Mining Challenges in the Great Lakes Region

Stephen Hoffman
ORCR  USEPA
February 2010

This presentation reflects my best professional judgment and may not reflect the official positions of the USEPA
Federal Environmental Regulation of Hard Rock Mining

• Clean Water Act (CWA): Ore Mining and Dressing Effluent Guidelines
• CWA: General Storm water regulation
• CWA UIC injection of waste water
• CWA Section 404/10 Dredge and Fill
• Clean Air Act: Major source SO2, NOX, Co-emissions from power production, dust
• Safe Drinking Water Act
• RCRA: hazardous wastes-does not apply to waste rock and tailings
• TRI: reporting
• CERCLA
Environmental Challenges: Soils

- The Great lakes Region has fragile upland/forest soil profiles.
- Forest soils are sensitive to disruption and are difficult to restore.
- Loss of forest cover can alter ecological balances.
- Water flow out of forested lands into the Great lakes affects overall biological resources: will fish populations tolerate subtle changes?
Environmental Challenges: Mine Water Balance Management

- Mine must develop engineering approach to collect and treat (if necessary) all water leaving the site.
- Given high snow loads, snow melt water management will require complex engineering approaches: concern over large slugs of water entering systems
- Freeze-thaw cycle affects operation of waste water treatment systems
- Cyanide treatment can be adversely affected by ice cover.
- All mining of sulfide deposits will leach out metals-under worst case Acid Rock Drainage may be formed.
Acid Rock Drainage

• If waste rock or tailings contain enough sulfides, exposure to air and water will cause a chemical reaction called Acid Rock Drainage (ARD).

• ARD will liberate metals in waste rock and tailings. If metals concentrations in ARD are high enough, it may kill fish or contaminate ground water.

• Metal leaching also can occur in a pH neutral or alkaline state.

• Great care must be given to studying the metals leaching potential of waste rock and tailings: these studies often take 2 years and should be monitored throughout the life of the mine.
Tailings and Waste Rock Management

- Tailings are usually disposed of in unlined impoundments which can leak metals into ground water.
- Tailings ponds can be lined.
- Tailings can be disposed of using the “dry paste” method which is more expensive but greatly reduces environmental threats from this disposal.
- Waste Rock piles are often disposed of with no specific design and are usually unlined.
- Waste rock piles can be engineered so they can be effectively reclaimed and can be lined.
- Both units should be designed to reduce the inflow of water into them and manage any rainfall/snow melt.
Cyanide Management

- Cyanide transport, handling and use must meet standards to avoid sudden releases into the environment.
- Transport to the site is often where the greatest risk occurs.
- Large amounts of Cyanide should not be stored on site: only transport and store what is used per month.
- All cyanide tanks, piping etc should be completely contained in concrete structures.
- Any waste water containing cyanide must be treated.
- The mine should implement a cyanide emergency spill response plan.
Financial Assurance

• All mines should be required to secure financial assurance (FA) in the full amount to environmentally close and restore the site assuming sudden bankruptcy.
• FA estimates are different than those costs related to reclamation and closure—FA addresses “clean closure” and is similar to a CERCLA closure approach.
• The state should have direct legal access to all of the FA funds.
• FA levels should be reassessed every three years.
Socio-economic impacts

- Mine construction often lasts 2-3 years.
- Local employment during construction may be limited since mine construction requires the use of very skilled labor.
- Mine construction will improve the use of local building supply and some construction businesses.
- Mine construction may require the construction of a labor camp since workers may be brought in from all over the country and work a 7 days on/off cycle.
- Construction will cause a significant increase in local traffic.
- Mine operations are not likely to generate significant new jobs since modern mining uses very sophisticated heavy equipment and computer assisted operations.
- A new mine will generate increase local property taxes.
- Local and State government need to assess whether mine operations will adversely impact outdoor recreation businesses: is the gain from a mine worth the loss in other segments of the regional economy?