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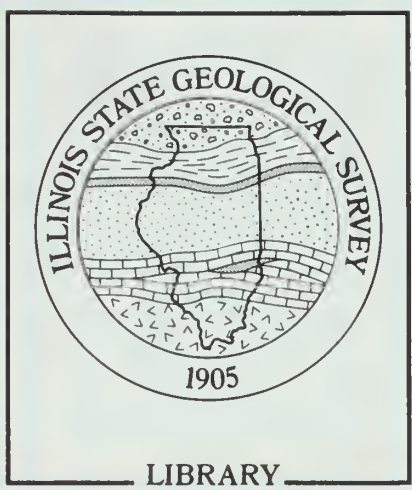
# ILLINOIS MINERAL INDUSTRY IN 1987

and Review of Preliminary Mineral Production Data for 1988

Irma E. Samson and Subhash B. Bhagwat

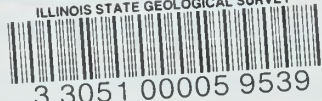
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Irma E. Samson and Subhash B. Bhagwat

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1989

Front cover: Inside the Monterey Coal Company No. 2 Mine near Albers.

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## CONTENTS

<b>EXECUTIVE SUMMARY</b>	1
<b>MINERALS EXTRACTED</b>	3
Fuels	
Coal	3
Crude Oil	7
Natural Gas	8
Industrial and Construction Materials	
Clays	9
Fluorspar	10
Sand and Gravel	11
Industrial Sand	11
Stone	12
Tripoli (Amorphous Silica)	14
Metals	
Zinc, Lead, Silver, and Copper	15
Other Minerals	
Peat	15
Gemstones	15
<b>MINERALS PROCESSED</b>	15
Ground Barite	15
Columbium and Tantalum	15
Calcined Gypsum	15
Crude Iodine	16
Iron-Oxide Pigments	16
Natural-Gas Liquids	16
Expanded Perlite	16
Pig Iron and Raw Steel	16
Slag (Iron and Steel)	17
Recovered Elemental Sulfur	17
Exfoliated Vermiculite	17
Primary and Secondary Slab Zinc	17
<b>PRODUCTS MANUFACTURED FROM MINERALS</b>	17
Cement	17
Clay Products	18
Coke	19
Glass	19
Lime	19
<b>PRELIMINARY PRODUCTION DATA: 1988</b>	20
Minerals Extracted	20
Fuels	20
Industrial and Construction Materials	20
Metals and Other Minerals	20
Minerals Processed	20
Products Manufactured from Minerals	21

## FIGURES

1	Illinois mineral production and mineral processing plants	1
2	Energy used in Illinois, 1957-1987	3
3	Illinois coal production, 1987	4
4	Trends in coal production, 1955-1987	5
5	Trends in coal mine productivity, 1965-1987	6
6	Annual crude oil production, 1905-1987	8
7	Consumption of natural gas, 1970-1987	9
8	Trends in clay production, 1955-1987	10
9	Sand and gravel districts and counties with production in 1987	12
10	Stone districts and counties with production in 1987	13
11	Uses of crushed and broken stone produced in Illinois	14
12	Production and consumption of finished portland cement, 1965-1987	18
13	Trends in consumption of quicklime and hydrated lime, 1965-1987	19

## TABLES

1	Illinois minerals extracted, processed, and manufactured into products, 1984-87: production and value	22
2	Illinois mineral production compared to U.S. mineral production, 1985-87	24
3	Value of minerals extracted, processed, and manufactured in Illinois counties, 1987	25
4	Employment and wages in the Illinois mineral industry, 1986-87	27
5	Minerals consumed in Illinois, 1986-87	28
6	Fuels and energy consumed in Illinois, 1986-87	29
7	Coal production in Illinois counties, 1986-87	30
8	Coal production in Illinois counties, 1833-1987	31
9	Employment and production by method of mining in Illinois, 1975-87	32
10	Coal production of Illinois companies, 1986-87	33
11	Coal shipped from Illinois to other states, 1983-87	34
12	Coal shipped to Illinois from other states, 1983-87	35
13	Crude oil production in Illinois counties between 1888 and 1987; value for 1986 and 1987	36
14	Crude oil production from major fields in Illinois, 1986-87	37
15	Petroleum products consumed in Illinois, 1983-87	38
16	Natural gas production in Illinois, 1980-87	38
17	Natural gas production from large fields in Illinois counties, 1985-87	39
18	Natural gas consumed in Illinois, 1986-87	39
19	Production and value of Illinois stone by district, 1987	40
20	Illinois stone production by size of operation, 1985 and 1987	40
21	Use of crushed and broken stone produced in Illinois, 1985 and 1987	41
22	Portland cement manufactured in Illinois, 1986-87	42
23	Mineral production data for 1987 compared to preliminary data for 1988	42
24	Illinois coal shipped to consumers in the United States, 1985-88	43
25	Coal shipments from Illinois to other states, 1986-88	43



## EXECUTIVE SUMMARY

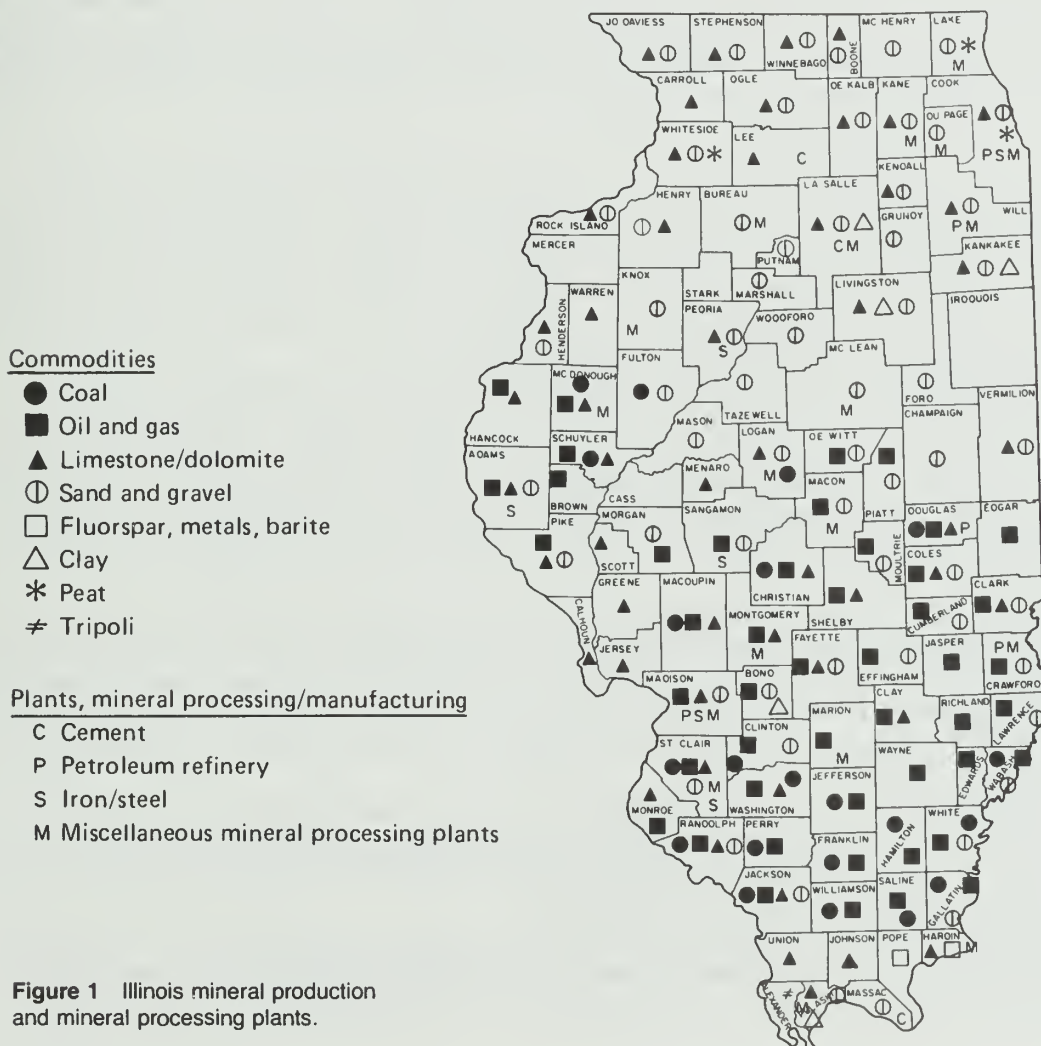
The Illinois mineral industry includes three types of operations (fig. 1):

- extracting minerals from the ground
- processing crude minerals (mined primarily out of state) into raw industrial materials
- manufacturing mineral products such as coke, lime, and cement from minerals extracted and processed primarily, but not exclusively, in Illinois.

The value of minerals extracted, processed, and manufactured in Illinois during 1987 fell to \$3,226.2 million—1.3 percent lower than the 1986 total. This was the lowest value recorded since 1978, when the total was \$3,170.7 million. In terms of constant 1979 dollars, the value of minerals mined, processed, and manufactured in Illinois has been consistently declining. In 1987, the value was just 57 percent of the 1979 level. During these same years, the Gross State Product of Illinois increased 10 percent, despite declines in the early 1980s caused by high inflation rates.

In 1987, coal continued to be the leading commodity. Oil ranked second, followed by stone, sand and gravel, and clays (table 1. Tables begin on page 22.).

In the production of nonfuels, Illinois dropped from sixteenth to seventeenth place in the nation, but the state continued to lead in the production of fluorspar, industrial sand, and tripoli. Peat production ranked third, stone production continued to hold seventh place, lime output also



placed seventh, and sand and gravel remained in eighth place. Illinois produced 1.96 percent of total U.S. nonfuel minerals. Preliminary data for 1988 indicate that the value of extracted minerals was \$2,397.7 million, a decrease of 8.5 percent from 1987.

Table 2 presents production data for each commodity. The quantity and value of each are also shown as percentages of the total national output in 1986 and 1987.

The 1987 value of commodities mined in Illinois was \$2,620.1 million, a decrease of 1.4 percent from 1986. Mineral fuels such as coal, crude oil, and natural gas accounted for 84.8 percent of the total. Industrial and construction materials such as clay, fluorspar, sand and gravel, stone, and tripoli accounted for 15 percent. Metals such as lead, zinc, and silver, and other minerals such as peat and gemstones accounted for the remaining 0.2 percent.

In 1987, mineral extraction was reported by 99 of the 102 counties in Illinois (table 3). The leading counties remained Perry and Franklin. Both produce coal and crude oil and, respectively, account for 10.1 and 7.4 percent of the state's total value of minerals produced.

The total value of processed minerals in 1987 was \$416.2 million. Processed minerals include pig iron, natural-gas liquids, expanded perlite, sulfur, ground barite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, crude iodine, bismuth, columbium, tantalum, and primary and secondary slab zinc. The value of pig iron produced in Cook and Madison Counties amounted to 82 percent of the value of processed minerals in Illinois in 1986. Illinois ranked seventh of ten producing states in pig iron production. Production of iron-oxide pigments increased less than 1 percent from 1986. Crude perlite expanded in Illinois decreased 3.3 percent; however, its value increased 8.5 percent. Sulfur production dropped 30.7 percent in 1987 after a 90-percent increase in 1986. Its value decreased 28.8 percent from the 1986 level. Gypsum production decreased less than 1 percent in 1987 after increasing about 29 percent in 1986; the value of gypsum decreased 5.2 percent in 1987. Vermiculite production dropped less than 1 percent from 1986 levels, and the average value per ton decreased 4.4 percent.

In 1987, the value of cement, coke, clay products, lime, and glass manufactured in Illinois (primarily from minerals mined within the state) was \$189.9 million, representing a 6.9-percent increase from 1986. Portland cement production did not increase, but its value increased by 2.9 percent in 1987. Masonry cement production jumped 62.5 percent and its total value 43.5 percent, indicating some price declines. Lime production was up 7.5 percent and value 3.2 percent. Clay production increased 15.2 percent from 1986. Information about the value of glass or coke is no longer reported by the U.S. Bureau of Mines (USBM).

The Illinois Department of Labor reported a 2.2-percent drop in employment in the state's mineral industries—from 118,600 workers in 1986 to 116,000 workers in 1987. Jobs in mining, quarrying, and oil and gas extraction decreased from 25,200 in 1986 to 23,400 in 1987, a 7.1-percent reduction. In mineral processing, employment fell by 2.6 percent from 61,700 in 1986 to 60,100 in 1987. On the other hand, the manufacturing sector of the minerals industry employed 2.5 percent more people in 1987 than in 1986, or 32,500 in 1987 versus 31,700 in 1986 (table 4).

Mineral shipments are a large part of the Illinois transportation industry. Most stone, sand, and gravel is shipped by truck, since these products are used primarily near the quarry. Illinois coal is primarily shipped by rail or rail/barge; only about 5 percent of the coal was moved to mine-mouth electricity-generating plants by conveyor belt. Crude oil and natural gas are mainly transported by pipeline. Other materials, such as pig iron, fluorspar, coke, and clay products, were shipped by rail, truck, and barge.

In 1987, the value of the state's consumption of mineral commodities was about 5 percent of the nation's total, or about the same proportion as Illinois' share of the total U.S. population. In physical units, Illinois' mineral consumption varied from less than 1 percent of the U.S. total (for kerosene) to almost 17 percent (for zinc) (table 5).

The state's energy consumption in 1987 was estimated as 3.2 quadrillion Btu, or 4.4 percent of the total U.S. energy consumption (table 6). Fossil fuels provided about 83 percent of the state's energy needs. In 1987, Illinois consumed 545.4 trillion Btu of nuclear power, compared



with 304.3 trillion Btu in 1977, a 79-percent increase. The increase was attributable to the completion of the Clinton nuclear plant in De Witt County.

During 1987, total energy usage in Illinois decreased only slightly from 1986 (fig. 2). The demand for fuels in Illinois was met by oil products, 31 percent; natural gas, 28 percent; coal, 24 percent; and nuclear power, 17 percent.

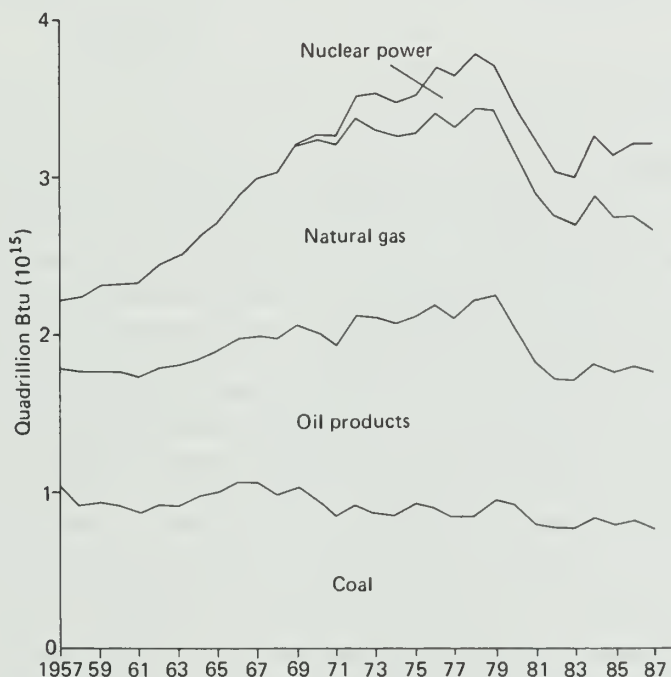
## MINERALS EXTRACTED

### Fuels

#### Coal

*Production.* With 60.8 million tons or 6.6 percent of the total U.S. coal production in 1987, Illinois remained the fifth-largest coal-producing state behind Kentucky, Wyoming, West Virginia, and Pennsylvania. Illinois coal production decreased 3.9 percent from 1986 levels (table 7). Although the 1987 production was comparable to the average of the past 15 years, a downward trend in production may have set in after 1984. Fears of a continuing decline in Illinois coal production appear justified in view of increasing use of nuclear energy, impending acid-rain regulations, and price competition. Coal was produced in 21 counties in 1987 (fig. 3). Perry, Franklin, Saline, and Randolph Counties—each producing more than 4 million tons—contributed about 49 percent of total production.

Perry County, the state's top producer, with 100 percent of its coal coming from surface mines, contributed 18 percent of all coal produced in the state in 1987. More than 51 percent of the surface-mined coal produced in Illinois came from Perry County. Jackson and Williamson Counties contributed 13 and 11 percent, respectively, of the production from surface mining. Franklin County, with 100 percent of its coal coming from underground mines, contributed 12.5 percent of the state's total, or 19 percent of total underground production. Other counties



**Figure 2** Energy used in Illinois, 1957-1987. Quantities of hydropower and early nuclear power (1960-1969) were too small to show.

