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COMMITTEE HEARING
RECORDS

Committee Name:

Senate Committee on
Agriculture and
Environmental
Resources
(SC-AER)

Sample:

- Record of Comm. Proceedings
- 97hrAC-EdR_RCP_pt01a
- 97hrAC-EdR_RCP_pt01b
- 97hrAC-EdR_RCP_pt02

- Appointments ... Appt
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- Clearinghouse Rules ... CRule
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- Committee Hearings ... CH
-
- Committee Reports ... CR
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- Executive Sessions ... ES
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- Hearing Records ... HR
- 97hr_sb0003_pt01
- Miscellaneous ... Misc
-
- Record of Comm. Proceedings ... RCP
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United States
Department of
Agriculture

Forest Service

In Cooperation
with the U.S.
Department of
the Interior's
Bureau of Mines

Program Aid 1505

March 1993

Acid Drainage From Mines on the National Forests

A Management Challenge

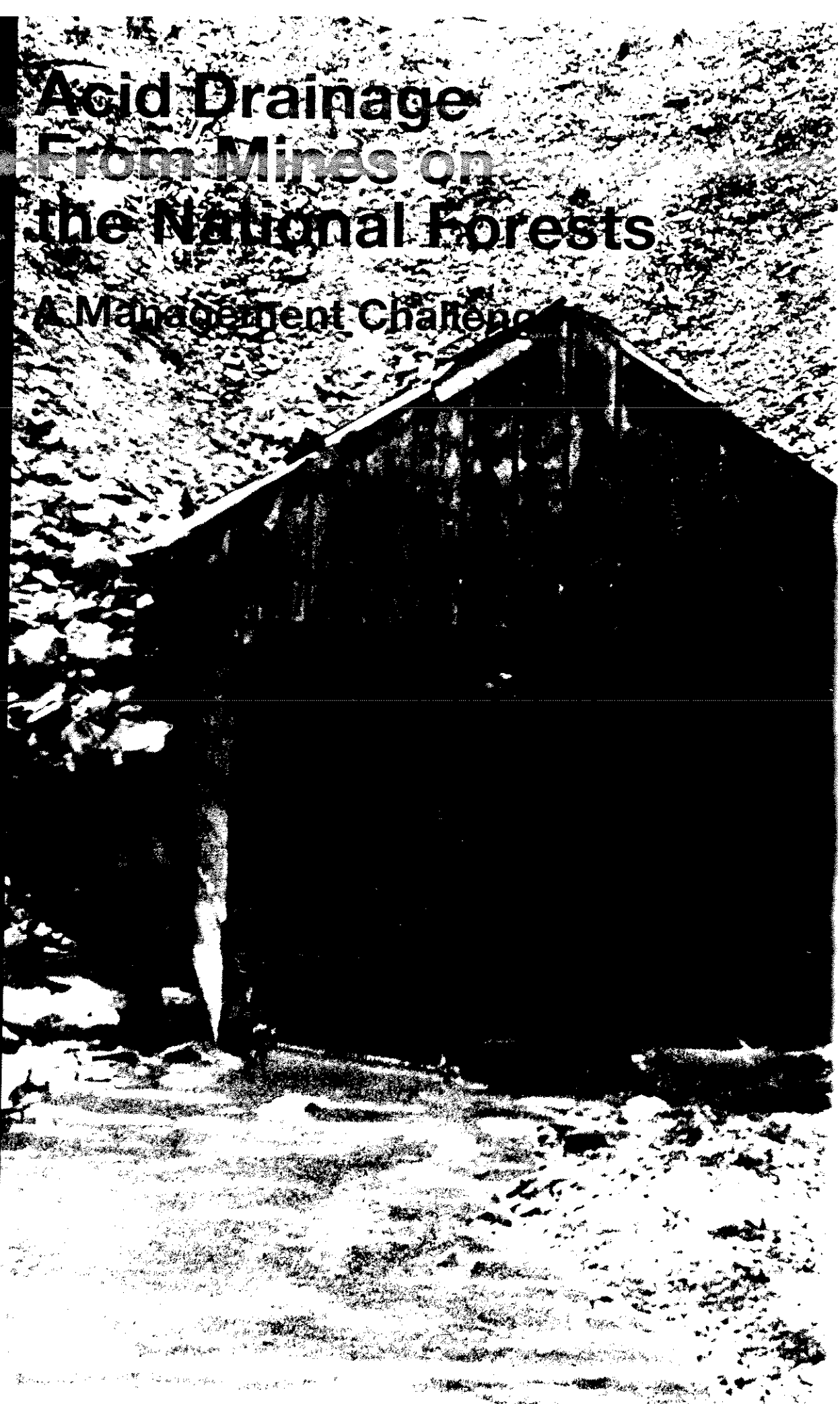


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On the Front Cover

Old mine adit on the Rio Grande National Forest in Colorado. Although partially collapsed, this adit still drains a historic lead, copper, and zinc mine. High acidity and high metal content have severely affected aquatic lifeforms below the mine.

All photos USDA FS/WO-M&GM



Cooperative Research Program - An Overview

"The Forest Service has identified acid drainage from mine sites as the most difficult and costly reclamation problem it faces with western metalliferous mining operations . . . with some significant environmental problems dating as far back as the late 1800's."

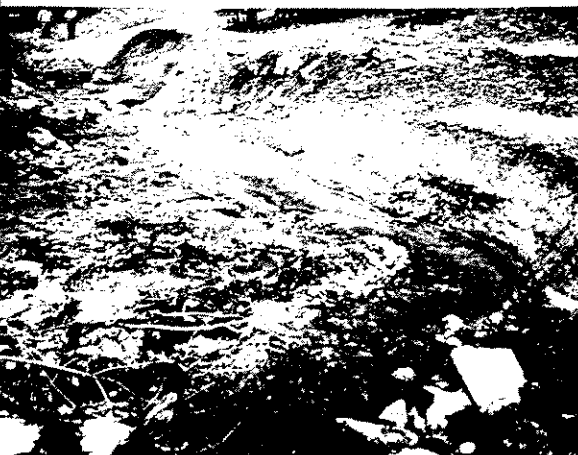
When the cooperative research plan on acid drainage from mine sites was signed in April 1991 by the Bureau of Mines and the Forest Service, its mandate was clear—to provide and apply technology to help manage national forests and grasslands affected by acid drainage. The plan represents a long-term cooperative research program focusing on National Forest System lands in the Western United States being carried out using the Research, Development, and Application (RD&A) model. It is a comprehensive program with practical goals—to provide and make use of needed information.

Under the program:

- The Bureau of Mines provides information on the prediction, control, and treatment of acid drainage from mine sites.
- The Forest Service, the mining industry, and others provide research sites and use the information.
- The Forest Service monitors its effectiveness.

This report highlights program contributions to be achieved over time. It also summarizes contributions of the program to date and describes how the program functions. The current effort is a long-term one, using available resources. Additional resources specifically designated to this cooperative effort would result in accomplishing the work in a more timely fashion.

Of course, the true effectiveness of the acid drainage cooperative research program will not be known for some years. Applying the results of new research and development is not accomplished quickly—it takes time. Fortunately, application of this new information being provided by the Bureau of Mines will be a continuing part of Forest Service programs.



*Figure 1
Mine tailings producing acid drainage on the Prescott National Forest in Arizona. This gold, lead, and zinc was active in the 1890's.*

The Forest Service and the Bureau of Mines –Agency Responsibilities

The U.S. Department of Agriculture's Forest Service and the U.S. Department of the Interior's Bureau of Mines each has unique responsibilities in the management of mineral resources in the United States. Generally, the overall responsibility for managing federally owned minerals belongs to the Bureau of Land Management. Other Department of the Interior agencies have minerals responsibilities as well.

In part, the Forest Service is charged with administration and management of National Forest System lands, including land and resource management planning. This responsibility encompasses the mining and extraction of mineral resources, the approval of mining and reclamation plans that protect the environment, particularly surface resources, and the research necessary to protect these resources. The Bureau of Mines has responsibility to ensure that the United States has a dependable and secure supply of domestic minerals, to conduct investigations and research for this purpose, and to protect the environment and minimize damage due to mining and mineral processing activities.

In June 1990, the two agencies entered into a Memorandum of Understanding to enable them to develop and carry out a comprehensive research program to solve problems and demonstrate solutions to acid drainage problems on National Forest System lands. It is an important program, in that solutions to problems such as these are necessary for the extraction of mineral resources in an environmentally sensitive manner. In effect, it influences the degree to which minerals necessary for the economic viability of the Nation are available on these lands.

"The Forest Service and Bureau of Mines have entered into a Memorandum of Understanding to enable them to develop and carry out a comprehensive research program to solve . . . acid drainage problems."

Figure 2

Acid is generated from these abandoned mill tailings on the Wenatchee National Forest in Washington. The primary commodity was copper. The color of the tailings results from precipitated iron.



The Problem



The Forest Service has identified acid drainage from mine sites as the most difficult and costly reclamation problem it faces with western metalliferous mining operations. Acid drainage persists at many active and abandoned mine sites, with some significant environmental problems dating as far back as the late 1800's.

[There are also concerns that current and future mining operations may generate acid drainage for years or decades after the mines cease operation. Unfortunately, major technical uncertainties are associated with the prediction of acid drainage potential at the time of mine plan approval as well as with mitigation or treatment techniques for post-mining use.]

[Over 1,500 western mining sites with significant acid drainage problems have been identified on National Forest System lands.] Many of these sites in remote locations that are not accessible the year around often represent small, but ecologically damaging flows. Such sites require either permanent control measures to prevent or mitigate acid formation, or low-cost, passive treatment technology to neutralize and detoxify the waters. The problems of acid drainage from the sulfide-bearing rock present at many western metal mines are exacerbated by contamination that occurs when acid waters contact exposed mineral zones and dissolve heavy metals. Many of these metals are toxic to aquatic and terrestrial life, if the concentrations are high enough.

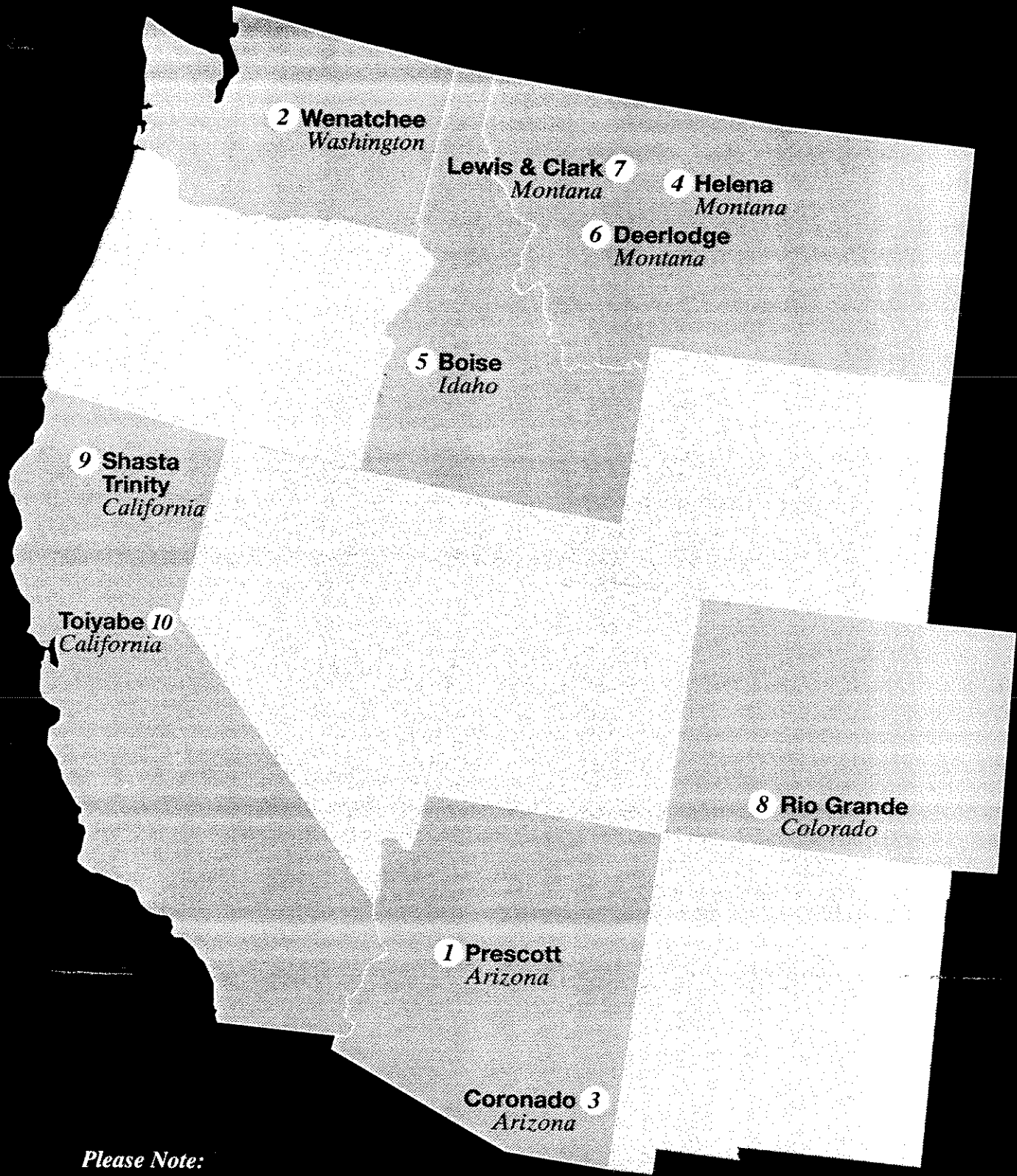
Forest Service land managers, who face increasingly complex and controversial decisions regarding mineral development, need new research information. [One major problem affecting the future of metal mining in the West is the absence of technology to predict the potential of new mining ventures to generate acid drainage.] State and Federal permitting and regulatory agencies need information on the acid-forming potential of ore deposits in order to analyze the impacts of new mining operations and provide for the development of necessary environmental controls. Gold and other precious metal operations, which have experienced a 30- to 35-percent growth in domestic production in each of the last 5 years, are expected to continue. [Without additional research information, it is almost certain that a significant percentage of existing

and new mining ventures will experience unexpected acid drainage situations. These situations could result in expensive and difficult remedial actions to prevent adverse environmental impacts, primarily to surface and ground waters, due to metal-contaminated drainage.]

