

# **SPEWING CAMP BRANCH REFUSE AML PROJECT**

## **LOCATION**

Spewing Camp Branch  
Floyd County, Kentucky

## **SUBMITTED BY**

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## **PROJECT START DATE**

September 20, 2002

## **PROJECT COMPLETION DATE**

October 15, 2004

## **CONSTRUCTION COST**

\$3,534,974.73

## **CONTRACTOR**

Hawkeye Construction, LLC  
Robinson Creek, KY

## The Spewing Camp Branch Refuse AML Project

### Overview

Coal mining has played a critical role in the economy of eastern Kentucky for generations. Many older communities in the region were established to house the personnel needed to work the mines. The miners' jobs were arduous and dangerous but provided a good living for many residents of this mountainous, Appalachian area. Southern Floyd County is home to several coal camp communities that developed because of the large coal mining operations in the area. Wheelwright, Price, and McDowell are just a few of communities in southern Floyd County that depended on the mining industry for the major portion of their economy.

While coal mining has provided many benefits for the people of eastern Kentucky, environmental impacts associated with the extraction of coal have plagued many communities. This story will focus on one of those sites located in the southern Floyd County community of Spewing Camp Branch and the AML reclamation project undertaken to correct the abandoned the mining problem faced by residents of that area. The Spewing Camp Branch Refuse site, located in Floyd County was one of the most visible, flagrant examples of the scars caused by past mining practices.

### Site History

Until its reclamation in 2003 the Spewing Camp Branch refuse dump had been one of the most egregious abandoned mine sites in the Commonwealth of Kentucky. (**Photo #1** is an on-ground depiction of the refuse dump just prior to reclamation.) From 1952 to 1973 the site received coal refuse generated by the Island Creek Coal Company preparation facility located at Price, KY, on the opposite side of the mountain from Spewing Camp Branch. The coal company placed over 7 million cubic yards of refuse in the dump from an aerial tram that transported the material from the coal washer, over the crest of the mountain, and dumped it in a small hollow in the Spewing Camp Branch watershed. This activity created a refuse pile up to 165 feet deep stretching approximately 2600 feet from the top of the mountain to the creek below. It was up to 1000 feet wide. The surface of the refuse pile has an average slope of a little less than 2.5 horizontal: 1 vertical, and it contains enough refuse to cover 42 football fields to a depth of 100 feet. (**Photo #2** is an aerial view of the dump showing its size and relation to surrounding topography.)

After the 1972 Buffalo Creek coal waste dam failure in West Virginia, the Spewing Camp Branch refuse dump received considerable attention from the federal Mine Enforcement and Safety Administration and the Kentucky Division of Water Resources. The agencies became concerned that the refuse from the dump could slide into Spewing Camp Branch, block its flow, and create a makeshift impoundment. Failure of that impoundment would cause catastrophic downstream flooding to the many residents that lived below. Because of this concern, Island Creek Coal Company was required to blast a new creek channel, farther away from the dump, divert the stream flow through it, and regrade the refuse pile. Stream channel diversion and other associated work were completed in 1981.

Having completed the stream channel diversion and terminating refuse disposal in 1973, Island Creek Coal Co. formally abandoned the site in 1981. After abandonment, the site began to erode. Rapid deterioration caused coal sediment to wash into the stream, clogging the creek channel and polluting the water all the way into the Left Fork of Beaver Creek, more than a mile away. Downstream sedimentation caused road culverts and the stream to clog resulting in frequent flooding to residential property and the county road.

In addition to sedimentation problems, the site contributed high levels of acidity and iron to Spewing Camp Branch. With an estimated discharge of 50 gallons per minute, the iron leaving the site was measured at 167 milligrams per liter (mg/l), and the acidity was measured at over 800 mg/l. This quantity of low quality water severely impaired Spewing Camp Branch all the way to its confluence with the Left Fork of Beaver Creek and even impacted the water quality of that larger stream.

