DEEP-MINABLE COAL RESOURCES OF ILLINOIS

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ABSTRACT

Deep-minable coal resources lie more than 150 feet below the surface and are generally mined by underground methods. Of the 181 billion tons of identified coal resources in Illinois, 161 billion tons (89%) are classified as deep-minable. About 44 billion tons (27%) of these have thickness and depth similar to coals currently being mined in Illinois, and thus are considered to have a high potential for development. Of the remaining deep-minable resources, approximately 55 billion tons (34%) are slightly thinner and/or deeper than currently mined coals and have a moderate development potential; 45 billion tons (28%) are significantly thinner and deeper, with a low development potential; and 18 billion tons (11%) have a restricted-potential classification because they underlie cities, public lands, interstate highways, and other surface features that might be damaged by subsidence, or they lie within areas densely drilled for oil.

In Illinois, deep-minable coal resources are distributed over 67 counties. Resources with a high potential for development are concentrated in the west-central, southwestern, and southern parts of the coal field, and resources with a moderate or low potential are concentrated in the central, eastern, and north-central parts of the coal field. Deep-minable resources comprise 13 different seams; however, of the resources with a high potential, 32 billion tons (73%) are from the Herrin (No. 6) Coal Member and 9 billion tons (21%) are from the Springfield (No. 5) Coal Member. These two seams will continue to be the major sources for underground coal production in the state.

About 10 billion tons (6%) of the deep-minable resources have a low to medium sulfur content (<2.5% S), and 3.7 billion tons (37%) of this low-sulfur coal have a high potential for development. In this study, resources are also evaluated in terms of chlorine content, rank, certainty of presence, and other factors that contribute to minability.

Additional deep-minable coal deposits are expected to be discovered, although with decreasing frequency and magnitude, since the deposits remaining to be explored are generally deeper, thinner, and/or of lesser quality than currently identified deposits.

ACKNOWLEDGMENTS

Computers were used extensively to calculate tonnages, produce the tabulations, and compile other information for this report: Mariann Clark, Frank Adrian, and Philip Robare wrote the computer programs.

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INTRODUCTION

Estimates of the character and magnitude of coal resources are important for (1) coal companies and landowners who want to compare the deposits they own or are planning to lease with the entire body of coal resources; (2) government agencies and companies who regulate or provide services to the mining industry (such as transportation, housing, and schools), and who must predict location of mines most likely to be developed; and (3) utilities and other major users of coal who need to determine what quantity and quality of coal is minable at current prices.

This report provides information on the character, quantity, and quality of the deep-minable coal resources of Illinois and evaluates their potential for development. In this study, deep-minable coal resources are defined as coals more than 150 feet deep that will probably be mined by underground methods. Surface-minable coal resources (<150 ft deep) have been evaluated in an earlier report (Treworgy et al., 1978).

As in earlier reports on coal resources in Illinois, the tonnage estimates are based on the assumption that there are 1800 tons of coal per acre foot. This conforms to the figure used by the U.S. Geological Survey in estimating resources of high-volatile bituminous coal. The main units of measurement are short tons, miles, feet, inches, and British thermal units (Btu), which may be converted to the metric system by the following factors:

U.S. Units		Metric System
short tons x 0.907	=	metric tonnes
miles x 1.609	=	kilometers
acres x 0.4047	=	hectares
feet x 0.3048	=	meters
inches x 2.54	=	centimeters
Btu x 0.252	=	kilogram calories

Previous Investigations

One of the earliest estimates of the coal resources of Illinois was made in 1908 by DeWolf, who calculated that there were about 136 billion tons of coal (both surface and deep minable) in deposits greater than 24 inches thick. The most comprehensive study of Illinois coal resources was made by Cady and members of the Illinois State Geological Survey (ISGS) Coal Section in 1952. Cady and his colleagues compiled maps and tabulations for all known coal seams more than 28 inches thick. Although their total estimate of resources (137 billion tons) was only slightly higher than DeWolf's, Cady's report provided more detailed information on the location and characteristics of the deposits. Since 1952 a considerable amount of new mapping of coal deposits has been done in Illinois. Surface-minable deposits were mapped in a series of reports published between 1958 and 1981 (Smith, 1957; Smith, 1958; Smith, 1961; Smith and Berggren, 1963; Reinertsen, 1964; Smith, 1968; Searight and Smith, 1969; Nance and Treworgy, 1981; Jacobson and Bengal, 1981). Deep-minable coals were mapped by Clegg (1959, 1961, 1965, 1972); Hopkins (1968); Allgaier and Hopkins (1975); Smith, Bengal, and Jacobson *in* Smith and Stall (1975); and Treworgy (1981). The present study utilized new mapping of coals in east-central Illinois by Colin G. Treworgy, and in La Salle and Livingston Counties by Russell J. Jacobson.

Explanation of Terms

Resources. This term refers to all coal in the ground that exceeds a specified minimum thickness (USGS, 1976); the category includes coal that cannot be economically or legally mined at the present time. Thus, resource estimates can be misleading because they do not directly indicate how suitable the coal is for mining, how costly it will be to mine, what the legal restrictions may be, or where future mining will be most likely. Resources increase when more coal is discovered, and of course, decrease as coal is mined out.

Mining method. An evaluation of a coal deposit must consider the most probable method for removing the coal. In Illinois, coals less than 150 feet deep are usually mined by surface methods (surface minable), and coals more than 150 feet deep are mined by underground methods (deep minable). This classification provides a useful framework for evaluating deposits on a statewide basis; however, underground mines in Illinois have operated at depths of less than 50 feet, and both the equipment and mining methods exist to surface-mine coals at depths greater than 150 feet.

Recovery of coal. All the tonnage estimates in this report represent coal in the ground, unless otherwise stated. The amount of coal that can be removed during mining varies from about 50 percent with room-and-pillar mining to as much as 85 percent with pillar recovery or longwall mining methods (Reese et al., 1978). An additional 5 percent of the coal may be lost if the coal is washed after mining (Bectel National, 1979).

Development potential. The potential for development of a coal deposit can be rated by comparing the characteristics of the deposit to the characteristics of deposits currently being mined. Deposits similar to those currently being mined have a high potential for development; deposits with significantly inferior characteristics have a low potential. The relative value of all deposits changes, however, as new coal is discovered, as the choice coals are mined out, and as mining technology improves. Market conditions, including competition from other fuels as well as coal from other regions, and laws that directly or indirectly apply to mining must also be considered in evaluating deep-minable coal resources.

Thickness and depth are two of the most important factors to be considered in evaluating deep-minable coal resources. In this study, information on thickness and depth of coals currently being mined or leased has been combined with information obtained through interviews with seven coal companies and consultants in order to define four categories of development potential (fig. 1).

Coal deposits with a high potential for development are equivalent in thickness and depth to deposits now being mined. These consist of deposits that are more than 4½ feet thick and less than 400 feet deep, or more than 5½ feet thick and less than 1000 feet deep.

Coal deposits with a moderate potential for development consist of actively leased seams that are slightly thinner and/or deeper than currently mined deposits. This coal which has been excluded from the high potential category, is more than 3½ feet thick and less than 1000 feet deep, more than 4½ feet thick and less than 1200 feet deep, or more than 5½ feet deep with no limit on depth. (No coal resources have yet been mapped in Illinois at depths greater than 1500 feet, although the coal measures extend to a depth of about 2500 feet.)

Coal deposits with a low potential for development are significantly thinner (28 in. minimum thickness) and deeper than currently mined or leased deposits. Traditionally, this coal has been classified as minable and included in both state and national resource estimates because technically it is minable.

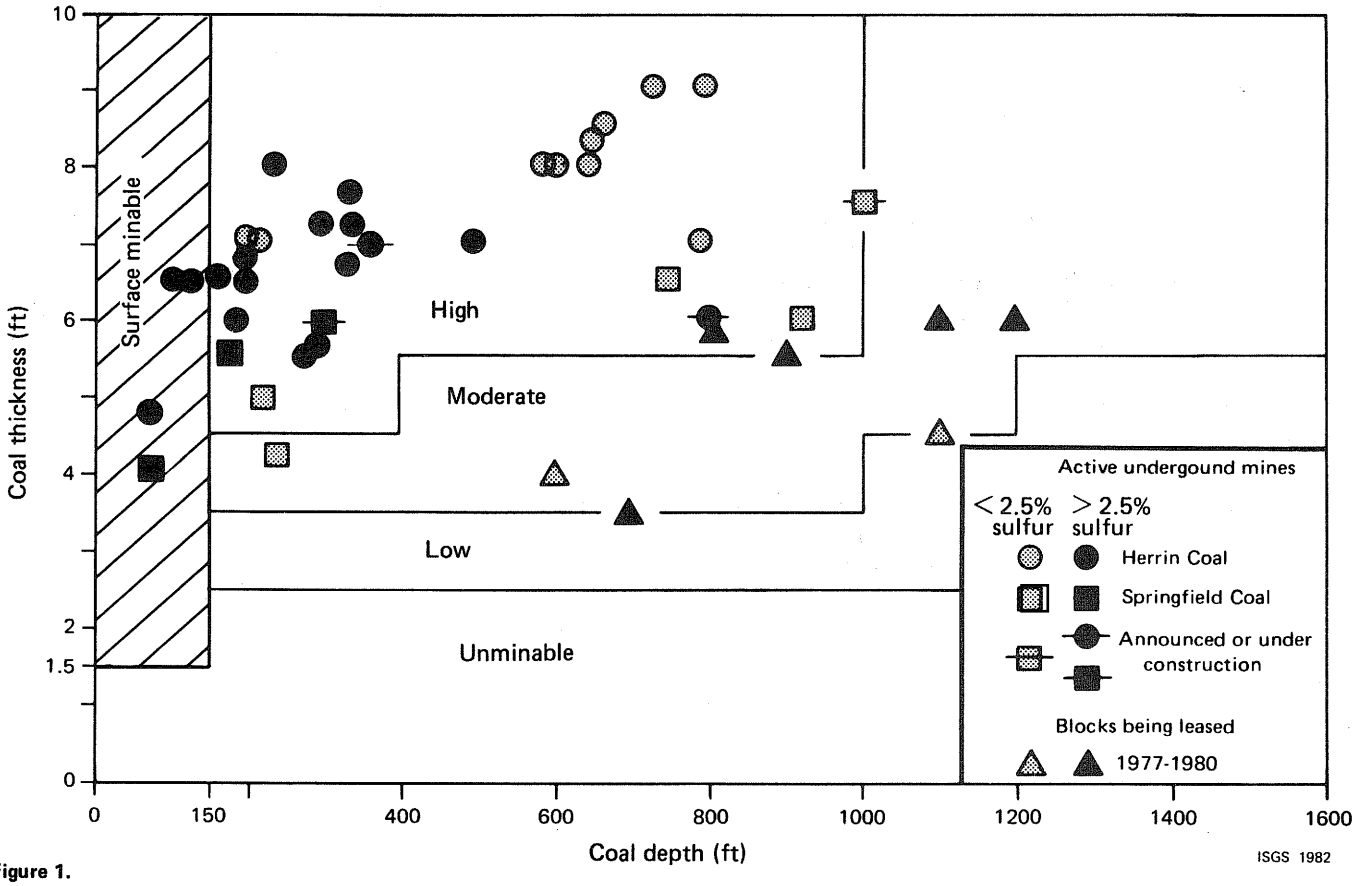

Figure 1.

Classification of development potential of deep-minable coal in Illinois based on the thickness and depth of coal currently being mined or leased. Solid symbols indicate that coal has a sulfur content of >2.5%. Stippled symbols indicate a sulfur content of <2.5 %.

Coal deposits with a restricted potential for development underlie cities, dams, public lands, interstate highways, or other surface features that might be damaged by subsidence. This classification is also applied to deposits located within areas densely drilled for oil and gas (1 well per 20 acres).

Coal deposits less than 28 inches thick and greater than 150 feet deep are considered unminable and have not been included in the resource estimates.

These categories are subject to change. As shallow, thick deposits are mined out, mining and leasing activites will move to thinner and deeper seams (fig. 1). Minability or development potential of a deposit is also influenced by its quality and size; however, the influence of these two factors is difficult to quantify and must be considered separately.

The concept of development potential as defined in this report has not been widely applied to coal resources. Although many reports explain that much coal may not be economical to mine, the criteria widely used to define economic minability are too general. For example, the U.S. Geological Survey and U.S. Bureau of Mines define bituminous coal as economically minable if it occurs in beds that are 28 inches thick or more and up to 1000 feet deep. Although coals as thin as 28 inches are mined in the United States, it is generally agreed that at this time no coal of that thickness would be economical to mine by underground methods in the Illinois Basin or in many other parts of the country. Consequently, the resource figures reported by many studies can be misleading.

The criteria used in this report are based on current mining practice in Illinois. To illustrate the need to evaluate development potential on this basis, an appraisal of the resources of two counties is presented.

Crawford County contains 7 billion tons of coal in seams that are 28 inches thick or more (fig. 2). According to criteria used by the U.S. Geological Survey and U.S. Bureau of Mines (USGS, 1976), all this coal is economically minable; Crawford County should be an important coal producer. In fact, no significant mining has ever occurred in this county.

In figure 3, the coal resources of Crawford County are divided into two categories: restricted and minable. The *restricted* coal consists of 2.5 billion tons within areas densely drilled for oil and 0.2 billion tons under towns and other surface features that interfere with mining because

of the risk of subsidence. The oil fields are large areas in which wells have been drilled at a spacing of one well for every 10 to 20 acres (about 660 to 930 ft between wells). Because federal laws require that a barrier of unmined coal be left around each oil well (unless special steps have been taken to plug the well), it is difficult and uneconomical to develop a mine in an area where wells are closely spaced.

Estimates of resources in the *minable* category (fig. 3) typically include coals that vary greatly in thickness, depth, and quality as well as in size of mining block. Much of this coal is technically but not economically minable; the costs of mining it will not be competitive with the costs of mining other deposits. When the Crawford County resources now classified as minable are evaluated in terms of development potential, only 0.6 billion tons (9%) of the estimated total 7 billion tons have a high potential and only 1.5 billion tons (21%) have a moderate potential (fig. 4). The remaining minable coal is either too thin or too deep to be of immediate interest. Clearly, resource estimates can be misleading.

Little is known about the quality of coals in Crawford County, as there has been no mining and only limited exploration. It is probable that the sulfur content ranges from 3 to 5 percent, which is comparable to the sulfur content of most Illinois coals. This factor alone does not make Crawford County coal less marketable than other coal produced in the state. Chlorine content of the coal is probably 0.3 percent or greater (Gluskoter and Rees, 1964). At present, no coal is considered unusable because of chlorine content; however, high-chlorine coals are less desirable because they contribute to corrosion and fouling in boilers and cause problems in industrial processes such as stack-gas desulfurization and cement making. In Crawford County, 55 percent of the coal with a high development potential may also have a chlorine content of 0.4 percent or more. Most coal currently mined in Illinois contains less than 0.4 percent chlorine.

Other parameters that must be considered include the percentage of coal recovered during mining and the size of the blocks of minable coal. If coal is mined by room-and-

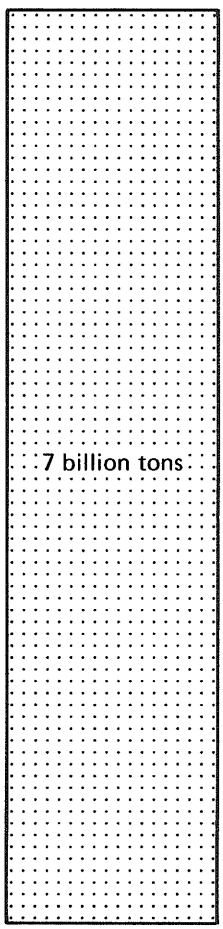

Figure 2.
Total tonnage of deep-minable coal in Crawford County.

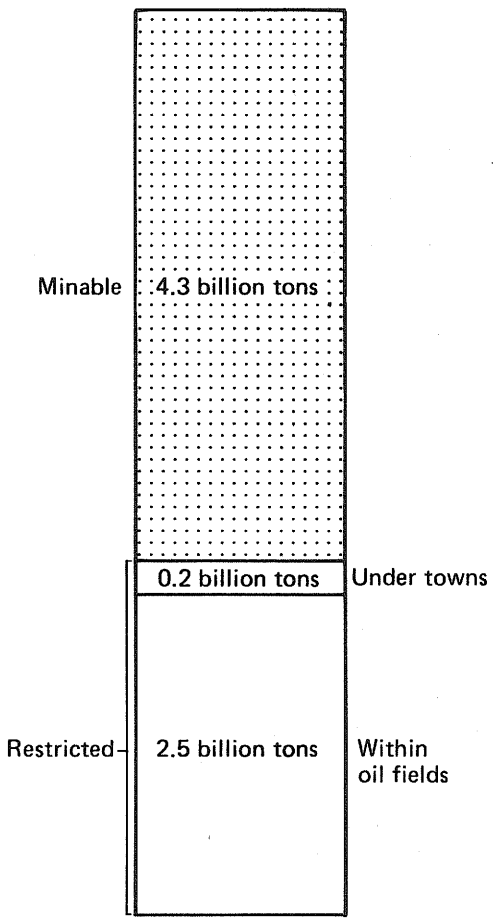

Figure 3.
Tonnage of minable and restricted coal in Crawford County.

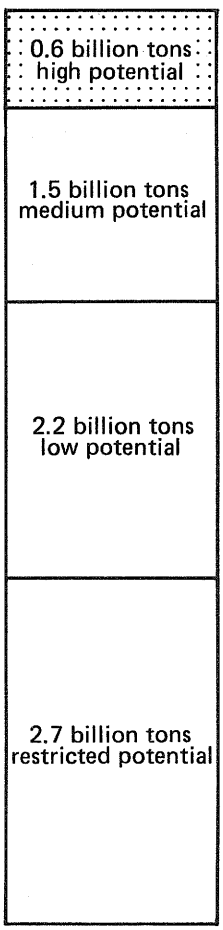

Figure 4.
Development potential of deep-minable coal in Crawford County.

ISGS 1982

pillar methods (the most widely used in Illinois), about 50 percent of the coal will be left in the ground as pillars and barriers; of the 50 percent recovered, 5 percent may be lost in cleaning. Thus, the estimates of resources with a high potential for development are reduced to less than 300 million tons of recoverable coal. Furthermore, this coal is found in three separate seams, and not many of the contiguous blocks of high-potential coal are large enough to support underground mining. Although there are an estimated 7 billion tons of coal in Crawford County, there may be only a few sites suitable for mining—where seam characteristics (thickness, depth, and quality) are optimal and access to the resource is unrestricted.

Madison County provides an interesting contrast. Although no mines are currently active, Madison County has been an important coal producer. Of its 1.7 billion tons of deep coal (fig. 5), only 0.1 billion tons are *unminable* because of surface features and oil fields. As much as 1.2 billion tons (70%) have a high potential for development. Most of this coal has a chlorine content of less than 0.3 percent, and a sulfur content ranging from low or medium to high. In addition, this coal occurs in large blocks that form many good mine sites. Madison County, with just one-fourth the coal resources of Crawford County, has twice the potential coal.

As this evaluation of Crawford and Madison County shows, traditional estimates of the tonnage of coal resources in the ground are not reliable indicators of where, when, and how much mining is likely to take place. Although currently there is no mining activity in either county, Madison County contains extensive resources situated in large, contiguous blocks with favorable characteristics of thickness, depth, and quality. Crawford County has large quantities of coal, but the coal has much less favorable characteristics. Although many nongeologic factors influence the decision to develop a mine, such an industry is more likely to develop in Madison County than in Crawford County. Extensive mining in Crawford County probably will not occur until much of the coal in Madison County is mined out or committed to markets.

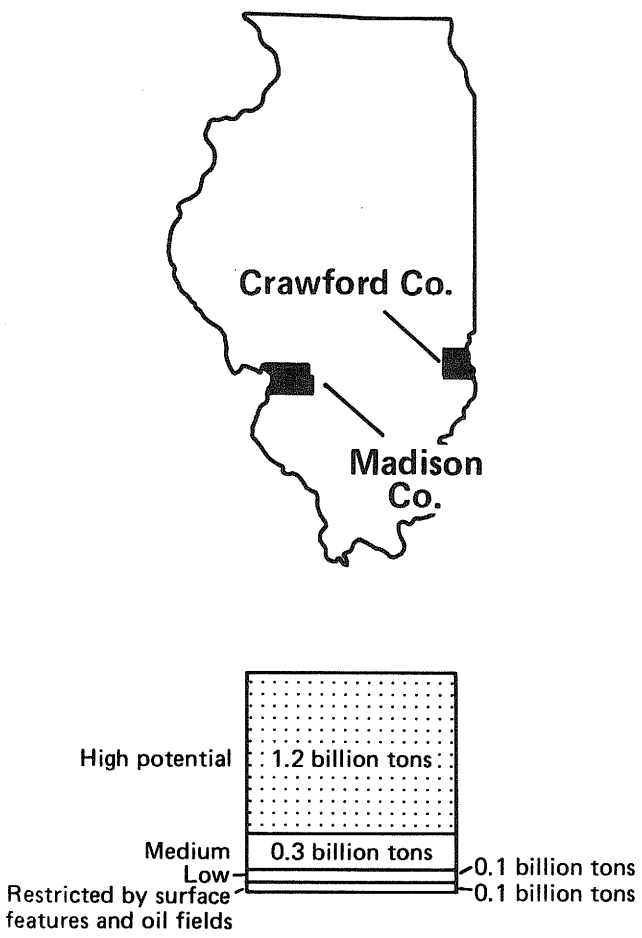

Figure 5.
Development potential of deep-minable coal in Madison County.

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DEEP-MINABLE RESOURCES— THEIR POTENTIAL FOR DEVELOPMENT

In Illinois, about 161 billion tons of deep-minable coal combine with 20 billion tons of surface-minable coal to bring the total coal resources of the state to 181 billion tons. Approximately 44 billion tons (27%) of the deep-minable resources are similar in thickness and depth to coals currently being mined in Illinois, and therefore are considered to have a high potential for development. Approximately 55 billion tons (34%) are slightly thinner and/or deeper than coals currently mined; these deposits are classified as having a moderate potential for development. Forty-five billion tons (28%) are significantly thinner and/or deeper and have a low potential for development. The restricted potential classification is applied to 18 billion tons (11%) of the deep-minable coal resources that either lie within areas densely drilled for oil or under cities, public lands, interstate highways, and other surface features likely to be damaged by subsidence.

Location of Resources

Deep-minable coal resources underlie 67 Illinois counties (fig. 6, table 1); the amount ranges from 10 million tons in Henry County to 7 billion tons in Crawford County. Many of the counties along the margins of the state also contain substantial amounts of surface-minable resources (Treworgy et al., 1978).

Distribution of deep-minable coal is fairly even over a large area. However, the distribution according to development potential is quite uneven (figs. 7-9), which helps explain the location of current mining and leasing activity as well as indicates the general future trend of mining activity. Resources with a high development potential are

TABLE 1. Deep-minable coal resources by county and seam (millions of tons)

County	Danville (No. 7)	James-town	Herrin (No. 6)	Spring-field (No. 5)	Colchester (No. 2)	Seely-ville	De Koven	Davis	Rock Island (No. 1)	Miscel-laneous*	Total	Development Potential		
												High	Moderate	Low
Bond	0	0	2,365	0	2	0	0	0	2	0	2,369	1,551	677	6
Bureau	187	0	369	0	592	0	0	0	0	0	1,147	110	342	603
Champaign	108	0	197	0	0	0	0	0	0	0	305	221	57	12
Christian	55	0	3,362	1,236	0	0	0	0	41	0	4,693	3,481	740	233
Clark	1,008	518	51	1,266	0	1,078	0	0	0	0	3,921	292	2,067	1,301
Clay	0	0	2,046	1,980	0	37	0	0	0	0	4,063	17	1,074	2,236
Clinton	0	0	3,132	0	0	0	0	0	0	0	3,132	2,150	484	4
Coles	320	0	635	644	0	736	0	0	0	0	2,335	0	909	1,114
Crawford	1,217	1,303	983	1,303	0	2,207	0	0	0	0	7,012	661	1,475	2,173
Cumberland	0	0	1,719	1,160	0	1,320	0	0	0	0	4,198	123	2,153	1,714
De Witt	0	0	0	1,511	0	0	0	0	0	0	1,511	0	1,331	32
Douglas	0	0	1,009	120	0	0	0	0	0	0	1,129	543	270	285
Edgar	1,073	0	808	556	0	893	0	0	0	0	3,330	844	1,432	931
Edwards	0	0	903	1,084	0	0	0	0	0	0	1,987	309	825	596
Effingham	0	0	1,191	1,981	0	384	0	0	0	0	3,555	92	1,534	1,652
Fayette	292	0	3,400	2,261	0	0	0	0	0	0	5,953	1,992	2,111	1,357
Franklin	0	0	1,534	2,050	0	0	345	503	0	64	4,496	1,339	1,827	763
Fulton	0	0	0	75	217	0	0	0	0	0	292	0	0	292
Gallatin	0	0	745	1,155	0	0	615	830	0	0	3,347	465	1,881	671
Greene	0	0	0	0	83	0	0	0	0	0	83	0	0	83
Grundy	0	0	0	0	379	0	0	0	0	0	379	0	0	373
Hamilton	0	0	2,559	2,386	0	0	4	5	0	0	4,953	1,428	2,610	349
Henry	0	0	0	0	10	0	0	0	0	0	10	0	0	10
Jackson	0	0	0	144	0	0	0	0	0	0	144	61	80	0
Jasper	0	0	2,576	1,995	0	2,151	0	0	0	0	6,722	124	3,099	2,929
Jefferson	0	0	2,686	2,844	0	0	0	0	0	0	5,529	1,258	3,379	372
Jersey	0	0	0	0	111	0	0	0	0	0	111	0	0	111
Kankakee	0	0	0	0	42	0	0	0	0	0	42	0	0	42
Knox	0	0	0	0	106	0	0	0	56	0	162	0	0	162
La Salle	476	0	98	0	1,041	0	0	0	0	0	1,615	7	380	1,061
Lawrence	1,026	1,167	988	1,473	0	561	0	0	0	146	5,361	88	2,186	2,264
Livingston	1,290	0	0	0	1,502	0	0	0	0	0	2,792	396	463	1,829
Logan	0	0	272	2,521	0	0	0	0	0	0	2,793	1,977	568	141
McLean	583	0	0	3,959	287	0	0	0	0	0	4,829	189	1,906	2,220
Macon	0	0	366	1,574	0	0	0	0	0	0	1,941	415	841	368

