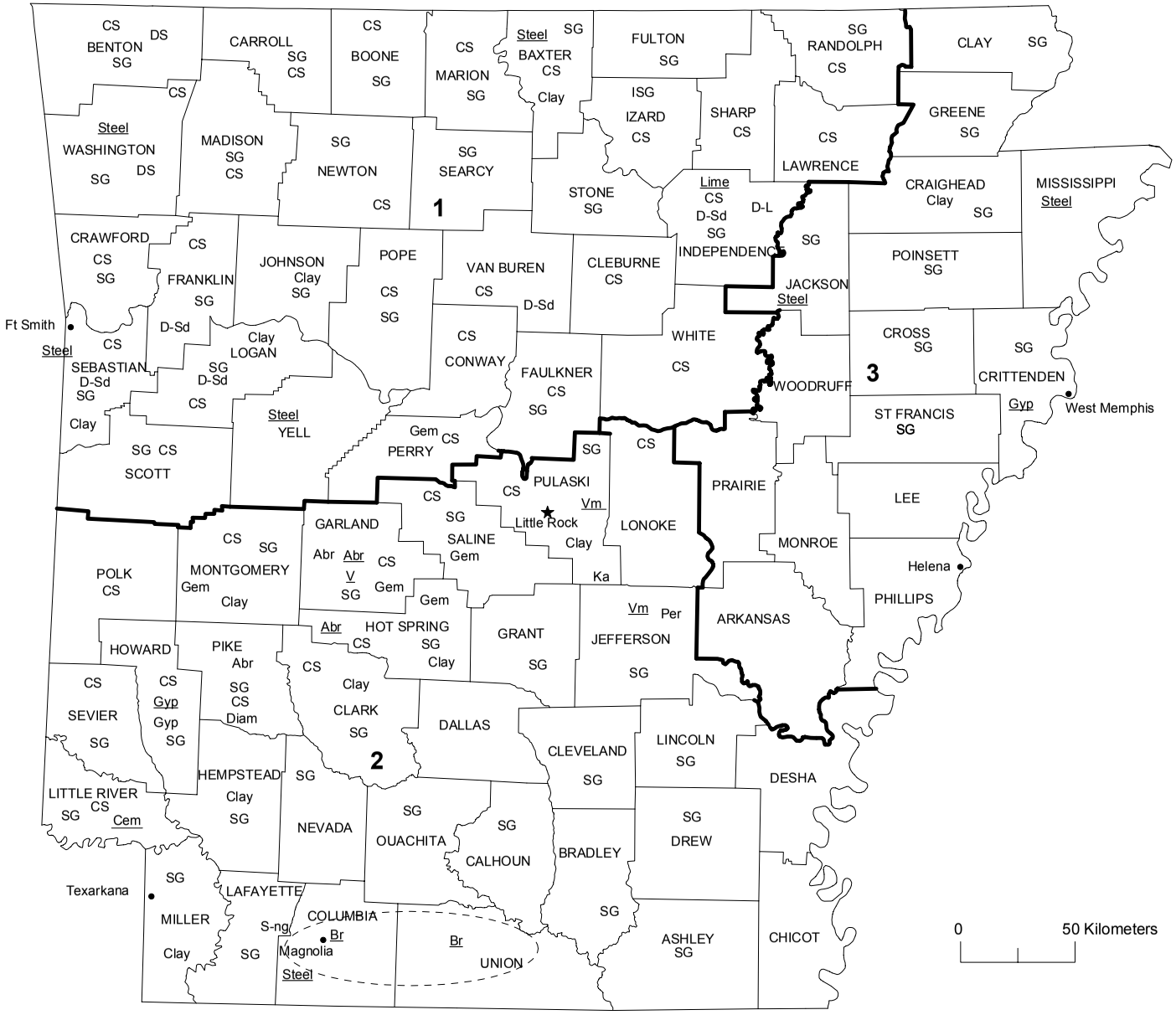
ARKANSAS



LEGEND

- County boundary
- ★ Capital
- • City
- 1 —— Crushed stone/sand and gravel districts

