The Science of Mining the Penokee Range

By Rep. Brett Hulsey

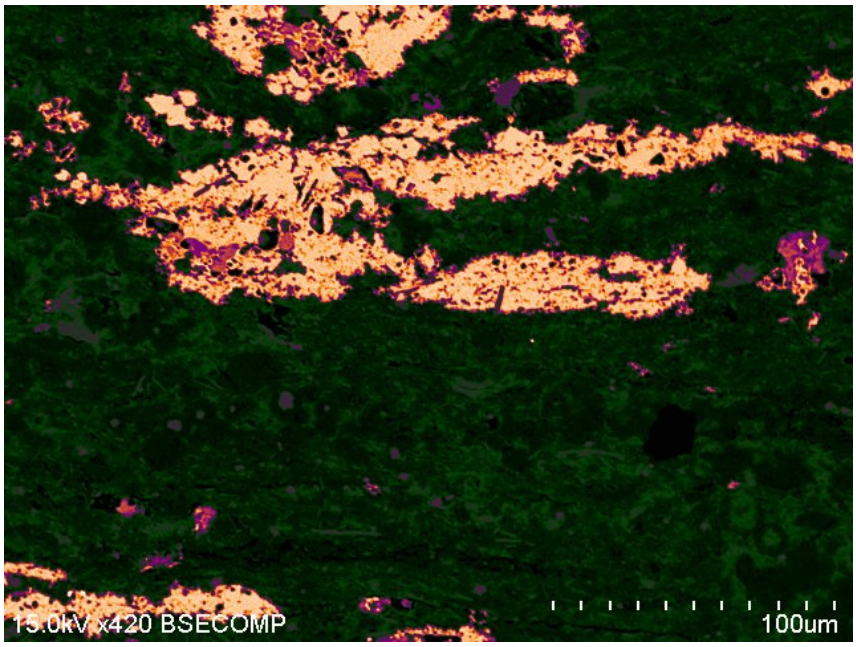
- Governor Walker described the mining issue as a "scientific issue," so here we focus on the science of mining in the Penokee Range.

- We don't have access to core samples from the proposed mine site itself, so we do not know enough about the chemistry of the rocks in the proposed mine site to make an informed decision about the mine proposal or weakening our mining laws.

- Only new cores, or examination of the US Steel core samples from the 1950s and 1970s currently in the possession of RGGS Minerals, could supply this information.

- The best data we have is a core taken about eight miles northeast of the eastern end of the proposed mine. While not from the proposed mine site itself, this core is the best evidence we have of the types of rock that would be encountered in the proposed mine.

- In this core, pyrite, or ferrous sulfide (FeS_2), occurs in both the Tyler Shale overburden and within the Ironwood formation ore body itself, in pyrite rich layers bedded between layers of iron oxide. Pyrite is shown as the tan/peach color in this microscopic image of a sample of one of these pyrite rich layers.



- A 300 X 1000 meter slab of Ironwood iron ore, a reasonable estimate of what would be removed during the first few years of mining, conservatively could contain 3 billion pounds or 1.5 million tons of pyrite. This is in addition to pyrite in the Tyler shale overburden.

- Pyrite content in the Ironwood formation is particularly troublesome because there is no practical way to reach the iron deposits without also removing pyrite and grinding it with the magnetite as part of the taconite production process.

- Ground pyrite has more surface area that can be exposed to oxygen and water, allowing it to oxidize much more quickly. Oxidized pyrite generates sulfuric acid.

- Sulfuric acid would be released from mine tailings posing a threat to Copper Falls state park, the Bad River, Lake Superior water quality, wetlands and aquatic life.

- The proposed Mining Bills brought before the Wisconsin Legislature made two distinctions: one between ferrous and non-ferrous mining, and the other between ferrous and sulfide mining.

- The problem with the ferrous vs. sulfide distinction is that pyrite (ferrous sulfide) is found along with iron oxide in the Penokee Hills.

- These concerns first were brought to the attention of the legislature in testimony by Dr. Marcia Bjornerud of Lawrence University, Dr. Joseph Skulan (Department of Geoscience at UW-Madison) and others before the Joint Committee on Finance on February 12, 2012.

  Link to Video of Testimony:
  http://www.youtube.com/watch?v=XRWhZeFkyxs&feature=player_embedded

- Under the Wisconsin Sulfide Mining Moratorium law, the DNR is prohibited from issuing a permit for the mining of a sulfide ore body unless DNR determines, based on information provided by a mining permit applicant and verified by DNR, that sulfide mining operations, with certain restrictions, have been operated and closed without polluting groundwater or surface water from acid drainage or from the release of heavy metals or other significant environmental pollution. The definition of “sulfide ore body" is "a mineral deposit in which metals are mixed with sulfide minerals” as we have here.

  See the law at: https://docs.legis.wisconsin.gov/statutes/statutes/293/IV/50?view=section

- Other states have suffered environmental damages from strip mining.

  - In Minnesota, wild rice harvests have been harmed by sulfates related to iron mining in the state.

  - A study published in the journal *Environmental Health Perspectives* found that 90% of 27 Appalachian streams below strip-mine fill sites were impaired by the Clean Water Act standards.

For more information, call 608-266-7521 or email Rep.Hulsey@legis.wi.gov.