



February 3, 2010

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Mr. Jon K. Ahlness
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Re: Comments on the NorthMet Project Draft Environmental Impacts Statement (October 2009)

Dear Mr. Arkley and Mr. Ahlness:

On behalf of the board, staff, and members of the Friends of the Boundary Waters Wilderness (“Friends”), I submit this letter and attached documents as comments on the NorthMet Project Draft Environmental Impact Statement (“DEIS”). Thank you for this opportunity to provide our input, information, concerns and recommendations for this proposed project of PolyMet Mining, Inc.

The board, staff and members of the Friends seek the protection of the Boundary Waters Canoe Area Wilderness and the larger Quetico-Superior ecosystem. The organization values healthy ecosystems, clean water, wilderness character, and primitive recreation. Our members from all over Minnesota and the country enjoy the area for its canoeing, camping, fishing, hunting, birdwatching, and many other reasons, as well as the region’s natural, largely-undeveloped character. The risks presented to many of these activities and attributes by nonferrous mining have been a significant concern for our organization for many years.

The Friends has conducted an extensive analysis of PolyMet’s proposed mine near Hoyt Lakes, MN. As part of our review, we worked with four technical experts with knowledge in the areas of geophysics, hydrology, geology, and wetlands and aquatic ecology. These individuals studied the DEIS and its associated technical background documents. Their written reports include relevant information, concerns and

recommendations. These reports are attached and should be considered part of the official comments by the Friends. The technical experts have included their credentials with their reports. Listed here are the individuals and their areas of focus in reviewing the DEIS:

- Dr. David Chambers, geophysicist; focus: mining engineering
- Dr. Paul Glaser, wetland geohydrologist; focus: hydrology and wetlands
- Dr. Donald Siegel, hydrogeologist; focus: hydrologic and selected geochemical aspects
- Dr. Daniel Engstrom, aquatic ecologist; focus: mercury and sulfate discharges

In our comments below, we frequently refer to these reports and cite these individuals, but their entire reports should be read for their complete analyses, and we ask that the agencies respond not only to the issues we identify in our comments but to each issue and concern identified in the expert reports

The Friends appreciates the effort and time involved in developing the DEIS. It is evident that a great deal of resources were involved in preparing it. However, despite the large amount of information provided in the DEIS, many significant issues associated with this proposed project remain unaddressed.

Based on our review of the DEIS and guided by input from the technical experts, the Friends has significant concerns about the PolyMet proposed mining operation as it is currently conceived. Our comments to follow detail these concerns. Some key issues identified in our comments include:

- Lack of any financial assurance calculations that would enable understanding the long-term environmental impacts of the project.
- Lack of a detailed reclamation plan (that should be tied to a financial assurance analysis) for necessary closure activities.
- A dangerously unstable tailings basin design that the DEIS acknowledges has a low margin of safety, and which would contain hazardous wastes.
- Unspecified required mitigation actions for the mine operator.
- High risk of mercury and sulfate contamination to Minnesota water bodies, with the risk of the bioaccumulation of mercury in fish, and human health implications; no identified method for preventing this contamination.
- Predicted water pollution lasting possibly 2,000 years.
- Repeated omissions in data collection and disclosure that prevent a full understanding of the risks of the project.

These and other concerns outlined in detail in our comments below are not minor. The flaws of this project pose unacceptable risks to human health and the environmental well-being of a potentially large area of northeastern Minnesota.

Given this level of risk, the Friends cannot support the PolyMet project as it is currently proposed. We recommend the “No Action” alternative be the selected outcome for this

project. We urge the agencies to consider the detailed recommendations provided here, which we believe would greatly improve this proposed project.

Thank you for your consideration of our input and recommendations.

Sincerely,

A handwritten signature in black ink, appearing to read "Betsy C. Daub". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Betsy Daub
Policy Director

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I. Significant Omissions

A. Financial Assurance

1.) The DEIS fails to provide information about the amount of financial assurance that will be required for the project. This is a fundamental problem with the DEIS.

“Any additional detail regarding the amount of financial assurance associated with reclamation actions cannot be estimated until these actions are understood at a deeper level of design detail. This detail is more typically made available during the permitting process. Therefore, further discussion of financial assurance figures and instruments are not included in the DEIS” (DEIS pg. 3-48).

But the inclusion of information regarding financial assurance is key if the public is to understand and assess the potential effectiveness of reclamation and closure activities. Financial assurance and a reclamation closure plan inform the public about the potential long-term environmental impacts of the mine and their absence in the DEIS is glaring.

Financial assurance should be fully explored in the EIS. The DEIS outlines the possibility that long-term water treatment, monitoring, and maintenance may be required for the Proposed Action, making a timely analysis of financial assurance essential in fully appreciating the potential impacts. It is unclear, after years of design preparation by PolyMet, what new information regarding design details will become available between the release of the DEIS and permitting that would dictate that financial assurance calculations cannot be determined and outlined in the EIS.

The U.S. Environmental Protection Agency (EPA) has also urged that financial assurance disclosure occur during the NEPA process. In an August 2009 letter regarding the NorthMet project, the EPA stated regarding the lack of financial disclosure for this project: “The EPA recommends including financial assurance information because one key component to determining the environmental impacts of a mine is the effectiveness of reclamation and closure activities...EPA has recognized the importance of disclosing financial assurance in EISs....” (U.S. EPA August 2009).

The EPA’s National Hardrock Mining Framework recommends that the:

“EPA should evaluate the adequacy of EISs for mining operations in predicting the long-term environmental impacts of mining operations. Assessment of financial assurance mechanisms that will be utilized to provide funding of required long term environmental management systems is critical to this analysis” (U.S. EPA 1997).

Dr. David Chambers has also highlighted the omission of financial assurance calculation as a major flaw in the document. “...the financial surety for the project could easily be in excess of \$100 million. This is a very significant potential impact to the public, who is ultimately accountable should the mine operators go bankrupt without an adequate financial surety to close the mine and treat waste water” (Chambers 2010).

Recommendation:

Including financial assurance information in Environmental Impact Statements has become standard practice, especially for mining projects in which long-term water treatment is expected. The PolyMet project anticipates long-term water treatment needs, and its EIS must include the necessary financial assurance calculations for the public to assess risks and impacts. Financial assurance calculations must be included in the EIS. It is critical to fully understanding the potential environmental impacts from this project. The lack of financial assurance in the DEIS renders the analysis incomplete and inaccurate. This analysis should not be delayed until permitting.

2.) By not calculating the financial assurance, the DEIS fails to provide a full understanding of needed closure activities and closure costs. Water treatment actions are “one of the most important components of closure, especially from a financial standpoint...” (Chambers 2010).

The DEIS acknowledges a need for water treatment for at least 45 years after mine closure. Given the predicted water contamination that may last for 2,000 years, it is obvious water treatment will be needed for a long time, if not in perpetuity.

The DEIS does not clearly outline what the water treatment plan will be, and provides no cost analysis. Dr. Chambers provides a way of estimating these costs, something the DEIS did not do:

“Again, as a rough estimate, the net present value of a chemical precipitation only system for the mine is \$27 million, and for a nanofiltration only system for the mine \$37 million. These costs include 20 years of operating costs...The closure water treatment systems will need to operate for at least 45 years, and the existing treatment systems will be 20 years old when closure begins. Given that the closure operating period is over twice as long as the 20 year mine operating period for which the cost estimates were made, and that the treatment systems will quite likely need to be replaced and upgraded during this 45 year period, using a figure of twice the cost estimate for the operating mine would seem to be a reasonable estimate. That would place the net present value of the Closure water treatment in the range of \$54 million to \$74 million for financial surety purposes” (Chambers 2010).

This is a very large amount of money. The public will be liable for this cost or be forced to accept the water contamination if financial assurance is not properly calculated or if the mine operator goes bankrupt. As a result, the public has a right to be provided with thorough estimates as early as possible to properly understand the risks associated with this project. It is alarming that the only financial estimate provided in the DEIS, the Project Preliminary Closure Cost Estimate Summary (DEIS pg. 3-48), does not appear to contain water treatment operating and capital costs. If water treatment is not a component of financial assurance calculations, Minnesota taxpayers and human and natural resource health will be placed at unacceptable risk by this project.

Recommendation:

Financial assurance calculations must be included in the EIS. Water treatment operating and capital costs must be a component of financial assurance calculations. Dr. Chambers

believes closure costs will likely require a financial surety of about \$100 million. The agencies overseeing the development of the EIS have an obligation to inform the public of this risk and to protect the public from unacceptable risk through full disclosure. The DEIS must also provide a rationale for why water treatment may only be needed for 45 years when pollution is expected to continue for much longer. Any longer treatment estimates must be included in closure costs and analyses.

B. Reclamation Plan

1.) The DEIS presents an incomplete plan for reclamation activities that will be needed to responsibly close the mine. Dr. Chambers notes:

“Lack of a viable reclamation plan and cost closure estimate is a major flaw in the EIS...It does not go far enough to present these details as a complete reclamation package that can be assessed in terms of what the overall reclamation goals are and how they will be met, whether the closure technologies that are proposed are viable, and how much implementing these closure and post-closure technologies will cost” (Chambers 2010).

Elements missing in the reclamation plan include: assessments of the technologies available to close the mine, estimates of the costs of these technologies, and articulation of overall reclamation goals and how they will be achieved. Central to this plan must be the calculations of financial assurance detailed within the EIS.

Recommendation:

Dr. Chambers notes,

“Mine reclamation should not be developed based on future technologies, or future resources. The pre-mining reclamation plan needs to lay out a basic approach to reclamation using technologies that are proven and have measurable costs, and with enough detail to provide a conservative but reasonable estimate of what these closure costs will be” (Chambers 2010).

Elements to include in a more detailed reclamation plan in the EIS are: assessments of the technologies available to close the mine, estimates of the costs of these technologies, and articulation of overall reclamation goals and how they will be achieved. Central to this plan must be the calculations of financial assurance detailed within the EIS.

As Dr. Chambers highlights in his comments, most modern EISs analyze the reclamation plan as part of the EIS process. He recommends that the PolyMet EIS do the same, and show the reclamation liability on a year-by-year basis. His attached comments provide an example of a reclamation plan with an appropriate level of detail and cost estimates (Pogo Project Reclamation and Closure Plan, Dec. 2002). This template should be used to develop an appropriate reclamation plan for the PolyMet project.

2.) The DEIS describes general maintenance activities that would need to continue through post-closure, including:

“repair of stockpile and tailings dike slope erosion, wetland outflow structure up-keep to ensure they are functioning properly, woody species and tree removal on stockpiles and

hydrometallurgical cells with membranes, tailings pond maintenance, and seepage collection from the Tailings Basin” (DEIS pg. 3-49).

These are all maintenance activities that will be required in perpetuity. Given this perpetual maintenance requirement, this project cannot ever be deemed “reclaimed.” Minnesota Nonferrous Metallic Mineral Mining Rules (Chapter 6132) clearly indicate that reclamation goals are for post-closure maintenance to cease. The rules also state: “No release from a permit to mine shall be approved for a portion of the mining area requiring post-closure maintenance until the necessity for the maintenance ceases” (MN Rules 6132.4800 Subp. 3).

Given these requirements, both the mine site and the tailings basin will fail to qualify, ever, as reclaimed. In addition, the responsible mining entity will never be released from their permit obligations. This is a failure to reach reclamation goals to achieve maintenance-free conditions and a final release from the permit conditions.

Recommendation:

The EIS must incorporate designs that achieve Minnesota State reclamation goals for an eventual maintenance-free site.

C. Land Exchange and the Mine Site

1.) While PolyMet has leased the privately held mineral rights at the mine site, the surface rights are in public ownership, managed by the U.S. Forest Service. The DEIS notes: “It is the position of the United States that the mineral rights leased by PolyMet do not include the right to open pit mine the National Forest System land” (DEIS S-1). PolyMet and the Forest Service are exploring a possible land exchange to trade to PolyMet the mine site in exchange for new land to put into public ownership. The DEIS indicates that a separate EIS will evaluate this proposed land exchange. The PolyMet DEIS does not examine the potential environmental impacts of this land exchange even though it is an integral component of this project.

The U.S. EPA in an August 2009 letter to the U.S. Army Corps of Engineers regarding the PolyMet project identifies as a “red flag issue,” the failure to analyze impacts related to the potential land exchange with the U.S. Forest Service:

“We are concerned that some impacts related to the potential land exchange between the U.S. Forest Service are not covered in the PDEIS. We question whether the discussion of the land exchange can be deferred to a separate EIS, as it is a connected action which is clearly related to the NorthMet project” (U.S. EPA August 2009).

Recommendation:

The EIS must include a complete analysis of the proposed land exchange. This is obviously a related and connected action to this project with the potential for environmental impacts.

2.) The DEIS fails to provide important information about the value of the site proposed for the land exchange, land that would be significantly and irrevocably altered during the mining operation. The proposed mine site was identified in the late 1990s as special habitat worthy of protection in two assessments, one conducted by the U.S. Forest Service and another by the MN DNR. In these evaluations, the scientists concluded that the mine site, part of what is called the “100 Mile Swamp,” represents some of the highest quality habitat remaining in the landscape.

In January 1997, as part of its preparation for the Forest Plan Revision, the Superior National Forest released a report titled, “Identification of Potential Natural Areas, Including Representative Ecosystems, on the Superior National Forest” by forest biologist Robin Vora. The report summarized a process to identify natural areas on the forest that might qualify for permanent protection. The focus was to develop a list and general description of the highest quality remaining examples of common ecosystems present in each Landtype Association (“LTA” or “landscape”). The report notes, “A network of natural areas helps to protect biological diversity at the genetic, species, ecosystem, and landscape scales. Natural areas representative of common ecosystems in natural conditions serve as baseline or reference” (Vora 1997).

The PolyMet potential mine site was identified in this report as part of the “100 Mile Swamp.” It sits within LTA 8A, and was considered one of those “ecosystems in natural condition” that was representative of its landscape, and a good candidate for protected status. The site is especially important as LTA 8A was noted as lacking ecosystem representation in protected areas. Features that gave this area a high ranking were its watershed integrity, the size of its wetlands, the presence of riverine ecosystems, and the large amount of interior forest present.

In December 1997, the Minnesota DNR released a report called, “Evaluation of Selected Potential Candidate Research and Natural Areas as Representative Ecological Landtype Associations on the Superior National Forest, Minnesota.” This study was conducted by plant ecologist Chel Anderson. The purpose of this assessment was to continue the evaluations begun by Robin Vora. The assessment was to further assist the Superior National Forest in evaluating areas for protection for the Forest Plan Revision process. The study analyzed the 93 sites identified by Vora and developed a shorter list of 45 sites worthy of consideration as protected natural areas. The assessment notes that these sites represent the highest-quality remaining examples of characteristic ecosystems in each ecological Landtype Association on the Superior National Forest.

Again, the “100 Mile Swamp” appears on this list of worthy candidates. The report notes, “Inclusion of the 100 Mile Swamp site would very likely complete representation of the prominent ELTs [ecological landtypes], and provide some additional upland diversity” (Anderson 1997).

Representative ecological systems within the Laurentian Highlands, the ecological subsection in which the PolyMet mine site is located, include forested communities dominated by aspen-birch, jack pine barrens, red and white pine on uplands, and conifer

bogs and swamps in the lowlands. The PolyMet mine site sits on a conifer bog and lowland swamp.

Within the Laurentian Highlands are 58 species identified as Species in Greatest Conservation Need, including 12 species that are federal or state endangered, threatened or of special concern. Habitat loss, habitat degradation and pollution represent some of the most pressing threats to these species. Lowland conifer forests have been identified by the MN DNR as key habitats for Species of Greatest Conservation Need in this subsection. Within the Laurentian Highlands, 22 Species of Greatest Conservation Need are typically associated with lowland conifer forests like the 100 Mile Swamp and PolyMet mine site. These include Gray Wolf, Canada Lynx, Sedge Wren, Bay-breasted Warbler, Black-backed Woodpecker, Golden-winged Warbler, and Boreal Chickadee.

