2004 Abandoned Mine Lands Reclamation Awards

Project Name:
Brier Ridge Burning Gob Pile

Project Location:
Village of Dillonvale, Jefferson County, Ohio

Nomination Submitted by:
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Abandoned Mine Land Emergency Section
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Project Starting Date:
01/21/2002

Project Completion Date:
07/11/2002

Project Cost:
$329,956.00

Contractor:
Triple A Construction, Inc
60997 Ridgeview Drive
Barnesville, Ohio 43713

Nomination Submittal Date:
March 19, 2004

Ohio's Coal Mining History

Ohio is located in the northern portion of the Appalachian Coal Basin, which is one of the largest coal fields in the United States. Coal mining in Ohio began around 1800 and during its first 150 years was conducted almost exclusively underground. Since 1800, 3.4 billion tons of coal have been mined in Ohio. This tonnage encompasses 1.3 billion tons from surface mines and 2.1 billion tons from underground mines.

The Ohio Department of Natural Resources Division of Mineral Resources Management administers the AML program, which includes an emergency program and a non-emergency program. The programs focus on problems that require action to protect the public health, safety, general welfare, and property from the adverse impacts of past coal mining practices in accordance with Title IV of the 1977 Surface Mining Control and Reclamation Act (SMCRA).

Project Background

The Brier Ridge Gob Pile is located in Smithfield Township, Jefferson County, Ohio. The site is situated approximately 3.2 miles northwest of the Village of Dillonvale. The gob pile was created as a result of underground coal mining in Jefferson County during the early part of the twentieth century. The gob pile was 2 acres in size and had a maximum depth exceeding 25 feet. *(See Photogragh 1.)* The perimeter slopes were very steep, with several large erosion gullies that discharge into Piney Fork Creek. The gob pile consisted of 70% coal waste. Much of the area surrounding the pile is popular as a recreational site for hunters and ATV enthusiasts, thus bringing the public in contact with the gob pile and increasing the chances for accidents on and around the steep edges of the pile.

The Ohio Division of Mineral Resources Management (DMRM) received a complaint in November of 2001 indicating that the gob pile located on Brier Ridge was on fire. Upon inspecting the site it was discovered that an approximate 1000 square foot portion of the pile was on fire or smoldering and that the fire had spread to some of the surrounding trees. The Ohio Division of Forestry had been to the site the previous day to extinguish the burning trees and to cut fire breaks to keep the fire from spreading to the surrounding vegetation.

The DMRM AML Program immediately initiated the process to obtain the necessary approvals to develop a project to quench the fire and reclaim the site. During this time the Divison received numerous complaints from the Village of Dillonvale of reporting the emission of noxious gases from the burning pile. The citizens of the Village were convinced that the fumes from the fire were threatening their health. Upon receiving the initial complaints, the Division also implemented a comprehensive air-sampling program that would sample the ambient air from the complainants' homes nearest to the fire. The air-sampling program found no elevated levels of noxious gases or conditions where the public's health was being threatened. Unfortunately there was a very strong smell of sulfur in the air from the burning gob that permeated the area homes. These homes are located in the lower portions of the ravines, which does not allow the smoke to rise during certain types of barometric conditions.

A public meeting was conducted to review the concerns raised and to outline the Division's plan to extinguish the fire and reclaim the site. Meanwhile the fire was spreading within the pile rapidly and it was becoming a serious danger to the people that used the area. The high percentage of coal in addition to the porous composition of the pile allowed oxygen to fuel the combustion within the pile.

Fortunately and ironically, this rapid spread of the fire helped to accelerate the approval process. Initially it appeared that the only way the project could be funded for reclamation was through the Division's Non-Emergency AML Program. However in consultation with the Office of Surface Mining (OSM) it was determined that immediate action could minimize reclamation costs over waiting to address the site under the Non-Emergency Program. The construction was then funded under Division's Emergency AML Program. This change in status allowed the Division to speed up the project design and construction.

Periodic inspections of the site detected the fire was spreading and there were locations where the pile was sinking. This created additional concerns that dangerous voids could be developing within the pile thus increasing the possibility of accidental human entrapment resulting in serious injury or

death. Coupled with the rising number of citizen complaints regarding health problems from the noxious fumes, it was evident to DMRM personnel that measures had to be taken quickly to contain and eliminate the burning gob fire to protect the public's health and safety.

Reclamation Plan

To effectively address the problem, the AML Emergency Program developed a design to quench, stabilize and reclaim the pile. **The first phase** of the design was intended to immediately reduce the noxious emissions from the site by quenching the burning portion of the pile. The initial design was to quench approximately 1 acre of burning refuse. A unit price contract developed for the Emergency Program was utilized. The standing unit price contract allows for immediate response and eliminates the need to go through a separate bidding process. The design also required a U.S. Army Corps of Engineers stream permit to cross Piney Fork Creek and approval from the State Historical Preservation Office for working near a historic railroad trestle at the north and south edges of the burning gob pile.

