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

WaterLegacy Objections & Petition for Contested Case Hearing

In re the Matter of the Minnesota Department of Natural Resources' Consideration of a draft Permit to Mine for the PolyMet NorthMet Copper-Nickel Mine Project

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INTRODUCTION

WaterLegacy is a Minnesota non-profit organization formed to protect Minnesota water resources and the communities that depend on them, particularly from the threat of sulfide mining pollution and destruction. We have thousands of members and supporters, many of whom live, work, drink water, swim, canoe, recreate, fish, gather wild rice and own property downstream of the PolyMet NorthMet proposed copper-nickel mine project ("PolyMet project"). Several of our members have signed declarations attesting that their interests in property they own will be affected by the proposed operation of the PolyMet mine and waste storage facilities.

WaterLegacy herein submits Objections to the PolyMet draft Permit to Mine,[1] a Petition for Contested Case Hearing, and the attached Exhibits on behalf of our members and in furtherance of our mission.

The PolyMet project is Minnesota's first copper-nickel sulfide ore mine project to reach the permitting stage. Many other copper-nickel mine projects are in various stages of exploration and feasibility analysis in Minnesota.[2] It is understood both that the PolyMet project would serve as the "snowplow" behind which other copper-nickel mine projects would advance and that the standards set for the PolyMet Permit to Mine would become precedent for future copper-nickel projects. For this reason, it is particularly important that the proposed PolyMet Permit to Mine "get it right" and establish standards and that will protect natural resources across a broad swath of northeastern Minnesota, from southwest of Duluth to the Boundary Waters watersheds.

Getting it right will be no easy task. Sulfide mining for copper, nickel, gold and other metals, also known as "hardrock mining," has a very poor track record. There is no sulfide mine in a water-rich environment, like that in northeastern Minnesota, which has operated and closed without polluting surface water and/or groundwater with acid mine drainage and/or toxic metals. In 2009, the U.S. Environmental Protection Agency ("EPA") in identifying the hardrock mining industry as the first priority for financial responsibility rules under Superfund statutes, estimated that the hardrock mining industry is responsible for polluting 3,400 miles of streams and 440,000 acres of land.[3] EPA also estimated that the metal mining industry (copper, nickel, gold, lead and zinc) was responsible for nearly 1.15 billion pounds or approximately 28% of the total 2007 Toxic Release Inventory that U.S. industry was required to report.[4]

In the course of analyzing the potential for a copper mine in Bristol Bay, Alaska, the EPA concluded that the probability of potential *failure* of water collection and treatment during

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[1] In these comments, when no specific document is identified "draft Permit to Mine" includes PolyMet's Permit to Mine Application for the NorthMet Project December 2017 (PolyMet PTM Application) and DNR's Draft Special Conditions for the Permit to Mine ("DNR draft Conditions") for the PolyMet project.
[2] DNR, Exploration for Metallic Mineral Resources in Minnesota - Copper, Nickel and Platinum Group Metals, Exhibit 1.
[3] EPA, *Identification of Priority Classes of Facilities for Development of CERCLA Section 108(b) Financial Responsibility Requirements*, 74 FR 37213, 37215 (July 28, 2009), attached as Exhibit 2. EPA defined "hardrock mining" to mean facilities that extract, beneficiate or process metals (e.g. copper, gold, iron, lead, magnesium, molybdenum, silver, uranium, and zinc) and non-metallic, non-fuel minerals (e.g. asbestos, gypsum, phosphate rock, and sulfur), *Id.*, at 37213.
[4] *Id.*

operations for a copper mine is 93%. Post-closure collection and treatment failures are yet higher and, if the mine site were to be abandoned, EPA concluded that sulfide mining's track record suggested that failure of water collection and treatment becomes "certain."[5]

The PolyMet copper-mine project is a substantial project with the potential for significant effects on Minnesota natural resources. PolyMet expects to mine approximately 533 million tons of rock over 20 years, resulting in about 308 million tons of waste rock and about 225 million tons of ore.[6] PolyMet estimates that the ore beneficiation process will generate a cumulative total of 225 million short tons of flotation tailings waste.[7] The hydrometallurgical process would generate 313,000 tons of residue annually, with a potential cumulative total of 5.6 million tons over the life of the mine.[8]

PolyMet's mine pits are expected to cover 528 acres,[9] and its permanent Category 1 waste rockpile at the mine site another 526 acres.[10] PolyMet mine pits would be as much as 696 feet deep and its permanent Category 1 waste rockpile as much as 280 feet (approximately 26 stories) tall.[11] PolyMet has requested, and DNR draft permits would authorize PolyMet to use a total of 6.175 billion gallons per year of water for its mine and processing facilities.[12]

Throughout the environmental review process, cooperating tribal governments, scientific experts and tens of thousands of citizens have expressed concerns that the PolyMet project would destroy wetlands and habitats, adversely impact resources needed for the exercise of Treaty-reserved rights and contaminate surface and groundwater in the headwaters of the St. Louis River, the largest United States tributary to Lake Superior and, potentially in Boundary Waters watersheds as well. Comments have stressed the unreasonable risk to human health, downstream property owners and communities, taxpayers and Minnesota's most precious legacy, its freshwater resources.

In light of the significance of the precedent to be set as well as the scope and risks of the PolyMet project, WaterLegacy respectfully requests that the DNR submit the issues identified in these Objections and the attached Petition for Contested Case for resolution by an impartial third party; an administrative law judge.

Specific Actions Requested

1. WaterLegacy requests that the Minnesota Department of Natural Resources (DNR) deny the draft PolyMet Permit to Mine pursuant to commissioner's authority under Minnesota Statutes Section 93.41, subdivision 2.

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[5] EPA, *An Assessment of Potential Mining Impacts on Salmon Ecosystems of Bristol Bay, Alaska*, Volume 1 – Main Report (EPA 910-R-14-001A (January 2014), Table 14-1, excerpts attached as Exhibit 3.
[6] PolyMet PTM Application, p. 174.
[7] *Id.*, p. 266.
[8] *Id.*, p. 273. PolyMet estimates length of operations of the hydrometallurgical plant as 18 years.
[9] *Id.*, p. 187.
[10] *Id.*, p. 307.
[11] *Id.*, pp. 307, 187.
[12] WaterLegacy, Comments on Draft PolyMet NorthMet Water Appropriation Permits, Aug.31, 2017, Exhibit 4, p. 4.

2. WaterLegacy requests that the DNR grant our Petition for Contested Case Hearing submitted on behalf of our members, several of which own property that would be affected by the PolyMet mine project, pursuant to Minnesota Statutes section 93.483, subdivision 2, and Minnesota Rules 6132.4000, subpart 2 and 6132.5000.

Summary of WaterLegacy's Objections to the PolyMet draft Permit to Mine

WaterLegacy's Objections to the PolyMet draft Permit to Mine pertain to matters within the DNR's jurisdiction. They are summarized below.

1. **Minnesota statutes and non-ferrous mining rules set requirements for a copper-nickel mining project to reduce impacts on natural resources, prevent potential damage to property, protect water resources and provide adequate insurance and financial assurance to protect taxpayers and downstream property owners.**

2. **The PolyMet draft Permit to Mine fails to provide tailings storage technology at an appropriate site to minimize potential adverse impacts to property, natural resources, groundwater and surface water or a final design demonstrating stability and compliance with factors of safety at the tailings waste facility.**

3. **The PolyMet draft Permit to Mine fails to provide an appropriate site, foundation or long-term management plan to protect natural resources from release of concentrated and toxic wastewater from the hydrometallurgical residue waste storage facility.**

4. **Tailings and Category 1 waste storage methods and seepage containment proposed in the PolyMet draft Permit to Mine do not protect groundwater or surface water or adequately provide for the collection of waters that drain from reactive wastes.**

5. **Reclamation, closure and postclosure maintenance of the tailings waste facility proposed in the PolyMet draft Permit to Mine fail to comply with Minnesota law.**

6. **In eliminating the mine site Wastewater Treatment Facility (WWTF) and proposing early adoption of non-mechanical treatment, the PolyMet draft Permit to Mine fails to protect groundwater and surface water in the upper Partridge River or to meet Rule requirements for closure and postclosure mitigation of impacts.**

7. **Storage of process wastewater at the mine site, as proposed in the PolyMet draft Permit to Mine fails to prevent the release of substances that result in adverse impacts or to minimize impacts on surface water and groundwater.**

8. **The PolyMet draft Permit to Mine fails to provide adequate insurance to compensate persons and property that might be damaged by polluted seepage, spills or dam failure as a result of mining operations, reclamation or restoration.**

9. **The PolyMet draft Permit to Mine fails to require financial assurance to cover legacy pollution and the contingency reclamation cost estimate for the first year of mining operations before issuance of a permit to mine.**

10. **The PolyMet draft Permit to Mine fails to comply with requirements for information, designs and methods before a permit is granted and is too vague to establish what is required for compliance or provide standards for enforcement.**

OBJECTIONS TO POLYMET DRAFT PERMIT TO MINE

1. **Minnesota statutes and non-ferrous mining rules set requirements for a copper-nickel mining project to reduce impacts on natural resources, prevent potential damage to property, protect water resources and provide adequate insurance and financial assurance to protect taxpayers and downstream property owners.**

Since the PolyMet copper-nickel mine project is the State's first proposed non-ferrous metallic mine, many applicable provisions of Minnesota statutes and non-ferrous mining rules may be interpreted now for the first time. They are not merely advisory. Minnesota statutes and rules require that a copper-nickel mining project "be conducted in a manner that will reduce impacts to the extent practicable, mitigate unavoidable impacts, and ensure that the mining area is left in a condition that protects natural resources and minimizes to the extent practicable the need for maintenance."[13] Minnesota Rules also require mining, mine waste management, and reclamation methods that "maximize physical, chemical, and biological stabilization of areas disturbed by mining."[14]

Minnesota Rules provide additional specificity as to what is required to minimize the adverse impacts of non-ferrous mining to the extent practicable.

> "Minimize to the extent practicable" means minimize through application of technologies and practices including methods, specifications, guidelines, standards, and engineering safety factors, developed for and commonly used in mining or in reasonably similar activities. These technologies and practices shall be determined by the commissioner, based on problem assessment, examination of alternative practices, and input from appropriate regulatory authorities, to be the most effective and workable means of achieving reclamation, including being technologically, economically, and practically applicable.[15]

Portions of a mining operation for which there is flexibility in site selection, such as tailings basins and hydrometallurgical waste facilities, shall be sited so that "potential damage to property and natural resources due to floods, caving or slope failure is minimized" and so that

[13] Minn. Stat. §93.44; Minn. R. 6132.0200.
[14] Minn. R. 6132.0200.
[15] Minn. R 6132.0100, subp. 17.

"runoff and seepage can be managed to minimize water impacts on surface water and groundwater."[16]

Reactive mine waste shall be mined, disposed of, and reclaimed to prevent the release of substances that result in the adverse impacts on natural resources.[17] Tailings basins shall also be designed, constructed and operated "to be structurally sound" and "minimize hydrologic impacts."[18] Any reactive mine waste storage facility must be designed so to provide for "collection and disposal" of water moving through or over the mine waste.[19]

At closure, a reactive mine waste storage facility must "permanently prevent substantially all water from moving through or over the mine waste" as well as "provide for the collection and disposal of any remaining residual waters that drain from the mine waste in compliance with federal and state standards."[20] In addition, reactive mine waste shall be mined, disposed of, and reclaimed to "prevent the release of substances that result in the adverse impacts on natural resources."[21]

In order to grant a permit, the DNR must determine that the reclamation and restoration planned for an operation complies with lawful requirements, that it "can be accomplished under available technology," and that "a proposed reclamation or restoration technique is practical and workable under available technology."[22] The DNR lacks the discretion to approve a project based on a speculative or unproven technology, or based on a vague aspiration to determine the plan for reclamation in the indeterminate future.

Minnesota law emphasizes the protection of persons and property that might be damaged as a result of a mining operation and the protection of taxpayers from the burden of potential reclamation costs. The applicant for a permit to mine must supply proof prior to permit issuance of insurance in an amount that is "adequate to compensate persons who might be damaged as a result of the mining operation or any reclamation or restoration connected with the operation."[23] Minnesota non-ferrous mining rules also require that the permittee must provide financial assurance in the amount equal to the contingency cost estimate for the first year of mining operations prior to issuance of a permit to mine.[24]

A permit to mine has defined parameters under Minnesota law. Mining for metallic minerals is prohibited unless a person has first obtained a permit to mine.[25] An application for a permit to mine must include the proposed plan for reclamation and, or restoration of any area affected by the mining operation[26] and a permit to mine must be issued for a defined term, including of reclamation and restoration as well as mining.[27]

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[16] Minn. R. 6132.2000, subp. 5, items C and E.
[17] Minn. R. 6132.2200, subp.1.
[18] Minn. R. 6132.2500, subp. 1.
[19] Minn. R. 6132.2200, subp. 2, item B.
[20] Minn. R. 6132.2200, subp. 2, item B
[21] Minn. R. 6132.2200, subp. 1.
[22] Minn. Stat. § 93.481, subd. 2.
[23] Minn. Stat. §93.481, subd. 1(2); Minn. R. 6132.1100, subp. 3.
[24] Minn. R. 6132.1200, subp. 2; subp. 4, item B and subp. 7, item A.
[25] Minn. Stat. §93.481, subd. 1; Minn. R. 6132.0300, subp. 1.
[26] Minn. Stat. §93.481, subd 1(1).
[27] Minn. Stat §93.481, subd. 3.

Minnesota law intends that a permit to mine will contain enforceable requirements. The DNR commissioner is granted authority to modify or revoke a permit "in case of any breach of the terms or conditions thereof," and to suspend operations "to protect the public health or safety or to protect public interests in lands or waters against imminent danger of substantial injury in any manner or to any extent not expressly authorized by the permit."[28]

As detailed in these Objections, the PolyMet draft Permit to Mine fails to comply with the requirements of Minnesota statutes and rules.

The PolyMet PTM Application proposes sites, technologies, and practices at the mine site, tailings waste facility and hydrometallurgical residue facility that may be least cost for PolyMet, but fail to protect natural resources, groundwater, surface water and property as required under Minnesota law. The DNR's draft Conditions exacerbate the failings of PolyMet's PTM Application. They fail to require compliance with applicable law and fail to set enforceable standards. On many key issues, DNR's draft Conditions merely defer plans and decisions until after permit issuance, preventing public and independent third party scrutiny and undermining DNR's own leverage to require improved technologies and practices in order to grant a permit to mine.

2. The PolyMet draft Permit to Mine fails to provide tailings storage technology at an appropriate site to minimize potential adverse impacts to property, natural resources, groundwater and surface water or a final design demonstrating stability and compliance with factors of safety at the tailings waste facility.

PolyMet will generate approximately 11.3 million short tons of Flotation Tailings annually (approximately 10.3 million in-place cubic yards annually) for an estimated cumulative total of 225 million short tons and approximately 207 million in-place cubic yards.[29] PolyMet tailings would be pumped in wet slurry form directly from the beneficiation plant to the tailings facility.[30] PolyMet tailings would be deposited without a liner on top of the existing unlined LTVSMC taconite tailings waste facility.[31] PolyMet has estimated that liquids of the wet tailings slurry would be 68.5% by weight or 86% by volume.[32]

PolyMet's proposed method of tailings storage does not minimize adverse impacts to property, water or other natural resources as a result of either tailings dam failure or tailings waste facility seepage.

Since the catastrophic failure of the Mount Polley tailings waste facility dam in 2014, experts have advised that dry stack tailings disposal is the Best Available Technology to avoid the potential for catastrophic dam failure with potentially disastrous environmental consequences.[33]

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[28] Minn. Stat. §93.481, subd. 4 (c) and (d).
[29] PolyMet PTM Application, p. 266.
[30] PolyMet PTM Application, pp. 272, 355.
[31] *Id.*, pp. xxvii, 206, 263
[32] PolyMet Tailings Mgt. Plan, *supra*, in Appx. 11.5 of the PolyMet PTM Application, Attachment B, Saint Anthony Falls Tailings Deposition Modeling Report (2011), Table 1, excerpt provided as Exhibit 5, autop. 4.
[33] Independent Expert Engineering Investigation and Review Panel, Report on Mount Polley Tailings Storage Facility Breach, Jan. 30, 2015 (Mount Polley Independent Report), Exhibit 6, p. iv.

As explained by the Independent Expert Panel Report analyzing the causes of the Mount Polley tailings storage facility breach, there are "intrinsic hazards associated with dual-purpose impoundments storing both water and tailings" and the goal of best available technology for tailings management "to assure physical stability of the tailings deposit. This is achieved by preventing release of impoundment contents, independent of the integrity of any containment structures."[34]

According to the Mount Polley Independent Report, the goal of Best Available Technology (BAT) for tailings management "is to assure physical stability of the tailings deposit." To accomplish this objective, "BAT has three components that derive from first principles of soil mechanics: 1. Eliminate surface water from the impoundment. 2. Promote unsaturated conditions in the tailings with drainage provisions. 3. Achieve dilatant conditions throughout the tailings deposit by compaction."[35] There are no overriding technical impediments to more widespread adoption of filtered tailings technology.[36]

Tailings dams fail at a rate that is approximately 10 times higher than that of water supply reservoir dams.[37] Upstream-type dam construction, which is the type of construction proposed for the PolyMet tailings dam,[38] poses the highest risk for both seismic and static failure, and most tailings dam failures have been associated with upstream construction.[39] When tailings are hydraulically spigotted into an impoundment, as also proposed for the PolyMet tailings dam,[40] their placement and water content are not uniform, and there is no practical way to test the tailings material to assure that it is "drained of excess water after hydraulic placement, and that it has the consistency and density assumed by the design modeling."[41]

Analysis of the Fundão dam failure in Samarco, Brazil has cited the "unforgiving" nature of the upstream embankment method due to the fact that "water is the primary instability agent" and the foundation of later lifts can be placed on unstable tailings slime.[42] Upstream embankments represent up to 66% of the worldwide reported dam failures.[43]

As explained in WaterLegacy's comments on the PolyMet draft Dam Safety Permits,[44] Minnesota has no experience with management of copper-nickel tailings, and little experience with dams holding back slurry in a closed system, where surface drainage and seepage are returned to the waste contained by the dam. When the Minnesota Pollution Control Agency

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[34] *Id.*, at 121.
[35] *Id.*, at 121
[36] *Id.*, at 122
[37] D. Chambers, Comments on the Geotechnical Stability of the Proposed NorthMet Tailings Basin and Hydrometallurgical Residue Facility in light of the Failure of the Mt Polley Tailings Storage Facility, Apr. 30, 2015, ("Chambers 2015") Exhibit 7, p. 2.
[38] PolyMet PTM Application, *supra*, p. 266.
[39] *Id.*, pp. 2-3.
[40] PolyMet PTM Application, *supra*, pp. 265, 355, 356.
[41] D. Chambers, Comments on Draft Dam Safety Permit Numbers 2016-1380 and 2016-1383, Oct. 16, 2017 ("Chambers 2017"), Exhibit 8, p. 1.
[42] F.F. Carmo et al., Fundão tailings dam failures: the environment tragedy of the largest technological disaster of Brazilian mining in global context, *Perspectives in Ecol. and Cons.*, 15: 145-151 (2017), Exhibit 9, p. 146.
[43] *Id.*
[44] WaterLegacy, Comments on PolyMet Draft Dam Safety Permits 2016-1380 and 2016-1383, Oct. 16, 2017 ("WaterLegacy Dam Permit Comments"), p. 11. These Comments and supporting exhibits are incorporated herein and attached as Exhibit 10.

(MPCA) required that surface runoff and leachate be collected and pumped back to the top of an LTV Steel Mining Company coal ash heap at Taconite Harbor, the wastes liquefied and collapsed.[45] Even modest level of pumping from the surface seep collection systems on the south side of the LTVSMC basin has increased the phreatic surface,[46] a factor that increases dam failure risk.

It is recognized by professionals that "the most common failure modes for slurry tailings impoundments are physical instability (including static and dynamic liquefaction) and water mismanagement issues (including lack of freeboard and seepage phenomena like piping)."[47] This serious adverse impact can be avoided through dry stack tailings storage: "Filtered tailings placed in dry stacks are essentially immune to catastrophic geotechnical 'failure' and can be readily designed to withstand static and seismic forces."[48]

In contrast, PolyMet has admitted that both its own flotation tailings and the LTVSMC fine tailings and slimes beneath them could liquefy, even without a seismic trigger:

> A seismic triggering event (earthquake) occurs globally and instantly impacts all soils. Global static liquefaction could also be induced by high porewater pressures associated with a large storm event or if the entire slope was unintentionally steepened during construction. The potential for LTVSMC fine tailings and slimes and the Flotation Tailings to liquefy in response to triggering events is due to the fact that some of these materials are hydraulically deposited and come to equilibrium under very loose to loose conditions.[49]

The DNR Record of Decision on the adequacy of the PolyMet final environmental impact statement (FEIS) states that the alternative of dry stacking of tailings would require a liner and thus could not be placed on the existing LTVSMC tailings site.[50] Although not stated, it is implied that the existing tailings would provide an unstable foundation for a lined facility. The DNR then asserted, without investigation, that dry stack tailings would require conversion of additional green space for the proposed project and would have no significant environmental benefit.[51] Although the Final Scoping Decision for the PolyMet project identified several alternative brownfield sites for tailings disposal,[52] it appears that neither these nor other potential sites for dry stack tailings disposal have been considered at any time during the past 13 years.

Dry stack tailings require a smaller footprint for tailings storage, are easier to reclaim, and have

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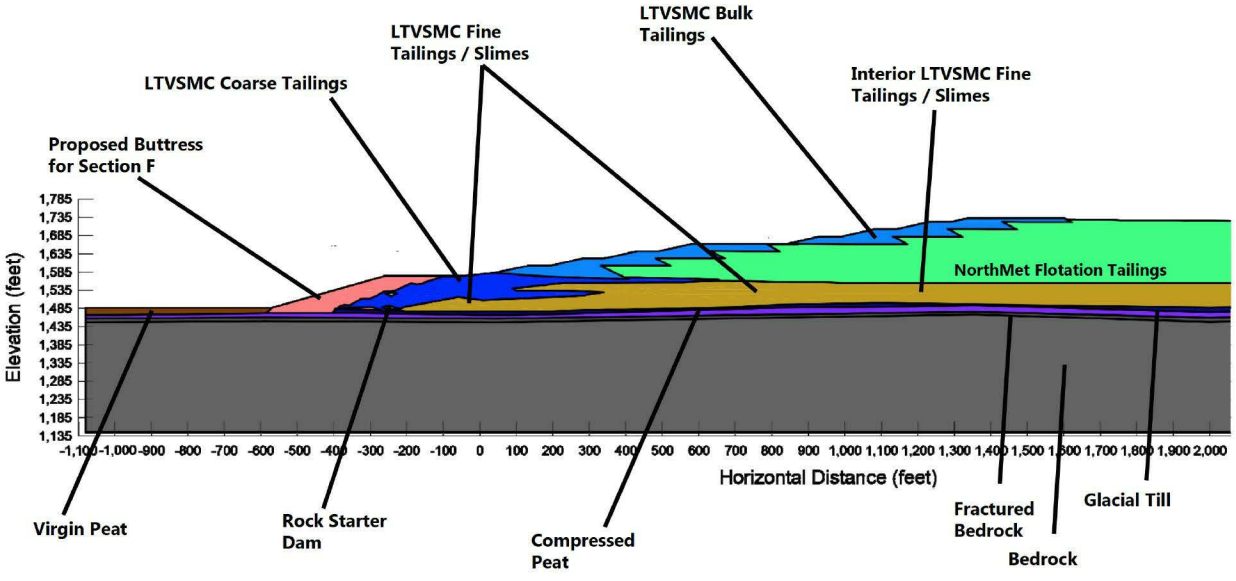
[45] *See Arrowhead Electric Coop. v. LTV Steel Mining Company*, 568 N.W. 2d 875 (Minn. App. 1997).
[46] PolyMet NorthMet Project Geotechnical Data Package for the Flotation Tailings Basin, May 2017 ("PolyMet FTB Geotech.") available at http://files.dnr.state.mn.us/lands_minerals/northmet/dam-safety/v2/dam_safety_permit_application_flotation_tailings_basin_v2_may2017.pdf p. 14.
[47] M. Davies and S. Rice, An alternative to conventional tailing management – "dry stack" filtered tailings, AMEC Earth & Environmental, Vancouver Canada, 2004, Exhibit 11, autop. 1.
[48] *Id.*, p. 4.
[49] PolyMet FTB Geotech., *supra*, pp. 71-72.
[50] *In the Matter of the Final Environmental Impact Statement for the PolyMet Mining, Inc., NorthMet Mining Project and Land Exchange, Record of Decision, Mar. 3, 2016, PolyMet PTM Application,* Appx. 16.2.1 ("DNR FEIS ROD"), p. 77.
[51] *Id.*
[52] MDNR et al, PolyMet NorthMet Draft Environmental Impact Statement, Oct. 19, 2009 ("PolyMet DEIS"), Appx. B, NorthMet Mine and Ore Processing Facilities Project Final Scoping Decision, Oct. 25, 2005, Figure 1, Alternative Sites Under Consideration, attached as Exhibit 12.

much lower long-term liability in terms of structural integrity and potential environmental impact.[53] These are significant environmental benefits, as is the reduction in seepage resulting from dry stack tailings discussed in Section 4 of these Objections. On a global scale, dewatered and filtered tailings practices are becoming substantially more common.[54]

The existing LTVSMC tailings site poses an additional risk spotlighted by the dam failure at Mount Polley; segments of the PolyMet tailings dams would be constructed on top of LTVSMC tailings slimes with a consistency and behavior similar to clays.[55] The northern and western toes of the existing LTVSMC tailings basin dams include areas of peat up to 20 feet thick and areas of tailings up to 17 feet thick.[56] The existing tailings dams upon which PolyMet dams would be constructed consist of a "shell of coarse tailings above a rock, sand and gravel starter dam with intermingling fingers of LTVSMC fine tailings and slimes."[57] The following illustration of Cross Section F[58] shows that PolyMet NorthMet tailings would be deposited on top of "fine tailings/slimes" and "compressed peat."



