

**NORTHMET PROJECT –
PERMIT TO MINE**

**FINDINGS OF FACT, CONCLUSIONS,
AND ORDER OF COMMISSIONER**

November 1, 2018

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LIST OF ACRONYMS AND ABBREVIATIONS

ALJ	Administrative Law Judge
BIF	Biwabik Iron Formation
BWCA	Boundary Waters Canoe Area Wilderness
CBD	Center for Biological Diversity
CDSM	Cement Deep Soil Mixing
CWA	Clean Water Act
DEIS	Draft Environmental Impact Statement
DNR	Commissioner of the Minnesota Department of Natural Resources
EAW	Scoping Environmental Assessment Worksheet finalized on March 30, 2005
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EQB	Environmental Quality Board
FBWW	Friends of the Boundary Waters Wilderness
FEIS	Final Environmental Impact Statement
FTB	Flotation Tailings Basin
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
HRF	Hydrometallurgical Residue Facility
ILOC	Irrevocable Letter of Credit
MCEA	Minnesota Center for Environmental Advocacy
MERA	Minnesota Environmental Rights Act
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
NSPS	New Sources Pollution Standards
OSLA	Overburden Storage and Laydown Area
PD	Project Description
ROD	Record of Decision
SDEIS	Supplemental Draft Environmental Impact Statement
SDS	State Disposal System
SEIS	Supplemental Environmental Impact Statement
SONAR	State of Need and Reasonableness
SWPPP	Stormwater Pollution Prevention Plan
USACE	United States Army Corps of Engineers
USFS	United States Forest Service
WWTF	Waste Water Treatment Facility
WWTP	Waste Water Treatment Plant
WWTS	Waste Water Treatment System

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

**In the Matter of the NorthMet Project
Permit to Mine Application Dated
December 2017**

FINDINGS OF FACT, CONCLUSIONS, AND ORDER OF COMMISSIONER

After review and due investigation and consideration, and based on the information and statements contained in the permit applications submitted by Poly Met Mining, Inc. and PolyMet Mining Corp., the description of work proposed to be undertaken, and supplemental information in the administrative record or otherwise available to the Minnesota Department of Natural Resources (“DNR”), the Commissioner of the DNR now makes the following:

FINDINGS OF FACT

I. EXECUTIVE SUMMARY OF THE NORTHMET PROJECT

1. “It is the policy of the state to provide for the diversification of the state’s mineral economy through long-term support of mineral exploration, evaluation, environmental research, development, production, and commercialization.” Minn. Stat. § 93.001; *cf.* Minn. Stat. § 93.43(a) (“The business of mining, producing, or beneficiating nonferrous metallic minerals is declared to be in the public interest and necessary to the public welfare, and the use of property therefor is declared to be a public use and purpose.”). To effectuate this policy, the DNR has been granted the authority to issue nonferrous permits to mine.

2. Poly Met Mining, Inc., a Minnesota corporation, and PolyMet Mining Corp., a British Columbia corporation (together, “PolyMet”) propose to develop the NorthMet copper-nickel-platinum group elements mine and associated processing facilities (“NorthMet Project”). Construction would last for approximately 18 to 24 months and would include land clearing, tailings basin improvements, building renovation and construction, stockpile preparation, and utility upgrades. Mining would involve open-pit surface methods for approximately 20 years, resulting in an average annual production of approximately 32,000 tons per day of ore and 42,000 tons per day of waste rock.

3. Mining of ore is proposed at a previously undisturbed site. Processing of ore is proposed at a previously developed taconite processing site, which will be refurbished for purposes of the NorthMet Project. Ore will be transported by an upgraded existing railway to a refurbished taconite facility for processing. Tailings and hydrometallurgical residues will be deposited in an upgraded existing tailings basin and new hydrometallurgical residue facility, respectively.

