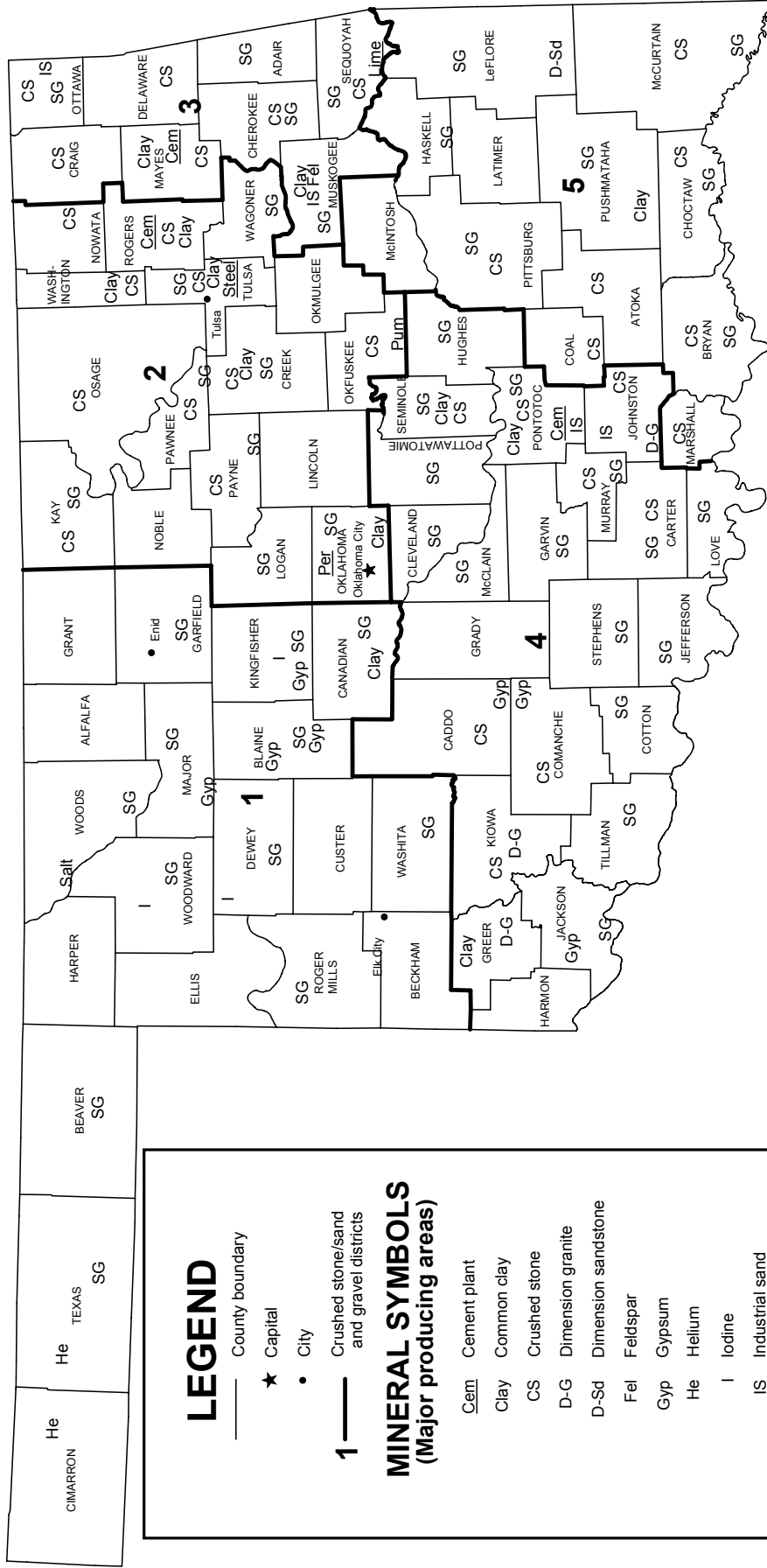


OKLAHOMA



Source: Oklahoma Geological Survey/U.S. Geological Survey (2002)

THE MINERAL INDUSTRY OF OKLAHOMA

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

In 2002, the estimated value¹ of nonfuel raw mineral production for Oklahoma was \$462 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 3% decrease from that of 2001² and followed a 1.1% increase from 2000 to 2001. The State rose in rank to 28th from 29th among the 50 States in total nonfuel mineral production value, of which Oklahoma accounted for more than 1% of the U.S. total.