In determining that the PolyMet FEIS was "adequate," the DNR emphasized that the tailings basin facility had been "upgraded" to include rock buttressing and cement deep soil mixing for increased stability on the former LTVSMC tailings basin.[59] In order to meet the required factor of safety, PolyMet would be "Incorporating cement deep soil mixing as an engineering measure to stabilize the existing tailings and peat layers in the northern dams of the LTVSMC Tailings Basin prior to the use of that facility for the NorthMet tailings."[60]

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[53] M. Davies and S. Rice, *supra*, Exhibit 11, autop. 1
[54] M. Davies, Filtered Dry Stacked Tailings – The Fundamentals, Proceedings Tailings and Mine Waste 2001, Vancouver, BC, Nov. 6-9. 2011, Exhibit 13, autop. 4.
[55] Chambers 2015, *supra*, Exhibit 7,p. 3.
[56] PolyMet PTM Application, *supra*, p. 262.
[57] *Id.*, p. 263
[58] *Id.*, Figure 10-3, autop. 346.
[59] DNR FEIS ROD, p. 45.
[60] *Id.*, p. 63.

WaterLegacy believes that the proposed factors of safety for the PolyMet tailings dam are insufficiently protective, given comments of the EPA and today's standards for coal refuse disposal and federal dam engineering; these sources suggest safety factors for worst-case liquefaction from 1.2 to 1.5.[61] However, even with the DNR's current proposal of a lower 1.1 factor of safety for full liquefaction, PolyMet's existing tailings dam proposal fails to achieve this minimum factor of safety. Cross-section F, with an erosion liquefaction trigger, attains only a 1.07 factor of safety.[62] With operation lift 8 as the triggering event, both Cross-Section F and Cross-Section G on the north side of the tailings facility just meet the proposed safety factor of 1.1 for fully liquefied conditions, while the safety factor for Cross-Section N on the south side at Second Creek is just 1.16.[63]

Since the DNR decision on the adequacy of the PolyMet FEIS, the proposal for cement deep soil mixing to achieve dam stability has been shelved, although the reason for the change is not discussed in the PolyMet PTM Application. PolyMet is now proposing a buttress and underdrain to obtain dam stability.[64]

It is troubling that the technology relied upon by the DNR to deem the PolyMet FEIS adequate has been set aside without explanation and that PolyMet's currently proposed tailings dam design fails to meet minimum factors of safety. On close reading of the PolyMet draft Permit to Mine, there is an even more disturbing situation. *PolyMet is expecting to obtain a Permit to Mine without completing a dam design that meets the required minimum factors of safety.*

PolyMet's PTM Application notes that its Dam Safety Permit application includes the "most probable dam design" and emphasizes the "significant effort" made to evaluate potential tailings dam design options.[65] PolyMet proposes that the tailings basin be developed and the "Observational Method" used to "adjust" the "subsequent design, construction, and operation" of the tailings facility "if needed to meet specified factors of safety."[66] PolyMet proposes that achieving "desired" factors of safety can be an "iterative design process," allowing PolyMet to construct and operate the tailings facility "in a manner that is estimated to achieve desired slope stability factors of safety."[67] In addition, "adaptive management" or "contingency mitigations" could be implemented "if updated models project that the planned or constructed FTB [flotation tailings basin] dams may not meet required factors of safety."[68]

DNR's own consultants objected that the Observational Method "is not a substitute for careful initial design."[69] It should be obvious that dam safety design is not the type of endeavor where a mining company can get an "A" for effort; that safety factors are required not optional; that

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[61] WaterLegacy Dam Permit Comments, *supra*, Exhibit 10, pp. 19-20. Factors of safety currently required by DNR are 1.3 for undrained shear strength stability analysis of yield (USSAyield) conditions, 1.5 for effective strength stability analysis (ESSA) conditions, and 1.1 for worst case liquefaction (USSAliq), PolyMet PTM Application, p. 268.
[62] PolyMet PTM Application, Table 10-8, p. 301.
[63] *Id.*, p. 302.
[64] *Id.*, p. 268.
[65] *Id.*, p. 44.
[66] *Id.*
[67] *Id.*, p. 266.
[68] *Id.*, pp. 44-45.
[69] EOR (Emmons & Olivier Resources) Review Team, PolyMet Dam Safety Permit Application Review, May 15, 2017 ("EOR Dam Safety Review"), Exhibit 14, p. 3.

infrastructure that meets safety factors must be designed before any project is approved, not jerry-rigged later as an adaptation or contingency to an inadequate plan.

One would expect that the DNR, to enforce Minnesota Rules requiring that tailings basins be designed to be structurally sound and minimize hydrologic impacts, would have flatly rejected PolyMet's Permit to Mine Application unless and until a tailings dam design for its outmoded wet slurry tailings storage on a site with poor foundations could meet minimum safety requirements.

Instead, the DNR proposed in its draft Conditions that PolyMet would prepare a tailings basin buttress "no later than 30 days following permit issuance . . . to demonstrate to the DNR that the use of the buttress material will meet all applicable standards, statutes and regulations to be protective of natural resources."[70] PolyMet has had more than ten years to design a tailings basin that meets safety standards; giving PolyMet 30 days after permit issuance provides no protection to natural resources.

What this "condition" would accomplish is to hide PolyMet's failure to design a tailings dam that meets factors of safety from the open, public process of the permit to mine and remove any leverage the DNR might have to deny a permit on the basis that PolyMet's plan for tailings wet slurry tailings storage sited on top of peat and tailings slimes remains unsafe and fails to comply with Minnesota rules.[71] Neither PolyMet's PTM Application nor the DNR's draft Conditions minimize adverse impacts to property, water or other natural resources from tailings dam failure.

3. The PolyMet draft Permit to Mine fails to provide an appropriate site, foundation or long-term management plan to prevent structural failure and release of concentrated and toxic wastewater from the hydrometallurgical residue waste storage facility.

The hydrometallurgical waste residue facility (HRF) would create a serious potential hazard to water quality, natural resources and downstream property owners were its dams to fail, its unstable foundation to result in liner leakage, or its inadequate long-term management plan to result in release of concentrated wastes over time. The HRF would be located on an inappropriate site, on an unstable foundation that renders it structurally unsound and lacks a management plan to ensure that its hydrologic impacts will be minimized.[72]

Once autoclave processing of wastes begins, the HRF would receive 313,000 tons of residue annually, and could also be the disposal site for coal combustion residuals from the landfill now on the LTVSMC tailings site.[73] The HRF would contain highly toxic and concentrated wastes.

PolyMet produced a technical report several years ago characterizing hydrometallurgical waste residue.[74] This report disclosed that copper concentrations in the residue would be 945 parts per

[70] DNR draft Conditions, p. 4 ¶26.
[71] *See* Minn. Stat. §93.44; Minn. R. 6132.0200; Minn. R. 6132.2000, subp. 5, item C; Minn. R. 6132.2500, subp. 1.
[72] *See* Minn. Stat. §93.44; Minn. R. 6132.0200; Minn. R. 6132.2000, subp. 5, item C.
[73] PolyMet PTM Application, p. 273.

million[75] - more than 100,000 times Minnesota's water quality standard for copper (9.3 parts per billion) set to protect fish in surface water near the proposed plant.[76] Total sulfate would be 13.78% of the residue or 14.91% when residue is combined with gypsum:[77] in other words, residue would have 138,000 to 149,100 parts per million (mg/L) sulfate. The level of sulfate in HRF residue would, thus, be more than 10,000 times Minnesota's wild rice sulfate standard of 10 mg/L,[78] applicable downstream in the Partridge River. PolyMet has also identified a number of toxic and reactive chemicals that would be used as hydrometallurgical plant consumables.[79]

PolyMet's Facility Mercury Mass Balance Analysis states that 164 pounds of mercury would be deposited in the HRF each year.[80] If the PolyMet autoclave processing were to operate for 18 years, as currently proposed in the PTM Application,[81] by the time it closes the hydrometallurgical residue facility would contain a staggering *2,952 pounds* of mercury. To get a sense of the significance of this amount of mercury, the water quality standard for mercury in Minnesota's Lake Superior basin is 1.3 nanograms per liter; one would need more than 450 billion nanograms to equal just one pound.

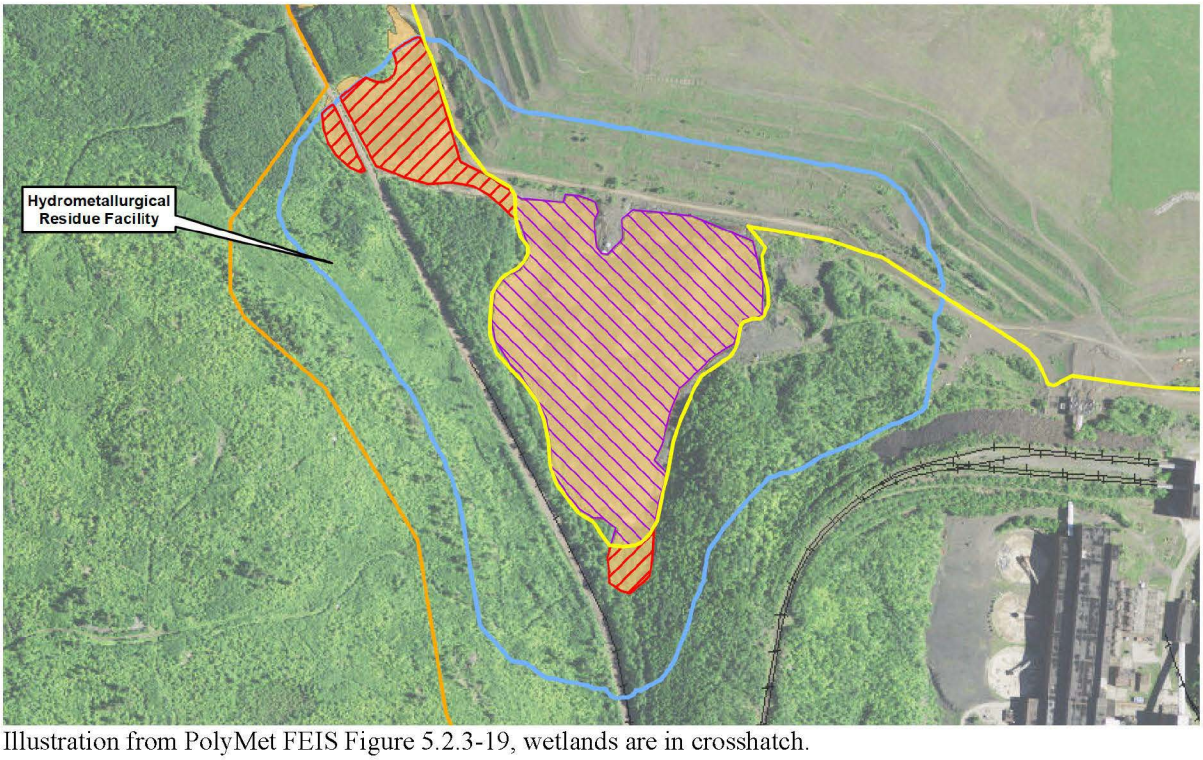

Illustration from PolyMet FEIS Figure 5.2.3-19, wetlands are in crosshatch.

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[74] RS33/RS65 – Hydrometallurgical Residue Characterization and Water Quality Model – NorthMet Project, Feb. 2007, referenced by PolyMet for HRF waste characterization at PolyMet PTM Application, p. 465, Reference 43. PolyMet is still proposing the copper sulfate activation process cited in the RS33/RS65 report. *Id.*, p. 212, 222.
[75] Table 5-2 of RS33/RS65 above is attached in Exhibit 15, autop. 3.
[76] Minn. R. 7052.0100, subp. 6. For the plant site hardness of 10 parts per million (mg/L) is applied.
[77] RS33/RS65 HRF Residue Excerpt, *supra*, Exhibit 15, Table 5-3, autop. 4.
[78] Minn. R. 7050.0224, subp. 2.
[79] PolyMet PTM Application, Table 8-5, pp. 225-227.
[80] PolyMet Facility Mercury Mass Balance Analysis (RS66), Mar. 2007, Excerpt attached as Exhibit 16, autop. 2. This Mass Balance Analysis was cited in the PolyMet FEIS; the PTM Application neither contains nor cites mercury mass balance information.
[81] PolyMet PTM Application, p. 359.

The proposed site for the hydrometallurgical residue facility would be located on 36.1 acres of wetlands,[82] a site that is unsuitable for a facility storing highly concentrated and toxic wastes. Although PolyMet asserts that HRF wastes are not "hazardous," no comprehensive waste characterization has been done to support such a conclusion.[83]

Location of hazardous waste facilities on wetlands is prohibited under Minnesota law.[84] Although location of industrial solid waste facilities on wetlands is also generally prohibited under Minnesota law,[85] in 2015 mining industry lobbyists successfully secured a loophole for disposal of their wastes. According to this special interest legislation, a mining company is "deemed to have obtained a solid waste management facility permit without making application for it" and waste from "extraction, beneficiation, and processing" of ores is exempt from the requirements applicable to all other facilities that treat, transfer, store, process or dispose of solid waste.[86]

This loophole does not absolve the DNR from its duty to reduce impacts on natural resources to the extent practical and to site non-ferrous mining waste facilities to prevent slope failure and minimize potential damage to property and natural resources.[87] The site for hydrometallurgical residue waste proposed in the PolyMet draft Permit to Mine fails to meet either common-sense siting criteria or those in non-ferrous mining law.

In addition to allowing an unsuitable site for concentrated and toxic hydrometallurgical wastes, the PolyMet draft Permit to Mine would permit the construction of the HRF without resolving concerns about the unstable foundations underlying the proposed facility, and without specifying construction materials, or providing for water management in the event of an extreme precipitation event. These comments highlight some of the concerns previously raised in WaterLegacy's comments on the Dam Safety Permit for the HRF,[88] none of which have been resolved.

PolyMet has proposed a double liner system with a leakage collection system between liners to manage water resource impacts from waters moving through reactive residue wastes.[89] This liner system is vulnerable to deformation and rupture due to its location on an unstable foundation.

Engineers retained by the DNR to review HRF dam safety expressed concerns regarding the unstable foundation beneath the proposed HRF and the risk of dam failure and liner deformation. The EOR Dam Safety Review team cautioned in May 2017, "The soft ground beneath the proposed residue facility consists of up to 30 feet of slimes, peat and tailings concentrate. This will not be an adequate foundation for the 80 foot high basin."[90]

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[82] PolyMet FEIS, 5-321, Figure 5.2.3-19.
[83] PolyMet proposes to characterize residue and coal ash wastes before disposal in the HRF. PolyMet PTM Application, p. 273. Minn. R. 7045.0214 describes evaluation of hazardous waste, including residues.
[84] Minn. R. 7045.0460, subp. 2.
[85] Minn. R. 7035.1600, item D.
[86] Minnesota Session Laws, Special Session 2015, ch. 4, sec. 119, amending Minn. Stat. §116.07, subd. 4j; Minn. R. 7001.3050, subp. 3, item G; Minn. R. 7035.2525, subp. 2, item G.
[87] See Minn. Stat. §93.44; Minn. R. 6132.0200; Minn. R. 6132.2000, subp. 5.
[88] WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[89] PolyMet PTM Application, p. 274.
[90] EOR Dam Safety Review, *supra*, Exhibit 14, p. 5.

The EOR Review further noted, "The basin will have a geomembrane or geosynthetic liner. The liner could deform and fail if the existing underlying material cannot support the material added to the basin."[91]

Excavation of slimes, peat and tailings concentrate to create a stable foundation is the technology commonly used in mining and other reasonably similar activities to minimize impacts on groundwater and surface water from leakage of liner systems. In fact, for the lined waste rock stockpiles at its mine site, PolyMet has proposed, "In preparation for building the temporary stockpiles, the sites will be cleared and grubbed, and geotechnically unsuitable soils (mainly peat) will be excavated as needed to support a stable foundation."[92] If the HRF were to be allowed on its proposed site, PolyMet should be required to implement site clearance and excavation to reduce the threat of liner failure releasing highly concentrated and toxic wastes from the hydrometallurgical residue facility.[93]

PolyMet does not propose excavation to ensure a stable foundation beneath the HRF. It has proposed placing a "preload" to "compress" or "consolidate" the slimes, peat and tailings on the site.[94] This compression will have a rebound when the preload is removed.[95] The PolyMet draft Permit to Mine provides no performance specifications for the preload, limit for the rebound, or criteria by which this penny wise and pound foolish mitigation method would be rejected.

As detailed in WaterLegacy's Dam Permit Comments,[96] PolyMet has yet to specify and DNR has yet to set requirements for the materials that will be used to construct the HRF dams.[97]

While the PolyMet tailings basin is designed to take into account probable maximum precipitation (PMP), albeit a maximum rainfall based on 1978 data,[98] it appears that no PMP at all was evaluated in designing the hydrometallurgical residue facility.[99] PolyMet's Geotechnical Data Package for the HRF assumed that "effects of precipitation are negligible" so that even a "large" rain event would result in only a small increase in existing pond depth.[100] Neither rain events nor climate change were included in evaluation of stress deformation of the HRF,[101] or slope stability due to excess pore water pressure at the HRF.[102]

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[91] *Id.*, p. 6.
[92] PolyMet PTM Application, p. 292.
[93] The EOR Dam Safety Review team suggested a remediation alternative of "Removing the existing material and any soft soils before constructing the basin," and commented that "the proposed pre-load design should be re-evaluated to determine if it will adequately surcharge and compress the existing material EOR Dam Safety Review, *supra*, Exhibit 14, p. 6.
[94] PolyMet PTM Application, pp. 277, 357
[95] NorthMet Project Geotechnical Data Package – Hydrometallurgical Residue Facility, July 11, 2016, p. 34, ("PolyMet HRF Geotech.") available at http://files.dnr.state.mn.us/lands_minerals/northmet/dam-safety/references/geotech_data_package_vol2_hrf_v6.pdf
[96] WaterLegacy Dam Permit Comments, *supra*, Exhibit 10, p. 16.
[97] PolyMet PTM Application, p. 275, states PolyMet will use soil borrow, may use LTVSMC tailings and possibly will use quarried rock for dam construction.
[98] PolyMet's analysis of the PMP at the tailings waste site is based on 1978 data contained in reference 52 and analyzed in reference 53, PolyMet PTM Application, pp. 354, 466.
[99] There is no discussion of a probable maximum precipitation event on the HRF in the PolyMet PTM Application, its appendices, or the PolyMet HRF Geotech. document.
[100] PolyMet HRF Geotech., *supra*, p. 32.
[101] *Id.*, pp. 36, 43, 44.
[102] *Id.*, p. 38.

There is no emergency overflow mechanism proposed for the HRF to prevent overtopping or dam failure during a massive precipitation event or in the event of disruption or blockage of the return water pipeline. PolyMet's PTM Application admitted that if the return water system "were to fail or be accidentally shutdown" overflow would occur.[103]

If the overflow occurred to the northwest, it might be intercepted by the tailings seepage containment system. But, "If the overflow were to overtop the dams to the west or the south instead of the northwest, the HRF water would enter the Plant Site stormwater system, which outlets to a tributary to Second Creek."[104] Despite the enormous threat to surface water quality from hydrometallurgical waste facility overflow, the DNR has imposed no conditions requiring analysis of a maximum precipitation event on the HRF facility, let alone a system to ensure that toxic and concentrated residue wastewater would not escape into groundwater to the northwest or surface waters of the United States on the west and south.

One of the assumptions allowing regulatory agencies to consider location of the hydrometallurgical residue storage facility on an unstable wetlands site near Second Creek is that "virtually all" of the leakage through the upper layer of the double liner system will be captured by PolyMet's proposed leakage collection system.[105] However, there are gaps and inconsistencies in PolyMet's plan for long-term maintenance of this concentrated waste facility. PolyMet proposed in documents supporting its application for an HRF dam permit that the HRF would be inspected daily and weekly *during operations* and that monitoring points will be surveyed twice per year to determine horizontal and vertical deformation of the HRF dams.[106]

However, PolyMet's plan for HRF maintenance *post closure* is meager and short-lived:

> The frequency of monitoring will decrease and monitoring will eventually cease once the cover system has been completed, once vegetation has become established, and once it is confirmed that there are no areas where surface runoff is becoming channelized and causing erosion of the facility dams.[107]

PolyMet's most recent closure and postclosure maintenance plan takes this hands-off approach to the HRF yet farther; "Once drainage stops or has decreased to a point of being insubstantial to final HRF closure, Drainage and Leakage Collection System pumps and pipes and supporting electric power systems will be removed."[108]

Although PolyMet states a few pages later that any postclosure problems "identified during a routine inspection" will be corrected, including a repair of the Leakage Collection System,[109] this

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[103] *Id.*, p. 35.
[104] *Id.*
[105] *Id.*, pp. 274, 276.
[106] Residue Management Plan - Hydrometallurgical Residue Facility ("PolyMet HRF Mgt. Plan"), pp. 25, 28, in Appendix A of PolyMet's May 2017 NorthMet Dam Safety Permit Application for the Hydrometallurgical Residue Facility, available at http://files.dnr.state.mn.us/lands_minerals/northmet/dam-safety/v2/dam_safety_permit_application_hydromet_residue_facility_v2_may2017.pdf?utm_content=&utm_name=&utm_term
[107] *Id.*, p. 36. Additional concerns about HRF maintenance are set forth in WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[108] NorthMet Project Reclamation, Closure and Postclosure Maintenance Plan. Nov. 2017 ("PolyMet Closure & Postclosure Plan"), p. 23, Appx. 14 of the PolyMet PTM Application.
[109] *Id.*, at 27.

is a flawed statement. PolyMet contemplates that postclosure inspections will become infrequent and eventually cease, and that the Leakage Collection System will be removed. It is highly unlikely that liner leakage could be identified in a routine inspection and, if it were, it is unlikely that any system would be in place to rectify the situation with or without repair.

DNR's Area Fisheries Supervisor has expressed concerns about downstream hazards that would result from release of waste from the HRF, particularly over the long term:

> How long does such a liner last and what happens when it inevitably degrades as nothing lasts forever? Even if it takes 200 years, the waste will still be there and in its location would be very susceptible to leaching into nearby wetlands and groundwater. There is no mention of the expected longevity of the liner and leakage system in the long term closure description. There is mention of a monitoring plan but no mention of how the liner could be maintained or repaired or replaced . . . I don't understand how a liner could be replaced, or even repaired, under a 97 acre site with 50 feet of fill on top . . . The Hydrometallurgical Residue Facility is a concern to Fisheries because of its potential impact on water quality as the system ages.[110]

The DNR has not required PolyMet to evaluate disposal of hydrometallurgical wastes on a suitable site or in a dedicated and professionally operated waste facility. The DNR has set no conditions with respect to accurately characterizing HRF wastes, establishing a stable foundation for the HRF or requiring long-term maintenance for the hydrometallurgical residue facility. As proposed, the site, technology and practices proposed for the HRF in the PolyMet draft Permit to Mine threaten dam failure and liner deformation failure, imprudently threatening downstream property, groundwater and surface water, and communities.

4. Tailings and Category 1 waste storage methods and seepage containment proposed in the PolyMet draft Permit to Mine do not protect groundwater or surface water or adequately provide for the collection of waters that drain from reactive wastes.

Tailings storage and Category 1 waste rock storage proposed by PolyMet, along with their seepage containment systems, fail to comply with Minnesota rules requiring that reactive waste be disposed of "to prevent the release of substances that result in the adverse impacts on natural resources," and fail to provide for adequate "collection and disposal" of residual waters moving over this waste as required by rules.[111]

Minnesota rules define reactive mine waste to include waste that releases "substances that adversely impact natural resources."[112] Whether or not tailings seepage and seepage from Category 1 waste rock will be acid-generating, they will contain sulfur, metals and other constituent that would harm natural resources if released the environment. PolyMet admits that

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[110] E. Evarts, Area Fisheries Supervisor, DNR Request for Comments - Dam Safety - Construction - St. Louis County - Applications 2016-1383 and 2016-1380, June 19, 2017, included as Ex. 10 with WaterLegacy's Dam Permit Comments, *supra*, Exhibit 10.
[111] Minn. R. 6132.2200, subp. 1 and subp. 2, item B (2).
[112] Minn. R. 6132.0100, Subp. 28.

its tailings will have the potential to release "metals and other parameters of concern" and that Category 1 waste rock may release metals.[113]

The PolyMet FEIS predicted that its tailings facility would produce 3,880 gallons per minute (gpm) of seepage,[114] equivalent to 2,041,000,000 gallons per year.

In its PTM Application, PolyMet predicted solute concentrations in tailings toe seepage far exceeding Minnesota water quality standards adopted to protect fish and aquatic life. For example, at the North Toe, levels of nickel in year 20 are predicted as 893 parts per billion (µg/L) -- more than 17 times the surface water quality standard of 52 µg/L and levels of copper are predicted at 650 parts per billion – nearly 70 times the water quality standard of 9.3 µg/L. Lead, a particularly dangerous neurotoxin with no safe level, would reach levels of 58 parts per billion -- more than 18 times the water quality standard of 3.2 µg/L. [115]

PolyMet's modeling of seepage concentrations at the tailings toe is likely to understate actual tailings chemistry. Leachate from copper-nickel *tailings* from MinnAMAX bulk sampling was not considered in modeling of NorthMet tailings seepage.[116] MinnAMAX tailings leachate contained levels of cobalt more than 30 times the tailings seepage concentration predicted for the NorthMet project, levels of nickel more than 21 times the predicted NorthMet concentrations, and sulfate concentrations more than 11 times higher than predicted NorthMet concentrations.[117]

A dry stack tailings facility on a liner system would substantially limit the potential impacts of PolyMet tailings leachate and seepage. Dry stack tailings disposal reduces seepage rates, as compared with slurry tailings. It is estimated that the seepage rate from slurry tailings is 6.4 gallons per minute (gpm) per acre, the seepage rate from paste or thickened tailings 0.06 gpm per acre and the seepage from dry filtered tailings 0.007 gpm per acre.[118] As compared to dry filtered tailings, this estimate indicates that wet slurry tailings would produce approximately 914 times as much seepage.

