A Guide to Coal Availability and Resource Development in Illinois

Herrin (No. 6) Coal

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Of the 88.5 billion tons of the original resources of the Herrin Coal in Illinois, 79 billion tons, or 89%, remain; the Herrin Coal is the largest remaining coal resource in the state. The other 9.4 billion tons have been mined or were lost in mining during the more than 200 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 58% of the original Herrin Coal resources (51 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, 21 billion tons are 42 to 66 inches thick and 30 billion tons are greater than 66 inches thick. An additional 3 billion tons of Herrin Coal resources are available but have geologic or land-use conditions that are potentially restrictive, making them less desirable for mining. Technological factors (geologic conditions and economic parameters such as size of reserve block) restrict mining of 24% of the resources, and land-use factors (e.g., towns, highways) restrict mining of 4% of the resources.

The available resources are primarily located in the central and southern portions of the state (map regions 2 and 3 on the key map) and are well suited for high-efficiency longwall mining. The Herrin Coal 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 resources 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 74 billion tons of the remaining Herrin Coal resources have greater than 1.67 pounds of sulfur per million BTU and are therefore mostly suited for the high-sulfur coal market. Although only 9% of the original resources has a sulfur content of less than 1.67 pounds per million BTU, almost one-third of the past mining has been concentrated in these deposits. About 6 billion tons of this lower-sulfur coal remain, and about half of this is classified as available or available with potential restrictions. For the most part, these lower-sulfur resources are too deep for surface mining and will have to be mined by underground methods. Technological factors, particularly seam thickness and the thickness of bedrock cover, are the primary restrictions on mining these lower-sulfur deposits. About 5% of these resources are available but potentially restricted by land use because of the eastward expansion of development in the St. Louis metropolitan area.

Most of the available Herrin Coal resources will be mined by underground methods. Of the 86 billion tons of original resources that are at least 40 feet deep (and therefore potentially minable by underground methods), 57% (49 billions tons) is available for underground mining. An additional 4% (3 billion tons) is available but with potential restrictions that make the resources less desirable. These potential restrictions 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 unfavorable thicknesses of bedrock and unconsolidated overburden (9% of original resources) coal less than 42 inches thick (8%), and thin interburden between the Herrin Coal and an overlying or underlying seam (4%). Land use restricts underground mining of 5% of the original resources, and 10% has already been mined or lost in mining.

Only about 15 billion tons of the original Herrin Coal resource lie at depths of less than 200 feet and are therefore potentially minable by surface methods. Of these resources, 21% have already been mined (3 billion tons) and 15% (2 billion tons) is available for surface mining. Land-use factors, primarily towns, restrict 17% of the resources. Technological factors, primarily the stripping ratio and thick unconsolidated material, restrict 45% of the surface-minable resources.

To avoid high mining costs resulting from unfavorable geologic conditions, companies seeking sites for underground mines should avoid areas with the following conditions: thick drift and thin bedrock cover, close proximity to the Walshville or Anvil Rock Channels or faults, areas of closely spaced oil wells, and areas at the margins of the Energy Shale or closely overlain by Anvil Rock Sandstone. Areas with 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, and C.L. Wiscombe, 2000, Availability of the Herrin Coal for mining in Illinois: Champaign, Illinois State Geological Survey, Illinois Minerals 120, 60 p.

Underground Mining Technological Restrictions	
Minimum seam thickness	42 in.
Minimum bedrock cover	variable
Minimum ratio of bedrock to unconsolidated overburden	1:1
Floodplains[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
Walshville Channel, no mining within	0.5 mi
Anvil Rock Channel, no mining within	1,800 ft
Energy Shale, no mining within	transition zone
Anvil Rock Sandstone within 5 feet of coal	identified
Partings	
Minimum yield	not used
Maximim thickness[2]	...
Land-use Restrictions (width of unminable coal around feature)	
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
Closely spaced oil wells	>7 wells per 40 acres
Available with Conditions	
Closely spaced oil wells	4 - 7 wells per 40 acres
Potential land-use conflicts	
All otherwise available underground minable coal within areas where land-use patterns are incompatible with mining	identified
Coal quality limitations	none
Bedrock cover	>minimum but <100 ft

[1] Floodplains are considered a restriction only if bedrock is less than 100 feet thick.

[2] Areas where partings are likely to be too thick for mining were identified. Data were generally insufficient to isopach parting thickness.

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