

Colorado Mining Water Quality Task Force  
Report and Recommendations  
Regarding Water Quality Impacts from  
Abandoned or Inactive Mined Lands

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## I. INTRODUCTION

The Mining Water Quality Task Force was established in 1995 by the Executive Directors of the Department of Natural Resources and the Department of Public Health and Environment. (Members of the Task Force, and other regular participants in the Task Force process, are listed in Appendix A.) The Task Force was initially formed to discuss whether current mine permitting requirements ensure the long-term protection of water quality. However, the Task Force has not limited its attention to this issue, but rather has looked broadly at issues relating to mining and water quality. The Task Force has approached these issues with a goal of finding ways to improve existing water quality in areas impacted by mining and to avoid future adverse water quality impacts from mining operations, while recognizing the positive contribution of the mining industry to Colorado's economy.

The Task Force began its work facing a relatively amorphous problem. The initial Task Force meetings were devoted to identifying and understanding the problems and issues associated with water quality and mining activities. To that end, staff from the Water Quality Control Division (WQCD) and the Division of Minerals and Geology (DMG) gave presentations concerning statutory authorities, implementation of current regulatory programs, inactive mine inventories and mine drainage abatement projects. This educational process led to a decision to divide the overall issues regarding water quality impacts of mining activities into three general three areas of concern, each with its own set of technical issues, institutional issues, equities, and complications: (1) abandoned or inactive mined lands; (2) existing active mines; and (3) permitting of new mines.

In the fall of 1995, the Task Force decided to focus initially on water quality problems in areas with abandoned or inactive mined lands in an effort to better understand:

- C The scope of the water quality impacts from these lands;
- C The current status of clean-up efforts; and
- C The current obstacles to making further progress in these efforts.

With this background, the Task Force's goal was to develop recommendations for further steps that can be taken to address this problem.

This report sets forth the Task Force's findings and conclusions regarding this first phase of its deliberations. Water quality issues relating to existing active mines and the permitting of new mines will be addressed in a future report or reports.

## II. THE SCOPE OF THE PROBLEM

### A. Overview

Colorado's Mined Land Reclamation Act went into effect in 1976. C.R.S. ' ' 34-32-101, et seq and ' ' 34-33-101, et seq. While other legislation was in effect prior to that time, not until the 1970s were there effective statewide statutory controls over the environmental impacts of mining or requirements for mine reclamation. As a result, Colorado has a considerable number of abandoned or inactive mine sites where significant water quality impacts are occurring, usually in the form of drainage from adits or seepage from mine workings.

The Task Force did not attempt to develop a precise definition of Abandoned or inactive mined lands. In general, this term refers to lands that were formerly mined and that are currently neither actively mined nor in temporary shutdown. As a result, the term Abandoned or inactive mined lands includes virtually all mines which do not now hold permits from the Mined Land Reclamation Board.

### B. Nature of the Impacts

A principal concern regarding water quality impacts from abandoned or inactive mined lands is acid mine drainage. The U.S. Geological Survey describes the problem of acid mine drainage as follows:

Mining activity occurs in areas that have high concentrations of economically important materials, such as gold, silver, copper, cobalt, iron, lead, and zinc. These areas may also contain high concentrations of non-economic elements such as arsenic, selenium, mercury, and sulfur, whose presence is closely tied to the formation of the heavy metals. Many of these economic and non-economic elements can be hazardous if released into the environment. Even without mining, mineralized areas can naturally adversely affect the environment.

A common process that results in dispersion of elements from a mineralized site is acid drainage. When acid drainage results from mining activity, it is more specifically called acid mine drainage. As the name implies, acid mine drainage is the formation and movement of highly acidic water rich in heavy metals. This acidic water forms principally through chemical reaction of surface water (rainwater, snowmelt, pond water) and shallow subsurface water with rocks that contain sulfur-bearing minerals (mainly pyrite), resulting in sulfuric acid. Heavy metals can be leached from rocks that come in contact with the acid, a process that may be substantially enhanced by bacterial action. The resulting fluids may be highly toxic and when mixed with groundwater, surface water, and soil may have harmful effects on humans, animals and plants.

Mining accentuates and accelerates natural processes. The development of underground workings, open pits, ore piles, mill tailings, and spoil heaps and the extractive processing of ores enhance the likelihood of releasing chemical elements to the surrounding area in large amounts and at increased rates relative to unmined areas.

U.S. Geological Survey Bulletin 2220, Environmental Considerations of Active and Abandoned Mine Lands: Lessons from Summitville, Colorado, Page 4.

