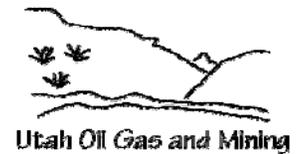


ANNUAL SUMMARY EVALUATION
of the
COLORADO INACTIVE MINE RECLAMATION PROGRAM
for
EVALUATION YEAR 2005
(July 1, 2004, through June 30, 2005)



August 23, 2005

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ACRONYMS

AML	Abandoned Mine Land
AMLIS	Abandoned Mine Land Inventory System
AMR	Abandoned Mine Reclamation
BLM	Bureau of Land Management (of the U.S. Dept. of the Interior)
CIMRP	Colorado Inactive Mine Reclamation Program
DFD	Denver Field Division (of the Office of Surface Mining)
DNR	Colorado Department of Natural Resources
DOGM	Utah Division of Oil, Gas and Mining
EPA	United States Environmental Protection Agency
GIS	Geographic Information System
GPS	Global Positioning System
NAAMLPLP	National Association of Abandoned Mine Land Programs
OIG	Office of the Inspector General (of the U.S. Dept. of the Interior)
OSM	Office of Surface Mining (of the U.S. Dept. of the Interior)
SMCRA	Surface Mining Control and Reclamation Act of 1977, as amended
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	Forest Service (of the U.S. Dept. of Agriculture)

I. Introduction

Title IV of the Surface Mining Control and Reclamation Act of 1977 (SMCRA or “the Act”) established the Abandoned Mine Reclamation Fund. The Fund’s primary purpose is to pay for mitigation of past mining effects. The Office of Surface Mining Reclamation and Enforcement (OSM) administers the Fund on behalf of the Secretary of the Interior. OSM awards grants to States and Tribes from the Fund to pay their administration costs and reclaim abandoned mines. SMCRA puts the highest priority on correcting the most serious abandoned mine land (AML) problems that endanger public health, safety, general welfare, and property. OSM and State and Tribal AML programs work together to achieve the goals of the national program. OSM also works cooperatively with the States and Tribes to monitor their AML programs.

Directive AML-22 generally describes how OSM evaluates State and Tribal AML reclamation programs in “enhancement and performance reviews.” Following that Directive, a team of State and Federal personnel, called the Colorado-Utah AML Review Team, has evaluated the Colorado Inactive Mine Reclamation Program (CIMRP) and the Utah Abandoned Mine Reclamation (AMR) Program since January 1996. The team includes representatives of CIMRP, the Utah AMR Program, and OSM’s Denver Field Division (DFD). Team members during the 2005 evaluation period included: Frank Atencio, Grants Management Specialist, OSM-DFD; Dave Bucknam, CIMRP; Mark Mesch, Administrator, Utah AMR Program; Loretta Pineda, Administrator, CIMRP; and Ron Sassaman, Environmental Protection Specialist, OSM-DFD. Sadly, Dave Bucknam passed away on November 22, 2004, at the age of 60 from metastatic melanoma. He worked for DMG for over 24 years, retiring as CIMRP Administrator and returning to work for the Program part-time. Dave was a member of our team since its beginning.

This report summarizes our review and evaluation of the Colorado Inactive Mine Reclamation Program for the 2005 evaluation year, which included the period of July 1, 2004, through June 30, 2005.

II. General Information on the Colorado Program

On June 11, 1982, the Secretary of the Interior approved Colorado’s AML reclamation plan (“State reclamation plan”) under Title IV of SMCRA. That approval allows Colorado to reclaim abandoned mines in the State in non-emergency AML projects. CIMRP is part of the Division of Minerals and Geology (DMG) in the Department of Natural Resources (DNR). It administers Colorado’s AML program under its approved plan. The Denver Field Division of OSM’s Western Regional Coordinating Center works with CIMRP to fund and approve AML projects in Colorado and to evaluate AML reclamation and other aspects of the Program.

Section 405(f) of SMCRA authorizes State and Tribal AML programs to apply to OSM each year for a grant to support their programs and reclaim specific projects. OSM awards grants to CIMRP based on the calendar year. CIMRP’s grants include money to

pay the Program's administrative and construction costs. Administration funding applies to a single year following the grant award date and construction funding is available for three years after that date. Because the *evaluation* year (on which this report is based) included the period of July 1, 2004, through June 30, 2005, CIMRP's grants spanned parts of the 2004 and 2005 evaluation years.

CIMRP's 2004 grant totaled \$2,300,000. Administration funding supported 14 full-time equivalents. The construction component funded five coal and ten noncoal projects and project maintenance.

OSM awarded \$2,415,000 to CIMRP in the 2005 grant. The grant funds 14 positions and other program administration costs. In addition, it funds reclamation of three coal and twelve noncoal projects and project maintenance, with the goal of safeguarding about 295 mine openings. It also funds development of 12 projects CIMRP plans to include in its 2006 grant request.

At the beginning of the 2005 evaluation year, OSM extended for the second time a grant awarded to CIMRP to address coal outcrop fires. Funds remaining from an original grant total of \$60,000 enabled CIMRP to complete work on the Horse Trap outcrop fire project in Mesa Verde National Park by the end of the 2005 evaluation period.