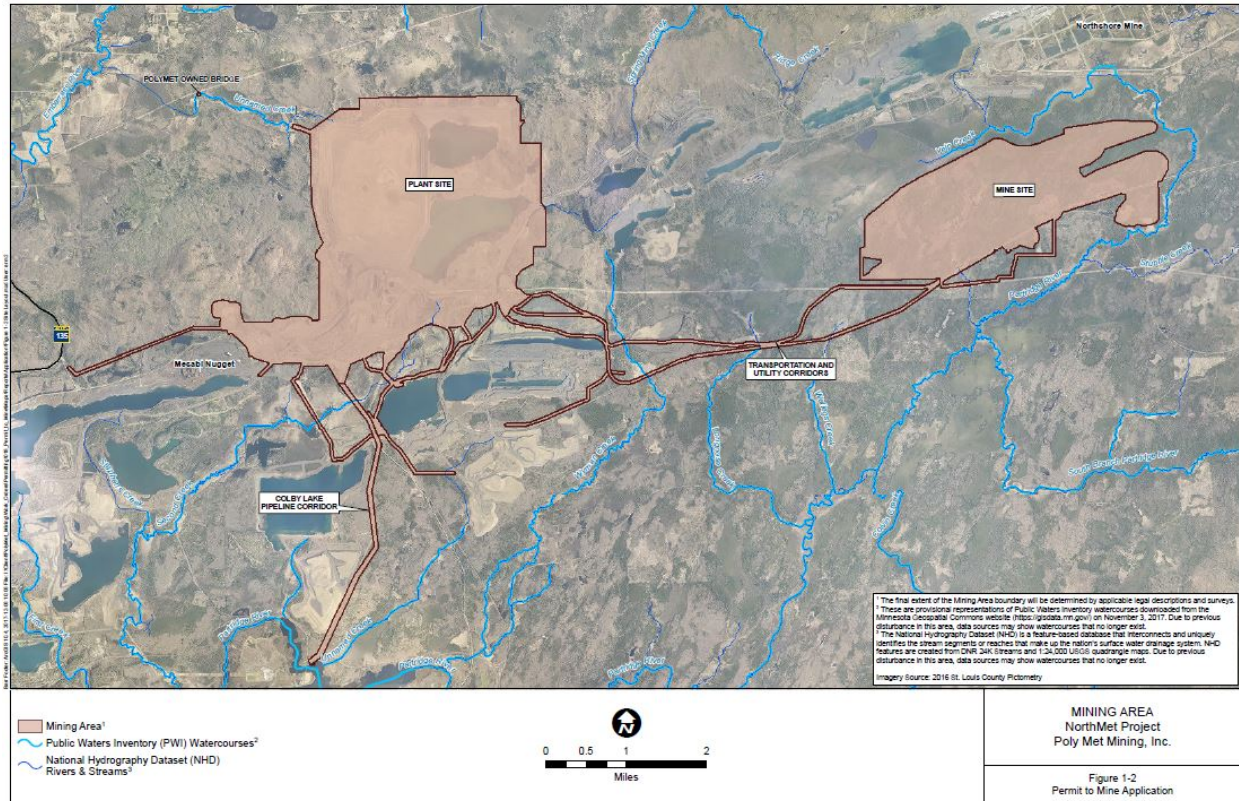
4. Final land reclamation, closure, and post-closure maintenance will occur after mining and will include infrastructure removal, site grading, revegetation, long-term water treatment, maintenance, and monitoring. At the proposed NorthMet Project open-pit mining area (“Mine Site”), one of the two pits will be backfilled with waste rock. One of the three waste rock stockpiles will remain on the surface, with a cover placed on the top to reduce the amount

of water percolating through the pile. The second pit will fill with water to become an open water pit lake. Water will be collected from mine features and sent for treatment at the former LTV Steel Mining Company's processing plant near Hoyt Lakes ("Plant Site") until the water can be released directly to the environment without treatment. At the Plant Site, the buildings will be removed and the land vegetated. The Flotation Tailings Basin ("FTB") will be closed with a water cover system with a pond bottom bentonite amendment to reduce the potential for water to percolate through the tailings and to reduce the exposure of the tailings to oxygen. The Hydrometallurgical Residue Facility ("HRF") would also remain with a geomembrane cover protecting the processing wastes from leaching due to percolating precipitation. Financial assurance must be provided as part of a Permit to Mine and maintained for as long as any reclamation, maintenance, or treatment is required in any portion of the mining area.

