“Getting Out the Coal”
A nthracite and Bituminous Coal Extraction
HABS/HAER Documentation

Background

In 1997 the National Park Service contracted with the Institute for the History of Technology and Industrial Archaeology (IHTIA) to produce measured drawings and a narrative report comparing coal mining technologies in the anthracite and bituminous fields. Despite several documentation projects targeting surface coal mining facilities, the Historic American Building Survey/Historic American Engineering Record (HABS/HAER) Collection contained nothing on underground mining technology. Because of its experience in completing projects related to coal mining history and technology and its proximity to the northern Appalachian coalfields, IHTIA possessed the expertise and was properly located to undertake this task.

Scope

The project was unique in two respects. First, IHTIA wanted to compare and contrast mining technology used in bituminous and anthracite mining. Therefore, the Institute selected two mines that lent themselves to this type of study: the Kay Moor No.1 Mine, a bituminous mine located in Fayette County, West Virginia, within the boundaries of the National Park Service’s New River Gorge National River, and the Council Ridge Colliery, an anthracite mine located in Luzerne County at Eckley, a heritage park operated by the Pennsylvania Anthracite Heritage Museum. The second novel feature of the project was that it involved no fieldwork. Both mines were closed in the 1960s, making it impossible to do the site-specific fieldwork characteristic of other HABS/HAER projects. Because no photography was possible, the documentation consisted of drawings and narrative histories. Historic mine maps, mining equipment catalogues, and reports by West Virginia and Pennsylvania mine regulation agencies were the main sources for the drawings and historical reports.

Results

The documentation package, completed in 1999, produced nine drawings: 1) a cover sheet with coal field maps showing locations of sites, as well as geological sections of both mines; 2) a historical perspective of topography and surface features of Kay Moor, using ArcView Geographic Information System (GIS) and data from United States Geological Survey (USGS) 1:24,000 quadrangle topographic maps for Fayetteville, W.Va.; 3) a site plan (based on a historic mine map) of Kay Moor No. 1; 4) early mining methods (1910) at Kay Moor No. 1; 5) modern mining methods (1941) at Kay Moor No. 1; 6) a historical perspective of topography near Council Ridge Colliery using ArcView GIS and data from USGS 1:24,000 quadrangle topographic maps for Hazelton, Pa.; 7) a site plan (based on a historic mine map) of Council Ridge Colliery; 8) early mining methods (1878) at Council Ridge Colliery; and 9) surface mining methods at Council Ridge Colliery (1912). The narrative history consisted of two essays: a forty-six-page report describing the development and technologies at Council Ridge Colliery and an eighteen-page report describing underground mining methods in use at Kay Moor No. 1. In addition, the principal investigator published a scholarly article based on the documentation: “The Kay Moor Mine, 1901-1962: A Case Study of Underground Mechanization in the Bituminous Coal Fields of Southern West Virginia,” in *Canal History and Technology Proceedings*, Vol.19 (March 18, 2000): pp.143-179.

Principal Investigator: Michael E. Workman
GETTING OUT THE COAL
Kay Moor #1 (Bituminous) Mine and Council Ridge (Anthracite) Colliery
1854-1964

KAY MOOR #1 MINE
GEOLOGICAL SECTION

Coal mining methods used in the United States during the 1854 to 1964 period varied according to geography, data of operation, geologic conditions, the availability of capital and mining machinery, the state of technical knowledge, and custom. Geologic conditions such as the height and pitch of the coal seams, depth and nature of overburden, and character of the roof and floor, played a decisive role in determining mining methods at the Council Ridge anthracite colliery in Pennsylvania, which operated from 1854 to 1964, and the Kay Moor #1 bituminous mine in West Virginia, which operated from 1901 to 1962. Coal is formed in low-temperature, low-pressure environments, energy captured by giant ferns and other plants which flourished 350 to 350 million years ago. Immense swamp forests thrived in the carbon dioxide-rich atmosphere of that period and set large deposits of plant debris. Subsequently buried by detritus, these deposits were covered with layers of sediment. Over time, heat and pressure transformed the deposits into coal. Variations in the coalification process account for differences in the chemical composition and quality of coal. Field tests of coal's rank provide a measure of its quality. High volatiles bituminous coal, low volatiles bituminous coal, anthracite coal, and lignite are classified by their rank and volatile content.

