WaterLegacy
Protecting Minnesota's waters and the communities who rely on them

Advocacy Director/Counsel • 1961 Selby Ave., St. Paul, MN 55104 • pmaccabee@justchangelaw.com • 651-646-8890
www.WaterLegacy.org

PolyMet NorthMet Proposal and MPCA Proposed Antidegradation Rulemaking
(Paula Maccabee - March 10, 2016)

INTRODUCTION

The Minnesota Pollution Control Agency (MPCA) antidegradation rulemaking record reflects extensive consultation with industry, including the PolyMet Company and various mining industry representatives. There has been no similar recent consultation with environmental stakeholders. (Attachment 1 to the MPCA SONAR attached)

As currently proposed, the MPCA's rules contain several mechanisms that could facilitate degradation of high quality waters, including headwaters streams in the Lake Superior Basin. The MPCA's proposed rules for compensatory mitigation, loading offsets and accommodation of economic "change" appear to conflict with the Clean Water Act, U.S. Environmental Protection Agency (EPA) rules on antidegradation (40 CFR §131.12), and EPA rules preventing degradation in connection with Section 404 permits. (40 CFR §230.10). The narrow scope of MPCA's proposed antidegradation rule and the proposed limit on public participation in NPDES permitting also conflicts with both federal and state law. WaterLegacy will detail in a separate document our concerns about the MPCA's proposed rule, which we believe must be withdrawn for major revisions. In this memo, we discuss the antidegradation rulemaking context related to the PolyMet NorthMet project.

Although WaterLegacy's Data Practices Act (DPA) Request to the MPCA for rulemaking information made no reference to any potential discharger (Exhibit A attached), the MPCA's DPA response came to us labeled with the Site/Facility name: "Polymet/antidegradation," the Site address/location: "Polymet" and the MPCA Preferred ID: "Polymet." (Exhibit B attached). This labeling by MPCA, along with the record of recent consultation with mining interests, creates the impression that MPCA's antidegradation revisions may have been influenced by a particular industry or a particular potential discharger.

WaterLegacy's analysis confirms that antidegradation rules are highly salient for the PolyMet NorthMet proposal. This sulfide mining project would result in significant degradation of receiving waters in the Lake Superior Basin, even if all of PolyMet's claims for the efficacy of its engineered systems (which we dispute in our comments) were accepted at face value.

PolyMet Degradation from Methylmercury Production, Export & Bioaccumulation

Brian Branfireun's expert report on the PolyMet NorthMet final environmental impact statement (FEIS) explained the mechanisms of sulfate loading, mercury loading, hydrological impacts to wetlands at the proposed mine site and tailings site, and methylmercury transport and bioaccumulation that would result in enhanced methylmercury production and export.

> [D]evelopment-induced change in hydrology, such as those proposed at both the NorthMet mine site and tailings basin, could amplify those drought-rewetting cycles (in terms of magnitude, frequency, or both). These implications should not be understated.

> Independent of any additional releases of uncaptured sulfate or mercury from the proposed NorthMet development, dewatering of wetlands surrounding the tailings basin through seepage collection and even modest impacts on water table position by underdrainage of mine site peatlands through open pit dewatering could increase total mercury, methylmercury and sulfate in the Partridge, Embarrass, and ultimately the St. Louis River. (Branfireun, 2015, pp. 21-22).

Dr. Branfireun estimated methylmercury export based on sulfate emissions to peatlands adjacent to the mine site:

> The potential near-doubling of methylmercury export from methylating peatlands receiving an additional sulfate load from the proposed PolyMet development would be reflected in methylmercury concentrations in the upper tributaries, and the Embarrass and Partridge Rivers, given the role these wetlands play in supplying water to these streams and rivers. Increased methylmercury would also be expected to impact the upper St Louis River, given the direct hydrological connection and known methods of methylmercury transport. (*Id.*, p. 23)

He concluded that these factors could "create a substantial risk of ecologically significant increases in water column and fish methylmercury concentrations in downstream waters, including the St. Louis River." (*Id.*, p. 27).

