

Mid-Continent Regional and National Awards

Sunshine Mine, Site 291

Bicknell, Indiana

Completed by:

Indiana Department of Natural Resources

Division of Reclamation



Project date: May 25, 2001 - November 15, 2001 at a cost of \$896,226.20

Background

The Sunshine Mine is located in Knox County, Indiana in the northwest corner of the city of Bicknell. Historical records indicate that Bicknell, established in 1869, was incorporated in 1907. The city is named after its founder, John Bicknell. Bicknell had a population of about 4000 at the time of its incorporation and the first local commercial coal mine was started in 1873. In 1920 there were approximately 20 shaft mines in the area providing jobs for over 2,000 men. The need for coal during this period was fueled by the industrial demands of World War I (1914 – 1918). Trains ran daily from Vincennes to Bicknell transporting miners to and from work. However, by 1927 (two years prior to the stock market crash of 1929) many of the early mines began to close and according to local citizens, delivered a deathblow to Bicknell. Currently, the population of Bicknell is approximately 3,300.

The Sunshine Mine was an underground shaft mine, which began operation in 1936 and continued until 1959. Mining records indicate that three different coal companies operated this mine during its life-span. They were: Mays Richardson Coal and Mining Company, Sunshine Coal Company, and the Wolfe-Koenig Coal Company. During the life of the mine approximately 2.8 million tons of coal were removed from the Hymera coal, or Indiana VI coal seam, which was approximately five feet thick and located at a depth of 128 feet.

The processing operations associated with the Sunshine Mine left behind a 25-acre area of gob, slurry, abandoned and derelict buildings, trash and other debris. This abandoned mine was clearly visible from State Highway 67, which forms the southern edge of the site. Highway 67 is a heavily traveled corridor connecting Bicknell and other outlying communities to

Vincennes, the county seat. The east side of the site adjoined the Knox County Fairgrounds, which seasonally hosts the county fair and other community activities. The site is bounded on the west by Indian Creek, a small tributary of the White River and agricultural farmland is located to the north.



Abandoned since 1959, this mine site contained derelict buildings, coal refuse that was causing sedimentation, and acid mine drainage pollution of nearby streams. In addition, frequent coal fires at the site were the source of significant air pollution and danger to unsuspecting visitors to the site.

The Problem

This abandoned mine site has been a detriment to the town of Bicknell. Travelers often referred to Bicknell as “the city on Highway 67 that had the ugly old coal mine at the edge of town.” Notoriety of this sort makes it very difficult to project a positive image of what is otherwise a very industrious community.

Indian Creek receives all of the drainage from this abandoned mine site. Since the mine was abandoned in 1959, the creek has been negatively impacted by the presence of the coal refuse. Chemical degradation included not only the acid mine drainage derived from the pyritic coal refuse, but also the associated precipitation of heavy metals in the stream. Physically, the creek received heavy loads of sediment, washed from the barren, loose coal refuse material.

This site also sustained periodic occurrences of fire in the gob material. Gob pile fires are a significant source of air pollution and unpleasant odors. When this pile was on fire, citizens of nearby Bicknell complained about the odor and one resident complained of respiratory problems from the air pollution. Gob fires also posed a serious threat to the many unsuspecting visitors to the site, since this type of fire is not always visible from the surface.

Project Design

The objectives of the reclamation project included: reducing the adverse off site contamination (chemical and physical) caused by the barren coal refuse area, eliminating air pollution and the dangerous abandoned structures, improving the aesthetic value of the area, and restoring the property to a productive land use.

Reclamation consisted of demolition and disposal of buildings, excavation and burial of coal refuse, covering of the graded construction area with excavated borrow material, installing erosion control features, and revegetation of all disturbed areas.

Project Construction and Reclamation

The reclamation of the Sunshine Mine was not a large project, but the difficulty of the work is what makes this site worthy of recognition. The extremely close working quarters required a high degree of coordination on the part of the contractor, and a design that was flexible enough to accommodate unforeseen discoveries during excavation.

Reclamation at this abandoned mine site has eliminated the dangers associated with the derelict buildings and the health and safety problems of past gob fires. Water infiltration into the coal refuse has been reduced and drainage is directed away from the site more quickly and efficiently, thus reducing acid mine drainage and off site sedimentation. The aesthetics have been greatly improved and the site now has potential for productive use.



The designated borrow area contained a small shallow pond that was not wanted by the landowner. It is believed that this pond may have been the primary source of water that seeped through the gob, producing acid mine drainage in the adjacent creek. Removal of the impoundment eliminated a water source, thus improving the off site impacts. The water in the pond met water quality standards, and therefore needed no treatment prior to discharge.