TABLE 1. *continued*

County	Danville (No. 7)	James-town	Herrin (No. 6)	Spring-field (No. 5)	Colchester (No. 2)	Seely-ville	De Koven	Davis	Rock Island (No. 1)	Miscel-laneous*	Total	Development Potential		
												High	Moderate	Low
Macoupin	13	0	3,365	0	1,460	0	0	0	717	145	5,699	2,966	1,170	1,321
Madison	0	0	1,666	0	62	0	0	0	9	6	1,742	1,151	279	150
Marion	0	0	1,830	2,456	0	0	0	0	0	0	4,286	190	2,099	1,431
Marshall	241	0	7	0	432	0	0	0	0	0	680	0	14	637
Menard	0	0	0	871	0	0	0	0	0	0	871	829	7	0
Montgomery	48	0	3,673	0	592	0	0	0	456	403	5,171	3,466	773	725
Morgan	0	0	225	0	726	0	0	0	0	0	952	51	524	315
Moultrie	0	0	447	0	0	0	0	0	0	0	447	17	165	226
Peoria	0	0	0	217	332	0	0	0	0	0	549	0	0	549
Perry	0	0	1,240	206	0	0	0	0	0	0	1,445	1,218	140	54
Piatt	0	0	0	1,308	0	0	0	0	0	0	1,308	0	985	265
Putnam	214	0	78	0	383	0	0	0	0	0	674	5	118	514
Randolph	0	0	131	0	0	0	0	0	0	0	131	119	0	0
Richland	452	0	1,812	1,673	0	144	0	0	0	0	4,081	7	1,538	2,061
St. Clair	0	0	1,178	0	0	0	0	0	0	0	1,178	954	65	42
Saline	0	0	1,036	767	0	0	633	962	0	12	3,409	1,030	1,658	342
Sangamon	0	0	1,962	2,540	0	0	0	0	3	211	4,717	3,316	339	509
Scott	0	0	0	0	29	0	0	0	0	0	29	0	0	29
Shelby	123	0	2,661	1,919	0	206	0	0	6	0	4,914	1,584	1,962	1,216
Stark	0	0	26	0	0	0	0	0	0	0	26	0	0	26
Tazewell	0	0	207	388	147	0	0	0	0	0	742	173	370	39
Vermilion	1,470	0	1,573	0	0	21	0	0	0	0	3,064	1,998	639	319
Wabash	0	0	898	1,147	0	0	0	0	0	0	2,045	428	583	388
Washington	0	0	3,736	0	0	0	0	0	0	0	3,736	3,503	21	4
Wayne	0	0	2,840	2,913	0	0	0	0	0	0	5,753	79	1,618	2,943
White	0	0	2,119	2,311	0	0	12	12	0	0	4,454	296	2,498	873
Williamson	0	0	342	705	0	0	652	328	0	4	2,032	339	646	856
Woodford	39	0	0	139	503	0	0	0	0	0	680	0	0	649
Total	10,233	2,987	67,042	54,838	9,038	9,737	2,261	2,639	1,289	994	161,058	43,849	54,913	44,769

*Summum (No. 4), Survant, Wiley, Mt. Rorah

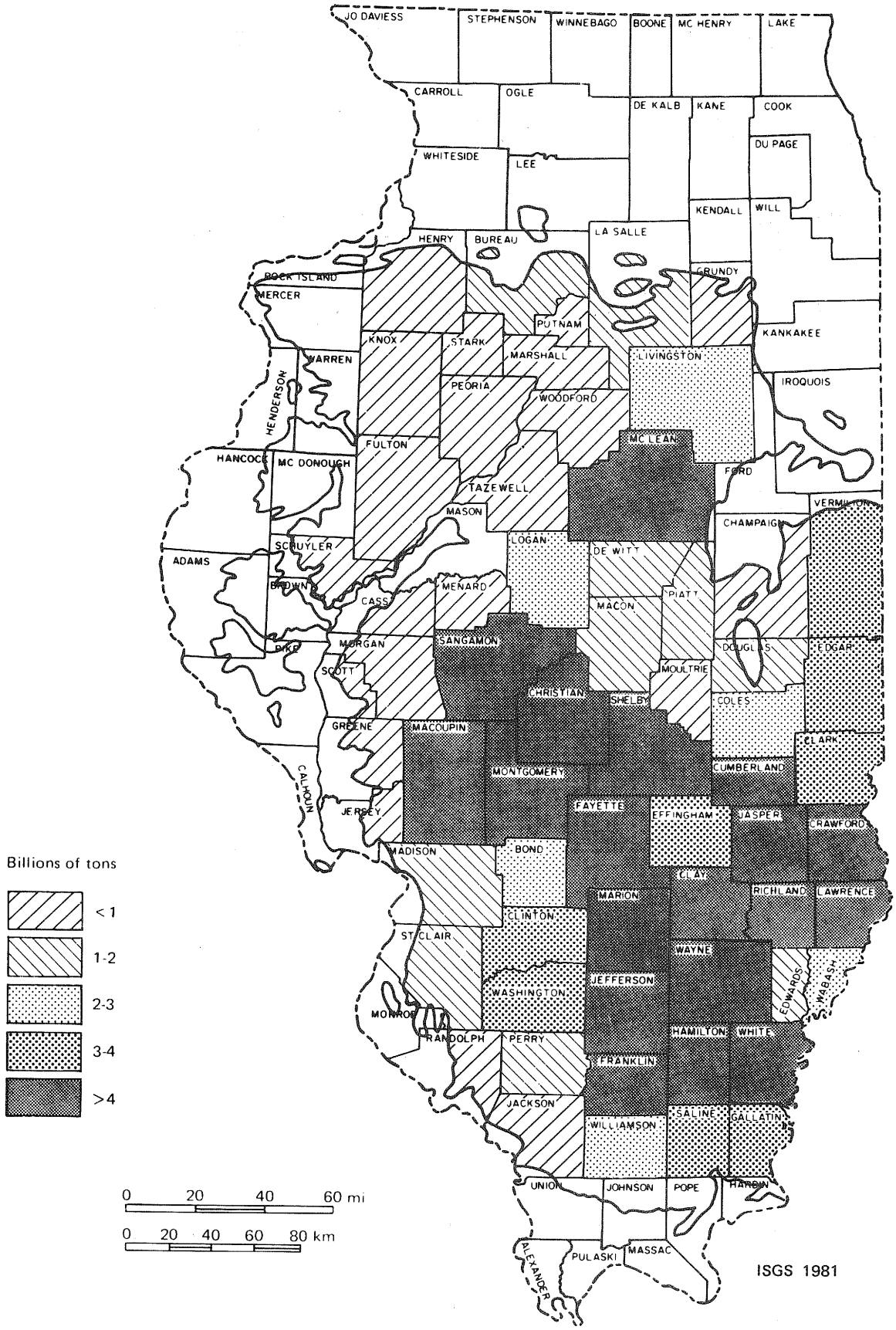


Figure 6.
Deep-minable coal resources by county.

concentrated in the west-central, southwestern, and southern parts of the coal field (fig. 7). These have been and probably will continue to be the major areas of underground mining in the state, providing more than 80 percent of the current production from underground mines. It is also probable that the high-potential resources in these areas are controlled by coal companies, and that exploration and leasing activities will be conducted largely by companies trying to consolidate their holdings.

Resources that have a moderate potential for development are concentrated in the southeastern and east-central parts of the coal field (fig. 8). Although relatively little underground mining has been done in these areas, there has been a considerable amount of leasing activity over the last 5 years. When deposits with a high development potential are mined out or committed to markets, mining activity will shift to deposits that now have a moderate potential for development. However, it will probably be many years before there is a significant amount of mining of the moderate-potential resources. Assuming a 50 percent rate of recovery, the ratio of recoverable resources with a high development potential to current annual production is more than 350:1 (350 times more coal than currently is mined during one year).

Deep-minable resources with a low potential for development are concentrated in the central, east-central, and northern parts of the coal field (fig. 9). Because the ratio of recoverable resources with a high or moderate development potential to current annual production is more than 800:1, it is unlikely that low-potential resources will be mined in the foreseeable future.

Thickness of Coal

Seam thickness affects mine productivity, and consequently, the costs of mining a particular deposit. Although the amount of time required to advance a mining machine decreases proportionately with a decrease in seam height, the amount of work required to control the roof rock remains constant. Consequently, the cost of roof control per ton of coal mined is higher for thinner seams, and productivity is generally lower in seams less than about 4 feet thick. Although coals as thin as 28 inches have been mined underground in Illinois, the thinnest seam currently being mined is about 48 inches thick. Seams as thin as 28 inches are mined elsewhere in the United States, particularly in eastern Kentucky and West Virginia; however, these coals generally have a higher Btu and lower sulfur content, thus they command significantly higher prices than typical Illinois coals.

Figure 10 shows the distribution of resources according to thickness of the seam as well as development potential. As would be expected, the thinner coals have only a low or moderate potential. The coals 60 inches and greater in thickness that have only a moderate potential for development are those at an unfavorable depth. With the exception of the 28- to 42-inch category, about 10 percent of the tonnage in each category has a restricted development potential. The 28- to 42-inch category has a slightly higher percentage of restricted coal because oil fields are concentrated in the southeastern part of the state where many of the coal seams are within this range of thickness.

Depth of Coal

Depth of coal influences the cost of planning, constructing, and operating a mine and determines the amount of coal to be recovered. The costs of exploration, development drilling, shaft construction, and to a lesser extent, the cost of lifting coal to the surface and ventilating the mine increase as depth to the coal increases. The size of the pillars of coal left to support the land surface must also increase with greater depth, and larger pillars reduce the amount of recoverable coal. Room-and-pillar mining may be marginally economical at depths of 700 to 1000 feet and uneconomical at depths more than 1000 feet (Fettweis, 1979; Weir and McNulty, 1981). At greater depths, longwall mining may become the most economical method.

Figure 11 shows the distribution of resources by depth. About 62 percent of the resources with a high development potential are less than 450 feet deep. The deepest resources mapped in Illinois are 1500 feet deep (Treworgy, 1981). Although coal-bearing strata in this state are known to be as deep as 2500 feet, the coals deeper than 1500 feet are believed to be thin and discontinuous. The depth to the Herrin (No. 6) Coal is shown in figure 12.

In some parts of the coal field, particularly in the southwest, the bedrock above the Herrin Coal contains one or more thick limestone beds, and is overlain by only a thin layer of unconsolidated surficial material. In these areas, underground mining is commonly conducted at depths less than 100 feet. In most other areas of the state, the presence of thick, unconsolidated, surface material and weak bedrock strata force underground mining to be conducted at depths of 150 feet or greater.

Quality of Coal

The quality of a coal contributes to the minability of a deposit. However, the influence of quality on development potential is difficult to measure because government regulations and the requirements of end users, which determine the quality of coal that can be mined, change over relatively short periods. Moreover, data concerning coal quality are difficult to obtain and tend to focus on areas with active mines. The quality of much coal in Illinois can only be inferred from widely scattered analyses or from indirect indicators such as depth or depositional environment. For these reasons, coal quality is not included as a criteria for determining the development potential of coal deposits.

This section explains how sulfur content, chlorine content, and rank influence development potential of deep-minable resources. Other quality parameters, such as ash content, cannot be evaluated on a regional basis at this time.

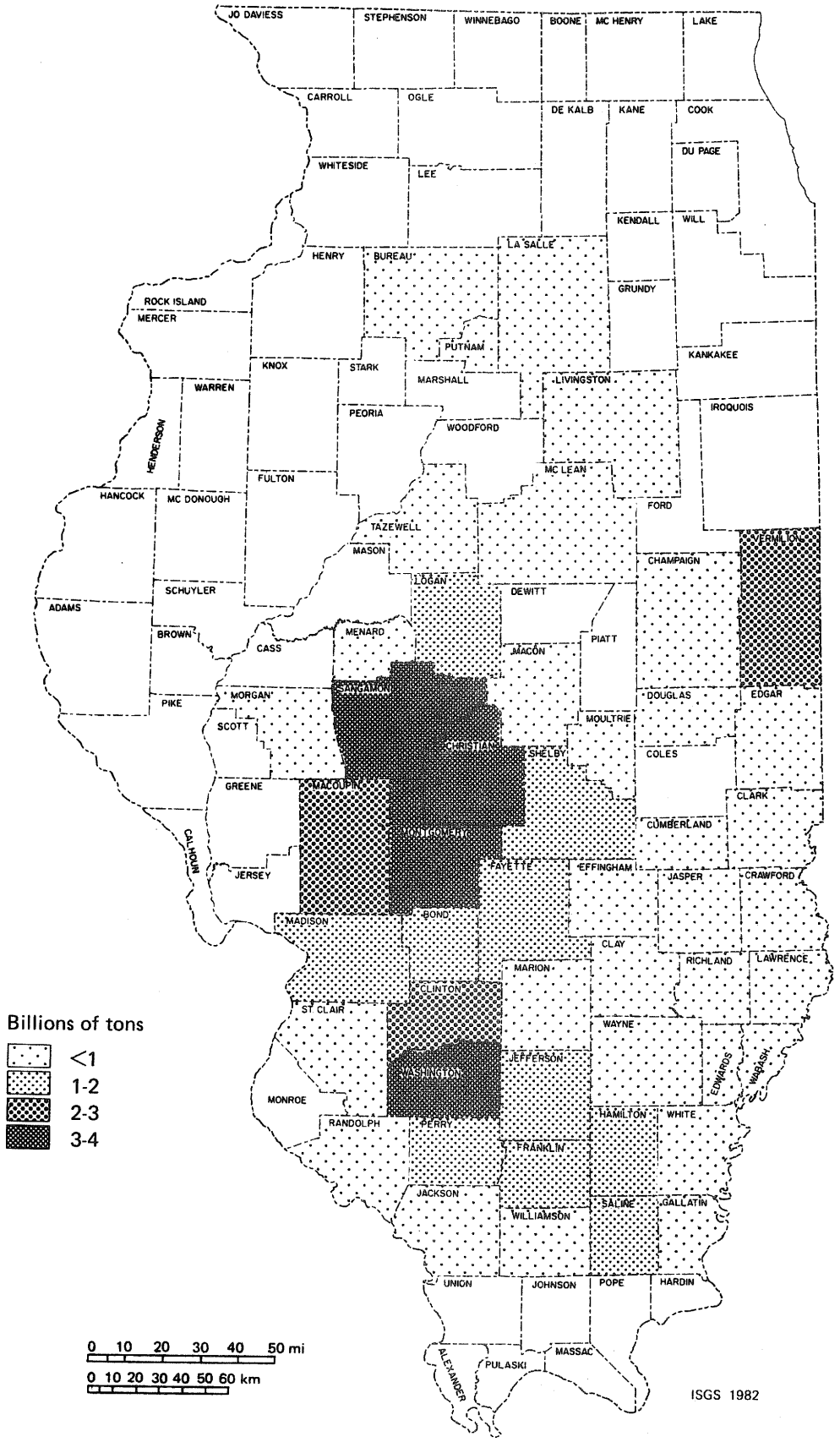


Figure 7.
Deep-minable coal resources with a high potential for development.

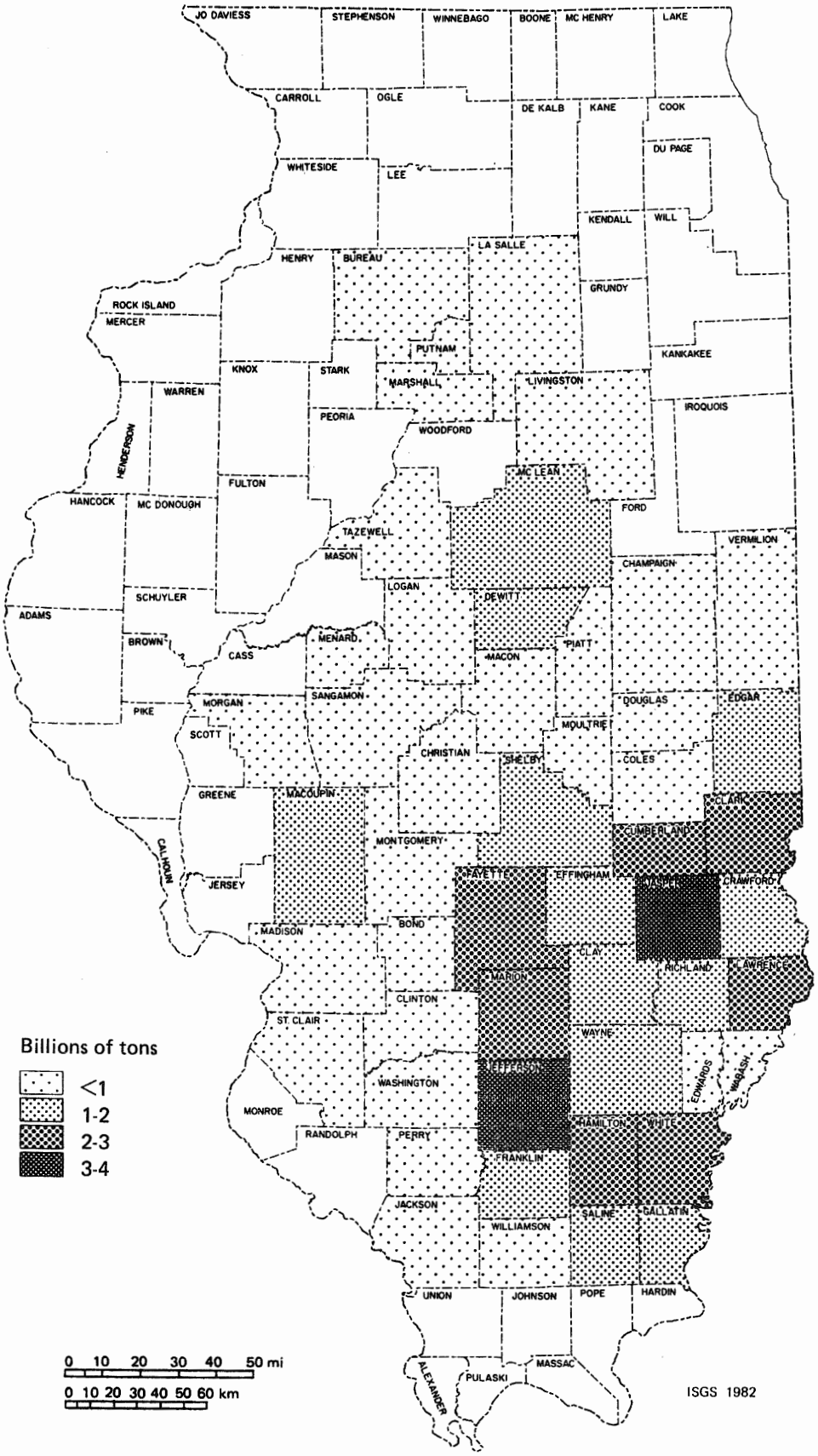


Figure 8.
Deep-minable coal resources with a moderate potential for development.

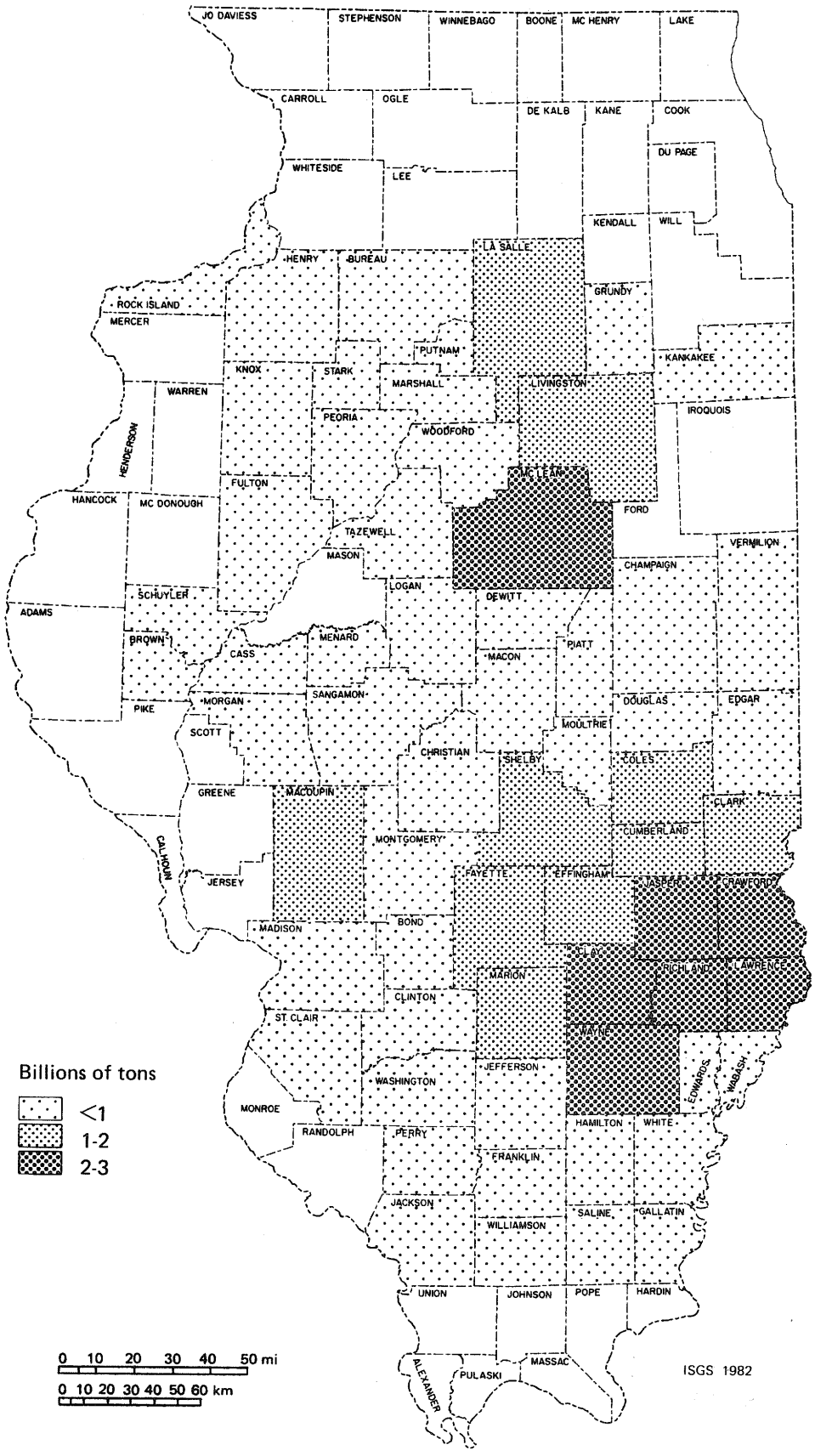


Figure 9.
Deep-minable coal resources with a low potential for development.

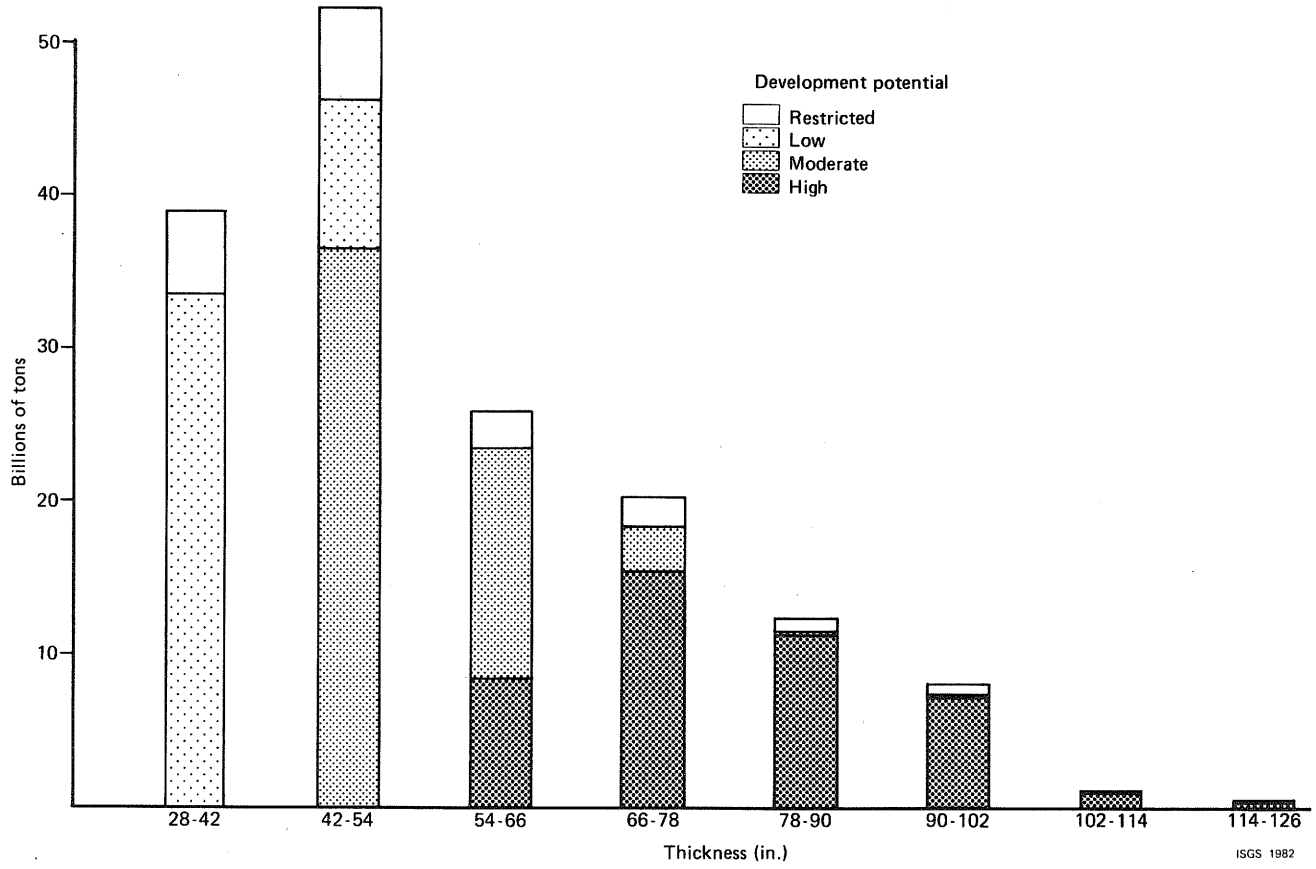


Figure 10.
Deep-minable coal resources by seam thickness.