Waters impacted by acid mine drainage can be toxic to fish and other aquatic life. Such waters may also be unsuitable for human recreational and drinking water uses, as well as for livestock watering or irrigation. The corrosive nature of acid mine drainage can also be harmful to structures such as culverts, pipes and bridge supports.

Mining can also adversely impact water quality and beneficial uses of water resources in other ways. Increased sediment or siltation loads resulting from runoff and erosion from lands disturbed by mining can smother aquatic organisms, raise stream temperatures, and degrade aquatic habitat. These sediment loads can also adversely impact the beneficial functions of riparian areas and wetlands. Sediments also frequently contain toxic metals, which can then be reintroduced into the food chain, harming aquatic life and potentially other wildlife, as well as humans.

In addition to the direct physical and biological impacts on aquatic life and humans from the types of conditions described above, degraded water quality from abandoned or inactive mined lands can have other adverse consequences. Visual and aesthetic impacts may reduce the potential for recreational and tourist use of an area. The loss of fisheries has adverse economic impacts through the reduction of recreational fishing. The presence of contamination can result in reduced property values due to liability concerns. Water treatment costs can be increased for downstream water users.

### C. Extent of the Impacts

A statewide inventory estimates that there are over 23,000 abandoned mines in Colorado. Approximately 400 are impacting or have the potential to adversely affect surface water systems. During this inventory, over 170 adits were found to be discharging acid mine drainage. The DMG estimates that there are 615 mill sites with tailings piles in Colorado. These are often--but not always--in the vicinity of the mines they served. The 1989 Colorado Nonpoint Source Assessment Report identified 1,283 miles of streams affected by heavy metals and acid mine drainage, out of 14,655 total perennial stream miles in the state.

A 1991 study by the Western Governors' Association estimated that just safeguarding the remaining 19,000 mines would cost in excess of \$101 million with an additional \$78 million

for environmental clean-up work to improve stream quality impacted by abandoned mines. The costs associated with recent clean-up efforts indicate that this amount is outdated and inadequate.

In general, heavy metals impacts occur more frequently in areas of historic mining. These areas include the upper reaches of streams originating in the San Juan mining districts near Silverton, Ouray, Telluride (Animas, Uncompaghre, San Miguel, Dolores Rivers), Creede (Rio Grande River), Summitville (Alamosa River), the mining districts near Leadville, St. Elmo, Garfield, and Cripple Creek (Arkansas River, Chalk Creek, and Fourmile Creek), and the mining districts along the Continental Divide between Leadville and Boulder (Eagle, Blue, Snake, Williams Fork, and North and Middle Forks of the South Platte River, Clear Creek, and Left Hand Creek). The Nonpoint Source Assessment Report cited above contains a more complete summary regarding what is known about water quality impacts in each of these areas.

Over the past 25 years, numerous studies of varying scope and focus have assessed various aspects of these impacts. These studies have resulted in a very complete identification of the major problem areas in Colorado with respect to mining impacts. Significant assessment on a watershed or regional scale has occurred in a few instances, such as the Animas basin. In addition, in-depth assessments have been conducted for a number of specific sites, for example those addressed by the Superfund clean-up program. However, there has not been the type of detailed characterization on a statewide basis that would be necessary for an overall prioritization of sites for remediation.

The Task Force believes that a number of general conclusions regarding the extent of the water quality impacts associated with abandoned or inactive mined lands can be drawn from the information currently available:

- C In many instances throughout the State, the site-specific water quality impacts from past mining are substantial;
- C In a few instances, such as the Animas and Clear Creek basins, the number of former mining sites is extensive enough to present a major regional water quality concern; and
- C Taken as a whole, impacts from abandoned or inactive mined lands present one of the major categories of current water quality problems in Colorado.

### III. THE CURRENT STATUS OF CLEAN-UP EFFORTS

#### A. Available Technologies

A wide range of technologies can be applied to the remediation of abandoned or inactive mined lands. The costs of these options vary widely, both for construction and for long-term maintenance. In summarizing these technologies, it is useful to consider the options associated with drainage from mine adits separately from those associated with tailings, waste rock and overburden piles.

In some circumstances, mine drainage can be eliminated by permanently sealing or plugging a mine opening. The feasibility of this option will depend on site-specific structural characteristics. While plugging a mine adit eliminates a concentrated point source, it can result in the creation of numerous smaller seeps and springs that can carry contamination into waters of the state. It is often difficult to predict in advance the resulting water quality impacts.

