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October 23, 2014

Commissioner John Linc Stine (John.Stine@state.mn.us)
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55104

MPCA Board Members (CitizensBoard.PCA@state.mn.us)
Minnesota Pollution Control Agency
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Resource Management and Assistance Division (Jim.Brist@state.mn.us)
Minnesota Pollution Control Agency,
Attention: 401 Certification
520 Lafayette Road North, St. Paul, Minnesota 55155-4194.

RE: **Northshore Mining Expansion - Clean Water Act Section 401 Certification**

Dear Commissioner Stine, MPCA Board Members, MPCA Section 401 Certification Staff:

The comments below are submitted on behalf of WaterLegacy, a non-profit organization formed to protect Minnesota's water resources and the communities that rely on them. We have approximately 10,000 members and supporters throughout the State of Minnesota.

WaterLegacy requests that the Minnesota Pollution Control Agency (MPCA) deny Clean Water Act Section 401 certification for the proposed 108-acre Northshore Mining expansion into Type II Virginia Formation (VF) rock (expansion project). This would be the first time that Northshore Mining has been permitted to mine in high-sulfur Type II Virginia Formation rock. To the best of our knowledge, it would be the first time that any mine in Minnesota would receive a permit to mine in high-sulfur rock. This proposal is highly controversial, and WaterLegacy is aware of more than 600 citizen requests to require an environmental impact statement for the Northshore expansion into high-sulfur Type II VF rock.

The Clean Water Act requires that state Section 401 certifications must ensure compliance with water pollution control requirements of federal and state law. 33 U.S.C. §1341(a)(1) and (d). Federal regulations promulgated to implement the Clean Water Act require that a Section 401 certification contain "A statement that there is a reasonable assurance that the activity will be conducted in a manner which will not violate applicable water quality standards." 40 C.F.R. §112.2(a)(3). Minnesota rules preclude Section 401 certification if the "facility or activity" for which certification is sought will not comply with federal or state pollution control statutes or

rules. Minn. R. 7001.1450, Subp. 1(B); Minn. R. 7001.0140, Subp. 2.

WaterLegacy requests that the MPCA deny Section 401 certification for the Northshore Mine high-sulfur expansion project on the following grounds:

1. The MPCA should deny Section 401 certification since there is no reasonable assurance that acid mine drainage, sulfates and metal leachates discharged from the Northshore Mine expansion project will not violate applicable water pollution control standards.

2. The MPCA should deny Section 401 certification since inadequate analysis of high-sulfur rock, metal leachates and other pollutants prevents the MPCA from finding reasonable assurance that the Northshore Mine expansion project will not violate water quality standards.

3. The MPCA should deny Section 401 certification since there is no reasonable assurance that pollutants seeping from the Northshore Mine expansion project to groundwater, particularly at mine closure, will not violate state standards for surface water and groundwater.

4. The MPCA should deny Section 401 certification because conditions to prevent or mitigate the impacts of the Northshore expansion into high-sulfur rock, including methods to collect and treat contaminated wastewater and pit water, have not been analyzed.

5. The MPCA should deny Section 401 certification since Northshore Mining's NPDES permit lacks effluent limits or monitoring for groundwater seepage, so this permit would allow, rather than prevent, expansion project pollution in violation of applicable standards.

Water Legacy, further requests that the MPCA comply with the procedures in Minnesota Rules 7001.1440, Subpart 1. These procedures incorporate notice provisions for draft NPDES permits (Minn. R. 7001.0100, Subp. 4). They would allow citizen review and comment on the MPCA's preliminary determination regarding certification, would permit request for a contested case proceeding on an appropriate showing, and would permit requests for a public meeting before the MPCA Board.

WaterLegacy believes that adherence to Minnesota Rules 7001.1440, Subpart 1 is necessary to allow the public, tribal stakeholders and, potentially, the MPCA Agency Board to participate in MPCA's decision whether to certify 401 that Northshore Mining's new excavation and permanent storage of high-sulfur Virginia Formation rock can be done without violating Minnesota water quality standards and contaminating groundwater. WaterLegacy believes that openness and transparency are important to ensure that good decisions are made as Northshore Mining proposes new mining and storage of high-sulfur waste.

Northshore Mining Expansion Project Summary
Northshore Mining's Peter Mitchell mine pit straddles two major watershed divides. The southwest half of the mine area originally drained to the Lake Superior Basin, and the northeast half drained to the Rainy River Basin. The watershed pillar that historically separated the two watersheds has been removed, and the division between the watersheds is currently maintained

by the placement and operations of the pit sumps. (Northshore Mining Environmental Assessment Worksheet, hereinafter "EAW," p. 8)[1] At closure, Northshore Mining proposes that the entire mine will form a single pit lake with an outfall discharging to the Dunka River watershed in the Rainy River Basin. (*Id*., pp. 9, 18).

