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October 15, 2014

Ronald Wieland
Ecological and Water Resources Division
Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4025

Via email: environmentalrev.dnr@state.mn.us

Re: Northshore Mining Expansion EAW

Dear Mr. Wieland,

Please accept the following comments on the Northshore Mine Expansion EAW from Northeastern Minnesotans for Wilderness, the Center for Biological Diversity, Save Lake Superior Association, and Friends of the Cloquet Valley State Forest, on behalf of our many members and supporters who live, work, or recreate on Birch Lake and downstream waters, and on the St. Louis River and its tributaries. Please add all of the names and addresses on the signature page to your list of interested parties for future notices.

We would like to begin by thanking the DNR for preparing an Environmental Assessment Worksheet for this project. In reviewing the EAW and the underlying documents, we think it is clear that the time has come to prepare an Environmental Impact Statement for this and future expansions of the Northshore Mine. Most of the taconite mining operations in Minnesota began before the Minnesota Environmental Protection Act (MEPA) was passed, and have operated a long time and expanded considerably without public environmental review. We think that conducting MEPA review at some point will be appropriate for all of these operations, and indeed expansions have already triggered environmental review for a couple of them.

It is clear from the EAW and underlying documents that a very significant amount of mining is planned for the Peter Mitchell Pit going into the future, and that the impacts of

that mining will also be significant. While some of these impacts would occur regardless of the next 100 years of mining, some would not, and mining activity that has not yet been permitted will contribute to the severity of the impacts. This is a good time to consider possible alternatives to Northshore Mining's long-term mine plan (which provides the framework for its short-term expansions) that might lessen the severity of the impacts. To give MEPA its intended effect requires looking at the long-term plan before any additional actions are taken that could foreclose alternatives with fewer impacts in the future.

We appreciate the fact that this mine is a private venture, and Northshore Mining undoubtedly would like to plan its operations in the way it finds most efficient and practical, without public interference. But unfortunately this private venture has had and will continue to have a significant impact on public resources, and as such the Minnesota legislature has given Minnesota citizens the right to ensure that mining is done in a way that presents the least environmental harm that is "feasible and prudent." It is clear that the DNR has done a great deal of work to that end on this project over the last few years. While we appreciate the DNR's efforts, we respectfully insist on the rights and procedures that have been granted to citizens by law.

The potential significant environmental effects of this project include the potential for acid mine drainage and/or the leaching of minerals from the current and future stockpiles and exposed pit wall of Virginia Formation (VF) Type II and III rock, and subsequent impacts on local water quality; the discharge of sulfates and its impact on wild rice in Birch Lake; and the hydrological impacts on both the Partridge River and the Dunka River and its tributaries after the mine closes. Several other issues appear to have the potential for significant effects, but the EAW lacks sufficient information to make that determination. These issues include the potential for cumulative increases in sulfates and heavy metals in downstream waters from this and other projects; the potential for increased mercury methylation in the Dunka River and Birch Lake; the impact of inhalation of mineral fibers on mine workers and the public; and the cumulative loss of wetlands. Before we address these issues in more detail, however, we have an initial observation about the EAW's lack of clarity and information regarding cumulative potential effects and connected and phased actions.

I. The EAW does not provide sufficient information about connected or phased actions or cumulative potential effects, and appears to be based on a misunderstanding of the regulatory requirements.

The Minnesota Environmental Policy Act, Minn. Stat. § 116D, and the Minnesota Environmental Quality Board (EQB)'s implementing regulations, Minn. R. 4410, set out the requirements for an Environmental Assessment Worksheet (EAW) and the determination as to whether an Environmental Impact Statement (EIS) is required. An EIS is required when an EAW or material gathered for or submitted in response to the EAW indicates that the project has the "potential for significant environmental effects." Minn. Stat. § 116D.04(2a); Minn. R. 4410.1700(1).

The EIS requirement is not limited to a situation where the specific project at issue has potential significant effects, but extends to situations where this and other projects affecting the same resources have "cumulative potential effects." Minn. R. 4410.1700(7)(B); CARD v. Kandiyohi County, 713 N.W.2d 817 at 834 (Minn. 2006). "'Cumulative potential effects' means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Significant cumulative potential effects can result from individually minor projects taking place over a period of time." Minn. R. 4410.0200(11a). Both past and "reasonably likely" future projects must be considered. *Id.*

The EQB regulations also require "connected" and "phased" actions to be considered as a whole. The EAW makes a number of statements apparently designed to indicate that the expansion at issue here is not connected to past mining at the Peter Mitchell Pit and is not connected to any mining that will be done at the Peter Mitchell Pit in the future. ("The UPL is a stand alone project." "Although additional progressions within the mine are expected in the future, there will be no 'future stages' of the project proposed here." "The stockpile aspect of the Proposed Project is not a 'subsequent stage of an earlier project'." "Northshore will address separately the presence of any Type II VF materials encountered in any future pit expansions.") We disagree that this project is not a "connected action" or "phased action" under the EQB rules; we believe that it meets the definitions of both.

Connected actions are actions wherein "A. one project would directly induce the other; B. one project is a prerequisite for the other and the prerequisite project is not justified by itself; or C. neither project is justified by itself." Minn. R. 4410.0200(9c). This, past, and future projects prepared according to Northshore Mining's conceptual long-term mine plan should all be considered as connected actions in part because orderly mining requires that each project include preparations for the next. For example, Figure 10.1 of the EAW provides a cross-section of the rock that will be removed under the permit amendment. The figure indicates that about 400 feet of surface overburden will be removed beyond the limit of the BIF ore that will be mined by this project. The removal of rock beyond what is needed to access the ore to be mined under this permit amendment will apparently uncover a great deal – perhaps more than half – of the VF Type II rock that will be disturbed and stockpiled in this project. While the EAW is short on information and we have not been given access to the long-term mine plan, we can only assume that Northshore Mining plans to uncover this amount of VF Type II rock in preparation for additional mining of the large volume of BIF ore available at increasing depth. In other words, it appears that some portion of the activity under the current permit amendment will occur to facilitate mining under a future permit amendment, and thus "is not justified by itself." Minn. R. 4410.0200(9c)(B).