The fact that acid drainage has been a persistent problem for more than 100 years is indicative of one of the major difficulties in dealing with it—[that there are currently no widely applicable technologies to mitigate or stop a fully developed acid drainage situation. Only stopgap prescriptions are available and at considerable cost.] On the other hand, the application of State and Federal regulatory controls on some modern mines has, in some instances, been able to limit the development of acid mine drainage and consequently reduce the long-term environmental effects. However, regulatory controls do not always work. In the case of old, abandoned mines it is too late for regulatory controls. New technologies are needed to effectively deal with these problems.

[Currently, reliable data on the total number of mines producing acid drainage and on the number of miles of streams affected by acid and metal drainage are not available for the Western United States. However, various estimates have placed the number of these mines in the range of 20,000-50,000, seriously affecting 5,000-10,000 miles of streams.] The cumulative effect of these mines, whatever their actual number, is significant.

[The basis for the production of acid drainage is well understood. Pyrite and other sulfide minerals are exposed to air and water in the mining process. Air and water oxidize the sulfide minerals, releasing sulfuric acid and sulfates.] This process is catalyzed by iron-oxidizing bacteria and permits a host of site-specific secondary reactions, principally ion exchange and acid-induced metal dissolution. The metals that may be involved in this process cover the range of heavy metals: arsenic, cadmium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc. Once the chemical reactions are fully realized, the discharge of acid and metal ions is known to persist



2 Wenatchee
Washington

Lewis & Clark 7
Montana

4 Helena
Montana

6 Deerlodge
Montana

5 Boise
Idaho

9 Shasta Trinity
California

Toiyabe 10
California

8 Rio Grande
Colorado

1 Prescott
Arizona

Coronado 3
Arizona

Please Note:

States in solid color are the ones represented by photos in this publication. However, acid drainage from metal mines is a problem throughout the West.

The Problem Continued

*A sampling of
national forests
having acid drain-
age problems.*

*Numbers refer to
figure numbers in
this publication.*

in some cases for hundreds of years and should be considered a long-term source of contamination. Although this process does occur naturally, it is the volume of drainage from mine sites that is problematic.

The makeup of acid drainage varies from mine to mine and from location to location. Classic acid drainage is composed of acid, precipitated iron compounds, sulfate ions, and dissolved metals. It is the metals, far more than the acidity, that cause the environmental damage. The type of metals in acid mine drainage is controlled by the mineralogy of the ore body; lead and zinc mines may produce metal migrations of lead and zinc. Unexpectedly, gold mines may produce flows containing arsenic. Once the acidity and metal ions migrate into the soils, they are usually unable to support the normal complement of vegetation and soil fauna and flora. These biological components of the soil are inhibited by the dissolved metals in the soil water solution. Bare, unvegetated soils are eroded by the weather elements, and streams are physically contaminated with large volumes of metal-bearing sediments coming off the acidified upland areas of the mines. Extant groundwater aquifers may also be contaminated by the dissolved metals.

When acid and metal drainage enters streams, the fish and other stream organisms are often depleted in a relatively short period of time. Copper ions are especially lethal to fish, but not to mammals. In a coldwater fishery, in softwater conditions, a copper concentration of as little as one part per million may be lethal to trout. Streamside vegetation is affected by a change in species composition and exhibits a general loss of vigor. However, some lower quality streamside vegetation is usually retained.

To briefly summarize, flows of acid drainage often create large, toxic, metal-bearing sediment loads in stream channels. The channels may be brightly colored—red, purple, and orange—by precipitates of iron and other metal compounds. The waters are somewhat acidified, but the metal constituents may increase drastically. Fish and other organisms in the system are lost in the waters most affected as a result of the metal contamination. Streamside vegetation is often changed as to species composition and loss of vigor. The most seriously affected streams are considered to be “dead.” Ground water may also be contaminated with metal ions.

A Model of Cooperation

“Without additional research . . . it is almost certain that a significant percentage of existing and new mining ventures will experience unexpected acid drainage situations that could result in expensive and difficult remedial actions”

The current gold boom in the Intermountain West began in the mid 1980's. It was made possible by a combination of high precious metals prices; discovery of large, low-grade, disseminated ore deposits; and new extraction technology. By the close of the decade, the Forest Service and some segments of the mining industry had recognized the need for better research information to deal with the likelihood of acid drainage. Acid drainage research and development efforts were generally not well coordinated with the needs of the national forests, and adequate planning for this type of focus was often lacking. For this reason, effective June 6, 1990, a Memorandum of Understanding was signed by the Bureau of Mines and the Forest Service in which the two agencies mutually agree to cooperate in addressing the significant national problem posed by acid drainage from mine sites in the Western States. The agreement does not include funding considerations.

A joint agency working group established by the agreement has identified four priority areas that must be addressed to develop effective solutions to acid drainage problems in the West. Together, these areas make up the cooperative research program. They relate to (1) predictive techniques and methodologies to assess the potential of new mining ventures to generate acid waters; (2) control technologies to prevent or minimize acid drainage; (3) treatment technologies to mitigate existing acid drainage problems; and (4) technology transfer and program monitoring to assess the effectiveness of technologies in the above three areas and transfer the information to the mining industry and government agencies.

Under the direction of the national offices of the Forest Service and the Bureau of Mines, the joint agency working group is responsible for program planning, setting research priorities, identifying field study and demonstration sites, and information exchange.



*Figure 3
Eroded mine and mill tailings generate acid on the Coronado National Forest in Arizona. The operation produced copper, silver, gold, and other metals.*

Using the RD&A Approach



The cooperative **research** program is a shared effort between the Bureau of Mines and the Forest Service. Basic research information forms the technical foundation of any such program. Although much new technology needs to be generated for the Western United States, some technology is already available in the East upon which to build. Much attention has been directed at acid problems associated with eastern coal mines. In fact, the Bureau of Mines has had an active research program to address acid drainage from eastern coal mines for more than 20 years and has produced a number of successful reclamation, mitigation, treatment, and pre-mine prediction technologies.

Development involves molding existing knowledge and technology into a form that can be used in specific ways. In this case, development efforts will utilize the knowledge base on treatment of acid drainage from eastern coal mines and the extensive expertise

of the Bureau of Mines in mining and processing of ores from western metal mines. Research and development in this RD&A model is being accomplished by the Bureau of Mines with Forest Service support.

Effective **application** of the cooperative model involves successful technology transfer. Unfortunately, considerably greater emphasis is frequently placed on generating information than on transferring it to users and getting it applied. As a result, a great disparity can exist between the amount of information available and the amount used. In this model, technology transfer is being emphasized and includes usage of the information on the ground. Monitoring to determine the effectiveness of new technologies is considered an integral part of application. The Forest Service, because it administers the land and regulates mining activity, has responsibility for application of research and development information with Bureau of Mines support.



Figure 4
Trees killed by heavy-metal-contaminated acid drainage seeping from sulphide-bearing waste rock on the Helena National Forest in Montana. The mineral commodity was gold.

Figure 5
Acid rock drainage seeps from an abandoned mine adit on the Boise National Forest in Idaho. This water has unusually high concentrations of arsenic.

period during which... solutions. The BDEA approach allows for concentration on high-priority projects that would otherwise not be accomplished. Following is an explanation of the four priority research areas:

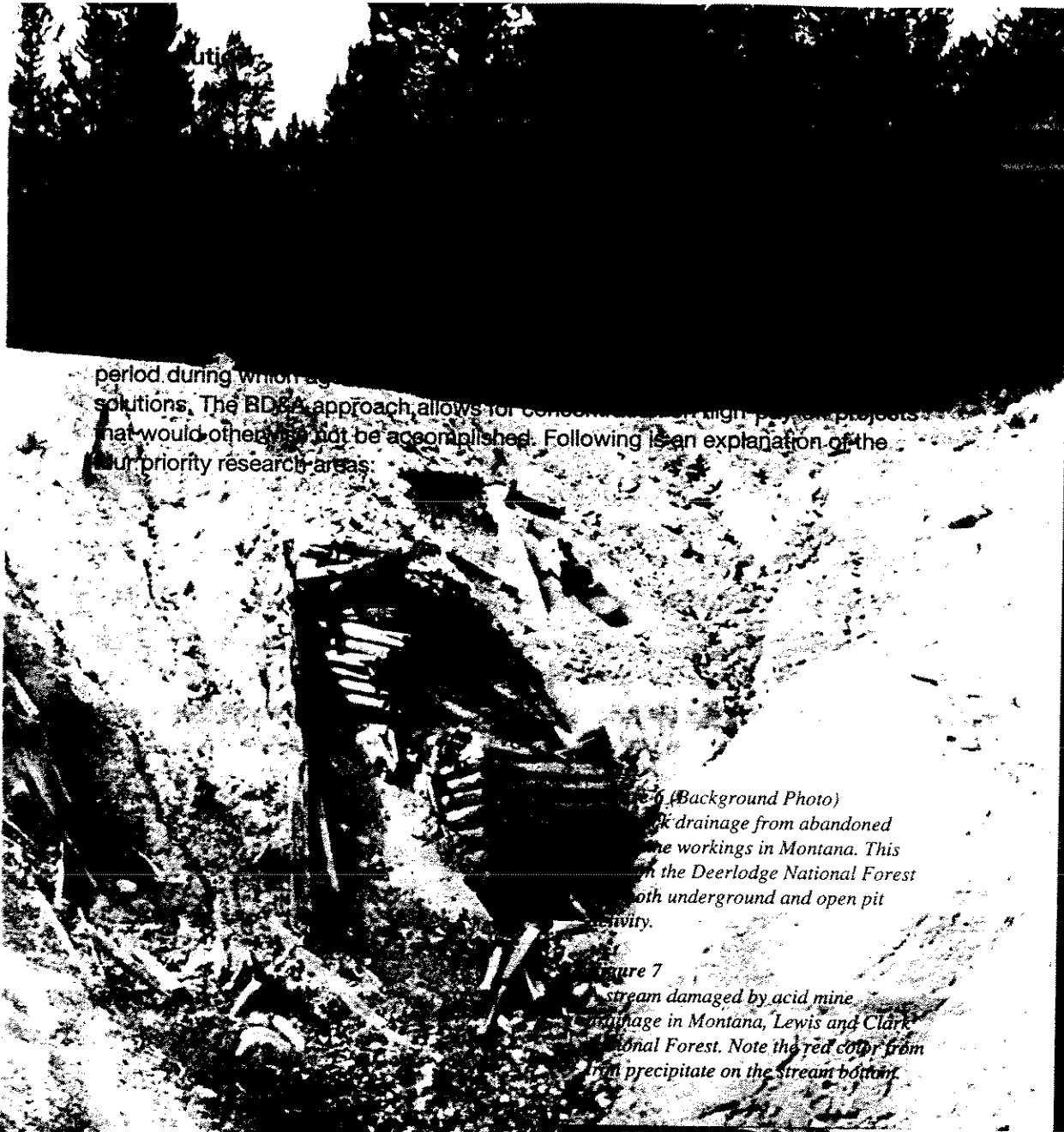
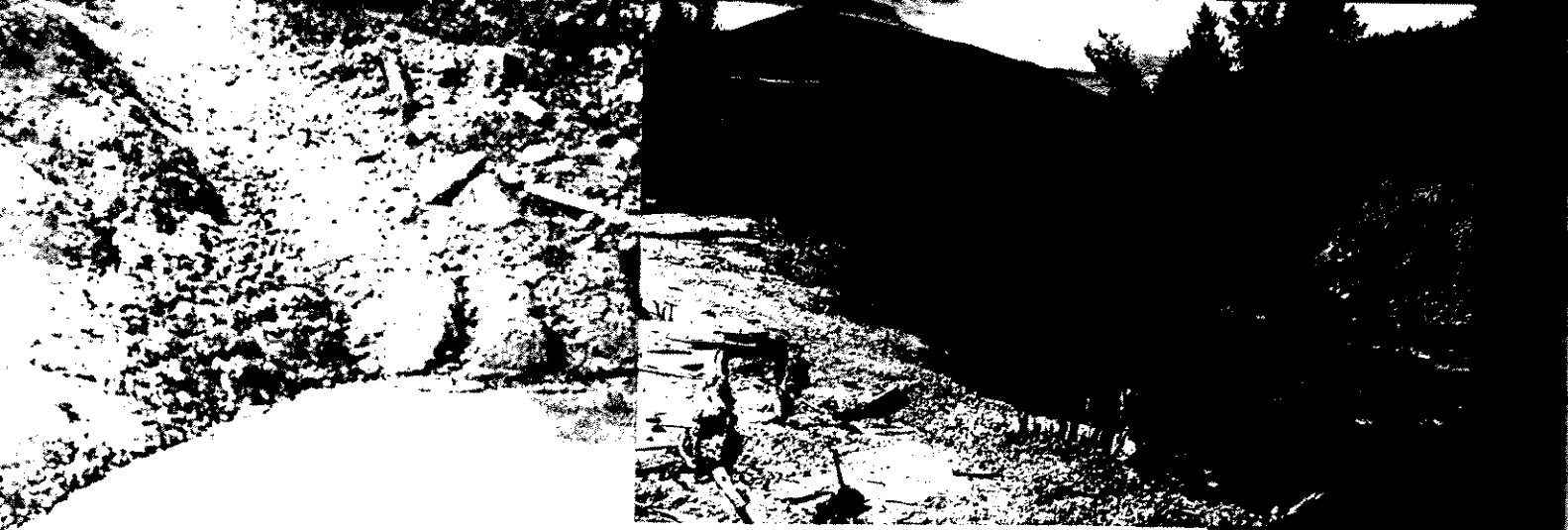


Figure 6 (Background Photo) Stream drainage from abandoned mine workings in Montana. This is part of the Deerlodge National Forest which has both underground and open pit mining activity.

Figure 7 Stream damaged by acid mine drainage in Montana, Lewis and Clark National Forest. Note the red color from iron precipitate on the stream bottom.



“... development of effective techniques and methods for predicting the potential of new mining ventures to form acid drainage... would allow the Forest Service, other land management agencies, and industry to avoid repeating the mining mistakes of the past...”

Acid Drainage Prediction

Scope: The Forest Service and the Bureau of Mines concur that the development of effective techniques and methods for predicting the potential of new mining ventures to form acid drainage is one of the highest priority efforts of cooperative research. In essence, predictive technologies would allow the Forest Service, other land management agencies, and industry to avoid repeating the mining mistakes of the past that have led to acid drainage problems. An accurate assessment of the potential for acid drainage formation using information obtained during exploratory drilling, for example, could be used in the permitting process. In addition, the assessment would allow industry to design mine and waste management plans to prevent or mitigate adverse environmental impacts from acid drainage.

