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 1996, for the third 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 1996 was $1.25 billion, about a 10% increase from that of 1995. This followed a 4.6% increase from 1994 to 1995 (based on final 1995 data). The State accounted for more than 3% of the U.S. total nonfuel mineral production value.

Missouri is, by a large measure, the top lead-producing State in the Nation. With a 24% increase in value, lead regained its standing in 1996 as Missouri's leading nonfuel mineral commodity. Except for several years in the mid-1980's and 1993-95, lead has been Missouri's leading nonfuel mineral since 1969. Crushed stone surpassed lead and portland cement in 1993 and ranked first through 1995. In 1996, crushed stone ranked second, portland cement, third, and lime, fourth. These four commodities accounted for 84% of the State's total nonfuel mineral value.

Significantly increased values for lead and lime, together with moderate increases for construction sand and gravel, portland cement, crushed stone, and silver accounted for most of the increase in 1996. Other values that increased were those of zinc, industrial sand and gravel, and iron oxide pigments. Mineral commodities that decreased in value in 1996 included copper, iron ore, masonry cement, common and fire clays, barite, and gemstones. In 1995, significant increases in lead, zinc, and fuller's earth clay values were about three times the decrease of crushed stone and construction sand and gravel combined.

Compared with USGS estimates of quantities produced in the other 49 States in 1995, Missouri remained first in fire clays and second in iron oxide pigments. The State also continued to rank third in iron ore and barite; third of four barite-producing States; fourth in crushed stone and zinc; fifth in portland cement and fuller's earth; and seventh in copper and silver. Missouri climbed from being one of the top six lime-producing States to first. Additionally, the State was a significant producer of industrial sand and gravel, masonry cement, and common clays.

The following narrative information was provided by the Missouri Department of Natural Resources, Division of Geology and Land Survey[2] (DGLS). Regulations for exploration drilling were revised and now include registration, casing, and plugging requirements. In general, all exploration drill holes are to be plugged with grout to within 61 centimeters of the surface and registered with the Missouri Department of Natural Resources, DGLS.

Several exploration companies were active during 1996, however, opposition to new and expanding quarry operations continued—especially in the West Plains and Kansas City areas.

Exploration for Olympic Dam-type iron-copper-gold deposits continuedg in Missouri. After originally granting permission to lease some of its land for mineral exploration, the Missouri Department of Conservation reversed its decision in response to complaints from environmental groups and some citizens. Doe Run Corp. had requested permission to explore on State forest lands in southeastern Missouri.

Lafarge Corp. continued design studies and exploration drilling at its Sugar Creek cement plant in Jackson County. Earlier, the company announced plans to build a new $135 million plant and underground mine at its existing site with start-up by the year 2000. The new plant will have the capacity to produce 800,000 metric tons of cement per year. Limestone for the cement making process will come from a 200-meter deep mine. The new plant will feature a single dry-process kiln with a five-stage preheater/precalciner tower to conserve energy. It will also employ sophisticated manufacturing control systems, including an on-line computerized analyzer that monitors product quality.

Mineral rights at the recently closed Magmont Mine were purchased by Doe Run Corp. from the previous operator, Cominco American Inc. Doe Run continued to mine on some parts of the property, using Doe Run facilities for crushing and hoisting. The head frame at the Magmont Mine site was taken down by a controlled blast on November 12.

Chemical Lime Co., headquartered in Fort Worth, TX, completed its first full year of operation at its new lime plant near Ste. Genevieve in Ste. Genevieve County.

Menefee Crushed Stone Co., with a quarry at Sedalia in Pettis County, was purchased by Lafarge Aggregates with regional headquarters in St. Louis, MO. Perry County Stone Co., with quarries in southeast Missouri and southwest Illinois, was purchased by Martin Marietta Aggregates.

G S Roofing Products Co. Inc., Irving, TX, purchased part of the Quality Aggregate Co. quarry and plant at Gads

Hill, Wayne County from the Union Pacific Railroad. The operation will continue to produce railroad ballast and will add a new facility to produce roofing granules.

On June 20, Continental Cement Co. was purchased by a group of 10 investors, mostly from Missouri. The company is now known as Continental Cement LLC. Cement manufacturing and clay mining operations will continue with little change.

Sales of refractory clay products were at a relatively high rate for the second consecutive year in 1996. The demand for refractory clays for use in cement manufacturing continued to increase and exerted upward pressure on raw clay prices.

Coal production continued to decline in the State and at yearend only three small mines in Bates and Vernon Counties were active.

Three deaths occurred in Missouri's mineral industry in 1996. On May 10, two employees of Southwest Lime Co. were killed by a roof fall at the company's underground limestone mine near Neosho, Newton County. The State's third mineral industry fatality was a truck driver, who apparently fell from his truck while waiting to load cement at the River Cement Co. plant near Festus in Jefferson County.

