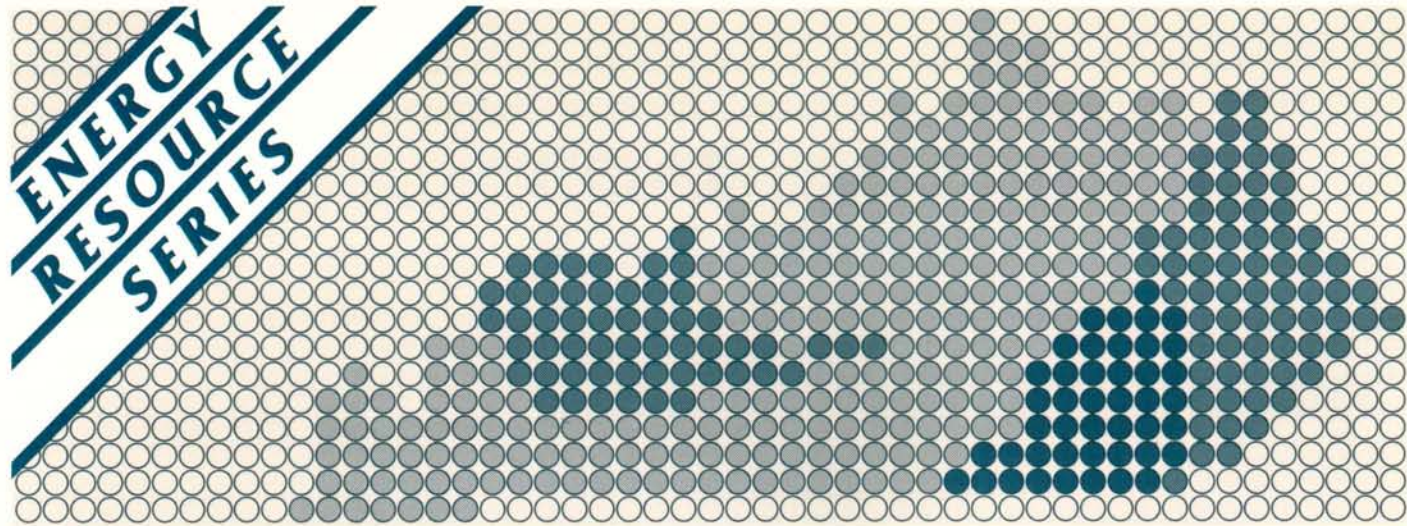




COAL RESOURCES OF THE SOUTHWESTERN DISTRICT, KENTUCKY

**Bell, Clay, Clinton, Estill, Jackson, Knox, Laurel, Lee, Madison, McCreary,
Owsley, Pulaski, Rockcastle, Wayne, and Whitley Counties.**

Russell A. Brant
Kentucky Geological Survey

Work performed by the Kentucky Geological Survey
under grants from the Kentucky Department of Energy
through the University of Kentucky
Institute for Mining and Minerals Research

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REPORTS IN THE ENERGY RESOURCE SERIES

WESTERN KENTUCKY COAL RESOURCES
Gilbert E. Smith and Russell A. Brant

COAL RESOURCES OF THE PRINCESS DISTRICT
Russell A. Brant

COAL RESOURCES OF THE SOUTHWESTERN DISTRICT
Russell A. Brant

PREFACE

Coal Resources of the Southwestern District, Kentucky was 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 third in the joint 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 Southwestern District (Bell, Clay, Clinton, Estill, Jackson, Knox, Laurel, Lee, Madison, McCreary, Owsley, Pulaski, Rockcastle, Wayne, and Whitley Counties) of the Eastern Kentucky Coal Field as calculated by the KGS. 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 represents part of an ongoing resource assessment of the Eastern Kentucky Coal Field, which began in 1976 with a grant from the Kentucky Energy Cabinet through the IMMR. For more information, contact:

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This work on the coal resources of the Southwestern District would not have been possible without the contributions of many people. The basis for coal resource estimates is data from field work performed by the following geologists: David A. Williams, Gary Harned, Lee Dick, Gary Cole, Ross Overby, Ken Gill, Steve Hoke, and Donald Chesnut. J. Hiram Smith coordinated field work, trained geologists in field methods, and maintained the files of field data.

Donald R. Chesnut coordinated field work, verified data, and maintained the files after retirement of J. Hiram Smith; Elisabeth R. Portig supervised data processing, planimetry, and tabulating of estimates. Wayne Frankie supervised preparation of summary maps. The project was augmented by the services of geologists Blaine Fennell and Richard Smath, and aides Dorothy McDaniel, Lorie Breeck, and Gail Gonzales; drafting advice and assistance were provided by Roger Potts and Freda Harris; Sara Evans Baxter provided much of the final drafting. James C. Cobb provided technical and editorial review of the manuscript. Margaret Luther edited the manuscript.

This work was supported in part by a grant from the Kentucky Department of Energy through the University of Kentucky Institute for Mining and Minerals Research. Additional support for the work was provided by the U. S. Geological Survey under U. S. Department of Interior Grant No. MOU-9420-0044 as part of the National Coal Resource Data System, and the Kentucky Geological Survey.

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ABSTRACT

The Southwestern District contains an estimated 7.43 billion short tons of original coal resources. Remaining coal resources total an estimated 6.85 billion short tons as of January 1, 1981. The coal resources are tabulated by standard U. S. Geological Survey resource classes for 25 of the coal beds that occur in the district. Clay County contains an estimated 1.54 billion tons, or 21 percent of the district total, followed by Knox, which contains 1.38 billion tons, or 19 percent of the district total. Bell County contains an estimated 1.03 billion tons, or 14 percent, and Whitley County contains 975 million tons, or 13 percent of the district total. Remaining coal resources in the other 11 counties range from 70 thousand tons in Madison County to nearly 574 million tons in Owsley County.

INTRODUCTION

The Southwestern District occupies 3,400 square miles and includes all of Clay, Jackson, Knox, Laurel, Lee, McCreary, and Owsley Counties and parts of Bell, Clinton, Estill, Madison, Pulaski, Rockcastle, Wayne, and Whitley Counties; it is covered by all or parts of 94 7½-minute quadrangles (Fig. 1 and Table 1). At least 80 names are applied to coal beds in the Southwestern District. Rice and Smith (1980) correlate principal coal beds, coal zones, and key horizons for the Eastern Kentucky Coal Field by district. Figure 2 shows the stratigraphic sequence and generally applied names for the principal coal beds of the Southwestern District. This generalized chart of the sequence depicts only the potential of coal and other rocks in the district and does not reveal the nature of the rock column for any specific locality. Detail and refinement of geologic description can be found on the geologic quadrangle maps published for the district.

The difference between coal resources and reserves is commonly misunderstood. Modern coal resources estimates refer to the

Table 1. List of quadrangles all or partially contained in the Southwestern District.

Albany	Eagan	Oneida
Alcorn	Fount	Oneida North
Ano	Frakes	Pall Mall
Artemus	Frazer	Panola
Balkan	Hail	Parmleysville
Barbourville	Heidelberg	Parnell
Barcreek	Heidrick	Parrot
Barthell	Helton	Pineville
Barthell SW	Hima	Portersburg
Beattyville	Hollyhill	Powersburg
Bell Farm	Irvine	Rockholds
Berea	Jellico East	Sandgap
Bernstadt	Jellico West	Savage
Beverly	Johnetta	Sawyer
Big Creek	Kayjay	Saxton
Bighill	Ketchen	Scalf
Billows	Leighton	Sharp Place
Blackwater	Lily	Shopville
Bobtown	Livingston	Somerses
Booneville	London	Stanton
Brodhead	London SW	Sturgeon
Burnside	Manchester	Tallega
Campton	Maretburg	Tyner
Clay City	Maulden	Vox
Cobhill	McKee	Wallins Creek
Coopersville	Middlesboro North	Whitley City
Corbin	Mill Springs	Wiborg
Cow Creek	Mistletoe	Wildie
Creekville	Monticello	Williamsburg
Cumberland City	Mt. Vernon	Winfield
Cumberland Falls	Nevelsville	Wofford
Dykes	Ogle	Zachariah

OHIO

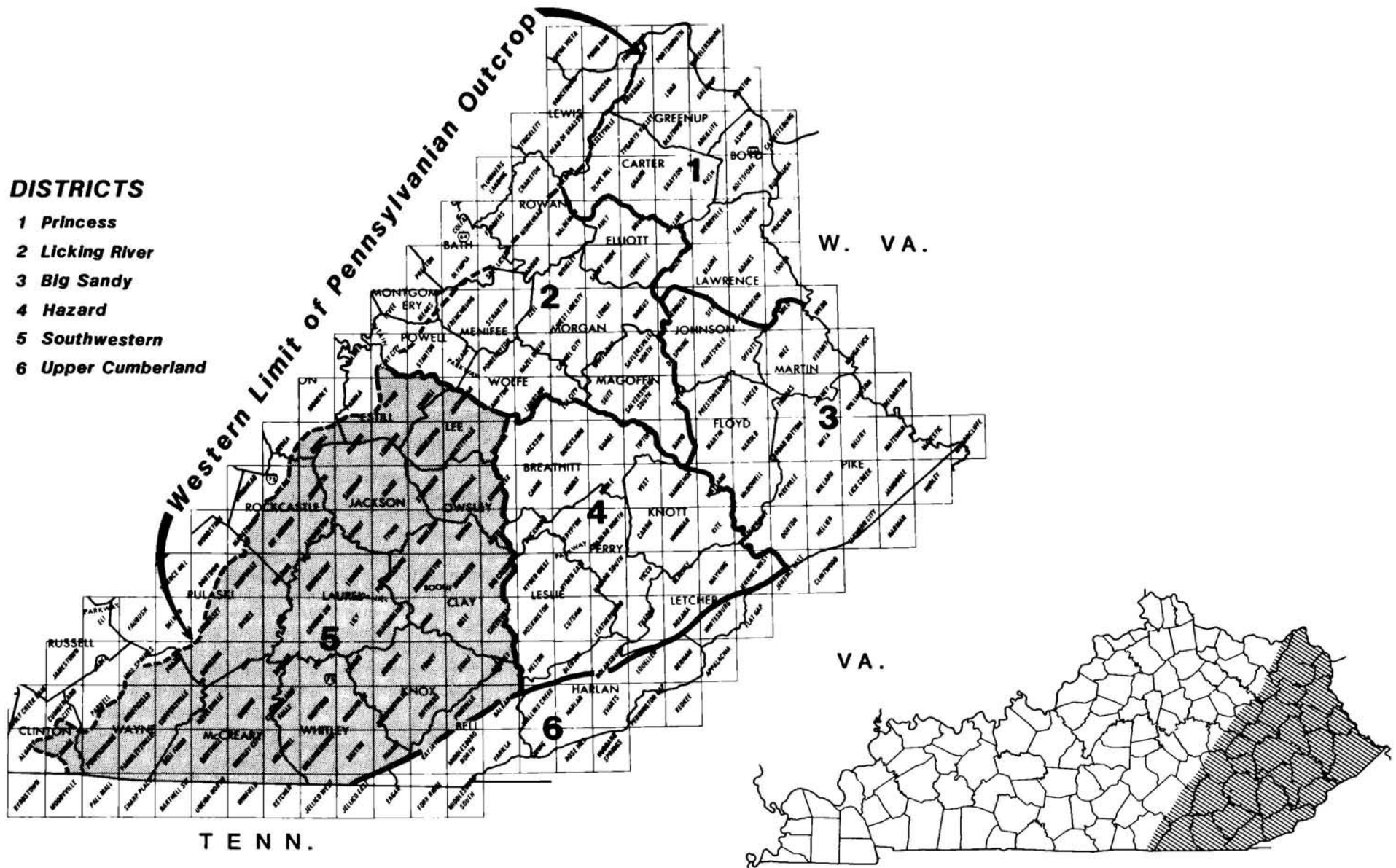


Figure 1. Coal districts in the Eastern Kentucky Coal Field. The Southwestern District includes: Clay, Jackson, Knox, Laurel, Lee, McCreary, and Owsley Counties, and parts of Bell, Clinton, Estill, Madison, Pulaski, Rockcastle, Wayne, and Whitley Counties.

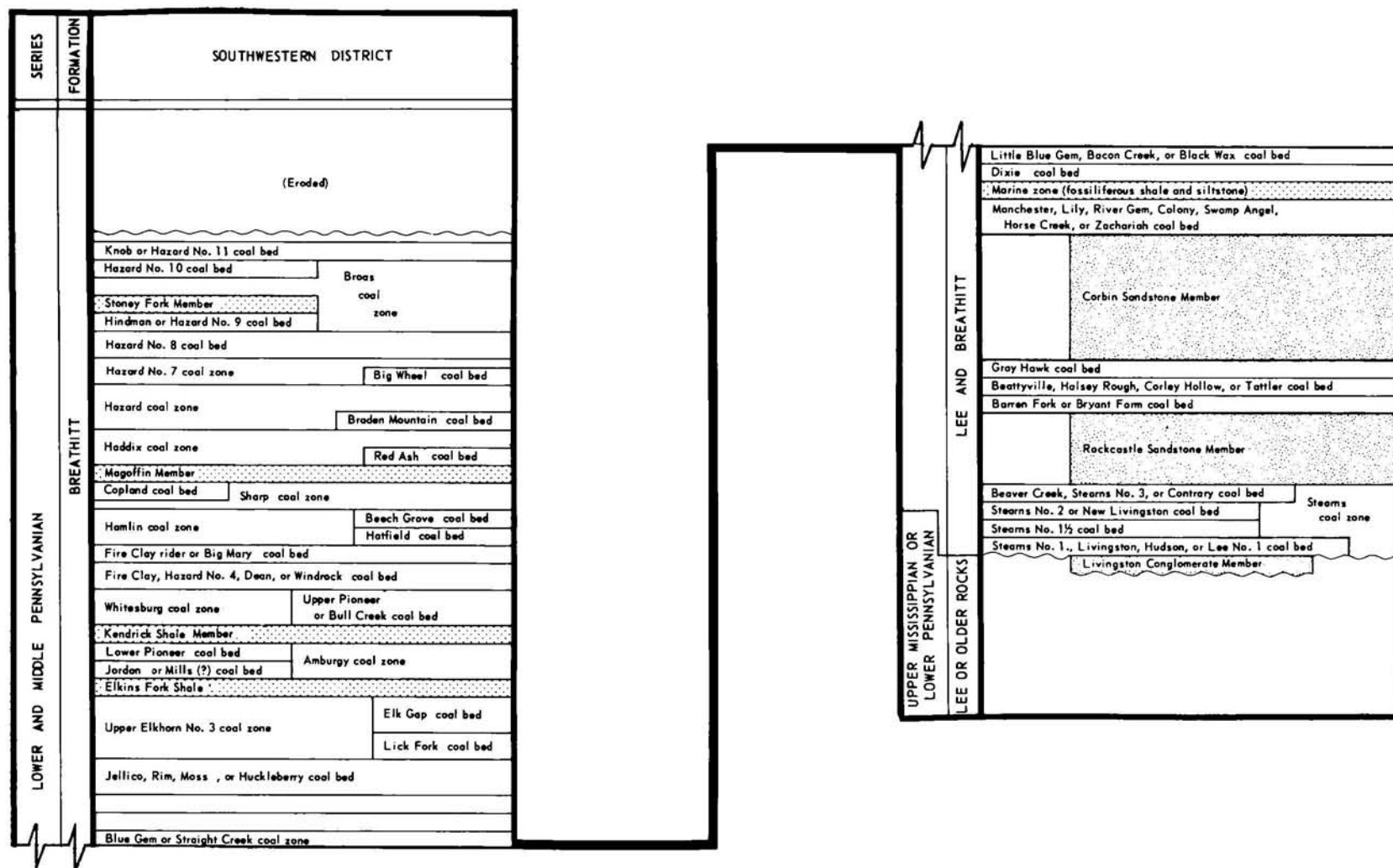


Figure 2. Key stratigraphic units of the Southwestern District, from Rice and Smith (1980).

geologic or regional occurrence of coal. The primary factors for these determinations are the correlation (accurate identification of beds), the coal bed extent, and the thickness characteristics. Coal reserves, on the other hand, apply to that part of the resource which is technically and economically recoverable under prevailing market conditions. Some technical considerations are the character of the roof rock, the mining method, detailed coal thickness, variation, coal inclination, interruption of coal by channels or cut-outs, and quality of the coal. Determination of these considerations prior to mining requires an abundance of closely spaced observations of a specific coal body or area, usually from drill core descriptions. Some economic factors affecting reserves include washability, labor, and transportation. All of these considerations are focused on relatively small, specific parts of a coal bed or area in order to design or assess a successful mining venture. Detail such as that outlined above is outside the scope of this investigation. The coal resources estimated in this report apply to individual coal beds as they occur in the district. These estimates are based on the correlation of coal beds, bed extent, and thickness, and provide a general knowledge of the occurrence and trends of each coal bed. Coal resources estimates are based on much more widely spaced data points and many fewer considerations than are needed for reserves determinations. Resource information is valuable to government, industry, business, and individuals for planning, exploration, resource policy decisions, and regulation decisions.

METHODS

Tonnage of coal in a given area is calculated by using the following formula: multiply the area in acres by the thickness of the coal in feet by 1,800 tons per acre-foot. This standard formula is generally used. An acre-foot is 1 foot of thickness over 1 acre of area. Density of 1,800 tons per acre-foot (weight of 1 foot coal over 1 acre) is applied to bituminous coal for resource estimates. Density is fixed and area is readily found, but thickness is variable and can

lead to differences between estimated and true tonnage.

Thickness characteristics of the individual coal beds are projected by the use of isopach lines. These lines are drawn through points of equal thickness. These points are determined, extrapolated, or interpolated from points of measurement of the coal bed. Coal thickness data are plotted on 7.5-minute quadrangle work maps at a scale of 1:24,000. Standard isopach lines are drawn to represent coal thickness in 14 inch increments, starting with 14 inches, and continuing with 28 inches, 42 inches, 56 inches, etc. These intervals were applied by Huddle and others (1963) and Averitt (1975) in previous studies of the district, and conform to U.S. Geological Survey (1976a, 1976b, 1980) classification. Coal less than 14 inches thick is excluded from resource estimation. Midpoint values between the standard isopachs are used for the tonnage calculation (21 inches, 35 inches, 49 inches, etc.).

In coal-resource estimation, a system of reliability categories (U. S. Geological Survey, 1976a, 1976b, 1980) is used to account for the concealed portions between points of measured coal thickness. The degree for confidence given to a resource calculation decreases with increasing distance from a point of measured coal thickness. The coal resource estimated within a ¼-mile radius of a measured thickness is considered to have the highest reliability and is termed the "measured resource"; the estimation between ¼ mile and ¾ mile from the measured thickness is termed the "indicated resource"; and the estimation between ¾ mile and 3 miles is termed the "inferred resource," and has the lowest reliability.

The original coal resource estimate accounts for coal prior to mining. The remaining coal resource is determined by subtracting the coal produced and lost in mining from the original coal resource. The coal lost in mining is considered to be equal to 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 support pillars or lost in the coal cleaning process. This factor includes losses incurred by augering and hillside stripmining. Production figures are based on summaries by Currens and Smith (1976) and annual reports of the Kentucky Department of Mines and Minerals, 1976-80.

Table 2. Southwestern District coal resource by county and coal bed.
(Millions of short tons. Listed stratigraphically.)

COAL BED	BELL	CLAY	CLINTON	ESTILL	JACKSON	KNOX	LAUREL	LEE	MADISON	MCCRERY	OWSLEY	PULASKI	ROCKCASTLE	WAYNE	WHITLEY	TOTALS
Hazard #10	0.95	0.07				0.06										1.08
Hazard #9	9.16	1.29				1.12					0.14					11.71
Hazard #8	27.43	14.63				7.47					0.52					50.05
Hazard #7	12.55	11.03				0.31					2.35					26.24
Hazard	68.30	74.17				24.09					38.09				0.48	205.13
Haddix	35.99	103.69				16.16					2.20					158.04
Copland	2.62	7.34				6.97		0.01			35.72					52.66
Hamlin	53.51	64.95				18.97					0.52				0.62	138.57
Fire Clay Rider	152.18	119.94				98.84		0.12			6.44				11.15	388.67
Fire Clay	180.64	148.22				109.84		0.18			88.80				24.49	552.17
Whitesburg	88.34	131.53				88.84					8.04				2.37	319.12
Amburgy	28.27	50.61				71.16		2.92			91.45				11.25	255.66
U. Elkhorn #3	31.03	137.42				100.19		8.79			110.33				2.62	390.38
Jellico	183.99	251.33			0.46	337.26	25.40	0.21		24.04	77.92				208.11	1,108.72
Blue Gem	159.48	16.25			0.63	383.11	28.37	24.89		31.35	12.32				268.13	924.53
Lower Blue Gem						54.70	3.86								71.39	129.95
Lily Rider		40.60														40.60
Lily (Manchester)	0.33	363.04			16.99	62.84	286.92	47.32		66.07	47.68				295.27	1,186.46
Gray Hawk					82.07			78.98			29.41					190.46
Halsey Rough					185.74		53.35	127.12			22.05	22.99	50.30			461.55
Barren Fork							4.26			225.86		10.03	63.71		79.58	383.44
Beaver Creek				2.50	43.12		2.68	73.44	<.01	37.22	0.16	111.03				270.16
Stearns #2			7.21		7.99		0.29			42.04		6.54	25.92	27.28		117.27
Stearns #1 1/2							1.21			13.75		2.78				17.74
Stearns #1					38.87		1.70		0.06	4.64			4.53			49.80
Total	1,034.77	1,536.11	7.21	2.50	375.87	1,381.93	408.04	363.98	0.06	444.97	574.14	153.37	144.46	27.28	975.46	7,430.16
Coal Mined & Lost*	367.05	78.47	3.34	0.01	16.55	101.96	55.32	12.97	.04	97.31	8.99	31.29	9.12	5.71	122.41	910.54
Remaining Coal	667.72	1,457.64	3.87	2.49	359.32	1,279.97	352.72	351.01	0.02	347.66	565.15	122.08	135.34	21.57	853.05	6,519.62
Percentage of Original Coal Remaining	65%	95%	54%	99%	96%	93%	86%	96%	33%	78%	98%	80%	94%	79%	87%	88%

*The figure given is two times the cumulative production of coal from 1790 to 1980 to account for coal mined and lost because of mining and cleaning.

COAL RESOURCES

The Southwestern District contains an estimated 7.430 billion tons original coal resource and an estimated 6.85 billion tons remaining coal resource. These resources occur in 25 coal beds. Table 2 presents the estimate of the individual beds in stratigraphic order by county for the Southwestern District, and Appendix I lists the detailed classification by bed, county, thickness class, and reliability class.

Nine coal beds in the district contain approximately 70 percent of the estimated original resources. Maps of these beds are shown in Appendix II. The Lily (Manchester) coal bed is the most extensive, and contains nearly 1.19 billion tons original resource; the Jellico follows with nearly 1.11 billion tons; the smallest bed illustrated contains 117 million tons.

Table 3 is a summary of the estimated coal resources in the Southwestern District by thickness and reliability class.

Coal in the 14-28 inch class constitutes 65 percent of the total estimated resource; that in the 28-42 inch class constitutes 28 percent; that in the 42-56 inch class constitutes nearly 6 percent; and that in the greater than 56 inches class constitutes almost 1 percent. Measured coal accounts for 7 percent, indicated coal accounts for 31 percent, and inferred coal accounts for 62 percent. Coal was not estimated in the inferred category for the Stearns 1, 1½, and 2 coal beds, because of their extreme variability.

Huddle and others (1963) estimated 4.58 billion tons of coal resources for the district. The estimate in this report shows an additional 62 percent. Two major factors account for this difference: one is the availability of 7.5-minute geologic quadrangle maps published by the U. S. Geological Survey in cooperation with the Kentucky Geological Survey, which show coal bed outcrops, and the other is 3,656 coal bed thickness measurements acquired during the recent field work, enabling more extensive resource estimation.

Table 3. Estimated original coal resources of the Southwestern District. (Millions of short tons.)

RELIABILITY CLASS	THICKNESS CLASS (in inches)					TOTAL
	14 - 28	28 - 42	42 - 56	56 - 70	70 - 84	
Measured	229.73	206.14	72.80	15.85	7.53	532.05
Indicated	1,284.19	765.65	201.51	22.74	2.45	2,276.54
Inferred	3,375.77	1,094.27	140.95	9.73	0.85	4,621.57
TOTAL	4,889.69	2,066.06	415.26	48.32	10.83	7,430.16

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APPENDIX I:

Coal Resources of the Southwestern District

**(Bell, Clay, Clinton, Estill, Jackson, Knox,
Laurel, Lee, Madison, McCreary, Owsley,
Pulaski, Rockcastle, Wayne, Whitley
Counties, Kentucky)**

**Listings by county, coal bed, and thickness
and reliability categories, thickness classes
in inches and tonnages in millions and short
tons**

Bell County

Original Resources in Millions of Tons

HAZARD NO. 10					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.02	0.20	0.06	0.0	0.28
Indicated	0.03	0.03	0.01	0.0	0.07
Inferred	0.01	0.59	0.0	0.0	0.60
Total	0.06	0.82	0.07	0.0	0.95

HADDIX					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.13	0.37	0.00	0.00	1.50
Indicated	4.87	0.07	0.00	0.00	4.94
Inferred	29.55	0.00	0.00	0.00	29.55
Total	35.55	0.44	0.00	0.00	35.99

HAZARD NO. 9					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.14	0.44	0.88	0.30	1.76
Indicated	0.36	1.40	1.90	1.05	4.71
Inferred	0.10	0.80	1.55	0.24	2.69
Total	0.60	2.64	4.33	1.59	9.16

COPLAND					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.32	0.00	0.00	0.00	0.32
Indicated	1.67	0.00	0.00	0.00	1.67
Inferred	0.63	0.00	0.00	0.00	0.63
Total	2.62	0.00	0.00	0.00	2.62

HAZARD NO. 8					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.93	1.41	2.59	0.0	4.93
Indicated	1.98	3.56	9.43	0.0	14.97
Inferred	0.80	2.87	3.86	0.0	7.53
Total	3.71	7.84	15.88	0.0	27.43

HAMLIN					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.21	1.40	0.51	0.30	4.42
Indicated	12.73	5.70	1.21	0.00	19.64
Inferred	28.88	0.39	0.17	0.01	29.45
Total	43.82	7.49	1.89	0.31	53.51

HAZARD NO. 7					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.24	0.48	0.0	0.0	0.72
Indicated	2.51	1.57	0.0	0.0	4.08
Inferred	7.75	0.0	0.0	0.0	7.75
Total	10.50	2.05	0.0	0.0	12.55

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.72	6.33	1.85	0.43	9.33
Indicated	3.60	30.44	5.05	0.12	39.21
Inferred	15.15	67.54	20.95	0.00	103.64
Total	19.47	104.31	27.85	0.55	152.18

HAZARD					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.34	4.42	0.0	0.0	6.76
Indicated	11.61	17.11	0.0	0.0	28.72
Inferred	16.73	16.09	0.0	0.0	32.82
Total	30.68	37.62	0.0	0.0	68.30

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.46	7.11	8.72	8.24	25.53
Indicated	11.20	27.23	37.37	8.47	84.27
Inferred	32.32	15.92	19.48	3.12	70.84
Total	44.98	50.26	65.57	19.83	180.64

Bell County, Continued

Original Resources in Millions of Tons

WHITESBURG					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.71	1.40	0.00	0.00	4.11
Indicated	17.06	7.07	0.00	0.00	24.13
Inferred	51.32	8.78	0.00	0.00	60.10
Total	71.09	17.25	0.00	0.00	88.34

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.55	10.94	1.67	0.37	14.53
Indicated	11.54	38.40	4.75	0.10	54.79
Inferred	64.11	24.52	1.53	0.00	90.16
Total	77.20	73.86	7.95	0.47	159.48

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.61	0.24	0.00	0.00	1.85
Indicated	7.07	0.20	0.00	0.00	7.27
Inferred	19.15	0.00	0.00	0.00	19.15
Total	27.83	0.44	0.00	0.00	28.27

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	0.33	0.00	0.00	0.00	0.33
Total	0.33	0.00	0.00	0.00	0.33

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.15	1.41	0.00	0.00	2.56
Indicated	8.68	5.70	0.00	0.00	14.38
Inferred	4.34	9.75	0.00	0.00	14.09
Total	14.17	16.86	0.00	0.00	31.03

BELL COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	18.31	40.09	20.99	11.59	90.98
Indicated	104.68	170.89	69.68	10.48	355.73
Inferred	301.90	234.61	48.17	3.38	588.06
Total	424.89	445.59	138.84	25.45	1034.77

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.78	3.94	4.71	1.95	12.38
Indicated	9.77	32.42	9.96	0.74	52.89
Inferred	30.73	87.36	0.63	0.00	118.72
Total	42.28	123.72	15.30	2.69	183.99

Clay County

Original Resources in Millions of Tons

HAZARD NO. 10					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.03	0.00	0.00	0.03
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	0.01	0.03	0.00	0.00	0.04
Total	0.01	0.06	0.00	0.00	0.07

HADDIX					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.48	2.94	0.99	0.20	6.61
Indicated	12.96	10.38	1.60	0.60	25.54
Inferred	55.54	15.04	0.96	0.00	71.54
Total	70.98	28.36	3.55	0.80	103.69

HAZARD NO. 9					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.03	0.14	0.00	0.00	0.17
Indicated	0.00	0.18	0.00	0.00	0.18
Inferred	0.45	0.49	0.00	0.00	0.94
Total	0.48	0.81	0.00	0.00	1.29

COPLAND					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.59	0.00	0.00	0.00	0.59
Indicated	2.20	0.00	0.00	0.00	2.20
Inferred	4.55	0.00	0.00	0.00	4.55
Total	7.34	0.00	0.00	0.00	7.34

HAZARD NO. 8					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.45	0.11	0.14	0.00	0.70
Indicated	1.42	0.69	0.12	0.00	2.23
Inferred	4.82	2.18	4.70	0.00	11.70
Total	6.69	2.98	4.96	0.00	14.63

HAMLIN					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.87	2.34	0.27	0.00	4.48
Indicated	15.39	11.30	0.03	0.00	26.72
Inferred	26.86	6.89	0.00	0.00	33.75
Total	44.12	20.53	0.30	0.00	64.95

HAZARD NO. 7					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.36	0.45	0.00	0.00	0.81
Indicated	1.56	1.55	0.00	0.00	3.11
Inferred	7.06	0.05	0.00	0.00	7.11
Total	8.98	2.05	0.00	0.00	11.03

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.60	0.53	0.14	1.35	3.62
Indicated	13.08	7.69	1.94	3.67	26.38
Inferred	73.52	14.72	1.55	0.15	89.94
Total	88.20	22.94	3.63	5.17	119.94

HAZARD					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.76	0.72	0.00	0.00	3.48
Indicated	11.37	2.30	0.15	0.00	13.82
Inferred	37.58	18.29	1.00	0.00	56.87
Total	51.71	21.31	1.15	0.00	74.17

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.61	4.29	0.01	0.00	6.91
Indicated	19.19	23.79	0.71	0.00	43.69
Inferred	49.85	45.02	2.75	0.00	97.62
Total	71.65	73.10	3.47	0.00	148.22

Clay County, Continued

Original Resources in Millions of Tons

WHITESBURG					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.66	2.82	0.00	0.00	5.48
Indicated	26.54	13.51	0.00	0.00	40.05
Inferred	67.48	18.52	0.00	0.00	86.00
Total	96.68	34.85	0.00	0.00	131.53

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.04	0.54	0.51	0.00	2.09
Indicated	3.64	3.15	4.07	0.00	10.86
Inferred	3.30	0.00	0.00	0.00	3.30
Total	7.98	3.69	4.58	0.00	16.25

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.37	1.20	0.20	0.00	2.77
Indicated	11.76	3.92	0.87	0.00	16.55
Inferred	20.70	9.88	0.71	0.00	31.29
Total	33.83	15.00	1.78	0.00	50.61

LILY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.60	0.00	0.00	0.00	0.60
Indicated	4.74	0.00	0.00	0.00	4.74
Inferred	35.26	0.00	0.00	0.00	35.26
Total	40.60	0.00	0.00	0.00	40.60

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.61	0.30	0.00	0.00	3.91
Indicated	27.88	2.44	0.00	0.00	30.32
Inferred	101.13	2.06	0.00	0.00	103.19
Total	132.62	4.80	0.00	0.00	137.42

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	15.19	25.00	0.00	0.00	40.19
Indicated	79.15	58.54	0.00	0.00	137.69
Inferred	140.57	44.59	0.00	0.00	185.16
Total	234.91	128.13	0.00	0.00	363.04

JELLICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	7.74	1.76	0.10	0.00	9.60
Indicated	48.68	3.62	0.00	0.00	52.30
Inferred	189.43	0.00	0.00	0.00	189.43
Total	245.85	5.38	0.10	0.00	251.33

CLAY COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	44.96	43.17	2.36	1.55	92.04
Indicated	279.56	143.06	9.49	4.27	436.38
Inferred	818.11	177.76	11.67	0.15	1007.69
Total	1142.63	363.99	23.52	5.97	1536.11

Clinton County

Original Resources in Millions of Tons

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.63	1.08	0.00	1.71
Indicated	0.00	2.53	2.97	0.00	5.50
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.00	3.16	4.05	0.00	7.21

CLINTON COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.63	1.08	0.00	1.71
Indicated	0.00	2.53	2.97	0.00	5.50
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.00	3.16	4.05	0.00	7.21

Estill County

Original Resources in Millions of Tons

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	2.50	0.00	0.00	0.00	2.50
Total	2.50	0.00	0.00	0.00	2.50

ESTILL COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	2.50	0.00	0.00	0.00	2.50
Total	2.50	0.00	0.00	0.00	2.50

Jackson County

Original Resources in Millions of Tons

JELLICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.01	0.00	0.00	0.00	0.01
Indicated	0.10	0.00	0.00	0.00	0.10
Inferred	0.35	0.00	0.00	0.00	0.35
Total	0.46	0.00	0.00	0.00	0.46

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.04	0.29	0.00	0.00	1.33
Indicated	7.65	0.95	0.00	0.00	8.60
Inferred	33.19	0.00	0.00	0.00	33.19
Total	41.88	1.24	0.00	0.00	43.12

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.30	0.00	0.00	0.00	0.30
Indicated	0.28	0.00	0.00	0.00	0.28
Inferred	0.05	0.00	0.00	0.00	0.05
Total	0.63	0.00	0.00	0.00	0.63

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.81	0.63	0.00	0.00	1.44
Indicated	4.49	2.06	0.00	0.00	6.55
Inferred	0.00	0.00	0.00	0.00	0.00
Total	5.30	2.69	0.00	0.00	7.99

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.66	0.00	0.00	0.00	1.66
Indicated	5.86	0.00	0.00	0.00	5.86
Inferred	9.47	0.00	0.00	0.00	9.47
Total	16.99	0.00	0.00	0.00	16.99

STEARNS NO. 1					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.86	1.92	1.31	0.00	4.09
Indicated	6.57	15.66	12.55	0.00	34.78
Inferred	0.00	0.00	0.00	0.00	0.00
Total	7.43	17.58	13.86	0.00	38.87

GRAY HAWK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.45	0.22	0.00	0.00	2.67
Indicated	36.33	0.19	0.00	0.00	36.52
Inferred	42.88	0.00	0.00	0.00	42.88
Total	81.66	0.41	0.00	0.00	82.07

JACKSON COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	10.17	5.44	1.59	0.00	17.20
Indicated	76.51	33.37	13.62	0.00	123.50
Inferred	207.08	27.06	1.03	0.00	235.17
Total	293.76	65.87	16.24	0.00	375.87

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.04	2.38	0.28	0.00	5.70
Indicated	15.23	14.51	1.07	0.00	30.81
Inferred	121.14	27.06	1.03	0.00	149.23
Total	139.41	43.95	2.38	0.00	185.74

Knox County

Original Resources in Millions of Tons

HAZARD NO. 10					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.02	0.00	0.00	0.00	0.02
Inferred	0.04	0.00	0.00	0.00	0.04
Total	0.06	0.00	0.00	0.00	0.06

HADDIX					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.22	0.18	0.00	0.00	1.40
Indicated	5.12	0.08	0.00	0.00	5.20
Inferred	9.56	0.00	0.00	0.00	9.56
Total	15.90	0.26	0.00	0.00	16.16

HAZARD NO. 9					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.02	0.20	0.00	0.22
Indicated	0.00	0.02	0.31	0.00	0.33
Inferred	0.03	0.43	0.11	0.00	0.57
Total	0.03	0.47	0.62	0.00	1.12

COPLAND					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.76	0.00	0.00	0.00	0.76
Indicated	4.23	0.00	0.00	0.00	4.23
Inferred	1.98	0.00	0.00	0.00	1.98
Total	6.97	0.00	0.00	0.00	6.97

HAZARD NO. 8					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.27	1.44	0.00	1.71
Indicated	0.01	0.37	2.95	0.00	3.33
Inferred	0.07	0.24	2.12	0.00	2.43
Total	0.08	0.88	6.51	0.00	7.47

HAMLIN					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.74	0.93	0.00	0.00	2.67
Indicated	11.31	1.22	0.00	0.00	12.53
Inferred	3.77	0.00	0.00	0.00	3.77
Total	16.82	2.15	0.00	0.00	18.97

HAZARD NO. 7					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.11	0.00	0.00	0.11
Indicated	0.04	0.15	0.00	0.00	0.19
Inferred	0.01	0.00	0.00	0.00	0.01
Total	0.05	0.26	0.00	0.00	0.31

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.20	3.24	1.98	0.51	6.93
Indicated	7.49	21.22	7.34	0.03	36.08
Inferred	23.37	24.98	7.48	0.00	55.83
Total	32.06	49.44	16.80	0.54	98.84

HAZARD					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.57	1.08	0.00	0.00	1.65
Indicated	3.05	6.79	0.00	0.00	9.84
Inferred	4.97	7.63	0.00	0.00	12.60
Total	8.59	15.50	0.00	0.00	24.09

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.53	5.51	3.85	7.67	20.56
Indicated	18.78	14.45	11.31	5.45	49.99
Inferred	20.11	8.19	9.48	1.51	39.29
Total	42.42	28.15	24.64	14.63	109.84

Knox County, Continued

Original Resources in Millions of Tons

WHITESBURG					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.20	4.43	0.26	0.00	7.89
Indicated	17.03	16.27	1.11	0.00	34.41
Inferred	32.24	14.30	0.00	0.00	46.54
Total	52.47	35.00	1.37	0.00	88.84

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	22.21	8.57	2.65	0.00	33.43
Indicated	108.81	16.68	0.63	0.00	126.12
Inferred	221.92	1.64	0.00	0.00	223.56
Total	352.94	26.89	3.28	0.00	383.11

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.03	0.78	0.00	0.00	3.81
Indicated	21.74	2.59	0.00	0.00	24.33
Inferred	39.68	3.34	0.00	0.00	43.02
Total	64.45	6.71	0.00	0.00	71.16

LITTLE BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.62	0.23	0.00	0.00	0.85
Indicated	3.65	1.51	0.00	0.00	5.16
Inferred	47.90	0.79	0.00	0.00	48.69
Total	52.17	2.53	0.00	0.00	54.70

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.12	3.19	0.28	0.00	7.59
Indicated	23.21	13.76	0.26	0.00	37.23
Inferred	46.93	8.44	0.00	0.00	55.37
Total	74.26	25.39	0.54	0.00	100.19

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.27	1.59	0.00	0.00	2.86
Indicated	5.58	6.25	0.00	0.00	11.83
Inferred	16.23	31.92	0.00	0.00	48.15
Total	23.08	39.76	0.00	0.00	62.84

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	14.90	14.59	11.55	0.00	41.04
Indicated	71.74	37.94	12.74	0.00	122.42
Inferred	125.59	46.96	1.25	0.00	173.80
Total	212.23	99.49	25.54	0.00	337.26

KNOX COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	58.38	44.71	22.21	8.18	133.48
Indicated	301.81	139.29	36.65	5.49	483.24
Inferred	594.40	148.86	20.44	1.51	765.21
Total	954.59	332.86	79.30	15.18	1381.93

Laurel County

Original Resources in Millions of Tons

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.49	4.04	0.82	0.00	5.35
Indicated	0.87	9.54	0.65	0.00	11.06
Inferred	5.99	3.00	0.00	0.00	8.99
Total	7.35	16.58	1.47	0.00	25.40

BARREN FORK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.39	0.21	0.00	0.00	0.60
Indicated	2.38	1.20	0.00	0.00	3.58
Inferred	0.08	0.00	0.00	0.00	0.08
Total	2.85	1.41	0.00	0.00	4.26

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.14	0.38	0.00	0.00	1.52
Indicated	7.54	0.05	0.00	0.00	7.59
Inferred	19.26	0.00	0.00	0.00	19.26
Total	27.94	0.43	0.00	0.00	28.37

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	2.67	0.01	0.00	0.00	2.68
Total	2.67	0.01	0.00	0.00	2.68

LITTLE BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.15	0.00	0.00	0.00	0.15
Indicated	1.09	0.00	0.00	0.00	1.09
Inferred	2.62	0.00	0.00	0.00	2.62
Total	3.86	0.00	0.00	0.00	3.86

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.29	0.00	0.00	0.00	0.29
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.29	0.00	0.00	0.00	0.29

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	8.45	4.01	0.00	0.00	12.46
Indicated	42.11	19.25	0.00	0.00	61.36
Inferred	66.34	146.76	0.00	0.00	213.10
Total	116.90	170.02	0.00	0.00	286.92

STEARNS NO. 1 1/2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	1.21	0.00	0.00	0.00	1.21
Inferred	0.00	0.00	0.00	0.00	0.00
Total	1.21	0.00	0.00	0.00	1.21

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.21	0.42	0.00	0.00	0.63
Indicated	0.91	2.77	0.00	0.00	3.68
Inferred	14.10	34.94	0.00	0.00	49.04
Total	15.22	38.13	0.00	0.00	53.35

STEARNS NO. 1					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.07	0.00	0.00	0.00	0.07
Indicated	1.63	0.00	0.00	0.00	1.63
Inferred	0.00	0.00	0.00	0.00	0.00
Total	1.70	0.00	0.00	0.00	1.70

Laurel County, Continued

Original Resources in Millions of Tons

LAUREL COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	10.90	9.06	0.82	0.00	20.78
Indicated	58.03	32.81	0.65	0.00	91.49
Inferred	111.06	184.71	0.00	0.00	295.77
Total	179.99	226.58	1.47	0.00	408.04

Lee County

Original Resources in Millions of Tons

COPLAND					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	0.00	0.01	0.00	0.00	0.01
Total	0.00	0.01	0.00	0.00	0.01

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.03	0.00	0.00	0.00	0.03
Indicated	0.06	0.00	0.00	0.00	0.06
Inferred	0.12	0.00	0.00	0.00	0.12
Total	0.21	0.00	0.00	0.00	0.21

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.02	0.00	0.00	0.02
Indicated	0.00	0.10	0.00	0.00	0.10
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.12	0.00	0.00	0.12

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.21	0.91	0.71	0.00	2.83
Indicated	4.37	0.81	0.57	0.00	5.75
Inferred	16.30	0.01	0.00	0.00	16.31
Total	21.88	1.73	1.28	0.00	24.89

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.01	0.00	0.00	0.00	0.01
Indicated	0.17	0.00	0.00	0.00	0.17
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.00	0.00	0.00	0.18

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.70	0.30	0.14	0.00	4.14
Indicated	14.08	0.46	0.00	0.00	14.54
Inferred	28.64	0.00	0.00	0.00	28.64
Total	46.42	0.76	0.14	0.00	47.32

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.10	0.00	0.00	0.10
Indicated	0.00	0.08	0.00	0.00	0.08
Inferred	0.00	2.74	0.00	0.00	2.74
Total	0.00	2.92	0.00	0.00	2.92

GRAY HAWK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	5.17	0.00	0.00	0.00	5.17
Indicated	28.45	0.00	0.00	0.00	28.45
Inferred	45.36	0.00	0.00	0.00	45.36
Total	78.98	0.00	0.00	0.00	78.98

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.16	0.00	0.00	0.16
Indicated	0.00	0.33	0.00	0.00	0.33
Inferred	5.87	2.43	0.00	0.00	8.30
Total	5.87	2.92	0.00	0.00	8.79

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.86	4.92	1.10	0.00	10.88
Indicated	25.50	17.23	0.92	0.00	43.65
Inferred	65.97	6.62	0.00	0.00	72.59
Total	96.33	28.77	2.02	0.00	127.12

Lee County, Continued

Original Resources in Millions of Tons

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.32	0.00	0.00	0.00	1.32
Indicated	9.87	0.00	0.00	0.00	9.87
Inferred	62.25	0.00	0.00	0.00	62.25
Total	73.44	0.00	0.00	0.00	73.44

LEE COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	16.30	6.41	1.95	0.00	24.66
Indicated	82.50	19.01	1.49	0.00	103.00
Inferred	224.51	11.81	0.00	0.00	236.32
Total	323.31	37.23	3.44	0.00	363.98

Madison County

Original Resources in Millions of Tons

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	<0.01	0.00	0.00	0.00	<0.01
Total	<0.01	0.00	0.00	0.00	<0.01

STEARNS NO. 1					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.05	0.00	0.00	0.00	0.05
Indicated	0.01	0.00	0.00	0.00	0.01
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.06	0.00	0.00	0.00	0.06

MADISON COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.05	0.00	0.00	0.00	0.05
Indicated	0.01	0.00	0.00	0.00	0.01
Inferred	<0.01	0.00	0.00	0.00	<0.01
Total	0.06	0.00	0.00	0.00	0.06

McCreary County

Original Resources in Millions of Tons

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.28	1.00	0.00	0.00	1.28
Indicated	3.92	1.33	0.00	0.00	5.25
Inferred	17.51	0.00	0.00	0.00	17.51
Total	21.71	2.33	0.00	0.00	24.04

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.59	1.55	4.38	0.57	7.09
Indicated	4.22	13.74	15.46	1.53	34.95
Inferred	0.00	0.00	0.00	0.00	0.00
Total	4.81	15.29	19.84	2.10	42.04

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.41	0.00	0.00	0.00	0.41
Indicated	2.61	0.00	0.00	0.00	2.61
Inferred	28.33	0.00	0.00	0.00	28.33
Total	31.35	0.00	0.00	0.00	31.35

STEARNS NO. 1 1/2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.06	0.26	0.55	0.00	1.87
Indicated	7.82	0.31	3.75	0.00	11.88
Inferred	0.00	0.00	0.00	0.00	0.00
Total	8.88	0.57	4.30	0.00	13.75

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.47	2.33	0.57	0.00	6.37
Indicated	16.83	2.99	0.63	0.00	20.45
Inferred	38.81	0.44	0.00	0.00	39.25
Total	59.11	5.76	1.20	0.00	66.07

STEARNS NO. 1					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.73	0.00	0.00	0.00	0.73
Indicated	3.91	0.00	0.00	0.00	3.91
Inferred	0.00	0.00	0.00	0.00	0.00
Total	4.64	0.00	0.00	0.00	4.64

BARREN FORK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	5.25	6.64	1.52	0.00	13.41
Indicated	25.31	31.06	6.65	0.00	63.02
Inferred	77.67	62.78	8.98	0.00	149.43
Total	108.23	100.48	17.15	0.00	225.86

McCREARY COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	11.98	12.89	8.30	0.57	33.74
Indicated	65.66	54.81	31.44	1.53	153.44
Inferred	171.20	68.68	17.91	0.00	257.79
Total	248.84	136.38	57.65	2.10	444.97

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.19	1.11	1.28	0.00	2.58
Indicated	1.04	5.38	4.95	0.00	11.37
Inferred	8.88	5.46	8.93	0.00	23.27
Total	10.11	11.95	15.16	0.00	37.22

Owsley County

Original Resources in Millions of Tons

HAZARD NO. 9					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.02	0.05	0.00	0.00	0.07
Indicated	0.06	0.01	0.00	0.00	0.07
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.08	0.06	0.00	0.00	0.14

COPLAND					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.28	0.85	0.07	0.00	1.20
Indicated	1.62	5.27	0.21	0.00	7.10
Inferred	12.30	15.05	0.07	0.00	27.42
Total	14.20	21.17	0.35	0.00	35.72

HAZARD NO. 8					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.02	0.00	0.00	0.00	0.02
Indicated	0.50	0.00	0.00	0.00	0.50
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.52	0.00	0.00	0.00	0.52

HAMLIN					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.05	0.00	0.00	0.05
Indicated	0.00	0.47	0.00	0.00	0.47
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.52	0.00	0.00	0.52

HAZARD NO. 7					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.15	0.23	0.00	0.00	0.38
Indicated	0.73	1.24	0.00	0.00	1.97
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.88	1.47	0.00	0.00	2.35

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.30	0.07	0.00	0.00	0.37
Indicated	1.29	0.22	0.00	0.00	1.51
Inferred	3.06	1.50	0.00	0.00	4.56
Total	4.65	1.79	0.00	0.00	6.44

HAZARD					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.07	1.19	1.57	0.35	3.18
Indicated	0.87	5.66	3.04	0.03	9.60
Inferred	6.09	19.06	0.16	0.00	25.31
Total	7.03	25.91	4.77	0.38	38.09

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.21	1.06	0.08	0.75	2.10
Indicated	1.46	7.71	4.85	2.73	16.75
Inferred	6.56	25.50	32.33	5.56	69.95
Total	8.23	34.27	37.26	9.04	88.80

HADDIX					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.13	0.41	0.00	0.00	0.54
Indicated	1.21	0.35	0.00	0.00	1.56
Inferred	0.09	0.01	0.00	0.00	0.10
Total	1.43	0.77	0.00	0.00	2.20

WHITESBURG					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.01	0.64	0.00	0.00	1.65
Indicated	2.79	3.60	0.00	0.00	6.39
Inferred	0.00	0.00	0.00	0.00	0.00
Total	3.80	4.24	0.00	0.00	8.04

Owsley County, Continued

Original Resources in Millions of Tons

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.66	0.37	0.00	0.00	2.03
Indicated	13.72	0.62	0.00	0.00	14.34
Inferred	70.44	4.64	0.00	0.00	75.08
Total	85.82	5.63	0.00	0.00	91.45

GRAY HAWK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.77	0.00	0.00	0.00	0.77
Indicated	5.55	0.00	0.00	0.00	5.55
Inferred	23.09	0.00	0.00	0.00	23.09
Total	29.41	0.00	0.00	0.00	29.41

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.57	0.40	0.00	0.00	4.97
Indicated	28.29	0.09	0.00	0.00	28.38
Inferred	75.55	1.43	0.00	0.00	76.98
Total	108.41	1.92	0.00	0.00	110.33

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.05	0.00	0.00	0.00	0.05
Indicated	1.17	0.00	0.00	0.00	1.17
Inferred	20.83	0.00	0.00	0.00	20.83
Total	22.05	0.00	0.00	0.00	22.05

JELICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.85	3.13	0.00	0.00	7.98
Indicated	22.86	8.72	0.00	0.00	31.58
Inferred	37.85	0.51	0.00	0.00	38.36
Total	65.56	12.36	0.00	0.00	77.92

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.00	0.00	0.00	0.00	0.00
Indicated	0.00	0.00	0.00	0.00	0.00
Inferred	0.16	0.00	0.00	0.00	0.16
Total	0.16	0.00	0.00	0.00	0.16

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.64	0.85	0.16	0.00	2.65
Indicated	4.50	1.81	0.00	0.00	6.31
Inferred	2.21	1.15	0.00	0.00	3.36
Total	8.35	3.81	0.16	0.00	12.32

OWSLEY COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	17.79	9.30	1.88	1.10	30.07
Indicated	98.09	35.77	8.10	2.76	144.72
Inferred	292.36	68.85	32.56	5.56	399.33
Total	408.24	113.92	42.54	9.42	574.12

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.06	0.00	0.00	0.00	2.06
Indicated	11.47	0.00	0.00	0.00	11.47
Inferred	34.13	0.00	0.00	0.00	34.13
Total	47.66	0.00	0.00	0.00	47.66

Pulaski County

Original Resources in Millions of Tons

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.30	2.18	0.59	0.00	3.07
Indicated	1.38	4.57	1.84	0.00	7.79
Inferred	8.79	3.27	0.07	0.00	12.13
Total	10.47	10.02	2.50	0.00	22.99

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.95	0.00	0.00	0.00	0.95
Indicated	5.59	0.00	0.00	0.00	5.59
Inferred	0.00	0.00	0.00	0.00	0.00
Total	6.54	0.00	0.00	0.00	6.54

BARREN FORK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.22	0.00	0.00	0.00	0.22
Indicated	0.82	0.00	0.00	0.00	0.82
Inferred	7.26	1.73	0.00	0.00	8.99
Total	8.30	1.73	0.00	0.00	10.03

STEARNS NO. 1 1/2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.42	0.00	0.00	0.00	0.42
Indicated	2.36	0.00	0.00	0.00	2.36
Inferred	0.00	0.00	0.00	0.00	0.00
Total	2.78	0.00	0.00	0.00	2.78

BEAVER CREEK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	1.65	5.09	3.75	0.00	10.49
Indicated	7.45	22.11	8.90	0.00	38.46
Inferred	32.93	27.44	1.71	0.00	62.08
Total	42.03	54.64	14.36	0.00	111.03

PULASKI COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.54	7.27	4.34	0.00	15.15
Indicated	17.60	26.68	10.74	0.00	55.02
Inferred	48.98	32.44	1.78	0.00	83.20
Total	70.12	66.39	16.86	0.00	153.37

Rockcastle County

Original Resources in Millions of Tons

HALSEY ROUGH					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.48	1.17	0.00	0.00	1.65
Indicated	2.81	7.16	0.00	0.00	9.97
Inferred	19.53	19.15	0.00	0.00	38.68
Total	22.82	27.48	0.00	0.00	50.30

BARREN FORK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.84	0.72	0.00	0.00	1.56
Indicated	6.62	3.20	0.00	0.00	9.82
Inferred	34.63	17.70	0.00	0.00	52.33
Total	42.09	21.62	0.00	0.00	63.71

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	3.06	2.60	0.74	0.00	6.40
Indicated	10.81	7.19	1.52	0.00	19.52
Inferred	0.00	0.00	0.00	0.00	0.00
Total	13.87	9.79	2.26	0.00	25.92

STEARNS NO. 1					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.56	0.00	0.00	0.00	0.56
Indicated	3.97	0.00	0.00	0.00	3.97
Inferred	0.00	0.00	0.00	0.00	0.00
Total	4.53	0.00	0.00	0.00	4.53

ROCKCASTLE COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.94	4.49	0.74	0.00	10.17
Indicated	24.21	17.55	1.52	0.00	43.28
Inferred	54.16	36.85	0.00	0.00	91.01
Total	83.31	58.89	2.26	0.00	144.46

Wayne County

Original Resources in Millions of Tons

STEARNS NO. 2					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.75	4.64	3.89	0.00	9.28
Indicated	2.47	9.95	5.58	0.00	18.00
Inferred	0.00	0.00	0.00	0.00	0.00
Total	3.22	14.59	9.47	0.00	27.28

WAYNE COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.75	4.64	3.89	0.00	9.28
Indicated	2.47	9.95	5.58	0.00	18.00
Inferred	0.00	0.00	0.00	0.00	0.00
Total	3.22	14.59	9.47	0.00	27.28

Whitley County

Original Resources in Millions of Tons

HAZARD					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.13	0.21	0.00	0.00	0.34
Indicated	0.14	0.00	0.00	0.00	0.14
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.27	0.21	0.00	0.00	0.48

AMBURGY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.70	0.00	0.00	0.00	0.70
Indicated	3.52	0.00	0.00	0.00	3.52
Inferred	7.03	0.00	0.00	0.00	7.03
Total	11.25	0.00	0.00	0.00	11.25

HAMLIN					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.13	0.00	0.00	0.00	0.13
Indicated	0.49	0.00	0.00	0.00	0.49
Inferred	0.00	0.00	0.00	0.00	0.00
Total	0.62	0.00	0.00	0.00	0.62

UPPER ELKHORN NO. 3					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.01	0.15	0.00	0.00	0.16
Indicated	0.22	1.21	0.00	0.00	1.43
Inferred	1.03	0.00	0.00	0.00	1.03
Total	1.26	1.36	0.00	0.00	2.62

FIRE CLAY RIDER					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.42	0.02	0.38	0.00	0.82
Indicated	0.67	0.61	0.81	0.00	2.09
Inferred	7.59	0.65	0.00	0.00	8.24
Total	8.68	1.28	1.19	0.00	11.15

JELLICO					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	5.62	11.26	1.69	0.00	18.57
Indicated	25.12	40.89	6.05	0.00	72.06
Inferred	74.67	40.60	2.21	0.00	117.48
Total	105.41	92.75	9.95	0.00	208.11

FIRE CLAY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.19	0.62	0.57	0.39	1.77
Indicated	0.49	3.56	2.16	0.68	6.89
Inferred	1.34	9.29	5.20	0.00	15.83
Total	2.02	13.47	7.93	1.07	24.49

BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	16.28	2.75	0.00	0.00	19.03
Indicated	85.78	18.73	0.00	0.00	104.51
Inferred	121.67	22.92	0.00	0.00	144.59
Total	223.73	44.40	0.00	0.00	268.13

WHITESBURG					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.33	0.00	0.00	0.00	0.33
Indicated	2.04	0.00	0.00	0.00	2.04
Inferred	0.00	0.00	0.00	0.00	0.00
Total	2.37	0.00	0.00	0.00	2.37

LITTLE BLUE GEM					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	2.53	0.00	0.00	0.00	2.53
Indicated	13.80	0.00	0.00	0.00	13.80
Inferred	55.06	0.00	0.00	0.00	55.06
Total	71.39	0.00	0.00	0.00	71.39

Whitley County, Continued

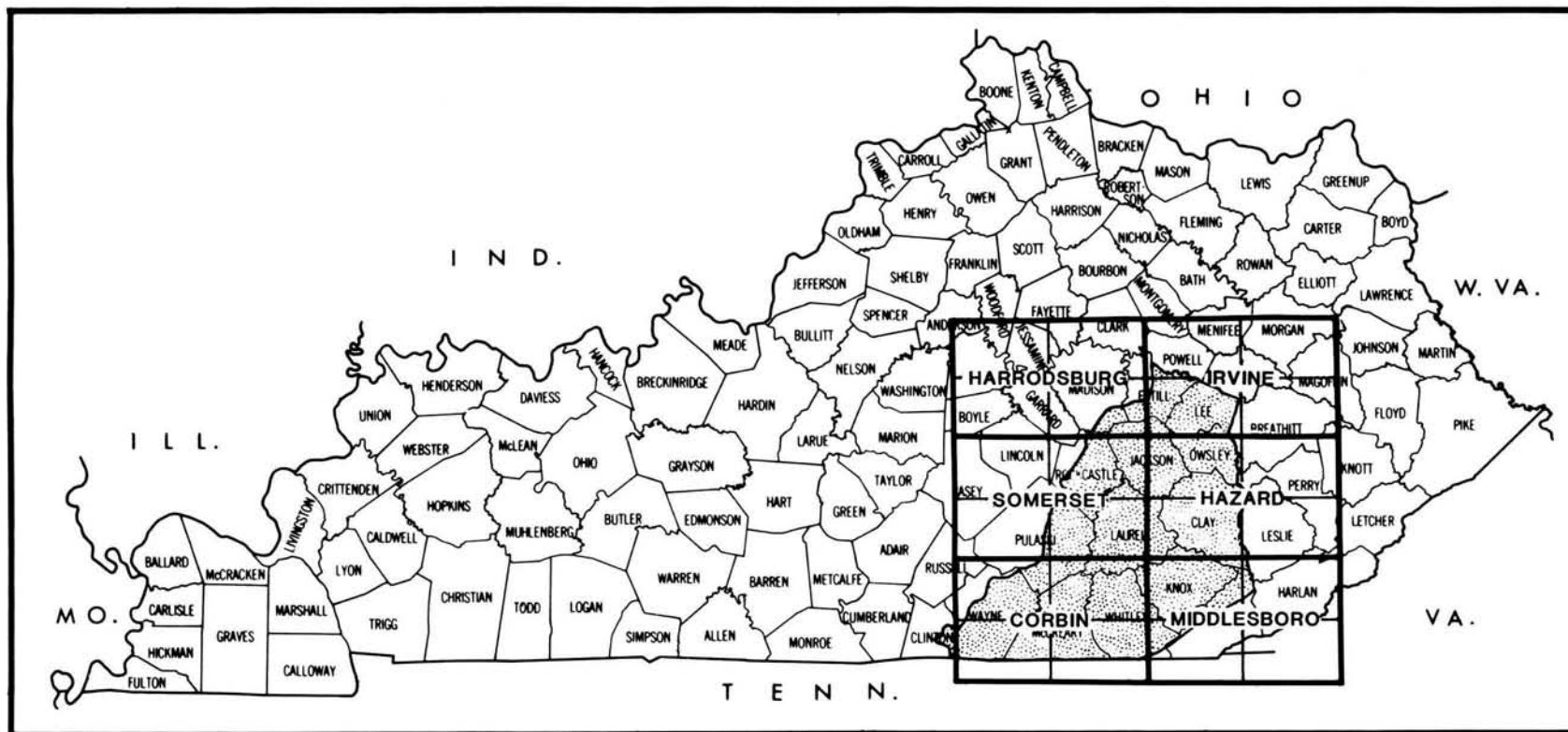
Original Resources in Millions of Tons

LILY					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	4.94	2.48	0.00	0.00	7.42
Indicated	35.16	10.15	0.53	0.00	45.84
Inferred	222.58	19.43	0.00	0.00	242.01
Total	262.68	32.06	0.53	0.00	295.27

BARREN FORK					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	0.39	0.54	0.00	0.00	0.93
Indicated	5.67	4.81	0.00	0.00	10.48
Inferred	58.47	9.70	0.00	0.00	68.17
Total	64.53	15.05	0.00	0.00	79.58

WHITLEY COUNTY TOTALS					
Reliability Class	Thickness Class (Inches)				Total
	14-28	28-42	42-56	56+	
Measured	31.67	18.03	2.64	0.39	52.73
Indicated	173.10	79.96	9.55	0.68	263.29
Inferred	549.44	102.59	7.41	0.00	659.44
Total	754.21	200.58	19.60	1.07	975.46

APPENDIX II:
Maps of the
Principal Coal Beds
of the
Southwestern
District



Index of the Southwestern District, Kentucky, showing counties and areas of the 1:100,000 $\frac{1}{2}$ degree quadrangles. The following coal bed illustrations are on quarter segments of the named 1:100,000 quadrangles.

