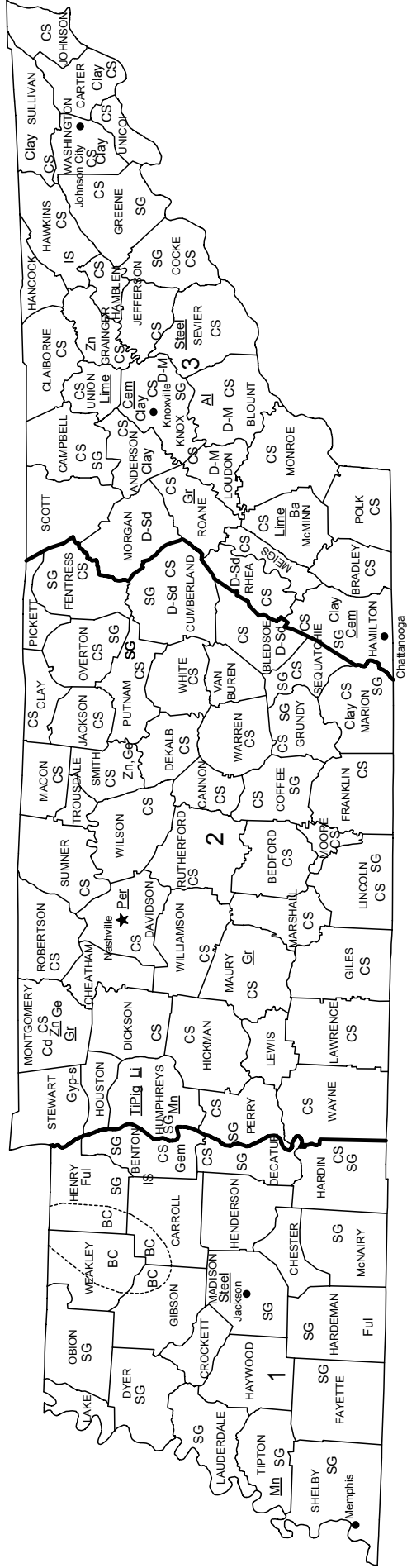


# TENNESSEE

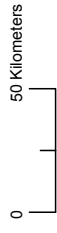


## LEGEND

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

## MINERAL SYMBOLS (Major producing areas)

Al	Aluminum plant	Gyp-s	Synthetic gypsum	SG	Construction sand and gravel	○	Concentration of mineral operations
Ba	Barite	IS	Industrial sand	Steel	Steel plant		
BC	Ball clay	Li	Lithium plant	TiPig	Titanium dioxide pigment plant		
Cd	Cadmium (See Zn)	Lime	Lime plant	Zn	Zinc		
Cem	Cement plant	Mn	Manganese dioxide plant	Zn	Zinc plant (Cd byproduct cadmium) (Ge byproduct germanium)		
Clay	Common clay	Per	Perlite plant				
D-M	Dimension marble						
D-Sd	Dimension sandstone						
Ful	Fuller's earth						
Ge	Germanium						
Gem	Gemstones						
Gr	Graphite plant						
CS	Crushed stone						
D-K	Dimension kaolin						
D-Sd	Dimension sand						
Ful	Fuller's earth						
Ge	Germanium						
Gem	Gemstones						
Gr	Graphite plant						



Source: Tennessee Department of Environment and Conservation, Division of Geology/U.S. Geological Survey (2002)

# THE MINERAL INDUSTRY OF TENNESSEE

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the Tennessee Department of Environment and Conservation, Division of Geology, for collecting information on all nonfuel minerals.

In 2002, the estimated value<sup>1</sup> of nonfuel raw mineral production for Tennessee was \$629 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about an 11% decrease from that of 2001<sup>2</sup> and followed a 2.6% decrease from 2000 to 2001. Tennessee was 22d in rank (21st in 2001) among the 50 States in total nonfuel mineral production value, of which the State accounted for more than 2% of the U.S. total.

Crushed stone has been Tennessee's leading mineral commodity, by value, for more than 25 years, except in 1981 when zinc was first. In 2002, crushed stone accounted for more than one-half of the State's total nonfuel mineral production value. Cement (portland and masonry) was the second leading nonfuel mineral, followed by zinc, construction sand and gravel, and ball clay. A significant decrease in the production and value of zinc accounted for most of the State's drop in value in 2002. The decrease resulted from the November 2001 closing of ASARCO Incorporated's Coy, Immel, and Young Mines and processing operations in Jefferson and Knox Counties because of low prices and continued sluggish market conditions. In 2001, most nonfuel mineral commodities showed little to no change from that of 2000. The State's decrease in value resulted mostly from the lower values of zinc, down about \$10 million, and crushed stone, down \$9 million. Fuller's earth was up about \$2 million (table 1).