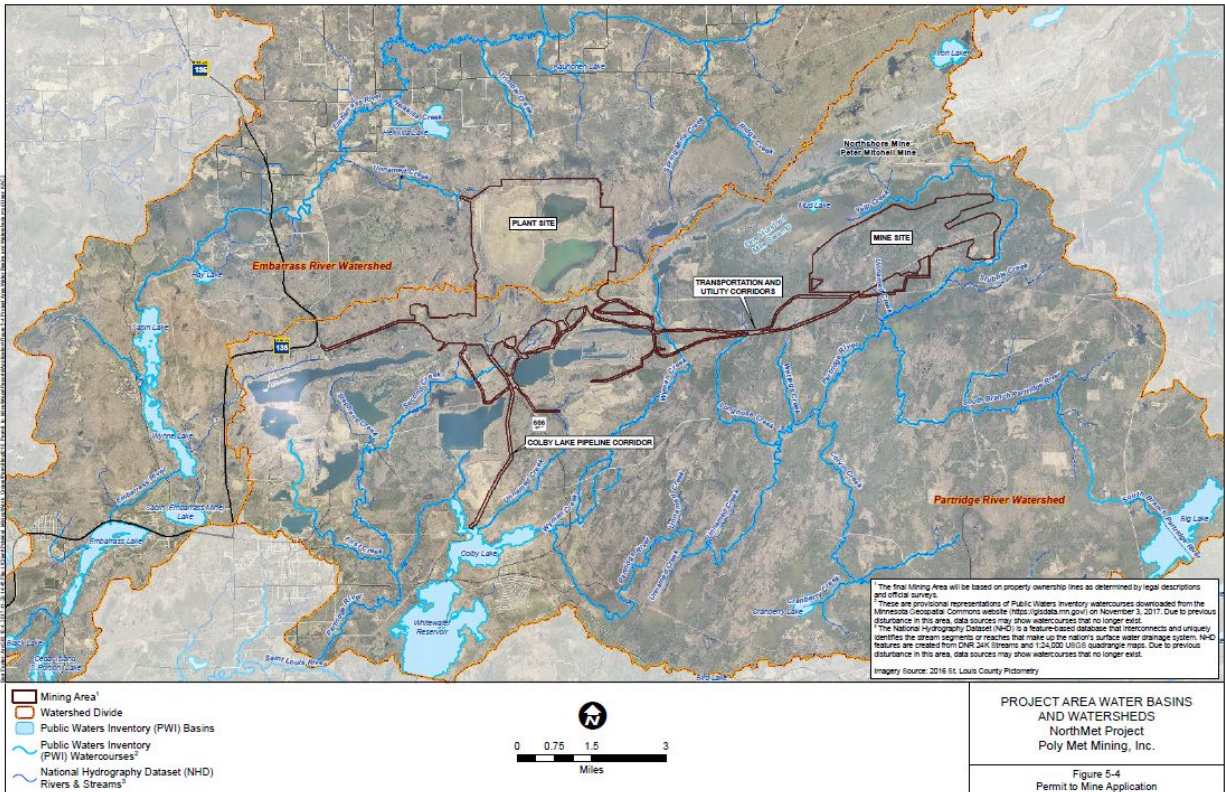
5. As detailed below, the DNR has reviewed the record and concludes that PolyMet has met its burden of proof and is entitled to issuance of a Permit to Mine, subject to the terms and conditions therein.

II. ENVIRONMENTAL SETTING OF THE MINE AND PLANT SITES

6. As shown below, the Mine Site is located approximately six miles south of Babbitt and two miles south of a currently operating open-pit taconite mine ("Peter Mitchell Mine"). FEIS ES-12. Ore processing will not occur at the Mine Site, but, rather, will take place at the Plant Site, approximately 8 miles from the Mine Site. *Id.* The Mine Site and the Plant Site are connected by a Transportation and Utility Corridor ("Corridor"), which includes pipeline transporting water between the Plant and Mine Site. *Id.* In addition, PolyMet proposes to appropriate make-up water for processing at the Plant Site with water from Colby Lake. The Colby Lake Pipeline Corridor will be part of PolyMet's mining area. FEIS § 3.2.2.1.1.



