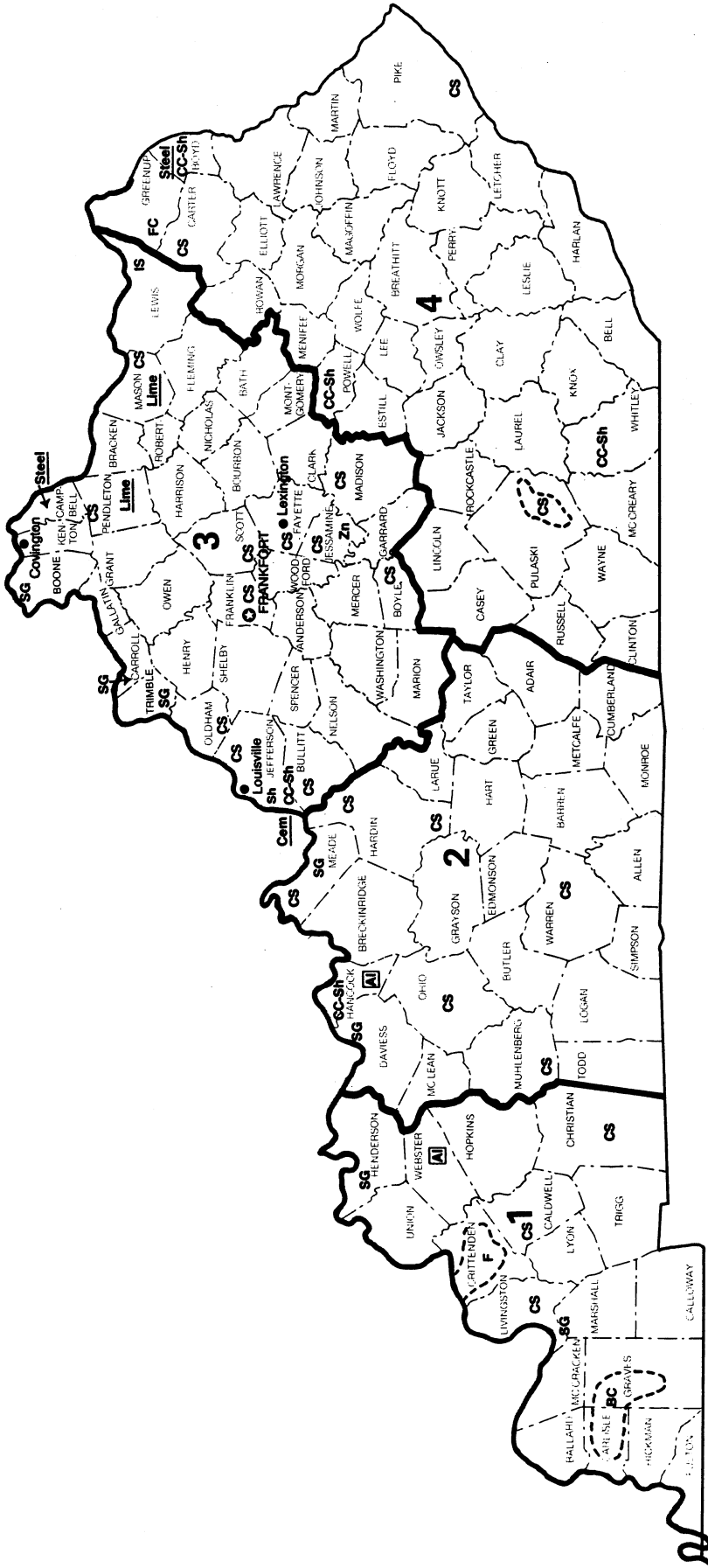


# KENTUCKY



**LEGEND**

	State boundary		Industrial Sand
	County boundary		Lime plant
	Capital		Sand and Gravel
	City		Iron and Steel plant
	Waterway		Zinc
	Crushed stone/sand & gravel districts		Concentration of mineral operations

**MINERAL SYMBOLS**

	Aluminum plant
	Ball Clay
	Common Clay & Shale
	Cement plant
	Crushed Stone
	Fluorspar
	Fire Clay

Principal Mineral-Producing Localities

# THE MINERAL INDUSTRY OF KENTUCKY

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

By L. J. Prosser, Jr.,<sup>1</sup> and Garland R. Dever, Jr.<sup>2</sup>

The value of nonfuel mineral production in Kentucky in 1990 of \$359 million was the highest reported in State history. Substantial increases in output and value were reported for clays, lime, and construction sand and gravel. Nationally, Kentucky ranked 30th in the value of nonfuel mineral production.

