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 1996, Arkansas was 29th among the 50 States in total nonfuel mineral production value,[1] according to the U.S. Geological Survey (USGS). The State was 28th in 1995. The estimated value for 1996 was $453 million, an 8% decrease from that of 1995. This followed nearly a 13% increase from 1994 to 1995 (based on final 1995 data). The State accounted for more than 1% of the U.S. total nonfuel mineral production value.

In 1996, the Arkansas decrease in nonfuel mineral value was mainly attributable to a drop in bromine value even though its production actually increased. Mineral commodities that increased in value were crushed stone and tripoli. All other values *(see table 1)* decreased except for those of industrial sand and gravel, fire clay, and dimension stone, which remained the same. In 1995, the largest portion of Arkansas' increased nonfuel mineral value came from crushed stone. Portland cement and construction sand and gravel significantly contributed to the State's rise in value with moderate increases relative to that of crushed stone.

Based on USGS estimates of quantities produced in the 50 States during 1996, 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 the only State to produce lascas; first of two silica stone-producing States; third in tripoli; fourth in kaolin; eighth in common clay; and rose from fifth to fourth in fire clay. Lascas are the feed material used to manufacture cultured quartz crystal. In addition, significant quantities of crushed stone,construction and industrial sand and gravel, crude gypsum, and dimension stone were produced in the State. 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 following narrative information was provided by the Arkansas Geological Commission[2] (AGC). Albemarle Corp., a major bromine producer, increased its elemental bromine production capacity in 1996 at its Columbia County plants. The company also increased its capacity for production of four bromine derivatives in 1996. Two other expansions underway were to be completed in early 1997. Strong demand continued for bromine and its derivatives in the first half of 1996, but a slow down occurred in the third quarter, due to reduced demand for brominated fire retardants in Asia. Fourth quarter demand rebounded strongly from the third quarter.

The Arkansas Department of Pollution Control and Ecology changed Regulation 15 of the Arkansas Open-Cut Mining and Land Reclamation Code to include the mining of stream-bed gravel. This change was made to comply with Act 827 of 1991, as amended by Act 1345 of 1995.

The U.S. Forest Service had 80 contracts that produced 165,600 tons[3] of building stone, riprap, and aggregate related materials (shale and chert). These projects generated about $21,000 in revenue for the Federal Government. Annual lease payments on the Ouachita National Forest (including property in Oklahoma) and the Ozark and St. Francis National Forests totaled more than $700,000. Fifty-five quartz contracts with the U.S. Forest Service on the Ouachita National Forest in Arkansas generated around $44,000 in revenue. About 680 tons of quartz was removed from these deposits.

In other developments in the State's aggregate industry in 1996, Gifford-Hill & Co. Inc. expanded its gravel operations in Nevada County. In addition, Gifford-Hill tested the Jackfork sandstone at a potential quarry site near Delight in southeast Pike County. Harbison-Walker Refractories, a division of Dresser Industries, Inc., intermittently operated the Butterfield quarry in Hot Spring County, producing high purity novaculite for refractory applications. Provo Co., based in east Texas, leased the HMB quarry (Jackfork sandstone) between Dierks and DeQueen and began processing dump material. Bill Swartz Quarries Co. in eastern Logan County increased its production of aggregate and dimension stone production over the past year. Bennett Brothers near Hot Springs Village, Garland County, expanded its market out-of-state for fieldstone and imported some decorative stone into Arkansas. Granite Mountain Hot Mix Products, a division of McGeorge Construction Co., constructed a computerized hot-mix asphalt production facility in central Pulaski County. The plant is a "double barrel" dryer-drum coater, manufactured by ASTEC Industries of Chattanooga, TN, and has a 320-ton-per-hour paving mix production capacity. Hot mix asphalt production began on July 11.

Rogers Group of Nashville, TN, bought M & M quarries (sandstone) in the Arkansas River Valley. The

company also acquired the Tidwell quarry (novaculite) in Hot Spring County. Boral Gypsum Co. advertised its Briar Gypsum Plant and mine for sale, stating that the facility showed a substantial profit, but needed capital to make additional major expansions into the national market. Souter Co. abandoned the Murfreesboro, Pike County, quarry and returned its leases to Weyerhauser Co.

Lascas Products, Inc. operated the Lascas plant adjacent to the Coleman quartz mine in Garland County, but obtained its material from a mine north of the plant site.

Increased demand for tripoli kept Malvern Minerals Co. busy during l996; minor equipment problems caused some delay in filling orders. After repairs, the company was able to meet demand and fill back orders.