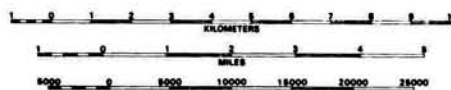
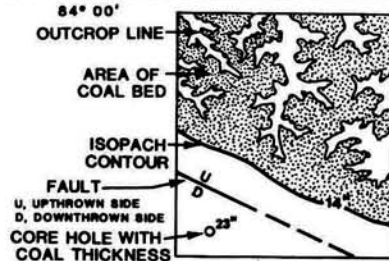
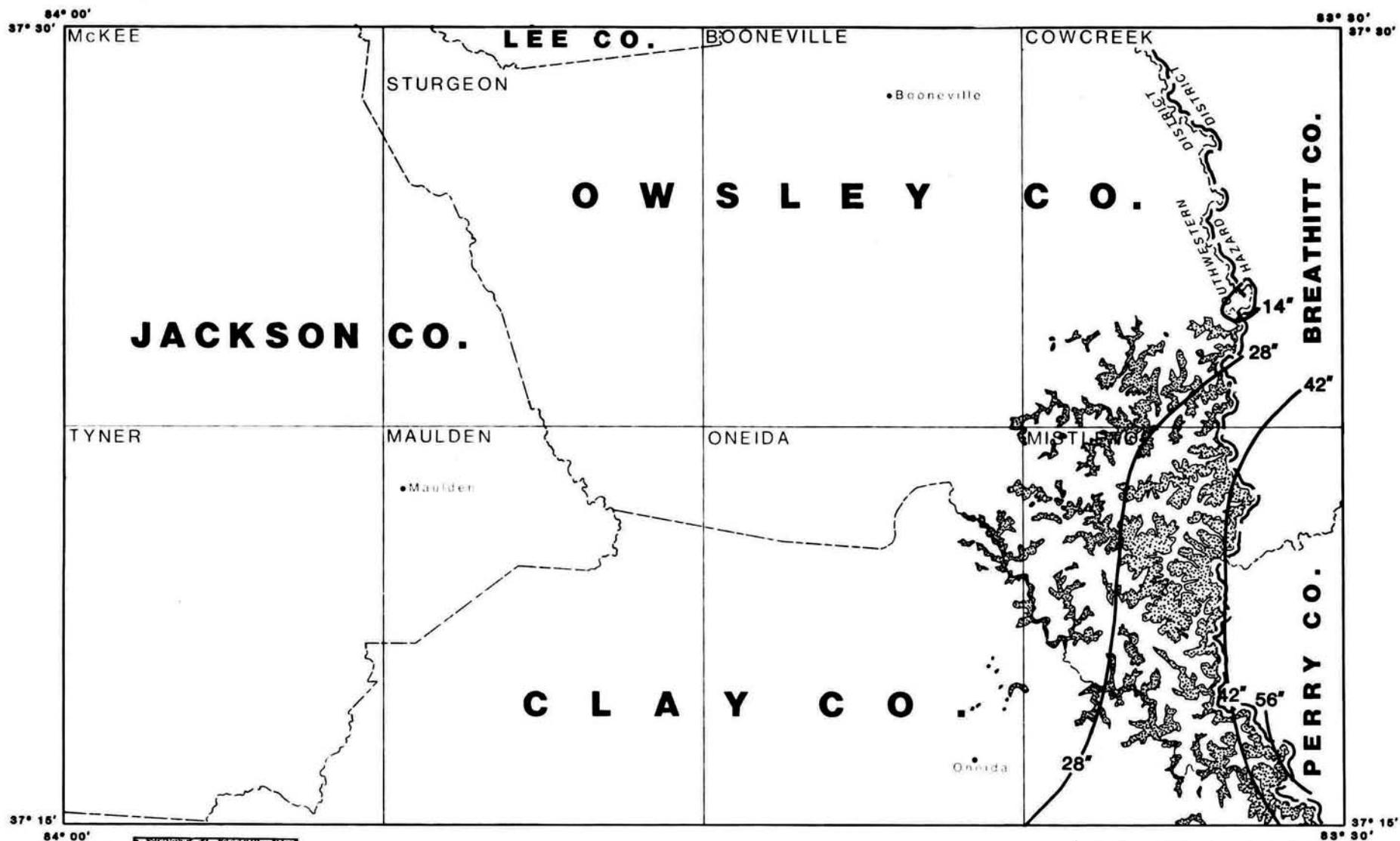
**RESOURCE MAPS SHOWING AREAL EXTENT AND THICKNESS OF
MINEABLE COAL BY BED IN THE SOUTHWESTERN DISTRICT**

COAL BED	MAP AREA (portion of 1:100,000, 1/2 degree series)
Hazard "C"	Hazard NW/4; SW/4; Middlesboro NW/4
Fire Clay Rider	Corbin SE/4; Hazard NW/4, SW/4; Irvine SW/4; Middlesboro NW/4, SW/4
Fire Clay	Corbin SE/4; Hazard NW/4, SW/4; Irvine SW/4; Middlesboro NW/4, SW/4
Jellico	Corbin NE/4, SE/4; Hazard NW/4, SW/4; Irvine SW/4; Middlesboro NW/4, SW/4
Blue Gem (Vires)	Corbin NE/4, SE/4; Hazard NW/4, SW/4; Irvine SW/4; Middlesboro NW/4, SW/4
Lily	Corbin NE/4, SE/4; Hazard NW/4, SW/4; Irvine, SW/4; Middlesboro NW/4, Somerset NE/4, SE/4
Halsey Rough	Hazard NW/4; Irvine SW/4; Somerset NE/4, SE/4
Beaver Creek	Corbin NE/4; Harrodsburg SE/4; Hazard NW/4; Irvine SW/4; Somerset SE/4
Stearns No. 2	Somerset NE/4

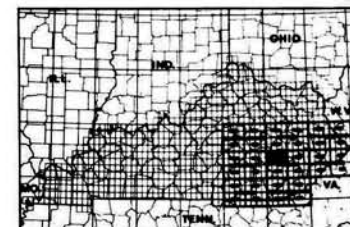
Maps in the appendix are scaled at 1:200,000 (about 3 miles to the inch).

Coal resource maps shown here represent summary compilation for the more extensive or representative beds in the district. These account for 70 percent of the estimated mineable coal. The original work maps are on 1:24,000 scale 7½-minute quadrangles.

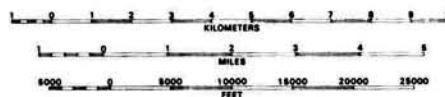
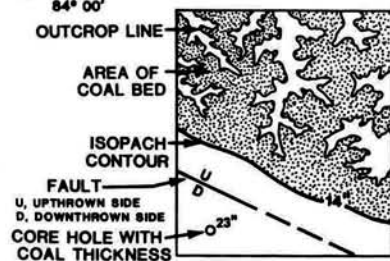
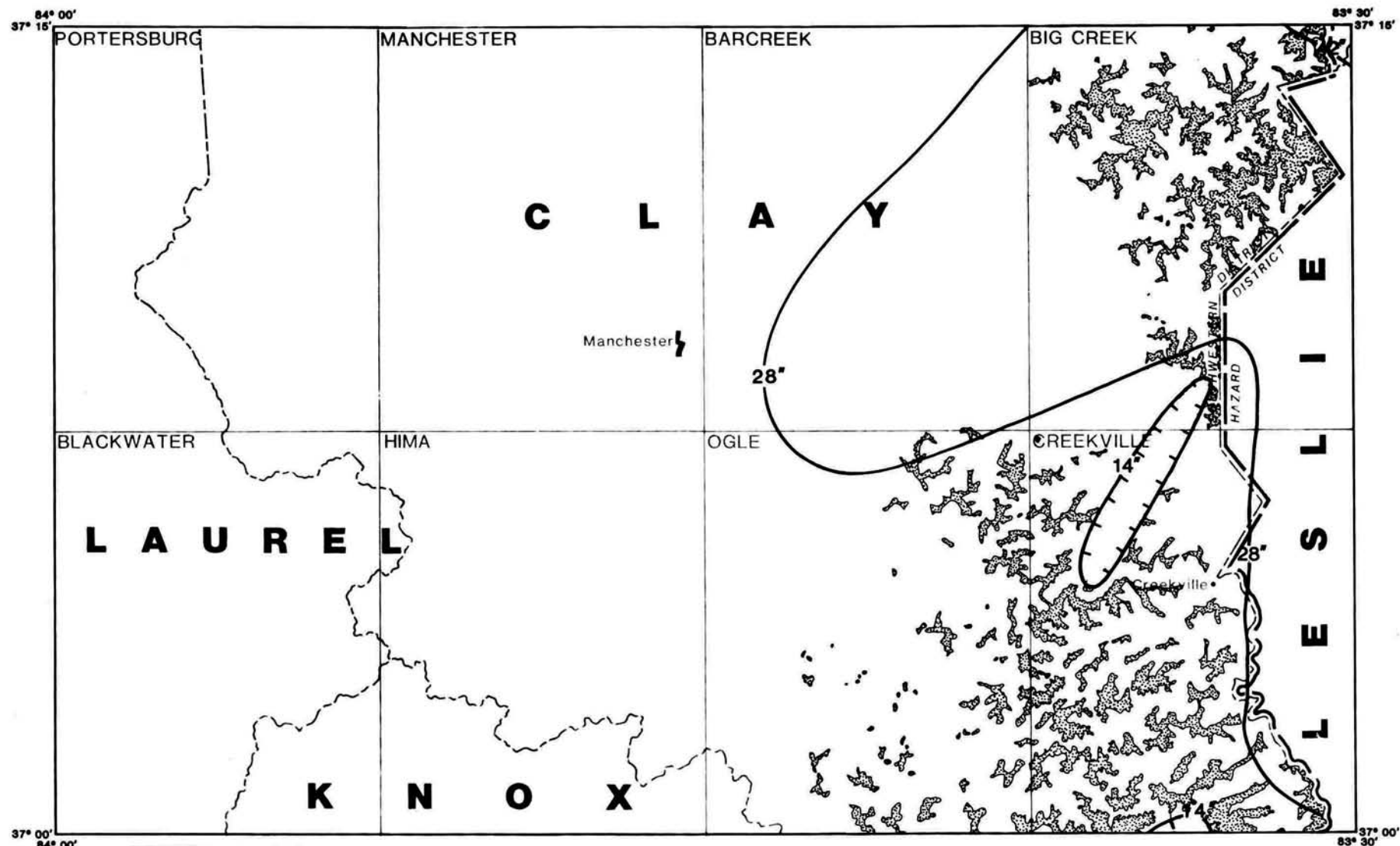
Maps at an intermediate scale of 1:100,000 were prepared and are available at the Kentucky Geological Survey. These are the same in content as those presented herein and differ only in scale.



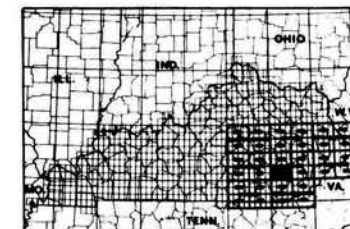
HAZARD COAL BED "C"



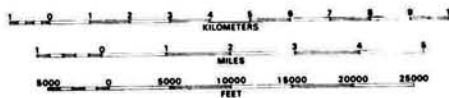
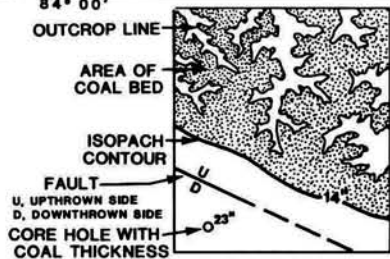
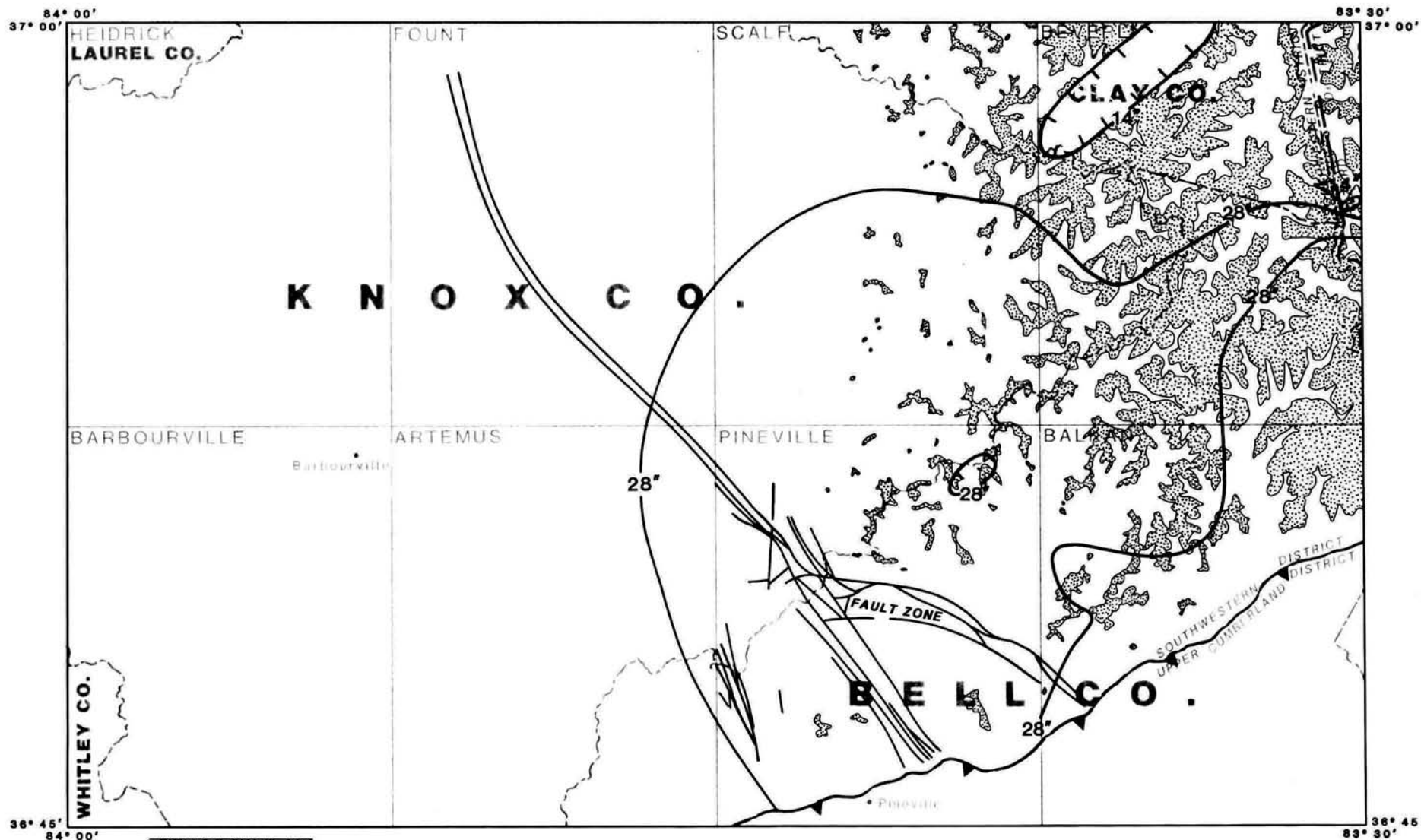
NW/4 HAZARD 1:100,000



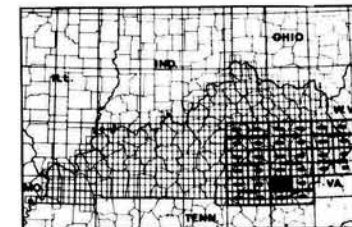
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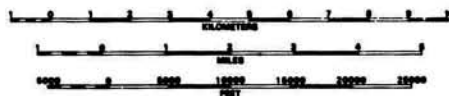
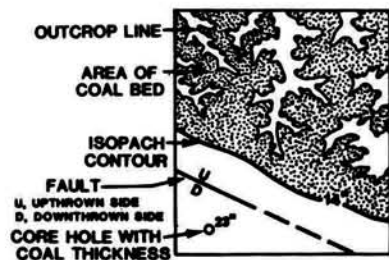
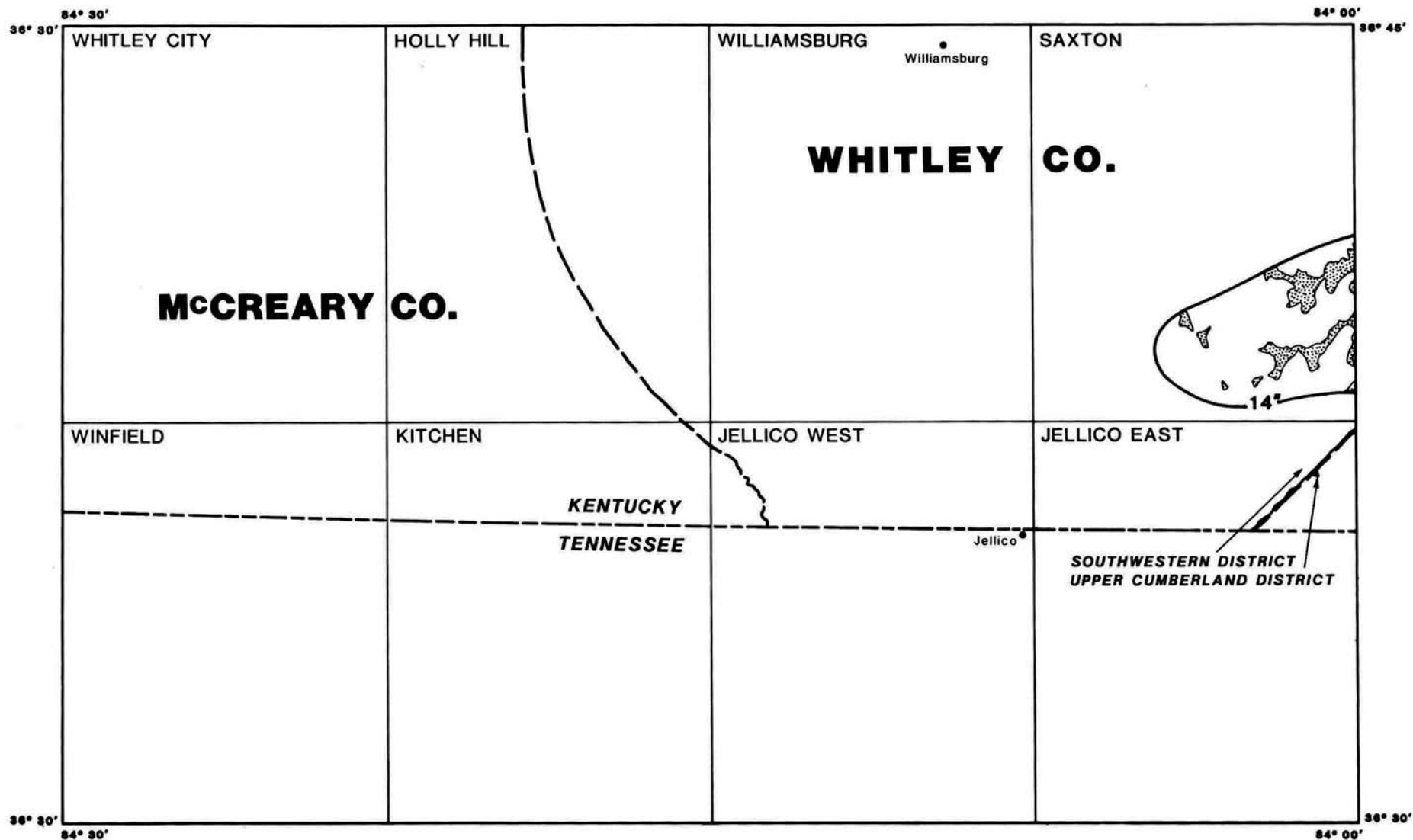
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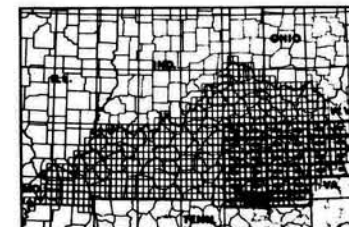
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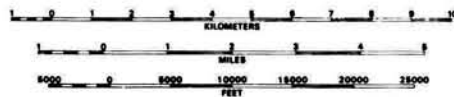
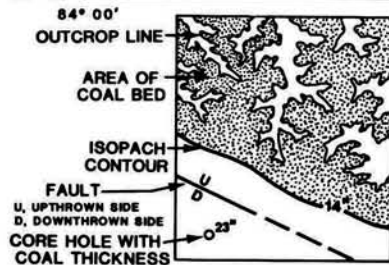
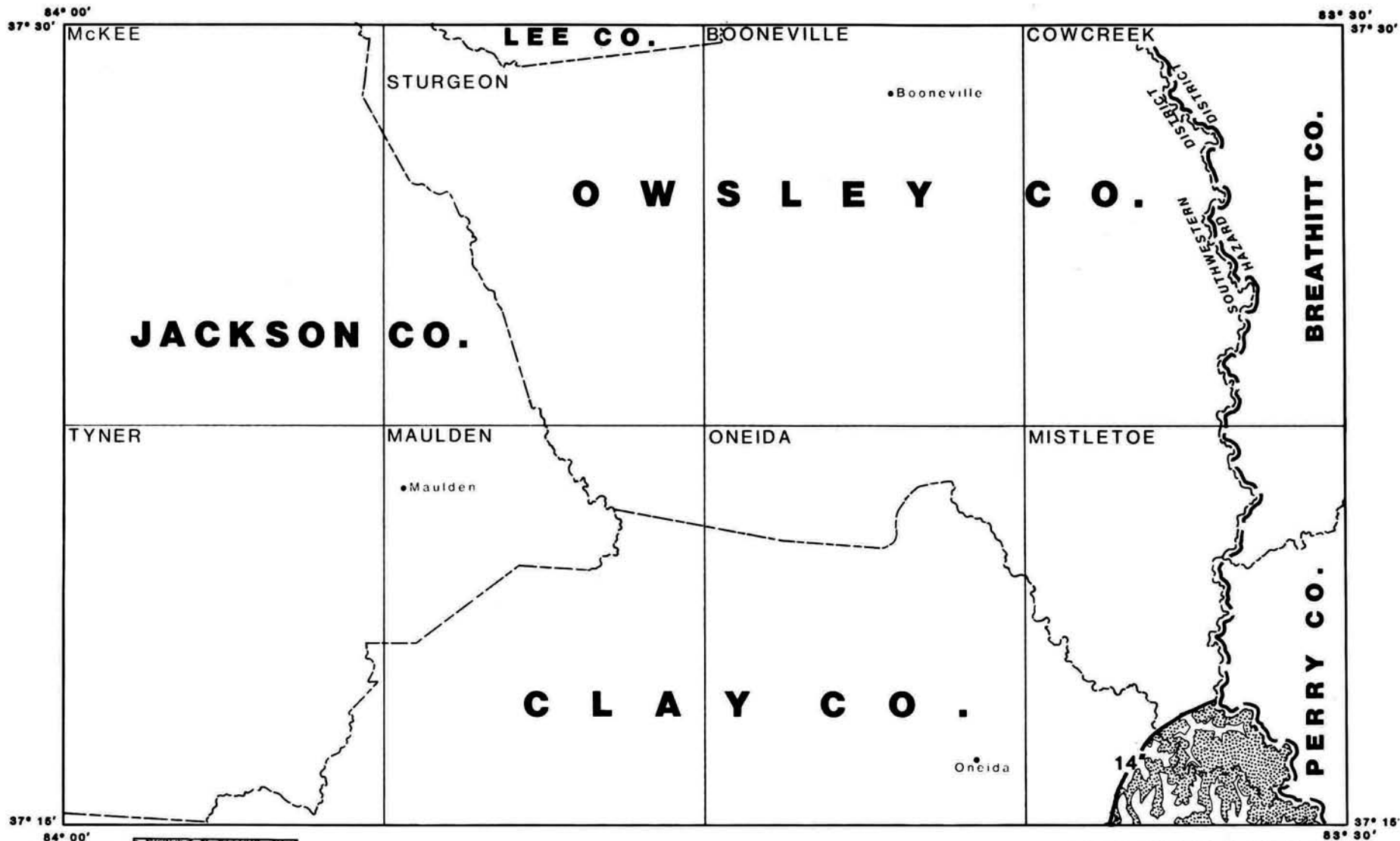
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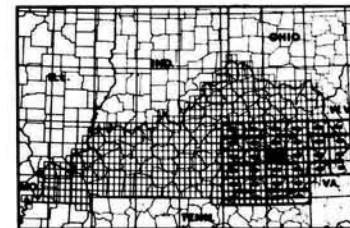
FIRE CLAY RIDER COAL BED



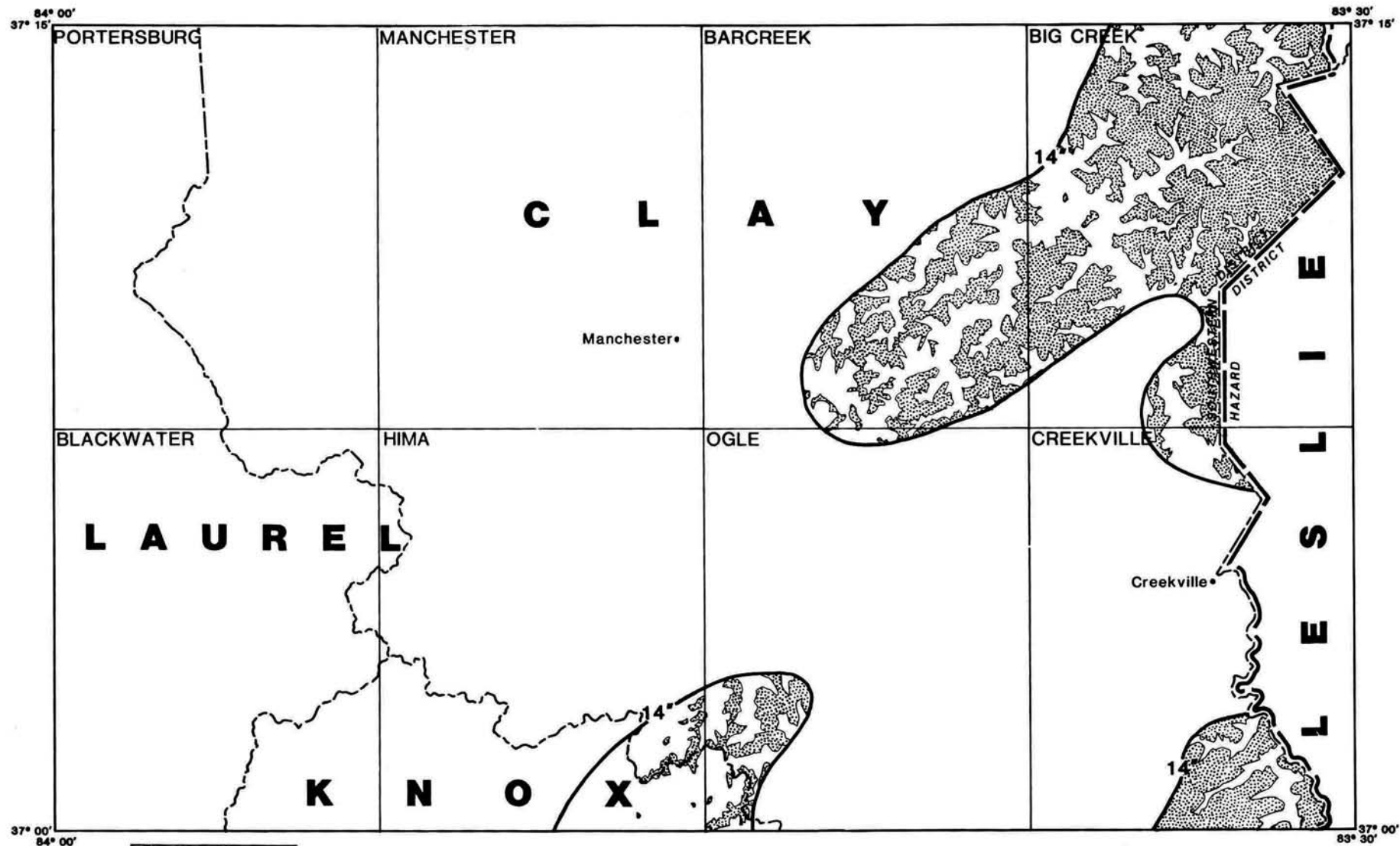
SE/4 CORBIN 1:100,000



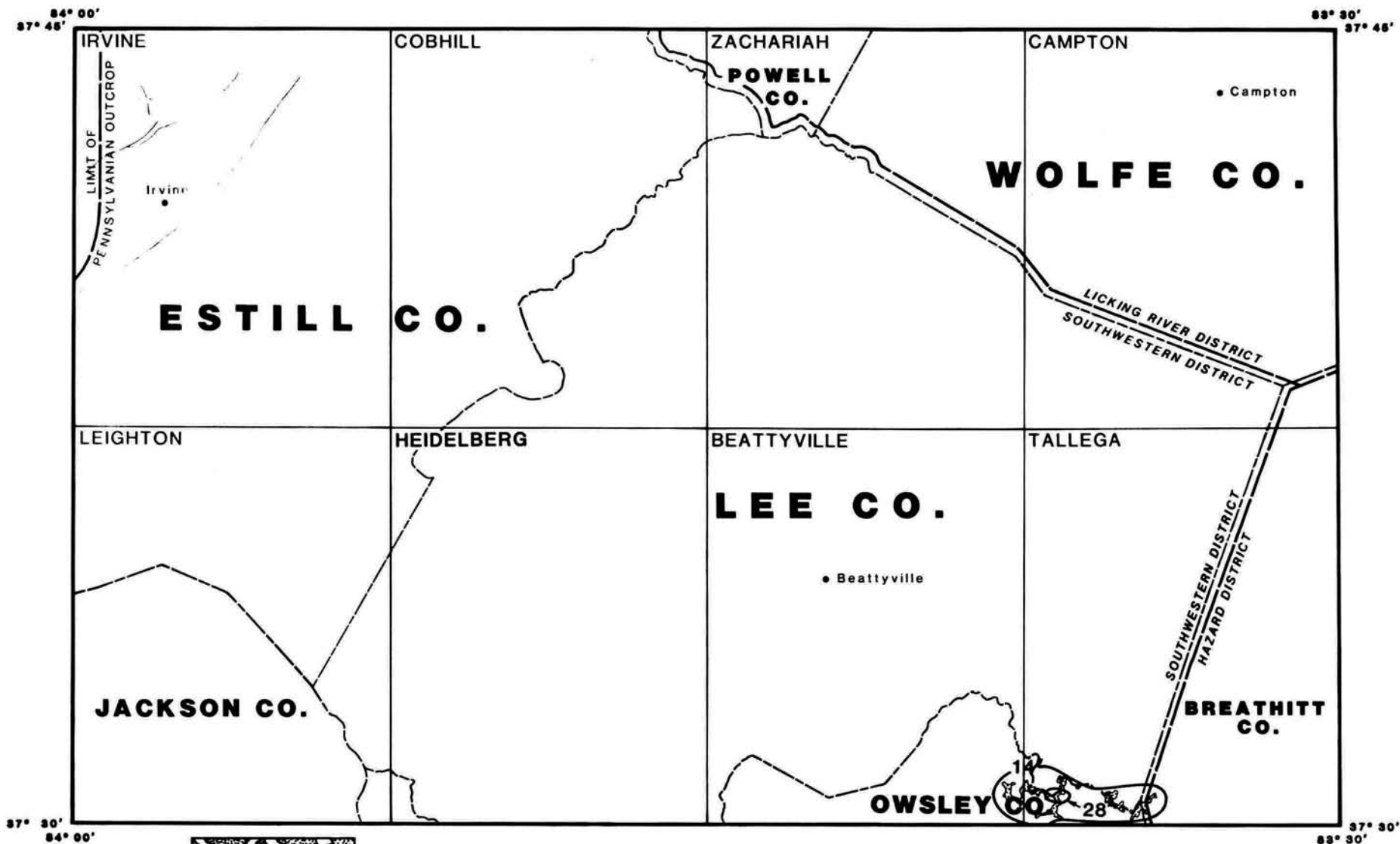
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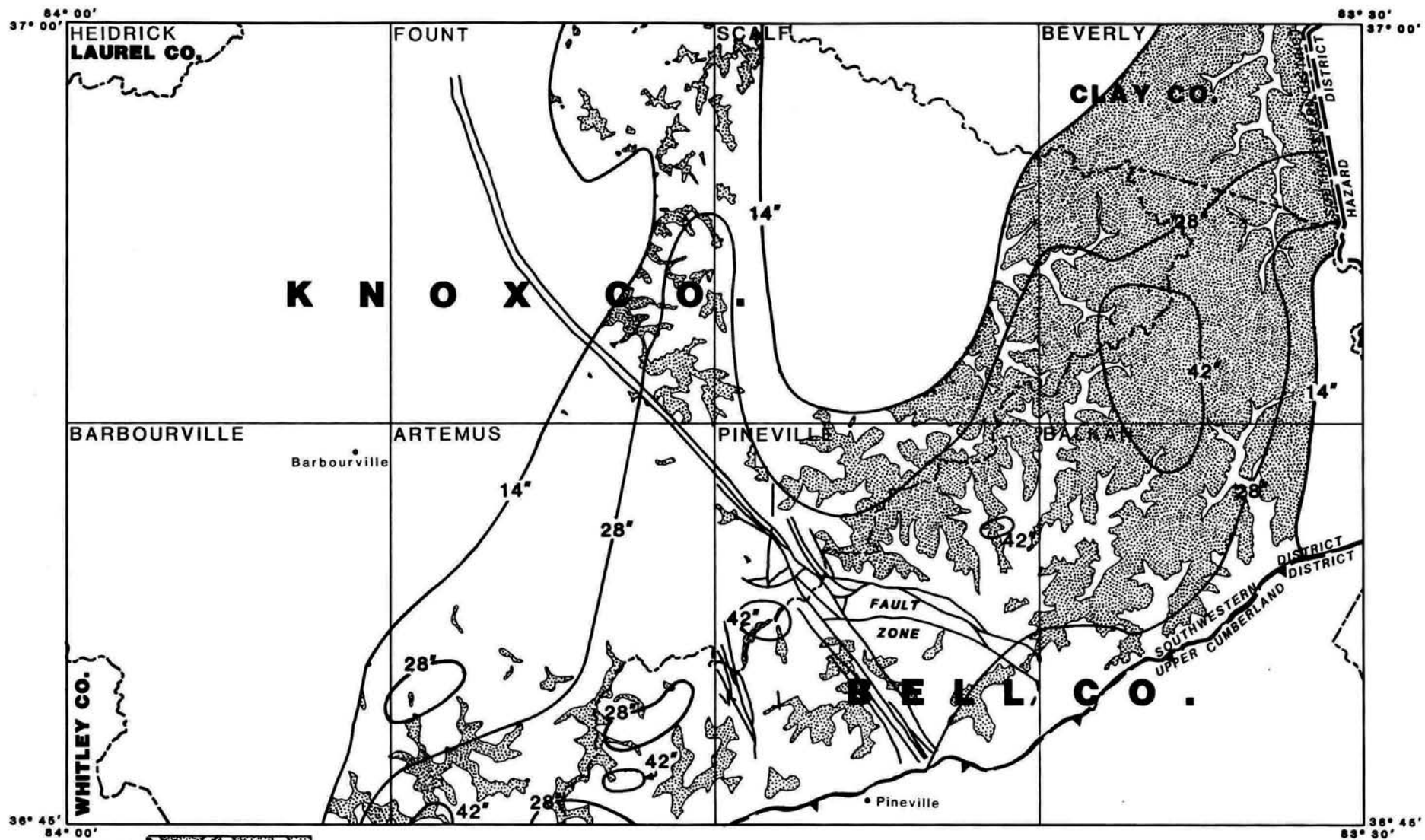