Northshore Mining plans to expand the Peter Mitchell mine pit by 108 acres south beyond its current permit limit. (*Id*., p. 4) In this expansion, Northshore Mining will encounter Type II Virginia Formation (VF) rock, which the Minnesota Department of Natural Resources (MDNR) has defined as VF rock with a sulfur content of between 0.2% and 1.0% by weight percent. (*Id*., p. 3)

This is the first time Northshore Mining would be permitted to excavate Type II Virginia Formation rock with the capacity to generate acid mine drainage (AMD). (Id., p. 3)

The expansion project would include 94 million long tons of stripping, including overburden, Virginia Formation (VF) and Biwabik Iron Formation (BIF) rock. (*Id.*, p. 4). It is expected that 16,297,000 long tons of Type II VF materials will be mined, including 6,571,000 long tons from VF sills and 9,727,000 long tons from VF metasediments. (*Id*., p. 17, Golder 2013, p. 33)

Northshore Mining would dispose of the Type II VF waste rock on a 153-acre stockpile pile on the north side of the pit at 1,600 feet above mean sea level (amsl), approximately 100 feet above the predicted pit lake level at mine closure. (EAW, p. 5). No liner or collection system is proposed for this permanent Type II VF waste rock stockpile. The EAW proposes that a 5-foot layer of other blasted rock, including BIF and Type I VF rock will be placed under the Type II VF rock and on the pile's outer slopes. (*Id.*, p. 6) A final cover, with a membrane-backed geosynthetic clay liner, will be progressively placed on stockpile areas at the final elevation. (*Id*.)

In addition to the Type II VF waste rock stockpile, the project expansion will permanently expose approximately 10.9 acres of Type II VF rock formations running the length -- approximately 8,600 feet or 1.6 miles -- of the pit's southern high wall. (*Id*., p. 16).

1. The MPCA should deny Section 401 certification since there is no reasonable assurance that acid mine drainage, sulfates and metal leachates discharged from the Northshore Mine expansion project will not violate applicable water pollution control standards.

A. Acid Mine Drainage

Both the Type II VF waste rock pile and the exposure of 1.6 miles of Type II VF rock running the length of the southern pit wall have the potential to result in acid mine drainage. "Similar to the materials in the stockpile, the pit wall materials may contribute metals and/or low pH as water flows over the face of the exposure or seeps through the pit wall." (Golder 2013, p. 40)

[1] The Northshore EAW and other documents from Minnesota Department of Natural Resources (MDNR) files cited in these comments have been provided to MPCA on a DVD.

Of the humidity cell tests performed on Northshore Mine VF rock sampled through 2004,[2] 13 tests resulted in acidic conditions, with an effluent pH below 5.5. These humidity cell samples had sulfur content from 0.06% to 0.42%, and only 11 were Type II VF rock, with 0.2% or more average sulfur by weight. Thus, *all* of the expansion project humidity cells containing Type II VF resulted in acidic effluent and at least two samples of *Type I VF rock* also resulted in acid drainage. (Golder 2013, pp. 31- 32)

The acidity results from the humidity cells are even more striking when reviewed in detail. Above just 0.25% sulfur, all Type VF samples, whether from sills or metasediments, produced *highly acidic effluent*, with a pH ranging from 3.1 to 3.4. (Golder 2013, Table 3-14).

Although the expansion project is characterized as Type II VF rock, which by definition has an average sulfur content between 0.2% and 1.0% by weight, actual sulfur content in the Virginia Formation metasediments sampled in 2004 ranged as high as 6.1 % sulfur. (Northshore 2004, p. 5). Heterogeneous rock with pockets of highly reactive sulfides would seed chemical reactions resulting in acid mine drainage and metals leaching at even higher rates than predicted based on the average sulfur concentration test results described above.

B. Sulfates and Impairment of Wild Rice

Sulfide reactions in the Type II VF waste rock stockpile and in the exposed Type II VF rock on the southern pit wall will also increase concentrations of sulfates at in-pit sumps and discharge points. The Northshore Mining EAW predicts that maximum in-pit sump sulfate concentrations will increase by 5% as a result of the expansion project. Maximum sulfate concentrations at surface discharge SD005, thus, would increase to 157 milligrams per liter (mg/L). (EAW, pp. 25-26).

This predicted discharge is more than 15 times the wild rice sulfate standard of 10 mg/L applicable in waters used for the production of wild rice. Minn. R. 7050.0224, Subp. 2. The EAW states, "Because wild rice has not been found to be present during recent wild rice surveys, the surface water quality sulfate standard for wild rice is not applied." (EAW, p. 17)

However, MDNR documents demonstrate that waters downstream of project discharge location SD005 are wild rice waters. Birch Lake is a water used for the production of wild rice; MDNR has repeatedly reported the presence of wild rice in Birch Lake. (Barr 2013, pp. 2, 4-5) Dunka Bay, where the Dunka River flows into Birch Lake is also a water used for the production of wild rice. (*Id*., pp. 8-9) The Dunka River should also be considered water used for the production of wild rice, since the 1854 Treaty Authority has listed Dunka River as a wild rice resource as recently as 2013. (*Id*., p. 5).

Sulfate levels where the Dunka River flows into Birch Lake are already elevated, with recent sampling of 21 mg/L and 23.6 mg/L. (*Id*., p. 14 and Figure 2). Maximum sulfate discharge of 157 mg/L at SD005 and average sulfate discharge of 92.6 mg/L predicted to result from the

[2] Inadequacies of humidity cell tests to characterize expansion project rock are explained in Section 2, below.

Northshore Mine facility and expansion project (EAW, p. 26) have the potential to cause or contribute to an exceedance of the 10 mg/L wild rice sulfate standard when the discharge reaches these downstream wild rice waters. This discharge, along with the cumulative impacts of sulfate releases from the Northshore Mine facility, will also violate the narrative standard protecting wild rice, which states with respect to wild rice waters, "The quality of these waters and the aquatic habitat necessary to support the propagation and maintenance of wild rice plant species must not be materially impaired or degraded." Minn. R. 7050.0224, Subp. 1.