The State was a major producer of aluminum and coal, ranking second in output in the United States in both of those commodities.

## TRENDS AND DEVELOPMENTS

Traditionally, Kentucky's mining industry has been dominated by coal. The State has produced in excess of 160 million short tons of coal each year since 1984. In 1990, about 179 million tons was reported by the Kentucky

Department of Mines and Minerals. The State has accounted for about 20% of U.S. production annually since 1966.

Future coal production in Kentucky was expected to be affected by enactment of amendments to the Federal Clean Air Act late in 1990. The amendments would require reduced sulfur dioxide emissions from coal-burning plants and were expected to result in increased competition between Kentucky coal and the low-sulfur coal mined in the Western United States, particularly in Wyoming. The installation of scrubbing systems for flue gas desulfurization at coal-fired plants, however, would permit the continued burning of higher sulfur coals and would increase the demand for lime and limestone used as reagents in sulfur dioxide removal.

During the past 5 years, the State's industrial mineral producers and metal

manufacturers increased production and expanded operations. In 1990, Kentucky was among the leading States in production of a number of mineral commodities, ranking 1st in ball clay, 2d in aluminum, 4th in lime, 6th in ferroalloys, and 10th in crushed stone.

## LEGISLATION AND GOVERNMENT PROGRAMS

In 1990, the Kentucky Revenue Cabinet began sending assessment notices for ad valorem taxation of unmined coal reserves in Kentucky. The Cabinet started its assessment program in 1989, after the Kentucky Supreme Court ruled in March 1988 that the State must tax unmined coal at the same rate as other real estate. That decision raised the State rate from one-tenth of 1 cent for every \$100 of assessed value to about 21 cents

TABLE 1  
NONFUEL MINERAL PRODUCTION IN KENTUCKY<sup>1</sup>

Mineral	1988		1989		1990	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Clays <sup>2</sup> metric tons	762,324	\$3,217	716,990	\$3,357	826,205	\$8,282
Gemstones	NA	3	NA	W	NA	W
Sand and gravel (construction) thousand short tons	6,325	15,243	*5,500	*15,100	8,802	29,581
Stone (crushed) do.	*50,700	*207,900	*48,178	*187,849	*350,100	*182,900
Combined value of cement, clays (ball clay, fire clay, 1988-89), lead (1990), lime, sand and gravel (industrial, 1988-89), silver (1990), stone (crushed dolomite, 1989-90), zinc (1988, 1990), and values indicated by symbol W	XX	118,616	XX	124,353	XX	138,101
Total	XX	344,979	XX	330,659	XX	358,864

<sup>1</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" figure. XX Not applicable.

<sup>2</sup>Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

\*Excludes certain clays; kind and value included with "Combined value" figure.

<sup>3</sup>Excludes certain stones; kind and value included with "Combined value" figure.

for each \$100.<sup>3</sup> The Cabinet determined the following basic valuations: In eastern Kentucky, a base value of 18 cents per ton for unmined coal; 22 cents per ton if the coal is in a permitted tract; and 36 cents per ton if it is part of an active mining operation. In western Kentucky, a base value of 8 cents per ton; 10 cents per ton if permitted; and 16 cents per ton if part of an active mining operation. The assessments were expected to be adjusted as additional information was collected and analyzed by the Revenue Cabinet.

The Kentucky Geological Survey (KGS) completed a study on the use of dolomite lime, and limestone, and for sulfur dioxide emission control in flue gas desulfurization and fluidized-bed combustion systems.<sup>4</sup> During the year, the KGS published a report on low-sulfur coals in western Kentucky.<sup>5</sup>

An investigation of limestone deposits in southeastern Kentucky focused on low-silica stone suitable for use as rock dust in coal mines also was completed. Results of this KGS study were expected to be published in 1991.

In cooperation with the U.S. Geological Survey, the KGS continued work on a study of coal resources in eastern Kentucky available for mining after environmental and technological restrictions were considered. The U.S. Bureau of Mines joined the study to provide mining and cost modeling expertise in an effort to determine the amount of recoverable coal and its cost to mine, process, and reclaim.