Phased actions are two or more projects undertaken by the same entity that "A. will have environmental effects on the same geographic area; and B. are substantially certain to be undertaken sequentially over a limited period of time." Minn. R. 4410.0200(60). Current, past, and future Northshore Mining projects also meet this definition. "A limited period of time" is not defined in the regulations, but the time that it takes to implement a project is surely not intended to remove it from this category, as this would exempt large, phased projects that take longer to build or implement, even though they also tend to have greater environmental effects. A reading more compatible with the purposes of MEPA would be that the actions are undertaken sequentially without significant time gaps between them. In other words "limited period of time" needs to be read in the context of the activity that is proposed. As each expansion project at Northshore Mining leads directly into the next, these projects should be looked at as "phased actions."

Regardless of whether the past, present, and reasonably likely future impacts at the Peter Mitchell Pit and downstream waters are considered as stemming from connected or phased actions or are assessed as cumulative effects of separate actions, MEPA requires that they be considered together, and if they are cumulatively significant, they must be considered in an EIS.

For connected or phased actions, the determination of the need for an EIS must be based on all of the connected or phased actions. The EQB regulations acknowledge that the details of future aspects of a project and the full extent of their environmental effects are not always known at the time of permitting an earlier stage of the activity. Nonetheless, "Multiple projects and multiple stages of a single project that are connected actions or phased actions must be considered in total when determining the need for an EIS and in preparing the EIS." Minn. R. 4410.2100(4). Lack of complete information regarding subsequent phases is not dealt with by ignoring them. Rather, "In connected actions and phased actions where it is not possible to adequately address all the project components or stages at the time of the initial EIS, a supplemental EIS must be completed before approval and construction of each subsequent project component or stage. The supplemental EIS must address the impacts associated with the particular project component or stage that were not addressed in the initial EIS." *Id.*

Similarly, the analysis of cumulative potential effects must include "reasonably likely" future actions affecting the same resources. In deciding whether to include future projects in the analysis, the DNR must consider "whether a project is reasonably likely to occur and, if so, whether sufficiently detailed information is available about the project to contribute to the understanding of cumulative potential effects." Minn. R. 4410.1700(7)(B).

The DNR should read the above requirements in a practical way in light of the purposes of MEPA, rather than parsing the definitions to find a way out of considering the known or knowable potential effects of future mine expansions. Clearly, Northshore Mining has already delineated the extent of the taconite resources accessible through the Peter

Mitchell Pit. The company has a clear understanding of how large the pit will ultimately be, and has conducted a hydrological study based on the likely size of the pit at closure.

The EAW refers to documents that have not been made available to the public that we believe would shed light on the ability of the DNR to consider the effects of future mining activity in the current analysis, and the extent to which that activity is "reasonably likely." The first line of the project description states, "Northshore Mining Company proposes to progress the Ultimate Pit Limit within its Permit to Mine at its Peter Mitchell Mine to access additional economic taconite ore, consistent with Northshore's long-term development plan for the mine." Northshore Mining's "conceptual long-term development plan" is referred to in several places in the EAW. If the DNR takes the position that the current mine expansion is not a connected or phased action with future mine expansions and/or that future actions at the mine are not "reasonably likely," it must make this long-term development plan available to the public. Also, if the long-term development plan provides information relevant to assessing the impacts of future mine expansions, it must be made available to the public.

The EAW also fails to provide information on impacts from past activities, such as loss of wetlands, deterioration of water quality, loss of wild rice and wild rice habitat, and impacts on human health. MEPA review should include an assessment of what the impact of mining has been up until now, and how the currently proposed activity would add to that impact.

After reading the EAW we have no idea how many times expansions have been permitted at the Peter Mitchell Pit, or how much the mine has expanded beyond what was covered by the Permit to Mine in effect at the time that MEPA was enacted. It seems incredible that the mine can just continue expanding, decade after decade, with no environmental review. Perhaps there have been past EAWs or EISs for expansions, but if so that information is also missing. If such documents exist and have looked at some of the impacts at issue here, the current EAW should "tier" to those documents. *See* Minn. R. 4410.0200(88); 4410.3100(7).

Finally, the EAW is also deficient in providing information about projects with cumulative potential effects that are planned by other parties. It mentions the PolyMet project, but opines that because the discharge from the current Northshore Mining expansion will go to another watershed, it will have no impact on water quality in the Partridge River. However, the cumulative impact of this, past, and reasonably likely future mine activities will ultimately eliminate a good portion of the Partridge River watershed. This will happen at a time when polluted water leaching from PolyMet's pits and stockpile is likely to be entering the river downstream. The loss of upstream water is likely to have a significant impact on both water quality and quantity in the Partridge River. A public environmental review is needed to determine whether there is a "feasible and prudent alternative" to Northshore Mining's closure plan that would lessen the cumulative environmental impact on the Partridge River; it is entirely possible that the least

environmentally harmful alternative would involve changes to the current project. Unless MEPA review was done at some past stage of mine planning and development, it must be done before any additional actions are taken that could foreclose alternatives that would have less impact than Northshore Mining's preferred plan.

