

## Preprint 03-087

### KENTUCKY'S PORTAL 31 EXHIBITION MINE

**J. S. Gardner**  
**P. D. Robinson**  
Engrg Consultg Svcs, Inc.  
Lexington, KY

**R. Woolacott**  
Gerard Hilferty & Assocs, Inc.  
Athens, OH

#### ABSTRACT

In 1917, U.S. Coal and Coke Company, a subsidiary of U.S. Steel, opened Mine 31 and built the community of Lynch, Kentucky. For the time this was truly a major engineering accomplishment. It was documented in Howard N. Eavenson's 1939 AIME paper, "Coal Through the Ages." In 1996, Arch Coal donated the Portal 31 property to Harlan County for public use. In 2003 the Southeast Education Foundation, Inc. and the Kentucky Coal Museum plan to open the Portal 31 Exhibition Mine to the public to tell the story of Kentucky coal mining through the decades. This presentation will summarize the history of the project, efforts to bring it to reality, the engineering problems, and the challenges of providing a safe environment for visitors.

#### BACKGROUND

At the turn of the 20<sup>th</sup> century deep within the Appalachian Mountains there was an area so remote that it was unnamed as yet. This small area at the foot of Black Mountain, the highest peak in Kentucky held an untapped resource, coal, which would soon play a key role in the industrialization of the United States.

In 1917 U.S. Coal and Coke began the exploration of this small area and discovered several coal seams that collectively would soon be considered one of the best gas and coking coals in the United States. The C or Darby and B or Kelioka seams averaged five feet thick and were considered to be of high quality. Mine No. 31 set the world's record in 1923 for coal production in a nine-hour shift when miners produced 12,820 tons of coal.

The U.S. Coal and Coke Company made the decision to begin mining in this remote area only to discover that, due to the remoteness, the company would have to supply all the fundamentals for the miner and their families. In U.S. Coal fashion, it was decided that this little area in the mountains would be developed into a model coal camp. When the company recognized a shortage of available man-power in the area, they began recruiting immigrants as they arrived into the United States. Also recruited were blacks from the old plantations of the South looking for a better life. The company utilized this workforce to not only produce some of the finest quality

bituminous coal but to build a town that the miners would be proud to call home. A theater, an impressive hotel, recreational areas (baseball fields, tennis courts, etc.), a hospital, company power plant, schools, churches, and hundreds of modern two-story homes with enough land for a vegetable and flower garden were all built. This town was to be the town in which everyone wanted to live, a model town. It was a unique microcosm of the American melting pot. The remote area in the foothills of Black Mountain became a quaint, picturesque town that would forever be known as Lynch, named for Thomas Lynch, the president of U.S. Coal and Coke at that time.

#### EMERGENCE OF THE PROJECT

In the late 1970's not long after the coal boom in Kentucky was over, the community leaders began to realize that the coal industry would not last forever in their area. The once thriving coal town, with a population of around 10,500 in the 1950's was slowly fading away (today the population is approximately 1,500). In the face of a dim future the Lynch community leaders and the leaders from the adjacent towns of Benham and Cumberland banded together and took the initiative to secure state and federal grants to purchase historic coal





**Kentucky Coal Museum**

properties and convert them into a coal museum and a bed-and-breakfast and began mining for tourism.

The leaders then hit a stumbling block in their attempts to acquire the Portal 31 property as an exhibition coal mine. In 1984, U.S. Steel Corporation sold its Harlan County properties and mine assets to Arch Coal. All efforts to acquire the property for the exhibition coal mine were put on hold with the community leaders focusing on the creation of the Kentucky Coal Museum. The old Benham coal camp commissary was still standing proudly on Highway 160, known as The Trail of the Lonesome Pine (immortalized in John Fox, Jr.'s novel of the same name), located only two miles from Portal 31. It was the obvious choice for the museum. Acquisition of this building had gone smoothly with funds provided from the state of Kentucky. Work began feverishly to create the museum. The renovations and creation of the exhibits were costly and were accomplished only through the aid of a \$750,000 Economic Development Grant. The tedious work paid off with the museum opening in 1994.