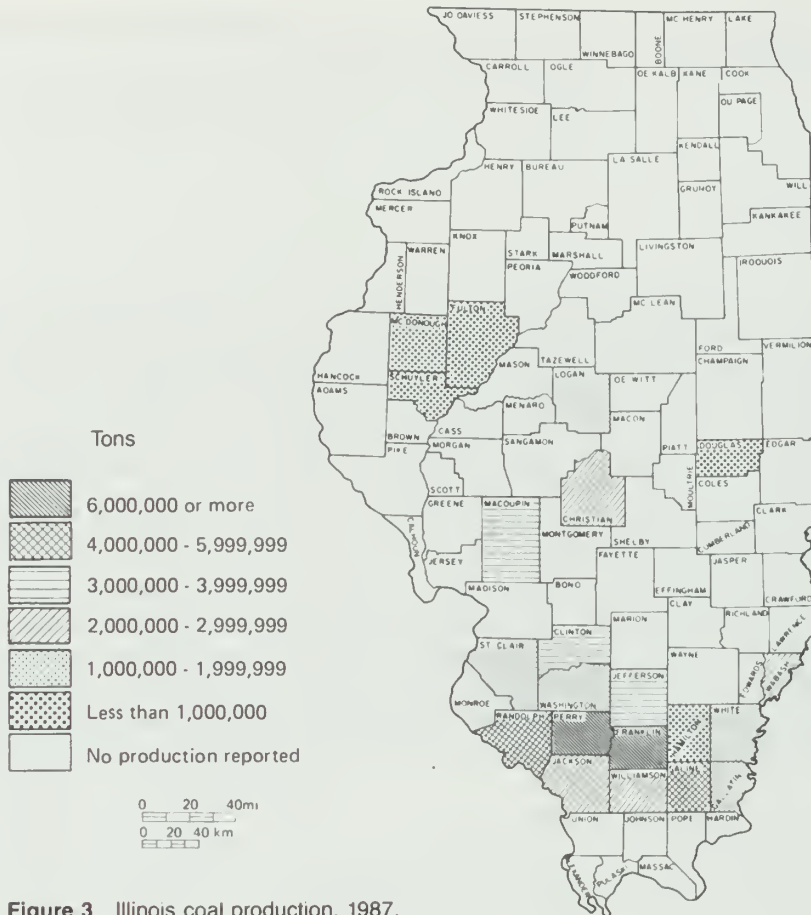


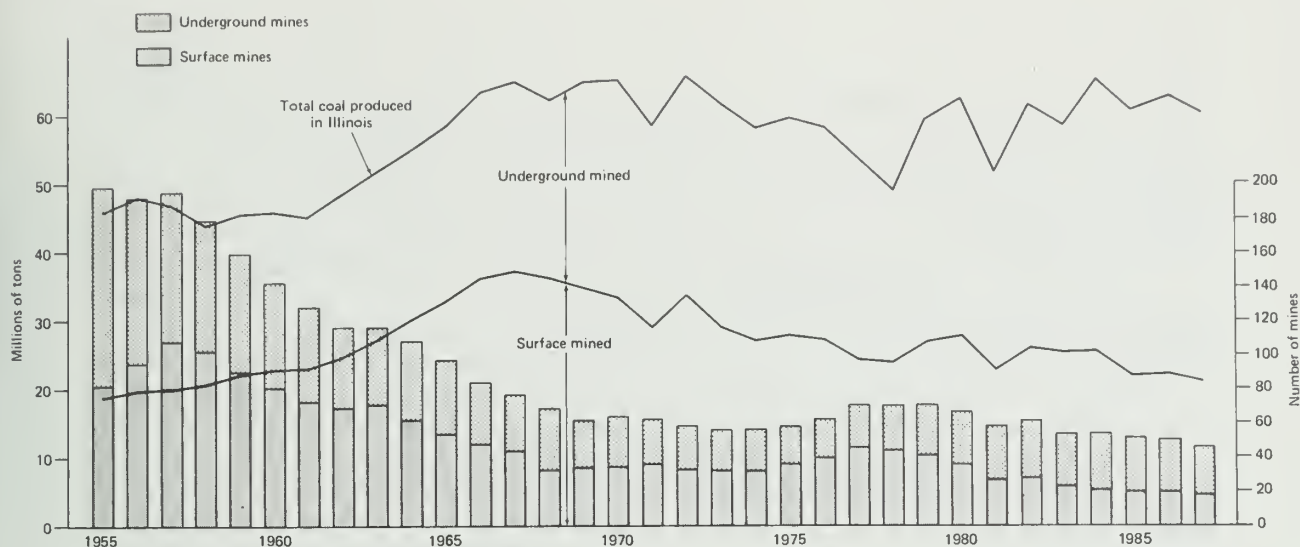
Figure 3 Illinois coal production, 1987.

contributing substantially to underground coal production were Randolph, with 11 percent; Saline, 10 percent; Jefferson, 9 percent; Macoupin, 9 percent; and Clinton, 8 percent.

The number of coal mines operating in Illinois has declined steadily since the early 1900s. By the 1950s, approximately 200 mines were in operation. A further rapid decline to about 60 mines occurred by 1970. In the latter half of the 1970s the number increased to about 70 as new mines opened after the first oil price shock of 1974. Demand for Illinois coal did not increase, however, and the number of mines dropped again in the 1980s. By 1987, only 47 mines remained in operation: 28 underground mines, accounting for 64.5 percent (39.2 million tons) of the state's total production, and 19 surface mines, accounting for 35.5 percent (21.6 million tons) (fig. 4). The proportions of underground and surface-mined coal have reversed in Illinois in 20 years as a result of both changing economics and geologic conditions.

Since 1833, Illinois mines have produced about 5.26 billion tons of coal (table 8). The average output per underground mine reached a peak in 1975. Since 1977, output has fluctuated between 0.9 and 1.4 million tons per year. Surface mines, operating since 1911, have supplied 1.23 billion tons, or 23.5 percent of the total coal produced. The average surface-mine output, which had been rising between 1977 and 1984, declined to 1.1 million tons per year in 1985 and has remained steady since then (table 9).

In 1987, 22 coal mining companies were operating in Illinois (table 10). The top five companies—Peabody, Consolidation, Old Ben, Arch of Illinois, and AMAX—represented about 61 percent of the state's production. The production share of the top five companies has not decreased appreciably since 1977, when the top five produced 67 percent of the state's



**Figure 4** Trends in coal production, 1955-1987.

production. By comparison, the U.S. coal mining industry is much less concentrated. The top five U.S. companies in 1987 produced only about 25 percent of the national total.

*Employment and wages.* Employment in Illinois coal mines decreased 10 percent to 12,188 in 1987 from 13,549 in 1986 (table 9). Underground mine employment decreased 10.8 percent in 1987. Surface-mine employment, which has been dropping since 1979, fell another 7.7 percent. Average hourly wages rose to \$17.21 per hour in 1987, up from \$16.35 per hour in 1986 (table 4). The average number of hours worked weekly went down to 38.1 in 1987 from 40.4 in 1986.

*Mine productivity.* Productivity is measured in tons of coal mined by one worker during an 8-hour shift. For underground mining operations in 1987, employment declined faster than production. This resulted in an increase in labor productivity of 8.3 percent, from 17 tons in 1986 to 18.5 tons in 1987. The peak level was 22.9 tons in 1969. In surface mines, labor productivity increased 4.4 percent from 26 to 27.2 tons. The peak year was 1967 with 41.6 tons (fig. 5).

Although the growth in productivity is encouraging, the gains may not be large enough to improve the competitiveness of Illinois coal relative to other coal-producing states. For example, the U.S. underground mine labor productivity in 1987 (18.2 tons/shift) surpassed the previous all-time high reached in 1969; whereas productivity of labor in Illinois underground mines fell 19.6 percent short of their 1969 level of 22.9 tons per shift. And while U.S. surface-mining productivity also broke records in 1987 (43.5 tons/shift), the Illinois surface mines remained 35 percent below their previous productivity (1967) record. Improving productivity will remain a prime concern of the Illinois coal industry, especially because wage increases have outpaced productivity since 1979, the year productivity reached its lowest level in the past quarter century. Hourly wages have increased by about 75 percent between 1979 and 1987, while labor productivity grew by 50 percent in underground mines and only 33 percent in surface mines.

*Prices.* In 1987, the average price of Illinois coal (f.o.b. mine) dropped 1.4 percent from \$29.99 to \$29.56 per ton (table 7). The average price of coal mined underground in Illinois was \$30.39 per ton and that of surface mine coal was \$28.12. Since 1979, the price of coal has increased 30 percent and compensated for much of the gap between faster-growing wages and slower-growing productivity. However, labor accounts for only a portion of all the mining costs. Inflation in other types of costs has remained unaccounted for in coal price increases since 1979.

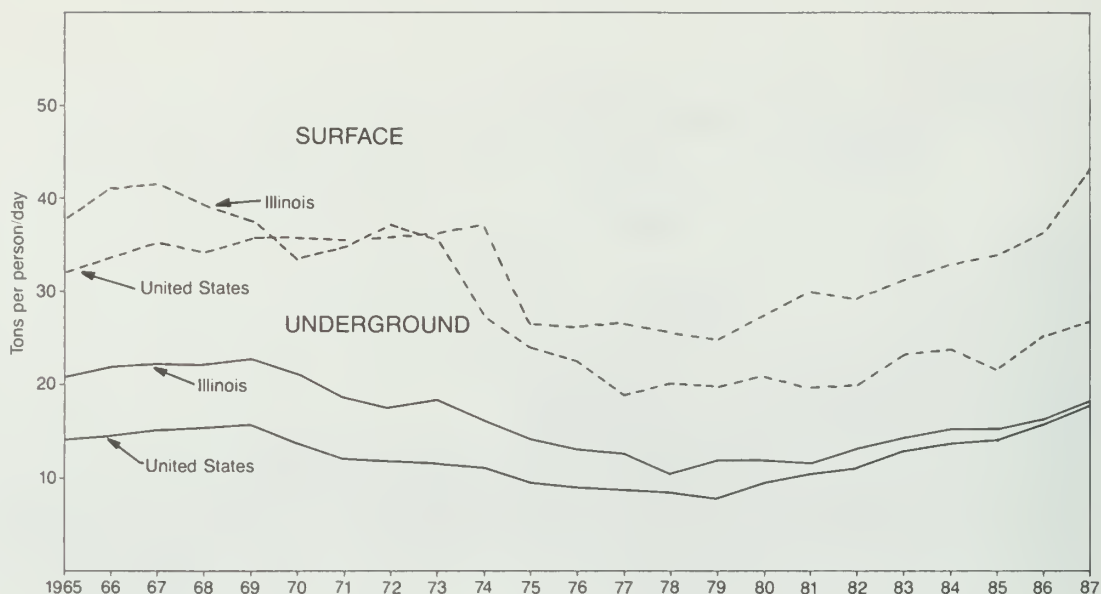


Figure 5 Trends in coal mine productivity, 1965-1987.

*Shipments.* Illinois coal is used in 22 states to generate electricity, manufacture coke, and supply the energy for other industrial activities. In 1987, about 89 percent of Illinois coal was sold to electric utility plants, 3 percent to plants manufacturing metallurgical coke, and 7 percent to industrial plants and retail dealers (table 11).

Shipments to electric utilities decreased from 55.7 million tons in 1986 to 53.4 million tons in 1987. About 30 percent of the Illinois coal sold to electric utilities was shipped within the state. Out-of-state shipments decreased 3.5 percent from the previous year's level; 35 percent of the out-of-state shipments went to Missouri, 25 percent to Indiana, and 24 percent to Georgia and Florida.

About 84 percent of coking coal from Illinois was shipped to coking plants in northwestern Indiana; the remainder was consumed within the state. Of the Illinois coal used for other industrial activities, about 54 percent was consumed within the state, and about 19 percent was shipped to Missouri, 10 percent to Iowa, and 7 percent each to Indiana and Wisconsin.

*Transportation.* Coal was shipped from mines to the consumer by rail, barge, and truck.

	Tonnage		
	1985	1986	1987
Rail*	44,016,187	48,125,328	42,853,324
Barge or rail/barge	8,867,239	5,772,410	9,993,890
Local trade and truck	7,700,515	13,331,084	8,169,401

\* Tonnages do not total because part of the rail tonnage is shown in the combined rail/barge category, and some was shipped from inventory. Breakdown by railroad company not available. Source: Illinois Department of Mines and Minerals.

Coal transportation by barge or rail/barge combinations apparently increased significantly in 1987 after it had shown an almost equally significant decline in 1986. This may represent a difference in reporting procedures: the attribution of tonnage to rail or to a rail/barge combination



is not based on any given mathematical formula but is subject to the discretion of the reporting personnel.

*Consumption.* After increasing 3 percent in 1986, Illinois coal consumption decreased by about 7 percent to 35.4 million tons in 1987 (table 12). The annual coal shipments from Illinois mines to Illinois markets have remained nearly unchanged since 1982, but they have slightly declined in each of the past 3 years after reaching a temporary high in 1984. The 1987 decline in total coal consumption in Illinois, resulting primarily from increased use of nuclear energy, led to lower western coal imports into the state. Coking coal consumption in Illinois also declined. However, industrial consumption rose to more than compensate for the lower coking coal consumption. Just 20 years ago, more than 82 percent of the total demand for coal in Illinois was filled within the state. By 1977, Illinois coal accounted for only 53 percent of in-state consumption. In the past decade, the market share of in-state coal fluctuated around 50 percent in Illinois. In 1987 about 53 percent of the demand for coal in Illinois was filled within the state. Illinois continued to consume coal from Indiana and western Kentucky (3.5 million tons), which shipped coal conveniently and cheaply to utility plants across the state's borders and via the Ohio, Mississippi, and Illinois Rivers. Although Illinois ranks fifth among coal-producing states, it ranks only seventh as a coal-consuming state.

### **Crude Oil**

*Production.* Despite higher prices, Illinois crude oil production dropped 11.6 percent from 27.2 million barrels in 1986 to 24.1 million barrels in 1987 (table 13). The 1987 production was valued at \$421.7 million, with an average unit value of \$17.50 per barrel—a 19-percent increase in per barrel value from \$14.70 in 1986. The secondary production method of waterflooding accounted for approximately 10.6 million barrels, or about 44 percent of the state's total; pressure maintenance operations produced 722,900 barrels or 3 percent of the state's total. Table 13 data also indicate that during the past 100 years, from 1888 to 1987, more than 3.3 billion barrels of oil have been produced in Illinois.

Illinois ranked thirteenth of 31 oil-producing states in 1987. Forty-seven counties produced crude oil. The following nine counties produced more than 1 million barrels each, contributing 66 percent of the state's total oil production:

<i>County</i>	<i>1986</i>	<i>1987</i>	<i>County</i>	<i>1986</i>	<i>1987</i>
Lawrence	10.7%	10.7%	Fayette	6.1%	5.7%
White	9.6	9.2	Clay	5.5	5.3
Marion	7.0	9.1	Jefferson	4.8	5.2
Crawford	7.7	8.0	Wabash	4.3	4.7
Wayne	7.9	8.0			

An oil field producing more than 200,000 barrels per year is considered a major field; the number of these fields remained unchanged at 17 in 1987. The combined production of these fields amounted to 67 percent of the state's total (table 14). The five largest fields—Southeastern Illinois, Clay City Consolidated, Salem Consolidated, Loudon, and New Harmony Consolidated—each produced more than 1 million barrels during 1987, accounting for 52 percent of the state's total. In 1987, 57 wells reported an initial production of 100 barrels of oil per day or more; 11 of these wells had production of 200 barrels per day. The average daily per-well production in Illinois remains well below three barrels and continues to render the state highly sensitive to oil price changes.

Crude oil production reached a peak of 147.6 million barrels in 1940 (fig. 6). From that level, oil production by primary recovery methods declined steadily until 1973, although some years



showed small gains. Introduction of the hydraulic rock fracturing method in 1954 and the increased use of waterflooding stabilized oil production at about 78 million barrels per year from 1955 to 1962. Production fell steadily after 1962 as reserves were depleted. The lowest production since 1939 was reached in 1979—21.8 million barrels. By December 1987, reserves were 153 million barrels. Although this represents an increase of 13 percent from December 1986, current reserves are 78 percent below the 700 million barrels of reserves of January 1956. The increase in production since 1980 driven by oil price increases has been mainly in the primary oil production.

**Refineries.** According to the U.S. Department of Energy, seven refineries were operating in Illinois as of January 1, 1988. Total capacity was 854,700 barrels per day, down 8 percent from January 1, 1987. The refining capacity was nearly 13 times the daily oil production in Illinois. Illinois crude oil is not necessarily refined in Illinois; most oil refined by Illinois refineries comes from out-of-state sources. Information about the market value of Illinois refinery output is not available. However, based upon nationwide product mix and delivered consumer prices, it can be concluded that the products from Illinois refineries in 1987 were worth about \$850 million.

**Consumption.** Consumption of major petroleum products in Illinois increased 2.8 percent in 1987. Gasoline consumption increased slightly (1.4 percent) in 1987; however, it is still about 9 percent below the 1983 level. Kerosene consumption dropped another 35 percent in 1987. Liquefied petroleum gas increased 15.6 percent from 1986 to 1987 (table 15).

**Natural Gas**

**Production.** Natural gas is not a major item of production in Illinois. The state’s production of natural gas dropped 27.4 percent in 1987 after a 42.6 percent increase in 1986. Withdrawals decreased 21.4 percent from gas wells and 54.4 percent from oil wells (table 16). Coles County was the top producer in Illinois in 1987 with 23 percent of the state’s total production, followed by Pike County (15 percent) and Clinton and Morgan Counties (12 percent each) (table 17). The average wellhead value of Illinois gas decreased about 13 percent from \$2.57 per thousand cubic feet (Mcf) in 1986 to \$2.24 in 1987.

