

## **LIMESTONE CHANNEL AT SWANK 13 MINE**

### **Clearfield Creek Watershed Association**

#### 1. Executive Summary

At the abandoned Swank 13 underground mine in Reade Twp., Cambria County, PA, the discharge averaged 175 gal/min with pH 3.4, acidity 150 mg/L, 0.8 mg/L Fe, 12 mg/L Al and 1.2 mg/L Mn. The discharge emerged high on a hill, and had been channeled down the slope. The 1000 foot channel has been lined with coarse limestone. Initial samples indicate that the outflow is net alkaline at low flow, and largely treated at recent very high flow. The discharge is on State Gameland 108, and the project was aided by a road constructed by the Game Commission. The remediation was funded by grants of \$8000 from WPCAMR (ARRIPPA), \$1500 from Dominion gas, and \$3800 from FPW. Sampling will be continued for several years to test the effectiveness of this technology, but this major discharge has been treated for a very modest cost.

#### 2. Successes and Accomplishments

In a contract by the Game Commission, the road into the site was improved and extended in early summer, and used to remove timber in a small area around the channel. In late August 2011 the limestone was trucked in by New Enterprise, and contractor John Slovikoski placed it in the channel using a front end loader. He also seeded, fertilized and mulched the disturbed area to Game Commission specifications. The initial samples of the outflow at the bottom of the channel showed pH 6.6, acidity negative 23 mg/L (i.e., net alkaline), with <0.3 mg/l Fe and 0.32 mg/L Al. Later samples at very high flow showed pH 5.1, and 10 mg/L field alkalinity.

Sampling will be continued, but the results indicate that a very substantial AMD discharge has been treated at a very low cost.

#### 3. Comparison with plans

The project went as planned, though slightly later in the summer owing to weather and other jobs committed to by Slovikoski. We actually spent slightly less than originally anticipated owing to stable limestone and decreased fuel prices.

#### 4. Beneficiaries of project

The project removes nearly all AMD from the one-half mile of the small tributary of Clearfield Creek, and will decrease the load of acid and metals to Clearfield Creek. We are working on another project on Brubaker Run which in combination with the current project should restore this 10-mile section of Clearfield Creek to fishable status.

#### 5. Lessons learned

We learned the methodology and costs for this technology, and made contacts in the Game Commission that should be helpful in the future.

#### 6. Completion State of Project

The construction of the limestone channel is complete, including installation of weirs to measure flow. We plan to monitor the site for 4 years, and to check for any washouts and other problems.

#### 7. Monitoring

We have installed weirs at the top and bottom, and will sample the top and bottom monthly for a year, and quarterly for 3 more years. Data collected will include pH, flow, conductance, acidity, alkalinity, Fe, Mn, Al, SO<sub>4</sub> and Total Suspended Solids. A professional report will probably be published about the technology.

#### 8. Operation and Maintenance

We retain funds for the lab analyses during the monitoring phase. Small maintenance requirements will be covered by volunteer efforts; any major problems will require additional funding.

#### 9. Operation and Maintenance Fund

We have about \$800 left from the grants for the project, plus the remaining funds for lab analyses. However, the \$800 we have requested that we be able to use on completion of construction and monitoring at an experimental slag bed at our Klondike project.

#### 10. Project Benchmarks

Benchmarks have been attained.

#### 11. Use of Funds

Funds were expended as follows:

Limestone, 410 T, delivered	\$6963
Placement (Slovikoski)	3850
Seed and straw	228
Lumber for weir	31
Lab analyses to date	150
Future lab analyses	1278
Total	\$12500

Funds available:

WPCAMR-ARIPPA	\$8000
Dominion Gas	1500
Foundation for PA Watersheds	3800
Total	13300



**Pre-construction photos**



**Limestone channel, low flow**



**Limestone channel, high flow**