In 2002, crushed stone continued to be Oklahoma's leading nonfuel mineral commodity, accounting for nearly two-fifths of the State's total nonfuel mineral production value. Based upon value, crushed stone was followed by cement (masonry and portland), construction sand and gravel, industrial sand and gravel, gypsum, and iodine. The combined values of three of Oklahoma's four major construction materials—crushed stone, construction sand and gravel, and gypsum (descending order of value)—accounted for more than 50% of the total value. Most of the State's decrease in value resulted from a drop in the production and value of portland cement. Further information regarding portland cement was withheld to protect company proprietary data.

In 2001, increases in the values of crushed stone (up \$11 million) and construction sand and gravel (up more than \$8 million) led the State's increase in nonfuel mineral value for the year, which was moderated somewhat by decreases in the values of gypsum, industrial sand and gravel, iodine, and portland cement. All other nonfuel minerals had changes in value of less than \$1 million (table 1).

Oklahoma's mines exclusively produced industrial minerals; no metals were mined. Based upon USGS estimates of the quantities produced in the 50 States during 2002, Oklahoma remained the only State that produced iodine and continued to be first in gypsum; second of 4 States that produce tripoli; third of 3 States that produce crude helium, and fifth in feldspar. The

¹The 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 2002 USGS mineral production data published in this chapter are preliminary estimates as of July 2003 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>.

²Values, percentage calculations, and rankings for 2001 may differ from the Minerals Yearbook, Area Reports: Domestic 2001, Volume II, owing to the revision of preliminary 2001 to final 2001 data. Data for 2002 are preliminary and are expected to change; related rankings may also change.

State decreased in rank to eighth from seventh in industrial sand and gravel and was a significant producer of crushed stone, portland and masonry and cements, construction sand and gravel, common clays, dimension stone, and gemstones (descending order of value).

The narrative information that follows was provided by the Oklahoma Geological Survey³ (OGS). Production data in the text that follows are those reported by the OGS based upon that agency's own surveys and estimates. Data may differ from some production figures or other data as reported to the USGS.

Mining Employment

The Oklahoma Department of Mines recorded that 264 mine operators produced nonfuel minerals from 328 mines in the State in 2002; however, there were 422 permitted mining operations. Almost all were open pit mines, salt and iodine were produced from brine wells, helium was produced from natural gas wells, and one underground operation mined limestone. The mining industry in Oklahoma directly employed 26,794 persons in 2002 (excluding those employed by iodine and helium operators).

Exploration

In June, Boral Bricks, Inc. explored for clay resources at its Union City plant location in Canadian County. The plant was previously acquired from the Oklahoma Brick Corp.

Commodity Review

Clay and Shale.—Clay and shale, found abundantly throughout Oklahoma, are used mainly in the manufacture of brick and tile; stoneware and pottery manufacture accounts for a smaller portion of the clay usage. The major clay production is near the State's two largest cities, Oklahoma City and Tulsa. The three counties with the highest output of clay are Muskogee, Creek, and LeFlore Counties (Oklahoma Department of Mines, 2002).

Crushed Stone.—Texas Industries, Inc. (TXI) began operating its Mill Creek Oklahoma crushed stone plant in July 2002, and the first rail shipment was sent in August. Exploration for the greenfield operation began in 1999 with the intention of supplying the Dallas-Fort Worth, TX, aggregate market. The Butterly Dolomite (Ordovician) is the principal unit mined at the Mill Creek operation. Plant capacity is 4.5 million metric tons per year, with slightly more than 1.8 metric tons per year (t/yr) scheduled for production in 2002. The Mill Creek operation can be modified to handle an additional 2 t/yr to 3 t/yr, depending

³Stanley T. Krukowski, Industrial Minerals Geologist with the Oklahoma Geological Survey, authored the text of the State mineral industry information provided by that agency.

on market demand. A 1,800-meter-long rail loop built into the plant facilitated rail shipments to the Dallas-Fort Worth market, which accounted for 80% to 85% of production.