The Revised Forest Plan for the Superior National Forest did not adopt the concept of representative natural areas in each landscape (LTA). This leaves the PolyMet mine site/100 Mile Swamp unprotected. This leaves one of the highest quality examples of LTA 8A without protection. The 100 Mile Swamp remains an important example of its ecosystem type within its landscape.

The industrialization of an area identified in multiple reports as providing important habitat value and worth of protection would be an irrevocable loss to the State of Minnesota. The DEIS notes that alternative sites for the project were not evaluated, as the ore deposit sought by PolyMet is found at the NorthMet location. While mining this deposit may be in the best interests of PolyMet, the loss of the site and its acknowledged habitat values would be a permanent loss to the public, who are the current owners of the land. Habitat fragmentation, loss of biological diversity, loss of representative habitats types, and climate change are threats to Minnesota's natural resources that only make sites like the 100 Mile Swamp more valuable and worthy of protection.

Recommendation:

The EIS should acknowledge the high quality habitat that this proposed mine would destroy. The job of the EIS is to provide full clarity of the potential impacts of the project. By not disclosing the information about previous assessments of this land, the DEIS fails in fulfilling its responsibility.

D. Geographic Scope of Evaluation

The DEIS evaluates the potential environmental impacts from the proposed project, but the scope of the evaluation was largely limited to a five mile radius around the mine site, the plant site, and the transportation corridor. Given predicted water quality violations, the acknowledgement that drainage from the project will enter both surface and groundwater, the geotechnical instability of the tailings basin, admitted global warming impacts, and the many uncertainties in data and modeling, this project is certain to have impacts broader than a five mile radius around the project's core.

Recommendation:

The EIS must provide evaluation of the potential impacts within a much larger zone, including likely impacts to the entire St. Louis River watershed and Lake Superior. Statewide impacts, such as those from increases in carbon emissions from the project, must be included. (See Comments III.B.2.)

E. Mitigation Measures

In the DEIS, mitigation measures for the proposed project are almost exclusively presented as recommendations vs. requirements. As Dr. Chambers notes, “the description of the mitigation measures end with statements like: the measure ‘warrants further consideration;’ or ‘it is recommended that...;’ or the measure ‘should...;’ or, could..., or would...” (Chambers 2010).

It is unclear and unstated which, if any, of the mitigation measures the responsible agencies will find significant enough to make requirements in the permit. It is unclear and unstated which measures will be considered voluntary. Dr. Chambers comments:

“Since the EIS is a document that is tied directly to the state and federal agencies that will be issuing the permits necessary for the mine to operate, it would be reasonable for the public to assume that the agencies can and would require some or most of the mitigation measures described in the EIS when they issue the permits for the mine. But the way the mitigation measures are described in the DEIS all of the mitigation measures would be voluntary. That leaves this reviewer, and the public, unsure what the final project will look like and what effects it will actually have” (Chambers 2010).

Recommendation:

The EIS should specify what mitigation measures will be required of the mine operators. Voluntary measures should be stated, enabling the public to “comment on the relevance and importance of the voluntary mitigation measures” (Chambers 2010). Voluntary mitigation measure must be assumed, for impact analysis, as not occurring.

F. Data Collection and Disclosure

A full understanding of significant environmental impacts can only be realized with the appropriate gathering of data and analysis. Repeatedly throughout the DEIS, however, it is clear that opportunities to gather relevant, available information were not taken. Models were created, with assumptions that may be inaccurate, to assess issues such as groundwater flow, when real world information could have easily been gathered for analysis. Details of models and assumptions are often not disclosed, making a review of these methods difficult. So often are necessary data missing, that an accurate portrayal of this project’s impacts is potentially not reflected in the DEIS.

Some examples of this insufficient data collection and disclosure are detailed in Dr. Siegel’s report, including:

- Insufficiently documented groundwater modeling approaches. “These models may, in fact, be inappropriate to address the problems considered; (a) dewatering caused by the mine and (b) how rapidly potentially contaminated water might move from the closed mine to the Partridge and Embarrass Rivers” (Siegel 2010).
- Installation of insufficient ground water monitoring wells and piezometers in bedrock to either characterize where and how ground water in bedrock moves across the site, or how it interacts with the Partridge River.
- Insufficient characterization of how water leaking from the present and future tailings pond may carry potential contaminants north to the Embarrass River. “The hydrologic conditions caused by tailings ponds present for many years offered a unique opportunity to directly evaluate important contaminant transport properties at the proper distance (scale) along subsurface pathways to the river prior to mine opening. PolyMet chose not to do this, but to develop models and other methods to infer what might happen” (Siegel 2010).
- Inappropriate assumption for the modeled area that the rock properties of the hydrostratigraphic bedrock aquifers in the mine site are uniform in all directions. There was little effort to characterize the distribution of fractures in the bedrock either by analogy with other sites in the Iron Range, or by direct measurement. “Without this characterization, no conclusion can be clearly made as to where potentially contaminated water might move in bedrock...” (Siegel 2010).
- Inadequate characterization of the potentiometric surfaces of bedrock aquifers from lack of measuring water levels, the potential for surface-water and groundwater interaction with respect to the Embarrass and Partridge Rivers, and the degree to which groundwater moves vertically naturally and under the influence of drainage through the bedrock to the mine pit.
- Inadequate assessment of the potential for contaminants to leak from the tailings basin, despite the presence of the existing tailings basin from which existing seepage could have been measured.

Please refer to Dr. Siegel’s full report for additional data collection and disclosure issues, and his recommendations for addressing these issues.

Dr. Engstrom notes many similar issues with insufficient data, overdependence on modelling, and inadequate sampling regarding the analyses for potential mercury methylation and sulfate contamination.

- A lack of useful data or supporting information on which to base predictions of methylation risk due to field sampling that was too little and of poor data quality.
- Inadequate sampling of water chemistry of area lakes and streams affected by past iron mining activity as a method of comparison and prediction for the methylation effects of additional sulfate discharges
- Failure to assess mercury exposure through the collection of biotic samples such as fish, as most mercury monitoring programs today include.

Recommendation:

Additional data collection must be conducted, and the results of this disclosed in the EIS. The technical experts repeatedly indicate that real world data is far more reliable and predictive than models with potentially faulty and layered assumptions. In nearly all cases, the data needed can easily be collected. See Dr. Siegel's and Dr. Engstrom's reports for complete recommendations for additional information and collection methods. Some of their recommendations include:

- Providing additional documentation about groundwater modeling, including water table maps and model assumptions
- Installing approximately 6 additional monitoring wells in bedrock south of the proposed mine area to determine how groundwater in bedrock moves across the site.
- Installing a series of shallow piezometer nests and water table monitoring well along appropriate transects from the existing tailings pond to determine such things as flow direction
- Installing several piezometer nests south of the mine and adjacent to the Embarrass and Partridge Rivers to better understand groundwater interactions with the rivers.
- Obtain direct measurements of head and water chemistry downgradient and perpendicular from the existing tailings basin to assess leakage and solute transport.
- Collect biotic samples and analyze for mercury contamination
- Design a well constructed sampling program to assess methylmercury production that includes more and strategic sampling sites

It is disturbing that, after years of preparation, the DEIS contains so many omissions and data gaps, and that opportunities to examine existing conditions that would obviously be helpful, were not taken. This lack of information must be resolved for the EIS to be complete.

G. Cumulative Impacts

The DEIS fails to include in its examination of cumulative effects on water resources, known mining projects that are currently in development. Dr. Chambers notes,

“For example, there are several mining projects in the advanced stages of exploration that should be considered as reasonably foreseeable. These projects include the Duluth Metals Ltd – Nokomis deposit and the Franconia Minerals Corp – Birch Lake deposit. Ignoring the potential for these developments understates the cumulative impacts to the region” (Chambers 2010).

In an October 29, 2008 tour of the PolyMet processing plant, the existing LTVSMC plant, Friends staff member Greg Seitz was told by PolyMet that 8 of the 24 crushers would be operating for processing ore from the NorthMet project. The Friends is concerned that if permitted, PolyMet is likely to use the un-used portions of its plant to process ore from other nonferrous mining operations. If this is the intent, it must be

outlined in this EIS. There are obvious potential cumulative impacts to the tailings basin, wetlands and water resources from increased activities resulting from handling ore from other mining operations.

Recommendation:

Mining projects in the advanced stages of exploration should be included as reasonably foreseeable impacts for analysis of the NorthMet project's cumulative impacts. Any anticipated use of the processing plant, tailings basin, project lands, and transportation corridors to handle ore from other mining operations must be included in this EIS's cumulative effects analysis.

H. Underground Mine Alternative

The option of developing an underground mine rather than the open pit mines of the Proposed Action was rejected by PolyMet as:

“Not economically viable. The rate of ore production of an underground mine would not support the processing rate necessary to economically process the low-grade ore...Additionally, the ore deposit is shallow and broadly distributed throughout the Mine Site...” (DEIS pg. 3-64).

But in Dr. Chambers' review of support document “ALT11 High Level Underground Costs,” from PEG Consultants Inc, July 30, 2009, he found only a limited economic analysis of an underground option.

“This was not a detailed analysis of the costs of underground mining at the NorthMet site. The document is only 2+ pages in length, and lays out what must be rough estimates of the costs of underground mining compared to open pit mining. The scope and depth of analysis presented in ALT11 is not enough to state conclusively that underground mining is not economical at this site” (Chambers 2010).

The tribal cooperating agencies provide additional information to suggest more consideration should be given to the underground alternative:

“A study of this particular deposit was performed by U.S. Steel that recommended underground mining. By examining cross-sections showing the distribution of ore by depth, it appears that there are substantial ore reserves at depths that likely could not be accessed by the proposed open-pit mine. The ecological costs of open-pit mining and above-ground disposal of tailings and waste rock are immense. This ecological cost, combined with the most current understanding of deposit ore grades and reasonably possible metals prices, must be evaluated to determine the viability of this alternative” (Tribal Cooperating Agencies, DEIS pg 3-64).

Recommendation:

The EIS should provide a thorough analysis of the underground mine alternative, examining ore distribution, the economic viability of this option and the potential environmental impacts of an underground mine.

II. Water Pollution Risks

A. Reactive Waste Rock and Material

1.) Waste rock disposal plans under both the Proposed Action and the Mine Site Alternative raise water pollution concerns.

Proposed Action

Storage of reactive waste rock permanently above ground the acknowledged potential to generate Acid Mine Drainage (AMD) and to leach metal contaminants.

The Proposed Action calls for placing only a portion of Category 1 and 2 waste rock, the least reactive material, into the East Pit for subaqueous disposal before converting the pit to a created wetland. Category 1 and 2 waste rock are predicted to contain less than 0.3% sulfur. Meanwhile, the Proposed Action would permanently leave on the surface all of the Category 3 and 4 waste rock, with sulfur contents between 0.3 and 0.6%. The DEIS indicates that Category 3 is medium reactive waste rock that may generate acid mine drainage and is predicted to leach heavy metals resulting in drainage with heavy metal concentrations in excess of water quality compliance levels. Category 4 waste rock is labeled highly reactive. “This material would generate ARD and leach heavy metals resulting in drainage with heavy metal concentrations in excess of anticipated water quality compliance levels” (DEIS pg. 3-14).

Indeed, modeling described in the DEIS indicates significant potential pollution problems from storing reactive waste rock above ground. Table 4.1-44 shows results of modeling showing potential groundwater exceedances from the waste rock stockpiles. The Category 3 Lean Ore stockpile shows potential exceedances of copper, iron, manganese, nickel, aluminum, beryllium and thallium. The Category 3 waste rock stockpile shows potential exceedances for antimony, arsenic, copper, iron, manganese, nickel, sulfate, aluminum, beryllium, and thallium. The Category 4 waste rock stockpile shows potential exceedances for antimony, iron, manganese, nickel, aluminum, beryllium, and thallium.

Additional modeling shown in Table 4.1-45 in the DEIS shows predicted groundwater exceedances into the Partridge River for nickel from the Category 3 Lean Ore stockpile lasting 50 to 2,000 years. Category 3 waste rock stockpile is predicted to exceed groundwater criteria for antimony, manganese, nickel, and sulfate from 50 to 2,000 years. Contamination exceeding groundwater criteria from the Category 4 waste rock stockpile is predicted for antimony lasting 90 to 250 years.

Storing medium to highly reactive waste rock permanently above ground presents acknowledged and unacceptable pollution risks for unacceptable durations.

Under the Proposed Action, some Category 1 and 2 waste rock will also be stockpiled on the surface, also with pollution risks associated with it. In one DEIS model, Category 1 and 2 waste rock are predicted to exceed groundwater evaluation criteria for arsenic, antimony, sulfate, aluminum, iron, manganese, beryllium and thallium. In a second

model, antimony, arsenic and sulfate are predicted to exceed groundwater evaluation criteria for 100 to 2,000 years.

Mine Site Alternative

The DEIS also presents a Mine Site Alternative to the Proposed Action that would place all the Category 3 and 4, as well as Category 2, waste rock into the East Pit for subaqueous disposal. The only permanent stockpiles would be for Category 1 waste rock and overburden. This is a preferable plan to the Proposed Action.

Dr. David Chambers notes: “Backfilling Category 2, 3 and 4 waste rock into the mined-out East Pit would probably be the most protective of water resources in the long-term” (Chambers 2010).

Nevertheless, although the Mine Site Alternative is preferable, modeling in the DEIS shows significant ground water pollution risks from this alternative action. A concern is the “dissolution of oxidation products formed prior to inundation with water in the East Pit (i.e. during temporary surface stockpiling) and continued reaction of the rock once submerged” (DEIS pg. 4.1-136). Modeling in the DEIS assumed oxidized solutes would be leached during the flooding of the East Pit.

Dr. Glaser notes in his report that the treatments proposed in the DEIS for limiting Acid Mine Drainage (depositing waste rock in the mine pits, submerging rock to create oxygen-limiting conditions, and applying limestone as a neutralizing agent) are commonly used but not always effective.

“First, it is now recognized that *Acidithiobacillus ferrooxidans*...the common bacterium responsible for pyrite oxidation and acid mine drainage, is a facultative anaerobe since it is capable of surviving and solubilizing metals under anaerobic conditions...Second, *A. ferrooxidans* has been shown to grow and etch pyrite crystals under circumneutral conditions in laboratory cultures apparently by forming biofilms that maintain an internal environment favorable for its growth...” (Glaser 2010).

Tests described in the DEIS to determine the potential for the development of AMD may not be reliable in providing meaningful results. Dr. Siegel notes, “I find the results of the humidity experiments done at benchtop-scale bear little, if anything, on what will happen in the actual stockpiles or subaqueously to waste rock deposited in the former mine pits. The DEIS must address the matter of scale more directly and why these studies were done” (Siegel 2010).

Modeling done for the Mine Site Alternative assumed all backfill rock would not oxidize further once it was submerged. This assumption is made without any explanation, and despite this being identified as a potential issue associated with subaqueous disposal of these categories of waste rock.

Table 4.1-70 describes potential exceedances in groundwater criteria for the Mine Site Alternative that include: Category 3 Lean Ore stockpile exceeding criteria for aluminum, beryllium and thallium; Category 3 waste rock stockpile exceedances for antimony,

arsenic, iron, manganese, aluminum and beryllium; Category 4 waste rock stockpile exceedances for iron, aluminum, beryllium and thallium. The DEIS indicates that Category 2 and 3 waste rock stockpiles could exceed criteria for antimony for 125 to 2,000 years.