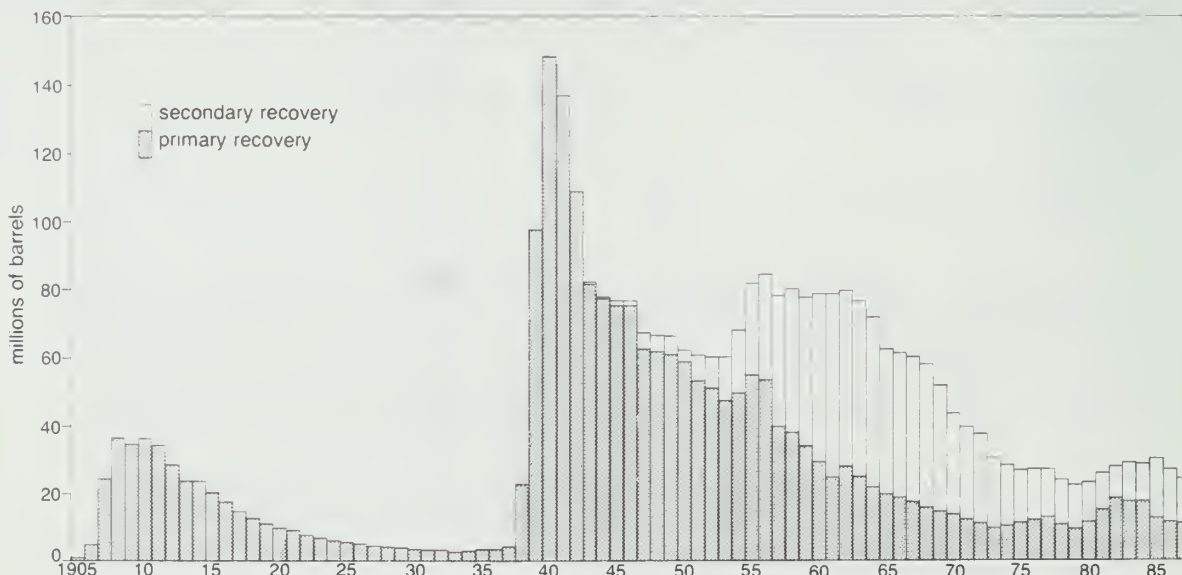


Figure 6 Annual crude oil production, 1905-1987.

*Consumption.* Natural gas consumption in Illinois declined 5.5 percent in 1987 (table 18). The average value of natural gas consumed in Illinois fell 2.6 percent from \$4.68 per Mcf in 1986 to \$4.56 per Mcf in 1987. Figure 7 shows the natural gas consumption trends in Illinois since 1970. The downward trend in gas consumption continues, apparently because the price is still perceived by consumers as too high, the winter has been relatively mild, and conservation efforts continue to yield success.

## Industrial and Construction Materials

### Clays

*Production.* Common clay and absorbent clay (fuller's earth) are mined in Illinois. Common clay is defined as a clay or claylike material that is sufficiently plastic to permit ready molding. Fuller's earth is a clay or claylike material that has absorbing, decolorizing, and purifying properties. Illinois clay production (excluding fuller's earth) decreased 17.7 percent from 282,993 tons in 1986 to 232,949 in 1987 (fig. 8). Nationally, the clay industry has been growing steadily for several years. In 1987 U.S. production of clays was 44.4 million tons, or 6.3 percent above the 1986 total. In Illinois, however, the downturn began 20 years ago and continued in 1987 as competition from cheaper southern clays remains keen. Refractory or fire clay production has not been reported since 1982 and has not been revealed since 1978, when A.P. Green Refractories Company, a subsidiary of U.S. Gypsum Company, was the only producer. Illinois clay is used in manufacturing cement, face brick, drain tile, and sewer pipe.

The average unit value of common clay increased 8.5 percent from \$3.86 per ton in 1986 to \$4.19 in 1987. The total value was \$977,048 in 1987 compared with \$1,091,609 in 1986. Five counties mined clay in 1987. Bond County led production of common clay, with La Salle County running a close second. Livingston and Kankakee Counties produced common clay and Pulaski County produced absorbent clay. Absorbent clay (fuller's earth) continued to be produced by two companies in Pulaski County. Production and per ton value increased about 15 percent in 1987.

*Consumption and uses.* Bricks, sewer pipes, drain tiles, wall tiles, dinnerware, lightweight aggregates, and cement are manufactured from common clays and shales mined in Illinois.

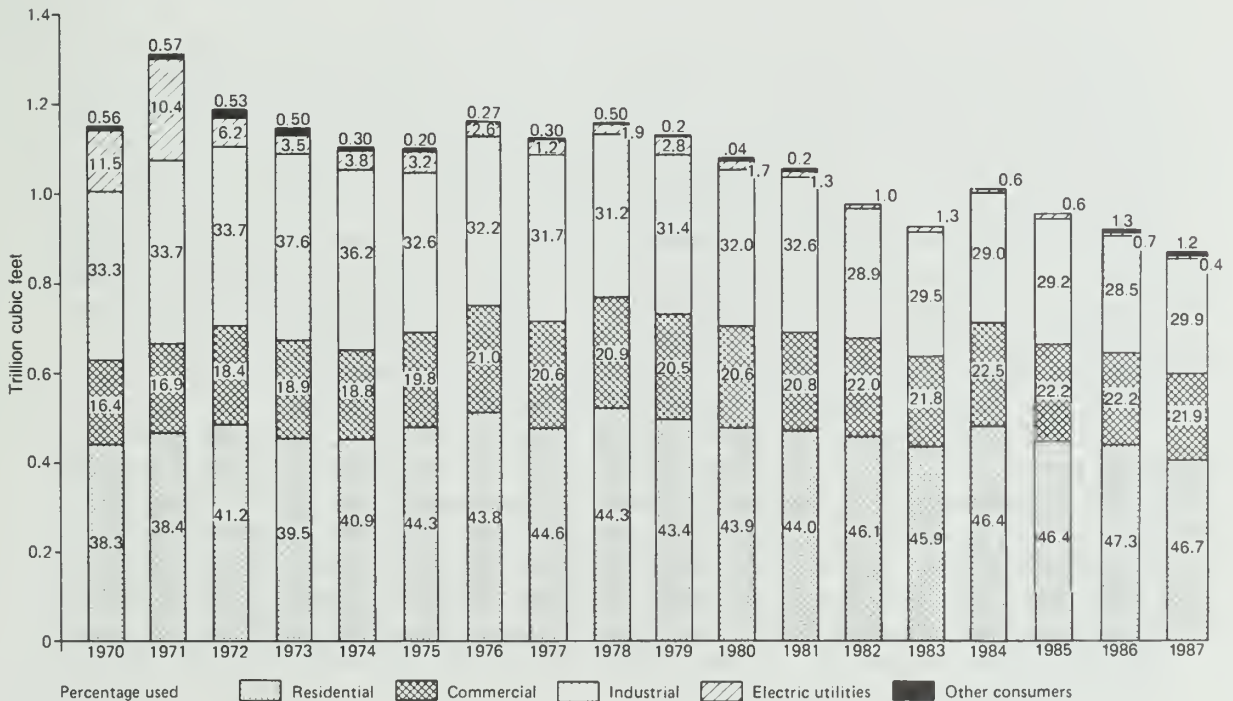


Figure 7 Consumption of natural gas, 1970-1987.

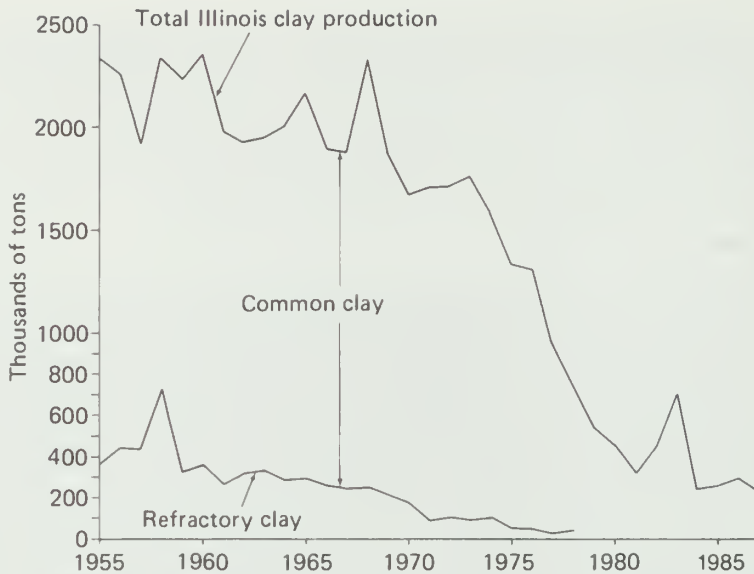


Figure 8 Trends in clay production, 1955-1987.

Overall, consumption of Illinois clay decreased about 17.7 percent in 1987. The primary product use remained building bricks, which accounted for about 57 percent (131,787 tons valued at \$614,170) of Illinois clay production in 1987.

About 33 percent of the state's common clay production in 1987 was used for the production of portland cement, structural concrete, concrete blocks, and highway surfacing, compared with 39 percent in 1986. In 1987, sales of Illinois clay to manufacturers of sewer pipe and drain tile decreased about 25 percent from 1986. Absorbent clay from Pulaski County is used mainly in the production of animal litter and oil and grease absorbents.

### Fluorspar

*Production and shipments.* Domestic production of finished fluorspar appears to have stabilized at about 70,000 tons during the 1980s. Lower production levels of 61,000 tons in 1983 and 66,000 tons in 1985 were partially offset by the 1986 high of 78,000 tons. The 1983 production level from U.S. mines was the lowest in 50 years. The U.S. depends on foreign sources for more than 90 percent of its fluorspar requirements.

Illinois continued to lead the nation in the production of fluorspar, contributing more than 90 percent of U.S. shipments, with small shipments from stocks in Nevada and Texas accounting for the remaining 10 percent. Fluorspar was mined in Illinois by one major and one small producer. In addition to the 70,000 tons mined in Illinois, about 100,000 tons of fluorspar-equivalent fluosilicic acid was produced from phosphoric acid plants in the United States in 1987. The equivalency is based on the fluorine contents of fluorspar and fluosilicic acid.

Ozark-Mahoning Company, the nation's leading fluorspar producer, operated two mines and a flotation plant near Rosiclare in Pope and Hardin Counties. Ozark-Mahoning also dried imported fluorspar to supplement its production. The Hastie Trucking and Mining Company, near Cave in Rock in Hardin County, mined a little ore and shipped to consumers. The Inverness Mining Company, located near Cave in Rock, dries imported fluorspar at its facilities and sells primarily to consumers in the ceramic industry. Financial and development work was begun toward reopening shut-down mines and mills in the Illinois/Kentucky fluorspar district. Ozark-Mahoning Company has begun negotiating with Inverness Mining Company to purchase its Minerva No. 1 mine and related assets near Cave in Rock.



*Consumption.* Reported consumption of fluorspar (acid-spar and met-spar only) in the United States increased 3.4 percent from 578,837 tons in 1986 to 598,368 tons in 1987. The use of fluorspar for manufacturing hydrofluoric acid and as flux for refining of iron and steel was essentially unchanged. The hydrofluoric acid industry accounted for 73 percent of the reported consumption and the steel industry for 22 percent. The remaining 5 percent was consumed in manufacturing glass, welding rod coatings, enamels, and water fluoridation (fluosilicic acid), and for other end uses or products.

The apparent U.S. consumption (production + imports - exports ± change in stocks) increased from 571,288 tons in 1986 to 719,512 tons in 1987, a 26-percent gain. The discrepancy between apparent and reported consumption is often large for many minerals, including fluorspar, because not all users report consumption to the USBM. The agreement to reduce by 50 percent the consumption of chlorofluorocarbons (CFC), endorsed by 40 nations in the form of the Montreal Protocol of 1987 and put into effect on January 1, 1989, may not necessarily affect the demand for fluorine worldwide because CFC alternatives continue to use fluorine. These alternative propellants break down before reaching the stratospheric ozone.

### ***Sand and Gravel***

Since 1981, the USBM has been surveying sand and gravel producers only in even-numbered years. In odd-numbered years, only estimates are published. In 1985, the USBM began compiling sand and gravel production by district (fig. 9). This is intended to preserve the confidentiality of individual producers. Individual county data will no longer be available.

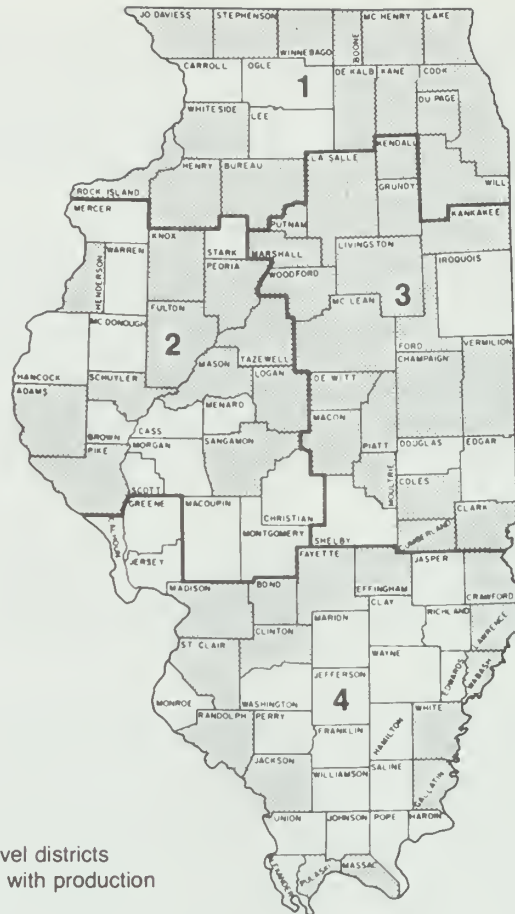
*Production and uses.* Sand and gravel deposits are widely distributed in Illinois. Glacial deposits, chiefly valley trains and outwash plains, are the principal sources of construction sand and gravel. Production was estimated at 28.3 million tons in 1987, an increase of 1.6 percent from 1986. The combined value of sand and gravel was \$93.3 million with an average unit value of \$3.30 per ton, up 11.5 percent from 1986. Illinois ranked eighth of 50 states in production of sand and gravel in 1987.

Demand for sand and gravel, which is used in construction aggregates, ultimately depends on population size, although the overall state of the economy and availability of public funding may result in short- to mid-term demand fluctuations. Illinois ranks sixth in population among states. Its eighth ranking in sand and gravel production could indicate that sand and gravel is being imported or that the quality requirements of sand and gravel in Illinois may be different from those in other states. Imports of sand and gravel from other states cannot be ruled out, given the proximity of Lake Michigan and major navigable waterways, such as the Mississippi, Ohio, and Illinois Rivers. However, data on imports are not available. Some sand and gravel is shipped to northeastern Illinois from southern Wisconsin and Indiana. Bulletin 23 of the Illinois Department of Transportation listed many out-of-state aggregate producers in 1986. However, the bulletin does not list the tonnage shipped.

*Transportation.* Because of its low unit price, most construction sand and gravel is shipped no farther than about 50 miles from the pit. In 1987, about 70 percent was shipped by truck and the remainder was shipped by barge or used at the pit, e.g., in asphalt production.

### ***Industrial Sand***

*Production.* In 1987, Illinois continued to rank first of 39 states in industrial sand production, accounting for 4.3 million tons (15.4 percent of the U.S. total) worth \$45.5 million. Five companies operated eight pits in La Salle, Mason, and Ogle Counties. The estimated average unit value decreased from \$12.91 per ton in 1986 to \$10.48 per ton in 1987. As of January 1, 1987, Ottawa Silica Company of Ottawa, Illinois, and Pennsylvania Glass Sand Corporation of Berkeley Springs, West Virginia, merged to become U.S. Silica Company, the nation's largest producer of industrial sand.



**Figure 9** Sand and gravel districts (bold lines) and counties with production (shaded areas) in 1987.

*Transportation.* In 1987, industrial sand was shipped by rail and truck with a small amount going by barge. Rail shipments were higher than truck shipments. In the past, trucking was the predominant mode of transportation.

*Consumption and uses.* Industrial silica sand was produced in two forms, ground and unground. Unground sand was used primarily in glass manufacturing. Other uses included molding, sand blasting, grinding and polishing, railroad traction sand, filtration sand, and propping sand for hydrofracturing of oil wells. Ground sand was used in chemicals, abrasives, enamels, pottery, porcelain, tile, and various fillers. Silica sand consumption in 1987 was 7.6 percent higher than in 1986, but consumption value decreased 12.6 percent. Forty-five percent of the sand was used in glassmaking, and 27 percent was used as foundry sand.

### Stone

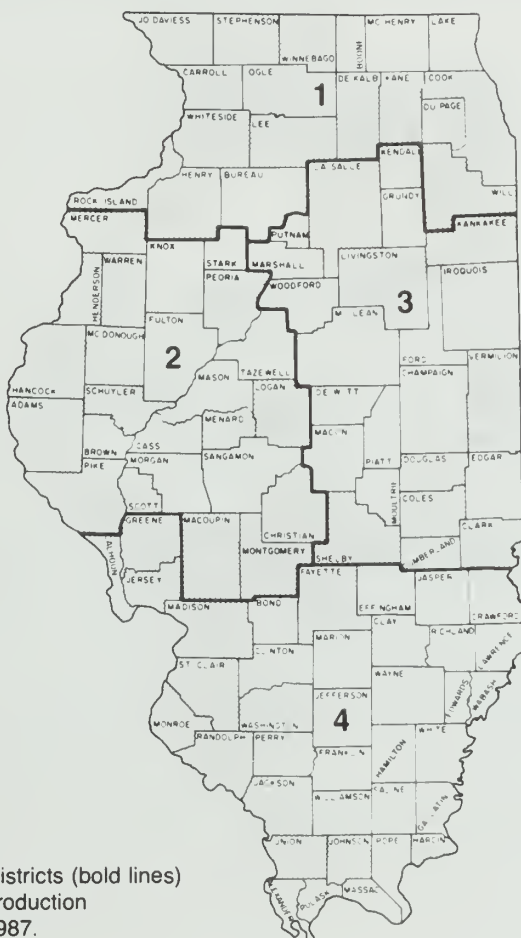
Since 1981, the USBM has been surveying stone production every odd-numbered year. Estimates are given for 1986 and actual data for 1987. In 1985, the USBM began compiling stone production in Illinois by district (fig. 10). Individual county data will no longer be available.