In instances where drainage from adits can not be eliminated, a variety of active or passive treatment options may be available. Active treatment systems generally consist of mechanical treatment plants that rely on a combination of physical and chemical processes to remove metals from the waste stream. These processes may include chemical precipitation, ion exchange, sorption, reverse osmosis and electrodialysis. The term *passive treatment* refers generally to a range of available technologies that do not require continual electrical or chemical inputs or frequent maintenance operations. One passive treatment option that has received considerable attention in recent years is the use of biological and organic materials in constructed wetlands. Other techniques include the use of inorganic material to absorb and filter out metals, the use of structures to oxygenate and aerate mine drainage, and neutralization of acidity with limestone.

The technologies utilized in the treatment of tailings, waste rock and overburden piles are similar. However, the water quality impacts from these different types of piles can vary substantially.

One common element of most remediation efforts for these types of materials is the diversion of water away from the piles by the construction of ditches or similar structures, to reduce erosion and the production of water contaminated with metals and low pH. Retaining walls may be used to stabilize slopes and to minimize erosion of piles adjacent to rivers and creeks. Walls can be constructed from a variety of materials (e.g., cement, timber or rocks). To minimize water contamination from precipitation that falls directly on these materials, an additional option is capping or excavation/landfill to further minimize contact with water. In some circumstances, removal of material to an off-site area isolated from water sources may be a viable option.

Material in piles also can be treated to reduce metals mobilization. Treatments include chemical stabilization, chemical or biological extraction, and reprocessing. Chemical stabilization can be accomplished by the addition of a chemical fixative like cement. Material mobility and metal availability are reduced. Metals in the material can be extracted by conventional chemical techniques like acid leaching or newer biological techniques using bacteria that oxidize the minerals and produce soluble metals. Reprocessing techniques include smelting, leaching and flotation.

Two general conclusions should be noted regarding the experience gained to date with respect to this array of potential technologies for remediating the water quality impacts of abandoned or inactive mined lands:

- C First, the selection of an appropriate remediation technology is a highly site-specific choice. Generally, in-depth monitoring and assessment of a particular impacted site will be necessary to determine the most viable and cost-effective option for that situation.
- C Second, in view of the complex and variable site-specific conditions that are present on impacted lands, it is usually extremely difficult to predict in advance what the precise water quality results of individual remediation projects will be.

## B. Regulatory Programs

In appropriate circumstances, authorities established under federal environmental laws can be applied to require responsible parties to undertake remediation of abandoned or inactive mined lands. Colorado's state laws do not currently provide any independent authority to require remediation of mined lands that are not associated with an active mining operation subject to a mined land reclamation permit.

### 1. Clean Water Act

The federal Clean Water Act prohibits the discharge of pollutants from a "point source" without a National Pollutant Discharge Elimination System (NPDES) permit. 33 U.S.C. ' 1342. The term "point source" is defined broadly to include "any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, [or] container . . . from which pollutants are or may be discharged." 33 U.S.C. ' 1362(14). In Colorado, administration of the NPDES permit program has been delegated by the federal Environmental Protection Agency (EPA) to the Water Quality Control Division.

Discharges from adits at abandoned or inactive mines, and seeps from identifiable sources of pollution (e.g., mine workings, land application sites, ponds, pits, etc.) are subject to point source permitting requirements. In addition, EPA has determined that runoff from land application areas, spent ore and waste rock piles, drainage from pits, seeps, french drains

and adits, runoff from on-site haul roads constructed of waste rock or spent ore, as well as runoff from tailings dams/dikes constructed of waste rock or tailings are all considered mine drainage. Therefore, these sources are subject to technology-based treatment requirements to meet effluent limitations established by EPA for the mining industry, at 40 CFR Part 440. Due to limited state resources and the tremendous commitment of resources required to identify responsible parties in a position to assume the liability and obligations of permittees, discharges from abandoned or inactive mined lands are not routinely addressed through the NPDES permitting process.

It is EPA's position that seeps and other groundwater discharges hydrologically connected to surface water from mines, either active or abandoned, are discharges from point sources and are subject to regulation through an NPDES permit. Current EPA policy . . . indicates that it is more the mine or the facility itself that is subject to NPDES regulations. Therefore, any seeps coming from identifiable sources of pollution . . . would need to be regulated by discharge permits." (Letter dated 12/22/93 from Max Dodson, EPA to Dan Fraser, State of Montana). Some members of the mining industry disagree with this conclusion.