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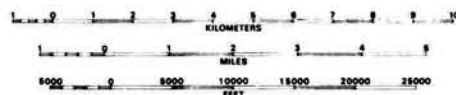
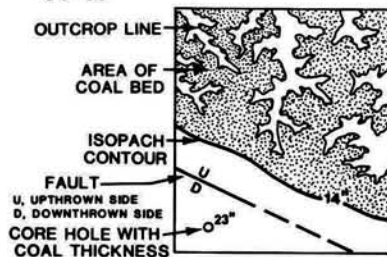
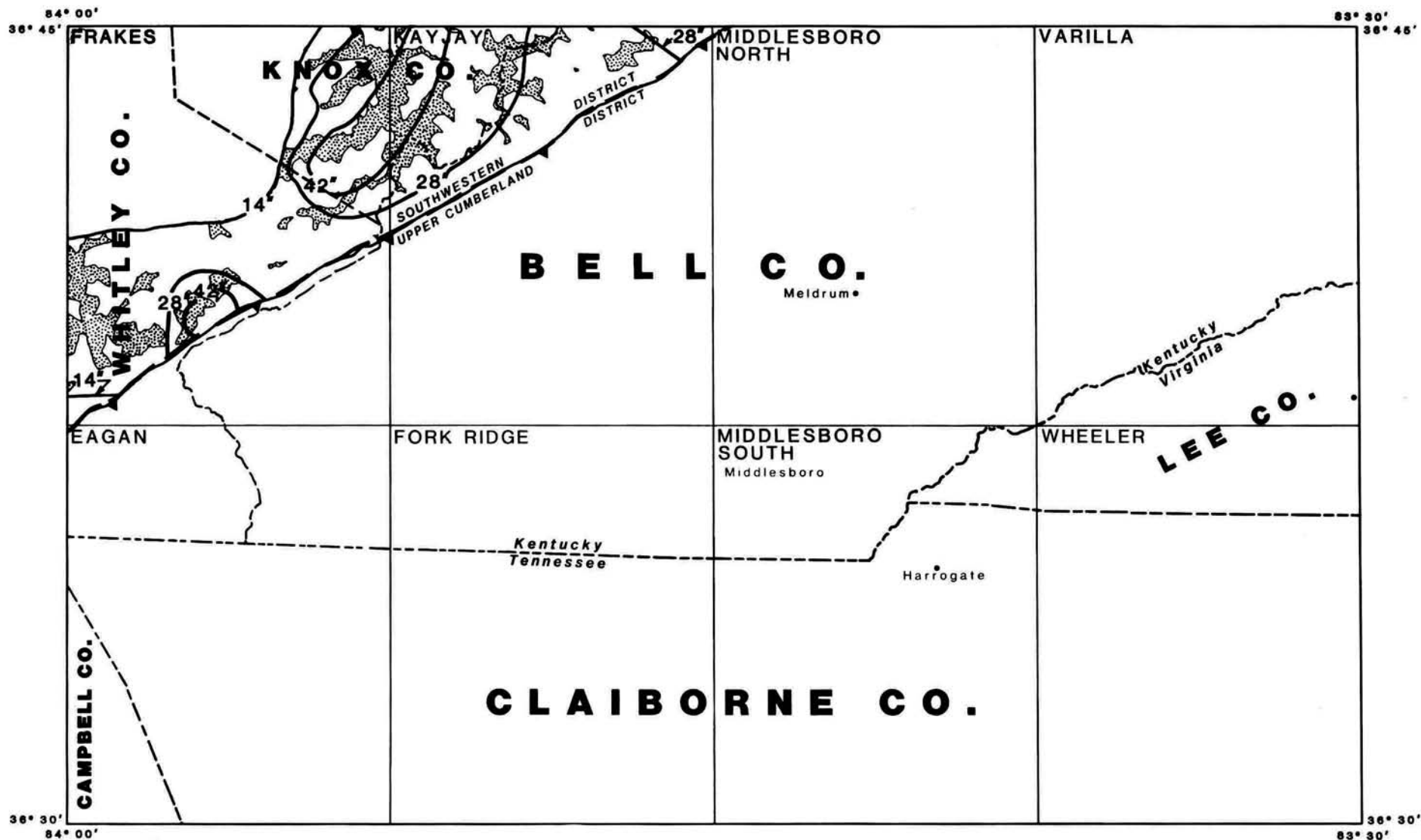
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SW/4 IRVINE 1:100,000

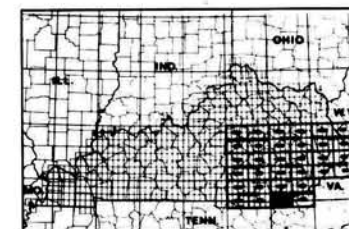


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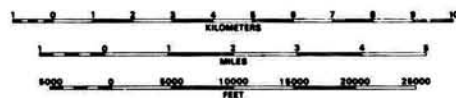
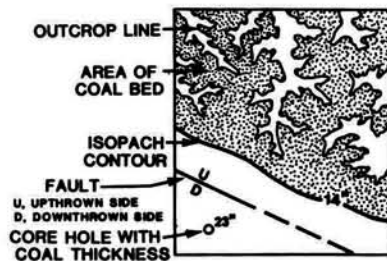
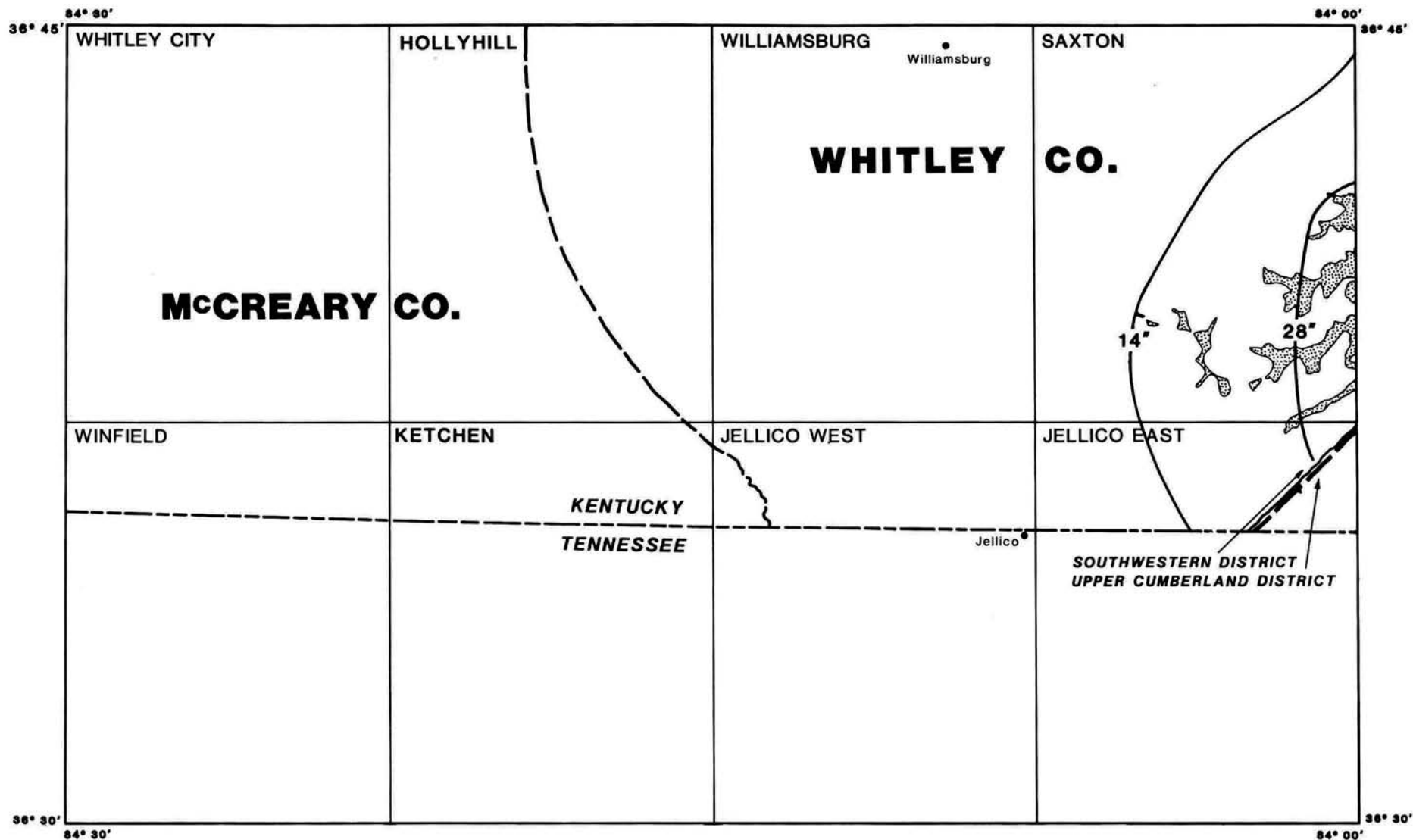
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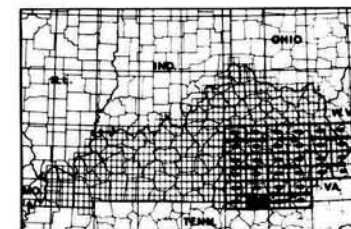
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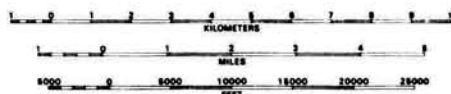
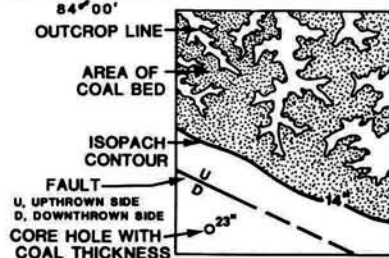
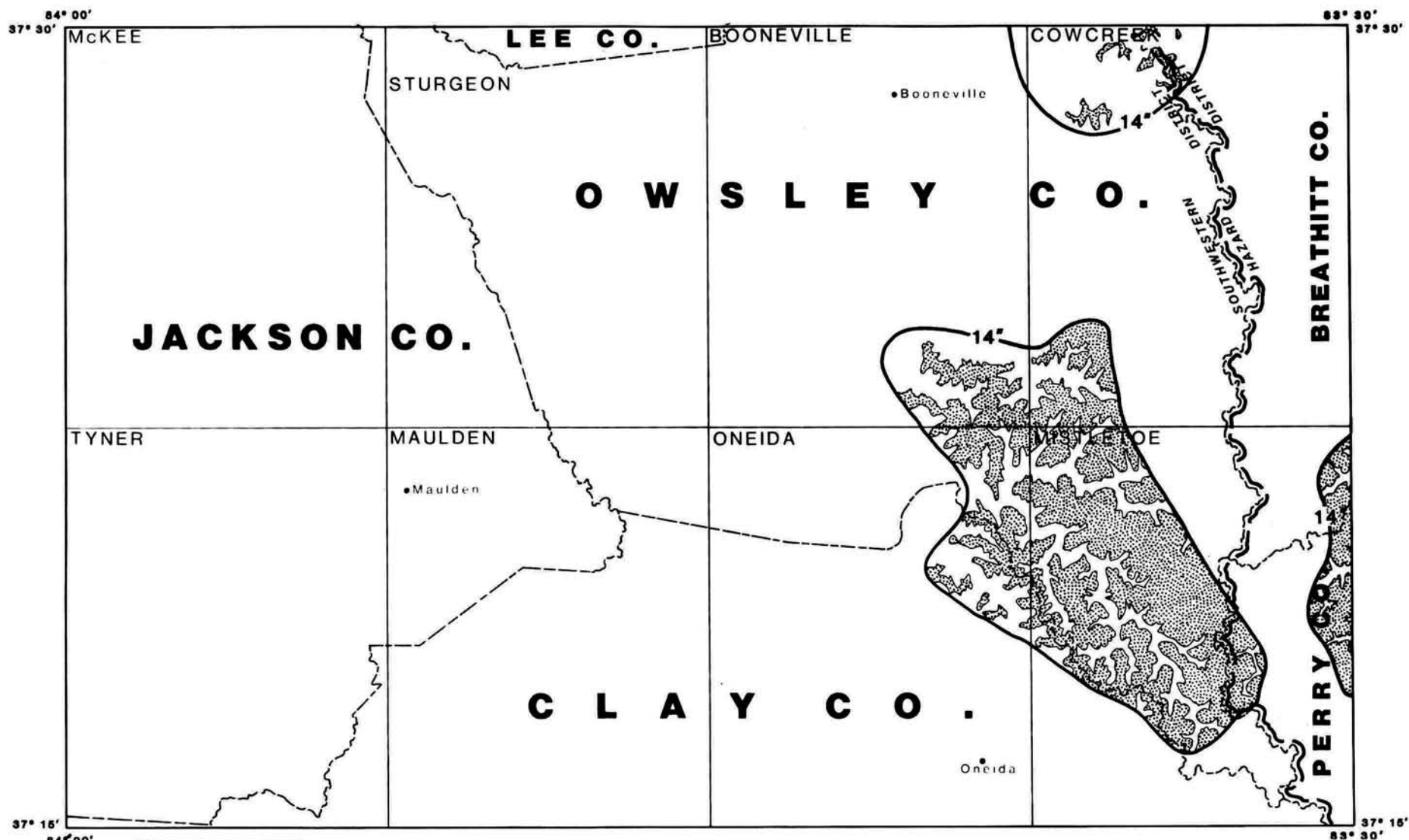
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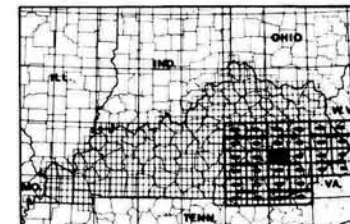
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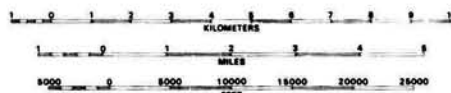
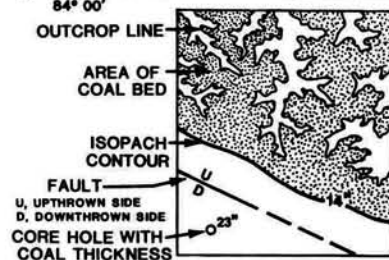
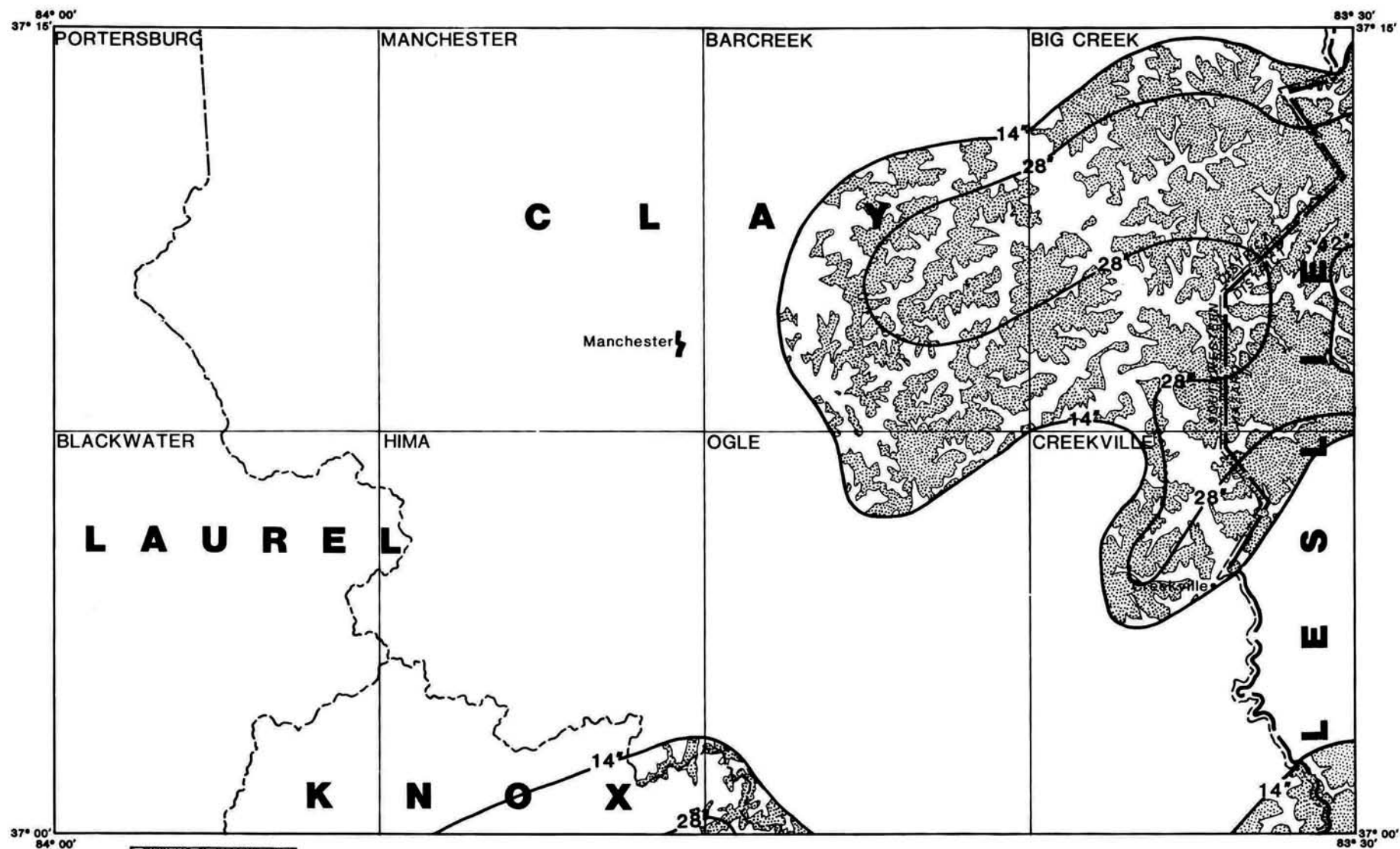
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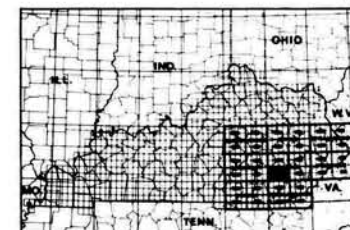
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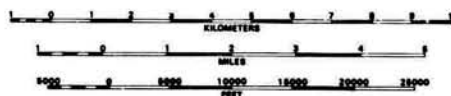
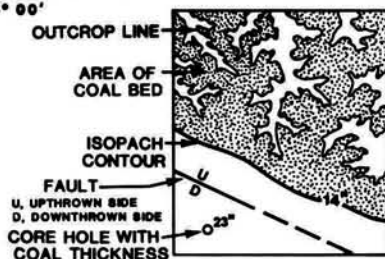
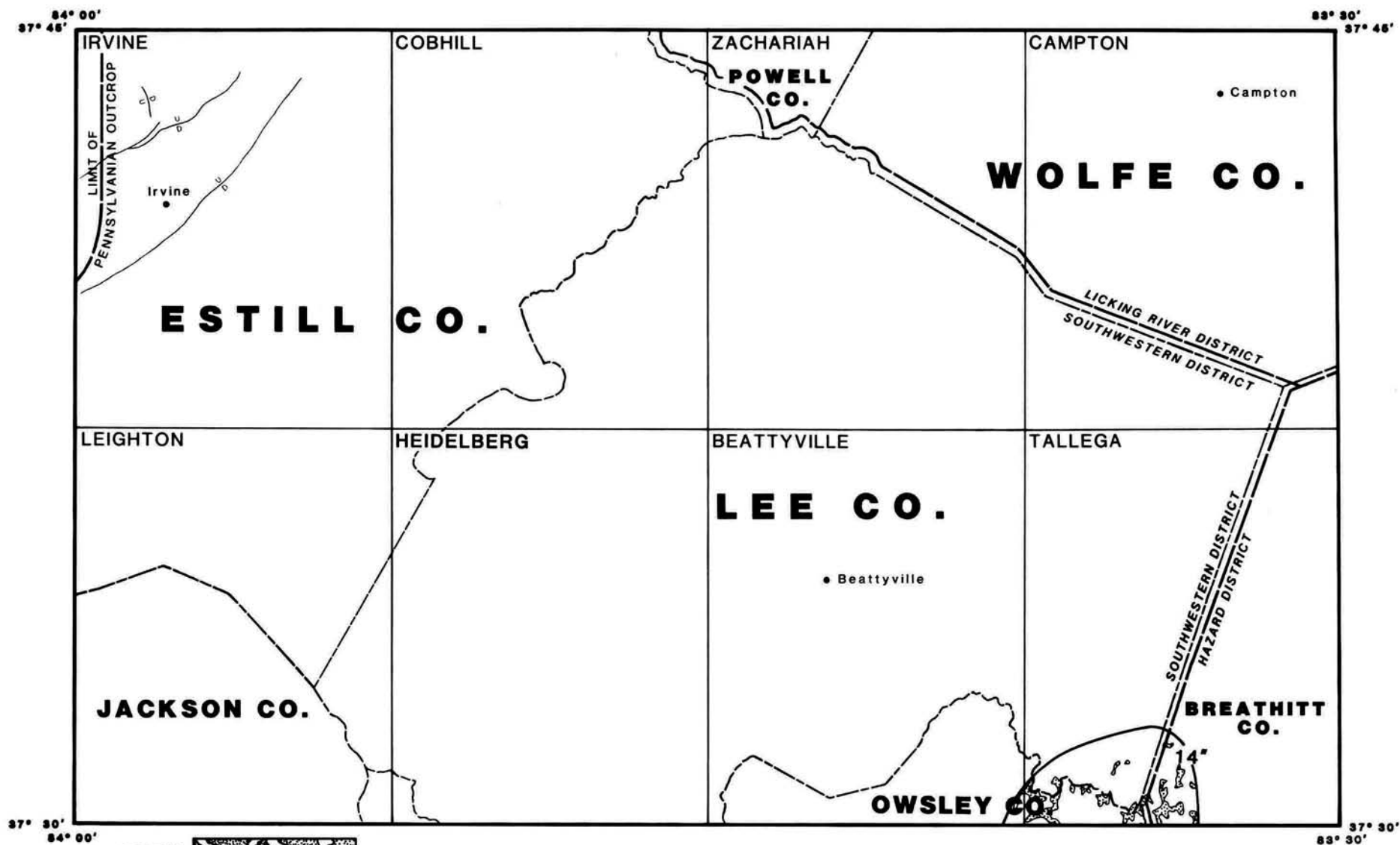
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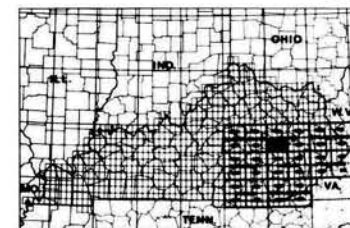
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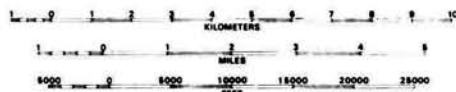
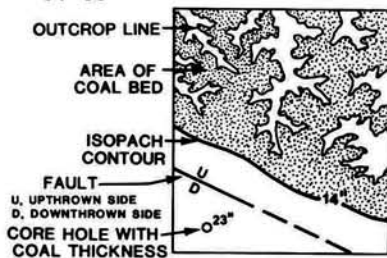
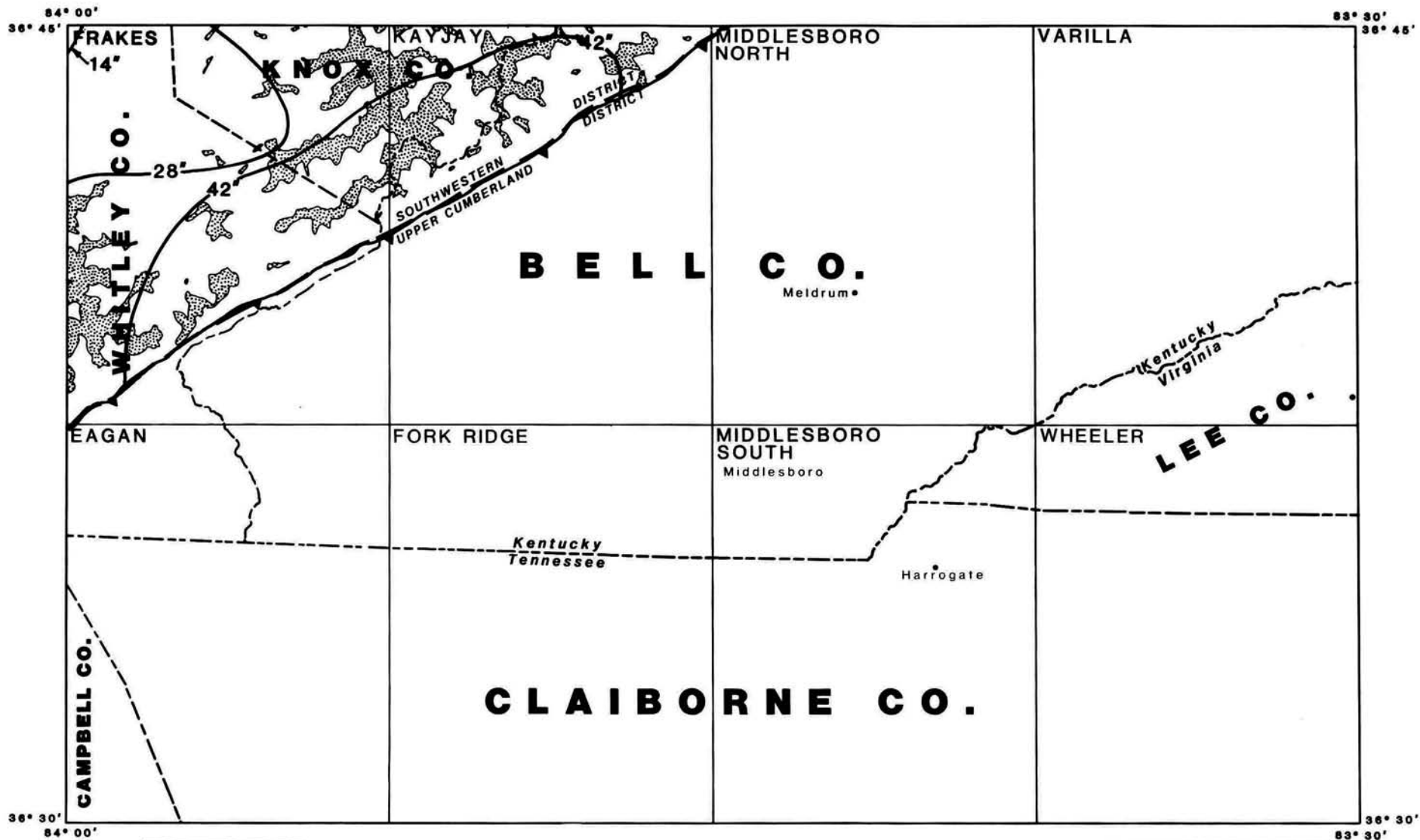
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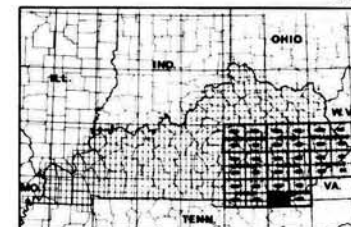
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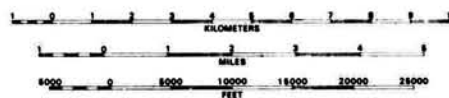
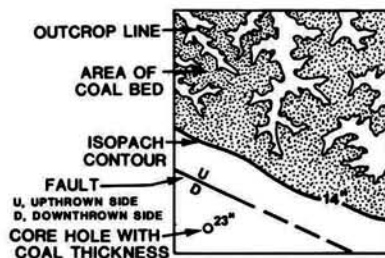
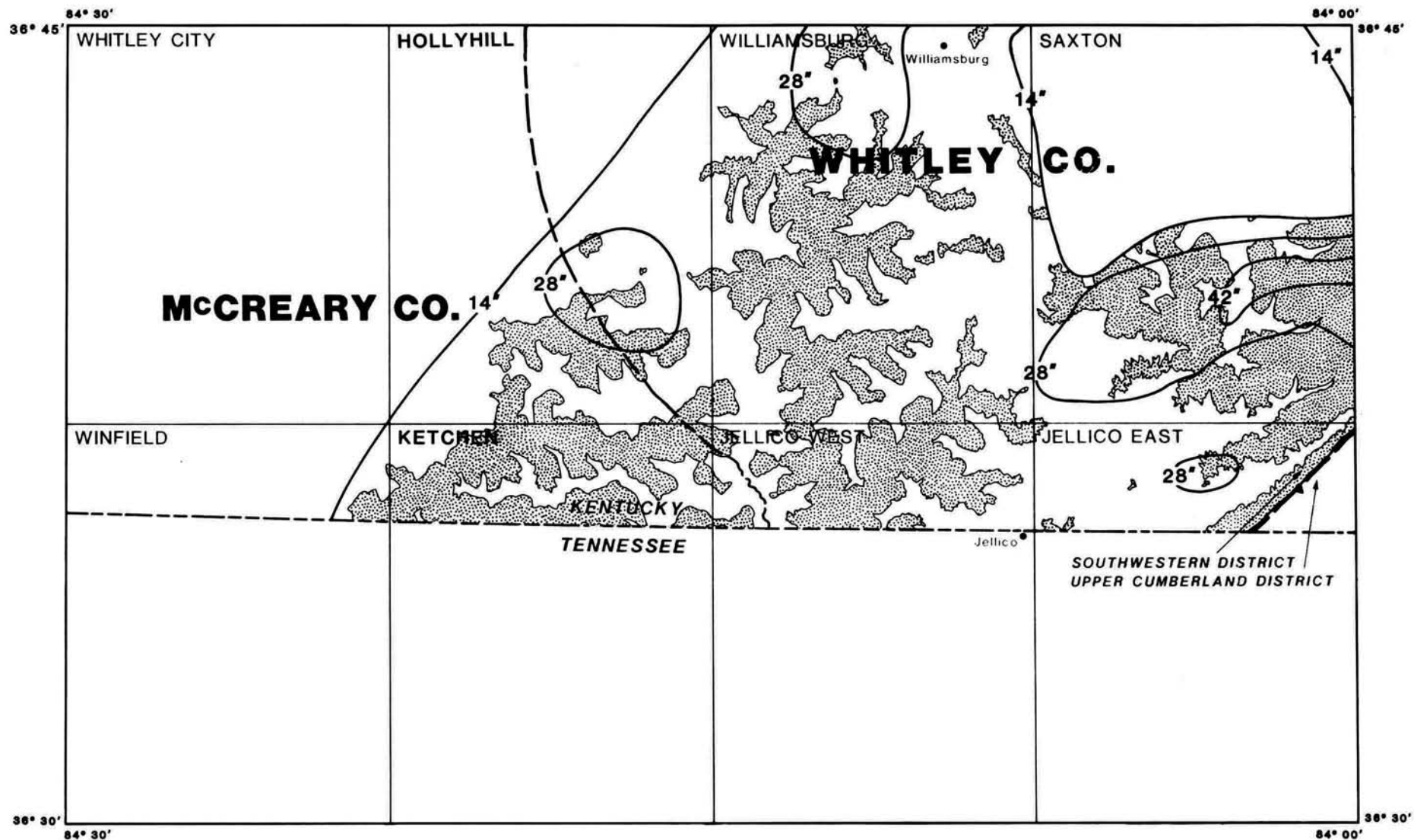
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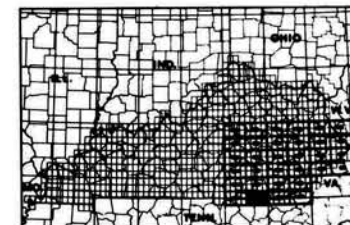
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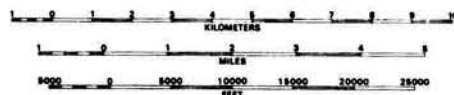
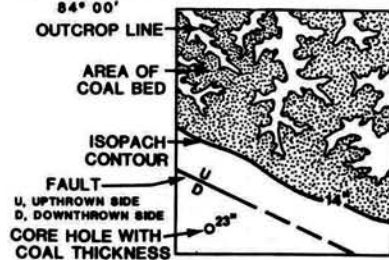
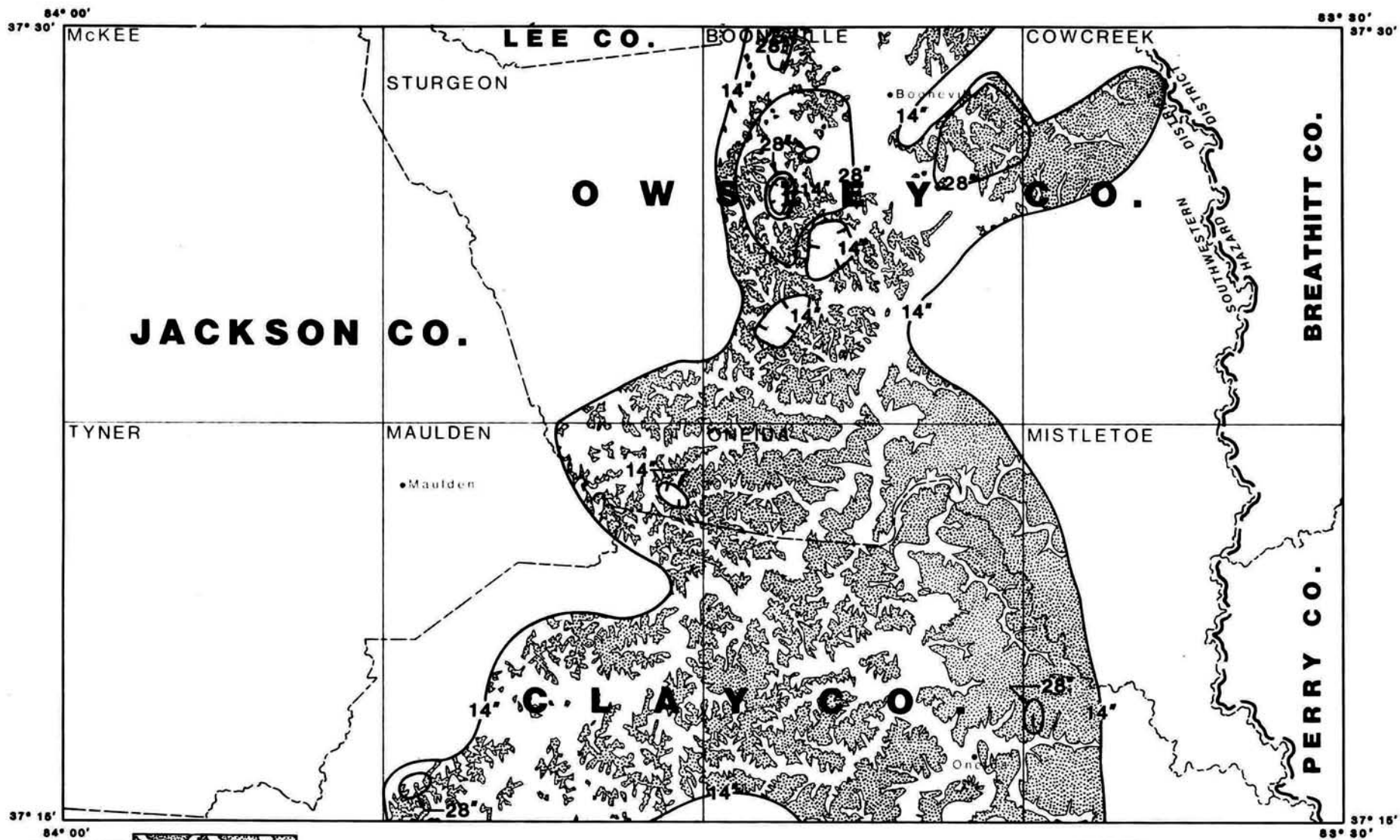
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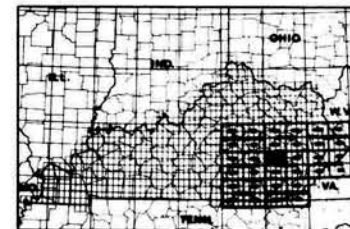
JELICO COAL BED