C. Metals Leachate and Discharge

Increased metals leaching from the Northshore Mine expansion project will violate Minnesota numeric and/or narrative standards. In addition to providing numeric standards for metals that will be discharged in increasing concentrations as a result of the expansion into high-sulfur rock, Minnesota rules also include narrative standards to protect aquatic life precluding, for all Class 2 waters, any significant increase in residues in the waters, sediments and aquatic flora and fauna, stating,

> [T]he normal fishery and lower aquatic biota upon which it is dependent and the use thereof shall not be seriously impaired or endangered, the species composition shall not be altered materially, and the propagation or migration of the fish and other biota normally present shall not be prevented or hindered by the discharge of any sewage, industrial waste, or other wastes to the waters. Minn. R. 7050.0150, Subp. 3.

Even excluding an initial rinsing period of 10 weeks, maximum weekly effluent concentrations from the humidity cell tests done for several metals of concern were far above applicable Minnesota chronic water quality standards (WQS). Nickel concentrations in the humidity cell tests for the expansion project reached 510 micrograms per liter (µg/L), more than three times the 158 µg/L chronic WQS;[3] copper concentrations reached 54 µg/L, five-and-a-half times the 9.8 µg/L chronic WQS; aluminum concentrations reached 2,500 µg/L, 20 times the chronic WQS of 125 µg/L; and zinc concentrations reached 2,800 µg/L, more than 26 times the 106 µg/L chronic WQS. Manganese also reached 290 µg/L, nearly three times the groundwater health risk limit of 100 µg/L. (Golder 2013, p. 32).

Without identifying whether the outcrops in question were Type I or Type II VF rock, the Northshore expansion project EAW admits that weathering of several VF outcrops in 2002 and 2003 resulted in exceedances of water quality standards for total aluminum and total copper. The EAW characterizes these exceedances as "isolated, discrete events" (EAW, p. 17), but no information is provided to demonstrate that these exceedances would not become representative and result in water quality violations on a more routine basis if expansion project Type II VF rock along the southern pit wall were exposed to weathering.

[3] Chronic WQS above follow the calculations in the EAW for nickel, zinc and copper at a hardness of 100 milligrams per liter. Minn. R. 7050.0220. If the natural background concentrations of receiving waters were applied, as suggested by retired MDNR scientist Bruce Johnson, the applicable WQS for nickel, copper, and zinc would be substantially lower.

EAW predictions of increased metals discharge from SD005 are based on the Golder 2013 report, after modeling water quality based on various sampling, scale up, infiltration and dilution assumptions. Even if all of these assumptions were reasonable (which cannot be determined by reviewing the EAW), the expansion project will result in significant increases in metal concentrations in effluent discharged to Langley Creek in the Dunka River headwaters. Maximum concentrations in wastewater discharge would increase 80% for copper, 120% for zinc, 194% for cobalt and 314% for nickel. (EAW, pp. 25-26, Table 11-6).

Increased concentrations of copper, zinc, cobalt and nickel on Unnamed Creek, Langley Creek, and the Dunka River have the potential to seriously impair water quality, species composition, and the propagation of fish and other biota due to the sheer volume of wastewater that will be discharged containing these contaminants.

For Langley Creek, the majority of existing flow already originates from Northshore Mine pit dewatering. (EAW, p. 29) During operations, mine water from the expansion project would flow into sumps and be discharged at SD004 and SD005 (*Id*., p. 21, Figure 11-2). The increased annual average flow at these sumps would be 200 gallons per minute or more than 105 million gallons per year. (*Id*., p. 22). This 8% increase in pumping rates would be added to the current Northshore Peter Mitchell pit discharge, for a total average annual wastewater discharge to Unnamed Creek of 2,700 gallons per minute, or more than 1.4 billion gallons per year. (*Id*.)

The EAW does not discuss what the lowest 7-day average flow expected to occur once every 10 years (7Q10) is for any of these discharge waters. If Unnamed Creek, Langley Creek or the Dunka River have a 7Q10 of zero excluding mining discharge, there is no allowable dilution and impacts to fisheries and lower aquatic biota must be evaluated on the basis that organisms in the aquatic ecosystem will be growing, swimming and reproducing in Northshore Mine effluent.

Preventing adverse effects of the expansion project on fisheries and lower aquatic biota is particularly important since waters downstream of Northshore Mining discharge were recently designated in MDNR rulemaking for their special qualities and unique ecological significance. In 2011, the Birch Lake Reservoir, including the lower 300 yards of Dunka River and Dunka Bay, were designated as spawning beds and fish preserves. Minn. R. 6264.0125(H).

2. The MPCA should deny Section 401 certification since inadequate analysis of high-sulfur rock, metal leachates and other pollutants prevents the MPCA from finding reasonable assurance that the Northshore Mine expansion project will not violate water quality standards.

Documents pertaining to the Northshore Mine project expansion provide inadequate characterization, analysis or predictions to allow the MPCA to state, as required under Clean Water Act Section 401, that the expansion project will not violate water quality standards.