In the other direction, the EAW provides virtually no information on pollution from the Dunka Pit (other than to say that it is now in compliance with its permits, which is by no means the same as saying that it is not polluting downstream waters), or about the Twin Metals mines, which are currently being sold to investors on the basis of a preliminary mine plan that clearly lays a "basis of expectation" for the project.[1] All of these projects disturbed or will disturb rock with sulfide levels that could result in acid drainage and/or heavy metal leachate problems, and all do or will discharge into tributaries of Birch Lake, which flows into the Boundary Waters Canoe Area Wilderness. In addition, these projects all do or are likely to discharge water with high levels of sulfate into Birch Lake tributaries. These impacts must be assessed together in a cumulative effects analysis.

II. This project has the potential for significant impacts on water quality.

As an initial matter, we do not agree with the DNR's apparent position that degradation of water quality in lakes and streams is insignificant unless it results in violations of water quality standards. This position flies in the face of federal and state antidegradation standards to protect existing water quality.

The EAW is unclear both as to what water quality data it used, and as to how the water quality predictions at the sump (Table 11-6) become the water quality predictions at the point of discharge (Table 11-7). It is unclear to us whether the SD 005 Monitoring Results refer to the discharge, or to water quality somewhere near the point of discharge. (And if it is the latter, how near?) Overall, our best guess at what is being said is that water at the sump is being diluted by water from other locations before it is discharged; if this is the case, we object to it as allowing unnecessary degradation of high-quality waters.

We were directed at one point to an Appendix to the 2008 review of the Virginia Formation plan, which provides data labeled as "Water Quality Data from Pit Discharges," but it is unclear where these samples were taken or how they were used in the modeling or predictions. Tables 11-6 and 11-7 refer to the "2013 Golder Report;" the only Golder document we have from 2013 is the stockpile plan, which does have water quality data in Appendix D. However, this data appears to include monitoring data from the entire mine (including the West Pit), and it is unclear how the data was used. We averaged the East Pit discharge sulfate levels from the 2008 document for the years 2004 through 2009, and found that the levels had doubled between 2004 (52 mg/L average) and 2009 (104 mg/L

[1] Duluth Metals, Twin Metals Minnesota Project, NI 43-101 Technical Report on Prefeasibility Study (Oct. 6, 2014). This document is too large to submit with these comments via email, but can be accessed through the Canadian Securities website at http://sedar.com/search/search_form_pc_en.htm

average). Table 11-6 shows a sulfate level of an average 42 mg/L at the sump, while Table 11-7 shows an average of 90.4 at SD 005. The DNR needs to provide more transparency in the data it is using for various purposes, and how it relates to the question at hand.

Despite the EAW's assurances, we believe that there is a significant potential for the project to violate water quality standards. The science of predicting water quality impacts from mining is highly uncertain, and there is always a wide range of possible outcomes with any mining scenario involving sulfide-bearing rock. Mining companies almost invariably underestimate the potential for water quality impacts from Acid Mine Drainage. A 2006 report on this phenomenon by Jim Kuipers and Ann Maest includes a summary of the causes of the under-predictions at the mines covered by the report. [2] Many of the causes of under-predictions at other mines have the potential to be present here, including lack of hydrologic characterization, dilution overestimates, lack of adequate geochemical characterization, sample size and representation, failure to account for storms, and potential liner leaks. Given the discrepancies that we have seen between predicted and actual concentrations of constituents in water at other mines, we believe that water at the sump could be several times the predicted levels.[3]

Our greatest concern remains the VF Type II rock that will be left exposed on the south wall of the mine pit. Northshore Mining proposes to leave this open area of high sulfide rock exposed to the elements with no controls whatsoever to arrest or slow the development of Acid Mine Drainage (AMD).

The EAW dismisses concern about this issue by referring to areas of exposed VF rock uncovered by Reserve Mining that allegedly have not resulted in water quality problems after 20 years of exposure. However, the discussion provides no information about the sulfur content of this rock, and does tell us that the study found "exceedances of total aluminum and total copper, which were limited to isolated, discrete events occurring at certain specific sampling locations and were not representative of overall typical conditions." We have to wonder whether the specific sampling locations referred to were locations where Type II rock was found, and whether these were not typical because much of the rock had a lower sulfur level. If the DNR does intend to use this to dismiss concerns about exposed pit walls, the EAW needs to do a better job of describing the situation and explaining its relevance.

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[2] James Kuipers and Ann Maest, *Comparison of Predicted and Actual Water Quality at Hardrock Mines,* 2006, p. 186, Table 8.1, http://www.earthworksaction.org/library/detail/comparison_of_predicted_and_actual_water_quality_at_hardrock_mines/#.UhD1T9IezSg

[3] *See, e.g.,* Laura Gauger, Flambeau Graphs (2012) (Attachment 1)

Furthermore, it is notoriously difficult to predict how much time will go by before drainage from a particular rock turns acidic. Twenty years is not very much time in this context. We are as concerned about leaving exposed rock that could turn acidic after 100 years or more as we are about AMD that begins immediately. Perhaps more so, as at least in the short term land owners and managers will understand what they are dealing with.

An exposed pit wall similar to what will be left at the Peter Mitchell Pit was one of the reasons that the first iteration of the PolyMet project was rejected. The Draft Environmental Impact Statement for that project stated,

> Observation in pit mines also show frequent formation of talus cones on benches from physical weathering of the steeper walls. The result is a permeable rind in the pit walls with enhanced oxygen diffusion (and thus sulfide mineral oxidation) and greater hydraulic permeability (which facilitates flushing of solutes by percolating rain and snowmelt). Naturally occurring fractures might also occur, especially in the Virginia Formation. Such fractures tend to dry during pit dewatering, with a resultant oxidation of sulfides present.[4]

In the PolyMet plan, the area that was proposed to be left above water was significantly less than it will be at the Peter Mitchell Pit. Still, the EPA recommended "analyzing other management strategies to prevent [Acid Rock Drainage] and develop adaptive management options that can address the likely situation that ARD will be generated post-closure from pit walls."[5] It appears to us that the same concern is present here as was deemed a significant problem for the PolyMet project.