Umetco began reclamation of the Christy vanadium pit near Magnet Cove in Hot Spring County in late November. The last production of vanadium ore from this site was in 1990. Reclamation was scheduled to be finished by the spring of l997. Holnam Inc. continued reclamation and removal of processing plant structures near Saratoga, Howard County. When finished, the reclaimed mine site will add about 8 hectares to Lake Millwood.

Exploration for minerals in Arkansas was fairly active in 1996. Phase II of an exploration project at Crater of Diamonds State Park began in early October 1996 with the excavation of a number of trenches. At least 11 trenches were scheduled to recover an estimated 8,700 metric tons of material for processing. Rock removed was transported under tight security to Texas Star Resources Corp.'s testing plant northeast of the State property. Initial diamond recovery from the first half of the processing consisted of 157 diamonds, weighing a total of 36.2 carats. Processing of rock from a total of 11 trenches along with the drilling of several additional core holes on the northern edge of the pipe were scheduled for completion by early 1997. A lawsuit against Phase II testing filed in 1996 was overturned by a U.S. District Court.

A variety of other exploration projects went forward with less complications. Several companies initiated investigations in the Ouachita Mountains for lasca and high-silica end-use materials, mostly for milky and colorless quartz and novaculite. Arkhola Sand & Gravel Co. conducted exploration for additional quarry sites in the Hartshorne Sandstone in the western portion of the Arkansas River Valley. McClinton-Anchor Co. conducted an exploration program for low-silica carbonate rock in northwest Arkansas to be used for aggregate, ag-lime, and road base. Rock Products Co. of Heber Springs, Cleburne County, explored for additional sandstone quarry sites in White and Cleburne Counties. Texas Industries Group leased property in southern Polk County for the Hatton Tuff (a lentil rock body in the Mississippian Stanley Shale) and began testing to evaluate the rock. Bobby Plant Asphalt Co., based in Murfreesboro, conducted exploration and development work for a quarry south of Kirby in central Pike County.

The Center for Energy, Natural Resources, and Environmental Studies (CENRES) at Arkansas Tech University, Russellville, continued to study the relationships between the various geologic units being quarried in north Arkansas and certain engineering properties of the rock, principally as determined by the Los Angeles abrasion and sodium sulfate soundness tests. Cooperating in this study by supplying base maps and engineering test data to CENRES were the AGC, the Arkansas Highway and Transportation Department, and the U.S. Corps of Engineers.

The AGC completed the mapping of 10-7½ minute topographic quadrangles in southwest Arkansas, in part funded through the USGS's STATEMAP program. These maps are now available as Open-File Reports.

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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.htm

[2]J. Michael Howard, Senior Geologist, authored the text of State minerals information provided by the Alabama Geologic Commission. He may be contacted at the same address and telephone and fax numbers as Mr. Bush.

[3]All tons are metric unless otherwise specified.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN ARKANSAS 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
Clays 3/		883	$2,440	1,160	$7,810	1,330	$5,460.00
Gemstones		NA	3,950	NA	4,890	NA	W
Sand and gravel:							
Construction		10,600	42,500	11,600	48,300	11,300	46,300.00
Industrial		684	8,230	W	W	W	W
Silica stone 4/	metric tons	510	3,940	W	W	W	W
Stone:							
Crushed		20,800 5/	122,000 5/	25,500	169,000	26,200	176,000.00
Dimension	metric tons	W	W	22,000	2,010	24,300	2,010.00
Combined value of bromine, cement, clays [fire, kaolin (1994)], gypsum (crude), lime, stone [crushed limestone and traprock (1994), dimension limestone, marble, and sandstone (1994)], tripoli, and values indicated by symbol W		XX	254,000	XX	260,000	XX	224,000.00
Total		XX	437,000	XX	492,000	XX	453,000.00

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/ Grindstones, pulpstones, and sharpening stones; excludes mill liners and grinding pebbles.
5/ Excludes certain stones; kind and value included with "Combined value" data.

