

# THE MINERAL INDUSTRY OF MINNESOTA

Minnesota remained ninth in the ranking of all 50 States in total nonfuel mineral value<sup>1</sup> in 1994, according to the U.S. Bureau of Mines (USBM). The estimated value for 1994 was \$1.35 billion, a 4% increase from that of 1993. This followed a 5% decrease in 1993 from that of 1992. The State accounted for nearly 4% of the U.S. total. Changes occurring between 1992-94 resulted mostly from the combined effects of shipments of iron ore, and less so, construction sand and gravel, and crushed stone. In 1994, iron ore accounted for more than 86% of the State's nonfuel mineral value, while construction sand and gravel accounted for nearly 7% and crushed stone more than 3% of the total. Throughout most of the years 1980-90, Minnesota ranked between second and sixth nationally when iron ore prices and related sales were relatively stronger than the recent 1990's. In estimated mineral production for 1994, Minnesota remained first in the Nation in iron ore, fourth in peat, and sixth in kaolin clays. While significant quantities of construction and industrial sand and gravel, crushed stone, and dimension stone were produced in Minnesota, the State ranked no higher than ninth among the 50 States in the quantity of each mineral produced. Compared with 1993, the value of iron ore, construction sand and gravel, crushed stone, industrial sand and gravel, lime, kaolin clays, and peat increased. Decreases occurred in the value of dimension stone and gemstones.

According to the Minnesota Geological Survey and the USBM, the Cliffs Minnesota Minerals Co., a subsidiary of Cleveland-Cliffs Inc., acquired Cyprus North Shore Mining Corp. and renamed it the Northshore Mining Co. Included in the deal were the Peter Mitchell Mine, near Babbitt,

MN, and the Silver Bay iron ore processing plant and power subsidiary located about 50 miles east of the mine. The principal assets acquired were 4 million metric- tons-per-year (mt/yr) of active iron ore pellet capacity supported by 6 mt/yr of concentrate capacity, a 115-megawatt power generation plant, and access to an estimated 1.2 billion tons of reserves, leased mainly from the Mesabi Trust at Babbitt, MN, on the eastern Mesabi Iron Range. As a result of the acquisition, according to Skillings' Mining Review, Cleveland-Cliffs' subsidiaries manage 20 million tons of annual iron ore pelletizing capacity in Minnesota, principally for steel company owners. This represents 43% of the total iron ore pelletizing capacity in Minnesota and nearly 25% of all pelletizing capacity in North America. The National Steel Pellet Co.'s production facility (mine and ore processing plant) at Keewatin, MN, was reopened after a prolonged shutdown. The Dunka River Pit was closed by LTV Corp. after 36 years of continuous production. Two government reports containing numerous suggestions for legislative initiatives and changes to existing mining, minerals processing and recycling, and related environmental laws were released in 1994. The first report, entitled Mining, Society and the Environment: Report by the Minerals Team of the Minnesota Sustainable Development Initiative, was published in January. The second report, Recommendations for Strengthening Minnesota's Mining and Minerals Industry: A Report to the Governor from the Governor's Task Force on Mining and Minerals, was printed in May. The industry expressed renewed interest in developing processing technology for the disseminated copper/nickel deposits associated with the basal zone of the Duluth Complex in northeastern

TABLE 1  
NONFUEL RAW MINERAL PRODUCTION IN MINNESOTA<sup>1</sup>

Mineral	1992		1993		1994 <sup>p</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Gemstones	NA	\$686	NA	\$65	NA	W
Iron ore (usable) thousand metric tons	42,348	1,180,563	42,459	1,126,576	43,000	\$1,170,000
Peat do.	36	2,764	33	1,931	29	2,260
Sand and gravel (construction) do.	34,114	98,673	<sup>e</sup> 30,500	<sup>e</sup> 85,400	31,800	92,200
Stone:						
Crushed do.	<sup>e</sup> 9,525	<sup>e</sup> 39,500	9,423	37,736	<sup>e</sup> 10,200	<sup>e</sup> 44,400
Dimension metric tons	<sup>e</sup> 32,833	<sup>e</sup> 11,436	33,466	11,766	W	W
Combined value of clays (common, kaolin), lime, and sand and gravel (industrial), and values indicated by symbol W	XX	<sup>1</sup> 30,364	XX	35,250	XX	47,000
Total	XX	<sup>1</sup> 1,363,986	XX	1,298,724	XX	<sup>2</sup> 1,350,000

<sup>e</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. NA Not available. XX Not applicable.

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

<sup>2</sup>Data do not add to total shown because of independent rounding.

## Minnesota.

mine shipments, mineral commodity sales, or marketable production as is applicable to the individual mineral commodities.

