

# THE MINERAL INDUSTRY OF ARKANSAS

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 Arkansas Geological Commission for collecting information on all nonfuel minerals.

In 1995, Arkansas rose in rank from 31st to 27th among the 50 States in total nonfuel mineral production value,<sup>1</sup> according to the U.S. Geological Survey (USGS). The estimated value for 1995 was \$451 million, an 11% increase from that of 1994. This followed a 16.8% increase from 1993 to 1994 (based on final data). The State accounted for more than 1% of the U.S. total nonfuel mineral production value.

In 1995, the largest portion of Arkansas increased nonfuel mineral value came from crushed stone. A substantial increase in bromine value and an increase in crushed stone value were responsible for the majority of the State's large rise in value in 1994. The 1994 increase also included a smaller increase in portland cement. Compared with 1994, other mineral commodity values that increased were as follows: construction sand and gravel, portland cement, gemstones, crude gypsum, kaolin clay, tripoli, and masonry cement. Decreases occurred in bromine, lime, silica stone (formerly called abrasives), and common clays.

Based on USGS production estimates for the 50 States during 1995, Arkansas continued to be the leading bromine-producing State, accounting for most U.S. production. Michigan was the only other State that produced bromine. Mining operations in both States

extracted subsurface bromine-rich natural brines by submersible pump for subsequent processing. Arkansas also remained first of two silica stone-producing States, third in tripoli, fourth in kaolin and fire clays, and ninth in crude gypsum. The State rose from 10th to 9th in common clays. Because of the difficulty in establishing a common physical unit that properly measures quantities of gemstones produced, gem production is measured in dollars. By value, Arkansas dropped from second to third in gemstone production. In addition, the State mine pits and quarries produced significant quantities of construction and industrial sand and gravel, crushed stone, and dimension stone. The State's mines exclusively produced industrial minerals; no metal mining has been reported in Arkansas since 1991, when bauxite and vanadium ore mining ceased following decades of production. The State's metal production, mostly raw steel, resulted from materials received from other domestic and foreign sources.

The Arkansas Geological Commission<sup>2</sup> (AGC), reported that the Arkansas Legislature, in response to increasing environmental concerns, passed Act 1345 of 1995 to amend parts of the Arkansas Open-Cut Land Reclamation Act (Act 827 of 1991). Act 1345 prevents the mining of gravel from Arkansas stream beds designated as

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

Mineral	1993		1994		1995 <sup>p</sup>	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Bromine <sup>e</sup> metric tons	177,000	\$123,000	<sup>1</sup> 184,000	<sup>1</sup> \$186,000	207,000	\$185,000
Clays <sup>3</sup> thousand metric tons	1,030	2,360	883	\$2,440	1,050	1,190
Gemstones	NA	5,530	NA	3,950	NA	4,720
Sand and gravel:						
Construction thousand metric tons	<sup>e</sup> 10,100	<sup>e</sup> 40,900	10,600	42,500	10,800	44,800
Industrial metric tons	642,000	7,600	684,000	8,230	684,000	8,230
Silica stone <sup>4</sup> do.	W	W	<sup>1</sup> 510	<sup>1</sup> 3,940	264	1,410
Stone:						
Crushed <sup>5</sup> thousand metric tons	<sup>1</sup> 22,200	<sup>1</sup> 108,000	20,800	122,000	21,500	128,000
Dimension metric tons	W	W	W	W	27,200	2,010
Combined value of cement, clays (fire, kaolin), gypsum (crude), lime, stone [crushed dolomite and quartzite (1993), crushed limestone and traprock (1994-95), dimension (1994), dimension limestone, marble, and sandstone], talc and pyrophyllite (1993), tripoli, and values indicated by symbol W						
	XX	65,100	XX	68,100	XX	75,500
Total	XX	<sup>1</sup> 352,000	XX	437,000	XX	451,000

<sup>1</sup>Estimated. <sup>p</sup>Preliminary. <sup>r</sup>Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" data. XX Not applicable.

<sup>2</sup>Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

<sup>3</sup>Data are rounded to three significant digits; may not add to totals shown.

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

<sup>5</sup>Formerly identified as "Abrasives." Grindstones, pulpstones, and sharpening stones; excludes mill liners and grinding pebbles.

<sup>6</sup>Excludes certain stones; kind and value included with "Combined value" data.

"extraordinary resource waters." Under the Act, existing permitted gravel mining operations on such waters are allowed to continue for a period of 2 years, after which they must cease operations and reclaim the affected area under the operator's approved reclamation plan. Gravel operations at streams not classified as extraordinary resource waters are unaffected.