A. Water Quality Predictions

MDNR documents predicting changes in water quality as a result of the Northshore Mine expansion project fail to consider impacts from exposed Type II VF rock on the southern pit

wall. Although Table 11-6 in the EAW appears to predict water quality at in-pit sump locations "with and without the proposed project," the predictions only consider drainage from the Type II VF waste rock stockpile, and not from 1.6 miles of exposed Type II VF pit wall rock remaining after excavation is completed. (EAW, p. 26, fn to Table 11-6).

The EAW also provides no analysis of the chemical composition of overflow to the Dunka River post-closure as a result of the expansion project. Post-closure, as a result of discharge of untreated pit overflow from the Peter Mitchell Pit lake, average annual flow in the Dunka River would increase by 30 percent as compared to existing conditions. (*Id.*, p. 29). Changes in the chemical composition of nearly one third of the Dunka River flow as a result of expansion into high-sulfur VF rock have the potential to cause or contribute to non-compliance with water quality standards and degradation of Dunka River water quality.

The EAW also provides no predictions of pH in leachate from either the Type II VF waste rock pile or the exposed Type II VF wall. The EAW seems to assume that dilution of acid mine drainage with existing slightly alkaline Northshore Mine wastewater will diminish acidity. (*Id*., p. 5). However, acid mine drainage from the project expansion must be disclosed to allow evaluation of whether water quality standards will be violated if drainage propagates through fractures and to ensure that assumptions in modeling metals leachate are sufficiently conservative.

WaterLegacy is not confident that parameters regarding input pH, groundwater flow dilution and infiltration through the Type II VF waste rock pile used by Northshore Mining's consultants to model concentrations of pollutants in discharge are reasonable. Each of these input parameters have a significant effect on modeled concentrations, particularly cobalt, chromium, copper, nickel and zinc. (Golder 2013, p. 44). In one scenario that utilized conservative input parameters, aluminum was predicted at maximum concentrations (0.14 mg/L) greater than Minnesota's chronic water quality standard (0.125 mg/L). (*Id*., p. 46).

In order to determine whether Northshore's compliance with water quality standards can be reasonably assured, the MPCA must require Northshore to produce a set of predictions based on a transparent and reasonable range of conservative input parameters.

B. Sampling and Humidity Cell Testing

Predictions of water quality provided in MDNR files rely on humidity cell tests that inadequately represent the areas into which the expansion is planned and the scale of the expansion. First, somewhat surprisingly, the humidity cell tests do not represent the entire area into which the Northshore Mine expansion project is planned.

The EAW is imprecise about the sampling used to predict water quality, stating that its numeric water quality predictions are "not directly representative" since the samples were collected "do not precisely match all constituent concentrations from the most recent surface water quality data set." (EAW, p. 24) The actual discrepancies are striking.

All of the samples used in the humidity cell tests upon which the EAW relied were taken in 2003 and 2004. (Golder 2013, pp. 31-32 and Table 3-9). This drill sampling did not extend to the southern and eastern portions of the proposed project's expansion into Type II VF rock. At the time these samples were taken, Northshore Mining explicitly recognized that additional drilling sites were needed to "complete the Virginia Formation characterization." (Northshore 2004, p. 10). The scope of drilling by 2004 and the fact that a significant area of the expansion project was not sampled for humidity testing is shown in Exhibit 1, which reproduces drilling maps from Northshore reports prepared in 2004 and 2008.

Rather than require humidity cell tests with a representative sample of the entire area where Northshore Mining's expansion was proposed, the EAW relied on 11 humidity cell tests selected through a *post hoc* determination that any of the humidity cells from 2003 and 2004 with Type II VF rock (defined as an average of 0.2% to 1.0% sulfur by weight) could be used to characterize the entire project expansion rock, including areas south and east of the actual 2003 to 2004 sampling. (Golder 2013, p. 32).[4]

Although some effort was made to verify that drilling conducted in 2008 did, in fact, have sulfur content consistent with Type II VF rock (Northshore 2008, Appendix B), there is no data on the composition of metals or salts in the rock south and east of the 2004 drill holes.

In addition to the fact that humidity cell tests fail to represent a significant area of the expansion, WaterLegacy is concerned that the number of samples actually tested is insufficient to characterize more than 16 million long tons of high-sulfur VF rock that Northshore Mining proposes to excavate in the expansion project. In particular, the few samples tested and the averaging of sulfur percentages are likely to understate the impacts of more reactive sulfides on water quality.

The EAW acknowledges that a variety of Virginia Formation rock referred to as "bedded pyrrhotite" has significantly higher sulfur content than other VF rock units. (EAW, p. 14) The EAW then claims, "No occurrences of bedded pyrrhotite have been identified by exploratory drilling in the project area." (*Id*.) Northshore Mining has explained that continuous sulfide layers of bedded pyrrhotite provide a corridor for oxidation of a large portion of the available sulfide (Northshore 2004, p. 8), that bedded pyrrhotite had been identified in three drill holes on the eastern end of the Northshore Mine site (*Id*., p. 3), and that first blast scheduled for the VF rock formation most likely to contain bedded pyrrhotite was planned for 2009. (*Id*., p. 13).

The EAW cites no documentation that drilling and sampling at any time were sufficient to rule out bedded pyrrhotite in the Northshore Mining expansion project area. In addition, sampling for the expansion project has demonstrated that pyrrhotite is "by far the dominant sulfide" and that sulfides may range from less than 1% to more than 15% in discrete samples. (Golder 2012, p. 14).

