

MINNPOST

Why proposed solutions to sulfide-mine pollution won't work

By [C.A. Arneson](#) | 01/22/14



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Sulfide mining threatens two of the greatest water resources in the nation, Lake Superior and the Boundary Waters Canoe Area Wilderness.

Despite machinations by PolyMet Mining Corp. and the Minnesota Department of Natural Resources to camouflage the fact, Minnesota's Arrowhead is facing perpetual pollution and water treatment from PolyMet's NorthMet Project, if its mine is permitted.

Financial assurance, reverse osmosis and compromise have been promoted as solutions to sulfide mining in Minnesota, as viable ways to ultimately protect two of the greatest water resources in the nation, [Lake Superior](#) and the [Boundary Waters Canoe Area Wilderness](#).



Then there are always the familiar standbys: ignorance and delusion.

Financial assurance is not the answer. It is not the answer for one simple reason. If a bonding company does take on the risk of PolyMet or any other sulfide mine, **PolyMet's SDEIS** indicates there is high probability that sulfide-mining contamination of surface water, sediments, ground water and soil cannot be cleaned up in our lake district. Money cannot fix the unfixable — or replace the irreplaceable.

Reverse osmosis is not the answer. Sulfide mining in water-intensive areas has never been done without contaminating surrounding waters. **Reverse osmosis** is not “new” technology. It has been around for decades. If it could solve water contamination caused by metal mining it would have done so by now. Reverse osmosis cannot even solve water pollution at Minnesota’s taconite mines, which are operating under variances or expired permits. In addition, in Minnesota, mining permits are often written to deliberately leave out or weaken important contaminant parameters.

The company neglects to point out that reverse osmosis will only treat part of the contamination from PolyMet’s proposed NorthMet Project, only treating discharge water at the end of the 20-year operation; it will not treat water going to the tailings basin for the proposed 20 years of production. As multiple types of waste chemicals concentrate in the basin (alleged in the proposal as a closed system) the treatment will become less effective, (e.g. 80% of 1000 ppm leaves 200 ppm, 80% of 2,000 ppm leaves 400 ppm). Keep in mind that many of the stream standards are in the parts-per-billion level.

A filtration system is only as good as the water you put into it. The proposed closed loop system of PolyMet is comparable to leaving a gallon of dirty water (total dissolved solids) in the bathtub each time you take a bath. All mining companies say they will have no discharge and will keep recycling. However, it does not work that way. Minntac is a closed system. The only solution to its contaminated wastewater is to contaminate surrounding waters. Reverse osmosis was tested for Mesabi Nugget and it was found to be too costly or it did not work. The company could not meet standards and obtained a variance to violate Minnesota’s water-quality standards.

Reverse osmosis for PolyMet is not scientifically defensible. No testing has been done that is relevant to the actual mining and treatment situation for this application. No substantive data indicates that reverse osmosis will work to fully meet water-quality standards. In PolyMet’s case reverse osmosis

was tested, but using what? It is unclear just what was run through the reverse osmosis system. Was wastewater used from its mineral extraction bulk sample testing? Compared to what PolyMet proposes to actually run through a full-scale treatment system, the "real" water will be much worse. Pre-filter plugging and reject water disposal will be major issues. PolyMet underestimates the quality and quantity of input water that will need to be treated.

All filtration systems (reverse osmosis and nano-filtration) require backwashing (backflushing) the pre-filters and the final filter. Since the pre-filter waste is a concentrate of the input wastewater, it will likely be aquatically toxic. Depending on the quality of the input water, up to 40% of the input water can be this reject back flush. The proposal is to return reject water to the tailings basin. Sludge may go to a landfill, but is untested and likely to be aquatically toxic. Precipitation (rain, snow) will impact the hydrometallurgical residue facility (solids dump). The solids dump will cause leaching. Since the waste particles will be similar to silt or clay, treatment of the solids to prevent toxic leachate will be difficult if not impossible to treat into perpetuity.

Ignorance is not the answer. PolyMet takes only a small number of samples in its environmental testing processes, which does not represent what will occur in the real world. The heterogeneous mixture of rocks is not consistent and small samples cannot reflect anywhere near actual field conditions. This can be demonstrated with field data from both the Dunka mine and MinnAmax, which has demonstrated that water quality is much worse than the small-scale lab testing that has been performed. This difference is caused by the heterogeneity (disseminated) nature of the entire deposit; one spot will have lots of sulfur, another spot will have little sulfur. They have only taken a very limited number of environmental laboratory samples in this heterogeneous deposit. In comparison, to evaluate the economics of the minerals, they report taking thousands of analyses to define the 1% of the minerals that are of economic interest.