The U.S. Bureau of Mines also conducted health and safety coal mine research projects in Kentucky. A field study of three longwall pillar systems to evaluate the effectiveness of pillar design for gate road stability was published.<sup>6</sup> The geology of hillseams as it relates to roof instability in drift mines in eastern Kentucky was also investigated by the Bureau. Examples of hillseams were described in both outcrops and coal mine roof to establish their geologic character and contribution to roof failure.<sup>7</sup>

The Energy Information Administration published a State Coal Profile for Kentucky.<sup>8</sup> According to this report,

more than 1,200 coal mines were operating in Kentucky (1988), the largest number in any State.

## REVIEW BY NONFUEL MINERAL COMMODITIES

### Industrial Minerals

**Lime.**—Dravo Lime Co. was the Nation's leading producer of lime. The firm operated underground limestone mines at Maysville and Carntown. Late in the year, Dravo was negotiating a contract to supply utility grade lime to Cincinnati Gas & Electric Co. Through the contract agreement, Dravo was expected to provide 200,000 short tons of lime for 10 years. The lime was expected to be manufactured at the Black River plant in Carntown.

**Sand and Gravel (Construction).**—Construction sand and gravel production is surveyed by the U.S. Bureau of Mines for even-numbered years only; data for odd-numbered years are based on annual company estimates. This chapter contains actual data for 1988 and 1990 and estimates for 1989.

Kentucky sand and gravel statistics are compiled by geographical districts as depicted in the State map. Table 3 presents end-use statistics for Kentucky's four districts.

Output of construction sand and gravel of 8.8 million short tons was the highest in Kentucky since 1979, when 11.7 million tons was produced. In 1990, production increased by about 3.3 million tons compared with the 1989 total. Most of the gain was reported from western Kentucky (district 1). Statewide, 20 sand and gravel pits were operated in 1990; 23 operated in 1988. District 3 led the State in output, accounting for about 60% of the State total.

**Stone (Crushed).**—Stone production is surveyed by the U.S. Bureau of Mines for odd-numbered years only; data for even-numbered years are based on annual company estimates. This chapter contains

estimates for 1988 and 1990 and actual data for 1989.

Crushed stone was the leading industrial mineral produced in Kentucky, accounting for slightly more than one-half of the State's total value of nonfuel mineral output. The estimated production of 50.1 million short tons of crushed stone in 1990 was the second highest output recorded in State history. The alltime high total of 50.7 million tons was reported in 1988.

In 1990, a number of independent family-owned stone operations were sold to major corporations. The sale of Reed Crushed Stone Co. to Vulcan Materials Co. was completed. With that purchase, Vulcan Materials, the Nation's leading producer of mineral aggregates, became the owner of the top-producing quarry in the country. Rogers Group Inc., one of the Nation's top 10 crushed stone-producing companies, purchased two quarries in Jefferson County. Rogers Group had operated four quarries in Kentucky and was the State's fifth leading producer of stone before purchasing the quarries from Billy Holloway Aggregates Co.

Also during the year, Kentucky's seventh leading crushed stone producer, Lexington Quarry Co., was purchased by a partnership of Allen Co. Inc. and Sterling Enterprises Inc. Lexington Quarry produced limestone at an underground mine in Jessamine County. Nally & Haydon Inc. bought Ward & Montgomery Co.'s quarry near Lebanon, Marion County.

According to the Kentucky Geological Survey, wet-scrubbing systems already installed by utilities in Kentucky require about 800,000 short tons per year of limestone and an estimated 425,000 tons per year of lime (see Legislation and Government Programs).

### Metals

Small quantities of fluorspar and zinc were recovered from an open pit operation in Crittenden County of the western Kentucky fluorspar district.

**Aluminum.**—Southwire Co. bought out its partner, National Aluminum Corp., and became the sole owner of the Hawesville smelter in Hancock County. Southwire agreed to pay \$17.4 million cash, \$60 million over 10 years based on aluminum prices, and to assume \$22.6 million in debt on the 172,000-ton-per-year primary aluminum smelter.<sup>9</sup>

Alcan Aluminum Corp. produced primary aluminum at a 163,000-ton-capacity smelter in Sebree, Webster County. In 1990, combined output at the Hawesville and Sebree smelters ranked Kentucky second nationally in production. Also during the year, the two aluminum producers reached an agreement on power rates with Big Rivers Electric Corp.

