



Donald C. Haney, State Geologist and Director  
Kentucky Geological Survey  
University of Kentucky, Lexington

# Industrial & Metallic Minerals

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**Definitions:** Mineral resources fall into four broad categories: fuels, metals, gemstones, and industrial minerals. Coal, oil, and natural gas are mineral fuels. Metals include gold, silver, iron, copper, lead, and zinc. Rubies and diamonds are examples of gemstones. All other minerals and rocks of economic significance, from river gravel to sheet mica, are classified as industrial minerals.

Industrial and metallic minerals, because of their physical and chemical properties, provide materials that are essential for modern society. They furnish raw materials for construction and agriculture, and for the ceramic, chemical, metallurgical, manufacturing, and energy-related industries.

**In Kentucky:** Industrial minerals are an important part of Kentucky's economy (Table 1). Limestone, dolomite, sand, gravel, clay, and shale currently are produced at numerous sites in the State. Metallic minerals are not being mined in Kentucky at the present time, but they have been in the past.

Limestone and dolomite, both carbonate rocks, are at the surface in 25 percent of Kentucky, mainly in central and western parts of the State (Fig. 1). With many deposits meeting specifications for hardness and soundness, they are the State's principal source of crushed stone for construction. Chemically pure limestone, composed of more than 95 percent  $\text{CaCO}_3$ , is being used in reactive processes, such as capturing  $\text{SO}_2$  emissions from coal-burning power plants (Table 2).

Sand and gravel also are a source of construction material. Principal deposits occur along the Ohio River Valley and in the Jackson Purchase Region of far western Kentucky. Meltwater from retreating glaciers carried large quantities of sand and gravel into the Ohio Valley. High-silica sand from sites in eastern and western Kentucky has been used in the past for the manufacture of glass.

Clay and shale are being produced from deposits in the western and eastern coal fields, Jackson Purchase, Knobs, and Blue Grass regions, and the Ohio River Valley. Current products and uses are outlined in Table 2. Of historic importance is the formerly large fire-brick industry that developed around refractory clay deposits of northeastern Kentucky.

**Production Sites:** Industrial minerals currently are being produced in all regions of Kentucky by more than 130 quarries, pits, underground mines, and dredges. Most operate at the surface of the land, but Kentucky also has 20 underground mines producing crushed

stone, more than any other state in the Nation. The deepest mine recovers stone from a depth of 950 feet below the land surface.

The Reed Quarry in western Kentucky is the largest producer of crushed stone in the United States. It produces more than 10 million short tons each year. The quarry ships 80 percent of its stone by barge, 10 percent by rail, and 10 percent by truck. Chief markets are in the lower Mississippi Valley, principally in Louisiana and Mississippi, states with few local sources of construction stone.

**Vein Minerals:** Fluorspar, barite, and calcite, which are industrial minerals, have been mined from vein deposits, commonly occurring along faults, in the Western Kentucky Fluorspar District and Central Kentucky Mineral District. For a number of years, Kentucky was the Nation's second largest producer of fluorspar.

The metallic minerals sphalerite and galena (ores of zinc and lead) also have been mined in the two mineral districts. Small quantities of cadmium, germanium, and silver were recovered as by-products during the processing of ores. All mining operations in the western fluorspar district and central mineral district are closed at the present time. Factors contributing to the mine closings include competition from the import of less expensive foreign ores and costs associated with mining Kentucky's relatively small deposits.

**Iron Ores:** From the late 18th century into the early 20th century, iron ores were mined extensively and smelted in local furnaces at sites across Kentucky. The ores were sufficient to support the State's early iron industry, but they are now mainly of historic, rather than commercial, interest.

**The Role of the Kentucky Geological Survey:** The Kentucky Geological Survey investigates the chemical composition, physical properties, geographic distribution, and geologic setting of industrial and metallic minerals in the State to provide information on potential resources for industry. KGS geologists currently are completing work on a statewide map of industrial and metallic mineral deposits, and a directory of mineral producers.