[4] The report seems to admit that the sampling process for humidity cells is not demonstrably representative. The humidity cells are described to contain metasediments or sills "*that are expected to be representative of the Type II VF materials slated for the stockpile based on geologic description and sulfur content*." (Golder 2013, p. 31, emphasis added).

There is thus, inadequate data for the MPCA to state that there is reasonable assurance that predicted levels of metals leaching from the high-sulfur expansion project would not violate water quality standards. Testing is also insufficient for MPCA to state there is reasonable assurance that pyrrhotites and the heterogeneity of sulfides in the expansion project area would not result in higher sulfates and higher metals leachates, violating water quality standards.

C. Specific Conductance Data and Analysis Omitted

There are no data or predictions pertaining to the Northshore Mine expansion project that might provide reasonable assurance that specific conductance in discharge won't violate both Minnesota's numeric and narrative water quality standards.

After extensive peer-reviewed research, the United States Environmental Protection Agency (EPA) recently set the chronic aquatic life benchmark value for conductivity at 300 micro Siemens per centimeter (µS/cm) for West Virginia and Kentucky, stating that this standard is also expected to be applicable to ecoregions extending into Ohio, Pennsylvania, Tennessee, Virginia, Alabama, and Maryland. EPA noted that this benchmark is likely to apply whenever dissolved ions are dominated by salts of Ca^{2+}, Mg^{2+}, $SO4^{2-}$ and $HCO3^{-}$, particularly where natural background levels are lower. EPA explained, "the salt mixture dominated by salts of $SO4^{2-}$ and $HCO3^{-}$ is believed to be an insurmountable physiological challenge for some species."[5]

EPA's web site states that studies of inland fresh waters indicate that streams supporting good mixed fisheries have a range between 150 and 500 µS/cm. Conductivity outside this range "could indicate that the water is not suitable for certain species of fish or macroinvertebrates."[6]

Recent research in the St. Louis River watershed of the Lake Superior Basin suggests that specific conductance from mine pit discharge is a stressor contributing to impaired streams in Minnesota. For example, in the Embarrass River watershed zone, two impaired streams -- Spring Mine Creek and the Embarrass River -- receive water originating from mine pits. Sampling results from these streams show elevated specific conductance and sulfate concentrations. (Exhibit 2 MPCA, *St. Louis River Stressor Identification Report* (2013), pdf p. 16). In the St. Louis River watershed, streams relatively unaffected by mining, urbanization or agriculture have conductivity values from 36 to 380 (µS/cm) and are generally below 230 µS/cm. Streams with conductivity values above 500 µS/cm are limited to areas with mining or urban land-uses. (*Id*., pdf p. 41)

Experience with the Dunka Mine discharge suggests that specific conductance may exceed even Minnesota's numeric Class 4 standard water quality standard of 1,000 µmhos/cm (equivalent to 1,000 µS/cm). Minn. R. 7050.0224, Subp. 2. Based on Minnesota sampling and stressor

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[5] EPA, *A Field-Based Aquatic Life Benchmark for Conductivity in Central Appalachian Streams*, Final Report, EPA/600/R-10/023F, March 2011, p. xv. Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=233809#Download

[6] EPA, *What is conductivity and why is it important*? http://water.epa.gov/type/rsl/monitoring/vms59.cfm

identification research as well as EPA guidance, dissolved salts that elevate conductivity from the Northshore Mine expansion into high-sulfur rock are likely to degrade water quality and impair fisheries, lower aquatic biota and species composition in violation of Minn. R. 7050.0150, Subp. 3. The potential impairment of aquatic life in the Dunka River is of particular concern since the lower portion of the River and Dunka Bay are designated as spawning beds and fish preserves. Minn. R. 6264.0125(H).

3. The MPCA should deny Section 401 certification since there is no reasonable assurance that pollutants seeping from the Northshore Mine expansion project to groundwater, particularly at mine closure, will not violate state standards for surface water and groundwater.

Section 401(a)(1) of the Clean Water Act applies to violation of state water quality standards, through discharge to surface waters either directly or through hydrologically-connected groundwater. *See e.g. Hawaii Wildlife Fund v. County of Maui*, 44 ELR 20128 (D. Haw. 2014). The MPCA must consider groundwater releases that pollute surface water in determining whether there is reasonable assurance that surface water quality standards will not be violated as a result of the Northshore Mine expansion project, whether during operations or closure.

In addition, under Section 401(d), a state determining whether to certify a project should consider all appropriate requirements of state law, including protection of beneficial uses of water. *See PUD No. 1 of Jefferson County v. Washington Department of Ecology*, 511 U.S. 700 (1994). The MPCA must consider the impacts of the Northshore Mine expansion into high-sulfur rock on drinking water wells and public water supplies.

The record does not permit the MPCA to certify either that Northshore Mine releases into groundwater that is hydrologically-connected to surface water or releases into groundwater that affects drinking water will not violate applicable Minnesota water quality standards and health risk limits.

First, there is no basis to determine that the Northshore Mine expansion project would not result in violations of surface water quality standards as a result of seepage from the Type II waste rock stockpile and contaminated pit water, particularly at mine closure. Although it is likely that pumping during mine operations will create a pressure gradient that minimizes seepage through the surficial aquifer and bedrock fractures, filling of the pit at closure will alter this hydrological profile.