Duluth child and adolescent psychiatrist, Margaret Saracino explained the known medical risks of increased methylmercury exposure in a report on the PolyMet FEIS:

> Methylmercury is a strong toxin that influences enzymes, cell membrane function, causes oxidative stress, lipid peroxidation and mitochondria dysfunction, affects amino acid transport and cellular migration in the developing brain. Exposure in utero can cause motor disturbances, impaired vision, dysesthesia, and tremors. Even lower level exposure can result in lower intelligence, poor concentration, poor memory, speech and language disorders, and decrease in visual spatial skills in children exposed to methylmercury in utero. Fetuses, infants, and young children are four to five times more sensitive to the adverse effects of methylmercury exposure than adults. (Saracino, 2015, p. 2).

PolyMet Degradation of the Partridge River Watershed

The following discussion is derived from WaterLegacy's December 14, 2015 Comments on the PolyMet NorthMet Application for Clean Water Act Section 404 Permit. (WaterLegacy Section 404 Comments, Section V, pp. 70 *et seq.*) Available data suggests that the PolyMet project would result both in violation of water quality standards and significant degradation of waters.

In addition to demonstrating the likelihood that Minnesota water quality standards for cobalt aluminum and lead are likely to be violated at the PolyMet mine site (*Id.*, pp. 71-72), data in the PolyMet NorthMet FEIS also shows a likelihood of significant degradation of water quality at the mine site. (*Id.*, pp. 72-73). This degradation would result from seepage through surficial flowpaths to surface water and as a result of the conversion of the mine site segment of the Partridge River headwaters to a system dominated by mine site wastewater, rather than a natural system. (FEIS 6-83).

Mine site seepage to the Partridge River would reflect substantial increases in flowpath concentrations of chloride, sulfate, beryllium, cadmium, selenium, and zinc, as well as additional loading of cobalt, aluminum and lead. (FEIS, 5-130, Table 5.2.2-24). At surface water site SW-004a where the impacts of mine site discharge are best represented, levels of several signature mining chemicals that affect aquatic life and wildlife are predicted to markedly increase as compared both to existing levels and to the modeled continuations of existing conditions.[1]

Copper concentrations at Partridge River surface water site SW-004a are predicted to reach 5.79 µg/L for the NorthMet project. Under baseline hardness conditions, this level of copper would violate the chronic water quality standard of 5.2 µg/L.[2] This copper concentration would be an increase to 386 % of existing mean water quality (1.5 µg/L) and 166% of predicted CEC levels.

Nickel concentrations are predicted at 26.7 µg/L for the NorthMet project, a level of nickel (slightly below water quality standard of 29 µg/L) that is 2,225 % of the existing mean nickel concentration of 1.2 µg/L, and 612% of CEC levels. Cadmium is predicted at 0.93 µg/L (water quality standard of 1.4 µg/L), which would be an increase to 1,033% of existing mean cadmium concentrations of 0.09 µg/L and an increase of 547% compared to CEC levels. Zinc is predicted at 48.7 µg/L (water quality standard of 67 µg/L), which would be an increase to 1059 % of existing mean zinc concentrations of 4.6 µg/L and 192% of CEC levels. Cobalt is predicted at 3.11 µg/L (water quality standard of 5 µg/L), which would be an increase to 740 % of existing 0.42 µg/L mean cobalt concentrations and 241% of modeled CEC levels.

Based on FEIS data alone, without addressing any of PolyMet's assumptions challenged in comments of WaterLegacy and other groups and independent experts, changing Partridge River headwaters to a stream dominated by wastewater effluent would significantly degrade water quality. Waters that now have low concentrations of metals would lose assimilative capacity, with concentrations reaching or approaching maximums prohibited by water quality standards. Some metals toxic to aquatic life would increase by more than an order of magnitude.

PolyMet Degradation of the Embarrass River Watershed

At the plant site, FEIS data also reflects reduction in water quality at tailings site tributaries and in the Embarrass River due to the fact that *treated* wastewater from the NorthMet WWTP would have higher concentrations of solutes than tributary water containing *untreated* LTVSMC tailings basin seepage. (WaterLegacy Section 404 Comments, pp. 73-75). Treated NorthMet wastewater would result in higher concentrations of various metals, including antimony, cobalt, lead, nickel, selenium and zinc in tributary streams and in the Embarrass River. (FEIS, 5-205, Table 5.2.2-42).

