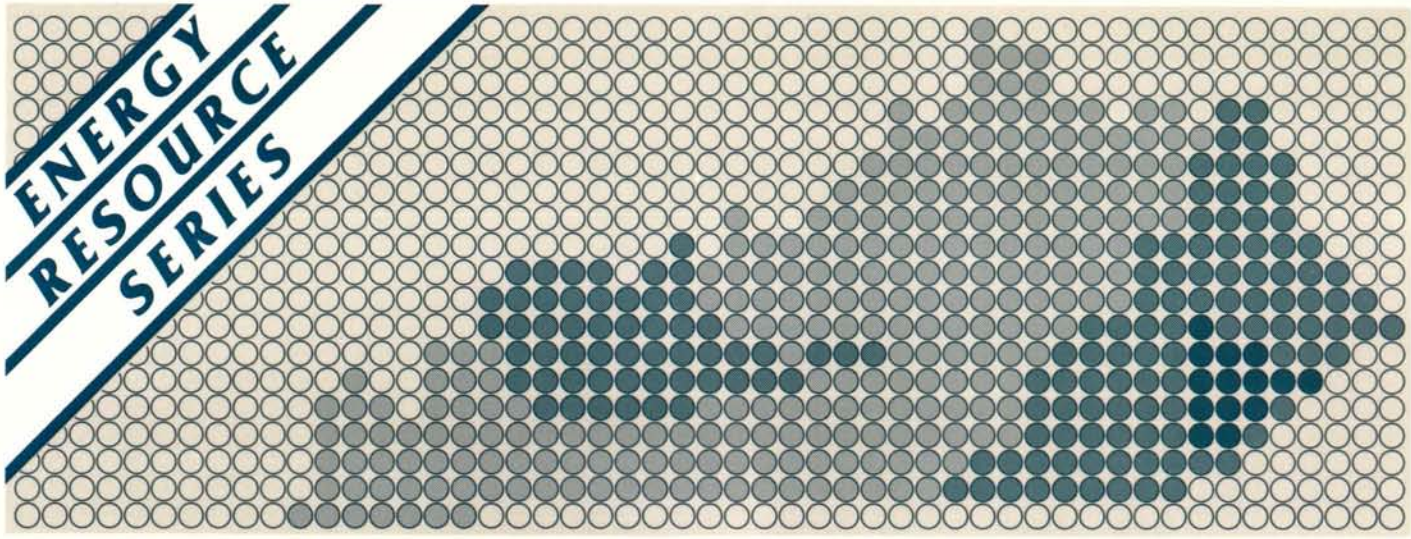


# COAL RESOURCES OF THE HAZARD DISTRICT, KENTUCKY

**Breathitt, Knott, Leslie, Perry and parts of Harlan and Letcher Counties**

**Russell A. Brant, Principal Investigator**

**Donald R. Chesnut, Wayne T. Frankie, and Elisabeth R. Portig, Geologists**
**Kentucky Geological Survey**

Work performed by the Kentucky Geological Survey
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**COAL RESOURCES OF THE HAZARD DISTRICT**
**Russell A. Brant,**
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**and Elisabeth R. Portig**

# PREFACE

"Coal Resources of the Hazard District, Kentucky," is published as part of the Commonwealth-sponsored Energy Research and Development Program under the auspices of the Kentucky Energy Cabinet (KEC). This report is the fifth in the Energy Resource Series published by the University of Kentucky Institute for Mining and Minerals Research (IMMR), with the Kentucky Geological Survey (KGS). It summarizes the coal resources of the Hazard District (Breathitt, Knott, Leslie, Perry, and parts of Harlan and Letcher Counties) of the Eastern Kentucky Coal Field as calculated by the Kentucky Geological Survey. Tonnage estimates for the individual coal beds in the district are presented in tabular form, along with resource maps of the major coal beds. The work is part of an ongoing resource assessment of the Eastern Kentucky Coal Field, which began in 1976 with a grant from the Kentucky Department of Energy through the IMMR. For more information, contact:

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# ABSTRACT

The Hazard District contains an estimated 19.40 billion short tons of *original coal resources. Remaining coal resources* (as of January 1, 1981) total 17.50 billion short tons. The coal resources are tabulated by standard U.S. Geological Survey methods, and of the 23 mineable coal beds (14 inches thick or greater) known to occur in the district, seven beds contain more than 70 percent of the estimated coal. Knott County contains an estimated *remaining resource* of 4.19 billion short tons, followed by Breathitt County with 3.93 billion tons, Leslie County with 3.38 billion tons, Perry County with 2.92 billion tons, Letcher County with 2.42 billion tons, and the small part of Harlan County within the district, with 0.65 billion tons. Those parts of Letcher and Harlan Counties lying north of Pine Mountain are included in the Hazard District, and the remaining parts are in the Upper Cumberland District.


# INTRODUCTION

The Hazard District occupies 1,886 square miles in the south-central part of the Eastern Kentucky Coal Field. It includes all of Breathitt, Knott, Leslie, and Perry Counties, and the parts of Letcher and Harlan Counties lying north of the Pine Mountain Fault. The Hazard District contains all or parts of 49 7.5-minute quadrangles (scale: 1:24,000) (Fig. 1, Table 1).

Numerous names are applied to coal beds within the district. Figure 2 shows the stratigraphic sequence and the commonly used names for the principal coal beds of the Hazard District. Rice and Smith (1980) have correlated the principal coal beds, coal zones, and key horizons of the Eastern Kentucky Coal Field. Figure 2 generalizes the geologic column, depicting the potential for coal and other rocks in a given area in the district, and does not reveal the nature of the rock column for any specific locality. More detailed geologic descriptions can be found on the geologic quadrangle map series published for the district.

Table 1. Quadrangles contained within all or part of the Hazard District boundaries.

| | | |
|---|---|---|
| Beverly | Hazard South | Mistletoe |
| Big Creek | Helton | Noble |
| Blackey | Hindman | Nolansburg |
| Bledsoe | Hoskinston | Quicksand |
| Buckhorn | Hyden East | Roxana |
| Campton | Hyden West | Salyersville South |
| Canoe | Jackson | Seitz |
| Carrie | Jenkins East | Tallega |
| Cowcreek | Jenkins West | Tilford |
| Creekville | Kite | Tiptop |
| Cutshin | Krypton | Vest |
| David | Landsaw | Vicco |
| Flat Gap | Leatherwood | Wallins Creek |
| Guage | Lee City | Wayland |
| Haddix | Louellen | Wheelwright |
| Handshoe | Mayking | Whitesburg |
| Hazard North | | |

The objective of the regional assessment of coal resources given in this report is to describe the coal by mapping the coal beds and by showing their areal extent and thickness variation, and to estimate the quantities of coal. Data for each quadrangle are summarized on regional maps, and the quantities of coal resources are tabulated by county, bed, thickness, and reliability category. The primary factors for these determinations are the correlation (accurate identification of beds), the extent of coal beds, and thickness measurements. Resource information is valuable to government, industry, business, and individuals for planning exploration, resource policy, and regulation decisions.

Coal reserves apply to that part of the resource, or coal bed, that is technically and economically recoverable under prevailing market conditions. Technical factors for reserve estimations include the character of the roof rock, thickness and extent, mining method, inclination, interruption by channel cutouts, and the quality of the

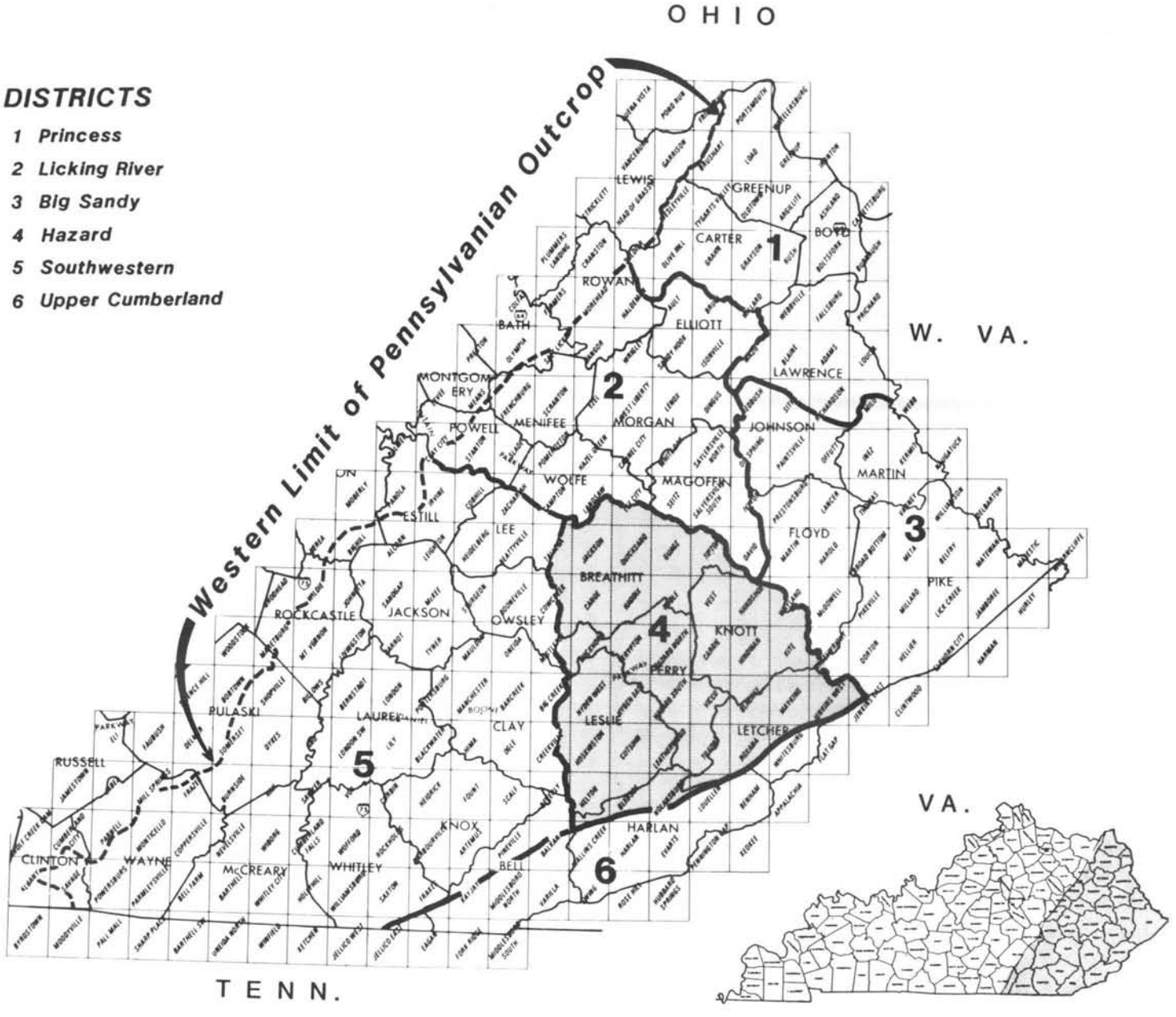


*Figure 1. Coal districts in eastern Kentucky.*

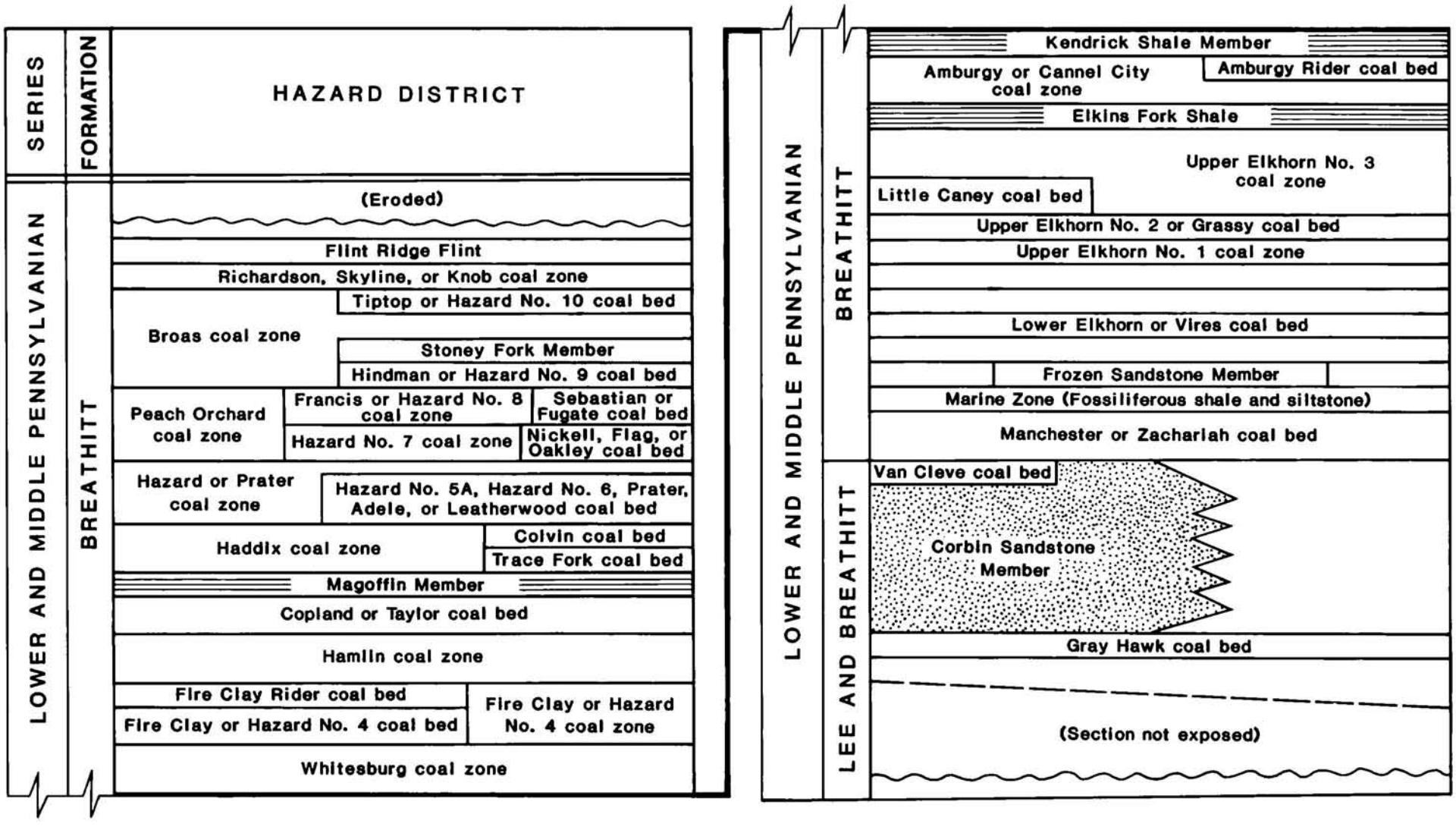


*Figure 2. Key stratigraphic units for the Hazard District from Rice and Smith (1980).*

coal. Determination of these factors for consideration prior to mining requires an abundance of closely spaced observations of a coal bed, usually from drill-core descriptions. Some economic considerations for the assessment of coal reserves include the costs of mining, preparation, labor, and transportation. Coal reserve considerations focus on a relatively small, specific portion of a coal bed or area in order to assess the potential of a mining venture. Detail such as that outlined above are outside the scope of this investigation.

# METHODS

There is a standard formula that is universally applied to calculate the tonnage of coal in a given area. The factors in this formula are the area occupied by the coal bed, the density of the coal, and the thickness of the coal; 1 foot of bituminous coal covering a 1-acre area equals 1,800 tons. All coal in the district is bituminous. The area and density, under most circumstances, are well defined. The thickness, on the other hand, varies and can cause variations in resource assessment.

Thickness characteristics of the individual coal beds are projected by use of isopach maps (contour lines that are drawn through points of equal thickness). These points are determined by extrapolation or interpolation from points of measurement of the coal bed. Coal thickness data are plotted on work maps of 7.5-minute area at a scale of 1:24,000. Isopach lines are drawn to represent coal thickness in increments of 14 inches, beginning with the 14-inch line; additional lines are drawn at 28 inches, 42 inches, 56 inches, etc. Similar intervals were employed by Huddle and others (1963), although all coal estimated to be 42 inches or thicker was compiled into the 42-inch category in their study, whereas this study utilizes the 56-inch and thicker class. Other reports in the district (Bergin, 1962) utilized the standard thickness categories, and summed all coal 42 inches and greater into one category, conforming to U.S. Geological Survey classification (1976a, 1976b, 1980; Wood and others, 1983). Coal less than 14 inches thick is excluded from resource estimation. Midpoint values between standard isopachs are used for tonnage calculation (21 inches, 35 inches, 49 inches, etc.).