The federal Clean Water Act leaves the regulation of ground water quality largely to the states. In Colorado, the Water Quality Control Commission has adopted both qualitative and quantitative statewide ground water quality standards. (The Commission has also adopted site-specific ground water quality classifications and standards in 38 locations that do not include areas impacted by historic mining operations.) Pursuant to the Colorado Water Quality Control Act, ' 25-8-202(7), C.R.S., the Division of Minerals and Geology is an "implementing agency" with primary responsibility for the implementation of the ground water quality standards adopted by the Commission for activities subject to DMG's jurisdiction.

## 2. CERCLA

In 1980, Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. ' ' 9601-et seq. CERCLA permits EPA and others to undertake and ensure the cleanup of hazardous substance releases posing threats to public health or the environment. Hazardous substances include toxic heavy metals. CERCLA permits any person to recover response costs (i.e., costs associated with remedying or investigating a hazardous substance release) from potentially responsible parties (PRPs). These PRPs may include: the current or past owner or operator of a facility; persons who arranged for disposal of hazardous substances; and transporters of hazardous substances. 42 U.S.C. ' 9607(a)(1)-(4). Courts have consistently interpreted a PRP's liability under CERCLA as strict, and joint and several. In addition, CERCLA provides only limited statutory defenses to liability.

Given CERCLA's broad scope, it presents significant remedial and liability implications for PRPs at mining sites. For example, CERCLA liability can be imposed

retroactively and, therefore, historic activities undertaken by a mine owner or operator at some time in the past, and although legal at the time, may give rise to CERCLA liability. Also, CERCLA provides little relief to entities who may initiate a voluntary clean-up at an inactive or abandoned mine where, for example, a release of hazardous substances occurs during remediation, or if a residual release remains after remediation is completed. With respect to its remedial implications, CERCLA requires that selected remedies satisfy applicable or relevant and appropriate requirements (ARARs), which may subject mine wastes to the substantive provisions of a broad range of federal and state law requirements, including compliance with state-adopted water quality standards.

With respect to remediation of abandoned or inactive mined lands, CERCLA could be a powerful tool free of traditional jurisdictional and regulatory constraints to require extensive multi-media clean-up. In practice, the CERCLA program as implemented has resulted in huge transaction costs and lengthy delays. In part because of these concerns, to date CERCLA has been applied to only a limited number of the abandoned or inactive mine sites in Colorado. To minimize these difficulties, EPA and the regulated community have been finding some flexibility in the program by carving sites into "operable units," undertaking "removal actions" which carry limited paperwork requirements and otherwise moving along actual clean-up activities much more quickly than traditionally has been the case.

### 3. RCRA

Pursuant to the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. ' ' 6901 et seq. (RCRA), the federal government regulates solid and hazardous waste. Different and varying degrees of regulation apply depending on whether the waste is hazardous. Hazardous waste is subject to the more onerous regulatory requirements of RCRA Subtitle C, whereas the disposal of solid waste is governed by Subtitle D. With respect to mining wastes in particular, RCRA excludes from Subtitle C regulation solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore ...@ 42 U.S.C. ' 6921(b)(3)(A). This exclusion is known as the Bevill exclusion and, currently, includes solid wastes from the extraction and beneficiation of ores and minerals, plus twenty mineral processing wastes.

Certain provisions of RCRA are of particular interest to the mining industry. First, the Bevill exclusion has been narrowed over time, and EPA continues to analyze mineral processing wastes and the Bevill exclusion's applicability to them. Another significant provision affecting mining facilities is RCRA section 3004(u), 42 U.S.C. ' 6924(u). This provision requires that permits issued to treatment, storage and disposal facilities under RCRA address corrective action (i.e., clean-up) for releases of hazardous waste or hazardous constituents from any solid waste management unit. Because the Bevill exclusion does not exempt mining waste from corrective action requirements, mining operators may be subject to RCRA corrective action if a Subtitle C permit is required anywhere at the mining facility. Finally, RCRA contains a citizen's suit provision permitting actions against the current owner of

a facility as well as past owners under certain conditions. 42 U.S.C. ' 6972. A somewhat similar provision confirms the same authority with the federal government. See 42 U.S.C. ' 6973. These provisions are triggered by the presence of solid waste and, therefore, the Beville exclusion regardless of its scope is of no relevance.

The Task Force is not aware of any instances where RCRA authorities have been applied to require corrective actions at abandoned or inactive mining sites in Colorado.