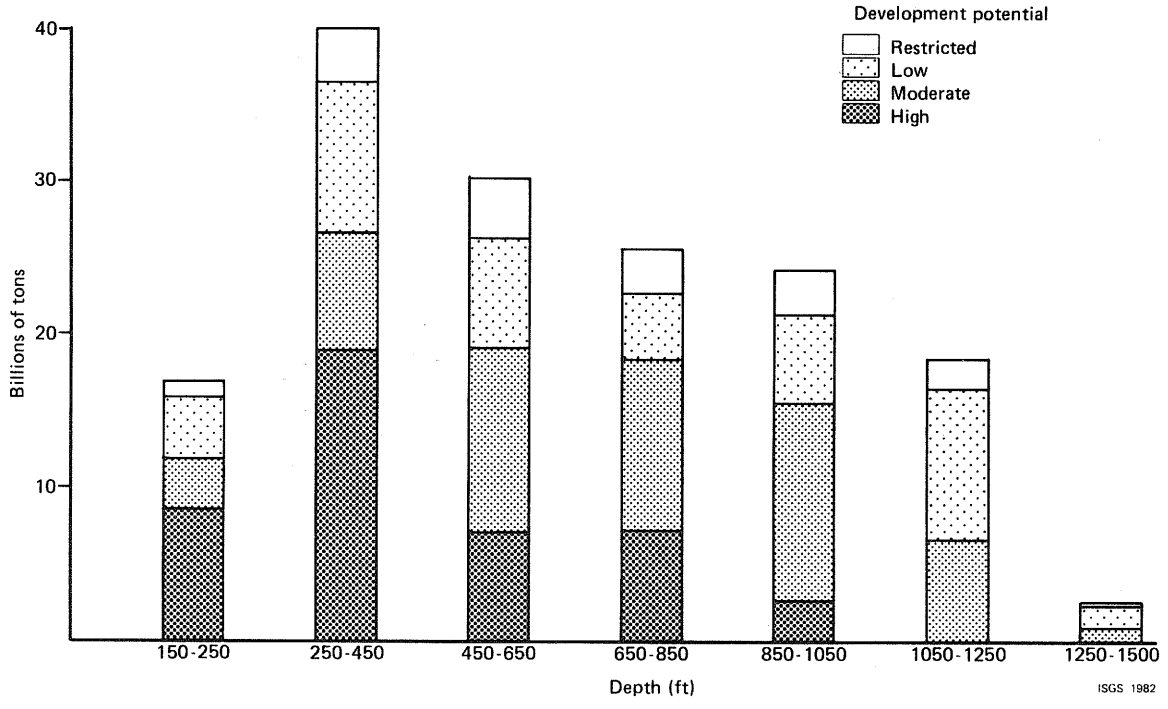


Figure 11.
Deep-minable coal resources by depth.

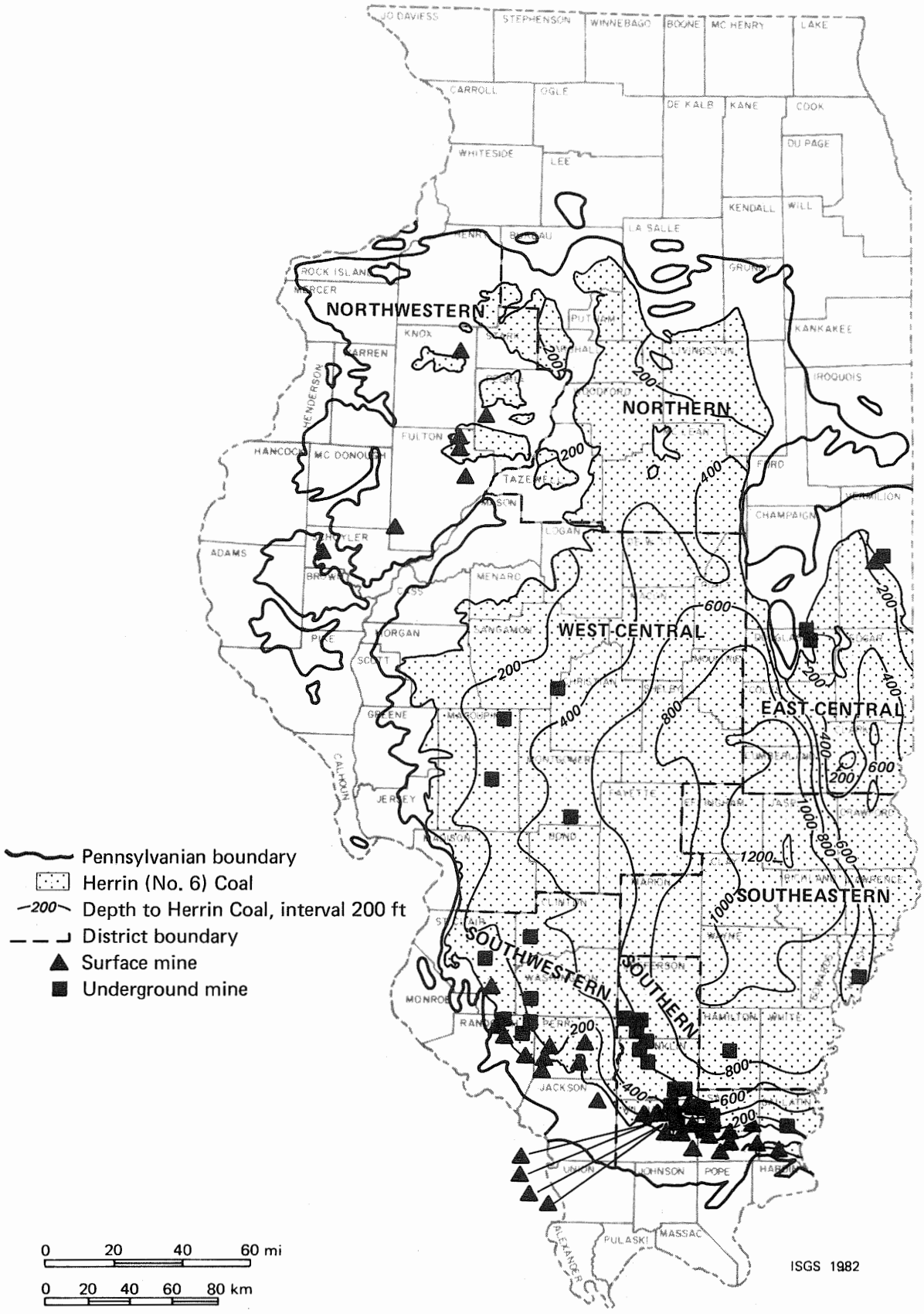


Figure 12.
Location of coal mines and generalized depth of the Herrin (No. 6) Coal Member.

Sulfur. Most of the deep-minable resources in Illinois have a relatively high sulfur content (between 3% and 5%) (fig. 13). About 10 billion tons (6%) of the resources have a low to medium sulfur content (0.5% to 2.5% S); 3.7 billion tons of this relatively low-sulfur coal (37%) have a high potential for development, and another 3.7 billion tons (37%) have a moderate development potential (table 2).

Because of the lack of chemical analyses in many areas, deposits of low- to medium-sulfur coal have been delineated on the basis of roof lithology and depositional environment; therefore, the boundaries (and tonnages) are only approximations and may vary considerably on a local basis. To date, the only areas of low- to medium-sulfur resources that have been included in the estimates are in the Herrin and Springfield Coals. Potential areas of low- to medium-sulfur coal have been described for the Danville (No. 7), Colchester (No. 2), and Murphysboro Coals (Treworgy and Jacobson, in press). The extent of these areas is too uncertain at this time to warrant their inclusion in the estimate of low- to medium-sulfur coal resources.

Several of the low- and medium-sulfur deposits have geologic factors associated with them that may adversely affect their minability. In some places, the rock overlying the coal is unstable and cannot be easily supported, or the immediate roof contains water-bearing sandstones. Moreover, the coal may contain shale partings that vary in thickness from several inches to several feet.

Chlorine. Chlorine in coal has been linked to corrosion and fouling of high temperature boilers. Coals containing more than 0.4 to 0.5 percent chlorine may require special preparation or may be usable only in specially designed boilers. More than 55 percent of the deep-minable coal resources and 77 percent of the coal with a high development potential have a chlorine content of 0.4 percent or less (fig. 14).

The distribution of chlorine in the Herrin (No. 6) Coal (fig. 15) has been used as a basis for estimating the chlorine content of the deep-minable resources. The chlorine content of other coals generally varies slightly but not significantly from the Herrin Coal. The chlorine content of

TABLE 2. Development potential of deep-minable coal resources with a low to medium sulfur content (<2.5% S) (millions of tons)

		Development Potential				
County	Coal	High	Moderate	Low	Restricted	Total
Christian	6	322	101	6	9	439
Clark	6	0	0	26	8	34
Clinton	6	59	22	0	6	87
Coles	6	0	223	326	85	635
Cumberland	6	0	644	95	29	768
Douglas	6	588	124	137	26	875
Edgar	6	245	209	322	32	807
Edwards	5	33	11	3	11	58
Franklin	6	157	1	0	14	172
Franklin	5	25	210	5	33	274
Hamilton	5	141	398	8	122	669
Jefferson	6	244	100	5	24	372
Macoupin	6	382	62	0	9	453
Madison	6	266	233	72	70	641
Montgomery	6	163	93	3	19	277
Moultrie	6	0	31	134	28	193
Perry	6	22	0	0	1	23
St. Clair	6	287	65	42	38	432
Saline	5	231	190	11	37	468
Shelby	6	0	222	183	27	432
Vermilion	6	322	36	28	25	422
Wabash	5	125	15	0	99	240
Wayne	5	0	33	159	29	222
White	5	20	470	101	56	649
Williams	6	3	0	0	0	3
Williams	5	35	246	5	4	289
Total	6	3,068	2,166	1,378	451	7,063
	5	610	1,573	294	391	2,868
GRAND TOTAL		3,679	3,740	1,672	842	9,932

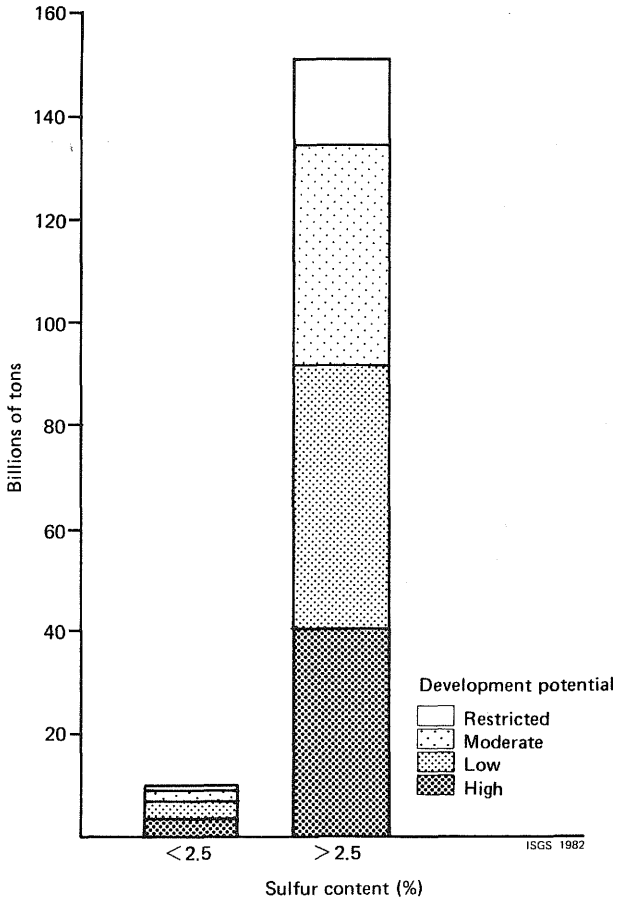


Figure 13.
Deep-minable coal resources by sulfur content.

coals in the center part of the Illinois Basin is somewhat uncertain because of the scarcity of data from this area. There is a basin-wide trend of increasing chlorine content with seam depth; and it has been suggested that salinity of groundwater, which is depth dependent, is the primary controlling factor of the chlorine content in the coal (Gluskoter and Rees, 1964). Because there may be other geologic factors that have not been recognized yet, this estimate of resources by chlorine content may change as more data become available.

Rank. Coals are classified according to their heat content (Btu/lb) calculated on a moist, mineral-matter-free basis. Almost all Illinois coals are of high-volatile bituminous rank (Standard D 388, ASTM 1980). For this report, the rank of deep-minable coals was calculated on the basis of the coalification map (fig. 16) of the Herrin (No. 6) Coal (Damberger, 1971). Coals below the Herrin Coal will generally have a slightly higher heating value and coals above will have a slightly lower heating value. However, the differences between the coals in this study are so small that no significant change in rank is anticipated. For this reason, all coals were assigned the same rank as the Herrin Coal in the same location.

On a moist, mineral-matter-free basis, the deep-minable coal resources range in rank from high-volatile C to high-volatile A bituminous and range in heat content from approximately 11,400 to 14,400 Btu/lb (fig. 17): 55 percent are high-volatile C, 45 percent are high-volatile B,

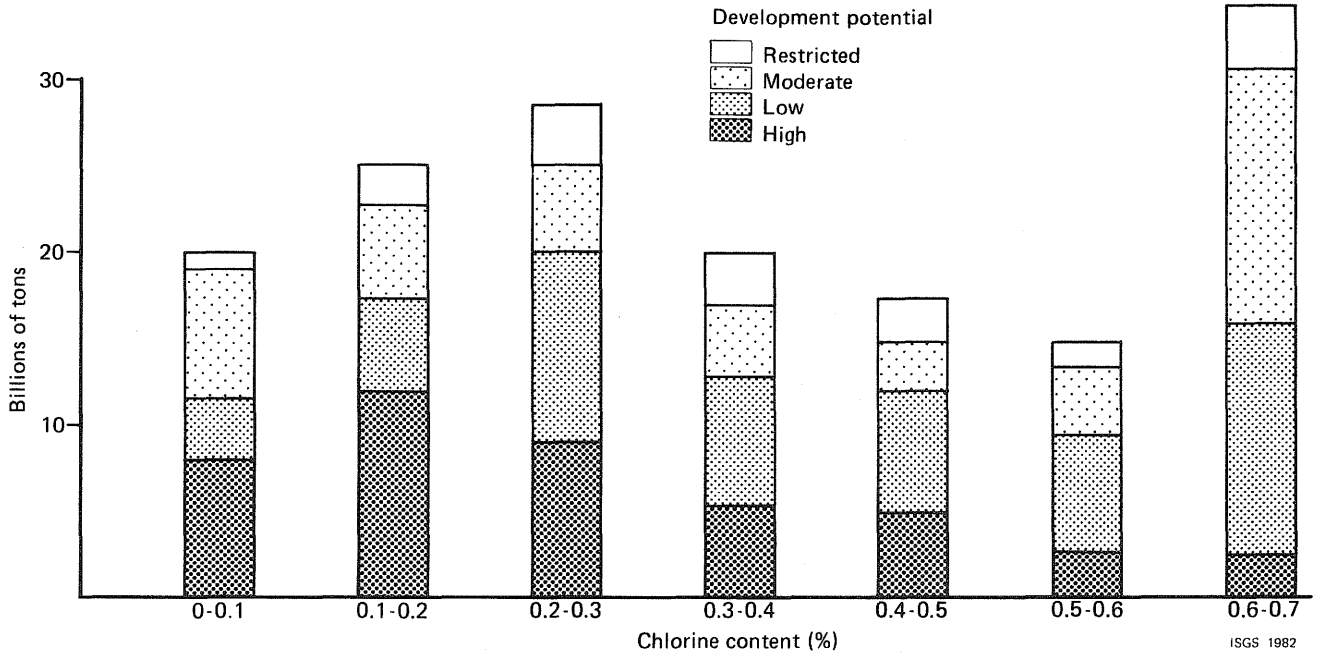


Figure 14.
Deep-minable coal resources by chlorine content.

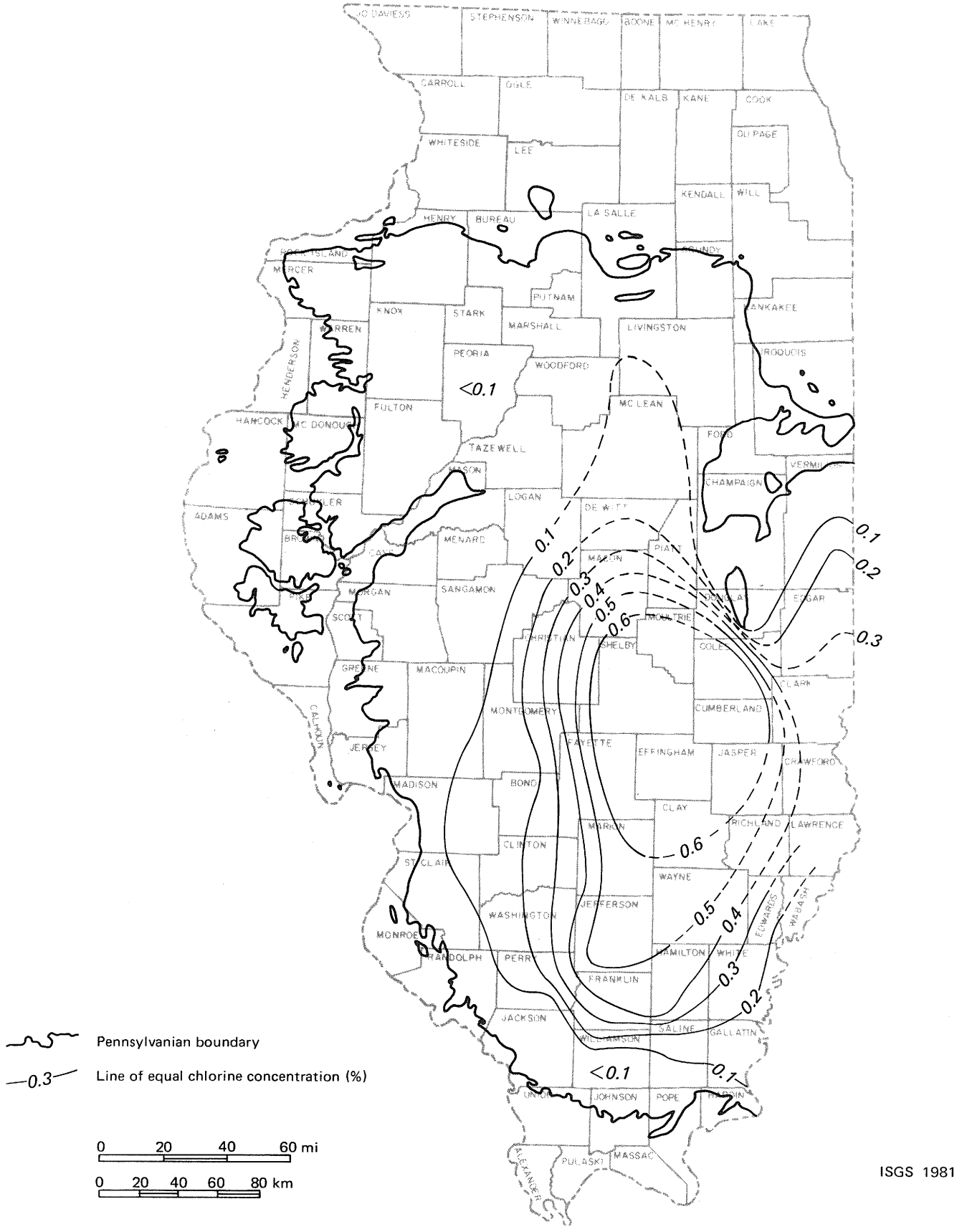


Figure 15.
Areal distribution of chlorine in the Herrin (No. 6) Coal Member in Illinois. The content of chlorine generally increases with depth of the coal (Chou, in preparation).

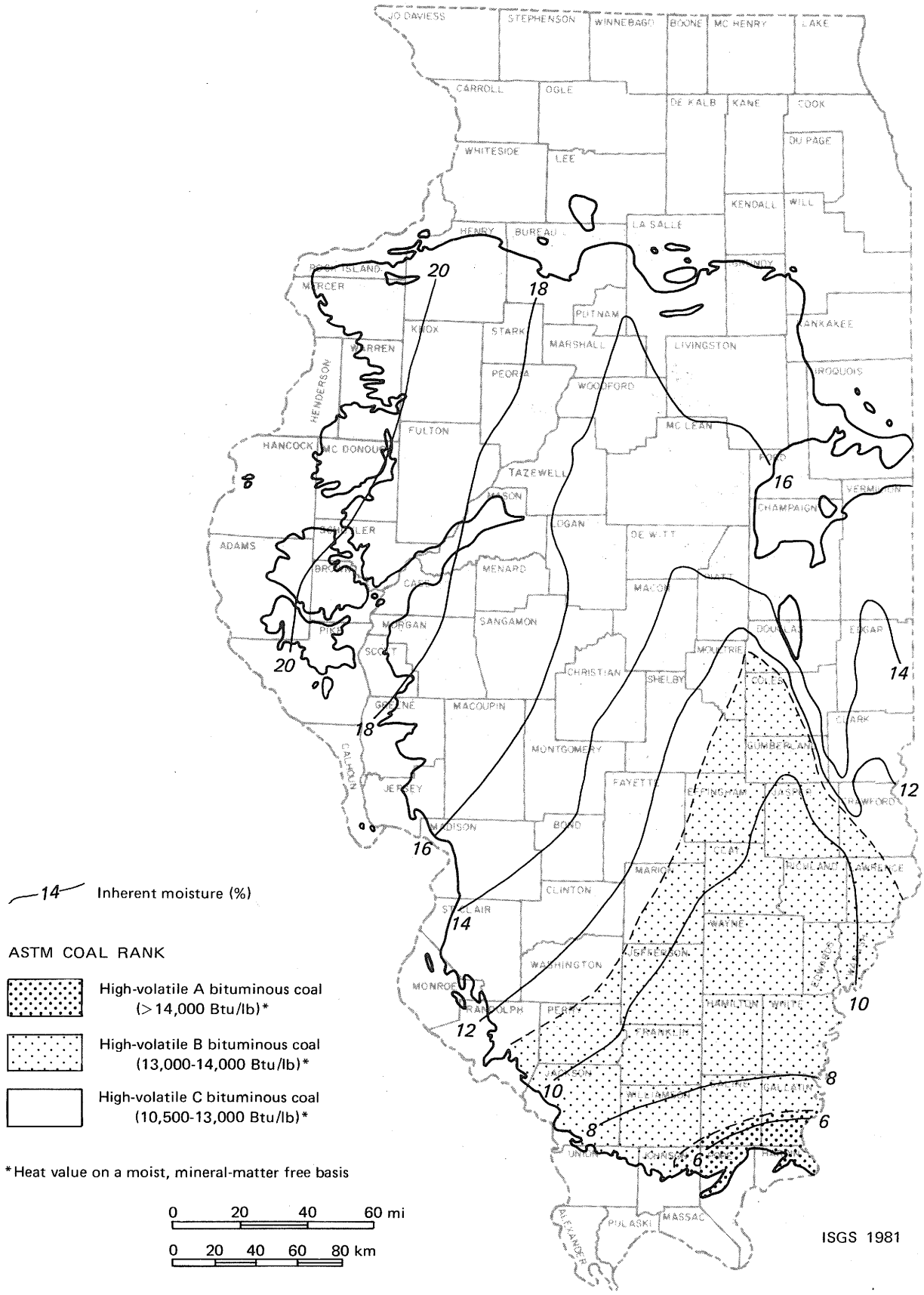


Figure 16.
Coalification pattern of the Herrin (No. 6) Coal Member (after Damberger, 1971).

and less than 1 percent are high-volatile A bituminous. Seventy-nine percent of the high-potential resources rank as high-volatile C bituminous. Column 3 in figure 17 shows the approximate heating value of the resources, assuming an ash content of 10 percent. This is equivalent to the average ash content of coal shipped from Illinois mines. On this basis, resources with a high development potential are in the range of 10,800 to 11,600 Btu/lb.

Coal Seams

The deep-minable coal resources have been calculated for 13 coal seams (table 3). About 32 billion tons (73%) of the resources with a high potential for development are from the Herrin (No. 6) Coal, and approximately 9 billion tons (21%) are from the Springfield (No. 5) Coal. In addition, nearly all the low- to medium-sulfur deposits identified in the state are from these two seams. Clearly, these two seams, which currently are the source for the state's entire production from underground mines, will continue to be the main target of mining activities. The distribution of the Herrin and Springfield Coals is shown in plates 1 and 2.

The Danville (No. 7) and Seelyville Coals are the only other seams that have significant resources with a high potential for development as defined in this study. Other coal seams appear to have little prospect of being mined extensively in the near future.

Size of Mining Block

In addition to having a favorable thickness and depth, a coal deposit must occur in a block of sufficient size to justify the investment in mine construction and equipment. According to current mining practice in Illinois, a block of deep-minable coal must have 25 to 50 million tons of recoverable coal—roughly equivalent to 50 to 100 million tons of in-place coal.

Figure 18 shows the general location of large mining blocks with a high potential for development. Townships containing more than 100 million tons of high-potential coal probably have one or more blocks that could support a large underground mine (2 million tons per year for 25 years), and townships containing 50 to 100 million tons of high-potential coal probably have at least one block that could support a medium-sized mine (1 million tons per year for 25 years). Depending upon the position of the block within the township, it could be combined with coal in an adjacent township to support a larger mine. Townships with less than 50 million tons of high-potential coal probably could not contain a modern underground mine. If the deposit is contiguous with similar coal in an adjacent township, the combined tonnage may be sufficient to support a mine.

Most blocks occur in the Herrin (No. 6) Coal Member, with areas of high-potential resources located in the west-central, southwestern, and eastern parts of the coal field (plate 2). The west-central and southeastern parts of the coal field contain blocks of Springfield (No. 5) Coal. Also, there are a few blocks of the Danville (No. 7) Coal in the eastern and northeastern part of the coal field, a few blocks of the Seelyville Coal in the eastern part of the coal field, and one block of the Rock Island Coal in the west-central part of the coal field. The Colchester (No. 2) and Jamestown Coals contain no 100-million-ton blocks, and deposits with a high potential for development are too small to support mining.