MINERAL SYMBOLS
(Major producing areas)

Abr	Abrasives
Abr	Abrasives plant
Br	Bromine plant
Cem	Cement plant
Clay	Common clay
CS	Crushed stone
Diam	Diamond
DS	Dimension stone
D-L	Dimension limestone
D-Sd	Dimension sandstone
Gem	Gemstones
Gyp	Gypsum
Gyp	Gypsum plant
ISG	Industrial sand and gravel
Ka	Kaolin
Lime	Lime plant
Per	Perlite
S-ng	Sulfur (natural gas)
SG	Construction sand and gravel
Steel	Steel plant
V	Vanadium plant
Vm	Vermiculite plant
	Concentration of mineral operations

Source: Arkansas Geological Commission/U.S. Geological Survey (2001)

THE MINERAL INDUSTRY OF ARKANSAS

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Arkansas Geological Commission for collecting information on all nonfuel minerals.

In 2001, the estimated value[1] of nonfuel mineral production for Arkansas was $491 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 1% increase from that of 2000[2] and followed a 2.6% decrease from 1999 to 2000. The State remained 30th in rank among the 50 States in total nonfuel mineral production value, of which Arkansas accounted for more than 1% of the U.S. total.

In 2001, bromine remained, by value, Arkansas' leading nonfuel mineral, followed by crushed stone with 33% of the State's nonfuel mineral value and cement (portland and masonry). Bromine and cement data must be concealed to protect proprietary company data. Arkansas' increase in value in 2001 resulted mostly from increases in crushed stone and construction sand and gravel, whereas decreases in bromine and cement values lowered the overall net gain for the year. In 2000, decreases in crushed stone, bromine, and construction sand and gravel (in descending order of change) accounted for most of the drop in value from the year previous (table 1). The most significant increases occurred in gypsum, up about $5 million, and silica stone. Increases of less than $1 million also occurred in dimension stone and gemstones.

Based upon USGS estimates of quantities produced during 2001, 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 States that produce silica stone and third of four tripoli-producing States. While it continued to be 10th in common clays, the State changed in rank to 8th from 6th in gemstones and to 9th from 8th in gypsum. Additionally, significant quantities of cement, construction sand and gravel, crushed stone, dimension stone, and industrial sand and gravel were produced in the State. The State's metal production, mostly that of raw steel, resulted from materials received from other domestic and foreign sources.

The Arkansas Geological Commission[3] (AGC) provided the following narrative information. No bauxite was mined in Arkansas in 2001. Alcoa Inc. completed its 7th year of a 20-year project of land reclamation adjacent to the community of Bauxite in Saline County. Umecto, Inc. initiated reclamation of the Wilson Springs mines area in Garland County in 1997 and continued this effort. Strategic Minerals Corp. continued operation of the mill facility at Potash Sulphur Springs, based on out-of-State vanadium-bearing feed.

In 2001, Albemarle Corp. and Great Lakes Chemical Co. operated their several bromine extraction and product production plants in Columbia and Union Counties, respectively.

Ash Grove Cement Co., sole producer of cement in the State, operated the Foreman plant in Little River County, using chalk from the Annona Formation and silica from the Marlbrook Formation (both Cretaceous).

In 2001, Star Resources Corp. of Houston, TX, ran a bulk tonnage test from its Black Lick diamond property, northeast of the Crater of Diamonds State Park in Pike County. No results were released on recovered diamond values, and the plant and properties appear inactive.

Arkhola Sand and Gravel Co. continued exploration for additional quarry sites in the western portion of the Arkansas River Valley. Arkhola was developing its second quarry near Jenny Lind in Sebastian County. Arkhola was producing asphalt mix at the Preston Quarry near Van Buren in Crawford County. Bennett Brothers Stone Co., Inc. obtained building stone materials from deposits in Garland and adjacent counties. Bobby Plant Asphalt Co., based in Murfreesboro, Pike County, produced from its quarry in the Jackfork Sandstone (Pennsylvanian) south of Kirby in central Pike County.