On June 1, 2005, Colorado Governor Owens signed Senate Bill 05-190 into law. That bill created the Abandoned Mine Reclamation Fund under Title 34 of the Colorado Revised Statutes and made an annual appropriation of \$500,000 for the fiscal year beginning July 1, 2005. The bill authorized the Legislature to appropriate that money annually to the Colorado DNR for allocation to DMG for abandoned coal and hardrock mine reclamation. DMG has three years to spend each appropriation just as it has three years in which to obligate construction funds in each OSM grant. CIMRP provided technical assistance during the bill's consideration in the 2005 legislative session. The additional funding will supplement Colorado's SMCRA-funded grants and enable CIMRP to abate a wider range of abandoned mine hazards.

Colorado oversees administration of its approved Mine Subsidence Protection Program by an insurance brokerage firm. A total of 854 active members were enrolled in the insurance program at the end of June 2005. That enrollment is an increase of 34 members since June 30, 2004. Of that number, 770 members live in the Colorado Springs area and another 71 live in the area of the Boulder/Weld coal field. Ten members live in the Rocky Mountain foothills and the remaining three live on the Western Slope. Members filed 10 claims during the period of July 1, 2004, through June 30, 2005, all for residences in the Colorado Springs area. Five of those claims were closed as of June 30, 2005. Investigations concluded that abandoned mine-related subsidence did not cause the damage involved in those five claims. The remaining five claims were still open as of June 30, 2005. The cause of damage is inconclusive for one of the five open claims (filed in the first quarter of 2005) and the insurance firm noted that a subsurface investigation might be warranted in that case.

OSM is reviewing a formal amendment to Colorado's AML plan that has been pending for several years. Colorado originally submitted formal amendment CO-031 to OSM on October 29, 1996. OSM's review generated one substantive concern and a number of editorial comments, which it described in a letter to the State dated June 7, 1999. CIMRP drafted several proposed changes in response to that letter over the following years without submitting them formally to OSM. In the 2001 evaluation year, we evaluated a performance measure to determine if and how the State's project ranking and selection evolved to meet its changing needs. We concluded at that time that CIMRP followed part of the approved ranking and selection process but not other parts that its experience showed were impractical. As a result, we recommended that Colorado revise its AML plan to include a project ranking and selection process that will meet its needs and specify the criteria it will follow to rank and identify projects as required by 30 CFR 884.13. In the 2005 evaluation year, CIMRP combined the final revised changes it developed in response to the June 7, 1999, letter with a proposed revised project ranking and selection process and additional changes in a formal revised amendment it submitted to OSM in late June 2005.

Colorado does not have an OSM-approved emergency coal reclamation program.

III. Noteworthy Accomplishments

The 2002 grant OSM awarded to Colorado funded, among other projects, the "coal fire reconnaissance" project. Changing demographics prompted CIMRP to develop this project to update a survey of known abandoned coal mine fires it completed in 1989. That survey culminated in the January 10, 2005, release of the "Report on the Status of Fires at Abandoned Underground Coal Mines In Colorado." CIMRP conducted field evaluations of 32 active underground mine fires as part of this project. It also flew over 54 mines hosting dormant fires, resulting in field evaluations of five fires which revealed one to be active. Finally, the project evaluated three coal outcrop fires, two of which CIMRP completed mitigation work on in the 2004 and 2005 evaluation periods with money from OSM's outcrop fire fund.

CIMRP participated in several activities during the 2005 evaluation period related to public outreach, technology transfer, and training.

The Program's outreach activities included:

- Distributing *Stay Out and Stay Alive* videotapes and compact discs to promote AML safety awareness;
- Providing funds and technical assistance to the Colorado Foundation for Agriculture for the March 2005, coal edition of the Colorado Reader, a publication designed to help fourth grade elementary school children understand the importance of coal and coal mining to Colorado's economy;
- Attending the Colorado Association of Conservation Districts teacher workshop, a Tourist Mine workshop, and the teachers' education class sponsored by the Colorado Mining Association's Education Foundation; sponsoring exhibits at the

State Fair, the Mesa County Safety Fair in Grand Junction, the Taste of Colorado, the Science Convention, the annual conference of the Colorado Mining Association, and a conference of Colorado Preservation, Inc.;

- Participating in a meeting of the Council of Government Mining Attorneys, a DNR legislative reception, and the Urban Conference of the Colorado Association of Conservation Districts; and making presentations at the Grand Junction Rendezvous and a meeting of the Northwest Coal Producers; and
- Submitting articles for publication in newspapers concerning coal mine fires and coal mine –related subsidence.

CIMRP's technology transfer, technical assistance, and training activities included:

- Attending the National Association of Abandoned Mine Land Programs (NAAML) conference and NAAML's winter meeting;
- Attending the Colorado Non-point Source Forum and the Center for the West's Abandoned Mine Seminar and leading a field trip for the Geology Society of America;
- Sponsoring the Women in Mining Industry appreciation dinner and providing educational reviews for the Colorado School of Mines' EPICS program;
- Participating in a GIS conference and staffing exhibits at a Colorado State University High Altitude Revegetation seminar and the American Society of Mine Reclamation; and
- Helping to develop an OSM-sponsored communications training course, attending OSM-sponsored GIS training, and providing instructors for the OSM-sponsored coal fire abatement and dangerous openings training courses.