*Production.* In 1987, total Illinois stone production increased 17.9 percent to 52.1 million tons. The total value was \$216.2 million, a 20.4-percent increase (table 19). Illinois ranked seventh of 49 producing states. Delaware was the only state not reporting crushed stone production. The



increase in Illinois stone production corresponds with the all-time U.S. production record in 1987 of about 1.2 billion tons, a 20-percent increase over 1986. Legislation passed in the U.S. Congress during 1987 was partially responsible for higher demand for stone in 1987, and this trend is expected to continue through 1991/92. In particular, the Surface Transportation Assistance Act (STAA) passed on April 2, 1987 extended the Federal-Aid Highway Program by 5 years with a total funding of \$68 billion. The Airport Improvement Program (AIP) legislation was passed on December 31, 1987, with a total of \$8.7 billion funding for 1988-1992. If the rest of the civilian construction market does not slow down significantly, stone production in Illinois may be poised for continued healthy growth. The interest rate moderation in 1988 and 1989 also is believed to have helped the construction industry.

In 1987, 53 of the state's 102 counties reported stone production (fig. 10). Crushed stone was produced in 199 quarries by 106 companies. District 1 produced about 55 percent of the state's total. Cook County was the largest producer in the state, followed by Will, St. Clair, La Salle, and Hardin Counties. These five counties accounted for about 54 percent of the state's total production. The 11 largest quarries (900,000 tons and more per year) accounted for 44 percent of the total production in 1987, while the 51 smallest producers (less than 25,000 tons per year) accounted for only 1 percent of total production (table 20). The McCook Quarry operated by Vulcan Material Company ranked as the fourth largest producer in the nation, with the Thornton Quarry, Material Service Corporation, in eighth place. After closing in early 1986, the Missouri Portland Cement Company quarry at Cave in Rock in Hardin County was leased to Dravo Basic Materials Company and began operating in April 1987. Stone from the quarry was shipped to the Missouri Portland Cement Plant in Joppa when it reopened in June.



**Figure 10** Stone districts (bold lines) and counties with production (shaded areas) in 1987.

*Shipments.* Stone, a bulk commodity, is used primarily in the areas near the quarry; therefore, most of the stone (66 percent) is transported by truck. Some is not transported from the site. Small amounts go by rail and barge, as Illinois waterways are put to use by some producers along the river.

*Consumption.* Stone is used principally as construction aggregate, especially as road-base stone, but also for chemical, agricultural, and other purposes. The total production by end use is included in table 21; however, the amounts are probably higher, because some crushed stone producers do not report a breakdown by end use. Instead, they record their total production as "other uses." The pattern of usage has not changed much over the years (fig. 11). The small amount of dimension stone mined in Illinois is used as veneer in house construction, rubble, and flagging.

### Tripoli (Amorphous Silica)

*Production.* The term tripoli refers to several fine-grained, porous, siliceous materials. Tripoli deposits in Alexander County occur in the almost horizontal strata of the Devonian Clear Creek Formation and the Grassy Knob Formation below it. Commercial-grade deposits of tripoli are up to 40 feet thick. Selective mining bypasses large areas of cherty, clayey, and iron-stained material that define the limits of commercial-grade tripoli. Two of the nation's leading tripoli producers are located in Alexander County in southern Illinois: Illinois Minerals Company, a division of Georgia Kaolin Company, and Tammsco, a Division of Unimin Corp.

Illinois has been the nation's largest producer of siliceous materials, accounting for more than half the total U.S. production. Actual production figures are confidential; however, crude tripoli production in Illinois declined 5 percent from 1986 to 1987, while value increased 5 percent.

*Consumption and uses.* The amorphous silica processed in Illinois was used for filler in paint, plastic, and rubber products, and for abrasives in buffing and polishing compounds, soap, and

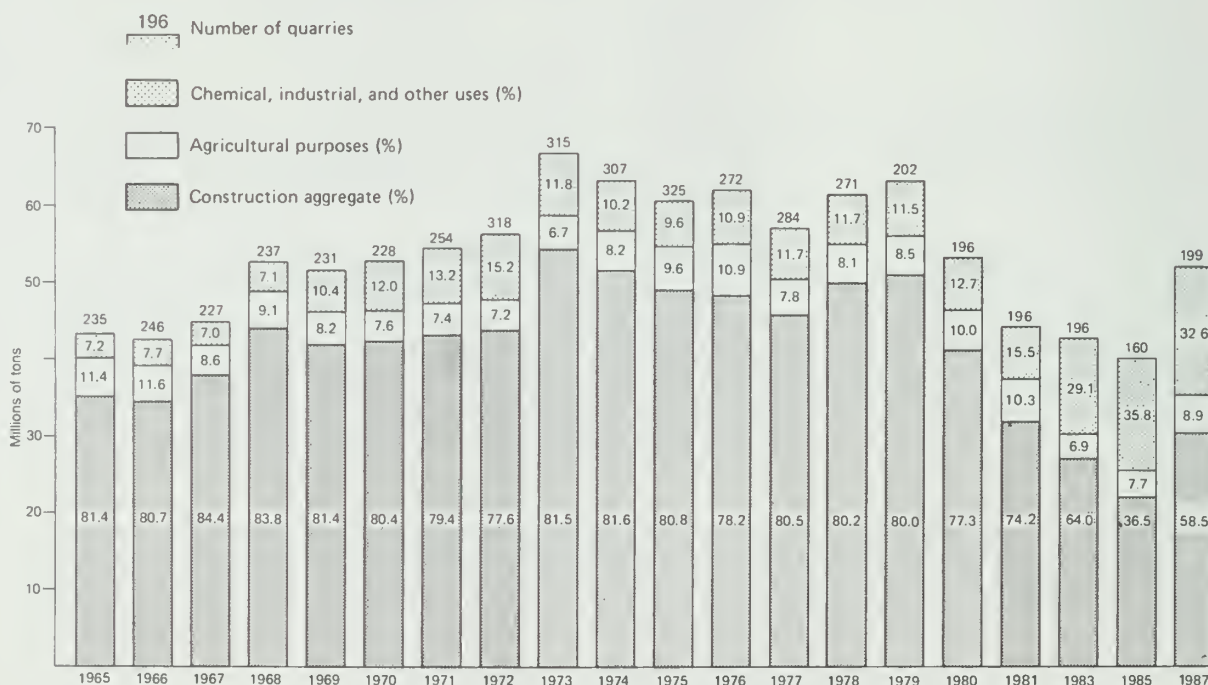


Figure 11 Uses of crushed and broken stone produced in Illinois: 1965-81, 1983, 1985, 1987. (Since 1981, only odd year data collected.)

toothpaste. Some iron-stained tripoli is now being used in the manufacture of portland cement. Processed material sales dropped about 5 percent from 1986, but value rose 7.5 percent.

## **Metals**

### ***Zinc, Lead, Silver, and Copper***

*Production.* Zinc, lead, silver, and copper were recovered from fluorspar ore mined in Hardin and Pope Counties by Ozark-Mahoning Company. Although metal prices were higher, 1987 was a year of generally lower metals production. Silver production was the only exception. Silver production and value per troy ounce rose about 35 percent and 28 percent, respectively. Copper recovered from sulfide concentrate fell about 21 percent, but the per-ton value increased about 25 percent. Lead production dropped 31 percent, though its value per ton increased about 63 percent. Likewise, zinc fell 15 percent, but its value per ton rose about 10 percent. Zinc contributed the most to the total value, followed in order by lead, copper, and silver.

## **Other Minerals**

### ***Peat***

The USBM formerly classified peat as a fuel; however, since all commercial sales of peat in the U.S. (excluding imports) are for agricultural and horticultural purposes, specifically for soil improvement, peat has been placed in the nonfuel section. Three major kinds of peat—reed sedge, moss, and peat humus—were produced in Illinois by five companies in Cook, Lake, and Whiteside Counties. Illinois ranked third after Florida and Michigan among the 22 peat-producing states. Peat production continued a strengthening trend during 1987, going up 6.4 percent with total value growing 8 percent over 1986. About 96 percent of the state's total peat was sold in packaged form, almost entirely for general soil improvement.

### ***Gemstones***

Limited to specimen-grade fluorite collected in the fluorspar mines in Illinois, gemstones contributed little to the total value of mineral production. The estimated value, only about \$15,000 in 1987, has not changed for several years.

## **MINERALS PROCESSED**

This category refers to minerals extracted mainly in other states or foreign countries but processed in Illinois. These include ground barite, columbium and tantalum, calcined gypsum, crude iodine, iron-oxide pigments, natural-gas liquids, expanded perlite, pig iron, sulfur, exfoliated vermiculite, primary slab zinc, and secondary slab zinc. The total value of minerals processed continued to decline for the third year in a row to about \$416,000 in 1987. As table 1 indicates, most data on processed minerals have been withheld for reasons of confidentiality.

### ***Ground Barite***

Two Illinois companies continued to process ground barite, Mineral Pigments and Metals Division of Pfizer in St. Clair County, and Ozark-Mahoning Company in Hardin County. Illinois-processed ground barite is used almost exclusively as a filler or an extender in paints.

### ***Columbium and Tantalum***

Fansteel in Cook County reported processing of columbium-tantalum concentrate imported from foreign countries. In 1987, Fansteel also produced tantalum metal. Columbium and tantalum are used primarily to produce various steel alloys.

### ***Calcined Gypsum***

Calcined gypsum, used primarily for prefabricated housing materials such as wallboard, was processed by the National Gypsum Company in Lake County. The production of calcined gypsum in Illinois dropped by less than 1 percent in 1987, but value fell 5 percent. Production in Illinois,



Indiana, and Kansas together was 1.5 million tons, valued at \$25.6 million. Six plants continued to be active in the three states. Gypsum from flue gas desulfurization has not entered Illinois markets because of the absence of plants generating usable gypsum.

### ***Crude Iodine***

Crude iodine was processed into inorganic compounds for commercial use at three Illinois plants: Abbott Laboratories in Lake County, Economics Laboratory in Will County, and West Argo-Chemicals in Lake County. Although crude iodine is used primarily as a catalyst or stabilizer, it also is added in animal feed, inks, colorants, pharmaceuticals, salt, and sanitary and industrial disinfectants.

### ***Iron-Oxide Pigments***

In 1987, the production and value of finished iron-oxide pigments, manufactured in three counties, increased about 1 percent. The finished pigments were produced from iron ore imported from other states by the Prince Manufacturing Company in Adams County, the George B. Smith Chemical Works in Kane County, Pfizer in St. Clair County, and Solomon Grinding Service in Sangamon County.

### ***Natural-Gas Liquids***

Natural-gas liquids include ethane, propane, isobutane, unsplit butane, and a combination of gasoline and liquefied petroleum gas. Natural-gas liquids were processed in Douglas County by the U.S. Industrial Chemical Company, a division of National Distillers and Chemical Corporation. The U.S. Department of Energy reports that Illinois processed 456 million cubic feet of gas produced in Illinois and 106,091 million cubic feet from out of state. The total liquids extracted from gas in Illinois amounted to 4.4 million barrels, a significant amount when compared with the 24 million barrels of crude oil production in the state.

### ***Expanded Perlite***

Crude perlite mined outside the state was processed by two companies: Silbrico Corporation in Cook County and Johns-Manville Sales Corporation in Will County. Strong-Lite Products Corporation of Illinois in De Kalb County was idle in 1987. Illinois ranked fifth out of 32 states in sales of expanded perlite in 1987, behind Mississippi, Pennsylvania, California, and Georgia. Production in 1987 dropped 3.3 percent, and sales of expanded perlite decreased 1.1 percent. The price per ton increased 9.7 percent in 1987.

Expanded perlite is used primarily as roof insulation board and for horticultural purposes. Other uses include aggregate for concrete and plaster, insulation, and filters.

### ***Pig Iron and Raw Steel***

For the first time, production figures and value of pig iron cannot be revealed. However, pig-iron output in Illinois increased in 1987, but the average value per ton dropped more than 9 percent, resulting in a slight decline in total value. The increase in production was due to a stronger demand; also, because 1986 production had been depressed by major strikes from August 1986 through January 31, 1987. Employees at the USX, South Works, Chicago plant were called back in early February. By midyear, the plant was operating at its former level of capacity with nearly all workers back on the job. Consumption of pig iron in Illinois increased about 9 percent from 2.4 million tons in 1986 to 2.6 million tons in 1987.

Illinois ranked seventh of ten states shipping pig iron in 1987. In the United States, pig iron was produced by 15 companies in 78 blast furnaces. Five blast furnaces are in Illinois.

The American Iron and Steel Institute in Washington, D.C. ranked Illinois fifth in raw steel production with 7.14 million tons, or 7.9 percent of the U.S. output in 1987. That is up about 11 percent from the 6.41 million tons in 1986. Indiana, Ohio, Pennsylvania, Michigan, and Illinois accounted for about 70 percent of total raw steel production.

### **Slag (Iron and Steel)**

In 1987, three companies operating five plants processed slag from iron and steel furnaces, three companies processed steel slag, and two companies produced air-cooled blast furnace slag. Slag was used mostly for construction aggregate. Iron and steel slag sales decreased about 14 percent in 1987.

### **Recovered Elemental Sulfur**

Four companies in three counties, Crawford, Madison, and Will, recovered elemental sulfur as a by-product of oil refinery operations. Sales of sulfur decreased 30.5 percent from 368,454 tons in 1986 to 255,929 tons in 1987; the value per ton increased from an average \$99.28 per ton in 1986 to \$101.72 per ton in 1987 for a total value of \$26 million.

### **Exfoliated Vermiculite**

Two companies in Du Page and La Salle Counties process exfoliated vermiculite from crude vermiculite mined outside the state. The state's sales rose 8 percent and value 3.3 percent in 1987. The average value per ton dropped 4.4 percent. In Illinois, exfoliated vermiculite has the following uses:

	1986 (%)	1987 (%)
Loose-fill insulation	27.3	21.8
Block insulation	14.6	13.0
Concrete aggregate	16.5	13.5
Horticulture and agriculture	11.2	12.3
Plaster aggregates, steel mills, and fireproofing	30.4	39.4

### **Primary and Secondary Slab Zinc**

Amax Zinc Company in St. Clair County processed special high-grade zinc from domestic and foreign ores and concentrates. Four primary smelters are producing in Illinois, Oklahoma, Pennsylvania, and Tennessee.

During 1987, secondary slab zinc was processed at Illinois Smelting and Refining Company in Cook County. The New Jersey Zinc Company in Bureau County processes zinc dust but no longer produces secondary slab zinc. Production data for individual states are not available.

Approximately 200 firms in Illinois, Indiana, New York, Ohio, and Pennsylvania account for about 60 percent of the slab zinc consumption in the U.S.

## **PRODUCTS MANUFACTURED FROM MINERALS**

Cement, clay products, coke, glass, and lime were manufactured in 1987 from crude mineral materials mined in and out of state.

### **Cement**

*Production.* Approximately 2.9 million tons of raw materials were used to manufacture cement in Illinois in 1987. The raw materials include cement rock (an argillaceous limestone containing lime, silica, alumina, and magnesia), limestone, clay, shale, sand, fly ash, slag, gypsum, and tripoli. In 1987, four companies produced cement in Illinois: Illinois Cement Company, a subsidiary of Centex Corporation, and Lone Star Industries, both in La Salle County; Dixon-Marquette Cement, a subsidiary of Prairie Materials Sales in Lee County; and Missouri Portland Cement Company, a division of Cementia Oldings AG in Massac County. All four companies produced portland cement, and all except Illinois Cement Company produced masonry cement. After closing in March 1986, Missouri Portland Cement Company reopened in June 1987 because of improved demand for cement, putting one of its two kilns back on stream.



Portland cement sales for 1987 stayed approximately the same as in 1986. The value per ton increased about 3 percent from \$39.55 in 1986 to \$40.69 in 1987 (table 22). Prepared masonry sales increased 67 percent, but the price per ton dropped 14 percent.

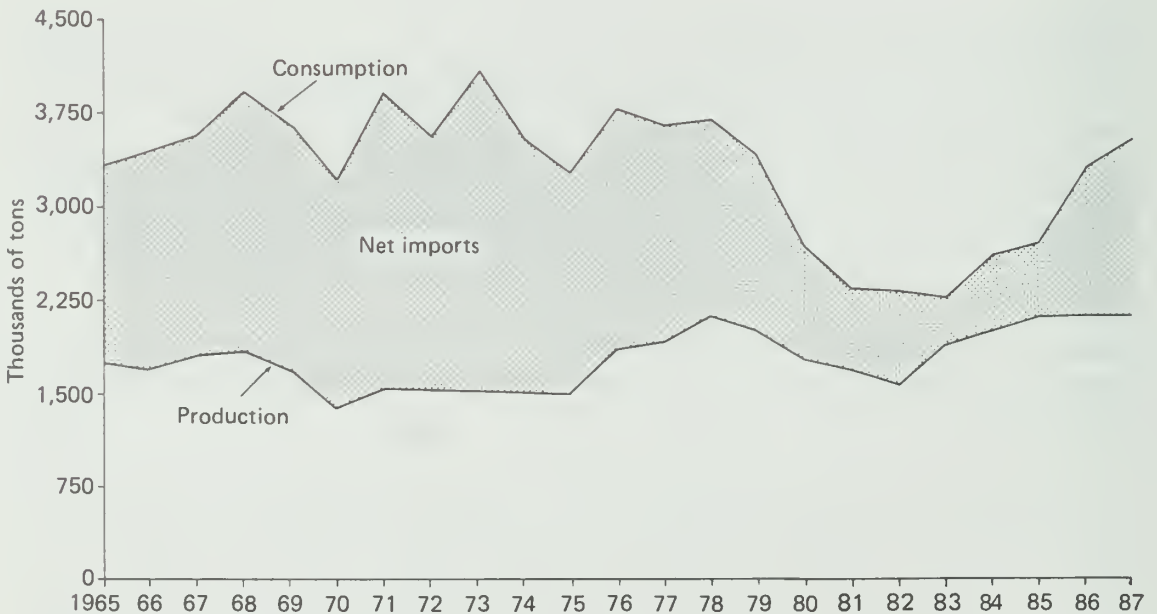
Nearly all of the cement was delivered by truck in bulk form, though a small amount was shipped by rail and barge.