Duffield Stone and Gravel Co. operated two quarries in Pope County; one in the upper Atoka Formation (Pennsylvanian) at Russellville, and the Gumlog Quarry, also in the upper Atoka. The company continued to explore the Arkansas River Valley. McClinton-Anchor, Inc., explored for new aggregate quarry sites in the limestone-bearing region of northwest Arkansas. Pyramid Co. produced aggregate from the Atoka Formation south of Damascus in Faulkner County.

Granite Mountain Quarries, Inc. (GMQ) produced aggregate from nepheline syenite at two quarries in Pulaski County. It continued development work for a new syenite aggregate quarry, known as Granite Mountain No. 3 Quarry, near Bryant

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[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon 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 2001 USGS mineral production data published in this chapter are preliminary estimates as of August 2002 and are expected to change. For some mineral commodities, such as 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. Specialist contact information may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals/contacts/comdir.html; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

[2]Values, percentage calculations, and rankings for 2000 may differ from the Minerals Yearbook, Area Reports: Domestic 2000, Volume II, owing to the revision of preliminary 2000 to final 2000 data. Data for 2001 are preliminary and are expected to change; related rankings may also change.

[3]J. Michael Howard, Geology Supervisor, authored the text of State minerals information provided by the Arkansas Geological Commission.

in Saline County, and began sales of aggregate from its site in late 2001. GMQ also started a new quarry operation northwest of DeQueen, Sevier County, in the Jackfork Sandstone (Pennsylvanian) and continued development efforts of a quarry site in southern Scott County in the Atoka Sandstone (Pennsylvanian). Martin Marietta Co. was actively quarrying the Hatton Tuff Lentil of the Stanley Group (Mississippian) at the Hatton Quarry in southern Polk County. It continued operations at the 270 Quarry near Magnet Cove in Hot Spring County, producing from the hornfels alteration zone in the Stanley Group adjacent to the Cretaceous igneous intrusion.

Minnesota Mining and Manufacturing Co. mined nepheline syenite from its Big Rock Arch Street Quarry to supply its roofing granule plant in Sweet Home, Pulaski County. Martin Marietta continued concurrent mining of dike rock for aggregate in this quarry.

Rogers Group Inc. continued exploration on a quarry site at Beryl in Faulkner County. The company continued operations at its Greenbriar Quarry in Faulkner County (sandstone) and its Lowell Quarry in southern Benton County (limestone), producing aggregate. Schwartz Stone Co. quarried sandstone from the Hartshorne Sandstone (Pennsylvanian) for aggregate and dimension stone north of Midway in Logan County. The Souter Construction Co. produced riprap from the Hollywood Quarry in Clark County. Texas Industries Group continued evaluation of tuff deposits from leased property in southern Polk County.

Vulcan Materials Co., based in Birmingham, AL, produced aggregate from its upper Morrowan Sandstone operation at Judsonia in White County. It also produced dolomitic limestone from Lower Ordovician rocks near Black Rock in Lawrence County. Vulcan continued to produce aggregate from the L&R Quarry in the middle part of the Atoka Sandstone near Floyd in White County. Vulcan continued aggregate exploration, focusing on Morrowan and Atokan sandstones in White and Cleburne Counties. Charles Weaver Co. produced crushed aggregate from its quarry in the middle part of the Atoka Formation near El Paso in White County.

The James Hardie Gypsum Co. continued to be the world's largest wallboard manufacturing plant, with an annual capacity of 130 million square meters. The production plant was located near its mines near Nashville in Howard County. The plant and mine employed about 275 people. Principal markets for the wallboard were in the eastern half of the United States. Product was shipped by railcar and truck. C. W. Harrison Gypsum Co. of Oklahoma was inactive in 2001 on its properties in Pike County, but continued reclamation efforts begun in 1999.