In preparing coal resource estimates, a system of reliability classification (U.S. Geological Survey, 1976a, 1976b, 1980; Wood and others, 1983) is used to account for the concealed portions of a coal bed between points of measured coal thickness. The geologic assurance of a resource estimate decreases with distance from a point of measured coal thickness. Coal estimated within a ¼-mile radius of a measured thickness is considered to have the highest reliability and is termed *measured resource;* coal estimated between ¼ and ¾ mile from the point of measurement is termed *indicated resource;* and estimates of coal between ¾ mile to 3 miles is termed *inferred resource* and has the lowest reliability of the three. A fourth category used for coal estimated beyond three miles is *hypothetical resource* (U.S. Geological Survey, 1976a, 1976b, 1980). Some of the estimated resources for the Hazard District is in the *hypothetical* category and is listed in this report as *inferred II resource.*

The *original coal resource* includes all coal prior to mining. The *remaining coal resource* is determined by subtracting the coal produced and lost in mining from the *original coal resource.* Coal lost in mining is considered to equal the coal produced. This approximation is based on the premise that only half of the coal is recovered; the other half is left in the ground as pillar support or lost in the cleaning process. This factor includes losses incurred by augering and hillside strip mining. Production figures are from Currens and Smith (1976) and annual reports of the Kentucky Department of Mines and Minerals, 1976-80.

# COAL RESOURCES

The Hazard District contains an estimated 19.40 billion tons of *original coal resource* and an estimated 17.50 billion tons *remaining resource.* These resources occur in 23 beds. Table 2 summarizes the estimates for the individual beds in stratigraphic order for each county in the district. Coal resource estimates by county, coal bed, thickness, and reliability class are given in Appendix I.

Table 2. Estimated coal resources of the Hazard District. (in millions of short tons, arranged stratigraphically)

| Coal Bed | Breathitt | Harlan* | Knott | Leslie | Letcher* | Perry | Total |
|---|---|---|---|---|---|---|---|
| Skyline | 295.67 | 1.95 | 38.52 | 4.12 | --- | 7.68 | 347.94 |
| Tiptop | 127.04 | 5.99 | 6.06 | 18.49 | --- | 11.98 | 169.56 |
| Hindman Rider | --- | --- | 2.34 | --- | --- | 1.06 | 3.40 |
| Hindman | 110.27 | 81.94 | 116.85 | 116.44 | 3.90 | 141.87 | 571.27 |
| Francis Rider | --- | --- | --- | 0.80 | --- | 0.49 | 1.29 |
| Francis | 415.78 | 63.01 | 297.48 | 215.28 | 12.72 | 296.53 | 1300.80 |
| Hazard No. 7 | 277.58 | 10.77 | 331.69 | 245.06 | 10.55 | 478.80 | 1354.45 |
| Hazard | 442.53 | 178.45 | 272.83 | 579.01 | 115.78 | 521.74 | 2110.34 |
| Haddix | 350.39 | --- | 83.85 | 135.93 | 40.41 | 214.30 | 824.88 |
| Upper Hamlin | 70.89 | 42.20 | 107.75 | 307.95 | 107.71 | 259.64 | 896.14 |
| Lower Hamlin | 0.80 | --- | 76.97 | 27.01 | --- | 29.77 | 134.55 |
| Fire Clay Rider | 155.06 | 67.24 | 167.10 | 503.27 | 156.31 | 212.49 | 1261.47 |
| Fire Clay | 102.99 | 126.26 | 752.29 | 948.07 | 413.77 | 720.65 | 3064.03 |
| Upper Whitesburg | 154.62 | --- | 251.94 | 123.46 | 230.32 | 44.56 | 804.90 |
| Lower Whitesburg | 92.30 | --- | 175.68 | 53.94 | 22.28 | 103.57 | 447.77 |
| Amburgy | 708.59 | --- | 459.31 | 168.48 | 526.41 | 365.95 | 2228.74 |
| Up. Elkhorn No. 3½ | 25.06 | --- | 17.84 | --- | 65.86 | 0.60 | 109.36 |
| Upper Elkhorn No. 3 | 406.82 | 68.14 | 648.82 | 99.47 | 868.26 | 114.26 | 2205.77 |
| Upper Elkhorn No. 2 | 239.13 | --- | 204.98 | --- | 134.04 | 18.58 | 596.73 |
| Upper Elkhorn No. 1 | 4.66 | --- | 338.14 | 7.26 | 263.55 | 50.29 | 663.90 |
| Lower Elkhorn | 84.57 | --- | 34.61 | --- | 133.96 | --- | 253.14 |
| Van Cleve | 45.57 | --- | --- | --- | --- | --- | 45.57 |
| Unnamed | 1.87 | 0.03 | --- | 0.61 | 0.10 | 1.86 | 4.47 |
| Totals | 4112.19 | 645.98 | 4385.05 | 3554.65 | 3105.93 | 3596.67 | 19400.47 |
| Mined & Lost** | 177.30 | small | 192.52 | 174.24 | 689.57 | 671.72 | 1905.36 |
| Remaining | 3934.89 | 645.97 | 4192.53 | 3380.41 | 2416.36 | 2924.95 | 17495.11 |
| % Remaining*** | 96% | 99+% | 96% | 95% | 78% | 81% | 90% |

* A small part of Harlan County and large part of Letcher County lie within the Hazard District. The Pine Mountain Fault divides these counties between the Hazard and Upper Cumberland Districts.

** The figure given is twice the cumulative production of coal from 1790 through 1980 to account for coal mined and lost in the mining and cleaning process.

*** Percent remaining of the estimated original coal resource.

Seven coal beds contain 13.52 billion tons or 70 percent of the estimated original coal resource in the district (*see* Table 2). Resource maps of two principal beds, the Fire Clay and the Upper Elkhorn No. 3, are shown in Appendix II. The Fire Clay coal bed is the most extensive and contains an *estimated original resource* of 3.06 billion tons. The Upper Elkhorn No. 3 contains an estimated 2.21 billion tons of *original coal resource*. These two coal beds account for more than 27 percent of the *total original coal* estimated for the district.

Coal in the 14-28-inch class accounts for 51 percent of the total estimated original resource; that in the 28-42-inch class constitutes 29 percent. Coal in the 42-56-inch class is 14 percent of the total, and coal greater than 56 inches accounts for 6 percent. Measured coal is 8 percent of the estimated original resource, indicated coal 32 percent, inferred coal 59 percent, and inferred II coal 1 percent.

Huddle and others (1963) estimated 11.06 billion tons of original coal resource. This study estimates 19.40 billion tons of *original coal resources,* which is an increase of 75 percent above the previous estimate. The major factors accounting for this difference are the availability and use of the 7.5-minute geologic quadrangle maps published by the U.S. Geological Survey in cooperation with the Kentucky Geological Survey since the 1963 estimate, which show coal outcrops, and the 7,702 coal thickness measurements from recent field work. Both of these factors contribute to a more extensive estimate than was previously feasible.

Table 3. Estimated original coal resources of the Hazard District. (in millions of short tons)

| **RELIABILITY** | **THICKNESS CLASS (in inches)** | | | | |
|---|---|---|---|---|---|
| **CLASS** | **14 - 28** | **28 - 42** | **42 - 56** | **56 +** | **TOTAL** |
| Measured | 445.18 | 482.25 | 404.88 | 225.51 | **1,557.82** |
| Indicated | 2,363.79 | 2,021.76 | 1,247.37 | 574.52 | **6,207.44** |
| Inferred | 6,930.39 | 3,115.76 | 1,037.90 | 382.87 | **11,146.91** |
| Inferred II | 168.30 | | | | **168.30** |
| **TOTAL** | **9,907.66** | **5,619.76** | **2,690.15** | **1,182.90** | **19,400.47** |

Table 4. Hazard District estimated original coal resource by thickness class. (in millions of short tons, arranged stratigraphically)

| Coal Bed | 14"-28" | 28"-42" | 42"-56" | 56+" | Total |
|---|---|---|---|---|---|
| Skyline | 43.01 | 70.18 | 72.81 | 161.94 | 347.94 |
| Tiptop | 24.51 | 51.00 | 60.22 | 33.83 | 169.56 |
| Hindman Rider | 0.64 | 2.76 | --- | --- | 3.40 |
| Hindman | 91.32 | 134.09 | 135.54 | 210.32 | 571.27 |
| Francis Rider | 1.29 | --- | --- | --- | 1.29 |
| Francis | 392.33 | 380.30 | 395.65 | 132.52 | 1,300.80 |
| Hazard No. 7 | 328.18 | 417.74 | 346.27 | 262.26 | 1,354.45 |
| Hazard | 877.87 | 808.05 | 292.87 | 131.55 | 2,110.34 |
| Haddix | 555.31 | 136.22 | 131.54 | 1.81 | 824.88 |
| Upper Hamlin | 791.89 | 100.47 | 3.28 | 0.50 | 896.14 |
| Lower Hamlin | 123.61 | 10.94 | --- | --- | 134.55 |
| Fire Clay Rider | 875.22 | 283.21 | 59.26 | 43.78 | 1,261.47 |
| Fire Clay | 718.67 | 1,463.52 | 775.29 | 106.55 | 3,064.03 |
| Upper Whitesburg | 628.37 | 124.51 | 48.31 | 3.71 | 804.90 |
| Lower Whitesburg | 400.63 | 47.14 | --- | --- | 447.77 |
| Amburgy | 1,618.15 | 583.61 | 19.90 | 7.08 | 2,228.74 |
| Upper Elkhorn No. 3½ | 109.36 | --- | --- | --- | 109.36 |
| Upper Elkhorn No. 3 | 1,201.95 | 608.16 | 309.58 | 86.08 | 2,205.77 |
| Upper Elkhorn No. 2 | 458.73 | 113.10 | 24.90 | --- | 596.73 |
| Upper Elkhorn No. 1 | 467.14 | 185.76 | 10.73 | 0.27 | 663.90 |
| Lower Elkhorn | 152.47 | 96.94 | 3.64 | 0.09 | 253.14 |
| Van Cleve | 43.64 | 1.93 | --- | --- | 45.57 |
| Unnamed | 3.37 | 0.13 | 0.36 | 0.61 | 4.47 |
| Totals | 9,907.66 | 5,619.76 | 2,690.15 | 1,182.90 | 19,400.47 |

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# APPENDIX I:
# Coal Resources of the Hazard District

**(Breathitt, Knott, Leslie, Perry and portions of Harlan and Letcher Counties north of the Pine Mountain Fault)**
**Listings by county, coal bed, and thickness and reliability categories. Thickness classes in inches and tonnages in millions of short tons.**

# Breathitt County

Original Resources in Millions of Tons

SKYLINE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.35 | 3.59 | 5.03 | 17.83 | 28.80 |
| Indicated | 6.76 | 12.31 | 16.72 | 48.52 | 84.31 |
| Inferred | 24.68 | 42.84 | 36.94 | 78.10 | 182.56 |
| Total | 33.79 | 58.74 | 58.69 | 99.58 | 295.67 |

TIPTOP

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.72 | 1.50 | 0.80 | 1.02 | 4.04 |
| Indicated | 3.15 | 5.29 | 4.54 | 3.33 | 16.31 |
| Inferred | 7.55 | 32.56 | 48.23 | 18.35 | 106.69 |
| Total | 11.42 | 39.35 | 53.57 | 22.70 | 127.04 |

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.90 | 2.55 | 3.02 | 2.11 | 9.58 |
| Indicated | 9.07 | 7.79 | 12.79 | 5.68 | 35.33 |
| Inferred | 30.91 | 17.61 | 12.54 | 4.30 | 65.36 |
| Total | 41.88 | 27.95 | 28.35 | 12.09 | 110.27 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.64 | 10.91 | 17.88 | 8.21 | 40.64 |
| Indicated | 21.47 | 58.73 | 79.76 | 17.40 | 177.36 |
| Inferred | 56.86 | 84.16 | 53.58 | 3.18 | 197.78 |
| Total | 81.97 | 153.80 | 151.22 | 28.79 | 415.78 |

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 8.52 | 14.78 | 3.24 | 1.92 | 28.46 |
| Indicated | 43.83 | 57.72 | 12.88 | 3.67 | 118.10 |
| Inferred | 76.91 | 47.46 | 5.72 | 0.93 | 131.02 |
| Total | 129.26 | 119.96 | 21.84 | 6.52 | 277.58 |

# Breathitt County, continued

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 12.99 | 9.03 | 4.96 | | 26.98 |
| Indicated | 69.54 | 50.01 | 14.20 | | 133.75 |
| Inferred | 153.88 | 118.05 | 9.87 | | 281.80 |
| Total | 236.41 | 177.09 | 29.03 | | 442.53 |

HADDIX

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 10.67 | 6.92 | 4.19 | | 21.78 |
| Indicated | 55.66 | 31.88 | 28.45 | | 115.99 |
| Inferred | 65.63 | 59.38 | 87.61 | | 212.62 |
| Total | 131.96 | 98.18 | 120.25 | | 350.39 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.99 | 1.13 | | | 3.12 |
| Indicated | 9.79 | 6.48 | | | 16.27 |
| Inferred | 44.78 | 6.72 | | | 51.50 |
| Total | 56.56 | 14.33 | | | 70.89 |

LOWER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | | | | |
| Indicated | | | | | |
| Inferred | 0.80 | | | | 0.80 |
| Total | 0.80 | | | | 0.80 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-45 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.89 | 12.63 | 1.26 | | 21.78 |
| Indicated | 40.82 | 39.55 | 1.57 | | 81.94 |
| Inferred | 48.29 | 3.05 | | | 51.34 |
| Total | 97.00 | 55.23 | 2.83 | | 155.06 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.93 | 1.71 | 0.82 | | 8.46 |
| Indicated | 30.09 | 5.98 | 2.34 | | 38.41 |
| Inferred | 52.43 | 2.04 | 1.65 | | 56.12 |
| Total | 88.45 | 9.73 | 4.81 | | 102.99 |

UPPER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 4.01 | 1.76 | | | 5.77 |
| Indicated | 22.70 | 8.34 | | | 31.04 |
| Inferred | 113.83 | 3.98 | | | 117.81 |
| Total | 140.54 | 14.08 | | | 154.62 |

LOWER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.21 | 3.03 | | | 10.24 |
| Indicated | 33.84 | 12.10 | | | 45.94 |
| Inferred | 32.01 | 4.11 | | | 36.12 |
| Total | 73.06 | 19.24 | | | 92.30 |

AMBURGY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.10 | 3.09 | 0.39 | | 10.58 |
| Indicated | 52.03 | 20.21 | 0.34 | | 72.58 |
| Inferred | 418.44 | 80.92 | | | 499.36 |
| Inferred II | 126.07 | | | | 126.07 |
| Total | 603.64 | 104.22 | 0.73 | | 708.59 |

UPPER ELKHORN NO. 3 1/2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.04 | | | | 2.04 |
| Indicated | 8.81 | | | | 8.81 |
| Inferred | 14.21 | | | | 14.21 |
| Total | 25.06 | | | | 25.06 |

**Breathitt County**, continued

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 9.11 | 1.08 | 0.77 | | 10.96 |
| Indicated | 55.53 | 7.01 | 1.67 | | 64.21 |
| Inferred | 328.50 | 3.15 | | | 331.65 |
| Total | 393.14 | 11.24 | 2.44 | | 406.82 |

UPPER ELKHORN NO. 2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 11.45 | 1.40 | 0.92 | | 13.77 |
| Indicated | 56.40 | 5.41 | 7.54 | | 69.35 |
| Inferred | 151.62 | 4.39 | | | 156.01 |
| Total | 219.47 | 11.20 | 8.46 | | 239.13 |

UPPER ELKHORN NO. 1

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.32 | | | | 0.32 |
| Indicated | 2.83 | | | | 2.83 |
| Inferred | 1.51 | | | | 1.51 |
| Total | 4.66 | | | | 4.66 |

LOWER ELKHORN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 4.23 | 5.90 | 2.10 | 0.09 | 12.32 |
| Indicated | 20.45 | 12.35 | 1.54 | | 34.34 |
| Inferred | 21.05 | 16.86 | | | 37.91 |
| Total | 45.73 | 35.11 | 3.64 | 0.09 | 84.57 |

VAN CLEVE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 4.76 | 0.85 | | | 5.61 |
| Indicated | 19.21 | 1.08 | | | 20.29 |
| Inferred | 19.67 | | | | 19.67 |
| Total | 43.64 | 1.93 | | | 45.57 |

## **Breathitt County**, continued

UNNAMED

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.45 | | | | 0.45 |
| Indicated | 1.42 | | | | 1.42 |
| Inferred | | | | | |
| Total | 1.87 | | | | 1.87 |

