

THE MINERAL INDUSTRY OF MISSOURI

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 Missouri Department of Natural Resources, Division of Geology and Land Survey, for collecting information on all nonfuel minerals.

In 1995, for the second consecutive year, Missouri ranked 10th among the 50 States in total nonfuel mineral production value,¹ according to the U.S. Geological Survey (USGS). The estimated value for 1995 was \$1.1 billion, about a 2% increase from that of 1994. This followed a 27% increase from 1993 to 1994 (based on final data). The State accounted for almost 3% of the U.S. total nonfuel mineral production value.

Crushed stone, by value, has been Missouri's leading mineral commodity since 1993 when it surpassed portland cement and lead. In 1995, lead was second and portland cement was third. These three commodities accounted for 75% of the State's total nonfuel mineral value. Missouri's 1995 increase, relatively small compared to that of 1994, helped the State maintain its rank among the States. The increased values of lead and lime, and smaller increases in crushed stone, copper, and zinc, more than offset drops in portland cement, construction sand and gravel, and iron ore. In 1994, a banner year for Missouri's minerals industry, nearly all nonfuel mineral commodity values

increased. Substantial increases in crushed stone, portland cement, lead, and construction sand and gravel values accounted for about 93% of 1994's increased nonfuel mineral value. Compared with 1994 other nonfuel mineral values that increased in 1995 were fuller's earth clays, silver, and bentonite clays. Decreases occurred in industrial sand and gravel, masonry cement, common clays, fire clays, and gemstones.

Missouri is, by a large measure, the top lead-producing State in the Nation. Production in Missouri and the country remained significantly lower than during the 1970's and early 1980's. The State's lead industry marked a low year in 1984, producing a little more than 278,000 metric tons² (recoverable content of ores). This, in part, resulted from restrictions by the Federal Government on the use of lead in paints, as a gasoline additive, and in advancing vehicle battery technologies. But, a prolonged strike at two facilities in 1984 was the most significant reason for this decline. Following a modest, although fluctuating, recovery from 1985-90 (381,000 tons were produced in

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN MISSOURI^{1 2}

Mineral	1993		1994		1995 ^p	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement (portland) metric tons	4,060,000	\$201,000	4,730,000	\$265,000	3,980,000	\$223,000
Clays ³ thousand metric tons	1,180	7,740	1,250	7,910	1,110	7,190
Copper ⁴ metric tons	6,980	14,100	7,720	18,900	8,500	26,000
Gemstones	NA	46	NA	67	NA	58
Iron ore (usable) thousand metric tons	287	W	W	W	W	W
Lead ⁴ metric tons	277,000	194,000	290,000	238,000	289,000	267,000
Sand and gravel:						
Construction thousand metric tons	6,400	19,800	9,760	36,500	8,400	31,900
Industrial metric tons	520,000	9,390	559,000	9,970	731,000	9,640
Silver ⁴ do.	40	5,580	40	6,860	41	6,970
Stone (crushed) thousand metric tons	53,400	239,000	68,900	330,000	69,500	337,000
Zinc ⁴ metric tons	40,200	40,900	42,000	45,600	42,000	49,100
Combined value of barite, cement (masonry), clays [bentonite (1995), fuller's earth], iron oxide pigments (crude), lime, stone [dimension (1993, 1995), dimension granite (1994)], and values indicated by by symbol W	XX	123,000	XX	128,000	XX	148,000
Total	XX	855,000	XX	1,090,000	XX	1,110,000

^aEstimated. ^pPreliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" data.

XX Not applicable.

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

²Data are rounded to three significant digits; may not add to totals shown.

³Excludes certain clays; kind and value included with "Combined value" data.

⁴Recoverable content of ores, etc.

1990), lead output declined in 1993 to just below the 1984 level. Missouri lead production has rebounded modestly since 1993; production in 1995 was 4% greater than that of 1993, the year of lowest production during the 1990's.