**Iron and Steel.**—Armco Advanced Materials Co., a division of Armco Inc. and Acerinox S.A. of Madrid, Spain, began construction of a 150,000-short-ton-per-year stainless steel rolling mill in Carrollton. The company, called North American Stainless, was a 50-50 joint venture of the two companies. Previously, most U.S. steel industry partnerships have been with firms from Japan. Last year, Armco entered a joint venture with Kawasaki Steel Corp. of Japan. Construction of the \$222 million facility, which includes a 60-inch-wide sheet mill, was expected to be completed in 1992. Available river and rail transportation, proximity to the interstate highway system, and State funding for building a barge dock contributed to the decision to select Carrollton as the site.

In 1990, Armco completed construction and began operating a \$60 million continuous slab caster at its Ashland plant. The caster has about a 1.5-million-short-ton-per-year capacity. Armco also announced plans to install new air pollution control equipment at the Ashland plant in a \$51.7 million project expected to be completed in 1992.

In September, NS Group Inc. began operation of a new continuous slab caster at its Newport Steel Corp. plant. The project, which also included a reheat furnace, cost \$45 million and had begun in early 1988.

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<sup>2</sup>Geologist, Coal and Minerals Section, Kentucky Geological Survey, Lexington, KY.

<sup>3</sup>Lexington Herald-Leader. Officials Send Out Appraisals of Unmined Coal. Mar. 28, 1990, p. 1.

<sup>4</sup>Denver, G. R., Jr. Use of Limestone, Lime, and Dolomite for SO<sub>2</sub> Emission Control in Kentucky. KY Geol. Surv. IC 31, Series XI, 1990 14 pp.

<sup>5</sup>William D. A., C. T. Helfrich, J. C. Hower, F. L. Fiene, A. E. Bland, and D. W. Koppelaar. Amos and Foster Coals: Low-Ash and Low-Sulfur Coals of Western Kentucky. KY Geol. Surv. RI 5, Series XI, 1990, 34 pp.

<sup>6</sup>Barton, T. M., and C. Mark. Field Evaluation of Three Longwall Pillar Systems in Kentucky Coal Mine. BuMines RI 9283, 1989, 13 pp.

<sup>7</sup>Moebis, N. N., and G. P. Sames. Hillseam Geology and Roof Instability Near Outcrop in Eastern Kentucky. BuMines RI 9267, 1989, 33 pp.

<sup>8</sup>Weekly Coal Production, State Coal Profile: Kentucky. DOA/EIA-0218 (90-31), July 28, 1990, pp. 3-5.

<sup>9</sup>The Courier-Journal (Louisville). Southwire Buys Out Its Partner in Hawesville Aluminum Plant. Mar. 28, 1990, p. 1.

**TABLE 2**  
**KENTUCKY: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1990, BY MAJOR USE CATEGORY**

Use	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregates (including concrete sand)	557	\$1,675	\$3.01
Plaster and gunite sands	W	W	3.07
Concrete products (blocks, bricks, pipe, decorative, etc.)	45	270	6.00
Asphaltic concrete aggregates and other bituminous mixtures	76	181	2.38
Road base and coverings	W	W	3.14
Fill	287	415	1.45
Other <sup>1</sup>	94	683	7.27
Unspecified: <sup>2</sup>			
Actual	7,010	24,207	3.45
Estimate	733	2,150	2.93
Total or average	8,802	29,581	3.36

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

<sup>1</sup>Includes filtration.

<sup>2</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

**TABLE 3**  
**KENTUCKY: SAND AND GRAVEL SOLD OR USED BY PRODUCERS IN 1990, BY DISTRICT AND USE**

(Thousand short tons and thousand dollars)

Use	District 1		District 2		District 3		District 4	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Concrete aggregates (including concrete sand)	W	W	150	450	W	W	36	170
Plaster and gunite sands	—	—	—	—	W	W	W	W
Concrete products (blocks, bricks, etc.)	—	—	—	—	—	—	45	270
Asphaltic concrete aggregates and road base and coverings <sup>1</sup>	W	W	57	123	280	345	29	139
Other miscellaneous <sup>2</sup>	141	422	—	—	272	711	51	594
Unspecified: <sup>3</sup>								
Actual	2,309	14,063	—	—	4,700	10,144	—	—
Estimated	219	717	277	838	234	585	3	9
Total <sup>4</sup>	2,669	15,202	485	1,411	5,486	11,785	162	1,184

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

<sup>1</sup>Includes fill.

