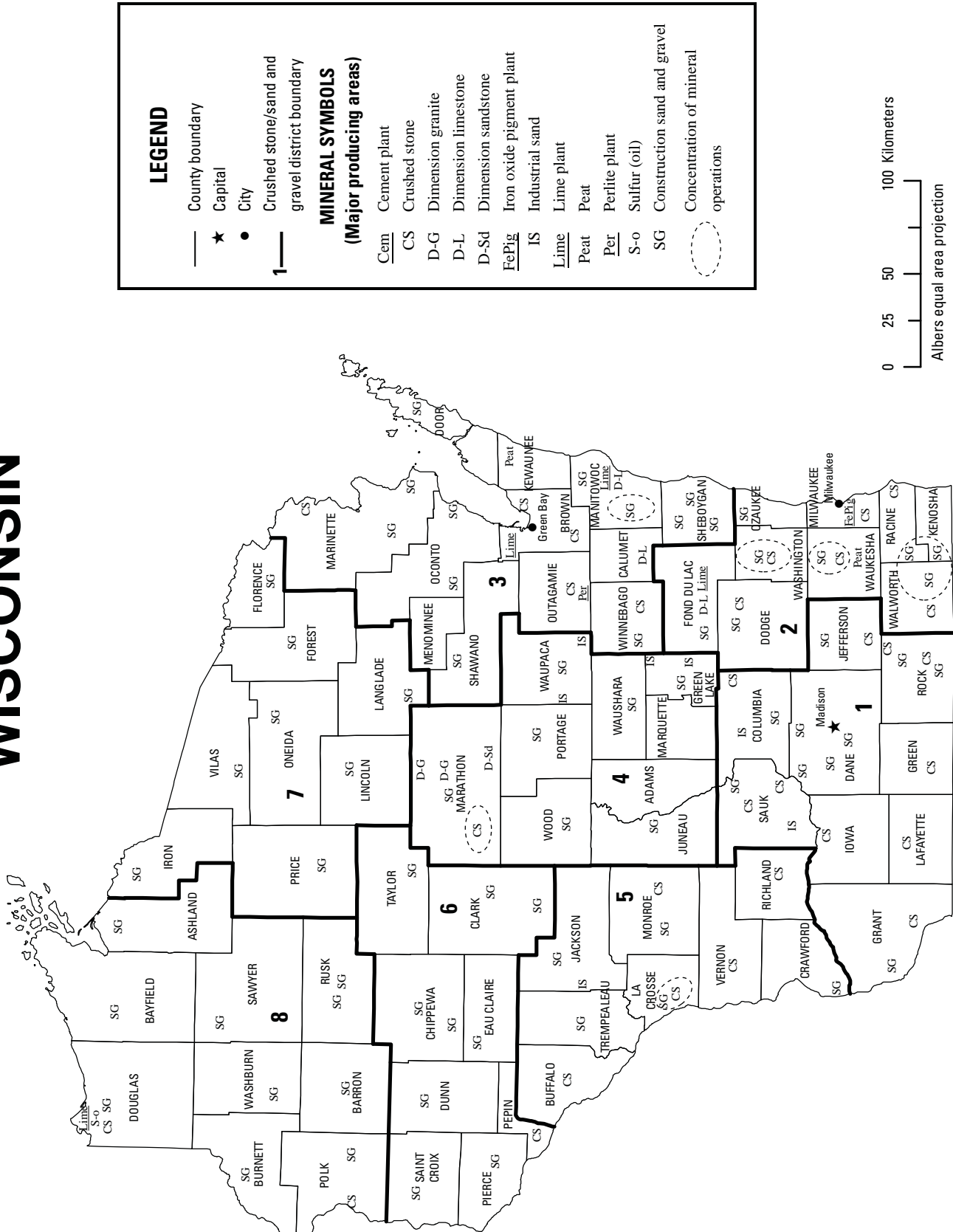




2006 Minerals Yearbook

WISCONSIN

WISCONSIN

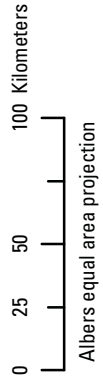


LEGEND

- County boundary
- ★ Capital
- City
- 1— Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Major producing areas)