CIMRP continued to partner with other agencies to leverage its SMCRA funding for AML reclamation or to address AML problems not eligible for SMCRA funding. The Program entered into cooperative agreements with the U.S. Department of Agriculture, Forest Service (USFS), to address AML hazards on National Forest land as part of two noncoal projects completed in the 2005 period and six additional noncoal projects. Those six projects also are funded in the 2004 and 2005 grants OSM awarded to Colorado, but were not started by the end of June 2005. CIMRP also entered into three cooperative agreements with the U.S. Department of the Interior, Bureau of Land Management (BLM), to reclaim three noncoal projects also funded in the State's 2003, 2004, and 2005 SMCRA grants. One of those projects was underway at the end of the 2005 evaluation year. CIMRP also continued to partner with various agencies to address mining-related water quality issues throughout the State, including non-point source problems. Those partners included: Crested Butte Land Trust; Colorado Department of Public Health and Environment's Water Quality Control Division; San Juan Resource Conservation and Development Council; Animas River Stakeholders Group; Lake Fork of the Gunnison Watershed Group; Lefthand Creek Watershed Oversight Group; London LLC; Lake Fork of the Arkansas Watershed Group; the Western Museum of Mining and Industry; Willow Creek Reclamation Committee; U.S. Environmental Protection Agency (EPA); and the BLM.

Protecting wildlife and wildlife habitat is a standard part of Colorado's AML projects. Part of that effort involves constructing specialized mine closures to protect bats and bat habitat. CIMRP safeguarded a total of 44 mine openings with bat-friendly closures during the 2005 evaluation period. Cooperation between the Program and the Colorado Division of Wildlife (DOW) resulted in 414 bat surveys of abandoned mines before and after construction. Fifty-one volunteers donated 2,636 hours of their time in the 2005 period to the DOW-DMG Bats/Inactive Mines Project to help survey abandoned mines for bats.

IV. Results of Enhancement and Performance Reviews

We updated the current "Colorado-Utah AML Review Team Performance Agreement" in an August 2, 2004, meeting to describe the principles of excellence and performance measures that we planned to review in the 2005 evaluation year. We finalized the updated agreement on August 25, 2004.

Principles of excellence and performance measures emphasize on-the-ground or end-results as much as possible. Each general principle of excellence has one or more specific performance measure(s). Performance measures describe: Why we selected that topic; what the review population and sample sizes will be; how we will do the review and report the results; and our schedule for completing the review. The principles of excellence and specific performance measures we chose for our 2005 evaluation of the Colorado Inactive Mine Reclamation Program are:

Principle of Excellence 1: The State's on-the-ground reclamation is successful.

- *Performance Measure (b):* Is reclamation successful on a long-term basis?

Principle of Excellence 2: The State AML procedures are efficient and effective.

- *Performance Measure (d):* Does the State have a system in place to make sure the data it enters into AMLIS match data in its files?
- *Performance Measure (g):* How is information technology (IT) being used to implement AML program activities?

Results of our 2005 evaluation are described below in Parts IV.A, B, and C. Our evaluation included field visits to three noncoal projects and one coal project and reviews of CIMRP's project closeout reports and specifications, grant applications, and AMLIS data. We described our evaluation results in much greater detail in an enhancement and performance review report for each performance measure. Those reports are on file in OSM's Denver Field Division and are the factual basis of this report's summary of our evaluation of performance measures 1(b), 2(d), and 2(g).

A. Summary Evaluation of Performance Measure 1(b)

This purpose of this evaluation was to determine if Colorado's reclamation is successful on a long-term basis. We concluded overall that Colorado's reclamation of the 40 safeguarded mine openings we visited at three noncoal projects and one coal project was successful on a long-term basis. The vast majority of CIMRP's closures remained intact and functional for 11.8 to 15.7 years despite harsh environmental conditions and vandals, attesting to their durability. Closing these mine openings abated extreme hazards to public health and safety in increasingly popular outdoor recreational areas. All the closures we visited are accessible despite being located at high elevation in remote areas. We also recognized that CIMRP needs to correct problems and restore public protection at five locations.

All the features we looked at were reclaimed mine portals, vertical shafts, inclined shafts, stopes, and subsidence openings. We characterized all vertical shafts, inclined shafts, subsidence openings, and stopes as vertical openings. All openings were priority 1 hazards at abandoned noncoal mines except for one: that closure safeguarded a priority 2 coal mine portal. CIMRP took advantage of our field review to document the condition of the reclaimed openings we visited and to record their GPS locations for monitoring purposes.

Colorado constructed six types of closures at the 15 safeguarded portals we visited. They included: Five backfills; four bulkheads with locking access doors; two steel grates with locking access doors; two cable net closures; one steel grate; and one bulkhead alone. All but three of the 15 portal closures were intact as constructed, and all but two still were functional. We agreed the three closures that were no longer intact require maintenance. One steel grate had been altered; a section of the grate was cut out as a door presumably by the landowner. In the second case, vandals apparently broke five anchor welds on a cable net portal closure, allowing access to the mine workings. Third, settling of the backfill in a portal closure created an opening that could allow access to the workings.

The State used seven types of closures to safeguard the 25 vertical openings we visited. They included: Nine backfills; four with pre-cast concrete panels and locking access doors; seven with steel grates alone; two with polyurethane foam, corrugated metal pipes, and locking access doors; one with a steel grate and locking access door; one with polyurethane foam and backfill; and one monolithic plug.

We noted the need for maintenance at two safeguarded vertical openings. All but one of the closures with locking access doors still had locks on them. The lock was missing from the access door in one steel grate shaft closure and needs to be replaced. The steel grate on a vertical shaft closure sagged in the center apparently from the weight of snow. Also, soil was displaced from under the south side of the grate, allowing access to the shaft.

Several mining-related structures and remnants of machinery were located throughout the project areas we visited. We noted that CIMRP did not disturb those resources at the locations we visited.