The PolyMet FEIS claimed that, during mine operations, 3,860 gallons per minute (gpm) of the total 3,880 gpm of seepage modeled would be collected from the unlined, permanent waste storage facility. This would be a nearly perfect collection rate of 99.5%.[119]

To reach this conclusion, the FEIS first assumed that all but 200 gpm (5%) of total NorthMet tailings seepage will be "surface seepage."[120] Next, based on PolyMet's modeling, the FEIS

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[113] PolyMet PTM Application, pp. 255, 257.
[114] PolyMet FEIS, 5-179, 5-181.
[115] PolyMet NorthMet Water Management Plan – Plant, Dec. 2017 ("PolyMet Water Mgt. – Plant"), in Appx. 11.3 of the PolyMet PTM Application, Large Table 3, Estimated Tailings Basin Seepage Water Quality from the North Toe, at P90 probability. Water quality standards are based on Minn. R. 7052.0100, subp. 6 and Minn. R. 7052.0222, subp. 2, with hardness levels of 100 parts per million (mg/L).
[116] B. Johnson, Summary Analysis of PolyMet NorthMet Modeled Tailings Chemistry and MinnAMAX Site Tailings Leachate, Dec. 2015, Exhibit 17, p, 1.
[117] *Id.*, p. 3 and Tables 1 and 2 at autop. 4.
[118] See John Lupo, Ph.D., P.E., Dry Stack Tailings Overview, Slide Presentation, 2012, available at ("Lupo 2012") excerpts attached as Exhibit 18, autop. 14. Lupo is the Senior Director of Geotechnical Engineering and Hydrogeology for Newmont Mining Corporation.
[119] PolyMet FEIS, 5-181, Table 5.2.2-37.
[120] *Id.*, 5-179.

assumed that 100% of both tailings surface seepage and groundwater seepage would be captured on both the east side and the south side of the tailings waste facility,[121] and that 100 % of the surface seepage and 90% of seepage retained in groundwater would be captured at the north, northwest and west toes of the tailings storage facility.[122]

In the course of environmental review, experts challenged these sanguine assumptions. Geologist J.D. Lehr criticized the "cursory and simplistic treatment of the role that bedrock fractures may play in the transmission of groundwater" at the tailings site, the assumption of a "no-flow boundary" beneath the tailings waste facility, and the resulting implication that groundwater flow through bedrock at the tailings site "is so insignificant that it can be ignored."[123]

Anthony Runkel, the Chief Geologist for the Minnesota Geological Survey, echoed the concern that fracture zones of relatively high hydraulic conductivity and multiple flow systems within bedrock needed to be modeled.[124] He noted that faults are known to be common across much of mapped extent of the Giants Range Batholith, including in the plant site/tailings basin area and nearby fractures in the same bedrock have had significant environmental effects: "Hydraulically significant fractures in the Giants Range Batholith are documented to have transported contaminants at the Northwoods Closed Landfill (MPCA reports) several miles north of the Plant Site/Tailings Basin area."[125]

Engineer and hydrologist Donald Lee cautioned that lack of data on bedrock groundwater at the tailings basin precludes calculation of how much groundwater is currently flowing in bedrock at the site; in addition, increased seepage and hydraulic head created in the tailings piles during PolyMet operations could result in more water flowing deeper into groundwater.[126] After reading predictions for tailings basin performance, Dr. Lee determined, "The analytical support for these conclusions is based on assumptions of performance that are not justified or supported by data."[127]

In addition to failing to provide appropriate data, the FEIS relied heavily on the project proponent's assumptions to reach its conclusions about tailings seepage capture. The capture efficiencies claimed for the tailings site were "provided by PolyMet" and "justified," "supported," and "assumed" based on the proponent's modeling.[128] On the south side of the tailings facility, claims of 100% seepage capture were based only on PolyMet's promise that its unspecified future upgrades would achieve "100 percent capture" if the project were approved.[129]

In deciding that the PolyMet FEIS was "adequate," the DNR relied on PolyMet's promises

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[121] *Id.*, 5-8, 5-102.
[122] *Id.*, 5-186.
[123] J.D. Lehr, Technical Memorandum - Summary of Comments Resulting from Review of NorthMet Mining Project and Land Exchange Supplemental Draft Environmental Impact Statement, Mar. 12, 2014 ("Lehr 2014"), attached with figures and maps as Exhibit 19, pp. 3, 4.
[124] Anthony Runkel, Comment on the NorthMet Supplemental Draft Environmental Impact Statement, Mar. 13, 2014, Exhibit 20, p. 1.
[125] *Id.*, p. 3.
[126] D. Lee, Ph.D., P.E., PolyMet Tailings Basin Performance, Dec. 10, 2015 ("Lee 2015 Tailings"), Exhibit 21, p. 4.
[127] *Id.*, p. 1.
[128] FEIS, 5-77, A-578, A-583, A-612.
[129] FEIS, 3-120, A-84, A-195, A-197, A-616.

regarding seepage capture at the tailings waste facility, finding:

> *Groundwater Seepage*. At the Tailings Basin, about 20 gallons per minute of untreated water would be released during closure (all related to Tailings Basin seepage that bypasses the groundwater containment system). This release represents less than one percent of total Tailings Basin water releases.[130]

PolyMet's PTM Application fails to reflect these findings, let alone make good on its promises for tailings seepage collection. In its Application, where claims might be considered part of an enforceable permit obligation, PolyMet retreats from its assertions that more than 99.5% of total tailings facility seepage will be contained by its seepage capture system. Instead PolyMet states, "tailings basin seepage will be *collected to the extent practical* by the FTB seepage capture systems."[131]

PolyMet states that it will build various segments of a seepage containment system on the west, north and part of the east sides of the tailings storage facility,[132] but specifies no performance standards for this system. PolyMet proposes that it will supply criteria, such as containment system trench wall thickness, conductivity and depth "prior to system construction."[133] At this point, despite more than a decade of planning, PolyMet seeks a Permit to Mine based on a "conceptual" layout and cross-section of the tailings facility seepage containment system.[134]

On the south side of the tailings waste facility, PolyMet acknowledges that groundwater from the existing LTVSMC tailings basin currently flows south toward NPDES/SDS monitoring station SD026 at the headwaters of Second Creek and downstream to the Partridge River.[135] But PolyMet's PTM Application fails to honor commitments during the FEIS process for 100% collection on the south side of the tailings facilities. PolyMet temporizes with a statement that could create no enforceable permit conditions:

> PolyMet is working with Cliffs Erie and MPCA *to evaluate possible improvements* to this system, which will be called the FTB South Seepage Management System for the Project . . . A geotechnical investigation is required to determine *if additional improvements are needed and to develop a design for these improvements, if deemed necessary. If improvements are necessary*, design drawings will be submitted to the DNR for approval and potentially a permit amendment, as determined by the DNR, prior to the initiation of construction.[136]

The DNR draft Conditions for the PolyMet Permit to Mine fail to require that PolyMet keep the commitments relied upon by the DNR to conclude that the PolyMet FEIS was "adequate." They do not set a seepage capture ratio or limits to the total amount of seepage that can escape containment without violating Minnesota rules that water moving through or over mine waste

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[130] DNR FEIS ROD, p. 47.
[131] PolyMet PTM Application, p. 354 (emphasis added).
[132] *Id.*, p. 269.
[133] *Id.*
[134] *Id.*, p. 270, Figure 10-6.
[135] *Id.*, p. 83. *See also* PolyMet FEIS, A-625, "It is acknowledged that there is currently incomplete capture of impacted water at SD026."
[136] *Id.*, p. 270 (emphasis added)

must be effectively collected.[137] DNR, instead, allows PolyMet to seepage capture designs until after a permit is issued and sets no standards for performance:

> Final designs for the cut-off wall for the tailings basin containment system must be submitted to the DNR for review at least 45 days prior to construction of such system. If DNR requests further information, then the Permittee must submit the requested information to the DNR at least 14 days prior to construction of such system.[138]

As with many other controversial issues in PolyMet's mining plan, DNR's draft Conditions would undermine the purpose of requiring a permit to mine prior to construction under Minnesota law.[139] DNR would lose regulatory leverage to deny a permit if PolyMet cannot demonstrate collection of water contacting reactive wastes, and members of the public, downstream property owners, affected governments, and independent adjudicators[140] would lose the ability to determine if PolyMet's designs, methods, specifications and practices comply with applicable statutes and rules.

This problem is particularly acute with respect to tailings seepage collection since there is no evidence that (absent a lined dry stack tailings storage facility sited as proposed in Section 2) seepage capture can approach the rate of success claimed for the PolyMet project.

Throughout the environmental review process, experts disputed PolyMet's claims of efficacy for the collection systems proposed. Geology at the tailings site would not be favorable for a trench to be "keyed into" bedrock and cobbles (often huge boulders) would impede construction of an effective slurry trench.[141] Claims that a slurry wall would be nearly impermeable for the indefinite future were unjustified.[142] Despite Data Practices Act requests, no documents were produced that demonstrated rates of seepage capture approaching those claimed by PolyMet.

In PolyMet's PTM Application and its most recent Water Management Plan, PolyMet asserts that a cutoff wall and containment system is commonly used to manage groundwater flow and surface seepage in tailings basins and other facilities.[143] However, PolyMet provides no evidence that any of these systems achieve anything approaching 90% capture of groundwater seepage or 99% overall capture efficiency. The single document referenced by PolyMet to demonstrate the effectiveness of the proposed tailings seepage containment system is a three-page Barr memo, Groundwater Containment System: Degree of Use in Industry written in 2012.[144]

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[137] Minn. R. 6132.2500, subp. 2, item B (6); Minn. R. 6132.2200, subp. 2, item B (2).
[138] DNR draft PTM Conditions, p. 7 ¶55.
[139] Minn. Stat. §93.481, subd. 1; Minn. R. 6132.0300, subp. 1.
[140] A permit to mine may be subject to a contested case and judicial review. Minn. Stat. §93.483; Minn. Stat. §93.50; Minn. R. 6132.4000, subp. 2; Minn. R. 6132.5000.
[141] Lehr 2014, *supra*, Exhibit 19, pp. 17-18.
[142] Lee 2015 Tailings, *supra*, Exhibit 21, p. 3.
[143] PolyMet Water Mgt. – Plant, *supra*, p. 17, in Appx. 11.3 of the PolyMet PTM Application.
[144] The Water Management Plan cites Attachment D to Reference 6 as the source of its claims. Reference 6 is the NorthMet Project Rock and Overburden Management Plan (v10). December 2017 ("PolyMet Rock Mgt. Plan"), in Appx. 11.1 of the PolyMet PTM Application. Attachment D to that Plan is the Barr Memo Groundwater Containment System: Degree of Use in Industry Dec. 26, 2012 ("Barr 2012 Containment Memo") attached as Exhibit 22.

As discussed in WaterLegacy's comments on the PolyMet FEIS, the 2012 Barr memo doesn't support PolyMet's claims for seepage capture efficiency. Instead it provides a cautionary tale.

The only mine tailings seepage example proffered by Barr on PolyMet's behalf as an example of successful use of slurry walls to keep mine tailings seepage out of downgradient water is the Fort McMurray tailings pond seepage containment system in Alberta Canada. To quote Barr,

> Another example is the installation of a soil-bentonite cutoff wall around the perimeter of a mine tailings pond located in the province of Alberta, Canada. The cutoff wall is approximately 100-feet deep and 3 feet wide, and has a hydraulic conductivity of less than $1x10^{-7}$ cm/sec. *The cutoff wall was used to isolate the tailings pond from downgradient surface water features* including wetlands and the Athabasca River.[145]

However, information available since 2012 demonstrates that Fort McMurray tar sands tailings seepage containment has had disastrous results.

Canadian news media reported four years ago that federal research found that "toxic chemicals from Alberta's vast oil sands tailings ponds are leaching into groundwater and seeping into the Athabasca River" despite a seepage collection system that includes ditches and cut-off walls to capture seepage and runoff water, groundwater interception wells and pumps to return captured water to the tailings ponds.[146] Canadian federal research used chemical profiling to confirm that the source of contaminants in the Athabasca River was oil sands process-affected water from tailings ponds welling up through groundwater to the Athabasca River.[147]

In 2014, it was reported, "Industry is working to address the tailings seepage issue, budgeting more than $1 billion in tailings-reduction technology."[148] By January 2018, provincial regulators estimated that cleanup of oil sands facilities represents a $27 billion liability.[149] Unsurprisingly, "Critics say the industry could end up sticking taxpayers with the bill, estimated at $27 billion."[150]

WaterLegacy is unaware of any other data on capture of unlined tailings waste seepage that would support PolyMet's seepage capture assumptions or protect Minnesota groundwater and surface water from tailings storage facility seepage.

The seepage capture system for the Category 1 waste rock pile poses similar challenges and fails to comply with the requirements in Minnesota law for capture of water contacting reactive wastes.[151] According to PolyMet's data, Category 1 seepage would far exceed Minnesota water quality standards and would harm natural resources if released to the environment.

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[145] Barr 2012 Containment Memo, *supra*, Exhibit 22, pp. 1-2 (emphasis added).
[146] B. Weber, Federal study says oil sands toxins are leaching into groundwater, Athabasca River, Edmonton Globe and Mail, Feb. 20, 2014, Exhibit 23.
[147] Frank et al., Profiling Oil Sands Mixtures from Industrial Developments and Natural Groundwaters for Source Identification, *Env. Sci & Tech.* accepted Jan. 21, 2014, Exhibit 24.
[148] Weber 2014, *supra*, Exhibit 23.
[149] K. Orland, The battle over when and how to clean up oilsands tailings ponds is escalating, *Calgary Herald*, Jan. 16, 2018, Exhibit 25.
[150] *Id.*
[151] Minn. R. 6132.2200, subp. 2, item B (2).

In Mine Year 20, PolyMet predicts that nickel concentrations in Category 1 seepage would be 2,228 µg/L, nearly 77 times the surface water quality standard of 29 µg/L, and copper concentrations would be 237 µg/L, more than 45 times the water quality standard of 5.2 µg/L. Sulfate concentrations would be 1,393 parts per million (mg/L), 139 times Minnesota's water quality standard that protects wild rice downstream in the Partridge River. Concentrations of lead, a neurotoxin with no safe level, would be 11 µg/L, more than eight times the water quality standard of 1.3 µg/L and concentrations of arsenic, a class 1 carcinogen, would be 100 µg/L, nearly twice the water quality standard of 53 µg/L to protect aquatic life and 50 times the downstream water quality standard of 2 µg/L to protect drinking water in Colby Lake.[152]

By Mine Year 75, chemical concentrations in Category 1 seepage would not have attenuated. Nickel concentrations would increase slightly to 2,230 µg/L, approaching 77 times the water quality standard of 29 µg/L, and copper concentrations would remain at 237 µg/L, more than 45 times the water quality standard of 5.2 µg/L. Arsenic would remain at 100 µg/L, nearly twice the aquatic life standard of 53 µg/L and 50 times the downstream drinking water standard of 2 µg/L. In addition, by Mine Year 75, sulfate concentrations would double to 2,793 mg/L, 279 times the wild rice sulfate standard of 10 mg/L. Lead concentrations would increase nine times to a level of 100 µg/L, a level which is 77 times the water quality standard of 1.3 µg/L.[153]

The Category 1 waste rock pile is proposed as a 526-acre permanent, unlined facility.[154] The PolyMet FEIS predicted that, during operations, more than 98% of groundwater seepage from the Category 1 waste rock pile would be captured by the containment system or flow through groundwater into the mine pits.[155] PolyMet FEIS predictions of minimal Category 1 seepage flow were also based on an assumption that the geomembrane cover that would eventually be placed on the rock pile would reduce infiltration by more than 99% (from 360 gpm to 2.8 gpm).[156]

Although the FEIS characterized the Category 1 seepage capture system as a "low-permeability cut-off wall keyed into bedrock,"[157] PolyMet has proposed that "compacted soil" could serve as the barrier for seepage capture.[158] The Category 1 drainage system would rely only on gravity for seepage collection, and PolyMet admitted that along the west, north, and east sides of the stockpile, there may be areas where drain pipe could not be installed at an elevation low enough to ensure that groundwater will not flow beneath the cutoff wall.[159]

Dr. Lee evaluated the efficacy of the proposed seepage collection system for the Category 1

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[152] Concentration levels are presented in PolyMet NorthMet Water Management Plan – Mine Dec. 2017 ("PolyMet Water Mgt. Plan - Mine"), Large Table 6, in Appx. 11.2 of the PolyMet PTM Application. Water quality standards for nickel, copper and lead are based on Minn. R. 7052.0100, subp. 6 and Minn. R. 7052.0222, subp. 2, with mine site background hardness levels of 50 mg/L; for sulfate are based on Minn. R. 7050.0224, subp. 2; and for arsenic are based on Minn. R. 7052.0100, subp. 3 and subp. 5.
[153] *Id.*
[154] PolyMet PTM Application, pp. 27, 343.
[155] PolyMet FEIS, 5-7.
[156] *Id.*, 5-145
[157] *Id.*, 5-113.
[158] PolyMet Rock Mgt. Plan, *supra*, pp. 11, 15, in Appx. 11.1 of the PolyMet PTM Application; PolyMet PTM Application 288.
[159] *Id.*, p. 14.

waste rock pile:

> The gravity driven drainage system for moving collected water to the NE and SW corners of the stockpile with subsequent pumping to the WWTF will not work as currently proposed. The bedrock surface is uneven and not uniformly sloped. . The conductivity of the cutoff wall for the Category 1 facility is quite high. . The effect of freeze thaw and other degradation mechanisms on the long-term performance of the cutoff wall have not been fully considered in the modeling. The degradation of the cutoff wall over hundreds of years is a certainty, but the consequences are not established.[160]

Dr. Lee concluded,"[T]he proposed drainage system is unlikely to work as anticipated." [161]

As with the tailings seepage collection system, the DNR's findings that the PolyMet FEIS was "adequate," relied on representations about seepage capture, as follows: "At the Mine Site, about 10 gallons per minute of untreated water would be released into groundwater during closure. This release represents less than five percent of total Mine Site water releases."[162]

The PolyMet PTM Application does not specify limits on the amount of untreated seepage that will be released from the Category 1 waste rockpile. PolyMet defers setting "the required performance of the groundwater containment system" to final designs not included in its permit application.[163] Although PolyMet claims that geomembrane cover systems are widely used, the Company admits, "there has not been significant demand for geomembranes in waste rock stockpile covers."[164] The long-term studies on geomembrane degradation cited by PolyMet have involved tests of 10 years duration.[165] The geomembrane PolyMet proposes would have to resist degradation for hundreds of years, if not forever.

PolyMet's claims for the efficacy of the Category 1 seepage collection system are based on the same Barr 2012 Containment Memo on which PolyMet relied for claims related to tailings seepage success.[166] PolyMet cites no examples demonstrating that an inward gradient has been maintained for decades, let alone hundreds of years, to prevent leakage of groundwater through a soil or slurry trench.[167]

DNR draft PTM Conditions do not establish enforceable requirements or ensure that the Category 1 seepage capture system will comply with Minnesota requirements for collection of water moving over reactive waste. They allow PolyMet to submit final designs and analyses for both the Category waste rock containment system and the geomembrane cover after the permit to mine is approved, no later than 30 days prior to construction.[168] As with the DNR's draft

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[160] D. Lee, PolyMet Category 1 Waste Rock Stockpile, Dec. 10, 2015, ("Lee 2015 Category 1), attached as Exhibit 26, pp. 1-2
[161] *Id.*, p. 2.
[162] DNR FEIS ROD, p. 47.
[163] PolyMet PTM Application, p. 288.
[164] PolyMet NorthMet Project Adaptive Water Management Plan Dec. 8, 2017 ("PolyMet Adaptive Mgt. Plan"), p. 28, Appx. 11.4 of the PolyMet PTM Application.
[165] *Id.*, p. 37.
[166] PolyMet Rock Mgt. Plan, *supra*, Appx. 11.1 of the PolyMet PTM Application, p. 11, citing the Attachment D Barr 2012 Containment Memo, *supra*, provided as Exhibit 22.
[167] See e.g. *Id.*, p. 11, describing maintenance of an inward gradient without references.
[168] DNR draft PTM Conditions, p. 7 ¶54.

Conditions regarding tailings seepage, these conditions defer design and analysis until after a permit to mine is issued, and undermine the purpose of Minnesota laws requiring a permit to mine and authorizing parties to challenge such a permit for failure to comply with Minnesota law.[169]

5. Reclamation, closure and postclosure maintenance of the tailings waste facility proposed in the PolyMet draft Permit to Mine fails to comply with Minnesota law.

The tailings storage facility design proposed in the PolyMet draft Permit to Mine is an outmoded technology that increases the risk of tailings dam failure, fails to minimize the effects of polluted seepage on groundwater and surface water, and fails to adequately provide for the collection of waters moving through or over the mine waste.[170] In addition, PolyMet's plan for wet slurry tailings disposal in an unlined facility has consequences for closure that conflict with Minnesota rules.

Permanent ponding on top of its flotation tailings, as proposed by PolyMet, conflicts with the requirement in Minnesota non-ferrous mining rules that, at closure, any facilities for the storage of reactive waste "permanently prevent substantially all water from moving through or over the mine waste."[171] Minnesota Rules specifically preclude indefinite wet closure of a tailings facility, stating that within three years after the start of closure, "the permittee shall provide for drainage of the basins and reintegrate the area into the natural watershed."[172]

PolyMet's plans for bentonite application in the tailings pond and on the tailings dam benches also fail to comply with Minnesota statutes that require that the reclamation or restoration planned for the operation "can be accomplished under available technology and that a proposed reclamation or restoration technique is practical and workable under available technology."[173]

Minnesota Rules state that, in cases where passive treatment will not meet reclamation goals, "active treatment technologies may be necessary and provisions for continued maintenance of the treatments will be required."[174] PolyMet's proposed transition to non-mechanical treatment of tailings seepage has not been demonstrated as practical or workable to achieve compliance with Minnesota water quality standards.

The draft Conditions proposed by DNR do not resolve these conflicts with Minnesota laws. They fail to require PolyMet to demonstrate any level of performance of its unproven technologies and propose that PolyMet receive a permit to mine without establishing that its proposals will be workable or effective.

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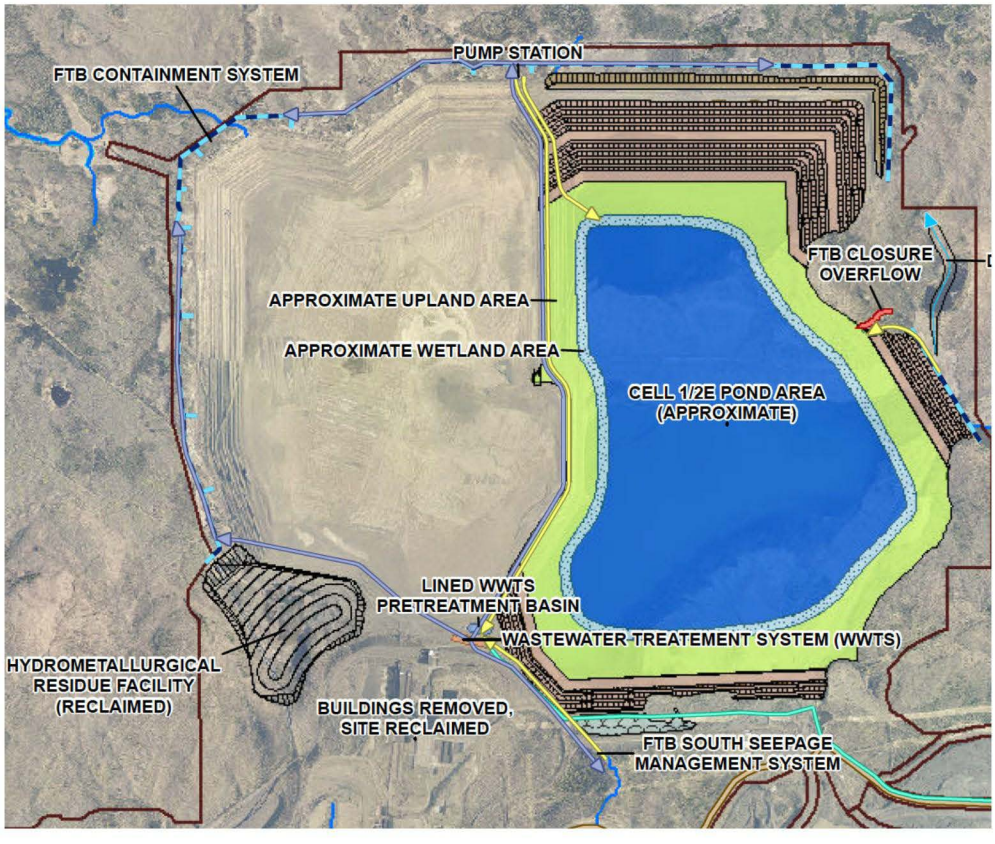
[169] Minn. Stat. §93.481, subd. 1; Minn. Stat. §93.483; Minn. R. 6132.0300, subp. 1; Minn. R. 6132.4000, subp. 2; Minn. R. 6132.5000.
[170] See Sections 2 and 4 of these Objections.
[171] Minn. R. 6132.2200, subp. 2., item B (2)
[172] Minn. R. 6132.3200, subp. 2, item E (5).
[173] Minn. Stat. §93.481, subd. 2.
[174] Minn. R. 6132.0200.