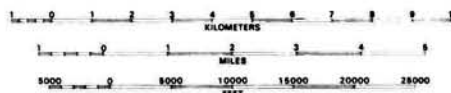
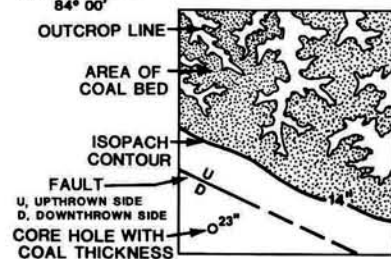
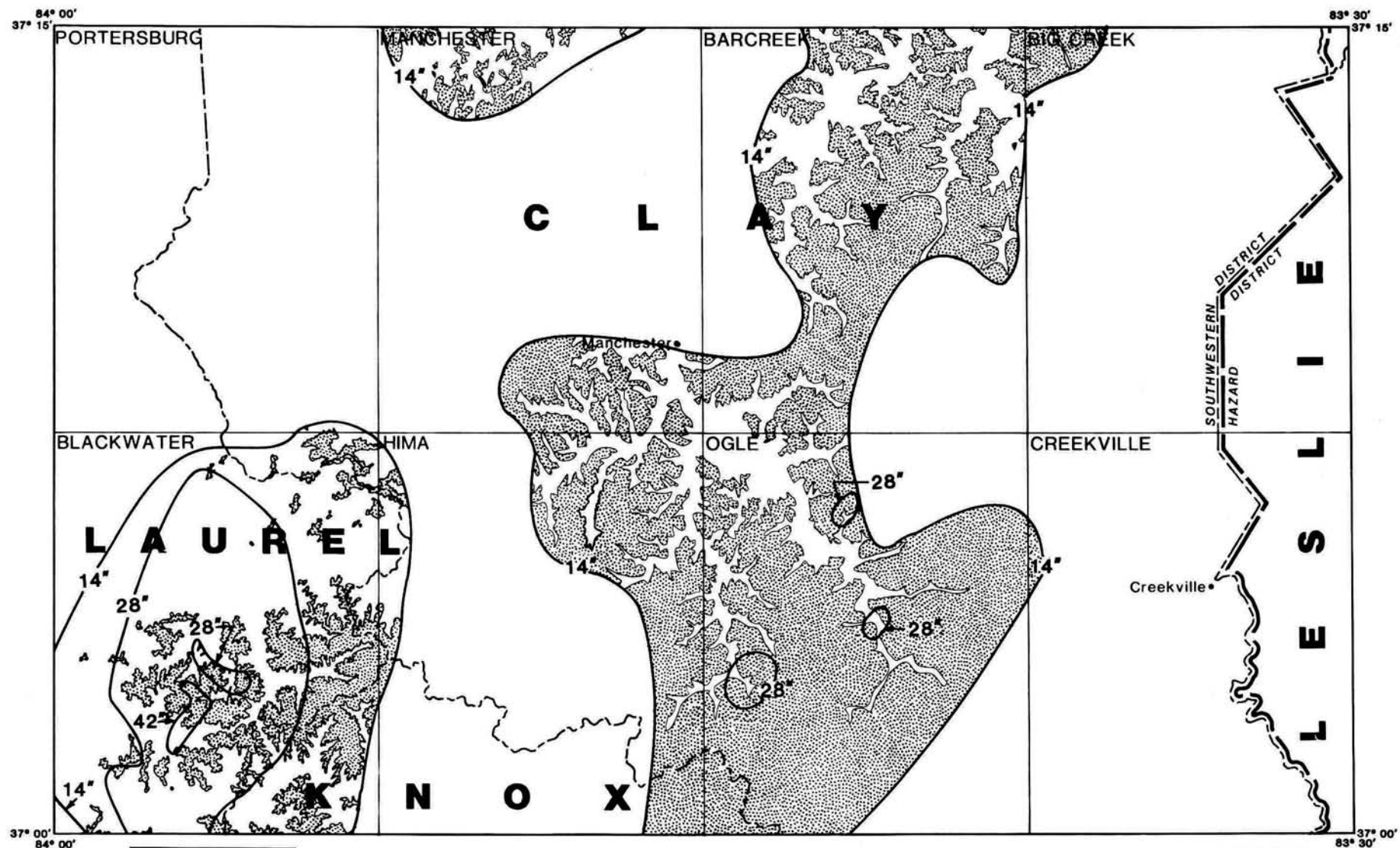
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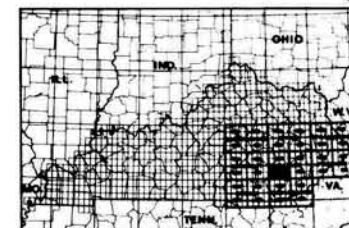
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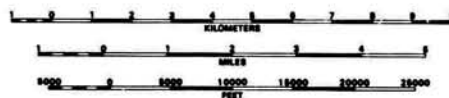
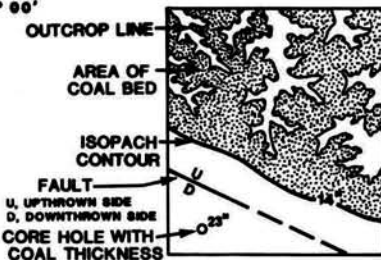
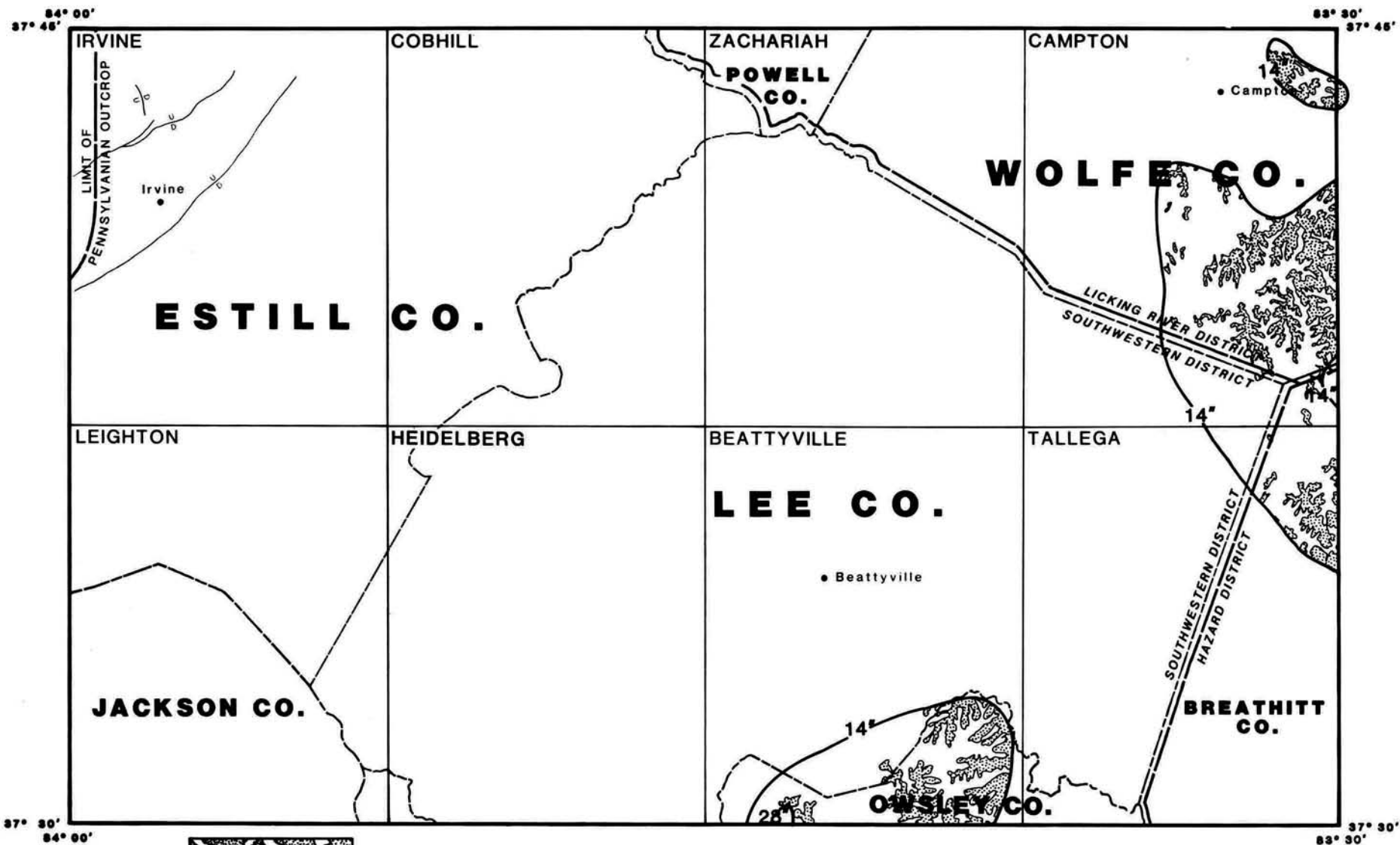
NW/4 HAZARD 1:100,000



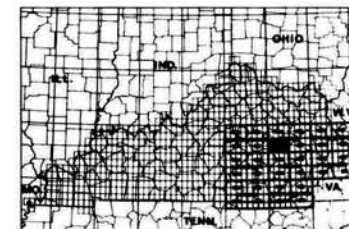
JELICO COAL BED



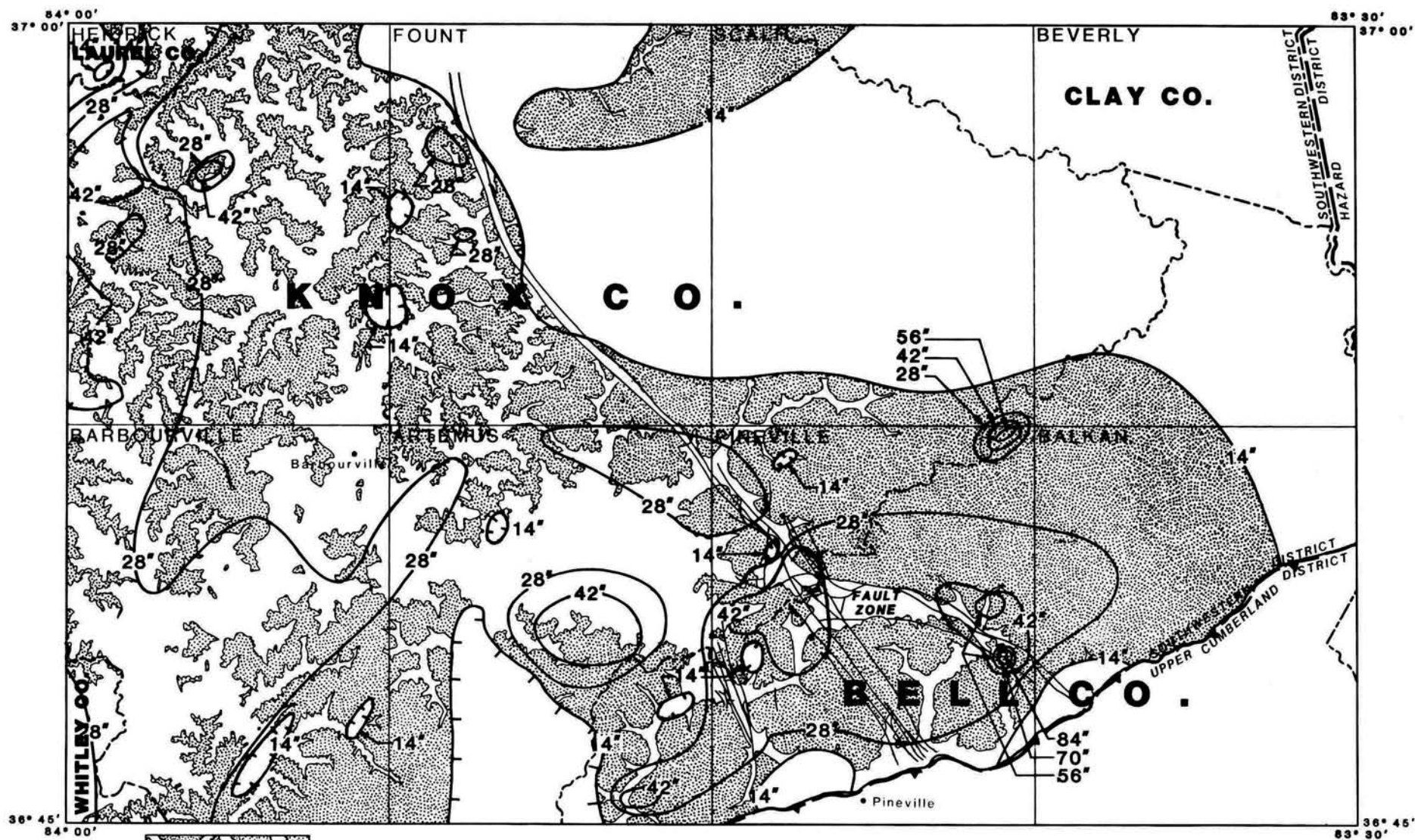
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JELICO COAL BED

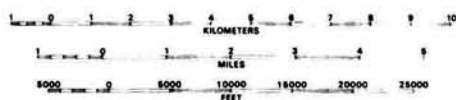
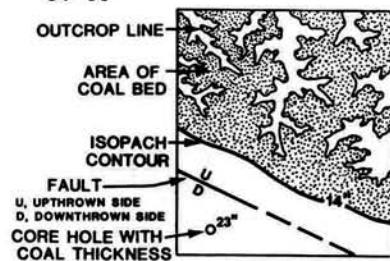
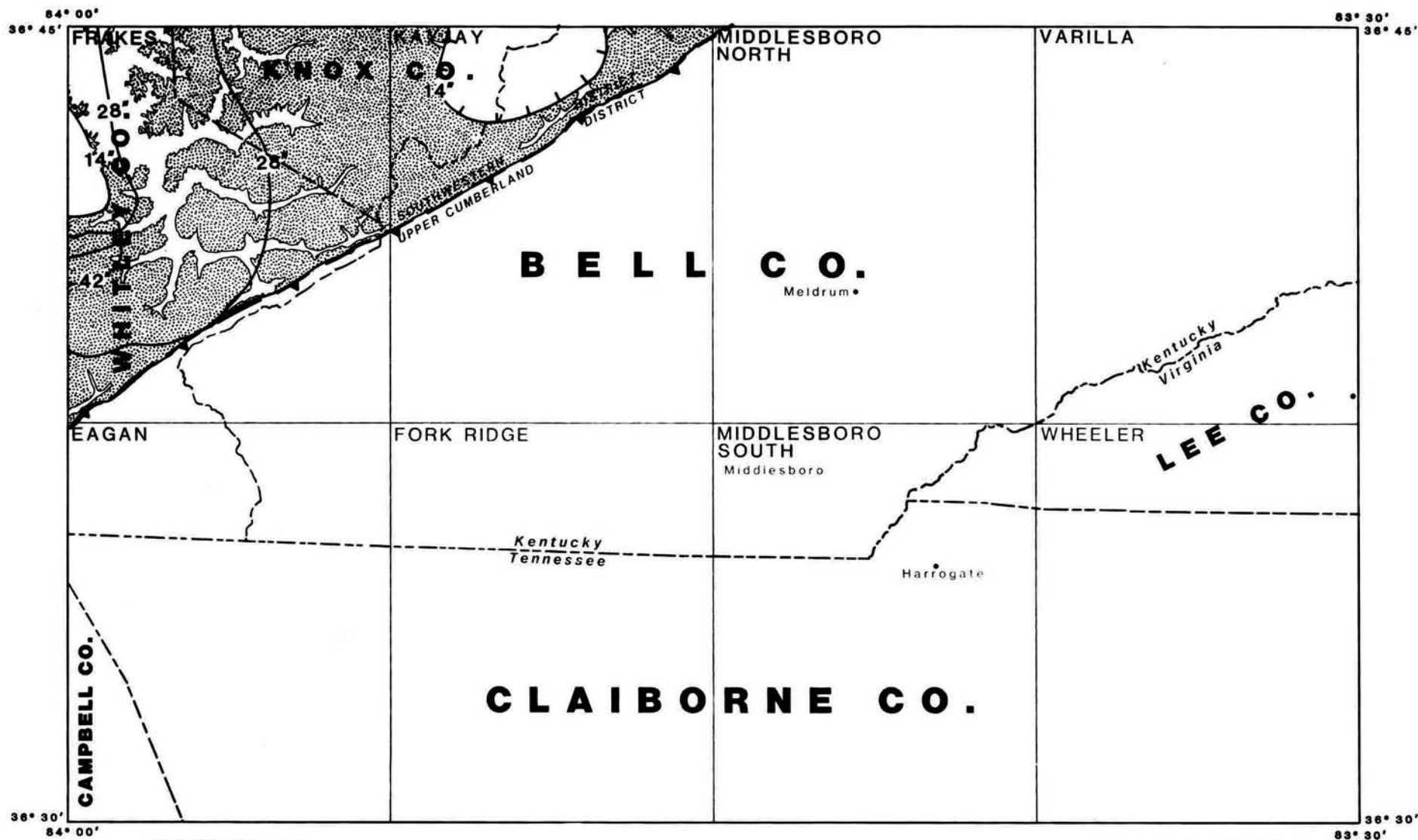


SW/4 IRVINE 1:100,000

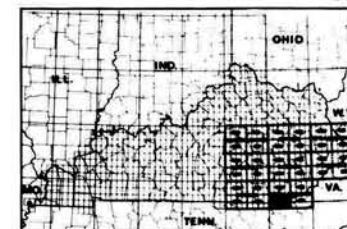


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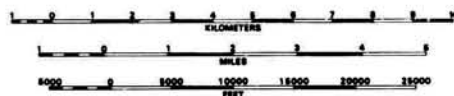
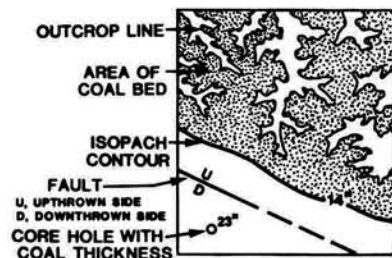
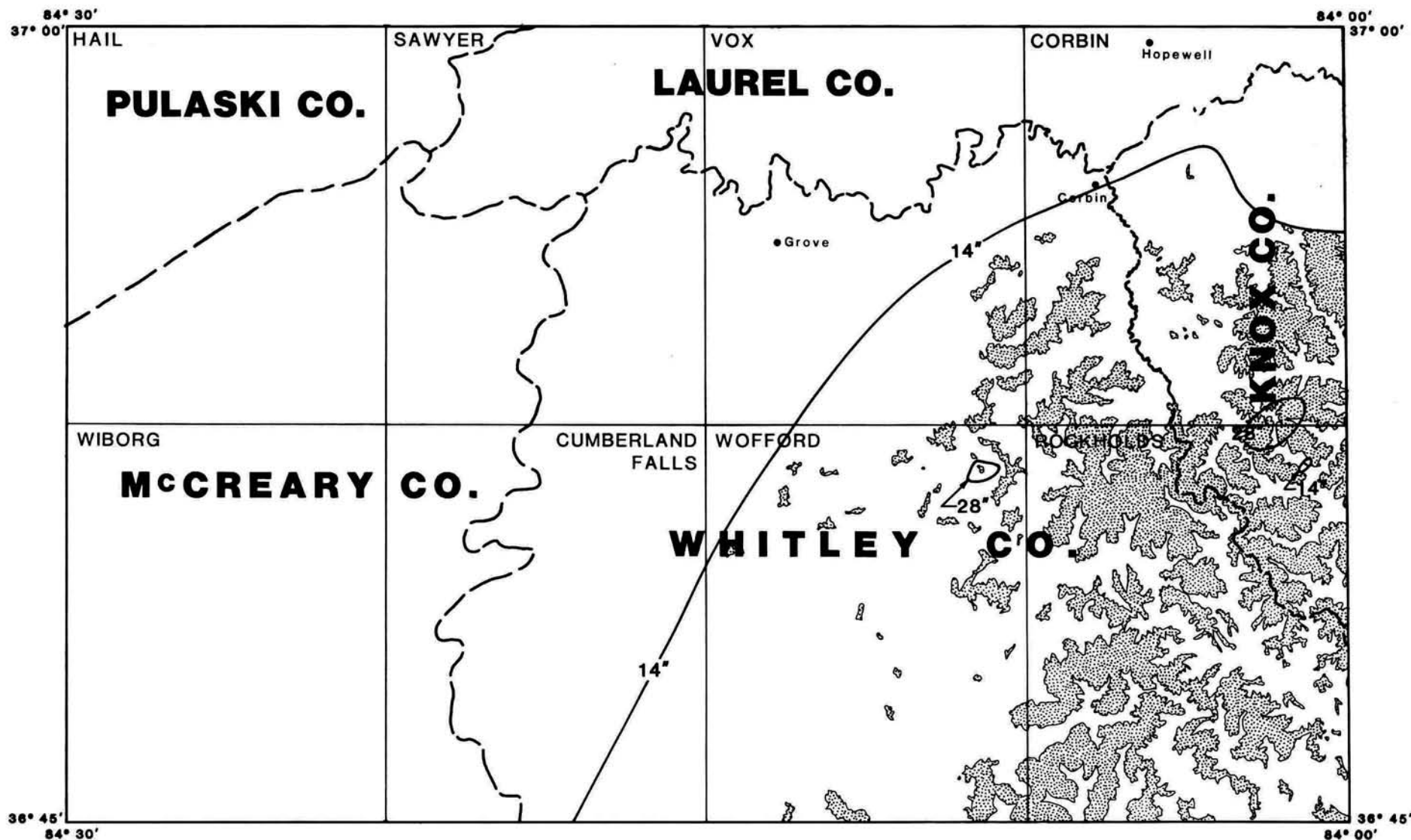
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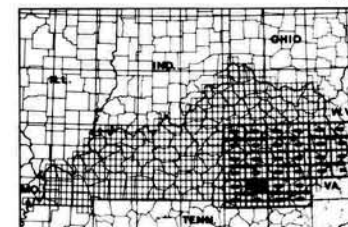
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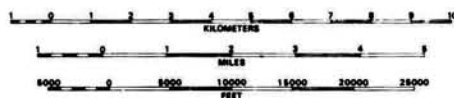
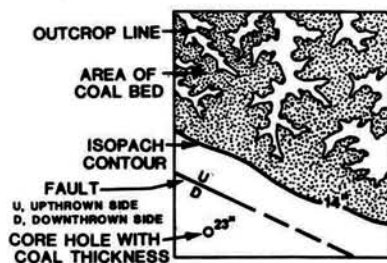
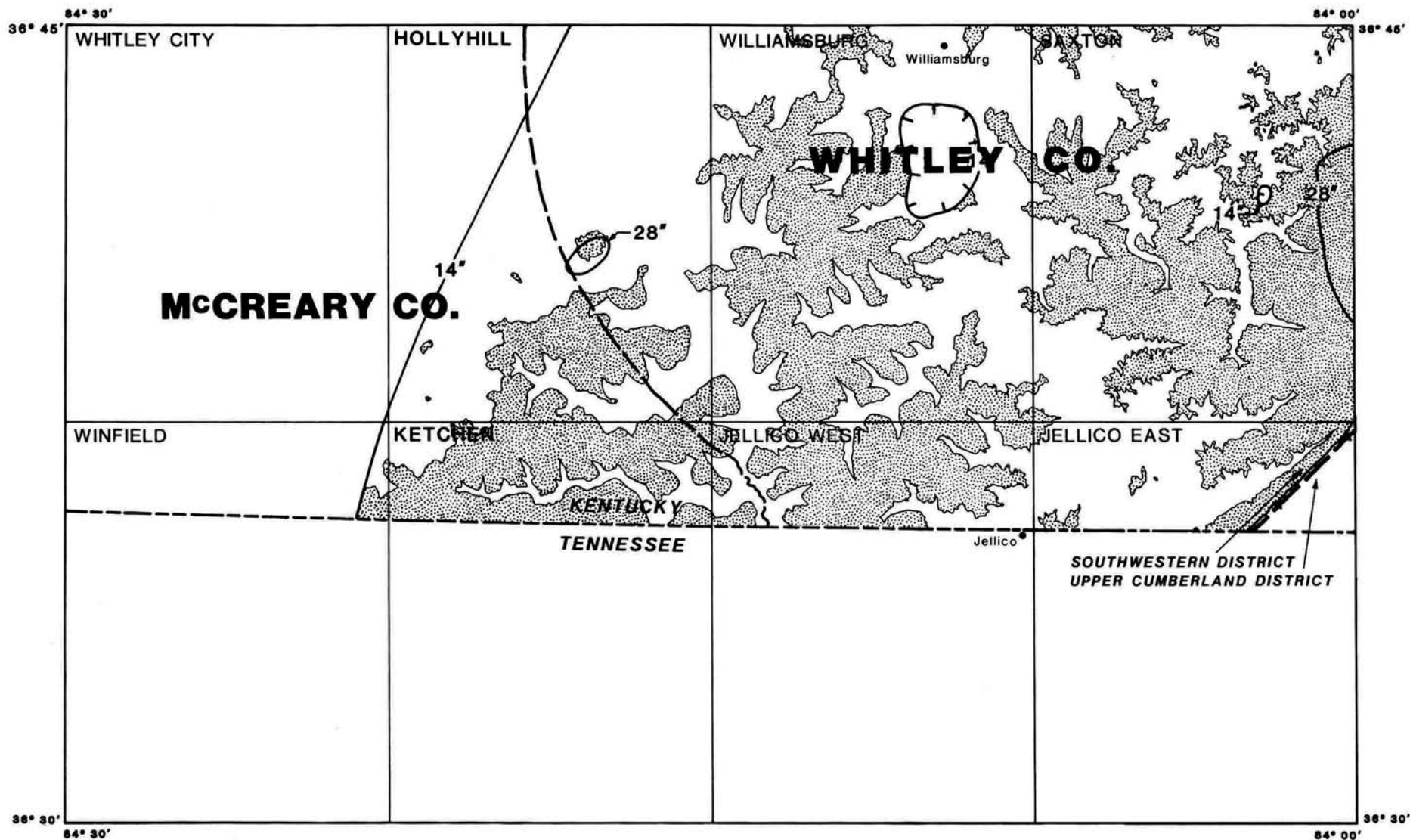
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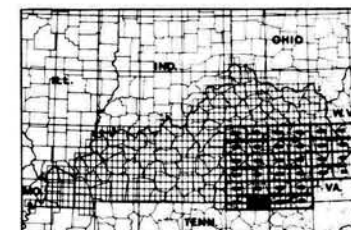
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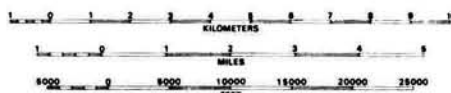
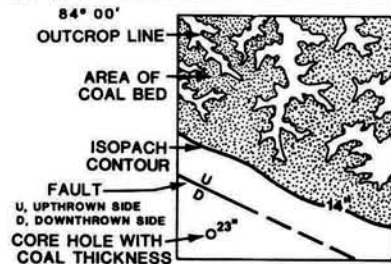
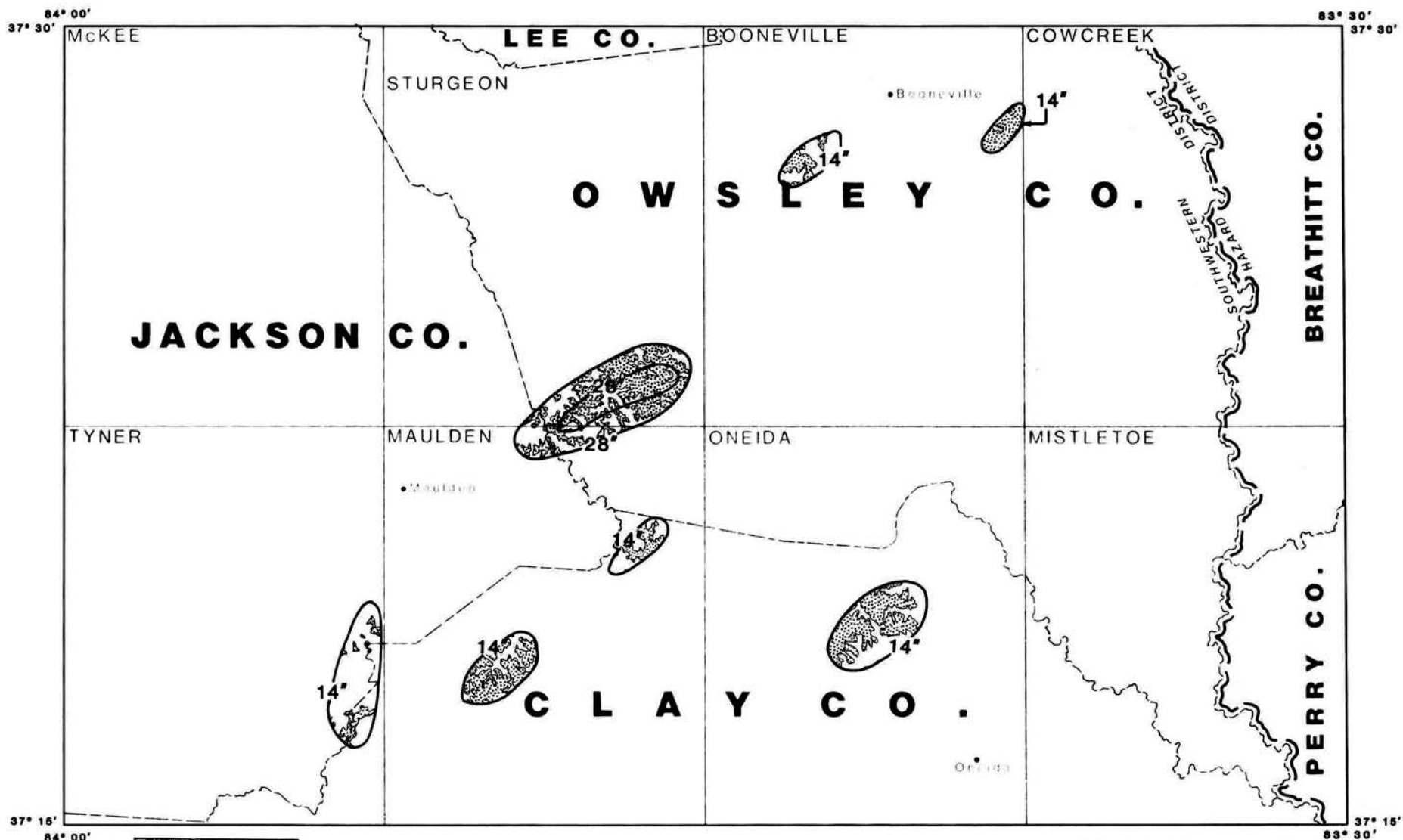
NE/4 CORBIN 1:100,000