The Butterfield Quarry in Hot Spring County was managed and operated by Mark Wallis Whetstones for high-silica novaculite. Shipments in 2001 were sporadic. The company also continued sporadic operation of a whetstone grade mine south of Lonsdale near the Saline-Hot Spring County line. The Rogers Group continued evaluation of high-silica novaculite for ferrosilicon and the silicon markets at a site near Glen Rose in Hot Spring County. The company acquired this deposit from Martin Marietta Co. in 2000.

There were approximately 89 active sand and gravel operations in Arkansas in 2000, the greatest number of these being in the southeastern one-half of the State (the Gulf Coastal Plain). For 2001, 17 new sand and gravel permits were issued by the Surface Mining and Reclamation Division of the Arkansas Department of Environmental Quality (ADEQ). The permits were issued to Arkansas Decorative Stone LLC; Asphalt Concrete Products; B & B Gravel; B & B Materials; BB & B Construction Co.; Brian Hoskins Construction; Carter Sand and Gravel; Garland Sand and Gravel Corp.; Glacial Sand and Gravel; Mike Blann Gravel Co., Inc.; Mountain Home Concrete; North Arkansas Sand and Gravel; R.L. Drum Sand and Gravel; S & K Dirtworks; Sheridan Excavating; Smith's Backhoe/ Dozer Service, LLC; and Teague Farms. Eight Notifications of Intent to Quarry were received by ADEQ: Benton County Stone Co., Inc. in Benton County; Dan's Whetstone Co., Inc. in Garland County; Delta Asphalt in Lawrence County; Edwards Brothers, Inc. in Sharp County; Pine Bluff Sand and Gravel in Logan County; Rogers Group, Inc. in Conway County; Malvern Minerals Co. in Garland County; and McGeorge Contracting Co., Inc. in Sevier County. All eight were issued Authorizations to Quarry; however, Benton County Stone Co., Inc. appealed the denial of the county's large-scale operation and had not begun to quarry the site.

The AGC web site (www.state.ar.us/agc/agc.htm) hosted approximately 47,500 visitors during 2001 during its third year online. This was a 79% increase in Web site use relative to 2000. Information posted on the Web pages included resource data, USGS annual nonfuel raw mineral production, publications and ordering information, stratigraphic and geologic data concerning Arkansas, Arkansas Board of Registration for Professional Geologist, agency services, and news items. The AGC links page provides a link listing for State Geological Surveys, along with many Federal and Arkansas government links. There is also an extensive listing of links to geology Web sites, organizations, and universities.

Initiated by AGC staff in 2001 is a spreadsheet database designed to contain all known sites of mineral extraction in the State, excluding petroleum and natural gas. Some 5,000 records have been entered into the database. In 2002, three digitized geologic maps based on 7.5-minute USGS topographic maps were completed under the STATEMAP cooperative agreement. Additionally, staff geologists completed the digitization of four geologic maps based on USGS 7.5-minute topographic maps in Pulaski County.

Operators of 24 quartz contracts with the U.S. Forest Service on the Ouachita National Forest in Arkansas generated around $19,000 in revenue. The U.S. Bureau of Land Management received about $3,300 in revenue on quartz. About 40 metric tons of quartz was removed from quartz mines in the Ouachita National Forest.

In 2001, the Arkansas General Assembly passed legislation that amended the Arkansas Open-Cut Land Reclamation Act. The legislation made changes primarily in the areas of the amount of civil penalty that a court or ADEQ could assess for violations of the act, changes to the permit application fee, and changes in the size of buffer zones. The Arkansas Pollution Control and Ecology Commission initiated rulemaking on December 7, 2001, to amend Regulation No. 15, the Arkansas Open-Cut Mining and Land Reclamation Code, to reflect

legislative changes made from 1999 to 2001.