Environmental review should also assess the potential for acidic and/or high-metal drainage from the stockpile over centuries or millennia. Geomembrane covers are a relatively new technology; certainly none have been in existence for the length of time that the VF Type II waste in the Peter Mitchell Pit will need to be segregated from water and oxygen. What is the expected lifespan of the plastic that will be used? What will the consequences be if and when the plastic breaks down?

The sulfate data presented in the Virginia Formation Development Plan 2008 Annual Update, App. D shows a steady increase in sulfate in discharge, especially in the East Pit. The data set ends in March of 2009, and we are unable to determine whether this trend has continued. As explained below, we disagree that the impact of sulfate on wild rice and mercury methylation is not an issue. An EIS is needed to explain the sulfate discharge situation and its impact on sulfate levels in Langley Creek and downstream waters.

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[4] MDNR, Northmet Project Draft Environmental Impact Statement (Oct. 2009), p. 4.1-71.

[5] Bharat Mathur, U.S. EPA, Letter to Colonel Jon L. Christenson, U.S. Army Corps of Engineers, Re: NorthMet Project Draft Environmental Impact Statement (Feb. 18, 2010) (Attachment 2)

We are also concerned that a number of assumptions made in the EAW and supporting documents result in an underestimation of the potential impacts on water quality. First, both the stockpile and the pit wall will be located some distance above the pit floor, and above the pit lake at closure. If drainage from either area does turn acidic, it will travel through additional rock before it reaches the pit lake or sump, and it is likely to continue to leach metals from the rock along its way. This is especially true if the underlying rock is VF Type I, which could contribute both acidity and metals if it comes in contact with low pH drainage. It does not appear that this potential source of heavy metals to pit water has been included in the assessment.

We also question the assumption that leachate will mix with other water in the pit lake to the point that no concern about water quality is warranted. Both the VF Type II area of the pit wall and the VF Type II stockpile will be above the surface of the pit lake, and thus all run-off and leachate from both areas will enter the top layer of the lake. This water has the potential to discharge to streams before it mixes thoroughly with deeper lake water. Storm events have the potential to flush a large pulse of polluted leachate from the stockpile and/or pit wall that would then discharge quickly to the outfall due to high water levels in the pit.

We note that many of the humidity cell tests on which modeling is based had not yet reached equilibrium when the results were used for modeling. It is quite possible that they will continue to show a decrease in pH and an increase in metals over time. As a result, the modeling may underestimate the impacts on the pit water discharge ("Cobalt, copper, and zinc concentrations are increasing in humidity cell leachate for several Group 3 humidity cells (e.g., NSM-HC6). These increasing concentrations could result in higher loading rates in the future.")[6] Similarly, no humidity cell tests were run for rock with greater than 0.42% sulfide, and modeling input data for higher sulfate rock used the data from 0.42% rock, which almost certainly results in an underestimate of water quality impacts for the higher sulfate rock. While this may be a small percentage of the rock overall, it is still a large amount of rock.

In general, we question the use of average data from combined humidity cell tests to predict maximum leachate concentrations. If drainage from a particular area does turn acidic, it will quite possibly leach metal from other rock in its pathway that would not necessarily have leached on its own. AMD that begins in higher-sulfate rock can also influence the rock around it that might not have turned acidic on its own. Small amounts of high-sulfide material can thus have an impact on water quality far beyond what would be predicted based on its percentage of the total rock.

Also, the mine plan does not ensure that Type II rock will not end up in the Type I stockpile. Northshore Mining apparently plans to sort the rock according to the average sulfur content of samples taken in each block. This is likely to result in pockets of Type II

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[6] Golder, Type II Virginia Formation Stockpile Plan (May 2, 2013), p. 46 and tables E9 through E12.

rock in the Type I stockpile that will not be covered or otherwise mitigated, and these pockets may well set up acidic conditions that could interact with and influence the chemistry of the surrounding Type I rock. Such pockets could result in localized flows of low pH, high metal leachate that are unaccounted for in the water quality modeling. If a more detailed sorting of rock is not possible as a practical matter, the DNR should consider requiring the alternative of covering (or otherwise mitigating) all VF rock taken from blocks that contain any Type II rock.

In addition to the impacts of discharges with low pH, high sulfate, or high metals levels on downstream waters, we are concerned about the potential impacts on wildlife that may use the mine pit or pit walls. If the pit walls do become acidic, what would the impact be for bats or cliff-dwelling birds that attempt to use the site? The closure mitigation plan calls for construction of a littoral zone along the edges of the pit lake; it appears that polluted drainage from the pit walls or stockpile would pass through these areas before mixing with the deeper waters of the pit lake. What is the potential impact on wildlife if the littoral area does contain low pH or high levels of heavy metals?

Finally, and most importantly, the EAW does not disclose the cumulative effects and/or effects from phased or connected actions on water quality. No information is given about how much Virginia Formation rock will be dug up and stockpiled in future actions, what amount of pit wall will be exposed, or what the likely water quality might be from these future actions. At least some of this information appears to be reasonably available, but has not been disclosed in the EAW. If this relatively small first step in excavating VF Type II materials is predicted to have the impacts described in the EAW, it seems very likely that future expansions will lead down a road of ever-worsening water quality.

III. The sulfate level in Northshore Mining's discharge is significant, and this project will add to that level.

Given the apparent level of sulfate in Northshore Mining's discharge, it is not surprising that no wild rice stands were found within a mile of the plant. This is like killing all the sensitive species in a stream with toxic discharge, and then arguing that the discharge is not toxic to species that currently inhabit the stream. An EIS should be prepared that includes a survey for sites that would likely support wild rice if sulfate levels had remained at baseline levels.