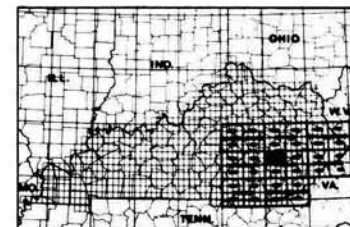
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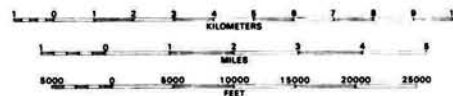
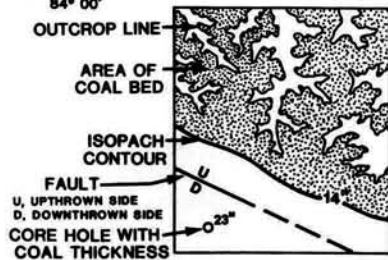
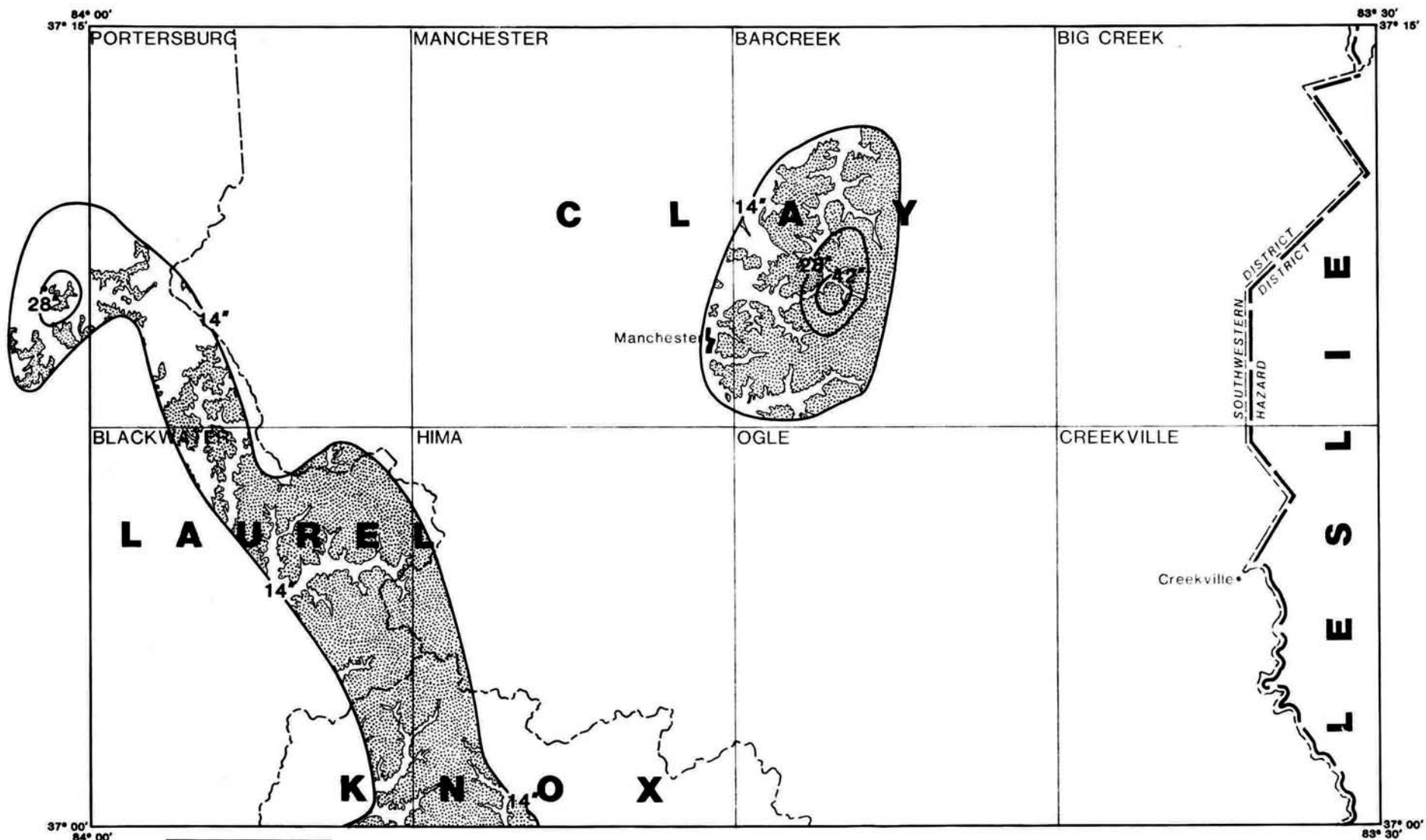
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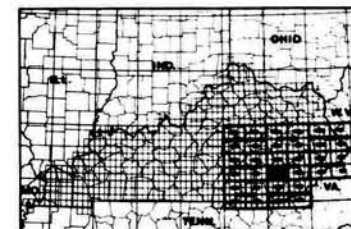
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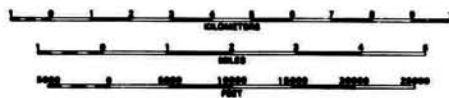
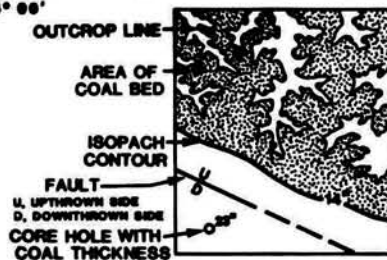
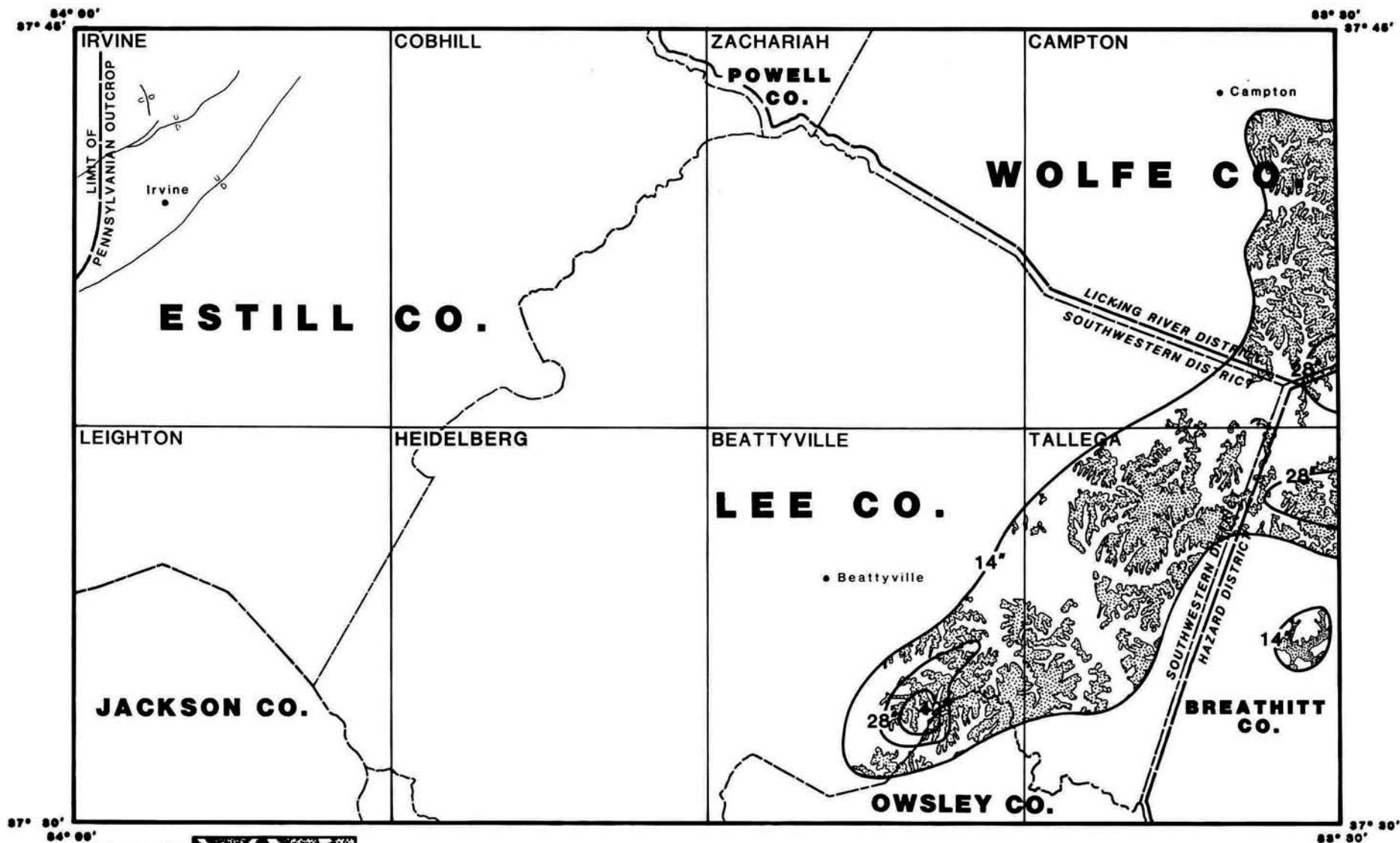
NW/4 HAZARD 1:100,000



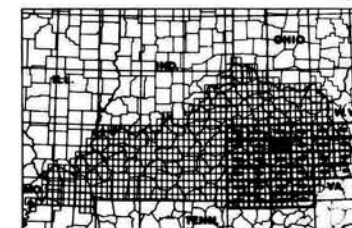
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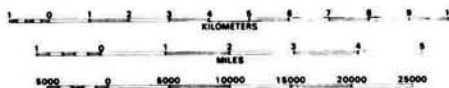
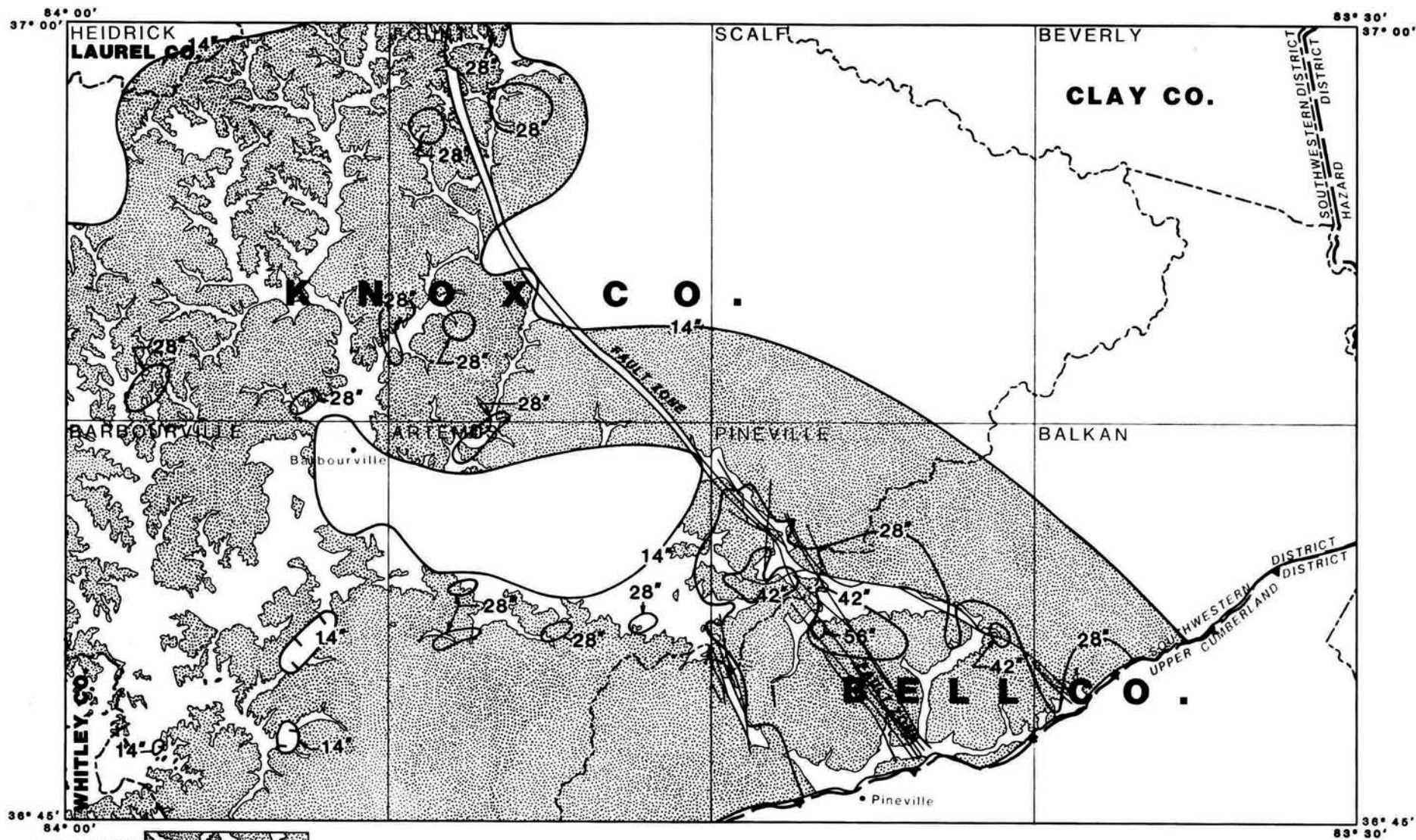
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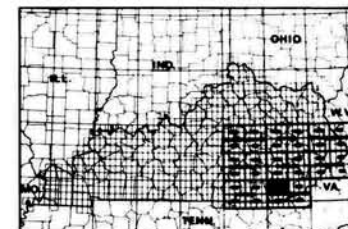
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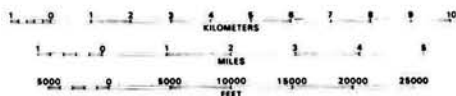
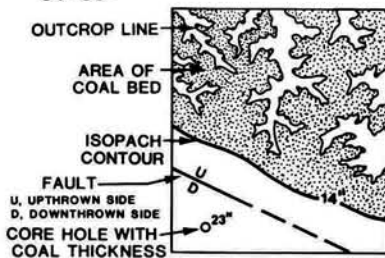
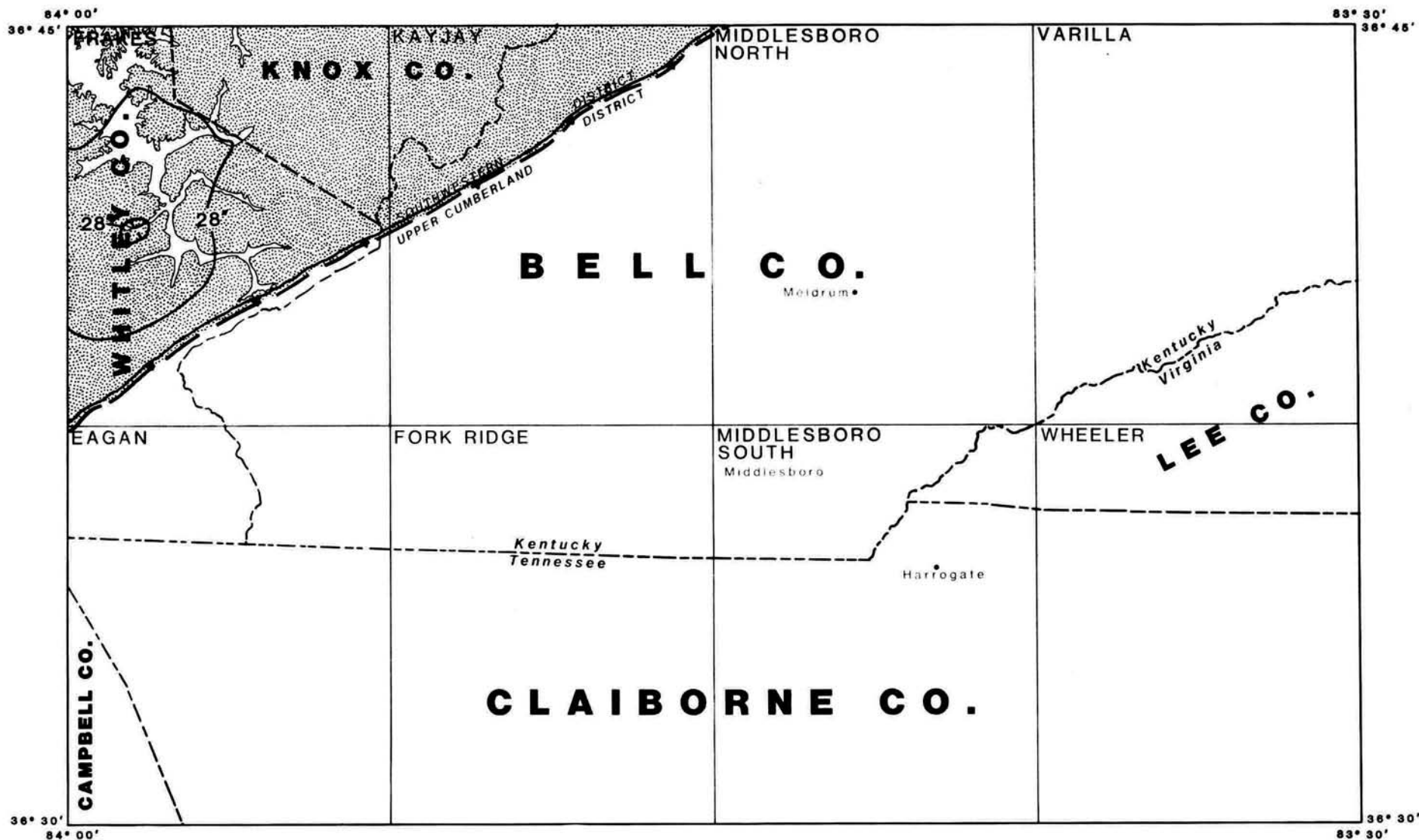
SW/4 IRVINE 1:100,000



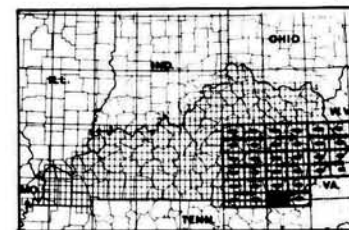
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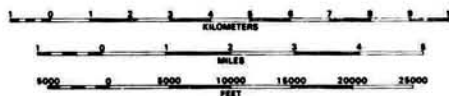
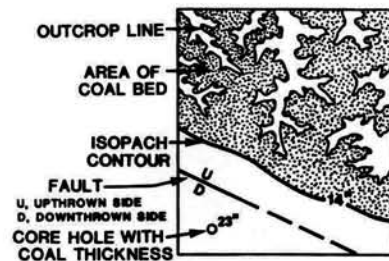
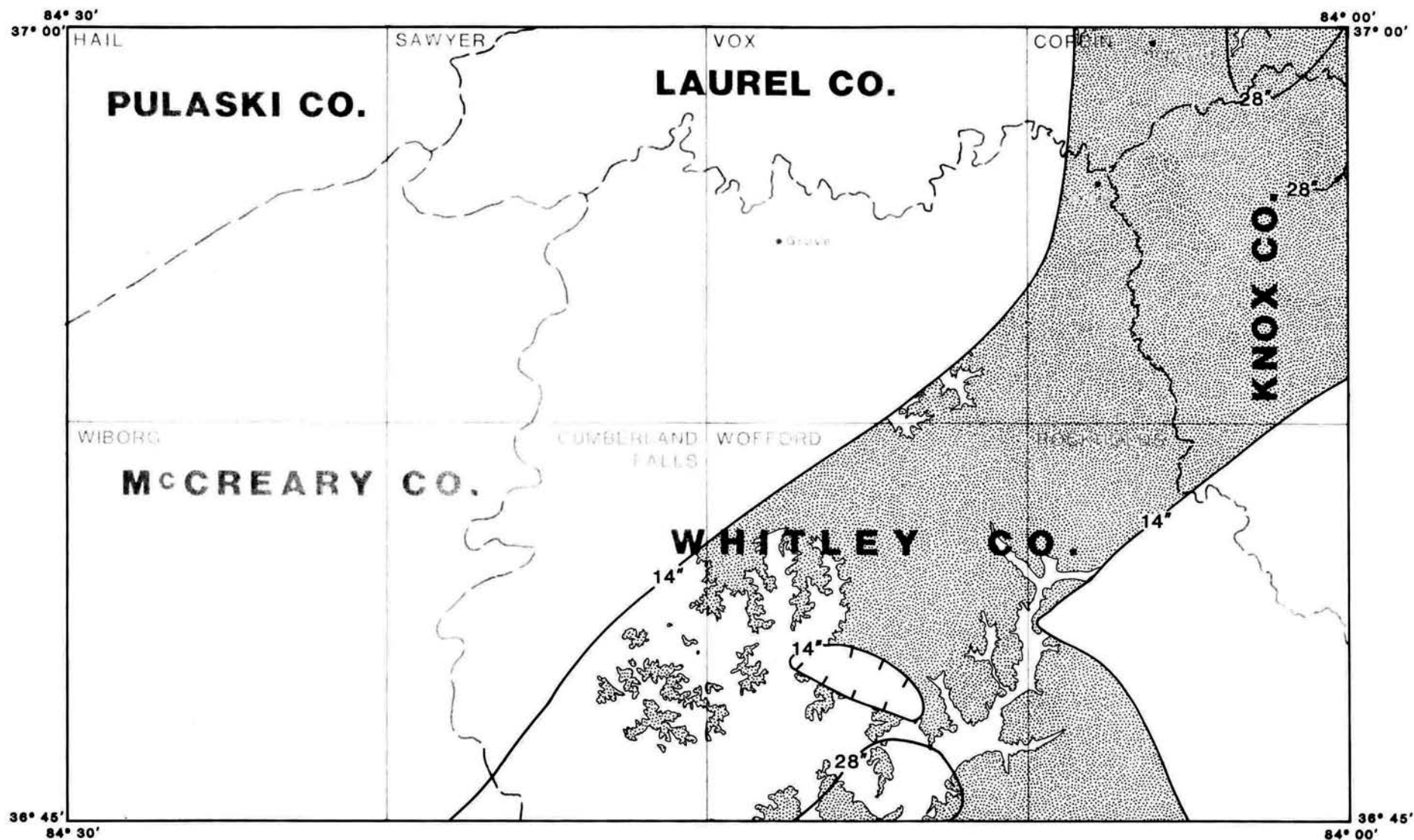
NW/4 MIDDLESBORO 1:100,000



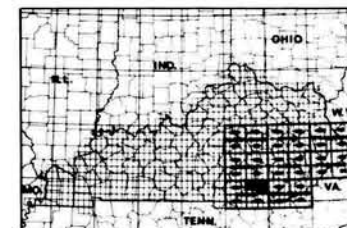
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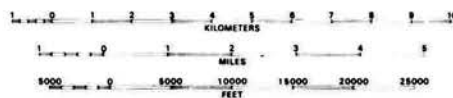
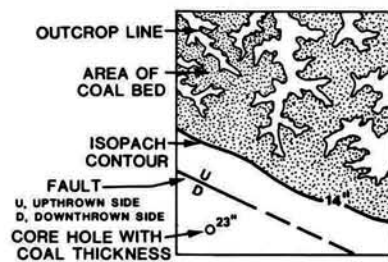
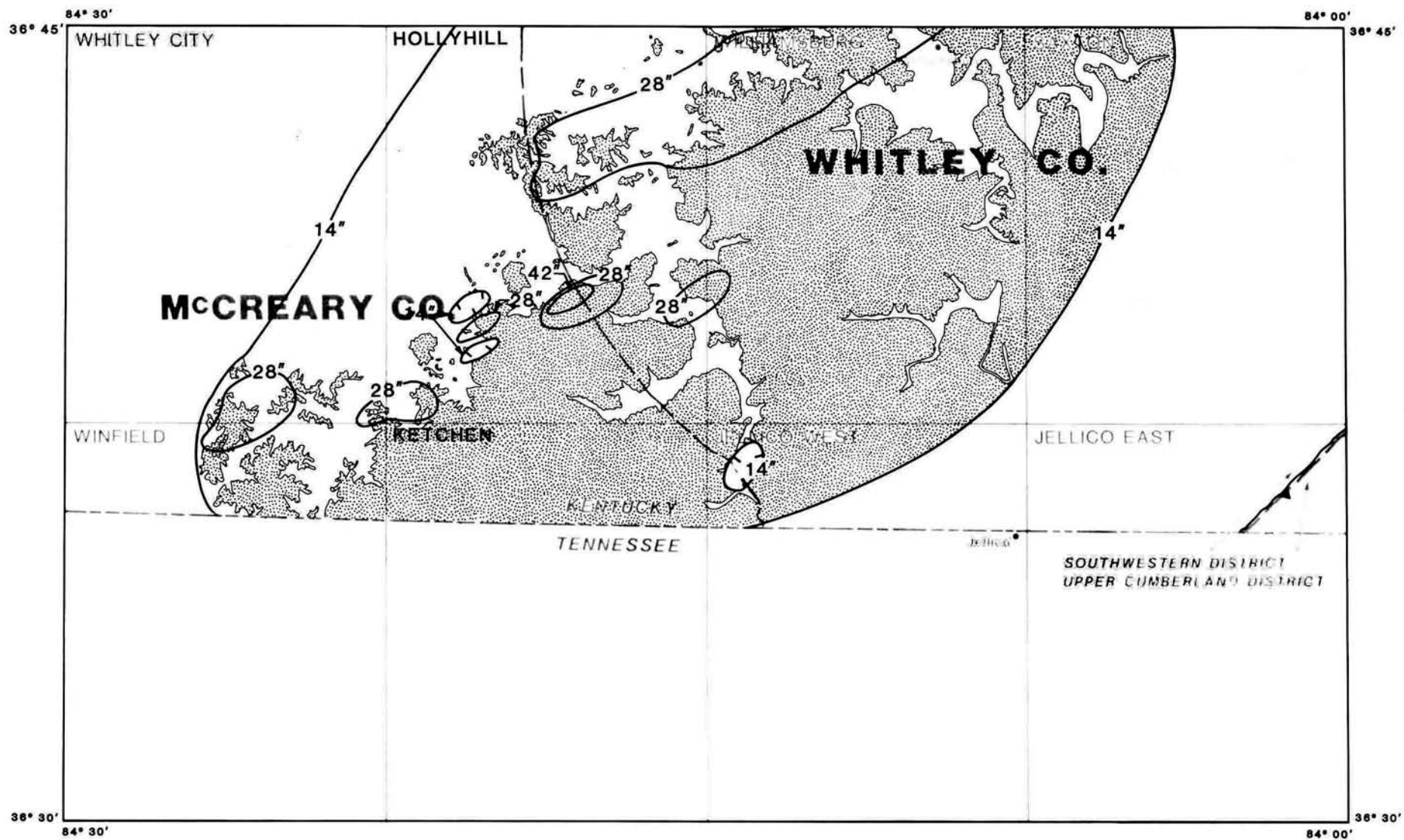
SW/4 MIDDLESBORO 1:100,000



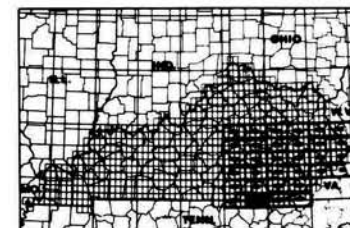
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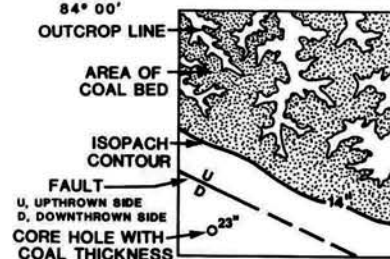
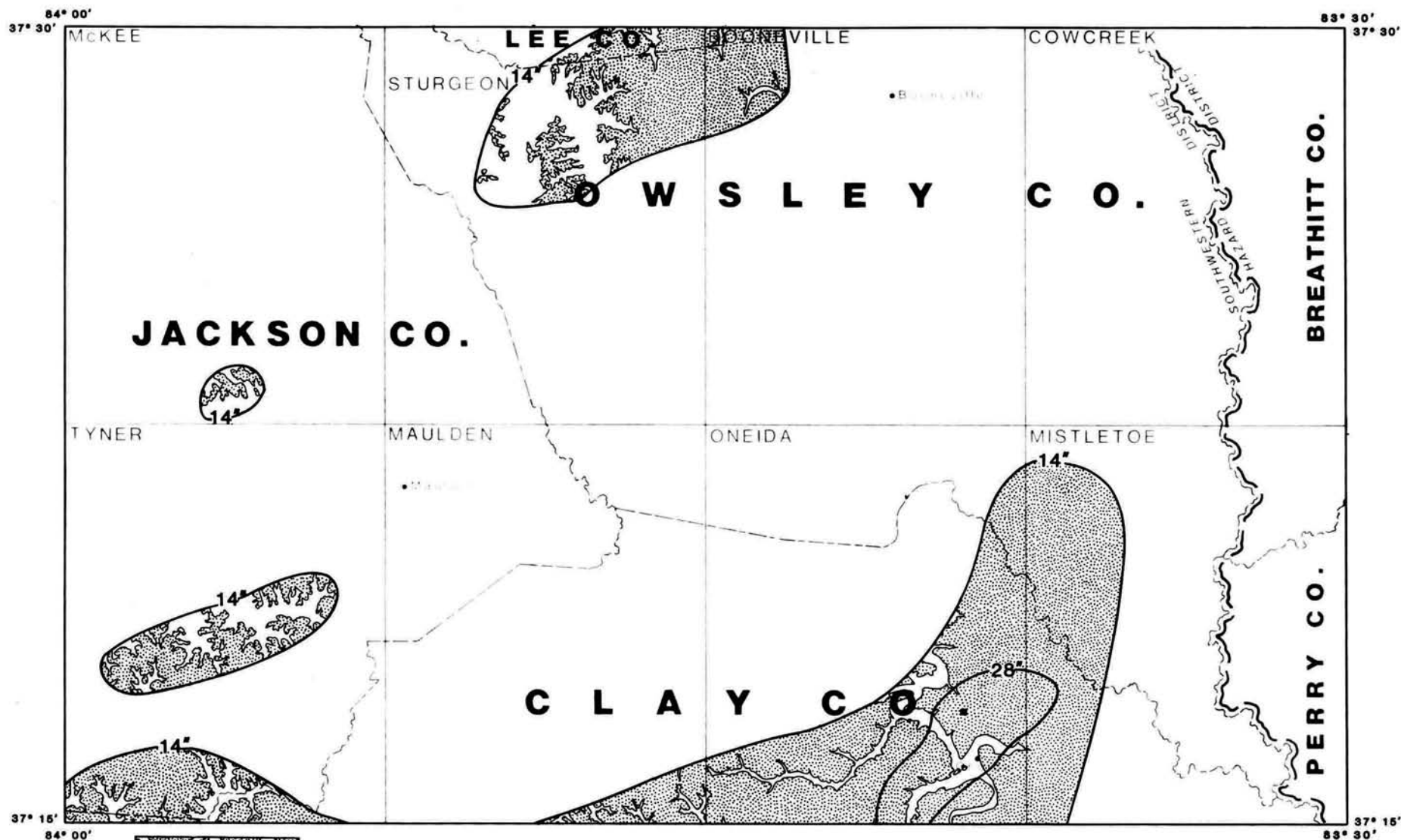


