



Acid Mine Drainage (AMD)

Fact Sheet #2

Metallic Sulfide Mining # 2

Track Record: Can sulfide ores be mined safely?



Minnesota's Arrowhead Region threatened by Sulfide Mining

What is *sulfide mining*? Sulfide ores contain heavy metals (such as copper or nickel) that are bonded to sulfur, forming sulfide minerals. When exposed to air and moisture, a chemical reaction generates sulfuric acid that can leach into the surrounding environment and cause the release of the metals into streams and lakes at levels that are toxic to fish and other aquatic life. This phenomenon is known as *Acid Mine Drainage (AMD)*.

To hear mining companies and elected officials tell it, any new copper-nickel sulfide mine that is permitted in Minnesota will operate “cleanly,” without polluting nearby waters. But the track record of sulfide mines in other locations indicates that *the mining industry does not yet have the ability to keep sulfuric acid and heavy metals from leaching into the environment*. Mining operations typically excavate hundreds of millions of tons of sulfur-bearing rock, much of which is left at mine sites as waste. Segregating this rock from the surrounding environment has proven impossible for the mining industry as a practical matter.

A 2006 Earthworks study looked at 25 modern mines operating in the United States, and found water quality standard violations at 21 of them. *A closer look at the mines that did not result in violations indicates that they were either located in a desert area with no nearby surface water, or had obtained an exemption from the water quality standards that would ordinarily apply.*

Two mines that the industry routinely point to as “clean” can serve as examples. At the Flambeau Mine in Wisconsin, highly polluted groundwater is known to be leaking into the Flambeau River. Because the permit includes an exemption from water quality standards, this leakage is not monitored for either quality or quantity. The nearest monitoring point is

hundreds of feet downstream. In addition, illegal discharge into a small surface stream has routinely violated water quality standards, and is not covered under any permit. This discharge is now the subject of a federal Clean Water Act lawsuit against Kennecott Mining Company.

The McLaughlin Mine in California is touted as the industry’s finest example of environmentally responsible mining. Yet the Earthworks report states that:

"apparently due to the regulatory exclusion for groundwater at the site no enforcement actions were taken . . . despite evidence that groundwater has been chronically degraded below the tailings impoundment and waste rock storage areas. Similarly, no enforcement actions were taken despite apparent evidence of chronic degradation of surface water."

Kuipers, J.R., Maest, A.S., MacHardy, K.A., and Lawson, G. 2006. *Comparison of Predicted and Actual Water Quality at Hardrock Mines: The reliability of predictions*

The massive amounts of rock excavated at mines and the inevitability that sulfur in that rock will be exposed to the elements and result in Acid Mine Drainage (AMD) has given hardrock mining the distinction of being the most polluting industry in the nation. The EPA’s Toxic Release Inventory indicates that nearly half of all the toxics released by industry come from hardrock mining. The nation’s top ten polluters are mine sites. Mining has polluted the (over)

headwaters of more than 40 percent of the streams in the western United States, with the Western Governors' Association estimating that 3, 346 miles of rivers are contaminated in their region.

Mining companies are generally required to provide "financial assurance," a bond or other financial instrument to be used for clean-up if the company goes bankrupt. However, regulators routinely underestimate the amount that will be needed for clean-up activities. Despite compliance with their states' financial assurance laws, mining companies routinely go bankrupt and leave enormous clean-up costs to taxpayers.

- The Gilt Edge Mine in South Dakota put up \$6 million as financial assurance, but more than \$80 million has already been spent for clean-up. Government officials have estimated that the \$6 million bond would not even cover water treatment costs for one year at the Superfund Site.
- The original estimate for the clean-up of the Summitville Mine in Colorado was \$232 million, but significantly more than that has been spent, with continuing public allocations every year. The bond paid by the mining company was about \$40 million.
- The Grouse Creek Mine in Idaho was touted as a "state-of-the-art" mine when it opened in 1994; it is now costing at least \$53 million for clean-up. The financial assurance bond put up at the start of mining was \$7 million.

These mines are by no means isolated examples; the total clean-up cost across the country is estimated at as high as \$70 billion.

Even at this level of expenditure, in many cases clean-up activities will need to continue for hundreds or thousands of years into the future. Once Acid Mine Drainage begins, often the only thing that can be done to address it is to collect and treat the water. At many mine sites, this water treatment will have to continue indefinitely (often referred to as "perpetual treatment").

Permitting mines that will require perpetual treatment of wastewater is the worst example of obtaining the benefit of using natural resources today while passing the costs on to future generations. Human history provides no basis to believe that our current government or social systems will continue for the length of time that treatment will be required, with estimates extending to 10,000 years. At least two states (New Mexico and Michigan) do not permit mines that will require perpetual treatment; the Minnesota DNR appears poised to allow it at the proposed NorthMet Mine.

With all of the environmental safeguards that are supposedly now in place, one might well wonder how new mines continue to receive permits. Many state governments require "environmental review" before a mine is permitted; that review is intended to inform decision-makers if a proposed mine is likely to result in polluted water.

However, *environmental review consistently fails to predict the actual impacts of mining.* The Earthworks study cited above indicates that for every mine in the study that resulted in water pollution problems, an environmental review document had been prepared that under-predicted the impacts.



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Only mines located in desert areas were accurate in their water quality predictions. Mining companies and regulating agencies routinely ignore the potential for problems, relying on the old adage, "It is easier to get forgiveness than permission." Once a mine is operating, dealing with water quality violations becomes just another aspect of doing business.



Acid Mine Drainage - Michigan

The history of pollution from sulfide mining and the industry's systematic failure to accurately predict water quality impacts reveals the wisdom of Wisconsin's 1997 "mining moratorium" law. This statute prohibits the granting of a mining permit unless the permittee can show:

- 1) that an existing mine has operated in a sulfide ore body for 10 years without polluting the ground or surface water; and
- 2) that a mine that operated in a sulfide ore body and has been closed for 10 years has not polluted the ground or surface water.

To date, no mine has been permitted under this law.



Gilt Edge Mine Superfund Site - SD

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