- Cem Cement plant
- CS Crushed stone
- D-G Dimension granite
- D-L Dimension limestone
- D-Sd Dimension sandstone
- FePig Iron oxide pigment plant
- IS Industrial sand
- Lime Lime plant
- Peat Peat
- Per Perlite plant
- S-o Sulfur (oil)
- SG Construction sand and gravel
- Concentration of mineral operations



THE MINERAL INDUSTRY OF WISCONSIN

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Wisconsin Geological and Natural History Survey for collecting information on all nonfuel minerals.

In 2006, Wisconsin's nonfuel raw mineral production¹ was valued at \$566 million, based upon annual U.S. Geological Survey (USGS) data. This was a marginal (less than 1%) decrease from the State's total nonfuel mineral value for 2005, following a 20%, or \$95 million, increase from 2004 to 2005. The State remained 34th in rank among the 50 States in total nonfuel mineral production value and accounted for 1% of the U.S. total value. [Because data for peat and portland cement (2004–05) have been withheld (company proprietary data), the actual total values for 2004 through 2006 are somewhat higher than those reported in table 1.]

Crushed stone and construction sand and gravel were (in descending order of value) Wisconsin's leading nonfuel minerals in 2006 accounting for more than 36% and 32%, respectively, of the State's reportable total nonfuel raw mineral production value (table 1). These were followed by industrial sand and gravel, representing about 13% of the total value, lime with about 12.5%, and dimension stone with about 6% of the State's total nonfuel mineral value.

In 2006, significant increases took place in the values of industrial sand and gravel, lime, and dimension stone, up by more than \$18 million, more than \$9 million, and nearly \$8 million, respectively. However, on balance, these increases were offset by decreases of \$30 million in crushed stone value and \$9 million in construction sand and gravel, resulting in the State's small decrease in total nonfuel mineral production value (table 1).

In 2006, Wisconsin continued to rank first in the Nation in the quantities of dimension stone produced, third in industrial sand and gravel production, and Wisconsin was a significant producer of crushed stone. Although lime production increased by 4%, the State decreased in rank to 9th from 8th, and in construction sand and gravel an 8% decrease in production resulted in a decrease in rank to 11th from 10th.

The following narrative information was provided by the Wisconsin Geological and Natural History Survey² (WGNHS). Although a small decrease took place in aggregate production, Wisconsin's nonfuel mineral industry remained active, particularly in the mineral commodities of industrial sand and dimension stone (sandstone and granite) (table 1). Other industrial minerals included agricultural lime produced as a primary product or a byproduct of aggregate crushing, dolomitic

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the 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 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Bruce A. Brown, Senior Geologist, Wisconsin Geological and Natural History Survey, authored the text of the State mineral industry information provided by that agency.

quicklime and hydrated lime products, landscape materials, roofing granules, and specialty aggregates. Also the State had a small peat industry and some limited clay production for landfill liners and construction use.

Exploration Activities, Discoveries, and Mine Development

In 2006, a continued consideration in aggregate exploration in and around major urban areas such as southeast Wisconsin has been whether permits and zoning can be obtained before development makes mining an impractical land use. Producers of dimension limestone, sandstone, and landscape stone products have followed the lead of the aggregate industry in seeking new reserves in less developed regions where permitting is easier. Industrial sand producers were active in expanding operations and seeking new reserves in anticipation of demand from the drilling and glass industries. There were no active metal mines in Wisconsin partly owing to recent rising metal prices, a renewed interest took place in the historic Penokee-Gogebic Range as a future iron resource.