B. Summary Evaluation of Performance Measure 2(d)

In September 2004, the U.S. Department of the Interior, Office of the Inspector General (OIG), issued report number 2003-I-0074 based on its review of AMLIS data for four eastern States' abandoned mine land (AML) programs. That report criticized the accuracy of the AMLIS data, concluding that AMLIS data did not match data in the respective States' files. In part, the OIG recommended establishing "a quality control system that ensures that States, Tribes, and OSM, as applicable, review and certify the accuracy of data entered into AMLIS."

OSM responded to the OIG's recommendation with two new requirements for program evaluations. The first requires OSM field offices to "assure that each State and Indian Tribe AML program has procedures in place to ensure and certify the accuracy of data entered into AMLIS" as part of the FY2004 oversight (subsequently changed to the 2005 evaluation year). This 2005 review fulfills the first new requirement.

The second new requirement will involve comparing data in AMLIS to corresponding data in the State's files to see if they match. We developed a second new performance measure that we will review in the 2006 evaluation year to fulfill that requirement.

For the purposes of this evaluation and subsequent annual evaluations, we consider the project closeout reports to be CIMRP's "system" for ensuring that completion data it enters into AMLIS match data in its files. Project closeout reports contain the information CIMRP uses to update AMLIS for completed reclamation. Though closeout reports vary slightly, a typical report includes: A project overview; landowner consent information; a list of construction and site specific information; and a narrative description of construction / reclamation. Closeout reports sometimes include a description of maintenance needs where anticipated. The list of construction and site-specific information includes: A contract or purchase requisition number, whichever applies; pre-bid meeting and bid opening dates; low bid amount and number of bids; notice of award and notice to proceed dates; construction start and completion dates; the final settlement date; the contractor name, address, phone number, and subcontractor name; any amount of shared costs; the final cost; the number of change orders; and a description of any change orders. Site-specific information is presented in a table under the following headings: Identification number; site or mine name; feature type; size of closure; feature depth; closure type; cost; access; and comments.

As of early May 2005, CIMRP planned to change some procedures for completing closeout reports and updating AMLIS to improve data accuracy and consistency. One change will require project managers to complete closeout reports within 30 days of project completion. Another change will require a senior specialist to review and edit closeout reports within 35 days of project completion as a quality control check of

accomplishments and cost data. After the quality control check, the senior specialist will give the closeout report to a Program Assistant. A third change will require a Program Assistant to update AMLIS within 40 days after project completion. Finally, CIMRP will reconcile data in its internal BrassCap database with data entered in AMLIS and shown in grant performance reports.

By June 18, 2005, CIMRP revised its closeout report as a result of this review. One change revised the report to include costs of mobilization, demobilization, materials supplied to the contractor (such as pre-cast concrete panels and seed), and revegetation with instructions for calculating such costs. Another change defines features such as shafts, adits, inclined shafts, declines, and stopes in terms of AMLIS keywords and units for direct input to AMLIS. The report also includes tables for listing features CIMRP added to a project and deleted and a reference to the applicable AMLIS Problem Area Description. The State is converting the feature closure summary table to Excel to automate calculations and other data manipulation. Finally, the revised report includes a signature line for the project managers' supervisor, which will be evidence of the quality control check by a senior specialist referred to above.

Upgrading the project closeout report, project closeout report procedures, and AMLIS updating procedures should improve the accuracy and consistency of data wherever CIMRP enters it. It standardizes accomplishments reporting, which in turn will reduce the number of ways data are interpreted and reported. The senior specialists' quality control checks and spot checks CIMRP plans to conduct to compare its AMLIS data to data in the revised project closeout reports will help further improve data quality and reporting. With reasonable care, we expect CIMRP's use of this system will ensure Colorado's AMLIS data match data in its files.

C. Summary Evaluation of Performance Measure 2(g)

We planned this evaluation to identify the IT resources CIMRP used and to emphasize what it accomplished with them. Our evaluation focused on all currently-used IT resources and the products generated or dated from January 2003 to March 24, 2005. It included IT resources related to: CIMRP's BrassCap System; the Division of Minerals and Geology's (DMG) imaged data archive; a Geographic Information System (GIS) and DMG's GIS OnLine; and use of enhanced GPS technology, tablet personal computers (PCs) or notebooks, and digital cameras.

Colorado's efforts to electronically track and manipulate realty, unreclaimed mine, and completed reclamation data began in 1984 and culminated in the current BrassCap System. DMG developed the BrassCap system in-house. The System contains information about much of CIMRP's completed and planned AML reclamation. It is based on a Microsoft Structured Query Language (SQL) network database engine using a Visual Basic software program. Presently, the System includes data for 682 AML projects and CIMRP is updating it for older completed projects. It includes links to digital photographs. IT specialists program the System; CIMRP staff members input and manipulate the data. Data can be entered and retrieved on a project or subproject

level. Staff members enter other data manually from handwritten mine site field forms and field monitoring forms. To date, the System includes the following data: Project dates; contractor and cost information; feature data, including location, type of reclamation by feature, and Abandoned Mine Land Information System (AMLIS) Problem Area Description (PAD) number; descriptive data for unreclaimed AML and other site features from mine site field forms; project monitoring data (including maintenance notes); landownership information by feature; consent of entry documentation; and cost sharing agreement information.