The Oklahoma Aggregates Association (OKAA) successfully began its second year of operation after it was incorporated in July 2001. The OKAA represents the aggregate, dimension stone, construction material producers, and allied industries. The OKAA was founded to provide a medium through which the members could coordinate their efforts in discussing and resolving various problems of common concern and interest within the State including: governmental affairs, environmental safety, industry promotion and marketing, public image and internal and external communications, membership, materials specifications, and production. The association was run on a voluntary basis; however, OKAA began planning for a permanent director in 2002. Additional information about OKAA may be obtained through the World Wide Web at URL <http://www.okaa.org>.

Gypsum.—Gypsum is a calcium sulfate compound used as a plaster for interior walls and wallboard, special plasters for medical and other uses, and as a retardant in cement manufacture, fillers, and soil conditioners. It's found in large quantities as rock in western Oklahoma, principally in Blaine, Caddo, Comanche, Jackson, and Major Counties. Oklahoma is the largest gypsum-producing State (Oklahoma Department of Mines, 2002).

Sand and Gravel.—Cardinal Glass Industries announced it had selected Durant, OK, for the site of its fourth float glass operation. Designed to melt 540 metric tons of glass per day, the plant would serve markets in Iowa, Mexico, and Texas. Construction of the plant was scheduled to start in 2003, with operations beginning in mid-2004. Plans called for 246 workers to be employed at the facility. Several raw materials required for float glass, such as cullet, dolomite, limestone, and silica sand, are produced in Oklahoma.

Tripoli.—Tripoli is the general name for soft, porous silica found in sedimentary rocks in Ottawa County and neighboring parts of Arkansas and Missouri. Although it is primarily used as an abrasive, it is also used in concrete and as a paint filler. Oklahoma had one producer. The United States is self-sufficient in tripoli, and much of the product is exported (Oklahoma Department of Mines, 2002).

Government Programs and Activities

A recent OGS special publication on the metallic mineral resources of Oklahoma was published in 2002. It discusses the principal metallic minerals found in Oklahoma, including copper, lead, and zinc (Fay and Brockie, 2002). Gold, iron, manganese, silver, titanium, uranium, vanadium, and zirconium also occur in the State, but none were ever produced on a large scale. No metals have been mined in Oklahoma since 1976, but interest in their exploration and development continued. Copies of the publication may be purchased through OGS Publication Sales by telephoning (405) 360-2886.

The OGS continued its geologic mapping of the State in cooperation with the USGS under the STATEMAP component of the USGS National Cooperative Mapping Program. The geologic mapping program continued on a statewide, regional basis at a 1:100,000 scale, supplanting previously published 1:250,000-scale maps. The following 7.5-minute quadrangles were completed in 2002: Blanchard, Denver, Newcastle, and Norman. The focus of the geologic mapping project includes engineering, environmental, and natural resource issues.

On November 6, 2002, OGS dedicated the new Oklahoma Petroleum Information Center (OPIC). OPIC was established with a \$3 million gift from BP, along with all cores, samples, and materials from the BP (formerly Amoco Corp.) Tulsa Core Facility. Occupying the former Sysco Foods warehouse, corporate office, and conference/training center, OPIC will be the largest petroleum information center in the country by 2004 when all OGS informational units are housed there. The BP grant allowed OGS to purchase and maintain the warehouse and to move and maintain the BP Amoco core collection. OGS publication sales and the OGS well data library were well established at OPIC by yearend. Plans also were made to relocate the following to OPIC: the OGS Core and Sample Library, an x-ray core scanner along with other analytical units, the Melton Collection of aerial photographs, and additional core and sample collections from various contributors.