BREATHITT COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 107.28 | 81.86 | 45.38 | 31.18 | 265.70 |
| Indicated | 563.40 | 342.24 | 184.34 | 78.60 | 1168.58 |
| Inferred | 1663.56 | 527.28 | 256.14 | 104.86 | 2551.84 |
| Inferred II | 126.07 | | | | 126.07 |
| Total | 2460.31 | 951.38 | 485.86 | 214.64 | 4112.19 |

## **Harlan County** (partial)

Original Resources in Millions of Tons

SKYLINE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.13 | 0.16 | 0.18 | | 0.47 |
| Indicated | 0.21 | 0.45 | 0.02 | | 0.68 |
| Inferred | 0.79 | 0.01 | | | 0.80 |
| Total | 1.13 | 0.62 | 0.20 | | 1.95 |

TIPTOP

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.48 | 0.37 | | 0.23 | 1.08 |
| Indicated | 0.50 | 2.39 | 0.49 | | 3.38 |
| Inferred | 0.46 | 0.87 | 0.20 | | 1.53 |
| Total | 1.44 | 3.63 | 0.69 | 0.23 | 5.99 |

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 0.43 | 1.81 | 2.91 | 5.15 |
| Indicated | | 3.68 | 14.53 | 10.64 | 28.85 |
| Inferred | 3.89 | 7.87 | 25.07 | 11.11 | 47.94 |
| Total | 3.89 | 11.98 | 41.41 | 24.66 | 81.94 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.96 | | 2.79 | | 3.75 |
| Indicated | 5.79 | 0.09 | 5.00 | | 10.88 |
| Inferred | 39.93 | 2.12 | 6.33 | | 48.38 |
| Total | 46.68 | 2.21 | 14.12 | | 63.01 |

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.06 | | | | 1.06 |
| Indicated | 5.82 | | | | 5.82 |
| Inferred | 3.74 | 0.15 | | | 3.89 |
| Total | 10.62 | 0.15 | | | 10.77 |

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.21 | 5.36 | 2.45 | 1.39 | 10.41 |
| Indicated | 7.65 | 29.40 | 18.53 | 0.90 | 56.48 |
| Inferred | 48.06 | 36.75 | 26.75 | | 111.56 |
| Total | 56.92 | 71.51 | 47.73 | 2.29 | 178.45 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.45 | 0.22 | | | 1.67 |
| Indicated | 9.54 | 0.11 | | | 9.65 |
| Inferred | 30.88 | | | | 30.88 |
| Total | 41.87 | 0.33 | | | 42.20 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.23 | | | | 1.23 |
| Indicated | 9.06 | 0.17 | | | 9.23 |
| Inferred | 55.40 | 1.38 | | | 56.78 |
| Total | 65.59 | 1.55 | | | 67.24 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.99 | 0.83 | | | 1.82 |
| Indicated | 5.99 | 8.39 | 1.28 | | 15.66 |
| Inferred | 61.39 | 47.39 | | | 108.78 |
| Total | 68.37 | 56.61 | 1.28 | | 126.26 |

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.41 | | | | 0.41 |
| Indicated | 4.03 | | | | 4.03 |
| Inferred | 63.70 | | | | 63.70 |
| Total | 68.14 | | | | 68.14 |

**Harlan County**, continued

UNNAMED

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 0.03 | | | 0.03 |
| Indicated | | | | | |
| Inferred | | | | | |
| Total | | 0.03 | | | 0.03 |

HARLAN COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.92 | 7.40 | 7.23 | 4.53 | 27.08 |
| Indicated | 48.59 | 44.68 | 39.85 | 11.54 | 144.66 |
| Inferred | 308.24 | 96.54 | 58.35 | 11.11 | 474.24 |
| Total | 364.75 | 148.62 | 105.43 | 27.18 | 645.98 |

# Knott County

Original Resources in Millions of Tons

SKYLINE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.23 | 0.59 | 1.02 | 2.13 | 3.97 |
| Indicated | 0.39 | 0.94 | 4.29 | 6.51 | 12.13 |
| Inferred | 2.82 | 5.73 | 7.12 | 6.75 | 22.42 |
| Total | 3.44 | 7.26 | 12.43 | 15.39 | 38.52 |

TIPTOP

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.18 | | | | 0.18 |
| Indicated | 0.87 | | | | 0.87 |
| Inferred | 5.00 | 0.01 | | | 5.01 |
| Total | 6.05 | 0.01 | | | 6.06 |

HINDMAN RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.20 | 0.24 | | | 0.44 |
| Indicated | 0.35 | 1.55 | | | 1.90 |
| Inferred | | | | | |
| Total | 0.55 | 1.79 | | | 2.34 |

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.68 | 1.40 | 0.76 | 16.40 | 19.24 |
| Indicated | 3.58 | 5.15 | 4.24 | 31.69 | 44.66 |
| Inferred | 12.65 | 9.91 | 7.06 | 23.33 | 52.95 |
| Total | 16.91 | 16.46 | 12.06 | 71.42 | 116.85 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.46 | 9.88 | 11.40 | 6.61 | 31.35 |
| Indicated | 11.88 | 39.57 | 44.34 | 12.42 | 108.21 |
| Inferred | 14.31 | 68.79 | 74.05 | 0.77 | 157.92 |
| Total | 29.65 | 118.24 | 129.79 | 19.88 | 297.48 |

## Knott County, continued

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.81 | 9.91 | 16.56 | 21.61 | 51.97 |
| Indicated | 13.71 | 30.67 | 54.68 | 52.81 | 151.87 |
| Inferred | 24.88 | 73.32 | 23.53 | 6.12 | 127.85 |
| Total | 42.40 | 113.98 | 94.77 | 80.54 | 331.69 |

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 10.81 | 14.39 | 4.54 | | 29.74 |
| Indicated | 54.32 | 47.83 | 10.46 | | 112.61 |
| Inferred | 90.57 | 39.21 | 0.70 | | 130.48 |
| Total | 155.70 | 101.43 | 15.70 | | 272.83 |

HADDIX

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.10 | 0.53 | | | 3.63 |
| Indicated | 19.07 | 0.10 | | | 19.17 |
| Inferred | 61.05 | | | | 61.05 |
| Total | 83.22 | 0.63 | | | 83.85 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.42 | | | | 3.42 |
| Indicated | 25.39 | | | | 25.39 |
| Inferred | 78.59 | 0.35 | | | 78.94 |
| Total | 107.40 | 0.35 | | | 107.75 |

LOWER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.09 | 0.41 | | | 2.50 |
| Indicated | 13.96 | 2.80 | | | 16.76 |
| Inferred | 55.25 | 2.46 | | | 57.71 |
| Total | 71.30 | 5.67 | | | 76.97 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.76 | 7.65 | 1.64 | | 17.05 |
| Indicated | 43.30 | 32.29 | 3.58 | | 79.17 |
| Inferred | 45.39 | 25.09 | 0.40 | | 70.88 |
| Total | 96.45 | 65.03 | 5.62 | | 167.10 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.87 | 34.13 | 23.75 | 6.41 | 70.16 |
| Indicated | 35.04 | 151.76 | 96.51 | 16.34 | 299.65 |
| Inferred | 88.16 | 249.43 | 43.45 | 1.44 | 382.48 |
| Total | 129.07 | 435.32 | 163.71 | 24.19 | 752.29 |

UPPER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 15.83 | 4.28 | | | 20.11 |
| Indicated | 78.24 | 16.70 | | | 94.94 |
| Inferred | 129.22 | 7.67 | | | 136.89 |
| Total | 223.29 | 28.65 | | | 251.94 |

LOWER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 8.28 | 4.79 | | | 13.07 |
| Indicated | 43.25 | 11.49 | | | 54.74 |
| Inferred | 104.75 | 3.12 | | | 107.87 |
| Total | 156.28 | 19.40 | | | 175.68 |

AMBURGY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.76 | 6.22 | 1.56 | 1.22 | 16.76 |
| Indicated | 44.68 | 39.41 | 6.45 | 3.83 | 94.37 |
| Inferred | 165.39 | 176.33 | 2.33 | 1.87 | 345.92 |
| Inferred II | 2.26 | | | | 2.26 |
| Total | 220.09 | 221.96 | 10.34 | 6.92 | 459.31 |

**Knott County**, continued

UPPER ELKHORN NO. 3 1/2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.50 | | | | 2.50 |
| Indicated | 11.57 | | | | 11.57 |
| Inferred | 3.77 | | | | 3.77 |
| Total | 17.84 | | | | 17.84 |

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.85 | 22.52 | 7.02 | 0.65 | 36.04 |
| Indicated | 36.20 | 112.42 | 34.88 | 7.01 | 190.51 |
| Inferred | 196.20 | 177.70 | 45.34 | 3.03 | 422.27 |
| Total | 238.25 | 312.64 | 87.24 | 10.69 | 648.82 |

UPPER ELKHORN NO. 2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.65 | 8.54 | 2.07 | | 18.26 |
| Indicated | 45.79 | 52.54 | 9.34 | | 107.67 |
| Inferred | 50.01 | 29.04 | | | 79.05 |
| Total | 103.45 | 90.12 | 11.41 | | 204.98 |

UPPER ELKHORN NO. 1

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.29 | 5.16 | 0.85 | 0.02 | 8.32 |
| Indicated | 16.44 | 34.65 | 8.16 | 0.25 | 59.50 |
| Inferred | 135.65 | 132.95 | 1.72 | | 270.32 |
| Total | 154.38 | 172.76 | 10.73 | 0.27 | 338.14 |

LOWER ELKHORN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.23 | 0.68 | | | 0.91 |
| Indicated | 2.59 | 4.58 | | | 7.17 |
| Inferred | 21.41 | 5.12 | | | 26.53 |
| Total | 24.23 | 10.38 | | | 34.61 |

## **Knott County**, continued

KNOTT COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 92.00 | 131.40 | 71.17 | 55.05 | 349.62 |
| Indicated | 500.62 | 584.45 | 276.93 | 130.86 | 149.86 |
| Inferred | 1285.07 | 1006.23 | 205.70 | 43.31 | 2540.31 |
| Inferred II | 2.26 | | | | 2.26 |
| Total | 1879.95 | 1722.08 | 553.80 | 229.22 | 4385.05 |

# Leslie County

Original Resources in Millions of Tons

SKYLINE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.62 | 0.85 | 0.20 | 0.11 | 1.78 |
| Indicated | 0.36 | 0.80 | 0.05 | 0.03 | 1.24 |
| Inferred | 0.80 | 0.30 | | | 1.10 |
| Total | 1.78 | 1.95 | 0.25 | 0.14 | 4.12 |

TIPTOP

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.39 | 0.71 | 0.46 | 3.73 | 5.29 |
| Indicated | 0.99 | 1.11 | 0.82 | 3.79 | 6.71 |
| Inferred | 1.42 | 1.72 | 0.48 | 2.87 | 6.49 |
| Total | 2.80 | 3.54 | 1.76 | 10.39 | 18.49 |

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.76 | 2.66 | 0.99 | 5.90 | 10.31 |
| Indicated | 1.63 | 6.10 | 7.15 | 15.06 | 29.94 |
| Inferred | 9.66 | 25.74 | 11.58 | 29.21 | 76.19 |
| Total | 12.05 | 34.50 | 19.72 | 50.17 | 116.44 |

FRANCIS RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.09 | | | | 0.09 |
| Indicated | 0.71 | | | | 0.71 |
| Inferred | | | | | |
| Total | 0.80 | | | | 0.80 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 4.94 | 2.04 | 2.32 | 1.01 | 10.31 |
| Indicated | 20.30 | 7.85 | 6.98 | 4.07 | 39.20 |
| Inferred | 120.12 | 28.96 | 14.58 | 2.11 | 165.77 |
| Total | 145.36 | 38.85 | 23.88 | 7.19 | 215.28 |

**Leslie County**, continued

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.38 | 3.02 | 3.70 | 1.48 | 13.58 |
| Indicated | 22.27 | 21.48 | 10.76 | 1.22 | 55.73 |
| Inferred | 69.34 | 88.58 | 17.74 | 0.09 | 175.75 |
| Total | 96.99 | 113.08 | 32.20 | 2.79 | 245.06 |

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 9.74 | 21.60 | 4.56 | 0.94 | 36.84 |
| Indicated | 59.28 | 93.83 | 12.48 | 9.82 | 175.41 |
| Inferred | 184.53 | 159.44 | 13.29 | 9.50 | 366.76 |
| Total | 253.55 | 274.87 | 30.33 | 20.26 | 579.01 |

HADDIX

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.19 | | | | 3.19 |
| Indicated | 18.21 | | | | 18.21 |
| Inferred | 114.53 | | | | 114.53 |
| Total | 135.93 | | | | 135.93 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 9.12 | 3.17 | | | 12.29 |
| Indicated | 69.57 | 12.60 | | | 82.17 |
| Inferred | 207.62 | 5.87 | | | 213.49 |
| Total | 286.31 | 21.64 | | | 307.95 |

LOWER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.93 | 0.93 | | | 1.86 |
| Indicated | 6.86 | 2.13 | | | 8.99 |
| Inferred | 15.91 | 0.25 | | | 16.16 |
| Total | 23.70 | 3.31 | | | 27.01 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 13.29 | 8.37 | 6.12 | 5.97 | 33.75 |
| Indicated | 82.00 | 42.53 | 15.39 | 23.22 | 163.14 |
| Inferred | 242.14 | 34.51 | 15.14 | 14.59 | 306.38 |
| Total | 337.43 | 85.41 | 36.65 | 43.78 | 503.27 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 10.53 | 37.82 | 41.29 | 13.74 | 103.38 |
| Indicated | 64.25 | 162.54 | 109.67 | 16.46 | 352.92 |
| Inferred | 119.49 | 308.37 | 63.01 | 0.90 | 491.77 |
| Total | 194.27 | 508.73 | 213.97 | 31.10 | 948.07 |

UPPER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.21 | 0.21 | | | 2.42 |
| Indicated | 14.18 | 0.74 | | | 14.92 |
| Inferred | 105.93 | 0.19 | | | 106.12 |
| Total | 122.32 | 1.14 | | | 123.46 |

LOWER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.04 | 0.54 | | | 2.58 |
| Indicated | 14.21 | 2.63 | | | 16.84 |
| Inferred | 33.83 | 0.69 | | | 34.52 |
| Total | 50.08 | 3.86 | | | 53.94 |

AMBURGY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 4.87 | 5.57 | | | 10.44 |
| Indicated | 26.01 | 7.37 | | | 33.38 |
| Inferred | 124.54 | 0.12 | | | 124.66 |
| Total | 155.42 | 13.06 | | | 168.48 |

## **Leslie County**, continued

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.50 | 0.25 | | | 0.75 |
| Indicated | 3.19 | 0.20 | | | 3.39 |
| Inferred | 95.33 | | | | 95.33 |
| Total | 99.02 | 0.45 | | | 99.47 |

UPPER ELKHORN NO. 1

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.82 | | | | 0.82 |
| Indicated | 6.44 | | | | 6.44 |
| Inferred | | | | | |
| Total | 7.26 | | | | 7.26 |

UNNAMED

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | | | 0.31 | 0.31 |
| Indicated | | | | 0.30 | 0.30 |
| Inferred | | | | | |
| Total | | | | 0.61 | 0.61 |

LESLIE COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 69.42 | 87.74 | 59.64 | 33.19 | 249.99 |
| Indicated | 410.46 | 361.91 | 163.30 | 73.97 | 1009.64 |
| Inferred | 1445.19 | 654.74 | 135.82 | 59.27 | 2295.02 |
| Total | 1925.07 | 1104.39 | 358.76 | 166.43 | 3554.65 |

## **Letcher County** (partial)

Original Resources in Millions of Tons

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 0.15 | | | 0.15 |
| Indicated | | 1.15 | | | 1.15 |
| Inferred | 2.00 | 0.31 | | 0.29 | 2.60 |
| Total | 2.00 | 1.61 | | 0.29 | 3.90 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.38 | 0.73 | 0.32 | 0.22 | 1.65 |
| Indicated | 0.59 | 0.32 | 0.21 | | 1.12 |
| Inferred | 8.22 | 1.73 | | | 9.95 |
| Total | 9.19 | 2.78 | 0.53 | 0.22 | 12.72 |

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.29 | 0.74 | 1.39 | 1.13 | 3.55 |
| Indicated | 0.52 | 1.10 | 2.72 | 0.27 | 4.61 |
| Inferred | 0.62 | 0.49 | 1.28 | | 2.39 |
| Total | 1.43 | 2.33 | 5.39 | 1.40 | 10.55 |

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.60 | 2.02 | 4.28 | 5.66 | 14.56 |
| Indicated | 7.51 | 8.58 | 11.70 | 26.26 | 54.05 |
| Inferred | 5.16 | 9.82 | 17.65 | 14.54 | 47.17 |
| Total | 15.27 | 20.42 | 33.63 | 46.46 | 115.78 |