The mine pits will eventually fill with water. The north wall of the East pit is Virginia Formation. It is well documented that this formation contains high sulfates and other heavy metals. This fractured mineralized wall will leach acid and metals. The mine pits will eventually discharge, carrying contaminated pit water to the wetlands and the Partridge River. *"The East Pit, West Pit, and Category 1 Stockpile are permanent features that would continue to provide solute-loading [metals and sulfate] for a minimum of 200 years."* (SDEIS) How the agencies picked a minimum of 200 years is a mystery; nothing is going to stop it. Take a look at the toxic Berkeley Pit if you want a preview.

The current PolyMet mine is designed for the 100-year storm (a 1980s statistical description of a 1% chance of a very high precipitation storm); given climate change, this design is insufficient. Scientific studies suggest the facility must be designed to withstand a 500-year storm, because the 1980s' 500-year storm is now occurring almost as often as the 100-year storm. For PolyMet this is critical; it must

be able to manage huge volumes of wastewater. If the storage and/or treatment system is insufficient, untreated wastewater overflows to the nearest stream partially treated or untreated.

Compromise is not the answer. In the news recently the sulfide-mining issue has been portrayed as an internal DFL problem; it is far bigger. This is a political issue that has crossed party lines. This is about Minnesota, not about any political party. Minnesotans love their lakes. They care about their children's health. Republican or Democrat.

Sulfide mining is not an issue solved by "compromise," as some suggest. Compromise what? There is no acceptable trade-off for perpetual water pollution and increased neurological damage to our children, some of it inheritable, for unknown numbers of generations. Compromise how? By selling out our children and our waters? That's hardly a solution in the public's best interest.

The answer: PolyMet's SDEIS "No Action Alternative." No permit. No sulfide mining in Minnesota's Arrowhead.

C.A. Arneson lives on a lake in the Ely area.

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Thank you

SUBMITTED BY LANCE GROTH ON JANUARY 22, 2014 - 1:13PM.

Thank you for this post. You explain the problem beautifully.

No amount of money can compensate for the loss of priceless wilderness and pristine waters. Any "cleanup" effort that will take centuries, at a minimum, of continuous operation - and that won't work anyway - is not worth contemplating.

Minnesota must have the moral courage to say no to this misbegotten plan.

I second Mr. Groth's thanks. Here's a few items from...

SUBMITTED BY STEVE TITTERUD ON JANUARY 22, 2014 - 3:31PM.

...the SDEIS document which further piqued my interest:

6.2.3.3 "Neither the Final SDD nor this SDEIS identified potential cumulative effects on groundwater."

So it is assumed then, that there will be no effects on groundwater? Or is this an admission that the effects on groundwater are nigh unto impossible to predict, that we simply do not know ?

6.2.3.3.1 "...it is not predicted to result in any direct exceedances of water quality evaluation criteria, although achieving this would require long term water treatment and WWTF/WWTP maintenance. Other reasonably foreseeable actions may also increase metal and other solute loadings downstream, but it is assumed that these other actions would also be required to meet federal and state water quality requirements, including nondegradation. Therefore, the potential for exceedances of water quality evaluation criteria as a result of cumulative effects from the NorthMet Project Proposed Action and other reasonably foreseeable actions is considered unlikely."

Here, the plain English equivalent is: there are OTHERS who will monitor water quality and enforce certain standards in future, AND, THEREFORE, we may figure the additive impact of the NorthMet Project will be OK. You know - if it isn't OK, those other enforcement agencies will take care of it THEN, right ?

But, wait - they're not done yet:

"Although not expected to result in any direct exceedances of water quality evaluation criteria, the NorthMet Project Proposed Action, in combination with other reasonably foreseeable actions, would increase metal and other solute loadings to the Partridge River and Embarrass River, and further downstream in the St. Louis River. These loadings

would, however, be diluted as the solutes are transported downstream”

Plain English version: Not to worry, folks. Whatever nasty stuff gets into these rivers, no matter how bad it is, will be diluted, so it won't be as bad downstream as where it enters. This reminds us of the long-held notion that the oceans will dwarf any pollution we throw at it, by dilution. We've seen how that has worked out.