References Cited

- Fay, R.O., and Brockie, D.C., 2002, Metallic mineral resources of Oklahoma: Oklahoma Geological Survey Special Publication 2002-1, 32 p.
Oklahoma Department of Mines, 2002, Annual report 2002: Oklahoma City, OK, Oklahoma Department of Mines, 50 p.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN OKLAHOMA^{1,2}

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	2000		2001		2002 ^P		
	Quantity	Value	Quantity	Value	Quantity	Value	
Clays, common	757	2,060	783	1,910	735	3,310	
Gemstones	NA	197	NA	197	NA	197	
Gypsum, crude	2,830	23,500	2,630	21,300	2,570	19,800	
Iodine, crude	metric tons	1,470	21,500	1,290	18,400	1,700	18,000
Sand and gravel:							
Construction	9,210	35,500	11,000	43,700	10,700	43,200	
Industrial	1,480	30,700	1,360	28,200	1,360	28,200	
Stone:							
Crushed	39,300	168,000	41,600	179,000	40,700	179,000	
Dimension	metric tons	5,910	1,530	16,500	2,190	16,500	2,190
Tripoli	do.	W	W	11,700	2,100	11,700	2,100
Combined values of cement (portland), feldspar, helium, lime, salt, and value indicated by symbol W							
	XX	190,000 ^r	XX	181,000	XX	166,000	
Total	XX	473,000	XX	478,000	XX	462,000	

^rRevised. ^PPreliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" data. XX Not applicable.

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

²Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 2
OKLAHOMA: CRUSHED STONE SOLD OR USED, BY KIND¹

Kind	2000				2001			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	41	31,200	\$134,000	\$4.28	41	32,900	\$139,000	\$4.24
Dolomite	3	1,460	5,000	3.42	2	W	W	4.19
Shell	1	W	W	3.50	1	W	W	3.64
Granite	5	3,850	14,300	3.71	5	4,210	15,700	3.73
Sandstone and quartzite	7	2,510	14,400	5.73	7	2,970	17,700	5.95
Miscellaneous stone	2	W	W	3.71	2	W	W	3.65
Total or average	XX	39,300	168,000	4.28	XX	41,600	179,000	4.30

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

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

TABLE 3
OKLAHOMA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE¹

Use	Quantity		
	(thousand metric tons)	Value (thousands)	Unit value
Construction:			
Coarse aggregate (+1 1/2 inch):			
Riprap and jetty stone	584	\$3,240	\$5.54
Filter stone	27	173	6.41
Other coarse aggregates	100	557	5.57
Total or average	711	3,970	5.58
Coarse aggregate, graded:			
Concrete aggregate, coarse	2,360	13,500	5.73
Bituminous aggregate, coarse	W	W	4.08
Bituminous surface-treatment aggregate	566	3,010	5.31
Other graded coarse aggregates	9,990	37,800	3.78
Total or average	12,900	54,400	4.21
Fine aggregate (-3/8 inch):			
Stone sand, concrete	(2)	(2)	3.64
Stone sand, bituminous mix or seal	271	1,120	4.13
Screening, undesignated	2,440	8,950	3.67
Coarse and fine aggregates:			
Graded road base or subbase	1,500	7,960	5.30
Unpaved road surfacing	(2)	(2)	4.27
Crusher run or fill or waste	5,260	21,200	4.03
Other coarse and fine aggregates	18	85	4.72
Other construction materials ³	(2)	(2)	17.64
Agricultural limestone	(2)	(2)	4.61
Chemical and metallurgical, cement manufacture	(2)	(2)	3.54
Other miscellaneous uses and specified uses not listed	(2)	(2)	4.68
Unspecified: ⁴			
Reported	12,400	58,500	4.70
Estimated	2,900	11,000	3.91
Total or average	15,300	69,900	4.55
Grand total or average	41,600	179,000	4.30

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

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Withheld to avoid disclosing company proprietary data, included in "Grand total."

³Includes building products.

⁴Reported and estimated production without a breakdown by end use.