Objective: Within 5 years, develop quantitative models, techniques, and methods for the prediction of acid drainage from samples obtained from exploratory drilling programs.

Control Technologies for Acid Drainage

Scope: There is a need for more effective technologies to control acid drainage at both abandoned and operating mine sites. Control aims to prevent acid drainage formation by inhibiting the weathering processes, for example, by preventing water or oxygen contact with mine wastes or mine workings. This technology is applicable to past sites and to all new operations through the development of mine and waste management plans.

Objective: Develop and demonstrate a suite of economical techniques that limit effluent volumes or heavy-metals concentrations from mines and waste rock (nonpoint sources of pollution). These include underground mine workings and pits, coarse waste rock, and fine fractions of mill wastes.

Treatment Technology for Acid Drainage

Scope: Cost-effective technology is needed to correct acid drainage from past operations. The development of a low-maintenance or passive treatment process may be the only cost-effective solution for many national forest sites because of their location, low-volume discharge, or extensive and diffuse underground contamination source. Research should focus on developing low-cost chemical and biochemical systems for small-volume discharges that can operate with minimum maintenance.

Objective: The 5-year objective is to develop a passive, low-maintenance system or systems for treating low-volume drainage from mine adits (point sources of pollution). Treatment may involve combined passive systems, which ideally would produce dense and environmentally stable sludges and have the potential for metal recovery to limit disposal costs.

Program Monitoring and Technology Transfer

Scope: The need to determine the effectiveness of new acid drainage technologies has resulted in a commitment on the part of the Forest Service and the Bureau of Mines to carry out long-term monitoring in the above three research areas. In addition, improved knowledge and technologies to predict, control, and treat acid mine drainage will require aggressive technology transfer, training, and information sharing efforts.

Objectives: Develop and carry out long-term monitoring and evaluation plans consistent with the level of new methods and techniques. Enhance the awareness of acid drainage problems and solutions with the mining industry and State and Federal land management and regulatory agencies.

Benefits

“... application of this new information being provided by the Bureau of Mines will be a continuing part of Forest Service programs.”

The benefits of an effective RD&A program include:

- The ability to predict the potential for acid drainage from mine sites will enable land managers to make informed decisions regarding the exploitation of metallic mineral resources on public lands.
- Predicting the likelihood of acid drainage prior to mining will enable industry to design effective control and mitigation measures into the mining operation.
- The economic viability of the mine can be better assessed. This will reduce premature and ineffective closure due to unexpected environmental control costs.
- A better design for final mine closure can be prepared. Post-mining site monitoring will be reduced, and the time for monitoring will be shortened.
- New techniques will prevent or reduce acid discharges from metal mines and processing wastes. Elimination of these discharges will preclude or reduce acid and heavy metal pollution of receiving streams and ground waters.
- Improved drinking water supplies and restoration of aquatic habitat will result. There will be an elimination of visual pollution of streams due to precipitation of iron compounds.
- Reduced costs for waste water treatment and correcting other damage to the environment.



Figure 8
Highly acidic tailings, with high metals content, were released downstream following collapse of a tailings dam on the Rio Grande National Forest in Colorado.

Accomplishments To Date

Program accomplishments as coordinated by the joint agency working group include:

- Development of site selection criteria for cooperative Bureau of Mines / Forest Service research-related efforts.
- Establishment of a joint agency reconnaissance team for site evaluation and selection.
- Assistance in the control and treatment of acid drainage from the Golinsky Mine on the Shasta-Trinity National Forest.
- Sponsorship of and participation in a national acid mine drainage seminar for industry, land managers, and State and Federal regulatory agencies.

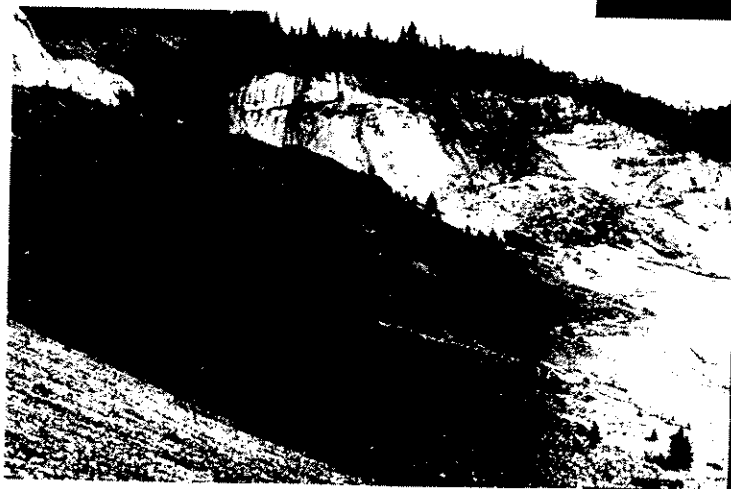
Figure 9

Acid drainage from an inactive gold mine runs down this hillside on the Shasta-Trinity National Forest in northern California. The acid flow has been the cause of fish kills further downstream.



Obviously, these accomplishments represent only a beginning and reflect limited funding. Much work remains to be done. The Forest Service and the Bureau of Mines are committed to moving ahead in this important work as fast as possible. The alternative to solving these problems at the pre-mining or mining stages of mineral development could result in unacceptably long long-term commitments to water treatment and site cleanup. In this age of environmental awareness, this alternative is of course unacceptable for current and future mining operations. Long-standing acid drainage problems from mines in the forests, many from operations before the national forests were set aside, are also in the public eye, with the expectation that an aggressive cleanup program will be pursued. The actions outlined in this publication are consistent with that expectation and are supported by the mining industry.

Figure Ten
Hillsides affected by mining in central California, Toiyabe National Forest. The acids generated in the soils of this old sulfur mine have severely slowed the rehabilitation of the area.





ALL IN JUST ONE DAY

IN ORDER TO MAINTAIN OUR STANDARD OF LIVING, EVERY DAY:

- 18,000,000 tons of raw material must be mined, cut or harvested to meet the demands of U. S. citizens (about 150 pounds for every man, woman and child);
- 640 acres (one square mile) of carpeting is woven using barite and calcium carbonate (dolomite);
- 9,700,000 square feet of plate and window glass (about 223 acres) are used, enough to cover 200 football fields, using silica sand and trona;
- 2,750 acres of pavement are laid-four times as much surface area as is mined-and enough concrete and asphalt to make a bicycle path 7 feet wide from coast to coast using gravel, stone aggregate, and limestone;
- 4,000,000 eraser tipped pencils are purchased (enough erasers to correct all mistakes from 1,500 miles of notebook paper-about 129 acres of "goofs") using graphite, kaolin, and pumice;
- 426 bushels of paper clips (35,000,000) are purchased. Seven million are actually used, 8-9 million are lost and almost 5 million are twisted up by nervous fingers during telephone conversations, all using iron clay, limestone, and trona;
- 164 square miles of newsprint is used to print 62.5 million newspapers (enough to line a bird cage 12 miles wide and 13 miles long) using trona and kaolin;
- 400 acres of asphalt roofing are nailed down, utilizing silica, borage, limestone, trona, feldspar, talc, and silica sand;
- 187,000 tons of cement are mixed (enough to construct a four foot wide sidewalk from coast to coast) using limestone, sand, gravel, and stone aggregate;
- 36,000,000 light bulbs are purchased, all made from tungsten, trona, silica sand, copper and aluminum;
- 10 tons of colored gravel is purchased for aquariums;
- 80 pounds of gold are used to fill 500,000 dental cavities;
- 50,000 pounds of toothpaste (2.5 million tubes) are used (enough to fill a small jet liner) requiring calcium carbonates, zeolites, trona, clays and silica;
- 1,000,000 photographs are snapped (more than 29 acres of wallet sized photos) using silver and iodine.

"ALL, JUST IN ONE DAY!" WHO SAYS WE DO NOT NEED MINERALS!!

Reprinted from Montana Mining Association, 11/96

Source: 1996 Blaster's Newsletter, 4/96

**Motion Approved by the Membership
of the
Pickereel/Crane Lake Protection and Rehabilitation District
(May 25, 1996)**

Whereas, the Crandon Mining Company (CMC), formed by an alliance between Exxon and Rio Algom Ltd., has applied for a permit in Wisconsin to mine a large copper-zinc deposit only a few miles north of the Pickereel/Crane Lake Protection and Rehabilitation District (hereafter referred to as the lake district); and,

Whereas, the proposed CMC mining site and surrounding area is located in an environmentally fragile glacial till area with many lakes, streams and wetland areas; and,

Whereas, the CMC mine will be a hardrock metallic sulfide type mine which have proven to be particularly damaging to the environment due to the generation of acidic mine wastes; and,

Whereas, the proposed mine, which will be below the water table, will require the pumping of millions of gallons of water out of our area and into the Wisconsin River resulting in a drawdown of the water table and the potential for lowered lake levels; and,

Whereas, the CMC proposed Tailings Management Area (TMA), designed to contain several million tons of toxic mine waste forever, will utilize an experimental, untried, and untested liner system; therefore,

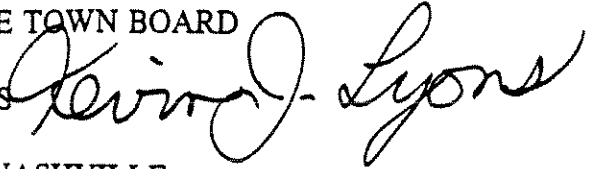
Be it resolved, that the lake district opposes the permitting of the proposed CMC mine; and,

Be it also resolved, that the lake district opposes the permitting of any mine in our area until such time in the future that a mining process is developed and operated which can be independently evaluated and scientifically verified and proven beyond doubt to have a negligible impact on an environment and ecosystem similar to ours; and,

Be it further resolved, that the lake district hereby authorizes its commissioners to represent the lake district between membership (elector) meetings and take any reasonable and responsible actions which they deem necessary, unless forbidden by the by-laws, to protect our lakes from any and all environmental degradation which might result from a proposed mining operation.

MEMORANDUM

November 26, 1996

TO: NASHVILLE TOWN BOARD
FROM: K. J. LYONS 
RE: TOWN OF NASHVILLE
TOWN OF NASHVILLE AND CMC
TENTATIVE LOCAL AGREEMENT

LAW

As a matter of law, the basic unit of government is the state, and the state gives power to (and may take power from) counties, cities, villages, and towns. Towns have legal authority to enact ordinances under the police power -- the power to enact laws to protect the general health, safety and welfare of the people -- and under zoning power -- the power to regulate land use. Towns have any powers to the extent that the state gives them to town by statute from the legislature or by decision from the courts. Remember, for example, the block grant program for mining related expenses: \$100,000/year, indexed for inflation, for up to 11 years, no strings attached. The legislature established it and it paid Nashville during the Exxon proposal. The legislature abolished it after 1986. The current discretionary grants program co-existed with the block grant program. Now block grants are only a memory, and discretionary grants are made at the discretion of the state.

Another legal limit on town powers is the law of preemption, the principle that says that local governments may not regulate an activity which state or federal governments have expressly or impliedly reserved for themselves. While neither state nor federal governments

have expressly preempted local regulation of mining, both have acted and are acting now to exercise their legal authority to regulate mining, and neither has delegated authority to Nashville, any other local government, or to any Native American community. (Quite the contrary for Native Americans, as described below.) This situation raises the question of implied preemption, a legal question answerable by courts. There are no particular reasons to think that local governments would win a case which would seek to establish primary local authority over mining. And winning would carry a heavy price: the cost of establishing local bureaucracies to do what state and federal governments are already doing.

Native American communities with sovereign nation status have relationships with state and federal governments that differ from the relationships between towns and state and federal governments. These relationships can vary from one Native American community to another for reasons including treaty provisions and agreements. Litigation between Native American communities and state or federal governments show that these relationships are still being defined. For example, there are five lawsuits pending -- in two of which the Sokoagan Chippewa are parties -- between the State of Wisconsin and the EPA in which Native American communities assert the legal authority to regulate water. The lawsuits raise questions of both environmental regulation and sovereignty, and their outcomes may impact not only the CMC proposal but human activity of all kinds both on and off the reservation. Nashville has never been a party to these lawsuits.

In Wisconsin, federal and state governments do have legal authority to regulate mining and are now exercising their respective authorities. The United States Army Corps. of Engineers (COE) has the lesser authority. COE regulates wetlands and is reviewing the CMC

proposal now. The Wisconsin Department of Natural Resources (DNR) has greater authority. DNR has been actively reviewing the CMC proposal for compliance with state laws since CMC made the proposal. Since the 1970's, DNR has also studied and analyzed proposals of Exxon to mine the same ore body which is the subject of the CMC proposal.

The Wisconsin legislature charged the DNR with this duty in Chapter 144, Wis. Stats., especially in sections 144.82 and 144.83, which in part require as follows:

144.82 Mine effect responsibility. The department shall serve as the central unit of state government to ensure that the air, lands, waters, plants, fish and wildlife affected by prospecting or mining in this state will receive the greatest practicable degree of protection and reclamation

144.83 Department powers and duties. (1) The department shall: . . .

(b) Establish by rule after consulting with the metallic mining council minimum qualifications for applicants for prospecting and mining permits

(2)(a) The department by rule after consulting with the metallic mining council shall adopt minimum standards for exploration, prospecting, mining and reclamation to ensure that such activities in this state will be conducted in a manner consistent with the purposes and intent of ss. 144.80 to 144.94

(4) The department may: . . .

(L) . . . [P]romulgate rules establishing groundwater quality standards or groundwater quantity standards, or both, for any prospecting or mining activity, including standards for any mining waste site.

(c) Issue orders directing particular prospectors or operators to comply with the provisions and purposes of ss. 144.80 to 144.94.

(g) Issue prospecting and mining permits.

The legislature also directed DNR to hold hearings in section 144.836, Wis. Stats. (the Master Hearing referred to in section 8 of the tentative Local Agreement.)

In section 144.85, Wis. Stats., the legislature directed the DNR to collect information from any mine permit applicant. CMC, and Exxon before it, have provided DNR with the required information, and have given that same information to Nashville. All of the information has been publicly available in the Town Hall and other locations around the state for months and years. The legislature also directed DNR to prepare an Environmental Impact Statement (EIS) in section 144.852 Wis. Stats., an activity now well underway.