Staff members can generate a variety of reports and templates from the database. Reports can be generated on topics such as landownership and consent of entry from the database in Microsoft Word. Staff members also can generate customized reports from the SQL data using Microsoft Access software. CIMRP's project bid / specifications packages are developed in part with data and templates from the BrassCap System, including the mine site bid schedule and descriptions of specific features and proposed reclamation methods. Examples of other reports and templates include: An all projects status report, used to track specific project approvals and dates; a report to track project monitoring by features, County, type of reclamation, and dates of initial reclamation, monitoring, and maintenance; a closeout feature summary listing the project name, describing specific features and reclamation, access, and reclamation cost by feature; a landowner report by feature, legal description and landownership; a report of all features reclaimed by project, subproject, and landownership; and templates for the mine site field form and field monitoring form.

CIMRP currently uses paper forms for site inventory and characterization (the mine site field form) and for field monitoring. It records project locations with GPS units while monitoring completed reclamation itself and when visiting projects during the team's annual oversight field evaluations. Eventually, CIMRP plans to replace the hand-written forms with tablet PCs/notebooks, which is part of its plan to develop a mobile computing capability that would integrate enhanced GPS technology (Trimble GeoExplorer / Pathfinder) with its BrassCap System and digital photography. Essentially, Colorado plans to download BrassCap data onto mobile units. That will enable it to locate AML features in the field more easily and to record current monitoring data. It then will be able to download its field data and digital photographs to the BrassCap System upon return to the office. The State hired a private firm to determine its mobile AML computing needs and scheduled a pilot mobile computing project to begin data gathering on April 12, 2005. CIMRP already has basic electronic forms on two GeoExplorer – Pathfinder units and is working on the data. The Program's goal is to have fully functional mobile computing capability by summer 2007. Colorado's purpose in developing a mobile computing capability is to eliminate multiple data entry layers to reduce the probability of data errors and improve the accuracy of BrassCap System data overall.

An imaged data archive provides CIMRP with electronic copies of historical documents for completed AML projects. Archived documents include regular paper documents (bid documents, contracts, grants, realty documents, etc.), maps, and photographs.

Presently, DMG archives documents using IBM's Content Manager 7.0 software and stores them as .tif files to accommodate multiple pages. Also, the image data is linked to tabular data (e.g., the BrassCap System). DMG's administrative staff members scan paper documents related to reclamation projects, contracts, and other actions into the archive about one year after a project or action is complete. The system is bolstered by CIMRP's direct receipt of some electronic documents. CIMRP is able to query the archive and retrieve documents related to specific topics of interest in a project's or action's history. The Division is considering going from the present approach of scanning documents a year after completion to a "day forward" approach. The day forward approach would involve scanning documents upon receipt, creating an electronic record from the beginning of a project or action and reducing CIMRP's primary reliance on paper files for the first year.

DMG is developing a GIS with AML and other related data. Though it is a work-in-progress, the GIS contains several layers that enable a user to generate maps showing a variety of mine-related, geographic, and infrastructure information. The GIS is linked to the SQL database, enabling users to generate reports providing tabular information about selected points on displayed map layers. Layers include: Inactive mine data, including inactive (abandoned) mines, active and dormant coal fires, and tourist mines; mineral permit data, including active and inactive construction and hardrock minerals; coal data, including active coal mine permits and the Colorado Geological Survey's list of coal mines; coal permit areas; historic coal mines; cities and airports; water resources, including lakes, major rivers, aquifers, and water quality classes; roads and railroads; soil surveys; geologic basins; and Bureau of Land Management special management areas. The GIS enables CIMRP to see where it has reclaimed abandoned mines, where abandoned mines remain to be reclaimed, and how AML hazards relate spatially to roads, cities, water resources, and other features. Notably, CIMRP used this resource to complete its 2005 Report on the Status of Fires at Underground Coal Mines in Colorado. Ongoing GIS work includes developing project layers based on underground mine maps in cooperation with the Mine Safety and Health Administration. That effort currently focuses on improving map data to help active mine operations accurately locate underground workings and avoid unexpected breakthroughs. DMG plans to expand on this effort by developing map layers of underground mine workings in the Colorado Springs area, helping CIMRP to proactively address potential AML-related subsidence in residential areas. All such information in the GIS and the ability to manipulate it can be a useful tool in CIMRP's preliminary project selection and planning.

DMG has made its GIS available to the public as well, using AutoDesk's MapGuide server and ArcGIS. The public can access DMG's GIS OnLine at Colorado's website through the Internet at <http://mining.state.co.us> by downloading AutoDesk MapGuide Viewer for free. Users can generate maps as described above and display tabular data linked to the point layers.

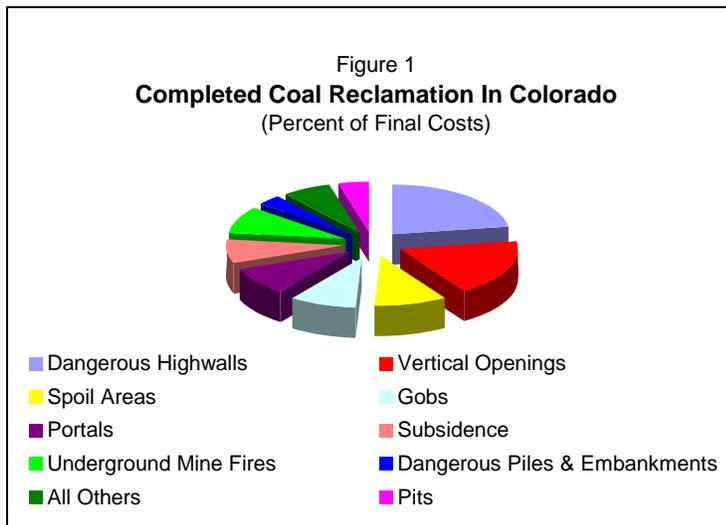
CIMRP can store and manipulate a wealth of data to address a wide variety of information needs using the BrassCap System and GIS. Recognizing that, and the

potential benefits to CIMRP from sharing experiences and techniques with its peers, DMG is considering a technology transfer initiative with other Division programs and possibly other Colorado departments and other States.