Recommendation:

Category 2, 3 and 4 waste rock should be back-filled into the mined-out East Pit. The EIS must, however, fully examine the potential for backfilled rock to continue oxidizing and then examine the risks to surface water and groundwater should this scenario occur. Dr. Glaser notes, "...a degree of caution should be exercised in the Draft EIS with regard to the generation of acid mine drainage by the waste rock" (Glaser 2010). Dr. Glaser recommends that statements in the DEIS that describe that the proposed treatments will render the waste rock *inert* should be either altered or qualified to recognize that the prescribed treatments have not always been effective in preventing AMD. An on-going monitoring plan should be included in the EIS, designed to check for the generation of Acid Mine Drainage within the mine pits and its seepage into surrounding areas. An adaptive management plan must be included in the EIS in case, as Dr. Siegel notes, "unanticipated surprises evolve, particularly in light of the serious modeling uncertainty, lack of direct pertinent information on the surface water and hydrogeologic system as it now stands, and the natural history of the inability of the environmental review process to project the extent of AMD at heavy metal mining operations elsewhere" (Siegel 2010) (see also Kuipers et al. 2006). The EIS must present designs and methods to prevent contamination that exceeds water quality criteria.

2.) The Proposed Action also calls for storing peat and unsaturated overburden in an unlined area called the Overburden Storage and Laydown Area. "Peat, in particular, is a sink for mercury. The wetting and drying of the peat that would occur in this storage area would promote the methylation of mercury" (DEIS pg. 4.1-166). The DEIS recommends that drainage from this area be collected and treated at the WWTF.

Recommendation:

Collecting and treating drainage from the Overburden Storage and Laydown Area must be a requirement in the EIS, rather than a recommendation.

3.) Saturated Overburden would be stored in the Category 1 and 2 waste rock stockpiles.

The DEIS describes analysis that indicates this overburden is likely to be high in sulfur content, sometimes equivalent to Category 4 waste rock. There is a risk of it acidifying and releasing metals and sulfate. "There is a concern that placement of this material in the Category 1 and 2 waste rock stockpile could result in acidification and release of various metals and sulfate on a liner system that was not designed for this level of reactivity" (DEIS pg. 4.1-165).

Recommendation:

The EIS should require that qualifying overburden be placed in the appropriate stockpile for its reactivity. An effective method for characterizing the reactivity of material in the field must be developed and required.

B. West Pit Flooding and Drainage After Closure

1.) After mining operations cease, the Proposed Action calls for the West Pit to naturally flood with groundwater, precipitation, and surface runoff, eventually leading to overflow into the Partridge River around Year 65 (about 45 years after mine closure).

The DEIS indicates that water quality standards for mercury could be exceeded in the long-term discharge from the West Pit, as neither the WWTF nor the East Pit constructed wetlands are “expected to be consistently effective in mercury removal” (DEIS pg. 4.1-123). Antimony from the West Pit drainage is predicted to exceed groundwater criteria for 550 to 2,000 years (DEIS Table 4.1-45). Additional exceedances may occur for nickel and sulfate. The deterministic model used to analyze West Pit overflow water quality predicts arsenic, cobalt and selenium would exceed surface water quality standards. An additional analysis, “uncertainty analysis,” predicts exceedances of surface water quality standards for cobalt, copper and nickel (DEIS pg. 4.1-113, Table 4.1-64). Sulfate concentrations are also predicted to be high. The DEIS notes:

“There is the potential that this overflow could result in a short reach (approximately 1,000 feet) of the Upper Partridge River between the confluence with the unnamed tributary and the South Branch Partridge River exceeding some surface water standards. The water quality of the West Pit overflow, however, is not predicted to result in exceedances of surface water standards in the Partridge River at SW-004a (located approximately 1,000 feet downstream from where the West Pit overflow would reach the Partridge River and downstream of the confluence of the South Branch Partridge River)” (DEIS pg. 4.1-113, 114).

But the DEIS does not provide flow information for this unnamed water body or explanation of why it is expected to sufficiently dilute contamination. This water body is a protected water of the State of Minnesota, and sacrificing it to potential contamination is not acceptable. The DEIS also fails to explain why contamination in the Upper Partridge River will be limited to 1,000 feet.

Recommendation:

The predicted pollution from the overflow of the West Pit violates the Clean Water Act. The EIS must present alternative designs and methods to prevent contamination that exceeds water quality standards. Given that neither primary method of water treatment is expected to be effective at removing mercury, the EIS must present an alternative method that is. Additional information must be presented to explain the expected geographic extent of contamination. No water bodies of the State of Minnesota should be sacrificed to pollution.

2.) Another concern for West Pit overflow comes from oxidation of West Pit rock wall that is predicted to be a significant source of contaminants in the pit lake (see Comments II.C.). As the pit gradually fills with water after closure, the exposed rock wall may oxidize and release metal contaminants into the filling lake. One mitigation measure explored is to more rapidly flood the West Pit. “The likely source of water to expedite flooding of the West Pit would be Colby Lake” (DEIS pg. 4.1-166). But, as the DEIS notes, Colby Lake already has elevated concentrations of mercury. If this method were used, mercury contamination in the West Pit overflow “could make it more difficult for the West Pit overflow to meet the Lake Superior surface water standard for mercury. This potential mitigation warrants further consideration” (DEIS pg. 4.1-166).

Recommendation:

The EIS should study this approach further and provide information describing its findings. Measures that involve elevated mercury levels being discharged from the West Pit should be rejected. The EIS should present other methods to achieve West Pit filling without mercury contamination.

3.) The DEIS acknowledges that overflow from the West Pit is predicted to exceed surface water quality standards at least initially. The DEIS does not explain what time frame is meant by “initially” nor any reason why the exceedances are expected to be finite. At closure, potentially contaminated hydrometallurgical drainage as well as waste rock stockpile drainage will be routed to the East Pit, which eventually will flow to the West Pit, which will overflow into the Partridge River. MODFLOW modeling in the DEIS predicts hydrometallurgical drainage to gradually decrease to zero by Year 34. “Waste rock stockpile drainage would continue to receive chemical treatment at least until the West Pit fill around Year 65. At that time, water quality monitoring of the West Pit overflow would determine whether continued treatment would be necessary” (DEIS pg. 4.1-67).

But Dr. Chambers believes the conclusion that water treatment will be unnecessary after 65 years is not a reasonable one.

“...the assumptions used in determining the scaling factors...for the release of contaminants from the waste rock piles could easily contain inadvertent errors (for example in the choice of particle size, temperature, fraction of rock flushed by infiltrating water and the upper limit of contaminant concentrations) that could cause a significant departure from the predicted contaminant loads assumed in the EIS” (Chambers 2010).

The scenario that water treatment of West Pit drainage will be necessary beyond 65 years is strongly possible. In fact, analyses of mines over the past two decades have shown poor abilities in accurately predicting post-mining water quality and quantity. In a review of 25 EISs for hardrock mining, 89 percent of those that experienced AMD had predicted low AMD potential in their EISs. “Therefore, nearly all the mines that developed acid drainage either underestimated or ignored the potential for acid drainage in their EISs” (Kuipers et. al. 2006).

Recommendation:

The duration of “initial” exceedances for West Pit drainage of surface water quality standards must be defined in the EIS. Contingencies should be put in place to fund long-term water treatment beyond the assumed 65 year limit. Given the poor record of predicting water quality post-mine operations, financial assurance calculations should be made conservatively for water treatment.

4.) The DEIS lays out several potential corrective actions should water quality of the West Pit drainage exceed standards. It does not, however, indicate which actions would be required and which are simply recommendations. It does not indicate what conditions would trigger specific corrective actions. The DEIS notes that if actions failed to improve water quality in the overflow, that “...the West Pit overflow structure could be altered to route flows to the WWTF for treatment before discharge...” and that “...it is recommended that the water quality of the West Pit be monitored regularly after Closure...” (DEIS pg. 4.1-167).

Recommendation:

The EIS must make it clear which corrective actions are required. Triggers for mitigation actions must be clear and outlined. Routing contaminated overflow to the WWTF must be a requirement rather than a recommendation. Monitoring overflow water quality post-closure must be a requirement rather than a recommendation. The duration of “initial” exceedances of surface water quality standards must be defined.

C. East Pit Category 4 Exposed Rock Wall

When mining the East Pit is complete, approximately 5,000 linear feet of the north wall of the East Pit will consist of “Virginia Formation or other Category 4 rock material” (DEIS pg. 3-40). The DEIS notes, “If left exposed to the air, oxidation of this surface would occur, resulting in elevated concentrations of dissolved salts (sulfates) and metals entering the East Pit surface water” (DEIS pg. 3-40). The Proposed Action calls for applying a layer of limestone against the rock face to neutralize the acidity, and installing a geosynthetic membrane cover system over the rock surfaces. The DEIS, however, acknowledges that “successful application of this measure has not been demonstrated. The groundwater quality modeling discussed below assumes these mitigation measures are successfully implemented” (DEIS pg. 4.1-66).

Recommendation:

Relying on an untested method to contain significant pollution is not acceptable. The EIS must contain analysis of field and laboratory tests of this technique. It must also model impacts to groundwater quality should this technique fail.

D. Inaccurate Characterization of Wetlands and Water Table

1.) The DEIS characterizes the wetlands at the mine site as bogs that are “isolated from underlying groundwater, receiving virtually all of their water and nutrient input from

precipitation. They receive essentially no groundwater inflow and have extremely low seepage rates to the underlying surficial aquifer” (DEIS pg. 4.1-4).

Dr. Glaser disagrees with this characterization of the wetlands as “perched” or “raised” bogs. His assessment is based on using a standard, accepted definition of raised bog which would indicate the project’s wetlands are not, in fact, raised bogs. His analysis of the species composition at the mine site shows these wetlands to be comprised of fen indicators.

The DEIS describes the wetlands as dominated by spruce, tamarack and balsam fir, with occasional occurrences of white cedar and deciduous swamp birch. It also describes the presence of speckled alder, raspberry and blue bead lily. “However, balsam fir, white cedar, swamp birch, speckled alder, raspberry, bead lily and all the grasses in Minnesota are reliable fen indicator species that are never found on true raised bogs” (Glaser 2010).

Finally, Dr. Glaser’s own visits to the PolyMet site leads him to characterize the wetlands as fens. “I have made 2 trips to the PolyMet site in 2006 and 2009 to see the existing facilities, vegetation, and general environmental setting of the project areas” (Glaser 2010).

Tribal cooperating agencies also disagree with the wetland characterization in the DEIS, and argue that no data support this conclusion.

Correct wetland characterization is important because wetland type conveys information about the degree of hydrologic connectivity. The DEIS asserts that as perched bogs the wetlands have little to no connection with underlying groundwater. This would mean potential contamination might be less likely to spread through groundwater flow and that there would be less risk of the methylation of mercury. However, as fens, the wetlands may likely be influenced by groundwater transporting dissolved sulfate from the waste rock or tailings basin. And this additional supply of sulfate could increase the production of methylmercury.

Dr. Glaser notes:

“Since the species composition provided for the bog vegetation types within this Draft EIS includes species that are clearly fen indicators, it is impossible to say that these wetlands are disconnected from groundwater flow systems as stated in this report. It is also illogical to conclude that these wetlands are ‘perched’ since many of the wetlands in the PolyMet site are probably forested or non forested fens poor fens that are supplied at least partly by surface or ground waters that has percolated through mineral soil” (Glaser 2010).

Recommendation:

The EIS should use more generally accepted definitions for bogs, fens, marshes, peatlands and other types of wetlands “so they conform to international scientific literature and also the scheme adopted by the Minnesota DNR’s County Biological Survey’s treatise on the native plant communities of Minnesota” (Glaser 2010). Dr. Glaser’s report highlights four criteria that help define raised bogs that the EIS should

use. The EIS should properly characterize these wetlands and fens. The EIS must provide supporting data for any further claims that little to no groundwater inflow and seepage rates occur in the wetlands at the mine site.

Samples of surface waters in the wetlands of the proposed project should be collected and analyzed for pH, alkalinity, and dissolved solutes (particularly calcium) to help distinguish bogs from fens and to determine the ability of these wetlands to neutralize acid. Further analysis and field tests should be conducted to examine the hydrologic connectivity of the mine site wetlands.

2.) Related to the inaccurate characterization of the project's wetlands, the DEIS also assumes that these wetlands have "perched" water tables that are isolated from groundwater flow systems. Dr. Glaser notes, "The basis for this assumption is not clear since the local hydrogeologic setting seems unfavorable for perched water tables to develop" (Glaser 2010). As he describes, perched water tables are more common within deep glacial deposits, such as terminal moraines and till plains. The DEIS indicates that the project area is comprised of a shallow layer of impermeable glacial deposits.

The hydrologic connectivity of wetlands to groundwater has implications for the production of methylmercury. "...[T]he assumption of perching should have been based on actual field data or explained more fully" (Glaser 2010).

Recommendation:

The EIS should provide data to support a claim of a perched water table or eliminate references to this in the document. "Erroneous explanations for perching contained in this report (e.g. 4.2-2 'slow movement through soils causing the perched wetland water tables') should be deleted" (Glaser 2010).

The EIS must include additional field tests to determine the hydrology of these wetlands, such as monitoring nests of piezometers to determine hydraulic head gradients and pore-water chemistry in response to snowmelt and precipitation. Dr. Glaser recommends a long-term monitoring plan to detect unexpected changes in the pore-water chemistry that can be related to Acid Mine Drainage and the transport of contaminants from the mine pits, waste rock stockpiles, and the tailings basin.

E. Poorly Defined Wetland Treatment System

1.) At closure, the Proposed Action calls for allowing the water level in the East and Central Pits to fill above the level of the waste rock that will have been backfilled into the pits. When the filling is complete, approximately one year after closure, "the top of the backfilled pit would be designed to function as a treatment wetland" (DEIS pg. 3-12).

This created wetland is expected to passively treat stockpile drainage. It is unclear from the DEIS, if stockpile drainage would first be treated at the WWTF and then sent to the East Pit wetlands, or first discharged into the wetland and sent to the WWTF only if the

discharge still exceeds limits. Two apparently contradictory statements are provided in the DEIS:

Pg. 3-41: “If stockpile drainage ceases or meets water quality discharge limits via treatment through the East Pit wetland treatment system, the drainage would not be collected for treatment at the WWTF. However, as long as there is drainage that does not meet discharge limits after wetland treatment, that drainage would be conveyed to the WWTF. Effluent from the WWTF would then be pumped for final polishing to the East Pit wetland treatment system.”

Pg. 3-42: “Water draining from the stockpile liners and water collected in the stockpile foundation underdrains after Closure would be monitored and returned to the WWTF for treatment if necessary, and ultimately discharged to the East Pit treatment wetlands.”

The statement on page 3-42 does not mention the initial discharge to the wetland before going to the WWTF.

Recommendation:

The EIS must clarify if stockpile drainage after closure will first go to the wetland or first to the WWTF. Where this water goes first is important, given the lack of supporting information for the effectiveness of the wetland system (examined in sub-section 3 below). The EIS must also explain what “final polishing” of effluent means. If this means the water leaving the WWTF still needs additional treatment, then it must explain what contaminants remain post-WWTF treatment. The EIS should provide information and field tests to support the belief that the wetland treatment system is capable of removing contaminants.

2.) The East Pit wetland system is planned to receive pore water from the Hydrometallurgical Residue Facility at the Plant Site, but does not describe the potential impacts for water quality.

Recommendation: The EIS should describe what the composition of the pore water is expected to be and show supporting data for the ability of the WWTF and the East Pit wetland to adequately treat this.

3.) PolyMet has not demonstrated that a created wetland system can effectively function as a water treatment system. Despite this lack of supporting data, the Proposed Action relies heavily on the assumption that it will work. The DEIS states:

“PolyMet assumed wetland removal efficiencies in the East Pit passive wetland system would range from 50 to 80-90% for six parameters (DEIS Table 4.1-63). Constructed wetlands have proven effective at removing various pollutants, but the results have been variable” (DEIS pg. 4.1-112).

