

A Guide to Coal Availability and Resource Development in Illinois Springfield (No. 5) Coal



Steven R. Gustison, Philip M. Johanek, Robert J. Finley, Illinois State Geological Survey

Of the 65.1 billion tons of the original resources of the Springfield Coal in Illinois, 63 billion tons, or 97%, remain; the Springfield Coal is the second-largest remaining coal resource in the state. The other 2.2 billion tons have been mined or were lost in mining during the more than 100 years Illinois coal has been mined. The degree to which this remaining resource is used in the future depends on the availability of deposits that can be mined at a cost that is competitive with other coals and alternative fuels. This report identifies those resources that have the most favorable geologic and land-use characteristics for mining, shows the probable trend of future mining of these resources, and alerts mining companies to geologic conditions that have a potentially negative impact on mining costs.

Approximately 41% of the original Springfield Coal resources (27 billion tons) is available for mining. Available means that the surface land-use and geologic conditions related to mining of the deposit (e.g., thickness, depth, in-place tonnage, stability of bedrock overburden) are comparable to other coals currently being mined in the state. Of these resources, 23 billion tons are 42 to 66 inches thick, and 4 billion tons are greater than 66 inches thick.

The available resources are primarily located in the central and southeastern portions of the state (map regions 2 and 3 on the key map) and are well suited for high-efficiency longwall mining. The resources are relatively flat-lying; have a consistent seam thickness over large areas; are relatively free of faults, channels, or other geologic anomalies; are located predominantly in rural areas free from oil wells and other surface development; and are situated in minable blocks of hundreds of millions of tons. Whether or not the resource are ultimately mined is still dependent on other factors that have not been assessed, including the willingness of local landowners to lease the coal, demands for a particular quality of coal, accessibility of transportation infrastructure, proximity of the deposit to markets, and cost and availability of competing fuels.

About 62 billion tons of the remaining Springfield Coal resources have greater than 2.5 pounds of sulfur per million BTU and are therefore mostly suited for the high-sulfur coal market. Only 1.4 billion tons of the Springfield resources have a sulfur content of 0.6 to 1.7 pounds per million BTU. However, the majority of these medium- to low-sulfur resources (1 billion tons) are classified as available or available with conditions. Technological factors, such as geologic conditions associated with faults and channels, are the primary restrictions on mining these lower-sulfur deposits.

An additional 3 billion tons of the Springfield Coal resources are available but have geologic or land-use conditions that may make them less desirable for mining. Technological factors (geologic conditions and engineering parameters such as size of reserve block) restrict mining of 46% of the resources, and land use (e.g., towns, highways) restricts mining of 5% of the resources.

Most of the available Springfield Coal resources will be mined by underground methods. Of the 63 billion tons of original resources that are at least 75 feet deep (and therefore potentially minable by underground methods), 41% (26 billions tons) is available for underground mining. An additional 4% is available but with conditions that make the resources less desirable. These conditions include the presence of closely spaced oil wells, less stable roof strata, or close proximity to developing urban areas. The major technological factors that restrict underground mining are thin interburden between the Springfield Coal and an overlying seam (17%), coal less than 42 inches thick (14%), and unfavorable thicknesses of bedrock and unconsolidated overburden (13%). Land use restricts underground mining of 5% of the original resources, and 3% has already been mined or lost in mining.

Only about 8 billion tons of the original Springfield Coal resource lie at depths of less than 200 feet and are potentially minable by surface methods. Of these resources, 15% has already been mined and 12% (just under 1 billion tons) is available for surface mining. Land-use factors, primarily towns, restrict 16% of the resources. Technological factors, primarily the stripping ratio and thick unconsolidated material, restrict 57% of the surface-minable resources.

To avoid high mining costs resulting from unfavorable geologic conditions, companies siting underground mines should avoid areas of thick drift and thin bedrock cover, close proximity to the Galatia Channel and faults, areas of closely spaced oil wells, and areas at the margins of the Dykersburg Shale. The areas of low-cost surface-minable resources (areas with low stripping ratios that are free of conflicting land uses) are limited and will only support small, limited-term operations.

From Treworgy, C.G., C.P. Korose, C.A. Chenoweth, and D.L. North, 1999, Availability of the Springfield Coal for mining in Illinois: Champaign, Illinois State Geological Survey, Illinois Minerals 118, 48 p.

Minimum seam thickness	42 in.
Minimum bedrock cover	75 ft
Minimum ratio of bedrock to unconsolidated overburden	1:1
Minimum interburden between minable seams	40 ft
Minimum size of mining block (clean coal)	40 million tons
Faults (width of zone of no mining)	
Cottage Grove Fault System	
Master fault	500 to 1,000 ft
Subsidiary fault	100 ft
Rend Lake Fault System	200 ft
Centralia Fault	300 ft
Wabash Valley Fault System	800 ft
Galatia Channel, no mining within	0.5 mi
Dykersburg Shale	*
Partings	
Minimum yield	not used
Maximim thickness	not used
Land-use Restrictions (width of unminable coal ar	•
Surface and underground mines	200 ft
Towns	0 ft
Subdivisions	not used
Churches and schools	not used
Cemeteries	not used
High-voltage transmission towers	not used
Interstate highways	100 ft
Major airports	100 ft
Dams	100 ft
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Available with Conditions Closely spaced oil wells	1 - 7 Walls nar
Closely spaced oil wells	4 - 7 wells per
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