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2006 Minerals Yearbook

TENNESSEE

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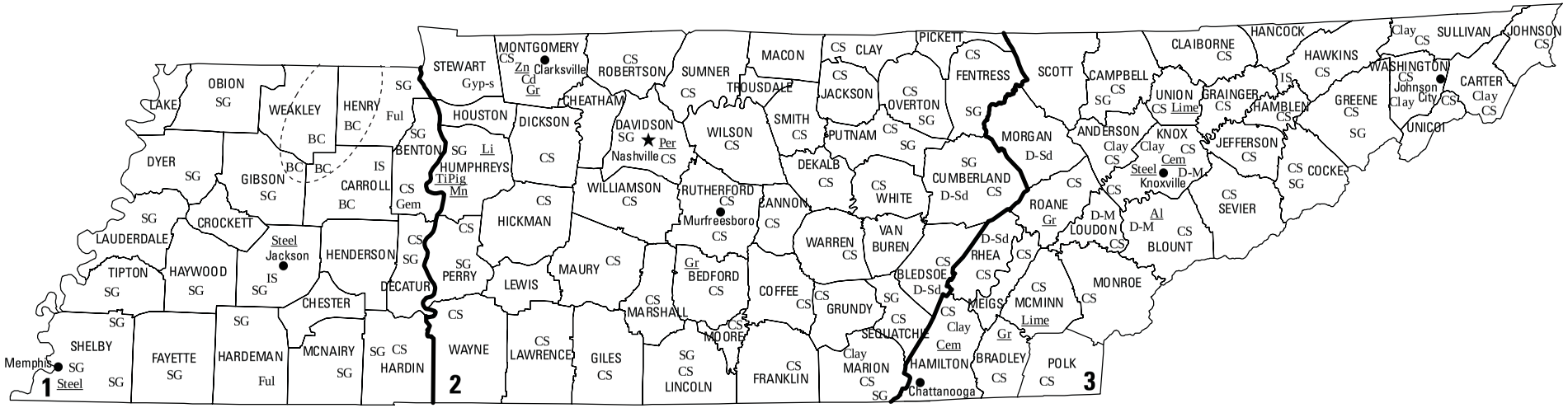
TENNESSEE



0 25 50 100 Kilometers

Albers equal area projection

LEGEND

——	County boundary
★	Capital
●	City
1——	Crushed stone/sand and gravel district boundary

MINERAL SYMBOLS (Major producing areas)

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

Source: Tennessee Department of Environment and Conservation/U.S. Geological Survey (2006).

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 2006, Tennessee's nonfuel raw mineral production[1] was valued at $856 million, based upon annual U.S. Geological Survey (USGS) data. This was an $85 million, or 11%, increase from the State's total nonfuel mineral production value for 2005, following a $119 million, or more than 18%, increase from 2004 to 2005. Tennessee increased to 25th from 26th in rank among the 50 States in total nonfuel mineral production value in 2006 and accounted for about 1.3% of the U.S. total.

Crushed stone has been Tennessee's leading nonfuel mineral commodity, by value, for nearly five decades (except in 1981 when zinc was first); crushed stone went ahead of cement (portland and masonry) in 1957. In 2006, crushed stone accounted for more than 60% of the State's total nonfuel mineral production value. Cement was the second-leading nonfuel mineral commodity, followed by construction sand and gravel, ball clay, industrial sand and gravel, and lime.

In 2006, increases in the mineral production values of cement and crushed stone led Tennessee's increase in total nonfuel mineral production value, the unit values of each also showing significant increases. Cement, with a somewhat small increase in production, led with the largest single increase in value (data withheld—company proprietary data), up nearly 30%. Crushed stone production decreased slightly, yet its resultant value rose by $34 million, or up by 7%. Smaller yet significant increases took place in the values of construction sand and gravel, up by more than $6 million, followed by increases in the production and value of lime and industrial sand and gravel. Several mineral commodities decreased in value, the largest of which were those of gemstones, down 40%, and common clays, down by $1.6 million (down more than 50%) (table 1).

In 2006, Tennessee continued to be the leading ball clay- and gemstone-producing State (gemstones based upon value), as well as 8th in the quantity of fuller's earth produced and 10th in the production of crushed stone. The State remained a producer of substantial quantities of portland cement, industrial sand and gravel, lime, and common clays (in 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 continued to rank 7th in the production of primary aluminum.

[1]The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the 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 2006 USGS mineral production data published in this chapter are those available as of March 2008. All USGS Mineral Industry Surveys and USGS Minerals Yearbook chapters—mineral commodity, State, and country—can be retrieved over the Internet at URL http://minerals.usgs.gov/minerals.

The Tennessee Division of Geology[2] (TDG) provided the following narrative information. Data and information in the following text are those reported by the TDG, based upon its own surveys and estimates. By yearend 2006, approximately 328 nonfuel mineral operations were permitted in 82 counties across the State.

