

# 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 1998, the preliminary estimated value<sup>1</sup> of nonfuel mineral production for Oklahoma was \$408 million, according to the U.S. Geological Survey (USGS). This was about a 6% increase from that of 1997,<sup>2</sup> following a 4.6% increase from 1996 to 1997. The State climbed in rank to 32d from 33d among the 50 States in total nonfuel mineral production value, of which Oklahoma accounted for 1% of the U.S. total.

In 1998, portland cement and crushed stone were Oklahoma's leading nonfuel mineral commodities, accounting for about 34% and 29%, respectively, of the State's total preliminary nonfuel mineral value. The combined values of construction materials—portland and masonry cements, crushed stone, construction sand and gravel, gypsum, and common clay, in descending order of value—accounted for almost 79% of the total value. Oklahoma's increase in value in 1998 mostly resulted from the higher values of portland cement, crude iodine, crushed stone, crude gypsum, and construction sand and gravel, in descending order of relative increase (table 1). Only feldspar, gemstones, and dimension stone showed relatively small value decreases, while industrial sand and gravel and tripoli remained at 1997 levels. Shell production for gem material declined considerably, resulting in a 92% decrease in the value of gemstones, but this had a relatively small effect on the State's overall total increase in value. In 1997, increases in portland cement, grade-A helium, and crude iodine far outweighed decreases in crushed stone, masonry cement, and salt, resulting in the State's increase for the year (table 1).

Oklahoma's mines exclusively produced industrial minerals; no metals were mined in the State. Based on USGS estimates of the quantities produced in the 50 States during 1998, Oklahoma remained the only<sup>2</sup> State that produced iodine, and

<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 1998 USGS mineral production data published in this chapter are preliminary estimates as of February 1999 and are expected to change. For some mineral commodities (for example, 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. A telephone listing for the specialists may be retrieved over the Internet at <http://minerals.usgs.gov/minerals/contacts/comdir.html>; by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists); or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

<sup>2</sup>Values, percentage calculations, and rankings for 1997 may vary from the *Minerals Yearbook, Area Reports: Domestic 1997, Volume II*, owing to the revision of preliminary 1997 to final 1997 data. Data for 1998 are preliminary and expected to change, while related rankings may also be subject to change.

it continued as first in crude gypsum; third of three States in crude helium; fourth of six grade-A helium; and eighth in industrial sand and gravel. The State dropped from fourth to fifth in feldspar. Additionally, significant quantities of portland and masonry cements, crushed stone, and common clays were produced in the State.

The following narrative information was provided by the Oklahoma Geological Survey (OGS), which reported that industrial-mineral activity in the State continued to increase during 1998.<sup>3</sup> Overall, production has been level or rising steadily over the past several years for the following mineral commodities: crushed stone for aggregate, railroad ballast, and fill; cement for highways, housing, and commercial buildings; dimension stone for houses and commercial buildings; sand and gravel for a variety of construction projects; gypsum for wallboard and plasters; and iodine for pharmaceuticals, disinfectants, and animal feed. Construction activities that held steady or increased somewhat in 1998 were highway construction and residential and commercial building.

Crushed stone demand rose in 1998, due largely to highway construction, the need for granite and rhyolite as railroad ballast, and increased housing and commercial building construction. Most Oklahoma highways are now being built with a concrete surface, which increases the demand for cement. In 1998, Oklahoma authorized \$700 million in road construction, including turnpikes and Federal and State highways.

Sand and gravel production increased in 1998. New and expanded activity is occurring in south-central and southeastern Oklahoma to help supply the Dallas-Fort Worth, TX, market area. Texas Industries, Inc. (TXI) opened a new pit on the Red River, just south of Durant in Bryan County; although TXI mines sand and gravel in Oklahoma, the material is sent by pipeline across the State line to the company's plant in Texas, owing to better and shorter highway access to the Dallas area.