In Union County, a proposed 25,000-hectare (60,000-acre) brine extraction unit for bromine production was the subject of a growing controversy. A key issue in the dispute, part of which was to be addressed in the U.S. District Court, involved the determination of adequate royalty compensation to landowners for the bromine extracted from the so-called "West Plant Unit." The controversy involves Great Lakes Chemical Corp. and about 1,000 landowners, including the El Dorado-based energy firm Murphy Oil Corp. whose subsidiary, Deltic Farm & Timber Co., holds about 4,900 hectares (12,000 acres) in the proposed unit. Great Lakes currently owns two active production units in Union and Columbia Counties totaling 30,000 hectares (70,000 acres). The Arkansas Oil and Gas Commission must approve the new unit before production can begin.

Capricorn Diamonds, Ltd. of Australia announced that it was dropping out of an exploration project at Crater of Diamonds State Park, leaving only two Texas companies—Arkansas Diamond Development Corp. of Dallas and Texas Star Resources Corp. of Houston—to continue with Phase II of the project. Initial environmental studies were being conducted to obtain a U.S. Department of the Interior (DOI) temporary noncompliance use permit. Drill and trench sampling were allowed by a DOI ruling in early 1995 because these activities "did not constitute mining." Separately, Texas Star shut down its diamond exploration program and testing plant near Murfreesboro, but retained its properties there.

In industry news, McGeorge Construction Co. of Little Rock custom-mined a small tonnage of bauxite on Aluminum Company of America property in Saline County. Also, work was underway to dismantle and remove Holnam Inc.'s Okay Cement manufacturing plant facilities, which closed in 1993. Reclamation of Holnam's Howard County mine site, which was a source of the Okay plant's raw materials, will be reclaimed and become part of Lake Millwood. Meridian Aggregates Co. of Engelwood, CO, which bought out all of Boorhem-Fields Inc.'s crushed stone operations in Arkansas 2 years ago, was in the

process of obtaining a permit for a formerly active quarry in Independence County, while it continued its gravel operations near Harrell, Calhoun County. Chrisman Inc. opened a new crushed stone quarry at Ratliff in Logan County. Pine Bluff Sand & Gravel Corp. opened the River Mountain quarry, a major crushed stone operation in the Hartshorne Formation, 16 kilometers (10 miles) west of Russellville in Yell County; the quarry is well situated to ship rock by way of the Arkansas River. At Boral Gypsum Co.'s Briar gypsum plant facility in Howard County, stripping operations began on the east side of Nathan-Corinth Road while the mined area west of this road was undergoing reclamation. A silica and high-purity quartz screening facility was sold by the owner, Gary Coleman, but he retained the options at the Butterfield novaculite quarry in Hot Spring County. This site has been a past producer of novaculite for high-silica applications, such as for whetstone production, as well as for crushed stone. Also, Coleman Lasca Products Co., in Garland County was sold to a group of Colorado investors. The company produced the quartz feed material, called lascas, for the manufacture of cultured quartz crystal.

AGC published Information Circular 32, *A Regional Survey of the Distribution of Mercury in the Rocks of the Ouachita Mountains of Arkansas*, presenting base line mercury data on more than 700 samples of varying lithology in central and west-central Arkansas. Another AGC publication, Information Circular 34, *Rare-Earth Elements in the Cason Shale—a Geological Reconnaissance*, reports on the occurrences of rare earths in the Paleozoic phosphorite beds in Independence and Izard Counties. Additionally, AGC geologists continued to map the Cretaceous formations in southwest Arkansas, in part funded through the USGS's STATEMAP program.

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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>This report includes information provided by the Arkansas Geological Commission.

TABLE 2  
**ARKANSAS: 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
<b>Coarse aggregate (+1 1/2 inch):</b>			
Macadam	W	W	\$2.27
Riprap and jetty stone	386	\$1,960	5.06
Filter stone	152	772	5.08
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	828	4,390	5.31
Bituminous aggregate, coarse	220	1,280	5.82
Bituminous surface-treatment aggregate	176	1,150	6.56
Railroad ballast	13	69	5.31
Other graded coarse aggregate	W	W	5.78
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, bituminous mix or seal	W	W	2.27
Screening, undesignated	373	1,230	3.29
Other fine aggregates	W	W	5.78
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	2,640	11,200	4.25
Unpaved road surfacing	39	116	2.97
Crusher run or fill or waste	295	1,260	4.26
Other coarse and fine aggregates	W	W	4.91
Other construction materials <sup>3</sup>	2,820	25,900	9.16
Agricultural: Agricultural limestone <sup>4</sup>	196	1,970	10.10
Other specified uses not listed <sup>5</sup>	1,610	6,760	4.21
<b>Unspecified:<sup>6</sup></b>			
Actual	4,620	21,800	4.71
Estimated	6,460	41,700	6.46
<b>Total</b>	<b>20,800</b>	<b>122,000</b>	<b>5.83</b>

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

<sup>1</sup>Includes granite, limestone, miscellaneous stone and sandstone; excludes dolomite and traprock 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 roofing granules.