Compared to USGS estimates of quantities produced in the other 49 States in 1995, Missouri remained first in lead and fire clays and second in iron oxide pigments. The State also continued to be one of the top three in lime, third in crushed stone and iron ore, third of four barite-producing States, fourth in zinc, fifth in fuller's earth, and seventh in copper and silver. Missouri dropped from 5th to 6th in portland cement production and from 9th to 11th in common clays. No bentonite production was reported for 1994. Additionally, Missouri mines and plants produced substantial quantities of construction and industrial sand and gravel and masonry cement.

The Missouri Division of Geology and Land Survey (MDGLS)³ reported that a variety of projects continued in 1995 for the State's metals industry. At least four major companies explored for Olympic Dam-type iron-copper-gold deposits. Placer Dome Inc. was the most prominent of these companies, drilling several holes in southeast Missouri before ending exploration in late spring. Limited exploration also proceeded for sediment-hosted base metal deposits, primarily lead and zinc. In Iron County, Cominco American, Inc. continued closure of its Magmont Mine and mill, which ceased operation in late spring 1994.

Construction continued on the Chemical Lime Co. plant adjacent to the Mississippi River in Ste. Genevieve County. Scheduled for opening in 1996, the plant will have two coal-fired preheater rotary kilns, each with a daily capacity of 1,225 tons (1,350 short tons). Annual capacity will be about 815,000 tons (900,000 short tons). Plant operations will be automated with the best available, state-of-the-art, environmental control technology. Most production was planned for desulfurization and other environmental use markets along the Mississippi and Ohio Rivers.

Opposition to crushed stone quarries was strong in several areas of the State, particularly near Kansas City, Springfield, and West Plains. Numerous complaints regarding blasting and truck traffic were received by regulatory agencies.

Bar and in-channel construction sand and gravel operations were significantly affected by new Federal mining regulations. The U.S. Army Corps of Engineers, in cooperation with the Missouri Department of Natural Resources and the Department of Conservation, was responsible for regulation enforcement. The regulations limit the depth that can be excavated and the distance that must be left untouched between the water's edge, permanent vegetation, and the pit itself. Although operations of all sizes were expected to be affected, MDGLS expected that the smaller the mining operation the greater the impact. Flood plain operations and in-stream dredges on the major

rivers were not affected.

Continental Cement Co. purchased the refractory clay properties of Allied Chemical Co. near Owensville, Gasconade County. Continental is using the clay in its cement plant near Hannibal, Ralls County. The demand for refractory clays in cement manufacturing increased, in part because of some apparent tightening of available supplies on the open market.

U.S. Borax Inc., a subsidiary of RTZ Corp. of Great Britain, announced plans to sell US Silica Co. to D. George Harris and Associates, a New York-based inorganic chemicals and minerals business. The transaction includes US Silica's industrial sand mine and plant near Pacific, in eastern Missouri.

Lafarge Corp. of Reston, VA, announced its intention to modernize its Sugar Creek cement plant. The new plant will utilize state-of-the-art pollution control technology and have an annual capacity of 815,000 tons. Limestone used in the facility will come from an underground mine on the property. The \$135 million project is expected to come on line by the year 2000.

The Society of Economic Geologists held its 75th anniversary conference in St. Louis in early June and addressed the subject of lead-zinc resources contained in sedimentary deposits. Several field trips were conducted in conjunction with the conference, including two trips to the Viburnum Trend portion of the Southeast Missouri lead-zinc district.

After 75 years, the Department of the Interior's U.S. Bureau of Mines Rolla Research Center (RRC) in Rolla was closed in December. Approximately 32 employees were affected. The office was established on the grounds of the University of Missouri School of Mines and Metallurgy in the summer of 1920. More than 750 scientific articles have been published by the RRC since it began operations, and the Center has been instrumental in numerous mining and metallurgical developments. In recent years, the Center has been involved in developing remediation techniques that are environmentally friendly. The RRC was noted for work with material containing heavy metals, especially lead-, zinc-, and chromium-contaminated wastes.