The permanent movement of water through and over PolyMet's tailing waste is inherent in PolyMet's tailings storage facility design and plan for post-closure maintenance. During mining operations, PolyMet will establish a flotation tailings basin pond on top of its tailings waste, into which untreated process water, untreated seepage collected from the toe of the tailings facility, filtered mine process water, sewage and waste cleaned out of the backwash and filters of the reverse osmosis treatment plan will all be dumped.[175]

PolyMet has proposed that this large pond on top of PolyMet tailings will remain during closure and during post-closure maintenance, as illustrated below:[176]



Six years ago, Donald Sutton, a consulting engineer to DNR, shared the DNR's concerns about PolyMet's proposal to maintain a pond on top of tailings for permanent wet closure:

> I share your wet closure concern and have additional concerns related to the long term tailings wet closure uncertainties and risks. . . In its simplest form, the proposed tailings basin will be a big pile of highly erosive loose sand and silt. The wet closure will include a pond of water on top that saturates the sand/silt making it less stable and more likely to fail than the dry option.[177]

[175] PolyMet PTM Application, Figure 11-5, Project Water Balance in Mine Year 10, attached as Exhibit 27.
[176] *Id.*, See Figure 10-10, Tailings Post-Closure Maintenance, see also Figure 15-2.
[177] Sutton (Spectrum Eng.), email to D. Dostert (DNR) re PolyMet Tailings Wet Closure Jan.23, 2012, Exhibit 28, pp. 1-2.

The DNR's draft Dam Safety Permit for the PolyMet tailings facility made no effort to resolve the uncertainties and risks of wet closure, let alone the conflict with Minnesota rules. The draft dam permit proposed that PolyMet construct its dam, spigot hundreds of millions of tons of wet slurry tailings and, only then, explore and submit updated "future closure options, such as a dry cap or other technologies that may improve closure conditions." [178] The DNR's draft PTM Conditions make no reference to dry closure or any other technologies that might improve tailings facility closure.

As part of its plan for permanent wet closure of the tailings facility, PolyMet proposes to add a "bentonite amendment" to the tailings side slopes, final pond bottom, and final beaches to reduce oxidation of sulfide minerals and release of metals, and "reduce percolation" from the pond and the beaches.[179]

Reading the PolyMet PTM Application carefully, it is obvious that application of bentonite to the tailings pond bottom is not a proven technology. PolyMet believes that, after the tailings facility hydrology stabilizes "it is likely" that the pond will be perched.[180] PolyMet's proposed method of adding bentonite to the pond bottom is by broadcasting, but "bentonite injection or placement of a geosynthetic liner are alternate methods."[181]

PolyMet, apparently, has yet to complete a field test and evaluation demonstrating that its proposed bentonite pond application method is effective, efficient, and economical; that bentonite application will be uniform; that bentonite on the pond bottom will have the specified hydraulic conductivity; or that the proposed bentonite pond bottom would provide the "required reduction in percolation."[182] PolyMet proposes that such testing and confirmations be deferred to some unspecified future time.[183]

Consulting engineer Michael Malusis found that "proof of concept for the bentonite pond bottom remains inadequate." PolyMet has proposed three possible subaqueous placement methods, "none of which are supported by laboratory studies, field case studies of successful use on other projects, or any other type of feasibility assessment."[184]

As with many other draft Conditions, the DNR neither requires PolyMet to demonstrate the efficacy of the pond bottom prior to permit issuance nor sets standards for uniformity of application, hydraulic conductivity or any other criteria for performance. DNR draft Conditions for the Permit to Mine state only that the Permittee must prepare a workplan within 90 days *after* permit issuance to show that "the pond bottom will perform as intended."[185]

This draft Condition is meaningless, except for its ability to shield any deficiencies in PolyMet's

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[178] Draft Permit for the Flotation Tailings Basin (2016-1380) ("FTB Draft Dam Permit") ¶45-46, available at http://files.dnr.state.mn.us/lands_minerals/northmet/dam-safety/2017-0915-draft-2016-1380.pdf
[179] PolyMet PTM Application, p. 443.
[180] PolyMet Adaptive Water Mgt. Plan, *supra*, p. 71, Appx. 11.4 of the PolyMet PTM Application.
[181] *Id.*
[182] *Id.*, pp. 74, 79.
[183] *Id.*
[184] M. Malusis, Comments on Draft Dam Safety Permit 2016-1380 (Flotation Tailings Basin), Updated Permit Application Documents, and Outstanding Permit Issues, Oct. 12, 2017 ("Malusis 2017"), Exhibit 29, p. 3.
[185] DNR draft Conditions, p. 11 ¶88.

plan from public or independent third party review. If PolyMet could demonstrate that the pond bottom will perform as intended, it would have done so some time during the past nine years since the same bentonite plan was proposed in the PolyMet draft EIS.[186]

PolyMet's final word on the demonstrable efficacy of its proposed bentonite pond bottom: if the installed pond bottom doesn't perform as modeled "the bentonite amended layer could be excavated from portions of the pond bottom."[187] This is not reassuring.

PolyMet has proposed to use agricultural equipment, such as that commonly used for below-grade manure injection, to place bentonite on exposed tailings beach areas. Using pneumatic injection through hollow tines of a rake pulled through the tailings, granulated bentonite would be added to an 18-inch layer of tailings and then overlain by an additional 30-inch layer of tailings.[188] This Bentonite addition to the exterior side of dams as part of construction is proposed "to limit oxygen infiltration" into the tailings.[189]

It is likely that PolyMet's proposed bentonite amendment will fail to perform as claimed. Citing peer-reviewed literature, consulting engineer Malusis recently cautioned that, "PolyMet provides no evidence to support the claim that the proposed bentonite-amended tailings layers, over the long term, will not be susceptible to root penetration, or that placing these layers beneath a 30-inch vegetated layer will provide adequate protection against wet-dry or freeze-thaw cycling." Over time, these processes can create cracks and fissures that alter retention and movement of water and air in barrier layers.[190]

Application of bentonite on the exterior face of dam benches also has the potential to increase erosion and result in dam failure. In 2012, DNR's consulting engineer Donald Sutton called the bentonite seal a "hail Mary type of concept" that "will exacerbate erosion and slope failure and will eventually fail,"[191] He cautioned,

> [T]he bentonite amended dam face and interior slopes will be subject to faster erosion if more precipitation runs off and less infiltrates. This could lead to other erosion problems, especially on the outside, because the slope geometry is geomorphologically unstable and the sandy matrix invites erosion. Can the soil cover become saturated and slide off the bentonite? I think the bentonite cover will eventually deteriorate due to erosion and plant roots and become ineffective, and that the erosion will weaken and destroy the embankments. If air is permitted to enter the tailings, they will oxidize and the purpose of the wet closure with bentonite seals will be negated. In my opinion, the reclamation plan is not a stable permanent closure.[192]

This past year, in an email to DNR reviewing the same bentonite embankment seal proposed by PolyMet years ago, Mr. Sutton explained that PolyMet's plan to amend dam slopes with

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[186] PolyMet DEIS, 8-7.
[187] PolyMet Adaptive Water Mgt. Plan, *supra*, p. 80.
[188] PolyMet Closure & Postclosure Plan, *supra*, p. 19. Appx. 14 of the PolyMet PTM Application.
[189] PolyMet PTM Application, pp. 268, 271.
[190] Malusis 2017, *supra*, Exhibit 29, p. 3.
[191] D. Sutton, Spectrum Engineering, Memo, (FTB) HydroMet and Stockpiles - review of Barr responses to comments, Feb. 24, 2012, attached as Ex. 22 to WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[192] Sutton email to DNR Jan. 23, 2012, *supra*, Exhibit 28, p. 1.

bentonite could increase the risk of catastrophic dam failure:

> The stair step FTB embankment sealed with bentonite is geomorphologically unstable and will erode, potentially cutting back into the pooled water, releasing the water and saturated tailings. Initially, surface water will collect in the horizontal ditch/ponds along the toes of lifts 1 and 5, and infiltrate into the embankment via the underdrain and the coarse LTV tailings beneath lift 1. Later, after the bentonite soil erodes from the slopes, the ditches will fill, plugging the underdrain, forcing the water to overflow the bench and cause head cutting in the non-cohesive tailings. If the FTB is to remain as a permanent structure without perpetual maintenance, then I recommend that the embankments be designed using established geomorphologic land reclamation principals. Otherwise there is a high probability that the embankments will eventually fail due to erosion, and catastrophically release the saturated tailings.[193]

The DNR draft Conditions for the PolyMet Permit to Mine fail to mention PolyMet's proposed use of bentonite on tailings dam embankments, let alone prohibit its use or set specifications to protect water quality and dam stability.

The PolyMet draft Permit to Mine also assumes a transition to passive non-mechanical treatment at the tailings waste facility. PolyMet promotes the transition to non-mechanical treatment and decommissioning of the plant site Wastewater Treatment System (WWTS).[194] PolyMet's proposed "low-maintenance, low-energy, non-mechanical treatment system" for the plant site "is expected to be" a constructed wetland for metal precipitation and solids removal, based on re-building the natural wetlands in the narrow area between the tailings facility and PolyMet's seepage containment trench and a permeable barrier to absorb additional pollutants (PSB).[195]

This strip of constructed wetlands and PSB is proposed to passively treat tailings seepage collected in the trench at the toe of the tailings facility.[196] Despite the highly elevated concentrations of mercury, copper, and sulfate in seepage from the hydrometallurgical waste facility, PolyMet proposes that concentrated wastewater from the HRF Leakage Collection System treatment would be sent for passive treatment.[197] PolyMet even suggests that if the water in the tailings pond complies with "applicable" water quality standards, it will seek approval "to allow the pond to discharge directly."[198]

There are no case studies, pilot tests or other reliable evidence demonstrating that passive, non-mechanical treatment would successfully treat tailings seepage, let alone HRF seepage, to meet Minnesota's existing water quality standards. The PolyMet FEIS states that the East Pit, West Pit, Category 1 stockpile and Tailings Basin are permanent features that would provide solute loading for a minimum of 200 to 500 years.[199] PolyMet also admits that treatment will be needed

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[193] Emails, Spectrum Eng., EOR & DNR, PolyMet Tailings Dam Comments Appendix 6, May 31- June 1, 2017, attached as Ex. 15 to WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[194] PolyMet PTM Application, p. 40.
[195] PolyMet Adaptive Mgt. Plan, *supra*, pp. 96-97, Appx. 11.4 of the PolyMet PTM Application.
[196] *Id.*, p. 96.
[197] *Id.*
[198] *Id. See also* PolyMet PTM Application, p. 444. These goals may reflect industry hopes to remove or make less stringent sulfate, hardness, total dissolved salts, specific conductance and/or metals standards, as well as claims for the efficacy of passive treatment.
[199] PolyMet FEIS, 5-173, 5-185, A-170, A-265.

for at least 200 years at the tailings site to reduce sulfur and other constituent levels: "The 200-year model does not show that the sulfur in the tailings has been depleted or that constituent release rates have decreased."[200]

PolyMet's desire to limit the duration of active water quality treatment is not new. However, throughout the FEIS process, approval of passive treatment was not presumed and could only happen if proven effective under site-specific conditions:

> Non-mechanical water treatment technologies need to be designed for site-specific conditions and actual site water quality. PolyMet accordingly would test non-mechanical water treatment technologies for several years during mine operations and reclamation, until an acceptable treatment performance could be achieved.[201]

The FEIS stated that long-term treatment would require active water treatment using reverse osmosis "until if, and when, non-mechanical treatment is proven effective for meeting water quality requirements.[202] "PolyMet would include funds in its contingency reclamation estimate and financial assurance package to operate mechanical water treatment for as long as necessary as a part of its Permit to Mine."[203] Although PolyMet PTM Application cites the need for DNR approval, it is far less clear that compliance with Minnesota water quality standards would be needed for passive treatment to be approved.[204]

It is understandable that PolyMet would promote passive non-mechanical treatment to reduce costs in maintaining active treatment after the mine is no longer returning a profit. What is more troubling is that the DNR's draft Conditions for the Permit to Mine place no constraints on PolyMet's ability to rely on unproven technologies in its plan for closure and postclosure maintenance at the tailings and hydrometallurgical reactive waste sites.

DNR draft Conditions seem to presume a transition to non-mechanical treatment. They prioritize passive treatment in evaluation of whether dam buttresses will meet safety standards, requiring that "analysis in the workplan must indicate that transition to non-mechanical treatment is no less likely to occur with the proposed use of buttress material."[205]

DNR draft Conditions then defer the requirement to set requirements for passive treatment until after a permit to mine is issued:

> To further evaluate the goal of non-mechanical water treatment, the Permittee must develop a plan for investigation, design, and pilot testing of non-mechanical water treatment systems. The Permittee must provide this plan to the DNR for review and approval prior to Mine Year 1.[206]

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[200] PolyMet Adaptive Mgt. Plan, *supra*, p. 80, Appx. 11.4 of the PolyMet PTM Application.
[201] PolyMet FEIS, 3-81. "Pilot studies for non-mechanical treatment would be conducted during operations (and post-closure as necessary) to demonstrate the ability to transition to non-mechanical water treatment." *Id.*, ES-24.
[202] *Id.*, 3-17.
[203] *Id.*, 3-81.
[204] *See e.g.* PolyMet PTM Application, p. 444; PolyMet Adaptive Mgt. Plan, *supra*, p. 82.
[205] DNR draft Conditions, p. 4 ¶26.
[206] *Id.*, p. 8 ¶64.

This Condition sets no requirement that passive water treatment must be shown to achieve compliance with all Minnesota water quality standards and no specifications of the nature or level of proof that PolyMet must offer to demonstrate this compliance. At best, despite more than a decade of review, the DNR kicks the can down the road for another couple of years before even a plan must be provided.

The DNR's draft condition would also preclude public or independent third party review of non-mechanical treatment. The Conditions say that PolyMet must provide a plan for pilot-testing before Mine Year 1, but any information about wetlands or PSB systems available in the next year or so would also be available now – and would have been available throughout the long years of environmental review. In addition, PolyMet states that test project for pilot-testing of non-mechanical treatment systems have already been provided to the DNR for review.[207] If this is the case, the deferral of DNR review until after the permit to mine is even more troubling.

The DNR provides no rationale for issuance of a permit to mine without evaluating PolyMet's proposed passive treatment system. In the absence of other justification, DNR Conditions suggest that this timing may be designed to affect the requirements for PolyMet financial assurance. The DNR draft Conditions state,

> Upon DNR approval of the non-mechanical water treatment system plan, the Permittee must provide financial assurance sufficient for the DNR to implement the plan to evaluate non-mechanical water treatment in the event of unplanned closure.[208]

It is unclear whether financial assurance would be based on non-mechanical treatment rather than active treatment once the permit to mine process is over and public scrutiny and recourse diminished. As explained in Section 9 of these Objections, despite Minnesota rule provisions to the contrary, the DNR proposes that only legacy contamination and liabilities from the construction period be financially assured prior to issuance of a permit to mine. Long-term costs for water treatment, whether active or passive, would not be determined until before Mine Year 1, and DNR draft Conditions for the PolyMet Permit to Mine do not specify that the "water treatment" covered to be financial assured must be active, rather than passive treatment.[209]

As with many aspects of the PolyMet project, we are left to wonder whether promises made by PolyMet for long-term treatment are a bait-and-switch in which State regulators are passively complicit.

6. In eliminating the mine site Wastewater Treatment Facility (WWTF) and proposing early adoption of non-mechanical treatment, the PolyMet draft Permit to Mine fails to protect groundwater and surface water in the upper Partridge River or to meet Rule requirements for closure and postclosure mitigation of impacts.

Eliminating the mine site Wastewater Treatment Facility (WWTF) and proposing early approval of passive non-mechanical treatment for post closure conflicts with Minnesota policies that

[207] PolyMet PTM Application, pp. 445-446; PolyMet Adaptive Mgt. Plan, *supra*, p. 101.
[208] DNR draft Conditions, p. 8 ¶65.
[209] See DNR draft Conditions, Attachment 2, p. 4 ¶G (18) and p. 2 ¶C (12)(b); p. 6 ¶I (24)(a) and (b)

copper-nickel mining be conducted to reduce impacts, mitigate unavoidable impacts, ensure that the mining area is left in a condition that protects natural resources,[210] and maximize the physical, chemical, and biological stabilization of areas disturbed by mining.[211]

Rejecting mine site active treatment in favor of treatment wetlands, barriers, earthen dams or in-situ chemical treatments will not result in "maintenance free" conditions at the mining area.[212] These changes in PolyMet project plans will increase environmental consequences of pipe rupture, flooding, direct discharge to surface water from West Pit overflow and Category 1 captured seepage, and seepage of contaminated pit water in both the West Pit and East Pit to groundwater and through groundwater to surface water. Eliminating the mine site WWTF will also reduce PolyMet's capacity to respond to contingencies and mitigate harm to natural resources during closure and post closure.

To understand the significance of PolyMet's proposed change to eliminate the mine site WWTF, it is necessary to review the history of this mitigation feature. Throughout environmental review in the draft EIS, supplemental draft EIS and the final EIS - PolyMet's plan included a mine site Wastewater Treatment Facility (WWTF). For at least five years, PolyMet has promised to protect water quality in the Partridge River watershed by upgrading the mine site WWTF during closure to provide reverse osmosis treatment of discharge and collected seepage.[213]

In the PolyMet FEIS, the WWTF is a critical part of plans to protect water quality at the mine site during operations, closure and post closure and to provide adaptive engineering and contingency mitigation. The FEIS and its appendices contain 464 references to the WWTF, and FEIS modeling of solute levels in mine site surficial aquifer and surface water was based on treatment at the WWTF.[214] WWTF functions highlighted in the FEIS included the following:

- During operations, the WWTF would treat mine processing water to reduce chemical parameters before wastewater was piped to the tailings pond for use at the plant site.[215]

- Process water treated at the mine site WWTF would be used to flood the East Pit after it was backfilled with waste rock and the combined East Central Pit to ensure subaqueous disposal conditions and reduce sulfide oxidation and metals leachate.[216]

- Reverse osmosis or equivalent technology would be added to the mine site WWTF at closure. The WWTF would also be an adaptive engineering control that could be "adjusted as needed to manage sulfate concentrations," and "could be expanded or treatment capabilities modified to meet water quality standards."[217]

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[210] Minn. Stat. §93.44; Minn. R. 6132.0200.
[211] Minn. R. 6132.0200.
[212] *See* Minn. R. 6132.3200, subp. 1. "Mining area" includes the tailings site as well as mine pits and waste features at the mine site. Minn. R. 6132.0100, subp. 19.
[213] MDNR et al., PolyMet NorthMet Supplemental Draft Environmental Impact Statement, Nov. 2013 ("PolyMet SDEIS"), see e.g. ES-24, Fig. 3.2-1, Fig. 3.2-13. Fig. 3.2-19.
[214] PolyMet FEIS, see 5-117 to 5-118, 5-162 to 5-178, 5-224 to 5-232 regarding solute modeling.
[215] PolyMet FEIS, 3-53, 5-101, 5-184.
[216] *Id.*, ES-23, 3-47, 5-101, 5-104.
[217] *Id.*, ES-25, 3-52, 5-236, 5-237.

- When the West Pit is full, its discharge would be pumped to the mine site WWTF (upgraded to include RO or equivalent technology) for treatment to meet water quality standards before discharge into the West Pit Overflow Creek south of the Mine Site.[218]

- Category 1 waste rockpile drainage from the seepage containment system would be treated at the mine site WWTF during closure and reclamation.[219]

- The mine site WWTF "would be maintained to treat pit lake water quality for as long as necessary."[220]

- West Pit water would be treated and returned to the West Pit to manage water quality within the pit prior to groundwater outflow from the pit lake through the surficial aquifer.[221]

- "By pumping pit lake water to the WWTF, the pit water level would be managed to always provide sufficient freeboard to absorb extreme precipitation events without overflowing."[222]

- Water from the combined East Central Pit would also be pumped to the mine site WWTF and treated and then sent to the combined East Central Pit and West Pit to improve pore water quality migrating through the surficial aquifer to the Partridge River.[223]

- During post-closure, the mine site WWTF would continue to operate until such time as monitoring and pilot-testing demonstrated that a transition could be made to non-mechanical treatment.[224]

- Treatment at the mine site WWTF could also be used as contingency mitigation if West Pit water quality or Tailings Basin pond water quality was worse than expected.[225]

- If groundwater extraction wells were required as contingency mitigation due to northward flow of mine site groundwater, the extracted water would be treated at the mine site WWTF.[226]

The DNR's decision that the PolyMet FEIS was "adequate" highlighted the functions of the WWTF.[227] The DNR's findings relied on the WWTF for adaptive engineering, adaptive mitigation, contingency mitigation and compliance with water quality criteria. The DNR Record of Decision findings stated the project would include "WWTF at the Mine Site (upgraded in closure to include reverse osmosis or an equivalently performing technology)."[228] The ROD repeated that "The WWTF would be upgraded to a reverse osmosis ("RO") process or

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[218] *Id.*, 3-65. 3-72.
[219] *Id.*, 3-66, 3-72.
[220] *Id.*, ES-24.
[221] *Id.*, 3-72.
[222] *Id.*, 5-105.
[223] *Id.*, 3-72, 5-102, 5-103.
[224] *Id.*, 5-8.
[225] *Id.*, 5-239.
[226] *Id.*, 5-242.
[227] DNR FEIS ROD, pp. 23, 30, 39.
[228] *Id.*, p. 39.

equivalently performing technology that would meet water quality targets during closure and long-term maintenance to manage sulfate concentrations."[229]

The DNR findings demonstrated the PolyMet FEIS' reliance on the mine site WWTF to provide adaptive mitigation measures. If adverse effects on surface waters of the Partridge River were predicted by monitoring and modeling, even prior to an actual effect, adaptive measures would be implemented, including the following:

- Modifying the WWTF design to generate cleaner effluent.
- Increasing the volume of WWTF discharge in closure. The Proposer could temporarily increase the volume of treated water from the WWTF during low-flow conditions, to dilute pollutant concentrations in the Partridge River.[230]

DNR findings also relied on the mine site WWTF to address contingency mitigation in the event that PolyMet's predictions about water quality were overly optimistic. If "West Pit water quality is not as expected," contingency mitigation measures would include "pumping West Pit water to the WWTF for treatment."[231] If "Tailings Basin pond water quality is worse than expected," contingency mitigation methods would include "Reduce solute load delivered to the Tailings Basin pond by incorporating additional treatment at the Mine Site WWTF."[232] The DNR Record of Decision for the PolyMet FEIS concluded, "With mechanical treatment as proposed, the project is predicted to meet applicable water quality evaluation criteria. The WWTP (wastewater treatment plan at the tailings site) and WWTF operating and replacement costs would be included in long-term financial assurance estimates."[233]

The PolyMet PTM Application proposes that the treatment train proposed for the mine site WWTF would be located at the plant site.[234] WaterLegacy has found no document in the record disclosing the risks or cost savings from this change.

At a minimum, during operations, concentrations of mine site wastewater piped nine miles to the PolyMet plant site would be much higher, increasing the environmental concern posed by pipeline spills or leaks. Based on PolyMet's WWTF targets.[235]

Elimination of the mine site WWTF would markedly increase toxicity of materials piped across eight miles of wetlands and other natural ecosystems. Effluent piped from the mine site High Concentration (West) Equalization Basin would contain 5,000 times the level of copper and 3,584 times the level of nickel (far above the levels toxic to fish and aquatic life), and 790 times the levels of manganese and 35 times the levels of lead (far above the levels neurotoxic to humans) as would have been transported if a mine site WWTF had treated these wastes before

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[229] *Id.*, p. 54.
[230] *Id.*, p. 55.
[231] *Id.*, p. 57.
[232] *Id.*
[233] *Id.*, p. 79.
[234] PolyMet PTM Application, p. xxix.
[235] PolyMet Adaptive Mgt. Plan, *supra*, Table 2-1, pp. 10-11, Appx. 11.4 of the PolyMet PTM Application. Referenced treatment targets are copper 20 µg/L; nickel 113 µg/L; manganese 50 µg/L; and lead 10.2 µg/L.

piping them to the plant site.[236] Even "Low" Concentration (East) Equalization Basin wastewater, untreated, would contain 370 times the level of copper and 218 times the level of nickel in WWTF treated effluent,[237] multiplying several hundred-fold the level of contaminants transported to the PolyMet plant in overland pipelines.

Next, treatment of contaminated process water from the mine site would depend on operation of pumps and pipelines. In the event of a disruption of the central pumping system or pipelines, no method of treatment would be available to address contaminated groundwater seepage or overflow of wastewater from equalization basins at the mine site.

The PolyMet mine pits would be perpetual sources of water pollution.[238] Modeling shows that contaminated seepage from mine waste rock piles would require water quality treatment for at least 200 years.[239] During closure, treatment of high concentration solutes from East Pit water or West Pit water would require extensive piping back and forth with an additional risk of spills and leaks. In long-term post-closure, cost and convenience would diminish the likelihood that remote active treatment, rather than unproven but inexpensive passive technologies, would be employed.

As suggested by the FEIS and the DNR in determining its adequacy, elimination of the mine site WWTF would create obstacles to effective adaptive mitigation and contingency mitigation, particularly if passive non-mechanical treatment were approved to treat direct discharge from the mine site to surface water. Several functions highlighted in the PolyMet FEIS, such as preventing overflow of the West Pit, temporarily increasing the volume of treated water from the WWTF during low-flow conditions to restore flow or dilute pollutant concentrations in the upper Partridge River, or treating groundwater from extraction wells to prevent northward groundwater flow, would simply not be possible.