*Consumption.* Illinois consumed about 3.5 million tons of portland cement and 96,000 tons of masonry cement in 1987 (fig. 12). These figures show a growth of 6.7 percent in the use of portland cement and a 7.9 percent gain for masonry cement, indicating an upturn in construction activity. Actually, there was about a 13-percent increase in the use of portland and masonry cement in the Chicago metropolitan area (Cook, Du Page, Kane, Kendall, Lake McHenry, and Will Counties) and about a 1-percent decrease in the remaining counties of Illinois. About 82.5 percent of the portland cement consumed was used by ready-mix concrete producers, 6.7 percent by manufacturers of concrete products and building material dealers, and 10.8 percent by government agencies and others for highway construction and related purposes.

**Clay Products**

To obtain accurate current information about the amount and value of clay products manufactured in Illinois, the Illinois State Geological Survey sends questionnaires every year to all producers in the state. Four companies reported mining clay in Illinois in 1987.

Clay products were valued at \$63.1 million in 1987. Whiteware and pottery increased from \$33.2 million in 1986 to \$44.9 million in 1987. All other clay products decreased from \$21.6 million in 1986 to \$18.2 million in 1987.



**Figure 12** Production and consumption of finished portland cement in Illinois, 1965-1987.

## Coke

*Production.* All data on coke production in Illinois have been withheld. U.S. production declined about 10 percent in 1987. The U.S. Department of Energy no longer provides data on by-products on a state-by-state basis. The average U.S. price of coal receipts at coke plants in 1987 was \$45.89 per ton compared with \$50.83 per ton in 1986.

*Consumption and uses.* Coke is used for pig iron production, foundry and other industrial purposes, and residential heating. Coke breeze was used as fuel in steam and agglomerating plants. Data on coke breeze on a state-by-state basis are no longer available.

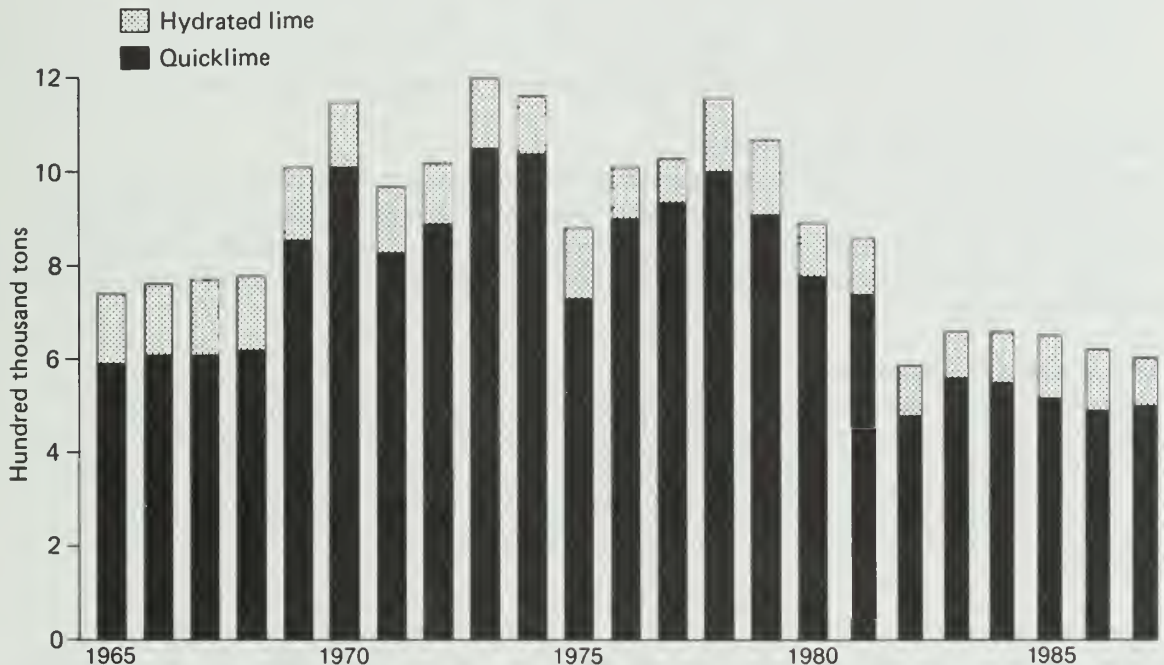
## Glass

Glass and/or fiberglass was manufactured in Du Page, Lake, La Salle, Logan, McLean, Macon, Madison, Marion, Montgomery, St. Clair, and Will Counties. Production data are not available.

## Lime

*Production.* In 1987, lime production in Illinois ranked seventh of 34 producing states. Data for lime cannot be disclosed. However, because of the increase in demand from the steel industry, production and value increased 7.5 and 3.2 percent, respectively. Three plants in Cook County supplied the state's entire output: two plants owned by Marblehead Company, a division of General Dynamics, produced quicklime and hydrated lime; and Vulcan Materials Company produced quicklime. Marblehead Company was the third-largest company of 72 producing lime in the United States.

*Consumption and uses.* In 1987, Illinois consumed 507,000 tons of quicklime and 99,000 tons of hydrated lime, an increase of 3.3 percent in quicklime and a drop of 25.6 percent in hydrated lime (fig. 13). The main chemical and industrial use of lime is in the production of basic oxygen furnace (BOF) steel.



**Figure 13** Trends in consumption of quicklime and hydrated lime, 1965-1987.

## **PRELIMINARY PRODUCTION DATA: 1988**

### **Minerals Extracted**

For 1988, the data indicate that the total value of minerals mined was about \$2.4 billion—an 8.5-percent decrease from the 1987 level (table 23). The decrease was caused primarily by declining coal and oil production. Per-ton value of coal in 1988 was estimated to have declined slightly; and the price of oil was down substantially from the 1987 average and was closer to the 1986 average per-barrel value. Coal continued to be the leading mineral commodity in Illinois, contributing more than 68 percent to the total value. Oil ranked second, followed by stone, sand and gravel, and industrial sand.

### ***Fuels***

Fossil fuels were valued at about \$2 billion in 1988, or 11 percent lower than in 1987.

*Coal.* The estimated per-ton value of coal for 1988 is \$29, down 60 cents from 1987. The amount of coal extracted is estimated to have decreased 7 percent to 56.6 million tons. The drop in production continued to be due to the decrease in consumption by electric utilities and coke and gas plants (table 24). Coal shipments decreased to Indiana, Missouri, and Georgia, as well as to in-state users. Increases were recorded in shipments to Wisconsin, Iowa, Florida, and Tennessee (table 25).

Tek-Bar Industries has announced plans to develop a slope mine just east of Harrisburg in southern Illinois and employ about 100 people. The company also operates an underground mine in Gallatin County.

*Crude oil and natural gas.* Crude oil production in 1988 is estimated at 22.5 million barrels—a 6.7-percent decrease (table 23). The 1988 production is estimated to be worth \$332.4 million based on an estimated value of \$14.79 per barrel. Oil price per barrel is estimated to have decreased 15.5 percent from 1987 to 1988.

The new owners of the petroleum refinery in Lawrenceville, Oil Producers Association of Springfield, plan to reopen the plant, which was closed during the 1985 oil-demand slump. This will be a big boost to the local economy, as 375 workers lost jobs when the plant closed.

From 1987 to 1988, natural-gas production and value showed a loss of about 2.3 and 4.4 percent, respectively. The estimated unit value decreased 2.2 percent to \$2.19 per Mcf in 1988.

### ***Industrial and Construction Materials***

Preliminary data for 1988 show an increase of about 5.8 percent in total value for industrial and construction materials. Gains were registered in stone, sand and gravel, clay, and tripoli. However, for tripoli the production alone grew; the value decreased. Losses were expected in fluorspar and industrial sand. Crushed stone was the leading nonfuel commodity, followed by sand and gravel and industrial sand.

### ***Metals and Other Minerals***

Lead, zinc, copper, and silver were recovered as by-products of Illinois fluorspar production in 1988. The total value of extracted metals increased about 9 percent from 1987 to 1988. Production of lead and zinc declined in 1988; however, price per ton increased for lead and zinc, as well as for copper. Silver production and value stayed the same. In other minerals, peat production and value declined 21 and 28 percent, respectively. Gemstones output remained unchanged.

### **Minerals Processed**

Preliminary data for 1988 are not yet available for most of the minerals processed in Illinois. The American Iron and Steel Institute reported that Illinois raw steel production rose to 7,758,000 net tons in 1988, about a 9-percent increase.

American Zinc Company sold its Sauget zinc refinery to Big River Minerals Corporation, a St. Louis-based investment firm, in September 1988. The plant will now be called Big River Zinc Corporation and employ approximately 365 people.

#### **Products Manufactured from Minerals**

Preliminary figures for 1988 show less than a 1-percent decline in portland cement production with a 1.5-percent increase in value. Masonry cement production fell 85 percent, though value per ton increased about 9 percent. Lone Star Industries has announced a modernization project for its Oglesby plant that is expected to boost its plant capacity by approximately 20 percent. Project completion is expected by the end of 1989.

In 1988, lime sales and value increased about 20 percent for the second year. This gain was attributed to the increase in demand by the steel industry.

Table 1 Illinois minerals extracted, processed, and manufactured into products, 1985-87: production and value<sup>a</sup>

Minerals	Unit	1985			1986			1987		
		Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)
<b>EXTRACTED</b>										
<b>FUELS<sup>c</sup></b>										
Coal	thousand tons	60,477	1,862,699	30.80	63,233	1,896,367	29.99	60,761	1,796,106	29.56
Crude oil	thousand bbl	30,226	813,093	26.90	27,245	400,498	14.70	24,096	421,685	17.50
Natural gas	million cu ft	1,324	3,668	2.77	1,887	4,851	2.57	1,371	3,071	2.24
TOTAL <sup>d</sup>			2,679,460			2,301,716			2,220,862	
<b>INDUSTRIAL AND CONSTRUCTION MATERIALS<sup>b</sup></b>										
Clay - common	thousand tons	265	876	3.30	283	1,092	3.86	233	977	4.19
Sand and gravel										
Common	thousand tons	26,600 <sup>d</sup>	77,000 <sup>e</sup>	2.89 <sup>e</sup>	27,867	82,523	2.96	28,300	98,300 <sup>e</sup>	3.30 <sup>e</sup>
Industrial	thousand tons	4,056	56,915	4.03	4,037	52,133	2.91	4,346	5,547	0.48
Stone (limestone & dolomite)										
Crushed & broken	thousand tons	1,044	164,117	4.00	4,200 <sup>e</sup>	179,600 <sup>e</sup>	4.06 <sup>e</sup>	2,102	216,212	4.15
TOTAL <sup>b</sup>			299,015			315,455			356,036	
<b>METALS<sup>c</sup></b>										
<b>OTHERS</b>										
Gem stones		NA	15	--	NA	15	NA	NA	15	NA
TOTAL <sup>d</sup>			15			15			15	
Values that cannot be disclosed (W)										
Total value of mineral materials <sup>b</sup>			3,138,029			2,656,560			2,620,142	
<b>PROCESSED<sup>c</sup></b>										
Pig iron	thousand tons	2,921	480,795	164.58	2,379	356,490	149.86	W	W	W
Sulfur	thousand tons	194	19,895	102.61	368	36,581	99.28	255	26,034	101.72
TOTAL <sup>d</sup>			524,861			393,071			26,034	
Values that cannot be disclosed (W)										
Total value of mineral materials processed <sup>d</sup>			15,529			40,787			390,169	
			540,390			433,858			416,203	



Table 1 continued

Minerals	Unit	1985			1986			1987		
		Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)	Quantity	Value (\$1000)	Average unit <sup>b</sup> value (\$)
<b>MANUFACTURED INTO PRODUCTS<sup>c</sup></b>										
Cement (shipments)										
Portland	thousand tons	2,101	86,211	41.04	2,118	83,783	39.55	2,119	86,210	40.69
Clay products, estimated										
TOTAL <sup>d</sup>			71,372			54,743			63,070	
Values that cannot be disclosed (W)			157,583			138,526			149,280	
Total value of mineral products manufactured <sup>e</sup>			47,715			39,196			40,615	
			205,298			177,722			189,895	
STATE TOTAL <sup>d</sup>			\$3,757,767			\$3,268,140			\$3,226,240	

<sup>a</sup>Sources: U.S. Bureau of Mines (USBM), Illinois Department of Mines and Minerals, Illinois State Geological Survey.

<sup>b</sup>Units used for reporting value are 1 barrel for oil, 1000 cubic feet for gas, 1 troy ounce for silver, and 1 ton for all other minerals and materials. Metals are reported in metric tons and other materials in short tons.

<sup>c</sup>EXTRACTED, Fuels - natural gas liquids

Industrial and construction materials - absorbent clay, fluorspar, dimension stone, tripoli

Metals - lead, zinc, silver, copper

Other - peat

PROCESSED - Natural gas liquids, expanded perlite, ground banite, calcined gypsum, exfoliated vermiculite, iron-oxide pigments, primary slab zinc, secondary slab zinc, columbium and tantalum, crude iodine, slag (iron and steel)

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

<sup>e</sup>Estimate by USBM, no survey.

TABLE 2 Illinois mineral production compared to U.S. mineral production, 1986-87<sup>a</sup>

Commodity	Unit	Illinois			United States			Illinois % of U.S. Production		
		Quantity	Value (\$1000)	Value (\$1,000)	Quantity	Value (\$1,000)	Value (\$1,000)	Quantity	Value	Value
<b>1986</b>										
Coal	thousand tons	63,233	1,896,367		885,880	21,075,085		7.14	9.00	
Crude oil	thousand bbls	27,245	400,298		3,168,353	39,634,833		0.86	1.01	
Natural gas liquids	thousand bbls	NA	NA		NA	NA		-	-	
Natural gas	million cu ft	1,887	4,851		16,790,910	32,574,365		0.01	0.01	
Clays <sup>b</sup>	thousand tons	283	1,092		44,620	1,095,179		0.63	0.10	
Fluorspar shipments	thousand tons	W	W		78	13,494		-	-	
Sand and gravel	thousand tons	31,904	134,656		883,000	2,746,130		3.61	4.90	
Stone (includes dimension stone)	thousand tons	46,200	179,707		1,024,175	4,428,680		4.51	4.06	
Lead	thousand tons	W	W		353	155,320		-	-	
Zinc	thousand tons	W	W		203	170,050		-	-	
Peat, commercial sales	thousand tons	W	W		886	23,560		-	-	
Pig iron	thousand tons	2,379	356,490		44,287	8,304,698		5.37	4.29	
Coke	thousand tons	NA	NA		25,540	NA		-	-	
Cement shipments (portland)	thousand tons	2,118	83,783		87,592	4,407,722		2.41	1.90	
Lime	thousand tons	W	W		14,474	761,188		-	-	
<b>1987</b>										
Coal	thousand tons	60,761	1,796,106		918,762	21,205,040		6.61	8.47	
Crude oil	thousand bbls	24,096	422,410		3,047,378	46,960,095		0.79	0.90	
Natural gas liquids	thousand bbls	NA	NA		585,000	NA		-	-	
Natural gas	million cu ft	1,371	3,071		17,348,537	28,888,630		0.01	0.01	
Clays <sup>b</sup>	thousand tons	233	977		47,657	1,202,284		0.49	0.08	
Fluorspar shipments	thousand tons	W	W		80	13,840		-	-	
Sand and gravel	thousand tons	32,646	138,847		896,900	3,004,615		3.64	4.62	
Stone (includes dimension stone)	thousand tons	52,102	216,212		1,051,000	4,403,690		4.96	4.91	
Lead	thousand tons	W	W		330	254,000		-	-	
Zinc	thousand tons	W	W		220	202,000		-	-	
Peat, commercial sales	thousand tons	W	W		900 <sup>c</sup>	20,700 <sup>c</sup>		-	-	
Pig iron	thousand tons	W	W		48,308	9,166,443		-	-	
Coke	thousand tons	NA	NA		28,307	NA		-	-	
Cement shipments (portland)	thousand tons	2,119	86,210		74,500	3,799,500		2.84	2.27	
Lime	thousand tons	W	W		15,200	789,032		-	-	

<sup>a</sup> Sources: U.S. Bureau of Mines, Illinois State Geological Survey, Illinois Department of Mines and Minerals, and American Petroleum Institute.

<sup>b</sup> Excluding fuller's earth.

<sup>c</sup> Estimated.

NA = not available. W = withheld to avoid disclosing confidential data from individual companies.