Results at the nearby Dunka Mine, where constructed wetlands were used to remove certain metals, show that concentrations of zinc and nickel actually increased. The DEIS states, “Metal removal effectiveness of these wetlands also had strong seasonal variability. Sulfate removal was highly variable” (DEIS pg. 4.1-112). And the DEIS

acknowledges that a literature review “also reveals a wide range of variability in the pollutant removal effectiveness of constructed wetlands treating mine drainage and other pollutant sources” (DEIS pg. 4.1-112). The DEIS also notes, “Constructed wetlands performance, however, is not sufficiently reliable to function as the primary treatment measure for assuring consistent year-round compliance with water quality standards” (DEIS pg. 4.1-113).

Dr. Glaser notes: “The Draft EIS proposes that wetlands could be used to treat acid mine drainage that leaks from the tailings basin and/or other sources. Although wetlands are often used to consume the acidity and immobilize metals arising from AMD they are not always effective in this capacity” (Glaser 2010). Dr. Glaser’s report provides examples of mines discharging into wetlands with little effectiveness.

“The term wetland covers a very wide range of ecosystems that are characterized by very different sets of physical, chemical, and biotic properties. It should therefore not be surprising that their capacity to neutralize the acidity and remove contaminants from different types of pollution sources varies depending on the type of wetland considered and its hydrologic setting” (Glaser 2010).

Dr. Glaser further notes that the PolyMet proposed mine site has glacial deposits with low carbonate content, which may limit the capacity of the wetlands to neutralize acid drainage.

Recommendation:

Given the lack of supporting data for the effectiveness of created wetland treatment systems at removing contamination in mine drainage, it is irresponsible and unwise for this project to rely so heavily on this method as an integral component of its water treatment. The EIS must present new data to show that this method can work, or it must eliminate this method as a significant component of this project’s water treatment.

Other more reliable designs or techniques should replace this method. One option is that the WWTF would remain functional in perpetuity. Given the DEIS’ conclusion that wetland systems can never be counted on as the primary treatment method of water, then de-commissioning the WWTF will be impossible as long as contamination remains in waters emanating from the mine and tailings basin. And as the DEIS notes this contamination may continue for 2,000 years, then the WWTF should be functional for this same time period. The EIS should incorporate the cost of running the WWTF in perpetuity into its reclamation plan and cost estimates.

If the wetland system is used, a long-term monitoring plan should be outlined in the EIS that includes testing the system’s effectiveness at remediation of Acid Mine Drainage. The EIS should also include a contingency plan should the wetlands be ineffective at treating the drainage.

4.) Once mining is completed in the East Pit, it would receive WWTF effluent to help flood it. The created East Pit wetland would continue to receive this effluent, and this water would eventually flow into the West Pit, which would discharge its waters into the

Partridge River. The effluent is expected to have mercury contamination given that “the WWTF is not predicted to be very effective in removing mercury” (DEIS pg. 4.1-123). Mercury concentrations in the effluent are predicted to be above the Great Lakes Initiative standard of 1.3 ng/L (DEIS pg. 4.1-123).

The DEIS acknowledges that the constructed wetland will not likely remove mercury either.

“There is very limited data regarding the effectiveness of constructed wetlands in removing mercury...Since neither the WWTF nor the East Pit constructed wetlands, which are the two primary treatment facilities for inflow to the West Pit, are expected to be consistently effective in mercury removal, concerns exist regarding the potential mercury concentration in the West Pit...There is some uncertainty as to whether the West Pit overflow would meet the Great Lakes Initiative standard for mercury and additional analysis of this issue is recommended” (DEIS pg. 4.1-123, 124).

The DEIS also notes: “...a wetland treatment system in this location could promote mercury methylation, depending on the mercury and sulfate concentrations in the effluent” (DEIS pg. 4.1-167).

Recommendation:

The wetland system must not be relied on for mercury removal. Other methods for preventing mercury contamination must be developed in the EIS, as neither the WWTF nor the wetland can do this job. Additional analysis of the issue of West Pit overflow not meeting Great Lakes Initiative standards must be conducted and presented in the EIS. And modeling and field data collection must be done to analyze the risk of these wetlands actually promoting the methylation of mercury.

F. Waste Rock Liner and Cover Systems

The permanent waste rock stockpiles will have engineered liners to prevent acid mine drainage and metal leaching. The DEIS acknowledges concerns about the ability of the liners to perform their functions long-term:

“However, concerns remain regarding the ability of this liner system to permanently maintain these design criteria..., the potential for the geomembrane liner to degrade over long periods of time, and the adequacy of the proposed overliner buffer thickness...to protect the liner from accidental tears or rips during waste rock placement. These concerns suggest that the use of the low and average liner leakage rates for purposes of groundwater modeling could underestimate the rate of liner leakage and result in underestimates of the solute loading to groundwater” (DEIS pg. 4.1-75).

The DEIS describes these liner characteristics in Table 3.1-9 as ranging in permeability from 5×10^{-7} to 1×10^{-5} cm/sec. Dr. Chambers raises questions about how this permeability will be achieved. “How will this specification be tested during construction? What methods will be employed if testing indicates that the target permeability is not being attained?” (Chambers 2010). He notes that achieving this permeability, especially the

lower values, may be difficult unless the subgrade material consists of significant clay content.

Recommendation:

Maintenance of these liners must be perpetual to prevent the establishment of woody plants and rips and tears. Even with this maintenance, WWTF will likely need to be permanently functional to handle what will be on-going water contamination problems. Analyses should be based on high liner leakage rates. A thorough testing program for verifying the target permeability of the various subgrade barriers should be required. The EIS needs to outline a plan for initiating corrective measures if testing shows the specified permeability is not being achieved.

G. Non-Contact Stormwater Runoff

At the mine site, any stormwater runoff that has not come in contact with sites having mining activity (undisturbed and reclaimed vegetated areas) would be routed to the Partridge River. At the processing plant (except the tailings basin), stormwater runoff would be routed to Second Creek, a tributary of the Partridge River.

The DEIS acknowledges that stormwater management facilities might be needed to handle the predicted sediment that will be associated with this runoff. It does not, however, propose such a facility at this time. The lack of managing this sediment, the DEIS concedes, could lead to “increased pollutant loadings to the Partridge River” (DEIS pg. 4.1-110). The DEIS recommends, but does not require, that stormwater management controls be installed.

Recommendation:

The EIS should require stormwater runoff management controls. As Dr. Chambers notes, “This is good pollution prevention practice” (Chambers 2010).

H. Geotechnical Stability of Waste Rock Stockpiles

The DEIS raises the concern about the stability of the waste rock stockpiles.

“Proposed heights and slope angles in the preliminary waste rock stockpile designs are within typical mine engineering practice, however a slope stability assessment has not been completed. Further design and analysis would occur during permitting to ensure that the proposed construction meets acceptable design standards” (DEIS pg. 4.13-2).

Dr. Chambers notes: “As implied in the quote...analysis of these critical questions is not being conducted as part of the EIS” (Chambers 2010). Instead the DEIS indicates that geotechnical stability will be analyzed first in permitting. A failure in stability for these enormous reactive stockpile could result in significant water contamination problems.

Recommendation:

Analysis of the geotechnical stability of the waste rock stockpiles is too critical to leave to permitting, and is essential in understanding the environmental impacts of the project.

This is evaluation that must be conducted and the issues resolved as part of the EIS process. The tribal cooperating agencies concur with this recommendation. “The lack of a stability analysis for the stockpiles is a serious gap given the serious environmental consequences of a structural failure of a stockpile” (DEIS pg. 4.13-2).

I. Problematic Transportation of Ore

PolyMet plans to transport ore from the mine site to the Processing Plant by rail, using three trains consisting of rail cars with hinged sides and open tops. The DEIS acknowledges the risk of fine ore particles escaping through the hinges of the cars, and larger ore pieces falling over the tops of the cars into the environment surrounding the rail line. The tribal cooperating agencies contend that “the amount of ore that could escape from the rail cars would not be small” (DEIS pg. 3-18). Fallen ore and fugitive dust have the potential to contaminate wetlands and soils along the rail line, leading to acid drainage and metal leaching in nearby water bodies. The DEIS suggests loading finer sized ore at the center of the car, with larger pieces on the outside to inhibit the release of spillage through the hinges. It also states that track maintenance efforts would include searching for spilled ore pieces along the tracks. But the DEIS offers no supporting data to show the centerline loading method will adequately contain spillage. And identifying and recovering spilled ore pieces along the rail line will not likely be easily accomplished.

Dr. Chambers also highlights concerns about the likely risk of this uncontained spillage. He finds the effectiveness of the centerline loading method “quite frankly, not good” at containing spillage. “Unless rail cars are designed to be completely enclosed, there will be spillage and most probably metals contamination along the rail haulage-line. Given time, spillage from the rail cars could be spread from the rail line across a wide area by wind” (Chambers 2010).

Recommendation:

The risk of widespread contamination from ore spillage during uncontained rail transport, is alarming and unacceptable. The risk of localized contamination along the line must also be prevented. The EIS must require the use of completely enclosed rail cars. This is an easily solved contamination risk through the use of properly designed rail cars. Soil monitoring along the rail line should also be required. Mine closure may need to include the removal of the top one foot of soil as part of reclamation actions.

J. Concentrate Shipping

Dr. Chambers notes that the concentrate that will be produced by the processing plant and will be loaded for transport, “poses significant risk for contamination because of its high metal content and the small particle size of the concentrate material” (Chambers 2010). He notes that the pneumatically sealed rail cars or rail cars with rigid covers that are proposed are appropriate methods for transporting this material.

Recommendation:

Soil monitoring at the concentrate loading facility and along the rail line should be a requirement outlined in the EIS to detect any soil contamination that may occur.

K. Stability of the Tailings Basin

1.) The DEIS admits that “the NorthMet Tailings Basin and hydrometallurgical residue facility embankments would have a low margin of safety due to fines and underlying soils in the existing LTVSMC Tailings Basin” (DEIS pg. S-10). Despite this alarming and dangerous condition, the Proposed Action intends to use the existing tailings basin for the mine project’s own tailings wastes.

Studies of the existing basin show the peat and clay soils under the dam have the potential to become unstable under certain conditions. “There are also layers of loose saturated slimes (fine silty tailings)...which are subject to liquefaction under certain conditions and therefore may create instability of the perimeter dam” (DEIS pg. 4.13-1). There is an especially low margin of safety for Cell 2E, the area where the NorthMet tailings would be deposited, due to extensive peat in the foundation and weak slimes close to the dam face.

Also concerning is that it is not known if the weak, unstable slimes layer occurs under the Hydrometallurgical Residue Facility, the part of the tailings basin that would hold the most toxic waste products of the project.

Should the tailings basin dams fail, significant and potentially long-lasting pollution would be released, entering surface and groundwater, and spreading possibly within the watershed.

Dr. Chambers also raises concerns about the tailings basin construction design. “Upstream-type tailings dam construction, which was used for the existing taconite tailings, poses a long-term stability risk to the proposed hydrometallurgical residue cells. Upstream-type construction will also be utilized to contain the project’s flotation tailings, and again poses a long-term risk...” (Chambers 2010). Dr. Chambers notes that most tailings dam failures have been associated with upstream dam construction. Dams using two other methods, known as “downstream” and “centerline” methods, are much safer. Upstream construction is at high risk for “seismic and static failure of tailings dams” (Chambers 2010).

Recommendation:

Regarding the geotechnical stability of the tailings basin, the DEIS says further design and analysis would occur during permitting to ensure that construction would meet acceptable design standards. The MN DNR recommends that a dam break analysis and risk assessment be conducted at permitting.

It is incomprehensible why the MN DNR would not insist on this analysis and risk assessment in the EIS. This is an unacceptable delay in analysis of a design already deemed dangerously flawed. The function of the DEIS is to outline potentially significant environmental impacts. The DEIS appropriately identifies an environmental risk from the failure of the tailings dam, but then does not provide information about what the environmental impacts of this would be. The EIS must include this information. Dr. Chambers notes, “a thorough analysis of the risk associated with tailings dam construction has not been done, and needs to be conducted as a part of the EIS” (Chambers 2010).

The EIS needs to include analysis for a centerline design for the tailings basin, as this has been identified as a more stable design. The hydrometallurgical residue cells will contain the project’s most hazardous waste products. A failure of the dam for these cells would subject humans and wildlife to unacceptable toxic pollution. “Given the nature of the material to be stored in the hydrometallurgical residue cells, these cells should be designed to withstand the maximum credible earthquake” (Chambers 2010).

2.) The Tailings Basin Alternative presents an approach that incorporates certain mitigation measures. The Alternative calls for increased rock buttressing for the northern outer embankment side slope for Cell 2E to increase its stability. “Further investigations, design and analysis would occur during permitting...” (DEIS pg. 4.13-3).

Recommendation:

Any effort to increase the stability of the tailings dam is desirable. However, this design and analysis should be done prior to permitting. Supporting data should be presented in the EIS providing for a design in which the public can have confidence. Contingency plans should be described in the EIS for tailings dam failures.

L. Hydrometallurgical Cell Liners

The hydrometallurgical residue cells at the tailings basin would be lined to minimize leaching from these cells containing highly hazardous wastes. But as Dr. Chambers notes in his comments, “There is no drawing of the ‘composite liner’ so it is assumed that this is not a double liner with leak detection, but merely a synthetic liner placed directly on top of a GCL liner. A double liner with leak detection would be the most protective liner design approach” (Chambers 2010).

Recommendation:

Dr. Chambers offers this excellent recommendation: “A better description of the composite liner for the hydrometallurgical residue cells should be included in the EIS. The additional cost associated with a double liner with leak detection for the hydrometallurgical residue cells is not cost prohibitive. A double liner with leak detection would provide maximum protection for the residue material, and should be required” (Chambers 2010).

M. Existing and Future Seepage of Contaminants at the Tailings Basin

1.) The existing LTVSMC tailings basin releases contaminated seepage into groundwater and surface waters that ultimately reaches the Embarrass River. Sulfate concentrations are high for this seepage. Monitoring data indicate that mercury levels and possibly aluminum concentrations do not meet surface water quality standards at several monitoring stations (DEIS pg. 4.1-41; Table 4.1-29). Concentrations of calcium, manganese, nickel and total dissolved solids increase as they seep from the tailings basin pond to the toe of the tailings basin. Groundwater quality monitoring at wells at or near the toe of the tailings basin show elevated aluminum, iron and manganese concentrations, as well as elevated sulfate, fluoride, molybdenum and total dissolved solids. “Based on these results, NTS (2009) concluded that groundwater has been impacted by the Tailings Basin” (DEIS pg. 4.1-14).

The tribal cooperating agencies note that only limited groundwater monitoring has actually occurred, and that the full extent of existing contamination is not yet known.

PolyMet would assume responsibility for 29 of the 62 identified “Areas of Concern” and “will investigate and remediate as necessary these AOCs on a schedule approved by the MPCA” (DEIS pg. 4.1-16). The MN DNR has indicated that “any associated clean up costs for the legacy AOCs would be included in the financial assurance requirements for any Permit to Mine issued to PolyMet...” (DEIS pg. 4.1-16).

Recommendation:

The EIS must include a remediation plan and schedule to address the existing pollution problems at the tailings basin. The EIS should include a full analysis of existing groundwater contamination that includes the results of additional groundwater monitoring. Financial assurance calculations must include clean up costs for current pollution from the tailings basin and must be fully delineated in the EIS.

2.) The DEIS acknowledges that when PolyMet begins adding its own tailings to the tailings basin, seepage will continue to occur. This seepage will move into the Embarrass River and also into Second Creek which flows into the Partridge River watershed. During the life of the mine, the surface water seepage will be collected and returned to the tailings basin. Groundwater seepage would not be collected.

The DEIS states that at closure, surface seepage would continue at first but “seepage collection would be occurring at progressively reduced rates” (DEIS pg. 3-44). The DEIS notes it expects either the seeps to dry out, or that seepage will meet water quality limits and that drainage from the hydrometallurgical residue cells to eventually end. But the DEIS does not provide a rationale for these expectations. Cap and liner systems leak, and over time develop additional leaks. There are no data given to support the assertion that seeps will dry out or somehow meet water quality standards.

