

# THE MINERAL INDUSTRY OF SOUTH DAKOTA

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 South Dakota Geological Survey for collecting information on all nonfuel minerals.

South Dakota remained 36th in the Nation in nonfuel mineral production value<sup>1</sup> in 1995, according to the U.S. Geological Survey (USGS). The estimated value for 1995 was \$317 million, a 2% decrease from that of 1994. This followed a more than 4% decrease from 1993 to 1994 (based on final data). The State accounted for almost 1% of the U.S. total nonfuel mineral production value.

The small decreases in value the past 2 years follow South Dakota's all time high of \$337 million, set in 1993. Gold remained the State's leading nonfuel mineral by value; the quantity and value have been withheld since 1994 to protect company proprietary data. Whereas the value of gold decreased in 1994 and 1995, the value of portland cement, the State's second-leading mineral commodity, increased in both years. In descending order of value, gold and portland cement were followed by crushed stone, construction sand and gravel, and dimension stone. Compared with 1994, other nonfuel mineral values that increased were dimension stone, lime, iron ore, mica, masonry cement, and gemstones. Values that decreased were crushed stone, construction sand and gravel, silver, and feldspar.

Compared with USGS estimates of the quantities produced in the other 49 States during 1995, South Dakota remained fourth of 14 U.S. gold-producing States, fifth in iron ore, and seventh in feldspar. The State moved down in rank from seventh to eighth in the production of dimension

stone and from fourth to fifth in crude mica. Additionally, significant quantities of construction sand and gravel were produced from the State's mine pits. Iron ore was mined mainly for use by a South Dakota cement company as an ingredient in its cement manufacturing process.

According to the South Dakota Geological Survey<sup>2</sup> (SDGS), companies receiving exploration permits for gold and silver were Western Mining Corp., Wharf Resources, Golden Reward Mining Co., Calumet Slag, and Rem Co. The State Board of Minerals and Environment (BME) awarded permits to Creek Gold for exploration of gold, tantalite, almandite, garnet, and sand and gravel, and to Homestake Mining Co. for all minerals excluding uranium.

LAC Minerals Ltd.'s Richmond Hill heap leach gold mine was closed in 1995, with 3.2 million metric tons of acid-generating waste rock being returned to the pit and capped. Vadose zone monitoring equipment was installed. The company installed a state-of-the-art acid mine drainage (AMD) water treatment plant with a secondary selenium removal system.

Brohm Mining was also very active on the environmental reclamation front. In March, the BME awarded the company a permit to conduct its acid mine drainage plan at the Gilt Edge Mine. Nine million metric tons of acid-generating waste were capped in Ruby Gulch with a multimedia cover. Brohm's new AMD water treatment plant began operation in September. The

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN SOUTH DAKOTA<sup>1 2</sup>

Mineral	1993		1994		1995 <sup>p</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Gemstones	NA	\$163	NA	\$110	NA	\$173
Gold <sup>3</sup> kilograms	19,200	223,000	W	W	W	W
Sand and gravel (construction) thousand metric tons	*8,300	*25,000	7,700	23,700	6,600	21,100
Silver <sup>3</sup> metric tons	5	651	4	696	4	707
Stone (crushed) <sup>4</sup> thousand metric tons	4,230	18,700	5,470	24,500	5,400	24,300
Combined value of cement, clays (common), feldspar, gypsum [crude (1993)], iron ore (usable), lime, mica (scrap), stone [crushed sandstone and miscellaneous (1993), crushed miscellaneous (1994-95), dimension (1993, 1995), dimension granite (1994)], and values indicated by symbol W	XX	69,400	XX	274,000	XX	270,000
Total	XX	337,000	XX	323,000	XX	317,000

<sup>p</sup>Estimated. <sup>p</sup>Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" data. XX Not applicable.

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

<sup>2</sup>Data are rounded to three significant digits; may not add to totals shown.

<sup>3</sup>Recoverable content of ores, etc.

<sup>4</sup>Excludes certain stones; kind and value included with "Combined value" data.

company also completed a multiyear, \$450,000 reclamation of abandoned, acid-generating tailings along Strawberry Creek. The project represents one of the most successful abandoned mine cleanups in the Black Hills. Strawberry Creek and Bear Butte Creek watersheds have shown significant improvement in water quality and aquatic habitats.

Homestake Mining Co. reached a major milestone, producing its 12 millionth kilogram (38 millionth troy ounce) of gold during November. The company estimated that it would produce more than 12,000 kilograms (about 400,000 troy ounces) of gold in 1995, according to the State Department of Environment and Natural Resources' (DENR) Minerals and Mining Program staff.

Wharf Resources, 60% owner of the Golden Reward Mine, announced in December that it is taking a \$9.5 million after-tax write-down of its investment in Golden Reward. This is because of uncertainty of ore reserves near the Terry Cemetery and Terry Peak ski area. This write-down represents Wharf's share of 9,770 kilograms (314,000 troy ounces) of gold in reserves in the cemetery and the ski area. Mining on permitted reserves was projected to end October 1996. The company planned to put the mine on a care and maintenance basis at that time.