Furthermore, the EAW's limitation of the discussion of wild rice to a one-mile distance is inappropriate. Wild rice is found in Dunka Bay, where it is almost certainly being impacted by Northshore Mining's discharge. While we recognize that the EAW form asks for an identification of impaired waters within one mile of the project, this should not be taken as precluding the need to consider impacts further downstream. Such a limitation would be directly counter to MEPA, which deems an impact significant if it violates an environmental standard. If a discharge causes a water quality standard violation, there is

no legitimate reason under MEPA to disregard it simply because it occurs more than a mile downstream.

As best as we are able to decipher the EAW, Northshore Mining is apparently currently discharging sulfate into Langley Creek at 90.4 mg/L (average) and 150 mg/L (maximum). According to the EAW, the pit expansion would increase that to 92.6 mg/L (average) and 157 mg/L (maximum). The standard to protect wild rice is set at 10 mg/L; recent research and peer review done by MPCA indicates that wild rice is impacted at even lower levels. In any event, Northshore Mining's discharge is very significantly above the limit, and this project will make the situation worse.

While the wild rice stands are located about ten miles downstream of the current discharge point and the levels no doubt attenuate before they reach Birch Lake, all indications are that they cause or contribute to violation of the wild rice standard in Birch Lake. The background level in Birch Lake appears to be between 3 and 8 mg/L, but levels at the mouth of the Dunka River were measured at 21 and 23 mg/L, twice the standard for wild rice waters. The EAW does not tell us whether the Dunka Pit also discharges to the Dunka River and may contribute to the problem, but whether the impacts are cumulative or due to Northshore Mining alone, they must be considered.

The EAW does not tell us what the discharge water quality is likely to be at closure, other than to say, "The chemical mass balance from Golder (2012) indicates that constituent concentrations in discharge to Unnamed Creek after closure are predicted to be less than their concentrations during operations." The assurance that they will be "less than their concentrations during operations" does not necessarily mean that there will not be a significant impact, because the discharge volume will be so much greater and the travel distance to Birch Lake so much shorter. The end result could be higher levels of sulfate in Dunka Bay even though the constituent concentrations in discharge are lower.

It is insufficient for the purposes of environmental review to state that the facility is meeting its permit limits. In this case, the reason the facility is meeting its permit limit is because the MPCA has not been enforcing the water quality standard for wild rice. The actual impact on wild rice is the same regardless of the status of Northshore Mining's permit. Environmental review is meant to assess the actual, on-the-ground impacts of a proposed project, rather than compliance with permits.

The EAW contains insufficient information to make a judgment regarding the potential increase of mercury methylation due to increased sulfates in the system. The statement, "Increases in mercury methylation require increased amounts of mercury" is not necessarily true. The level of mercury in Northshore Mining's discharge water is not the point here; more than sufficient mercury is deposited in virtually all surface waters in Minnesota from the atmosphere to provide an excess of mercury to the system. Birch Lake is on the State's impaired waters list for mercury; children and women of child-bearing age are advised not to eat more than one meal per month of any size of walleye or northern

pike caught in its waters. The question is not whether there is sufficient mercury to make the situation worse, but whether sulfate from Northshore Mining's discharge is making the situation worse.

The EAW cites the Berndt and Bavin report, apparently in support of its statement, "The proposed project also does not have high potential to contribute to mercury methylation downstream of the discharge points." It is difficult to discern what is meant by the EAW text, but the indication "that increased sulfate may not be a direct cause of increased mercury methylation" is insufficient to dismiss the issue, because the converse is also true. Increased sulfate *may* be a direct cause of increased mercury methylation; many academic and scientific studies indicate that this is often the case. The EAW does not present enough information to support a conclusion that it is not the case in the wetlands where Northshore Mining discharges its mine water and/or in downstream waters.

IV. The expected impacts on hydrology are significant.

The impacts of mining on hydrology in the Partridge River and the Dunka River and its tributaries as currently planned at closure of the Peter Mitchell Pit are clearly significant. The impacts to the Dunka River system are described by the EAW as follows:

> Hydrologic impacts to Langley Creek and Unnamed Creek at closure are presented in the *Long Range Hydrology Study* (Barr 2008), but do not address the specific, incremental impacts of the proposed Project on that final condition. At closure, dewatering to Langley Creek will cease, resulting in a 46 percent decrease in watershed area relative to the current condition, and a decrease in average annual flow relative to the current condition and to the Project condition of approximately 60 percent (i.e., the majority of existing flow originates from pit dewatering). The proposed project accounts for approximately 6 percent of the cumulative reduction in watershed area estimated in final closure (and by extension, a similar reduction in flow) relative to existing conditions.
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> The watershed tributary to Unnamed Creek will increase by approximately 450 percent in final pit closure, relative to existing conditions. Flow in Unnamed Creek will increase at closure to six to seven times the current flow, as the entire pit lake will drain to the Dunka River via Unnamed Creek (Barr 1136 2008). The proposed project accounts for approximately 3 percent of the change in watershed (and by extension, a similar increase in flow) relative to the current condition.
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> At closure, the average annual flow in the Dunka River will increase by approximately 11 cfs, a 30 percent increase over the existing condition (Barr, 2008). These impacts are described in greater detail in the *Long Range Hydrology Study* (Barr 2008), as approved by the MNDNR. Flow impacts at closure will be mitigated with development of pit-lake littoral habitat area (as described in the Peter Mitchell Pit Mitigation Plan).

EAW p. 29. The EAW ignores hydrological impacts to the Partridge River, which according to the *Long Range Hydrology Study* include decreases in flow of as much as 50% at the Dunka Road crossing, with even greater decreases upstream.