Commodity Review

Industrial Minerals

Sand and Gravel, Industrial.—Wisconsin's industrial sand industry continued to increase in 2006, fueled by increasing demand for hydrofrac sand for the petroleum industry, increasing needs of the local glass industry, and a strong demand for foundry sand. Proposals for two new silica sand mines were submitted to Dunn County in western Wisconsin in 2006. The larger of the two planned mines, which would produce sand for glass and hydrofracturing, had advanced to the permitting process in early 2007. Plans were initiated to reopen an abandoned underground sand mine in Pierce County, located near Wisconsin's only other underground mine, which also produces industrial sand.

Stone, Crushed.—Wisconsin's aggregate industry is dominated by crushed limestone (and smaller quantities of crushed dolomite) and sand and gravel, but production of various Precambrian crystalline rock continued to increase. Much of the State's diabase, granite, quartzite, and traprock, that was quarried was used in railroad ballast, but an increasing share was being used for asphalt and concrete in applications where high durability was required. Other hardrock products included manufactured sand and specialty aggregates for architectural and landscape uses.

Stone, Dimension.—In 2006, Wisconsin continued to be a national leader in dimension stone production. A good economy and strong demand from the building industry resulted in several producers expanding capacity and product lines in 2006. The dominant share of dimension stone production and value was

from the Silurian age dolomites of eastern Wisconsin. Products included landscape stone, pavers, riprap, structural stone, and a variety of cut and finished facing and veneer stone. Dimension limestone production also is concentrated in the Silurian age rocks of eastern Wisconsin, centered on the Byron area of Fond du Lac County, the Chilton area of Calumet County, and the Sussex-Lannon area of Waukesha County. Products included paving and flagstone, riprap, a variety of cut and finished building stones, landscape stone materials, and veneer stone colors and styles. Strong demand for upscale housing has resulted in several producers planning to expand and modernize veneer and paving stone plants.

A similar range of building and landscape materials was produced from silica-cemented sandstone beds in the Cambrian-age rocks of central Wisconsin. The demand for landscape stone has resulted in local quarries, including some aggregate operations, producing rough dimension stone from the Ordovician age Prairie du Chien and Galena-Platteville limestones.

Many sand and gravel producers saved and sold large boulders for landscaping use. Stones for use in landscaping, including glacial boulders, grus (disaggregated weathered granite), washed gravel, and weathered limestone blocks have become an increasingly lucrative sideline for many aggregate and stone producers. Precambrian-age hardrock (granite, traprock, quartzite) material is increasingly in demand for aggregates requiring high durability such as seal coat chips, breakwater stone, railroad ballast, riprap, roofing granules, and specialty aggregate for terrazzo and exposed aggregate structural panels.

Environmental Issues and Reclamation

No metallic mining has taken place in Wisconsin since the closing of the Flambeau copper mine 10 years ago. The Flambeau Mining Co. (a subsidiary of Kennecott Minerals Co.) asked the State to declare restoration of the site as successfully completed. That status would allow the company to reduce its reclamation bonding significantly, although the company would still be obligated to maintain a reduced bond for 20 years and continue to monitor ground water and surface water for 40 years. No active exploration for metals took place in Wisconsin during 2006.

Legislation and Government Programs and Outreach Activities

Legislative and regulatory action viewed with concern by the aggregate industry included diversion of money from the State's Transportation Fund and repeal of gasoline tax indexing. On the positive side, progress was made in streamlining the process for obtaining air quality and general operating permits for portable crushing plants, and nonmetallic mine reclamation rules were revised and updated.

The WGNHS, in cooperation with Wisconsin Department of Transportation, began work on a statewide GIS mapping and data project of aggregate production sites that will include geology and test data.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN WISCONSIN^{1,2}
(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2004		2005		2006	
	Quantity	Value	Quantity	Value	Quantity	Value
Cement, portland	W	(3)	W	(3)	--	--
Gemstones, natural	NA	6	NA	6	NA	6
Lime	850	53,900	888	61,300	922	70,700
Peat	W	(3)	W	(3)	W	(3)
Sand and gravel:						
Construction	43,400	178,000	43,200	191,000	39,600	182,000
Industrial	2,140	47,000	2,250	55,700	2,450	74,100
Stone:						
Crushed	39,300	172,000	39,800 [†]	234,000 [†]	35,800	204,000
Dimension	232	23,800	278	27,600	297	35,400
Total	XX	475,000	XX	570,000 [†]	XX	566,000

[†]Revised. NA Not available. W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

¹Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Value excluded to avoid disclosing company proprietary data.

