4/ Includes reported and estimated production without a breakdown by end use.