NE/4 CORBIN 1:100,000

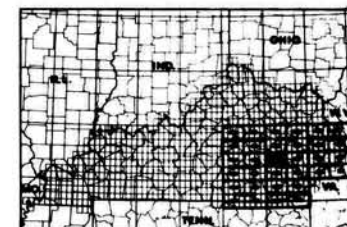


LILY COAL BED

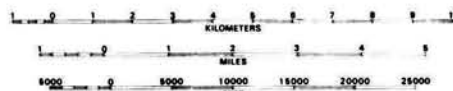
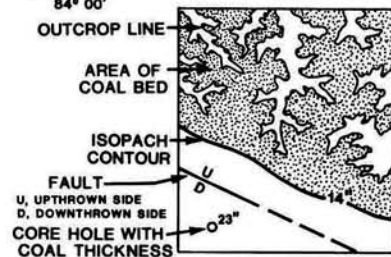
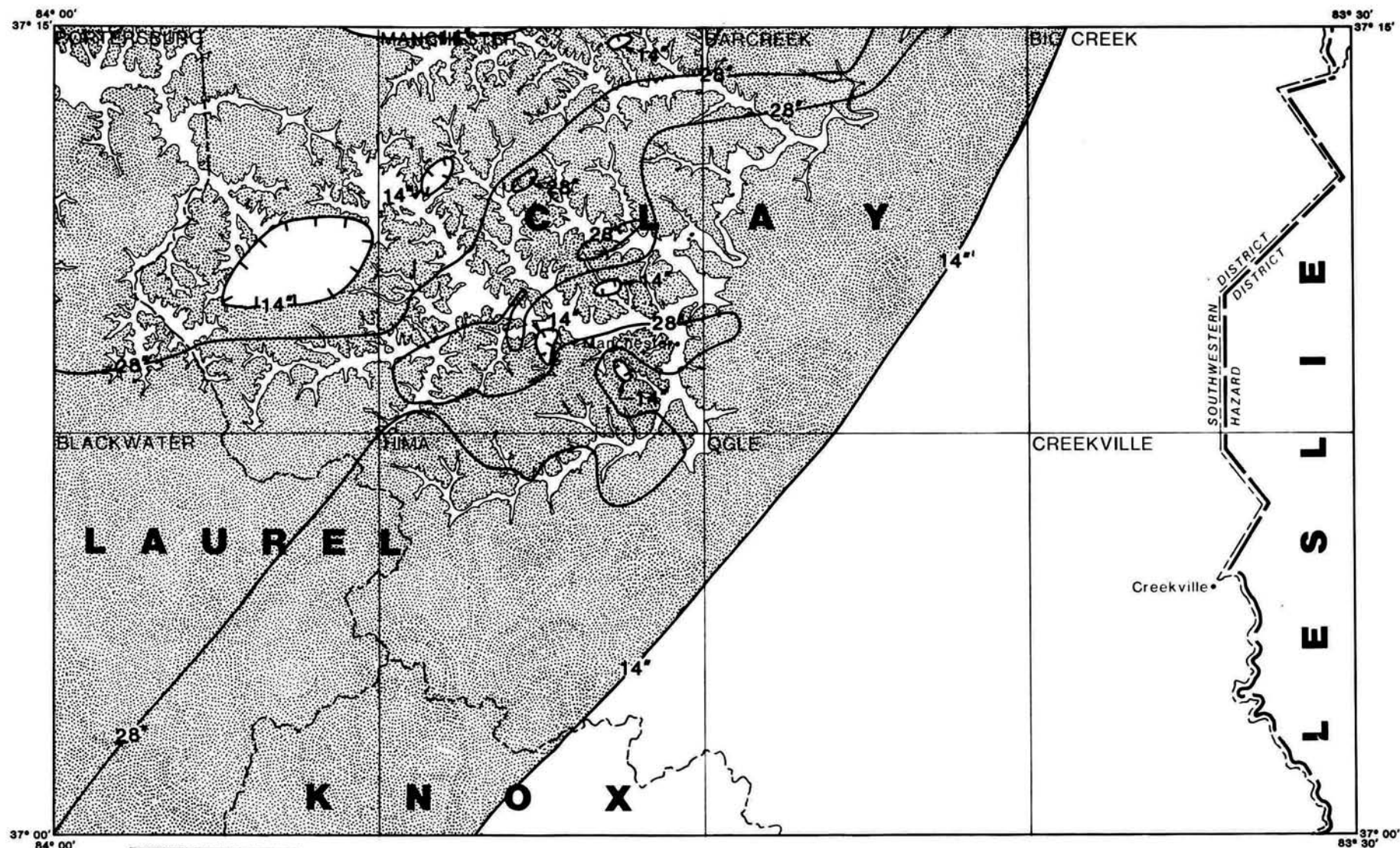




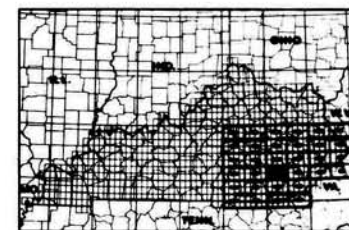
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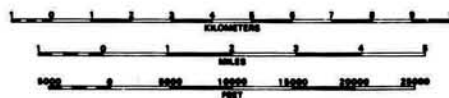
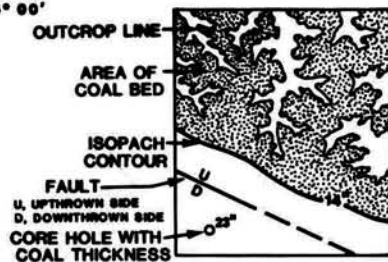
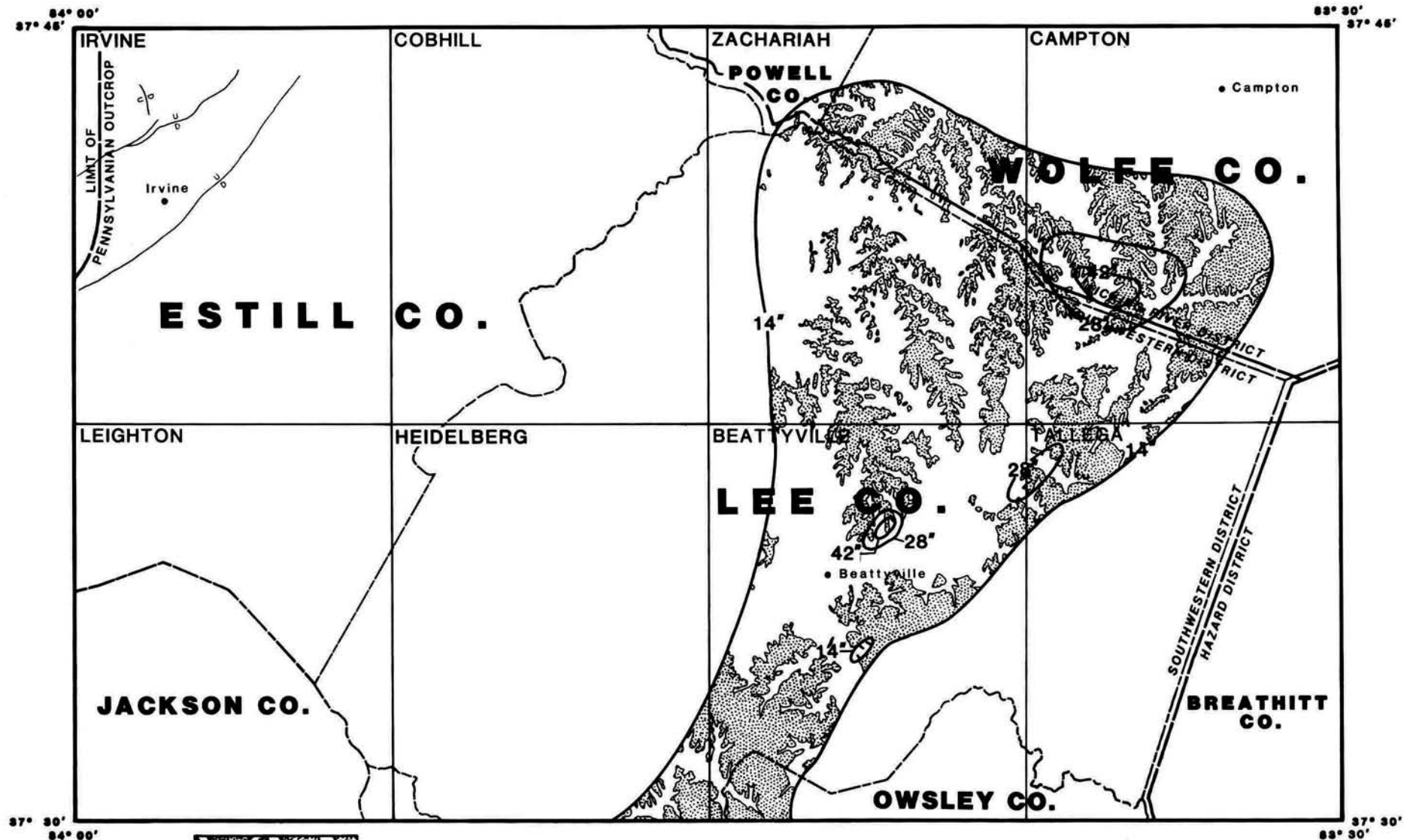
NW/4 HAZARD 1:100,000



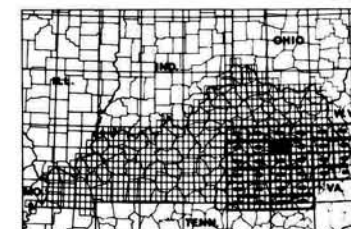
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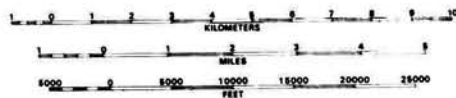
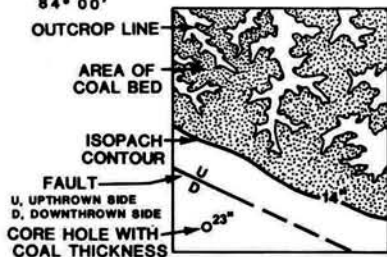
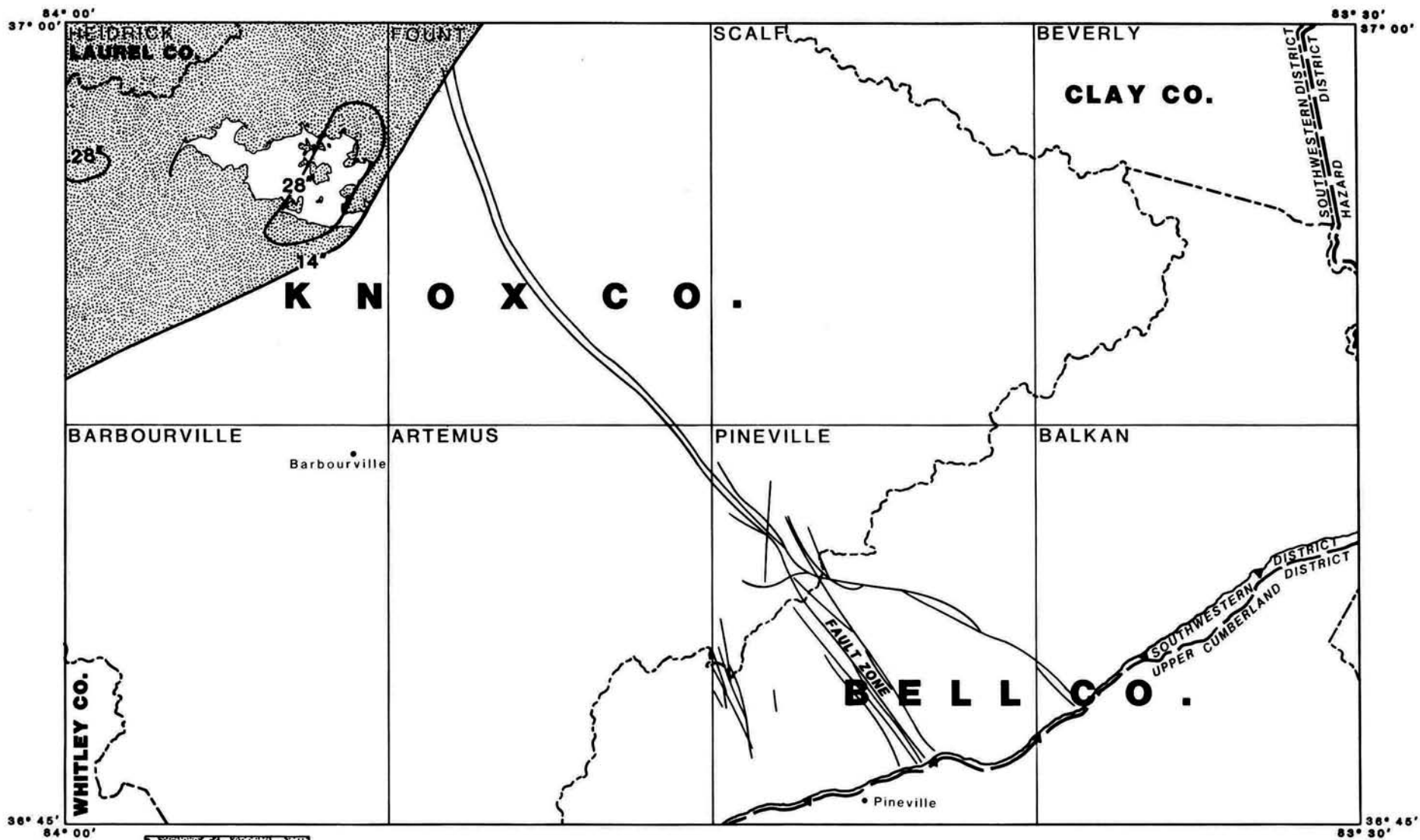
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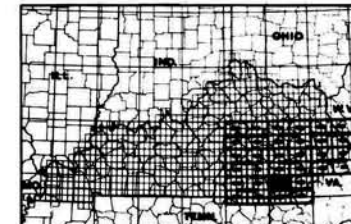
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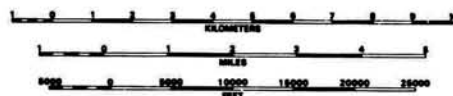
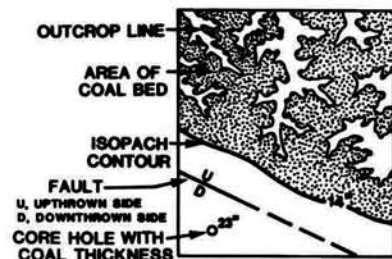
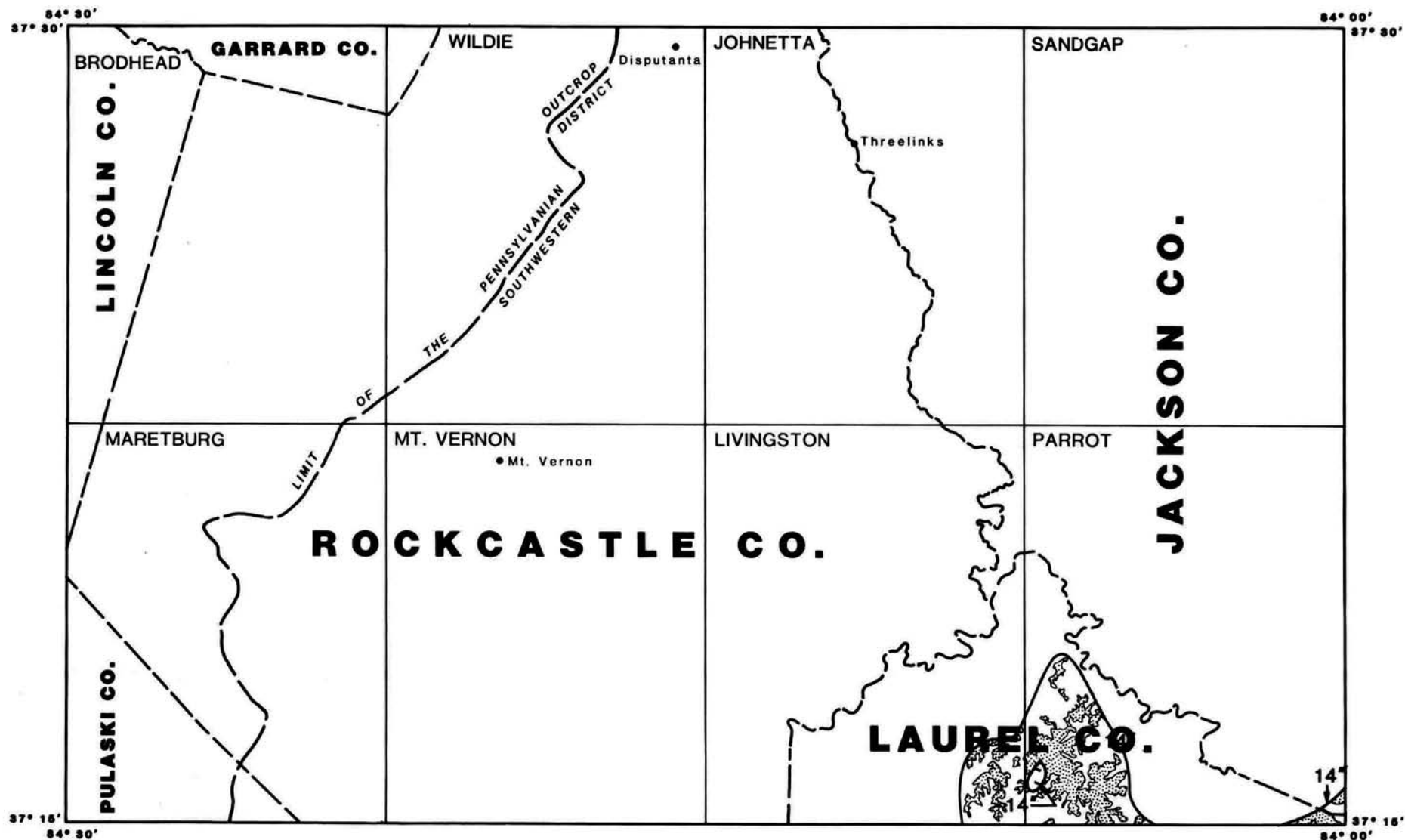
SW/4 IRVINE 1:100,000



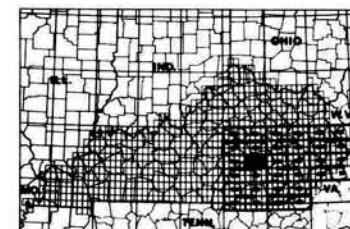
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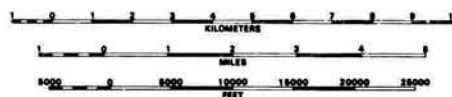
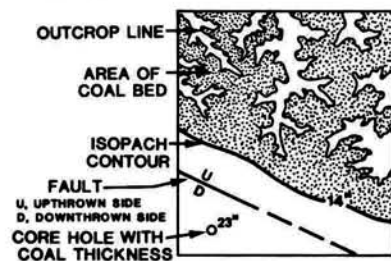
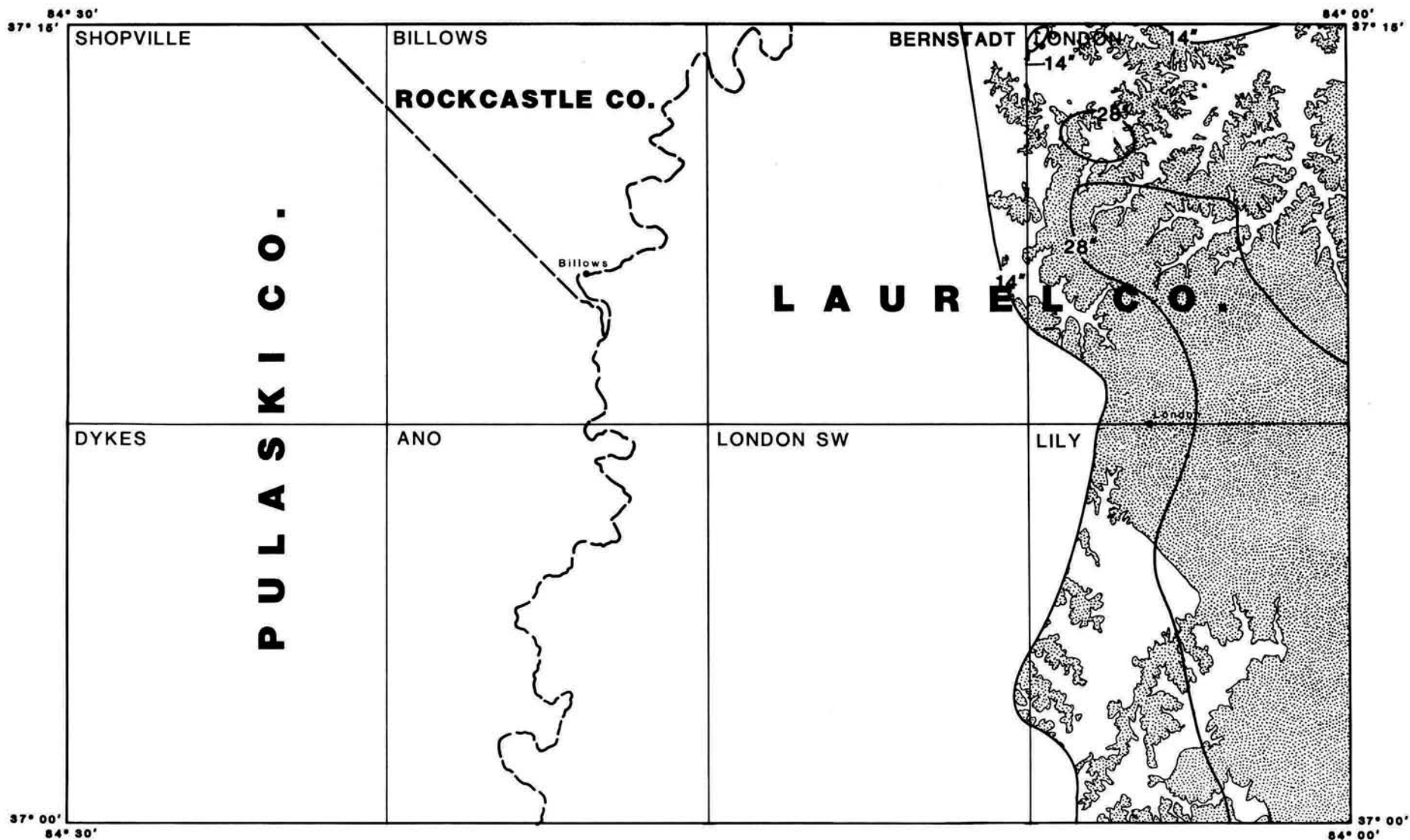
NW/4 MIDDLESBORO 1:100,000



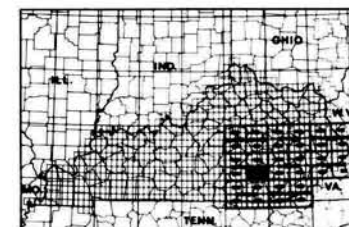
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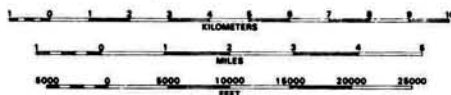
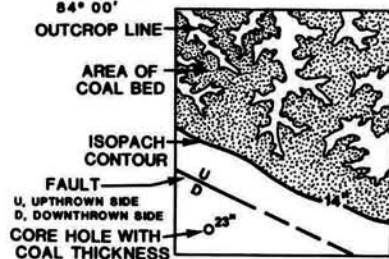
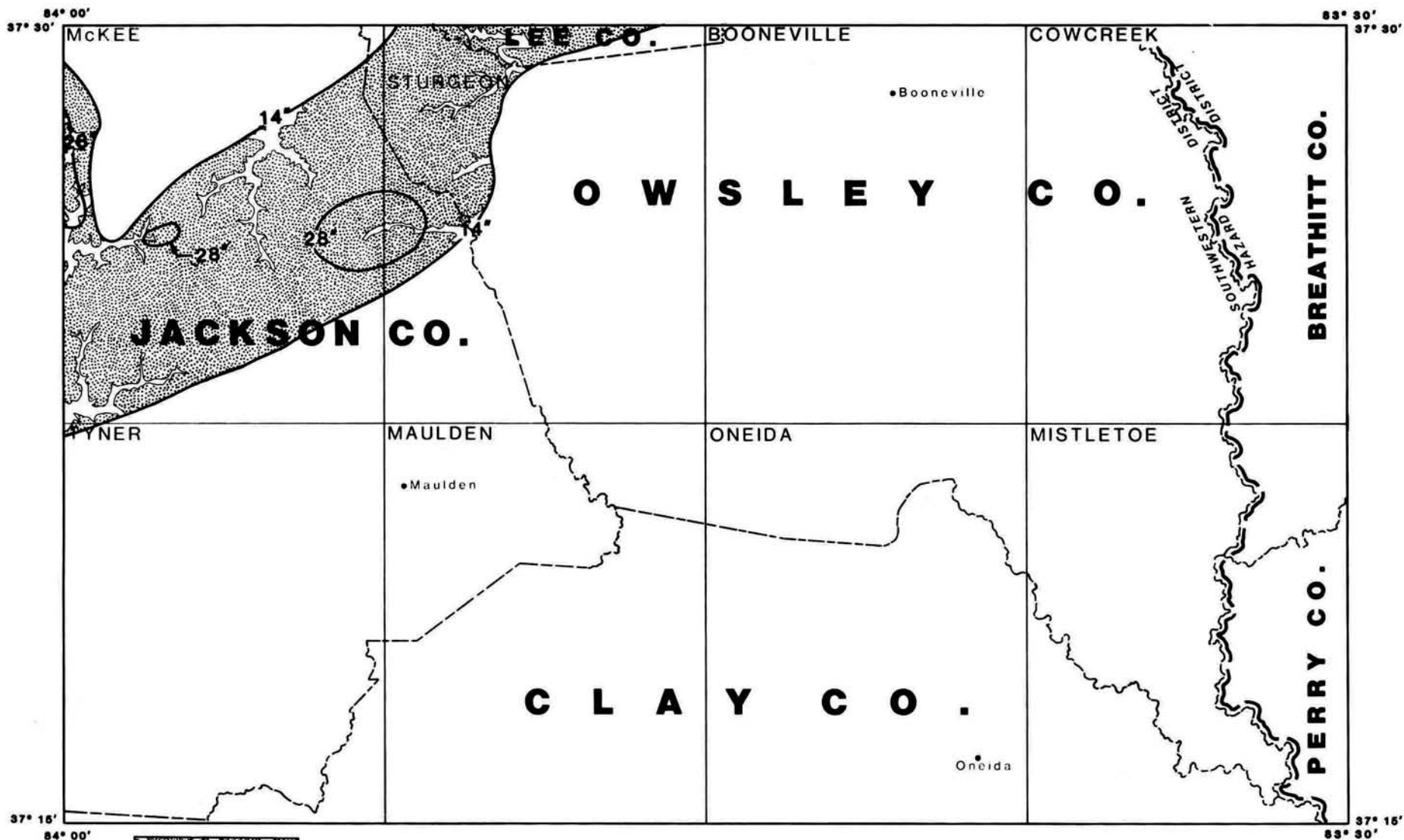
NE/4 SOMERSET 1:100,000



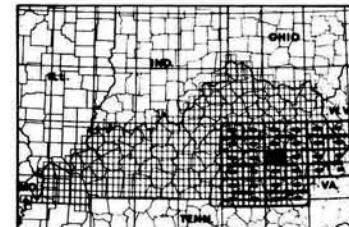
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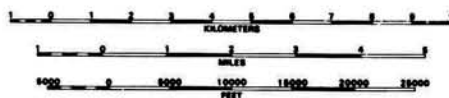
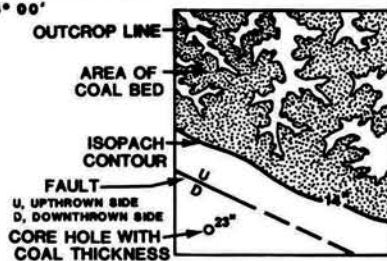
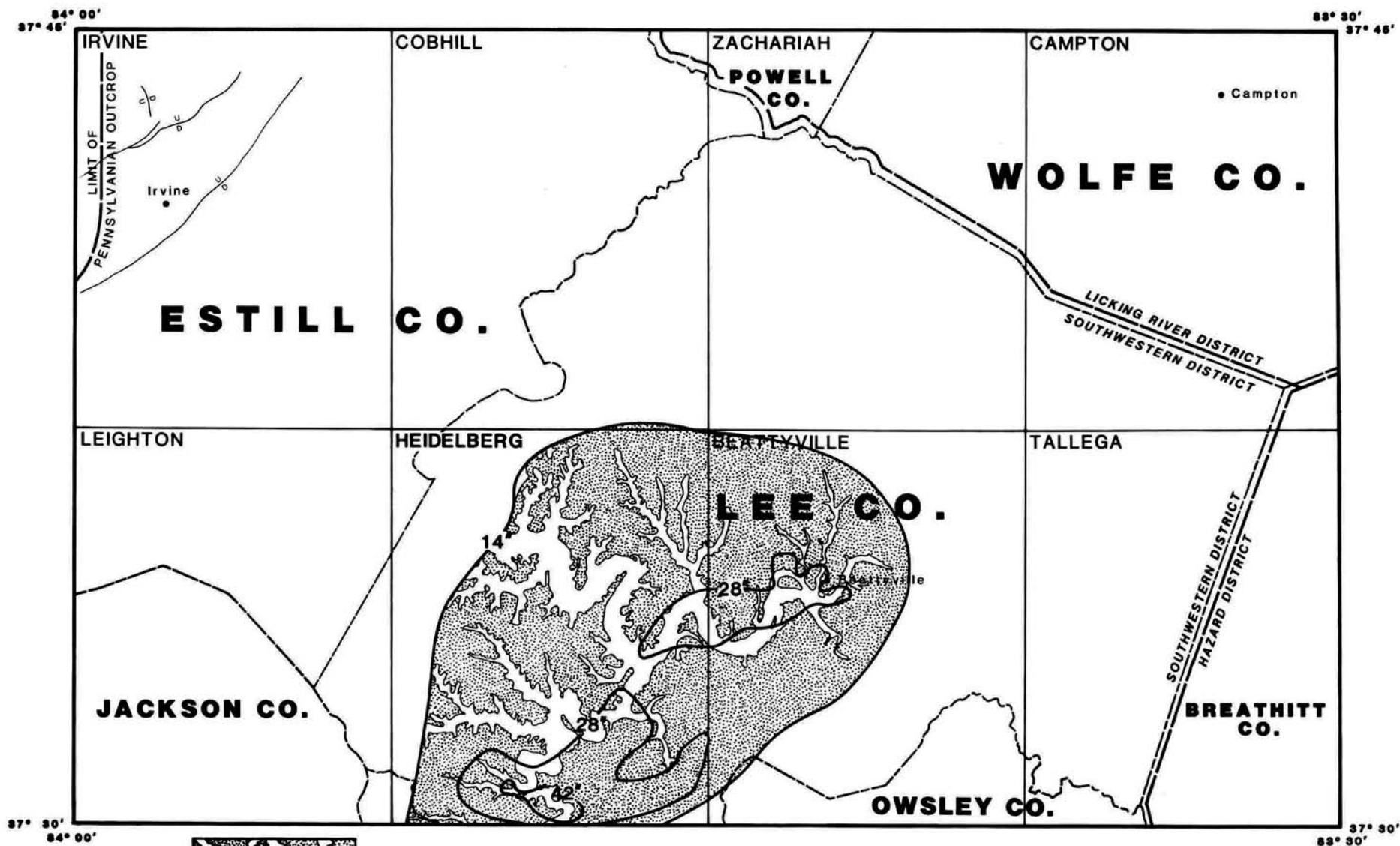
SE/4 SOMERSET 1:100,000