There were 176 active, permitted, or authorized noncoal mine sites in Arkansas during 2001. ADEQ held reclamation bonds on approximately 3,040 hectares of land permitted or authorized for noncoal mining and released a total of 44 hectares from reclamation bond liability.

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

(Thousand metric tons and thousand dollars)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	1,010	1,510	958	1,170	958	1,170
Gemstones	NA	731	NA	925	NA	675
Sand and gravel, construction	11,300	53,200	9,820	48,600	10,700	53,800
Stone, crushed	30,700	145,000	28,300	137,000	33,000	165,000
Combined values of bromine, cement, clays (kaolin), gypsum (crude), lime, sand and gravel (industrial), silica stone 3/ (1999-2000), stone (dimension limestone, marble, sandstone), tripoli	XX	296,000	XX	296,000	XX	271,000
Total	XX	497,000	XX	484,000	XX	491,000

p/ Preliminary. NA Not available. XX Not applicable.
1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
2/ Data are rounded to no more than three significant digits; may not add to totals shown.
3/ Grindstones, pulpstones, and sharpening stones; excludes mill liners and grinding pebbles.

TABLE 2
ARKANSAS: CRUSHED STONE SOLD OR USED, BY KIND 1/

Kind	1999				2000			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	24 r/	8,170 r/	$36,600 r/	$4.48 r/	24	8,660	$37,800	$4.37
Dolomite	2	W	W	4.83	2	W	W	5.02
Granite	6	12,500	58,200	4.66	6	10,200	53,400	5.21
Sandstone	22 r/	6,060 r/	30,300 r/	4.99 r/	19	5,740	28,000	4.87
Quartzite and quartz	7	W	W	5.21	7	W	W	4.68
Miscellaneous stone	13	W	W	5.99	10	W	W	5.14
Total or average	XX	30,700	145,000	4.73	XX	28,300	137,000	4.84

r/ Revised. W Withheld to avoid disclosing company proprietary data, included in "Total." XX Not applicable.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3
ARKANSAS: CRUSHED STONE SOLD OR USED
BY PRODUCERS IN 2000, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	115	$581	$5.05
Filter stone	42	167	3.98
Other coarse aggregate	148	928	6.27
Total or average	305	1,680	5.50
Coarse aggregate, graded:			
Concrete aggregate, coarse	338	1,510	4.45
Bituminous aggregate, coarse	293	1,390	4.74
Bituminous surface-treatment aggregate	W	W	5.66
Railroad ballast	W	W	4.85
Other graded coarse aggregate	1,300	8,150	6.27
Total or average	1,930	11,000	5.72
Fine aggregate (-3/8 inch):			
Stone sand, concrete	W	W	3.58
Stone sand, bituminous mix or seal	W	W	3.45
Screening, undesignated	W	W	3.41
Other fine aggregate	343	1,710	5.00
Total or average	343	1,710	5.00
Coarse and fine aggregates:			
Graded road base or subbase	1,510	7,130	4.72
Unpaved road surfacing	72	271	3.76
Crusher run or fill or waste	89	346	3.89
Roofing granules	W	W	6.38
Other coarse and fine aggregates	4,640	27,700	5.96
Total or average	6,320	35,400	5.61
Other construction materials	62	219	3.53
Agricultural:			
Agricultural limestone	137	634	4.63
Poultry grit and mineral food	W	W	3.84
Other agricultural uses	113	483	4.27
Chemical and metallurgical:			
Cement manufacture	(3/)	(3/)	2.57
Lime manufacture	(3/)	(3/)	3.87
Special:			
Asphalt fillers or extenders	(3/)	(3/)	4.71
Other fillers or extenders	(3/)	(3/)	6.36
Other miscellaneous uses:			
Abrasives	(3/)	(3/)	2.00
Acid neutralization	(3/)	(3/)	3.65
Other specified uses not listed	(3/)	(3/)	12.00
Unspecified: 4/			
Reported	11,300	51,600	4.58
Estimated	6,100	29,000	4.76
Total or average	17,300	80,400	4.64
Grand total or average	28,300	137,000	4.84

W Withheld to avoid disclosing company proprietary data, included with "Other."
1/ Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.
2/ Includes dolomite, granite, limestone, miscellaneous stone, quartz, quartzite, and sandstone.
3/ Withheld to avoid disclosing company proprietary data, included in "Grand total."
4/ Reported and estimated production without a breakdown by end use.