Commodity Review

Industrial Minerals

Clay and Shale.—Ball clay and kaolin were mined from the Eocene-age Claiborne and Wilcox Formations in Carroll, Gibson, Henry, and Weakly Counties, northwest Tennessee. Companies operating in the State were Boral Bricks Inc., H. C. Spinks Clay Company Inc. (owned by Franklin Minerals Inc.), Kentucky-Tennessee Clay Co. (a member of IMERYS Minerals Ltd.), Old Hickory Clay Co., and United Clay Product Inc. (owned by Unimin Corp.). Fuller's earth (montmorillonite) was mined in Hardeman County by Moltan Co. and in Henry County by American Colloid Co.

General Shale Brick, Inc. (the U.S. subsidiary of Wienerberger AG located in Vienna, Austria) operated eight shale mines in Anderson, Carter, Knox, Sullivan, and Washington Counties in east Tennessee to supply its brick production plants. Two other companies operated two shale mines in Hamilton and Marion Counties in southeast Tennessee.

Gemstones.—The fresh water pearl was designated the official Tennessee State Gem in 1979. The historic Tennessee River Freshwater Pearl Farm and Museum located in Benton County is the official site of freshwater pearl culturing in the State. The American Pearl Co. operated the only freshwater pearl farm in North America. American Shell Co., Tennessee Shell Co., and The American Pearl Co. exported mollusk shells from the Tennessee River to pearl-producing countries. Approximately 90% of all cultured pearls begin with a mother-of-pearl nucleus taken from the shell of a Tennessee mussel.

Sand and Gravel, Construction.—Construction sand and gravel was produced at 89 sites located in 29 counties and operated by 55 different companies and two county highway departments. Companies operating at least five sites were: Ford Construction Co., Memphis Stone and Gravel Co., and Standard Construction Co. located in District 1 (west Tennessee). Industrial sand was mined in Hawkins County by Short Mountain Silica Co. and Fine Sands, LLC. Unimin Corp.

[2]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.

operated two industrial sand mines in Benton County, and Teague Transports, LLC. operated one mine in Madison County.

Stone, Crushed and Dimension.—The crushed stone industry operated 154 quarries in 2006. Dolomite and limestone were produced at 151 quarries and underground mines located primarily in District 2 (middle Tennessee) and District 3 (east Tennessee). Three quarries in Johnson County produced crushed granite and quartzite. Crushed dolomite and limestone were produced in 67 counties by 42 different companies and 15 county highway departments. Vulcan Materials Co. operated 44 quarries in 32 counties, Rogers Group Inc. operated 33 quarries in 28 counties, and Rinker Materials operated 12 quarries in 7 counties.

The Ordovician-age Holston limestone was quarried for dimension marble in Blount, Knox, and Loudon Counties by the Tennessee Marble Co. and Tennessee Valley Marble Inc. Six companies operated eight dimension sandstone quarries in the Pennsylvanian-age Crab Orchard Sandstone in Bledsoe, Cumberland, Morgan, and Rhea Counties.

Other Industrial Minerals.—Synthetic 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. (owned by O-N Minerals a division of Oglebay Norton Co.) in Union County produced high-calcium quicklime and hydrated lime.

Metals

Zinc.—Switzerland-based Glencore International AG purchased the Tennessee Mines Division of Asarco Inc., reviving a zinc mining industry that had been inactive since 2001. The purchase included the underground Young and Coy Mines and the 6,900-metric-ton-per-day Young Mill in Jefferson County, as well as the Immel Mine in Knox County. These mining and milling facilities were to be operated under Glencore as the East Tennessee Zinc Co. The newly formed company expected that mining would be resumed in the first quarter of 2007 (Mining Engineering, 2007).

Zinifex Limited continued to operate the electrolytic zinc plant in Clarksville, Montgomery County, which produced Special High Grade and Continuous Galvanizing Grade zinc metal. The Clarksville plant also produced cadmium and sulfuric acid.

Reference Cited

Mining Engineering, 2007, Zinc mining to return to three sites in Tennessee: Mining Engineering, v. 59, no. 1, January, p. 26.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN TENNESSEE[1, 2]

(Thousand metric tons and thousand dollars)

Mineral	2004		2005		2006	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays:						
Ball	762	34,300	740	32,500	736	32,300
Common	365	3,140	372	3,210	231	1,530
Fuller's earth	W	W	W	W	W	W
Kaolin	W	W	W	W	W	W
Sand and gravel:						
Construction	7,830	47,500	7,570	51,500	8,500	57,900
Industrial	975	26,100	985	26,500	1,010	29,300
Stone, crushed	57,900	381,000	66,500 r	483,000 r	65,300	517,000
Combined values of cadmium [byproduct in zinc concentrates (2004)], cement, gemstones (natural), lime, salt, stone (dimension marble), zinc (2004), and values indicated by symbol W	XX	160,000	XX	174,000	XX	218,000
Total	XX	652,000	XX	771,000 r	XX	856,000

rRevised. W Withheld to avoid disclosing company proprietary data. Withheld values included in "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 no more than three significant digits; may not add to totals shown.