TABLE 3 Minerals extracted, processed, and manufactured by county in Illinois, 1987<sup>a</sup>

County	Approximate rank based on total value <sup>b</sup>	Minerals extracted in order of value <sup>c</sup>	Minerals processed, in order of value	Mineral products, in order of value
Adams	35	Stone, crude oil, sand/gravel	Iron oxide pigments	--
Alexander	46	Tripoli	--	--
Bond	62	Crude oil, sand/gravel, clay	--	--
Boone	75	Sand/gravel, stone	--	--
Brown	80	Crude oil	--	--
Bureau	78	Sand/gravel	--	Clay products
Calhoun	95	Stone	--	--
Carroll	84	Stone	--	--
Cass	100	--	--	--
Champaign	60	Sand/gravel	--	--
Christian	14	Coal, crude oil, stone	--	--
Clark	49	Crude oil, stone, sand/gravel	--	--
Clay	32	Crude oil, stone	--	--
Clinton	9	Coal, crude oil, natural gas, sand/gravel	--	--
Coles	47	Crude oil, stone, sand & gravel, natural gas,	--	--
Cook	7	Stone, sand/gravel, peat	Expanded perlite, slag, pig iron <sup>a</sup> , secondary slab zinc <sup>o</sup>	Lime, coke <sup>o</sup>
Crawford	18	Crude oil, sand/gravel	Sulfur	Clay products
Cumberland	89	Sand/gravel, crude oil	--	--
De Kalb	59	Stone, sand/gravel	--	--
De Witt	85	Crude oil, sand/gravel	--	--
Douglas	24	Coal, stone, crude oil	Natural gas liquids <sup>o</sup>	--
Du Page	48	Sand/gravel	Exfoliated vermiculite	Glass <sup>o</sup>
Edgar	81	Crude oil, natural gas	--	--
Edwards	44	Crude oil	--	--
Effingham	52	Crude oil, natural gas, sand/gravel	--	--
Fayette	30	Crude oil, stone, sand/gravel, natural gas	--	--
Ford	87	Sand/gravel	--	--
Franklin	2	Coal, crude oil	--	--
Fulton	37	Coal, sand/gravel	--	--
Gallatin	16	Coal, crude oil, sand/gravel, natural gas	--	--
Greene	91	Stone	--	--
Grundy	64	Sand/gravel	--	--
Hamilton	31	Coal, crude oil	--	--
Hancock	72	Stone, crude oil	--	--
Hardin	34	Fluorspar, stone, zinc, lead copper, silver, gemstones, germanium <sup>o</sup>	Ground/crushed barite <sup>o</sup>	--
Henderson	82	Stone, sand/gravel	--	--
Henry	93	Stone, sand/gravel	--	--
Iroquois	101	--	--	--
Jackson	10	Coal, stone, sand/gravel, crude oil	--	--
Jasper	41	Crude oil	--	--
Jefferson	5	Coal, crude oil	--	--
Jersey	96	Stone	--	--
Jo Daviess	73	Stone, sand/gravel	--	--
Johnson	69	Stone	--	--
Kane	25	Sand/gravel, stone <sup>f</sup>	--	Clay products
Kankakee	50	Stone, sand/gravel, clay	--	--
Kendall	71	Stone, sand/gravel	--	--
Knox	39	Sand/gravel	--	Clay products
Lake	42	Sand/gravel, peat	Calcined gypsum, crude iodine <sup>o</sup> , columbium <sup>o</sup>	Clay products
La Salle	11	Industrial sand, sand/gravel, stone, clay	Exfoliated vermiculite	Portland cement, clay products, masonry cement, glass <sup>o</sup>

TABLE 3 *continued*

County	Approximate rank based on total value <sup>b</sup>	Minerals extracted in order of value <sup>c</sup>	Minerals processed, in order of value	Mineral products, in order of value
Lawrence	20	Crude oil, sand/gravel	--	--
Lee	29	Stone	--	Portland/masonry cement
Livingston	45	Stone, clay, sand/gravel	--	--
Logan	23	Coal, stone, sand/gravel	--	Glass <sup>o</sup>
Macon	65	Crude oil, sand/gravel	--	Glass <sup>o</sup>
Macoupin	8	Coal, stone, crude oil	--	--
Madison	36	Stone, crude oil, sand/gravel	Sulfur, slag <sup>o</sup> , pig iron <sup>d</sup>	Clay products, coke <sup>o</sup> , glass <sup>o</sup>
Marion	21	Crude oil	Secondary slab zinc <sup>o</sup>	Glass <sup>o</sup>
Marshall	74	Sand/gravel	--	--
Mason	54	Industrial sand, sand/gravel	--	--
Massac	27	Sand/gravel	--	Portland & masonry cement
McDonough	38	Coal, stone, crude oil	--	Clay products
McHenry	28	Sand/gravel	--	--
McLean	53	Sand/gravel	--	Fiberglass <sup>o</sup>
Menard	77	Stone	--	--
Mercer	92	Stone	--	--
Monroe	76	Stone, crude oil	--	--
Montgomery	51	Stone, crude oil, natural gas	--	Glass <sup>o</sup>
Morgan	90	Natural gas, crude oil	--	--
Moultrie	98	Crude oil, sand/gravel	--	--
Ogle	43	Industrial sand, stone	--	--
Peoria	63	Sand/gravel, stone	Slag <sup>o</sup>	--
Perry	1	Coal, crude oil	--	--
Piatt	88	Sand/gravel, crude oil	--	--
Pike	67	Stone, sand/gravel, natural gas	--	--
Pope	99	Fluorspar <sup>o</sup> , lead <sup>o</sup> , zinc <sup>o</sup> , silver <sup>o</sup>	--	--
Pulaski	26	Clay, stone, sand/gravel	--	Clay products
Putnam	97	Sand/gravel	--	--
Randolph	4	Coal, crude oil, stone, sand/gravel, natural gas	--	--
Richland	40	Crude oil	--	--
Rock Island	61	Stone, sand/gravel	--	--
St. Clair	15	Coal, stone, sand/gravel, crude oil, natural gas	Iron-oxide pigments, ground barite <sup>o</sup> , Primary slab zinc <sup>o</sup>	Glass <sup>o</sup>
Saline	3	Coal, crude oil, natural gas	--	--
Sangamon	56	Sand/gravel, crude oil	Iron-oxide pigments	--
Schuyler	33	Coal, natural gas, sand/gravel, crude oil, stone	--	--
Scott	86	Stone	--	--
Shelby	83	Crude oil, stone	--	--
Stark	102	--	--	--
Stephenson	70	Stone, sand/gravel	--	--
Tazewell	94	Sand/gravel	--	--
Union	57	Stone	--	--
Vermilion	55	Stone, sand/gravel	--	--
Wabash	6	Coal, crude oil, sand/gravel	--	--
Warren	79	Stone	--	--
Washington	17	Coal, crude oil, stone	--	--
Wayne	22	Crude oil, natural gas	--	--
White	12	Coal, crude oil, sand/gravel	--	--
Whiteside	58	Peat, stone, sand/gravel	--	--
Will	18	Stone, sand/gravel	Sulfur, expanded perlite	Glass <sup>o</sup>
Williamson	13	Coal, crude oil, natural gas	--	--
Winnebago	66	Stone, sand/gravel	--	--
Woodford	68	Sand/gravel	--	--
Undistributed		Stone, crude oil	Pig iron	--

<sup>a</sup>Sources: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Illinois State Geological Survey.

<sup>b</sup>Since some values are not available by county, ranking cannot be exact.

<sup>c</sup>Sand and gravel production; 1987 data were estimated to rank each county.

<sup>d</sup>Pig iron not available by county.

<sup>e</sup>Including dimension stone.

<sup>o</sup>Value unknown; not included in total.

<sup>o</sup>Pope County fluorspar and metal values included in Hardin County.



TABLE 4 Employment and wages in the Illinois mineral industry, 1986-87<sup>a</sup>

	1986				1987			
	No. of employees (1000)	Average weekly earnings (\$)	Average hours worked/week	Average hourly earnings (\$)	No. of employees (1000)	Average weekly earnings (\$)	Average hours worked/week	Average hourly earnings (\$)
Mining	25.2	599.13	40.7	14.72	23.4	606.60	39.3	15.44
Bituminous coal	14.6	660.17	40.4	16.35	14.2	655.45	38.1	17.21
Oil and gas extraction	5.2	503.92	39.7	12.71	4.3	515.56	39.6	13.03
Other	5.4	525.79	42.5	12.27	4.9	544.93	42.5	12.46
Processing	61.7	558.68	43.2	12.95	60.1	568.55	43.3	13.17
Primary metal industries	55.4	552.32	43.6	12.67	53.8	561.44	43.6	12.89
Petroleum refining	6.3	614.66	40.0	15.38	6.3	629.27	40.5	15.53
Manufacturing	31.7	486.79	40.7	11.96	32.5	494.42	41.0	12.08
Glass and glass products	6.7	512.33	43.2	11.87	6.4	488.31	40.3	12.13
Cement and clay products	3.6	386.50	38.4	10.07	3.3	417.27	41.2	10.13
Other stone and clay, glass	13.1	447.24	40.8	10.95	14.4	455.31	41.5	10.97
Petroleum and coal products	8.3	572.14	39.7	14.43	8.4	596.41	40.6	14.69

<sup>a</sup>Source: Illinois Department of Labor, Bureau of Employment Security.

**TABLE 5 Minerals consumed in Illinois 1986-87<sup>a</sup>**

Commodity	Unit	1986			1987		
		U.S.	Illinois	Illinois % of U.S. consumption	U.S.	Illinois	Illinois % of U.S. consumption
<b>Fuels</b>							
Coal	million tons	804.4	38.1	4.74	842.5	35.4	4.20
Coke	million tons	25.4	NA	—	29.4	NA	—
Distillate fuel oils	million bbl	1,064.0	35.1	3.30	1,086.0	34.1	3.14
Gasoline	million bbl	3,056.0	110.9	3.63	3,145.0	112.4	3.57
Kerosene	million bbl	36.0	0.4	1.14	35.0	0.3	0.76
LPG and ethane	million bbl	552.0	36.6	6.63	588.0	42.3	7.19
Natural Gas	trillion cu ft	16.2	1.0	5.70	17.1	0.9	5.09
Residual fuel oil	million bbl	518.0	9.2	1.77	462.0	7.1	1.54
<b>Metals</b>							
Pig iron	million tons	45.6	2.4	5.20	50.0	2.6	5.15
Lead	thousand tons	1,125.5	70.2	6.24	1,230.4	72.0	5.85
Zinc (slab)	thousand tons	706.0	108.2	15.53	788.7	131.5	16.67
<b>Construction materials</b>							
Air-cooled slag	million tons	13.5	NA	—	13.5	NA	—
Asphalt and road oil	million bbl	164.0	6.2	3.77	170.0	6.1	3.59
Cement	million tons	92.1	3.4	3.67	94.1	3.6	3.82
Sand and gravel	million tons	883.0	27.9	3.16	896.2	28.3	3.16
Stone	million tons	1,023.2	44.2	4.32	1,200.1	52.1	4.34
<b>Agricultural and chemical materials</b>							
Feldspar	thousand tons	735.0	27.9	3.80	720.0	28.7	3.99
Fluorspar	thousand tons	578.8	8.1	1.40	598.4	NA	—
Lime <sup>b</sup>	thousand tons	14,658.0	624.0	4.30	15,758.0	606.0	3.85
Salt							
Evaporated	thousand tons	7,429.0	437.0	5.88	7,707	439.0	5.70
Rock	thousand tons	15,040.0	1,134.0	7.54	14,470	1,002.0	6.92

<sup>a</sup>Source: U.S. Bureau of Mines, U.S. Department of Energy.

<sup>b</sup>Excludes regenerated lime.

NA = not available.

TABLE 6 Fuels and energy consumed in Illinois, 1986-87<sup>a</sup>

Fuel	Units	1986	1987	Change	Trillion Btu <sup>b</sup>		
				1986-87 (%)	1986 <sup>c,*</sup>	1987 <sup>d</sup>	
Coal	thousand tons	38,089	35,362	- 7.2	817.5	758.9	
Natural gas	million ft <sup>3</sup>	924,280	873,436	- 5.3	952.0	900.5	
Gasoline	thousand bbl	110,906	112,409	+ 1.4	583.3	591.1	
Kerosene	thousand bbl	409	267	- 34.7	2.3	1.5	
Distillate fuel oil	thousand bbl	35,132	34,129	-2.9	204.6	198.8	
Residual fuel oil	thousand bbl	9,156	7,127	- 22.2	57.6	44.8	
Liquid petroleum gases	thousand bbl	36,627	42,328	+ 15.6	133.3	154.9	
Hydropower	million kWh	141	107	24.1	1.5	1.1	
Nuclear power	million kWh	42,614	50,194	+ 17.8	460.2	545.4	
TOTAL				- 0.5	3,212.3	3,197.0	
Illinois percentage of total U.S. energy consumption						4.5	4.4
Percentage of total energy consumed in Illinois							
Coal						25.45	23.74
Natural gas						29.63	28.17
Oil products						30.54	31.00
Nuclear power						14.33	17.06
Hydropower						0.05	0.03
						100.00	100.00

<sup>a</sup>Source: U.S. Department of Energy, Energy Information Administration.

<sup>b</sup>Fuel conversion factors: gasoline—5,253,000 Btu/bbl; kerosene—5,670 Btu/bbl; distillate fuel oil—5,825,000 Btu/bbl; residual fuel oil—6,287,000 Btu/bbl.

<sup>c</sup>1986 fuel conversion factors: coal—21,462,000 Btu/ton; natural gas—1,031 Btu/Mcf; LPG—3,640,000 Btu/bbl; nuclear power—10,799 Btu/kWh; hydropower—10,638 Btu/kWh.

<sup>d</sup>1987 fuel conversion factors: coal—21,462,000 Btu/ton; natural gas—1,031 Btu/Mcf; LPG—3,659,000 Btu/bbl; nuclear power—10,865 Btu/kWh; hydropower—10,280 Btu/kWh.

\*Revised.

TABLE 7 Coal production in Illinois counties, 1986-87<sup>a</sup>

County	1986 Production				1987 Production					
	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>
Christian <sup>c</sup>	1	2,733,528	--	2,733,528	81,978,505	1	2,159,510	--	2,159,510	63,835,116
Clinton	1	3,321,591	--	3,321,591	99,614,514	1	3,153,954	--	3,153,954	93,230,880
Douglas	2	950,230	--	950,230	28,497,398	1	983,779	--	983,779	29,080,507
Franklin	4	8,033,315	--	8,033,315	240,919,117	4	7,571,337	--	7,571,337	223,808,722
Fulton	1	--	595,952	595,952	17,872,600	1	--	625,905	625,905	18,501,752
Gallatin	3	1,190,002	414,723	1,604,725	48,125,703	3	1,320,822	463,599	1,784,421	52,747,485
Hamilton	1	1,087,680	--	1,087,680	32,619,523	1	595,351	--	595,351	17,598,575
Jackson	1	--	2,371,980	2,371,980	71,135,680	1	--	2,803,052	2,803,052	82,858,217
Jefferson	2	3,487,812	--	3,487,812	104,599,482	2	3,425,697	--	3,425,697	101,263,603
Logan	1	904,967	--	904,967	27,139,960	1	1,044,718	--	1,044,718	30,881,864
Macoupin	3	4,097,045	--	4,097,045	122,870,380	3	3,406,262	--	3,406,262	100,689,105
McDonough	1	--	480,450	480,450	14,408,696	1	--	456,988	456,988	13,508,565
Perry	7	242,198	13,277,797	13,519,995	405,464,650	6	--	11,047,853	11,047,853	326,574,535
Randolph	4	3,998,654	1,020,200	5,018,854	150,515,431	4	4,192,962	1,247,100	5,440,062	160,808,233
St. Clair	2	1,257,468	42,100	1,299,568	38,974,044	1	1,077,573	--	1,077,573	31,853,058
Saline	9	2,902,752	1,703,978	4,606,730	138,155,833	8	3,925,418	1,770,672	5,696,090	168,376,420
Schuyler	1	--	685,044	685,044	20,544,470	1	--	762,704	762,704	22,545,530
Wabash	1	2,892,505	--	2,892,505	86,746,225	1	2,957,464	--	2,957,464	87,422,636
Washington	1	1,423,700	--	1,423,700	42,696,763	1	1,610,800	--	1,610,800	47,615,248
White	1	1,463,310	--	1,463,310	43,884,667	1	1,437,785	--	1,437,785	42,500,925
Williamson <sup>d</sup>	4	944,867	1,709,454	2,654,321	79,603,087	4	325,038	2,395,025	2,720,063	80,405,062
TOTAL:	51	40,931,624	22,301,678	63,233,302	1,896,366,727	47	39,188,470	21,572,898	60,761,368	1,796,106,038

<sup>a</sup>Production figures from Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

<sup>b</sup>Value calculated at an average of \$29.29/ton for 1986 and \$29.56/ton for 1987.

<sup>c</sup>One mine operated at junction of Christian, Montgomery, and Sangamon Counties; all production placed in the county where tippie is located.

<sup>d</sup>One mine operated at junction of Williamson and Saline Counties; all production placed in county where tippie is located.