HADDIX

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.69 | 1.23 | | 0.40 | 3.32 |
| Indicated | 4.02 | 2.22 | 0.23 | 1.41 | 7.88 |
| Inferred | 28.27 | 0.87 | 0.07 | | 29.21 |
| Total | 33.98 | 4.32 | 0.30 | 1.81 | 40.41 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.99 | 0.84 | 0.67 | 0.22 | 5.72 |
| Indicated | 26.52 | 6.75 | 2.38 | 0.28 | 35.93 |
| Inferred | 59.57 | 6.26 | 0.23 | | 66.06 |
| Total | 90.08 | 13.85 | 3.28 | 0.50 | 107.71 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.52 | 4.91 | 2.01 | | 10.44 |
| Indicated | 19.21 | 18.83 | 6.90 | | 44.94 |
| Inferred | 77.50 | 18.18 | 5.25 | | 100.93 |
| Total | 100.23 | 41.92 | 14.16 | | 156.31 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.44 | 18.03 | 27.75 | 6.61 | 52.83 |
| Indicated | 2.31 | 74.63 | 102.57 | 11.88 | 191.39 |
| Inferred | 14.09 | 76.96 | 62.77 | 15.73 | 169.55 |
| Total | 16.84 | 169.62 | 193.09 | 34.22 | 413.77 |

UPPER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.28 | 5.60 | 1.93 | 0.55 | 10.36 |
| Indicated | 18.67 | 27.53 | 10.08 | 1.05 | 57.33 |
| Inferred | 77.92 | 46.30 | 36.30 | 2.11 | 162.63 |
| Total | 98.87 | 79.43 | 48.31 | 3.71 | 230.32 |

LOWER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.62 | 0.37 | | | 0.99 |
| Indicated | 4.48 | 0.38 | | | 4.86 |
| Inferred | 16.43 | | | | 16.43 |
| Total | 21.53 | 0.75 | | | 22.28 |

**Letcher County**, continued

AMBURGY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 24.04 | 9.49 | 2.11 | 0.16 | 35.80 |
| Indicated | 124.69 | 55.13 | 5.88 | | 185.70 |
| Inferred | 234.97 | 69.10 | 0.84 | | 304.91 |
| Total | 383.70 | 133.72 | 8.83 | 0.16 | 526.41 |

UPPER ELKHORN NO. 3 1/2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.06 | | | | 5.06 |
| Indicated | 23.08 | | | | 23.08 |
| Inferred | 37.72 | | | | 37.72 |
| Total | 65.86 | | | | 65.86 |

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 20.26 | 22.78 | 28.06 | 13.06 | 84.16 |
| Indicated | 101.57 | 109.82 | 120.20 | 33.07 | 364.66 |
| Inferred | 185.09 | 135.97 | 69.12 | 29.26 | 419.44 |
| Total | 306.92 | 268.57 | 217.38 | 75.39 | 868.26 |

UPPER ELKHORN NO. 2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.68 | 0.52 | 0.22 | | 4.42 |
| Indicated | 25.49 | 2.92 | 2.34 | | 30.75 |
| Inferred | 97.97 | 0.90 | | | 98.87 |
| Total | 127.14 | 4.34 | 2.56 | | 134.04 |

UPPER ELKHORN NO. 1

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.95 | 0.96 | | | 4.91 |
| Indicated | 28.82 | 4.64 | | | 33.46 |
| Inferred | 221.72 | 3.46 | | | 225.18 |
| Total | 254.49 | 9.06 | | | 263.55 |

## Letcher County, continued

LOWER ELKHORN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.20 | 0.88 | | | 3.08 |
| Indicated | 15.76 | 5.32 | | | 21.08 |
| Inferred | 64.55 | 45.25 | | | 109.80 |
| Total | 82.51 | 51.45 | | | 133.96 |

UNNAMED

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 0.09 | | | 0.09 |
| Indicated | | 0.01 | | | 0.01 |
| Inferred | | | | | |
| Total | | 0.10 | | | 0.10 |

LETCHER COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 75.00 | 69.34 | 68.74 | 28.01 | 241.09 |
| Indicated | 403.24 | 319.33 | 265.21 | 74.22 | 1062.00 |
| Inferred | 1131.80 | 415.60 | 193.51 | 61.93 | 1802.84 |
| Total | 1610.04 | 804.27 | 527.46 | 164.16 | 3105.93 |

# Perry County

Original Resources in Millions of Tons

SKYLINE

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.54 | 0.64 | 0.17 | 0.48 | 1.83 |
| Indicated | 1.26 | 0.81 | 0.63 | 1.18 | 3.88 |
| Inferred | 1.07 | 0.16 | 0.44 | 0.30 | 1.97 |
| Total | 2.87 | 1.61 | 1.24 | 1.96 | 7.68 |

TIPTOP

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.40 | 0.35 | 0.62 | 0.19 | 1.56 |
| Indicated | 1.23 | 1.24 | 1.08 | 0.32 | 3.87 |
| Inferred | 1.17 | 2.88 | 2.50 | | 6.55 |
| Total | 2.80 | 4.47 | 4.20 | 0.51 | 11.98 |

HINDMAN RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 0.25 | | | 0.25 |
| Indicated | 0.09 | 0.72 | | | 0.81 |
| Inferred | | | | | |
| Total | 0.09 | 0.97 | | | 1.06 |

HINDMAN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.66 | 5.93 | 5.11 | 8.34 | 22.04 |
| Indicated | 3.96 | 14.23 | 11.44 | 23.04 | 52.67 |
| Inferred | 7.97 | 21.43 | 17.45 | 20.31 | 67.15 |
| Total | 14.59 | 41.59 | 34.00 | 51.69 | 141.87 |

FRANCIS RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.07 | | | | 0.07 |
| Indicated | 0.42 | | | | 0.42 |
| Inferred | | | | | |
| Total | 0.49 | | | | 0.49 |

FRANCIS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 6.57 | 10.02 | 12.43 | 14.90 | 43.92 |
| Indicated | 17.28 | 27.14 | 40.47 | 32.16 | 117.05 |
| Inferred | 55.63 | 27.26 | 23.21 | 29.46 | 135.56 |
| Total | 79.48 | 64.42 | 76.11 | 76.52 | 296.53 |

HAZARD NO. 7

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.17 | 11.36 | 80.56 | 33.63 | 132.72 |
| Indicated | 23.56 | 32.96 | 72.95 | 101.88 | 231.35 |
| Inferred | 16.75 | 23.92 | 38.56 | 35.50 | 114.73 |
| Total | 47.48 | 68.24 | 192.07 | 171.01 | 478.80 |

HAZARD

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 20.30 | 29.52 | 19.17 | 10.76 | 79.75 |
| Indicated | 74.05 | 78.13 | 74.09 | 35.55 | 261.82 |
| Inferred | 65.67 | 55.08 | 43.19 | 16.23 | 180.17 |
| Total | 160.02 | 162.73 | 136.45 | 62.54 | 521.74 |

HADDIX

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 5.78 | 4.72 | 1.92 | | 12.42 |
| Indicated | 36.27 | 19.94 | 3.34 | | 59.55 |
| Inferred | 128.17 | 8.43 | 5.73 | | 142.33 |
| Total | 170.22 | 33.09 | 10.99 | | 214.30 |

UPPER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.52 | 2.79 | | | 10.31 |
| Indicated | 56.92 | 16.51 | | | 73.43 |
| Inferred | 145.23 | 30.67 | | | 175.90 |
| Total | 209.67 | 49.97 | | | 259.64 |

**Perry County**, continued

LOWER HAMLIN

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.56 | 0.80 | | | 2.36 |
| Indicated | 13.56 | 1.16 | | | 14.72 |
| Inferred | 12.69 | | | | 12.69 |
| Total | 27.81 | 1.96 | | | 29.77 |

FIRE CLAY RIDER

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 11.55 | 5.14 | | | 16.69 |
| Indicated | 59.28 | 17.42 | | | 76.70 |
| Inferred | 107.59 | 11.51 | | | 119.10 |
| Total | 178.42 | 34.07 | | | 212.49 |

FIRE CLAY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 13.24 | 23.59 | 31.08 | 5.25 | 73.16 |
| Indicated | 53.84 | 122.80 | 110.05 | 11.20 | 297.89 |
| Inferred | 154.59 | 137.12 | 57.30 | 0.59 | 349.60 |
| Total | 221.67 | 283.51 | 198.43 | 17.04 | 720.65 |

UPPER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.81 | 0.50 | | | 2.31 |
| Indicated | 11.17 | 0.71 | | | 11.88 |
| Inferred | 30.37 | | | | 30.37 |
| Total | 43.35 | 1.21 | | | 44.56 |

LOWER WHITESBURG

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 2.69 | 0.67 | | | 3.36 |
| Indicated | 19.31 | 2.98 | | | 22.29 |
| Inferred | 77.68 | 0.24 | | | 77.92 |
| Total | 99.68 | 3.89 | | | 103.57 |

AMBURGY

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 7.33 | 3.22 | | | 10.55 |
| Indicated | 40.86 | 12.28 | | | 53.14 |
| Inferred | 167.14 | 95.15 | | | 262.29 |
| Inferred II | 39.97 | | | | 39.97 |
| Total | 255.30 | 110.65 | | | 365.95 |

UPPER ELKHORN NO. 3 1/2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | | | | |
| Indicated | 0.60 | | | | 0.60 |
| Inferred | | | | | |
| Total | 0.60 | | | | 0.60 |

UPPER ELKHORN NO. 3

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 3.00 | 1.74 | 0.88 | | 5.62 |
| Indicated | 16.84 | 12.04 | 1.64 | | 30.52 |
| Inferred | 76.64 | 1.48 | | | 78.12 |
| Total | 96.48 | 15.26 | 2.52 | | 114.26 |

UPPER ELKHORN NO. 2

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | | 1.86 | 0.65 | | 2.51 |
| Indicated | | 5.58 | 1.82 | | 7.40 |
| Inferred | 8.67 | | | | 8.67 |
| Total | 8.67 | 7.44 | 2.47 | | 18.58 |

UPPER ELKHORN NO. 1

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 1.04 | 1.41 | | | 2.45 |
| Indicated | 5.81 | 2.50 | | | 8.31 |
| Inferred | 39.50 | 0.03 | | | 39.53 |
| Total | 46.35 | 3.94 | | | 50.29 |

**Perry County**, continued

UNNAMED

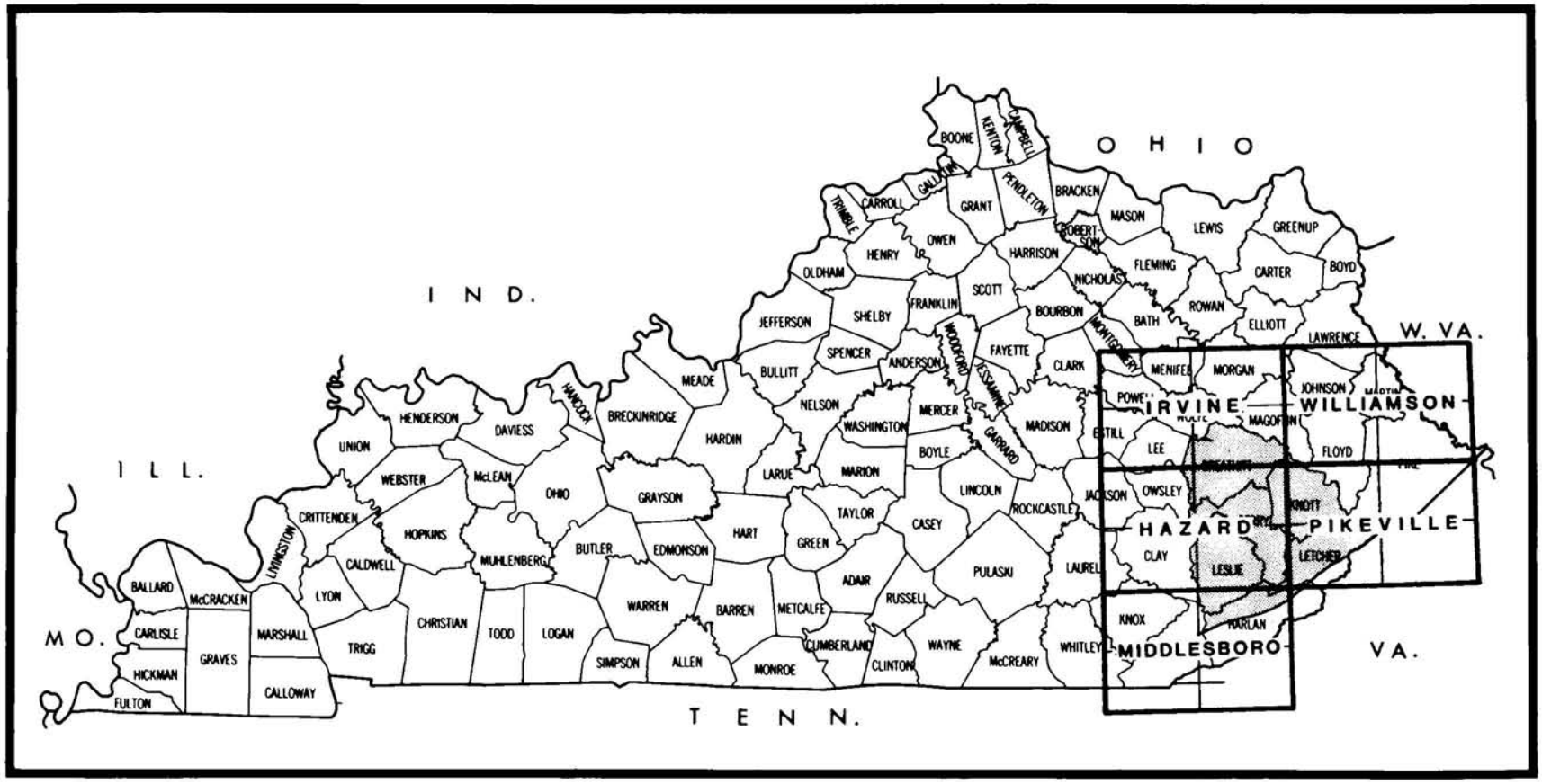
| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 0.33 | | 0.13 | | 0.46 |
| Indicated | 1.17 | | 0.23 | | 1.40 |
| Inferred | | | | | |
| Total | 1.50 | | 0.36 | | 1.86 |

PERRY COUNTY TOTALS

| Reliability Class | Thickness Class (Inches) 14-28 | 28-42 | 42-56 | 56 + | Total |
|---|---|---|---|---|---|
| Measured | 93.56 | 104.51 | 152.72 | 73.55 | 424.34 |
| Indicated | 437.48 | 369.15 | 317.74 | 205.33 | 1329.70 |
| Inferred | 1096.53 | 415.36 | 188.38 | 102.39 | 1802.66 |
| Inferred II | 39.97 | | | | 39.97 |
| Total | 1667.54 | 889.02 | 658.84 | 381.27 | 3596.67 |

# APPENDIX II:
# Coal Resource Maps

**Maps of the Fire Clay (Hazard No. 4) and the Upper Elkhorn No. 3 Coal Beds of the Hazard District.**




Index of the Hazard District, Kentucky, showing counties and locations of the 1:100,000 quadrangles. The following coal bed illustrations are on quarter segments of the named 1:100,000 quadrangles.