Compared with USGS estimates of the quantities produced in the 50 States in 2002, Tennessee remained the leading gemstone and ball-clay-producing State and 2d in zinc; rose to 9th from 10th in industrial sand and gravel; and continued to be a significant producer of crushed stone and portland cement (descending order of value). Primary aluminum and raw steel were produced in Tennessee but were processed from materials obtained from other domestic and foreign sources. The State

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<sup>1</sup>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 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>.

<sup>2</sup>Values, 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.

remained eighth in rank in the production of primary aluminum.

The Tennessee Division of Geology provided the following narrative information.<sup>3</sup> By the end of 2002, a total of 329 nonfuel mineral operations had permits to mine in 81 counties across the State.

## Commodity Review

### Industrial Minerals

**Clay.**—Ball clay and kaolin were mined from the Eocene Claiborne and Wilcox Formations in northwest Tennessee. Boral Bricks Inc., H.C. Spinks Co., Kentucky-Tennessee Clay Co., Old Hickory Clay Co., and Unimin Corp. (United Clays Inc.) operated mines in Carroll, Gibson, Henry, and Weakly Counties. Fuller's earth was mined in Hardeman County by Moltan Co. and in Henry County by American Colloid Co.

**Gemstones.**—Tennessee's gem industry is located in Benton County. The American Shell Co. and Tennessee Shell Co. harvested mollusk shells from the Tennessee River for seeds in the cultured pearl industry. The American Pearl Co. operated the only freshwater pearl farm in the United States, which cultivates approximately 250,000 mussels each season.

**Sand and Gravel.**—Construction sand and gravel was produced at 91 sites located in 28 counties and operated by 57 different companies, which was similar to 2001. Companies operating at least five sites are Ford Construction Co., Memphis Stone and Gravel Co., and Standard Construction Co. in District 1 (west Tennessee) and Bradley Stone and Sand Inc. in the eastern part of District 2 (middle Tennessee). Industrial sand was mined in Hawkins County by Short Mountain Silica Co. and in Benton County by Unimin Corp.

**Shale.**—General Shale Products Corp. operated eight shale mines in Anderson, Carter, Knox, Sullivan and Washington Counties in northeast Tennessee to supply its brick production plants. There was additional shale mining in Hamilton and Marion Counties in southeast Tennessee.

**Stone.**—The crushed stone industry produced limestone and dolomite at 152 quarries and underground mines primarily in District 2 (middle Tennessee) and District 3 (east Tennessee). Crushed limestone and dolomite was produced in 65 counties by 46 different companies and 19 county highway departments. The top three producers in descending order were Vulcan Materials Co., which operated 41 quarries in 30 counties; Rogers Group Inc., which operated 31 quarries in 27 counties; and Rinker Materials Corp., which operated 10 quarries in 6 counties. Three quarries in Johnson County produced crushed granite and quartzite.

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<sup>3</sup>Peter Lemiszki, Chief Geologist with the Tennessee Division of Geology in Knoxville, authored the text of the State mineral industry information provided by that agency.

The Holston Limestone was quarried for dimension stone in Blount, Knox, and Loudon Counties by the Tennessee Marble Co. and Tennessee Valley Marble Inc. Quartzitic sandstone was quarried on the Cumberland Plateau for dimension sandstone, flagstone, and ashlar. Six companies operated seven quarries in Bledsoe, Cumberland, Morgan, and Rhea Counties.

**Other Industrial Minerals.**—Gypsum was produced from Tennessee Valley Authority byproducts at the Allied Custom Gypsum plant in Stewart County. Lime plants operated by Bowater Southern Paper Corp. in McMinn County produced high-calcium quicklime, and Global Stone Tenn-Luttrell Inc. in Union County produced high-calcium quicklime and hydrated lime.

### Metals

**Zinc.**—Asarco owns the Young, Immel, and Coy Mines in Knox and Jefferson Counties, but zinc mining and processing operations were suspended in November 2001. A small staff remained to continue processing agricultural lime from existing production byproducts and for care and maintenance.

Pasminco Ltd. operated the electrolytic zinc plant in Clarksville (Montgomery County) and mined at Gordonsville (Smith County) and Clinch Valley (Grainger County). Pasminco Ltd. announced on December 4, 2002, that it planned to shut down the Gordonsville and Clinch Valley Mines. Gordonsville is scheduled to close by spring 2003. The Clinch Valley Mine

was scheduled to close by 2004 (Pasminco Ltd., 2002§<sup>4</sup>).