Council Ridge Colliery is located near Eddyville along the western margin of the Lehigh field. The topography is a nearly level plateau, but the underlying anthracite coal measures are irregular, with numerous folds, faults, and coal seams in close to the surface. The main coal bed, the Buhl Mountain seam, is 13 to 20 feet thick and extends 20 miles along strike. Due to the pitching seams, underground mining was never mechanized at Council Ridge. Instead, strip mining began quite early in 1903 and by 1906 accounted for one half of total production.

COUNCIL RIDGE COLLIERY
GEOLOGICAL SECTION

Bituminous coal is plentiful compared to anthracite. The most extensive and valuable deposits are found in the Appalachian basin. The highest ranking bituminous coal is low volatile, semianthracitic, which is known as "smokeless" coal because it emits very little smoke when burned. Kay Moor is located in Fayette County along the northern margin of southern West Virginia's low-volatile, "smokeless" New River coal field. It is situated within the New River gorge, a 160-foot deep channel with steeply sloping walls of 30 degrees or more. Despite a rugged topography, the structure of the underlying coal measures is regular with an absence of folding and faulting. The coal seams, however, are quite thin. The Sewell seam, mined at Kay Moor, reaches a maximum thickness of only about 3 feet. Despite the thin seams, mining equipment was utilized from the beginning of Kay Moor. Two distinct phases in the technological development of underground mine machinery occurred at Kay Moor.

This research project was undertaken by the Institute for the History of Technology and Industrial Archaeology (IHITA) at West Virginia University. Directed by Dr. Ensley Kemp, IHITA works with the Historic American Engineering Record (HAER) of the National Park Service to document historically significant engineering and industrial sites of the United States.

Maps and geologic information were provided by Chester Kucius of the Anthracite Heritage Museum; Len D. Ivers, geologist with the Pennsylvania Department of Conservation and Natural Resources; and Steve McFarland, geologist at the West Virginia Geological and Economic Survey. Field visits to Eddy and Kay Moor were completed in 1996 and 1997 by Dr. Michael E. Winterman of IHITA, who served as principal investigator and historian in this project. Historical research was underwritten by IHITA staff Scott Daley, Ryan Robie, and Bryan Ward. The drawings were prepared under the direction of Dannye Benthemenger by Allie Owens, Kevin McClung, Reil Rosto, Geoff Daley, and Jeremy Morris.

NOTE: SEE ALSO ADDENDUM TO KAY MOOR COAL MINE (1901-1962)
HAER NO. WV-39 SHEETS 1-4
In 1910, mining at Kay Moor No. 1 took place in the Sewell coal seam, a low-sulfur coking coal which averaged thirty-six inches thick. Mining was concentrated in four panels, each with approximately twenty rooms. These rooms provided working places for seventy-seven miners and twenty-two machine operators and helpers.

Most of the personnel was machine-based, including a special crew to operate the locomotives. Bituminous coal was used, and the face was excavated by a pick-hammer. The coal was then loaded into a mine car and hauled off for processing.

After undercutting was completed, the miner drilled four holes along the top of the seam across the working face with a breast auger. Meanwhile, the miner's buddy rolled up shales of black powder in a paper capsule, and the rock would be blasted. The blast was then repeated until the blasthole was finished. The coal was then loaded into a mine car and hauled off for processing.

Miners loaded an average of fourteen to twenty tons per day, averaging 350 feet per day. The mine's total output in 1910 was 153,595 short tons. About half of this output, 76,024 tons, was used in coke-making at the mine site, while the remainder was shipped to market.