<sup>2</sup>Includes filtration.

<sup>3</sup>Includes production reported without a breakdown by end use and estimates for nonrespondents.

<sup>4</sup>Data may not add to totals shown because of independent rounding.

TABLE 4  
PRINCIPAL PRODUCERS

Commodity and company	Address	Type of activity	County
<b>Aluminum (primary):</b>			
Alcan Aluminum Corp.	Sebree, KY 42555	Smelter	Webster.
Southwire Co.	Box M Hawesville, KY 42348	do.	Hancock.
<b>Cement:</b>			
Kosmos Cement Co. <sup>1,2</sup>	Dixie Highway Box 72319 Louisville, KY 40272	Plant	Jefferson.
<b>Clays:</b>			
<b>Ball clay:</b>			
Kentucky-Tennessee Clay Co.	Box 449 Mayfield, KY 42066	Mines and plant	Carlisle and Graves.
Old Hickory Clay Co.	Box 66 Hickory, KY 42051	do.	Graves.
<b>Common clay:</b>			
General Shale Products Corp.	Box 3547 CRS Johnson City, TN 37602	Mine and plant	Jefferson and Whitley.
Kentucky Solite Corp.	Box 27211 Richmond, VA 23261	do.	Bullitt.
Sipple Brick Inc.	Box 567 Stanton, KY 40380	do.	Boyd and Powell.
<b>Ferrous alloys:</b>			
SKW Alloys Inc.	Box 217 Calvert City, KY 42029	Plant	Marshall.
<b>Iron and steel (pig iron):</b>			
Armco Inc.	Middletown, OH 45202	do.	Boyd.
NS Group Inc.	9th & Lowell Sts. Newport, KY 41072	Plants	Boyd and Campbell.
<b>Lime:</b>			
Dravo Lime Co. <sup>2</sup>	One Gateway Center Pittsburgh, PA 15222	Mines and plants	Mason and Pendleton.
<b>Sand and gravel (construction):</b>			
Bellview Sand & Gravel Inc.	5725 Bellview Rd. Petersburg, KY 41080	Pit	Boone.
Boone County Sand & Gravel Co. Inc.	Box 476 Burlington, KY 41005	Pit	Do.
Ingram Materials Inc.	10 Fatherland St. Nashville, TN 37213	Dredges	Livingston.
Morrow Gravel Co.	11641 Mosteller Rd. Cincinnati, OH 45241	Pits and plant.	Boone.
Nugent Sand Co.	Box 6072 1833 River Rd. Louisville, KY 40206	Dredges	Jefferson and Trimble.
<b>Stone (crushed):</b>			
Beazer East Inc.	436 7th Ave. Pittsburgh, PA 15219	Underground mines, quarries, plants	Various.
Lafarge Corp.	Route 60 Olive Hill, KY 41164	Quarry	Carter.
Lexington Quarry Co.	Catnip Hill Nicholasville, KY 40356	do.	Jessamine.
Medusa Aggregates Co.	Suite 101, 880 Corporate Dr. Lexington, KY 40503	Quarries and plants	Nelson, Ohio, Pendleton, Warren.

See footnotes at end of table.

TABLE 4-Continued  
**PRINCIPAL PRODUCERS**

Commodity and company	Address	Type of activity	County
<b>Stone (crushed)—Continued</b>			
Nally & Gibson Georgetown Inc.	100 Farmers Bank Dr. Georgetown, KY 40324	Quarry	Scott.
Rogers Group Inc. <sup>3</sup>	Box 310 Shepherdsville, KY 40165	Quarries and plants	Bullitt, Christian, Jefferson, Oldham.
Vulcan Materials Co.	3001 Alcoa Highway, Box 7 Knoxville, TN 37901	Underground mines, quarries, plants	Fayette, Hardin, Livingston.
<b>Zinc:</b>			
Triple M Mining Corp.	Box 497 Salem, KY 42078	Mine	Crittenden.

<sup>1</sup>Also clays.

<sup>2</sup>Also stone.

<sup>3</sup>Also sand and gravel.