A proposed inventory and cleanup of abandoned mines in the Black Hills made some significant advances during the year. DENR officials entered into a Memorandum of Understanding with the U.S. Environmental Protection Agency (EPA) that provides the State and its agents protection from the Comprehensive Environmental Response, Compensation, and Liability Act (the "Super-

fund" Law) while conducting inventory and cleanup operations. Affected mines exist on both private and public lands throughout the Black Hills region.

A representative of the DENR's Minerals and Mining Program presented EPA-sponsored seminars in Anaconda, MT, Denver, CO, and Sacramento, CA, on acid mine drainage (AMD). The seminars detailed the AMD efforts at Richmond Hill and Gilt Edge Mines and the Strawberry Creek relic tailing cleanup of the northern Black Hills.

Budget reductions in the South Dakota State Government may have some impact on minerals' activities in DENR. Nineteen of 21 agencies, including DENR, will be downsized by about 9% under the Governor's 1997 budget proposal. The Minerals and Mining Program was slated to lose one of its two hydrologists while the SDGS will discontinue several functions, including its water chemistry lab, minerals lab, minerals investigations, natural resources education activities, and aid to economic development. Three full-time and two seasonal positions will be eliminated at SDGS.

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<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 1995 USGS mineral production data are estimates, as of Dec. 1995. For some commodities, especially 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. Call MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset and request Document No. 1000 for a telephone listing of all mineral commodity specialists or call USGS information at (703) 648-4000 for the specialist's name and number.

<sup>2</sup>The remaining narrative portion of this report was based on information provided by the South Dakota Geological Survey.

TABLE 2  
**SOUTH DAKOTA: CRUSHED STONE<sup>1</sup> SOLD OR USED BY PRODUCERS IN 1994, BY USE<sup>2</sup>**

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse and fine aggregates <sup>3</sup>	1,250	\$6,000	\$4.79
Chemical and metallurgical:			
Cement manufacture	(4)	(4)	1.49
Lime manufacture	(4)	(4)	4.52
Glass manufacture	(4)	(4)	22.00
Unspecified: <sup>5</sup>			
Actual	2,460	13,600	5.52
Estimated	600	2,680	4.46
Total	5,470	24,500	4.47

<sup>1</sup>Includes limestone and quartzite; excludes miscellaneous stone from State total to avoid disclosing company proprietary data.

<sup>2</sup>Data are rounded to three significant digits; may not add to totals shown.

<sup>3</sup>Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), crusher run or fill or waste, filter stone, graded road base or subbase, other coarse aggregate, railroad ballast, stone sand (bituminous mix or seal), and stone sand (concrete).

<sup>4</sup>Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>5</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 3  
**SOUTH DAKOTA: CRUSHED STONE SOLD OR USED, BY KIND<sup>1</sup>**

Kind	1993 <sup>2</sup>				1994 <sup>3</sup>			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	5	2,580	\$9,020	\$3.49	5	2,850	\$9,520	\$3.34
Quartzite	4	1,650	9,670	5.87	5	2,620	15,000	5.70
Total	XX	4,230	18,700	4.42	XX	5,470	24,500	4.47

XX Not applicable.

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

<sup>2</sup>Excludes miscellaneous stone and sandstone from State total to avoid disclosing company proprietary data.

<sup>3</sup>Excludes miscellaneous stone from State total to avoid disclosing company proprietary data.

TABLE 4  
**SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY MAJOR USE CATEGORY<sup>1</sup>**

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate and concrete products <sup>2</sup>	1,040	\$5,230	\$5.05
Asphaltic concrete aggregates and other bituminous mixtures	432	1,740	4.03
Road base and coverings <sup>3</sup>	2,910	7,220	2.48
Fill	461	905	1.96
Snow and ice control	23	120	5.22
Railroad ballast	34	175	5.15
Other	11	50	4.55
Unspecified: <sup>4</sup>			
Actual	1,530	4,560	2.98
Estimated	1,260	3,730	2.96
Total or average	7,700	23,700	3.08

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

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes road and other stabilization (cement).

<sup>4</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5  
**SOUTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY USE AND DISTRICT<sup>1</sup>**

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products <sup>2</sup>	368	1,910	122	665
Asphaltic concrete aggregates and road base materials <sup>3</sup>	398	757	642	1,650
Snow and ice control	7	62	—	—
Railroad ballast	—	—	—	—
Other miscellaneous uses <sup>4</sup>	—	—	—	—
Unspecified: <sup>5</sup>				
Actual	88	225	129	215
Estimated	316	966	197	565
Total	1,180	3,920	1,090	3,100
	District 3		District 4	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products <sup>2</sup>	167	836	379	1,820
Asphaltic concrete aggregates and road base materials <sup>3</sup>	872	2,670	1,890	4,790
Snow and ice control	1	3	15	55
Railroad ballast	27	149	6	26
Other miscellaneous uses <sup>4</sup>	—	—	11	50
Unspecified: <sup>5</sup>				
Actual	427	1,090	888	3,040
Estimated	352	1,080	391	1,110
Total	1,850	5,820	3,580	10,900

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

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes fill, road, and other stabilization (cement).

<sup>4</sup>Includes filtration and roofing granules.

<sup>5</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.



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