### C. Non-Regulatory Remediation Efforts

As discussed further below in the section on current obstacles, there are several reasons why the regulatory authorities described above do not provide an adequate solution to abandoned or inactive mined land water quality impacts in Colorado. Therefore, a variety of non-regulatory initiatives also have been explored to facilitate remediation efforts.

#### 1. Inactive Mines Program

The Inactive Mines Program implemented by the Division of Minerals and Geology is funded through the U.S. Department of the Interior's Office of Surface Mining. Under the Surface Mining Control and Reclamation Act ("SMCRA"), the revenue source for this Program comes from the Abandoned Mined Land fee assessed for coal produced within the State. Colorado received \$2 million per year for administration of the program and construction. By statute, Inactive Mines Program monies may only be spent on safeguarding (health and safety issues) abandoned mines; they may not be spent on environmental problems at abandoned non-coal mines.

To date, the Inactive Mine Reclamation Program has reclaimed over 1,100 acres of abandoned mine sites, safeguarded over 4,000 hazardous openings, and constructed seven low-cost, low-maintenance mine drainage and mine waste treatment projects.

#### 2. Nonpoint Source Program

Nonpoint source water pollution originates from a diffuse source that does not meet the definition of a "point source." Pursuant to Section 319 of the federal Clean Water Act, the Colorado Water Quality Control Division has developed a nonpoint source assessment report and a management program that have been approved by EPA. These approvals make Colorado eligible for federal grant monies for nonpoint source projects. The current nonpoint source program is largely voluntary, focussing on providing grant funds to site-specific remediation projects, and on broader educational efforts.

A Colorado Nonpoint Source Task Force, with representatives from about 25 separate water interests ranging from governmental to environmental, develops recommendations annually on which proposed projects should receive federal funding. To date, approximately

16 mining-related nonpoint source remediation projects have been funded in Colorado at a cost of \$3.4 million, although most activity on these projects has ceased due to the liability concerns discussed below. A list of these projects is included in Appendix B.

### 3. Federal Initiatives

For the past five years, EPA Region VIII granted funds to Colorado and other western states under section 104(b) of the Clean Water Act through its Rocky Mountain Headwaters Mining Waste Initiative for remedial projects, water quality assessment work, and individual coordinators for watershed initiatives in the Clear Creek, Upper Arkansas and Upper Animas Basins. Due to changes in available funding, this initiative has now been discontinued.

Over the last two or three years, federal land management agencies with lands containing abandoned or inactive mining sites have explored a new watershed-based general permit initiative to address the need for remediation of these sites. These agencies--which include the Bureau of Land Management (BLM) and the National Park Service within the Department of the Interior (DOI), and the U.S. Forest Service (USFS) within the Department of Agriculture--have completed an inventory of their lands and have identified the most significant problem sites.

The federal land management agencies do not have established agency funding sources for mine remediation. In 1995, extensive discussions occurred between the states of Montana and Colorado, BLM, the National Park Service, the USFS, and EPA, concerning the development of a general NPDES permit for discharges from inactive mines on federal lands, to address impacted sites on a prioritized basis. At this time, the discussions regarding a general permit have been dropped because of a Department of the Interior legal position that permits for abandoned or inactive mined lands are not the responsibility of the federal government. However, the completion of the prioritization process has led to funding of an abandoned mined lands (AML) initiative for FY97. This initiative is providing \$750,000 for remediation activities in Montana and \$250,000 for activities in Animas River Basin in Colorado during this fiscal year.

In addition to the roles of EPA and the federal land management agencies described below, other federal agencies may play a role in the remediation of abandoned or inactive mined lands. The U.S. Geological Survey (USGS) can perform monitoring and technical investigations through cooperative agreements. The Bureau of Reclamation can provide technical assistance, engineering investigations, and construction work.

### 4. Private Citizen Initiatives

In a number of site-specific instances in Colorado, private concerns are attempting to address water quality impacts from abandoned mines. Grassroots groups, such as the Clear Creek Watershed Initiative and the Animas River work group, comprised of private citizens,

businesses, local, state and federal officials, now exist. While their funding is limited, these groups provide can direction for voluntary clean-ups in their areas.

One new market-based initiative being explored in the Clear Creek Basin is called the "Adoption of Orphan Sites for Credit Program". Over the next year, this pilot effort will explore the feasibility of providing a market-based incentive for private entities to clean up abandoned or inactive mine sites in exchange for receiving some form of credit for these efforts.