The legislature split the enforcement authority for Chapter 144, and the Administrative Rules DNR adopted under authority granted to it in Chapter 144, between DNR (section 144.91, Wis. Stats.) and the Wisconsin Department of Justice (DOJ) (section 144.93, Wis. Stats.). That split is consistent with the usual split of authority between these two agencies: DNR takes administrative action, while DOJ takes violators to court. In addition, the legislature provided for citizen lawsuits in section 144.935 and for persons to seek Chapter 227 review in section 144.94. Nowhere, however, did the legislature explicitly delegate any enforcement authority to towns, any local units of government, or to any Native American community.

While the legislature did not give the direct authority to make or enforce environmental rules to towns, the legislature did authorize towns to enter into agreements with operators and did direct state agencies to assist towns in enforcing provisions of local agreements within the expertise of the state agencies, in section 144.839, Wis. Stats. This statute requires the inclusion of certain provisions set forth in section 144.839(2)(a) through (g). Then, in

section 144.839(2)(h), the legislature allowed towns and operators the freedom to contract concerning matters which they deemed to be important to them, typically matters of local, not state-wide, concern. This grant of authority does not permit mine permit applicants to escape compliance with state statutes and administrative regulations. It does, however, give towns the authority to contract with applicants, not only for compliance with the goals of a zoning or land use ordinance, but also to contract with applicants for matters not within the scope of a lawful zoning or land-use ordinance. Nashville has used this authority to contract to obtain an agreement that deals with questions of concern to the town, both within and beyond the scope land-use ordinances. The Agreement gives Nashville benefits which it could not require CMC to give it under its zoning law, while at the same time covering all of the issues properly covered by its Zoning Ordinance. The Agreement also avoids potential expensive litigation over the scope of local authority or the Nashville Zoning Ordinance; litigation that could involve CMC, the State of Wisconsin, or both; litigation the outcome of which is uncertain.

AGREEMENT: NOTICE

The first thing to note about the Local Agreement is the NOTICE printed on the cover of the document. This notice makes clear that neither construction nor mining may begin unless and until state and federal agencies have carried out the duties referred to above, including, but not limited to, exercising their legislative and congressional mandates to protect the environment.

AGREEMENT: INTRODUCTION

The 32 sections of the Agreement fall into 4 broad categories, with a bit of overlap, as follows: Sections 10 through 14, 16 through 18, and 21 and 22 comprise the environmental

category; sections 3 through 5, and 20 and 22 comprise the economic category; sections 6 through 9, 19 through 21, and 23 comprise the process category; and sections 1 and 2, and 24 through 32 comprise the legal provisions category.

Please note that air, dust, and noise topics are believed to be included in a draft tentative Agreement between the Town of Lincoln and CMC, since any sources for air, dust or noise emissions would exist within the boundaries of the Town of Lincoln. While it seems unnecessary to duplicate those provisions in Nashville's Agreement, those provisions could easily be incorporated if Nashville chose to do so.

AGREEMENT: ENVIRONMENT

Section 10 addresses issues raised in the Zoning Ordinance (in sections 15.39, 15.36.1(b)(16), and 15.32.4) and questions raised by members of the public. For example, section 10(b) addresses public concern about converting an underground mine to an open pit mine by forbidding such conversion. Section 10.D requires the collection of surface water and its treatment in a water treatment plant in order to protect both ground and surface waters. Sections 10.A, .C, and .D are requirements that come from the Zoning Ordinance. Section 10.E is an additional requirement to address further questions of surface water run off and erosion.

Section 11 deals with Sand Lake Road. It recognizes that CMC may use Sand Lake Road during the construction, and must maintain and restore it. (See section 15.32.2 of the Zoning Ordinance). In addition, CMC will provide approximately \$60,000 to pave Sand Lake Road as set forth in a letter to the Town.

Section 12 protects the Town and all of its citizens from any harm caused by the subsidence of soils. Please note there is no claim, monetary, or time limit in this provision.

Section 13 addresses the set back requirement in section 15.32.1 of the Zoning Ordinance. The ordinance provides for a buffer zone ranging from 200 feet to 1,200 feet along the property line. The Agreement fixes the setback at 1,000 feet. The Agreement does not require setbacks for certain structures or activities associated with transportation, monitoring, contingency planning, environmental mitigation, and the like. This provision is consistent with the portion of section 15.32.1 of the Zoning Ordinance, which allows such activities in a buffer zone.

Section 14 addresses the fencing question raised in section 15.36.1(b)(10) of the Zoning Ordinance. Fencing is likely to occur within the buffer zone established in section 13 of the Agreement, and therefore not be visible from public roads.

Section 16 addresses questions raised in public meetings. Without Nashville's permission, CMC may not handle waste from any other mine. It even agrees not to apply for a DNR permit for hazardous or radioactive wastes. As noted above, both this Agreement and the Zoning Ordinance forbid Uranium mining. Note also that this section calls for storage of rock collected during construction, and protection of groundwater for seepage from water percolating through such rock and the treatment of any water that does seep through such stored rock.

Section 17 transfers the duty to provide water from the town to CMC, a duty that Wisconsin legislature originally gave to the Town. Note that this water supply provision guarantees both quantity and quality of water and carries no time nor money limitation. The

requirement for CMC to conduct a private water well survey comes directly from section 15.32.3 of the Zoning Ordinance. Such a survey insures that CMC will carry out its duty to collect base line data with respect to ground water quality and quantity, information it must turn over to the Town under section 9 of the Agreement and section 15.36.2 of the Zoning Ordinance. By requiring citizens to participate in well survey, both Nashville and CMC hope to get as much water data as possible and to protect themselves from unfounded claims. Please note that this requirement does not apply to anyone who acquires an existing private water supply after the well survey has been completed.

Section 17(b) follows the statutory scheme established by the Wisconsin legislature. Under section 17, CMC must replace both quantity and quality of water whenever the Town of Nashville asks for such replacement, regardless of whether proof exists at the time of the request for water that CMC caused the damage to quantity or quality of water. Whenever a request for water is made by the Town, CMC must provide the water at its expense. The Town or CMC may, however, seek the hearing prescribed by Wisconsin statutes, to determine the cause of the damage to the water supply. If the DNR concludes that the damage was not caused by CMC, Nashville or CMC may seek reimbursement for the water it provided even though it had not caused damage to the water supply. Essentially this provision allows CMC the right to recover costs the same way the Town could under state law if and when the DNR determines that CMC did not cause the damage to the water supply.

Section 18 addresses requirements of section 15.32.4 of the Zoning Ordinance, which requirements in turn come directly from the state statute enforceable by the DNR. In short,

no about Bottled water?

CMC agrees to meet all state and federal standards. Extending the concept contained in section 16 of the Agreement, CMC also agrees not to handle any water from any other mine.

Section 21 fits within both the environment and process groupings. It does not have a counterpart in the Zoning Ordinance. In this section, Nashville gains, by contract, rights otherwise given to the DNR or the COE by state or federal law. Nashville, through the Citizens' Advisory Committee, established in section 20 of the Agreement, may enter the CMC property, and sample water entering the treatment plant, leaving the treatment plant, or entering the environment from any CMC water outfall. The town may also sample to determine groundwater impacts. Both Nashville and CMC may observe sampling and split samples. This observation and splitting protects both Nashville and CMC from faulty science and from unfounded claims while helping to provide both Nashville and CMC with early warning of any water problems. The notice provision gives CMC an opportunity to protect the safety of visitors and to ensure that it has qualified personnel available for the observing and sampling. Note, however, that notice is not required for sampling during normal business hours on normal business days. Note also that, although there is a once per quarter limitation on sampling, this limitation does not apply if the committee has reasonable grounds to believe that CMC has violated the Agreement or its mining permit. This provision also requires an exchange of any reports or analyses of any samples taken.

Section 22 deals with the state required reclamation plan covered in section 15.36.2 of the Zoning Ordinance. In addition, this section requires consultation with local units of government in an effort to allow for modification of the reclamation plan to mitigate the economic impact of the end of mining. This provision takes into account the Rusk County

mining experience in which alternative, job producing uses were found for portions of the mined property, uses which do not injure the environment.

AGREEMENT: ECONOMY

Section 3 requires that CMC make cash payments to Nashville. This section covers expenses incurred by the Town as described in section 20.04 of the Zoning Ordinance as amended on July 11, 1996. These payments include a permitting fee of \$100,000, legal expenses relating to the Agreement of up to \$350,000, legal expenses of up to \$150,000 for defending the Agreement and for participating in the state or federal permitting processes. This section also guarantees five years of payments of not less than of \$120,000 a year or a total of \$600,000, in a combination of net proceeds tax payments, property tax payments, tax equalization payments, and direct cash payments. These payments are indexed for inflation, with the index capped at four percent per year.

In addition to these payments, under section 3 of the Agreement Nashville will be entitled to net proceeds tax payments totaling approximately \$4,000,000 over the life of the mine, approximately \$60,000 for Sand Lake Road, and approximately \$150,000 in Citizens Advisory Committee funding (section 20). The total value of the Agreement to the Town of Nashville is approximately \$5,500,000.

Please note that Nashville's 1995 tax levy for local government purposes was approximately \$116,000. The section 3 mining impact payments should produce more money per year than the tax levy, thus yielding a surplus for the Town.

In addition, mining payments and tax revenues to the County, schools, and VTAE should permit those jurisdictions to reduce their levies, collected by the County, thus allowing

for substantial property tax reduction. These taxing authorities will determine how much the property tax reduction will be.

Section 4 requires CMC to make tax equalization payments so that both Nashville and Lincoln receive the same amount of property tax dollars for local government purposes, without regard to location of the mine buildings and structures.

Section 5 deals with employment, a subject not generally within the scope of a land use control ordinance. While sections 15.36.1(b)(13) and (14) of the Zoning Ordinance require employment data and CMC's employment policy; and while sections 15.51 - 15.54 of the Zoning Ordinance require economic information, analysis, and planning, none of these sections require hiring of local people. Employment law matters are typically governed by specific federal and state statutes that apply to employment generally. In section 5, Nashville and CMC have entered into an Agreement to train and hire local residents to the extent that such training and hiring is permitted by applicable federal and state law. The attorneys for Nashville and CMC believe that the program set forth in section 5 is permitted by law.

Section 5.A defines who is entitled to the employment preference and in what order. Preference, without quota or numerical limitation, extends to all jobs CMC creates. The Agreement extends the preference to present residents and former residents who have moved away (perhaps in search of jobs). This preference allows former residents, like children of present residents, to return to Nashville and obtain a job. The preference requires returning residents to have attended, but not graduated from, high school while living in Nashville or Lincoln. This section establishes three classes of people entitled to the preference: first, those living in Nashville or Lincoln; second, those living in Forest County; and third, those living in

any other community that has a local Agreement with CMC. All jobs are first available to people in these communities, and all jobs available could theoretically be filled by people in these communities.

Section 5.B contains CMC's commitment to provide on-the-job training for jobs and to fill those jobs needing on-the-job training using the preferences set forth in section 5.A.

Section 5.C commits CMC to following the section 5.A preference list for positions requiring qualifications. This provision would allow persons with educational or other job qualifications who qualify for such jobs, but who cannot now find jobs requiring their qualifications, to return to Nashville and obtain employment locally that uses their skills and qualifications. Section 5.D incorporates exhibit C into the contract, and that exhibit lists jobs available during mine operation, a range of 402 to 526 jobs.

Section 5.E requires CMC to pass through its employment commitment to all of its contractors via contract provisions in their respective agreements.

Section 5.F authorizes the Citizens' Advisory Committee, created in section 20 of the Agreement, to monitor CMC compliance with section 5. Nashville may enforce this provision under sections 6 and 23 of the Agreement.

Jobs may also be considered in the reclamation plan, pursuant to section 22 of the Agreement.

AGREEMENT: PROCESS

These provisions deal with the negotiation, implementation, monitoring, and enforcement of this Agreement. They treat the relationship of the parties to this Agreement and the Agreement itself to the state and federal permitting processes. Most importantly, these

provisions seek to establish ongoing discussion and dialogue between Nashville and CMC, with the twin goals of avoiding disputes and litigation and fostering cooperation in environmental protection and economic development. The Agreement allows both Nashville and CMC to measure each other's talk by each other's acts.

Section 6 describes the rights of Nashville and CMC to reopen the Agreement and the procedure for reopening it. Any act by CMC that would result in a substantial unmitigated negative impact, a legal test taken directly from section 15.06 of the Zoning Ordinance allows Nashville to reopen the Agreement. The key provision for Nashville is section 6.A.(1), which permits Nashville to reopen the Agreement if CMC operates its facility in a manner substantially different from the way it proposed to operate it, and if that difference in operation results in an additional substantial unmitigated negative impact. This provision requires CMC to do what it says it will do, or to do better than it says it will do, or to mitigate any substantial negative impacts resulting from any change in its operation.

Sections 6.B and 6.C set forth the conditions under which either party may reopen the contract, again applying the legal test contained in section 15.06 of the Zoning Ordinance. Paragraphs 6.C(1) through 6.C(3) are all numerical indicators that would show an increase in the size of the CMC operation. Paragraphs 6.C(4) and 6.C(5) are quantitative and qualitative indicators of a potential environmental problem. Section 6.C(6) is a qualitative indicator of greater use of town roads by CMC and the potential for further mitigation of town roads damaged by CMC use.

Sections 6.D through 6.G set forth procedures for reopening and renegotiating the Agreement, which procedures require Nashville and CMC to talk to each other before they sue

each other. Section 6.H allows CMC to mitigate or remediate environmental impacts and to do the remediation or mitigation in the Town of Nashville. This provision tends to ensure prompt remediation or mitigation, and tends to prevent squabbles between units of government from delaying or preventing any required environmental protection activities. Section 6.I encourages the parties to talk before the formal renegotiation process begins, and allows the parties to enter into alternative dispute resolution in order to avoid litigation.

Should talk or alternative dispute resolution fail, section 6.J provides for lawsuits. Nashville's remedy in such a lawsuit is an order amending any terms of the Agreement that are substantially and directly related to an additional substantial unmitigated negative impact on Nashville, the same remedy available to the Town under section 15.06 of the Zoning Ordinance. Under section 15.06.3 of the Zoning Ordinance, the town board could suspend or terminate only if the permit holder fails to construct its project on time, for reasons within its control, if the actual project is significantly different than that approved by the Town and would result in additional unmitigated negative impacts, or if there is an occurrence or imminent danger of a major adverse or catastrophic environmental or economic impact not already described in the permit holder's application materials. Section 6.J recognizes the right of an applicant to mitigate, as recognized in section 15.06.3(b) of the Zoning Ordinance. But that right and duty of mitigation is not limited to construction timing beyond the control of the applicant, or impacts not predicted in the mining plan. In fact, the duty to mitigate, and the right of a court to order mitigation, includes all the provisions of this Agreement, whether mentioned in the Zoning Ordinance or not.