<sup>4</sup>Includes poultry grit and mineral food and other agricultural uses.

<sup>5</sup>Includes asphalt fillers or extenders, cement manufacture, lime manufacture, and other fillers or extenders.

<sup>6</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

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

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	18	6,000	\$30,500	\$5.08	16	6,870	\$33,500	\$4.87
Granite	8	7,890	41,500	5.26	5	7,090	52,600	7.42
Traprock	2	1,550	(3)	(3)	(3)	(3)	(3)	(3)
Sandstone	15	5,140	25,400	4.95	13	5,290	25,300	4.78
Miscellaneous stone	6	1,600	10,300	6.42	5	1,580	10,200	6.43
<b>Total</b>	<b>XX</b>	<b>22,200</b>	<b>108,000</b>	<b>4.86</b>	<b>XX</b>	<b>20,800</b>	<b>122,000</b>	<b>5.83</b>

<sup>1</sup>Revised. XX Not applicable.

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

<sup>3</sup>Excludes dolomite and traprock (traprock 1993, value only) from State total to avoid disclosing proprietary data.

<sup>4</sup>Excludes value for traprock from State total to avoid disclosing company proprietary data.

TABLE 4  
**ARKANSAS: CRUSHED STONE<sup>1</sup> SOLD OR USED BY PRODUCERS IN 1994, BY USE AND DISTRICT<sup>2</sup>**

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
<b>Construction aggregates:</b>				
Coarse aggregate (+1 1/2 inch) <sup>3</sup>	223	1,100	325	1,650
Coarse aggregate, graded <sup>4</sup>	W	W	( <sup>5</sup> )	( <sup>5</sup> )
Fine aggregate (-3/8 inch) <sup>6</sup>	W	W	( <sup>5</sup> )	( <sup>5</sup> )
Coarse and fine aggregate <sup>7</sup>	2,530	W	2,480	( <sup>5</sup> )
Other construction materials	1,730	19,100	—	—
Agricultural <sup>8</sup>	196	1,970	—	—
Chemical and metallurgical <sup>9</sup>	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )	( <sup>5</sup> )
Special <sup>10</sup>	( <sup>5</sup> )	( <sup>5</sup> )	—	—
Other miscellaneous uses <sup>11</sup>	( <sup>5</sup> )	( <sup>5</sup> )	—	—
Unspecified: <sup>12</sup>				
Actual	4,360	20,200	266	1,600
Estimated	820	6,460	5,640	35,300
<b>Total</b>	<b>10,200</b>	<b>52,500</b>	<b>10,700</b>	<b>69,000</b>

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

<sup>1</sup>Excludes dolomite and traprock 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 filter stone, macadam, and riprap and jetty stone.

<sup>4</sup>Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

<sup>5</sup>Withheld to avoid disclosing company proprietary data; included in "Total."

<sup>6</sup>Includes stone sand (bituminous mix or seal), screening (undesignated), and other fine aggregate.

<sup>7</sup>Includes graded road base or subbase, unpaved road surfacing, crusher run (select material or fill), other coarse and fine aggregates, and roofing granules.

<sup>8</sup>Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.

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

<sup>10</sup>Includes asphalt fillers or extenders, and other fillers or extenders.

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

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

TABLE 5  
**ARKANSAS: 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>	4,900	\$20,400	\$4.17
Asphaltic concrete aggregates and other bituminous mixtures	1,370	6,790	4.95
Road base and coverings	1,070	3,770	3.52
Fill	236	821	3.48
Snow and ice control	2	9	4.50
Filtration	3	5	1.67
Other	158	636	4.03
Unspecified: <sup>3</sup>			
Actual	1,360	4,470	3.29
Estimated	1,510	5,520	3.66
<b>Total or average</b>	<b>10,600</b>	<b>42,500</b>	<b>4.00</b>

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

TABLE 6  
**ARKANSAS: 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		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products <sup>2</sup>	1,620	5,760	3,060	13,700	227	1,010
Asphaltic concrete aggregates and road base materials <sup>3</sup>	754	3,120	1,590	7,040	330	1,220
Other miscellaneous uses <sup>4</sup>	13	51	148	596	1	3
Unspecified: <sup>5</sup>						
Actual	1,030	2,870	8	30	323	1,570
Estimated	82	349	665	3,080	762	2,090
Total	3,500	12,100	5,470	24,400	1,640	5,890

<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.

<sup>4</sup>Includes filtration and snow and ice control.

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



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