At closure, the pit in the expansion project area of the Northshore Mine will be connected with pit lakes to the west, forming an entire, connected "extensive pit lake" across both the Lake Superior and Rainy River Basins. (Golder 2013, pp. 16-17) The expected final pit lake surface elevation will be 1,500 feet amsl, with a ponded area of approximately 400 acres, a maximum depth of approximately 300 feet, a volume of 60,000 acre-feet, and a total of 19,550,000,000 gallons storage. (Golder 2013, p. 18 and Table 3-7).

The change in water pressure gradient as this extensive pit lake forms has the potential to result in propagation of pollutants through bedrock faults and fractures as well as through surficial

groundwater. The expansion project, including the Type II VF waste rock pile and Type II VF exposed pit wall, would increase pollutants seeping through groundwater from the huge Northshore Mine pit lake to both the Lake Superior and Rainy River Basins. The EAW cites no predictions of pollutant concentrations in the Northshore "extensive pit lake" over time. In addition, it is acknowledged that stratification may occur within the eventual pit lake. (Golder 2103, p. 49). A meromictic pit lake may result in higher concentrations of sulfates and metals seeping into fractures than the concentrations of these parameters at pit lake outfalls.

MDNR's EAW recognizes that fractures carry water in the bedrock at the Northshore Mine. (EAW, p. 15). Ground water movement in the BIF is generally through fractures, faults and joints. (Barr 2008, p. 7)

The existing Northshore Mine area and the area of proposed excavation into and storage of high-sulfur VF rock include highly fractured and faulted areas. Exhibit 3, *Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 1*, provides an overview of fractures and faults at the mine site. Exhibit 4, *Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 2*, shows faults in a broader context that identifies some of the area waters from Birch Lake to Colby Lake. Some of these faults extend to the location of surface waters, including Yelp Creek, the Partridge River, Langley Creek, the Dunka River and Birch Lake. Both of these maps are derived from Minnesota Geological Survey data.

The EAW claims that there will be no post-closure effects to groundwater quality because regional surface water features surrounding the pit are all at elevations higher than its 1,500 feet above sea level (amsl). (EAW, p. 29) However, uncollected seepage from the Type II VF waste rock pile would drain from 1,600 amsl, not 1,500 feet amsl. (*Id*., p. 5) Birch Lake is 1,417 feet above sea level and Colby Lake is 1,440 feet amsl. The elevation of faults and fractures is not discussed in the EAW.

The MDNR record contains several assumptions related to surface water quality. The EAW assumes that *all* seepage from Type II VF waste rock will drain to the pit sumps and be discharged through NPDES discharge points during operations (EAW, p. 5); that pit water from the entire Northshore Mine will flow *only* through an outfall to the Dunka River via Unnamed Creek even after mine closure (*Id*., p. 9); and that the expansion project will have "no impact" on the Partridge River. (*Id*., p. 18). These assumptions are arbitrary and provide no reasonable assurance that pollutants won't propagate to surface waters, since groundwater releases and transport have not been analyzed.

Second, there is insufficient data to provide reasonable assurance to the MPCA that the Northshore Mine project will not violate Minnesota rules protecting drinking water and health. Sampling of rock from the Northshore Mine expansion project identified several trace metals that can contaminate drinking water and adversely affect human health, which metals occurred at concentrations well above the cut-off of 1 milligram per kilogram. These metals included barium, chromium, strontium and vanadium. (Golder 2012, p. 13).[7] Minnesota sets Health Risk

[7] Sampling from the balance of the expansion project may identify other metals exceeding this cut-off.

Limits (HRL) for barium, chromium and vanadium to protect human life and health, pursuant to Minnesota Rule 4717.7500. Although Minnesota does not have an HRL for strontium, the Center for Disease Control has concluded that bone growth may be impaired in children drinking high levels of strontium.[8]

MDNR references report no humidity cell testing to predict concentrations of barium, chromium, strontium, and vanadium in seepage if the Northshore Mine expansion is permitted. Concentrations in releases to groundwater have not been predicted either of these metals or of other drinking water contaminants from the expansion project, including manganese, arsenic and lead.

The MPCA should deny certification of the Northshore Mine expansion into high-sulfur rock because no reasonable assurance can be made that seepage from high sulfur-rock mining will not increase groundwater pollution, contaminating drinking water and the Biwabik Iron Formation.

The Northshore Peter Mitchell mine pit is excavated into the Biwabik Iron Formation (BIF), and the Northshore expansion project would excavate several hundred additional feet into BIF rock. (EAW, Figure 10-1) Maps attached to the EAW and to the Barr 2008 Hydrology Study illustrate the excavation of BIF rock proposed in the expansion project and the significant change in depth of the pit, as compared with both pre-mining bedrock elevation and the current ground surface. (Barr 2008, Map 1, attached as Exhibit 5). Although the PolyMet NorthMet SDEIS highlighted plans to retain a 130-foot separation between its final mine pit and the Biwabik Formation (PolyMet SDEIS, p. 4-43), the Northshore EAW doesn't even discuss potential impacts of the high-sulfur expansion project on this critical aquifer.

The Biwabik Iron Formation is an important drinking water aquifer for Northeastern Minnesota, and more than 55,000 people rely on public water systems drawing their water from the BIF.[9] Numerous public water supply and residential drinking wells are located in the vicinity of the Northshore Mine and the expansion project. (Barr 2008, Map 9, attached as Exhibit 6).