In the late 1980's, a company named Enerpro, Inc. secured a mining permit on the refuse site in an effort to extract the coal from the refuse pile by running it through an on-site reprocessing plant. The reprocessing effort ultimately failed and the Enerpro permit along with the reclamation bond of \$296,100 were forfeited to the Commonwealth of Kentucky in 1993. The site was again abandoned.

Years passed, and although several coal companies explored the possibility of reprocessing the refuse, no entity repermited the site and the AML problems caused by the deterioration of the site worsened. The site continued to degrade the environment and became an attractive location for illegal garbage dumping, partying, and hazardous off-road vehicle activity. Several sediment ponds located at the toe of the pile filled with coal refuse and sediment and began to deteriorate.

By 2000, the Spewing Camp Branch refuse dump had developed overwhelming erosion problems. Numerous gullies over 15 feet deep had eroded into the refuse. During rains, the refuse runoff filled the creek with black sediment requiring Floyd county government to continually clean out the stream channel and repair flood damage to the county road. The substandard water from the site constantly tainted the 1.5 miles of Spewing Camp Branch and the Left Fork of Beaver Creek further downstream. The site was void of vegetation and the fill had developed numerous slide areas on its surface.

In 2001 a forest fire ignited the top portion of the refuse material sparking a new fear that fire would gradually spread over the entire fill generating noxious fumes and smoke endangering nearby residents. Additionally, open mine portals near the dump posed ever-present threats to public safety.

Because of the occasional interest expressed by coal companies in reprocessing the refuse prior to 2001, the Kentucky Division of Abandoned Mine Lands (DAML) had suspended its plans to reclaim the refuse site. However, in 2001 it became apparent to DAML that reprocessing the waste was not economically feasible and design work was begun for a reclamation project to abate the problems at the dump.

## **Project Design**

DAML design engineers were dispatched to the site to develop a reclamation plan. The design phase took several months and involved surveying the site and drawing detailed engineering plans to provide a stable, long-term solution for the problems associated with the dump.

The volume of refuse at the site was calculated using “before and after” computer topographic models of the land prior to refuse dumping and of the existing surface at the time design activities began. Quantifying the existing volume of refuse information was critical in determining the viability of potential design scenarios.

DAML contracted with a photogrammetric mapping firm to provide color aerial photography (1:4800 scale) along with a 1 inch = 50 feet topographic map. This map was provided in AutoCAD format allowing design engineers to utilize AutoCAD and SurvCADD computer aided design programs to determine coal refuse volumes, stable design slopes, soil cover volumes as well as other important design parameters. By utilizing boring logs from previous reprocessing analysis explorations, design engineers were able to determine an in-situ volume of the coal refuse of seven million cubic yards. This volume was also compared to a three-dimensional volume calculation that utilized a 1950 USGS topographic map as the base layer and the current photogrammetric map as the top layer. The comparison produced remarkably similar results.

The design team faced other challenging obstacles in addition to the sheer volume of the coal refuse lying on such steep slopes. Two-thirds up the 2500-foot slope was a one acre saturated area of refuse. Unfortunately, the refuse was over 100 feet deep at this location, which prohibited pinpointing the source of the saturation. Boring log data, geologic quadrangles, visible coal seams, and historical mine documents were reviewed in developing a plan to stabilize this area. Because excavating to the source of the seep was not practical, the design team chose to utilize a geo-grid fabric in combination with a filter fabric and crushed limestone aggregate to provide a sump to collect as much of the surface expression of the water as possible. This approach enabled a drying effect that allowed for grading and covering the slopes. Other design features incorporated into the Spewing Camp Branch AML Reclamation project included closure of three open portals with bat accessible gates and draining and covering two sediment ponds. The bat gates were designed with welded #6 rebar, concrete block and mortar, and angle iron covered with rust inhibiting paint. Additionally, because of the highly erodible nature of the refuse, large rock-lined ditches had to be designed to adequately control runoff.