TABLE 2
ARKANSAS: 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):			
Riprap and jetty stone	581	$2,630	$4.53
Filter stone	116	571	4.92
Coarse aggregate, graded:			
Concrete aggregate, coarse	829	4,300	5.18
Bituminous aggregate, coarse	672	3,370	5.01
Bituminous surface-treatment aggregate	151	914	6.05
Railroad ballast	314	2,430	7.75
Fine aggregate (-3/8 inch):			
Screening, undesignated 3/	397	1,670	4.21
Coarse and fine aggregates:			
Graded road base or subbase	2,860	12,500	4.36
Crusher run or fill or waste	363	1,740	4.79
Other construction materials 4/	103	595	5.78
Agricultural: Agricultural limestone 5/	301	2,800	9.30
Chemical and metallurgical:			
Cement manufacture	W	W	16.50
Lime manufacture	W	W	4.79
Special:			
Asphalt fillers or extenders	W	W	10.00
Other fillers or extenders	W	W	14.10
Other specified uses not listed	W	W	5.46
Unspecified: 6/			
Actual	14,200	91,700	6.45
Estimated	W	W	5.93
Total	25,500	169,000	6.64

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Includes dolomite, granite, limestone, miscellaneous stone, sandstone, and traprock.
2/ Data are rounded to three significant digits; may not add to totals shown.
3/ Includes stone sand (bituminous mix or seal).
4/ Includes unpaved road surfacing.
5/ Includes poultry grit and mineral food, and other agricultural uses.
6/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

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

Kind	1994 Number of quarries	1994 Quantity (thousand metric tons)	1994 Value (thousands)	1994 Unit value	1995 Number of quarries	1995 Quantity (thousand metric tons)	1995 Value (thousands)	1995 Unit value
Limestone	16	6870	33500	4.87	15	6890	53700	7.8
Dolomite	(2/)	(2/)	(2/)	(2/)	1	W	W	4
Granite	5	7890 r/	58200 r/	7.37 r/	7	10100	75700	7.47
Traprock	(2/)	(2/)	(2/)	(2/)	1	W	W	5.06
Sandstone	14 r/	5500 r/	26500 r/	4.83 r/	16	5970	28500	4.77
Miscellaneous stone	4 r/	563 r/	3290 r/	5.84 r/	1	W	W	2.2
Total	XX	20800	122000	5.83	XX	25500	169000	6.64

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/ Excludes dolomite and traprock from State total to avoid disclosing company proprietary data.

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

(Thousand metric tons and thousand dollars)

Use	District 1 Quantity	District 1 Value	District 2 Quantity	District 2 Value
Construction aggregates:				
Coarse aggregate (+1 1/2 inch) 2/	412	1,790	286	1,420
Coarse aggregate, graded 3/	1,300	6,060	667	4,960
Fine aggregate (-3/8 inch) 4/	283	1,300	113	375
Coarse and fine aggregate 5/	2,670	11,600	651	3,230
Agricultural 6/	301	2,800	--	--
Chemical and metallurgical 7/	W	W	W	W
Special 8/	W	W	--	--
Unspecified: 9/				
Actual	5,470	25,300	8,730	66,400
Estimated	W	W	W	W
Total	12,000	60,600	13,500	109,000

W Withheld to avoid disclosing company proprietary data; included in "Total."
1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes filter stone and riprap and jetty stone.
3/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, and railroad ballast.
4/ Includes stone sand (bituminous mix or seal) and screening (undesignated).
5/ Includes graded road base or subbase, unpaved road surfacing, crusher run (select material or fill), and other construction materials.
6/ Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.
7/ Includes cement and lime manufacture.
8/ Includes asphalt fillers or extenders, other fillers or extenders, and other specified uses not listed.
9/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 5
ARKANSAS: 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 2/	5,810	$25,700	$4.43
Asphaltic concrete aggregates and other bituminous mixtures	1,140	5,230	4.59
Road base and coverings 3/	695	2,180	*3.13*
Fill	176	660	3.75
Other 4/	10	32	3.20
Unspecified: 5/			
Actual	1,020	2,850	2.78
Estimated	2,710	11,600	4.30
Total or average	11,600	48,300	4.18

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes plaster and gunite sands.
3/ Includes road and other stabilization (cement).
4/ Includes filtration and snow and ice control.
5/ Includes production reported without a breakdown by end use and estimates for nonrespondents.

TABLE 6
ARKANSAS: CONSTRUCTION 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 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregate 2/	1,610	5,750	3,890	18,600	311	1,420
Asphaltic concrete aggregates and road base materials 3/	296	964	1,430	6,020	282	1,080
Other miscellaneous uses 4/	6	23	4	9	--	--
Unspecified: 5/						
Actual	1,020	2,840	1	2	--	--
Estimated	563	2,710	736	3,250	1,410	5,670
Total	3,500	12,300	6,070	27,900	2,000	8,170

1/ Data are rounded to three significant digits; may not add to totals shown.
2/ Includes plaster and gunite sands.
3/ Includes fill, road, and other stabilization (cement).
4/ Includes filtration and snow and ice control.
5/ Includes production reported without a breakdown by end use and estimates for nonrespondents.