TABLE 2
TENNESSEE: CRUSHED STONE SOLD OR USED, BY KIND[1]

Kind	2005 Number of quarries	2005 Quantity (thousand metric tons)	2005 Value (thousands)	2006 Number of quarries	2006 Quantity (thousand metric tons)	2006 Value (thousands)
Limestone[2]	113 r	65,100 r	$472,000 r	113	63,800	$505,000
Dolomite	1	W	W	1	W	W
Granite	1	W	W	1	W	W
Sandstone	4 r	559	4,910	4	771	6,200
Total	XX	66,500 r	483,000 r	XX	65,300	517,000

rRevised. 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.
[2]Includes limestone-dolomite reported with no distinction between the two.

TABLE 3
TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE[1]

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	403	2,710
Filter stone	96	646
Other coarse aggregate	1,580	12,900
Total	2,080	16,300
Coarse aggregate, graded:		
Concrete aggregate, coarse	446	2,610
Bituminous aggregate, coarse	W	W
Bituminous surface-treatment aggregate	W	W
Railroad ballast	W	W
Other graded coarse aggregate	16,300	140,000
Total	18,700	157,000
Fine aggregate (-⅜ inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	W	W
Other fine aggregate	4,710	42,500
Total	4,890	43,800
Coarse and fine aggregates:		
Graded road base or subbase	805	4,260
Unpaved road surfacing	W	W
Crusher run or fill or waste	642	2,890
Roofing granules	W	W
Other coarse and fine aggregates	15,800	109,000
Total	17,300	117,000
Other construction materials	265	1,780
Agricultural:		
Limestone	(2)	(2)
Poultry grit and mineral food	(2)	(2)
Chemical and metallurgical:		
Cement manufacture	(2)	(2)
Lime manufacture	(2)	(2)
Flux stone	(2)	(2)
Special:		
Mine dusting or acid water treatment	(2)	(2)
Asphalt fillers or extenders	(2)	(2)
Other fillers of extenders	(2)	(2)
Unspecified:[3]		
Reported	13,100	105,000
Estimated	6,300	47,000
Total	19,500	152,000
Grand total	65,300	517,000

W Withheld to avoid disclosing company proprietary data; included in "Total."
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Withheld to avoid disclosing company proprietary data; included in "Grand total."
[3]Reported and estimated production without a breakdown by end use.

TABLE 4
TENNESSEE: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2006, BY USE AND DISTRICT[1]

(Thousand metric tons and thousand dollars)

Use	District 1		District 2		District 3	
	Quantity	Value	Quantity	Value	Quantity	Value
Construction:						
Coarse aggregate (+1½ inch)[2]	W	W	W	W	W	W
Coarse aggregate, graded[3]	W	W	W	W	W	W
Fine aggregate (-⅜ inch)[4]	W	W	W	W	W	W
Coarse and fine aggregate[5]	W	W	W	W	W	W
Other construction materials	--	--	265	1,780	--	--
Agricultural[6]	W	W	152	1,380	W	W
Chemical and metallurgical[7]	--	--	W	W	W	W
Special[8]	--	--	W	W	W	W
Unspecified:[9]						
Reported	723	5,810	7,290	58,500	5,140	40,800
Estimated	--	--	4,200	34,000	2,100	13,000
Total	4,330	40,000	33,800	251,000	27,200	226,000

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 filter stone, riprap and jetty stone, and other coarse aggregates.
[3]Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregates.
[4]Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregates.
[5]Includes crusher run or fill or waste, graded road base or subbase, roofing granules, unpaved road surfacing, and other coarse and fine aggregates.
[6]Includes agricultural limestone and poultry grit and mineral food.
[7]Includes cement and lime manufacture and flux stone.
[8]Includes mine dusting or acid water treatment, asphalt fillers or extenders, and other fillers or extenders.
[9]Reported and estimated production without a breakdown by end use.

TABLE 5
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
BY MAJOR USE CATEGORY[1]

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products[2]	2,690	$19,700	$7.30
Asphaltic concrete aggregates and other bituminous mixtures	246	1,360	5.52
Road base and coverings	219	843	3.85
Fill	98	691	7.05
Unspecified:[3]			
Reported	2,120	14,700	6.95
Estimated	3,130	20,700	6.61
Total or average	8,500	57,900	6.82

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes plaster and gunite sands.
[3]Reported and estimated production without a breakdown by end use.

TABLE 6
TENNESSEE: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2006,
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]	1,090	$7,200	W	W	W	W
Asphaltic concrete aggregates and road base materials	312	1,210	W	W	W	W
Fill	92	658	6	32	--	--
Unspecified:[3]						
Reported	1,920	13,600	196	1,110		
Estimated	1,790	11,800	686	4,540	653	4,320
Total or average	5,200	34,500	2,040	13,800	1,260	9,620

W Withheld to avoid disclosing company proprietary data; included in "Total or average." -- 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]Reported and estimated production without a breakdown by end use.