7. Both the Plant Site and Mine Site are located in the St. Louis River Watershed, within the Lake Superior Basin. FEIS § 1.1.1. Surface water and surficial groundwater at the Mine Site flow to the Partridge River, while most flows at the Plant Site drain to the Embarrass River, with the exception of Second Creek which is part of the Partridge River watershed. FEIS ES-35. The relevant watershed boundaries are illustrated in Figure 5-4 of the Permit to Mine, which is reproduced below. FEIS § 4.2.1.4.1.



III. ENVIRONMENTAL REVIEW OF THE PROPOSED NORTHMET PROJECT AND OTHER PERMITS ASSOCIATED WITH THE NORTHMET PROJECT

A. History of Environmental Review Process

8. Joint federal-state environmental review of the proposed NorthMet Project began in 2004. From the outset of environmental review, the DNR and the United States Army Corps of Engineers (“USACE”) were co-lead agencies in preparing the Environmental Impact Statement (“EIS”) for the proposed NorthMet Project. FEIS ES-3. The United States Forest Service (“USFS”) initially participated in the environmental review process as a cooperating agency. The Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, and Grand Portage Band of Lake Superior Chippewa participated in the environmental review process as cooperating agencies because the location of the proposed NorthMet Project is within the 1854 Treaty Ceded Territory, an area in which these tribal nations retain certain hunting, fishing, and gathering rights. FEIS ES-40. The Great Lakes Indian Fish & Wildlife Commission (“GLIFWC”) and the 1854 Treaty Authority assisted the Bands in their roles as cooperating agencies throughout environmental review. FEIS ES-10.

9. On May 30, 2005, the DNR and the USACE finalized a Scoping Environmental Assessment Worksheet (“EAW”) and a Draft Scoping Decision Document for the NorthMet Project. FEIS § 2.2. The DNR published a Notice of Availability of the Scoping EAW and Draft Scope in the EQB Monitor (a publication of the Environmental Quality Board (“EQB”)) on

June 6, 2005, which initiated a 30-day scoping period. *Id.* at § 2.2.1. A public scoping meeting was held in Hoyt Lakes on June 29, 2005. *Id.* On July 1, 2005, the USACE published a Notice of Intent to Prepare an EIS for the proposed NorthMet Project in the Federal Register. *Id.* On October 25, 2005, the DNR and the USACE issued a Final Scoping Decision Document for the proposed NorthMet Project. FEIS §§ 2.2.1, 3.2.3.3.1.

10. On April 24, 2006, the DNR published a Draft Environmental Impact Statement (“DEIS”) preparation notice in the EQB Monitor. PolyMet submitted an initial Project Description (“PD”) for the proposed NorthMet Project on April 26, 2006. The PD was revised in January 2007 and a supplemental PD was submitted in July 2007. The PD was further revised through June 2009. On October 27, 2009, the DNR and the USACE issued the DEIS for the proposed NorthMet Project. *See generally* FEIS §§ 2.3.2.1, 3.2.3.3.1. Notification of the publication of the DEIS was published in the EQB Monitor and the Federal Register in November 2009. This opened a 90-day public comment period on the DEIS. In addition, the DNR and the USACE convened a public meeting in Aurora and another in Blaine to gather public comments on the DEIS. FEIS Appendix A.1. The agencies received approximately 2,800 comments on the DEIS. *Id.* at A.1.1.

11. On February 18, 2010, the United States Environmental Protection Agency (“EPA”) submitted comments on the DEIS and assigned it a rating of EU-3 (Environmentally Unsatisfactory – Inadequate Information). In mid-2010, the DNR, the USACE and the USFS determined that a land exchange proposed action should be included in environmental review of the proposed NorthMet Project. The USFS thus joined the DNR and the USACE as a co-lead agency for environmental review purposes (the DNR, USACE, and USFS hereafter referred to collectively as the “Co-Lead Agencies”). The Co-Lead Agencies then developed a Supplemental Draft EIS (“SDEIS”) for the proposed NorthMet Project. The EPA became a cooperating agency for development of the SDEIS in order to participate in the resolution of issues identified in its February 2010 comment letter. FEIS § 1.2.2.

12. In December 2013, the DNR released the SDEIS for public comment. A 90-day public comment period closed on March 13, 2014. In addition, public meetings were held in Duluth, Aurora, and St. Paul in January 2014. Over 58,000 comments were submitted on the SDEIS. FEIS ES-7.