TABLE 4
OKLAHOMA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE AND DISTRICT^{1,2}

(Thousand metric tons and thousand dollars)

Use	District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1 1/2 inch) ³	174	1,320	W	W	W	W
Coarse aggregate, graded ⁴	4,510	22,900	W	W	W	W
Fine aggregate (-3/8 inch) ⁵	658	2,600	W	W	W	W
Coarse and fine aggregate ⁶	2,610	13,900	W	W	W	W
Other construction materials ⁷	--	--	--	--	--	--
Agricultural ⁸	W	W	W	W	--	--
Chemical and metallurgical ⁹	W	W	W	W	W	W
Other miscellaneous uses and specified uses not listed	--	--	--	--	--	--
Unspecified: ¹⁰						
Reported	2,120	10,900	2,260	11,000	5,020	19,500
Estimated	8	30	620	2,200	90	330
Total	11,100	55,400	4,400	19,000	17,800	65,900
District 5						
	Quantity	Value				
Construction:						
Coarse aggregate (+1 1/2 inch) ³	173	958				
Coarse aggregate, graded ⁴	W	W				
Fine aggregate (-3/8 inch) ⁵	W	W				
Coarse and fine aggregate ⁶	W	W				
Other construction materials ⁷	W	W				
Agricultural ⁸	--	--				
Chemical and metallurgical ⁹	--	--				
Other miscellaneous uses and specified uses not listed	W	W				
Unspecified: ¹⁰						
Reported	3,040	17,100				
Estimated	2,200	8,800				
Total	8,340	38,900				

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

¹No crushed stone was produced in District 1.

²Data are rounded to no more than three significant digits; may not add to totals shown.

³Includes filter stone, riprap and jetty stone, and other coarse aggregates.

⁴Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), and other graded coarse aggregates.

⁵Includes screening (undesignated), stone sand (bituminous mix or seal), and stone sand (concrete).

⁶Includes crusher run (select material or fill), graded road base or subbase, unpaved road surfacing, and other coarse and fine aggregates.

⁷Includes building products.

⁸Includes agricultural limestone.

⁹Includes cement manufacture.

¹⁰Reported and estimated production without a breakdown by end use.

TABLE 5
OKLAHOMA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY¹

Use	Quantity	Value	Unit
	(thousand metric tons)	(thousands)	value
Concrete aggregates (including concrete sand)	4,230	\$17,900	\$4.24
Plaster and gunite sands	52	287	5.52
Concrete products (blocks, bricks, pipe, decorative, etc.)	37	234	6.32
Asphalt concrete aggregates and other bituminous mixtures	374	1,140	3.06
Road base and coverings	172	567	3.30
Fill	854	1,560	1.83
Other miscellaneous uses ²	68	603	8.87
Unspecified: ³			
Reported	2,370	10,800	4.57
Estimated	2,900	11,000	3.68
Total or average	11,000	43,700	3.96

¹Data are rounded to no more than three significant digits, except unit value; may not add to totals shown.

²Includes snow and ice control.

³Reported and estimated production without a breakdown by end use.

TABLE 6
OKLAHOMA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY USE AND DISTRICT¹

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	736	2,070	1,680	5,980
Asphaltic concrete aggregates and road base materials	97	324	223	547
Other miscellaneous uses ³	173	368	298	809
Unspecified: ⁴				
Reported	3	54	482	1,330
Estimated	460	2,000	1,100	3,300
Total	1,470	4,780	3,800	12,000
	Districts 3 and 5 ⁵		District 4	
	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products ²	194	804	1,710	9,610
Asphaltic concrete aggregates and road base materials	159	727	66	113
Other miscellaneous uses ³	109	367	342	621
Unspecified: ⁴				
Reported	114	439	1,770	9,000
Estimated	660	3,000	630	2,300
Total	1,240	5,360	4,520	21,600

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes plaster and gunite sands.

³Includes fill and snow and ice control.

⁴Reported and estimated production without a breakdown by end use.

⁵Districts 3 and 5 are combined to avoid disclosing company proprietary data.