

## NONPOINT SOURCE AND WATER QUALITY CONTROL PROJECTS

2002



Abandoned mine problems are being well documented nationwide. In Colorado there are over 23,000 hazardous mines and 604 miles of streams impacted by past mining. The Colorado Inactive Mine Reclamation Program (IMP) began in 1980 and has safeguarded over 6,127 mines and reclaimed 1539 acres of abandoned mined land statewide. The program also works in cooperation with Water Quality Control Division, EPA, BLM, USFS and watershed stakeholders to determine the extent of the environmental problems associated with mine waste, mill tailings and acid mine drainage and provide options to address these environmental problems. Funding for the program comes from Section 319 of the Clean Water Act, Colorado Water Quality Control Division, Colorado Severance Tax funding and other funding from federal partners.



### Projects Funded with 319 Grants

#### *Cement Creek Hydrologic Control Project – San Juan County*

Two waste piles were removed from the headwaters of Prospect Gulch and stockpiled at the Howardsville Mill near Silverton, Colorado during the fall of 2001. The waste piles contribute a significant amount of the metals to Cement Creek, particularly lead, copper and arsenic. The Division of Minerals and Geology was the contractor for the San Juan RC&D and Animas River Stakeholders Group. Cost -\$91,656. An additional \$90,000 in severance tax money was spent on this project.

#### *Red Mountain Mine Waste Control /Carbon Lakes Project – San Juan County*

This is the third phase of the Carbon Lakes Project that was begun in 2000. In 2000, most of the Congress waste pile in the stream channel was removed. In 2001, the remainder and part of the upper Congress waste pile were removed. An additional 10,000 – 17,000 tons of mine waste are planned to be removed from the Congress and San Antonio waste piles during October and November of 2002. The mine waste rock will be transported to the Howardsville Mill for reprocessing and disposal. The Division of Minerals and Geology will be acting as the contractor for the San Juan RC&D

and Animas River Stakeholders Group. Cost Estimate-\$260,000, which includes \$90,000 of Severance tax money.

#### *Animas River Infiltration Controls – San Juan County*

This is a cooperative project with the San Juan RC&D and the Animas River Stakeholders Group. One element of the project work is to intercept or prevent clean water from contacting sulfides in mine workings. Originally, the Vermillion Mine was the targeted site. However, the amount of water

flowing into the mine workings apparently has changed since water quality sampling was done in 1997 and 1998. Instead, we are currently looking at the Sound Democrat, Columbus, and Pride of the West as possible candidates.

A second component of the project

included implementing a die tracer study to determine the quantity of water that is entering, and becoming contaminated through, the stopes of the North Star Mine. The study indicates that a portion of the mine drainage from the North Star Mine can be eliminated if the water can be prevented from flowing into the stopes.

A third element to the project will include conveying water from the U.S. Basin trans-basin diversion



past a stope that drains into the Kohler Tunnel. The Kohler Tunnel is the most significant source of metal contamination to Mineral Creek. The Division of Minerals and Geology will be acting as the contractor for the San Juan RC&D.

In September 2002, the workings of the Sound Democrat and Pride of the West Mine were investigated. Because of flooded stopes in the lowest level of the Sound Democrat, no conclusions concerning clean water inflows could be made. It is hoped that the upper level workings can be investigated at a later date. Snow the day following the lower level investigations prevented investigation of the upper level. The #6 and #1 levels of the Pride of the West were also investigated. In the #1 level (lowest), a large portion of the inflows were found to come from core holes. These holes can potentially be plugged to prevent the inflow. Additional investigations of the core holes are planned for the near future. In addition, there are two intermittent streams that flow into stopes on the #6 and #7 (highest) level of the mine. These stopes will be capped as part of the Cunningham Gulch AML Project in 2003. Cost Estimate-\$180,000

#### *London Extension Project – Park County*

A lime addition treatment system was constructed with 319 monies in 1997. Recently, the Colorado Department of Public Health & Environment issued a letter authorizing a full-scale testing of the treatment system. We will fill the lime tank and proceed with testing of the treatment system during the winter of 2002-2003. Cost Estimate - \$75,000

#### *Silver Wing Mine Non-Point Source Project – San Juan County*

Water draining from the Silver Wing Mine was flowing across a heavily mineralized dump is being collected, conveyed to a lined sedimentation pond, and then passed through one of two full-scale demonstration process reactors for metals removal – an ion exchange/electrical regeneration and metals precipitation unit or a contained bioreactor vessel. Currently, the pilot scale bioreactor is in place. This project is being undertaken by the Silver Wing Company of Silverton. Total project cost is \$360,000, including \$76,000 of severance tax monies which are being used as match for the 319 grant.

#### *Animas Segment 3a Water Quality Investigation – San Juan County*

Segment 3a of the Animas River extends from Minnie Gulch, approximately 5 miles east of Silverton, to the confluence with Cement Creek. Initial characterization of this stream reach identified only 50% of the metal load. The Water Quality Control Commission has requested that additional water quality monitoring be done in the area to determine the source of the heavy metals. Monitoring will include both surface and groundwater. The first surface water sampling is scheduled for spring 2003. The entire stream reach was walked in April 2002 and several previously unidentified sources of metals were identified. DMG will be a subcontractor to the San Juan RC&D and the Animas River Stakeholders Group to complete the surface water sampling component. The estimated cost is approximately \$145,000.

