



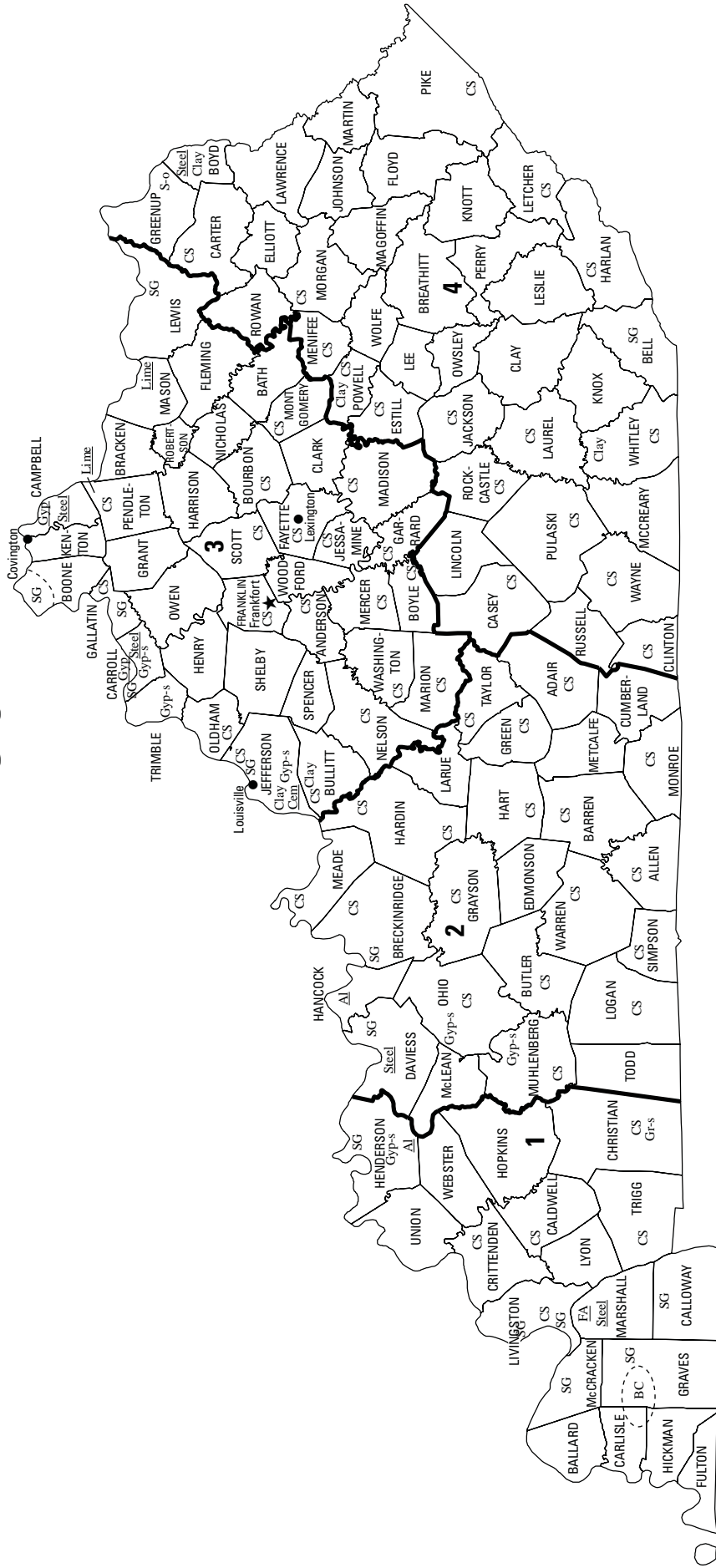
# 2007 Minerals Yearbook

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KENTUCKY [ADVANCE RELEASE]