After discharging the impounded water, borrow operations commenced. Because of the tight construction limits, the excavated borrow material could not be spread over the site, but was stockpiled. Stockpiled soil could be spread only after sub-grade had been established on the coal refuse. In order for the final sub-grade to be established, excess coal refuse had to be disposed of in the borrow pit. This extreme Catch-22 scenario thus led to all three operations (borrow excavation, refuse disposal, and borrow spreading) being performed simultaneously, moving the same quantities of material, and at approximately the same time. As the work progressed toward completion, the degree of coordination rose as the remaining work area continued to shrink in size.

In order to avoid double handling of the excavated coal refuse, the refuse was placed immediately into the borrow pit following removal of the borrow soil. Much of the time, coal



Reclamation of the site included almost 5,000 linear feet of erosion control structures. Here rock-lined ditches carry water off the site without causing soil erosion.

Since reclamation of the site was recently completed, there are no long-term measurements of the effects of the project. However, current post reclamation analyses of water quality have been positive and are a good indication that the reclamation will provide long-term improvement of nearby streams.



refuse dumping and borrow pit excavation operations were being conducted simultaneously within a few feet of each other. The coal refuse excavation and hauling operation was an integral part of this project. As the project wound down to completion, refuse was being placed literally adjacent to the soil being excavated in the same pit. Approximately 232,000 cubic yards of coal refuse were disposed of in the excavated borrow pit.

During the course of the project, approximately 207,000 cubic yards of borrow material were excavated to provide the necessary space for the gob disposal. This was enough material to place a four foot thick soil cap over the resulting 32 acres of disturbance. By raising grades on some portions of the site, the contractor was able to dispose of more refuse in the borrow pits than yards of material removed for cover.

Prior to the placement of soil over the graded refuse, 100 tons per acre of agricultural lime was spread over the gob surface and incorporated to a depth of six inches. This lime layer will provide an alkaline barrier between the acidic coal refuse and the soil cover. A total of 3,429 tons of lime were applied to the site. The four foot deep soil cap is thick enough to significantly reduce infiltration of rainwater into the gob material. This will reduce the potential for production of acid mine drainage that could leave the site via seeps or groundwater flows. The soil cap also provides a suitable base to support a diverse and thriving stand of vegetation.

The soil cap and the establishment of permanent vegetation across this site have greatly reduced offsite sedimentation. In addition to the soil cap, 4,985 linear feet of various erosion control features were installed. These included grass waterways, rock lined ditches, and terraces. Most drainage from the site and the immediate surrounding area is directed into a small wetland. This wetland improved the site aesthetics, eliminated offset sedimentation, and has enhanced the water quality of adjacent Indian Creek.

This project included the demolition and burial of two concrete buildings. The demolished buildings were excavated to an elevation of three (3) feet below final grade. All concrete rubble from the buildings was buried on site under five (5) feet of cover material. Any salvageable metal or other material from the demolished buildings was retained by the contractor or disposed of in a certified landfill. All trash and debris was disposed of in a state certified landfill.

Pre-reclamation water sampling of Indian Creek just downstream from the site revealed pH levels of less than three (3.0). Quarterly post reclamation water quality data collection and analyses continues today. The evaluation of water quality will determine the degree of success that has been achieved on this site. Early analysis of post reclamation water quality has been favorable. Values for pH have gone from a low of 2.7 to a high of 6.9. This current high reading was recorded one month prior to completion of the project and again two months after completion. Reduced levels of total suspended solids, total dissolved solids, iron, manganese and sulfates are good indicators that the site is already on the mend as a result of the reclamation.

Prior to reclamation, this site was a detriment to the community of Bicknell. Past gob fires and abandoned buildings created health and safety problems. Environmental conditions were being negatively impacted not only by the gob fires but by acid mine drainage and off site sedimentation into Indian Creek. It was a liability to the community both aesthetically and economically.

Reclamation has eliminated the dangers associated with the buildings and the health and safety problems of past gob fires. Infiltration of precipitation into the gob has been reduced and drainage is directed away from the site more quickly and efficiently, thus reducing acid mine drainage and off site sedimentation. The aesthetics have been greatly improved and the site now has potential for productive use.



Most drainage from the site and the immediate surrounding area is directed into a small man-made wetland. This wetland improves aesthetics, eliminates off-site sedimentation, and enhances the water quality of adjacent Indian Creek.