The Kentucky Coal Museum offers a complete picture of the lives that revolve around the coal industry. Visitors can view the process detailing the formation of coal by looking at numerous visuals and fossil displays. Other displays include items from the company hospital, early mining tools, items from the commissary and the miner's home, and a working scale model of a coal tippie.

Additionally, there is an impressive collection of photography documenting the history of the local area as well as a narrated video for the visitors to enjoy that describes the early coal mining days in Benham and Lynch.

The development of the bed-and-breakfast was a long and expensive process. It first began as a private venture after the closing of the school in 1992. The community leaders, recognizing the historical value and overwhelming task for a public venture, stepped forward and purchased the old public school structure that was built by International Harvester in the early 1900's. This structure was chosen for preservation because it is a magnificent example of the efforts made in the early part of the 20th century to provide a proper education for the miners' families.

The restoration process for the old school entailed securing several grants and private donations to create an outstanding bed-and-breakfast. The renovation process took over 3 years and \$1.2 million. The community leaders recognized that as their plans unfolded to preserve the coal heritage, there would be a need for appropriate lodging for overnight guests. U.S. Coal and Coke had realized this need back in 1920's and had built in Lynch one of the most modern hotels in the South. However, when U.S. Coal began to consolidate their mining ventures the hotel was torn down and the materials recycled. The community leaders poured their energies into creating a hotel that would again be a showcase of the Appalachian Mountains.

At the Benham School House Inn, guests can step back in time



while experiencing the hospitality of the people of Appalachia whose roots are closely tied to the coal industry. This mountain resort features a beautiful banquet hall that was converted from the school's original gymnasium while the school cafeteria was converted into a unique restaurant, Apple Room Restaurant. The Apple Room in keeping with the theme of the communities' coal heritage features a cultural menu of regional favorites while providing a comfortable setting to enjoy an evening meal. One of the specialties served is fresh trout grown in water that comes from the surrounding mines as part of an Aquaculture program overseen by the Southeast Community College.

With the near completion of the restoration of the museum and the bed-and breakfast, efforts were once again turned to the acquisition of the property for the exhibition coal mine. In 1996, Arch Coal decided to donate the Portal 31 property to Harlan County. This was excellent news and the beginning of the unfolding of the exhibition mine phase of the project. This area was still permitted, though inactive.

Mining Consulting Services, Inc. (MCSI), a subsidiary of Engineering Consulting Services, Inc. (ECSI), was asked to handle the process of preparing all regulatory and environmental permits and assessments necessary to transfer the property. Steve Gardner, president of ECSI/MCSI, worked closely with Arch Coal throughout the process. MCSI helped Arch secure the appropriate permits from the state of Kentucky to leave the existing infrastructure in place. These facilities would be instrumental in adding to the authenticity of the final exhibit. Buildings included: a power plant, bathhouses, coal tippie, lamphouse, rail depot, shop, warehouse, and silo.

When the property officially belonged to Harlan County, the Southeast Education Foundation, Inc. took the responsibility of overseeing the exhibition mine project. MCSI was retained as Project Manager to oversee the mine rehabilitation and supervise installation of the exhibits. Gerard Hilferty and Associates, Inc. of Athens, Ohio was contracted to provide the interpretive design of the exhibits.

MCSI had to immediately tackle the safety issues inside the mine and to determine what part of the mine was best suited for exhibits. The Kentucky Department of Mines and Minerals volunteered a mine rescue team to explore the tunnels and assisted in selecting an area consisting of two entry tunnels that extend about 600 feet underground.

The coal mine had been abandoned for many years without maintenance of roof, ribs, pumps, etc. After choosing the areas to be rehabilitated there was a lot of good housekeeping to be done. The excess debris and old timbers had to be removed as well as checking the existing mine seals, replacing them where necessary. Also, all of the roof and ribs had to have loose rock and hanging debris removed. The more extensive items to be done included the removal of the old roof bolts and replacing them with modern, resin roof bolts; addressing the ventilation problems; controlling the water with use of



several sump pumps; and providing additional roof support that would ensure the safety of the future visitors.