The first phase of the project commenced on January 21, 2002. The design called for the contractor to gain access to the site, construct trenches and to extinguish the burning material excavated from the trench using water pumped from nearby Piney Fork Creek. The extinguished material would then be placed back into the trench and compacted to reduce porosity. Diversion ditches and silt fences were used to protect the surrounding area including Piney Fork Creek from sediment during construction.

Access to the gob pile site was very difficult because the site was located in a steep ravine in a remote and virtually inaccessible area within the Piney Fork watershed. The site is bordered on the east, north and south by the Piney Fork Creek and on the west by an abandoned railroad spur. The nearest public road to the site is one mile away from this location. The only way to access the site with equipment is to cross an abandoned strip mine site, follow a narrow all terrain vehicle (ATV) path over an unstable railroad tunnel and then across the Piney Fork Creek, which is approximately 30 feet in width.

The contractor mobilized track hoes and dozers to the site. The track hoes were used to excavate and place the burning material for quenching. *(See Photograph #2.)* The dozers were used to mix the hot material with the water and then to backfill the trenches with the quenched material. The contractor utilized three water pumps during the peak of the project. The water pumping was made difficult at times because of freezing weather.

The contractor and his crew were faced with many hazards and obstacles in the process of extinguishing the fire. The noxious gases and steam required them to wear protective masks. The application of the water to the burning gob created superheated steam and caused hydrogen gas explosions to occur without warning. *(See Photograph #3.)* The acidic steam caused the electrical connections on the operator's equipment to corrode and malfunction. In addition, the heat from the fire scorched the paint on the contractor's equipment.

The fire was extinguished by February 21, 2002 which completed the first phase on the project. Over the course of one month, the contractor had excavated and quenched an estimated 136,000 cubic yards of gob material. The contractor had excavated and graded over half of the 700-foot pile to depths of 25 feet. The north and south ends of the pile were discovered not to be burning so they were not addressed under this phase. The fire appeared to be completely extinguished. No steam or noxious odors could be detected on the site upon completion.

The second phase of the project commenced on April 2, 2002 and would utilize a more comprehensive design intended to stabilize and reclaim the entire site. The second phase of the project was designed to utilize non-combustible buffer material to construct fire breaks within the gob pile. The project area would also be capped with resoiling material and vegetated upon completion. The buffer material was located approximately one mile away from the project site. The contractor was required to construct a roadway to the borrow area on a very rugged terrain. Construction of the roadway utilized 500 tons of limestone aggregate because of soft subgrade and steep terrain.

The design to reclaim the gob pile required that four-foot wide vertical trenches be constructed throughout the pile and filled with buffer material to act as a firebreak. In addition, two-foot horizontal lifts of buffer material were incrementally installed to further segment the gob

pile. A cut-off trench was also designed along the outer edge of the pile to add more protection to the toe and to restrict the water flow from the site.

A major problem faced in the project's second phase was that a new fire had engulfed the entire previously unaffected portions of the site. The fire started back up as consequence of it not being totally extinguished after the first phase. The contractor had to excavate these new areas and quench them using the same technique that was used to complete the first phase. This required the additional burning refuse to be excavated and quenched. The contractor used non-combustible material from the abandoned railroad roadbed to mix with the gob throughout the site. The design called for the compaction of the pile and grading the perimeter slopes to 10 degrees or less. The entire site was resoiled to a depth in excess of 8 inches and seeded and mulched.

The second phase of the project was completed on July 11, 2002. The contractor excavated and quenched 55,600 cubic yards of burning refuse, utilized 22,025 cubic yards of buffer material from the borrow site and installed 900 linear feet of silt fence.

The reclamation of both phases covered a total of 3 acres which included the refuse pile and the borrow area. A total of 191,600 cubic yards of burning refuse were excavated and quenched. The total cost of the project was $329,956.00.

Reclamation Benefits

The two-phase project has eliminated any present or future fire danger from the gob pile site. The reclamation of the 2 acre gob pile was done in such a manner as to create gentle slopes and establish vegetative cover to eliminate future sedimentation and water quality problems occurring from the gob pile into Piney Fork Creek. *(See Photogragh #4.)* A serious threat to hunters, ATV and recreational users has been eliminated. Local homeowners are no longer concerned about noxious gases and fumes from the gob pile. The historic railroad trestle abutments remain intact and the overall reclamation project has enhanced the natural beauty of the area.

Attached are photographs illustrating the before and after condition of the reclamation project. Also included are photos of the construction work in progress.

Cover Photograph: Date - February 10, 2002. Hazards associated with extinguishing the burning gob fire range from noxious gases and acidic steam to superheated conditions causing hydrogen gas explosions to occur without warning.

Photograph #1: Date - January 21, 2002. Burning coal refuse (gob). Project area consisted of a 2- acre gob pile with an approximate depth of 25 feet.

Photograph #2: Date – February 1, 2002. Track hoe excavating four foot wide trenches into the burning gob.

Photograph #3: Date – February 3, 2002. Quenching burning gob material. Two pumps discharging water into the sump and quenching the gob material. Track hoe excavating quenched material and placing it into four foot wide trenches.

Photograph #4: Date - October 15, 2002. Reclaimed gob pile. Fire extinguished, layered with non-combustible material, capped with 8 inches of soil, vegetated with grasses and legumes.