Colorado's Voluntary Clean-up Program, pursuant to HB 94-1299 offers an opportunity for land owners to obtain a certification from the State that, following implementation of a clean-up plan for a specific piece of property, no further action is required to assure that this property, when used for the purposes identified in the voluntary clean-up plan, is protective of existing and proposed uses and does not pose an unacceptable risk to human health or the environment at the site.<sup>6</sup> However, this program does not eliminate the responsibility to comply with other applicable legal requirements. To date, voluntary clean-ups have been proposed at two mining sites.

In addition to land owners, other entities may be willing to pursue voluntary clean-up efforts for a variety of reasons, such as good public relations and the fact that abatement measures undertaken without regulatory oversight can be more efficient and cost-effective. For example, requirements in NPDES permits for active facilities can be relaxed if contaminant loading is reduced upstream; it may be cost-effective to permanently control an upstream source rather than treat ongoing discharges at higher levels; and water balance concerns at a mine site may motivate a mining company to accept historic drainage into its process water system, thus mitigating the impacts of the inactive site.

The reclamation of the Black Eagle Mill and Tailings represents a case study of measures taken by a landowner for altruistic reasons. The site, in Clear Creek County, was identified as a CERCLA site of concern. The issue was not water chemistry effects, but sediment loading from the site. The Environmental Protection Agency's plan for remediation was to isolate the creek from the tailing material by putting Chicago Creek in a box culvert. The landowner, who had inherited the site and has derived no economic benefit from her ownership, felt that the proposed plan was not appropriate and would cause environmental damage of its own by the loss of habitat and riparian area. The landowner proposed and gained approval of a plan to reclaim the site to stabilize the erosion and mitigate the sediment loading. The effort was viewed as quite successful and awarded the 1995 Colorado Mined Land Reclamation Board Reclamation Award.

To date, actual implementation of abandoned or inactive mined land remediation projects through the type of private initiatives described here has been limited, in large part due to the liability concerns and other obstacles discussed below.

## **IV. SUMMARY OF CURRENT OBSTACLES**

### **A. Limitations of Regulatory Programs**

Colorado cannot adequately address water quality impacts from abandoned or inactive mined lands with existing regulatory programs due to several factors. First, there are substantial difficulties in identifying legally responsible, and financially viable parties for particular impacted sites. Mine operators may be long gone. The land and mineral ownership patterns in mining districts are extremely complex and highly differentiated. The surface and mineral estates at mine sites are often severed and water rights may exist for mine drainage. It is not uncommon for there to be dozens of parties with partial ownership or operational histories associated with a given site.

Second, there are limitations on agency resources and authority to take action against potentially responsible parties. In Colorado, no state mining legislation exists to address the environmental impacts of earlier mines that were not required to be permitted under Colorado's Mined Land Reclamation Act of 1976. In many instances, ownership of mine sites has changed since the time that the mining took place, and the original owners are gone. Moreover, substantial technical and legal resources would be required for an effort to impose and enforce water quality permitting requirements at each of these sites. This is particularly true in view of potential debate regarding the legal responsibilities of various past or present owners or operators, depending on their involvement with the activities that caused the conditions now resulting in water quality impacts.

Third, state and local governments are concerned about lands reverting to their ownership due to non-payment of taxes if any remediation requirements imposed are beyond the financial capability of the owners. Particularly in view of the fact that most of the lands in question do not currently generate any revenue, it is anticipated that many owners would have difficulty financing a comprehensive clean-up project on their lands.

Finally, significant equity issues are raised in considering when to impose mandatory duties on persons whose mining activities may have occurred in compliance with the legal regime in effect at the time, while the mining operator's economic calculations were not adjusted to include abatement costs. These equity issues tend to influence the application of current legal authorities, particularly where questions of interpretation exist.

### **B. Limitations of Non-Regulatory Efforts**

The major limitations of current non-regulatory efforts to address water quality impacts from abandoned or inactive mined lands tend to fall into two categories: (1) liability concerns; and (2) the lack of availability of adequate funding.

As discussed above, some federal funds are available, e.g. under section 319 of the Clean Water Act, and some private funds have been provided for remediation of individual abandoned or inactive mined land sites. However, it is estimated to cost over \$101 million merely to safeguard 19,000 mines, with an additional \$78 million or more required for environmental clean-up.

Under current law, public or private entities that undertake remedial activities at abandoned or inactive mine sites risk being held liable for any ongoing discharges from such sites that may occur following remediation, even where the entity had no legal responsibility for a site prior to beginning the remediation work.