V. Accomplishments and Inventory Reports

Title IV of SMCRA stresses reclamation of abandoned coal mine-related problems because a fee that active mines pay per ton of coal produced generates the AMR Fund. Nevertheless, the Colorado Inactive Mine Reclamation Program’s reclamation and inventory address coal and noncoal problems.

CIMRP has requested funding for abandoned coal mine projects in each of 24 grants OSM awarded to it since 1982.



The State’s current 2003, 2004, and 2005 grants include funding for seven, six, and three coal projects, respectively. Coal-related reclamation accomplishments CIMRP entered into AMLIS during the 2005 period include twelve acres of underground mine fires and 4 acres of spoil areas. Reclamation is funded to address an additional five acres of gobs, one portal, and four acres of subsidence. OSM funded the State to reclaim 172 coal projects to date. CIMRP

completed 165 of those projects and cancelled six by the end of the 2005 evaluation period. The State spent over \$13.18 million since program approval to abate eighteen types of abandoned coal mine-related problems. About 93.5 percent of the money Colorado spent on coal reclamation so far addressed nine types of problems. Those problem types include: Dangerous highwalls (22.4%); vertical openings (18.5%); spoil areas (9.8%); portals and gobs (9.2% each); underground mine fires (8.8%); subsidence (7.8%); pits (4.3%); and dangerous piles and embankments (3.5%). The remaining 6.5 percent of the total cost of completed coal reclamation went to abating nine other problem types. Figure 1 (above) illustrates CIMRP’s coal reclamation accomplishments. Appendix 1 shows Colorado’s coal reclamation accomplishments and costs in detail.

AMLIS shows over \$38.29 million in unfunded coal problems remain in Colorado. This is an increase of \$420,000 since the end of the 2004 evaluation period. About 93 percent of the estimated cost of reclaiming those coal problems is associated with priority 2 subsidence (35.4%), priority 1 and 2 underground mine fires (28%), priority 3 gob (23%); priority 3 spoil areas (3.5%), and priority 1 and 2 vertical openings (3.2%). Unfunded priority 3 coal problems such as gob, spoil areas, slumps (2.1%), mine

openings (1.9%), and pits (1.1%), involve environmental hazards where the need for abatement is important but somewhat less urgent. Figure 2 (below) compares the percent of estimated reclamation costs comprised by the major unfunded coal problem types. Appendix 1 shows all the unfunded coal problem types and the estimated costs of their reclamation, based on AMLIS data.

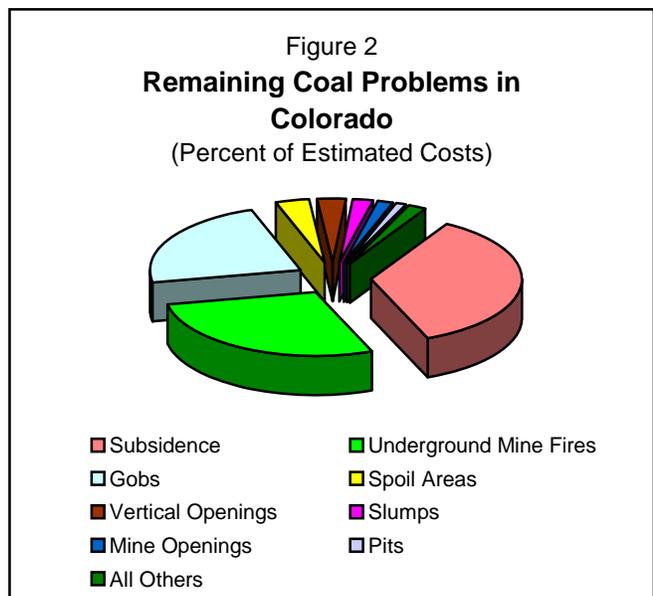
Colorado recently increased coal fire abatement and monitoring. Of the thirteen coal projects funded in the State's 2003 and 2004 grants, nine involved underground mine fires, including one that resulted in the comprehensive report of the status of underground fires described in Part III of this report. Of the three coal projects funded in the 2005 grant, one will characterize and mitigate an underground mine fire and another will monitor changes in coal fires Statewide. As Appendix 1 shows, over \$3.76 million in coal reclamation is funded, 76 percent of which is dedicated to underground mine fires.

CIMRP has become more directly involved with subsidence abatement again during the 2005 evaluation period. Colorado has a history of subsidence-related problems, particularly along the Front Range of the Rocky Mountains. CIMRP completed projects to abate subsidence problems years ago, but most recent occurrences were abated in OSM-funded emergency projects.