**TABLE 8** Coal production in Illinois counties, 1833-1987<sup>a</sup>

County	Cumulative total surface production (tons)	Cumulative total production (tons)	County	Cumulative total surface production (tons)	Cumulative total production (tons)
Adams	338,147	341,924	Macoupin	--	320,849,352
Bond	--	7,355,569	Madison	37,843	164,295,722
Brown	41,761	74,068	Marion	--	39,247,722
Bureau	11,094,808	53,823,055	Marshall	4,779	12,516,141
Calhoun	--	96,247	McDonough	2,765,078	5,373,559
Cass	--	212,477	McLean	--	5,544,139
Christian	--	345,724,981	Menard	--	13,462,005
Clark	4,482	4,482	Mercer	67,080	15,519,862
Clay	801	801	Monroe	--	8,284
Clinton	--	62,281,761	Montgomery	--	141,824,660
Coles	--	198,932	Morgan	13,564	190,787
Crawford	17,315	45,400	Moultrie	--	2,032,236
Douglas	--	40,960,407	Peoria	32,702,938	96,718,740
Edgar	207,242	915,698	Perry	338,209,431	436,878,116
Effingham	--	796	Pike	2,224	5,081
Franklin	--	664,295,415	Pope	34,704	36,266
Fulton	238,049,513	314,644,899	Putnam	--	10,071,893
Gallatin	8,556,390	39,835,442	Randolph	97,371,801	206,357,328
Greene	71,090	693,191	Richland	35	154
Grundy	1,635,422	40,872,430	Rock Island	--	3,846,169
Hamilton	--	6,130,688	St. Clair	116,444,567	364,944,481
Hancock	459,329	771,281	Saline	59,873,570	285,483,957
Hardin	--	40	Sangamon	--	233,449,607
Henry	9,065,783	22,910,053	Schuyler	7,788,825	9,492,241
Jackson	55,633,218	123,306,130	Scott	3,790	612,476
Jasper	--	23,739	Shelby	925	4,119,763
Jefferson	5,353,358	145,640,008	Stark	8,342,056	9,569,336
Jersey	2,290	120,350	Tazewell	--	17,633,802
Johnson	72,781	314,325	Vermilion	30,651,670	165,878,433
Kankakee	18,284,342	19,192,105	Wabash	12,082	28,628,839
Knox	62,601,174	65,896,605	Warren	132	685,466
La Salle	2,345,878	65,547,638	Washington	--	27,605,737
Livingston	139,091	10,111,437	White	--	5,525,911
Logan	--	18,738,250	Will	29,333,708	37,553,733
Macon	--	11,000,468	Williamson	96,904,152	453,814,186
			Woodford	--	7,810,160
Total cumulative surface production, 1911-1987			Estimated production, all counties, 1833-1881		
			73,386,123		
Total cumulative production, 1882-1987			Total cumulative production, 1833-1987		
			5,263,063,609		

<sup>a</sup> Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Reports. This table has been revised with production placed in county where tipple is located.

TABLE 9 Employment and production by method of coal mining in Illinois, 1976-87<sup>a</sup>

Year	Underground				Surface			
	No. of mines	No. of employees	Average production /mine (tons)	Average no. employees /mine	No. of mines	No. of employees	Average production /mine (tons)	Average no. employees /mine
1976	23	10,396	1,343,987	452	39	4,392	698,063	113
1977	25	11,375	1,183,559	455	45	4,739	539,810	105
1978	28	12,620	888,914	451	43	5,241	554,757	122
1979	31	13,200	1,054,233	426	40	5,299	671,422	132
1980	31	13,219	1,128,022	426	35	5,065	787,821	145
1981	31	13,351	943,081	431	27	4,797	835,672	178
1982	32	10,554	1,115,121	330	28	4,397	919,439	157
1983	31	10,514	1,076,464	339	23	4,245	1,087,096	185
1984	31	10,857	1,288,564	350	21	3,946	1,206,843	188
1985	32	11,386	1,207,769	356	20	3,445	1,091,432	172
1986	31	10,379	1,320,375	335	20	3,170	1,115,084	159
1987	28	9,263	1,399,588	331	19	2,925	1,135,416	154

<sup>a</sup>Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

TABLE 10 Coal production of Illinois companies, 1986-87<sup>a</sup>

Rank	Company	1986					1987					
		No. of mines		Production (tons)	Percentage of total production	No. of employees	Rank	No. of mines		Production (tons)	Percentage of total production	No. of employees
		Under-ground	Surface					Under-ground	Surface			
1	Peabody Coal	5	3	10,174,838	16.09	2,740	1	5	2	9,552,275	15.72	2,449
2	Consolidation Coal	2	3	9,985,724	15.79	1,688	2	2	3	8,751,152	14.40	1,294
3	Old Ben Coal	4	0	8,033,315	12.71	1,451	3	4	0	7,571,337	12.46	1,454
4	Arch of Illinois	0	2	6,747,423	10.67	833	4	0	2	5,661,485	9.32	1,454
5	Monterey Coal	2	0	5,321,134	8.42	1,163	6	2	0	4,978,613	8.19	1,116
6	Freeman United											
	Coal Mining	4	2	5,123,702	8.10	1,632	7	4	2	4,128,493	6.79	952
7	AMAX Coal	2	1	4,473,273	7.08	1,123	5	2	1	5,471,904	9.01	1,166
8	Zeigler Coal	4	0	2,992,123	4.73	591	8	3	0	3,424,862	5.64	569
9	Kerr-McGee Coal	1	0	1,980,163	3.13	504	9	1	0	2,216,402	3.65	508
10	Pipestone Greek Mining	0	1	1,891,239	2.99	215	10	0	1	1,694,452	2.79	200
11	White County Coal	1	0	1,463,310	2.31	236	11	1	0	1,437,785	2.37	233
12	Sahara Coal	2	1	1,170,219	1.85	450	12	1	1	1,056,313	1.74	449
13	Turris Coal	1	0	904,967	1.43	288	13	1	0	1,044,718	1.72	274
14	Black Beauty	0	1	685,044	1.08	123	15	0	1	762,704	1.25	118
15	Midland Coal	0	1	595,952	0.94	140	16	0	1	625,905	1.03	135
16	Jader Coal	0	1	414,723	0.66	56	18	0	1	463,599	0.76	67
17	Equality Mining	0	1	397,300	0.63	39	17	0	1	583,393	0.96	42
18	Carter Coal	1	0	242,198	0.38	7	-	-	-	-	-	-
19	Kenellis Energies	1	0	234,701	0.37	161	14	1	0	930,524	1.53	253
20	A & F Coal <sup>b</sup>	1	0	214,999	0.34	62	19	1	0	242,490	0.40	47
21	Williamson Coal	0	1	90,006	0.14	29	22	0	1	12,090	0.02	9
22	J. J. Truck Mining	0	1	54,718	0.09	6	21	0	1	34,137	0.06	5
23	Ace Diggin, Inc.	0	1	42,231	0.07	12	20	0	1	116,735	0.19	15
	TOTAL	31	20	63,233,302	100.00	13,549		28	19	60,761,368	100.0	12,188

<sup>a</sup>Source: Illinois Department of Mines and Minerals, Annual Coal, Oil and Gas Report.

<sup>b</sup>Was A & F Coal in 1986; now is TekBar Industries.

TABLE 11 Coal shipped from Illinois to other states, 1983-87<sup>a</sup>

Consumers	Minnesota & Michigan										Total
	Wisconsin	Iowa	Missouri	Indiana	Kentucky	Georgia & Florida	Other states <sup>b</sup>	Exports and miscellaneous	Illinois		
	(1,000 tons)										
<b>Electric utilities</b>											
1983	2,907	1,659	14,428	5,999	53	4,431	2,997	-	16,812	49,902	
1984	2,516	1,115	16,125	8,522	12	5,423	3,737	-	18,418	56,197	
1985	1,216	1,959	13,419	7,653	117	6,854	4,840	-	16,541	52,899	
1986	1,523	2,045	12,824	9,130	847	6,318	6,028	-	16,822	55,659	
1987	1,757	1,621	12,945	9,282	61	9,140	2,364	-	15,909	53,375	
<b>Coke and gas plants</b>											
1983	-	-	-	1,979	-	-	200	-	276	2,455	
1984	-	-	3	2,222	-	-	1	-	272	2,499	
1985	-	-	-	1,292	-	-	-	-	715	2,006	
1986	-	-	10	1,536	-	-	-	-	281	1,827	
1987	-	-	-	1,531	-	-	-	-	294	1,826	
<b>Retail dealers</b>											
1983	1	-	30	-	-	-	-	-	319	382	
1984	1	e	30	19	-	-	9	-	293	381	
1985	-	14	89	1	-	-	e	24	186	309	
1986	3	2	47	1	-	-	e	-	201	273	
1987	-	11	44	4	-	-	17	-	200	291	
<b>Others</b>											
1983	832	888	733	528	-	-	46	35	1,379	4,634	
1984	721	543	940	290	-	-	46	6	1,852	4,603	
1985	624	412	780	317	9	-	50	40	1,553	3,838	
1986	341	177	835	204	204	-	186	7	1,692	3,530	
1987	287	389	754	269	-	-	91	-	2,211	4,063	
<b>Totals<sup>c</sup></b>											
1983	3,739	2,547	15,192	8,506	53	4,431	3,243	329 <sup>d</sup>	18,786	57,717 <sup>d</sup>	
1984	3,238	1,659	17,098	11,053	12	5,423	3,793	25 <sup>d</sup>	20,836	63,707 <sup>d</sup>	
1985	1,872	2,385	14,288	9,262	125	6,854	4,889	117 <sup>d</sup>	18,995	59,171 <sup>d</sup>	
1986	1,867	2,224	13,716	10,871	847	6,318	6,213	202 <sup>d</sup>	18,996	61,493 <sup>d</sup>	
1987	2,044	2,020	13,743	11,087	61	9,140	2,472	345	18,614	59,899	

<sup>a</sup> Sources: U.S. Department of Energy, Coal Distribution, 1983-1987.

<sup>b</sup> Includes AL (1983-1987), MS (1983-87), TN (1983-87), LA (1983-87), OH (1984 + 86<sup>e</sup>, 87<sup>e</sup>), PA (1983-84, 86<sup>e</sup>, 87<sup>e</sup>), NY (1984<sup>e</sup>), KS (1983-87), TX (1983-87), CA (1983-87), SD (1984<sup>e</sup>), AR (1985-87), WV (1985<sup>e</sup>), MA (1986<sup>e</sup>-87<sup>e</sup>), ND (1986<sup>e</sup>), MT (1987<sup>e</sup>).

<sup>c</sup> Totals may not add up because of independent rounding.

<sup>d</sup> Includes shipments to foreign countries, with no breakdown by consuming sector: 294,000 tons in 1983, 19,000 tons in 1984, 44,000 tons foreign and 9,000 tons U.S. in 1985, 195,000 tons in 1986, 343,000 tons foreign, 2,000 U.S. in 1987.

<sup>e</sup> = Quantity is less than 500 tons.



TABLE 12 Coal shipped to Illinois from other states, 1983-87<sup>a</sup>

Consumers	(1,000 tons)										Total coal consumed in Illinois
	Illinois	Western Kentucky	Indiana	Ohio, eastern Pennsylvania, <sup>b</sup> and northern West Virginia	Southern West Virginia, <sup>c</sup> Virginia, and eastern Kentucky	Western interior <sup>d</sup> states	Western states <sup>e</sup>	Montana <sup>f</sup> and Washington	Pennsylvania		
<b>Electric utilities</b>											
1983	16,812	738	1,467	-	1,118	2	8,415	2,848	3	31,404	
1984	18,418	1,594	1,581	-	1,683	-	7,422	1,995	9	32,693	
1985	16,541	1,116	1,310	-	1,272	-	8,186	3,258	9	31,682	
1986	16,822	1,147	1,313	12	1,431	-	7,198	4,277	-	32,200	
1987	15,909	1,154	1,427	-	1,849	-	5,608	3,500	4	29,452	
<b>Coke and gas plants</b>											
1983	276	-	-	581	639	112	-	-	-	1,608	
1984	272	-	-	779	1,003	35	-	-	-	2,089	
1985	715	-	4	210	1,139	-	-	-	-	2,068	
1986	281	-	-	146	1,527	-	-	-	-	1,954	
1987	294	-	-	-	1,344	-	-	-	-	1,638	
<b>Retail dealers</b>											
1983	319	22	52	-	28	-	-	-	3	423	
1984	293	31	66	-	28	-	9	-	1	420	
1985	186	12	30	-	8	-	-	-	1	236	
1986	201	5	30	9	9	-	-	-	9	245	
1987	200	1	49	-	22	-	9	-	1	273	
<b>Others</b>											
1983	1,379	77	787	-	599	-	29	-	24	2,897	
1984	1,852	443	482	150	593	16	-	-	61	3,596	
1985	1,553	315	499	30	601	-	-	-	36	3,035	
1986	1,692	577	499	5	918	-	-	-	33	3,690	
1987	2,211	528	356	68	820	1	-	-	25	3,999	
<b>Total</b>											
1983	18,786	838	2,307	581	2,384	114	8,444	2,848	30	36,332	
1984	20,836	2,067	2,129	928	3,307	51	7,422	1,995	63	38,799	
1985	18,995	1,443	1,843	240	3,020	-	8,186	3,258	37	37,022	
1986	18,996	1,738	1,842	162	3,886	-	7,198	4,277	33	38,089	
1987	18,614	1,683	1,832	68	4,025	1	5,608	3,500	30	35,362	

<sup>a</sup>Sources: U.S. Department of Energy, Coal Distribution.

<sup>b</sup>Includes Districts 1, 2, 3, 4, and 6 (MD, OH, eastern PA, northern WV).

<sup>c</sup>Includes Districts 7, 8, and 13 (AL, GA, eastern KY, NC, TN, VA, southern WV).

<sup>d</sup>Includes Districts 14 and 15 (AR, KS, MO, OK, TX).

<sup>e</sup>Includes Districts 16, 17, and 19-21 (CO, ID, ND, NM, SD, UT, WY).

<sup>f</sup>Includes Districts 22 and 23 (AK, MT, OR, WA).

g = Quantity is less than 500 tons.

**TABLE 13** Crude oil production in Illinois counties between 1888 and 1987; value for 1986 and 1987<sup>a</sup>

County	1888-1987 cumulative production (1000 bbl)	1986			1987			1985-86 percent change
		Production (1000 bbl)	% of total Illinois production	Value <sup>d</sup> (\$1000)	Production (1000 bbl)	% of total Illinois production	Value <sup>d</sup> (\$1000)	
Adams	275	2	0.0	26	3	0.0	49	+55.0
Bond	8,000	74	0.3	1,091	69	0.3	1,200	- 7.6
Brown	1,926	104	0.4	1,526	70	0.3	1,226	-32.5
Champaign	7	--	--	--	--	--	--	--
Christian	29,286	519	1.9	7,633	347	1.4	6,071	-33.2
Clark-Cumberland	94,016	278	1.0	4,088	241	1.0	4,209	-13.5
Clay	146,543	1,486	5.5	21,851	1,274	5.3	22,297	-14.3
Clinton	87,726	240	0.9	3,530	264	1.1	4,628	+10.1
Coles	24,818	263	1.0	3,866	209	0.9	3,664	-20.4
Crawford	247,289	2,109	7.8	31,001	1,936	8.0	33,882	- 8.2
De Witt	3,691	49	0.2	724	48	0.2	848	- 1.6
Douglas	3,665	4	0.0	62	7	0.0	125	+70.3
Edgar	4,485	63	0.2	922	63	0.3	1,095	- 0.2
Edwards	55,687	882	3.2	12,967	635	2.6	11,106	-28.1
Effingham	19,330	278	1.0	4,084	295	1.2	5,156	+ 6.1
Fayette	408,833	1,655	6.1	24,322	1,365	5.7	23,886	-17.5
Franklin	79,413	1,005	3.7	14,775	876	3.6	15,325	-12.9
Gallatin	55,144	391	1.4	5,745	353	1.5	6,184	- 9.6
Hamilton	137,375	536	2.0	7,883	371	1.5	6,491	-30.8
Jackson	95	9	0.0	130	8	0.0	139	-10.8
Jasper	59,400	1,016	2.0	7,883	763	3.2	13,356	-24.8
Jefferson	92,624	1,321	4.9	19,422	1,265	5.2	22,130	- 4.3
Lawrence	417,311	2,920	10.7	42,918	2,584	10.7	45,228	-11.5
Macon	2,420	88	0.3	1,289	78	0.3	1,363	-11.5
Macoupin	367	11	0.0	161	18	0.1	309	+61.7
Madison	18,513	108	0.4	1,594	100	0.4	1,758	- 7.4
Marion	431,718	1,913	7.0	28,122	2,198	9.1	38,465	+14.9
McDonough- Hancock <sup>c</sup>	5,690	4	0.0	62	1	0.0	26	-65.0
Monroe	77	5	0.0	67	6	0.0	103	+29.8
Montgomery	153	8	0.0	110	3	0.0	53	-59.4
Morgan	1	1	0.0	15	f	0.0	8	-55.7
Moultrie	128	4	0.0	64	3	0.0	58	-23.6
Perry	933	11	0.0	162	9	0.0	151	-22.0
Piatt	8	1	0.0	10	f	0.0	3	-75.6
Randolph	4,968	91	0.3	1,332	9	0.0	91	-89.9
Richland	110,615	849	3.1	12,485	771	3.2	13,495	- 9.2
St. Clair	3,599	22	0.1	324	22	0.1	368	- 2.5
Saline	24,090	372	1.4	324	298	1.2	5,213	-19.9
Sangamon	4,975	82	0.3	1,213	84	0.3	1,288	-10.8
Schuyler	175	8	0.0	112	3	0.0	45	-65.9
Shelby	2,117	44	0.2	654	63	0.3	1,104	+41.9
Wabash	118,637	1,183	4.3	17,387	1,142	4.7	19,983	- 3.5
Washington	35,150	503	1.8	7,401	383	1.6	6,695	-24.0
Wayne	272,743	2,142	7.9	31,490	1,920	8.0	33,602	-10.4
White	312,245	2,603	9.6	38,271	2,223	9.2	38,899	-14.6
Williamson	2,689	26	0.1	376	26	0.1	452	+ 1.0
Other <sup>b</sup>	13,477	1,962	7.2	28,836	1,702	7.1	29,785	-13.3
Total <sup>e</sup>	3,342,412	27,245	100.0	400,498	24,096	100.0	421,685	-11.6

<sup>a</sup>Source: Illinois State Geological Survey Oil and Gas Section

<sup>b</sup>Could not be assigned to individual field or county.

<sup>c</sup>No oil production reported for Hancock County in 1971-1978; 123 bbl was produced in 1986 and 143 bbl in 1987.

<sup>d</sup>Value calculated at an estimated average price of \$14.70 per barrel for 1986 and \$17.50 per barrel for 1987.