For example, a portion of the Penn Mine in California, an abandoned copper and zinc mine, was acquired by the East Bay Municipal Utility District to construct a reservoir. Subsequently, the utility and a California Regional Water Quality Control Board constructed a facility to contain toxic runoff from the site and minimize its impact on downstream waters. Because the new facility did not eliminate all discharge to downstream waters, the municipal utility and the regional board were sued by an environmental group alleging that the facility was discharging pollutants without an NPDES permit. This position was upheld in the 9th Circuit Court of Appeals, with the result that costly additional clean-up requirements were imposed on the municipal utility and the regional board. This case has had a severe chilling effect on the interest of other public entities and others in pursuing similar clean-up efforts in several western states.

There is currently no provision in the Clean Water Act which protects from legal responsibility a remediating agency--or "Good Samaritan"--who does not otherwise have liability for abandoned or inactive mined lands, who attempts to improve the conditions at these sites. Specifically, a Good Samaritan may become legally responsible, under section 301(a) and section 402 of the Clean Water Act, for any continuing discharges from the mined land after completion of a clean-up project. This potential liability is an overwhelming disincentive to voluntary remedial activities to address the serious problems associated with abandoned or inactive mined lands. In Colorado alone, there are currently seven remediation projects in various stages of planning or implementation on which work is stalled pending resolution of this issue.

In the past, similar liability concerns were raised with respect to potential liability under CERCLA for the implementation of mined land remediation projects under the State's nonpoint source program. To address this concern, the State of Colorado has entered into a Memorandum of Understanding with EPA whereby the State receives protections from CERCLA liability when engaged in the clean-up of an abandoned or inactive mine pursuant to the Clean Water Act section 319 nonpoint source program. While this has satisfactorily addressed CERCLA liability, it does not solve the Clean Water Act liability concern regarding continuing discharges.

EPA has formally endorsed other one potential avenue of relief from CERCLA liability for those considering the purchase of a contaminated site, including an inactive or abandoned mine. In May, 1995, EPA announced its "Guidance on Settlements with Prospective Purchasers of Contaminated Property," which provides, under certain conditions, for a covenant-not-to-sue from EPA to prospective purchasers for contamination existing at the time of purchase. The covenant will not extend to contamination subsequent to purchase, but provides some relief with respect to that contamination solely attributable to activities prior to purchase. In exchange for its covenant not to sue, EPA expects to receive either a direct benefit in the form of actual cleanup or reimbursement of EPA's costs, or an indirect public benefit in the form of redeveloped property or reduction in the risk posed by the property in its current condition.

## **V. RECOMMENDATIONS**

Water quality impacts associated with abandoned or inactive mines are difficult to address for a number of reasons. A combination of financial resources and technical and regulatory strategies is needed. The Task Force offers the following specific recommendations:

1. The General Assembly should make an initial capital appropriation of approximately \$15,000,000 that will generate funds to begin to abate the water quality impacts related to drainage from abandoned or inactive mines. The interest generated from this capital appropriation should be used, along with any other available state funds, to match private funds, federal funds and local investments to remediate abandoned or inactive mine sites and abate water quality impacts.
2. The overall goal of expenditures should be to maximize the water quality improvements attained with the available resources. For example, the Task Force endorses the ongoing efforts to coordinate the use of funds available to the Division of Minerals and Geology's Inactive Mine Reclamation Program with the use of nonpoint source control project funds available under section 319 of the Clean Water Act. The emphasis should be on incremental improvements that work in the direction of attaining the classified uses of the affected state waters. A broad-based advisory group, perhaps modeled after the Colorado Nonpoint Source Task Force, should provide advice and consultation regarding the expenditure of funds.
3. A very important element of appropriately focused remediation efforts is adequate monitoring and assessment of watersheds impacted by historic mining activities. Funding for such monitoring and assessment should be a priority in the use of ongoing appropriations to the Water Quality Control Division and the mineral severance tax funds operational account. Monitoring and assessment efforts should be designed to develop a proper scientific foundation for establishing appropriate water quality

standards. Such efforts should be tightly coordinated and rely on common data collection and analysis protocols to ensure data comparability and decisions supported by sound science and adequate representative data.