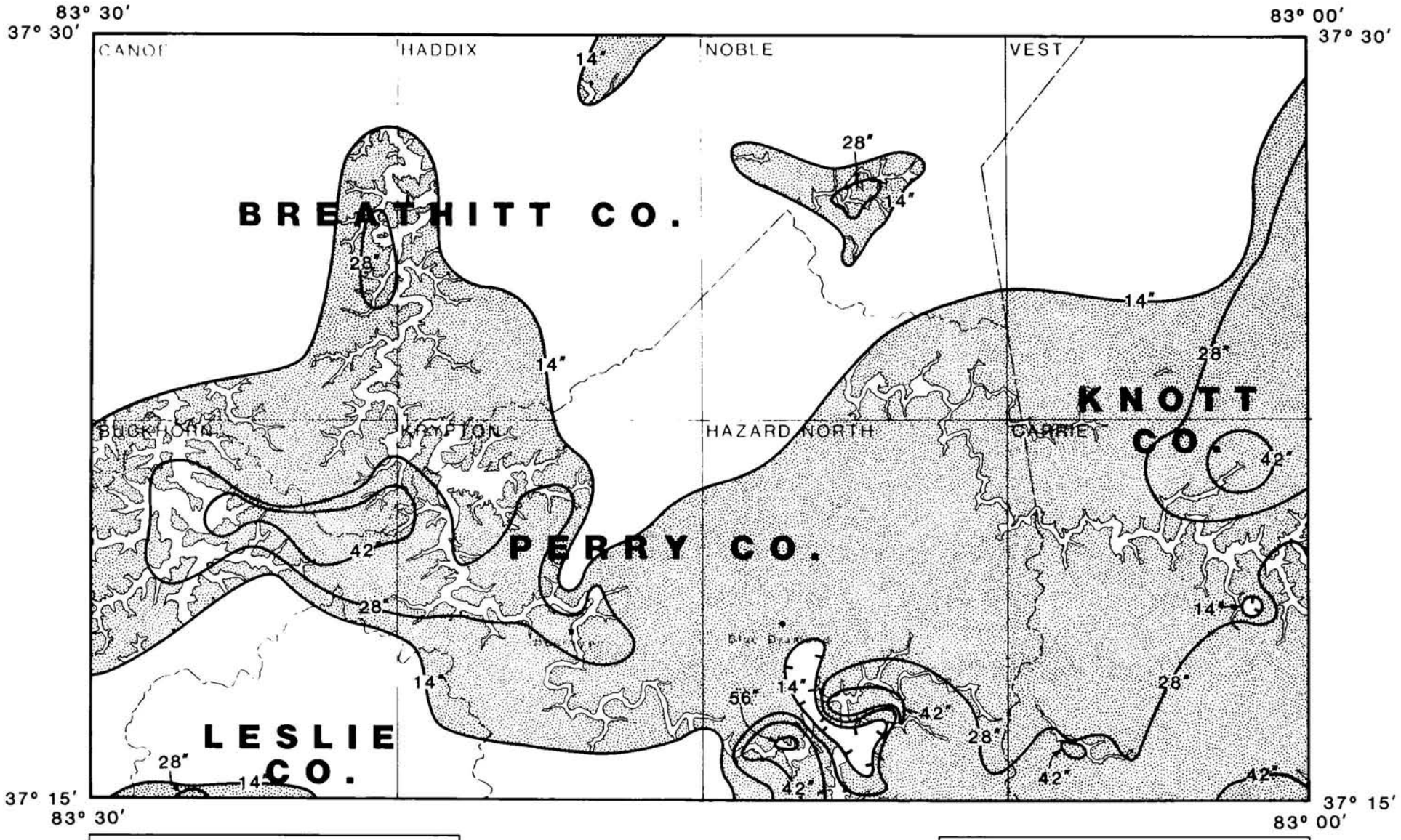
**RESOURCE MAPS SHOWING THICKNESS AND ORIGINAL EXTENT, PRIOR TO MINING, OF THE FIRE CLAY (HAZARD NO. 4) AND THE UPPER ELKHORN NO. 3 COAL BEDS**

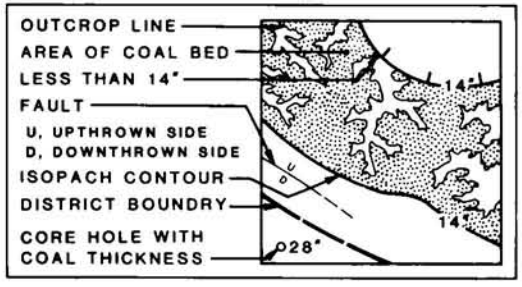
| COAL BED | MAP AREA (portion of 1:100,000, ½ degree series) |
|---|---|
| Fire Clay | Hazard NE/4, SE/4; Irvine SE/4; Middlesboro NE/4; Pikeville SW/4, NW/4; Williamson SW/4. |
| Upper Elkhorn No. 3 | Hazard NE/4, SE/4; Irvine SE/4; Middlesboro NE/4; Pikeville SW/4, NW/4. |

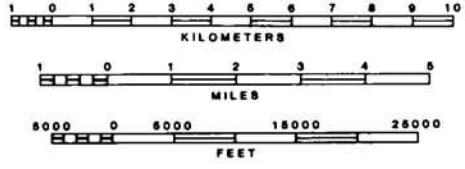
Maps in the appendix are scaled at 1:200,000 (about 3 miles to the inch).

Coal resource maps shown here represent summary compilation for the more extensive or representative beds in the district. These account for — percent of the estimated mineable coal. The original work maps are on 1:24,000-scale 7½-minute quadrangles.

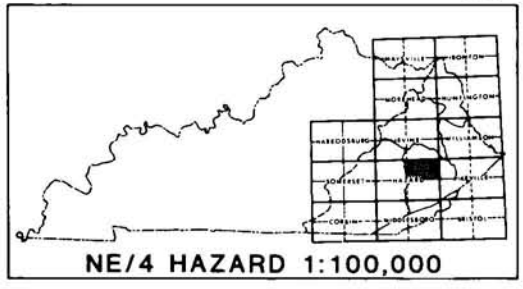
Maps at an intermediate scale of 1:100,000 were prepared and are available at the Kentucky Geological Survey. These are the same in content as those presented herein and differ only in scale.

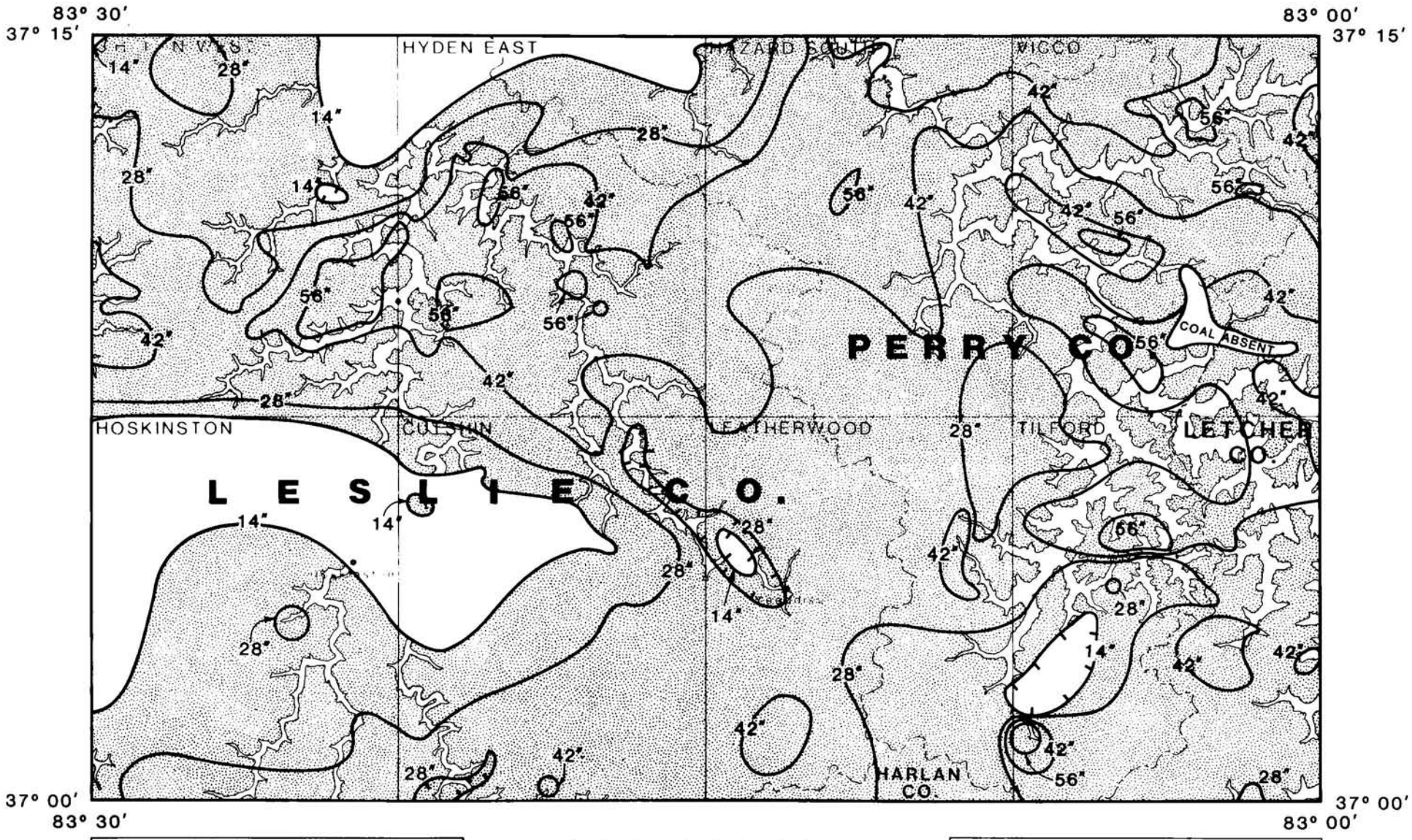



**FIRE CLAY COAL BED**

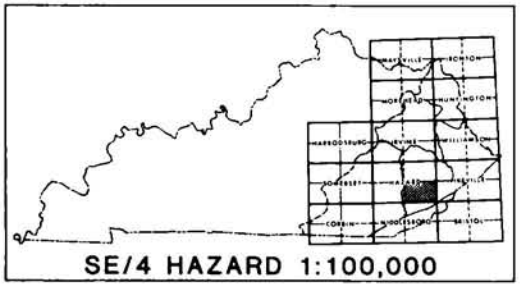


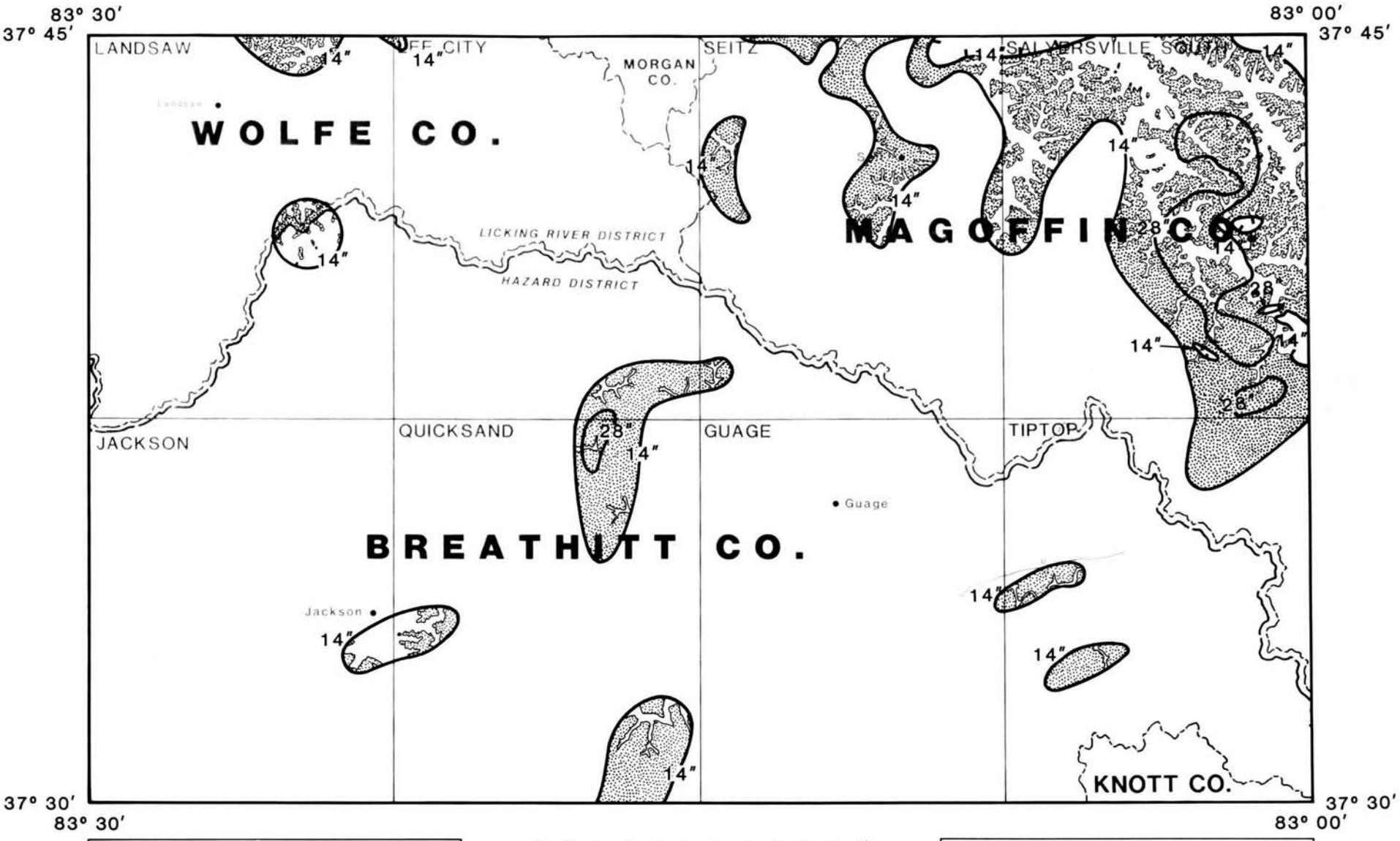



OUTCROP LINE
AREA OF COAL BED
LESS THAN 14"
FAULT
U, UPTHROWN SIDE
D, DOWNTHROWN SIDE
ISOPACH CONTOUR
DISTRICT BOUNDRY
CORE HOLE WITH COAL THICKNESS

KILOMETERS
MILES
FEET

## FIRE CLAY COAL BED





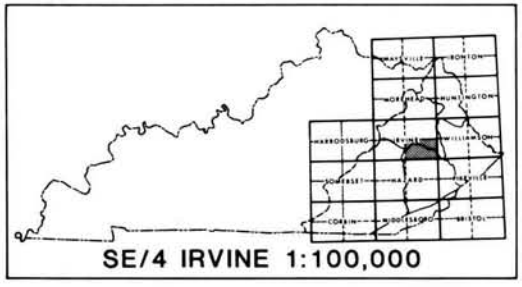

OUTCROP LINE
AREA OF COAL BED
LESS THAN 14"
FAULT
U, UPTHROWN SIDE
D, DOWNTHROWN SIDE
ISOPACH CONTOUR
DISTRICT BOUNDRY
CORE HOLE WITH COAL THICKNESS