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# KENTUCKY



**LEGEND**

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

**MINERAL SYMBOLS  
(Major producing areas)**

- Al Aluminum plant
- BC Ball clay
- Cem Cement plant and quarry
- Clay Common clay
- CS Crushed stone
- FA Ferroalloys plant
- Gr-s Synthetic graphite plant

- Gyp Gypsum plant
- Gyp-s Synthetic gypsum
- Lime Lime plant and quarry
- S-o Sulfur (oil)
- SG Construction sand and gravel
- Steel Steel plant
- Concentration of mineral operations



Albers equal area projection

# THE MINERAL INDUSTRY OF KENTUCKY

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

In 2007, Kentucky's nonfuel raw mineral production<sup>1</sup> was valued at \$786 million, based upon annual U.S. Geological Survey (USGS) data. This was a 3.4% decrease from the State's total nonfuel mineral production value of \$814 million in 2006, and followed a \$32 million, or 4.1%, increase in the State's value from 2005 to 2006. Kentucky was 27th (26th in 2006) in rank among the 50 States in total nonfuel mineral production value, accounting for more than 1% of the U.S. total. Yet, per capita, the State ranked 20th in the Nation in its minerals industry's value of nonfuel mineral production; with a population of nearly 4.25 million, the value of production was about \$185 per capita.

Crushed stone continued to be Kentucky's leading nonfuel mineral commodity in 2007 and accounted for 54% of the State's nonfuel raw mineral production value. Lime was second, followed by cement (portland and masonry) and construction sand and gravel. These four mineral commodities accounted for about 99% of the State's total nonfuel mineral production value. In 2007, Kentucky's decrease in total nonfuel mineral production value was the result of decreases in the majority of the State's mineral commodities, the largest decrease being that of crushed stone, down by \$16 million, followed (descending order of change) by lime (withheld—company proprietary data), construction sand and gravel, down by about \$6 million, and ball clay (also withheld) (table 1). The only mineral commodity to increase in value was cement (portland and masonry combined); with a small increase in production the value of cement rose by more than \$4 million.

In 2007, Kentucky continued to rank 3d in the quantities of lime produced, 4th in the production of ball clay, and the State produced significant quantities of crushed stone (12th in rank), portland cement, and common clays (descending order of value). Additionally, primary aluminum and raw steel were produced from materials obtained from other domestic and foreign sources. Kentucky remained the Nation's leading producer of primary aluminum.

The following narrative information was provided by the Kentucky Geological Survey<sup>2</sup> (KGS).

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<sup>1</sup>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 2007 USGS mineral production data published in this chapter are those available as of June 2009. 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>.

<sup>2</sup>Warren H. Anderson, Geologist and Principal Investigator with the Kentucky Geological Survey, submitted the text of the State mineral industry information provided by that State agency.

## Overview

Although crushed stone production decreased by 8% to 55.5 million metric tons (Mt) from that of 2006, only a 4% decrease took place in the production value owing to the rising costs of the raw products (table 1). Kentucky continued to be the leading State in underground limestone production in 2007.

Construction sand and gravel production volume was 9 Mt with a value of production of about \$48 million, representing a 10% decrease in volume and an 11% decrease in value from those of 2006. Common clays production showed about a 40% decrease, down to nearly 600,000 metric tons (t) in 2007 from its 2006 production of 1 Mt; the commodity's value decreased by 28% from that of 2006 to about \$3.7 million (table 1). The production of ball clays similarly decreased.

Production data for ball clays, cement, and lime were proprietary, but the combined production value for these commodities decreased by 1.5% in 2007 from that of 2006. Synthetic graphite continued to be produced in several Kentucky counties. Gemstone production remained at about the level of 2006, lower than it has been in recent years, partly thought to be the result of a lack of reporting by producing companies.

## Exploration

In 2007, Hastie Fluorspar Mining and Moodie Minerals Inc. continued work in the Western Kentucky Fluorspar District and began the permitting process on its previous fluorite operations where the companies had conducted core drilling operations along the Klondike Mine area in Livingston County. Cores containing a high percentage of fluorspar have been recovered along the fault system, and the companies planned to continue the process of obtaining the regulatory approval necessary to open a mine in the next few years (Greb and Anderson, 2007).