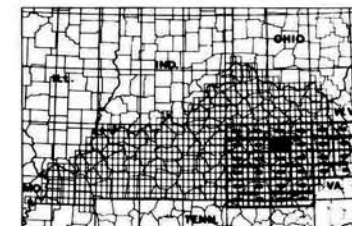
HALSEY ROUGH COAL BED



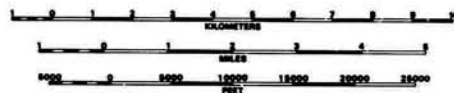
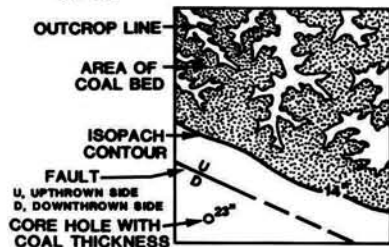
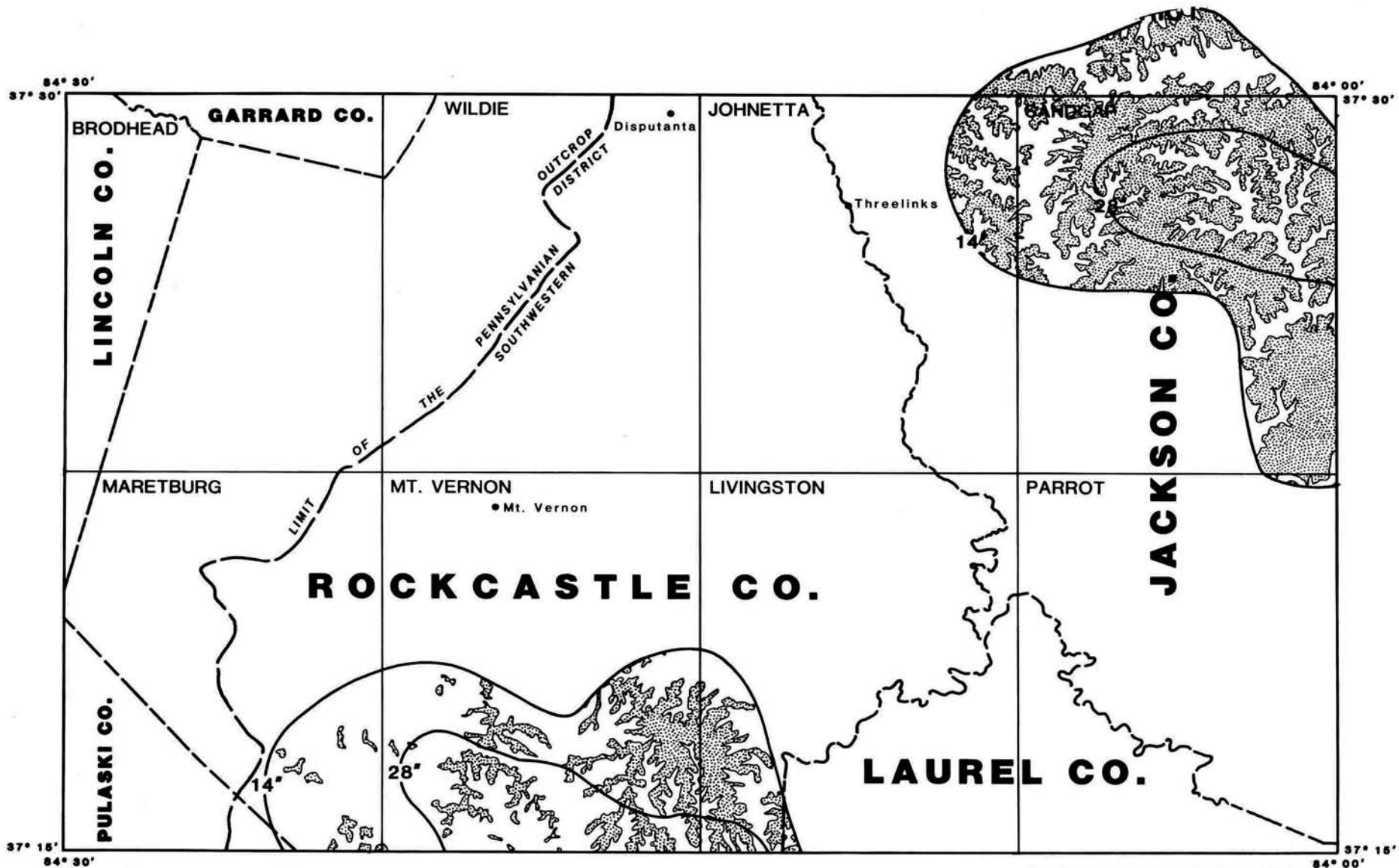
NW/4 HAZARD 1:100,000



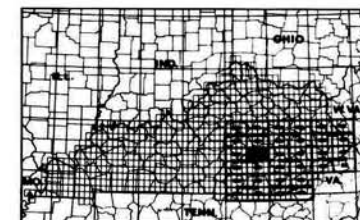
HALSEY ROUGH COAL BED



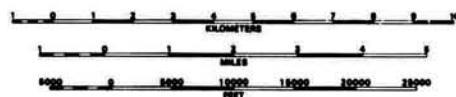
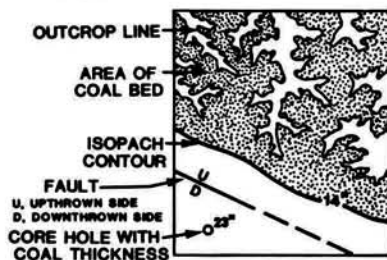
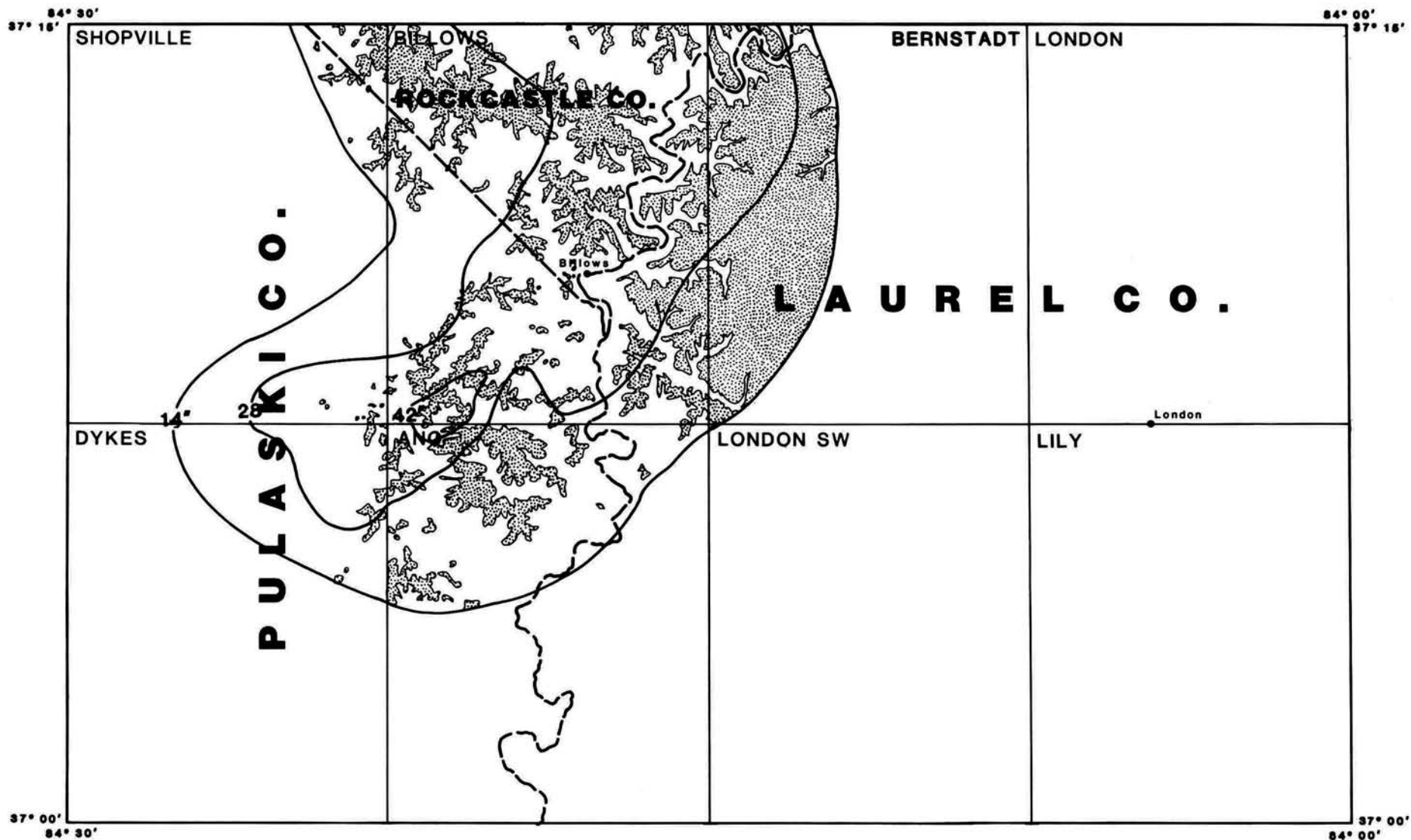
SW/4 IRVINE 1:100,000



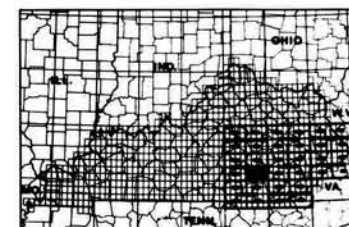
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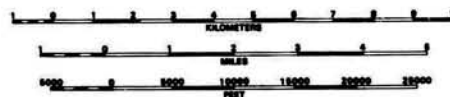
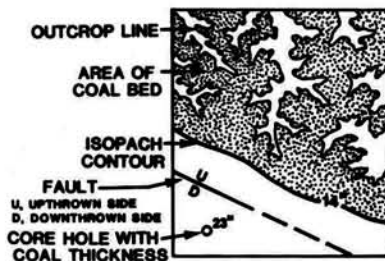
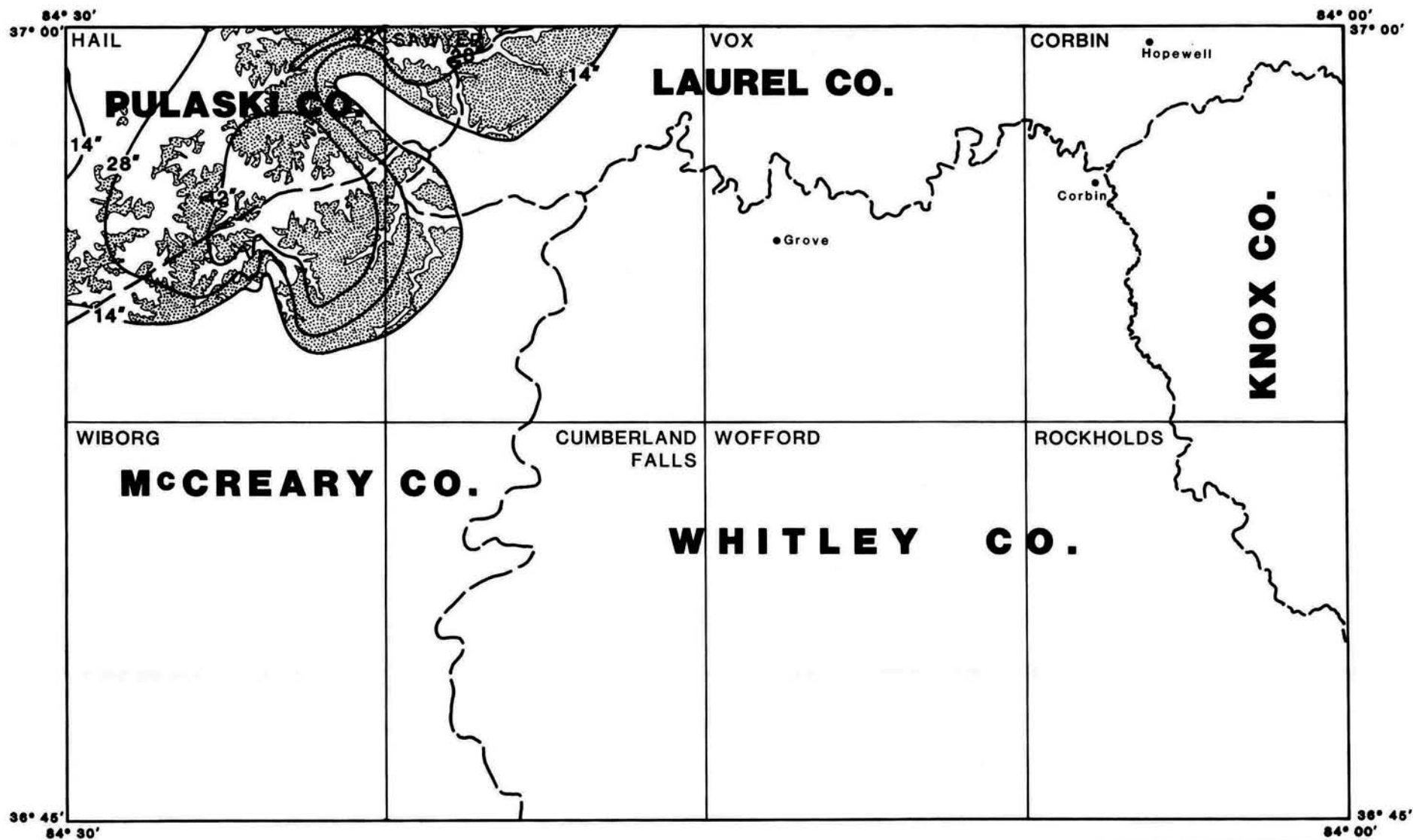
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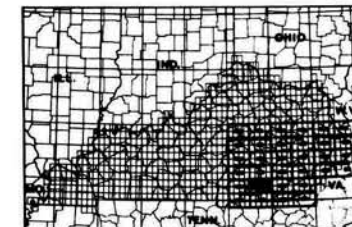
HALSEY ROUGH COAL BED



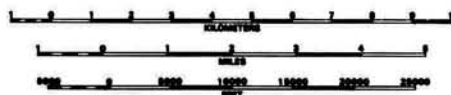
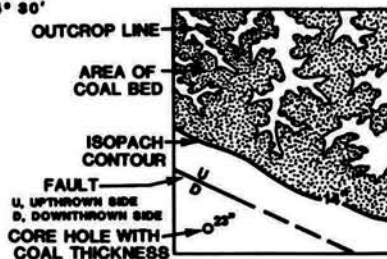
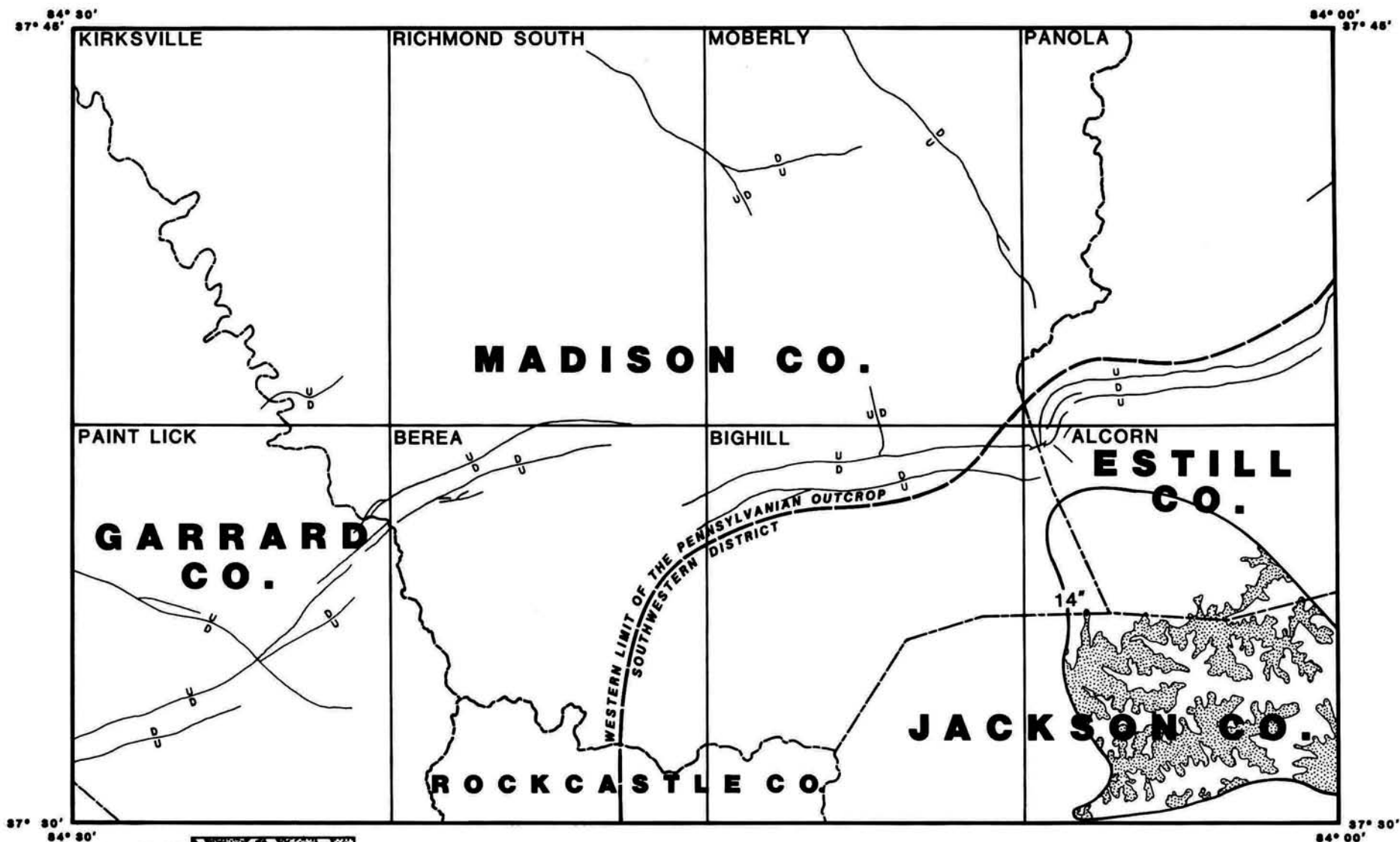
SE/4 SOMERSET 1:100,000



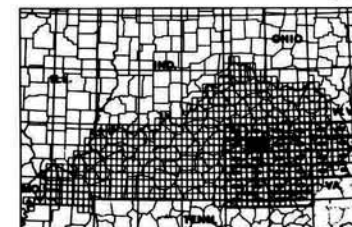
BEAVER CREEK COAL BED



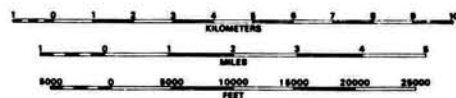
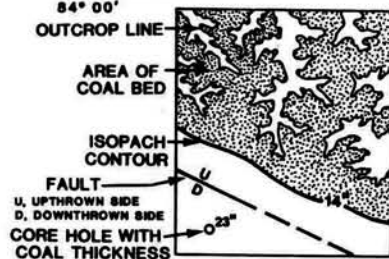
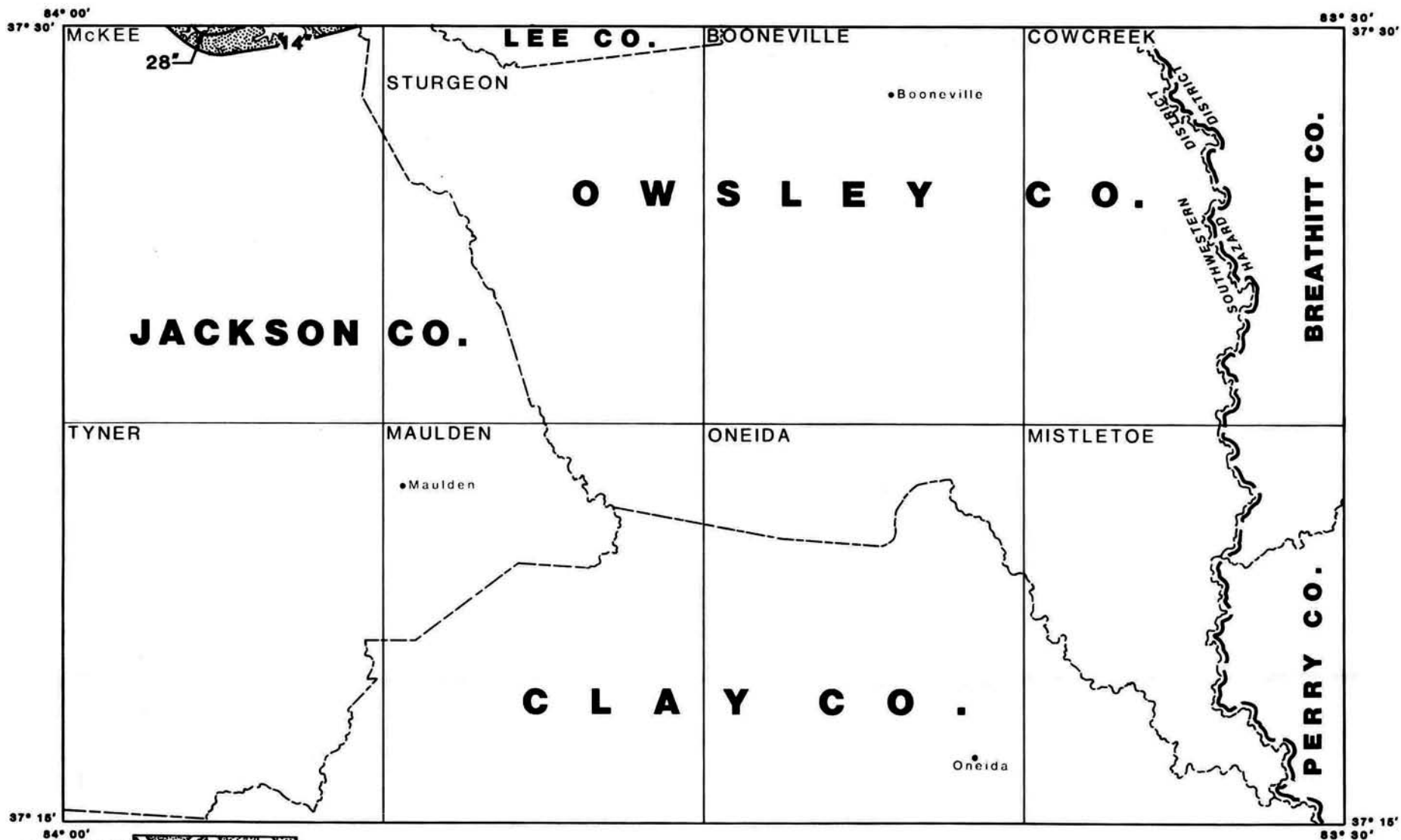
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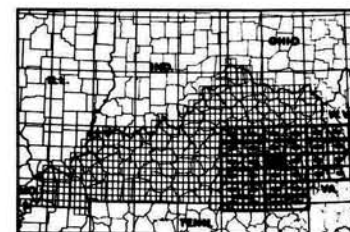
BEAVER CREEK COAL BED



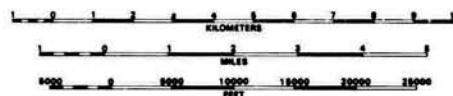
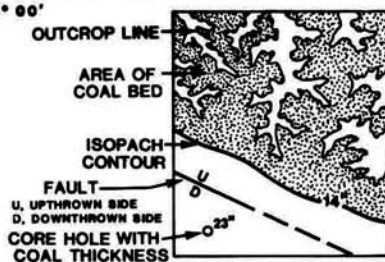
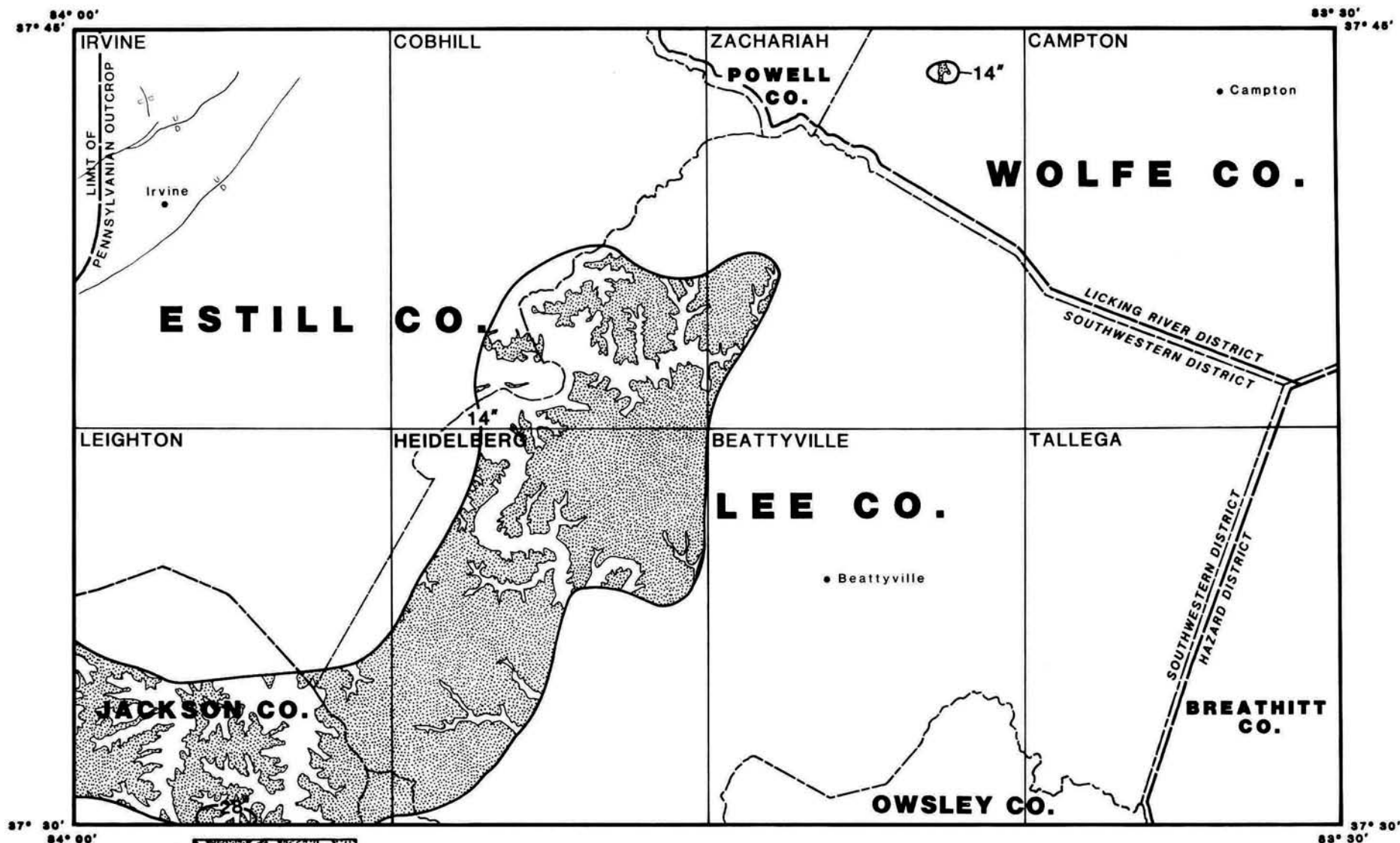
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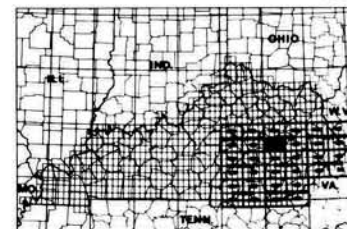
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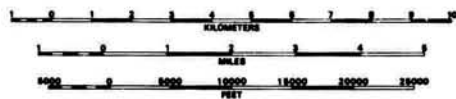
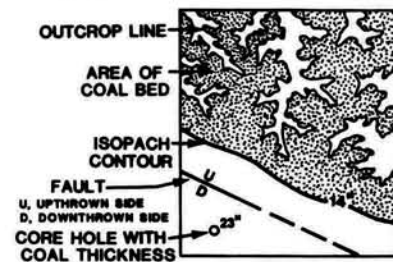
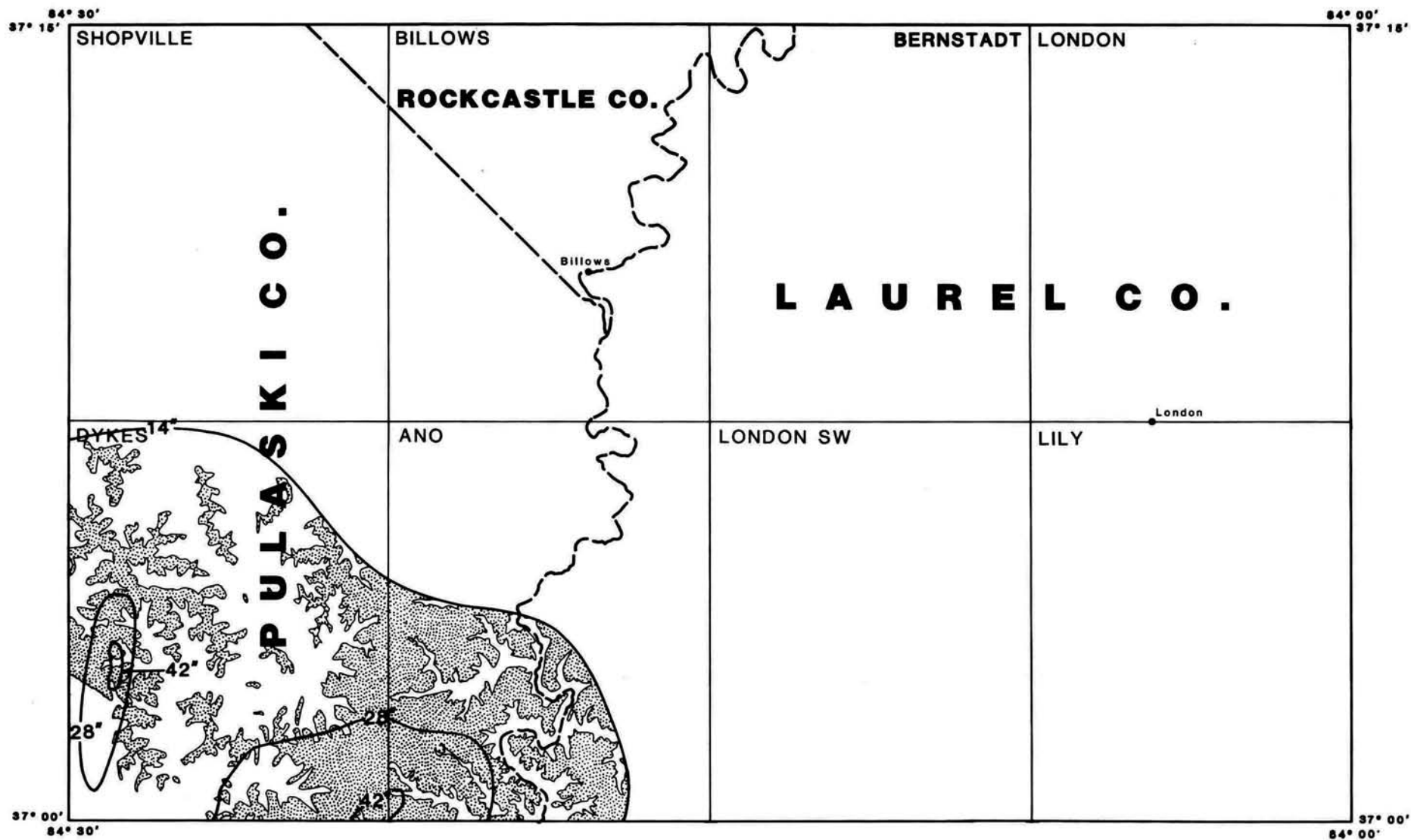
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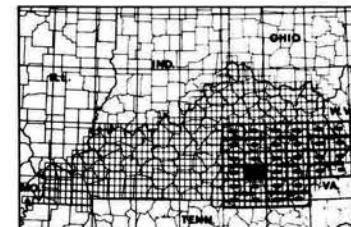
BEAVER CREEK COAL BED



SW/4 IRVINE 1:100,000



BEAVER CREEK COAL BED



SE/4 SOMERSET 1:100,000

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