The Gordonsville and Clinch Valley Mines will continue to provide zinc concentrate to the Clarksville zinc plant until closure and raw material contracts have been put in place to cover future zinc concentrate requirements. The Clarksville zinc plant also produced primary cadmium as a byproduct during roasting and leaching of the zinc concentrate.

### Government Programs

In September 2002, the U.S. Department of Labor's Mine Safety and Health Administration presented the Sentinels of Safety Award to Asarco's Young Mine, recognizing it as the country's safest underground metal mine in 2001 (Asarco Inc., 2002§).

### Internet References Cited

Asarco Inc., 2002 (September 20), Asarco zinc mine in Tennessee honored as Nation's safest underground metal mine in 2001, Press Release, accessed September 23, 2003, at URL <http://www.asarco.com/PressReleases/sentinels.pdf>.

Pasminco Ltd., 2002 (December 4), Pasminco to close U.S. mines, Press Release, accessed September 23, 2003, at URL [http://www.pasminco.com.au/index.asp?link\\_id=2.1087](http://www.pasminco.com.au/index.asp?link_id=2.1087).

<sup>4</sup> References that include a section mark (§) are found in the Internet References Cited section.

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

(Thousand metric tons and thousand dollars)

Mineral	2000		2001		2002 <sup>p</sup>	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Ball	685	29,300	680	28,800	640	26,300
Common	W	W	304	251	283	657
Fuller's earth	W	W	W	W	64	3,790
Sand and gravel:						
Construction	8,760	47,000	8,350	46,400	8,900	50,500
Industrial	W	W	W	22,900	W	21,900
Stone, crushed	60,100 <sup>r</sup>	353,000 <sup>r</sup>	58,600	344,000	57,800	347,000
Combined values of barite (2000-2001), cement, clays [kaolin (2000-2001)], gemstones, lime, salt, sand and gravel (industrial), silver (2001), stone (dimension marble), zinc, and values indicated by symbol W	XX	298,000	XX	266,000	XX	179,000
Total	XX	728,000 <sup>r</sup>	XX	709,000	XX	629,000

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

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

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

TABLE 2  
TENNESSEE: CRUSHED STONE SOLD OR USED, BY KIND<sup>1</sup>

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 <sup>2</sup>	111 <sup>r</sup>	56,800 <sup>r</sup>	\$334,000 <sup>r</sup>	\$5.88 <sup>r</sup>	112	54,700	\$319,000	\$5.81
Dolomite	5 <sup>r</sup>	W	W	6.38 <sup>r</sup>	6	W	W	7.20
Granite	1	W	W	4.41	1	W	W	4.63
Sandstone	1	W	W	3.59	1	W	W	3.64
Total or average	XX	60,100 <sup>r</sup>	353,000 <sup>r</sup>	5.88 <sup>r</sup>	XX	58,600	344,000	5.88

<sup>r</sup>Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

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

<sup>2</sup>Includes limestone-dolomite reported with no distinction between the two.

TABLE 3  
TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, BY USE<sup>1</sup>

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
<b>Construction:</b>			
<b>Coarse aggregate (+1 1/2 inch):</b>			
Riprap and jetty stone	986	\$6,220	\$6.31
Filter stone	609	3,630	5.96
Other coarse aggregates	1,200	5,420	4.51
Total or average	2,800	15,300	5.46
<b>Coarse aggregate, graded:</b>			
Concrete aggregate, coarse	1,550	9,740	6.30
Bituminous aggregate, coarse	9,160	63,200	6.91
Bituminous surface-treatment aggregate	187	1,130	6.02
Railroad ballast	W	W	4.10
Other graded coarse aggregates	2,490	15,800	6.35
Total or average	13,400	89,900	6.72
<b>Fine aggregate (-3/8 inch):</b>			
Stone sand, concrete	340	2,770	8.15
Stone sand, bituminous mix or seal	W	W	5.54
Screening, undesignated	2,610	17,500	6.69
Other fine aggregates	1,730	12,800	7.38
Total or average	4,690	33,000	7.05
<b>Coarse and fine aggregate:</b>			
Graded road base or subbase	9,550	53,400	5.59
Unpaved road surfacing	343	1,230	3.59
Crusher run or fill or waste	769	2,840	3.70
Roofing granules	W	W	5.90
Other coarse and fine aggregates	2,130	12,200	5.72
Total or average	12,800	69,700	5.45
Agricultural limestone	605	2,870	4.74
<b>Chemical and metallurgical:</b>			
Cement manufacture	(2)	(2)	4.13
Lime manufacture	(2)	(2)	3.58
Chemical stone for alkali works	(2)	(2)	4.13
Sulfur oxide removal	(2)	(2)	5.72
<b>Special:</b>			
Mine dusting or acid water treatment	(2)	(2)	7.72
Whiting or whiting substitute	(2)	(2)	11.68
Other fillers or extenders	(2)	(2)	9.91
Other miscellaneous uses and other specified uses not listed	(2)	(2)	5.68
<b>Unspecified:<sup>3</sup></b>			
Reported	13,200	73,000	5.52
Estimated	8,800	48,000	5.47
Total or average	22,100	121,000	5.50
Grand total or average	58,600	344,000	5.88