The KGS received many inquiries about the mineral potential of the State from mining companies, consultants, and landowners regarding geologic features associated with alkali intrusives, base metal mineralization, other mineral concentrations, and potential development of limestone resources.

## Commodity Review

### Metals

**Aluminum.**—Logan Aluminum Inc., the State's leading aluminum employer, with 1,030 employees, was the manufacturer of rolled sheet for use in beverage cans. The company began construction on a \$30 million recycling center at its facility in Russellville, KY, that will allow the company to reduce its energy consumption and air emissions there where it

receives and melts scrap aluminum, such as used beverage cans and painted siding. The furnace technology to be used in the new plant has been used extensively in Europe, but this will be the first time the technology has been introduced in the United States. The furnace was designed to provide high metal yields with lower energy demands, resulting in significantly reduced air emissions (Lane Report, The, 2008, p. 1–2).

### *Industrial Minerals*

**Clay and Shale.**—Panariagroup Industrie Ceramiche SPA, a publicly traded Italian corporation that purchased Florida Tile Industries in 2006, was in the process of consolidating its Shannon, GA, operation into its Florida Tile, Inc. tile manufacturing plant in Lawrenceburg, KY (Panariagroup Industrie Ceramica S.P.A., 2006). Florida Tile invested \$15 million in upgrades to better meet the needs of its customer base, with an overall investment of \$20 million in the plant. The new phase of the project was expected to bring about 67 new jobs to Anderson County while increasing the demand for the State's natural supplies of ball clay and common clays (Florida Tile, Inc., 2006).

General Shale Brick, Inc. closed its Corbin, KY, plant, which affected 47 employees, citing economic conditions and the decline in home sales. A fabrication plant remained operational and a reopening of the brick plant was planned pending the improvement of market conditions. Also, the company planned to maintain a presence in the community by means of continuing the company's shipping of materials through the Corbin location. General Shale Brick, based in Johnson City, TN, was one of the leading exterior building materials manufacturers in the Nation (Lane Report, The, 2007a, p. 1).

Superior Graphite, Hopkinsville, KY, producer of graphite and carbon products, planned a \$6.5 million expansion of its Hopkinsville plant to increase production of silicon carbide powder and ceramic body armor. The ceramic armor tiles are 70% lighter than steel plates. Superior expected employment at the company to increase from the current approximately 70 employees to about 85 employees in connection with the expansion (Lane Report, The, 2007b, p. 2).

**Lime.**—Alpha Natural Resources Inc. (through its majority-owned subsidiary Gallatin Materials, LLC) continued construction of the new lime plant located at the Sterling Materials Mine, in Verona, KY. Major construction included installation of the first of two planned rotary kilns each designed to produce about 250,000 metric tons per year. The lime plant was expected to start up in early 2008 and produce high-calcium quicklime for industrial uses (Alpha Natural Resources, Inc., 2007). Other lime plants in the State are the Carmeuse Lime Plant in Maysville and the Carmeuse Plant at Black River, Pendleton County.

**Stone, Crushed.**—Acquisition activity increased and remained steady in 2007. Titan American LLC acquired the Cumberland Quarry from Cumberland River Resources LLC and Jim Smith Contracting LLC. The Quarry, located along the Cumberland River in western Kentucky, produces limestone aggregates and contains more than 900 Mt of reserves. Titan American is a producer of heavy building materials such as

aggregates, cement, concrete, and fly ash (Lane Report, The, 2007c, p. 3).