Various grading options were developed using computer-generated cross-sections that provided for quick and accurate assessment for potential construction scenarios. It was ultimately determined that reducing the refuse surface area would not be cost effective, and therefore an “in-place” refuse grading plan was employed which called for 25 diversion benches to properly control drainage. Similar volumetric calculations were used for native stone recovery that reduced costs for rock channel lining and the need for purchased, quarried limestone.

The “in-place” grading plan was designed using earthwork management computer routines, which allowed for effective and efficient earth moving techniques during construction. The plan

minimized the earth movement needed to construct the diversion benches and ultimately provided for 2.5 horizontal to 1 vertical (max.) stable slope configuration. The information was supplied to potential bidders in the design plans, which ultimately saved construction time and money.

Surface water from the face of the reclaimed fill was directed to two rock lined ditches located on either side of the dump. In order to prevent ditch erosion, rock buttresses were incorporated in the design of the ditches. The buttresses provided erosion control for the ditches and a measure of retention for the channel lining in the ditches. The buttress and ditch design was generated by numerous cross sections which provided for a reasonable estimate of aggregate that was needed to prevent further erosion and ensure long term stability of the side drains. In total, the side drains are nearly 1 mile long and contain over 20,000 tons of placed aggregate.

It soon became apparent during the design process that a unique approach to securing the estimated 350,000 cubic yards of required cover material for the expansive refuse pile was necessary. DAML decided to incorporate work from two other AML projects that were to be constructed simultaneously with the Spewing Camp Branch Refuse project. This unique approach required the importation of earth cover material from two other AML landslide projects located in the same general area of Floyd County as Spewing Camp. This was the only way DAML could obtain enough cover material for the large dump.

Initially, an area adjacent to the Spewing Camp dump owned by Progress Land Co. was used to retrieve cover material for the regraded refuse in the upper reaches of the pile. Then, the lower areas of the pile received cover from material generated at the two other AML projects located within trucking distance of Spewing Camp Branch. Those projects, the Hoods Fork and Curtis Johnson AML projects, involved the reclamation of two landslides caused by abandoned mines. Since both these projects required DAML to locate an area to place the excavated landslide material, DAML made these projects “satellites” of the larger refuse project by transporting earth material from these two sites to the Spewing Camp refuse project for refuse cover. (**Photo #3** shows the contractor covering the refuse from the borrow area located adjacent to the fill.)

By using the project area for the Spewing Camp Branch refuse as a waste area for two satellite AML landslide abatement projects, (and conversely, using the two satellite landslide projects as borrow areas for cover material on the Spewing Camp refuse) DAML minimized the disturbance that would have otherwise been necessary for three separate projects needing two separate waste areas and a borrow area. DAML estimates that this unique approach saved the agency \$240,000 in construction costs when compared to completing three separate projects requiring separate waste and borrow areas.

### **Project Construction**

By 2002 the design for the site was completed and the project contract was released for bid. The design engineer’s construction estimate was \$4,059,009.73. A total of four bids were received and the average bid was \$3,803,108.64. The contract was awarded to the low bidder, Hawkeye Construction, LLC, from Robinson Creek, KY, in the amount of \$3,660,922.27. Actual construction

began in October 2002. Hawkeye Construction mobilized equipment to the site, and initial work consisted of installing sediment control and upgrading the road into the site. The burning refuse material, located on the top of the fill, was extinguished. The fill was graded with bulldozers throughout the winter and into the spring of 2003. A heavy lime barrier of 75 tons per acre was placed directly on top of the graded refuse to neutralize acidity that might leach into the cover material. Cover material from adjacent areas and from the two satellite AML projects was transported to the site and placed to a depth of two feet. The fill slopes were stabilized and benches were cut into the fill at 30-foot vertical intervals to direct surface water to the side drains to prevent erosion. Rock lined drainage ditches were installed on each side of the fill to prevent erosion and direct surface runoff to the creek. (**Photo #4** is an aerial view taken after the refuse was covered and the side drains installed.) Other hazards at the site, including two sediment ponds, and three open mine portals were also reclaimed during the project work. The portal closures were constructed with openings to allow wildlife (bat) access.