The significance of this degree of impact on several miles of streams does not need elaboration. We do point out, however, that the DNR clearly sees it as significant in that it required a plan to compensate the public for the loss of water resources. The most appropriate time for an EIS to assess impacts and alternatives for hydrology was probably before removal of the pillar separating the Lake Superior and Rainy River basins was approved. Apparently no MEPA review was conducted at the time. This does not mean, however, that the issue is moot. This and future expansions will result in cumulative contributions to the hydrological impacts at closure. Despite removal of the pillar, there may still be alternatives that would result in less hydrological impact (including but not limited to continuing an appropriate volume of discharge to the Partridge River after closure).

Furthermore, it appears from the information available that the current and future expansions are likely to add greatly to the hydrological impacts. According to the *Long Range Hydrology Study*, the total volume of the mine pit below 1600 feet will be more than 4 times larger at closure than it was in 2008, and the area at 1600 feet will triple. (Barr 2008, Table 3) Estimates of increases in groundwater inflow vary; the VF II Stockpile Report states that inflow will increase from 760 gpm to 2,160 gpm, while the EAW states that the inflow will increase from 760 gpm to 1779 gpm. It seems obvious from these figures that much of the physical, on-the-ground activity that will result in hydrological impacts are still in the future, and thus could benefit from an alternatives analysis.

We doubt very much that the percentage of the hydrological effects from this and future expansions will be equivalent to the increase in the area of the pit at the surface, as the EAW assumes. In any event, this is not determinative of whether an EIS is required. That determination is based on the *total* impact of this and connected and phased actions, whether past or future (or alternatively, on the cumulative impact of all actions, past or future, that have similar impacts on the same resources). So long as agency decisions remain to be made that could require a less damaging alternative (including additional mitigation), an EIS remains appropriate.

V. The potential environmental effects of this project cannot be assessed without contingency plans and financial assurance information.

According to the EAW, Northshore Mining will prepare a contingency plan to address water quality problems should they occur. Financial assurance estimates have been prepared, but were not included in the EAW. Both of these items are essential to a reasoned consideration of the potential environmental effects of this project.

Clearly, the waste rock at issue here has the capacity to produce low-pH, high-metals leachate. The actual water quality of leachate from VF Type II rock in the Peter Mitchell Pit cannot be determined with any certainty before the mining actually happens. As discussed above, this entire area of science is fraught with uncertainty; the DNR has itself spent millions of dollars over the last few decades attempting to address it. Because of this uncertainty, a contingency plan that details the steps to be taken if the predictions are wrong needs to be in place to ensure that an error in predictions does not result in unanticipated impacts on the environment. That contingency plan needs to address not only issues that arise within the life of the mine, but the potential for water quality issues as far into the future as they might occur. In order to ensure that mitigation of worse-than-expected water quality is possible and financially viable, the contingency plan needs to be written before the project begins. The DNR cannot rely on a contingency plan that has not yet been written to conclude that there will be no significant impacts on water quality.

In addition, predictions of water quality to be released to the environment are based on planned mitigation measures, such as the stockpile cover, and these mitigation measures are expensive. It appears that all parties acknowledge that the potential environmental effects of the project are likely to be much greater than they would be without the mitigation measures. It also appears that the DNR believes that the risk that Northshore Mining will have insufficient funds to carry out that mitigation is significant enough that the DNR is pursuing financial assurance. To put it another way, without adequate financial assurance, this project presents the potentially significant effects of an unmitigated stockpile of sulfide-bearing rock left exposed to the elements. It is thus incumbent on the DNR to include details of the financial assurance plan in environmental review documents, so that the public can judge whether the planned mitigation is certain to occur.

VI. This project requires a NPDES/SDS permit reissuance.

According to the EAW, the current NPDES permit from the Minnesota Pollution Control Agency is sufficient to cover the pit expansion. We disagree. First, as Minnesota Center for Environmental Advocacy points out in its comment letter, this project requires reissuance of the NPDES permit. The increase in metals and sulfate is a material change that would ordinarily require permit modification; because Northshore Mining's permit has expired, reissuance is required in this case.

In addition, Minnesota's nondegradation rules require action by the Minnesota Pollution Control Agency. The nondegradation rules are based on the policy that "water quality conditions that are better than applicable water quality standards and are better than levels necessary to support existing beneficial uses must be maintained and protected unless the commissioner finds that, after full satisfaction of [the nondegradation rules], a lowering of water quality is acceptable." Minn. R. 7050.0185(1).

Under the rules,

> If a person proposes a new or expanded significant discharge from either a point or nonpoint source, the agency shall determine whether additional control measures . . . can reasonably be taken to minimize the impact of the discharge on the receiving water. In making the decision, the agency shall consider the importance of economic and social development impacts of the project, the impact of the discharge on the quality of the receiving water, the characteristics of the receiving water, the cumulative impacts of all new or expanded discharges on the receiving water, the costs of additional treatment . . . , and other matters as shall be brought to the agency's attention.

Minn. R. 7050.0185(4).

An "expanded" discharge "means a discharge that changes in volume, quality, location, or any other manner after January 1, 1988, such that an increased loading of one or more pollutants results. In determining whether an increased loading of one or more pollutants would result from the proposed change in discharge, the agency shall compare the loading that would result from the proposed discharge with the loading allowed by the agency on January 1, 1988." Minn. R. 7050.0185(2)(B). An expanded discharge is "significant" if it contains "any toxic pollutant at a mass loading rate likely to increase the concentration of the toxicant in the receiving water by greater than one percent over the baseline quality." Minn. R. 7050.0185(2)(G)(3).

According to the EAW, the mine pit expansion would increase the mass loading of many pollutants at a rate likely to increase the concentration in the receiving water by greater than one percent. These pollutants include copper (increase of 9 to 80%), nickel (increase of 92 to 314%) and zinc (increase of 13 to 120%), all of which are toxic pollutants. 40 C.F.R. § 401.15. The MPCA thus must conduct a nondegradation review in the course of permit reissuance before any activity begins that would result in this increase in mass loading.