Figure 19 shows the location of large mining blocks with a low to medium sulfur content (<2.5% S) and a high potential for development. Because of the scarcity of these blocks and the relatively strong demand for low-sulfur coal, even deposits with moderate potential may attract mining at this time. Figure 20 shows the location

TABLE 3. Deep-minable coal resources by seam and development potential (millions of tons)

	High	Moderate	Low	Restricted	Total
Danville (No. 7)	1,960	2,475	4,616	1,181	10,233
Jamestown	1	1,320	991	675	2,987
Herrin (No. 6)	31,751	18,969	9,717	6,605	67,042
Springfield (No. 5)	8,641	23,305	16,568	6,324	54,838
Summum (No. 4)	0	50	438	25	514
Survant	0	94	49	19	162
Colchester (No. 2)	62	1,560	6,856	561	9,038
Seelyville	1,273	4,165	2,897	1,403	9,737
De Koven	0	500	1,499	262	2,261
Wiley	0	0	210	42	252
Davis	0	1,542	780	318	2,639
Mt. Rorah	0	11	50	5	66
Rock Island (No. 1)	161	924	99	104	1,289
	43,849	54,913	44,769	17,524	161,058

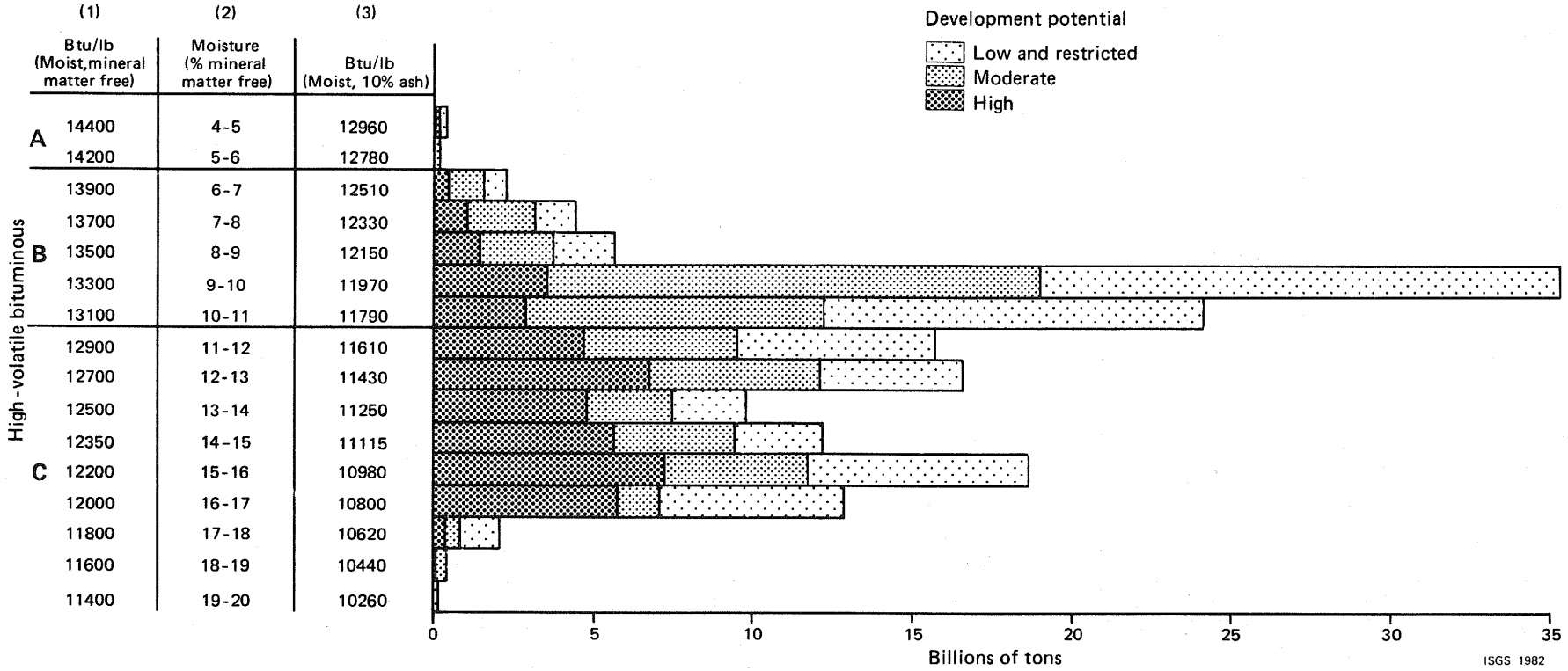


Figure 17.
Deep-minable coal resources by rank.

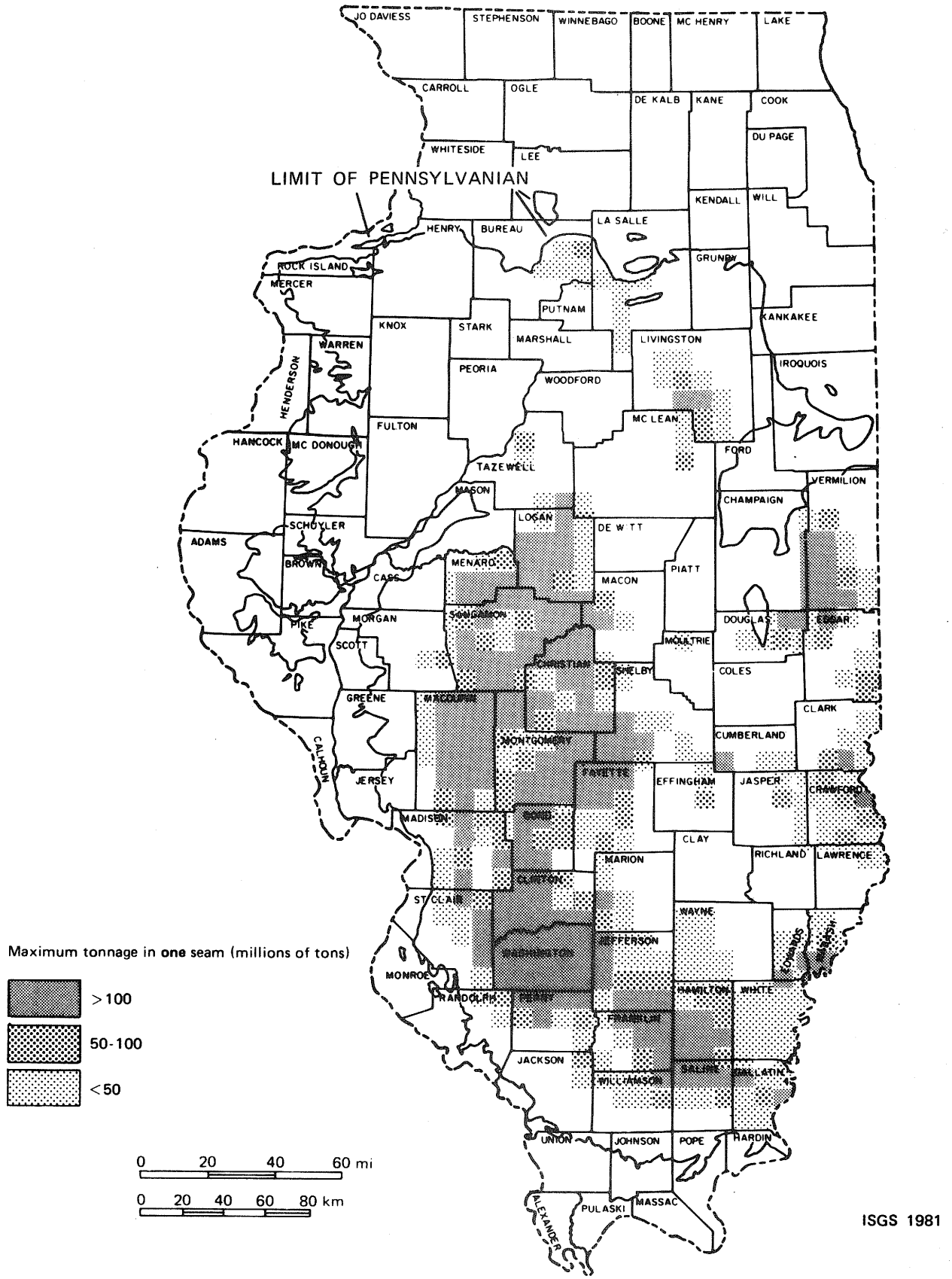


Figure 18.
Townships containing deep-minable coal resources with high development potential.

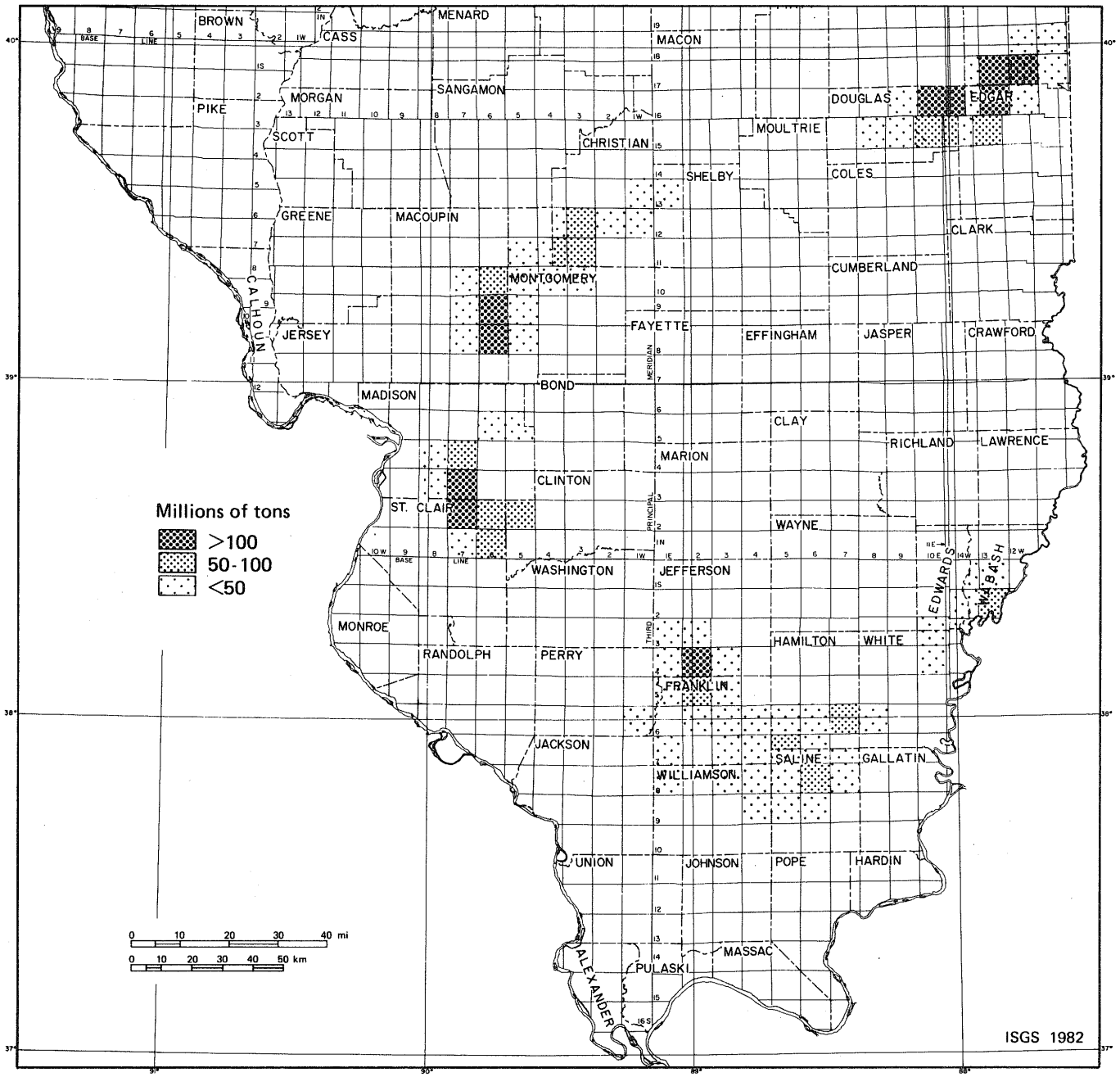


Figure 19.
Townships containing deep-minable coal resources with high development potential and <2.5% sulfur.

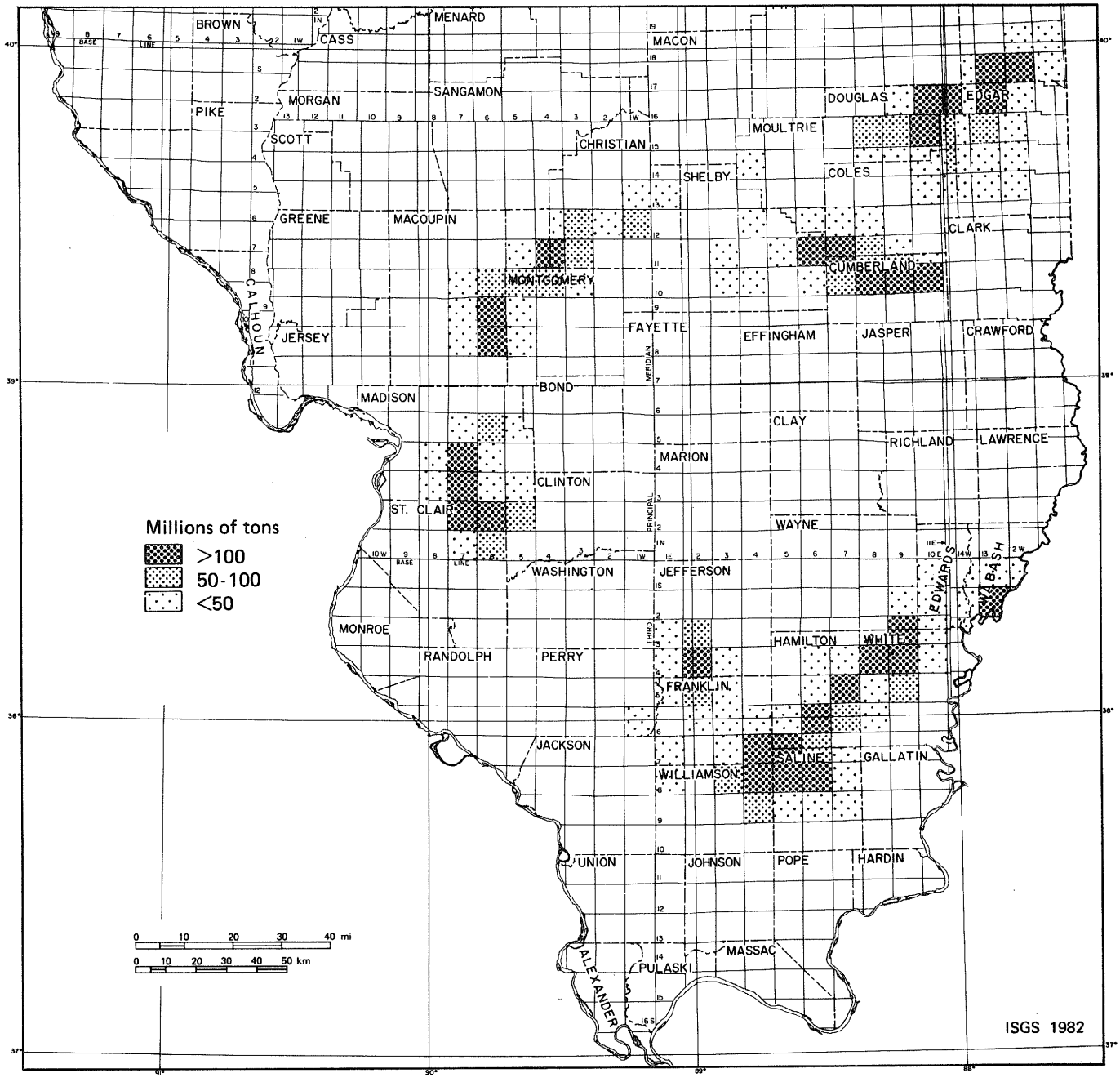


Figure 20.
Townships containing deep-minable coal resources with high or moderate development potential and <2.5% sulfur.

of blocks of low- to medium-sulfur coal with a high or moderate potential for development. It is probable that nearly all these blocks are controlled by mining companies.

Reliability of Estimates

Resources have been classified traditionally according to the type and spacing of data points used to map deposits. These classifications, which are based on widely accepted practices, provide a measure of certainty to the tonnage estimate. This study follows procedures established by Cady (1952) and classifies coal as *proved* (Class I-A), *probable* (Class I-B), and *strongly indicated* (Class II-A) (table 4). The *weakly indicated* category (Class II-B) of Cady's classification has not been used. Areas that were formerly classified as II-B were either remapped using geophysical logs and new data from coal tests or were excluded from this study because of their low reliability. This classification is similar to those used by the U.S. Geological Survey and other state Surveys; however, because of the lateral continuity of most coal seams in Illinois, the radius of influence assigned to each drill hole is larger than that used in many other states (Carter et al., 1981).

Geophysical logs from oil-test holes were not used in Cady's 1952 estimate of coal resources because workers at that time did not consider them suitable for mapping coal thickness. Hopkins (1968) showed that these geophysical logs could be used to estimate coal thickness with sufficient accuracy for regional mapping. Subsequent resource studies in Illinois have relied extensively on information from geophysical logs of oil-test holes to estimate coal thickness in areas where other types of data were scarce (Allgaier and Hopkins, 1975; Smith and Stall, 1975; Treworgy, 1981). In this study, resource estimates based on oil-test geophysical logs are included in the strongly indicated category of reliability (Class II-A).

Proved resources (Class I-A): the highest category of reliability. Resources in this category are based on closely spaced sample sites. Additional measurements are not likely to alter the estimates.

Probable resources (Class I-B): a slightly lower category of reliability. Estimates are based partly on measurements and partly on geologic projections. Modification of the estimates may be necessary as additional information becomes available.

Strongly indicated resources (Class II-A): the lowest category of reliability used in this study. These estimates are based on geologic projections from areas of high reliability and on measurements interpreted from geophysical logs of oil-test holes. Measurements from the logs are not as accurate as those made from diamond-drill cores or mine exposures. Although it is appropriate to include strongly indicated resources in regional appraisals of coal

TABLE 4. Summary of reliability classifications for coal resources (modified from Cady, 1952)

Class	Maximum distance from datum points*	Accepted datum points	Remarks
I-A Proved	½ mile	Mined-out areas Diamond drill holes Outcrops	Approximately equivalent to *measured* category of the U.S. Geological Survey
I-B Probable	2 miles	All points of Class I-A plus coal test churn drill holes	Approximately equivalent to *indicated* category of the U.S. Geological Survey
II-A Strongly indicated	4 miles	All points of Classes I-A and I-B plus churn drill holes drilled for oil or water with unusually good records, control rotary drill holes and oil-test geophysical logs	Approximately equivalent to *inferred* category of the U.S. Geological Survey
II-B Weakly indicated	Indefinite	All points used in higher categories plus knowledge of geologic probablility based on all available information	Approximately equivalent to *hypothetical* category of the U.S. Geological Survey
Thin or absent		All available data plus knowledge of geologic probability	Data, though sometimes sparse, shows coal thin or absent
No information			

*Distances modified in practice by geological considerations.

resources, more accurate information should be obtained for evaluating specific mine sites. Modification of these estimates will be necessary as additional information becomes available.

Approximately 17 percent of the resources in the high, moderate, and low development category are considered to be proved, 27 percent are probable, and 56 percent are strongly indicated (fig. 21). Approximately 40 percent of the resources with a high development potential are proved and an additional 41 percent are probable. The large percentage of coal with a high development potential in the proved and probable categories shows that, as one might expect, the greatest amount of drilling is carried out where coals are known to be thick and/or shallow.

The areas of proved coal are concentrated around the margins of the coal field, particularly in the west-central and southern parts ot the coal field. Probable resources are adjacent to the proved areas. The strongly indicated resources are located mainly in the central, eastern, and north-central portions of the coal field where the major coals are believed to be thin (<42 in.) and/or deep (>1000 ft).

Resources with a Restricted Potential for Development

Coal underlying surface features. At this time, approximately 8.5 billion tons (5%) of deep-minable resources are considered to have a restricted potential for development because they lie beneath cities, dams, public lands, interstate highways, and other features that might be damaged by subsidence (table 5). The amount of coal in each county ranges from 3 million tons in Jackson County to 463 million tons in Sangamon County.

About 6.7 billion tons (78%) of this restricted-potential coal underlies manmade structures such as towns and dams, with the largest deposits under the major cities of Springfield, Bloomington, and Decatur. Coal beneath public lands such as state parks amounts to 964 million tons (11%); and almost 60 percent of this coal, which is under Carlyle and Shelbyville Lakes, may actually be recoverable because subsidence may have no adverse effects on the lakes. Coal underlying Rend Lake State Park, for example, is considered to have development potential because coal companies already own the mining rights and are currently removing coal there. Coal under interstate highways accounts for another 869 million tons (10%) of resources in the restricted-potential category. Although the government does not own the rights to all this coal, the Illinois Department of Transportation tries to arrange that coal companies limit extraction under interstate highways.

If surface features did not restrict the development of these resources, approximately 25 percent would be classified as coal with a high potential for development and 47 percent as coal with a moderate potential. The amount of coal with a restricted potential due to surface features is a small percentage of the total available coal, and it is unlikely that much of it will be mined in the foreseeable future.

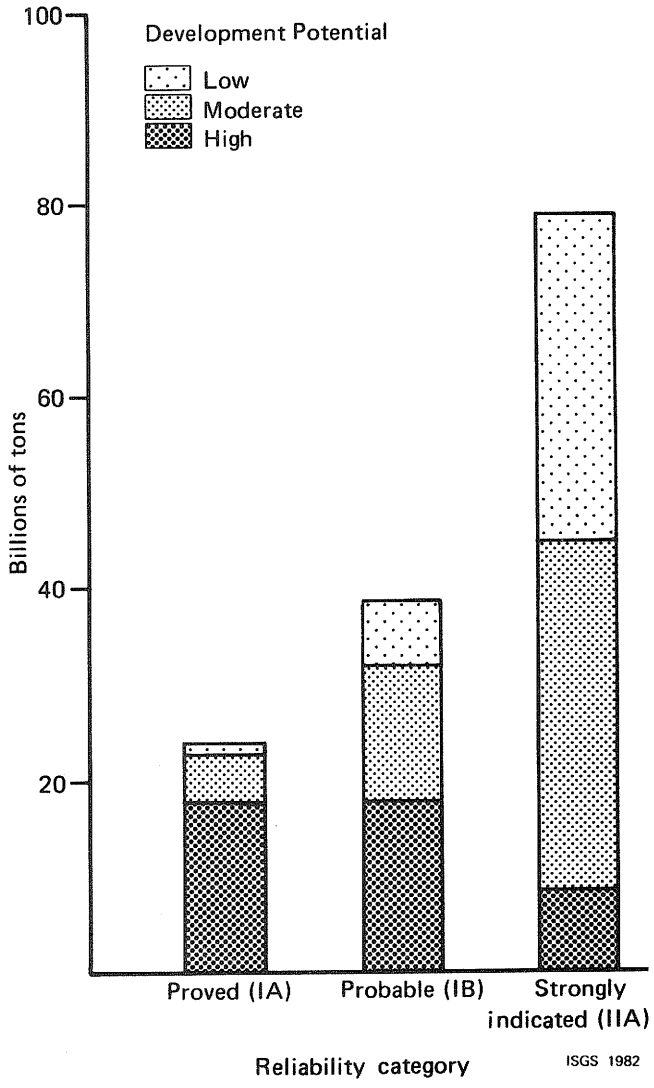


Figure 21.
Deep-minable coal resources by category of reliability. (Coal with a restricted potential for development has been omitted.)

Coal within oil fields. About 9.6 billion tons (6%) of deep-minable coal resources have been classified as having a restricted potential for development because they lie within areas of closely spaced oil and gas wells (table 5). If access to these resources were not restricted by wells, 16 percent would have a high potential, about 39 percent would have a moderate potential, and about 45 percent would have a low potential for development.

Mine layouts must be planned carefully in areas of numerous, closely spaced wells. Whether producing or dry, a well must either have a barrier of unmined coal around it

TABLE 5. Deep-minable coal with a restricted potential for development (millions of tons)

County	Cities	Parks	Highways	Oil fields	Oil and surface features	Total
Bond	74	10	19	32	1	134
Bureau	74	0	19	0	0	92
Champaign	10	0	4	0	0	14
Christian	85	14	0	142	2	239
Clark	79	9	29	144	1	260
Clay	124	2	1	618	9	736
Clinton	115	266	7	110	5	493
Coles	200	16	25	91	19	312
Crawford	213	0	0	2535	44	2704
Cumberland	98	0	47	64	1	207
De Witt	138	4	3	4	0	149
Douglas	29	0	2	0	0	31
Edgar	100	0	0	23	0	123
Edwards	69	0	0	193	5	257
Effingham	143	0	49	86	2	277
Fayette	186	243	29	39	3	494
Franklin	387	0	31	186	37	567
Gallatin	61	22	0	252	4	331
Grundy	5	0	2	0	0	7
Hamilton	80	12	0	475	1	566
Jackson	3	0	0	0	0	3
Jasper	89	32	0	451	2	570
Jefferson	294	0	62	173	8	520
La Salle	129	14	24	0	0	167
Lawrence	338	23	21	462	20	824
Livingston	69	2	35	0	0	105
Logan	55	22	30	0	0	107
McLean	422	12	79	0	0	513
Macon	291	3	17	6	1	317
Macoupin	189	8	25	20	0	242
Madison	100	0	31	33	1	163
Marion	278	41	22	249	24	567
Marshall	24	5	0	0	0	29
Menard	34	1	0	0	0	35
Montgomery	158	0	45	6	1	208
Morgan	50	1	10	1	0	62
Moultrie	11	28	0	0	0	39
Perry	29	0	0	6	2	33
Piatt	34	17	7	0	0	59
Putnam	26	10	1	0	0	37
Randolph	9	0	0	4	0	12
Richland	104	0	0	382	11	475
St. Clair	100	0	16	1	0	117
Saline	240	7	0	163	31	379
Sangamon	463	8	54	33	5	553
Shelby	76	63	6	8	0	153
Tazewell	154	1	6	0	0	160
Vermilion	74	21	13	0	0	108
Wabash	78	12	0	598	40	647
Washington	83	10	33	85	4	207
Wayne	98	22	32	978	17	1114
White	135	0	17	653	19	787
Williamson	159	0	17	15	1	192
Woodford	31	0	0	0	0	31
Total	6,695	964	869	9,320	322	17,526

or be properly plugged above and below the coal seam to preclude the chance of gas seepage or water drainage into the mine. (About 2 acres of coal are lost for every unplugged well.) Mine entries should be located about 150 feet from any wells that are active or not known to be adequately plugged (the usual case); therefore, entries cannot be constructed where wells are spaced one for each 20 acres or less over large areas. Rooms cannot be developed in areas where wells are spaced every 10 acres or less.

The economic feasibility of plugging a few wells to permit coal mining in a heavily drilled area depends on the physical arrangement of the wells and the cost of plugging versus the value of the coal. In many cases plugging one or two wells will clear a large area for mining, whereas in other cases plugging will free only a few acres.

Exploration for oil and gas has been carried out largely in the southern half of Illinois, with a concentration in the southeast. The amount of coal with a restricted development potential due to oil and gas drilling reflects this pattern of activity (fig. 22). Each of 5 counties—Clay, Crawford, Wabash, Wayne, and White—contains more than 500 million tons of coal classified as unminable because of oil fields; together these counties account for 58 percent of such coal. Crawford County contains the largest amount of coal within oil fields: 2.5 billion tons or about 27 percent of the state total.

In the future, mining coal within oil fields may become economically feasible. At present, there are large quantities of recoverable resources with a high or moderate potential for development in more accessible areas.

Other Factors That Contribute to Development Potential

Thickness and depth are the basic criteria for determining the development potential of a deposit. Contributing factors include coal quality, size of mining block, land usage, and a number of others. Some factors, although significant, are beyond the scope of this report, e.g., demand for coal, supply of coal from other areas, and availability of transportation (Bhagwat and Collias, 1981); however, some additional geologic and engineering factors that are specific to Illinois should be considered.