¹The terminologies "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 published in this chapter are estimated as of Dec. 1995. Estimates for some commodities, e.g., construction sand and gravel, crushed stone, and portland cement, are periodically updated. To obtain the most recent 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.

²All tons are metric tons unless otherwise specified.

³This report includes information provided by the MDGLS.

TABLE 2
MISSOURI: CRUSHED STONE¹ SOLD OR USED BY PRODUCERS IN 1994, BY USE²

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Macadam	235	\$1,070	\$4.56
Riprap and jetty stone	4,160	14,300	3.45
Filter stone	387	1,370	3.55
Other coarse aggregate	427	1,950	4.57
Coarse aggregate, graded:			
Concrete aggregate, coarse	3,460	24,300	7.04
Bituminous aggregate, coarse	1,840	10,200	5.52
Bituminous surface - treatment aggregate	1,040	4,540	4.37
Railroad ballast	W	W	4.65
Other graded coarse aggregate	1,180	6,720	5.68
Fine aggregate (-3/8 inch):			
Stone sand, concrete	275	1,380	5.01
Stone sand, bituminous mix or seal	202	1,460	7.21
Screening, undesignated	916	3,050	3.33
Other fine aggregate	37	161	4.35
Coarse and fine aggregates:			
Graded road base or subbase	10,700	42,900	4.01
Unpaved road surfacing	2,450	12,000	4.89
Terrazzo and exposed aggregate	W	W	6.33
Crusher run or fill or waste	712	3,190	5.72
Other coarse and fine aggregates	2,820	19,300	6.86
Other construction materials ³	999	6,910	6.91
Agricultural:			
Agricultural limestone	1,850	18,300	9.87
Poultry grit and mineral food	(4)	(4)	5.71
Other agricultural uses	(4)	(4)	4.53
Chemical and metallurgical:			
Cement manufacture	6,880	21,000	3.05
Lime manufacture	318	1,600	5.02
Dead-burned dolomite manufacture	(4)	(4)	4.98
Flux stone	(4)	(4)	4.97
Chemical stone	(4)	(4)	4.13
Sulfur oxide removal	(4)	(4)	5.51
Special:			
Asphalt fillers or extenders	(4)	(4)	4.70
Other fillers or extenders	(4)	(4)	5.51
Other specified uses not listed	628	3,170	5.05
Unspecified:⁵			
Actual	13,100	63,100	4.81
Estimated	14,200	68,200	4.78
Total	68,900	330,000	4.80

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

¹Includes dolomite, granite, limestone, and sandstone.

²Data are rounded to three significant digits; may not add to totals shown.

³Includes roofing granules and waste material.

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

⁵Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 3
MISSOURI: CRUSHED STONE SOLD OR USED, BY KIND ¹

Kind	1993				1994			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone ²	168	49,900	\$223,000	\$4.47	194	64,400	\$303,000	\$4.71
Dolomite	16	2,200	9,070	4.13	18	2,960	13,600	4.58
Granite	2	W	W	6.08	2	W	W	9.55
Sandstone	2	W	W	3.37	1	W	W	3.24
Total	XX	53,400	239,000	4.48	XX	68,900	330,000	4.79

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

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

²Includes "Limestone-dolomite," reported with no distinction between the two.

TABLE 4
MISSOURI: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1994, BY DISTRICT¹ AND USE