VII. More information is needed on mineral fiber emissions to determine the significance on human health.

Mineral fibers that closely resemble asbestos fibers are known to be present in rock at the Peter Mitchell Pit. The emission of these fibers from the Northshore Mining processing plant in Silver Bay has been subject to a control standard to protect public health for decades. Although there has been a great deal of debate about the standard, to our knowledge it continues to be the Minnesota Pollution Control Agency and Department of Health's position that the standard is appropriate to guard against health risks. These same fibers are released into the air at the mine pit, with no regulatory standard applied and apparently with no assessment of the impact on the health of mine workers or others who live, work, or recreate in the area.

The EAW dismisses this concern as follows:

> Type II VF is expected to have significantly less potential to generate mineral fibers than Type I VF or BIF, because amphibole minerals present in the Virginia Formation are primarily associated with the diabase sills (Golder, 2012), which are generally categorized as Type I VF. In addition, the Virginia Formation is non-ore grade, so it would not be crushed and processed. Avoiding the crushing of Virginia Formation rock would result in a low potential for generation of mineral fibers.

EAW at 15. This statement completely ignores the generation of mineral fibers from the crushing of BIF rock, even after telling us that BIF rock has significantly more potential to generate fibers than Type II VF rock.

While we understand that the crushing of BIF rock does not represent a change in practices at the mine, to our knowledge the release of mineral fibers and its impact on human health has never been assessed in a MEPA review. Furthermore, the long-term plan apparently includes quadrupling the size of the pit over the next 100 years; simple arithmetic indicates that the amount of rock being blasted and moved will have to increase over what it has been in the past. Also, the impact of the release of fibers on local residents and mine workers is surely cumulative over time. For all these reasons, the impact of mineral fibers on human health should be considered in an EIS before mine expansion is permitted.

We believe that these fibers do have the potential to significantly impact human health. MPCA data indicates that fibers in the ambient air in Babbitt are as high or higher than those in Silver Bay. The taconite worker health study has found a significantly increased rate of mesothelioma in taconite workers, the source of which is in debate. Unfortunately, the taconite workers health study is not designed to look at toxicity of the mineral fibers; the State of Minnesota seems intent *not* to determine what part mineral fibers in taconite ore plays in the mesothelioma rate among taconite workers.

As explained in our comments on the PolyMet SDEIS, a similar scenario has played out in other places, with the same industry actors and lawyers making the same arguments. The public health crisis in Libby, Montana provides more than sufficient reason for caution, which would include an assessment of the health risks of mineral fibers before expansions are permitted at the Peter Mitchell Pit. We are attaching the Expert Affidavit of Steve Ring, along with accompanying comments prepared for the PolyMet SDEIS, the Expert Affidavit of Steve Ring, and several articles about EPA testing of mineral fibers or fragments taken from the Peter Mitchell Pit to further explicate this issue (Attachments 3 through 9).

VIII. More information is needed about the cumulate amount of wetlands that have been and will be destroyed in the Dunka and Partridge River watersheds.

Although this project requires a permit for the destruction of twelve acres of wetlands, the EAW completely ignores cumulative impacts from wetland destruction in the Langley Creek and Dunka River watersheds. It provides no information on the number of acres or percentage of wetlands that have already been lost from mining at the Peter Mitchell and Dunka Pits, nor on the acreage or percentage of foreseeable wetland losses in the future. It is thus impossible to determine whether the potential cumulative wetland loss is significant. The EAW also does not describe the wetland *functions* that will be lost due to this, past, or future activities.

Connected or phased actions or reasonably foreseeable actions will clearly impact additional wetlands beyond those described in the EAW. According to the EAW, the inflow to the mine at the time of closure will increase from 760 gpm to 1779 gpm. It defies belief that this increase will have no impact on wetlands.

Finally, we disagree that because this project will not individually impact the Partridge River watershed, the loss of wetlands in that watershed does not need to be considered. As the EAW notes, the physical barrier between the watersheds has been destroyed, and the divide is currently being artificially maintained by pumping and discharge. The pit expansion in this case is clearly the first step in a much larger, long-term plan to access the ore that lies at greater depth. It seems entirely possible that the impacts of the planned mining over time will be felt in the Partridge River watershed as well as the Dunka River watershed. And if at closure water is no longer discharged to the Partridge River, a very significant loss of wetlands in the Partridge River headwaters is bound to occur. The current mine expansion is one of the many phased/connected/cumulative actions that will result in that loss, and the loss must thus be considered before the expansion is permitted.

IX. An alternatives analysis is needed to determine whether alternatives are feasible that would have less impact on the environment.

Under the Minnesota Environmental Policy Act, if a project (including connected or phased actions) is likely to have significant environmental effects (either individually or cumulatively), that project cannot go forward if there is a "feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state's paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction." Minn. Stat. § 116D.04(6). An alternatives analysis is thus a critical component of MEPA review. The Northshore Mining pit expansion could benefit from an alternatives analysis in a number of areas.

A. An EIS is needed to consider alternatives to the extent of disturbance and exposure of Virginia Formation Type II rock.

As noted above, Figure 10.1 of the EAW provides a cross-section of the rock that will be removed under the permit amendment. The figure indicates that about 400 feet of surface overburden will be removed beyond the limit of the BIF ore that will be removed by this project. The removal of rock beyond what is needed to access the ore to be mined under this permit amendment will apparently uncover a great deal – perhaps more than half – of the VF Type II rock that will be disturbed and stockpiled in this project. If this is truly a stand-alone project as the EAW states, we question whether there might be an alternative that requires less exposure, excavation, and movement of VF Type II rock.