Roof and floor conditions. The success or failure of a mining operation may depend on the roof and floor conditions; however, these factors cannot be meaningfully evaluated on a regional level and must be considered on a site-by-site basis. Even at the local level, premining assessment of roof and floor conditions is more an art than an exact science. Numerous publications have reported the effects of roof strata on mining in Illinois (Krausse et al., 1979; Damberger et al., 1980; Nelson and Nance, 1981). Less is understood about the cause and control of floor problems, particularly floor squeezing (Ganow, 1975; Speck, 1979).

Ratio of drift to bedrock thickness. The ratio of the thickness of drift overburden to bedrock overburden has been cited as an indicator of possible roof and floor problems. Where the unconsolidated sediments are more than 100 feet thick and the thickness of glacial drift to bedrock overburden approaches a ratio of 1:1 or more, unstable roof conditions may develop (Stephen Hunt, personal communication). Unfavorable ratios of drift to bedrock thickness ($>1:1$) are found in large areas of the western and north-central parts of the coal field; in eastern Douglas, Champaign, and western Vermilion Counties; and along major bedrock valleys in southwestern Illinois.

Multiple seam mining. In many areas of the state, two or more minable seams are present at the same location. Although there are no underground mines that currently recover more than one seam, multiseam operations have been conducted previously in the state and are carried out commonly in other parts of the country. A recent study estimated that 58 billion tons of Illinois coal could be subject to underground, multiseam mining (Singh and Dunn, 1981); however, less than 5 billion tons of coal with a high development potential overlap other high-potential deposits (fig. 23). Coals that may be subject to multiseam mining are generally thin, deep seams with only a moderate or low potential for development.

Careful engineering and mine layout is required in multiseam operations to ensure that the removal of coal at one level does not cause a collapse of strata at another level. According to mining engineers interviewed for this study, a minimum of 25 to 100 feet of interburden between seams is necessary for most mine designs. Throughout most of the state, the interburden between minable seams is sufficiently thick. Seams that may not have an adequate interburden for multiseam mining are the Springfield and Herrin Coals in central and east-central Illinois; the Herrin, Jamestown, and Danville Coals in extreme east-central Illinois; and the Davis and De Koven Coals in southern Illinois.

Problems also may be encountered by single seam operations attempting to mine a seam directly above or below one seam that has been mined out previously. Regardless of the thickness of interburden, the seams over a mined-out area may have been disturbed by subsidence. The amount of disturbance will depend upon the mining method used in the older mine, and to a lesser degree, the depth of the coals. Mined-out areas below potentially minable coals will be encountered only in a few locations, particularly with the Springfield and Herrin Coals of southern Illinois and the Herrin and Danville Coals in Vermilion County.

When mining coal below a previously mined-out area, the thickness and composition of the interburden between the seams must be considered. If the interburden is thin, the lower mine must be laid out so that the pillars of the upper mine do not put too much strain on the roof. This situation is more complicated than one in which both seams are mined simultaneously because the layout of the mined-out

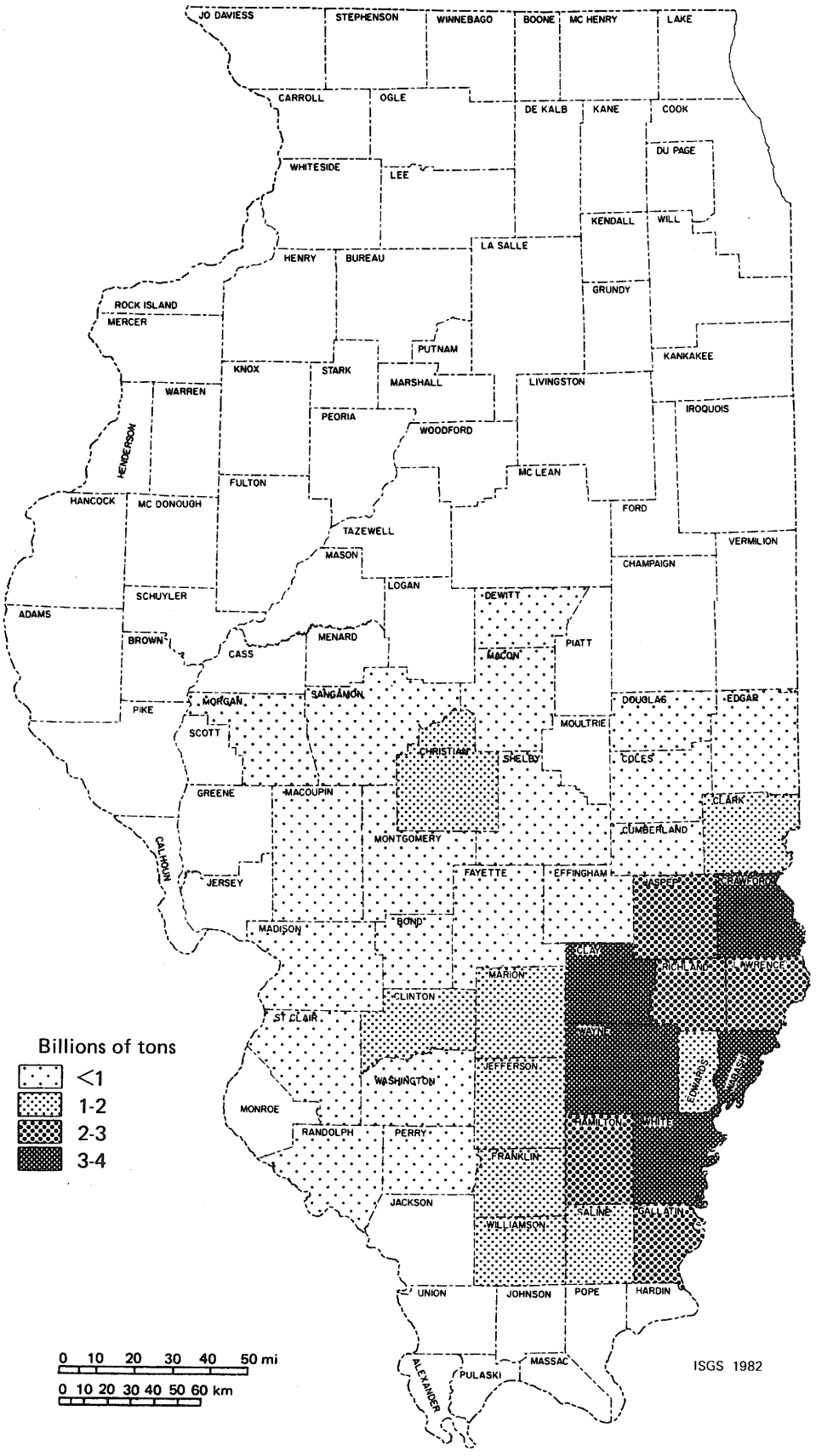


Figure 22.
Deep-minable coal resources within oil fields.

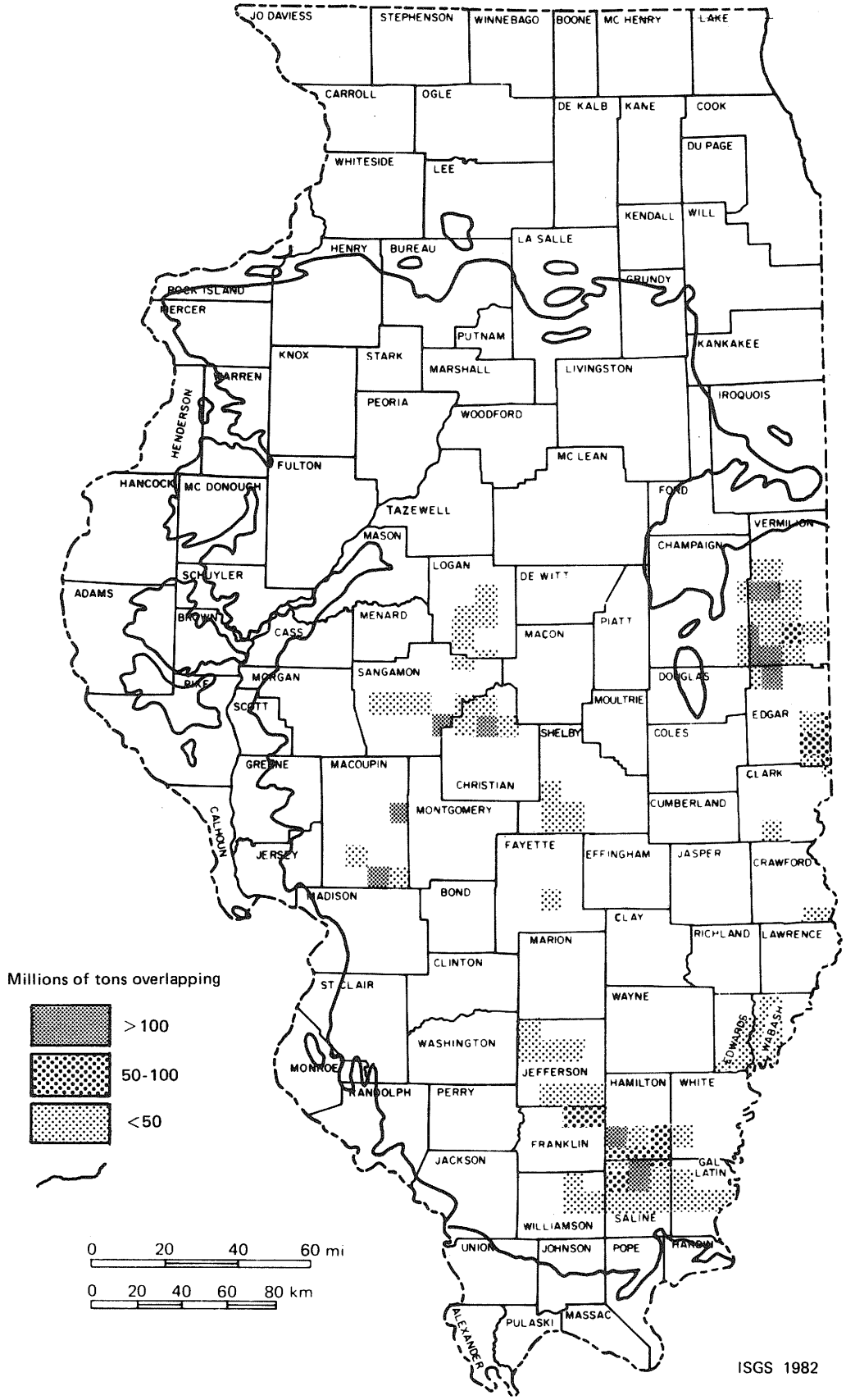


Figure 23.
Townships that have coal resources with high development potential in two or more seams.

area may not be known in sufficient detail and the old works may be full of water. These conditions occur with the Springfield and Herrin Coals of southern Illinois and the Herrin and Danville coals of Vermilion County.

Future Additions to Resources

The estimate of Illinois coal resources has grown slowly from DeWolf's calculation of 136 billion tons in 1908 to 181 billion tons today, including 161 billion tons of deep-minable coal and 20 billion tons of surface-minable coal (Treworgy et al., 1978). Discoveries of new coal deposits are expected to continue, though with decreasing frequency and magnitude, since the most promising areas of the coal field have been well explored and the remaining deposits are deeper, thinner, and/or of lesser quality than currently identified deposits. Although the total may ultimately increase to about 200 billion tons, the high development-potential category, as currently defined, will not gain much tonnage.

Additional deep-minable resources may be found in two areas: 1) north-central Illinois, and 2) the southern half of the coal field at depths below the Springfield Coal. In north-central Illinois, the counties of Piatt, De Witt, McLean, Livingston, Woodford, Grundy, and La Salle have not been extensively explored. The Herrin Coal is believed to be thin or absent in much of this area. Probably, the Danville, Springfield, Colchester, and local unnamed coals are of minable thickness in some locations. According to the information currently available, these resources will have only a moderate or low potential for development.

In the southern half of the coal field, there have been relatively few coal-test holes drilled below the Springfield (No. 5) Coal. Recent work by Treworgy (1981), using geophysical logs from oil-test holes, showed the presence of about 10 billion tons of the Seelyville Coal in east-central Illinois. Although coals below the Seelyville were noted, none appeared to be of minable thickness over a large area. The Davis, De Koven, and possibly other lower coals are believed to be of minable thickness in areas south of those covered in the Treworgy study. To the west, the Summum (No. 4), Colchester (No. 2), and Rock Island (No. 1) Coals may be of some significance. New resources of these coals probably will have a moderate or low potential for development.

CONCLUSIONS

The deep-minable coal resources of Illinois are estimated to be 161 billion tons. About 44 billions tons (27%) of these resources have thickness and depth similar to deposits currently being mined and are considered to have a high potential for development. Fifty-five billion tons (34%) are slightly thinner and/or deeper but are comparable to coals currently being leased; these deposits are considered to have a moderate potential for development. Another 45 billion tons (28%) of the deep-minable resources consist of coals that are significantly thinner and/or deeper than those currently being mined or leased and are considered to have a low potential for development. The remaining 18 billion tons (11%) of the resources lie within areas densely drilled for oil and gas or beneath surface features such as cities, dams, interstate highways, and public land; these resources have a restricted potential for development.

Resources with a high potential for development are concentrated in west-central and southern parts of the coal field: 32 billion tons (73%) of these high-potential resources are in the Herrin (No. 6) Coal, 9 billion tons (21%) are in the Springfield (No. 5) Coal, 2 billion tons (5%) in the Danville (No. 7) Coal, 1.3 billion tons (3%) in the Seelyville Coal and less than 200 milion tons (1%) each in the Rock Island (No. 1), Colchester (No. 2), and Jamestown Coals. These statistics indicate that the Herrin and Springfield Coals will continue to be the major sources of underground coal production in the state.

About 10 billion tons (6%) of the deep-minable resources—all from the Herrin and Springfield Coals—have a low to medium sulfur content: 3.7 billion tons (37%) have a high development potential and another 3.7 billion tons have a moderate development potential. Deposits with a moderate potential may attract mining in the near future because minable blocks of high-potential coal are scarce, yet the demand for low-sulfur coal is relatively strong. In some areas, coals such as the Danville, Colchester, and Murphysboro have a low to medium sulfur content; however, the extent of the areas is unknown.

The tonnage figures quoted in this report represent coal resources in the ground. The amount of coal that actually can be recovered depends on the mining method used and varies from about 50 percent for room-and-pillar mining to as much as 90 percent for some types of longwall and pillar recovery methods. An additional 5 percent may be lost if the coal is washed prior to use.

The most promising areas of the coal field have been well explored. Additional discoveries of deep-minable coal in Illinois are expected, but the quantities probably will not be large, and most deposits will have a moderate to low potential for development according to the current classification scheme. The criteria used to define high, moderate, and low potential will change as the choice coals are mined out and as changes are made in mining technology, in laws affecting mining, and in the demand for coal—including competition from other fuels as well as from coal of other regions.

This report provides a new perspective that will contribute to better planning and development of deep-minable coal resources in Illinois. It shows coal companies and land owners how the deposits they own or plan to lease compare with the entire body of resources and indicates where mines are most likely to be located in the state. Most importantly, it shows that Illinois contains large resources of coal that can be mined at the same relative cost as deposits currently being exploited.

REFERENCES

Allgaier, G. J., and M. E. Hopkins, 1975, Reserves of the Herrin (No. 6) Coal in the Fairfield Basin in southeastern Illinois: Illinois State Geological Survey Circular 489, 31 p.

American Society for Testing and Materials, 1980, Annual Book of Standards, Part 26, p. 223-227.

Bectel National, Inc., 1979, Impact of coal cleaning on the cost of new coal-fired power generation: Electric Power Research Institute Project 1180-2.

Bhagwat, S. B., and T. J. Collias, 1981, The future competitive position of coal from the Illinois Basin: Illinois State Geological Survey Illinois Minerals Notes 81, 25 p.

Cady, G. H., 1952, Minable coal reserves of Illinois: Illinois State Geological Survey Bulletin 78, 138 p.

Carter, M. D., A. L. Medlin, and K. K. Krohn, 1981, The national coal resources data system: A status report: Geological Society of America Bulletin, v. 92, no. 8, p. 563-573.

Chou, C.-L., in preparation, Distribution of sodium and chlorine in Springfield (No. 5) and Herrin (No. 6) Coals of the Illinois Basin: Illinois State Geological Survey.

Clegg, K. E., 1959, Subsurface geology and coal resources of the Pennsylvanian System in Douglas, Coles, and Cumberland Counties, Illinois: Illinois State Geological Survey Circular 271, 16 p.

Clegg, K. E., 1961, Subsurface geology and coal resources of the Pennsylvanian System—Sangamon, Macon, Menard, and parts of Christian and Logan Counties, Illinois: Illinois State Geological Survey Circular 312, 28 p.

Clegg, K. E., 1965, Subsurface geology and coal resources of the Pennsylvanian System in Clark and Edgar Counties, Illinois: Illinois State Geological Survey Circular 380, 28 p.

Clegg, K. E., 1972, Subsurface geology and coal resources of the Pennsylvanian System in De Witt, McLean, and Piatt Counties, Illinois: Illinois State Geological Survey Circular 473, 27 p.

Damberger, H. H., 1971, Coalification pattern of the Illinois Basin: Economic Geology, v. 66, p. 488-494.

Damberger, H. H., W. J. Nelson, and H.-F. Krausse, 1980, Effect of geology on roof stability in room and pillar mines in the Herrin (No. 6) Coal of Illinois: First Conference on Ground Control Problems in the Illinois Coal Basin, Proceedings, p. 14-32.

DeWolf, F. W., 1908, The coal resources of Illinois: Illinois State Geological Survey Bulletin 14, p. 189-195.

Fettweis, G. B., 1979, World Coal Resources: Elsevier Scientific Publishing Company, Amsterdam, 415 p.

Ganow, H. C., 1975, A geotechnical study of the squeeze problem associated with the underground mining of coal, Ph.D. thesis, University of Illinois at Urbana-Champaign, 230 p.

Gluskoter, H. J., and O. W. Rees, 1964, Chlorine in Illinois coal: Illinois State Geological Survey Circular 372, 23 p.

Gluskoter, H. J., and J. A. Simon, 1968, Sulfur in Illinois Coals: Illinois State Geological Survey Circular 432, 28 p.

Hopkins, M. E., 1968, Harrisburg (No. 5) Coal reserves of southeastern Illinois: Illinois State Geological Survey Circular 431, 25 p.

Jacobson, R. J., and L. E. Bengal, 1981, Strippable coal resources of Illinois. Part 7, Vermilion and Edgar Counties: Illinois State Geological Survey Circular 521, 24 p.

Johnson, D. O., 1972, Stratigraphic Analysis of the interval between the Herrin (No. 6) Coal and the Piasa Limestone in southwestern Illinois: Ph.D. dissertation, University of Illinois, 105 p.

Krausse, H.-F., H. H. Damberger, W. J. Nelson, S. R. Hunt, C. T. Ledvina, C. G. Treworgy, and W. A. White, 1979, Roof strata of the Herrin (No. 6) Coal Member of mines in Illinois: Their geology and stability: Illinois State Geological Survey Illinois Minerals Notes 72, 46 p.

Nance, R. B., and C. G. Treworgy, 1981, Strippable coal resources of Illinois. Part 8—Central and southeastern counties: Illinois State Geological Survey Circular 515, 32 p.

Nelson, W. J., and R. B. Nance, 1981, Geologic mapping of roof conditions: Crown II Mine, Macoupin County, Illinois: Preprint of the Society of Mining Engineers of AIME paper no. 80-308, p. 1-9 (ISGS Reprint 1981A).

Reese, R. G., B. B. Dash, and P. A. Hamilton, 1978, Coal recovery from underground bituminous coal mines in the United States, by mining method: U.S. Bureau of Mines Information Circular 8785, 30 p.

Reinertsen, D. L., 1964, Strippable coal reserves of Illinois. Part 4—Adams, Brown, Calhoun, Hancock, McDonough, Pike, Schuyler, and the southern parts of Henderson and Warren Counties: Illinois State Geological Survey Circular 374, 32 p.

Searight, T. C., and W. H. Smith, 1969, Strippable coal reserves of Illinois. Part 5B—Mercer, Rock Island, Warren, and parts of Henderson and Henry Counties: Illinois State Geological Survey Circular 439, 24 p.

Singh, M. M., and M. F. Dunn, 1981, Investigation of problems and benefits of underground multiple seam coal mining: Engineers International, Inc. for U.S. Department of Energy, DOE/ET/14242-T2, 292 p.

Smith, W. H., 1957, Strippable coal reserves of Illinois. Part 1—Gallatin, Hardin, Johnson, Pope, Saline, and Williamson Counties: Illinois State Geological Survey Circular 228, 39 p.

Smith, W. H., 1958, Strippable coal reserves of Illinois. Part 2—Jackson, Monroe, Perry, Randolph, and St. Clair Counties: Illinois State Geological Survey Circular 260, 35 p.

Smith, W. H., 1961, Strippable coal reserves of Illinois. Part 3—Madison, Macoupin, Jersey, Greene, Scott, Morgan, and Cass Counties: Illinois State Geological Survey Circular 311, 40 p.

Smith, W. H., 1968, Strippable coal reserves of Illinois. Part 6—La Salle, Livingston, Grundy, Kankakee, Will, Putnam, and parts of Bureau and Marshall Counties: Illinois State Geological Survey Circular 419, 29 p.

Smith, W. H., and D. J. Berggren, 1963, Strippable coal reserves of Illinois. Part 5A—Fulton, Henry, Knox, Peoria, Stark, Tazewell, and parts of Bureau, Marshall, Mercer, and Warren Counties: Illinois State Geological Survey Circular 348, 59 p.

Smith, W. H., and J. B. Stall, 1975, Coal and water resources for coal conversion in Illinois: Illinois State Geological Survey and Illinois State Water Survey Cooperative Resources Report 4, 79 p.

Smith, W. H., L. E. Bengal, and R. J. Jacobson, 1975, Plate 1. Coal reserves of Illinois Herrin (No. 6) Coal, Plate 2. Coal reserves of Illinois Harrisburg-Springfield (No. 5) Coal, *in* W. H. Smith and J. B. Stall, Coal and water resources for coal conversion in Illinois: Illinois State Geological Survey and Illinois State Water Survey Cooperative Resources Report 4.

Speck, R. C., 1979, A comparative evaluation of geologic factors influencing floor stability in two Illinois coal mines, Ph.D. thesis, University of Missouri-Rolla, Missouri, 265 p.

Treworgy, C. G., L. E. Bengal, and A. G. Dingwell, 1978, Reserves and resources of surface-minable coal in Illinois: Illinois State Geological Survey Circular 504, 44 p.

Treworgy, C. G., 1981, The Seelyville Coal: A major unexploited seam in Illinois: Illinois State Geological Survey Minerals Notes 80, 11 p.

Treworgy, C. G., and R. J. Jacobson, in press, Paleoenvironments and distribution of low sulfur coal in Illinois: Proceedings of the Ninth International Congress of Carboniferous Stratigraphy and Geology, May 1979, Urbana-Champaign, Compte Rendu, 20 p.

Turner, K. A., 1976, Computer aided environmental impact anaylsis. Composite mapping: Colorado School of Mines and Mineral Industries Bulletin, vol. 19, no. 2, 23 p.

U.S. Geological Survey, 1976, Coal resource classification system: U.S. Bureau of Mines and U.S. Geological Survey, Bulletin 1450-5, 7 p.

Weir, J. P., and J. E. McNulty, 1981, Effects of physical characteristics of coal occurrence and current mining methods on economic recoverability: Geologic Society of America Bulletin, Part I, v. 92, no 8.

APPENDIX A. METHOD OF STUDY

Base Maps Used to Map Deep-Minable Resources in Illinois

County maps of coal thickness at a scale of 1:62,500 were obtained from various sources or constructed using all available data. A total of 73 maps were updated and 46 additional maps substantially revised or newly constructed. Mined-out boundaries as of January 1979 were used. A significant portion of the drill hole information used to construct these maps is confidential; consequently, these maps are not available to the public.

Surface features, which may inhibit underground mining, were delineated on 7½-inch quadrangle maps. Three categories of surface featues were delineated: surface development, highways, and public lands. Mining of coal under these features may be restricted. Surface development consisted of manmade structures or clusters of structures that occupied more than 10 acres (e.g., towns, dams, and rail yards). Highways consisted of interstate highways and other 4-lane divided roads. Because of the map scales used, the zone of coal affected by a highway was a minimum of 660 feet wide. The category of public lands included any land owned by a public organization. Some of this land, particularly under the large, publicly owned lakes, may be available for mining.

Oil fields. By law, a pillar of unmined coal must be left around wells that have been drilled for oil or gas. The dimensions of the pillar may vary with mining plans, but in general, about 2 acres of coal per well are left unmined. Mine layouts must be carefully planned in areas of numerous closely spaced wells. Mine entries cannot be properly developed where wells are spaced one for each 20 acres or less over large areas. Rooms cannot be developed in areas where wells are spaced evenly 10 acres or less.

Areas where the density of oil wells may inhibit coal mining were delineated on 1:31,250 scale maps.

Depth to the Herrin (No. 6) and Springfield (No. 5) Coals was obtained from maps that had a scale of approximately 1:1,500,000 and a contour interval of 200 feet (Smith and Stall, 1975). Depths to other seams were calculated based on their average distance above or below the No. 5 or No. 6 Coals. The accuracy of the depths obtained by this method is probably within ±100 feet.

Low-to medium-sulfur coal was delineated based on the lithology of the overlying rocks. It has been shown that where nonmarine shale 20 feet or more thick directly overlies the coal, the coal generally has a sulfur content between 0.5 and 2.5 percent (Gluskoter and Simon, 1968). This rule-of-thumb allows more complete delineation of sulfur deposits in areas where few chemical analyses are available. The maps of low-sulfur areas were taken from Hopkins (1968), Johnson (1972), and work maps by C. G. Treworgy.

Chlorine content of the Herrin (No. 6) Coal was obtained from an updated version of Gluskoter and Rees (1964) map. An average value in tenths of percent was assigned to each township. The actual chlorine value of coals will be slightly higher for coals deeper than the No. 6 and slightly lower for coals shallower than the No. 6. However, we do not have enough information to adjust the chlorine values for depth.

Moisture content of the Herrin (No. 6) Coal was obtained from Damberger (1971). An average mineral-matter-free moisture value was assigned to each township. This figure can be used to calculate Btu/lb values for the coals.

Mapping Procedure

The base maps constructed for this study were processed by computer using a technique called composite mapping (fig. A-1). Maps of the various parameters were constructed separately at whatever scale was convenient. The information on these maps was then digitized, converted to a grid format, and stored in a computer file. Using these files, a computer overlaid the data from the various maps and calculated the tonnages of coal in selected categories (e.g., the amount of coal 6 ft thick with <2.5% S overlain by a city).

The process of converting map data to a grid format is depicted in figure A-2. The study area was divided into 10-acre cells (660 ft x 660 ft). The computer scanned the digitized map information for each parameter and assigned a value to the cell corresponding to each map location. Although this technique produced a very large computer file (our file contains about 2 million cells and 58 million characters), the file structure permits rapid processing of information.