According to the OGS, silica sand production (reported as industrial sand and gravel in table 1) was up significantly in 1998. U.S. Silica Co. and Unimin Corp. hydraulically mine high-purity quartz sand in the Arbuckle Mountains of south-central Oklahoma, and Arkhola Sand and Gravel Co. is dredging a feldspathic sand from the Arkansas River at Muskogee in northeast Oklahoma. These sands are used for glassmaking, foundry sands, ceramics, and the manufacture of sodium silicate.

According to OGS estimates, gypsum production slightly increased during 1998, and some companies reported a record year. Also, the price of gypsum increased moderately. The output of plasters and other industrial-gypsum products was higher than in 1997. Healthy building activity helped to keep

<sup>3</sup>Kenneth S. Johnson, Associate Director of the Oklahoma Geological Survey, authored the text of State minerals information submitted by the OGS.

Oklahoma wallboard plants operating at near-capacity during the year, and there was little room to expand to meet the rising national and regional demand. Republic Gypsum Co. added a second board line at its plant in Duke, OK, increasing the company's capacity by another 80%.

Iodine production marginally increased during 1998, and based on USGS preliminary data (table 1), the value rose 25% above that of 1997. The price of iodine held steady at \$18 to \$19 per kilogram during the year, a significant increase over the \$11 to \$15 per kilogram price just 2 years earlier. Three companies are operating four facilities in northwest Oklahoma. The companies drilled several new producing wells during the year, and plugged several wells that were only marginally productive. Oklahoma produced about 26% of the Nation's iodine needs.

The number of mining permits in Oklahoma dropped slightly in 1998, but the acreage under permit has risen. The Oklahoma Department of Mines (ODM) issued a total of 409 permits in 1998, covering a total of about 22,000 hectares (about 55,000 acres). According to ODM, many more companies are obtaining a Life Expectancy Permit, as allowed under the State's 1994 law. Under this law, a company may submit a mining plan only once to cover the mine's life expectancy, instead of undergoing a permit review every 5 years. Of permits on file for 1998, ODM reports that 225 (55%) have been secured under the Life Expectancy provision.

ODM reported that during 1997 about 3.5 million man-hours were worked in Oklahoma's noncoal mining activities, a moderate increase over the 3.3 million man-hours worked in 1996.

Recent Federal legislation provides an accelerated depreciation for mining and other business and industry activity on former American Indian reservations in Oklahoma. A 1993 Federal law first provided for such assistance on existing reservations in the United States, but a U.S. Congressman from Oklahoma sponsored a portion of the Tax Relief Act of 1997 that extended depreciation allowances to Oklahoma lands that were within reservation boundaries just prior to opening the lands for settlement in the late 1800's and early 1900's. These former American Indian reservations comprise about two-thirds of Oklahoma.

Oklahoma hosted the 34th Forum on the Geology of Industrial Minerals on May 2-6, 1998, in Norman. This prestigious annual meeting was attended by 177 specialists in the geology, production, and marketing of a wide range of industrial minerals throughout the United States and elsewhere in the world. Attendees came from Canada, Chile, England, Greece, Turkey, and the United States. A total of 54 talks and posters were presented; they are scheduled to be published in mid-1999 in a proceedings volume. The forum was sponsored by the OGS, the ODM, the Oklahoma Mining Commission, and the USGS.

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

(Thousand metric tons and thousand dollars unless otherwise specified)