Section 6.K of the Agreement requires Nashville to decide whether or not it thinks an amendment to the mine permit is consistent with this Agreement. If Nashville fails to decide, or decides negatively, CMC may sue for modification of this Agreement under section 6.J, just as Nashville can sue under that same provision. Note, however, that CMC's right to sue under section 6.K extends to Zoning Ordinances, but not any other Nashville Town Ordinances.

Section 7.A requires CMC to obtain a DNR mining permit and furnish Nashville with copies of all bonds or proofs of net worth before it begins construction, requirements also found in sections 15.32.6, 15.36.2 and 15.36.3 of the Zoning Ordinance. CMC must also certify to Nashville that it is in compliance with its mining permit every year.

Section 8 states Nashville's right to participate fully in any state or federal permitting process including any proposal for substantial change in a mining permit. Nashville's agreeing not to renounce or repudiate the Agreement says Nashville is as good as its word. Note that that declaration in no way limits Nashville's ability to invoke the reopen provision in sections 6, the defaults and disagreements provision in section 23, or to enforce any other provision of the Agreement.

Section 9 details CMC's reporting requirements. This section covers submittal requirements found in sections 15.36.1(a), 15.36.1(b), 15.36.1(c), 15.36.2, 15.37, and sections 15.51 through 15.54 of the Ordinance. In addition to those requirements, section 9 requires CMC to furnish the Town with copies of any OSHA notices, any environmental notices of non-compliance or violation, and any complaints or answers to any lawsuits involving the mine. These additional reporting requirements will give the Town early notice

of environmental, human health and safety, and other problems involving the mine, in order to give the Town the opportunity to take action under the Agreement or otherwise.

Section 15 requires CMC to obey Wisconsin licensing requirements when it hires construction contractors, to keep unlicensed outsiders from potentially approving unsafe work or working conditions. Section 19 acknowledges CMC's contingency plan, and commits CMC to provide equipment and personnel on site for dealing with accidents on site. In addition, section 19 commits CMC to reimburse Nashville for the costs of emergency services performed by Nashville for CMC. Section 19 also requires CMC to lend its emergency response resources to Nashville if requested, unless such lending would unreasonably reduce CMC's ability to respond to emergencies on its own site. The details for implementing this Agreement may be determined by the section 20 Citizens' Advisory Committee pursuant to its authority under section 20.I.

Section 20 establishes the Citizens' Advisory Committee. This section gives citizens the opportunity to monitor the CMC operation, and creates an opportunity and a means for regular communication among citizens, governments, and CMC. This committee will facilitate enforcement of the Agreement as well as early problem spotting and avoidance or solution. The recommendations of the committee are non-binding, since the committee is neither a unit of government nor a partnership or corporation, and does not have the rights and duties of a unit of government, partnership, or corporation. As a matter of law, the Town of Nashville could not delegate its legal powers to the committee. Note the broad scope of the charge given to the committee: to review and consider any matters concerning mining or the

impact of mining on the region. There is no equivalent to this committee in the Zoning Ordinance.

Section 21 authorizes the Citizens' Advisory Committee to sample and test water, and split water samples with CMC. Under section 20.B., CMC will provide up to \$5,000 per year to the committee which can be used for environmental sampling and testing. Like section 20, this section has multiple goals: protection of the water resource and the encouragement of Nashville and CMC to work together to protect that resource. There is no equivalent provision in the Zoning Ordinance. The total financial commitment over a thirty year mine life is \$150,000.

Section 23 describes the procedure to be followed if Nashville or CMC defaults on an obligation under this Agreement, or if Nashville and CMC disagree with one another over a matter covered by the Agreement. The procedure is designed to have Nashville and CMC to talk to each other, try to cure defaults and settle disagreements without resorting to expensive court proceedings. Nevertheless, after attempting to resolve a dispute, either party may sue the other. The plan is to have the parties talk first and sue last in the hope that Nashville and CMC will cooperate, rather than litigate, to solve their problems.

AGREEMENT: LEGAL PROVISIONS

Section 1 defines the terms used throughout the Agreement. Section 2 consists of recitations required by Wisconsin statute. Section 24 gives Nashville the duty to allow CMC to defend this Agreement, at CMC's expense, if the Agreement is made the subject of any legal proceedings. CMC may accept or decline the tender of defense. Section 25 indicates that the parties are bound to this Agreement the same way they would be bound to the terms of

a permit issued under the Zoning Ordinance. While the Agreement supersedes all other prior written and oral negotiations, representations and agreements, it does not supersede the contemporaneous letter agreement which provides money for paving Sand Lake Road.

Section 26 states that CMC can assign its rights under this Agreement only if its successor complies with each and every obligation CMC has under this Agreement. Section 27 is a standard severability clause that says that the invalidity of one section of the Agreement shall not invalidate the rest of the Agreement. Section 28 reflects the fact that lawyers for both Nashville and CMC wrote this Agreement.

Sections 29 through 32 are self-explanatory.

The Sheboygan Press

"The past is gone, we face today"

Founded December 17, 1907

David G. Decker, Publisher

3/14/97

OUR VIEW

PRESS EDITORIALS

'Tough' mining stance difficult to believe

Did Gov. Tommy Thompson "get religion" on the environment — and specifically on the proposed Crandon mine in northeast Wisconsin?

We're skeptical.

Yes, the governor did insert proposals in his 1997-99 state budget that he says "get tough" on mining companies. But they fail to fully address the problem, fail to undo the grave harm done to environmental protection by his 1995-97 budget, and fall far short of comprehensive mining laws proposed last year by state Rep. Spencer Black, D-Madison.

The budget Thompson presented Wednesday would require mining companies to identify and use existing technology to make sure any discharges comply with state groundwater and surface water pollution rules.

That sounds good.

But as a result of its effective lobbying efforts, the state's mining industry is subject to less restrictive standards on groundwater than other industries.

Further, the governor's 1995-97 budget interfered with the state's ability to protect the environment from the effects of mining.

That budget bill politicized the state Department of Natural Resources by making the agency's secretary an appointee of the governor. It also emasculated the public intervenor's office, an environmental watchdog agency that had enjoyed bipartisan support since the 1960s, by moving it to the DNR from the Department of Justice and eliminating its power to sue the state on behalf of the public.

The Crandon mine threatens two of our largest rivers, the Wolf and the Wisconsin.

The Crandon Mining Co. proposes to extract 55 million tons of zinc and copper from a metallic-sulfide mine. The waste from the operation, which can form sulfuric acid in the presence of water, would be stored in what would become the state's largest landfill, near the Wolf's headwaters.

The mine wastewater cannot be released into the Wolf, a National Wild and Scenic River, so the company would pump it 38 miles and dump it in the Wisconsin River.

Last year, DNR researchers found that all 20,000 metallic-sulfide mines in North America have caused significant water pollution.

Instead of allowing the Crandon Mining Co. to use Wisconsin as a test for new technology it thinks would protect resources, the state should approve a mining moratorium.

A moratorium, proposed by Black and others last year, would delay any mining permits until mining companies provide an example of a metallic-sulfide mine that operated for 10 years without polluting surrounding waters.

We would have more faith in the governor's "tough" stance on mines if he would support Black's proposal to lift all mining company exemptions from state groundwater laws, ban mining in state parks, and bar from operating in this state mining companies that have violated environmental laws.

Press editorials express the views of the newspaper's editorial board. Readers are encouraged to comment on editorials through letters to the editor.

G.D. Klesing
Clean Land 3/14/97

2/13/97 AgriView

Mining in Trempealeau County Opposed

To the Editor:

As if we didn't have enough things to worry about, now we have international mining corporations trying to get their foot in the door in Trempealeau County. This is evident from their slick TV ads, public opinion phone 'surveys,' and their participation in the committee and public hearing process to influence the drafting of mining permit regulations by our county government.

A few individuals in Trempealeau County have already signed exploration leases with Kennecott Mining. They, together with the mining corporations, and some business interests and community leaders who have been persuaded that there are economic benefits to our area from mining, would all like to have our county board welcome the mining corporations with an 'open arms' policy.

As is to be expected, for mining certainly creates a lot of wealth for certain peoples the corporation stockholders, obviously, the landholders of leased mines, possibly, certain busi-

ness people who create roads, schools, housing, mining facilities; and government leaders, who are often influenced with monetary contributions to community coffers by mines.

Let's face it. Mining is very profitable. The mining corporations have a lot of money to throw around, at least while they're here. It's very hard to deny the wishes of someone who tucks a wad of bills in your pocket. Yes, in the short run, money is nice to have. But when that money is spent and the bills start coming in, it's a different story.

The promises of the mines sound good: Wealth, jobs, growth. But residents of former mining communities around the country know from experience that when the mine dries up, so does the boom economy and the taxpayers foot the bill for cleaning up after the party.

Consider how much we pay in taxes for the Environmental Protection Act Superfund to clean up toxic messes around the country. Consider how much we might pay in unemployment compensation for ex-mine workers, consider the costs of paying for and maintain-

ing roads, schools, government services, etc. that are no longer needed when the mines pull out. Consider the costs of repairing damaged and contaminated wells or of treating or hauling in drinking water for human and animal use for perhaps thousands of years. Consider who benefits from all these costs and consider who pays.

A few people may get rich from mining. But most of us will pay. The economic benefits are a deliberate distortion by mining public relations people. Mining is profitable to corporations only when they can pass their costs on to taxpayers.

A few misguided county residents, in a narrow sense of self-interest, see this as an issue of land ownership rights. They need to consider that in our society, individual rights have never come at the expense of the rights of the larger community.

There are numbers of things we cannot do on our own land that affect the larger society. That's why we have laws. That's why we need mining regulations - tough mining regulations. Mining companies cannot make profits

without polluting, without passing their costs of clean-up on to the taxpayer, without deliberately misleading the public about the real consequences of mining for a community.

Representatives from international mining corporations will be in Whitehall, Wisconsin, the afternoon and evening of Feb. 18 at Sunset Memorial Auditorium, Whitehall High School, to lobby our county board at its public hearing on the mining permit process. The county board needs to hear the other side of the story, the other side of the ledger, the side that will pay and pay and pay if the mines have their way. (If you think times are tough now, wait until the mining companies are through with us).

Please find time in your busy Tuesday schedule to leave written or oral testimony at this very important hearing. Call your county board supervisor and tell him or her that we do not need mining in our county.

Ron Reimer
Eltrick, WI 54627

*Ed Klossing
re a. o. d. J. Wis.*

Commentary

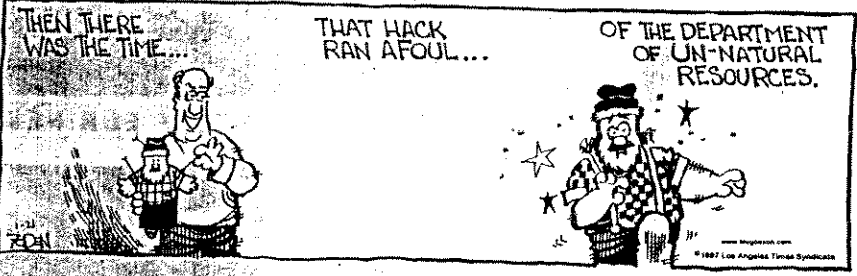
Friday, February 14, 1997

WISCONSIN OUTDOOR NEWS

Page 21

ION PAGE

AGAINST THE GRAIN



COMMENTARY

Views expressed in the Commentary are those of the writer.

Green and gold at risk

By Kira Henschel

Do you get water from a well? Either your own or a municipal well? If you do, you're in good company. Most of us depend on groundwater for drinking, irrigation, and for the rivers and lakes we so enjoy.

Wisconsin has one of the world's largest concentrations of lakes: more than 15,000 of them cover our state. When you look at all that water, remember that what appears on the surface is only 3 percent of the total volume. That is like being able to see 3 cents of every dollar of piled-up pennies. The other 97 percent is our "liquid gold," the life-giving groundwater flowing beneath green forests and fields.

How would you feel if one day you found out that someone wanted to dig a huge well near yours that was one-half mile deep and one mile long? Would you believe him if he told you that according to his computer models, his well would not affect the level or quality of water in your well, or those of your neighbors? Or how would you like the notion that he would be pumping millions of gallons of water from that well for the next 30 years?

Not only would he take the water, he would mix in all sorts of chemicals, dig out different chemicals and mineral he thought were valuable, then put the dirty water through an underground pipe to the Wisconsin River. After diluting the wastewater to meet DNR regulations, he would dump it in a viable river miles away.

That scenario matches plans cooked up by Exxon and its Canadian partner, Rio Algom, for Crandon at the headwaters of the Wolf River in Forest County. Yes, folks, it is the same Exxon that modestly schemed to divert water from the mighty

Missouri River for its oil-shale mining project in bone-dry Colorado some years ago. And recently, good ol' Exxon thumbed its nose at long-suffering local residents in Alaska by demanding permission to again float the tanker Valdez, now renamed to the more innocuous title of Mediterranean (in 1989, the Valdez "spilled" 11 million gallons of crude oil into Prince William Sound, imperiling fish, fowl and people).

Behind the innocent mask known as the "Crandon Mining Company," or CMC, the two partners have promised bountiful rewards to local town boards in exchange for their approval of the plan to mine zinc and copper (as well gold, silver, and possibly uranium) before the DNR's environmental-impact reports have been issued and subjected to public scrutiny. Liken that to signing a sales contract for an expensive car or house after looking at (and believing) a glossy ad in the paper. CMC plays down the massive sludge dump, otherwise known as the "350-acre accident waiting to happen" that would remain on one of the region's highest hills. CMC tells us that the clean-flowing streams and pure groundwater in the region would be "protected" from acidic leachate and heavy-metal contamination produced by the metallic-sulfide ore by a thin layer of plastic and clay (in Texanese: "gaaaahranteed not to leak for 160 years.") According to the U.S. Bureau of Mines, mines and associated piles of mine waste adversely affect more than 12,000 miles of rivers and streams and more than 180,000 acres of lakes and reservoirs, and early Roman mine sites in Europe continue to generate acid drainage 2000 years later.

