Road to Ambler:
Acid Mine Drainage

Figure 1: Acid Mine drainage seeping through a rock wall at Kensington Mine, near Juneau AK

The acidity of a mine depends on the contents of the surrounding bedrock. When mining, the minerals of interest are only typically 5% to 0.00005% of the rock that is processed. The rest of the rock goes either to waste piles or tailings. Waste rock is produced before the extraction process and might be the size of rubble or boulders, and tailings is produced during the extraction process and are the size of sand or silt. Once the rock is removed from the earth and pulverized into smaller bits, it increases the surface area of the rock which can cause the chemical reactions that lead to acid mine drainage if exposed to air and water.

When air and water flow through the rubble, sulfides present in the rock will react with oxygen and water, and create sulfuric acid and dissolved heavy metals. This sulfuric acid then flows from the waste piles or the tailings dams into the ground water, and starts to affect the watershed. A review for the US Fish and Wildlife Service showed that “no hard rock surface mines exist today that can demonstrate that acid mine drainage can be stopped once it occurs on a large scale” (Jennings, 2008). Many of the mines that were reviewed will require water treatment for hundreds of thousands of years, otherwise known as “in perpetuity”. This water treatment can pose an economic burden on a state if the mine declares bankruptcy or refuses to cover the costs of adequate water treatment.

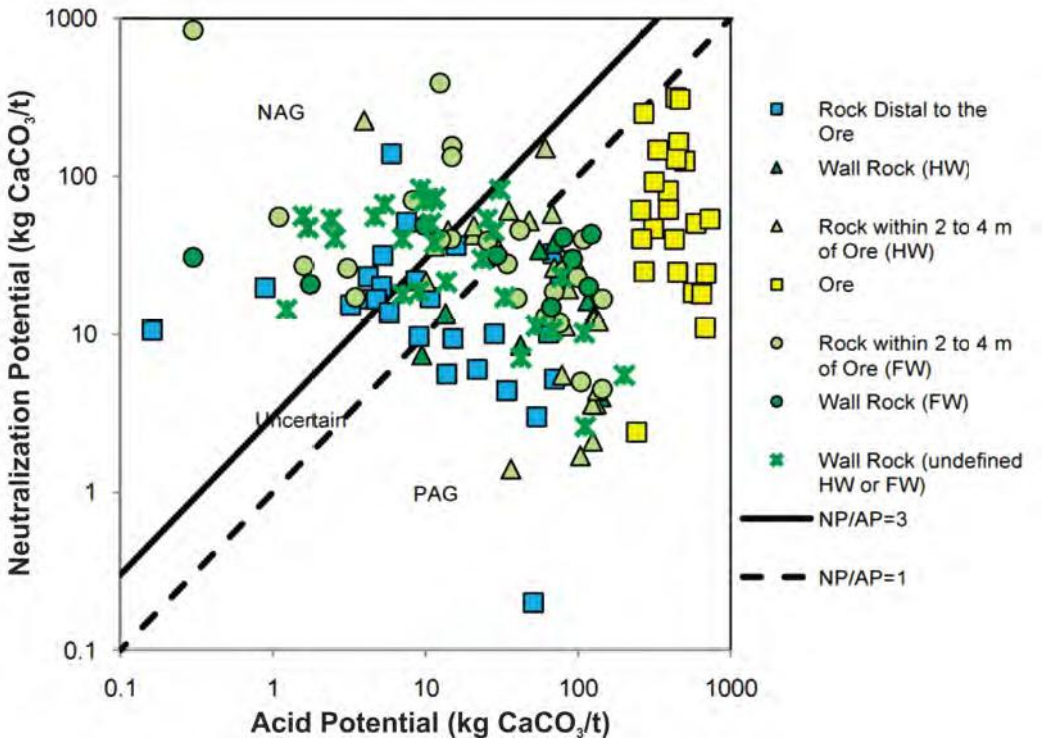

Figure 2: PAG vs. NAG Rock type at the Arctic Deposit (Tetra Tech, 2013 Figure 9.6)

Arctic Deposit

The image above shows the various rock types found in the Arctic Deposit, and whether they are Non-Acid Generating (NAG) or Potentially Acid Generating (PAG). As you can see, there are many samples that fall below the line separating NAG from PAG. Ore rock will mostly go through the extraction process and waste will end up as tailings, while wall rock will mostly become waste rock, and indeed all of the ore falls in the PAG range while wall rock seems like it will be a mix of PAG and NAG. NovaCopper claims that this mine will not pose a significant risk of acid mine drainage, yet their own report shows that it is a real possibility.

- Is NovaCopper's treatment plan sufficient to ensure no harm will come to the rivers and streams affected by the mine and the Road to Ambler?
- What is the plan when the Mine is finished, and who will bear the cost?
- Is 12 years of mining worth having to deal with water treatment in perpetuity and potentially leeching thousands of gallons of acidic water per year into Alaska's rivers and streams?

References

Jennings, S.R., Neuman, D.R. and Blicker, P.S. (2008). "Acid Mine Drainage and Effects on Fish Health and Ecology: A Review". Reclamation Research Group Publication, Bozeman, MT

Tetra Tech. *Report to NovaCopper Inc: Preliminary Economic Assessment Report on the Arctic Project, Ambler Mining District, Northwest Alaska*. Vancouver: n.p., 2013. Print.

MiningWatch Canada. *Two Million Tonnes a Day: A Mine Waste Primer*. Ottawa: n.p., 2009. Print.

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The Northern Alaska Environmental Center promotes conservation of the environment and sustainable resource stewardship in Interior and Arctic Alaska through education and advocacy.

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