Even if this is not a stand-alone project, we believe that potential water quality impacts might benefit from a review of the mine plan by a qualified mining engineer whose primary consideration is environmental impact rather than cost and efficiency. We would particularly like to see a review of the long-term comprehensive plan *before* actions are taken that might foreclose a less harmful plan in the future.

This project will also leave a significant amount of VF Type II rock exposed on the pit wall. Once again, if this is truly a stand-alone project, based on the scant information available to us it appears that the area of exposure could be minimized. In addition, we believe there may be methods that could be used to reduce exposure to the elements. In its initial mine plan, PolyMet planned a cover over part of its pit wall; while the EPA and other parties questioned the effectiveness of that plan, it does seem that it would be better than no plan at all.

B. An EIS is needed to consider alternatives to stockpile placement, management, and design.

We also would like to see a review of the stockpile plan to see if there might be alternatives that would reduce the environmental effects. For example, an EIS should consider the alternative of moving VF Type II material to a location that will be completely submerged at mine closure.

An EIS should also consider an alternative to the plan for Type I/Type II rock characterization. The alternative of placing all VF rock from blocks that contain any Type II rock in the Type II stockpile should be considered, along with possible alternatives that would provide a more refined sorting process in the field.

C. An EIS should consider alternatives for several activities related to water quality.

An EIS should be used to consider alternatives to direct discharge of mine water, such as active or passive treatment. In addition to the potential for increases in heavy metals in local and downstream waters, alternatives need to be considered to deal with high sulfate discharge. While the incremental increase from the current expansion is not predicted to be large, the sulfate level in discharge from the East Pit appears to have risen steadily over the past decade, to the point where it is almost certainly impacting wild rice downstream. It would be nice to believe that this will be addressed by the Minnesota Pollution Control Agency in NPDES permitting, but we have seen no reason to believe that this is the case.

As far as we are able to tell, the predicted increase in constituent levels in discharge is based only on the current expansion. Figure 10.1 (the best information that has been made available to us) leads us to believe that a good deal more VF Type II rock will be excavated in future expansions, and we have to wonder what the future increases are likely to be. If a treatment facility is likely to be needed ten or twenty years down the road anyway, it would be instructive to know what the additional cost would be of building that plant now.

Finally, the DNR should consider requiring monitoring of leachate from the VF Type II stockpile and pit wall, and regular reporting of the monitoring data. Monitoring this water before it mixes with other water at the pump could be helpful not just for early knowledge about a developing problem in the Peter Mitchell Pit, but also to add to the DNR's knowledge about the leaching potential of Virginia Formation rock for other applications.

D. An EIS should consider alternatives to the closure plan.

It appears from the EAW and Long-Range Hydrology Study that the DNR has already conducted an informal assessment of Northshore Mining's closure plan and the hydrological impacts that will result, to the point of requiring mitigation measures to compensate for some of the impacts on public resources. The closure plan is a long way from implementation, however, and much of the activity that it addresses has yet to be permitted. It is therefore not too late to consider alternatives under the auspices of MEPA.

We remain concerned about the legality of the planned diversion of water out of the Lake Superior Basin. The record materials for the EAW include responses by Reserve Mining Company, Northshore Mining's predecessor, to questions from the DNR. The DNR asked,

> The Peter Mitchell Mine is located astride a major divide between the Hudson Bay watershed and the Lake Superior watershed. How does Reserve assure the continued flow of water into the appropriate watersheds and how does Reserve

> propose to accomplish the same continued flow in the future as mining progresses deeper and upon closure?

The response was,

> Water from precipitation, surface flows and underground flows enter the Peter Mitchell Mine and, to the extent they do not flow through unaided to their appropriate watercourse and watershed, are pumped to the proper point so that the mine is dewatered as needed and so that the waters remain in the original course and shed. This is presently accomplished by a series of pumping stations located according to need along the south side of the Peter Mitchell Mine through the nine mile length of the open pit.
>
> To preserve the division of waters between the two watersheds in the future, pit barriers, dams or ditches may have to be constructed.

This document is dated May 11, 1983, and we assume it informs the terms of the 1985 permit, as it follows the permit application (dated 1981), which is referenced by the 1985 permit approval.

The Water Resources Development Act (WRDA) that precludes diversions out the Great Lakes Basin without approval of all of the Great Lakes governors was enacted by Congress in November 1986. *See* 42 U.S.C. § 1962D-20(d). The more recent Great Lakes Compact implements and clarifies the WRDA prohibition, but the prohibition was very much in place before the signing of the Compact. Perhaps we are missing an intervening document that approved a diversion sometime between March 1985 and November 1986; if so, please provide it. If not, the diversion needed the approval of all of the Great Lakes Governors even if it pre-existed the Compact.

At any rate, we do not believe that the diversion of Great Lakes water has yet occurred, as Northshore Mining continues to pump water to the two respective watersheds. It undoubtedly would have made more sense to comply with the law (i.e., obtaining the approval of the governors) before the pillar separating the watersheds was removed, but we see no reason why removing the pillar would excuse compliance.

The amount of time, attention, and energy that went into the Great Lakes Compact is clear evidence that a diversion of this much water out of the Great Lakes Basin is a significant environmental effect. Rather than claiming that this diversion is "already permitted," a claim for which we have seen no evidence, DNR should conduct a MEPA alternatives analysis to prepare the least environmentally harmful plan possible to address hydrology on closure. The time to conduct that analysis is now, before additional actions are permitted that will add to future hydrological impacts.

Once again, thank you for preparing an EAW on this project, and for the opportunity to comment. Between the hydrology and the Virginia Formation rock, the Peter Mitchell Pit appears to have a number of environmental issues that could benefit from the MEPA process. We hope that the DNR will do the right thing and prepare an Environmental Impact Statement.

Sincerely,

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