"Rocks and Minerals of Kentucky," by Warren H. Anderson, published in 1994 by KGS, provides information about more than 100 different rocks and minerals, and over 50 full-color photographs of selected mineral specimens. This publication is an ideal reference for students, scientists, mineralogists, and amateur rock collectors.

## For More Information Contact:

Dr. Donald R. Chesnut, Jr., Head, Coal and Minerals Section, Kentucky Geological Survey  
228 Mining and Mineral Resources Bldg., University of Kentucky, Lexington, KY 40506-0107

Telephone: (606) 257-5500 Fax: (606) 257-1147 E-mail: [chesnut@kgs.mm.uky.edu](mailto:chesnut@kgs.mm.uky.edu)

Electronic version also available on the KGS World Wide Web home page at <http://www.uky.edu/KGS/home.htm>





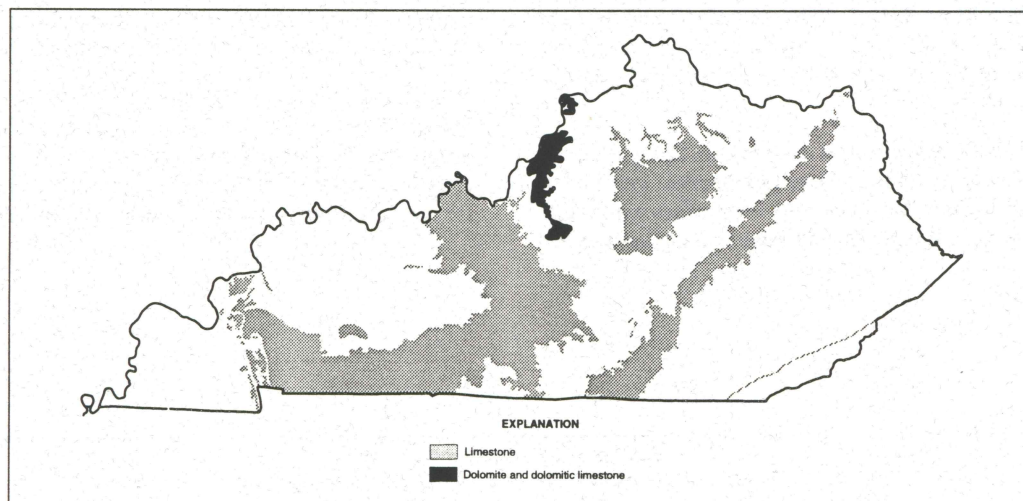
**Table 1.** Industrial mineral production in Kentucky, 1994.

<i>Industrial Minerals</i>	<i>Quantity (thousand short tons)</i>	<i>Value (thousand dollars)</i>
Limestone and dolomite	61,930	\$259,000
Sand and gravel	10,054	\$32,200
Clay and shale	902	\$3,460
Combined value of ball clay, cement, gemstones, and lime		\$134,000
Total		\$428,660

Source: U.S. Bureau of Mines, 1995, Statistical summary, annual review-1994: U.S. Bureau of Mines, Mineral Industry Surveys, 35 p.

**Table 2.** Products and uses of Kentucky's industrial minerals.

<i>Industrial Minerals</i>	<i>Products and Uses</i>
Limestone and dolomite	Road construction and maintenance
	Residential, commercial, and government construction
	Lime, cement
	Riprap, jetty stone
	Concrete products
	Agricultural limestone
	Sewage plant filter beds
	Sulfur dioxide (SO <sub>2</sub> ) removal
	Railroad ballast
Sand and gravel	Mine dust, acid neutralization, poultry grit, mineral food
	Road construction and maintenance
	Residential, commercial, and government construction
Clay and shale	Concrete products
	Brick, tile
	Sanitary ware
	Lightweight aggregate
	Cement
	Pottery
	Fillers, extenders

**Figure 1.** Principal outcrop of limestone and dolomite resources in Kentucky.