Using the 10-acre cell size limited resolution of data to 660 feet. This was acceptable for our purposes since the accuracy attained in mapping most parameters was much less. The representation of features occupying small areas (small mines, dams, and highways) can be somewhat distorted; however, these inaccuracies are not significant on a regional scale.

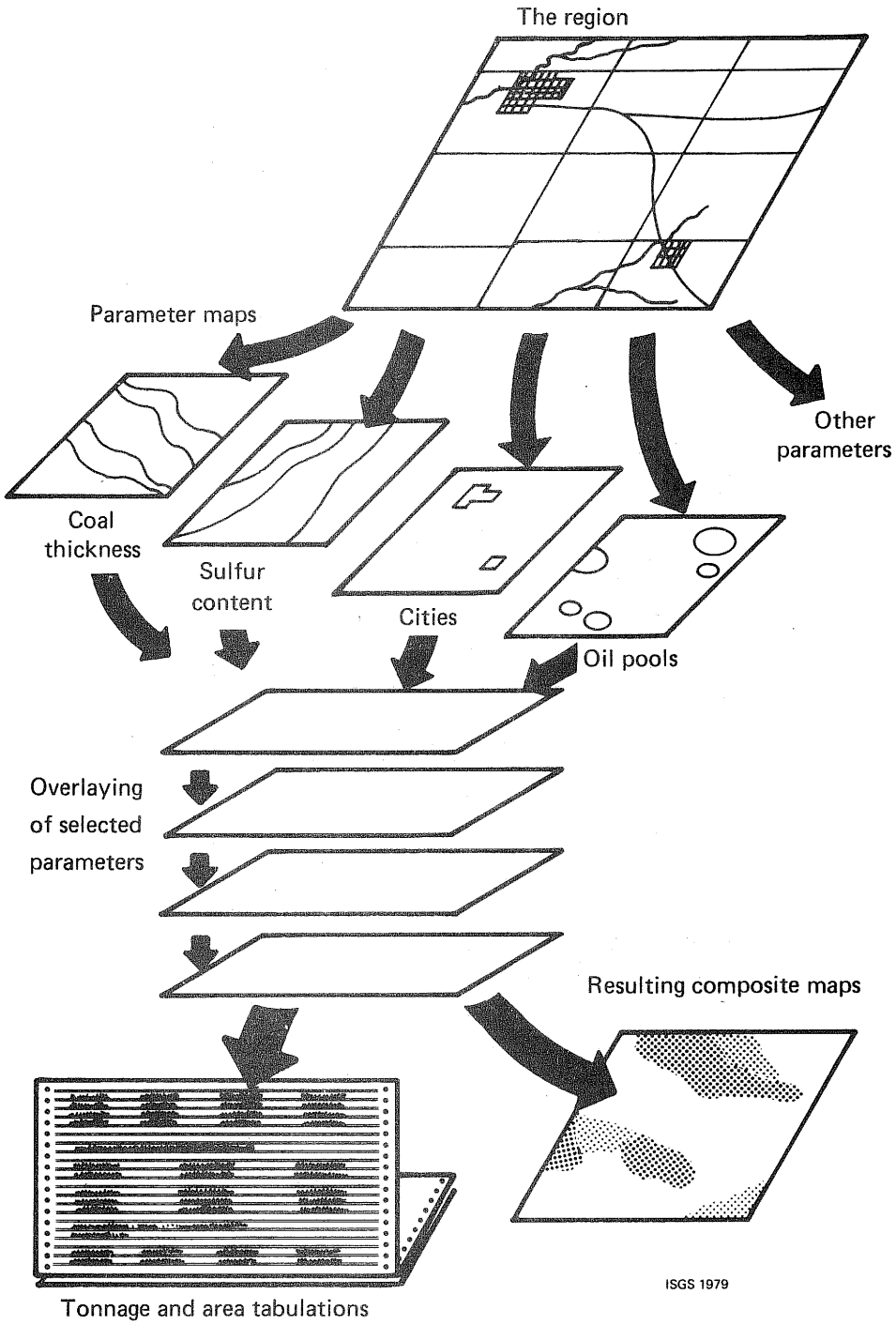
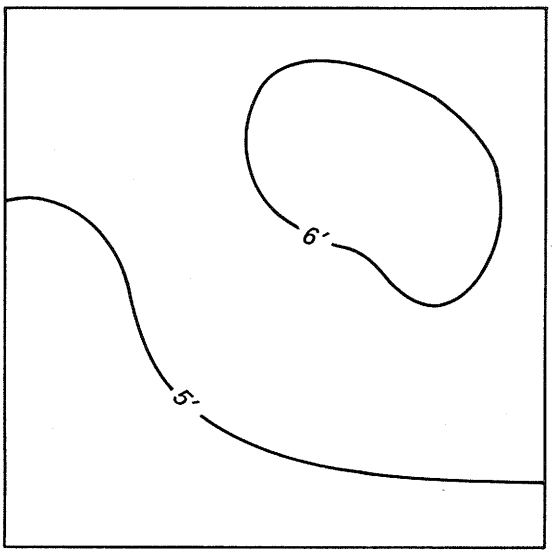


Figure A-1.
Composite mapping (modified from Turner, 1976).



Map of coal thickness (ft)

5	5	5	5	5	5	5
5	5	5	6	6	6	5
4	5	5	6	6	6	5
4	5	5	5	5	6	5
4	4	5	5	5	5	5
4	4	4	5	5	5	5
4	4	4	4	4	4	4

Grid representation of coal thickness map

ISGS 1982

Figure A-2.
Representation of map data as grid cells.

APPENDIX B. DEEP-MINABLE RESOURCES BY COUNTY, SEAM, AND THICKNESS (MILLIONS OF TONS)

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
BOND COUNTY								
ROCK ISLAND (NO. 1)								
42 - 54"	0	2	0	0	2	0	0	2
COLCHESTER (NO. 2)								
28 - 42"	0	0	2	0	2	0	0	2
HERRIN (NO. 6)								
28 - 42"	0	0	4	0	4	3	1	0
42 - 54"	0	121	0	19	140	7	94	21
54 - 66"	196	554	0	51	801	34	172	544
66 - 78"	519	0	0	25	544	89	335	95
78 - 90"	657	0	0	29	686	199	443	14
90 - 102"	156	0	0	11	167	30	119	7
102 - 114"	23	0	0	0	24	10	14	0
TOTAL, COAL SEAM	1551	676	4	134	2365	372	1177	682
TOTAL, COUNTY	1551	677	6	134	2369	372	1177	686
BUREAU COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	379	17	396	183	174	22
42 - 54"	0	183	0	13	196	138	44	0
TOTAL, COAL SEAM	0	183	379	30	592	321	218	22
HERRIN (NO. 6)								
28 - 42"	0	0	108	11	119	28	74	6
42 - 54"	0	115	0	10	125	47	67	0
54 - 66"	68	0	0	10	78	45	24	0
66 - 78"	42	0	0	5	47	31	11	0
TOTAL, COAL SEAM	110	115	108	36	369	151	176	6
DANVILLE (NO. 7)								
28 - 42"	0	0	116	12	127	29	87	0
42 - 54"	0	45	0	15	60	13	32	0
TOTAL, COUNTY	110	342	603	92	1147	513	514	28
CHAMPAIGN COUNTY								
HERRIN (NO. 6)								
28 - 42"	0	0	4	0	4	0	0	4
42 - 54"	0	52	0	6	58	1	23	28
54 - 66"	23	0	0	0	23	5	17	0
66 - 78"	60	0	0	0	60	5	45	10
78 - 90"	50	0	0	2	52	13	37	0
TOTAL, COAL SEAM	132	52	4	9	197	24	122	42
DANVILLE (NO. 7)								
28 - 42"	0	0	8	0	8	1	7	0
42 - 54"	0	5	0	0	5	3	3	0
54 - 66"	89	0	0	5	94	8	15	65
TOTAL, COAL SEAM	89	5	8	5	108	11	25	66
TOTAL, COUNTY	221	57	12	14	305	36	147	108

*Does not include resources with a restricted potential for development.

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
CHRISTIAN COUNTY								
ROCK ISLAND (NO. 1)								
28 - 42"	0	0	38	3	41	0	26	12
TOTAL, COAL SEAM	0	0	38	3	41	0	26	12
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	52	2	55	3	37	12
42 - 54"	0	139	0	17	156	8	82	49
54 - 66"	481	294	0	52	827	45	307	422
66 - 78"	177	0	0	21	198	11	96	70
TOTAL, COAL SEAM	658	433	52	92	1236	68	522	554
HERRIN (NO. 6)								
28 - 42"	0	0	106	26	131	4	20	81
42 - 54"	0	174	0	13	187	17	72	85
54 - 66"	102	125	0	17	244	33	126	67
66 - 78"	550	0	0	10	560	68	349	133
78 - 90"	492	0	0	15	507	226	228	38
90 - 102"	1265	0	0	53	1319	506	588	171
102 - 114"	372	0	0	0	372	190	182	0
114 - 126"	42	0	0	0	42	22	20	0
TOTAL, COAL SEAM	2823	299	106	134	3362	1066	1585	576
DANVILLE (NO. 7)								
28 - 42"	0	0	37	9	46	13	24	0
42 - 54"	0	8	0	0	8	8	0	0
TOTAL, COUNTY	3481	740	233	239	4693	1156	2157	1142
CLARK COUNTY								
SEELYVILLE								
42 - 66"	0	719	0	73	792	2	38	679
66 - 90"	284	0	0	2	286	2	2	280
TOTAL, COAL SEAM	284	719	0	75	1078	4	40	959
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	676	64	741	2	50	625
42 - 54"	0	486	0	34	520	20	189	278
54 - 66"	6	0	0	0	6	0	6	0
TOTAL, COAL SEAM	6	486	676	98	1266	21	244	903
HERRIN (NO. 6)								
28 - 42"	0	0	40	11	51	6	16	18
JAMESTOWN								
28 - 42"	0	0	176	18	193	0	20	156
42 - 54"	0	211	0	5	215	4	28	179
54 - 66"	1	107	0	1	109	0	0	108
TOTAL, COAL SEAM	1	318	176	23	518	4	47	443
DANVILLE (NO. 7)								
28 - 42"	0	0	409	32	441	8	110	291
42 - 54"	0	545	0	21	566	14	143	388
54 - 66"	1	0	0	0	1	0	1	0
TOTAL, COAL SEAM	1	545	409	53	1008	22	254	679
TOTAL, COUNTY	292	2067	1301	260	3921	57	602	3002

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
CRAWFORD COUNTY								
SEELYVILLE								
42 - 66"	0	720	0	448	1168	1	24	696
66 - 90"	660	0	0	379	1039	20	118	523
TOTAL, COAL SEAM	660	720	0	827	2207	20	142	1218
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	765	422	1187	16	178	572
42 - 54"	0	65	0	49	114	4	5	55
54 - 66"	0	0	0	0	0	0	0	0
66 - 78"	1	0	0	0	1	1	0	0
78 - 90"	1	0	0	0	1	1	0	0
TOTAL, COAL SEAM	1	65	765	471	1303	21	183	627
HERRIN (NO. 6)								
28 - 42"	0	0	405	367	772	0	16	389
42 - 54"	0	94	0	84	178	1	12	82
54 - 66"	0	20	0	12	32	0	0	20
TOTAL, COAL SEAM	0	114	405	464	983	1	28	491
JAMESTOWN								
28 - 42"	0	0	366	250	617	6	70	291
42 - 54"	0	499	0	186	686	17	169	314
DANVILLE (NO. 7)								
28 - 42"	0	0	636	393	1029	17	168	451
42 - 54"	0	76	0	113	189	1	22	53
TOTAL, COUNTY	661	1475	2173	2704	7012	83	781	3445
CUMBERLAND COUNTY								
SEELYVILLE								
42 - 66"	0	244	877	76	1198	0	0	1121
66 - 90"	0	118	0	4	122	0	0	118
TOTAL, COAL SEAM	0	362	877	80	1320	0	0	1239
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	481	16	497	0	103	378
42 - 54"	0	330	230	37	597	0	82	478
54 - 66"	0	63	0	2	65	0	0	63
TOTAL, COAL SEAM	0	393	711	55	1160	0	185	920
HERRIN (NO. 6)								
28 - 42"	0	0	102	23	125	0	0	102
42 - 54"	0	470	24	8	502	11	88	395
54 - 66"	0	828	0	35	863	29	283	516
66 - 78"	123	101	0	5	229	1	61	162
TOTAL, COAL SEAM	123	1398	126	72	1719	40	432	1175
TOTAL, COUNTY	123	2153	1714	207	4198	40	617	3334

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
CLAY COUNTY								
SEELYVILLE								
42 - 66"	0	0	30	7	37	0	0	30
TOTAL, COAL SEAM	0	0	30	7	37	0	0	30
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	302	36	338	0	0	302
42 - 54"	0	91	1103	277	1471	0	0	1194
54 - 66"	0	135	0	36	171	0	0	135
TOTAL, COAL SEAM	0	227	1405	349	1980	0	0	1632
HERRIN (NO. 6)								
28 - 42"	0	0	529	55	584	0	0	529
42 - 54"	0	310	272	145	727	0	0	582
54 - 66"	0	412	0	108	520	0	0	412
66 - 78"	17	125	0	73	215	0	0	142
TOTAL, COAL SEAM	17	848	802	380	2046	0	0	1666
TOTAL, COUNTY	17	1074	2236	736	4063	0	0	3327
CLINTON COUNTY								
HERRIN (NO. 6)								
28 - 42"	0	0	4	0	4	1	1	2
42 - 54"	0	36	0	2	38	3	14	19
54 - 66"	58	448	0	283	789	82	256	169
66 - 78"	685	0	0	85	770	121	358	205
78 - 90"	764	0	0	77	841	239	407	118
90 - 102"	469	0	0	30	499	226	192	51
102 - 114"	117	0	0	7	125	36	57	24
114 - 126"	57	0	0	9	66	32	13	12
TOTAL, COAL SEAM	2150	484	4	493	3132	741	1298	599
TOTAL, COUNTY	2150	484	4	493	3132	741	1298	599
COLES COUNTY								
SEELYVILLE								
42 - 66"	0	281	365	90	736	0	0	646
TOTAL, COAL SEAM	0	281	365	90	736	0	0	646
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	130	12	142	0	11	119
42 - 54"	0	393	52	56	501	2	44	399
HERRIN (NO. 6)								
28 - 42"	0	0	271	54	324	3	56	212
42 - 54"	0	187	55	26	268	19	96	127
54 - 66"	0	36	0	6	42	0	4	32
TOTAL, COAL SEAM	0	223	326	85	635	22	156	371
DANVILLE (NO. 7)								
28 - 42"	0	0	241	29	270	0	0	241
42 - 54"	0	11	0	39	50	0	10	1
TOTAL, COUNTY	0	909	1114	312	2335	24	221	1777

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
DE WITT COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	32	1	33	0	0	32
42 - 54"	0	1277	0	142	1419	0	0	1277
54 - 66"	0	54	0	6	59	0	0	54
TOTAL, COAL SEAM	0	1331	32	149	1511	0	0	1362
TOTAL, COUNTY	0	1331	32	149	1511	0	0	1362
DOUGLAS COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	79	2	81	7	54	19
42 - 54"	0	37	0	2	39	0	0	37
TOTAL, COAL SEAM	0	37	79	4	120	7	54	55
HERRIN (NO. 6)								
28 - 42"	0	0	205	1	207	18	81	107
42 - 54"	0	213	0	10	223	44	90	79
54 - 66"	17	20	0	0	37	15	17	4
66 - 78"	325	0	0	7	332	136	163	27
78 - 90"	201	0	0	9	211	168	33	0
TOTAL, COAL SEAM	543	233	205	27	1009	381	384	217
TOTAL, COUNTY	543	270	285	31	1129	388	438	272
EDGAR COUNTY								
SEELYVILLE								
42 - 66"	0	563	0	21	584	60	275	228
66 - 90"	287	0	0	22	308	81	137	69
TOTAL, COAL SEAM	287	563	0	42	893	141	412	297
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	225	7	232	25	88	113
42 - 54"	0	265	0	7	272	83	98	84
54 - 66"	52	0	0	0	52	28	24	0
TOTAL, COAL SEAM	52	265	225	14	556	136	210	196
HERRIN (NO. 6)								
28 - 42"	0	0	323	9	332	51	160	112
42 - 54"	0	209	0	22	230	65	117	27
54 - 66"	140	0	0	0	141	83	58	0
66 - 78"	103	0	0	1	104	49	54	0
78 - 90"	2	0	0	0	2	2	0	0
TOTAL, COAL SEAM	245	209	323	32	808	249	388	139
DANVILLE (NO. 7)								
28 - 42"	0	0	383	24	407	80	154	149
42 - 54"	0	395	0	4	399	70	167	158
54 - 66"	234	0	0	7	241	99	134	1
66 - 78"	26	0	0	0	26	20	6	0
TOTAL, COAL SEAM	260	395	383	35	1073	270	462	307
TOTAL, COUNTY	844	1432	931	123	3330	796	1472	939

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
EDWARDS COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	254	26	280	1	10	243
42 - 54"	0	34	69	5	108	2	7	94
54 - 66"	0	99	0	12	111	5	21	73
66 - 78"	107	88	0	33	227	5	39	151
78 - 90"	91	100	0	45	236	5	23	163
90 - 102"	58	40	0	23	121	6	10	82
TOTAL, COAL SEAM	256	361	323	144	1084	24	111	805
HERRIN (NO. 6)								
28 - 42"	0	0	272	31	303	6	40	226
42 - 54"	0	358	0	57	414	6	51	301
54 - 66"	0	106	0	14	120	11	24	71
66 - 78"	47	0	0	11	58	8	18	21
78 - 90"	7	0	0	0	7	4	3	0
TOTAL, COAL SEAM	54	464	272	113	903	35	136	619
TOTAL, COUNTY	309	825	596	257	1987	59	247	1424
EFFINGHAM COUNTY								
SEELYVILLE								
42 - 66"	0	0	264	24	288	0	0	264
66 - 90"	0	94	0	2	96	0	0	94
TOTAL, COAL SEAM	0	94	264	25	384	0	0	358
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	462	25	487	0	0	462
42 - 54"	0	443	554	97	1094	2	16	980
54 - 66"	0	335	0	32	366	3	44	287
66 - 78"	33	0	0	0	33	0	0	33
TOTAL, COAL SEAM	33	778	1016	154	1981	5	60	1761
HERRIN (NO. 6)								
28 - 42"	0	0	258	19	277	0	0	258
42 - 54"	0	195	115	36	346	0	2	308
54 - 66"	0	341	0	36	377	4	34	303
66 - 78"	59	126	0	6	191	2	31	152
TOTAL, COAL SEAM	59	663	372	97	1191	6	68	1021
TOTAL, COUNTY	92	1534	1652	277	3555	10	128	3141
FAYETTE COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	1024	112	1136	1	35	987
42 - 54"	0	991	0	101	1092	4	72	914
54 - 66"	0	32	0	0	32	0	0	32
66 - 78"	1	0	0	0	1	0	0	1
TOTAL, COAL SEAM	1	1023	1024	213	2261	6	107	1935
HERRIN (NO. 6)								
28 - 42"	0	0	57	2	59	0	0	57
42 - 54"	0	152	0	4	156	0	0	152
54 - 66"	0	935	0	172	1107	6	75	855
66 - 78"	1252	0	0	72	1324	23	302	927
78 - 90"	569	0	0	14	583	43	355	171
90 - 102"	170	0	0	1	171	33	99	38
TOTAL, COAL SEAM	1991	1087	57	265	3400	104	831	2200
DANVILLE (NO. 7)								
28 - 42"	0	0	276	15	292	33	244	0
TOTAL, COUNTY	1992	2111	1357	494	5953	142	1182	4135

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
FRANKLIN COUNTY								
MT RORAH								
28 - 42"	0	0	32	4	36	10	22	0
42 - 54"	0	6	16	1	22	10	11	0
66 - 78"	0	5	0	0	5	5	0	0
TOTAL, COAL SEAM	0	11	48	5	64	26	34	0
DAVIS								
28 - 42"	0	0	401	99	501	13	133	255
42 - 54"	0	0	0	2	3	0	0	0
DE KOVEN								
28 - 42"	0	0	229	61	290	3	35	191
42 - 54"	0	50	0	5	55	4	45	2
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	85	16	101	34	49	2
42 - 54"	0	1054	0	185	1239	315	692	46
54 - 66"	0	513	0	42	555	244	268	0
66 - 78"	142	0	0	2	144	50	93	0
78 - 90"	10	0	0	1	10	3	7	0
TOTAL, COAL SEAM	152	1567	85	246	2050	646	1109	48
HERRIN (NO. 6)								
28 - 42"	0	0	0	0	0	0	0	0
42 - 54"	0	0	0	0	0	0	0	0
54 - 66"	0	199	0	18	217	116	83	0
66 - 78"	446	0	0	32	478	256	191	0
78 - 90"	405	0	0	40	445	324	81	0
90 - 102"	189	0	0	39	228	183	6	0
102 - 114"	131	0	0	13	144	128	4	0
114 - 126"	14	0	0	7	21	7	7	0
TOTAL, COAL SEAM	1187	199	0	149	1534	1014	371	0
TOTAL, COUNTY	1339	1827	763	567	4496	1707	1726	497
FULTON COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	217	0	217	0	217	0
TOTAL, COAL SEAM	0	0	217	0	217	0	217	0
SPRINGFIELD (NO. 5)								
42 - 54"	0	0	75	0	75	0	75	0
TOTAL, COUNTY	0	0	292	0	292	0	292	0
GALLATIN COUNTY								
DAVIS								
42 - 54"	0	781	0	49	830	31	277	473
DE KOVEN								
28 - 42"	0	0	521	32	553	21	199	301
42 - 54"	0	60	0	2	63	5	30	25
SURVANT								
28 - 42"	0	0	2	0	2	2	0	0
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	5	4	9	3	1	1
42 - 54"	0	332	0	51	384	100	189	43
54 - 66"	225	370	0	73	667	362	221	11
66 - 78"	77	0	0	15	92	55	22	0
78 - 90"	0	0	0	2	2	0	0	0
TOTAL, COAL SEAM	301	702	5	146	1155	520	433	56
HERRIN (NO. 6)								
28 - 42"	0	0	143	24	167	82	52	9
42 - 54"	0	303	0	47	350	135	124	44
54 - 66"	104	34	0	23	161	43	94	2
66 - 78"	46	0	0	6	53	6	34	6
78 - 90"	14	0	0	1	15	0	2	12
TOTAL, COAL SEAM	164	337	143	102	745	266	305	72
TOTAL, COUNTY	465	1881	671	331	3347	846	1244	927

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
GREENE COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	83	0	83	0	0	83
TOTAL, COAL SEAM	0	0	83	0	83	0	0	83
TOTAL, COUNTY	0	0	83	0	83	0	0	83
GRUNDY COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	373	7	379	16	93	264
TOTAL, COAL SEAM	0	0	373	7	379	16	93	264
TOTAL, COUNTY	0	0	373	7	379	16	93	264
HAMILTON COUNTY								
DAVIS								
42 - 54"	0	5	0	0	5	0	0	5
DE KOVEN								
28 - 42"	0	0	4	0	4	0	0	4
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	27	0	27	3	21	3
42 - 54"	0	170	261	35	465	52	140	238
54 - 66"	0	745	0	109	854	224	274	247
66 - 78"	267	342	0	97	705	187	292	130
78 - 90"	144	108	0	20	272	139	108	6
90 - 102"	27	25	0	1	53	47	5	0
102 - 114"	2	4	0	0	6	6	0	0
114 - 126"	2	1	0	0	3	3	0	0
TOTAL, COAL SEAM	443	1394	288	261	2386	661	840	624
HERRIN (NO. 6)								
28 - 42"	0	0	57	4	61	6	18	33
42 - 54"	0	542	0	43	585	60	221	261
54 - 66"	0	670	0	73	743	249	328	93
66 - 78"	453	0	0	96	549	155	240	58
78 - 90"	331	0	0	48	379	103	181	47
90 - 102"	183	0	0	33	217	62	83	38
102 - 114"	17	0	0	9	26	11	6	0
TOTAL, COAL SEAM	985	1212	57	305	2559	646	1079	529
TOTAL, COUNTY	1428	2610	349	566	4953	1307	1918	1162
HENRY COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	10	0	10	10	0	0
TOTAL, COAL SEAM	0	0	10	0	10	10	0	0
TOTAL, COUNTY	0	0	10	0	10	10	0	0
JACKSON COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	0	0	0	0	0	0
42 - 54"	0	80	0	2	82	22	52	7
54 - 66"	57	0	0	1	58	31	26	0
66 - 78"	4	0	0	0	4	3	1	0
TOTAL, COAL SEAM	61	80	0	3	144	55	79	7
TOTAL, COUNTY	61	80	0	3	144	55	79	7

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
JASPER COUNTY								
SEELYVILLE								
42 - 66"	0	229	1057	125	1411	0	0	1286
66 - 90"	4	625	0	41	671	0	0	630
90 - 114"	0	69	0	0	69	0	0	69
TOTAL, COAL SEAM	4	924	1057	166	2151	0	0	1985
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	772	102	874	2	33	737
42 - 54"	0	184	720	66	970	9	129	765
54 - 66"	0	149	0	2	151	10	38	101
TOTAL, COAL SEAM	0	334	1492	170	1995	22	200	1604
HERRIN (NO. 6)								
28 - 42"	0	0	160	24	184	0	6	154
42 - 54"	0	360	220	46	626	4	51	525
54 - 66"	0	817	0	109	926	5	45	766
66 - 78"	119	665	0	55	839	17	157	610
TOTAL, COAL SEAM	119	1842	380	234	2576	27	259	2055
TOTAL, COUNTY	124	3099	2929	570	6722	49	459	5644
JEFFERSON COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	109	8	117	17	26	67
42 - 54"	0	1319	58	154	1531	187	511	679
54 - 66"	0	887	0	78	966	98	238	551
66 - 78"	92	109	0	23	224	16	27	158
78 - 90"	5	0	0	1	6	1	0	3
TOTAL, COAL SEAM	97	2315	167	265	2844	318	802	1459
HERRIN (NO. 6)								
28 - 42"	0	0	205	21	226	5	11	188
42 - 54"	0	443	0	55	499	43	60	340
54 - 66"	0	620	0	58	679	162	226	232
66 - 78"	668	0	0	79	747	233	352	83
78 - 90"	256	0	0	23	280	127	107	23
90 - 102"	178	0	0	18	195	88	45	45
102 - 114"	39	0	0	0	39	33	6	0
114 - 126"	21	0	0	0	21	21	0	0
TOTAL, COAL SEAM	1161	1064	205	255	2686	710	808	912
TOTAL, COUNTY	1258	3379	372	520	5529	1028	1610	2371
JERSEY COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	111	0	111	0	0	111
TOTAL, COAL SEAM	0	0	111	0	111	0	0	111
TOTAL, COUNTY	0	0	111	0	111	0	0	111
KANKAKEE COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	42	0	42	0	24	19
TOTAL, COAL SEAM	0	0	42	0	42	0	24	19
TOTAL, COUNTY	0	0	42	0	42	0	24	19