Groundwater sampling for the PolyMet NorthMet project has demonstrated the propagation of pollutants from the existing Northshore Peter Mitchell pit to groundwater in the Partridge River watershed. As noted in the tribal Cumulative Effects Assessment (PolyMet NorthMet SDEIS, Appx. C, pdf pp. 2072-2073), deep groundwater borehole samples for the PolyMet project found elevated ammonia nitrogen, the most likely source of which was the blasting compound used at the Northshore Mine one mile north of the site. This tribal analysis, as well as WaterLegacy's comments (WaterLegacy 2014, pp. 50-51) cited underlying technical reports indicating that tritium, a post-1952 pollutant, was found deep in groundwater on the PolyMet site, confirming a connection between Partridge River watershed groundwater and pollutant sources at the Northshore Mining Peter Mitchell Pit.

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[8] ATSDR, Public Health Statement for Strontium, http://www.atsdr.cdc.gov/phs/phs.asp?id=654&tid=120

[9] James F. Walsh, Minnesota Department of Health, *Isotopic and Chemical Characterization of Water From Mine Pits and Wells on the Mesabi Iron Range, Northeastern Minnesota, as a Tool for Drinking Water Protection*, available at http://info.ngwa.org/gwol/pdf/042180533.pdf

Despite the evidence of faults in BIF bedrock and at the Northshore Mine site and the depth of excavation into the BIF bedrock proposed in the expansion project, no analysis has been provided of the potential impacts of the expansion project on the BIF aquifer or public and residential drinking water either during operations or at mine closure, after formation of an enormous Northshore Mine pit lake. The MPCA must deny certification to protect both surface water and groundwater from pollution resulting from newly-proposed mining in high-sulfur rock.

4. The MPCA should deny Section 401 certification because conditions to prevent or mitigate the impacts of expansion into high-sulfur rock, including methods to collect and treat contaminated wastewater and pit water, have not been analyzed

Under Clean Water Act, Section 401, no federal permit may be issued unless it includes all conditions required by a certifying state. Unless further research is done through an environmental impact statement process to identify potential alternatives that can be reasonably expected to minimize the effects of the Northshore Mining expansion into high-sulfur rock on water quality, MPCA has insufficient information to determine what conditions would be needed to assure protection of Minnesota surface water and groundwater.

Northshore Mining has not evaluated conditions that contain, collect or treat polluted seepage from the expansion project. The EAW admits that "direct seepage from the Type II stockpile will not be collected or monitored." (*Id*., p. 27) Placing crushed BIF or Type I VF rock under the Type II VF waste rock stockpile, as Northshore currently proposes, will not prevent seepage of leachates. In fact, Type I Virginia Formation rock itself may generate acid mine drainage. (Golder 2013, p. 32, see discussion in Section 1(A), *supra*).

Neither MDNR's EAW nor underlying reports from Northshore's consultants evaluate any seepage collection system or water quality treatment to reduce pollutant loads from Type II VF waste rock stockpile seepage or the exposed Type II VF pit wall either during operations or at closure. No water quality treatment to reduce pollutant loads from intentional surface discharge to Rainy River Basin waters or to reduce pollutant loads in the extensive pit formed at closure have been analyzed.

The "supplemental" monitoring and "contingency plan" proposed by Northshore Mining would be ineffective to prevent violations of Minnesota water quality standards and health risk limits. Northshore Mining only proposes monitoring at planned discharge points or sumps (Golder 2013, p. 13); no monitoring of groundwater or groundwater flowpaths to surface waters is contemplated. No specific strategies are required to address contingencies. Northshore Mining merely proposes that a mine water management contingency plan "will be developed" at some indefinite future time. (EAW, p. 27) Since the sole purpose of the EAW's undefined contingency plan would be "compliance with the NPDES effluent limits" (*Id.*), and there are no effluent limits for most pollutants of concern in the Northshore Mine NPDES permit (*Id*., pp. 26-27), Northshore's assurance that a contingency plan will be developed in the future is meaningless.

The MPCA should deny Section 401 certification for the Northshore Mine expansion into high-sulfur Type II Virginia Formation rock and should support the need for an EIS to assess whether water quality compliance could be assured with appropriate conditions, including but not limited

to the following:

- Alternative location of the overall expansion project to reduce excavation and exposure of Type II VF rock.
- Avoidance of pockets of VF rock with localized higher sulfides, upon completion of more detailed sampling.
- Liners beneath the permanent Type II VF waste rock stockpile.
- Leachate collection and treatment of seepage from the Type II VF waste rock stockpile.
- Subaqueous in-pit disposal of Type II VF waste rock.
- Water quality treatment to reduce pollutants prior to surface water discharge to Langley Creek, Unnamed Creek and/or Dunka River watershed during operations.
- Long-term water quality treatment to reduce pollutants prior to surface water discharge to Langley Creek, Unnamed Creek and/or Dunka River watershed post-closure.
- Long-term treatment and pump back of pit water to reduce pollutants and mitigate effects of pit water seepage to groundwater post-closure.

5. The MPCA should deny Section 401 certification since Northshore Mining's NPDES permit lacks effluent limits or monitoring for groundwater seepage, so this permit would allow, rather than prevent, expansion project pollution in violation of applicable standards.