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

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

<sup>2</sup>Withheld to avoid disclosing company proprietary data; included in "Grand total."

<sup>3</sup>Reported and estimated production without a breakdown by end use.

TABLE 4  
TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2001, 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
Construction:						
Coarse aggregate (+1 1/2 inch) <sup>2</sup>	229	1,790	1,590	7,050	982	6,430
Coarse aggregate, graded <sup>3</sup>	1,970	13,700	5,390	35,800	6,020	40,400
Fine aggregate (-3/8 inch) <sup>4</sup>	293	2,340	1,200	7,390	3,190	23,300
Coarse and fine aggregate <sup>5</sup>	1,590	7,570	4,800	23,100	6,400	39,000
Agricultural <sup>6</sup>	171	1,380	32	107	402	1,380
Chemical and metallurgical <sup>7</sup>	--	--	W	W	W	W
Special <sup>8</sup>	--	--	--	--	W	W
Other miscellaneous uses	--	--	W	W	--	--
Unspecified: <sup>9</sup>						
Reported	596	3,380	10,000	54,700	2,610	15,000
Estimated	--	--	7,200	41,000	1,600	6,900
Total	4,850	30,200	30,600	171,000	23,100	143,000

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

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

<sup>2</sup>Includes filter stone, riprap and jetty stone, and other coarse aggregates.

<sup>3</sup>Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregates.

<sup>4</sup>Includes screening (undesignated), stone sand bituminous mix or seal, stone sand (concrete), and other fine aggregates.

<sup>5</sup>Includes crusher run (select material or fill), graded road base or subbase, roofing granules, unpaved road surfacing, and other coarse and fine aggregates.

<sup>6</sup>Includes agricultural limestone.

<sup>7</sup>Includes cement manufacture, chemical stone for alkali works, lime manufacture, and sulfur oxide removal.

<sup>8</sup>Includes mine dusting or acid water treatment, whitening or whitening substitute, and other fillers or extenders.

<sup>9</sup>Reported and estimated production without a breakdown by end use.

TABLE 5  
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity	Value (thousands)	Unit value
	(thousand metric tons)		
Concrete aggregates (including concrete sand) <sup>2</sup>	2,490	\$15,200	\$6.10
Concrete products (blocks, bricks, pipe, decorative, etc.)	180	970	5.39
Asphaltic concrete aggregates and other bituminous mixtures	636	3,550	5.58
Road base and coverings <sup>3</sup>	1,070	5,330	4.96
Fill	69	361	5.23
Other miscellaneous uses <sup>4</sup>	160	1,250	7.82
Unspecified: <sup>5</sup>			
Reported	1,210	7,060	5.85
Estimated	2,500	13,000	5.02
Total or average	8,350	46,400	5.56

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

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes road and other stabilization (lime).

<sup>4</sup>Includes filtration.

<sup>5</sup>Reported and estimated production without a breakdown by end use.

TABLE 6  
 TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2001, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	District 1		District 2 and 3	
	Quantity	Value	Quantity	Value
Concrete aggregates and concrete products <sup>2</sup>	1,580	9,260	1,090	6,900
Asphaltic concrete aggregates and road base materials <sup>3</sup>	1,260	5,210	451	3,670
Other miscellaneous uses <sup>4</sup>	77	432	152	1,180
Unspecified: <sup>5</sup>				
Reported	1,020	5,580	182	1,480
Estimated	1,800	9,200	690	3,500
Total	5,780	29,700	2,560	16,700

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

<sup>2</sup>Includes plaster and gunite sands.

<sup>3</sup>Includes road and other stabilization (lime).

<sup>4</sup>Includes fill and filtration.

<sup>5</sup>Reported and estimated production without a breakdown by end use.