Recommendation:

The EIS should include an explanation for the assumptions that tailings basin seepage collection will gradually become unnecessary. It must also provide a plan for the scenario that the assumptions are wrong. And it must include calculations for financial assurance to deal with long-term contaminated seepage.

3.) At closure, seepage to Second Creek, which flows into the Partridge River, would no longer be collected, and would be permitted to drain to the River.

Recommendation:

The EIS must provide an analysis of the water quality of this seepage that will be permitted to flow into Second Creek at closure. It must examine the downstream impacts of potential contamination in that water.

4.) Groundwater seepage from the tailings basin will not be collected in the Proposed Action. Nevertheless, DEIS modeling shows groundwater seepage is expected to exceed groundwater evaluation criteria for aluminum, antimony, arsenic, fluoride, iron, manganese and sulfate, and possibly beryllium and thallium. A second model predicted aluminum exceedances for as much as 500 years.

The hydrometallurgical cell liners are expected to leak, resulting in seepage from Cell 2W that is predicted to be high in sulfate concentration. “Groundwater seepage from Cells 1E and 2E would be the primary input of sulfate into the Embarrass River during low flows in all mine years” (DEIS pg. 4.1-120).

The DEIS states, “the unrecovered seepage rate is predicted to increase to a maximum of approximately 3,800 gallons per minute in Year 20...” (DEIS pg. 4.1-65). The DEIS also states that, “because of the generally flat topography and extensive wetlands, much of this water would be expected to form ponds and inundate wetlands” (DEIS pg. 4.1-65).

Dr. Siegel notes significant deficiencies in the DEIS’ groundwater modeling that call this expectation of ponding and inundation of wetlands into question:

1. The degree to which groundwater and possible contaminants might leak from the tailings basin was not appropriately characterized by modeling due to assumptions used and “uncertainties in material properties of the porous media along the flow path” (Siegel 2010).
2. The degree to which possible contaminants from the closed mine may get into the Partridge River through groundwater flow was inadequately documented. “There was no consideration of possible migration of contaminants in bedrock under the Partridge River...” (Siegel 2010).
3. Groundwater flow is not likely to be only horizontally dispersed “given the probable subvertical and acute fracture fields which likely evolved in the tectonic setting of the emplacements” (Siegel 2010)
4. The model used in the DEIS to predict how groundwater will flow, MODFLOW, is widely recognized as “very limited in what it can do to

determine how water moves in a fractured media at the scale of this investigation” (Siegel 2010).

The DEIS predicted rates for seepage from the tailings basin into groundwater is high. The potential for this large quantity of unrecovered groundwater seepage to spread contamination is troubling.

Recommendation:

Further analysis of likely seepage rates, flow, spread and level of potential contamination should be conducted prior to permitting. More detailed field examinations of existing seepage characteristics are needed in order to predict what new seepage from the Project might do. Dr. Siegel’s evaluation of the DEIS cites the need for conducting more field tests to better understand potential environmental impacts. He notes that a major flaw in the DEIS is its reliance on models based on likely inaccurate assumptions.

“...The opportunity was there to actually calibrate such a model against real field data...I have the same concerns with the modeling PolyMet did from the tailings basin as with the other groundwater models done by PolyMet: poor documentation of results, assumptions that cannot be tested very well because of insufficient instrumentation, and inarticulated logic behind the work. This is a missed opportunity if I have ever seen one” (Siegel 2010).

5.) The DEIS assumes the average tailings sulfur content will be 0.13%. But the DEIS acknowledges the potential for this rate to be higher, with pollution consequences.

“Predictions made from kinetic testing suggest that water reacting with NorthMet tailings could become acidic when sulfur content is between 0.14 to 0.17% (Day 2008). During the small scale plant testing, some of the tailings exceeded 0.13% sulfur and were within the critical sulfur range. As a result, these tailings could produce lower pH, which would increase metal mobility. Test work by both the MN DNR and PolyMet have shown increased release of nickel and cobalt as pH begins to decrease” (DEIS pg. 4.1-95).

Dr. Chambers notes that it is commonly understood that even neutral or basic pH conditions can produce metal leaching contamination. The risk of Acid Mine Drainage and metal leaching from the tailings basin is not fully explored and analyzed in the DEIS.

Recommendation:

“More discussion and verification should be given to the findings that the sulfide sulfur content of the tailings is and will remain under 0.13% and non-acid producing” (Chambers 2010). The EIS must include scenarios for AMD and metal leaching from the tailings basin.

6.) Another concern highlighted by Dr. Siegel is that the modeling of subsurface flow assumes a flow to the Partridge River, which may be inaccurate. Unknown, for example, is if groundwater flow actually might pass below the river in bedrock. This scenario is not modeled at all, and the lack of real field data fails to provide helpful information. Dr. Siegel states, “For example, if subsurface contaminated water by passes the Partridge River, it could move north towards the larger regional lake hydrologic discharge zones within the Boundary Waters Wilderness” (Siegel 2010).

Subsurface flows that might enter the federally protected wilderness would pose significant impacts that have not been modeled or analyzed.

Recommendation:

The EIS should include:

1. Modeling and field data to assess the risk of subsurface flows into the Boundary Waters Canoe Area Wilderness.
2. Direct measurements of head and water chemistry to provide ground truth with respect to the degree of leakage and solid transport that might occur. This should include likely retardation rates for metals.
3. Direct measurements of recharge rates through till by hydrograph separation methods to understand the potential for contaminants to enter the Partridge River through groundwater flow.
4. Direct measurements of potentiometric surfaces of the bedrock aquifer, and characterization of the degree to which groundwater moves vertically naturally.
5. Additional modeling that includes the list in Dr. Siegel’s report (pg. 23) for items to include in a groundwater or solute transport model.

N. Sulfate and Mercury in Water

Both the mine site and the tailings basin will discharge high sulfate concentrations in seepage and overflow that could lead to the methylation of mercury. This is a process in which the biologically active form of mercury is mobilized from stored mercury in rocks, soil, peat and vegetation. This form of mercury can accumulate in fish and is toxic to humans and wildlife.

“Relatively high sulfate concentrations in seepage from the Tailings Basin would be released to wetlands north of the Tailings Basin and lakes downstream on the Embarrass River that represent ‘high risk situations’ for mercury methylation. There is some uncertainty as to whether the West Pit overflow would meet the Lake Superior mercury standard” (DEIS pg. S-9).

In addition to methylating mercury from high sulfate discharges, mercury can be released to water bodies by exposing rocks that contain mercury and by clearing vegetation, especially peat. “Disruption of peat deposits, such as proposed excavating and stockpiling of peat at the Mine Site...may increase the mobility of the stored mercury” (DEIS pg. 4.1-123).

The DEIS notes, “The Proposed Action would result in increased sulfate loadings via groundwater to both the Partridge and Embarrass Rivers” (DEIS pg. 4.1-125).

At the tailings basin, much of the groundwater seepage is expected to upwell into the wetlands complex north of it. “The sulfate transported by this seepage would have a long contact period with wetlands before actually reaching the Embarrass River. All of these factors may create favorable conditions for mercury methylation” (DEIS pg. 4.1-126.)

Liner leakage from the hydrometallurgical cells “is predicted to have a very high sulfate concentration” (DEIS pg. 4.1-118).

“Increasing the sulfate load from the Tailings Basin could increase the potential for mercury methylation both in the wetlands north of the Tailings Basin and at the downstream lakes” (DEIS pg. 4.1-126). Dr. Engstrom notes,

“This tailings-basin leakage poses the project’s greatest risk of increasing mercury methylation and methylmercury export to downstream aquatic environments...The configuration of the Embarrass River wetland complex make it especially susceptible to sulfate-enhanced mercury methylation. Not only would these bogs/poor fens be sulfate limited (and hence sensitive to additional sulfate), but the anticipated discharge would upwell through a mercury and carbon-rich anoxic environment ideal for SRB. Such groundwater discharge at the upland-wetland margin has been identified as creating sites of intense mercury methylation...The increased ground-water and surface discharge toward the Embarrass River would also increase mercury transport from sites of methylation to the river itself where the methylmercury load could then impact downstream aquatic systems” (Engstrom 2010).

Some of the tailings basin leakage is also predicted to occur toward the Partridge River. Dr. Engstrom notes that the DEIS downplays the risk of sulfate-enhanced mercury methylation to the Partridge River, but he states that the risk may be higher than portrayed in the DEIS.

“...the Partridge River is described as having ‘a very well-developed floodplain along most of its reaches’ with ‘many beaver dams along the entire length...which create wide pools.’ Recent studies have shown that beaver impoundments provide conditions suitable for active mercury methylation and represent net sources for methylmercury in riverine systems...It thus seems likely that the risk of enhanced methylation from sulfate discharge into the Partridge River may be greater than is concluded in the DEIS” (Engstrom 2010).

The Proposed Action calls for routing mine leachate through the artificial East Pit wetland, which may also lead to additional methylation of mercury. “...Constructed wetlands...could function as a source for methylmercury production” (DEIS pg. 4.1-123). Dr. Engstrom’s comments note that a lack of information about the proposed constructed wetland makes generating predictions about its efficacy in treating contaminated waters difficult. “However, another issue not addressed in the DEIS is the potential for mercury methylation in the constructed wetlands” (Engstrom 2010).

Methylation of mercury can also be stimulated by drying and wetting periods associated with changing water level fluctuations. The Proposed Action would create both influxes and drawdown of water that would increase the risk of mobilizing mercury.

Dr. Engstrom highlights a concern that the DEIS “only briefly considers the potential for mercury methylation in the St. Louis River estuary” (Engstrom 2010). He notes that the shallow and productive waters of the estuary suggest the potential for methylating mercury could be high. He also points out that,

“the estuary supports a rich recreational fishery and abundant wildlife, and is a critical resource for the Fon du Lac Band of Lake Superior Chippewa. The failure of the DEIS to address mercury-exposure risks in the estuary associated with the NorthMet project is a serious oversight. Based on this near-complete lack of information it is difficult to see how the DEIS can conclude (4.1-196) that, ‘Overall, the Project is not expected to contribute significantly to cumulative effects on mercury or methylmercury in the St. Louis River’” (Engstrom 2010).

Elevated sulfate concentrations also have the potential to impact waters in which wild rice grows. Wild rice represents a significant cultural resource to the Ojibwe people, especially for the Fon du Lac Band of Lake Superior Ojibwe which is downstream from the proposed project. It is the position of the tribal cooperating agencies that “extensive research in Minnesota has demonstrated that healthy and viable wild rice beds occur in waters with less than 10 mg/L of sulfate” (DEIS pg. 4.1-46). It is the position of the tribal cooperating agencies that the 10 mg/L standard (as stated in Minn. 7050) applies for water bodies where wild rice is found. The tribal cooperating agencies state:

“The PCA has used this approach in past permitting activities (MINNTAC Schedule of Compliance, 2008). The 10 mg/L sulfate standard also applies to the Partridge River below Colby Lake where several wild rice beds are located. Tribal cooperating agencies note that the Army Corps has not completed consultation on cultural issues with the potentially affected tribes. This delay means that the extent of existing wild rice beds has not been fully characterized” (DEIS pg. 4.1-33).

The PolyMet project presents a very real risk of raising sulfate concentrations above the 10 mg/L wild rice standard, with potential impacts on the health of wild rice beds.

Waters in the project area already are mercury impaired. Four lakes downstream of the project on the Embarrass River are listed for mercury in fish tissue impairments. Most of the water bodies in the project’s area are already listed as impaired for mercury and have fish consumption advisories. Most are not included in the statewide Total Maximum Daily Load (TMDL) because the mercury contamination is so severe that no remediation through the TMDL process can be identified. Most of the St. Louis River, downstream of the Partridge and Embarrass Rivers, is listed as mercury impaired. Colby Lake is on the Minnesota TMDL list, but without a TMDL plan. Whitewater Reservoir is on the TMDL list for mercury concentrations in fish. Several lakes through which the Embarrass River flows are listed for mercury fish tissue impairments.

“...the cumulative effects of past, present, and reasonably foreseeable future activities have resulted in a significant increase in sulfate concentrations from baseline conditions of approximately 5 mg/L to the existing concentration of 149 mg/L downstream of the confluence with Second Creek, which is expected to increase further as a result of the NorthMet and Mesabi Nugget Phase II projects” (DEIS pg. 4.1-189).

A serious mercury contamination situation exists for the waters into which this project’s drainage would flow. The additional discharge of mercury and sulfates that could mobilize mercury is not acceptable. The DEIS notes, “An increase in mercury bioavailability would be counter to statewide efforts to reduce mercury concentrations in

fish” (pg. 4.1-122). In their September 2009 review of the PDEIS, the Superior National Forest provided this comment for inclusion into the DEIS, a suggestion that was not incorporated: “The increase in mercury loading will make future attainment of mercury standards more challenging” (Superior National Forest 2009).

The Minnesota Pollution Control Agency recommends avoiding discharges of sulfate, including through groundwater seepage, into “high risk” situations. High risk situations include wetlands, low-sulfate water, and waters that flow to a downstream lake that may stratify, “...all of which apply to the area downstream of the Tailings Basin” (DEIS pg. 4.1-193). The DEIS accepts that, “Under the Proposed Action, seepage from the Tailings Basin would introduce additional sulfate to several high risk situations for mercury methylation” (DEIS pg. 4.1-194).

Minnesota Rules parts 7050.0185 and 7052.0300 establish non-degradation standards for surface waters and procedures for waters in the Lake Superior basin. The Lake Superior Basin non-degradation procedures apply to new or expanded point source discharges of bioaccumulative substances of concern, which includes mercury. It is unlikely, especially at closure, that mercury concentrations would meet Great Lakes Initiative Water Quality Standards. In their September 2009 comments about the NorthMet project, the Superior National Forest highlighted their concerns about mercury discharges from the West Pit overflow: “Additional information/analysis/conclusions regarding the ability of the West Pit overflow to meet the Great Lakes Initiative should be included in the DEIS. In addition, mitigation should be developed if it appears it will exceed Great Lakes Initiative standards” (Superior National Forest 2009). This additional analysis was not included in the DEIS.

The DEIS does not provide any other mechanism to deal with potential violations of mercury standards, other than to recommend gathering additional data and monitoring. The high potential for mercury contamination is one of the most problematic aspects of the PolyMet project.

Dr. Engstrom notes,

“Of principle concern in this review of the NorthMet project is the potential for significant mercury releases to air and water and possible enhancement of methylmercury production...The NorthMet DEIS is deficient in its evaluation of the risks of increased mercury methylation and the development of contingency plans for adaptive management should unforeseen problems arise” (Engstrom 2010).

Please refer to Dr. Engstrom’s entire report for his complete descriptions of the DEIS deficiencies. They include:

- Lack of useful data on which to base predictions of methylation risk. Sampling of lakes, wetlands, and streams was inadequate.
- Inadequate sampling done of the water chemistry of area lakes to assess existing sulfate leaking; an adequate sampling effort is needed to use as a comparison and

predictive tool for the NorthMet project. Dr. Engstrom notes about Barr Engineering’s sampling methods,

“It is one of the unfortunate outcomes of Barr’s stream sampling scheme that no water samples were apparently collected within the wetland complex north of the tailings basin (except at its toe). Such sampling would have provided a picture of current (legacy) groundwater discharge and associated sulfate and mercury levels by which a better understanding of the effects of increased groundwater discharge might be derived” (Engstrom 2010).

- The assessments of mercury methylation risks by PolyMet’s consultant, Barr Engineering, are scientifically biased and use inappropriate models and incorrect assumptions.
- The DEIS fails to examine the methylation risk from sulfate discharges to key locations in the watershed, including the St. Louis River estuary, the wetland complex north of the tailings basin, the bottom waters of the Embarrass River chain of lakes, and beaver impoundments along the Upper Partridge River.
- The DEIS provides little in the way of mitigating sulfate discharges and the mercury methylation potential. No consideration is given to alternatives that might sequester sulfate.
- The DEIS lacks a contingency plan for effective monitoring and adaptive management.
- The plan for monitoring focuses on water samples, without including sampling biotic communities such as fish as indicators of mercury in the system.