As previously noted, Minnesota Rules recognize that in some cases passive treatment will not meet reclamation goals and require that in those cases, where active treatment technology is necessary, provisions for continued maintenance of the treatments will be required.[240] Despite more than a decade during which PolyMet could have proved the efficacy of passive treatment, as this record stands construction, upgrading and long-term operation of a mine site Wastewater Treatment Facility (WWTF) is necessary. Active treatment at the WWTF is required to comply with Minnesota water quality standards and protect mine site groundwater and surface water from contamination due to mine pit, waste rockpile and mine wastewater direct discharge, seepage to groundwater, and seepage through the surficial aquifer to

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[236] Compare treatment targets in the PolyMet Adaptive Mgt. Plan, *supra*, in Appx. 11.4 of the PolyMet PTM Application at Table 2-1 (fn. 235) with concentrations in Mine Year 14, P90 in Large Table 4 of the Plan. High Concentration (West) Equalization Basin levels include: copper 110,000 µg/L; nickel 405,000 µg/L; manganese 39,500 µg/L and lead 361µg/L. Aquatic life water quality standards in 50 mg/L of background hardness are 5.2 µg/L for copper; 29 µg/L for nickel; and 1.3 for lead under Minn. R., 7052.0100, subp. 6 and Minn. R. 7052.0222, subp. 2. The EPA secondary maximum contaminant level for manganese is 50 µg/L, applicable under Minn. R. 7050.0221, subp. 1, item B. The Minnesota Health Department Human Health-Based Water Guidance for manganese is 100 µg/L to prevent neurotoxic effects. (http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html).

[237] *See Id.*, Large Table 4 for concentrations in Low Concentration (East) Equalization Basin. Mine Year 14 P90 concentrations include copper 7,410 µg/L; and nickel 24,600 µg/L.

[238] PolyMet FEIS, 5-144.

[239] Tribal Comments and Co-Lead Agencies' Dispositions, Aug. 19, 2013, Exhibit 24

[240] Minn. R. 6132.0200.

nearby wetlands and streams.

As with the tailings site, the PolyMet draft Permit to Mine, unlike the PolyMet FEIS previously summarized, appears to presume a transition to passive treatment at the mine site without requiring proof that non-mechanical treatment would protect groundwater and surface water. PolyMet's PTM Application proposes "to transition from the mechanical treatment provided by the WWTS to non-mechanical treatment systems as early in the reclamation, closure, and postclosure maintenance phases as possible"[241] PolyMet urges that "non-mechanical water treatment technology could be implemented at the Mine Site a few years after the West Pit has been flooded during the postclosure maintenance phase, currently projected for Mine Year 55."[242]

PolyMet's Water Management Plan for the Mine Site suggests that mine pit water quality could be improved by constructing a soil barrier or dam to raise water levels above exposed ore grade and Virginia Formation pit walls, placing a permeable reactive barrier in the channel between the East Pit and the West Pit or by dumping iron salts, fertilizers or other chemicals into pit lakes to treat contamination in situ.[243] However, there is no evidence in this record that these or similar passive and cheap mitigation methods could reduce solute concentrations in mine site surficial aquifers or surface waters affected by those aquifers to achieve Minnesota groundwater or surface water quality standards.

As explained before in Section 5 of these Objections, the DNR draft PTM Conditions set no requirements for what must be demonstrated by PolyMet for non-mechanical water treatment to be approved. They Conditions don't even set standards for PolyMet's plan to investigate and pilot test non-mechanical water treatment. DNR merely defers PolyMet's obligation to demonstrate the effectiveness of passive treatment until shortly after a permit to mine is issued, precluding public and independent third party review of whether that plan would allow an ineffectual (but inexpensive) passive treatment plan to be approved for the PolyMet mine site.

The PolyMet PTM Application and DNR's draft Conditions allowing elimination of the WWTF and reducing the burden of proof for non-mechanical treatment might minimize costs of building and operating active wastewater treatment. But, these choices will not minimize hydrologic impacts, prevent the release of substances that adversely affect natural resources, or mitigate unavoidable impacts as required under Minnesota law.

7. Storage of process wastewater at the mine site, as proposed in the PolyMet draft Permit to Mine fails to prevent the release of substances that result in adverse impacts or to minimize impacts on surface water and groundwater.

Under Minnesota Rules, reactive mine waste from non-ferrous mining must be handled to prevent the release of substances that result in adverse impacts on natural resources,[244] and mining must apply technologies and practices to reduce impacts on natural resources to the

[241] PolyMet Closure & Postclosure Plan, *supra*, pp. 13, 25, Appx. 14 of the PolyMet PTM Application.
[242] PolyMet PTM Application, p. 447.
[243] PolyMet Water Mgt. Plan - Mine, *supra*, p. 55, Appx. 11.2 of the PolyMet PTM Application.
[244] Minn. R 6132.2200, subp.1.

extent practical.[245] In addition, mine site features where there is flexibility in siting, such as water storage facilities, must be sited to minimize impacts on surface water and groundwater.[246]

The PolyMet draft Permit to Mine fails to require even the simplest protective practices to prevent release of substances that adversely impact natural resources from mine site features.

Along with eliminating the mine site Wastewater Treatment Facility and the potential to reduce wastewater contamination on site, the PolyMet draft Permit relocates the Equalization Basins to the closest point to the Partridge River and provides inadequate water management to prevent overflow of these Basins or other mine site wastewater features.

The mine site wastewater storage facilities described by PolyMet as Equalization Basins would be profoundly contaminated. The High Concentration Equalization (West) Basin would contain reactive wastes *more than four orders of magnitude* above water quality standards. The wastewater in this Basin would have copper concentrations of 110,000 µg/L, more than 21,150 times Minnesota's water quality standard that protects aquatic life; nickel concentrations of 405,000 µg/L, more than 13,965 times the water quality standard; and lead concentrations of 361 µg/L, nearly 278 times the water quality standard.[247] Manganese concentrations of 39,500 µg/L would be 39.5 times the Minnesota's health-based limit based on prevention of neurotoxic effects.[248]

Even the "Low" Concentration (East) Equalization Basin would contain reactive waste *more than three orders of magnitude* above water quality standards. Copper concentrations of 7,410 µg/L would be 1,425 times Minnesota's water quality standard and nickel concentrations of 24,600 µg/L would be 848 times the water quality standard.[249] Manganese concentrations of 2,223 µg/L would be 22 times Minnesota's health-based limit.[250]

Sulfate concentrations in the High Concentration (West) Equalization Basin would be 9,010 milligrams per liter (mg/L), more than 900 times the wild rice sulfate standard applicable downstream in the Partridge River.[251] Sulfate in the "Low" Concentration (East) Equalization Basin would be 2,450 mg/L, 245 times the wild rice sulfate standard.[252] Sulfate releases from either Equalization Basin to surface water and wetlands whether directly or through or hydrologically connected groundwater would also have the potential to markedly increase mercury release and methylmercury production.[253]

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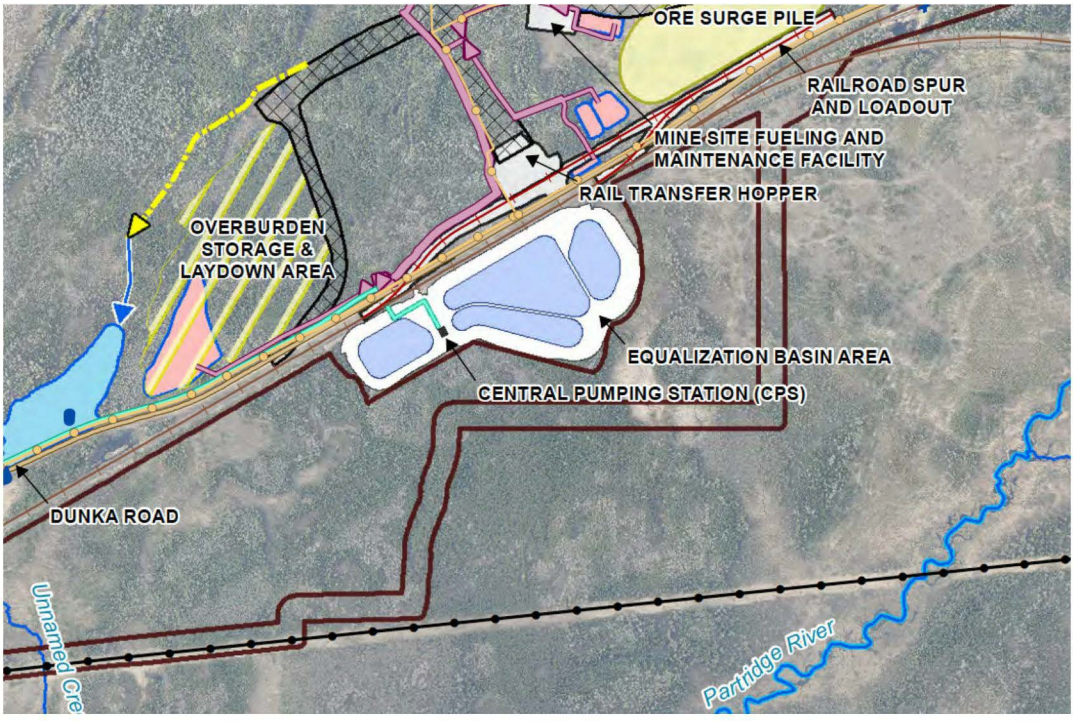
[245] Minn. Stat. §93.44; Minn. R. 6132.0200; Minn. R. 6132.0100, subp. 17.
[246] Minn. R. 6132.2000, subp. 5, item E.
[247] PolyMet Adaptive Mgt. Plan, *supra*, Appx. 11.4 to PolyMet PTM, concentrations provided in Large Table 4, P90 at Mine Year 14. Water quality standards in 50 mg/L of hardness are 5.2 µg/L for copper; 29 µg/L for nickel, and 1.3 µg/L for lead. Minn. R. 7052.0100, subp. 6; Minn. R. 7052.0222, subp. 2.
[248] *See* Minnesota Health Department Human Health-Based Water Guidance of 100 µg/L for manganese, *supra*.
[249] *Id.*, Large Table 4, P90 at Mine Year 14. Water quality standards are 5.2 µg/L for copper; 29 µg/L for nickel. Minn. R. 7052.0100, subp. 6.
[250] *Id.*, Large Table 4, P90 at Mine Year 14, and MDH Health-Based Water Guidance, *supra*.
[251] *Id.*, Large Table 4, P90 at Mine Year 14. Wild rice sulfate standard of 10 mg/L in waters used for the production of wild rice/wild rice present. Minn. R. 7050.0224, subp. 2; Minn. R. 7050.0220, subp. 5a, item A (19).
[252] *Id.*
[253] See Myrbo, et al., Increase in nutrients, mercury, and methylmercury as a consequence of elevated sulfate reduction to sulfide in experimental wetland mesocosms, *J. Geophys. Research: Biogeosciences* (2017), Exhibit 30, Table 1, p. 2775.

As compared with the PolyMet FEIS and other project plans, PolyMet's PTM Application relocates the Equalization Basins, placing them south of Dunka Road at the part of the site closest to the Partridge River.[254]



Locations of mine site waste facilities are particularly salient since the Equalization Basins, the nearby pond for runoff of process water at the rail transfer hopper where ore is loaded, and the sumps collecting seepage from the Category 1 waste rock pile would each have the capacity to contain only a 100-year, 24-hour rainfall event.[255] Various sumps and mine-water ponds containing highly contaminated mine process water would be designed for a 10-year 24-hour rain event with an overflow back-up to accommodate only a 100-year 24-hour rainfall; these include sumps and ponds for the Category 2/3 waste rock pile, the Category 4 waste rock pile and the ore surge pile.[256]

The 100-year 24-hour rainfall used for these designs is 5.2 inches.[257] That level of rain is approximately half of the highest locally reported rainfall resulting in widespread flooding in northeastern Minnesota in June of 2012.[258]

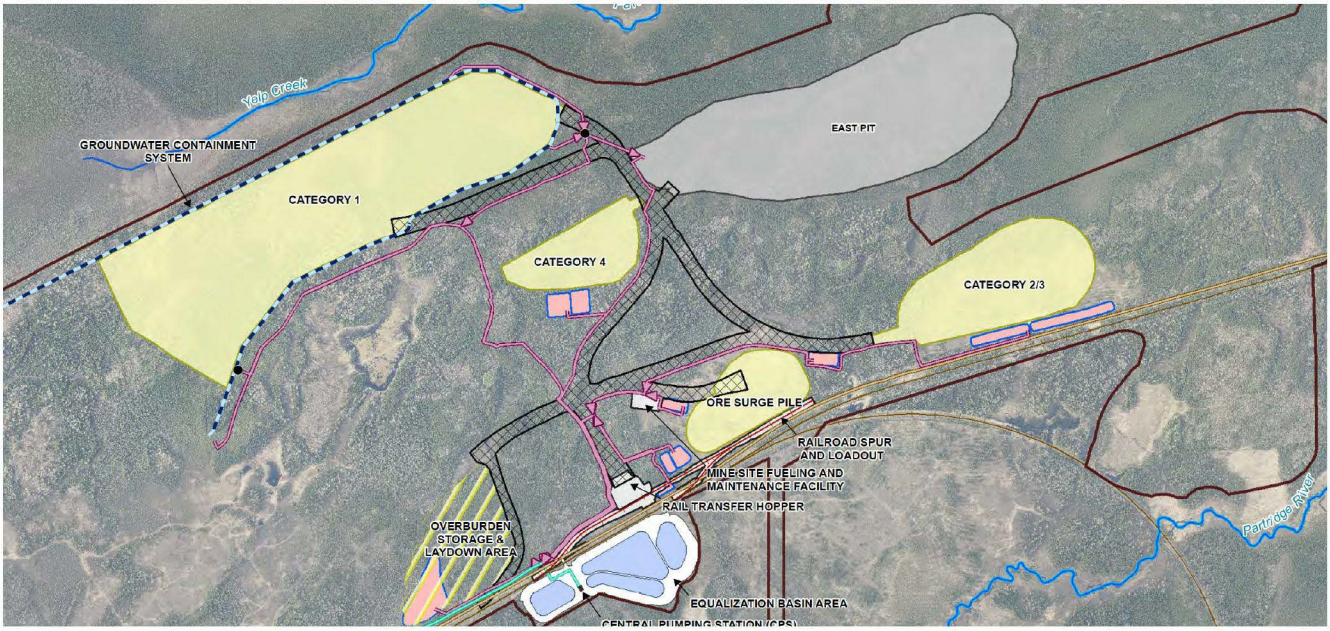
The overburden storage and laydown area (OSLA) on the south side of the site, which will contain excavated peat with the potential to release mercury as well mineralized overburden materials, would provide even less protection from flooding, since it is designed to accommodate

[254] Illustration from PolyMet PTM Application, Figure 10-15.
[255] PolyMet PTM Application, p. 344; PolyMet Water Mgt. Plan - mine, *supra*, pp. 10-11.
[256] *Id.*, pp. 10-11.
[257] PolyMet Rock Mgt. Plan, *supra*, autop. 183, Appx. 11.1 of the PolyMet PTM Application.
[258] U.S. Geological Survey, Floods of June 2012 in Northeastern Minnesota, Scientific Investigations Report 2012-5283, Exhibit 31, p. 1.

only a 25-year 24-hour rain event.[259] Both the OSLA and the pond to which its runoff will be directed through grading are unlined,[260] allowing seepage of mercury, sulfates and metals from stored materials through groundwater to the surficial aquifer.

Prevention of overflow from the Equalization Basins and other wastewater storage locations at the mine site depends on pumping contaminated water through the pipeline between the mine and the plant site using pumps at the central pumping station.[261] A sensor is proposed to provide a warning before Equalization Basins reach full capacity to prevent overfilling so that pumping to the plant site can be done at a faster rate.[262] However, no redundant pumps or pipelines are planned to protect water quality in the event of an extended power outage or a storm event exceeding the 100-year 24-hour design volume.[263] In a heavy rainfall, PolyMet proposes an emergency operating procedure where temporary portable pumps may be used to return mine water in various sumps to the mine pits and temporarily stop pit dewatering.[264] No additional plans to prevent Equalization Basin overflow are described.

The mine site Equalization Basins, process water ponds (pink) and sumps (black circles) are shown on the map below.[265]



Several of the mine site wastewater ponding locations are near and flow toward the 100-year floodplain of Yelp Creek or the upper Partridge River. The pond and a sump containing Category 1 waste rock seepage may lie within that floodplain as illustrated on the map below.[266]

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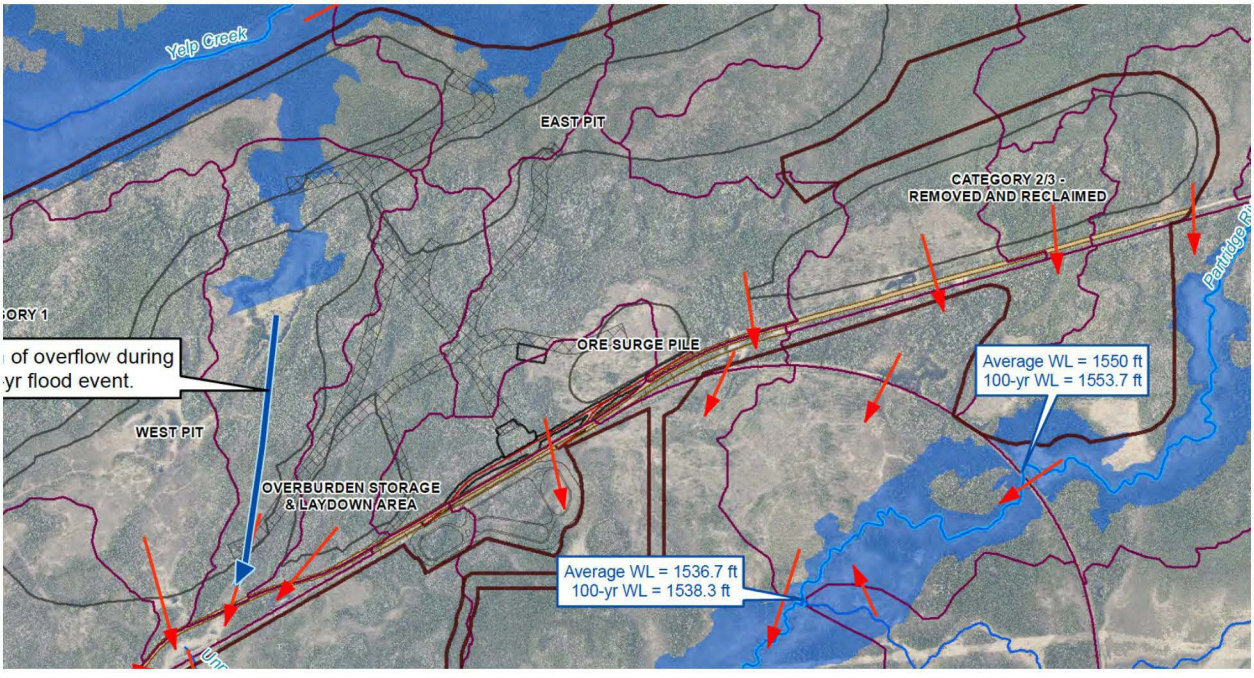
[259] PolyMet PTM Application, p. 179, 280, 344.
[260] *Id.*, pp. 280, 284.
[261] *Id.*, pp. 172, 180, 344-345.
[262] PolyMet Water Mgt. Plan – Mine, *supra*, p. 24.
[263] *Id.*, p. 43.
[264] *Id.*, pp. 43-44.
[265] *Id.*, Large Figure 4.
[266] *Id.*, Large Figure 3.



The DNR draft Conditions don't address the location of mine site wastewater features, the need for a liner to prevent seepage of mercury from the OSLA, the limited contingency planning if pumps and pipelines fail, or the lack of prudence in storing highly concentrated wastewater in basins, ponds and sumps designed to withstand only a 100-year 24-hour rain event. The draft Permit to Mine plans for storage of mine process wastewater fails to prevent the release of substances that adversely impact natural resource or to minimize impacts on surface water and groundwater as required by Minnesota non-ferrous mining rules.

8. The PolyMet draft Permit to Mine fails to provide adequate insurance to compensate persons and property that might be damaged by polluted seepage, spills or dam failure as a result of mining operations, reclamation or restoration.

Under Minnesota law, an applicant for a permit to mine must submit proof that the applicant has a public liability insurance policy in force or has met state or federal self-insurance requirements "to provide personal injury and property damage protection in an amount adequate to compensate any persons who might be damaged as a result of the mining operation or any reclamation or restoration operations connected with the mining operation."[267]

To evaluate compliance with this statutory and rule requirement, two basic questions must be answered: 1) What proof of insurance has PolyMet submitted in applying for a permit to mine? 2) Is the proposed insurance adequate according to Minnesota law?

Answering the first question is relatively simple. In PolyMet's PTM Application, the only certificate of insurance submitted provided modest general commercial liability, auto accident coverage, employer liability, and an umbrella policy, but no environmental or pollution liability

[267] Minn. Stat. §93.481, subd. 1(2); Minn. R. 6132.1100, subp. 3, item C.

insurance.[268] PolyMet proposed a $10 million environmental insurance policy with an annual estimated cost of $100,000 would be included financial assurance for the "long-term phase."[269]

The DNR draft Conditions, in this instance, provided additional clarity:

> ¶B7 In addition to the financial assurance provided to DNR, the permittee must maintain environmental liability insurance coverage during the term of the Permit to Mine that covers both sudden, accidental, or gradual pollutant releases from the mine pits, stockpiles, production facilities, waste water treatment facilities, pipelines, tailings basins, and, when constructed, the hydromet residue facility.
> ¶B8 At the time of permit to mine issuance the Permittee must provide documentation of a minimum of $10,000,000 in existing environmental liability insurance for the project.
> ¶B9 One year after tailings are first deposited in the tailings basin, Permittee must evaluate and report on the future environmental liability insurance premium costs that the State of Minnesota could incur in the event of unplanned closure of the project.[270]

Under the DNR draft Conditions, PolyMet would be required to demonstrate proof of existing environmental liability insurance in the amount of $10 million at the time of permit issuance. In the future, risks to State government would also be reviewed.

However, there is no evidence from which one might conclude that the sum of $10 million would be "adequate" to compensate any persons, including downstream property owners, consumers of fish and wild rice, and communities affected by pollution or dam failure resulting from the proposed PolyMet mining project. Based on the experiences of tailings storage facility failures affecting other watersheds and communities and the costs of remediation of polluted seepage under federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) laws, also known as Superfund laws, it is clear that a $10 million environmental liability policy would be inadequate under Minnesota law.

A comprehensive analysis of potential damages to persons or property from the PolyMet project, along with an estimate of Superfund remediation liabilities that might be levied on taxpayers, must be conducted to determine a prudent level of environmental liability insurance for the PolyMet project. Then, prior to permit issuance, PolyMet must demonstrate that it has secured a valid insurance policy for that amount.

To date, PolyMet has not conducted any analysis of the damage to persons, property or natural resources that would result in the event of partial or complete dam failure at either the tailings storage facility or the hydrometallurgical residue facility.

WaterLegacy's comments on the PolyMet draft Dam Safety permits, incorporated by reference herein, detail the inadequacies of the PolyMet dam break analysis.[271] In brief, the only PolyMet

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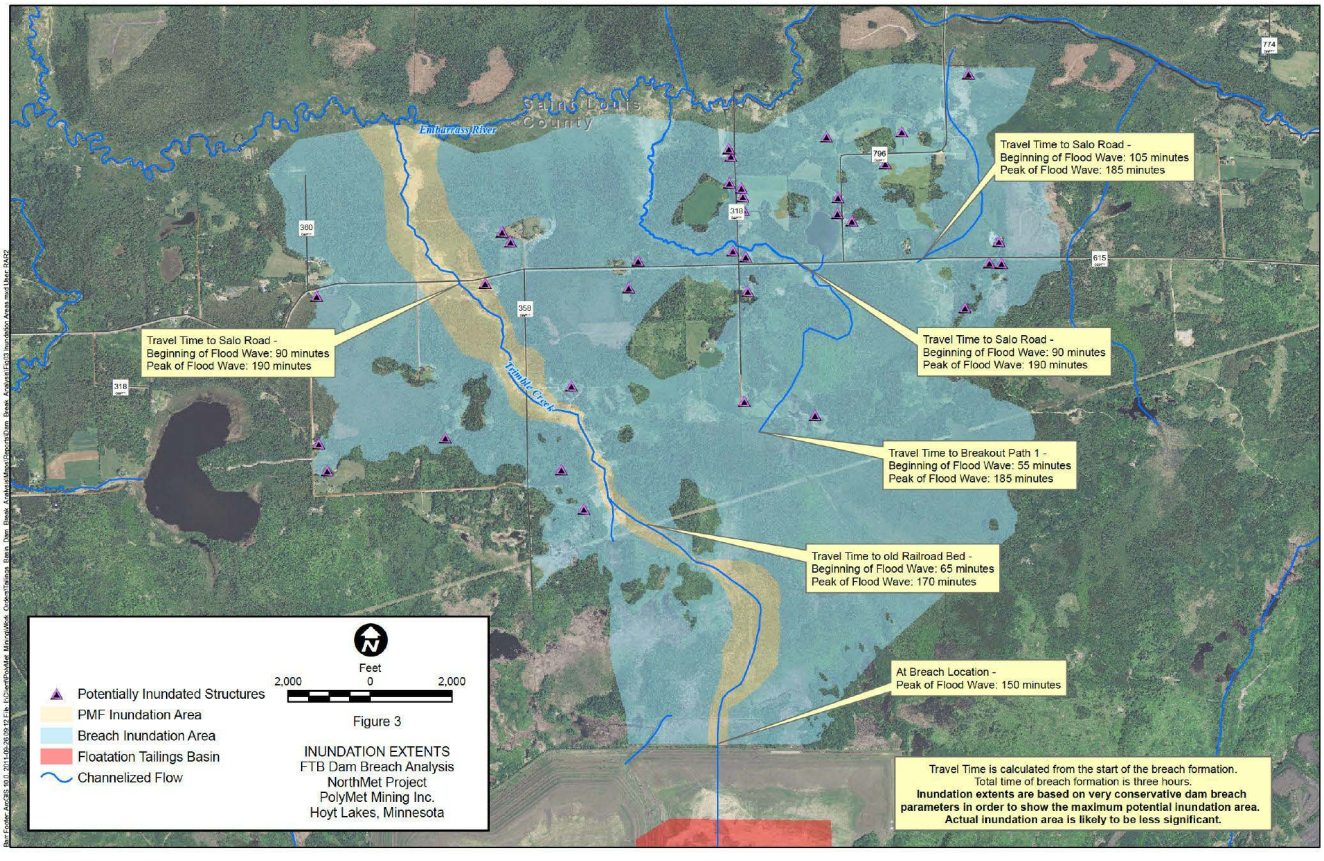
[268] PolyMet PTM Application, pp. 456, 566, Certificate of Insurance.
[269] PolyMet NorthMet Project Mine Year 1 Reclamation Plan with Financial Assurance Estimate and Basis Dec. 2017 ("PolyMet Mine Year 1 Reclamation Plan"), Appx. 15.3 of the PolyMet PTM Application, p. 33, autop. 490 of Appx.15.
[270] DNR draft Conditions, Attachment 2, pp. 1-2.
[271] WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.