13. On November 6, 2015, the Co-Lead Agencies released the Final EIS (“FEIS”) on the proposed NorthMet Project. The FEIS responded to all substantive comments received during the public review of the DEIS and the SDEIS. In addition, the public had the opportunity to review and submit comments on the FEIS.

14. On March 3, 2016, the DNR issued its Record of Decision (“ROD”), which concluded that the FEIS was adequate under the Minnesota Environmental Policy Act. Notice of the Record of Decision (“ROD”) was published in the EQB Monitor on March 14, 2016. The ROD was not appealed, so it is a final agency decision no longer subject to judicial review. *See* Minn. Stat. § 116D.04, subd. 10 (certiorari review of an adequacy decision must be initiated within 30 days of publication of notice of the final decision in the EQB Monitor).

15. On January 9, 2017, the USFS issued a Final Record of Decision authorizing a land exchange between PolyMet and the USFS for lands at the Mine Site. Pursuant to a land exchange agreement with the USFS dated August 31, 2017, PolyMet took fee title to the Mine Site on June 28, 2018. To date, the USACE has not issued a Final Record of Decision because it has yet to make a final decision on the Section 404 Permit.

16. The FEIS was included within PolyMet's Permit to Mine Application as Reference 1. The environmental review documents, including the FEIS and the ROD, are publicly available at: <https://www.dnr.state.mn.us/input/environmentalreview/polymet/index.html> and are incorporated herein by reference.

17. On December 30, 2016, PolyMet notified the DNR that it proposed to eliminate the cement deep soil mixing ("CDSM") zone from the Cell 2E North Dam of the FTB previously analyzed during environmental review and replace it with increased buttressing to achieve the required stability for the FTB.

18. On March 21, 2017, the DNR determined that the elimination of the CDSM zone and increased buttressing proposed by PolyMet did not result in substantial changes that affect the potential significant environmental effects of tailings management at the Plant Site. The DNR further determined that such changes did not appear to generate significant environmental effects that were not considered in the FEIS or affect the availability of prudent and feasible alternatives with lesser environmental effects. The DNR concluded that preparation of a supplemental EIS ("SEIS") was not warranted as a result of this change.

19. On March 27, 2017, PolyMet notified the DNR that it proposed to combine the location of the waste water treatment systems for both the Mine Site and Plant Site into a single building at the Plant Site to be called the Wastewater Treatment System ("WWTS"). This proposed change would relocate the WWTF originally proposed for water treatment at the Mine Site to the wastewater treatment location at the Plant Site that had been analyzed in the FEIS. Mine water transfers were proposed to occur through a three-pipeline system along the Corridor, rather than a two-pipeline system as originally proposed. PolyMet did not propose any changes to the actual wastewater treatment processes or to the volume of wastewater.

20. The DNR reviewed the proposed change to the WWTS and concluded, on April 11, 2017, that this modification did not result in substantial changes that affect the potential significant adverse environmental effects of project-related wastewater management through operations, closure, and reclamation. The DNR further determined that such changes did not appear to generate significant environmental effects that were not considered in the FEIS or affect the availability of prudent and feasible alternatives with lesser environmental effects. The DNR concluded that preparation of an SEIS was not warranted as a result of this change.

21. On June 8, 2018, the Minnesota Center for Environmental Advocacy ("MCEA"), the Center for Biological Diversity ("CBD"), and the Friends of the Boundary Waters Wilderness ("FBWW") submitted a petition for the preparation of an SEIS for the NorthMet Project. After review, the DNR determined that an SEIS was not warranted and notified these petitioners of this decision on July 11, 2018. On July 18, 2018, WaterLegacy submitted a

separate petition for an SEIS. The DNR again determined that an SEIS was not warranted and notified WaterLegacy of this decision on August 20, 2018. MCEA, FBWW, and WaterLegacy have each appealed the DNR's decisions. Proceedings on these appeals are currently pending in the Minnesota Court of Appeals.