As a geologist, I am not against mining in general. I do, however, vehemently oppose the Crandon project and other mines proposed for Wisconsin's

(From Page 2)
unique north woods because I've been there. I spent many years in Central Europe, mostly Austria, hanging around with alpine fly fishermen, mountaineers, skiers, and other outdoors folks who respect and revere nature's creations like many of us here in Wisconsin. I found mining communities in the Western US and Austria. In Europe, I witnessed the vast dev-

astation left behind in those beautiful mountains caused by more than 500 years of mining. On both sides of the ocean, I saw impoverished villages so dependent on outside mining interests that health, physical and mental, had long ceased to matter. Industry benefited as whole river systems were altered. Once-pure water is putrid, flowing red or yellow with poisons and acids, running into rivers that no longer

support edible fish or other wildlife. Our lawmakers must soon decide on a postponement of mining known to produce acid-rune drainage until mining companies can prove that it is possible to successfully prevent perpetual damage. Known as the "Mining Moratorium Bill," legislators must know that we, the citizens of Wisconsin, will not allow such abuse of our precious Green

and Gold!
Let us use our talents and networks to become "defensive line men" in protecting Wisconsin's foundations, our green lands and yet-pristine "liquid gold." Or better yet, strengthen the team, moving the ball forward to save the Wolf, the Willow Flowage, the Wisconsin, and other precious waterways. Our "Green and Gold" energies should not focus solely on the football field.

They must be carried forth to the legislative, economic and educational arenas, as well.
Kira Henschel is president of the Mining Impact Coalition (MIC) of Wisconsin, director of Kids for Clean Water and a Friend of the Menomonee River. Contact MIC at (414) 964-5758 or (608) 231-9721 for information on mining and water conservation in Wisconsin.

*Eof K Henschel
Chasland, Wis.*



Memo

TO: Senate Committee on Agriculture & Environmental Resources
FROM: James A. Buchen, Vice President, Government Relations
DATE: February 17, 1997
RE: 1997 Senate Bill 3

1997 SENATE BILL 3
MINING MORATORIUM

Wisconsin Manufacturers & Commerce (WMC) strongly opposes 1997 Senate Bill 3 introduced by Senator Shibilski and Representative Black. SB 3 in effect places an indefinite moratorium on sulfide metallic mining in Wisconsin.

Senate Bill 3 states that before a mining permit can be issued in Wisconsin there must be proof that a mine has operated in the US or Canada for at least 10 years without polluting groundwater or surface water, and that the mine has been closed for 10 years without polluting groundwater or surface water. Furthermore, it requires a mining company to demonstrate that no groundwater or surface water pollution has occurred in a sulfide ore body of "similar geological characteristics."

While the language of the bill seems reasonable upon initial review, a more thorough analysis reveals that the bill attempts to establish a zero impact or activity standard for mining. If this standard were applied across the board, virtually every industry and municipality in Wisconsin would be shut down.

SENATE BILL 3

Zero Impact or Activity Standard

The bill seems to establish a zero impact or activity standard because it states that a mining company must provide evidence that a sulfide mining operation has operated for ten years "without the pollution of groundwater or surface water" and that a sulfide mining operation has been closed for at least ten years "without the pollution of groundwater or surface water".

Pollution is defined under Wisconsin statutes as "contaminating or rendering unclean or impure the waters of the state . . ." Under this standard, any change to background level would be considered pollution regardless of whether it has an adverse impact on human health or the environment.

There are no other industries subjected to a zero impact or activity standard, nor are there any state or federal regulations which require such a standard. The reasons for this are obvious. A zero impact or activity standard is not necessary to protect public health, welfare or the environment. Second, such a standard is

neither technically or economically feasible. To require a zero impact or activity standard for mining operations would be a substantial departure from the entire federal and state regulatory scheme.

Requires Old Technology

SB 3 is definitely a step in the wrong direction because it *requires* that old technology be examined for current or future mining projects in light of today's technology. Mining projects currently operating are using the most state-of-the-art technology of today and continuously upgrade operations to ensure that the environment is being protected.

Ambiguous

SB 3 is tied to an ambiguous reference point. It requires a mining company to demonstrate that no groundwater or surface water pollution has occurred from mining operation in "a sulfide ore body of similar geological characteristics." To some extent, all geological characteristics are unique. Even if parameters could be determined, the real issues that should be examined are the size, location, nature of the operation and hydrologic considerations associated with the ore body, not the geological characteristics.

CURRENT LAW

Wisconsin law is clear. The Wisconsin Legislature has specifically allowed for mining in the state as long as it is accomplished in an environmentally sound manner.

Under current law a mine cannot be granted a permit unless it can be determined that the environment, public health, safety and welfare will be protected. The Department of Natural Resources will only grant a permit if all of the following conditions are met:

- All state and federal laws, as well as local zoning ordinances, are complied with;
- Land with unique features such as critical ecological importance or historical value is safeguarded;
- A suitable plan for reclamation is included; and
- A net positive socioeconomic impact will be provided.

These requirements include protecting groundwater, surface water, wetlands, air, unique land, endangered species, etc. It requires a tailings management plan, a feasibility report, a plan of operation and several other reports and studies. Finally, financial and perpetual responsibility is required under the law.

ECONOMIC DEVELOPMENT

There are literally hundreds of Wisconsin-based companies employing 10,000 plus individuals in mining and mining-related companies, whether it be manufacturers, suppliers or transporters to the industry.

Crandon Mining Company

Metallic mining is an extremely important industry in Wisconsin. The Crandon mine, for example, will provide hundreds of long-term mining and mine-related jobs to Forest, Oneida and Langlade counties. \$43 million will be spent for goods and services in the tri-county areas during three years of mine construction, and an average of \$1.2 million more will be spent each year during its 28 years of operation.

As far as tax revenue is concerned, it is estimated that the mine will contribute up to \$110 million to the local tax base in property taxes to benefit the Towns of Lincoln and Nashville, Forest County and the Crandon School District. In federal and state income taxes, Crandon Mining Company will pay an estimated \$175 million over the life of the mine.

Furthermore, the mine will have to pay a net proceeds tax. This is an additional tax that only mining companies pay, over and above the corporate and property tax. The net proceeds tax will generate approximately \$119 million in revenue to local communities and the Native American tribes over the mine's life.

Not only will the proposed Crandon mining project contribute directly to the economy in Northern Wisconsin, but also to the entire state in mining-related industries.

Flambeau Mining Company

Since 1991, the Flambeau mine in Ladysmith Wisconsin, one of the world's richest concentrations of copper, has created jobs for an area of the state where jobs were badly needed. They have contributed \$20 million to the tax base and will contribute even more before their project is finished.

The Flambeau mine in Ladysmith has operated without any of the environmental problems predicted by its opponents. Its state-of-the art technology has proven to be exceptional in protecting the environment.

MINING IS FUNDAMENTAL

Mining is fundamental to society. Everything used in modern society is a product of mining: cars, roads, planes, telephones, appliances, computers, stereos, TVs, electricity, road, heat, buildings, machinery, equipment , agricultural equipment, fuel, fertilizers, etc.

Placing an outright moratorium or ban on an essential and legal economic activity that must comply with all state and federal environmental laws as well as all mining laws and regulations is unreasonable. SB 3 sets a bad precedent by singling out the mining industry. If the ban becomes law, other industries could become the target for extremists bent on legislating an industry out of existence.

We urge the Senate Agriculture and Environmental Resources Committee to reject SB 3.

JAB:JMH:jr



**SOCIETY FOR
MINING, METALLURGY,
AND EXPLORATION, INC.**

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PREPRINT

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**ENVIRONMENTALLY RESPONSIBLE MINING: RESULTS AND THOUGHTS
REGARDING A SURVEY OF NORTH AMERICAN METALLIC MINERAL MINES**

J. W. Todd

The S. M. Stoller Corp.
Boulder, CO

D. W. Struhsacker

Environmental and Government Relations Consultant
Reno, NV

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Wisconsin Manufacturers & Commerce

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the Technology, the People, the Commitment***
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INTRODUCTION

A Precambrian volcanogenic massive sulfide mineral belt in northern Wisconsin has attracted the attention of mining and mineral exploration companies for over 25 years. To date, two commercially viable deposits have been discovered: the Flambeau deposit in Ladysmith, and the Crandon deposit in Crandon. Flambeau Mining Company, a subsidiary of Kennecott Corporation is in the final stages of mining the Flambeau copper and gold deposit. Crandon Mining Company (CMC), a partnership between Exxon Coal and Minerals Company and Rio Algom Mining Corp. is currently in the permitting process for the Crandon zinc and copper deposit.

For most of this 25 years, hard rock metallic mineral exploration and mining in Wisconsin have been the subject of intense debate. Public policy discussions about mining in Wisconsin have recently centered around proposed legislation that challenges the mining industry to prove sulfide mining can be done in an environmentally safe and responsible manner. The opponents to mining in Wisconsin allege that there are no environmentally safe sulfide mines in the U.S. or Canada, and point to environmental problems, especially acid rock drainage (ARD), at old hard rock mines in the western U.S. with the implication that mining today will create the same types of environmental problems. The sulfidic nature of these Wisconsin massive sulfide orebodies is one of the focal points of the current controversy over mining in Wisconsin. Mining opponents contend that mining and concentrating sulfidic rock and ultimate closure and reclamation of these operations cannot be done to control and contain acidification of sulfide-bearing materials and the resultant ARD.

This debate is not unique to Wisconsin. Across North America, mining industry detractors rely on outmoded images of mining of the past to foment public concern about mining and to justify their opposition to proposed mining projects and their support of anti-mining legislation. These public policy discussions about mining and the environment are taking place on the local, state, and federal levels.

MINING INDUSTRY ENVIRONMENTAL SURVEY

In support of its planning and permitting process, and its position that the hard rock mining industry is attuned to environmentally aware operations and has the appropriate science and technology to predict, prevent, and control ARD and other environmental problems, CMC commissioned a comprehensive study to survey the industry. The objectives of this study were to determine the extent and degree of environmental awareness and sensitivity in mining and processing operations and to locate examples of environmentally responsible operations in a sulfide ore environment.

CMC retained the services of the authors to conduct this survey based on their experience, background, and qualifications. Mr. Todd has degrees in wildlife ecology and more than 23 years experience in environmental and regulatory affairs in the metallic mining industry. Ms. Struhsacker is a geologist with over 20 years of experience in the mining industry, 11 of which have dealt with environmental and regulatory issues. Both authors are well known within the industry and have travelled extensively to both active and closed mine sites throughout North America.

Methodology

The survey was initiated in the Fall of 1995. Because of the large number of active, inactive, and closed operations, a phased approach was implemented. Hundreds of potential sites were screened initially to determine specifically which were operating within or had historically operated within a sulfide ore zone. Following this initial screening, contacts were established by telephone and fax with corporate and mine site environmental directors and managers, and with various state and federal regulatory agencies to discuss the scope of the study and determine which sites met the general criteria of operating within a sulfide zone. Over the course of several months, more than 150 telephone discussions with the companies, regulatory agencies, and organizations shown in Table 1 led to a narrowing of the field. As is

typical of these types of surveys, many individuals identified additional leads during their interviews. Some of these leads provided additional sites for review or people to contact. Although the survey was designed to be fairly comprehensive, it is not considered "all-inclusive". Indeed, it is likely that some operations meeting the criteria of operating in an environmentally responsible manner were overlooked. Additionally, the authors are fully aware that there are numerous examples of environmentally responsible operations that were not included in this survey for reasons of simple logistics and time constraints.

During the course of the telephone interviews, the initially proposed Wisconsin legislation (1995 Assembly Bill 758) pertaining to sulfide mining was discussed in order to determine whether there were any operations that categorically meet the criteria set forth in that proposal. Quickly, it became evident several *active* operations appeared to satisfy the operating criteria of 144.851 (2) (a), *to wit*, "...that a mining operation has operated in a sulfide ore body in the United States and Canada for at least 10 years without polluting groundwater or surface water from acid drainage at the tailings site or at the mine site of from release of heavy metals."

It also became readily apparent that examples of *formally reclaimed and closed* sulfide mining operations meeting the closure and reclamation criteria of 144.851 (2) (b) "...that a mining operation that operated in a sulfide ore body in the United States or Canada has been closed for at least 10 years without polluting groundwater or surface water from acid drainage at the tailings site or at the mine site or from the release of heavy metals." were difficult to find because of the arbitrary and inappropriate time frame criteria proposed in the bill. In restricting the analysis to mines that have been closed for at least 10 years, the bill eliminates from consideration many exemplary mines that used state-of-the-art technology and environmental controls but that have been closed and reclaimed for less than ten years.

It was also recognized at an initial point in the survey that there are abandoned mines in selected old mining districts throughout the country that meet both the operational and the closure criteria proposed in the legislation. One such district in southwestern Wisconsin is described in this paper. However, it was decided that the survey should evaluate environmental practices at modern mines and identify active, reclaimed, closed, and partially closed mines that employ sound, proactive, and contemporary environmental management practices, rather than conducting an intensive survey of old, abandoned mines. In this manner, the survey focused on identifying environmentally responsible mines that have been developed under the current environmental regulatory framework and that have used modern pollution prevention and environmental protection technology.

The ensuing investigation process identified more than two dozen active and closed operations throughout North America that merited site visits. Subsequently, based on additional telephone investigations, logistics, and weather-related constraints, 14 mines were visited during the Fall of 1996. Because of logistics and weather considerations, visits were limited to the contiguous 48 states, although several sites in Canada were identified which are worthy of a visit.

Mine site visits included inspections of operations presently active, in temporary closure, and permanently closed. Generally, visits consisted of three parts: 1) introductory discussions with site personnel explaining the purpose and objectives of the visit; 2) tour and inspection of the site and facilities of interest; 3) follow-up discussions and, sometimes, file and document reviews in the site office; and 4) discussions with regulators and community leaders at selected sites. These tours were documented by photos and videos taken at will.

Although not unexpected, the responses from both telephone interviewees and personnel at the sites visited consistently impressed the authors. The metallic mining industry in both the United States and Canada has been extraordinarily open, positive, and responsive concerning this survey.

The situation regarding mining industry-specific restrictive legislation in the State of Wisconsin has captured the attention of the entire industry.