TABLE 4
ARKANSAS: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000,
BY USE AND DISTRICT 1/ 2/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 ½ inch) 3/	253	1,480	W	W	W	W
Coarse aggregate, graded 4/	W	W	--	--	W	W
Fine aggregate (-3/8 inch) 5/	283	1,350	W	W	W	W
Coarse and fine aggregate 6/	2,640	12,100	W	W	--	--
Other construction materials	52	186	10	33	--	--
Agricultural 7/	251	1,120	--	--	--	--
Chemical and metallurgical 8/	W	W	W	W	--	--
Special 9/	W	W	W	W	--	--
Other miscellaneous uses 10/	W	W	W	W	--	--
Unspecified: 11/						
Reported	6,160	28,400	5,100	23,200	--	--
Estimated	1,100	5,000	4,900	24,000	--	--
Total	13,000	62,000	15,300	74,600	57	641

W Withheld to avoid disclosing company proprietary data, included in "Total." -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes dolomite, granite, limestone, miscellaneous stone, quartz, quartzite, and sandstone.
3/ Includes riprap and jetty stone and other coarse aggregate.
4/ Includes bituminous aggregate (coarse), bituminous surface treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregate.
5/ Includes stone sand (bituminous mix or seal), stone sand (concrete), screening (undesignated), and other fine aggregate.
6/ Includes crusher run (select material or fill), graded road base or subbase, roofing granules, unpaved road surfacing, and other coarse and fine aggregates.
7/ Includes agricultural limestone, poultry grit and mineral food, and other agricultural uses.
8/ Includes cement manufacture and lime manufacture.
9/ Includes asphalt fillers or extenders and other fillers or extenders.
10/ Includes abrasives and acid neutralization.
11/ Reported and estimated production without a breakdown by end use.

TABLE 5
ARKANSAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products 2/	4,430	$24,600	$5.55
Asphaltic concrete aggregates and other bituminous mixtures	470	3,470	7.39
Road base and coverings 3/	390	1,280	3.28
Fill	66	247	3.74
Other miscellaneous uses 4/	262	1,070	4.09
Unspecified: 5/			
Reported	2,640	10,900	4.11
Estimated	1,600	7,100	4.55
Total or average	9,820	48,600	4.95

1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes plaster and gunite sands.
3/ Includes road and other stabilization (lime).
4/ Includes filtration and snow and ice control.
5/ Reported and estimated production without a breakdown by end use.

TABLE 6
ARKANSAS: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2000,
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 and concrete products 2/	424	2,770	3,180	17,100	827	4,670
Asphaltic concrete aggregates and other bituminous mixtures	--	--	222	1,230	248	2,250
Road base and coverings 3/	90	436	W	W	W	W
Fill	47	220	W	W	W	W
Other miscellaneous uses 4/	51	305	468	1,420	61	214
Unspecified: 5/						
Reported	1,270	4,220	474	2,280	898	4,360
Estimated	420	1,900	760	3,400	380	1,800
Total	2,310	9,860	5,100	25,500	2,410	13,300

W Withheld to avoid disclosing company proprietary data, included with "Other miscellaneous uses." -- Zero.
1/ Data are rounded to no more than three significant digits; may not add to totals shown.
2/ Includes plaster and gunite sands.
3/ Includes road and other stabilization (lime).
4/ Includes filtration and snow and ice control.
5/ Reported and estimated production without a breakdown by end use.