TABLE 2
WISCONSIN: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2005			2006		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone ²	199	32,400 ^r	\$193,000 ^r	188	29,000	\$166,000
Dolomite	9	1,000	4,920	9	781	3,800
Marble	--	--	--	1	59	340
Granite	5	2,740	15,800	5	2,630	14,800
Sandstone and quartzite	3	1,580	9,920	3	1,660	8,740
Traprock	4	2,120 ^r	10,900 ^r	4	1,690	10,100
Total	XX	39,800 ^r	234,000 ^r	XX	35,800	204,000

^rRevised. XX Not applicable. -- Zero.

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

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

TABLE 3
WISCONSIN: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE¹

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Macadam	W	W
Riprap and jetty stone	98	1,570
Filter stone	118	557
Other coarse aggregate	819	5,420
Total	1,040	7,550
Coarse aggregate, graded:		
Concrete aggregate, coarse	371	2,340
Bituminous aggregate, coarse	59	258
Bituminous surface-treatment aggregate	(2)	(2)
Railroad ballast	(2)	(2)
Other graded coarse aggregate	940	7,260
Total	2,070	12,800
Fine aggregate (¾ inch):		
Stone sand, concrete	(2)	(2)
Stone sand, bituminous mix or seal	(2)	(2)
Screening, undesignated	633	3,050
Other fine aggregate	283	1,060
Total	941	4,230
Coarse and fine aggregates:		
Graded road base or subbase	2,890	13,800
Unpaved road surfacing	(2)	(2)
Crusher run or fill or waste	776	5,340
Roofing granules	(2)	(2)
Other coarse and fine aggregates	2,280	11,900
Total	6,470	34,500
Other construction materials	5	25
Agricultural:		
Limestone	218	2,590
Other agricultural uses	16	62
Total	234	2,650
Chemical and metallurgical, lime manufacture	(3)	(3)
Other miscellaneous uses, refractory stone	(3)	(3)
Unspecified:⁴		
Reported	902	5,170
Estimated	24,000	140,000
Total	24,800	141,000
Grand total	35,800	204,000

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

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

²Withheld to avoid disclosing company proprietary data; included in "Total."

³Withheld to avoid disclosing company proprietary data; included in "Grand total."

⁴Reported and estimated production without a breakdown by end use.

TABLE 4
WISCONSIN: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE AND DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 2 ³		District 3		District 4		District 5	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction:								
Coarse aggregate (+1½ inch) ⁴	650	5,800	W	W	--	--	--	--
Coarse aggregate, graded ⁵	1,720	11,100	W	W	--	--	--	--
Fine aggregate (-¾ inch) ⁶	W	W	W	W	--	--	--	--
Coarse and fine aggregate ⁷	4,450	23,900	1,280	7,050	(8)	(8)	--	--
Other construction materials	5	25	--	--	--	--	--	--
Agricultural ⁹	W	W	W	W	--	--	--	--
Chemical and metallurgical ¹⁰	--	--	W	W	--	--	--	--
Other miscellaneous uses ¹¹	--	--	W	W	--	--	--	--
Unspecified: ¹²								
Reported	--	--	--	--	1,140	6,250	--	--
Estimated	8,000	45,000	3,300	19,000	2,100	12,000	6,900	40,000
Total	15,400	89,600	5,890	32,200	3,230	18,300	6,900	40,000
	Districts 6 and 8 ³		Unspecified districts					
	Quantity	Value	Quantity	Value				
Construction:								
Coarse aggregate (+1½ inch) ⁴	W	W	70	311				
Coarse aggregate, graded ⁵	W	W	--	--				
Fine aggregate (-¾ inch) ⁶	--	--	87	450				
Coarse and fine aggregate ⁷	241	1,330	263	1,160				
Other construction materials	--	--	--	--				
Agricultural ⁹	--	--	--	--				
Chemical and metallurgical ¹⁰	--	--	--	--				
Other miscellaneous uses ¹¹	--	--	--	--				
Unspecified: ¹²								
Reported	--	--	--	--				
Estimated	3,600	21,000	--	--				
Total	3,930	22,300	420	1,920				