Results and Discussion

The survey resulted in several definitive findings of fact:

- 1) Today's mines are highly regulated and make extensive use of pollution prevention and environmental protection technology. In contrast, old mines were largely unregulated, and operated with few if any measures to protect the environment. Therefore, it is inappropriate to use environmental problems at antiquated mine sites to predict what will occur in the future at modern mines;
- 2) Environmentally responsible operations are evident at every active mining operation explored by this survey;
- 3) There are examples of currently active sulfide mines that have been in operation for more than 10 years and have not caused surface or groundwater pollution;
- 4) There are at least several successfully closed and reclaimed mines that meet the operating criterion but do not yet meet the closure criterion. Thorough environmental monitoring at these sites indicates they are complying with all environmental protection standards and there is every expectation that they will continue to be in compliance at year ten and beyond following closure;
- 5) There are a number of old lead-zinc sulfide mines in southwestern Wisconsin that operated for more than 10 years, were either closed or abandoned more than 10 years ago, and have caused no known surface water or groundwater pollution problems. These sites meet both the operating and the closure criteria in the proposed legislation; and
- 6) Operations that mined sulfide ore for more than 10 years, were formally reclaimed, have

been closed for more than 10 years, and have not caused surface or groundwater pollution are difficult to locate due to the arbitrary time criteria established in the proposed legislation. A more meaningful measure of compliance with all applicable environmental protection standards would evaluate operating and closed sites that are subject to rigorous and regular monitoring, reporting, and inspection requirements.

The remainder of this paper discusses the survey findings in more detail.

The Abandoned Mine Problem

Mining opponents often contend that the ARD problems at some old and abandoned mines are representative of what will occur at modern operations and newly proposed mines. Their premise is that mining today will create problems similar to mining of the past. This contention is without merit because modern mining operations are highly regulated at the federal, state, and local levels. Today, even operations proposing to mine oxide materials are required to conduct extensive waste characterization tests to determine the potential for generation of ARD. If the potential for ARD exists, waste management plans must be developed to prevent, minimize and control acid generation before construction can proceed. *Modern mines are designed for closure* to avoid, minimize, and mitigate potential long-term environmental concerns.

In contrast, unregulated mines of the past typically disposed of mine wastes without any environmental controls or constraints. Prior to the advent of current environmental laws and regulations, mine waste disposal sites were located for operational convenience rather than environmental concern. Mine wastes were deposited adjacent to the mines or directly down-gradient in the nearest valley much as domestic wastes of the time were sent to the nearest moving water body. Gravity was considered the great equalizer -- the miners' and other industrial waste generators' best friend. Once the commercial ore was depleted, operators commonly abandoned sites with little, if any,

thought to reclamation. In many settings, these old mine wastes remain vulnerable to wind and water erosion and, with the right geochemistry, the generation of ARD. The effective manner in which anti-mining activists use environmental issues at historic mines to create public concern about mining points to the importance of developing an industry program to help solve the abandoned mine problem.

Changes in the Regulatory Framework for Mines

In evaluating the environmental track record of the modern mining industry, it is essential to consider the enormous difference in the environmental regulatory climate that has developed in the last 20 years compared to the regulatory requirements for mines that operated prior to the late 1970s. Starting in about 1970, environmental laws and regulations to protect environmental resources such as groundwater, surface water, air quality, wildlife, and cultural and historic features were developed on both the federal and state levels. Just like any other industry, mines must comply with these regulations.

Table 2 shows the dates of enactment of some of the federal and state environmental laws and regulations affecting mining, and the approximate dates at which significant mining activities began at some major U.S. mining districts. It is evident from Table 2 that mining at many metallic mining districts throughout the country began well before the advent of environmental laws and regulations. Nearly all of the environmental laws and regulations affecting metallic mining were enacted since about 1970, with many significant state and federal environmental regulations being developed within the last decade. In contrast, mining at a number of important U.S. mining districts commenced more than a century before the enactment of the environmental laws listed in Table 2. It should be noted that the examples of environmentally responsible mines discussed below were developed concurrent with or after the establishment of the environmental laws and regulations shown in Table 2.

Metallic mining under the modern, stringent, environmentally sensitive regulatory climate prevalent at the state and federal levels is a completely different enterprise than 100 years ago...or even 20 years ago. State and federal regulators take their jobs very seriously and perform them in a very responsible manner. In the authors' combined years of experience, they have never encountered a regulator who desired to have an environmentally problematic mine on his or her watch. Likewise, although unintended incidents and accidents do occur, as in any facet of life, there are no mine or mill managers or mining companies who wish to be tagged as environmentally irresponsible. Mine operators at sites at which environmental problems develop have undertaken aggressive and responsive environmental remediation measures. The results of this survey support these conclusions. By definition, modern mining is, and will remain, environmentally responsible.

Environmentally Responsible Mining Operations: The Norm

It is important to emphasize that the sulfide mining operations singled out for discussion in this paper in no way detract from the environmentally responsible operations of the dozens of other metallic mining operations reviewed and, in some cases, visited during this survey. In many instances, the mines not specifically described in this paper display even higher levels of environmental awareness and proaction than those discussed. The vast majority of these mines have been in operation between five and ten years. During their operating periods, many have not exceeded any environmental standards and have maintained sparkling compliance records. Some, while excellent examples of environmentally sensitive operations, have had unexpected, and mostly minor, system upsets causing short-term exceedences of standards for which they were issued regulatory notices. This situation is not atypical for all industries, municipalities, and indeed, even U.S. natural resource regulatory agencies. Without exception, the operators at these sites responded aggressively and effectively to correct the noted problems. In most of these cases,

the identified issues created regulatory compliance problems (i.e., an arbitrary standard may have been exceeded) but did not result in significant impairment of environmental resources (e.g. wildlife, air, soil, water, etc.) or jeopardy to public health and safety.

Every active operation, modern and historic, has some positive environmental story to tell; some large and showy, others more understated. This statement is not to be misconstrued as a rosy-hued Pollyanna-type declaration. Environmental problems and issues do, indeed, exist at some mines, particularly older operations, where initial planning and facility designs (generally pre-1975) were significantly less sensitive (or "insensitive" in some cases) to environmental concerns than in later years. However, even those operations with significant problems are presently working toward either permanent resolution or control and maintenance of those problems in a manner consistent with today's standards. Modern mining statutes and regulations at the state and federal levels, modern business practices, and criteria established by the international financial community require no less.

The most prominent general examples of positive environmental stories observed or documented during this survey and during the careers of the authors include the following areas in which many mining operations have gone the extra step beyond regulatory requirements. Again, the authors do not imply that the following examples are by any means all inclusive.

- *Improvement of water quality.* In some cases, new mines have been permitted within old mining districts that are the loci of poor quality water discharging from historic workings, waste rock piles, or tailing impoundments. Similarly, there are some older mines still in operation. Where this scenario occurs, it is typical for the active operation to either remediate the contaminated drainages outright, or, at some sites, to divert contaminated drainages into the active process water return and treatment system. The end result in several instances is a radical improvement in

downstream water quality over historic levels, including rehabilitation of public sport fisheries and increased viability of threatened or endangered species habitats.

- *Wildlife Protection and Habitat Enhancement.* Probably the most ubiquitous example of environmental responsibility by mining operations is in the area of terrestrial and aquatic wildlife resources. Granted, some form of wildlife protection or mitigation plan is required for today's mines. Many operations go well beyond the scope of these requirements to implement resource protection and habitat improvement programs. Even many of those older and, in some cases historic, operations maintain or sponsor ongoing wildlife projects. As is typical of any human population group employed in the natural resource fields, most employees in the metallic mining industry are oriented toward outdoor activities, not the least of which are hunting, fishing, camping, and wildlife observation and photography. Thus, many operations can exhibit examples of wildlife protection and habitat enhancement programs including projects to save threatened amphibians, to reintroduce peregrine falcons (an endangered species), to improve in-stream fisheries habitat, and large mammal telemetry projects. Indeed, the results of this survey revealed that most mine site reclamation plans are geared toward wildlife habitat restoration, creation, or enhancement as the primary beneficial post-mining land use.
- *Wetlands.* Development, enhancement, or restoration of wetlands is a commonly required mitigation for modern mining in settings where operations will disturb or otherwise impact existing wetland areas. Wetlands mitigation is common in today's mine permitting world. However, there are a number of examples of both historic and newer active operations where the extra step has been taken to create or enhance wetlands. Mine operators are learning the multiple benefits that natural and created wetlands have for active and inactive operations. These

benefits include passive aerobic and anaerobic water treatment, sediment control and water clarification, control of stormwater run-off and run-on, aesthetic appeal, and valuable wildlife habitat.

- *Reclamation.* Post-mining reclamation of disturbances on federal, state, and private lands is a requirement in all states and in most foreign countries. Those states with active metallic mining operations, without exception, have promulgated stringent, specific, and detailed rules and regulations concerning mined land reclamation over the past 20 years. Therefore, the issue of environmentally responsible mining is not whether a mine site will be reclaimed, but rather, the manner in which reclamation is accomplished. In its most basic form, mined land reclamation is a "green is good" proposition; stabilize it and grow grass. While some operations continue to subscribe to this "one size fits all" format, a number of others have expanded upon their reclamation requirements and have made virtual showcases of their sites even while still operating by taking extra measures to blend the site into the surrounding landscape and to create aesthetically pleasing and productive post-mining land uses. As with other environmental components at mine sites, high quality, responsible reclamation simply makes good business sense. A number of operators believe that if they go beyond the letter of the law in their reclamation practices, these efforts will enhance their working relationship with the regulatory community and the public at large. Many times this is an accurate presumption as "reputation" literally can mean the difference in millions of dollars and years of time in today's metallic mineral permitting environment.
- *Cultural Resources.* The National Historic Preservation Act and various state laws require assessment and protection of significant archaeological and historic resources located on federal and state lands. In assessing, protecting, and mitigating necessary disturbances to these resources, a number of

active operations have taken the extra step to preserve interesting and significant sites located on private and patented lands under their control. In a number of instances, mining interests have worked with state and federal regulatory agencies to join in protective covenants and to erect interpretive signs and centers for public use. This sensitivity to historic interests is particularly evident where newer operations have been developed within historic mining districts. Historic mining artifacts and their history are as much an interest to operators of modern mines as they are to the general public.

- *Community Relations.* Every active operation has some form of community relations programs that go well beyond any regulatory or legal requirements. Mining managers and employees live in the communities most affected by their operations; they are active members of those communities. As such, it is in the best interests of their companies, their families, and their employees' families to establish, promote, and maintain the mutual respect that is the foundation of good relations. Without exception, all active operations investigated during this survey worked closely with and contributed to the local communities and counties in which they reside. Programs included financial assistance with community infrastructure such as roads, schools, police and fire departments, as well as contributions to hospitals, health clinics, and local and national conservation organizations. In at least one instance, heavy equipment and operators from an active, older mine were virtually on call by the nearby communities when assistance was needed for even minor emergencies. The survey also found that most active operations conduct business in the spirit of open planning, and consult with community leaders and citizens when expansions or changes to operating scenarios occurred. The majority of active operations give public and educational tours of their operations - some on virtually no notice. In addition to conducting formal tours, several operations offer self-guided "tours" from nearby vantage points.

Operations Active for More than 10 Years

The survey located six active metallic mining and milling operations that: 1) mine and mill sulfide ores; 2) have been in continuous operation for periods ranging from 10 to 83 years; and 3) have received no regulatory notices or orders for releasing ARD or metals to surface or groundwaters. Several of these mines are described at the end of this paper.

These active operations are located in either sensitive, high quality resource areas (scenic, fish and wildlife, etc.) or within heavily used recreational areas or both. These mine sites, located in California, Colorado, Montana, Missouri, and New York, have the following elements in common:

- Each has an active and dedicated professional environmental staff at the site. These personnel maintain integrated working communications with and support from both the mine managers and the corporate environmental directors and managers;
- All have excellent relations with surrounding communities; each maintaining an open planning policy with the public;
- All display examples of superior reclamation practices, fish and wildlife habitat preservation and enhancement programs, wetlands protection and enhancement, or other environmentally oriented programs. Typically, these programs go beyond the letter of regulatory requirements;
- Each displays a solid qualitative and quantitative understanding of the environment in which it operates, the ecological relationships within that environment, and the potential impacts of operations on the components of that environment; and
- As with all active mining operations, each is strictly regulated by local government, state agencies and, depending upon location and land ownership, the federal government.

Of these six active sites, three have been operating continuously for more than 20 years, and two of those truly can be considered "historic." In the latter two cases, the present operations have upgraded their facilities and operations as modern times have dictated to maintain compliance with increasingly more stringent environmental rules and regulations. Where past practices, acceptable at those times, caused environmental impacts, these operations have expended considerable effort and resources to remediate those impacts.

Operations Inactive for More than 10 Years

The arbitrary time criteria in the proposed legislation are not a meaningful yardstick with which to measure the environmental performance of today's mining industry. In assessing the environmental track record of the modern mining industry, considerable weight should be placed upon the large number of currently operating environmentally responsible mines, some of which are more than 10 years old, and the number of successfully reclaimed sites even though they do not meet the 10 year closure criterion.

There should be no doubt that active mine sites prove that environmentally responsible mining is occurring throughout the country. The regular basis with which mining environmental professionals, regulators, and in some cases, citizens monitor and inspect active mine sites provides real time, concrete evidence of their environmental performance. The fact that these sites have not yet been reclaimed for 10 years is irrelevant.

Similarly, mines that have been successfully reclaimed for fewer than 10 years cannot be dismissed as compelling evidence of the mining industry's ability to operate in an environmentally responsible manner. Many of these reclaimed sites are still in a post-closure monitoring and maintenance status that requires mine operators to monitor the sites and provide regular monitoring and compliance reports to state and/or federal regulatory agencies. Additionally, regulatory authorities are required to inspect these sites on a

regular basis. Sites reclaimed within the last 10 years are thus the subject of considerable environmental monitoring and regulatory scrutiny to detect any potential environmental problems. Therefore, the 10 year closure criterion proposed in the bill is an arbitrary and meaningless measurement that does not provide regulators or citizens with useful information. The ongoing monitoring and scrutiny at recently closed sites provides substantive documentation of the environmental performance at these sites.

EXAMPLES OF ENVIRONMENTALLY RESPONSIBLE MINES

This survey documents that environmentally responsible mining is taking place at numerous mines throughout the country. Every site evaluated by this survey is an example of an environmentally responsible operation. A few such sites are described below. The mines discussed in the following paragraphs by no means form an all inclusive list. These sites were selected for discussion to represent a range of commodities produced, mining and mineral processing techniques used, and geographic settings. Several of the mines described below, like many of the sites researched in this survey are located in scenic areas - some in high altitude, steep, mountainous terrain with severe climate conditions. The many environmentally responsible mines operating successfully in these scenic and environmentally sensitive settings prove that sulfide mining can be done in an environmentally responsible manner - especially in light of today's stringent mining regulations. These regulations require state-of-the-art engineering design, pollution prevention technology, monitoring, and financial guarantees to ensure that mines are built, operated, and reclaimed to the highest environmental standards.