Dam Break Analysis done by PolyMet was a brief report in 2012, with the limited objective of developing an emergency action plan to notify the closest property owners in the event of a breach on the north side of PolyMet's tailings dams.[272] PolyMet mapped the inundation that would occur within the first couple of hours of a breach, reproduced below:[273] In that timeframe inundation reached the Embarrass River.



However, PolyMet has admitted that, given its limited purpose, the dam break analysis provided no information on the extent or consequences of tailings release in the event of a breach:

> Extensive additional analysis would be necessary to realistically estimate the percentage of flotation tailings left in the FTB, to evaluate flotation tailings deposition after the breach and to better understand flow properties of the liquefied flotation tailings. Such analysis is not warranted given the objective of this dam break analysis, which is to serve as an aid in development of the facility Emergency Action Plan.[274]

At minimum, the following questions must be answered to evaluate potential damages to persons, property and natural resources downstream of a tailings breach:

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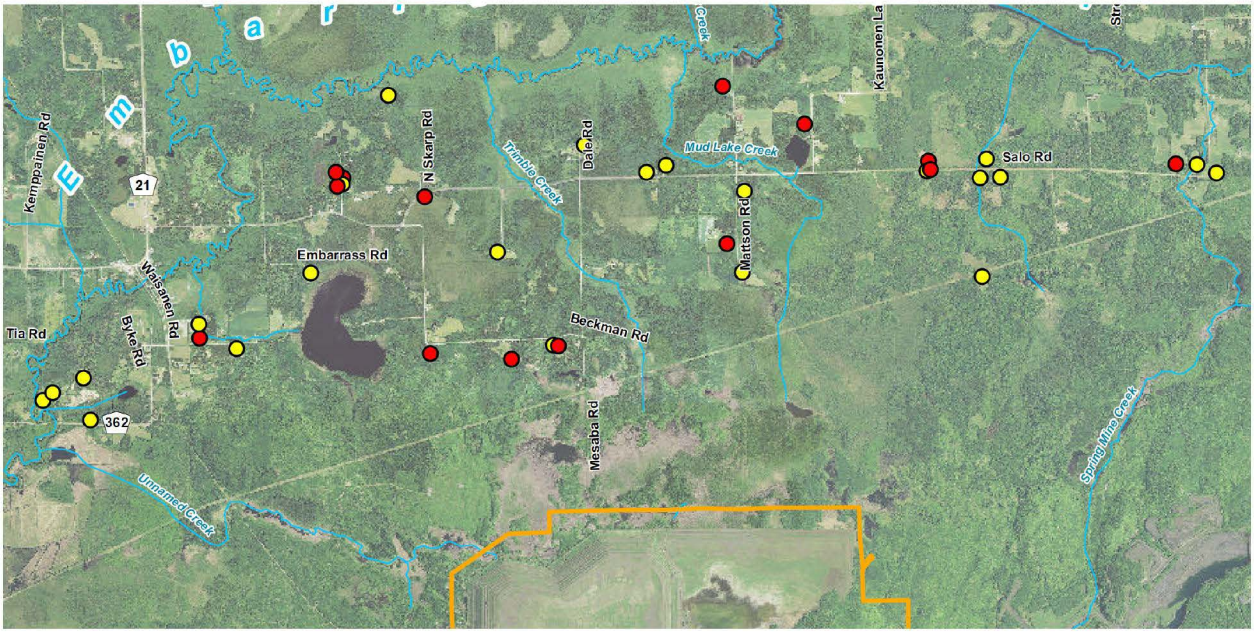
[272] Barr Memo, "FTB Dam Break Analysis," Dec. 4, 2012, provided as Attachment H of PolyMet Tailings Mgt. Plan, *supra*, Appx. 11.5 of the PolyMet PTM Application.
[273] *Id.*, Figure 3 of the FTB Dam Break Analysis, *supra*, which depicts inundation, is also attached as Exhibit 32.
[274] *Id.*, p. 7.

- What potential damages would result from a PolyMet dam breach or failure involving mobilization and flow of tailings waste?
- What potential damages would result from a PolyMet tailings dam collapse rather than an assumed breach of limited scope?
- What potential hazards would result from a dam failure at other cross-sections of the dam, particularly at cross-section N on the south side of the tailings site, adjacent to Second Creek?
- What potential damages to riparian and lakeshore property, residential wells, surface water and groundwater quality, municipal water supplies, fisheries, wild rice and human health would result from a PolyMet tailings dam failure?

The first question in this analysis would be the impacts on persons and property resulting from inundation already mapped by PolyMet to take place within approximately two hours of a north side tailings dam breach. Even within that short time, there would be 34 homes along Trimble Creek or breakout paths that could be affected by the modeled dam break.[275] As illustrated on the map below, where both red and yellow dots represent wells between the tailing waste facility and the Embarrass River, dozens of residential drinking wells would also be affected.[276]



Additional impacts are likely far downstream. PolyMet has acknowledged that, "The most significant unknown breach parameter for a tailings basin dam is how much of the tailings would be suspended and carried downstream in the event of a dam breach," and that dam breaks have occurred where up to 80% of the volume was carried downstream.[277] However, PolyMet's dam break modeling only modeled water release, not tailings, although a senior DNR dam safety engineer cautioned, "An actual failings that mobilized tailings would be much more serious."[278]

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[275] *Id.*, Figure 3 and p. 8.
[276] PolyMet FEIS, Figure 4.2.2-18, attached as Exhibit 33.
[277] *Id.*, pp. 6-7.
[278] D. Dostert, DNR Review of PolyMet's Dam Safety- Tailings Basin – Permit Application, Contingency Action Plan, undated, attached as Ex. 2 to WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.

PolyMet's 2012 dam break analysis only addressed a relatively small break - 450 feet wide in the mile-long north side of the tailings waste dam - as a result of a piping-initiated failure at cross-section E.[279] No analysis has been done for cross-sections F, G and N or to address the potential for global liquefaction, highlighted in PolyMet reports since 2012.[280] Even without a seismic trigger, PolyMet has admitted that both its own flotation tailings and the LTVSMC fine tailings and slimes beneath them could liquefy as a result of high porewater pressure from a large storm event or due to steepening of slope construction, resulting in "global static liquefaction."[281]

In addition to evaluating a breach of greater scope, estimating potential damages from a dam breach would require considering costs of a breach at other cross-sections of the dam, particularly cross-section N, at the south side of the tailings site.[282] The rationale for PolyMet's focus on a north side dam break was that this is the location that would result in the "shortest warning time for potentially affected downstream properties."[283] To evaluate compensable damages, rather than provide a warning, a broader scope is needed.

Finally, for the DNR to evaluate potential damages and the level of insurance required for a dam breach, the chemical composition of tailings and slurry water as well as the volume that would be released in the event of a breach would need to be analyzed, along with the impacts to water quality. Specific concerns could include impacts to residential wells, municipal drinking water, riparian and lakeshore property values, clarity and contamination of streams, fish abundance, wild rice abundance, methylmercury contamination of fish, and impacts on human health.

The PolyMet hydrometallurgical residue facility (HRF) "dam break analysis"[284] is yet more deficient than that for the FTB. PolyMet simply declines to disclose any consequences at all of any dam breach or failure at the HRF, alleging that no potential hazards need be discussed, since various failure scenarios are "improbable" or "have a low probability" of occurrence.[285] Modern standards for dam break analysis recognize the need for dam break analysis even if harm is improbable to allow risk informed decision-making.[286] In the context of insurance, the potential that potential damages may be unlikely would be reflected in the cost of the policy.

Although the EPA specifically requested that PolyMet perform a liquefaction analysis for the HRF,[287] PolyMet has instead assumed that the HRF waste fill is not subject to liquefaction,[288] without specifying any properties of the underlying foundation or dam perimeter materials that would support, let alone guarantee, the validity of this assertion.[289] As explained in

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[279] PolyMet FTB Mgt. Plan, *supra*, p. 20, FTB Dam Break Analysis, *supra*, p. 6: The average breach width was assumed to be 2.24 times the height of the dam and the depth of the breach was calculated at 134 feet. Breach width was estimated based on dam height of 200 feet.
[280] *See e.g.,* PolyMet FTB Geotech., *supra*, pp. 8, 39, 63, 91, 111, 117.
[281] *Id.*, pp. 71-72.
[282] As discussed previously, there are concerns about dam failure and liquefaction at cross-sections F, G and N, as well as cross-section E. *See e.g.,* PolyMet FTB Geotech., *supra*, pp. 8, 39, 63, 91, 111, 117.
[283] FTB Dam Break Analysis, *supra*, pp. 3,4.
[284] Barr, HRF Dam Break Analysis, July 11, 2016, Attachment L to PolyMet NorthMet Residue Management Plan, Appx. 11.6 of the PolyMet PTM Application. The HRF Dam Break Analysis is provided as Exhibit 34.
[285] *Id.*, p. 4, "[H]ydrologic and hydraulic modeling to detail the extent of inundation from an HRF dam break is not warranted because no plausible HRF dam failure scenarios have been identified." *See also* pp. 2.
[286] See FERC Engineering Guidelines Risk-Informed Decision Making, Dam Breach Analysis, Ch. R21, Draft 2014, p. 2, excerpt in Ex. 8 to WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[287] EPA PolyMet SDEIS Comments Mar. 13, 2014, p. 16 of Attachment B to WaterLegacy Letter to U.S. Army Corps June 29, 2017, attached in Ex. 11 to WaterLegacy Dam Permit Comments, *supra,* Exhibit 10.
[288] PolyMet HRF Geotech., *supra*, p. 23.
[289] *Id.*, p. 12.

WaterLegacy's comments on the draft PolyMet HRF Dam Safety permit, various characteristics of HRF wastes create a risk for liquefaction.[290]

In addition to evaluating dam breach at the HRF, assessment of damages to be covered by environmental liability insurance must include the consequences of liner stress-deformation and liner failure over time.[291] Given the location of the HRF at the headwaters of Second Creek and the concentrated and toxic nature of hydrometallurgical wastes,[292] HRF wastes would have the potential to propagate far downstream adversely affecting water quality, wild rice, aquatic life and human health. All of these damages must be evaluated to determine the scope of an environmental liability policy to protect downstream properties, resources and communities.

In addition to performing an analysis of the damages resulting from tailings dam failure, hydrometallurgical dam failure and liner failure at the HRF facility, PolyMet must also incorporate into its liability analysis the consequences of spills, pipe failures, liner leaks, flooding or other predictable, but unanticipated events. Specific factors, such as the concentration of wastes in lined and unlined facilities, the characteristics of piping between the mine site and the plant site and the severity of rain events for which facilities are designed would influence the estimate of potential liability.

Finally, to evaluate the size of an environmental liability policy needed to assure adequate compensation for damage to property an natural resources, DNR must require PolyMet to estimate the costs of seepage to groundwater and the various contingencies reflected in the PolyMet FEIS and Permit to Mine Application.

Although every project must be considered on its own merits, recent trends and experience with the costs of tailings storage facility failures and the EPA's work to set Financial Responsibility requirements to protect taxpayers from Superfund liability are highly instructive. This data and analysis suggests that the level of environmental liability insurance proposed by the DNR in its conditions is more than an order of magnitude below what would be needed to provide adequate compensation either for dam failure or to address contaminated seepage.

In 2015, a report on Tailings Storage Facility Failures analyzed recorded tailings facility failures from 1940 to 2010 using statistical tools and found an emerging and pronounced trend since 1960 toward a higher incidence of Serious failures, i.e. large enough to cause significant impacts or loss of life and Very Serious failures, i.e. catastrophic dam failures that released more than 1 million cubic meters of tailings and even multiple losses of life. [293] Since 1990, 63% of all incidents and failures were Serious or Very Serious. The total cost for just 7 of these 16 large failures was $3.8 billion, at an average cost of $543 million per failure.[294]

An updated report published in 2017 confirmed "the absolute number of major failures, and the severity of all failures as indicated by cumulative release and cumulative runout per decade,

[290] WaterLegacy Dam Permit Comments, *supra,* p. 9, Exhibit 10.
[291] See *Id.*, p. 10 and Section 3 of these Objections.
[292] See Section 3 of these Objections.
[293] L.N. Bowker and D. Chambers, The Risk, Public Liability & Economics of Tailings Storage Facility Failures, July 21, 2015 (Bowker & Chambers 2015), Exhibit 35, pp. 1-2.
[294] *Id.*, pp. 1-2.

has steadily escalated reaching all new highs."[295] Mines with Very Serious Failures had a copper equivalent grade (including all metals) of 1.10 as compared to a realized grade of 2.25 for 330 producing copper mines during the same period.[296] The authors concluded that risk factors for catastrophic tailings failure included mines with poor performance as compared to global econometrics,[297] lower grade ore bodies, older tailings storage facilities pushed to unplanned heights, and tailings storage facilities that were not built or managed to best practices in the first place.[298] All of these risk factors apply to the PolyMet tailings storage facility.

The World Information Service on Energy (WISE) has prepared a chronology of major dam failure, last updated in July 2017. Since 2010, WISE has identified 17 major tailings dam failures, including failures in Canada, the United States, and Europe.[299]

Although the EPA's new Administrator decided in December 2017 not to issue final regulations setting financial responsibility requirements for hardrock mining and mineral processing facilities,[300] analysis done in the course of developing the draft rule is instructive as to the potential environmental liability from copper-nickel mining even in the absence of dam failure, due to the contamination of groundwater with acid mine drainage and toxic metals. The U.S. EPA's failure to establish federal financial responsibility rules also underscores the need for adequate environmental liability insurance in compliance with Minnesota law.

CERCLA laws enacted in 1980, granted EPA the authority to require that classes of facilities provide financial responsibility commensurate with the degree and duration of risk associated with production, transportation, treatment, storage and disposal of hazardous substances.[301] In 2009, prompted by federal litigation, the EPA published notice in the Federal Register identifying the hardrock mining industry sector as the first priority for financial responsibility rules.[302]

In that notice, EPA estimated that the metal mining industry (copper, nickel, gold, lead and zinc) was responsible for nearly 1.15 billion pounds or approximately 28 percent of the total 2007 U. S. Toxic Release Inventory.[303] EPA estimated that the cost of remediating all then-existing hardrock mining facilities was between $20 and $54 billion.[304] EPA cited the ownership of hardrock mines by multi-national corporations and the prevalence of bankruptcy declarations in the face of remediation needs among the reasons to prioritize financial responsibility requirements.[305]

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[295] L.N. Bowker and D. Chambers, In the Dark Shadow of the Supercycle Tailings Failure Risk & Public Liability Reach All Time Highs, *Environments* 2017, 4. 75 (Bowker & Chambers 2017), Exhibit 36, p. 9.
[296] *Id.*, pp. 14, 17.
[297] *Id.*, p. 14.
[298] Bowker & Chambers 2015, *supra*, Exhibit 7, pp. 1, 2, 16.
[299] WISE, Chronology of major tailings dam failures (from 1960), updated July 8, 2017, Exhibit 37.
[300] See B. Machlis, A Win For The Mining Industry: EPA Declines To Impose CERCLA 108(b) Financial Responsibility Requirements, Dec. 4, 2017, Dorsey & Whitney, LLP, Publications, Exhibit 38.
[301] 42 U.S.C. §9608(b)(1).
[302] EPA, *Identification of Priority Classes of Facilities for Development of CERCLA Section 108(b) Financial Responsibility Requirements*, 74 FR 37213 (July 28, 2009), *supra*, Exhibit 2.
[303] *Id.*
[304] *Id.*, at 37217.
[305] *Id.*, at 37218.

In 2016, under a consent decree, the EPA developed proposed rules for hardrock mining financial responsibility. In a webinar for members of the public, EPA shared examples of its formula; for a large open-pit copper mine using wet tailings deposition, potential financial responsibility costs would be approximately $525 million.[306] EPA's proposed rule, published in January 2017, would have required owners and operators to demonstrate financial responsibility to cover response/remediation costs, natural resource damages and covered costs for health assessments.[307] EPA noted that historic costs for hardrock mine sites on the National Priorities List had averaged more than $103 million per site.[308]

EPA explained risks posed by hardrock mining requiring responsibility for releases, stating that "the basic technologies for extracting and processing of mineral ores have remained fairly constant over approximately the last 50 years. But, "At the same time, a combination of economic and technological factors have increase the scale of surface disturbance and waste generation."[309] EPA noted that waste rock and overburden piles, groundwater affected by pits, process water and slurries are all potential sources of hazardous releases, and emphasized that all processing of ore "can result in spills of intermediate material and waste." EPA concluded that "leaks also often occur due to liner failures, containment failures . . .and defects in pipe seams. EPA has also documented that operator error, such as mishandling of solutions (e.g., over-fills) or equipment, and severe weather events that overwhelm containment systems can contribute to these types of releases."[310]

Without analysis of the damages that would be posed by failure of PolyMet tailings and hydrometallurgical residue dams, and by spills, leaks, uncontained seepage, and other releases of contaminants from the PolyMet mine and plant site, it is not possible to determine precisely what amount of environmental liability insurance would be sufficient to compensate all persons for damages resulting from the PolyMet mine from construction through long-term closure. However, there is no basis for PolyMet or the DNR to assert that $10 million in pollution insurance is "adequate." And there is overwhelming evidence from the history of tailings dam failure and CERCLA liability that environmental insurance more than an order of magnitude above that amount would be needed to allow adequate compensation for damages.

9. The PolyMet draft Permit to Mine fails to require financial assurance to cover legacy pollution and the contingency reclamation cost estimate for the first year of mining operations before issuance of a permit to mine.

Minnesota law is clear. Financial assurance in the amount equal to the contingency reclamation cost estimate for the first year of mining operations, not the first year of pre-mining construction activity, must be provided before issuance of a permit to mine.

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[306] EPA, CERCLA Section 108(b) Financial Responsibility, A public webinar hosted by the United States Environmental Protection Agency, May 17, 2016, Exhibit 39, slide 23.
[307] EPA, *Financial Responsibility Requirements Under CERCLA §108(b) for Classes of Facilities in the Hardrock Mining Industry*, 82 FR 3388 (Jan. 11, 2017), Exhibit 40.
[308] *Id.* at 3479.
[309] *Id.*
[310] *Id.*

Under subpart 2 of Minnesota Rules 6132.1200 a permit applicant must submit a contingency reclamation cost estimate include closure and postclosure maintenance activities required "if *operations* cease within the first calendar year."[311] The rule then provides, "Financial assurance in the amount equal to the contingency reclamation cost estimate under subpart 2 shall be submitted to the commissioner for approval *before issuance of a permit to mine*."[312]

This requirement is substantive. If a permit applicant fails to provide financial assurance equal to contingency reclamation costs for the first year of operations prior to issuance of a permit to mine, the commissioner is authorized to deny the permit to mine.[313]

In these non-ferrous mining rules, the term "operations" unambiguously refers to mining activities. The application for a permit to mine must include "a detailed plan for the activities planned during the *first year of operation*," including all of the information listed in subparts 3 to 6 of the annual report.[314] The cited subpart 3 of the annual report requires information on "the anticipated rate of mining," and "anticipated mining activities," including "the types, amounts, sequence, and schedule of mining the ore body and storage piling materials" and "changes in the beneficiating process" including effects on "the types, amount, and means of waste disposal."[315]

Definitions provided in Chapter 6132 underscore the fact that, under non-ferrous mining rules, "operations" are synonymous with "mining operations." A "mining operation" is defined to mean "all of a mining project."[316] "Mining" does not mean construction activities; it is defined in rule as "the process of removing; stockpiling; processing; storing; transporting, excluding use of common carriers and public transportation systems; and reclaiming a material in connection with the commercial production of metallic minerals."[317]

There is no ambiguity in the rules. Providing financial assurance based on a pre-operations construction contingency fails to meet Minnesota's legal requirements for financial assurance.

There is, similarly, no controversy in the facts. PolyMet's Permit to Mine Application clearly distinguished between the "construction" phase of the project and the mining "operations" phase of the project. In introducing its Application, PolyMet defines the phases of the project as follows:

> **construction**: the approximately 18-24-month construction phase prior to Mine Year 1.
> **operations**: the approximately 20-year phase of mining and production, from Mine Year 1 through Mine Year 20.[318]

PolyMet further clarifies, "The *operations* phase will commence on the first day of production

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[311] Minn. R. 6132.1200, subp. 2 (emphasis added).
[312] Minn. R. 6132.1200, subp. 4, item B (emphasis added).
[313] Minn. R. 6132.1200, subp. 7, item A.
[314] Minn. R. 6132.1100, subp. 8, stating that all information required in Minn. R. 6132.1300, subp. 3 to 6 must be supplied.
[315] Minn. R. 6132.1300, subp. 3, item A, item B (1) and (2).
[316] Minn. R. 6132.0100, subp. 20.
[317] Minn. R. 6132.0100, subp. 18.
[318] PolyMet PTM Application, p. xxvi.

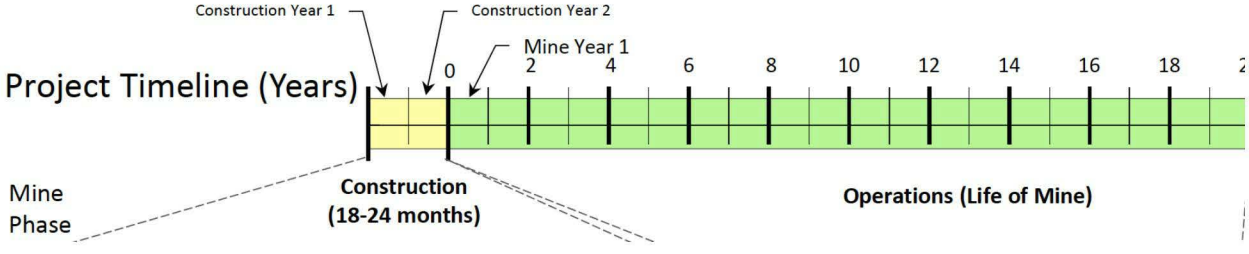
blasting within the open pit (Mine Year 1) and extend through the end of Mine Year 20."[319] "The Project will transition from construction to operations when production blasting commences to access ore at the Mine Site."[320]

The difference between pre-operation construction and operations is neatly illustrated in Table 3-1 of PolyMet's PTM Application below.[321]

Table 3-1 Terminology for Project Phases in Various Project Documents

Mine Year	Construction Year (PTM only)	Project Phase in Permit to Mine	Project Phase in FEIS and supporting documents, and in other environmental permit applications(1)
Not Applicable	1 to 2	Construction	Pre-Operation Construction
1 to 20		Operations	Operation

An additional graphic explanation of the difference between construction years and operations, the life of the mine is provided in PolyMet's project timeline in Figure 3-9.[322]



Despite the clear rule requirement that contingency reclamation be provided based on the first year of mining operations prior to a permit to mine and the obvious factual distinction between construction and mining operations, PolyMet's PTM Application proposes to provide and assure only a "Construction Contingency Reclamation Plan" prior to securing a permit to mine. PolyMet explains that its proposed financial assurance plan "is effectively addressing a premature closure scenario where legacy conditions exist, and where only construction activities would have taken place for the Project."[323]

PolyMet's estimate of costs for "Pre-Mining Financial Assurance" is $58,413,305 for "Existing Legacy Conditions" and $16,272,037 for "Nonferrous Construction Activities," for a total of $74,685,342.[324] This is the amount for which PolyMet states it will submit a financial assurance

[319] *Id.*, p. 30 (emphasis added).
[320] *Id.*, p. 180.
[321] *Id.*, Table 3-1, p. 46.
[322] *Id.*, Figure 3-9, autop. 90.
[323] *Id.*, p. 453. See also NorthMet Project Construction Contingency Reclamation Plan Dec. 2017, Appx. 15.2 of the PolyMet PTM Application, autop. 327 of Appx. 15.
[324] PolyMet PTM Application, p. 456, Table 16-1.

package for approval prior to issuance of a permit to mine.[325]

In addition to the "Construction Contingency Reclamation Plan," PolyMet's PTM Application includes an estimate for the costs of reclamation after the first year of PolyMet's mining operations. PolyMet's Application estimates the cost of financial assurance for the first year of operations is $543,723,116.[326] But, PolyMet states that these costs are only "projections" and neither characterizes this sum as a "Contingency Reclamation Estimate" for the first year of operations nor proposes to assure this sum prior to issuance of the permit to mine.[327]

The DNR's draft Conditions for the PolyMet Permit to Mine endorse PolyMet's proposal that only legacy pollution remediation and construction reclamation costs must be assured prior to issuance of a permit to mine. PolyMet would be required to provide $75 million in surety or reclamation bonds, letters of credit, or cash, with a minimum of $10 million in cash prior to issuance of a permit to mine.[328] This sum is based on "Financial Assurance Calculations – Construction Period" with a total financial assurance of $74,684,682, reflecting legacy reclamation costs of $45,143,496; legacy long term costs of $13,269,809; and construction reclamation costs of $16,271,537.[329]

Under DNR's draft Conditions, PolyMet's reclamation costs for the first year of mining operations would be assured some time prior to production blasting in the mine area.[330] PolyMet's estimates of reclamation costs plus long term costs for years 1 and 2 of mining operations, $544,000,000 and $588,000,000, respectively, are cited only as "expected liabilities," which may be "adjusted" at the start of mining operations year 1.[331]

The financial assurance agreed to in DNR's draft Conditions for Minnesota's first proposed copper-nickel sulfide ore mining project would not comply with Minnesota rules. The DNR would require PolyMet to provide a negligible $10 million in cash or its equivalent prior to issuance of a permit to mine. As with the many choices for PolyMet's technology and practices, the PolyMet draft Permit to Mine proposes financial assurance operating on the cheap, internalizing profit to PolyMet while externalizing risk to the public.