B. Summary of Analysis Within the FEIS

22. The purpose of the FEIS is to inform the public and decision-makers of the proposed actions, assess potential environmental impacts, identify potential mitigation measures and reasonable and feasible alternatives, and evaluate the no-action alternative (i.e., an alternative pursuant to which the proposed project is not implemented). The FEIS and its underlying environmental review process are also intended to inform the subsequent permitting and approval processes for the NorthMet Project. FEIS § 1.5.

23. Chapter 1.0 of the FEIS is entitled "Introduction" and provides an overview and descriptions of the purpose of and need for the NorthMet Project, as well as the regulatory framework, agency roles and responsibilities, and organization of the FEIS. The FEIS sets forth several purposes of the NorthMet Project: to allow PolyMet to exercise its mineral lease rights to mine the NorthMet Deposit; to help meet domestic and global demand for base and precious metal precipitates and flotation concentrates; and to resolve the conflict between the surface estate owned by the United States and the private mineral estate owned by PolyMet.

24. Chapter 2.0 of the FEIS is entitled "EIS Development" and describes the process undertaken by the Co-Lead Agencies in developing the FEIS. This chapter includes discussion of a number of topics, including: the scoping process; identification of issues; development of project alternatives; public and agency participation; consultation and coordination regarding the DEIS, SDEIS, and FEIS; incorporation of the land exchange between PolyMet and the USFS for land at the Mine Site; reevaluation of DEIS alternatives; impact analysis; and identification of the required project permits and approvals. Chapter 2.0 also sets forth a number of project modifications adopted in light of updated business needs and comments on the SDEIS, including: the addition of a water containment system on the east side of the FTB to capture potential future seepage in that area; the addition of a semi-autonomous grinding (SAG) mill to the Plant Site for a more energy-efficient ore grinding process; the removal of the coal ash landfill located within the proposed FTB footprint; the treatment of water from Colby Lake prior to its use as stream augmentation; and the addition of bedrock groundwater monitoring wells north of the Mine Site to understand bedrock groundwater flow direction.

25. Chapter 3.0 of the FEIS is entitled "Proposed Action and Alternatives" and describes the NorthMet Project and alternatives, including the no-action alternative. This chapter contains detailed analysis of the no-action alternative and two alternatives of the NorthMet Project involving a land exchange with differently sized federal parcels. This chapter also discusses alternatives that were considered but eliminated from further consideration, including alternative wet and dry closure options for the FTB, backfilling of the West Pit with Category 1 waste rock, and underground mining, as well as other alternatives pertaining to siting, technologies, design, layout, and throughput levels. In addition to discussing the alternatives to the NorthMet Project, the FEIS provides a comprehensive comparison of the effects on resources from the alternatives.

26. Chapter 4.0 of the FEIS is entitled “Affected Environment” and summarizes the existing conditions of the NorthMet Project area and the surrounding environment, as well as the parcels to be exchanged between PolyMet and the USFS, including the land and its physical, biological, cultural, socioeconomic, and recreational resources.

27. Chapter 5.0 of the FEIS is entitled “Environmental Consequences” and presents the direct and indirect environmental effects of the various alternatives of the NorthMet Project.

28. Chapter 6.0 of the FEIS is entitled “Cumulative Effects” and describes the cumulative effects of the various alternatives of the NorthMet Project when considered along with other past, present, and reasonably foreseeable future actions in the region. The FEIS explains that there would be few cumulative effects from the NorthMet Project after proposed mitigation and adaptive management measures are applied.

29. Chapter 7.0 of the FEIS is entitled “Comparison of Alternatives and Other Considerations” and contains a comparison of the various alternatives of the NorthMet Project, conclusions regarding the impacts, and public interest considerations regarding the land exchange.

30. Chapter 8.0 of the FEIS is entitled “Major Differences of Opinion” and describes the tribal cooperating agencies’ major differences of opinion regarding aspects of the SDEIS.

31. Appendix A to the FEIS contains responses to comments regarding the DEIS and SDEIS.

32. Appendix B to the FEIS describes the analysis that the Co-Lead Agencies performed in considering a potential underground mining alternative for the NorthMet Project.

33. Appendix C to the FEIS includes the comments and supporting documentation submitted by the tribal coordinating agencies in response to the SDEIS.