A few examples of environmentally responsible sulfide mines include the following:

The Henderson Mine and Mill - this molybdenum sulfide mine and mill have maintained a spotless environmental compliance record since 1976 when mining and milling operations commenced. Located less than a 2-hour drive west of Denver,

Colorado at an elevation of 10,346 ft in the spectacular mountain scenery of the Colorado Front Range; the areas immediately around the mine and mill serve as Denver's backyard and receive intensive year-round recreational use. Denver residents regularly use areas adjacent to the mine and mill sites for fishing, camping, picnicking, hunting, hiking, skiing, and snowmobiling. Treated wastewater from the operation supports a thriving population of Boreal toads, a species that the U.S. Fish and Wildlife Service is considering listing as threatened and endangered. Streams downstream from both the mine and mill facilities are excellent brown and brook trout fisheries. Both the mine and the mill are located in Denver's watershed, and two reservoirs associated with the nearby reclaimed Urad Mine are used as municipal reservoirs for the city of Golden, Colorado.

The Viburnum Mine No. 27 - developed in geology similar to that found in southwestern Wisconsin's lead-zinc mining district, the water from this lead-zinc sulfide mine, which operated from 1960 to 1978, is so clean it has served as the primary domestic water source for the town of Viburnum, Missouri since 1981.

The McLaughlin Mine - straddling three counties about 70 miles north of San Francisco in the rugged mountainous terrain of California's Coast Range, this gold mine is acknowledged by regulators, environmentalists, and the mining industry to be a model of effective environmental practice. Proactive mine planning and permitting processes, pollution prevention features, and reclamation and habitat management programs are just some of the mine's successful environmental efforts that have been adapted for use at other mine sites. Comprehensive environmental monitoring of the McLaughlin Mine confirms the ecological effectiveness of these practices. This monitoring demonstrates that since its development in 1985, the mine has operated without environmental harm, and has not only protected but actually enhanced the quality of both on-site and downstream habitats and improved downstream water quality. Using ecology-based habitat management planning, resource values of the

surrounding landscape that were disturbed by historic mining are in the process of being restored and enhanced. Ultimately the entire mine site and attached buffer lands of thousands of acres will become a wildlife preserve and an environmental studies field research station for the University of California.

The Stillwater Mine - located in southern Montana in the magnificent Beartooth Mountains on the northern edge of the Absaroka-Beartooth Wilderness, about 30 miles north of Yellowstone National Park, this platinum-palladium sulfide mine is an excellent example of environmentally responsible mining in an extremely beautiful and sensitive environment. Operating since 1987, the Stillwater Mine has maintained a clean environmental record. The only domestic source of these strategic minerals, the Stillwater operation includes an off-site smelter in Columbus, Montana with state-of-the-art pollution control equipment. This underground mine is recognized by regulators, environmental groups, and industry experts for its excellent concurrent reclamation activities, wildlife enhancement projects, community support programs, and responsive environmental management. In addition to its scenic attributes, the area around the mine is also recognized for its recreational opportunities - the mine is adjacent to the Stillwater River, a Montana Blue Ribbon Trout Fishery.

The Cannon Mine - located at the intersection of South Miller and Circle Streets, this gold mine was developed in 1985, one block south of the Wenatchee, Washington, city limits. This agricultural community of approximately 40,000, known as "the apple capital of the world", is about 150 miles east of Seattle. With residents, parks, churches, schools, hospitals, and an equestrian center as its neighbors, the Cannon Mine is a model of environmentally responsible mining in an established urban environment. The mine, which operated for nine years, is now in the final stages of reclamation, and nearly all traces of this once bustling underground mining and milling project are gone. All of the millsite buildings have been removed, the area regraded, and replanted; the mine portal has been plugged; and the tailings

management area has been reclaimed and planted with natural grasses. The local school district has converted the mine buildings into offices and an equipment maintenance facility. As quoted in a July 2, 1996 article entitled "A Promise Kept - Mine Tailings Cleaned Up" in the Wenatchee World, a local official states that the mine has done a good job living up to its promises - "The scale of the (reclamation) work is just amazing. It's been a good project."

The Flambeau Mine - Located in northern Wisconsin's Rusk County, partially within city limits of Ladysmith and immediately adjacent to the Flambeau River, this copper mine has complied with all applicable environmental regulations since opening in 1993. Stormwater runoff from sulfide waste material and the operating open pit, along with groundwater infiltration into the pit, are treated in a state-of-the-art water treatment facility that produces mine discharge water which has proven safe at 100 percent concentration (i.e., without dilution) for the most sensitive aquatic life, and meets state drinking water safety standards. Examinations of fish, crayfish, macro-invertebrates, and dragonfly; sediment sampling; and habitat characterization both above and below the mine discharge point prove the mine water has not adversely affected river life. Upon completion of mining in 1997, the open pit will be backfilled and the site will be recontoured and revegetated to pre-mining conditions. City officials credit the mine with creating an economic miracle for the local community of 4,000 people. Tax revenue from the mine has stimulated an economic development boom in Rusk County where the unemployment rate has fallen from 15.3% just prior to the mine opening to 4.0% in October 1996. The Flambeau Mine is one of Rusk County's top tourist attractions, with over 30,000 people per year visiting the mine's information center.

Southwestern Wisconsin Historic Lead-Zinc District - At least a dozen historic (i.e., closed) mines in the lead-zinc district southwestern Wisconsin and adjacent parts of Iowa and Illinois meet the arbitrary operating and closure criteria in the proposed legislation. As shown in Table 2,

mining in this district began as early as 1825, long before the enactment of federal and Wisconsin environmental laws and regulations. Mining in the district continued into the twentieth century, with the last zinc mine closing in the late 1970s. Most of the mines in southwestern Wisconsin were abandoned without formal reclamation; many were simply plowed under and today remain as nearly indiscernible features in the rolling farmlands characteristic of this part of Wisconsin. Although a few isolated and localized water quality problems are known at several mines in the district, there are literally hundreds of historic mines that do not create surface water or groundwater pollution problems. The ore bodies in this district contain abundant acid-generating iron sulfide minerals (pyrite and marcasite). However, ARD is not a problem in this district due to the high acid neutralization capacity of the carbonate host rocks. A number of communities in the area including Platteville and Dodgeville, Wisconsin; Dubuque, Iowa; and Galena, Illinois and are built on top of and adjacent to these historic mines.

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Table 1
Industry and Regulatory Agency Contacts Made During the Survey

Amax Gold Inc. - Corporate	Cyprus Amax Minerals Company
Amax Gold Inc. - Fort Knox Mine	Cyprus Climax Metals Company -
Amax Gold Inc. - Sleeper Mine	Corporate
Amax Gold Inc. - Wind Mtn. Mine	Cyprus Climax Metals Company
Arizona Department of Environmental	Climax Mine
Quality	CR Kendall
ASARCO - Corporate	Cyprus Climax Metals Company -
ASARCO - Exploration	Henderson Mine
ASARCO - Mission Unit	Cyprus Climax Metals Company -
ASARCO - Globeville Unit	Henderson Mill
Atlas Corporation	Echo Bay Mines - Corporate
Barrick Gold Corp.	Echo Bay Mines - Kettle River JV
Barrick - Goldstrike Mine	Echo Bay Mines - McCoy/Cove Mine
Battle Mountain Gold Co. - Corporate	Echo Bay Mines - Round Mtn. Mine
Battle Mountain Gold Co. -	Echo Bay Mines - Sunnyside Mine
Crown Jewel Project	Ellis Environmental Engineering
Battle Mountain Gold Co. -	EnviroNet Inc.
San Luis Mine	Environmental Support Services
Behre Dolbear & Co., Inc.	ESCO Associates, Inc.
BHP Copper	FMC Gold - Beartrack Mine
BHP - Corporate	Geochimica, Inc.
British Columbia Ministry of Energy,	Golder Associates Inc.
Mines and Petroleum	Greenwald & Associates
British Columbia Ministry of	Homestake Mining Company -
Environment, Lands, and Parks	Corporate
Brohm - Gilt Edge Mine	Homestake Mining Company -
Brown and Associates	Homestake Mine
California Regional Water Quality	Homestake Mining Company -
Control Board	McLaughlin Mine
Canyon Resources Corporation	Hydrologic Laboratories, Inc.
Chelan County Planning Dept.	Idaho Dept. of Health and Welfare
Coeur d'Alene Mines Corp.	Idaho Dept. Environmental Quality
Coeur - Rochester Mine	Independence Mining Company -
Colorado Mining Association	Cresson Mine
Colorado Department of Public Health	Independence Mining Company -
and Environment	Jerritt Canyon Mine
Colorado Division of Minerals and	Inmet Mining - Samatofum Mine
Geology	Jefferson Group
Consultants (3)	Kennecott Corporation - Corporate
Crandon Mining Company	Kennecott Minerals Company

Table 1 (continued)
Industry and Regulatory Agency Contacts Made During the Survey

Kennecott - Flambeau Mine	Stibnite Mine Inc.
Kennecott - Ridgeway Mine	Stillwater Mining Company
Kennecott Utah Copper	The Doe Run Company - Corporate
Kenneth R. Paulsen Consulting, Inc.	The Doe Run Company -
Kinross Gold USA, Inc. - Corporate	Viburnum Mine
Kinross Gold USA, Inc. -	Thompson Creek Mine
Exploration	USDA Forest Service
Kinross - Candelaria Mine	USDI Bureau of Land Management
Knight Piesold Inc.	U.S. EPA Region 10; Water
LSX, Inc.	Management Division
Mattabi Mines Ltd.	U.S. Silica
Missouri Department of Environmental	University of Saskatchewan - Civil
Quality	Engineering Department
Montana Department of Environmental	Wharf Resources -
Protection, Reclamation Division	Golden Reward Mine
Montana Water Quality Bureau	Wharf Resources -
Nevada Division of Environmental	Wharf Mine
Protection	Wright Water Engineers, Inc.
Nevada Department of Minerals	ZCA Mining Division -
Nevada Mining Association	Balmat Operations
New Crest Resources, Inc.	
Noranda Mining & Exploration, Inc.	
Northwest Mining Association	
Pegasus Gold Corporation -	
Corporate	
Pegasus - Beal Mountain Mine	
Pegasus - Montana Tunnels Mine	
Pegasus - Zortman/Landusky Mine	
Placer Dome Canada -	
Equity Silver Mine	
Placer Dome U.S., Inc. -	
McDermitt Mine	
Placer Dome U.S., Inc. - Corporate	
Rio Algom Mining Corp. - Corporate	
Royal Gold, Inc.	
Royal Mountain King Mine	
RTR Resource Management, Inc.	
Selland Construction - Cannon Mine	
Sonora Mining Corp. -	
Jamestown Mine	

Table 2

**Comparative Dates of Historic Mining Activities in Selected U.S. Mining Districts
and Enactment of State and Federal Environmental Laws and Regulations**

Date	Commencement of Mining Activities	Enactment of Environmental Laws or Regulations Affecting Mining
1825	Upper Mississippi Valley lead mining (Southwestern Wisconsin and adjacent Iowa and Illinois)	
1849	California - gold mining	
1858	Colorado - precious metals mining	
1859	Nevada - Comstock Lode silver and gold mining	
1862	Montana - gold mining	
1863	Utah - copper mining	
late 1860s	Upper Mississippi Valley zinc mining (Southwestern Wisconsin and adjacent Iowa and Illinois)	
1875	South Dakota - Black Hills gold mining	
1877	Colorado - base metal mining	
1877	Arizona - copper mining	
1882	Montana - copper mining	
1917	Colorado - molybdenum mining	
1965	Nevada - Carlin-type gold mining started	
1966		National Historic Preservation Act
1967		Air Quality Act
1969		National Environmental Policy Act (NEPA)
1970		Occupational Safety and Health Act (OSHA)
1970		Clean Air Act
1970		CA Environmental Quality Act (CEQA)
1971		MT Metal Mine Reclamation Act

Table 2 (continued)
Comparative Dates of Historic Mining Activities in Selected U.S. Mining Districts
and Enactment of State and Federal Environmental Laws and Regulations

Date	Commencement of Mining Activities	Enactment of Environmental Laws or Regulations Affecting Mining
1971		MT Environmental Protection Act (MEPA)
1972		Federal Water Pollution Control Act/Clean Water Act
1973		Endangered Species Act
1974		Safe Drinking Water Act (SDWA)
1974	Mining begins at Henderson Mine, CO	U.S. Forest Service Mining Regulations
1975		CA Surface Mined Land Reclamation Act (SMARA)
1976		Federal Land Policy and Management Act (FLPMA)
1976		Resource Conservation and Recovery Act (RCRA)
1976		Clean Water Act Amendments
1976		CO Mined Land Reclamation Act
1977		Mine Safety and Health Act (MSHA)
1977		Surface Mining Control and Reclamation Act (SMCRA)
1977		WI Metallic Mining Reclamation Act
1977		ID Surface Mining Act
1979		Archeological Resources Protection Act
1980	Mining begins at Jerritt Canyon, NV	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund
1981	Viburnum Mine No. 27 becomes drinking water source for Viburnum, MO	U.S. Bureau of Land Management Mining Regulations
1982		SD Mined Land Reclamation Act

Table 2 (continued)

**Comparative Dates of Historic Mining Activities in Selected U.S. Mining Districts
and Enactment of State and Federal Environmental Laws and Regulations**

Date	Commencement of Mining Activities	Enactment of Environmental Laws or Regulations Affecting Mining
1982		WI Metallic Mineral Mining (Ch. .NR 132) and Regulation of Metallic Mining Waste (Ch. NR 182)
1984		Hazardous and Solid Waste Amendments
1984		CA Chapter 15 Discharges of Waste to Land, Article 7, Mine Waste Management
1985	Mining begins at Cannon Mine, WA Mining begins at McLaughlin Mine, CA Mining begins at Sleeper Mine, NV	
1986	Mining begins at Goldstrike Mine, NV	Superfund Amendments and Reauthorization Act
1986	Mining begins at Montana Tunnels, MT	Emergency Planning and Community Right-to-Know Act
1987	Mining begins at Stillwater Mine, MT	UT Mined Land Reclamation Act (amended)
1988		ID Code §39-118A (statutory provision requiring permits for processing ore by cyanidation)
1989		NV Water Pollution Control Law
1989		NV Mined Land Reclamation Act
1990		MT Admin. R. §§26.4.160 to .168
1990		Clean Air Act Amendments
1993	Mining begins at Flambeau Mine, WI	CO Mined Land Reclamation Act Amendments