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[1]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 1996 USGS mineral production data published in this chapter are estimates as of February 1997. For some commodities (e.g., 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 # 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. This telephone listing may also be retrieved over the Internet at http://minerals.er.usgs.gov/minerals/contacts/comdir.html

[2]Ardel Rueff, Geologist, authored the text of State mineral industry information submitted by the Division of Geology and Land Survey. He may be contacted at the same address and fax number as Mr. Williams, telephone: (573) 368-2139.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral		1994 Quantity	1994 Value	1995 Quantity	1995 Value	1996 p/ Quantity	1996 p/ Value
Cement (portland)		4,730	265,000	4,360	270,000	4,490	278,000
Clays		1,250 3/	7,910 3/	1,610	10,300 3/	1,530	3,760 3/
Copper 4/		8	18,900	7	22,800	9	22,000
Gemstones		NA	67	NA	58	NA	W
Lead 4/	metric tons	290,000	238,000	W	W	W	W
Sand and gravel:							
Construction		9,760	36,500	8,840	32,400	10,500	41,000
Industrial		559	9,970	W	W	W	W
Silver 4/	metric tons	40	6,860	W	W	W	W
Stone (crushed)		68,900	330,000	65,700 5/	305,000 5/	65,500 5/	311,000 5/
Zinc 4/	metric tons	42,000	45,600	W	W	W	W
Combined value of barite, cement (masonry), clays (fuller's earth), iron ore (usable), iron oxide pigments (crude), lime, stone [crushed granite (1995-96), dimension granite], and values indicated by symbol W		XX	128,000	XX	495,000	XX	596,000
Total		XX	1,090,000	XX	1,140,000	XX	1,250,000

p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" 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/ Excludes certain clays; kind and value included with "Combined value" data.
4/ Recoverable content of ores, etc.
5/ Excludes certain stones; kind and value included with "Combined value" data.

TABLE 2
MISSOURI: CRUSHED STONE 1/ SOLD OR USED BY PRODUCERS
IN 1995, BY USE 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Coarse aggregate (+1 1/2 inch):			
Macadam	241	$1,130	$4.69
Riprap and jetty stone	5,160	14,800	2.86
Filter stone	281	1,270	4.52
Other coarse aggregate	726	3,550	4.89
Coarse aggregate, graded:			
Concrete aggregate, coarse	2,860	15,100	5.30
Bituminous aggregate, coarse	2,080	10,800	5.22
Bituminous surface-treatment aggregate	1,070	4,980	4.67
Other graded coarse aggregate 3/	2,330	22,500	9.66
Fine aggregate (-3/8 inch):			
Stone sand, concrete	114	595	5.22
Stone sand, bituminous mix or seal	305	2,430	7.98
Screening, undesignated	1,380	4,660	3.37
Other fine aggregate	88	146	1.66
Coarse and fine aggregates:			
Graded road base or subbase	9,140	36,200	3.96
Unpaved road surfacing	2,350	10,700	4.54
Crusher run or fill or waste	785	3,180	4.05
Other coarse and fine aggregates 4/	1,990	10,500	5.30
Agricultural: Agricultural limestone 5/	1,090	4,170	3.82
Chemical and metallurgical:			
Cement manufacture	6,030	19,200	3.19
Lime manufacture	W	W	5.97
Dead-burned dolomite manufacture	W	W	7.21
Flux stone	W	W	7.25
Chemical stone	W	W	4.11
Special:			
Asphalt fillers or extenders	W	W	5.33
Whiting or whiting substitute	W	W	10.00
Other specified uses not listed	843	4,480	5.31
Unspecified: 7/			
Actual	11,900	64,600	5.41
Estimated	14,900	70,200	4.70
Total	65,700	305,000	4.64

W Withheld to avoid disclosing company proprietary data; included with "Other specified uses not listed."
1/ Includes dolomite, limestone, limestone-dolomite, and sandstone; excludes granite from total to avoid disclosing company proprietary data.
2/ Data are rounded to three significant digits; may not add to totals shown.
3/ Includes railroad ballast.
4/ Includes roofing granules and terrazzo and exposed aggregate.
5/ Includes poultry grit and mineral food.
6/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 3
MISSOURI: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1995, BY KIND 1/

	1994				1995			
Kind	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone 2/	195 r/	65,200 r/	$307,000 r/	$4.71	193	63,000	$292,000	$4.64
Dolomite	17 r/	2,020 r/	9,590 r/	4.76 r/	17	2,560	12,900	5.04
Granite	2	W	W	9.55	(3/)	(3/)	(3/)	(3/)
Sandstone	1	W	W	3.24	1	200	442	2.21
Total	XX	68,900	330,000	4.80 r/	XX	65,700	305,000	4.64

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." 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.
3/ Excludes granite from total to avoid disclosing company proprietary data.