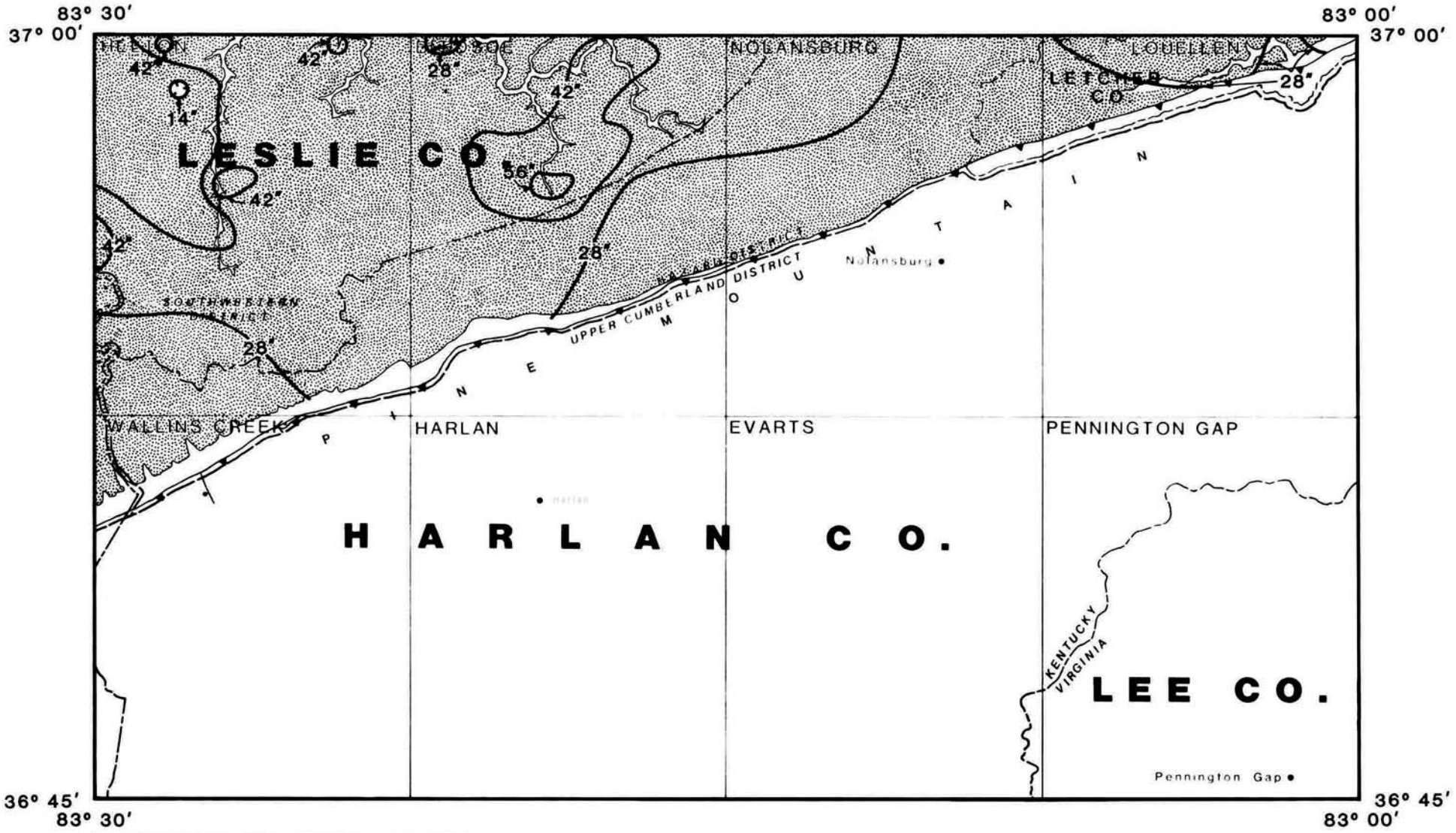
1 0 1 2 3 4 5 6 7 8 9 10
KILOMETERS

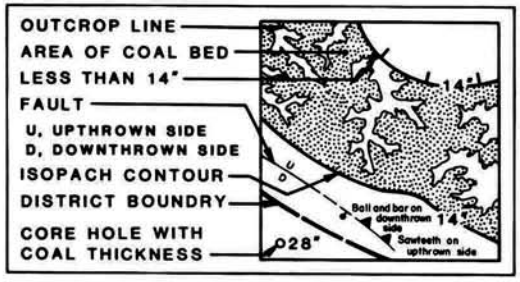
1 0 1 2 3 4 5
MILES

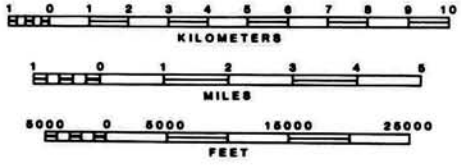
5000 0 5000 15000 25000
FEET

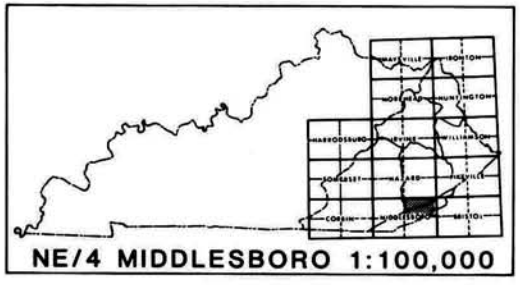
# FIRE CLAY COAL BED
(HAZARD DISTRICT)
# FIRE CLAY COAL BED "A"
(LICKING RIVER DISTRICT)



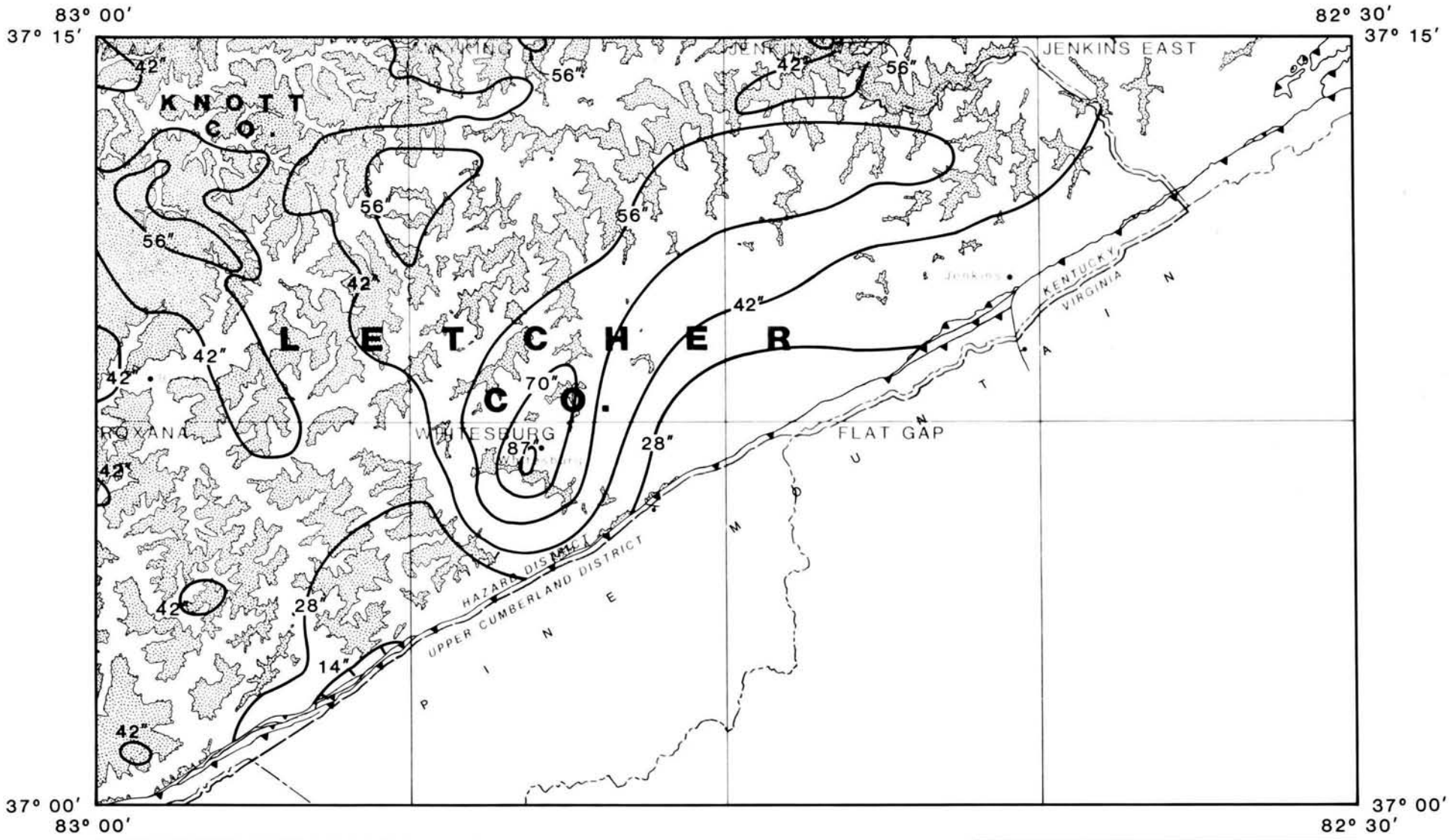



**FIRE CLAY COAL BED**



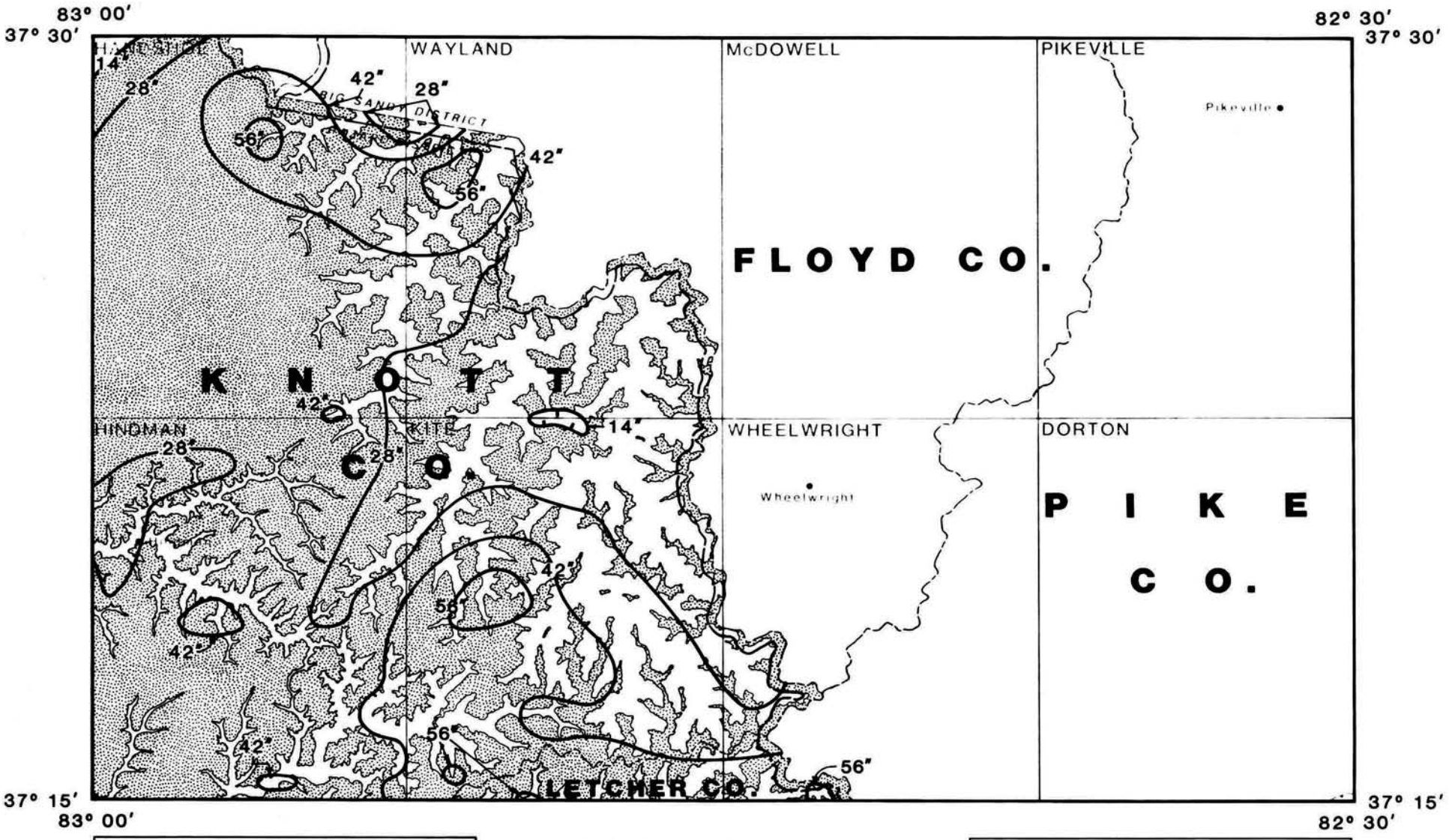

OUTCROP LINE
AREA OF COAL BED
LESS THAN 14"
FAULT
U, UPTHROWN SIDE
D, DOWNTHROWN SIDE
ISOPACH CONTOUR
DISTRICT BOUNDRY
CORE HOLE WITH COAL THICKNESS

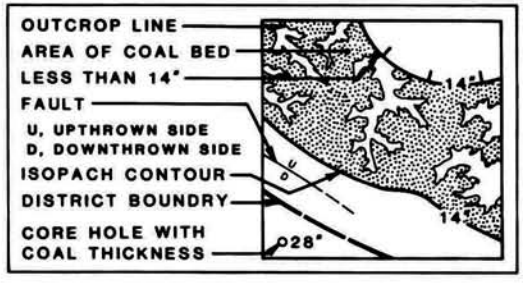
Ball and bar on downthrown side
Sawteeth on upthrown side