(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	339	1,640	338	1,220	W	W	W	W
Coarse aggregate, graded ³	W	W	258	981	1,080	6,090	778	4,310
Fine aggregate (-3/8 inch) ⁴	W	W	59	229	W	W	W	W
Coarse and fine aggregate ⁵	1,110	6,860	696	3,470	1,180	5,910	1,380	6,190
Other construction materials ⁶	222	1,030	—	—	299	1,780	263	1,080
Agricultural ⁷	63	237	W	W	W	W	71	256
Chemical and metallurgical ⁸	—	—	W	W	W	W	1,360	1,500
Special ⁹	—	—	—	—	—	—	—	—
Other miscellaneous uses ¹⁰	—	—	—	—	—	—	—	—
Unspecified: ¹²								
Actual	1,840	12,900	—	—	2,580	15,100	—	—
Estimated	1,470	8,390	873	4,470	1,380	6,520	2,670	12,500
Total	5,040	31,100	3,240	13,600	9,010	57,500	6,530	25,900
Use	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:								
Coarse aggregate (+1 1/2 inch) ²	588	2,510	W	W	W	W	W	W
Coarse aggregate, graded ³	2,060	12,500	1,550	14,800	616	2,680	W	W
Fine aggregate (-3/8 inch) ⁴	849	3,080	W	W	W	W	41	123
Coarse and fine aggregate ⁵	6,270	26,000	1,650	8,060	264	1,050	4,440	32,700
Other construction materials ⁶	—	—	599	2,930	49	234	4,790	16,200
Agricultural ⁷	W	W	359	1,800	91	430	W	W
Chemical and metallurgical ⁸	W	W	W	W	—	—	W	W
Special ⁹	—	—	W	W	—	—	—	—
Other miscellaneous uses ¹⁰	—	—	W	W	—	—	—	—
Unspecified: ¹¹								
Actual	5,960	22,600	1,640	7,670	—	—	360	1,470
Estimated	2,710	12,200	3,290	15,600	789	3,660	1,060	4,790
Total	20,000	82,900	9,470	52,900	1,810	8,060	12,900	54,700

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

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

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

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

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

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

⁶Includes waste materials.

⁷Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

⁸Includes cement manufacture, chemical stone for alkali works, dead-burned dolomite manufacture, flux stone, lime manufacture, and sulfur oxide removal.

⁹Includes asphalt fillers or extenders and other fillers or extenders.

¹⁰Includes other specified uses not listed.

¹¹Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5
MISSOURI: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, BY MAJOR USE CATEGORY ¹

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	4,650	\$18,600	\$4.01
Plaster and gunite sands	93	356	3.83
Concrete products (blocks, brick, pipe, decorative, etc.)	752	2,770	3.68
Asphaltic concrete aggregates and other bituminous mixtures	1,300	4,130	3.19
Road base and coverings	404	1,600	3.97
Fill	413	869	2.10
Snow and ice control	95	414	4.36
Filtration	77	312	4.05
Other ²	12	81	6.75
Unspecified: ³			
Actual	116	650	5.60
Estimated	1,860	6,690	3.61
Total or average	9,760	36,500	3.74

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

²Includes railroad ballast and roofing granules.

³Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 6
MISSOURI: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1994, 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 aggregate and concrete products ²	129	727	W	W	—	—	1,230	4,760
Asphaltic concrete aggregates and road base materials ³	47	221	109	420	W	W	554	2,130
Other miscellaneous uses ⁴	29	158	W	W	—	—	W	W
Unspecified: ⁵								
Actual	—	—	34	113	—	—	—	—
Estimated	225	684	103	377	W	W	W	W
Total	430	1,790	378	1,460	683	2,010	2,220	8,600
	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products ²	3,460	12,000	173	1,900	W	W	267	1,150
Asphaltic concrete aggregates and road base materials ³	975	2,490	W	W	279	745	116	491
Other miscellaneous uses ⁴	7	45	W	W	W	W	—	—
Unspecified: ⁵								
Actual	43	412	25	82	13	43	(6)	1
Estimated	317	1,530	11	81	203	759	10	19
Total	4,800	16,500	225	2,160	634	2,340	394	1,660

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

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

²Includes plaster and gunite sands.

³Includes fill.

⁴Includes filtration, railroad ballast, roofing granules, and snow and ice control.

⁵Includes production reported without a breakdown by end use and estimates for nonrespondents.

⁶Less than 1/2 unit.



U. S. Geological Survey Minerals Information

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