TABLE 4
MISSOURI: CRUSHED STONE 1/ SOLD OR USED BY PRODUCERS IN 1995, BY USE AND DISTRICT 2/

(Thousand metric tons and thousand dollars)

	District 1		District 2		District 3		District 4	
Use	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:								
Coarse aggregate (+1 1/2 inch) 3/	80	384	W	W	W	W	W	W
Coarse aggregate, graded 4/	W	W	W	W	1,710	1,960	1,110	6,320
Fine aggregate (-3/8 inch) 5/	W	W	W	W	W	W	W	W
Coarse and fine aggregate 6/	1,060	6,390	765	3,780	1,360	7,020	1,380	6,010
Agricultural 7/	47	191	62	154	197	479	66	238
Chemical and metallurgical 8/	--	--	(9/)	(9/)	(9/)	(9/)	--	--
Special 10/	--	--	--	--	--	--	--	--
Unspecified: 11/								
Actual	1,250	8,740	(9/)	(9/)	(9/)	(9/)	537	2,350
Estimated	1,470	7,450	1,910	9,780	1,870	8,930	1,450	6,160
Total	3,900	23,200	5,480	28,300	7,680	50,900	4,530	21,100

	District 5		District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Construction aggregates:								
Coarse aggregate (+1 1/2 inch) 3/	654	2,940	W	W	W	W	W	W
Coarse aggregate, graded 4/	1,590	8,690	1,360	8,320	745	3,490	1,650	6,590
Fine aggregate (-3/8 inch) 5/	1,350	4,540	W	W	W	W	W	W
Coarse and fine aggregate 6/	4,830	20,500	1,600	8,130	256	1,120	9,400	29,200
Agricultural 7/	109	374	302	1,530	60	301	375	1,490
Chemical and metallurgical 8/	(9/)	(9/)	(9/)	(9/)	--	--	(9/)	(9/)
Special 10/	--	--	(9/)	(9/)	--	--	(9/)	(9/)
Unspecified: 11/								
Actual	(9/)	(9/)	3,280	16,800	63	307	465	1,950
Estimated	4,770	21,100	2,350	11,800	931	4,300	195	695
Total	18,900	77,900	9,290	48,500	2,060	9,530	13,900	46,000

W Withheld to avoid disclosing company proprietary data; included with "Coarse and fine aggregate."
1/ Excludes granite from total to avoid disclosing company proprietary data.
2/ Data are rounded to three significant digits; may not add to totals shown.
3/ Includes filter stone, macadam, riprap and jetty stone, and other coarse aggregate.
4/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.
5/ Includes stone sand (concrete), stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregate.
6/ Includes crusher run (select material or fill), graded road base or subbase, other coarse and fine aggregates, roofing granules, terrazzo and exposed aggregate, and unpaved road surfacing.
7/ Includes agricultural limestone and poultry grit and mineral food.
8/ Includes cement manufacture, chemical stone for alkali works, dead-burned dolomite, flux stone, and lime manufacture.
9/ Withheld to avoid disclosing company proprietary data; included in "Total."
10/ Includes asphalt fillers or extenders, whiting or whiting substitute, and other specified uses not listed.
11/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5
MISSOURI: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1995,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand)	4,280	$14,400	$3.35
Plaster and gunite sands	4	35	8.75
Concrete products (blocks, bricks, pipe, decorative, etc.)	126	921	7.31
Asphaltic concrete aggregates and other bituminous mixtures	346	1,310	3.77
Road base and coverings 2/	252	985	3.91
Fill	88	316	3.59
Snow and ice control	53	252	4.75
Other 3/	48	417	8.69
Unspecified: 4/			
Actual	1,260	5,200	4.13
Estimated	2,390	8,610	3.61
Total or average	8,840	32,400	3.66

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes road and other stabilization (cement).
3/ Includes roofing granules.
4/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 6
MISSOURI: C ONTRUCTION SAND AND GRAVEL SOLD OR USED IN 1995,
BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 4		District 5	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 3/	53	266	13	90	W	W	3,260	10,800
Asphaltic concrete aggregates and road base materials 4/	32	127	129	525	W	W	311	1,500
Unspecified: 5/								
Actual	--	--	28	119	1,090	4,200	--	--
Estimated	289	956	1,090	334	365	1,460	430	2,240
Total	374	1,350	1,270	4,080	1,610	6,210	4,000	14,600

	District 6		District 7		District 8	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 3/	W	W	206	976	738	2,430
Asphaltic concrete aggregates and road base materials 4/	W	W	131	366	102	406
Unspecified: 5/						
Actual	31	238	15	101	100	548
Estimated	15	76	181	481	13	66
Total	107	845	532	1,930	953	3,450

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Production reported in District 3 was included with "District 2" to avoid disclosing company proprietary data.
2/ Data are rounded to three significant digits; may not add to totals shown.
3/ Includes plaster and gunite sands.
4/ Includes fill, road and other stabilization (cement), roofing granules, snow and ice control, and other miscellaneous uses.
5/ Includes production reported without a breakdown by end use and estimates for nonrespondents.