As portions of the project were completed, seedbed preparation began. 700 pounds of fertilizer, 80 pounds of seed, and 2.5 tons of mulch were applied to each acre of the project. The seed mixture was specially selected to contain a wildlife compatible blend of species including clovers particularly attractive to elk. (**Photo #5** depicts the revegetation success on the dump.) Kentucky's elk restoration program has been particularly successful in the southern Floyd county area, and the DAML wished to promote elk habitat on the Spewing Camp Branch project as much as practical. The seed mix included switchgrass, redbow clover, orchard, grass, birdsfoot trefoil, yellow sweet clover, ladino clover, crown vetch, timothy, tall fescue, and Korean lespedeza.

After almost two years of work, the project was completed and a final inspection was conducted on September 15, 2004. (**Photo #6-Cover Photo** is an aerial photo showing the completed project.) An itemized list of the quantities used on the project illustrates the enormous scope of the work involved:

- **Gravel, Class II and Class III rock** to gravel roads and rock ditches: 31,500 tons, or approximately 1,125 truckloads.
- **Soil** to cover refuse: 357,464 cubic yards, equivalent to approximately 29,500 dump truck loads.
- **Seed** to revegetate the site: 12,400 lbs.
- **Agricultural Lime** to neutralize acidity: 5,683 tons or approximately 200 truckloads.
- **Straw Mulch** to cover seed: 9,700 bales.
- **Netting** to hold straw mulch in place: 174,840 square yards.
- **Guardrail** to protect the public on Spewing Branch Road: 2,525 feet.

The total project (including the two satellite sites) was completed at a cost of \$3,534,974.73, which was slightly under budget for the three sites combined.

### **Project Funding**

Funding for the Spewing Camp Branch Refuse Project came from four different sources. The primary source, contributing \$2.1 million, was the Commonwealth's federal Abandoned Mine Land Grant. Additionally, \$723,297 in funding from the Appalachian Clean Streams Initiative (ACSI), made available by the federal Office of Surface Mining, was used. DAML also contributed \$406,665 from the state supplemental reclamation fund to supplement the forfeited Enerpro reclamation bond of \$296,100.

### **Project Benefits**

The completion of this project eliminated several hazards associated with one of the worst AML problems in the eastern Kentucky coalfields. In addition to the abatement of the safety hazards existing on the dump itself, the open portals, and failing sediment ponds, the quality of the water discharging from the site improved dramatically. Sedimentation has ceased entirely. Pre-project water samples taken in June 1998 from the downstream discharge point immediately below the refuse site showed iron levels of 167 milligrams per liter, acidity of 800 milligrams per liter, and alkalinity of 25 milligrams per liter. Post-project water samples taken at the same point in March of 2005 indicate iron levels have been reduced to 38 milligrams per liter, acidity has been reduced to 50 milligrams per liter, and alkalinity has been increased to 75 milligrams per liter. The iron level is reduced even further (to two milligrams per liter) after the discharge cascades over a constructed limestone riprap waterfall immediately below the discharge point.

Citizens downstream from the project no longer experience coal waste eroding into the creek causing routine flooding. The site is no longer an aesthetic blight or a safety concern to area residents. The Spewing Camp Branch Refuse AML project is another success attributable to the reclamation provided by the Kentucky Abandoned Mine Land program.

Roland Howell, a longtime resident of Spewing Camp, had actually worked at the refuse fill area for years when it was active. When asked his opinion of the site after project completion, Mr. Howell said, "It's 100 % better. There's no slate or black water in the creek during rains now. Fish may come back into the branch."