Dr. Engstrom believes the discharge of sulfate-laden waters from the PolyMet project is

“among the most serious environmental risks posed...Based on a large body of experimental and observational evidence, it is my view that these discharges are likely to increase the microbial methylation of mercury somewhere in the watershed of the St. Louis River, either in wetlands or lakes proximal to the mining/processing operations or possibly downstream in its estuary with Lake Superior. This increase in methylmercury production will be transferred up the food chain to increased levels of mercury in game fish, with the attendant increase in human and wildlife exposure” (Engstrom 2010).

Recommendations:

The EIS must provide a better approach to address issues of mercury and sulfates that may enhance the production of methylmercury. It is clear from Dr. Engstrom’s report that a much more thorough sampling program must be enacted to fully understand existing and future discharges. The full geographic extent of potential impacts – all the way down to the St. Louis estuary – must be examined. Alternative approaches should be explored to deal with potentially dangerous mercury and sulfate discharges. Dr. Engstrom in his report suggests exploring the potential for using the mined-out pits as sinks for mercury and potentially in removing methylmercury. Sampling of fish and other biotic indicators of mercury should be included in any monitoring program. Wild rice mercury standards should be adhered to in developing this project, and wild rice waters protected from increased levels of sulfates. Contingency plans should be included in the EIS for situations when mercury and/or sulfate concentrations exceed what is expected. A rigorous monitoring plan should be outlined in the EIS.

O. Tailings Basin Alternative

1.) The DEIS provides a Tailings Basin Alternative as a modification to the Proposed Action. The main focus of the Tailings Basin Alternative is that, unlike the Proposed Action, it would attempt to capture groundwater seepage and improve surface water collection. It proposes to capture 95% of the seepage from the tailings basin by installing a series of vertical wells on the lower-most bench of the tailings facility. But captured seepage would not be treated at the WWTF, but instead discharged directly to the Partridge River.

The DEIS states that “Based on current water quality modeling, the discharge of seepage would meet all surface water quality standards and no treatment would be needed” (DEIS pg. 3-13). But apparently contradicting this conclusion that no water treatment would be needed, the DEIS describes modeling that identifies 9 parameters as having the potential to exceed groundwater evaluation criteria: aluminum, antimony, arsenic, beryllium, fluoride, iron, manganese, sulfate and thallium (DEIS pg. 4.1-152). Additional modeling showed aluminum exceeding groundwater evaluation criteria. And the wild rice standard for sulfate is predicted to be exceeded.

Discharging untreated tailings basin seepage to the Partridge River when this discharge has been modeled to contain contaminants exceeding water quality standards, is not acceptable. The tribal cooperating agencies agree, noting “...discharging untreated tailings basin water to the Partridge River will have significant adverse impacts” (Tribal Cooperating Agencies, DEIS pg. 4.1-153). They note the presence of several wild rice beds immediately downstream of the proposed discharge point. Sulfate concentrations above 10 mg/L can adversely impact wild rice (see Comments II.N.).

The DEIS contends that, “if it were determined upon further analysis during permitting, or during operational monitoring, that pre-treatment were necessary prior to discharge, a treatment facility would be installed” (DEIS pg. 3.52). But it does not state what conditions would trigger the requirement for pre-treatment or what water quality standards the discharge would need to meet.

The U.S. EPA in an August 2009 letter also indicated its concern about discharging tailings basin water into the Partridge River.

“...The effects of these discharges to the Partridge River are not clear. We recommend the DEIS describe impacts to the Partridge River from this discharge...We have several concerns about the discharge of this water to the Partridge River or to the unnamed creek also mentioned. We recommend that impacts from discharges and mitigation discussions be evaluated as part of this decision-making phase and not deferred to some later discussion outside the NEPA process” (U.S. EPA August 2009).

Recommendation:

The Tailings Basin Alternative is an improvement from the Proposed Action in that attempts to collect groundwater seepage are made. But discharging this untreated seepage directly to the Partridge River should not be permitted. The EIS must present an alternative that both captures and treats this discharge. The EIS should clearly state what

levels of contamination would trigger discharge treatment and what standards the treated water would need to meet prior to final discharge into the Partridge River. Sulfate discharges resulting in concentrations exceeding the wild rice standard should not be permitted.

2.) The DEIS notes that under the Tailings Basin Alternative, a demonstration test will be conducted of a “Passive Reactive Barrier” (PRB). During mine operations at a location north of the tailings basin, the PRB would be installed to determine its effectiveness in reducing constituents of concern such as sulfate, antimony and arsenic, from the tailings basin seepage. If effective, “a PRB could be built as a vertical unit and/or horizontal surface (i.e. constructed wetland) through the flow path of the seepage from the Tailings Basin” (DEIS pg. S-13). The DEIS states this PRB would be installed to provide final treatment of the groundwater seepage, if needed...” (DEIS pg. 4.1-148).

The PRB is an untested water treatment system. While the demonstration test will be important in determining the effectiveness of the PRB, the EIS provides no contingency plan for if it is not. If unsuccessful in the demonstration test, it will clearly no longer be an option for large-scale, long-term treatment of the tailings basin seepage. And if the PRB tests succeed, the PRB itself would need to be replaced and maintained at regular intervals for as long as water treatment is needed, possibly hundreds or thousands of years. This is long-term maintenance that does not comply with Minnesota’s goal of a maintenance-free closure.

P. Omissions in Data Collection and Disclosure

Please see Comments I.F. for our concerns about the water pollution risks from gaps in data collection and disclosure.

Q. Hydrologic and Geochemical Issues

Dr. Siegel’s report on the hydrologic and geochemical issues in the DEIS should be read in its entirety for a full description of these issues. Several of these have been noted in Comments I.F. in Omissions in Data Collection and Disclosure. Others of Dr. Siegel’s observations are highlighted below:

1.) The DEIS describes recharge rates of precipitation and snowmelt through till using calibration of mathematical models. But Dr. Siegel contends that these values for recharge “seem many factors less than probable as determined by the USGS...The amount of water calculated to potentially discharge to the mine may be factors too low, which could lead to unanticipated mine discharges to streams” (Siegel 2010).

Dr. Siegel laments the missed opportunity for PolyMet to have “directly determined the order of magnitude of the amount of recharge to both bedrock and surficial groundwater systems from changes in the water levels in their observation monitoring wells, coupled to appropriate specific yields of the materials” (Siegel 2010).

Recommendation:

Recharge rates should be directly determined from hydrograph analysis in monitoring wells installed in glacial till at the mine site.

2.) PolyMet failed to collect important hydrologic information needed to characterize the mine site. “Without this data, no direct means can be used to characterize groundwater flow in the vertical direction, up or down, from the water table or surface waters under natural or perturbed conditions. As a result, there is no means to determine the accuracy of the broad results of PolyMet’s groundwater modeling efforts” (Siegel 2010).

Recommendation:

Additional piezometers should be installed in “clearly isolated within presumed hydrostratigraphic units in bedrock” (Siegel 2010). The results of this additional data gathering should be presented in the EIS.

3.) When modeling aspects of groundwater flow, PolyMet failed to provide important information to provide a proper analysis. “PolyMet produced no water table maps or potentiometric surface maps during the mining operations, no MODPATH simulations to show groundwater velocities and flow paths before or during mining, and no hydrogeologic cross sections showing vertical flow directional and velocities” (Siegel 2010).

Dr. Siegel notes, “Given these modeling uncertainties in recharge rates, flow rates, flow velocities, effective porosity, dispersivity, and calibration points...the modeling does not provide certainty in forecasting. In the absence of proper and multidisciplinary field calibration using chemistry and water levels, there can be no assurance the models, in fact, worked” (Siegel 2010).

Recommendation:

The EIS must include the results of additional data collection. The models in the EIS should be supported with enough information for the public to do a proper analysis. The models should be calibrated to field data.

4.) The DEIS models force all subsurface flows to the Partridge River, an assumption Dr. Siegel finds unsupported by data. A lack of supporting data means the potential remains for this flow to pass below the river in bedrock. Dr. Siegel notes,

“...knowing the true flow path directions and if groundwater in bedrock flows under the river may be important. For example, if subsurface contaminated water bypasses the Partridge River, it could move north towards the larger regional lake hydrologic discharge zones within the Boundary Waters Wilderness” (Siegel 2010).

While Dr. Siegel states that the volume of water in this scenario would likely be slight, the possibility of this occurrence should still be analyzed and addressed.

Recommendation:

Knowing subsurface flow from this proposed project is critical. The EIS must include an appropriate level of collected field data, analysis, and consideration of all possible flow paths. Contingency plans should be included for if there are deviations from expected flow paths.

III. Wetland and Climate Change Impacts

A. Indirect Wetland Impacts

The DEIS concedes that the NorthMet Project would result in the direct destruction of 854.2 acres of wetlands and 667.9 acres of indirect impacts to wetlands. Indirect impacts are likely to result from hydrologic changes in the project area from activities such as pit excavation, pit dewatering, and the development of dikes and ditches.

As described in Comments II.D., there is strong evidence to suggest that the DEIS has mischaracterized the wetlands in the project area. If the wetlands are not perched bogs but rather fens with connectivity to groundwater, there is a great likelihood that indirect impacts to wetlands could be greater than described in the DEIS.

In addition, the tribal cooperating agencies point out that no reliable groundwater model for groundwater drawdown impacts of the project have been provided.

“The estimates of groundwater drawdown are currently based on anecdotal observations and analysis of historical aerial photography. Therefore, there is not quantitative assessment of mine related drawdown of the regional water table. This serious data gap has prevented an adequate indirect impact assessment for wetlands from being conducted” (Tribal Cooperating Agencies, DEIS pg. 4.2-18).

Dr. Siegel also found groundwater modeling and data collection that was insufficient to properly analyze groundwater flow. “I found that PolyMet installed insufficient ground water monitoring wells and piezometers in bedrock to either characterize where and how ground water moves across the mine site, or how it interacts with the Partridge River” (Siegel 2010).

Dr. Glaser disagrees with the assumption in the DEIS that the wetlands within the project area have perched water tables and are isolated from the groundwater flow system. “The hydrology of representative wetlands should be determined by monitoring nests of piezometers...It should not be assumed that the wetlands within the entire project area are isolated...” (Glaser 2010).

The lack of collected field data to measure hydrologic connectivity of the wetlands and groundwater and the mischaracterization of the mine site wetlands are serious flaws that could lead to a much greater impact on the hydrology of nearby wetlands than has been projected in the DEIS.

Recommendation:

The indirect impacts to wetlands from the project are likely to be much greater than portrayed in the DEIS. The EIS must re-characterize the project’s wetlands as fens, and then re-evaluate the indirect impacts to wetlands. Included in this analysis should be reliable groundwater modeling and field data collection.

B. Loss of Peatlands and Global Warming

1.) Over 900 acres of the wetlands at the mine site are coniferous bog and open bog peatland communities. If the project projections are correct, about 586 acres of peatlands will be directly impacted (destroyed) at the mine site by operations. Another 266 acres of peatlands are projected in the DEIS to be indirectly impacted, although as described in Comments III.A. above, the indirect impacts are likely to be higher than this figure. Combined, at least 852 acres of peatlands will be destroyed by the mine's operations.

Peatlands are wetlands that form over hundreds and thousands of years. They consist of the decayed remains of plants, accumulating in stagnant, low-oxygen conditions that prevent the normal decomposition of vegetation. Peat bogs function as a natural water filter, preventing flooding. Many support rare plants and animals. Peatlands are important terrestrial environments in the sequestration of carbon that would otherwise contribute to climate change.

These are wetland systems that take millennia to form. And the peatlands at the mine site have already been identified as part of the "100 Mile Swamp," an important natural area within its landscape. There can be no mitigation of the loss of these peatlands.

Recommendation:

The EIS should highlight that these are wetland systems that can never be replaced by mitigation actions. Their value and loss should be placed in a statewide and regional context within the EIS.

2.) As noted above, peatlands have been identified as crucial ecosystems in storing carbon that would otherwise contribute to global warming. The destruction of peatlands can release large quantities of previously sequestered CO₂ into the atmosphere.

The PolyMet project's peatland impacts would be at a minimum nearly 900 acres, and likely much higher (see Comments III.A.). Scientists have calculated that the loss of 1,000 acres of Minnesota peatlands translates to a release of approximately 2.7 million metric tons of CO₂ to the atmosphere. This is an increase in Minnesota's *total* annual emissions of CO₂ by approximately two percent (above 2005 levels) (Anderson et al., 2008). PolyMet's impacts on Minnesota's carbon emissions are likely to be close to this level, given their peatland impacts are nearly 900 acres and perhaps higher.

In 2007, the Minnesota State Legislature requested that the University of Minnesota produce an assessment of the potential capacity for carbon sequestration in Minnesota's terrestrial ecosystems. The Minnesota Terrestrial Carbon Sequestration Project, an interdisciplinary research group, was organized to produce that assessment. The team analyzed existing scientific literature, land existing in broad land use categories, and the role of current state policies and programs on carbon sequestration potentials. In February 2008, the Project produced a report titled, "*The Potential for Terrestrial Carbon Sequestration in Minnesota.*" Some of the key findings and recommendations of that team of researchers are:

- Peatlands in Minnesota contain the largest carbon stocks in the state, in excess of 4 billion metric tons
- Release of this carbon to the atmosphere as CO₂ can result from peatland drainage and conversion
- Release of this carbon to the atmosphere would accelerate global warming and require greater reductions in CO₂ emissions elsewhere
- Destruction of 1,000 acres of peatland in Minnesota from mining or other activities would increase the state’s total CO₂ emissions by 2% over 2005 levels

The top recommendation of this research group: “Preserve the existing large carbon stocks in peatlands and forests by identifying and protecting peatlands and forests vulnerable to conversion, fire, and other preventable threats” (Anderson et. al 2008).

In December 2006, Governor Tim Pawlenty announced the state’s “Next Generation Energy Initiative,” including the development of a comprehensive plan to reduce Minnesota’s emissions of greenhouse gases. The Minnesota Climate Change Advisory Group, a broad-based group of Minnesota citizens and leaders, was created to develop state-level policy recommendations to the Governor. In April 2008, the Advisory Group released its report titled, “*Minnesota Climate Change Advisory Group Final Report: A Report to the Minnesota Legislature.*” Some of its key findings and recommendations include:

- “Wetlands have among the highest potential carbon-sequestration capacities for any type of land cover in Minnesota. Peatlands are likely Minnesota’s largest single carbon sink, containing 37% of all carbon stored in the state...” (Minnesota Climate Change Advisory Group 2008).
- Recommendation: “Protecting these enormous carbon reservoirs (peatlands)...is critical” (Minnesota Climate Change Advisory Group 2008).

The policy goals from the Advisory Group included:

- Protect and restore northern peatlands.
- By 2015, identify peatlands at risk of releasing greenhouse gases because of lowered water table or industrial uses such as mining.
- Design policies to protect peatlands and wetlands from drainage and other carbon-releasing land uses.

The destruction of the peatlands at the PolyMet mine site runs counter to the recommendations of both of these government-initiated studies.

The DEIS acknowledges the impacts in CO₂ emissions from wetland losses and other destruction of vegetation. “In addition, secondary emissions from the change in the existing land cover are projected. CO₂ emissions from carbon stock loss (i.e., wetland vegetation, trees and peat) due to the excavation of wetland and deforesting of the project area, as well as the loss in CO₂ sequestration from the affected land cover disturbances of the wetlands, forests, and peat storage would occur...” (DEIS pg. 4.6-31).

The DEIS notes that “...the Project would increase the CO₂ emissions in the atmosphere” (DEIS pg. 4-6-32), but it does not put this increase in a statewide context. The EIS fails to describe how much the project would add to Minnesota’s overall greenhouse gas emissions. Given the attention given to this issue by the Minnesota public, legislature and governor, the EIS should present an evaluation of this project’s statewide contribution to greenhouse gas emissions.