Several of the existing mine seals were deemed unsafe for a tourist-type environment. These seals were re-designed and replaced according to today's regulatory specifications. The placement of a few of the new seals was adjusted to allow for better overall ventilation of the mine. The mine fan was completely refurbished.

Securing the roof required a new design incorporating a high-strength fiber mesh with resin roof bolts. Fosroc, Inc. provided a state-of-the-art high-tensile sealant, Tekflex, to permanently bind the rock face in areas where meshing was not possible (including the tunnel walls). Meshing of the roof was done as an extra safety precaution in every viable area of the tunnels to be traveled by visitors. Donut cribs were used in areas with wider spans for additional roof support.

The placement of the exhibits and the work in the mine had to coordinate. Ribs in several areas had to be cut to preserve the design interpretation developed by Hilferty. Another issue was the humidity level in the mine and its effect on the instrumentation controlling the exhibits, i.e. audio/visual and animated figures. Humidity monitors were installed in keys areas throughout the mine to assist Hilferty in the equipment specifications.

The actual rehabilitation of the mine, Portal 31, is now complete at a cost of almost \$1,000,000 and many hours of time from engineers, designers, and volunteers. But there is still much work to be done.

The project is now in the final design stages. Hilferty has designed the exhibits and the graphic labels are being reviewed for authentication and accuracy of content. The physical creation of the exhibits is expected to begin by December, 2003. The exhibits will be located along the tour path. The tour will begin at the renovated U.S. Coal and Coke lamphouse. Visitors will arrive at the old L&N Depot building. As they head towards the lamphouse they will pass full-size figures of miners depicting mine-related jobs that are necessary to the mining operation. At the lamphouse visitors will receive their "authentic" underground gear including hard hat and miner's light. Their ticket will be a uniquely numbered brass check which will be hung on the check board just as the miners of yesteryear did. As the visitors don their gear they will be guided through an orientation of mine safety and will have the opportunity to view a 3-D map with A/V introduction of Portal 31.

After orientation, visitors will be transported underground via a light rail system with a specially designed mantrip. The experience in the mine will involve a ride with A/V elements with the emphasis on developing the gut feeling of working in the mine while expressing the change in the mining methods over time. The storyline follows one



Scale model of one of the proposed exhibits by Hilferty.

immigrant miner from 1917 and his family through the decades as mining technology evolves. It will tell not only the story of the mine, but the story of the "Community of Coal." The gallery of exhibits will include units on surveying, mine safety, underground equipment, and ventilation. Above ground equipment highlighted will be the coal tippie and the train used for shipping coal to the U.S. Coal and Coke steel manufacturing plants in the north. The tour will conclude at the lamphouse where visitors will deposit their gear and depart for home taking with them a little piece of the industrial heritage known as coal.

## CONCLUSION

When the final exhibit is in place and Portal 31, the Exhibition Coal Mine, is opened to the public in June, 2003, the 30 year dream of the community leaders will be realized. These men and women will have created an exemplary tourism program that highlights Southeast Kentucky's rich and colorful coal mining heritage. The culmination of their efforts will be in the rehabilitation of the amazing engineering feat of U.S. Coal and Coke, Company, the development from a largely wilderness area in the early 1900's of one of the nation's largest and most productive coal mines.

Dr. Bruce Ayers, President of Southeast Community College, Mr. Rayburn Doss, Chairman of the Southeast Education Foundation, Ms. Bobbie Gothard, Curator of the Kentucky Coal Museum, and the volunteer efforts of the retired miners and their families of the Tri-City area of Benham, Cumberland, and Lynch are to be commended for their 30 year pursuit of the dream. The light can now be seen at the end of the Tunnel. Please visit [www.portal31.org](http://www.portal31.org) for more information.