At Trimble Creek-1, a tailings site tributary surface sampling site, zinc concentrations for the NorthMet project are predicted at 100 µg/L (water quality standard of 120 µg/L in 100 mg/L hardness), which is 1,124% of the existing maximum detected of 8.9 µg/L and 2,222% of the

[1] For this section, mean existing concentrations of solutes at SW-004a are obtained from FEIS 4-88 to 4-89, Table 4.2.2-14. Proposed action and CEC scenario information is from FEIS 5-151, Table 5.2.2-31.
[2] Minn. R. 7052.0100, subp. 6 provides chronic water quality standards for baseline hardness of 50 mg/L.

existing mean of 4.5 µg/L.[3] Predicted zinc also represents an increase to 719% of the modeled CEC conditions. Cobalt would be elevated to 5.0 µg/L (equal to the water quality standard of 5.0 µg/L), which is 357% of the existing maximum concentration of 1.4 µg/L and 806% of the existing mean of 0.62 µg/L, as well as an increase to 175% of CEC conditions.

For each of the other four solutes we reviewed, data for existing conditions is reported incorrectly. For nickel, the existing mean concentration is reported above the highest range detected and for antimony, selenium, and lead, current levels fell below detection limits. Though the FEIS said it had adopted the Barr practice of reporting non-detects at half the detection limit, each of these important metals were reported *at* the detection limit, rather than at *half* the detection limit, although no metals had been detected.

Under the proposed NorthMet project at P90 antimony at Trimble Creek-1 would be elevated to 20.3 µg/L (water quality standard of 31µg/L). If antimony non-detect sampling were reported as half the detection limit (0.13 µg/L), antimony would 15,615% of the existing antimony level and an increase to 4,060% of CEC conditions. Nickel is predicted to reach 50 µg/L (water quality standard of 52 µg/L in 100 mg/L hardness) under the proposed project. If existing nickel concentration is calculated at the top of the range detected (0.25 µg/L), predicted P90 nickel at Trimble Creek TC-1 would be 20,000% of the existing maximum concentration as well as 849% of modeled CEC conditions.

Lead concentrations are predicted at 3.0 µg/L (water quality standard of 3.2 in 100 mg/L hardness) under the Proposed Action. If lead non-detect sampling were reported as half the detection limit (0.13 µg/L), predicted lead levels would be at least 2,308 % of the existing maximum and an increase to 265% of CEC modeled conditions. Selenium is predicted reach 5.0 µg/L, which is also equal to the water quality standard of 5.0 µg/L. Existing sampling found no detection of selenium despite four samples with a detection level of 0.50 µg/L. If selenium levels were reported at half its detection limit (0.25 µg/L), predicted NorthMet concentrations would increase to 2,000% of existing levels and 633% of CEC conditions.

Similar increases in predicted solute concentrations and ratios are predicted at PM-19 (Trimble Creek) and PM-11 (Unnamed Creek) tributary sites. Elevations persist, with some dilution, in the Embarrass River at PM-13, further downstream of NorthMet wastewater treatment discharge. (FEIS, 5-207, Table 5.2.2-43).

Even if the appropriate water quality based effluent limits were set for solutes in an NPDES permit and PolyMet complied with these limits (contingencies which neither the FEIS record nor the history of mining permit enforcement in Minnesota allow one to assume) predicted changes to NorthMet tailings site receiving waters would significantly degrade waters that were previously substantially less impacted by mining metals. For several metals, current high quality waters would lose all or nearly all assimilative capacity and be degraded by metals at or approaching the water quality standard adopted to protect aquatic life. The differences between water quality in the existing Trimble Creek and conditions after the Creek is inundated with sulfide mining wastewater are over two orders of magnitude in some cases.

[3] For this section, data on existing concentrations of solutes at Trimble Creek are obtained from FEIS 4-155, Table 4.2.2-37. Data for the proposed action and CEC scenario are obtained from FEIS, 5-205, Table 5.2.2-42.