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
KNOX COUNTY								
ROCK ISLAND (NO. 1)								
28 - 42"	0	0	8	0	8	4	4	0
42 - 54"	0	0	33	0	33	12	21	0
54 - 66"	0	0	13	0	13	2	6	5
66 - 78"	0	0	1	0	1	1	1	0
TOTAL, COAL SEAM	0	0	56	0	56	19	32	5
COLCHESTER (NO. 2)								
28 - 42"	0	0	106	0	106	0	0	106
TOTAL, COUNTY	0	0	162	0	162	19	32	111
LA SALLE COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	799	67	866	40	541	218
42 - 54"	0	153	0	21	174	20	132	1
54 - 66"	2	0	0	0	2	1	1	0
TOTAL, COAL SEAM	2	153	799	88	1041	60	674	219
HERRIN (NO. 6)								
28 - 42"	0	0	50	15	65	15	35	0
42 - 54"	0	20	0	8	28	14	6	0
54 - 66"	3	0	0	1	4	2	1	0
TOTAL, COAL SEAM	3	20	50	25	98	31	42	0
DANVILLE (NO. 7)								
28 - 42"	0	0	213	24	237	1	151	61
42 - 54"	0	207	0	22	229	17	157	33
54 - 66"	2	0	0	8	10	1	1	0
TOTAL, COAL SEAM	2	207	213	54	476	20	308	94
TOTAL, COUNTY	7	380	1061	167	1615	111	1024	313
LAWRENCE COUNTY								
SEELYVILLE								
42 - 66"	0	420	41	58	519	3	27	431
66 - 90"	36	0	0	6	42	0	0	36
TOTAL, COAL SEAM	36	420	41	64	561	3	27	467
SURVANT								
28 - 42"	0	0	35	15	49	3	32	0
42 - 54"	0	83	0	3	86	1	25	56
54 - 66"	0	10	0	0	10	9	1	0
TOTAL, COAL SEAM	0	94	35	18	146	14	58	56
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	639	159	798	15	81	543
42 - 54"	0	408	0	66	474	32	82	294
54 - 66"	0	135	0	8	143	24	10	102
66 - 78"	37	0	0	2	39	15	22	0
78 - 90"	14	0	0	5	19	3	11	0
TOTAL, COAL SEAM	51	543	639	240	1473	89	206	939
HERRIN (NO. 6)								
28 - 42"	0	0	604	127	732	2	71	532
42 - 54"	0	234	0	23	256	7	35	192
JAMESTOWN								
28 - 42"	0	0	449	122	571	17	107	325
42 - 54"	0	346	0	79	425	30	95	221
54 - 66"	0	157	0	14	171	12	71	74
TOTAL, COAL SEAM	0	503	449	215	1167	59	273	620
DANVILLE (NO. 7)								
28 - 42"	0	0	496	81	577	35	79	382
42 - 54"	0	329	0	48	377	13	149	166
54 - 66"	0	65	0	7	73	8	29	29
TOTAL, COAL SEAM	0	394	496	137	1026	56	256	577
TOTAL, COUNTY	88	2186	2264	824	5361	229	926	3382

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
LIVINGSTON COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	1415	51	1465	7	189	1219
42 - 54"	0	37	0	0	37	0	0	37
TOTAL, COAL SEAM	0	37	1415	51	1502	7	189	1255
DANVILLE (NO. 7)								
28 - 42"	0	0	414	13	427	2	51	361
42 - 54"	0	426	0	35	461	11	99	316
54 - 66"	368	0	0	7	375	34	148	186
66 - 78"	28	0	0	0	28	0	8	20
TOTAL, COAL SEAM	396	426	414	54	1290	47	306	883
TOTAL, COUNTY	396	463	1829	105	2792	54	495	2138
LOGAN COUNTY								
SPRINGFIELD (NO. 5)								
42 - 54"	0	482	0	13	495	7	160	315
54 - 66"	948	0	0	48	996	60	474	414
66 - 78"	1007	0	0	23	1030	94	561	352
TOTAL, COAL SEAM	1955	482	0	84	2521	161	1195	1081
HERRIN (NO. 6)								
28 - 42"	0	0	141	6	147	12	128	0
42 - 54"	0	86	0	15	101	24	62	0
54 - 66"	22	0	0	2	24	6	16	0
TOTAL, COAL SEAM	22	86	141	23	272	42	206	0
TOTAL, COUNTY	1977	568	141	107	2793	204	1401	1081
MCLEAN COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	22	0	22	0	0	22
42 - 54"	0	149	0	116	265	1	28	120
TOTAL, COAL SEAM	0	149	22	116	287	1	28	142
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	1859	73	1932	5	69	1786
42 - 54"	0	1613	0	221	1834	1	35	1577
54 - 66"	64	104	0	3	171	0	4	164
66 - 78"	22	0	0	0	22	0	1	21
TOTAL, COAL SEAM	86	1717	1859	297	3959	6	108	3548
DANVILLE (NO. 7)								
28 - 42"	0	0	338	48	387	1	31	307
42 - 54"	0	40	0	48	89	1	36	3
54 - 66"	3	0	0	0	3	0	3	1
66 - 78"	100	0	0	4	104	10	85	5
TOTAL, COAL SEAM	104	40	338	100	583	12	154	316
TOTAL, COUNTY	189	1906	2220	513	4829	19	290	4007

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
MACON COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	122	16	139	3	19	101
42 - 54"	0	636	0	184	820	1	43	592
54 - 66"	277	119	0	62	458	21	200	176
66 - 78"	105	0	0	30	136	27	67	11
78 - 90"	20	0	0	2	22	7	13	0
TOTAL, COAL SEAM	403	755	122	294	1574	59	342	879
HERRIN (NO. 6)								
28 - 42"	0	0	246	18	264	4	41	201
42 - 54"	0	85	0	4	89	1	21	63
54 - 66"	0	1	0	0	1	0	0	1
66 - 78"	10	0	0	0	10	0	8	2
78 - 90"	3	0	0	0	3	0	3	0
TOTAL, COAL SEAM	12	86	246	23	366	5	72	267
TOTAL, COUNTY	415	841	368	317	1941	63	414	1146
MACOUPIN COUNTY								
ROCK ISLAND (NO. 1)								
42 - 54"	0	34	0	1	35	0	4	30
54 - 66"	47	459	0	44	549	5	47	454
66 - 78"	114	0	0	19	133	0	0	114
TOTAL, COAL SEAM	161	493	0	64	717	5	51	598
WILEY								
28 - 42"	0	0	102	22	125	4	31	67
COLCHESTER (NO. 2)								
28 - 42"	0	0	1055	50	1104	14	178	863
42 - 54"	0	289	0	6	295	0	0	289
54 - 66"	60	0	0	1	61	4	53	3
TOTAL, COAL SEAM	60	289	1055	56	1460	18	231	1154
SUMMUM (NO. 4)								
28 - 42"	0	0	20	0	20	0	0	20
HERRIN (NO. 6)								
28 - 42"	0	0	132	3	135	18	81	33
42 - 54"	0	388	0	5	393	84	272	32
54 - 66"	507	0	0	19	526	195	300	11
66 - 78"	787	0	0	20	807	434	340	13
78 - 90"	985	0	0	38	1023	663	322	0
90 - 102"	438	0	0	13	451	376	62	0
102 - 114"	24	0	0	0	24	22	2	0
114 - 126"	5	0	0	0	5	5	0	0
TOTAL, COAL SEAM	2745	388	132	99	3365	1798	1378	89
DANVILLE (NO. 7)								
28 - 42"	0	0	12	1	13	5	7	0
TOTAL, COUNTY	2966	1170	1321	242	5699	1830	1698	1929

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
MADISON COUNTY								
ROCK ISLAND (NO. 1)								
54 - 66"	0	8	0	0	9	0	0	8
WILEY								
28 - 42"	0	0	6	0	6	0	0	6
COLCHESTER (NO. 2)								
28 - 42"	0	0	62	0	62	2	14	46
HERRIN (NO. 6)								
28 - 42"	0	0	82	5	87	13	29	40
42 - 54"	0	270	0	24	294	45	176	49
54 - 66"	288	0	0	27	315	119	158	11
66 - 78"	358	0	0	40	397	185	151	22
78 - 90"	451	0	0	63	514	185	75	191
90 - 102"	54	0	0	3	58	54	0	0
TOTAL, COAL SEAM	1151	270	82	162	1666	602	589	313
TOTAL, COUNTY	1151	279	150	163	1742	604	603	372
MARION COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	381	33	414	0	5	376
42 - 54"	0	1341	152	227	1720	9	113	1372
54 - 66"	0	208	0	68	276	9	34	165
66 - 78"	14	0	0	23	37	0	0	14
78 - 90"	3	0	0	6	9	0	0	3
TOTAL, COAL SEAM	17	1549	534	356	2456	18	152	1930
HERRIN (NO. 6)								
28 - 42"	0	0	898	69	967	1	9	888
42 - 54"	0	278	0	37	315	3	17	257
54 - 66"	0	271	0	47	318	7	36	228
66 - 78"	100	0	0	43	143	17	57	26
78 - 90"	72	0	0	15	87	32	39	2
90 - 102"	1	0	0	0	1	1	0	0
TOTAL, COAL SEAM	173	550	898	210	1830	61	158	1401
TOTAL, COUNTY	190	2099	1431	567	4286	79	310	3331
MARSHALL COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	412	19	432	29	192	192
42 - 54"	0	1	0	0	1	0	1	0
TOTAL, COAL SEAM	0	1	412	19	432	29	193	192
HERRIN (NO. 6)								
42 - 54"	0	4	0	2	7	0	4	0
DANVILLE (NO. 7)								
28 - 42"	0	0	225	2	227	2	72	151
42 - 54"	0	9	0	5	14	8	1	0
TOTAL, COUNTY	0	14	637	29	680	39	270	343
MENARD COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	0	0	0	0	0	0
42 - 54"	0	7	0	0	7	5	2	0
54 - 66"	193	0	0	5	198	81	112	0
66 - 78"	619	0	0	30	648	372	246	0
78 - 90"	17	0	0	1	18	15	2	0
TOTAL, COAL SEAM	829	7	0	35	871	473	363	0
TOTAL, COUNTY	829	7	0	35	871	473	363	0

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
MONTGOMERY COUNTY								
ROCK ISLAND (NO. 1)								
42 - 54"	0	283	0	27	311	5	71	207
54 - 66"	0	136	0	9	145	3	37	96
TOTAL, COAL SEAM	0	420	0	36	456	8	108	303
WILEY								
28 - 42"	0	0	102	19	121	4	33	65
COLCHESTER (NO. 2)								
28 - 42"	0	0	352	16	368	7	110	235
42 - 54"	0	201	0	19	220	4	35	162
54 - 66"	0	4	0	0	4	0	4	0
TOTAL, COAL SEAM	0	205	352	35	592	11	149	397
SUMMUM (NO. 4)								
28 - 42"	0	0	224	5	229	7	44	173
42 - 54"	0	50	0	3	53	4	44	2
HERRIN (NO. 6)								
28 - 42"	0	0	3	3	6	1	1	1
42 - 54"	0	82	0	4	86	0	8	73
54 - 66"	90	16	0	4	110	13	54	40
66 - 78"	240	0	0	4	244	113	106	21
78 - 90"	1255	0	0	25	1280	470	777	7
90 - 102"	1695	0	0	62	1757	952	743	0
102 - 114"	164	0	0	6	170	151	12	0
114 - 126"	22	0	0	0	22	22	0	0
TOTAL, COAL SEAM	3466	98	3	107	3673	1722	1702	142
DANVILLE (NO. 7)								
28 - 42"	0	0	45	2	48	9	36	0
TOTAL, COUNTY	3466	773	725	208	5171	1764	2117	1082
MORGAN COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	175	3	178	3	36	136
42 - 54"	0	493	0	55	549	3	31	459
HERRIN (NO. 6)								
28 - 42"	0	0	140	1	141	1	77	62
42 - 54"	0	31	0	2	33	2	14	15
54 - 66"	51	0	0	1	51	0	14	37
TOTAL, COAL SEAM	51	31	140	4	225	3	105	114
TOTAL, COUNTY	51	524	315	62	952	9	173	708
MOULTRIE COUNTY								
HERRIN (NO. 6)								
28 - 42"	0	0	226	33	259	0	6	220
42 - 54"	0	157	0	4	162	3	22	132
54 - 66"	0	8	0	1	9	4	4	0
66 - 78"	4	0	0	0	5	2	3	0
78 - 90"	12	0	0	0	12	4	8	0
90 - 102"	1	0	0	0	1	1	0	0
TOTAL, COAL SEAM	17	165	226	39	447	14	42	352
TOTAL, COUNTY	17	165	226	39	447	14	42	352

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
PEORIA COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	332	0	332	0	0	332
TOTAL, COAL SEAM	0	0	332	0	332	0	0	332
SPRINGFIELD (NO. 5)								
42 - 54"	0	0	217	0	217	0	0	217
TOTAL, COUNTY	0	0	549	0	549	0	0	549
PERRYCOUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	54	6	59	1	2	51
42 - 54"	0	125	0	8	133	10	111	4
54 - 66"	0	13	0	0	13	9	4	0
TOTAL, COAL SEAM	0	138	54	14	206	20	117	55
HERRIN (NO. 6)								
42 - 54"	0	2	0	0	2	2	0	0
54 - 66"	126	0	0	4	130	112	13	0
66 - 78"	254	0	0	9	262	233	21	0
78 - 90"	654	0	0	6	660	650	4	0
90 - 102"	167	0	0	1	168	167	0	0
102 - 114"	11	0	0	0	11	11	0	0
114 - 126"	7	0	0	0	7	7	0	0
TOTAL, COAL SEAM	1218	2	0	20	1240	1182	38	0
TOTAL, COUNTY	1218	140	54	33	1445	1202	155	55
PIATT COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	265	12	276	0	0	265
42 - 54"	0	985	0	47	1032	0	0	985
TOTAL, COAL SEAM	0	985	265	59	1308	0	0	1250
TOTAL, COUNTY	0	985	265	59	1308	0	0	1250
PUTNAM COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	362	14	376	128	232	1
42 - 54"	0	6	0	0	7	6	0	0
TOTAL, COAL SEAM	0	6	362	15	383	135	232	1
HERRIN (NO. 6)								
28 - 42"	0	0	42	7	49	6	36	0
42 - 54"	0	20	0	0	21	8	12	0
54 - 66"	5	0	0	3	7	0	4	0
TOTAL, COAL SEAM	5	20	42	11	78	15	52	0
DANVILLE (NO. 7)								
28 - 42"	0	0	110	8	118	39	71	0
42 - 54"	0	92	0	4	95	25	54	12
TOTAL, COUNTY	5	118	514	37	674	213	410	14

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
RANDOLPH COUNTY								
HERRIN (NO. 6)								
54 - 66"	1	0	0	0	1	1	0	0
66 - 78"	82	0	0	7	89	82	0	0
78 - 90"	35	0	0	5	40	35	0	0
90 - 102"	1	0	0	0	1	1	0	0
TOTAL, COAL SEAM	119	0	0	12	131	119	0	0
TOTAL, COUNTY	119	0	0	12	131	119	0	0
RICHLAND COUNTY								
SEELYVILLE								
42 - 66"	0	0	60	5	65	0	0	60
66 - 90"	0	76	0	3	79	0	0	76
TOTAL, COAL SEAM	0	76	60	9	144	0	0	136
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	219	20	239	0	0	219
42 - 54"	0	45	829	157	1031	0	0	873
54 - 66"	0	299	0	18	316	0	0	299
66 - 78"	0	85	0	2	87	0	0	85
TOTAL, COAL SEAM	0	428	1048	197	1673	0	0	1476
HERRIN (NO. 6)								
28 - 42"	0	0	117	16	132	0	0	117
42 - 54"	0	271	434	82	787	0	0	705
54 - 66"	0	661	0	106	767	0	0	661
66 - 78"	7	102	0	17	125	0	0	109
TOTAL, COAL SEAM	7	1034	551	221	1812	0	0	1591
DANVILLE (NO. 7)								
28 - 42"	0	0	306	47	353	0	0	306
42 - 54"	0	0	97	2	99	0	0	97
TOTAL, COUNTY	7	1538	2061	475	4081	0	0	3606
ST CLAIR COUNTY								
HERRIN (NO. 6)								
28 - 42"	0	0	42	0	42	2	22	18
42 - 54"	0	65	0	2	67	17	44	4
54 - 66"	72	0	0	12	84	56	16	0
66 - 78"	173	0	0	26	200	105	57	11
78 - 90"	423	0	0	58	481	294	126	3
90 - 102"	271	0	0	17	288	185	86	0
102 - 114"	14	0	0	0	14	14	0	0
114 - 126"	1	0	0	0	1	1	0	0
TOTAL, COAL SEAM	954	65	42	117	1178	675	351	35
TOTAL, COUNTY	954	65	42	117	1178	675	351	35

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
SALINE COUNTY								
DAVIS								
28 - 42"	0	0	77	2	79	3	43	31
42 - 54"	0	748	12	123	882	40	243	476
TOTAL, COAL SEAM	0	748	89	125	962	43	287	508
DE KOVEN								
28 - 42"	0	0	205	25	230	1	10	194
42 - 54"	0	346	0	56	403	31	100	216
SURVANT								
28 - 42"	0	0	11	1	12	11	0	0
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	12	1	12	8	4	0
42 - 54"	0	85	0	9	93	64	21	0
54 - 66"	79	246	0	25	350	241	84	0
66 - 78"	135	0	0	8	144	95	40	0
78 - 90"	102	0	0	7	109	72	30	0
90 - 102"	30	0	0	1	30	20	10	0
102 - 114"	26	0	0	0	26	19	6	0
114 - 126"	3	0	0	0	3	1	2	0
TOTAL, COAL SEAM	374	331	12	51	767	520	197	0
HERRIN (NO. 6)								
28 - 42"	0	0	26	2	28	8	19	0
42 - 54"	0	93	0	8	101	57	35	0
54 - 66"	224	140	0	54	417	258	106	0
66 - 78"	393	0	0	55	448	230	163	0
78 - 90"	35	0	0	2	37	27	8	0
90 - 102"	4	0	0	0	5	4	0	0
TOTAL, COAL SEAM	656	233	26	121	1036	584	330	0
TOTAL, COUNTY	1030	1658	342	379	3409	1190	923	917
SANGAMON COUNTY								
ROCK ISLAND (NO. 1)								
54 - 66"	0	1	0	2	3	1	0	0
TOTAL, COAL SEAM	0	1	0	2	3	1	0	0
SUMMUM (NO. 4)								
28 - 42"	0	0	194	17	211	15	64	114
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	80	12	92	4	39	37
42 - 54"	0	167	0	39	206	25	101	40
54 - 66"	1335	0	0	155	1490	288	760	287
66 - 78"	615	0	0	103	718	234	367	14
78 - 90"	35	0	0	0	35	14	20	0
TOTAL, COAL SEAM	1984	167	80	309	2540	565	1287	379
HERRIN (NO. 6)								
28 - 42"	0	0	235	38	273	20	99	116
42 - 54"	0	170	0	31	202	32	103	35
54 - 66"	188	0	0	22	211	61	120	8
66 - 78"	236	0	0	36	271	116	118	2
78 - 90"	412	0	0	64	476	293	119	0
90 - 102"	480	0	0	34	513	351	129	0
102 - 114"	16	0	0	0	16	16	0	0
TOTAL, COAL SEAM	1331	170	235	225	1962	889	688	160
TOTAL, COUNTY	3316	339	509	553	4717	1471	2039	653

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
SCOTT COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	29	0	29	0	0	29
TOTAL,COAL SEAM	0	0	29	0	29	0	0	29
TOTAL, COUNTY	0	0	29	0	29	0	0	29
SHELBY COUNTY								
ROCK ISLAND (NO. 1)								
28 - 42"	0	0	6	0	6	0	0	6
TOTAL,COAL SEAM	0	0	6	0	6	0	0	6
SEELYVILLE								
42 - 66"	0	0	195	8	204	0	0	195
66 - 90"	0	2	0	0	2	0	0	2
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	379	16	396	0	1	379
42 - 54"	0	952	0	11	964	1	46	905
54 - 66"	0	368	0	11	379	10	26	332
66 - 78"	173	0	0	8	181	0	0	173
TOTAL,COAL SEAM	173	1320	379	47	1919	10	73	1789
HERRIN (NO. 6)								
28 - 42"	0	0	518	38	556	0	15	503
42 - 54"	0	394	0	28	422	1	12	381
54 - 66"	0	242	0	5	247	2	45	196
66 - 78"	166	0	0	6	172	8	86	72
78 - 90"	662	0	0	14	676	77	339	246
90 - 102"	512	0	0	5	517	46	164	302
102 - 114"	47	0	0	0	47	7	31	9
114 - 126"	23	0	0	0	23	2	21	1
TOTAL,COAL SEAM	1410	636	518	96	2661	143	713	1709
DANVILLE (NO. 7)								
28 - 42"	0	0	117	2	119	20	97	0
42 - 54"	0	3	0	0	3	3	0	0
TOTAL, COUNTY	1584	1962	1216	153	4914	176	884	3701
STARK COUNTY								
HERRIN (NO. 6)								
42 - 54"	0	0	26	0	26	0	0	26
TOTAL, COUNTY	0	0	26	0	26	0	0	26
TAZEWELL COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	33	54	88	0	0	33
42 - 54"	0	43	0	16	59	0	17	26
TOTAL,COAL SEAM	0	43	33	71	147	0	17	59
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	1	0	1	1	0	0
42 - 54"	0	164	0	31	195	18	63	84
54 - 66"	173	0	0	19	192	14	54	105
TOTAL,COAL SEAM	173	164	1	50	388	33	117	188
HERRIN (NO. 6)								
28 - 42"	0	0	5	0	5	2	3	0
42 - 54"	0	162	0	40	202	3	56	103
TOTAL, COUNTY	173	370	39	160	742	37	193	351

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
VERMILION COUNTY								
SEELYVILLE								
28 - 42"	0	0	10	1	11	8	2	0
42 - 66"	0	2	0	0	3	0	2	0
66 - 90"	1	0	0	7	8	1	0	0
TOTAL, COAL SEAM	1	2	10	8	21	9	4	0
HERRIN (NO. 6)								
28 - 42"	0	0	208	15	223	63	131	14
42 - 54"	0	419	0	13	432	92	223	104
54 - 66"	345	0	0	10	355	159	137	49
66 - 78"	411	0	0	15	426	220	165	26
78 - 90"	127	0	0	5	132	88	37	2
90 - 102"	4	0	0	0	4	3	1	0
TOTAL, COAL SEAM	887	419	208	58	1573	625	694	196
DANVILLE (NO. 7)								
28 - 42"	0	0	101	7	108	69	24	7
42 - 54"	0	218	0	6	224	115	99	3
54 - 66"	794	0	0	14	808	272	475	47
66 - 78"	299	0	0	15	314	88	210	0
78 - 90"	13	0	0	0	13	12	1	0
90 - 102"	3	0	0	0	3	3	0	0
102 - 114"	0	0	0	0	0	0	0	0
TOTAL, COAL SEAM	1109	218	101	42	1470	561	810	57
TOTAL, COUNTY	1998	639	319	108	3064	1194	1508	253
WABASH COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	116	102	218	0	24	91
42 - 54"	0	168	0	94	262	6	27	135
54 - 66"	0	130	0	21	150	22	31	76
66 - 78"	114	0	0	43	157	26	39	49
78 - 90"	127	0	0	41	167	35	53	39
90 - 102"	120	0	0	51	171	32	67	22
102 - 114"	11	0	0	7	18	9	2	0
114 - 126"	2	0	0	1	3	2	0	0
TOTAL, COAL SEAM	374	297	116	360	1147	131	244	412
HERRIN (NO. 6)								
28 - 42"	0	0	272	191	463	20	91	161
42 - 54"	0	228	0	64	292	44	67	117
54 - 66"	0	57	0	21	78	16	27	14
66 - 78"	52	0	0	10	62	11	34	6
78 - 90"	2	0	0	0	2	2	0	0
TOTAL, COAL SEAM	54	285	272	286	898	94	220	298
TOTAL, COUNTY	428	583	388	647	2045	226	463	710
WASHINGTON COUNTY								
HERRIN (NO. 6)								
28 - 42"	0	0	4	0	4	3	1	0
42 - 54"	0	3	0	0	3	2	1	0
54 - 66"	50	18	0	3	71	23	42	3
66 - 78"	567	0	0	31	599	272	284	11
78 - 90"	1499	0	0	96	1595	968	510	21
90 - 102"	979	0	0	62	1042	653	262	65
102 - 114"	249	0	0	9	259	158	71	20
114 - 126"	159	0	0	5	163	90	69	0
TOTAL, COAL SEAM	3503	21	4	207	3736	2169	1238	121
TOTAL, COUNTY	3503	21	4	207	3736	2169	1238	121

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
WAYNE COUNTY								
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	867	209	1075	0	41	825
42 - 54"	0	113	1144	265	1523	24	97	1137
54 - 66"	0	202	0	66	268	12	22	168
66 - 78"	0	40	0	6	46	2	10	28
78 - 90"	0	0	0	0	0	0	0	0
TOTAL, COAL SEAM	0	355	2011	547	2913	39	170	2158
HERRIN (NO. 6)								
28 - 42"	0	0	736	188	924	0	20	716
42 - 54"	0	797	196	185	1179	9	42	942
54 - 66"	0	415	0	107	522	24	59	332
66 - 78"	59	50	0	85	194	0	0	108
78 - 90"	17	0	0	2	19	0	0	17
90 - 102"	4	0	0	0	4	0	0	4
TOTAL, COAL SEAM	79	1262	932	567	2840	33	122	2118
TOTAL, COUNTY	79	1618	2943	1114	5753	72	291	4276
WHITE COUNTY								
DAVIS								
42 - 54"	0	8	0	4	12	0	0	8
TOTAL, COAL SEAM	0	8	0	4	12	0	0	8
DE KOVEN								
28 - 42"	0	0	7	3	11	0	0	7
42 - 54"	0	1	0	0	2	2	0	0
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	333	137	470	2	32	299
42 - 54"	0	494	138	142	774	16	102	515
54 - 66"	0	373	0	46	419	64	218	92
66 - 78"	70	232	0	48	350	46	214	42
78 - 90"	27	228	0	22	276	59	193	2
90 - 102"	4	11	0	7	22	13	1	1
TOTAL, COAL SEAM	101	1337	471	402	2311	200	759	950
HERRIN (NO. 6)								
28 - 42"	0	0	395	93	488	2	51	342
42 - 54"	0	779	0	210	990	13	199	567
54 - 66"	0	372	0	55	427	46	133	193
66 - 78"	161	0	0	18	179	27	41	93
78 - 90"	27	0	0	3	30	13	9	5
90 - 102"	6	0	0	0	6	1	0	5
TOTAL, COAL SEAM	195	1151	395	378	2119	103	433	1205
TOTAL, COUNTY	296	2498	873	787	4454	304	1192	2170

APPENDIX B. *CONTINUED*

COUNTY COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	 MODERATE	 LOW	 RESTRICTED	 TOTAL	RELIABILITY CLASS* PROVED I - A	 PROBABLE I - B	 STRONGLY INDICATED II - A
WILLIAMSON COUNTY								
MT RORAH								
28 - 42"	0	0	2	0	2	1	1	0
TOTAL, COAL SEAM	0	0	2	0	2	1	1	0
DAVIS								
28 - 42"	0	0	289	39	328	6	74	209
DE KOVEN								
28 - 42"	0	0	533	70	603	11	168	354
42 - 54"	0	39	0	7	46	4	33	2
54 - 66"	0	3	0	1	4	0	2	1
TOTAL, COAL SEAM	0	42	533	77	652	15	203	357
SURVANT								
28 - 42"	0	0	1	1	2	1	0	0
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	30	17	48	5	26	0
42 - 54"	0	490	0	50	540	273	217	0
54 - 66"	58	56	0	2	116	101	13	0
66 - 78"	2	0	0	0	2	2	0	0
TOTAL, COAL SEAM	60	546	30	69	705	380	256	0
HERRIN (NO. 6)								
28 - 42"	0	0	0	0	0	0	0	0
42 - 54"	0	2	0	0	2	2	0	0
54 - 66"	29	56	0	1	86	86	0	0
66 - 78"	174	0	0	3	178	174	0	0
78 - 90"	54	0	0	1	54	54	0	0
90 - 102"	20	0	0	0	20	20	0	0
102 - 114"	2	0	0	0	2	2	0	0
TOTAL, COAL SEAM	279	58	0	5	342	337	0	0
TOTAL, COUNTY	339	646	856	192	2032	740	535	566
WOODFORD COUNTY								
COLCHESTER (NO. 2)								
28 - 42"	0	0	486	17	503	16	115	355
TOTAL, COAL SEAM	0	0	486	17	503	16	115	355
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	127	12	139	0	31	96
DANVILLE (NO. 7)								
28 - 42"	0	0	35	3	39	1	25	10
TOTAL, COAL SEAM	0	0	35	3	39	1	25	10
TOTAL, COUNTY	0	0	649	31	680	17	171	461

*Does not include resources with a restricted potential for development.