Mineral	1996		1997		1998 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
<b>Cement:</b>						
Masonry	101	8,850 e/	89	6,500 e/	91	6,800
Portland	1,750	118,000 e/	1,900	132,000 e/	1,970	139,000
<b>Clays:</b>						
Common	799	4,090	653	4,430	666	4,520
Fire	23	W	--	--	--	--
<b>Gemstones</b>	NA	603	NA	354	NA	30
<b>Gypsum, crude</b>	2,690	16,500	3,100	17,500	3,080	21,500
<b>Iodine, crude</b> metric tons	1,270	14,600	1,320	19,600	1,340	24,500
<b>Sand and gravel:</b>						
Construction	7,910	27,700	8,250	29,000	8,930	32,300
Industrial	1,350	27,200	1,380	28,200	1,380	28,200
<b>Stone:</b>						
Crushed 3/	28,300	117,000	31,900	112,000	32,500	117,000
Dimension	9,710	2,220	5,770	995	6,180	966
Combined values of feldspar, helium, lime, salt, stone [crushed shell and traprock (1996), crushed shell, traprock, and miscellaneous (1997-98)], tripoli and values indicated by symbol W	XX	32,300	XX	35,800	XX	33,100
<b>Total</b>	XX	369,000	XX	386,000	XX	408,000

e/ Estimated. p/ Preliminary. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined values" 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 stones; kind and value included with "Combined values" figure.

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

Kind	1996				1997			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	45	21,500 r/	\$84,400 r/	\$3.93 r/	41	24,300	\$75,600	\$3.10
Dolomite	4 r/	2,400 r/	10,600 r/	4.43 r/	4	2,950	13,300	4.49
Granite	3	1,930	9,940	5.15	3	1,770	9,840	5.57
Traprock	1	(2/)	(2/)	(2/)	1	(2/)	(2/)	(2/)
Sandstone	7 r/	2,420	11,900	4.93	7	2,820	13,400	4.75
Shell	2	(2/)	(2/)	(2/)	2	(2/)	(2/)	(2/)
Slate	(3/)	(3/)	(3/)	(3/)	--	--	--	--
Miscellaneous stone	1	91	402	4.42	1	(2/)	(2/)	(2/)
Total	XX	28,300 r/	117,000	4.14	XX	31,900	112,000	3.52

r/ Revised. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Excluded from State total to avoid disclosing company proprietary data.

3/ Revised to zero.

TABLE 3  
OKLAHOMA: CRUSHED STONE SOLD OR USED BY PRODUCERS  
IN 1997, BY USE 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Coarse aggregate (+1 1/2 inch):</b>			
Riprap and jettv stone	462	\$1,360	\$2.95
Filter stone	68	361	5.31
Other coarse aggregate	93	724	7.78
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	3,780	16,000	4.23
Bituminous aggregate, coarse	365	2,070	5.68
Bituminous surface-treatment aggregate	616	3,410	5.54
Other graded coarse aggregate 3/	2,010	10,200	5.09
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, concrete	134	198	1.48
Stone sand, bituminous mix or seal	456	2,150	4.72
Screening, undesignated	6,080	11,000	1.81
Other fine aggregate	369	1,420	3.85
<b>Coarse and fine aggregates:</b>			
Graded road base or subbase	1,530	6,010	3.92
Unpaved road surfacing	W	W	3.75
Crusher run or fill or waste	4,970	12,200	2.45
Other coarse and fine aggregates	934	4,910	5.26
Other construction materials 4/	366	1,270	3.46
<b>Agricultural:</b>			
Agricultural limestone	119	446	3.75
Poultry grit and mineral food	(5/)	(5/)	4.15
<b>Chemical and metallurgical:</b>			
Cement manufacture	(5/)	(5/)	2.83
Lime manufacture	(5/)	(5/)	4.15
Chemical stone	(5/)	(5/)	4.14
Sulfur oxide removal	394	1,800	4.57
Special: Other fillers or extenders	(5/)	(5/)	6.61
<b>Unspecified: 6/</b>			
Actual	5,300	22,600	4.26
Estimated	1,600	6,420	4.03
Total	31,900	112,000	3.52

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

1/ Includes dolomite, granite, limestone and sandstone; excludes miscellaneous stone, shell and traprock from State 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 unpaved road surfacing.

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

6/ Includes reported and estimated production without a breakdown by end use.