#### *NPS Mining Education Project – El Paso County*

This is a cooperative project between DMG and the Western Museum of Mining and Industry. The museum is contributing match to this project. This project will enhance on going public awareness of abandoned mine water quality problems, mining and reclamation, and careers in mined land reclamation. A mill tailings reclamation demonstration plot was constructed during the summer of 2001 by the DMG. Signage will be added to the exhibit later this year. This project will provide a vehicle for enhanced public participation and educational opportunities. Cost: \$25,000

#### *Handies Peak Project – San Juan County*

This is a cooperative project with the San Juan RC&D and the Animas River Stakeholders Group. This project is scheduled for the summer of 2003. This project will involve removal and/or on-site reclamation of waste rock piles in the Upper Animas River. Candidate sites include the Ben Butler, Lucky Jack, Eagle, Bagley mill tailings, and the Tom Moore Mines. Cost Estimate - \$200,000

## Other Water Quality Projects

### *Nelson Tunnel – Lake County*

The mine waste pile from the Nelson Tunnel was removed and consolidated, then capped and revegetated during the summer of 2001. The Nelson Tunnel is located in Sugarloaf Gulch, a tributary to the Lake Fork of the Arkansas River, south of Turquoise Lake near Leadville. The Division of Minerals and Geology acted as the contractor for the Bureau of Land Management.

Approximate Cost - \$80,000

### *Dinero Tunnel – Lake County*

The Dinero Tunnel is located in Sugarloaf Gulch approximately 1/4 mile downstream from the Nelson Tunnel. This is a cooperative project

with the Lake Fork Watershed Group and BLM. Funding for the Project comes from the BLM, DMG Severance Tax Funds, and a 319 grant obtained by the Lake Fork Watershed Group. Project work includes removing the waste rock piles from both sides of Sugarloaf Gulch, constructing a disposal area for each pile, and reclamation of the disposal and removal areas. The project has been bid out and is planned to start in summer 2003.

Approximately 45,000 cubic yards of waste rock will be removed. The waste rock piles continually leach metals into the Lake Fork of the Arkansas because they were placed in a wetland. The estimated cost of this portion of the project is \$175,000.

Additional work planned at the Dinero Tunnel is to facilitate future underground investigations. The Dinero Tunnel is a draining mine. Previous investigations have shown that there is a collapse damming the water approximately 400 feet from the entrance. The collapse has formed a chimney that extends to the surface approximately 90 feet above. DMG plans to drill the chimney collapse and pressure grout the collapse material above the tunnel. This will allow the blockage to be removed

safely in the future. The estimated cost for drilling and grouting the collapse is \$25,000

### *Commodore Mine/Nelson Tunnel – Mineral County*

This is a cooperative project with the Willow Creek Reclamation Committee near Creede, Colorado. This project is currently underway. Nine open connections between the Commodore Mine and



the Nelson Tunnel have been identified during reconnaissance investigations. Currently, work is underway to stabilize potential hazardous areas of the mine by timbering and roof bolting, plus safe access has been constructed down two winzes connecting the two tunnels. This

work will facilitate water quality characterization studies to determine the source of water to the Nelson Tunnel. The Nelson Tunnel drainage is the principle source of metals to Willow Creek. The feasibility of constructing hydrologic controls will be investigated. The project is funded by Region 8 of the Environmental Protection Agency. Cost Estimate-\$85,000

### *Mary Murphy Mine – Chaffee County*

Construction of a new manway up the raise between the 1400 and 700 levels of the Mary Murphy Mine was planned for the summer of 2002. Bids were solicited for this project during 2001. Only one bid was received. However, the contractor failed to submit the required bonds and insurance, so the project will have to be re-bid in 2003. This work is part of a project that began several years ago. The goal of the project is to locate and intercept the mine water prior to the time that it contacts the ore body in the mine and becomes contaminated with metals. The work will include re-timbering the raise from the 1400 level to the 1000 level in order to access the 1300, 1100 and 1000 levels of the mine. The Division of Minerals

and Geology will be acting as the contractor for the Environmental Protection Agency and the United States Forest Service. Cost Estimate-\$200,000

*Palmetto Gulch - Hinsdale County*

DMG is working on two mine sites in Palmetto Gulch with the BLM. These sites are the Roy Pray Mine and the Wyoming Mine. Project work started at the Roy Pray Mine in 2001. Work completed in 2001 included constructing settlement ponds, geotechnical testing and a cofferdam to facilitate underground investigations for future construction of a hydrologic bulkhead seal at the Roy Pray Mine. A spring and seep survey, core drilling and underground workings investigation were completed in 2002. Work planned for 2003 includes consolidation of the mine waste, installation of a geosynthetic clay liner over the consolidated pile, and potential construction of a watertight bulkhead seal. The estimated cost for the work at the Roy Pray Mine is \$170,000.

At the Wyoming Mine, the collapsed adit of the mine has been dewatered. It will be re-opened and a steel grated access door will be installed in the adit to allow investigations of the mine workings in 2003. Underground investigations will be completed to determine if any of the source water can be diverted and to determine the potential for closure with a watertight bulkhead seal. The estimated cost for the work at the Wyoming Mine is \$45,000.

*US Army Corps of Engineers*

DMG has been cooperating with the Corps of Engineers Omaha and Albuquerque Offices to get characterization work completed using RAMS funding and Corps of Engineers personnel. Project work includes:

**Water quality sampling** of South Mosquito Creek and Buckskin Gulch in Park County.

**Water quality sampling** of the Slate River in Gunnison County.

**Waste rock sampling and analysis** in the Gregory Gulch and Chase Gulch watersheds in Gilpin County.

**Groundwater well installation and monitoring** in the Willow Creek floodplain below Creede in Mineral County.

**Groundwater sampling** in an alluvial tailings deposition area south of Leadville in Lake County.

**Laboratory analysis of water samples** from the Animas River in San Juan County.

**Operations funding** for the real time conductivity and stream gage station on the Animas River in San Juan County.



**For more information, contact**

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