<sup>e</sup>May not add up because of independent rounding.

<sup>f</sup>Less than 1,000 bbl.

**TABLE 14** Crude oil production from major fields (over 200,000 barrels per year) in Illinois 1986-87\*

Field	County	1986		1987		1986-87 Change (%)
		Production (1000 bbl)	% of Ill. total	Production (1000 bbl)	% of Ill. total	
Southeastern Illinois	Wabash					
	Lawrence					
	Crawford	5,548.9	20.4	5,116.7	21.2	- 7.8
	Clark					
	Cumberland					
Clay City Consolidated	Jasper					
	Clay					
	Wayne	2,963.4	10.9	2,657.4	11.0	- 10.3
Salem	Richland					
	Jasper					
Louden	Marion	1,831.8	6.7	2,315.3	9.6	+ 26.4
	Jefferson					
New Harmony Consolidated	Fayette	1,695.3	6.2	1,383.3	5.7	- 18.4
	Effingham					
Sailor Springs Consolidated	White	1,086.3	4.0	1,002.5	4.2	- 7.7
	Wabash					
	Edwards					
Phillipstown Consolidated	Clay	765.2	2.8	604.1	2.5	- 21.1
	Jasper					
	Effingham					
Herald Consolidated	White	517.6	1.9	468.2	1.9	- 9.5
	Edwards					
Roland Consolidated	White	441.7	1.6	346.8	1.4	- 21.5
	Gallatin					
Albion Consolidated	White	432.8	1.6	292.9	1.2	- 32.3
	Gallatin					
Benton	Edwards	422.0	1.5	337.2	1.4	- 20.1
	White					
Dale Consolidated	Franklin	311.0	1.1	241.5	1.0	- 22.3
	Hamilton					
	Saline	300.5	1.1	216.9	0.9	- 27.8
Divide Consolidated	Jefferson					
	Jefferson	286.7	1.1	289.3	1.2	+ 0.9
Goldengate Consolidated	Wayne	256.5	0.9	214.1	0.9	- 16.5
	White					
Mattoon	Coles	240.1	0.9	b	--	--
Mill Shoals	White	228.4	0.8	223.8	0.9	- 2.0
	Hamilton					
	Wayne					
Elk Prairie	Jefferson	227.6	0.8	b	--	--
Storms Consolidated	White	--	--	206.5	0.9	--
Parkersburg	Edwards	--	--	208.1	0.9	--
	Richard					
		<u>17,556.0</u>	<u>64.4</u>	<u>16,124.6</u>	<u>66.9</u>	<u>- 8.2</u>

\*Source: Illinois State Geological Survey Oil and Gas Section.  
b = Less than 200,000 barrels of oil per year.

**TABLE 15** Petroleum products consumed in Illinois, 1983-87<sup>a</sup>

	1983	1984	1985	1986	1987
	(1,000 bbl)				
Motor gasoline <sup>b</sup>	123,133	107,967	114,047	110,906	112,409
Kerosene	638	642	1,148	409	267
Distillate fuel oil	34,788	36,415	32,189	35,132	34,129
Residual fuel oil	13,700	11,821	7,250	9,156	7,127
Lubricants	3,180	3,391	3,160	3,090	3,493
Liquefied gases	27,037	31,310	33,891	36,627	42,328
Asphalt & road oil	5,365	5,727	7,500	6,185	6,130
Other <sup>c</sup>	<u>20,784</u>	<u>21,107</u>	<u>19,834</u>	<u>20,440</u>	<u>22,290</u>
Total	229,274	219,530	216,862	221,944	228,173

<sup>a</sup> Source: State Energy Data Report, U.S. DOE/EIA-0214.

<sup>b</sup> Aviation and motor gasoline and jet fuel

<sup>c</sup> Includes natural gasoline, unfractionated stream, plant condensate, petrochemical feedstocks, special naphthas, non-electric utility sector use of petroleum coke, still gas, wax, unfinished oils, motor gasoline and aviation gasoline blending components, and miscellaneous products.

**TABLE 16** Natural gas production in Illinois. 1980-87<sup>a</sup>

Year	Withdrawals			Marketed
	Gas wells	Oil wells	Total	
	(million cu ft)			
1980	1,333.6	240.4	1,574	1,574
1981	1,103.6	191.4	1,295	1,295
1982	993.5	168.5	1,162	1,162
1983	858.0	172.0	1,030	1,030
1984	1,399.6	130.4	1,530	1,530
1985	1,228.0	96.0	1,324	1,324
1986	1,545.9	341.6	1,888	1,888
1987	1,215.2	155.8	1,371	1,371

<sup>a</sup>Source: Illinois State Geological Survey Oil and Gas Section



**TABLE 17** Natural gas production from large fields in Illinois counties, 1985-87<sup>a</sup>

Gas field	County	Production (million cu ft)			Change (%)	
		1985	1986	1987	1985-86	1986-87
Stolletown	Clinton	165.2	256.1	167.7	+ 55.0	- 34.5
Mattoon	Coles	320.8	266.4	315.0	- 16.9	+ 18.2
Main Consolidated	Crawford	1.7	169.3	sold	+9723.0	-
Ashmore East	Edgar	42.6	49.9	57.5	+ 17.2	+ 15.2
Prentice	Morgan	59.4	210.7	165.0	+ 254.6	- 21.7
Fishhook	Pike	215.8	195.6	202.1	- 9.4	+ 3.3
Raleigh South	Saline	155.5	99.5	59.4	- 36.0	- 40.2
Rushville	Schuyler	-	132.5	119.9	-	- 9.5
Keenville	Wayne	69.4	319.8	141.2	+ 361.0	- 55.9
Griggsville	Pike	58.6	d	-	-	-
Other <sup>b</sup>		235.0	187.7	143.2	- 23.8	- 23.8
<b>TOTAL<sup>c</sup></b>		<b>1,324.0</b>	<b>1,887.5</b>	<b>1,371.0</b>	<b>+ 42.6</b>	<b>- 27.4</b>

<sup>a</sup> Source: Illinois State Geological Survey. Fields producing 50 million cu ft or more.

<sup>b</sup> Loudon, Fayette and Effingham Counties; Eldorado East, Gallatin County; Waggoner, Montgomery County; Eden, Randolph County; New Athens, St. Clair County; St. Libory, St. Clair County; Eldorado Consolidated and Eldorado West, Saline County; Pittsburg, Williamson County 1985, 1986, 1987; Harco South, Saline County (1985); Highland, Madison County (1985)

<sup>c</sup> Totals may not add up because of rounding.

d = abandoned

**TABLE 18** Natural gas consumed in Illinois 1986-87<sup>a</sup>

Consumers	1986		1987		1986-87 change (%)
	Quantity (million cu ft)	% of total consumption	Quantity (million cu ft)	% of total consumption	
Residential	437,081	47.3	407,875	46.7	- 6.7
Commercial	204,979	22.2	191,047	21.9	- 6.8
Industrial	263,847	28.5	261,168	29.9	- 1.0
Electric utilities	6,067	0.7	3,172	0.4	-47.7
Total delivered to consumers	911,947	98.7	863,261	98.8	- 5.3
Other uses <sup>b</sup>	12,306	1.3	10,175	1.2	-17.3
<b>Total consumption</b>	<b>924,280</b>	<b>100.0</b>	<b>873,436</b>	<b>100.0</b>	<b>- 5.5</b>

<sup>a</sup>Source: U.S. Department of Energy.

<sup>b</sup>Includes lease and plant fuel, pipeline fuel, and extraction loss.

**TABLE 19** Production and value of Illinois stone by district<sup>a</sup>, 1987<sup>b</sup>

County	Companies	Operations	Total quantity (1000 ton)	Value (\$1000)
<b>District 1</b>				
Boone	Jo Daviess	Stephenson		
Carroll	Kane	Whiteside		
Cook	Lee	Will	62	98
De Kalb	Ogle	Winnebago		
Henry	Rock Island	Various		
<b>District 2</b>				
Adams	Macoupin	Peoria		
Christian	McDonough	Pike		
Hancock	Menard	Schuyler	30	35
Henderson	Mercer	Scott		
Logan	Montgomery	Warren		
<b>District 3</b>				
Clark	Kankakee	Livingston		
Coles	Kendall	Shelby	20	33
Douglas	La Salle	Vermilion		
<b>District 4</b>				
Calhoun	Jackson	Pulaski		
Clay	Jersey	Randolph		
Fayette	Johnson	St. Clair	30	33
Greene	Madison	Union		
Hardin	Monroe	Washington		
	Total		142	199
			52,102	216,212

<sup>a</sup>See figure 9.<sup>b</sup>Source: U.S. Bureau of Mines.**TABLE 20** Illinois stone production by size of operation, 1985 and 1987<sup>a</sup>

Size of operation (tons/year)	1985			1987		
	No. of quarries	Production <sup>a</sup> (tons)	Percent of total	No. of quarries	Production <sup>b</sup> (tons)	Percent of total
less than 25,000	48	427,268	1.0	51	561,290	1.1
25,000 to 49,999	18	705,547	1.7	23	823,760	1.6
50,000 to 74,999	12	774,107	1.9	30	1,881,112	3.6
75,000 to 99,999	11	975,497	2.4	11	967,247	1.9
100,000 to 199,999	19	2,921,218	7.1	23	3,300,780	6.3
200,000 to 299,999	17	3,997,539	9.7	26	6,555,433	12.6
300,000 to 399,999	9	3,065,707	7.5	3	1,065,353	2.0
400,000 to 499,999	5	2,413,876	5.9	5	2,827,048	5.4
500,000 to 599,999	6	3,229,593	7.9	2		
600,000 to 699,999	2	1,264,595	3.1	6	3,878,071	7.4
700,000 to 799,999	6	4,527,242	11.0	5	2,810,059	7.3
800,000 to 899,999	0	—	—	4	3,360,449	6.5
900,000 and over	7	16,742,671	40.8	11	23,072,820	44.3
Total	160	41,043,858	100.0		52,102,422	100.0

<sup>a</sup> Source: U.S. Bureau of Mines. Due to the canvassing procedure used for stone production, 1986 information will not be available.<sup>b</sup> Excludes dimension stone.

TABLE 21 Use of crushed and broken stone produced in Illinois, 1985 and 1987<sup>a</sup>

Use	1985			1987			
	Total (tons)	% of total	1983-85 change (%)	Total (tons)	% of total	1985-87 change (%)	Average value/ton
Road-base stone	8,511,467	20.7	- 1.12	12,294,572	23.6	+44.4	3.60
Concrete aggregate	3,371,011	8.2	- 9.25	4,767,729	9.2	+41.4	3.96
Surface-treatment aggregate	1,119,571	2.7	-18.58	1,778,020	3.4	+58.8	5.16
Bituminous aggregate	3,102,705	7.6	+20.98	3,940,129	7.6	+27.0	4.49
Unspecified construction	2,276,438	5.6	-31.34	3,350,789	6.4	+47.2	3.69
Agricultural purposes <sup>b</sup>	3,164,972	7.7	+ 6.56	4,638,760	8.9	+46.6	3.48
Cement	2,577,261	6.3	- 8.89	1,762,387	3.4	-31.6	2.84
Macadam aggregate	1,616,985	3.9	-50.79	750,882	1.4	-53.6	4.09
Flux stone	W <sup>c</sup>	-	-19.27	W <sup>c</sup>	-	+ 2.6	4.33
Riprap and jetty	886,798	2.2	-52.12	677,249	1.3	-23.6	5.66
Railroad ballast	979,755	2.4	+67.74	574,533	1.1	-41.4	4.06
Other uses <sup>c</sup>	13,436,895	32.7	+30.40	17,567,372	33.7	+30.7	4.63
Total	41,043,858	100.0	-4.00	52,102,422	100.0	+26.9	4.15

<sup>a</sup>Source: U.S. Bureau of Mines. Due to the new reporting procedure implemented for stone, 1986 figures will not be available.

<sup>b</sup>Includes agricultural limestone and poultry grit.

<sup>c</sup>Includes stone for asphalt filler, chemicals, lime manufacture, mine dusting, filler, roofing aggregate, fill, waste material, whiting, other uses, and flux.

W = Withheld to avoid disclosing individual company confidential data.

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**TABLE 22** Portland cement manufactured in Illinois, 1986-87<sup>a</sup>

	1986	1987	Change (%) 1986-87
No. of active plants	4	4	-
Production (tons)	2,139,187	1,730,895	- 19.1
Shipments from mills			
Quantity (tons)	2,118,385	2,118,512	+ 0.0
Value (\$)	83,783,379	86,209,855	+ 2.9
Average value/ton	39.55	40.69	+ 2.9
Stocks at mills, Dec. 31			
(tons)	145,714	307,655	+111.1

<sup>a</sup>Source: U.S. Bureau of Mines.

**TABLE 23** Mineral production data for 1987 compared to preliminary data for 1988<sup>a</sup>

Minerals extracted	Unit	1987		1988		Percentage of change from 1987 to 1988	
		Quantity	Value (\$ 1000)	Quantity	Value (\$ 1000)	Quantity	Value
<b>Fuels</b>							
Coal	thousand tons	60,761	1,796,106	56,576	1,640,712 <sup>b</sup>	- 6.9	- 8.7
Crude oil	thousand bbl	24,096	421,685	22,476 <sup>b</sup>	332,420 <sup>b</sup>	- 6.7	- 21.2
Natural gas	thousand Mcf	1,371	3,071	1,340 <sup>b</sup>	2,935 <sup>b</sup>	- 2.3	- 4.4
<b>Industrial and construction materials</b>							
Stone <sup>c</sup>	thousand tons	52,102	216,212	54,300	224,900	+ 4.2	+ 4.0
Sand and gravel	thousand tons	32,646	138,847	35,250	153,600	+ 8.0	+ 10.6
Clay <sup>d</sup>	thousand tons	233	977	236	1,076	+ 1.3	+ 10.1
Fluorspar	thousand tons	W	W	W	W	- 2.4	- 2.4
Tripoli	thousand tons	W	W	W	W	+ 4.0	- 11.5
<b>Metals</b>							
Lead	tons	W	W	W	W	- 70.9	- 70.4
Zinc	tons	W	W	W	W	- 21.8	+ 88.1
Silver	troy ounce	W	W	--	--	--	--
Copper	tons	W	W	--	--	+ 38.5	+100.0
<b>Other</b>							
Peat	thousand tons	W	W	W	W	- 20.7	- 28.2
Gem stones		NA	15	--	15	--	--
Barite, primary	thousand tons	W	W	W	W	--	--
Values that cannot be disclosed (W)							
		--	43,229	--	42,043		- 2.7
Total value of minerals extracted			\$2,620,142		\$2,397,701		- 8.5

<sup>a</sup>Source: U.S. Bureau of Mines and Illinois Department of Mines and Minerals

<sup>b</sup>Estimated by Illinois State Geological Survey

<sup>c</sup>Dimension stone included with values that cannot be disclosed because 1987 must be concealed.

<sup>d</sup>Excludes fuller's earth; included with values that cannot be disclosed.

W = Withheld to avoid disclosing individual company confidential data.

**TABLE 24** Illinois coal shipped to consumers in the United States, 1986-88<sup>a</sup>

Consumers	1986	1987	1988	1986-87 change (%)	1987-88 (change %)
	Jan-Sept	Jan-Sept (1000 tons)	Jan-Sept		
Electric utilities	42,773	39,946	39,112	- 6.6	- 2.1
Coke and gas plant	1,573	1,382	1,040	- 12.1	- 24.7
Retail dealers	196	207	212	+ 5.6	+ 2.4
Others	2,604	3,034	3,226	+ 16.5	+ 6.3
Transportation	--	--	--	--	--
Used at mine	9	2	1	- 77.8	- 50.0
Mine stock (adjusted)	2,029	1,371	1,734	- 32.4	+ 26.5
Foreign	<u>202</u>	<u>207</u>	<u>332</u>	<u>+ 2.5</u>	<u>+ 60.9</u>
Total	47,350	44,778	43,921	- 5.4	- 1.9

<sup>a</sup> Source: U.S. Department of Energy, Coal Distribution, January-September, 1986, 1987, and 1988.

**TABLE 25** Coal shipments from Illinois to other states, 1986-88<sup>a</sup>

Consumers	1986	1987	1988	1986-87 change (%)	1987-88 (change %)
	Jan-Sept	Jan-Sept (1000 tons)	Jan-Sept		
Illinois	14,652	13,774	13,023	- 6.0	- 5.5
Missouri	10,368	10,432	9,988	+ 0.6	- 4.3
Indiana	8,352	8,248	6,963	- 1.2	- 15.6
Wisconsin	1,385	1,348	1,866	- 2.7	+ 38.4
Georgia	1,555	4,307	4,298	+177.0	- 0.2
Iowa	1,844	1,698	1,950	- 7.9	+ 14.8
Alabama	2,019	*	324	--	--
Florida	3,037	2,654	3,048	- 12.6	+ 14.8
Tennessee	985	2,356	934	+168.6	+ 5.5
Other states <sup>b</sup>	1,580	1,176	1,154	- 25.6	- 1.9
Exports	<u>202</u>	<u>207</u>	<u>332</u>	<u>+ 2.5</u>	<u>+ 60.4</u>
Total	47,350	44,778	43,921	- 5.4	- 1.9

<sup>a</sup> Source: U.S. Department of Energy, Coal Distribution, January-September, 1986, 1987, and 1988.

<sup>b</sup> Arkansas, California, Kansas, Kentucky (1986, 1987, 1988), Louisiana (1986-87), Massachusetts (1986, 1987, 1988), Michigan, Minnesota, Mississippi (1987, 1988), Montana (1987), North Dakota (1986) Ohio (1986, 1987, 1988), Pennsylvania (1986, 1987), Texas (1987, 1988).