There are many factual issues pertaining to cost calculations, discount rates and the appropriate form of financial assurance so that funds will be sufficient, available, binding, enforceable and will not be dischargeable through bankruptcy.[332] WaterLegacy believes that this discussion is premature until the legal concerns raised here are resolved, and we expressly reserve our right to raise additional factual issues in the future.

However, one aspect of PolyMet's cost proposal and adopted in the DNR's draft Conditions reflects a violation of the Clean Water Act, to which we object at this time. The calculation of

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[325] *Id.*, p. 456.
[326] *Id.*, pp. 452, 459. *See also* PolyMet Mine Year 1 Reclamation Plan, *supra*, Appx. 15.3 of the PolyMet PTM Application, autop. 494 of Appx. 15.
[327] *Id.*, p. 1, autop. 458 of Appx.15 of the PolyMet PTM Application.
[328] DNR draft Conditions, Attachment #2, p. 4 ¶G(17).
[329] DNR draft Conditions, Appendix A-1, p. 3.
[330] DNR draft Conditions, Attachment #2, p. 4 ¶G(18).
[331] *Id.*
[332] Minn. R. 6132.1200, subp. 5.

legacy reclamation and remediation costs based on an explicit exclusion of any "treatment activities or costs" to remedy legacy pollution at the LTVSMC tailings facility [333] is a violation of the federal Clean Water Act and must be rejected and revised.

PolyMet's assertion that no treatment would be required for legacy contamination at the existing LTVSMC tailing site did not arise on its own; it was based on a December 12, 2017 memorandum from the Minnesota Pollution Control Agency (MPCA) to the DNR. That memorandum stated that, should the PolyMet copper-nickel mine project never become operational (scenario II), no treatment or mitigation would be required for potential exceedances of mercury, sulfate, alkalinity, hardness, total dissolved salts and specific conductance at the LTVSMC tailings facility.[334]

For mercury, without public review of its analysis, MPCA offered that high concentrations of mercury exceeding Minnesota water quality standards in surface water surrounding the LTVSMC Basin "are most likely due to influences from precipitation and background concentration, not from seepage from the existing Basin."[335] Thus, under scenario II, "no treatment/mitigation is necessary in final closure for mercury."[336]

For sulfate, MPCA proposed that high sulfate at the Basin "will likely not result in an exceedance of the calculated sulfate standard (or alternative sulfate standard in the proposed rule) if the MPCA's proposed rule revision goes into effect."[337] If the proposed wild rice rulemaking revision were not completed, the MPCA offered, "another regulatory option available to the State would be to consider developing a site-specific standard based on the science at that time."[338] Current state law preventing financial expenditures to design or implement sulfate treatment technologies was also cited by MPCA.[339] In any case, under scenario II, "no treatment/mitigation for sulfate would be required for protection of wild rice."[340]

For a range of Class 3 and Class 4 pollutants from the LTVSMC tailings site – alkalinity, hardness, total dissolved salts and specific conductance, MPCA offered that the Agency "has made this rulemaking a high priority and expects to propose revisions in 2018." Ms. Foss continued, "Based on current information, MPCA expects that these standards will either remain unchanged or become less stringent."[341] MPCA also suggested that, even if the rules were not weakened, "At any point, the MPCA can consider other regulatory options such as site-specific standards (SSS), a use attainability analysis (UAA), a use and value demonstration (UVD), or a variance."[342] Thus, if the PolyMet project did not become operational (scenario II), "no

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[333] Legacy Closure Plan for Ferrous LTVSMC Legacy Areas subject to Assignment from Cliffs Erie, L.L.C. Dec. 2017, Appx. 15.1 of the PolyMet PTM Application, autop. 6 of Appx. 15.
[334] Ann Foss, MPCA Metallic Mining Sector Director, Legacy Permitting/Financial Assurance for Change in Assignment Former LTV Steel Mining Company (LTVSMC) Tailings Basin and Plant Site (Dec. 12, 2017), Attachment O to Legacy Closure Plan for Ferrous LTVSMC Legacy Areas subject to Assignment from Cliffs Erie, L.L.C., Dec. 2017, Appx. 15.1 of the PolyMet PTM Application, Attachment O provided in Exhibit 41.
[335] MPCA, Legacy Permitting Attachment O, *supra*, Exhibit 41, p. 4.
[336] *Id.*, see also p. 5.
[337] *Id.*, p. 4.
[338] *Id.*
[339] *Id.*, p. 6.
[340] *Id.*, p. 7.
[341] *Id.*, p. 4.
[342] *Id.*, p. 9

treatment/mitigation for alkalinity, hardness, TDS and specific conductance would be required."[343]

The federal Clean Water Act prohibits MPCA from making these determinations or the DNR from relying on them. Mercury exceedances may not be ignored without an analysis of whether discharge from tailings basin seeps has a reasonable potential to cause or contribute to violation of surface water quality standards.[344]

Exceedances of sulfate standards based on the MPCA's proposed rulemaking are no longer applicable. In January 2018, an Administrative Law Judge, with the concurrence of the Chief Judge, disapproved both repeal of Minnesota's 10 parts per million (mg/L) wild rice sulfate standard and replacement of the standard with an equation-based formula.[345] Among other grounds, the ALJ concluded that repeal of Minnesota's existing wild rice sulfate standard would conflict with the Clean Water Act and its implementing regulations.[346]

A water quality standard may only be removed or made less stringent in compliance with the Clean Water Act and its implementing regulations, which require a scientific basis for the change and a demonstration that the uses of water for aquatic life, recreation and wildlife have all been preserved.[347] There is extensive peer-reviewed science establishing that pollutants regulated in Minnesota under Class 3 and Class 4 rules (hardness, total dissolved salts and specific conductance) affect fish and other aquatic life so that removal or weakening of these standards would impair Clean Water Act protected uses.[348]

Absent a rule change in compliance with the Clean Water Act, the MPCA lacks the authority to preclude treatment or mitigation to prevent exceedances of surface water quality standards for sulfate, alkalinity, hardness, total dissolved salts or specific conductance. The EPA has advised MPCA that enforcement of Minnesota surface water quality standards is not discretionary under the Clean Water Act,[349] and internal MPCA documents confirm that "Minnesota is required to enforce the state assembled and federally approved water standards, including the wild rice sulfate standard."[350]

In addition to requiring that financial assurance equal to the contingency reclamation cost estimate for the first year of mining operations be provided by PolyMet prior to issuance of a permit to mine, the DNR must require PolyMet to recalculate legacy pollution and long-term treatment costs based on treatment to achieve compliance with all Minnesota water quality standards.

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[343] *Id.*, pp. 4, 10.
[344] 40 C.F.R. §122.44(d)(1)(i)-(iii)
[345] *In the Matter of the Proposed Rules of the Pollution Control Agency Amending the Sulfate Water Quality Standard Applicable to Wild Rice and Identification of Wild Rice Rivers,* OAH 80-9003-34519 Revisor R-4324, Report of the Administrative Law Judge, Jan. 9, 2018, ("ALJ Wild Rice Rule Report"), Exhibit 42, p. 5.
[346] *Id.*
[347] *See* 40 C.F.R. §131.5; 131.6. A variance is considered to be a change in water quality standards and requires a determination that existing uses would be preserved by the change. 40 C.F.R. §131.10.
[348] Environmental Groups' Comments on MPCA 2017 Triennial Standards Review, Feb. 9, 2018, Exhibit 43, pp. 2-4.
[349] EPA (T. Hyde), Letter to Sen. Bakk and Rep. Dill, May 13, 2011, Exhibit 44, pp. 1-2.
[350] MPCA, MPCA Wild Rice Sulfate Standard (updated 1/28/13), Exhibit 45.

10. The PolyMet draft Permit to Mine fails to comply with requirements for information, designs and methods before a permit is granted and is too vague to establish what is required for compliance or provide standards for enforcement.

Minnesota Statutes preclude any person from carrying out a mining operation for metallic minerals within the state "unless the person has first obtained a permit to mine from the commissioner."[351] Minnesota law also provides that "a permit may be modified or revoked by the commissioner in case of any breach of the terms or conditions thereof," and that the DNR commissioner can suspend operations "to protect the public health or safety or to protect public interests in lands or waters against imminent danger of substantial injury in any manner or to any extent not expressly authorized by the permit."[352] It is intended that a permit to mine be issued for a defined term, including of reclamation and restoration as well as mining.[353]

The statutory requirement for a permit and the statutory authority granted to the DNR to modify a revoke a permit would be meaningless if a permit could be vague and indefinite, particularly with respect to practices that could impair public health or public interests in lands or waters. In Minnesota, a permit, as well as a statute or rule, may be unconstitutionally void due to its vagueness. A permit that is vague and non-specific in its requirements may be unenforceable, [354] setting up a situation where there is no recourse if PolyMet's discharge, seepage and emissions result in adverse impact to natural resources, lands and waters.

In addition to requiring a permit sufficiently defined that its modification or revocation, would have meaning, Minnesota law requires that the application for a permit to mine include specific disclosures. These include "the engineering design, methods, sequence, and schedules of reclamation including closure and postclosure maintenance" that address the goals and meet the requirements of non-ferrous mining rules;[355] mine waste characterization;[356] and maps of bedrock geology in areas both directly and indirectly affected by mining.[357] Despite many years of process, repeated requests by cooperating agencies and citizens for more definitive information, and PolyMet's voluminous and repetitive production of documents, many simple and important aspects of its project remain undefined and undisclosed.

As suggested in the preceding sections of these Objections, the DNR draft Conditions do not cure the deficiencies in PolyMet's Permit to Mine Application. The DNR has set no enforceable conditions for the PolyMet Permit to Mine, whether to require compliance with factors of safety

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[351] Minn. Stat. §93.481, subd. 1; Minn. R. 6132.0300, subp. 1.
[352] Minn. Stat. §93.481, subd. 4 (c) and (d).
[353] Minn. Stat §93.481, subd. 3.
[354] *See State v. Halvorsen*, 2017 Minn. App. Unpub. LEXIS 31; 2017 WL 84146 (Minn. Ct. App. Jan. 9, 2017)(Dismissing charges for dust emissions due to vagueness of conditional use permit that required dust-abatement methods rather than a limit on dust emissions), attached as Exhibit 46.
[355] Minn. R. 6132, 1100, subp. 6, item C, citing goals and requirements in parts 6132.200 to 6132.3200. *See also* Minn. Stat. §93.481, subd. 1(1) requiring a plan for reclamation and restoration.
[356] Minn. R. 6132.1100, subp. 6, item D.
[357] Minn. R. 6132.1100, subp. 5, item B (1).

for tailings dam stability, to set limits on seepage escaping containment systems or to define standards that must be met for closure and postclosure designs and methods.

Perhaps most problematic, the DNR draft Conditions explicitly defer decisions, modeling, plans and practices related to controversial issues until after a permit to mine is issued, ensuring both that the DNR will have little leverage in resolution of these issues and that the DNR's decisions will evade public, administrative law judge and judicial review.

On the most basic level, the PolyMet draft Permit to Mine omits critical information required to be in an application for a permit. DNR draft Conditions do not require that these omissions be cured in a new permit application prior to issuance of the PolyMet Permit to Mine.

Minnesota rules require waste characterization in an application for a permit to mine.[358] PolyMet's waste characterization has notable gaps. First, the PolyMet PTM Application fails to provide any characterization at all the concentrated and toxic waste that PolyMet plans to deposit in the hydrometallurgical residue facility, including but not limited to high levels of mercury, copper and sulfate.[359] *The DNR should require PolyMet to revise its application to thoroughly characterize hydrometallurgical waste and the composition of all wastes deposited in the HRF before a permit to mine can be issued.*

Next, PolyMet's characterization of mine to plant pipeline water quality is incorrect and misleading. The level of pollutants in pipeline water supplied for the PTM application[360] are based on a prior modeling plan that assumed a mine site Wastewater Treatment Facility would treat mine wastewater before piping it from the mine site to the plant site.[361] For example, under the old plan that included a mine site WWTF, piped wastewater would have a sulfate concentration of 250 mg/L. Under the current plan with no mine site treatment, wastewater with a sulfate concentration of 2,450 mg/L would be piped from the Low Concentration (East) Equalization Basin and wastewater with a sulfate concentration of 9,010 would be pumped untreated from the High Concentration (West) Equalization Basin.[362] *The DNR should require PolyMet to revise its application to disclose the changes in mine to plant pipeline wastewater concentrations as a result of the elimination of a mine site WWTF before a permit to mine can be issued.*

PolyMet provides no characterization of the peat and sulfur mineralized overburden in the overburden storage and laydown area (OSLA), which will be an unlined waste containment area at the proposed mine site, and no evaluation of levels of mercury, other metals or sulfate in the runoff from the OSLA that will be pumped to the tailings piles without treatment.[363] *The DNR should require PolyMet to revise its application to characterize peat and overburden waste and runoff before a permit to mine can be issued.*

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[358] Minn. R. 6132.1100, subp. 6, item D.
[359] See Section 3 of these Objections, *supra*.
[360] PolyMet Water Mgt. Plan - Mine, *supra*, Large Table 12, in Appx. 11.2 to PolyMet PTM Application.
[361] *Id.*, citing the February 2015 PolyMet NorthMet Project Water Modeling Data Package – mine Site as the source of the data.
[362] Compare PolyMet Water Mgt. Plan - Mine, *supra*, Large Table 12 with PolyMet Adaptive Mgt. Plan, *supra*, Large Table 4.
[363] See PolyMet PTM Application, p. 340,

Throughout its PTM Application, PolyMet has failed to include mercury in its characterization of wastes or water quality. As noted above, two of the areas where mercury is of greatest concern are not characterized at all – the HRF in which 164 pounds of mercury will be deposited each year[364] and the unlined OSLA, where mercury-containing peat will be stored. We have found 26 separate tables estimating water quality in various locations where water contacts waste, from the tailings toe to mine pits and waste rock seepage.[365] None of these tables estimate levels of mercury in the seepage or wastewater, even though receiving waters for the proposed PolyMet project -- the Partridge River and Embarrass Rivers; Embarrass, Sabin, Wynne, Esquagama and Colby Lakes; the Whitewater Reservoir and many downstream segments of the St. Louis River -- are all listed under the Clean Water Act 303(d) as impaired due to mercury.[366] *The DNR should require PolyMet to revise its application to analyze and disclose mercury concentrations in all project wastes and in all water quality associated with mine site or plant wastes or ores before a permit to mine can be issued.*

Throughout its application, PolyMet has also failed to disclose the levels of specific conductivity in mine pit water and water in contact with mine and plant site wastes. The Embarrass River is listed under the Clean Water Act 303(d) program as impaired for fishes assessment from its headwaters to the St. Louis River and a stressor identification has been done identifying specific conductance as a stressor in the Embarrass River and noting the Embarrass River as well as Spring Mine Creek "are discharge points for mine pit dewatering, and water quality sampling results from these streams show elevated specific conductance and sulfate concentrations."[367] *The DNR should require PolyMet to revise its application to analyze and disclose specific conductance levels in all water quality associated with mine site or plant wastes or ores before a permit to mine can be issued.*

The PolyMet PTM Application contains a water balance showing that, among other materials, 13,770 gallons per minute (more than 7 trillion gallons per year) of untreated plant processing water, 1,750 gallons per minute (more than 920 million gallons per year) of untreated seepage from the seepage capture system and 200 gallons per minute (more than 105 million gallons per year) of untreated filter waste and backwash from the reverse osmosis plant will be deposited in the unlined tailings pond.[368] This water balance is new information. *The DNR should require PolyMet to revise its application to disclose concentrations of parameters in tailings, process water and wastes deposited individually and in aggregate in the tailings pond and tailings facility beaches before a permit to mine can be issued.*

In addition to waste characterization, Minnesota rules require maps of bedrock geology in areas both directly and indirectly affected by mining, and bedrock geology, including cross sections that show horizontal and vertical relationships and identification and description of

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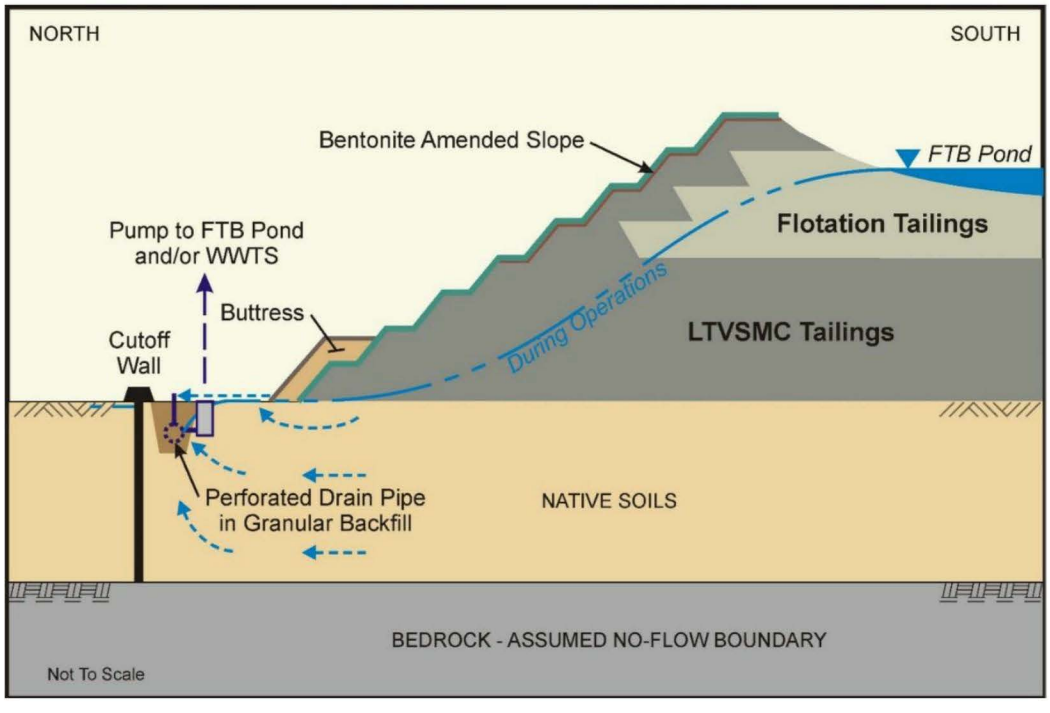
[364] PolyMet Mercury Mass Balance, *supra*, Exhibit 16.
[365] PolyMet Water Mgt. Plan, *supra*, Large Tables 1-6, Appx. 11.2 of the PolyMet PTM Application; PolyMet Water Mgt. Plan – Plant, *supra,* Large Tables 3-15, Appx. 11.3 to PolyMet PTM Application; PolyMet Adaptive Water Mgt. Plan, *supra*, Large Tables 1-4 and p. 10, Table 2-1, Appx. 11.4 of the PolyMet PTM Application.
[366] MPCA, Draft Impaired Waters List 2018, excerpt with St. Louis River, Lake Superior Basin 2018 Mercury Impaired Waters attached as Exhibit 47, full listing at https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list
[367] MPCA, St, Louis River Watershed Stressor Identification Report, Dec. 2016, pp. 22,33, available at https://www.pca.state.mn.us/sites/default/files/wq-ws5-04010201a.pdf .
[368] PolyMet PTM, Figure 11-5, Project Water Balance in Mine Year 10, *supra*, Exhibit 27.

hydrogeologic information.[369] For the PolyMet project, bedrock geology and hydrogeology is critical to ascertain bedrock conditions beneath unlined, permanent tailings and mine waste storage facilities and whether faults and fractures will increase the propagation of pollutants through groundwater, either from waste storage or from the mine pits themselves.

Despite numerous expert opinions throughout the environmental review process that information on bedrock hydrogeology at the tailings waste facility site and beneath the proposed Category 1 waste rock pile was needed to understand seepage,[370] PolyMet has steadfastly refused to provide this information. For bedrock beneath the tailings, in order to model the efficacy of its seepage collection system, PolyMet simply assumes without evidence of geology or hydrogeology that the bedrock is a "no flow" boundary.[371]



A similar illustration is provided to suggest that the seepage collection system beneath the Category 1 waste rock pile would capture all or nearly all of the groundwater seepage beneath the Category 1 unlined waste rockpile.[372]

PolyMet, in fact, goes to some trouble to prevent disclosure of faults and fractures in bedrock in its PTM Application. The map of Bedrock Geology in PolyMet's PTM Application actually removes and edits out evidence of faults and fractures beneath the mine site and plant site illustrated by its own engineering consultants, Barr Engineering.

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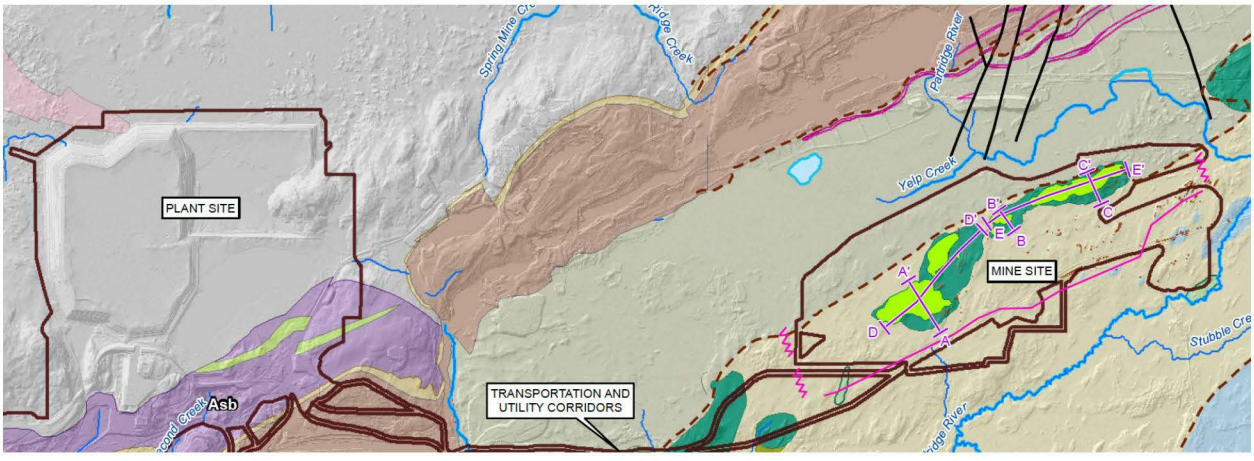
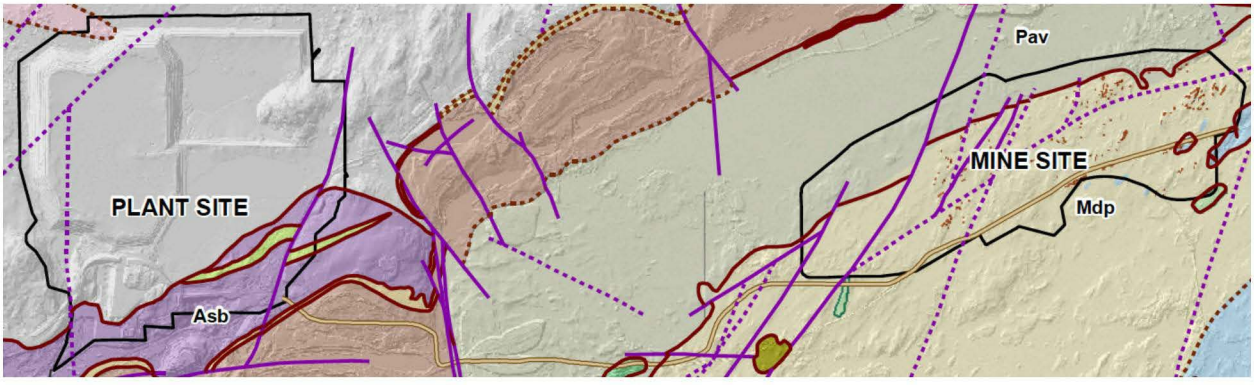
[369] Minn. R. 6132.1100, subp. 5, item B (1) and (4).
[370] *See e.g.* Lehr 2014, Runkel 2104, Lee Tailings 2015, and Lee Category 1 2015, *supra*, attached as Exhibits 19, 20, 21 and 26.
[371] PolyMet PTM Application, Figure 10-6 autop. 349.
[372] *Id.*, p. 370, Figure 10-27, autop. 370.