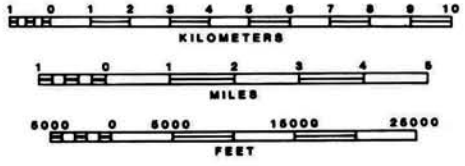
KILOMETERS
MILES
FEET

# FIRE CLAY COAL BED

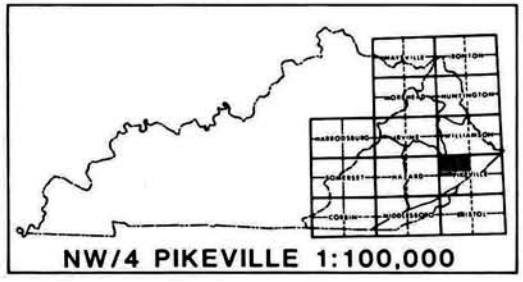
SW/4 PIKEVILLE 1:100,000

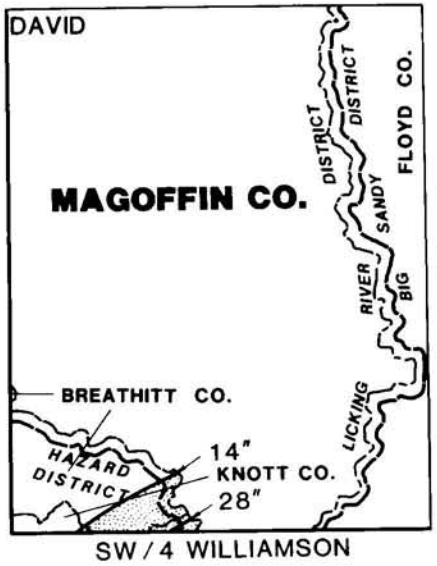


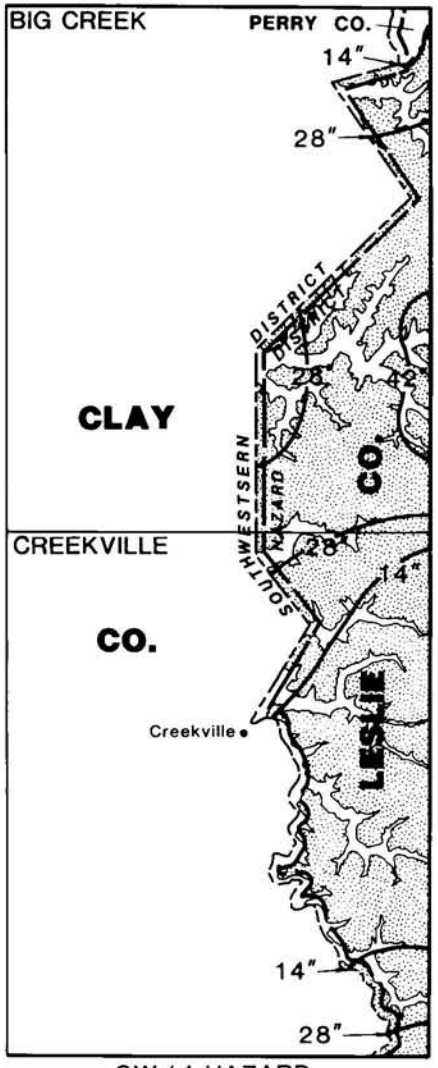




**FIRE CLAY COAL BED**

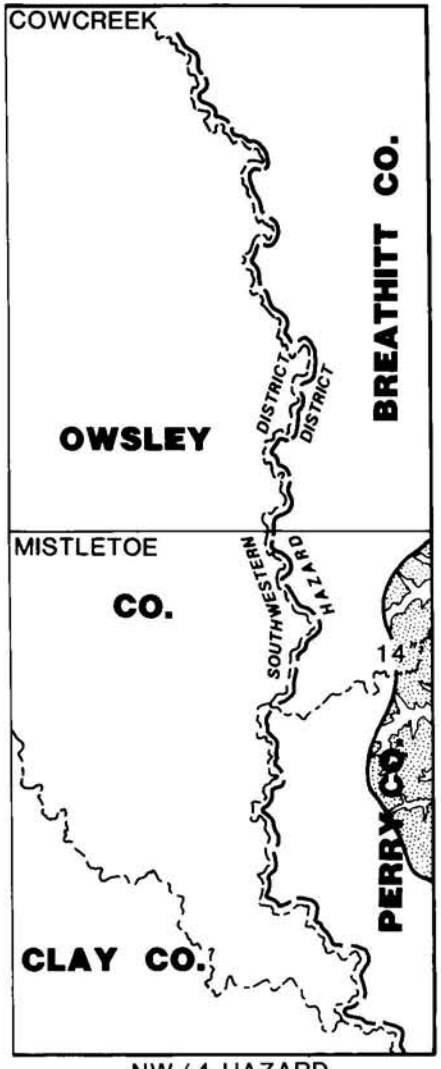





SW / 4 WILLIAMSON



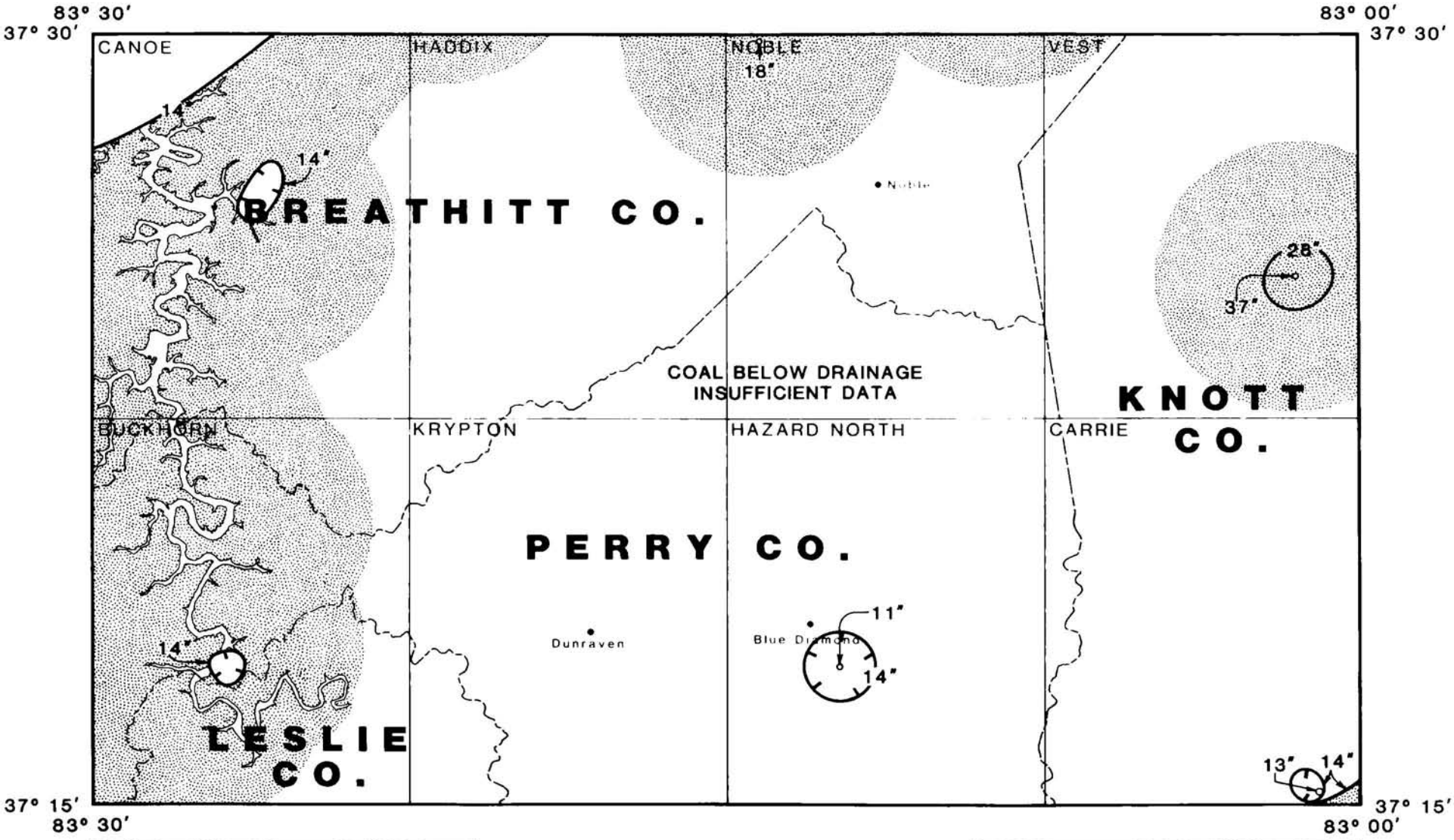

SW / 4 HAZARD

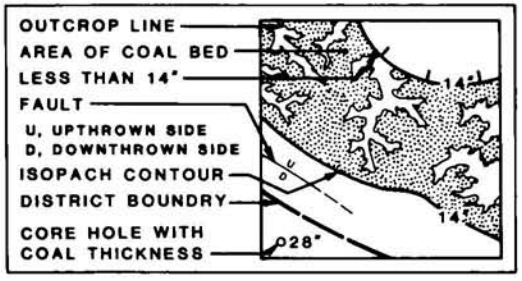


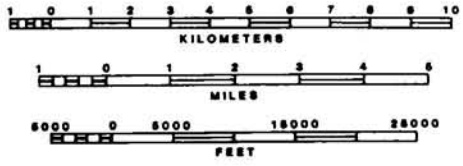

NW / 4 HAZARD

FIRE CLAY COAL BED

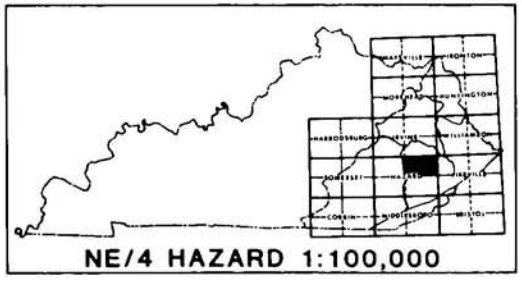
Compilation maps for the western extension of the Hazard District.

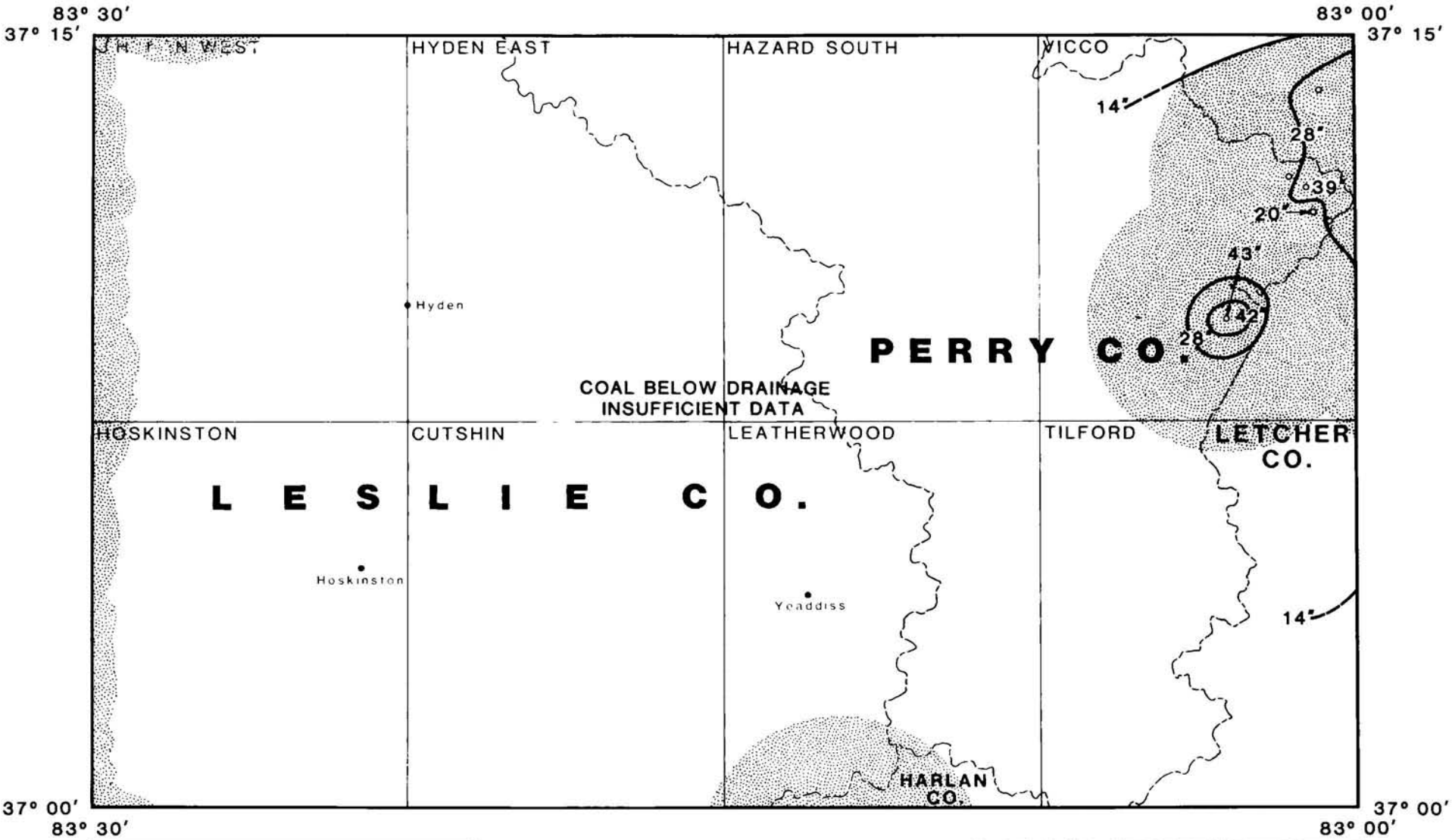


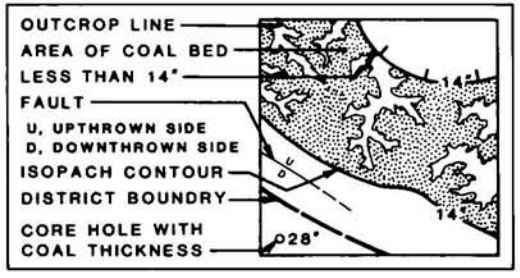



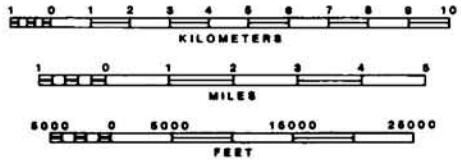




UPPER ELKHORN No.3

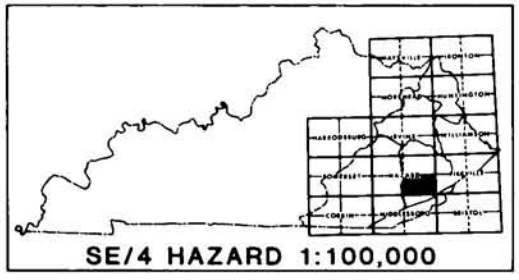


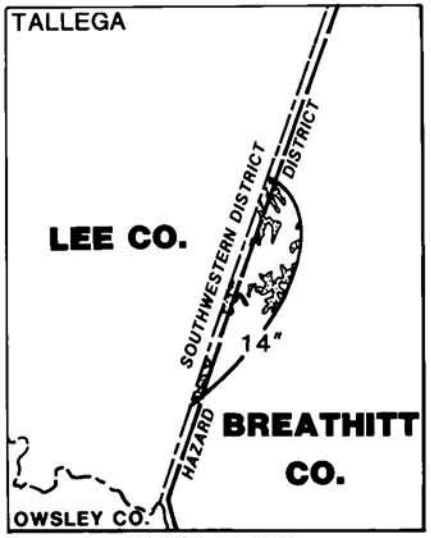


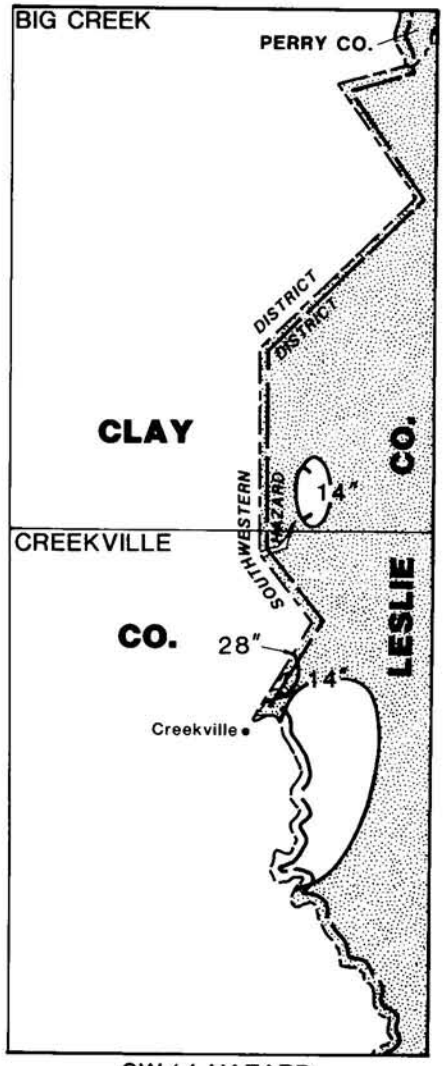




**UPPER ELKHORN No.3**

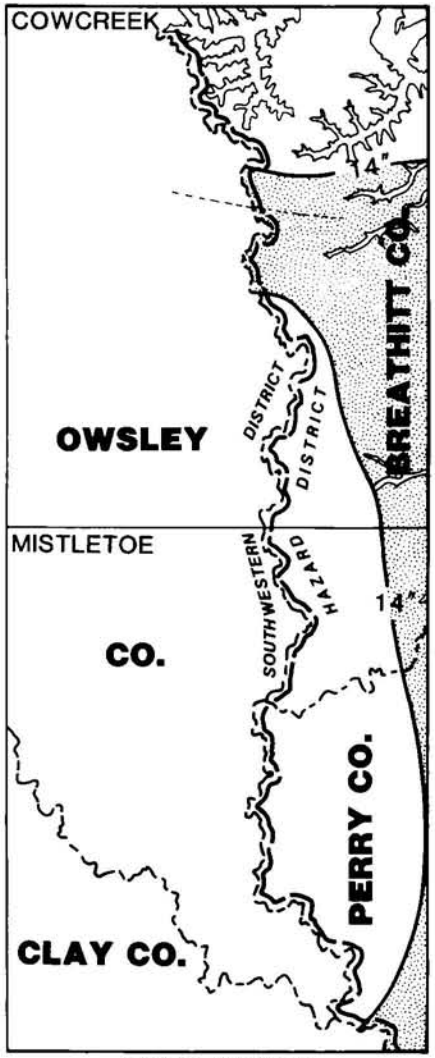





SW / 4 IRVINE



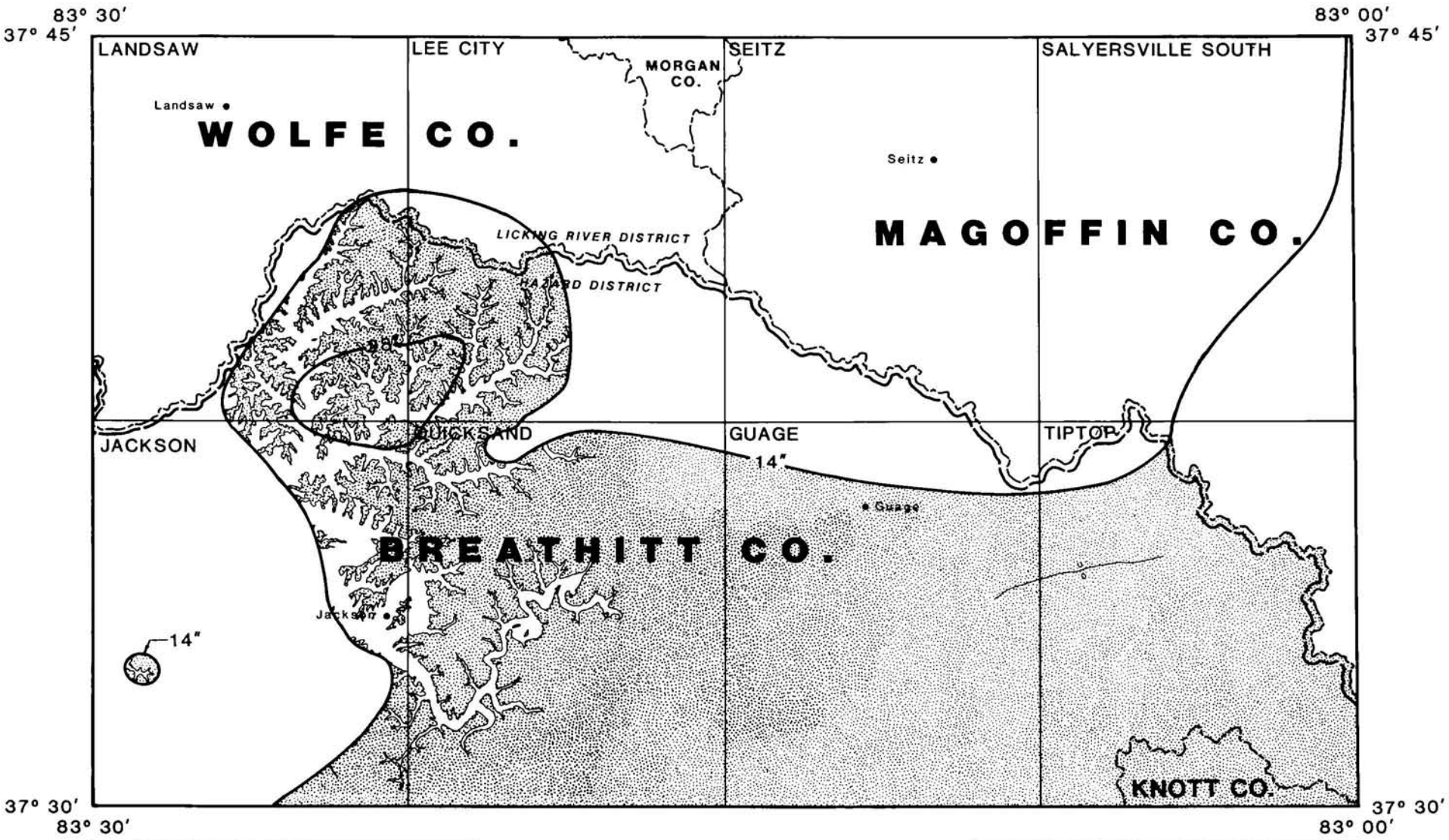

SW / 4 HAZARD

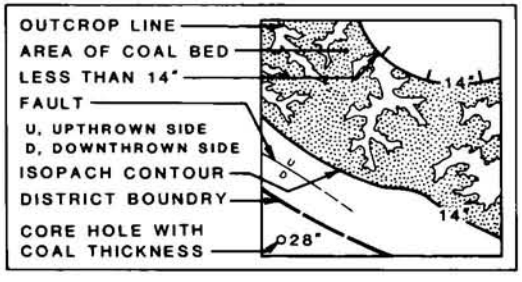


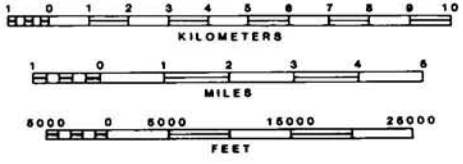

NW / 4 HAZARD

## UPPER ELKHORN No. 3

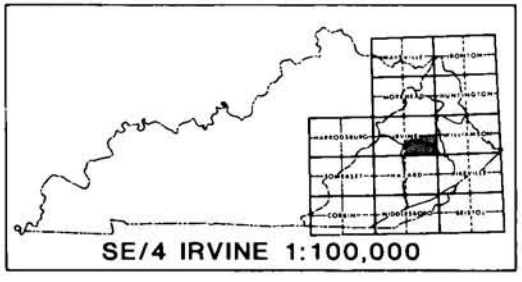
Compilation maps for the western extension of the Hazard District.

