

**YEAR 2002
ABANDONED MINE LAND RECLAMATION AWARD
NOMINATION**

LCUM 4 ABANDONED MINE LAND RECLAMATION PROJECT

LeFlore, LeFlore County, Oklahoma

Submitted by

**THE OKLAHOMA CONSERVATION COMMISSION
ABANDONED MINE LAND PROGRAM**

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Contracting Agency: Oklahoma Department of Central Services
Construction Contractor: Frazier Construction, Inc., Wister, Oklahoma
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Construction Cost: \$232,567

LCUM 4 RECLAMATION PROJECT

Until the death of a 14-year-old boy on July 19, 1992, very little information was known about the abandoned underground mines in LeFlore County, Oklahoma. This death and subsequent jury trial resulted in a concerted effort by the Oklahoma Conservation Commission (OCC) to enlist the support of governmental agencies, universities, and the general public in locating all the hazards associated with the mines such as open shafts/portals and subsidence.

Mining in LeFlore County began in the late 1800s with miners using pick-axes. The coal was loaded into pit cars that mules pulled out of the mines. By the mid 1900s most underground mining had ceased.

As the open shafts and portals were located, the OCC contracted for the closures in phases, beginning with LeFlore County Underground Mines (LCUM) in November 1992 to the most recent, LCUM 4, completed in January 2002. The four projects closed a total of 203 mine shafts and portals.

The LCUM 4 Project is in central LeFlore County. There were 61 separate sites from the western part of the county extending eastward to the Oklahoma-Arkansas border. A total of 19 portals, 11 vertical openings, and 31 areas of subsidence were identified as hazardous or potentially hazardous to the public. A few of the sites were on the southwestern edge of Poteau (pop. 7,939). Most of the remaining sites were located within or near public hunting and recreation areas close to the towns of LeFlore, Fanshawe, Wister, and Heavener. Using a Global Positioning System, Mike Sharp, OCC AML Program assistant director, mapped each hazard to identify and monitor the site in the future (Photo 1). Nine sites were deemed as having significant historical features such as a brick- or native rock-lined entry, engine hoists, fan house and boiler room footings. During construction, the significant historical features were either salvaged, left intact, or removed then put back in place upon completion of the site. Four portals were identified as potential bat habitat, and one portal was a den for rattlesnakes. LCUM 4 was unique for the state because it was the first time the Oklahoma AML Program constructed bat gate closures.

LCUM 4 involved the cooperation and interaction of more people and a larger variety of governmental organizations than the first three projects. A total of 17 landowners were involved, including the U.S. Corps of Army Engineers. The

Corps land had open portals and vertical air shafts posing health and safety risks to the public who utilize the Corps land around Lake Wister. Most abandoned underground mine portals and vertical openings were water-filled, but four of the portals on the Corps property were dry. The OCC signed a temporary license to perform the necessary reclamation work on the Corps property.

According to the U.S. Fish and Wildlife Service, more and more significant bat colonies are being discovered in abandoned mines. Human disturbance of caves, cave commercialization, deforestation, and urban/agricultural development have forced bats from traditional roosts into new areas, including abandoned mines. More than 43 bat species in the continental United States use mines to some extent. Little has been done to survey abandoned mines in Oklahoma for bat use. Therefore, Steve Hensley of the U.S. Fish and Wildlife Service agreed to investigate four mines that appeared to have potential for providing habitat for subterranean wildlife such as bats (Photo 2). Old mine maps helped identify potential bat habitat by showing where mine shafts, portals, and air shafts were located.

Mist netting verified that bats used the mines. The eastern pipistrelle bat (*Pipistrellus subflavus*) and the northern long-eared bat (*Myotis septentrionalis*) were captured during the netting. Although neither species has been identified as threatened or endangered, the decision was made to enlarge the entries of the four portals to attract more bats. As a result, inquiries were made to other states and the Office of Surface Mining (OSM) staff experienced in the design and construction of bat gates over mine portals. The OSM/Bat Conservation International workshop held at St. Louis in November 2000 proved to be an excellent forum for the Oklahoma AML staff to learn about the latest design and technology in protecting bats and their habitat. A considerable amount of staff time was spent developing the design and specifications for installation of the bat gates. The final design was adapted from combined American Cave Association and Bat Conservation International bat gate designs and modified to address Oklahoma's specific needs.

Due to the age of the abandoned mines, most of the sites had collapsed or deteriorated. To determine the extent of a problem, the contractor, Frazier Construction, Inc. (Wister, Oklahoma), excavated each site (Photo 3). Once a site was exposed the contractor built a ramp to fill the void with various gradations of rock, then packed the rock with clay. On-site soil material was placed over the clay as the final fill material. One portal was not filled using the typical rock/clay method because western diamondback rattlesnakes were using the portal as a den. In this

case, Frazier Construction excavated the portal and placed large rock in the opening to provide voids for the rattlers to have access to their den, but protected the public from the hazardous opening.

The construction of the four bat gates was by far the most challenging part of the job for the contractor due to the variation in size and complexity of each mine entry. Frazier Construction poured a concrete footer (Photo 4) across the entire width of each entry, placing embedded anchor bolts 12 inches deep in competent rock and 24 inches deep in incompetent material. The gates were made of 4-inch by 4-inch by 3/8-inch angle iron, 4-inch by 4-inch structural tubing, and 4-inch by 3/8-inch strap iron, and other materials as needed. The contractor embedded the anchor bolts into the walls and roofs at the same depth as those in the footer. Each bat gate was built so that entry can be made by using McGard Security bolts with nuts and keys. This will allow for continued monitoring of bat usage in the portals. Henry Roye, AML project inspector, and LeFlore County Conservation District board member Wesley Pickle inspected one of the completed bat gates (Photo 5). A sign was installed inside each gated portal describing the inherent danger of abandoned underground mines, explaining how the bat gate provides wildlife habitat, and describing the benefits of bats.

Construction started on June 27, 2001. Frazier Construction, Inc., took 116 days to reclaim the 61 sites at a cost of \$232,567. The cost to reclaim LCUM 4 was higher than the three previous projects. Six months before construction started, a massive ice storm struck eastern Oklahoma and western Arkansas, making the sites completely inaccessible due to the large amount of downed trees and limbs. In addition, over half the sites were located in very rugged terrain requiring construction of service roads to get to the sites.

The LeFlore County Conservation District (District) coordinated the vegetation of all sites. The permanent vegetation involved two different plantings. In October 2001 the District used all-terrain four-wheelers to spread, per acre, a mixture of 30 lb of perennial ryegrass, 30 lb of Kentucky 31 fescue, and 300 lb of triple 17 fertilizer. This allowed for a relatively quick cover in the disturbed areas, which were in rugged terrain with steep slopes. This planting cost \$4,500. The second planting was much more labor-intensive and required more supervision. Pine and hardwood trees are indigenous to the area and are generally planted in the winter months. As a learning experience, the National FFA Organization members from the Howe, Wister, and LeFlore chapters and the Poteau Boy Scout Troop No. 30 helped plant 5,050 loblolly pine trees during February 2002 in the same area as the

first planting (Photo 6). Each tree cost 19 cents to plant. The scout troop was so excited about the tree planting and the bat gates that they plan to make the LCUM 4 area one of their long-range conservation projects and develop other natural resource and wildlife activities.