The map in PolyMet's PTM Application is provided below:[373]



The unexpurgated map, prepared by Barr in 2014, shows multiple faults and fractures through PolyMet's proposed mine pits and beneath its proposed tailings waste site, hydrometallurgical waste facility and Category 1 waste rock pile.[374]



The DNR should require PolyMet to revise its application to provide maps of bedrock geology showing faults, fractures and horizontal and vertical relationships along with description of hydrogeologic information, sufficient to evaluate propagation of constituents through groundwater at the mine site and plant site before a permit to mine can be issued.

DNR draft Conditions are commendable in that they flag many areas of concern. However, they both defer PolyMet's need to demonstrate the safety or efficacy of its plan until after a permit to mine is issued and fail to specify and standards for performance. These concerns have already discussed several critical areas where DNR's draft Conditions for the PolyMet Permit to Mine fail to set enforceable requirements and defer designs and approvals until after a permit to mine would be issued:

DNR draft Conditions defer PolyMet's demonstration that the tailings dam buttress will

[373] *Id.*, Figure 5-1, autop. 152.
[374] Barr, Hydrogeology of Fractured Bedrock in the Vicinity of the NorthMet Project, Dec. 2014, Large Figures 1-2, attached as Exhibit 48.

meet applicable safety standards until sometime within 30 days after permit issuance.[375]

DNR draft Conditions defer PolyMet's obligation to submit final designs for the cut-off wall for the tailings basin containment system until after permit issuance. They contain no specifications for performance.[376]

DNR draft Conditions defer PolyMet's obligation to design and analyze both the Category 1 waste rock seepage containment system and its cover until after permit issuance, no later than 30 days prior to construction.[377]

DNR draft Conditions defer PolyMet's development of a plan for investigation, design, and pilot testing of non-mechanical water treatment systems for both the plant site and the mine site after permit issuance but prior to Mine Year 1.[378]

DNR draft Conditions defer PolyMet's obligation to prepare a work plan to evaluate the tailings facility bentonite pond bottom until no more than 90 days following permit issuance. The results of this evaluation need not be provided until just prior to tailings deposition.[379]

The DNR's draft Conditions also fail to require verification that Category 1 waste rock can be stored in a permanent, unlined waste rockpile without generating acid drainage. The PolyMet PTM Application assumes that Category 1 waste rock has a sulfur content less than or equal to 0.12 percent, with little potential for acid drainage or metals leaching.[380] Throughout environmental review, experts have questioned whether the "block model" proposed by PolyMet would be effective to prevent inclusions of rock with much higher sulfur and potential for acidic and toxic leachate than PolyMet has modeled.[381] The DNR proposes in its draft Conditions that PolyMet begin modeling and data verification work "no later than 60 days following permit assurance," including verification of the block model for "assessing concentrations in waste rock and water quality models."[382] *The DNR should require PolyMet to demonstrate that its waste rock sorting methods are effective and that Category 1 seepage will be sufficiently benign to allow an unlined, permanent storage pile prior to issuance of a permit to mine.*

DNR draft Conditions require a "more detailed and revised adaptive water management review process plan" to explain the process that would be implemented "if water quality objectives are not met."[383] However, that plan is not required until within 90 days after permit issuance.[384]

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[375] DNR draft Conditions, p. 4 ¶26. The DNR's Draft Dam Safety Permit for the HRF similarly fails to require PolyMet to establish that any its proposals will provide a stable foundation for this facility. *See* WaterLegacy Dam Permit Comments, *supra*, Exhibit 10, pp. 23-24.
[376] *Id.*, p. 7 ¶55.
[377] *Id.*, p. 7 ¶54.
[378] *Id.*, p. 8 ¶64.
[379] *Id.*, p. 11 ¶88, ¶89.
[380] PolyMet PTM Application, pp. 255-256.
[381] B. Johnson, A Review of the PolyMet NorthMet Supplementary Draft Environmental Impact Statement and Selected Supporting Documents Related to the Predictions of Solute Levels in Discharge, Mar. 2014, Exhibit 49, pp. 2-9,
[382] DNR draft Conditions, p. 4 ¶32, ¶33.
[383] *Id.*, p.10, ¶80.
[384] *Id.*

DNR draft Conditions also defer until two years before backfilling the East Pit verification of PolyMet's modeling and determination of whether alternate closure plans are required for the East Pit, due to the potential for acid generation and metals leachate from exposed rock.[385] PolyMet would receive a permit without standards for East Pit contamination levels or proof that they would be attainable. *The DNR should set clear standards for East Pit closure and water quality and require PolyMet to demonstrate that they are attainable prior to permit issuance*.

The DNR states that PolyMet "must develop performance monitoring for stockpile sumps and mine pit sumps,"[386] "must report to the DNR" if dusty conditions persist and submit revised dust control plans,[387] must provide a pipeline "monitoring plan and spill response procedure,"[388] and may be required to provide a "spilled ore prevention plan" if rail car spillage is evident and surface water quality affected.[389] *DNR conditions should require each of these plans prior to permit issuance and specify standards for sump performance, and what enforceable limits should apply to constrain dust, pipeline spills and ore spillage*.

A particularly troubling failure of the DNR draft Conditions relates to the threat of mine site pollution migrating northward through groundwater. During the environmental review process, experts challenged PolyMet's assertion that there would be no direct, indirect of cumulative effects on surface water or groundwater in Boundary Waters (Rainy River) watersheds.[390] They explained that, in the future, after the Northshore Peter Mitchell Pit closed, simple gravity would result in northward groundwater flow to the Boundary Waters watershed.[391]

The DNR admitted during the environmental review process that "the well data and the NorthMet Mine Site MODFLOW model do not exclude the possibility of a future northward bedrock flowpath from the proposed NorthMet pits to the Northshore pits."[392] The DNR and other co-lead agencies listed several contingency mitigation methods that might, hypothetically, address northward flow.[393] In determining that the PolyMet FEIS was adequate, the DNR confirmed that "a northward groundwater flowpath is possible."[394] To approve the FEIS despite this potential, the DNR emphasized, "It is possible to detect and prevent a northward flowpath before any impacts occur."[395]

In its comments on the PolyMet FEIS, the EPA agreed with experts that "a northward flow path is a possibility." The EPA stated that "further impact assessment is needed *during the permitting*

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[385] *Id.*, p. 10 ¶82.
[386] *Id.*, p. 6 ¶51.
[387] *Id.*, p. 8 ¶63.
[388] *Id.*, p. 11 ¶85.
[389] *Id.*, p. 7 ¶ 58.
[390] *See* GLIFWC email to MDNR et al. Bedrock-Wetland Connections at PolyMet Mine Site, July 29, 2015, Exhibit 50; GLIFWC letter to Co-Lead Agencies Northward Flowpath & Modeling, Aug. 11, 2015, Exhibit 51, p. 5; GLIFWC letter to Co-Lead Agencies Discharge from PolyMet East Pit at Closure, Oct. 20, 2015, Exhibit 52.
[391] *Id. See also* Northshore Mining Company Environmental Assessment Worksheet, 2014, Exhibit 53.
[392] DNR et al., Technical Memorandum, NorthMet EIS Co-lead Agencies' Consideration of Possible Mine Site Bedrock Northward Flowpath, Oct. 12, 2015, Exhibit 54, pp. 1-2.
[393] *Id.*, pp. 8-12.
[394] DNR FEIS ROD, *supra*, p. 78.
[395] *Id., see also* p. 47.

process, including information on water quality and quantity impacts that may occur as a result of a northward flow path and/or contingency mitigation measures."[396] The EPA recommended:

> Recommendation I: Given the possibility of a northward flow path, analyses of environmental impacts associated with this possibility should be conducted and evaluated *during the permitting process*. These analyses should include anticipated direct and indirect environmental impacts that may occur if one or more of the proposed contingency mitigation measures are implemented.[397]

Rather than resolve this controversial issue and require specific measures to prevent northward flow as part of the permitting process, the DNR allows PolyMet to kick the can down the road just far enough to avoid scrutiny and reduce its own leverage to deny or condition the PolyMet permit to mine:

> ¶66. Prior to blasting within any mine pit footprint, the Permittee must submit a report and supporting data assessing the potential for current and future northward groundwater flow at the Mine Site. If the DNR concludes that this report, or other monitoring data, indicates a reasonable likelihood of northward groundwater flow at the Mine Site, then the DNR will require adaptive management or mitigation.
> ¶67. Any required management or mitigation must be approved by the DNR.[398]

WaterLegacy believes the DNR draft Conditions are vague, unenforceable, and further serve to insulate PolyMet from demonstrating that its proposed mine project will use modern technologies and methods and meet legal requirements.

SUMMARY OF OBJECTIONS & ANALYSIS OF CONDITIONS

Fundamentally, the draft Permit to Mine for the PolyMet NorthMet copper-nickel mine fails to protect natural resources, particularly groundwater and surface water, and the communities - including aquatic life, wildlife and human beings - who rely upon these freshwater resources. Approval of this draft permit would pose a huge risk of creating a Superfund legacy of destruction and contamination in the headwaters of the St. Louis River, the largest United States tributary to Lake Superior. On the arguments and evidence provided in these Objections, the attached Exhibits and the record as a whole, WaterLegacy requests that the DNR commissioner exercise his authority to deny the PolyMet draft Permit to Mine.[399]

PolyMet has pursued its goal of constructing a copper-nickel mine in the Lake Superior Basin for at least thirteen years. PolyMet's investment has created political pressure and a slow war of attrition. Although the length of PolyMet's narratives and reports has increased over the past decade, the quality of the mine project has not. In fact, since the FEIS process, PolyMet has taken steps backward: omitting mine site treatment, reducing dam stability, and lobbying to roll

[396] EPA, Letter and Detailed Comments on the NorthMet Mine Final Environmental Impact Statement, Dec. 21, 2015, Exhibit 55, p. 4 of Detailed Comments (emphasis added).
[397] *Id.*, (emphasis added).
[398] DNR draft Conditions, p. 8.
[399] Minn. Stat. §93.481, subd. 2.

back Minnesota statutes and rules that protect natural resources. Overall, PolyMet has proposed a project with marginal economics that uses outmoded waste storage technology and makes unsupported claims that the cheapest waste containment and treatment methods will produce unheard of and extraordinary results.

The Minnesota Department of Natural Resources has a noble mission, which includes providing for the "commercial used of natural resources in a way that creates a sustainable quality of life" and providing economic opportunities "in a manner consistent with sound natural resource conservation and management principles."[400] The commissioner has stated that his statutory authority would not include blanket denial of the potential for copper-nickel mining throughout the Lake Superior Basin. However, the DNR's authority explicitly includes the authority to deny a specific permit and to impose modifications or conditions, without which a permit will not be granted.[401] Such modifications or conditions for the PolyMet project could require the following:

- *Storage of tailings in a dry stack facility on a double liner system and a stable foundation located on one or more brownfield sites, specifying requirements for long-term seepage monitoring and maintenance.*

- *Hydrometallurgical waste disposal off site in a professionally operated waste disposal facility for concentrated industrial waste or hazardous waste.*

- *Treatment of process water at the beneficiation plant for reuse with no release of untreated process water to unlined ponds or unlined storage facilities.*

- *Capture and treatment of leakage from the dry stack tailings liner system at a plant site reverse osmosis or equivalent active wastewater treatment plant (WWTP) in perpetuity or until testing demonstrates, based on actual seepage that alternative treatment of captured seepage will comply with all Minnesota water quality standards.*[402]

- *Storage of Category 1 waste rock on a double liner capturing all seepage for treatment with reverse osmosis or equivalent active water treatment or in-pit subaqueous disposal with active water treatment of pit water quality as described below.*

- *Storage of peat and overburden in a lined facility with a stable foundation, which collects seepage for treatment before any discharge or release to surface water or groundwater.*

- *Designing all waste storage and wastewater storage facilities, sumps and ponds at the mine site and plant site to avoid flooding or malfunction during a maximum precipitation event calculated based on current precipitation and scientific estimates of climate change effects.*

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[400] DNR, Our Mission, http://www.dnr.state.mn.us/aboutdnr/mission.html
[401] Minn. Stat. §93.481, subd.2.
[402] For purposes of this section "comply" or "compliance with all Minnesota water quality standards" means compliance with existing numeric criteria, narrative standards and non-degradation without variances or exemptions. Compliance further means that direct discharge to surface water will comply with surface water quality standards, and that discharge to groundwater will comply with groundwater standards and with surface water quality standards where hydrologically connected groundwater daylights to surface water.

- *Construction and operation of a mine site wastewater treatment (WWTF) to treat all mine process water to specified levels before piping to the plant and to provide contingency mitigation at the mine site.*

- *Upgrade of the mine site WWTF to reverse osmosis or equivalent active water treatment to treat overflow of the West Pit prior to discharge so that it complies with all Minnesota water quality standards.*

- *Upgrade of the mine site WWTF to reverse osmosis or equivalent active water treatment whenever required as a contingency measure to mitigate impacts on wetlands from dewatering or to reduce mine pit contamination levels based on specified limits for wetlands impacts and prescribed mine pit parameter concentrations.*

- *Operation of the mine site WWTF reverse osmosis or equivalent technology to treat captured seepage and pit water in perpetuity or until it is demonstrated both that captured seepage from any remaining Category 1 waste rockpile and West Pit discharge can be otherwise treated to comply with all Minnesota water quality standards and that mine pit water quality meets parameter concentration limits set to ensure that mine pit seepage through groundwater complies with all Minnesota water quality standards.*

- *Agreement by the permittee not to seek variances or site-specific exemptions from water quality standards, not to seek changes to weaken existing water quality standards, and to be bound by existing water quality standards through operations, closure, and postclosure of the project.*

- *Specification of performance standards for mine site and tailings operations, such as dam safety factors, seepage capture, dust abatement, sumps, pipelines, dewatering systems and treatment facilities, the violation of which will be considered a breach of the permit to mine.*

- *Specification of timing and performance requirements for closure and postclosure, including a prohibition of polluted groundwater seepage northward to Boundary Waters watersheds.*

- *Environmental liability insurance provided prior to the permit to mine to ensure that there is adequate compensation for all harms to any persons resulting from dam failure, seepage, spillage and other pollution impacts.*

- *Financial assurance provided prior to the permit to mine to fund remediation of legacy pollution in compliance with all Minnesota water quality standards and to fund the Contingency Reclamation Estimate for the first year of mining operations based on active mechanical water quality treatment.*

- *Provision that any disputes with the permittee regarding future adjustments to financial assurance or environmental liability insurance will be resolved through arbitration or a contested case process.*

- *Provision that any requests for amendment to permit to mine shall be publicly noticed and the permittee will not object if members of the public request a comment period to review proposed changes.*

The DNR commissioner now has an opportunity to reconsider the PolyMet draft Permit to Mine in light of the Department's mission and the long-term public interest of Minnesotans in a sustainable economy and the protection of natural resources. Minnesota citizens count on the DNR to take advantage of this opportunity.

Timing and Preservation of Issues

In addition to the concerns raised in our Objections above, WaterLegacy believes that consideration of the PolyMet draft Permit to Mine is premature. Critical issues pertaining to dam safety and water appropriations have not been resolved, and may not be susceptible of resolution without substantial changes to the PolyMet project.[403] Various aspects of the PolyMet draft Permit to Mine will remain "conceptual" until conditions and/or performance standards are set by dam safety and water appropriations permits.[404]

Consideration of the PolyMet Permit to Mine is also premature since PolyMet has yet to satisfy one of the most basic requirements for a permit to mine application, the demonstration of "surface and mineral rights ownership within the mining area."[405] PolyMet suggests that its "ownership *or substantial control*" will be demonstrated before the DNR makes a final decision on whether to issue the Permit to Mine.[406] However, there is nothing in statute or rule authorizing issuance of a permit to construct or operate a mine based on an applicant's "substantial control" of surface rights to the property. Such a permit would place the interests of the current surface owners at risk and create potential legal conflicts.

In addition, Minnesota law is designed so that wetlands issues will be resolved "under a mining reclamation plan approved by the commissioner under the permit to mine."[407] The DNR's proposal that the permittee's wetland replacement plan, if subsequently approved, can be "deemed" part of the mining and reclamation plan[408] is inconsistent with statutory intent.

PolyMet has submitted its wetland permit application to the U.S. Army Corps of Engineers ("USACE") to fulfill the requirements of Sections 401 and 404 of the Clean Water Act.[409] Determinations on wetlands mitigation for the PolyMet project are primarily within the jurisdiction of the USACE. Preference for wetlands bank selection has followed the sequencing for compensation required by the USACE,[410] and compensatory wetland mitigation will be based on the USACE St. Paul District Policy for wetland mitigation.[411] PolyMet is still working with

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[403] *See* WaterLegacy Water Appropriations Permit Comments, *supra*, Exhibit 4; WaterLegacy Dam Permit Comments, *supra*, Exhibit 10.
[404] *See e.g.*, PolyMet PTM Application, pp. 270, 339.
[405] Minn. R. 6132.1100, subp. 5, item B (13).
[406] PolyMet PTM Application, pp. 1, 2, 64 (emphasis added).
[407] Minn. Stat. §103G.222, subd. 1(a); Minn. Stat. §93.47, subd. 4.
[408] DNR draft Conditions, p. 1 ¶8.
[409] PolyMet NorthMet Wetlands Mitigation Plan, Dec. 2017, pp. 8, 39, Appx. 18.1 of the PolyMet PTM Application.
[410] *Id.*, pp. 6, 28.
[411] *Id.*, p. 73.

the USACE St. Paul District to determine how many wetland bank credits are needed to satisfy federal requirements.[412]

WaterLegacy believes that a final decision on the PolyMet Permit to Mine is premature until the USACE has completed its evaluation of wetlands mitigation issues under the Clean Water Act. Although the PolyMet NorthMet Wetlands Mitigation Plan is flawed, we believe that the governing law for wetlands and streams that are waters of the United States is provided by the federal Clean Water Act and its implementing regulations. The proper place to address concerns about wetlands issues is in administrative proceedings at the USACE or in judicial review of those proceedings in federal court.

Irrespective of the timing of the DNR's consideration of the PolyMet Permit to Mine, WaterLegacy expressly reserves our rights, on behalf of our organization and our members, to challenge any and all issues under Section 404 and Section 401 of the federal Clean Water Act, along with all other issues pertaining to the National Environmental Policy Act or other federal laws, in federal administrative proceedings and, if necessary, through judicial review of the federal Record of Decision from those proceedings in a federal court where the U.S. Army Corps of Engineers is a party to the proceedings.

PETITION FOR CONTESTED CASE HEARING

Petitioner, WaterLegacy, submits this Petition for Contested Case Hearing to the Minnesota Department of Natural Resources (DNR) pursuant to Minnesota Statutes Section 93.483, Minnesota Statutes 14.57(a), and Minnesota Rules 6132.4000, subpart 2 and 6132.5000.

Petitioner also requests that the Commissioner exercise discretion allowed by Minnesota Statutes Section 93.483, subdivision 3(a), to determine on his own motion that there are material issues of fact in dispute and that a contested case hearing before an impartial administrative law judge would aid the commissioner in making a final determination on PolyMet's completed application for a permit to mine.

Statement of Interest in the Proposed Mining Operation and Permit[413]

WaterLegacy's is a 501(c)(3) non-profit organization founded in 2009 to protect Minnesota water resources from the pollution and destruction threatened by copper-nickel sulfide ore mining proposed for northeastern Minnesota. We have focused much of our work on protecting the Lake Superior Basin from threats to groundwater, surface water, and other natural resources posed by the proposed PolyMet project. Our mission is to protect Minnesota's fresh waters and natural resources and the communities that rely on them. We work in collaboration with allies to address the environmental and human health impacts of proposed sulfide mining, to strengthen enforcement of regulations that protect water quality, and to increase public understanding and involvement in decision-making that affects the quality of Minnesota waters, particularly in the Lake Superior and Rainy River Basins of northern Minnesota.

[412] PolyMet PTM Application, p. 391.
[413] Minn. Stat. §93.483, subd. 1; Minn. R. 6132.4000, subp. 2, item B(1) and item C(1).

Among WaterLegacy's thousands of members and supporters, we represent many Minnesotans who own property that would be adversely affected by the proposed PolyMet project as a result of contaminated seepage of pollutants from the mine site and tailings site, dam failure and liner failure at the hydrometallurgical residue facility, and dam failure and catastrophic releases to downstream waters from the tailings waste storage facility. The declarations of three members of WaterLegacy who own property that would be adversely affected by the proposed PolyMet project are attached with this Petition.[414]

Statement of Reasons for Contested Case Hearing[415]

The bases underlying the disputed material issues of fact in this Petition for Contested Case Hearing are provided in WaterLegacy's preceding Objections to the PolyMet draft Permit to Mine, the Exhibits attached with these Objections, and the files and records of these proceedings, including but not limited to those cited in WaterLegacy's Objections and Exhibits. These documents, citations and arguments demonstrate that there is a reasonable basis underlying several disputed material issues of fact within the jurisdiction of the DNR commissioner so that a contested case hearing would allow the introduction and consideration of information that would aid in the final decision on PolyMet's Application for a Permit to Mine.

WaterLegacy requests a contested case hearing on the following specific material issues of fact within the authority of the commissioner:

1. As detailed in Section 2 of the preceding Objections, Petitioner disputes that the siting, technology, design and methods of operation for the tailings waste storage facility proposed in the PolyMet draft Permit to Mine comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

2. As detailed in Section 3 of the preceding Objections, Petitioner disputes that the siting, preparation of foundation, method of operation and long-term maintenance for the hydrometallurgical residue facility proposed in the PolyMet draft Permit to Mine comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

3. As detailed in Section 4 of the preceding Objections, Petitioner disputes that the waste storage and seepage containment technologies and methods for the tailings storage facility and Category 1 waste rockpile proposed in the PolyMet draft Permit to Mine comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

4. As detailed in Section 5 of the preceding Objections, Petitioner disputes that the reclamation, closure and postclosure maintenance of the tailings storage facility proposed in the PolyMet draft Permit to Mine comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

[414] Minn. Stat. §93.483, subd. 1.
[415] Minn. Stat. §93.483, subd. 2 (a)(1) and subd. 3 (a)(1)-(3); Minn. R. 6132.4000, subp. 2, item B(3) and item C(3).

5. As detailed in Section 6 of the preceding Objections, Petitioner disputes that the elimination of the mine site Wastewater Treatment Facility and plans for adoption of mine site non-mechanical treatment proposed in the PolyMet draft Permit to Mine comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

6. As detailed in Section 7 of the preceding Objections, Petitioner disputes that the storage of process wastewater at the mine site proposed in the PolyMet draft Permit to Mine complies with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

7. As detailed in Section 8 of the preceding Objections, Petitioner disputes that the environmental liability insurance proposed in the PolyMet draft Permit to Mine complies with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.

8. As detailed in Section 10 of the preceding Objections, Petitioner disputes that the PolyMet draft Permit to Mine contains information and specificity required to comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules and to be enforceable rather than void for vagueness.

Petitioner's objections to the requirements for financial assurance proposed in the PolyMet draft Permit to Mine in Section 10 are made as a matter of law. Petitioner's objection that a decision on the PolyMet draft Permit to Mine is premature is also made as a matter of law. However, WaterLegacy expressly reserves the right to participate in contested case hearings on these and any other matters raised by other parties as matters of disputed material issues of fact.

Request for Contested Case on Commissioner's Motion[416]
In addition to the Petition for Contested Case Hearing on the basis of disputed material facts raised by Petitioner, WaterLegacy also requests that the DNR commissioner, as a matter of discretion and on his own motion, order a contested case on the PolyMet draft Permit to Mine.

Specific Relief Requested[417]
The specific relief requested by WaterLegacy is that the DNR commissioner deny PolyMet's draft Permit to Mine.

Proposed Witnesses and Summary of Evidence[418]
Petitioner's evidence may include oral or written testimony by any persons commenting or providing expert opinions in the course of environmental review of the PolyMet project or in response to the public release of draft Water Appropriations permits and draft Dam Safety permits for the PolyMet project as well as the draft Permit to Mine. Petitioner may also pose

[416] Minn. Stat. §93.483, subd. 1.
[417] Minn. Stat. §93.483, subd. 2 (a)(2); Minn. R. 6132.4000, subp. 2, item B(2).
[418] Minn. Stat. §93.483, subd. 2 (b).

questions to regulatory staff, representatives of the permit applicant and experts to clarify unresolved questions in the record as to the nature of PolyMet plans, proposals, and risks.

Petitioner's documentary evidence may include any documents submitted by any parties in the course of PolyMet environmental review or in the course of responding to PolyMet draft Water Appropriations permits, draft Dam Safety permits, or the PolyMet draft permit to Mine. Petitioner's documentary evidence may also include additional publications, references, expert reports, agency documents and records, or other documentary evidence pertinent to the issues raised in this Petition or in response to issues or matters that would potentially be raised by other parties. Petitioner is unable to determine at this point the length of time required to present these matters at a contested case hearing.

Petitioner expressly reserves the right not to be bound or limited to the witnesses, materials, or estimated time identified in this Petition if the requested contested case hearing is granted by the commissioner.[419]

CONCLUSION

On the basis of the Objections, Exhibits, Petition for Contested Case Hearing and declarations submitted herein, and on the records of environmental review of the PolyMet project and records pertaining to the draft Permit to Mine and pertaining to the Dam Safety and Water Appropriations draft permits released by the DNR for public review and the authorities and references contained in these documents, WaterLegacy requests that the DNR commissioner deny the PolyMet draft Permit to Mine and order a contested case hearing on the issues identified in WaterLegacy's Petition for Contested Case Hearing.

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Respectfully submitted,

JUST CHANGE LAW OFFICES
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[419] Minn. Stat. §93.483, subd. 2(c).