If you've looked at the SDEIS document, it is HUGE, and represents very substantial effort. Yet even the simplest assurances on basic matters of concern can't be given by these studies.

For example: by what examples can we predict pollution mitigation requiring 200 to 500 years of sustained effort to be actually carried out, or financed in present dollars ?

Actually

SUBMITTED BY **ROLF WESTGARD** ON JANUARY 23, 2014 - 9:37AM.

The new SDEIS is supportive of the 2009 DEIS which in turn was in support of Polymet. Most of this 500 year hysteria is not justified.

SDEIS

SUBMITTED BY **ELANNE PALCICH** ON JANUARY 23, 2014 - 3:39PM.

In 2010, the EPA gave PolyMet's DEIS a rating of EU-3, Environmentally Unsatisfactory-Inadequate. The Supplementary DEIS is SUPPOSED to address all off those inadequacies. Of course the SDEIS supports PolyMet, since PolyMet is paying ERM to do their environmental review.

As for the 500 years, it is my understanding that peak water treatment would be necessary at the plant site at about 500 years, which would mean that water treatment would need to continue past this point--maybe for another 500 years?

Although PolyMet and the agencies are claiming that 500 years of treatment is just a usual part of mining, where is the history for such treatment?

I wouldn't say that negative response to 500 years of water treatment is hysteria--I would say that it's common sense.

"...where is the history for such treatment?" (i.e., 500 yrs)

SUBMITTED BY **STEVE TITTERUD** ON JANUARY 23, 2014 - 9:31PM.

Of course there is none, as your question implies. .

It is the hubris of those who side blindly with the extraction industries that breezily projects, problem-free, for 500 imaginary years. After all, they're not going to be around for the consequences - that's for future generations.

You'd better read it again, Rolf

SUBMITTED BY **STEVE TITTERUD** ON JANUARY 23, 2014 - 4:02PM.

I guess you must not have read the whole thing, because the "500 year hysteria" arises out of the SDEIS ** ITSELF ** - its OWN text. To quote that document:

"Mechanical water treatment is part of the modeled NorthMet Project Proposed Action for the duration of the simulations (200 years at the Mine Site, and 500 years at the Plant Site). The duration of the simulations was

determined based on capturing the highest predicted concentrations of the modeled NorthMet Project Proposed Action. It is uncertain how long the NorthMet Project Proposed Action would require water treatment, but it is expected to be long term; actual treatment requirements would be based on measured, rather than modeled, NorthMet Project water quality performance,..." (from page 13 of the Water Quality Executive Summary)

Also, it's interesting that you say "Most of this 500 year hysteria is not justified."

Do you mean to say while "Most" of it is NOT justified, that some of it IS justified ? Which part is justified ? Or did you mean to imply that any and all reservations are hysterical - "Most" being a slip at the keyboard ? Did you mean to indicate that the "200 year" period the SDEIS references is reasonable, and it is only the 500 year period which results from hysteria ?

Can you give an example of a sustained, consistent human activity over 500 years in the nature of specific maintenance or environmental remediation ? This can't be dismissed as mere hysteria, it is a real question.

Please be specific here, or admit that the notion we can actually DO such a project is pure speculation. Don't cite the pyramids, as it would be an insult to Egypt. You might as well also advise us as to WHO specifically is going to carry out this effort. A government body, a private entity ? One more thing: please give us your estimate of the COST in present dollars of this effort, as you see it.

Also, the chain of "support" leading from the new SDEIS going back through the 2009 DEIS to the benefit of Polymet is a real head-scratcher. If the 2009 DEIS was so satisfactory, why did we even DO the new SDEIS ? Also, "support" is a little vague, isn't it ? Maybe you could better illustrate whatever your real point here is by being specific.

What type of mine

SUBMITTED BY DANIEL BLONDEAU ON JANUARY 28, 2014 - 12:18PM.

This is a proposed copper-nickel mine. People opposed to mining typically use the terms 'sulfide' and 'acid rock drainage' to scare people. The copper and nickle are entrained in this sulfide bearing ore. Mining can be completed responsibly and is a part of modern life. I would much rather have mining take place here under our regulations than in another country without the same environmental protections.

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