### **Government Programs and Activities**

The KGS (based out of the University of Kentucky in Lexington) updated its Minerals Web site to include a substantial increase in information about historical mining in Kentucky (Kentucky Geological Survey, 2008). The KGS also completed a 2-year geochemical sampling program sponsored by the USGS through its National Geochemical Survey (NGS). The USGS, in collaboration with other Federal and State government agencies, industry, and academia, is partnering with the NGS to produce a body of geochemical data for the United States based primarily on stream sediments, analyzed using a consistent set of methods (U.S. Geological Survey, 2007). Analyses of these data are documented at the Web site and may provide valuable geochemical exploration information for companies exploring for metals and nonmetals in Kentucky and in many other States.

During 2007, the KGS continued the development of a digital database and Web site of geologic information for digital 1:100,000-scale geologic maps for the State. A new series of derivative maps called Land Use maps were nearing completion to allow users to access a variety of Web-based information about Kentucky's environment, infrastructure, landscape, and resources, such as showing the areas of potential limestone resources in the State. The KGS continued to release these maps via the KGS GeoPortal, an Internet map server. This Web site allows a user to download various types of geologic maps and data to create custom maps (Kentucky Geological Survey, 2007).

The University of Kentucky continued State-funded research efforts into carbon sequestration issues and powerplants and their impact on nearby underground limestone mining operations. The Kentucky Consortium for Carbon Sequestration was formed to evaluate the potential for drilling a well in western Kentucky to test the sequestration potential in deeper rocks. Preparation also was underway to drill a test well at the Duke Energy powerplant in Boone County. Limited amounts of carbon dioxide were to be injected into this well in an effort to monitor the behavior and migration of the fluid. Monitoring wells will observe the subsurface fluid's behavior; usually these fluids are injected in the deep subsurface so as not to be a threat to the operation of subsurface mining operations in the State.

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

(Thousand metric tons and thousand dollars)

Mineral	2005		2006		2007	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	1,060	4,370	1,000	5,140	598	3,720
Gemstones, natural	NA	78	NA	48	NA	48
Sand and gravel, construction	10,500	55,000	10,100	54,400	9,070	48,300
Stone, crushed	61,600	446,000	60,100 <sup>r</sup>	443,000 <sup>r</sup>	55,500	427,000
Combined values of cement, clays (ball), lime	XX	277,000	XX	311,000	XX	307,000
Total	XX	782,000	XX	814,000 <sup>r</sup>	XX	786,000

<sup>r</sup>Revised. NA Not available. 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 three significant digits; may not add to totals shown.

TABLE 2  
KENTUCKY: CRUSHED STONE SOLD OR USED, BY TYPE<sup>1</sup>

Type	2006			2007		
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Number of quarries	Quantity (thousand metric tons)	Value (thousands)
Limestone <sup>2</sup>	95 <sup>r</sup>	60,100 <sup>r</sup>	\$443,000 <sup>r</sup>	92	55,500	\$427,000

<sup>r</sup>Revised.

<sup>1</sup>Data are rounded to no more than three significant digits.

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

TABLE 3  
 KENTUCKY: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2007, BY USE<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	Quantity	Value
Construction:		
Coarse aggregate (+1½ inch):		
Riprap and jetty stone	803	753
Filter stone	208	1,360
Other coarse aggregate	1,260	11,100
Coarse aggregate, graded:		
Concrete aggregate, coarse	1,380	12,000
Bituminous aggregate, coarse	737	6,120
Bituminous surface-treatment aggregate	W	W
Railroad ballast	W	W
Other graded coarse aggregate	3,730	31,300
Fine aggregate (<math>\leq 3/8</math> inch):		
Stone sand, concrete	W	W
Stone sand, bituminous mix or seal	W	W
Screening, undesignated	1,070	4,760
Other fine aggregate	1,690	12,400
Coarse and fine aggregates:		
Graded road base or subbase	4,770	26,700
Unpaved road surfacing	326	2,590
Terrazzo and exposed aggregate	W	W
Crusher run or fill or waste	W	W
Other coarse and fine aggregates	5,430	45,700
Other construction materials	35	88
Agriculture:		
Limestone	W	W
Other agriculture uses	W	W
Chemical and metallurgical:		
Cement manufacture	W	W
Lime manufacture	W	W
Unspecified: <sup>2</sup>		
Reported	17,900	145,000
Estimated	10,000	79,000
Total	55,500	427,000

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

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

<sup>2</sup>Reported and estimated production without a breakdown by end use.