<sup>1</sup>The term value means the total monetary value as represented by either

TABLE 2

**MINNESOTA: CRUSHED STONE<sup>1</sup> SOLD OR USED BY PRODUCERS IN 1993, BY USE**

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Coarse aggregate (+1 1/2 inch):</b>			
Macadam	W	W	\$3.31
Riprap and jetty stone	163	\$823	5.05
Filter stone	158	818	5.18
Other coarse aggregate	459	2,523	5.50
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	401	1,978	4.93
Bituminous aggregate, coarse	310	975	3.15
Bituminous surface-treatment aggregate	286	1,228	4.29
Railroad ballast	129	705	5.47
Other graded coarse aggregate	W	W	8.27
<b>Fine aggregate (-3/8 inch): Screening, undesignated<sup>f</sup></b>			
	219	873	3.99
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	2,424	8,614	3.55
Unpaved road surfacing	342	1,148	3.36
Terrazzo and exposed aggregate	W	W	6.85
Crusher run or fill or waste	33	175	5.30
Other construction materials	183	1,311	7.16
Roofing granules	W	W	5.51
<b>Agricultural:</b>			
Agricultural limestone <sup>3</sup>	251	1,024	4.08
<b>Chemical and metallurgical:</b>			
Cement manufacture	( <sup>d</sup> )	( <sup>d</sup> )	16.53
Lime manufacture	( <sup>d</sup> )	( <sup>d</sup> )	6.68
<b>Special:</b>			
Asphalt fillers or extenders	( <sup>d</sup> )	( <sup>d</sup> )	2.48
Other specified uses not listed	431	1,970	4.57
<b>Unspecified:<sup>5</sup></b>			
Actual	2,095	7,938	3.79
Estimated	1,540	5,631	3.66
Total <sup>6</sup>	9,423	37,736	4.00
Total <sup>7 8</sup>	10,387	37,736	3.63

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

<sup>1</sup>Includes dolomite, granite, limestone, quartzite, sandstone, and traprock.

<sup>2</sup>Includes stone sand (concrete), and stone sand (bituminous mix or seal).

<sup>3</sup>Includes poultry grit and mineral food.

<sup>4</sup>Withheld to avoid disclosing company proprietary data; included with "Other specified uses not listed."

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

<sup>6</sup>Data may not add to totals shown because of independent rounding.

<sup>7</sup>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.

<sup>8</sup>Total shown in thousand short tons and thousand dollars.

TABLE 3  
MINNESOTA: 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	45	6,174	\$24,005	\$3.88	37	7,209	\$27,134	\$3.76
Dolomite	1	W	W	3.00	3	W	W	3.50
Granite	3	W	W	5.00	3	W	W	4.00
Traprock	1	W	W	10.09	2	W	W	4.29
Sandstone	—	—	—	—	1	W	W	14.50
Quartzite	1	W	W	6.57	1	W	W	7.31
Total <sup>1</sup>	XX	7,601	30,624	4.03	XX	9,423	37,736	4.00
Total <sup>2,3</sup>	XX	8,378	30,624	3.66	XX	10,387	37,736	3.63

W Withheld to avoid disclosing company proprietary data; included with "Total." XX Not applicable.

<sup>1</sup>Data may not add to totals shown because of independent rounding.

<sup>2</sup>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.

<sup>3</sup>Total shown in thousand short tons and thousand dollars.

TABLE 4  
MINNESOTA: CRUSHED STONE<sup>1</sup> SOLD OR USED BY PRODUCERS IN 1993, BY USE AND DISTRICT

(Thousand metric tons and thousand dollars)

Use	District 4		District 5		District 6	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:						
Coarse aggregate (+1 1/2 inch) <sup>2</sup>	W	W	W	W	25	59
Coarse aggregate, graded <sup>3</sup>	W	W	W	W	W	W
Fine aggregate (-3/8 inch) <sup>4</sup>	W	W	W	W	W	W
Coarse and fine aggregate <sup>5</sup>	443	1,944	W	W	W	W
Other construction materials <sup>6</sup>	1,321	7,034	2,797	10,434	520	1,703
Agricultural <sup>7</sup>	( <sup>8</sup> )	( <sup>8</sup> )	( <sup>8</sup> )	( <sup>8</sup> )	120	445
Chemical and metallurgical <sup>9</sup>	—	—	( <sup>8</sup> )	( <sup>8</sup> )	( <sup>8</sup> )	( <sup>8</sup> )
Special <sup>10</sup>	—	—	( <sup>8</sup> )	( <sup>8</sup> )	—	—
Other miscellaneous uses <sup>11</sup>	( <sup>8</sup> )	( <sup>8</sup> )	—	—	( <sup>8</sup> )	( <sup>8</sup> )
Unspecified: <sup>12</sup>						
Actual	253	1,166	392	624	1,450	6,148
Estimated	148	736	446	1,878	653	2,429
Total <sup>13</sup>	2,661	12,663	3,917	13,924	2,845	11,149
Total <sup>14,15</sup>	2,933	12,663	4,318	13,924	3,136	11,149

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

<sup>1</sup>To avoid disclosing company proprietary data, production reported in District 2 and 3 was included with "District 4;" no Crushed Stone was produced in District 1.

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

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

<sup>4</sup>Includes stone sand (concrete), stone sand (bituminous mix or seal), and screening (undesigned).

<sup>5</sup>Includes graded road base or subbase, unpaved road surfacing, terrazzo and exposed aggregate, crusher run (select material or fill), and other coarse and fine aggregates.

<sup>6</sup>Includes roofing granules.

<sup>7</sup>Includes agricultural limestone, and poultry grit and mineral food.

<sup>8</sup>Withheld to avoid disclosing company proprietary data; included with "Total."

<sup>9</sup>Includes cement manufacture and lime manufacture.

<sup>10</sup>Includes asphalt fillers or extenders.

<sup>11</sup>Includes specified uses not listed.

<sup>12</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

<sup>13</sup>Data may not add to totals shown because of independent rounding.

<sup>14</sup>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.

<sup>15</sup>Total shown in thousand short tons and thousand dollars.