The MPCA should deny Section 401 certification since the impacts of the Northshore Mine expansion project on water quality will not be prevented or mitigated by NPDES permit controls; the existing NPDES permit for the Northshore Mining Peter Mitchell Mine (Northshore NPDES) contains no effluent limits for critical pollutants and no monitoring for indirect releases of pollutants to nearby surface water or releases of pollutants to groundwater.

The Northshore NPDES contains no effluent limits for pollutants of concern, including metals such as nickel and cobalt that are predicted to increase markedly with the expansion project and pollutants, like sulfate, which may already be discharged in excess of water quality standards. (EAW pp. 26-27 Table 11-7). In fact, the existing NPDES permit contains no effluent limits for any of the following parameters: aluminum, arsenic, cadmium, cobalt, copper, hardness, lead, mercury, nickel, specific conductance, sulfate or zinc. (Northshore NPDES, pp. 13-28).

The Northshore NPDES permit does not consider potential effects of groundwater pollution from the Peter Mitchell mine, even in terms of monitoring. The NPDES permit only monitors surface water at remote locations, which are not designed to identify potential water quality impacts of mine seepage daylighting to nearby surface water.[10] (*Id*., p. 7) The permit requires no monitoring

[10] Surface water is monitored at the untreated municipal water supply for city of Hoyt Lakes, the outlet of Birch Lake at the Highway 1 bridge crossing of the South Kawishiwi River and in the Partridge River at the County Road 666 bridge east of Hoyt Lakes. (Northshore NPDES, p. 12).

of groundwater at any location. (*Id*., p. 12) If leachates were released through groundwater to pollute nearby surface water or to contaminate drinking water, no monitoring would identify, let alone regulate these effects on water quality.

The Northshore Mine NPDES permit, although it may measure certain pollutants, does little if anything to limit potential violation of numeric and narrative water quality standards should a federal Section 404 permit be granted to allow Northshore Mining to expand its operations into high-sulfur Type II Virginia Formation rock.

Conclusion

For the foregoing reasons, based on applicable law, documents from MDNR files, and citations and exhibits supplied with our comments, WaterLegacy believes that the MPCA should deny certification for the Northshore Mine expansion project. There is no reasonable assurance that this high-sulfur mining expansion will comply with Minnesota water quality standards and rules.

WaterLegacy also believes that the Northshore Mine expansion project, which would be the Mine's first permitted excavation of Type II Virginia Formation rock, is both different in kind from its previous taconite mining operations and is controversial within the community. The Agency, stakeholders and the public would all benefit from an open and transparent process, including notice of the staff's preliminary certification decision, an opportunity for contested case fact-finding if warranted on the record, and a public meeting before the MPCA Board. We request that the MPCA apply Subpart 1 of Minnesota Rule 7001.1440 in this case and in other cases involving novel and controversial mining operations. We also recommend that the MPCA Board take an active role in review of staff decisions pertaining to mining in high-sulfur rock.

We appreciate the opportunity to comment on this matter and would be happy to answer any questions you may have regarding our comments.

Sincerely yours,

Paula Goodman Maccabee
Advocacy Director/Counsel for WaterLegacy

cc: Tinka Hyde, Water Division Director, EPA Region 5 (Hyde.Tinka@epa.gov)

Attached Exhibits

Exhibit 1 Maps of Expansion Project (EAW, Figure 6-1) and Northshore Mine Drilling from Northshore 2004 (p.10) and Northshore 2008 (p. 11)

Exhibit 2 MPCA, *St. Louis River Watershed Stressor Identification Report*, October 2013, draft from MPCA files dated December 31, 2013.

Exhibit 3 Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion, Map 1 (J.D. Lehr)

Exhibit 4 Faulted Bedrock and Surface Topography Vicinity of Proposed Northshore Mining Expansion Map 2 (J.D. Lehr)

Exhibit 5 Map of Current and Post-Closure Northshore Pit Stratigraphy (Barr 2008, Map 13)

Exhibit 6 Map of Wells and Public Water Supply Within 15 Miles of Northshore Mine Site (Barr 2008, Map 9)

Primary References from MDNR Files – Provided on CD

Barr, *Long-Range Hydrology Study*, November 2008 (Barr 2008)

Barr Technical Memorandum- Louise Segroves and Rachel Walker, *Wild Rice Literature Review and 2013 Field Survey for the Peter Mitchell Mine*, December 11, 2013 (Barr 2013)

Golder Associates, *Northshore Mining Type II Virginia Formation Laboratory Weathering Experiment*, October 2012 (Golder 2012)

Golder Associates, *Type II Virginia Formation Stockpile Plan*, May 2, 2013 (Golder 2013)

MDNR, *Northshore Mining Company Progression of the Ultimate Pit Limit Public Review Environmental Assessment Worksheet*, September 2, 2014. (EAW)

MDNR, *Environmental Assessment Figures, Northshore Mining Company Progression of the Ultimate Pit Limit Project* (EAW Figures)

Northshore Mining Co., *Northshore Mining Virginia Formation Development Plan*, June 15, 2004. (Northshore 2004)

Cliffs Natural Resources Northshore Mining, *Virginia Formation Development Plan 2008 Annual Review*. (Northshore 2008)

Northshore Mining Company – Peter Mitchell Mine, National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Permit MN0046981, Issuance Date: August 11, 2009; Modification Date August 14, 2013. (Northshore NPDES)