APPENDIX C. DEEP-MINABLE RESOURCES BY SEAM AND THICKNESS (MILLIONS OF TONS)

COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
ROCK ISLAND (NO. 1)								
28 - 42"	0	0	51	3	54	4	30	17
42 - 54"	0	319	33	29	381	18	96	239
54 - 66"	47	605	13	55	719	11	90	563
66 - 78"	114	0	1	19	134	1	1	114
TOTAL, COAL SEAM	161	924	99	104	1289	33	218	933
MT RORAH								
28 - 42"	0	0	34	4	38	11	23	0
42 - 54"	0	6	16	1	22	10	11	0
66 - 78"	0	5	0	0	5	5	0	0
TOTAL, COAL SEAM	0	11	50	5	66	26	35	0
DAVIS								
28 - 42"	0	0	768	140	908	22	250	496
42 - 54"	0	1542	12	178	1731	71	521	962
WILEY								
28 - 42"	0	0	210	42	252	8	64	138
DE KOVEN								
28 - 42"	0	0	1499	191	1690	37	412	1050
42 - 54"	0	497	0	71	568	45	207	245
54 - 66"	0	3	0	1	4	0	2	1
TOTAL, COAL SEAM	0	500	1499	262	2261	82	621	1296
SEELYVILLE								
28 - 42"	0	0	10	1	11	8	2	0
42 - 66"	0	3180	2888	936	7004	65	366	5636
66 - 90"	1271	916	0	459	2646	102	257	1827
66 - 90"	1	0	0	7	8	1	0	0
90 - 114"	0	69	0	0	69	0	0	69
TOTAL, COAL SEAM	1273	4165	2897	1403	9737	176	625	7533
COLCHESTER (NO. 2)								
28 - 42"	0	0	6856	314	7170	455	2114	4287
42 - 54"	0	1555	0	246	1802	172	290	1093
54 - 66"	62	4	0	1	67	5	57	3
TOTAL, COAL SEAM	62	1560	6856	561	9038	633	2461	5383
SURVANT								
28 - 42"	0	0	49	16	65	18	32	0
42 - 54"	0	83	0	3	86	1	25	56
54 - 66"	0	10	0	0	10	9	1	0
TOTAL, COAL SEAM	0	94	49	19	162	28	58	56
SUMMUM (NO. 4)								
28 - 42"	0	0	438	23	461	22	108	308
42 - 54"	0	50	0	3	53	4	44	2
TOTAL, COAL SEAM	0	50	438	26	514	26	152	310
SPRINGFIELD (NO. 5)								
28 - 42"	0	0	10967	1679	12646	157	1067	9743
42 - 54"	0	15964	5601	2883	24448	1301	3601	16662
54 - 66"	3948	5928	0	1002	10879	2007	3515	4354
66 - 78"	3814	896	0	518	5227	1239	2138	1332
78 - 90"	594	436	0	151	1182	353	461	216
90 - 102"	239	75	0	83	397	118	93	104
102 - 114"	39	4	0	7	50	34	8	0
114 - 126"	7	1	0	1	9	6	2	0
TOTAL, COAL SEAM	8641	23305	16568	6324	54838	5216	10886	32413

APPENDIX C. *CONTINUED*

COAL THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
HERRIN (NO. 6)								
28 - 42"	0	0	8374	1551	9925	409	1517	6448
42 - 54"	0	9377	1342	1425	12145	930	2617	7172
54 - 66"	2708	8423	0	1530	12662	2111	3151	5869
66 - 78"	9748	1169	0	991	11908	3427	4334	3155
78 - 90"	10470	0	0	656	11126	5303	4252	916
90 - 102"	7247	0	0	385	7633	3943	2579	726
102 - 114"	1226	0	0	46	1272	788	385	54
114 - 126"	351	0	0	21	372	209	130	12
TOTAL, COAL SEAM	31751	18969	9717	6605	67042	17120	18964	24353
JAMESTOWN								
28 - 42"	0	0	991	390	1381	23	196	772
42 - 54"	0	1056	0	270	1327	51	291	714
54 - 66"	1	263	0	15	280	12	71	181
TOTAL, COAL SEAM	1	1320	991	675	2987	86	558	1668
DANVILLE (NO. 7)								
28 - 42"	0	0	4519	754	5273	364	1439	2716
42 - 54"	0	2410	97	360	2867	302	973	1231
54 - 66"	1491	65	0	49	1605	422	805	328
66 - 78"	452	0	0	18	471	119	308	25
78 - 90"	13	0	0	0	13	12	1	0
90 - 102"	3	0	0	0	3	3	0	0
102 - 114"	0	0	0	0	0	0	0	0
TOTAL, COAL SEAM	1960	2475	4616	1181	10233	1223	3527	4301

*Does not include resources with a restricted potential for development.

APPENDIX D. DEEP-MINABLE RESOURCES BY THICKNESS (MILLIONS OF TONS)

THICKNESS(IN)	DEVELOPMENT POTENTIAL HIGH	MODERATE	LOW	RESTRICTED	TOTAL	RELIABILITY CLASS* PROVED I - A	PROBABLE I - B	STRONGLY INDICATED II - A
28 - 42"	0	0	34766	5107	39873	1537	7253	25976
42 - 54"	0	36040	9989	6405	52434	2971	9044	34013
54 - 66"	8257	15302	13	2653	26225	4579	7693	11300
66 - 78"	15399	2986	1	2005	20391	4894	7038	6454
78 - 90"	11079	436	0	814	12329	5669	4714	1132
90 - 102"	7489	144	0	468	8102	4063	2671	899
102 - 114"	1266	4	0	53	1323	823	393	54
114 - 126"	358	1	0	22	381	215	132	12
TOTAL, STATE	43849	54913	44769	17526	161058	24750	38940	79841

*Does not include resources with a restricted potential for development.

APPENDIX E. TOTAL COAL RESOURCES OF ILLINOIS (SURFACE AND DEEP MINABLE) BY COUNTY AND SEAM (MILLIONS OF TONS)

County	Danville (No. 7)	James-town	Herrin (No. 6)	Spring-field (No. 5)	Colchester (No. 2)	Seely-ville	De Koven	Davis	Rock Island (No. 1)	Miscel-laneous*	Total	Total surface minable strippable	Total high development potential
Adams					619						619	619	76
Bond			2,365		2				2		2,369	0	1,551
Brown					386						386	386	0
Bureau	370		628		599						1,597	450	260
Calhoun					15						15	15	0
Cass				105	189						294	294	2
Champaign	108		197								305	0	221
Christian	55		3,362	1,236					41		4,693	0	3,481
Clark	1,008	518	51	1,266		1,078					3,921	0	292
Clay			2,046	1,980		37					4,063	0	17
Clinton			3,132								3,132	0	2,150
Coles	320		635	644		736					2,335	0	0
Crawford	1,217	1,303	983	1,303		2,207				43	7,055	43	682
Cumberland			1,719	1,160		1,320				2	4,200	2	125
De Witt				1,511							1,511	0	0
Douglas			1,009	120							1,129	0	543
Edgar	1,223		811	556		893					3,484	154	908
Edwards			903	1,084							1,987	0	309
Effingham			1,191	1,981		384				1	3,556	1	92
Fayette	292		3,400	2,261						2	5,955	2	1,992
Franklin			1,534	2,050			345	503		67	4,499	3	1,339
Fulton	59		241	669	1,305				5		2,278	1,986	672
Gallatin			862	1,270			615	830		2	3,579	232	517
Greene			97		584						681	598	226
Grundy					691					37	727	348	25
Hamilton			2,559	2,386			4	5			4,953	0	1,428
Hancock					30						30	30	29
Henderson					53						53	53	0
Henry	59		255		253				64		632	622	201
Jackson			122	243						141	506	362	244
Jasper			2,576	1,995		2,151					6,722	0	124
Jefferson			2,686	2,844						25	5,554	25	1,281
Jersey			57		274						331	220	84
Kankakee					51					15	67	25	0
Knox	3		225	623	803				56		1,710	1,548	520
La Salle	477		168		1,251						1,895	280	28
Lawrence	1,026	1,167	988	1,473		561				146	5,361	0	88
Livingston	1,300		29		1,502					10	2,841	49	416
Logan			272	2,521							2,793	0	1,977
McDonough					584						584	584	78

APPENDIX E. *CONTINUED*

County	Danville (No. 7)	James-town	Herrin (No. 6)	Spring-field (No. 5)	Colchester (No. 2)	Seely-ville	De Koven	Davis	Rock Island (No. 1)	Miscel-laneous*	Total	Total surface minable strippable	Total high development potential
McLean	583			3,959	287						4,829	0	189
Macon			366	1,574							1,941	0	415
Macoupin	13		3,616		1,485			125	717	20	5,975	276	3,048
Madison			2,115		228			6	9		2,357	615	1,403
Marion			1,830	2,456							4,286	0	190
Marshall	357		7		432						796	116	0
Menard				1,412							1,412	541	872
Mercer					15				54		69	69	0
Monroe			7								7	7	0
Montgomery	48		3,673		592			121	456	282	5,171	0	3,466
Morgan			711		1,068						1,780	828	113
Moultrie			447								447	0	17
Peoria	283		1,038	943	431						2,695	2,146	642
Perry			1,971	379							2,349	904	1,868
Piatt				1,308							1,308	0	0
Pike					144						144	144	16
Putnam	214		78		383						674	0	5
Randolph			350	162							512	381	342
Richland	452		1,812	1,673		144				5	4,086	5	7
Rock Island									42		42	42	0
St. Clair			2,218								2,218	1,040	1,381
Saline	78		1,293	858			673	999		12	3,912	503	1,202
Sangamon			1,962	2,958					3	211	5,135	418	3,426
Schuyler				107	606						713	713	191
Scott			6		249						256	227	30
Shelby	123		2,661	1,919		206			6	85	4,999	85	1,611
Stark	58		458		26						541	515	268
Tazewell	4		277	425	186						892	150	173
Vermilion	1,857		1,791			21					3,668	604	2,144
Wabash			898	1,147						158	2,203	158	564
Warren				1	363				39		403	403	55
Washington			3,736								3,736	0	3,503
Wayne			2,840	2,913							5,753	0	79
White			2,119	2,311			12	12			4,454	0	296
Will					13						13	13	0
Williamson	57		597	900			684	341		40	2,621	589	449
Woodford	39			139	503						680	0	0
TOTAL	11,680	2,987	73,978	58,825	16,202	9,737	2,333	2,940	1,494	1,307	181,484	20,426	49,941

*Belle Rive, Bristol Hill, Calhoun, Friendsville, Loudon, Mt. Rorah, Murphysboro, Opdyke, Shelbyville, Summum (No. 4), Trowbridge, Willis, Wise Ridge.

APPENDIX F. COAL RESOURCES OF ILLINOIS BY COUNTY AND DEVELOPMENT POTENTIAL (MILLIONS OF TONS)

	Development Potential								
	Deep-minable resources					Surface-minable resources			
County	High	Moderate	Low	Restricted	Total	High	Moderate/low/ restricted	Total	Total resources
Adams	0	0	0	0	0	76	543	619	619
Bond	1,551	677	6	134	2,369	0	0	0	2,369
Brown	0	0	0	0	0	0	386	386	386
Bureau	110	342	603	92	1,147	150	300	450	1,597
Calhoun	0	0	0	0	0	0	15	15	15
Cass	0	0	0	0	0	0	294	294	294
Champaign	221	57	12	14	305	0	0	0	305
Christian	3,481	740	233	239	4,693	0	0	0	4,693
Clark	292	2,067	1,301	260	3,921	0	0	0	3,921
Clay	17	1,074	2,236	736	4,063	0	0	0	4,063
Clinton	2,150	484	4	493	3,132	0	0	0	3,132
Coles	0	909	1,114	312	2,335	0	0	0	2,335
Crawford	661	1,475	2,173	2,704	7,012	21	22	43	7,055
Cumberland	123	2,153	1,714	207	4,198	2	0	2	4,200
De Witt	0	1,331	32	149	1,511	0	0	0	1,511
Douglas	543	270	285	31	1,129	0	0	0	1,129
Edgar	844	1,432	931	123	3,330	64	90	154	3,484
Edwards	309	835	596	257	1,987	0	0	0	1,987
Effingham	92	1,534	1,652	277	3,555	0	1	1	3,556
Fayette	1,992	2,111	1,357	494	5,953	0	2	2	5,955
Franklin	1,339	1,827	763	567	4,496	0	3	3	4,499
Fulton	0	0	292	0	292	672	1,314	1,986	2,278
Gallatin	465	1,881	671	331	3,347	52	180	232	3,579
Greene	0	0	83	0	83	226	372	598	581
Grundy	0	0	373	7	379	25	323	348	727
Hamilton	1,428	2,610	349	566	4,953	0	0	0	4,953
Hancock	0	0	0	0	0	29	1	30	30
Henderson	0	0	0	0	0	0	53	53	53
Henry	0	0	10	0	10	201	421	622	632
Jackson	61	80	0	3	144	183	179	362	506
Jasper	124	3,099	2,929	570	6,722	0	0	0	6,722
Jefferson	1,258	3,379	372	520	5,529	23	2	25	5,554
Jersey	0	0	111	0	111	84	136	220	331
Kankakee	0	0	42	0	42	0	25	25	67
Knox	0	0	162	0	162	520	1,028	1,548	1,710

APPENDIX F. *CONTINUED*

	Development Potential								
	Deep-minable resources					Surface-minable resources			
County	High	Moderate	Low	Restricted	Total	High	Moderate/low/ restricted	Total	Total resources
La Salle	7	380	1,061	167	1,615	21	259	280	1,895
Lawrence	88	2,186	2,264	824	5,361	0	0	0	5,361
Livingston	396	463	1,829	105	2,792	20	29	49	2,841
Logan	1,977	568	141	107	2,793	0	0	0	2,793
McDonough	0	0	0	0	0	78	506	584	584
McLean	189	1,906	2,220	513	4,829	0	0	0	4,829
Macon	415	841	368	317	1,941	0	0	0	1,941
Macoupin	2,966	1,170	1,321	242	5,699	82	194	276	5,975
Madison	1,151	279	150	163	1,742	252	373	615	2,357
Marion	190	2,099	1,431	567	4,286	0	0	0	4,286
Marshall	0	14	637	29	680	0	116	116	796
Menard	829	7	0	35	871	43	498	541	1,412
Mercer	0	0	0	0	0	0	69	69	69
Monroe	0	0	0	0	0	0	7	7	7
Montgomery	3,466	773	725	208	5,171	0	0	0	5,171
Morgan	51	524	315	62	952	62	766	828	1,780
Moultrie	17	165	226	39	447	0	0	0	447
Peoria	0	0	549	0	549	642	1,504	2,146	2,695
Perry	1,218	140	54	33	1,445	650	254	904	2,349
Piatt	0	985	265	59	1,308	0	0	0	1,308
Pike	0	0	0	0	0	16	128	144	144
Putnam	5	118	514	37	674	0	0	0	674
Randolph	119	0	0	12	131	223	158	381	512
Richland	7	1,538	2,061	475	4,081	0	5	5	4,086
Rock Island	0	0	0	0	0	0	42	42	42
St. Clair	954	65	42	117	1,178	427	613	1,040	2,218
Saline	1,030	1,658	342	379	3,409	172	331	503	3,912
Sangamon	3,316	339	509	553	4,717	110	308	418	5,135
Schuyler	0	0	0	0	0	191	522	713	713
Scott	0	0	29	0	29	30	197	227	256
Shelby	1,584	1,962	1,216	153	4,914	27	58	85	4,999
Stark	0	0	26	0	26	268	247	515	541
Tazewell	173	370	39	160	742	0	150	150	892
Vermilion	1,998	639	319	108	3,064	146	458	604	3,668
Wabash	428	583	388	647	2,045	136	22	158	2,203

APPENDIX F. *CONTINUED*

	Development Potential								
	Deep-minable resources					Surface-minable resources			
County	High	Moderate	Low	Restricted	Total	High	Moderate/low/ restricted	Total	Total resources
Warren	0	0	0	0	0	55	348	403	403
Washington	3,503	21	4	207	3,736	0	0	0	3,736
Wayne	79	1,618	2,943	1,114	5,753	0	0	0	5,753
White	296	2,498	873	787	4,454	0	0	0	4,454
Will	0	0	0	0	0	0	13	13	13
Williamson	339	646	856	192	2,032	110	479	589	2,621
Woodford	0	0	649	31	680	0	0	0	680
TOTAL	43,849	54,913	44,769	17,526	161,058	6,091	14,335	20,426	181,484

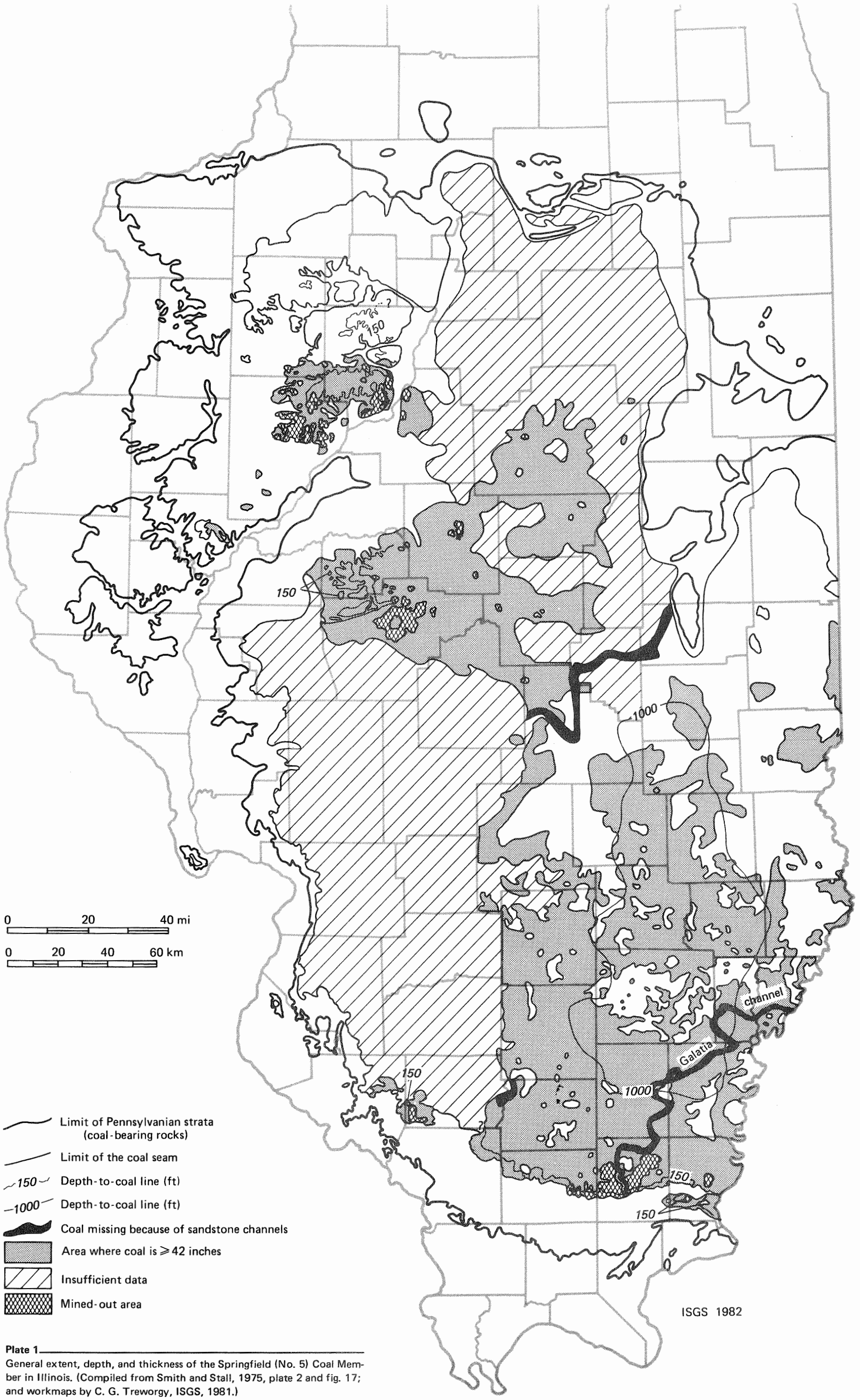


Plate 1

General extent, depth, and thickness of the Springfield (No. 5) Coal Member in Illinois. (Compiled from Smith and Stall, 1975, plate 2 and fig. 17; and workmaps by C. G. Treworgy, ISGS, 1981.)

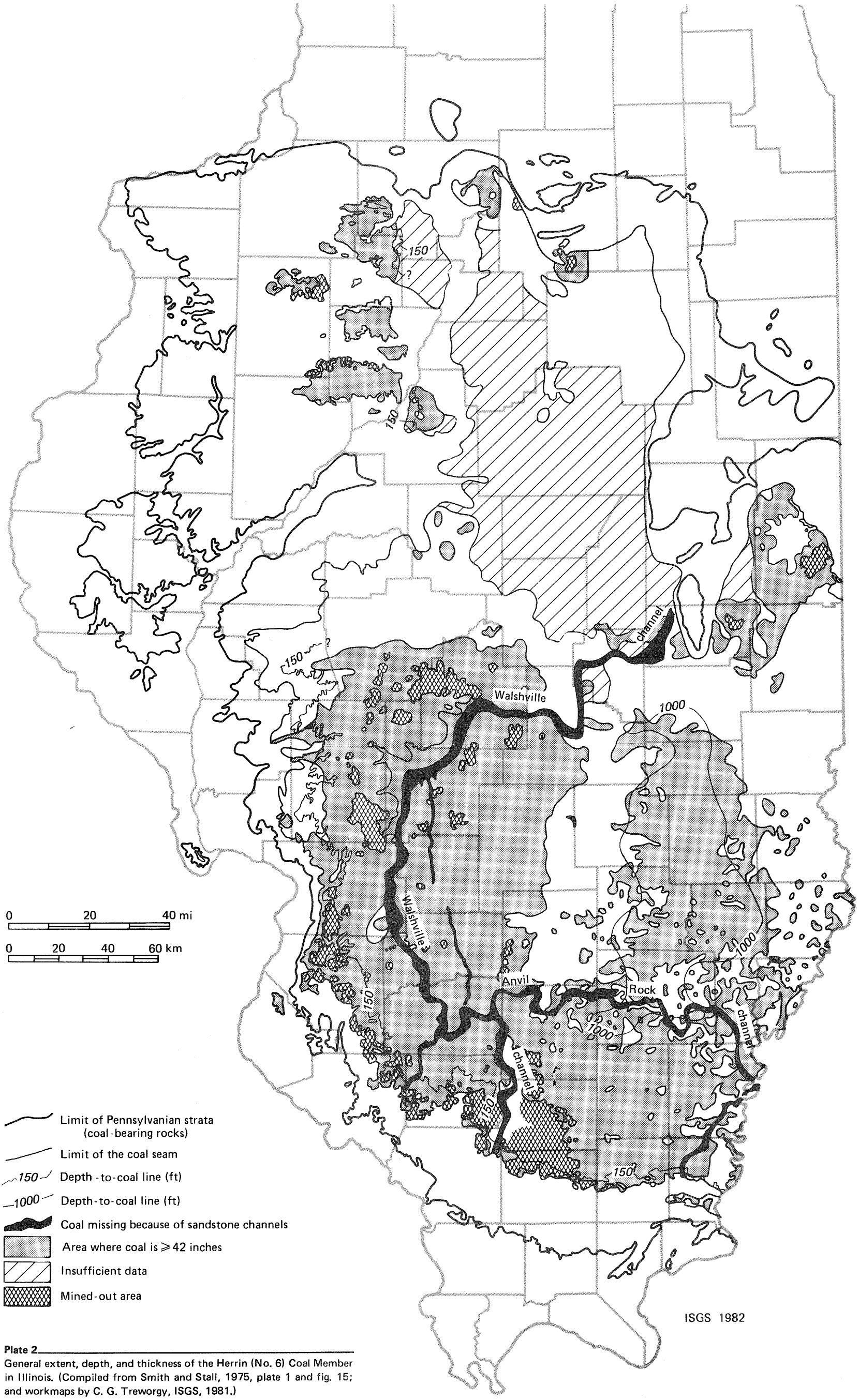


Plate 2

General extent, depth, and thickness of the Herrin (No. 6) Coal Member in Illinois. (Compiled from Smith and Stall, 1975, plate 1 and fig. 15; and workmaps by C. G. Treworgy, ISGS, 1981.)