TABLE 4  
OKLAHOMA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1997, BY USE AND DISTRICT 1/ 2/ 3/

(Thousand metric tons and thousand dollars)

Use	District 2		District 3		District 4		District 5	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
<b>Construction aggregates:</b>								
Coarse aggregate (+1 1/2 inch) 4/	128	871	W	W	W	W	117	808
Coarse aggregate, graded 5/	1,490	8,170	W	W	W	W	2,240	10,700
Fine aggregate (-3/8 inch) 6/	507	1,570	W	W	W	W	530	1,790
Coarse and fine aggregate 7/	2,090	8,010	491	9,400	3,130	5,600	1,950	8,550
Other construction materials	--	--	222	1,170	10,000	28,100	(8/)	(8/)
Agricultural 9/	32	144	(8/)	(8/)	--	--	(8/)	(8/)
Chemical and metallurgical 10/	(8/)	(8/)	(8/)	(8/)	(8/)	(8/)	394	1,800
Special 11/	--	--	--	--	(8/)	(8/)	--	--
<b>Unspecified: 12/</b>								
Actual	(8/)	(8/)	2,090	6,770	(8/)	(8/)	(8/)	(8/)
Estimated	71	107	21	86	522	2,160	981	4,070
Total	8,170	35,300	3,070	10,800	14,100	36,800	6,560	29,200

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

1/ No crushed stone was produced in District 1.

2/ Excludes miscellaneous stone, shell, and traprock from State total to avoid disclosing company proprietary data.

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

4/ Includes filter stone, riprap and jetty stone, and other coarse aggregate.

5/ Includes concrete aggregate (coarse), bituminous aggregate (coarse), bituminous surface-treatment aggregate, railroad ballast, and other graded coarse aggregate.

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

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

8/ Withheld to avoid disclosing company proprietary data; included in "Total."

9/ Includes agricultural limestone, poultry grit, and mineral food.

10/ Includes cement manufacture, chemical stone, lime manufacture, and sulfur oxide removal.

11/ Includes other fillers or extenders.

12/ Includes reported and estimated production without a breakdown by end use.

TABLE 5  
OKLAHOMA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Value per ton
Concrete aggregate (including concrete sand) 2/	3,470	\$13,900	\$4.02
Concrete products (blocks, bricks, pipe, decorative, etc.)	44	209	4.75
Asphaltic concrete aggregates and other bituminous mixtures	272	720	2.65
Road base and coverings 3/	266	867	3.26
Fill	1,010	1,910	1.89
Other miscellaneous uses	2	33	13.32
<b>Unspecified: 4/</b>			
Actual	1,650	6,240	3.79
Estimated	1,540	5,090	3.30
Total or average	8,250	29,000	3.51

1/ Data are rounded to three significant digits, except value per ton; may not add to totals shown.

2/ Includes plaster and gunite sands.

3/ Includes road and other stabilization (lime) and snow and ice control.

4/ Includes reported and estimated production without a breakdown by end use.

TABLE 6  
 OKLAHOMA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1997,  
 BY USE AND DISTRICT 1/

(Thousand metric tons and thousand dollars)

Use	District 1		District 2	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 2/	726	2,460	1,290	4,380
Asphaltic concrete aggregates and road base materials 3/	220	825	208	555
Fill	149	409	693	1,270
Other miscellaneous uses	2	33	--	--
Unspecified 4/	322	1,200	930	2,550
Total	1,420	4,920	3,120	8,760
	District 4		Districts 3 and 5	
	Quantity	Value	Quantity	Value
Concrete aggregate and concrete products 3/	1,040	4,960	456	2,350
Asphaltic concrete aggregates and road base materials 4/	W	W	W	W
Fill	W	W	W	W
Other miscellaneous uses	--	--	--	--
Unspecified 4/	998	4,270	937	3,310
Total	2,250	9,560	1,460	5,770

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 plaster and gunite sands.

3/ Includes road and other stabilization (lime) and snow and ice control.

4/ Includes reported and estimated production without a breakdown by end use.