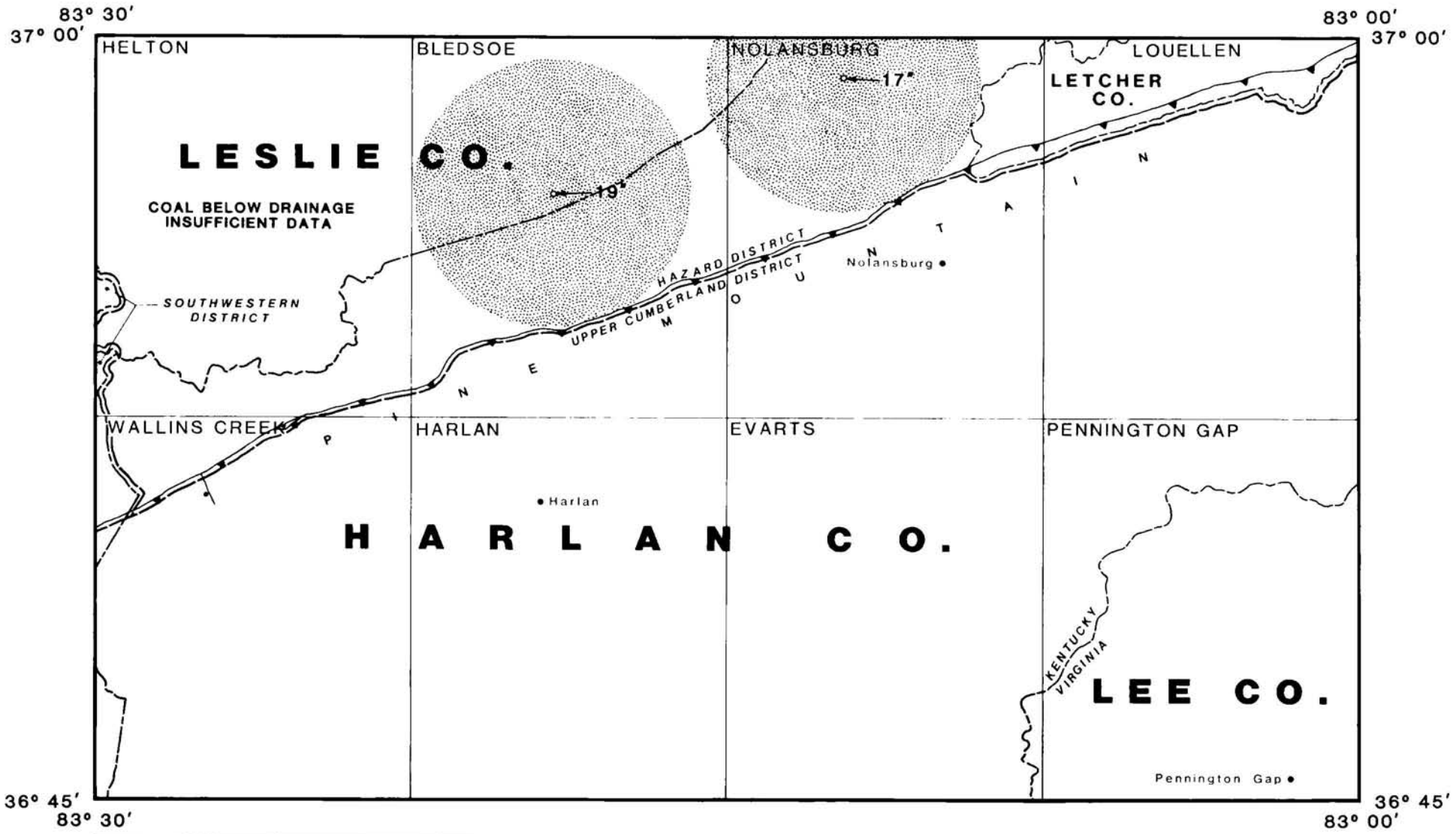


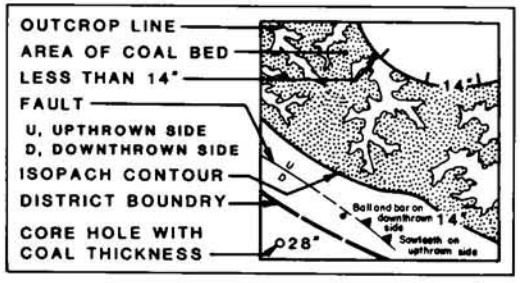



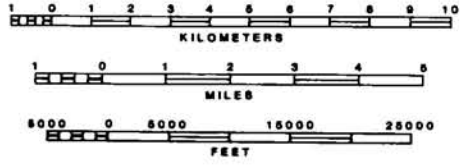




**UPPER ELKHORN NO. 3**

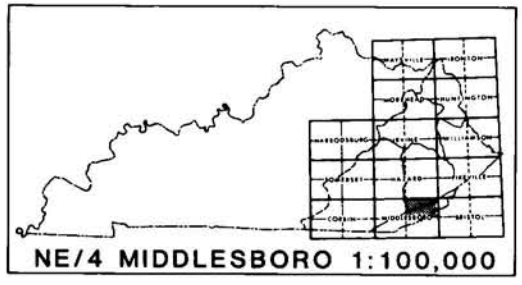


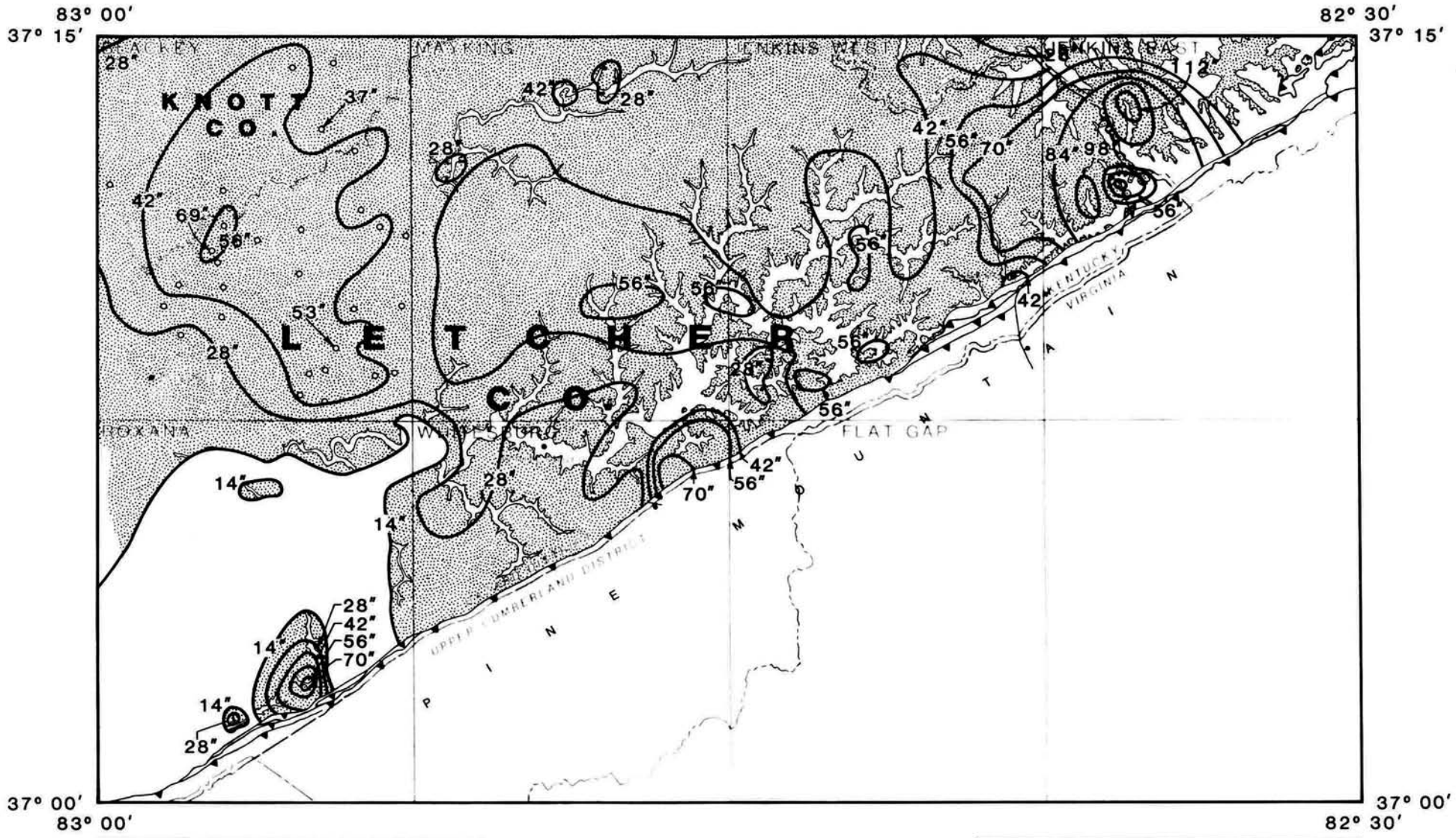



**UPPER ELKHORN No.3**






OUTCROP LINE
AREA OF COAL BED
LESS THAN 14″
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U, UPTHROWN SIDE
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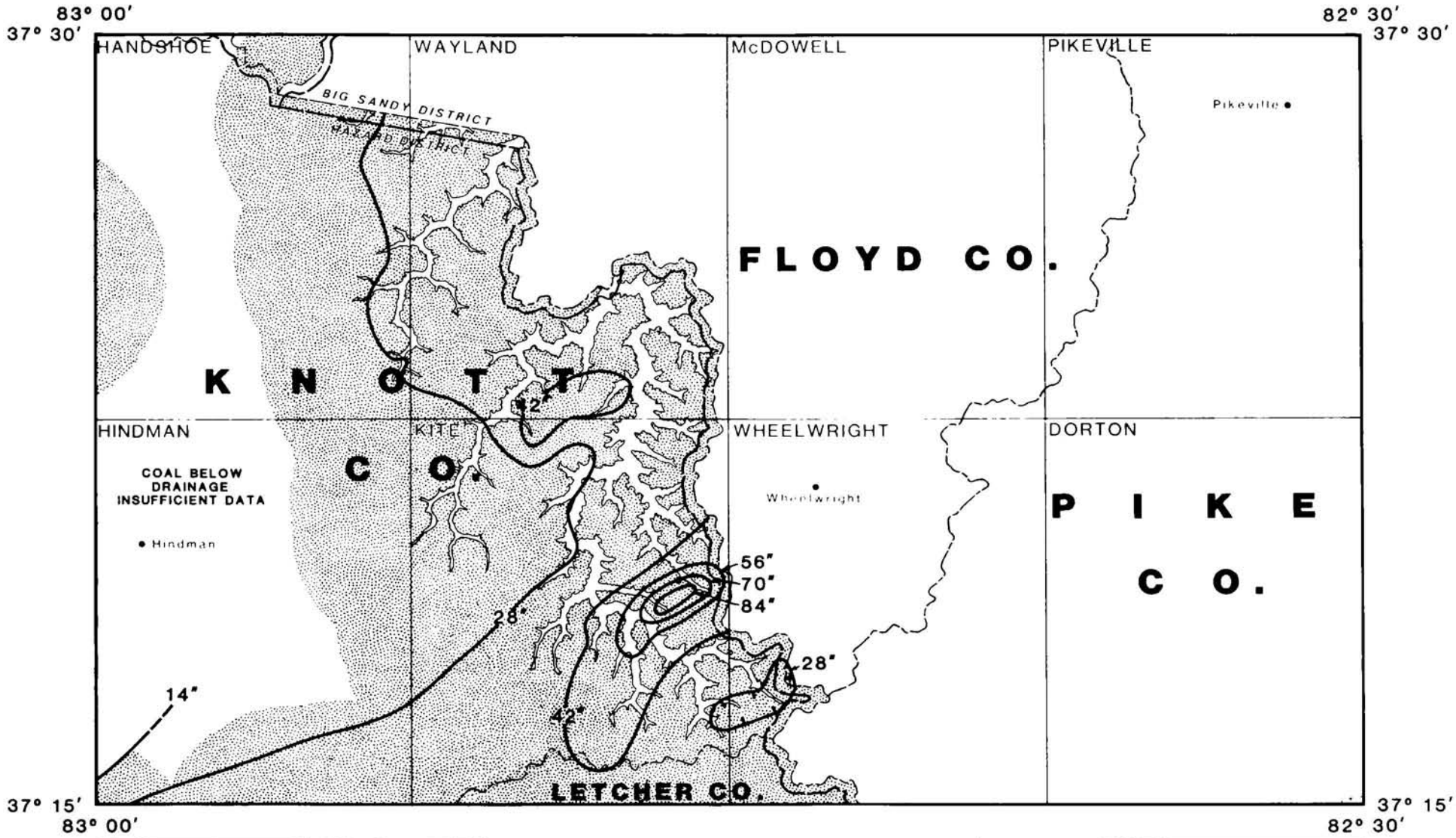
ISOPACH CONTOUR
DISTRICT BOUNDRY
CORE HOLE WITH COAL THICKNESS

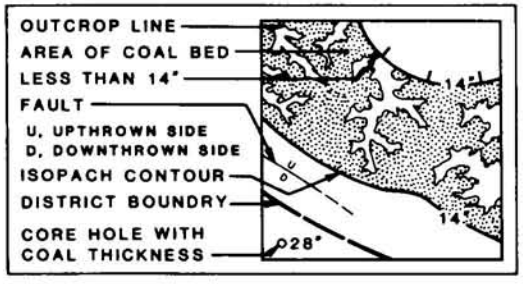
Ball and bar on downthrown side
Sawteeth on upthrown side

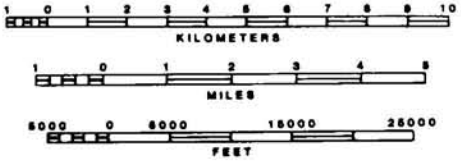
KILOMETERS
MILES
FEET

# UPPER ELKHORN No.3

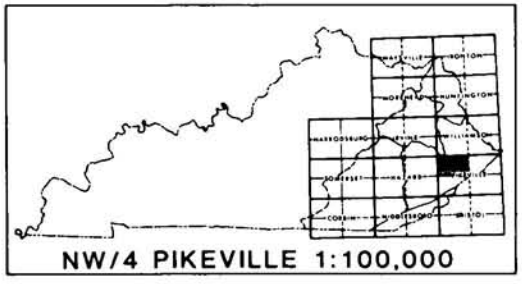
SW/4 PIKEVILLE 1:100,000




**UPPER ELKHORN No.3**



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