Recommendation:

The recommendations of both the Climate Change Advisory Group and the Terrestrial Carbon Sequestration Initiative should be heeded, and no significant losses to the state’s peatlands should be permitted. Given the projected loss of nearly 900 acres – and likely more – of peatlands, this project should be identified as proposing a significant loss of peatlands that should be prohibited. The EIS should evaluate the project’s statewide contribution to greenhouse gas emissions.

C. Mitigation of Wetland Losses and Greenhouse Gas Emissions

The DEIS describes plans to mitigate wetland losses and greenhouse gas impacts associated with the wetlands destruction by “restoring high quality wetland communities of the same type, quality, function and value as those impacted by the Project” (DEIS pg. 4.6-33). And yet, the mitigation plan described fails to achieve that goal.

The DEIS notes that, “Given site limitations and technical feasibility, it is impractical to replace all impacted wetland types with an equivalent area of in-kind wetlands” (DEIS pg. 4.6-33). Despite the fact that most of the wetlands to be destroyed are open bogs and coniferous bogs (peatlands) the off-site mitigation acreage is “expected to exceed impacted acreage for all wetland types except for Type 8 (open bog and coniferous bog)” (DEIS pg. 4.6-33). So the type of wetland most impacted and most important for carbon sequestration, will be the least mitigated type of all. This is a significant flaw in the wetland mitigation plan.

The off-site wetlands selected for mitigating the NorthMet project’s wetlands are at two distant sites near Aitken and Hinckley, Minnesota. These wetlands Dr. Glaser feels contain very different characteristics than the wetlands to be destroyed by the project. He cites five concerns about the mitigation sites selected and described in the DEIS:

1. The two sites selected for mitigation efforts have “different environmental settings with respect to climate, depth to bedrock, and glacial deposit than those at the PolyMet project site” (Glaser 2010).
2. The selected wetlands are probably significantly different from the PolyMet wetlands because the Aitken and Hinckley sites “are located at the extreme southern fringe of the boreal and mixed-conifer hardwood peatlands of the northern portions of Minnesota” (Glaser 2010).
3. The DEIS did not provide geographic coordinates for all the sites evaluated for mitigation, so they could not be located and evaluated.

4. Replacement of the mine site peatlands cannot be achieved. “It is impossible to replace a peatland ecosystem within the lifetime of human beings since it takes centennial to millennial time scales for peatlands to form and develop into raised bogs” (Glaser 2010).
5. The DEIS failed to consider restoring and protecting “an exceptional complex of wetlands north of the town of Alborn in the Saint Louis River watershed that contains peatlands and wetlands very similar to those found in the PolyMet site” (Glaser 2010).

Dr. Glaser also notes that the DEIS did not provide adequate documentation of all the sites evaluated for mitigation, making it impossible to determine why so many sites within the St. Louis River watershed were rejected.

The U.S. Army Corp of Engineers St. Paul District requires a wetland compensation ratio of 1.5:1. In other words, for every acre of wetland lost, 1.5 acres of wetlands must be replaced. The tribal cooperating agencies note that “the large acreage of wetlands to be directly impacted and the high quality of the wetlands warrant a mitigation ratio of greater than 1.5:1” (Tribal Cooperating Agencies, DEIS pg. 4.2-29).

Recommendation:

The EIS should include a table containing the geographic coordinates of all the wetlands considered for mitigation and the rationale for rejecting each of these sites. The wetland complex north of Alborn described by Dr. Glaser should be given serious consideration and analysis. Mitigation sites should be selected that are as close to the PolyMet project wetlands as possible, “because the closer sites have the highest probability of containing wetlands that are similar to those that will be directly impacted by the PolyMet mine” (Glaser 2010). Wetland mitigation should replace Type 8 (peatlands) wetlands in excess of the peatland acres to be destroyed. The EIS should consider a replacement ratio greater than 1.5:1. The EIS should include an evaluation of how the wetland mitigation plan will affect statewide greenhouse gas emissions.

IV. Impacts to Vegetation and Wildlife

A. Mine Site Natural Area

The Minnesota County Biological Survey has characterized the proposed PolyMet mine site as a “site of High Biological Significance.” These are sites that “contain very good quality occurrences of the rarest species, high quality examples of the rare native plant communities, and/or important functional landscapes” (DEIS pg. 4.3-2). See Comments I.C.2. for earlier discussion about other evaluations of the mine site as an important natural area. The DEIS notes, “a separate wetland delineation by Barr Engineering reported that approximately 91% of the wetlands were of high quality” (DEIS pg. 4.3-2).

The destruction of this valuable natural area would be a significant loss to the State of Minnesota.

Recommendation:

The mine site contains a natural area and wetlands of acknowledged high quality. Given studies showing its value for preserving increasingly rare features within its landscape, it is an area that should be preserved. The EIS must examine the significance of this area within its landscape and within the state. Alternatives, such as underground mining, that would disturb less of the site should be more thoroughly examined.

B. At-Risk Plant Species

The mine site contains nine known state-listed endangered, threatened or species of special concern (ETSC) plant species. Many of these populations are expected to be destroyed by direct or indirect activities of the mine. The mine site population of *Caltha natans*, floating marsh marigold, represents 42% of the statewide population of this state-listed endangered species. Only 12 known populations of this plant occur in the state. Five populations are at the mine site. The remaining state populations are either down-gradient from the mine site and susceptible to changes in water chemistry or hydrology, or along the Partridge River, which is also likely to be impacted by mine operations, discharges and hydrologic changes. The NorthMet project constitutes a risk to the entire population of this plant in Minnesota. Despite the acknowledgment that this is a species not likely to tolerate disturbance and that the entire known state population is at the mine site or in proximity to the mine, the DEIS arrives at this unsupported conclusion: “...Project-related losses would not jeopardize the existence of these communities” (DEIS pg. 4.3-19).

Recommendation:

The EIS must provide a more thorough analysis of the potential impacts to the state population of *Caltha natans* from this project. The taking of the entire population of a state-listed endangered species should not be permitted, and would violate Minnesota’s endangered species laws.

C. Use of Non-native Invasive Plant Species

The DEIS describes the plan to use non-native plant species to stabilize disturbed areas and to reclaim the project area. Some of these species are considered to be invasive species. The DEIS acknowledges, “These species, once introduced, are difficult to remove and could spread to and colonize susceptible areas following future disturbance...These species may reduce diversity, out-compete native vegetation, and provide lower quality habitat for some specialist animal species” (DEIS pg. 4.3-11).

The use of non-native invasive species to reclaim the mine site is unnecessary and irresponsible with respect to the wide-scale problem of non-native species in Minnesota, and the efforts to contain their spread by federal and state agencies. The proposal to use non-native species is unacceptable.

Recommendation:

The EIS should include a requirement that non-native plants will not be used in reclamation activities or for temporarily stabilizing disturbed areas. Only the use of native, non-invasive species should be permitted.

D. Wildlife Impacts

1.) Canada lynx are a federally-listed threatened species. The DEIS acknowledges that portions of the mine site lie within the recently revised boundaries of federally designated critical habitat for lynx. It also acknowledges that “the Project would result in the loss of...1,454 acres of lynx habitat” (DEIS pg. 4.4-10). The DEIS also says, “Habitat loss at the Mine Site, however, would result in fragmentation of lynx habitat in a portion of its current range” (DEIS pg. 4.4-10).

At least 20 individual lynx have been identified within 18 miles of the mine site. The U.S. Forest Service has designated Lynx Analysis Units (LAUs) within the Superior National Forest “that comprise landscape-scale analysis areas for lynx management” (DEIS pg. 4.4-3). The mine site is in LAU 12. About 94% of LAU 12 provides suitable lynx habitat.

Critical habitat was designated for the lynx as part of a process to reverse this species population decline. The Endangered Species Act defines critical habitat for endangered or threatened species as:

“(i) the specific areas within the geographical area occupied by the species, at the time it is listed...or on which are found those physical or biological features (I) essential to conservation of the species and (II) which may require special management considerations or protection; and
(ii) specific areas outside the geographical area occupied by the species at the time it is listed and that are essential for the conservation of the species” (Endangered Species Act 1973 Section 3(5)(A)).

The loss of critical habitat from this project's activities is detrimental to the recovery of this species and violates the provisions of the Endangered Species Act.

Maps created by the Minnesota Center for Environmental Advocacy (Maas 2010) using data published in the *Journal of Wildlife Management* (Moen 2008), indicate that the PolyMet mine site contains large amounts of suitable lynx denning sites (see attached maps prepared by the Minnesota Center for Environmental Advocacy). The tribal cooperating agencies note, "the tribal cooperating agencies disagree with the conclusion that the effects on statewide lynx populations would be insignificant; this analysis does not consider the possibility that the Mine Site might include critical components of lynx habitat present such as den sites" (Tribal Cooperating Agencies, DEIS pg. 4.4-10).

Reclamation work at the mine site may also make this critical lynx habitat more suitable as bobcat habitat than as lynx habitat. "It is the tribal cooperating agencies' note that this restoration of 'lynx habitat' initially creates good bobcat habitat. Bobcats are superior competitors to lynx and thus may prevent lynx from returning to the site" (Tribal Cooperating Agencies, DEIS pg. 4.4-11). The proposed project may therefore diminish critical lynx habitat long into the future.

The DEIS also notes the increased risk of the project resulting in lynx-vehicle collisions.

Nevertheless, the DEIS states that, "Although the Proposed Action would result in a loss and fragmentation of lynx habitat at the Mine Site, the effect on statewide lynx populations would be insignificant since no individual lynx or pair of lynx would be significantly affected by the habitat loss" (DEIS pg. 4.4-10).

It is not clear what data support this conclusion in the DEIS. The DEIS contains no biological assessment or completed consultation with the U.S. Fish and Wildlife Service (USFWS). It does not analyze the cumulative impacts on the species. The DEIS notes that on-going consultations with the USFWS are taking place, but states that USFWS comments have not been received (DEIS pg. 4.4-9).

Recommendation:

The EIS must present the results of a biological assessment, consultation with the USFWS, and an evaluation of the cumulative impacts on the lynx's survival and recovery as required by law. It is not sufficient for the DEIS to provide conjecture that the project presents no risk to the lynx's population; conclusions about potential impacts must be based on scientific assessments and the appropriately completed consultations with the USFWS. Impacts to denning sites must also be evaluated.

2.) The gray wolf is a federally-listed threatened species and a Minnesota species of special concern that has also been identified as potentially occurring within the project area. The project is located within Zone 2 of the gray wolf's federally-listed critical habitat. "Radio-collared wolves were documented to the north and northeast of the Mine Site in 200, 2005 and 2008; and calling surveys located wolves south of the Mine Site in

2004...”(DEIS pg. 4.4-4). The DEIS notes, “Observations indicate the likelihood of a single wolf pack whose territory includes the Mine and Plant Sites” (DEIS pg. 4.4-12).

The development of the mine site by the Proposed Action would remove 1,454 acres of wolf habitat, about 1-10% of a single wolf pack territory. Without providing supporting data or a biological assessment, or a completed USFW consultation, the DEIS arrives and this unsupported claim: “This reduction in available habitat is relatively small and is not expected to significantly affect the wolf population in the region...” (DEIS pg. 4.4-12).

As with the lynx, vehicle collisions with wolves are noted as a potential risk from project activities.

Recommendations:

The EIS must present the results of a biological assessment, consultation with the USFWS, and an evaluation of the cumulative impacts on wolf survival and recovery as required by law. It is not sufficient for the DEIS to provide conjecture that the project presents no risk to the wolf population; conclusions about potential impacts must be based on scientific assessments and the appropriately completed consultations with the USFWS.

3.) Other wildlife species are potentially at risk from the project. Bald eagle, wood turtle, heather vole, yellow rail, and tiger beetle are some mentioned in the DEIS. But the DEIS predicts no adverse effects to these species.

The DEIS fails to assess impacts to many of these species from the predicted water contamination that is likely to spread from the site. For example, mercury contamination has been identified as a high risk for occurring, but no method for preventing or containing mercury pollution has been described in the DEIS. And the DEIS fails to analyze the risk of wildlife exposure to mercury. As the tribal cooperating agencies note, “impacts to bald eagles could result from eagle feeding sites within or adjacent to the project area. Contaminants from the mine site, specifically mercury and heavy metals, could affect prey species thus having secondary impacts on eagle reproduction” (Tribal Cooperating Agencies, DEIS pg. 4.4-13).

When discussing the known wood turtle population downstream from the mine site, the DEIS says, “the Project would not result in exceedances of surface water quality standards in the Upper Partridge River; therefore, there would be no significant project-related changes to water quality and no indirect effects on downstream habitat where wood turtles are located...”(DEIS pg. 4.4-13).

It is hard to understand how the DEIS can draw this unequivocal conclusion. The DEIS has acknowledged predicted water quality exceedances, the un-tested effectiveness of the East Pit wetland treatment system, and that untreated seepage will be released into a tributary of the Partridge River. The DEIS has failed to properly analyze groundwater flow, and has likely mischaracterized the hydrologic connectivity of the adjacent wetlands with groundwater. With these inadequacies in data, it cannot be stated that

there will be no significant project-related changes to water quality. Therefore, the full impact to wood turtles and other wildlife has not been evaluated by this DEIS.

Recommendation:

The EIS must provide the required full assessment of impacts to wildlife from this project, including all Regional Forester’s Sensitive Species. This must consider scenarios for water quality exceedances, situations which are probable. This assessment should more fully examine impacts to more common species, such as moose, which are experiencing a statewide population decline and for which preserving wetlands may be important.

4.) The DEIS acknowledges that the NorthMet project will impact identified wildlife travel corridors. The DEIS cites a study by Emmons and Olivier Resources Inc. (2006) that identifies 13 major wildlife travel corridors connecting large roadless blocks along the Iron Range. The study considered the loss of any one of these wildlife corridors “significant” (DEIS pg. 4.4-30).

The NorthMet project area includes Corridors 11 and 12. The DEIS acknowledges that Corridor 11 is already obstructed and “not likely to be heavily used by wildlife” (DEIS 4.4-31). This would increase the significance of the remaining corridors for wildlife travel. But Corridor 12 is likely to be heavily impacted by the project. “Operations at the Mine Site would indirectly impact the corridor by reducing the size of, and acting as a source of noise and activity near, the large habitat block southeast of the corridor” (DEIS pg. 4.4-31).

As the tribal cooperating agencies note, “#12 will likely be degraded as a corridor by the Project; these impacts should be considered significant” (Tribal Cooperating Agencies, DEIS pg. 4.4-32).

Recommendation:

A biological assessment and consultation with the USFWS must be conducted to assess impacts to wildlife travel corridors. The EIS must analyze the loss of Corridors 11 and 12 under the scenario that these are long-term or permanent losses.

E. Inadequate Sampling of Fish and Macroinvertebrates

The impacts of the project on fish and macroinvertebrates cannot be fully understood due to an inadequate sampling effort. The DEIS notes that the nearest known occurrence of northern brook lamprey is far from the project area. And yet, the tribal cooperating agencies note, “...no conclusion about the presence of northern brook lamprey can be made in this analysis without specific surveys in the Project Area. Tribal fisheries biologist have definitively identified this species in the Dark River, just a few miles to the west of the St. Louis River watershed” (Tribal Cooperating Agencies, DEIS 4.5-2).

The creek heelsplitter, a state mussel species of special concern, was also not adequately sampled to determine its presence.

“The tribal cooperating agencies position is that there was not adequate sampling effort to determine the presence of the creek heelsplitter in the Project Area, particularly for a species that is already known to be limited in numbers or distribution. While the detection probability is low for each site, tribal fisheries biologists have sampled this species in the headwaters region of the St. Louis River, approximately a mile downstream of Seven Beavers Lake...in 2008” (Tribal Cooperating Agencies, DEIS pg. 4.5-5).

Recommendation:

The EIS should present the results of a more thorough sampling effort for fish and macroinvertebrates.