CIMRP and OSM met on September 9, 2004, to discuss subsidence-related OSM emergency projects and to consider a proactive approach to dealing with subsidence-prone areas before emergencies occur. On December 2, 2004, CIMRP, OSM, the Colorado Geological Survey, a construction contractor, and the firm that administers Colorado's Subsidence Insurance Program met to discuss several subsidence-related topics. The topics included: CIMRP's planned subsidence abatement projects; the subsidence reporting process; attendees' roles in responding to subsidence

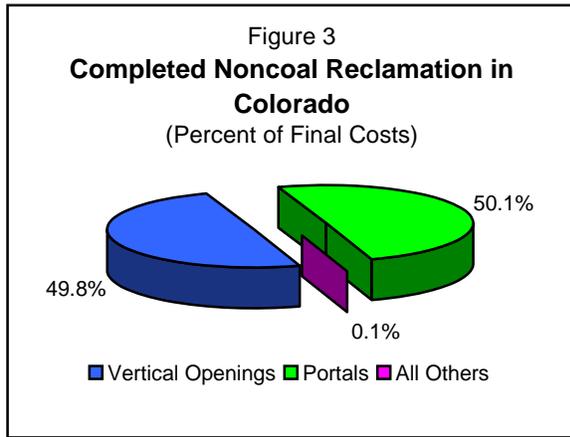
occurrences; sources of information; information sharing; and processing subsidence insurance claims. One of the three coal projects funded in the 2005 grant will proactively mitigate two subsidence-prone areas along the Front Range of the Rocky Mountains. CIMRP completed drilling and grouting on the first, most-likely-to-subside of those two areas in Spring 2005. The Program postponed work on the second area due to funding constraints and plans to fund it next year.

CIMRP continues to review AMLIS data to more accurately show its reclamation accomplishments and identify remaining reclamation needs. Subsidence and coal fires figure prominently in this effort. In addition, OSM will work with CIMRP to review data



for other unfunded high priority coal problem types including priority 1 and 2 portals and vertical openings and priority 2 dangerous highwalls and hazardous equipment and facilities.

Though CIMRP continues to abate abandoned coal mine problems, abandoned *noncoal* mines generally pose more serious and immediate hazards to public health and safety in Colorado. As a result, noncoal projects have dominated CIMRP's grants and reclamation for the past 10 years. OSM funded CIMRP to reclaim 195 noncoal projects since 1985. Of those projects, 173 are complete and four were cancelled. To date, CIMRP spent over \$35.3 million to abate hazards attendant to abandoned noncoal portals, vertical openings, hazardous equipment and facilities, gobs, pits, and



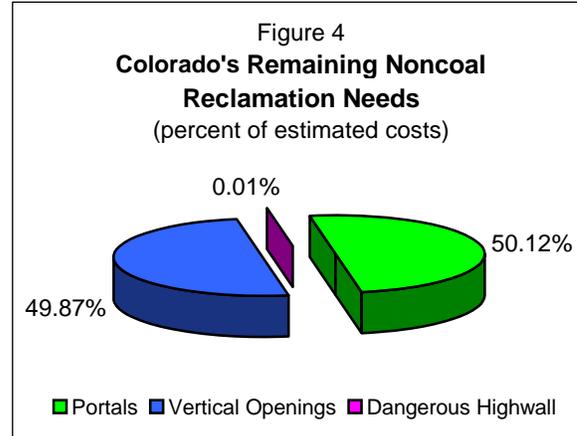
subsidence at a cost of over \$35.3 million. Based on AMLIS data, CIMRP safeguarded at least 5,668 noncoal portals and vertical openings by the end of the 2005 evaluation period. That number is an increase of 494 safeguarded portals and vertical openings over data reported by the end of the 2004 evaluation year, 788 since 2003 and 1,547 since the 2002 evaluation. Figure 3 (left) compares the percent of total final costs attributed to safeguarded portals, vertical openings, and all other noncoal problems Colorado reclaimed. Almost 99 percent of

mine openings CIMRP safeguarded were priority 1 hazards. Also, over 99.5 percent of the total cost of completed noncoal reclamation went to priority 1 hazard abatement. AMLIS data also show that the Program reclaimed 62 priority 2 noncoal portals and vertical openings and five acres of priority 3 gobs and pits incidental to abating priority 1 hazards for 0.48 percent of the total cost of noncoal reclamation it completed to date.

CIMRP continues to revise AMLIS data to more accurately show its noncoal reclamation accomplishments. The increased number of reclaimed portals and vertical shafts and the cost of that work noted above reflect a combination of Colorado's accomplishments and costs for the 2005 period and refined data for earlier projects.

Priority 1 portals and vertical openings generally pose the most hazardous noncoal problems in the State and make up just over 99 percent of the estimated cost of abating unfunded noncoal problems reflected in AMLIS. A priority 2 dangerous highwall is the remaining unfunded noncoal problem. Figure 4 (below) illustrates a comparison of the percentages that portals, vertical openings, and the dangerous highwall comprise of Colorado's estimated unfunded noncoal reclamation costs.

While CIMRP has been updating AMLIS to include more data for Colorado’s remaining noncoal problems, we note that AMLIS data shown in Appendix 2 are not a complete summary of Colorado’s unfunded abandoned noncoal mine problems or their estimated reclamation costs. Moreover, AMLIS data for unfunded noncoal problems are based on very preliminary inventory data and rough cost estimates. As a result, AMLIS data are an imprecise measure of Colorado’s unfunded noncoal reclamation needs. Estimates of reclamation needs and costs become more accurate as projects are planned to address AML problems and are funded for construction. Appendix 2 shows that CIMRP had funding to reclaim 167 noncoal portals and 211 vertical openings at a cost of over \$1.34 million by the end of the 2005 evaluation year.