TABLE 4  
 KENTUCKY: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2007, BY USE AND DISTRICT<sup>1</sup>

(Thousand metric tons and thousand dollars)

Use	Districts 1 and 2 <sup>2</sup>		Districts 3 and 4 <sup>2</sup>	
	Quantity	Value	Quantity	Value
Construction:				
Coarse aggregate (+1½ inch) <sup>3</sup>	877	8,290	668	4,880
Coarse aggregate, graded <sup>4</sup>	2,770	20,900	3,840	34,400
Fine aggregate (¾ inch) <sup>5</sup>	1,170	7,710	2,060	1,310
Coarse and fine aggregate <sup>6</sup>	1,900	12,800	8,850	63,800
Other construction materials	--	--	35	88
Agricultural <sup>7</sup>	W	W	W	W
Chemical and metallurgical <sup>8</sup>	W	W	W	W
Unspecified: <sup>9</sup>				
Reported	7,430	60,600	10,500	84,300
Estimated	3,600	27,000	6,800	52,000
Total	19,800	153,000	35,600	274,000

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>Districts 1 and 2 and 3 and 4 are combined to avoid disclosing company proprietary data.

<sup>3</sup>Includes filter stone, riprap and jetty stone, and other coarse aggregate.

<sup>4</sup>Includes bituminous aggregate (coarse), bituminous surface-treatment aggregate, concrete aggregate (coarse), railroad ballast, and other graded coarse aggregate.

<sup>5</sup>Includes screening (undesignated), stone sand (bituminous mix or seal), stone sand (concrete), and other fine aggregate.

<sup>6</sup>Includes crusher run or fill or waste, graded road base or subbase, unpaved road surfacing, terrazzo and exposed aggregate, and other coarse and fine aggregates.

<sup>7</sup>Includes agricultural limestone and other agricultural uses.

<sup>8</sup>Includes cement and lime manufacture.

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

TABLE 5  
 KENTUCKY: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2007,  
 BY MAJOR USE CATEGORY<sup>1</sup>

Use	Quantity	Value (thousands)	Unit value
	(thousand metric tons)		
Concrete aggregate and concrete products	6,710	\$35,700	\$5.32
Asphaltic concrete aggregates and other bituminous mixtures	303	1,500	4.93
Fill	321	1,330	4.16
Other miscellaneous uses	22	174	7.97
Unspecified: <sup>2</sup>			
Reported	377	2,540	6.72
Estimated	1,330	7,060	5.29
Total or average	9,070	48,300	5.33

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

<sup>2</sup>Reported and estimated production without a breakdown by end use.

TABLE 6  
 KENTUCKY: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 2007, 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
Concrete aggregate (including concrete sand)	W	W	W	W	W	W
Asphaltic concrete aggregates and other bituminous mixtures	W	W	W	W	W	W
Fill	--	--	1	4	320	1,330
Other miscellaneous uses	1,250	5,060	32	169	5,760	32,100
Unspecified: <sup>2</sup>						
Reported	--	--	--	--	377	2,540
Estimated	860	4,550	172	911	159	842
Total	2,110	9,610	205	1,080	6,610	36,900
	District 4					
	Quantity	Value				
Concrete aggregate (including concrete sand)	--	--				
Asphaltic concrete aggregates and other bituminous mixtures	--	--				
Fill	--	--				
Other miscellaneous uses	--	--				
Unspecified: <sup>2</sup>						
Reported	--	--				
Estimated	142	752				
Total	142	752				

W Withheld to avoid disclosing company proprietary data; included in "Other miscellaneous uses." -- Zero.

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

<sup>2</sup>Reported and estimated production without a breakdown by end use.