V. Noise and Air Issues

A. Mercury Emissions

1.) Dr. Chambers notes the potential exists for mercury emissions to occur from the project's air exhaust of the autoclaves. He cites mines in Nevada where this has been a significant problem. While these mines have higher mercury content than the mercury content of ore in the NorthMet project, the risk for this project still must be acknowledged and addressed.

“...the concern is that high temperature processes like the autoclaves can volatilize mercury...” (Chambers 2010). Dr. Chambers notes that mercury must be captured through appropriate equipment on the autoclave exhaust. “One of the major concerns with these capture systems is ensuring that they are performing as planned” (Chambers 2010). He points out that only Nevada has air emission standards for mercury, and that the US EPA is still developing mercury air emission standards.

Dr. Chambers highlights a need for mercury emissions monitoring to occur with enough frequency to effectively evaluate problem emissions:

“Under Nevada's standards mercury emissions from autoclaves are mostly monitored only once a year, and are sometimes based on manufacturer's specifications with no monitoring. Once a year measurements will not provide enough data to ensure statistically reliable measurements of the efficiency of mercury capture systems” (Chambers 2010).

Recommendation:

Dr. Chambers recommends: “In order to ensure that the mercury capture systems on the autoclaves are functioning as designed, a monitoring scheme should be required that will provide statistically reliable data on the autoclave mercury emissions” (Chambers 2010). He notes that the technology for measuring mercury frequently is available and is economically practical.

B. Class I Airsheds

The Project is located within 300 km of four Class I regions. Under the Clean Air Act, Class I airsheds were established as areas where emissions of particulate matter and sulfur dioxide are to be restricted. Class I areas include federal wilderness areas exceeding 500 acres and national parks. These are places that are allowed only the smallest incremental pollution levels above baseline conditions. The four Class I areas within the vicinity of this project are the Boundary Waters Canoe Area Wilderness, Rainbow Lakes Wilderness, Voyageurs National Park, and Isle Royale National Park.

The emissions modeling described in the DEIS for the NorthMet project, shows this project contributing 30 tons per year (tpy) of SO₂, 159 tpy of NO_x and 1,175 tpy of PM₁₀. These emissions would come primarily from crushing and grinding ore, handling reagents and materials and the flotation and hydrometallurgical processing (DEIS pg. 4.6-53 and 54). The DEIS acknowledges that these emissions will cause visibility

impairment for as much as 23 days a year in the Boundary Waters Canoe Area Wilderness. The NorthMet project may result in a 5% visibility impact in the BWCAW for 23 days a year, and as much as a 10% impact for one day a year (DEIS pg. 4.6-37).

This is not an insignificant level of impairment from a single project. The Minnesota Regional Haze State Implementation Plan (SIP) is a plan developed by the Minnesota Pollution Control Agency as required by the Regional Haze Rule of 1999. The goal of the SIP is to reduce haze in Class I areas affected by Minnesota emissions, and to reach natural visibility conditions by 2064. The SIP was submitted to the EPA for review on December 30, 2009. The Haze SIP notes that a 5% or more contribution to visibility impairment from an *entire state* would be considered significant. The NorthMet project, as described in the DEIS, would contribute a 5% visibility impairment for as many as 23 days, and a 10% impairment for one day per year.

Emissions contributions of this level are keeping Minnesota from making progress toward the goals outlined in the SIP. Even the DEIS concedes that the state is not likely to reach the visibility goals. “Current MPCA estimates indicate that emission reductions at power generation facilities and additional reasonably foreseeable projects in northeastern Minnesota are not enough to meet the current Regional Haze SIP goals” (DEIS pg. 4.6-54). The air visibility quality in the BWCAW shows a trend of becoming worse, not better. Between 1992 and 2006, visibility in the wilderness on the 20% worst days showed a worsening trend. The NorthMet project will add to the downward trend for air visibility quality over Minnesota’s Class I Areas and impede reaching the goal of natural visibility conditions by 2064 as the Regional Haze Rule requires.

Within the DEIS, mitigation measures are discussed, but many eliminated from further discussion without explanation. The DEIS mentions the use of low-NO_x burners in the heaters, the conversion to electric heating, and the use of waste heat for work space heating requirements. But each of these was eliminated and excluded from modeling. Missing are explanations for why these measures were found to be “infeasible or non-viable” for the project.

While PolyMet, MPCA and the Federal Land Managers continue to “evaluate additional potential control measures that may be applicable to the Project” (DEIS pg. 4.6-37), this analysis should be available within the EIS for full disclosure and public review.

The DEIS also fails to adequately evaluate the cumulative effects on air quality of the NorthMet project when combined with foreseeable projects. Not included in the analysis are the impacts from on-going and future hardrock mineral exploration in and near the Superior National Forest. Nonferrous mines in advanced stages of exploration and development (including projects by Duluth Metals and Franconia Minerals) were not evaluated for their impacts to air quality and visibility. The tribal cooperating agencies highlight the failure to include “any emissions from the Keetac Expansion Project which plans to increase production by 61% by reopening another furnace line” and “the Essar Steel Expansion project that is planned” (Tribal Cooperating Agencies, DEIS pg. 4.6-44).

The U.S. EPA also objected to the failure of the DEIS to examine cumulative impacts from foreseeable projects in an August 2009 letter, but the omission remained unaddressed.

“In order to accurately assess cumulative impacts of the proposed project, including those impacts to Class I and Class II areas, the DEIS air quality analyses...should consider all current and reasonably foreseeable projects occurring in the area. The air quality modeling analyses do not include a comprehensive inventory of existing and planned sources impacting regional air quality. In particular, the analysis does not appear to include the proposed Mesaba Energy power plant, the Mesabi Nugget Phase II projects, or the Keetac Expansion project...We recommend revising the air quality analysis to include all reasonably foreseeable projects in the area” (U.S. EPA August 2009).

Recommendation:

The EIS should provide explanation for why proposed mitigation measures were rejected. It must include mitigation measures for public review that achieve the goals of reducing this project’s air quality and visibility impacts. The EIS should include a full cumulative impacts assessment that examines all reasonably foreseeable and on-going activities within the region affecting air quality. It should also provide an explanation of how Minnesota will reach the goals of the Regional Haze Rule if the NorthMet project occurs. Given that the Minnesota Regional Haze SIP submitted to the US EPA already fails to meet the 2064 visibility goals, additional new sources of visibility impairments should not be permitted until a strategy for meeting those goals can be developed.

C. Noise Impacts

The proposed mine is on public land in the Superior National Forest, and may generate noise that could be heard beyond the project area. While the DEIS describes “noise sensitive areas or receptors” (e.g. campgrounds, wilderness areas) in the vicinity of the project, no noise contour maps were prepared for the document.

“Noise contour mapping would allow reviewers to assess the impacts of noise to all publicly accessible lands in the vicinity of the project which include large sections of the Superior National Forest immediately adjacent to the mine site” (Tribal Cooperating Agencies, DEIS pg. 4.7-2).

Recommendation:

The EIS should include an analysis of noise impacts that uses noise contour mapping for a more thorough assessment.

VI. Impacts to Human Communities, Cultures and Health

A. Cultural Impacts

The NorthMet project would impact resources with cultural significance to the Ojibwa. Significant impacts to water resources, wetlands, wild rice and wildlife are possible from the project, and would affect natural resources available for Ojibwe use. Compensatory wetlands are proposed for outside the 1854 Ceded Territory and would result in a loss of these lands to the Ojibwa Bands. If the land exchange occurs, giving PolyMet ownership of the mine site lands, this area would be removed from public ownership and would diminish both Ojibwa Band members' and the general public's access to these lands. The potential impacts to wild rice beds from increased sulfate concentrations, and the potential impacts to fish consumption from methylmercury contamination pose significant cultural impacts to the Ojibwa Bands.

Recommendation:

The EIS must include the identification of land to be exchanged and the potential cultural resource impacts associated with this exchange.

B. Socioeconomic Impacts

The DEIS presents a one-sided evaluation of impacts to communities and economies in the region. The only potential negative impacts from the project cited in the DEIS are that “the Project would further reduce access to the site for hiking, fishing and hunting” and “generate some noise and light which may impact the recreational experience,” and “some impacts may experienced by recreational users of Whitewater Reservoir due to water fluctuations” (DEIS pg. 4.10-21).

Absent from the DEIS is a meaningful assessment of other potentially negative impacts. Missing, for example, is any analysis of impacts to tourism and recreation, impacts on real estate values and sales, impacts to commercial fisheries if mercury contamination occurs.

The Superior National Forest estimates that these public lands bring over \$200 million in tourism and recreation to the region annually (personal communication, Jim Sanders, Supervisor, SNF). But the DEIS provides no evaluation of this project's potential impacts on this sustainable, important industry.

The DEIS is devoid of any evaluation of reasonably foreseeable negative impacts, such as the impacts to communities from potentially contaminated drinking water, and impacts on fisheries from mercury contamination. There is not even an analysis of the impact on communities, schools, and the tax base when the mine closes in Year 20. This biased representation of impacts is not fair to those communities most directly affected by the mine's closure.

Particularly disturbing is that the DEIS describes the “No Action Alternative” as the option that entails on-going population and employment decline. No data are provided to support the conclusion that not building the mine will lead to ever declining jobs and dwindling population. And no evaluation is provided to show how the Proposed Action won’t lead to those same outcomes when the mine closes.

Recommendation:

The EIS must do a complete analysis of the potential negative impacts to communities, employment, and the economies of the area from this project. It must evaluate the region’s reliance on environmental amenities such as tourism and recreation. The EIS should include an analysis of the impacts to the region when the mine closes. And it must assess the potential impacts from scenarios that include water contamination.

C. Human Health

Fish consumption advisories already occur for fish caught from many of the water bodies into which the project would drain. The risks of methylmercury contamination are examined in Comments II.N. Minnesota’s fish tissue water quality standard for mercury is 0.2 mg/kg. At this level of mercury contamination, it is recommended that people not consume more than one fish per week. More than that is not considered safe.

But for many people, fish constitutes an important nutritional and/or cultural part of their diet. People consuming more than one fish a week from impaired waters, or fish with higher levels of mercury than 0.2 mg/kg, are at risk of harming their health.

The NorthMet project with its potential for increasing the mobilization of mercury, poses a human health risk to people who consume fish.

The problems of geotechnical stability of the tailings basin (discussed in Comments II.K.), poses another serious risk to human health. The contents of the hydrometallurgical residue cells in particular will be extremely hazardous. Should the tailings dams fail (with an acknowledged “low margin of safety”), toxic materials would drain into water bodies from which human communities obtain drinking water.

In addition, the DEIS also reviews the potential for mining to release amphibole mineral fibers to air and water. Exposure to these fibers has been connected to cancer and other health problems. The PolyMet project is in proximity to the Peter Mitchell Mine and Silver Bay Processing Plant, which has been associated with releases of amphibole fibers. “...amphibole minerals are present in the Duluth Complex and in close proximity to the NorthMet deposit. Thus, there remains an uncertain level of potential health risk from airborne amphibole fibers for the Project” (DEIS pg. 4.6-60).

Recommendation:

The EIS must fully examine the potential impacts from mercury contamination in fish and the resulting impacts on human health from fish consumption. It must include a new tailings basin design that has a reliable degree of stability. And it must more thoroughly

examine the risks of amphibole mineral fibers in the project's ore and its impact on human health.

VII. DEIS Process Problems

A. Length of Comment Period

The Minnesota Department of Natural Resources and the U.S. Army Corps of Engineers provided a 90-day public review and comment period for the DEIS. This was despite the urgings of the U.S. EPA to allocate a 120-day comment period.

“The complexity and potential impacts of this project warrant a longer public review period than the 45-day minimum for a DEIS published in the Federal Register. Recent similar projects elsewhere in the country that were submitted for public review under NEPA have had 120-day review periods, either initially or through one or more extensions. We observe that public interest in copper mines in the Upper Midwest is high. Decisions made for this project may be precedent-setting, as it is the first large-scale copper mine in Minnesota. We have consistently urged the USACE to adopt a realistic comment period over the past few years and will address this concern regarding the comment period with the USACE St. Paul District Colonel separately” (U.S. EPA August 2009).

On October 7, 2009, The Friends of the Boundary Waters Wilderness joined ten other organizations through the Minnesota Environmental Partnership (MEP), a statewide coalition of more than 80 environmental, conservation, and non-profit organizations, to request a 120-day comment period. That request was rejected in favor of the 90-day period. With the release of the DEIS and a more full realization of the scope and complexity of the DEIS, MEP in December 2009 requested an extension that would provide a total of 180-day comment period.

“As you are aware, November 2nd marked the start of the scheduled 90 day public comment period for the DEIS. We do not believe that the length of the comment period is adequate to meet the need for a credible and accessible public review process. We request that the time period for submitting comments be extended to 180 days...This DEIS was years in development and totals three volumes of material. It is unreasonable to expect citizens and concerned stakeholders to be able to fully review, analyze and prepare adequate comments in this relatively brief 90 day period. An extension to 180 days is necessary to provide time for adequate review and preparation of comments” (MEP letter to the DNR, USACE December 2009).

This request was rejected. “The MnDNR has determined that no additional public meetings will be held and that the DEIS public comment period will not be extended” (Mn DNR letter to MEP January 15, 2010).

The complexity and length of the DEIS warranted the 120-day period to enable the public to thoroughly examine and respond to it. The Friends worked with technical experts to solicit their analysis of the project, and the 90-day comment period proved very challenging for providing them the review and response time they needed. The Friends is an organization that works directly with the public, providing information to citizens on projects like the NorthMet project. The short timeframe was an extremely difficult one for us to both receive the technical comments from experts, and to summarize and distribute these findings to members of the public. We were prevented from adequately

communicating these findings with our members and other members of the public due to this short timeframe for comments.

The DEIS is 1,800 pages, three volumes, and hundreds of supporting documents in length. This is a sufficiently long and technical project to warrant the recommended 120-day comment period.

In addition, the comment period included the Thanksgiving, Christmas and New Year's holidays, periods of time for which many organizations are closed for business, and for which members of the public are engaged in travel and activities that likely limit their time for review and comment on the DEIS. It was reasonable for the agencies to provide extra time given the overlap with this busy holiday period.

In early December, 2009, the DNR's email address for public comments on the DNR website malfunctioned. In an email communication with the Friends, Stuart Arkley acknowledged that the email address had stopped working on Thursday, December 4th. An email on December 11, indicated it was working again. This was a 7 or 8 day period of time during which any public comments sent to the DNR through this email address were not received. The Friends is aware of several public comments that were sent during this outage that were not received by the DNR.

Initially, the DNR provided no announcement of this malfunction, provided no instructions to members of the public who may have sent comments during this time period that they would need to re-submit their input, and continued to leave the malfunctioning email address up on the website. After contact from the Friends, the DNR eventually removed the broken email address from the website, but never provided any remarks or instructions to the public about the need to re-submit comments that were not received during the email outage.

The malfunctioning of this email comment link also warranted an extension of the overall comment period to ensure adequate public access and time to provide input.

B. Problematic DNR Public Meetings

The DNR held two public forums for providing information and opportunities for comment on the DEIS. One forum was in Aurora, MN, the other in Blaine, MN. Despite requests from the environmental community that additional forums in other more accessible locations be organized, the DNR refused to do so. Forums in Duluth and Minneapolis or St. Paul at a minimum should have been held, for these are centers of populations in the state.

The DNR and USACE organized the forums in a manner that did not allow for oral public conversation, questions, or comments. Stenographers were available to take oral comments in a private space, but the public gathered at the event was prevented from hearing questions, answers and remarks from others. However, several politicians were

given a formal platform during the presentation part of the gathering, to support the project. In some cases, the information these political leaders provided was inaccurate.

The forums were biased events, in which only supporting comments were publicly heard, and no negative remarks were permitted in a public forum. This was an unbalanced event that deteriorated into a political rally in favor of the project. The fundamental purpose of the public forums – to provide a public space for citizens to learn, ask questions, and comment on the proposed project – was not achieved.

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