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹No production for District 7.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Districts 1 and 2 and 6 and 8 are combined to avoid disclosing company proprietary data.

⁴Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregates.

⁵Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregates.

⁶Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregates.

⁷Includes crusher run or fill or waste, graded road base or subbase, roofing granules, unpaved road surfacing, and other coarse and fine aggregates.

⁸Withheld to avoid disclosing company proprietary data; included with "Unspecified: Reported."

⁹Includes agricultural limestone and other agricultural uses.

¹⁰Includes lime manufacture.

¹¹Includes refractory stone.

¹²Reported and estimated production without a breakdown by end use.

TABLE 5
WISCONSIN: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
BY MAJOR USE CATEGORY¹

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	5,670	\$26,600	\$4.70
Plaster and gunitite sands	10	101	10.10
Concrete products (blocks, bricks, pipe, decorative, etc.)	215	1,030	4.80
Asphaltic concrete aggregates and other bituminous mixtures	1,480	7,110	4.81
Road base and coverings ²	6,200	26,300	4.23
Fill	1,450	4,880	3.37
Snow and ice control	176	1,050	5.94
Roofing granules	10	60	6.00
Filtration	62	310	5.00
Other miscellaneous uses	165	1,160	7.05
Unspecified: ³			
Reported	1,210	6,050	5.01
Estimated	23,000	107,000	4.68
Total or average	39,600	182,000	4.60

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

²Includes road and other stabilization (lime).

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

TABLE 6
WISCONSIN: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	864	4,880	1,860	8,430	1,380	6,470
Asphaltic concrete aggregates and road base materials ³	340	1,510	W	W	1,280	4,570
Fill	68	254	860	3,240	249	604
Snow and ice control	--	--	W	W	W	W
Other miscellaneous uses ⁴	71	370	2,530	12,600	149	740
Unspecified: ⁵						
Reported	148	972	38	294	102	529
Estimated	1,250	5,960	9,640	48,100	2,560	11,500
Total	2,740	13,900	14,900	72,600	5,720	24,400
	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	545	1,550	(6)	(6)	W	W
Asphaltic concrete aggregates and road base materials ³	280	1,130	(6)	(6)	W	W
Fill	50	213	(6)	(6)	96	172
Snow and ice control	--	--	(6)	(6)	W	W
Other miscellaneous uses ⁴	10	54	--	--	832	5,100
Unspecified: ⁵						
Reported	817	3,600	--	--	43	505
Estimated	3,020	13,400	2,170	9,560	1,780	7,840
Total	4,720	19,900	2,640	12,300	2,750	13,600
	District 7		District 8		Unspecified districts	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	24	122	407	1,890	W	W
Asphaltic concrete aggregates and road base materials ³	282	1,060	1,460	5,660	W	W
Fill	W	W	W	W	--	--
Snow and ice control	W	W	W	W	5	24
Other miscellaneous uses ⁴	W	W	98	440	W	W
Unspecified: ⁵						
Reported	11	50	49	95	--	--
Estimated	1,570	6,920	626	2,580	362	1,590
Total	1,970	8,760	2,640	10,700	1,500	5,840

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

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

²Includes plaster and gunite sands.

³Includes road and other stabilization (lime).

⁴Includes filtration and roofing granules.

⁵Reported and estimated production without a breakdown by end use.

⁶Withheld to avoid disclosing company proprietary data; included in "Total."