Appendix 1

Colorado Inactive Mine Reclamation Program

Coal Reclamation Accomplishments and Remaining Reclamation Needs*

Problem Type and Description	Unfunded		Funded		Completed		Total	
	Units	Costs	Units	Costs	Units	Costs	Units	Costs
Bench	58 acres	\$201,500	0	0	3 acres	\$31,044	61 acres	\$232,544
Dangerous Highwalls	1,030 feet	\$30,000	0	0	51,992 feet	\$2,955,885	53,022 feet	\$2,985,885
Dangerous Piles & Embankments	0	0	0	0	40.5 acres	\$459,432	40.5 acres	\$459,432
Equipment & Facilities	73 (count)	\$108,000	0	0	7 (count)	\$14,657	80 (count)	\$122,657
Gobs	568.3 acres	\$8,719,954	36 acres	\$218,253	158.6 acres	\$1,210,367	762.9 acres	\$10,148,574
Highwall	1,100 feet	\$82,500	0	0	2,027.5 feet	\$46,387	3,127.5 feet	\$128,887
Hazardous Equipment & Facilities	1(count)	\$2,000	0	0	1(count)	\$1	2 (count)	\$2,001
Haul Road	4 acres	\$13,000	0	0	0	0	4 acres	\$13,000
Industrial / Residential Waste	3 acres	\$13,000	8 acres	\$84,000	16 acres	\$379,904	27 acres	\$476,904
Mine Openings	298 (count)	\$720,000	3 (count)	\$3,206	18 (count)	\$62,592	319 (count)	\$785,798
Other	28.0	\$104,000	0	0	5.0	\$48,916	33.0	\$152,916
Portals	32 (count)	\$136,060	30 (count)	\$89,736	538 (count)	\$1,214,712	600 (count)	\$1,440,508
Pits	98 acres	\$441,900	0	0	129.4 acres	\$569,424	227.4 acres	\$1,011,324
Polluted Water: Agric. & Industrial	0	0	1 (count)	\$50,000	3 (count)	\$19,699	4 (count)	\$69,699
Subsidence	179.6 acres	\$13,550,000	5 acres	\$202,000	45.4 acres	\$1,029,140	230 acres	\$14,781,140
Spoil Area	398.6 acres	\$1,347,595	2 acres	\$25,000	832 acres	\$1,295,374	1,232.6 acres	\$2,667,969
Surface Burning	1acre	\$5,000	5 acres	\$70,000	35 acres	\$235,621	41 acres	\$310,621
Slump	25 acres	\$804,000	0	0	0	0	25 acres	\$804,000
Underground Mine Fire	176.5 acres	\$10,750,000	67 acres	\$2,872,000	181 acres	\$1,161,041	424.5 acres	\$14,783,041
Vertical Openings	118 (count)	\$1,239,967	27 (count)	\$124,995	291 (count)	\$2,442,782	436 (count)	\$3,807,744
Water Problems	39 gal/min	\$23,000	1 gal/min	\$25,000	1 gal/min	\$6,000	41 gal/min	\$54,000
COLORADO TOTAL COSTS		\$38,291,476		\$3,764,190		\$13,182,978		\$55,238,644

* This table is based on a Problem Type Unit and Cost Summary Report from the Abandoned Mine Land Inventory System as of July 2005.

NOTE: Completed cost of \$1 means that problem type's reclamation was incidental to reclamation of another problem type.

Appendix 2

Colorado Inactive Mine Reclamation Program

Noncoal Reclamation Accomplishments and Remaining Reclamation Needs*

Problem Type and Description	Unfunded		Funded		Completed		Total	
	Units	Costs	Units	Costs	Units	Costs	Units	Costs
Dangerous Highwalls	1.0	\$5,000	0	0	0	0	1.0 foot	\$5,000
Gobs	0	0	0	0	3 acres	\$78,250	3 acres	\$78,250
Hazardous Equipment & Facilities	0	0	0	0	13 (count)	\$214,669	13 (count)	\$214,669
Industrial/Residential Waste	0	0	1 acre	\$20,000	0	0	1.0 acre	\$20,000
Portals	3,981 (count)	\$24,040,315	167 (count)	\$674,310	2,263 (count)	\$19,795,785	6,410 (count)	\$44,509,410
Pits	0	0	0	0	2 acres	\$12,000	2 acres	\$12,000
Subsidence	0	0	0	0	2 acres	\$10,000	2 acres	\$10,000
Vertical Openings	6,087 (count)	\$23,926,263	211 (count)	\$672,484	3,405 (count)	\$15,281,566	9,703 (count)	\$39,880,313
COLORADO TOTAL COSTS		\$47,971,578		\$1,366,794		\$35,392,270		\$84,729,642

* This table is based on a Problem Type Unit and Cost Summary Report from the Abandoned Mine Land Inventory System as of July 2005. AMLIS does not include a complete inventory of Colorado's unfunded noncoal problems.

Appendix 3

State Comments on the Report

From: Pineda, Loretta [loretta.pineda@state.co.us]
Sent: Monday, August 22, 2005 11:16 PM
To: Ronald Sassaman
Subject: RE: Draft revised 2005 annual summary report

* * *

Memo

TO: Ron Sassaman

FROM: Loretta Pineda

Date: August 22, 2005

RE: 2005 Colorado Annual Summary Report

I have read the revised 2005 annual evaluation report for Colorado and I agree with the report. Please note that Colorado continues to address coal mine fire and coal mine subsidence problems in Colorado. I appreciate your help in our efforts to resolve our AMLIS reporting requirements and inventory and accomplishment data resolution with Colorado's BrassCap database. Thanks again for your guidance and support.