4. Following the establishment of refined use classifications and appropriate water quality standards, total maximum daily loads (TMDLs) should be established for metals, acidity and any other parameters of concern which relate to the attainment of water quality goals in mining-impacted watersheds. The development of TMDLs should be accomplished with broad-based stakeholder involvement.
5. Watershed-specific water quality management plans should be developed for purposes of implementing the load allocations (for nonpoint sources) and waste load allocations (for point sources) established in the aforementioned TMDL process. The Task Force endorses a watershed approach to addressing Colorado's abandoned or inactive mined land impacts. A watershed-by-watershed process, involving all interested stakeholders in monitoring and assessing sites, and determining appropriate priorities for remediation, utilizing available private as well as local, state and federal government resources appears to hold the greatest promise as a constructive model for addressing these impacts over time. Once watershed-based priorities are established, available regulatory and non-regulatory options can be assessed to identify the best approach to implementation.
6. One potential use of the new state abandoned or inactive mined lands remediation funding recommended above relates to implementation of stormwater discharge permit requirements. Federal law requires that stormwater discharge permits be obtained for any discharge of stormwater from a mining site that has come into contact with areas disturbed by prior mining operations. There is a need to prioritize implementation of this requirement, in view of the vast number of sites potentially subject to stormwater discharge permit requirements. Implementation of the stormwater program should be targeted to ensure that sites which discharge pollutants at levels greater than de minimis quantities relative to the TMDL are properly addressed. To facilitate this implementation effort, the Task Force recommends that state matching funds be made available to property owners, on a well-defined priority basis, to address the regulatory requirements of the stormwater program.
7. Ongoing drainage from abandoned or inactive mine adits is potentially subject to requirements applicable to discharges of Aprocess@ water from mines, rather than stormwater discharge permit requirements. The Task Force recommends that consideration be given to also making state matching funds available, in appropriately defined and targeted circumstances, to assist with remediation efforts to address drainage from mine adits where such drainage poses an impact on receiving streams during critical periods (e.g., low flow or high flow events). Public/private cooperative

efforts may provide that best opportunity to achieve significant progress with respect to these impacts.

8. The Mining Water Quality Task Force believes that it is important that some form of a Good Samaritan provision be added to the federal Clean Water Act, to provide appropriate limitations on the liability of certain third parties who voluntarily undertake remediation of abandoned or inactive mined lands. The Task Force therefore endorses and encourages efforts that are currently underway by the State of Colorado to work with other western states, EPA, environmental groups, and other interested persons to develop an appropriate statutory amendment. Because these efforts are ongoing and evolving as of this writing, the Task Force is not at this time endorsing any specific version of a Good Samaritan provision. However, it is extremely important that an appropriate provision be adopted as soon as possible, so that the work that is currently stalled on already proposed projects in Colorado can move forward, and so that other remediation opportunities can be identified.

## APPENDIX A: Task Force Participants

Members of the Task Force. The appointees to the Mining Water Quality Task Force were chosen by the Department of Health and Environment and the Department of Natural Resources and represent a diverse variety of backgrounds and interests. The members are:

| <b>NAME</b>  | <b>INTEREST</b>                  |
|--|----------------------------------|
| Jay Jones, Climax Molybdenum Co.   | Mining Industry                  |
| Chris Hayes, Echo Bay Mines  | Mining Industry                  |
| Richard Early, Sedgwick of Colorado, Inc.  | Financial Market                 |
| Linda Ann Figueroa, Colorado School of Mines   | Science/Academia                 |
| William H. Clements, Colorado State University   | Science/Academia                 |
| Robert Ray, Northwest Colorado Council of Governments  | Local Government                 |
| Luke Danielson, Gersh & Danielson<br>Barbara Green, Hale Pratt Midgley Laitos<br>Green & Hackstaff, P.C. | Mined Land Reclamation Board     |
| Sue Ellen Harrison, Office of the City Attorney, Boulder, Colorado<br>Thomas Steinberg                   | Water Quality Control Commission |
| Mike Long, Director, Division of Minerals, Energy and Geology  | Division of Minerals and Geology |
| David Holm, Director, Water Quality Control Division   | Water Quality Control Division   |
| Nora Jacquez, Executive Director, Pro Americas   | Environmental                    |
| Jo Evans   | Environmental                    |

Other Participants. The Task Force encouraged attendance and participation from other interested parties, and a number of participants in the process devoted substantial time and effort to this project. Deserving special mention for their efforts in this regard are: Glenda Williams, Erica Rosenberg, Dan McAuliffe, Paul Frohardt, Elizabeth Temkin, Kit Kimball, Bob Moran, Roger Flynn, Aimee Boulanger, and Joshua Lipton.