34. Appendix D to the FEIS is the Biological Assessment and Biological Evaluation, which identifies whether activities related to the NorthMet Project may affect listed or proposed species and critical habitat under the Endangered Species Act.

35. The FEIS explains that the NorthMet Project would consist of three major components: a Mine Site, a Plant Site, and a 7 to 8-mile Transportation and Utility Corridor connecting the Mine Site and the Plant Site. FEIS § 3.1.1.4. The FEIS thoroughly analyzes each component and its potential impacts.

36. The FEIS states that the NorthMet Project would consist of three distinct phases: (i) an approximately 18-month period of construction, consisting of land clearing, building renovation and construction, stockpile preparation, and utility upgrades; (ii) an approximately 20-year period of operations, including ore mining and processing, waste rock stockpiling, continued construction, progressive reclamation, and water treatment; and (iii) final land reclamation, closure, and post-closure maintenance, including infrastructure removal, long-term water treatment, maintenance, and monitoring. FEIS ES-12. The FEIS thoroughly analyzes each phase and potential impacts, and evaluates potential alternatives and mitigation measures.

37. The FEIS describes in detail those elements of the natural and human environment that would be affected by the NorthMet Project. Among the issues addressed are physical impacts on groundwater and surface water, water appropriations, surface water runoff, wastewater, solid waste, vegetation cover types, fish and wildlife resources, threatened and endangered species, erosion and sedimentation, air emissions, amphibole mineral fibers, noise, cultural resources and tribal access to lands, visibility, compatibility with land use regulations, and infrastructure. *See, e.g.,* FEIS Table 7.2.4-1.

38. The Adequacy Determination concluded that the FEIS adequately analyzed significant environmental impacts associated with the NorthMet Project, appropriately presented alternatives and analyzed their impacts, and presented methods by which adverse environmental impacts associated with the NorthMet Project could be mitigated.

39. Throughout the environmental review process, predictive modeling was used to adjust the plans for the proposed NorthMet Project in order to minimize environmental impacts.

C. Relationship Between Environmental Review and Permit to Mine

40. The Permit to Mine is informed by the associated environmental review and other permitting efforts for the NorthMet Project. As prescribed in Minnesota Rule 4410.0300, subpart 3, the detailed environmental analysis, mitigation measures, and changes to the NorthMet Project that emerged from the EIS process are to be used “as guides in issuing, amending, and denying permits and carrying out other responsibilities of government units to avoid or minimize adverse environmental effects and to restore and enhance environmental quality.” The related federal and state environmental permitting and regulatory approval processes provide an additional basis for this Permit to Mine to show compliance with the DNR requirements. These related permits, which include, among other items, permits for wetlands, water quality, air quality, dam safety, and water appropriation, are the mechanism by which the responsible agency or agencies can develop and apply performance-based standards (when allowable by applicable regulations) for NorthMet Project operations. These standards will help achieve the goals of the Permit to Mine regulations. The Permit to Mine includes many conditions that PolyMet anticipates will emerge from these related permitting and regulatory processes and acknowledges that, as the independent review of PolyMet’s other permit applications proceeds, there could be additional conditions imposed by other agencies that further inform the Permit to Mine.

IV. OVERVIEW OF PERMITTING

A. Permitting Under Chapter 6132

41. Permits to Mine for nonferrous metallic mineral mining projects in Minnesota are governed by Chapter 6132 of the Minnesota Rules. These rules were adopted by the DNR in 1993. The NorthMet Project is the first nonferrous metallic mineral mine to proceed to the permitting phase in Minnesota.

42. Under Chapter 6132, work on an application for a permit to mine occurs in multiple phases. Prior to the submission of the application, the applicant must meet with the DNR to discuss plans for analytical testing of the potential mine waste that would be generated

by a mining operation. Separately, the Rules require a pre-application meeting and site visit prior to submission of any application for a permit to mine to the DNR.

43. A proposed mining operator submits an application for a permit to mine to the DNR, which then reviews it to ensure that it contains all of the information required under applicable rules and statutes. Once deemed complete, an application is put on public notice near the area of the proposed mining operation. If approved by the DNR, with or without special conditions, the plans set forth in the application are incorporated into a permit to mine.

44. Mining and reclamation within the geographic footprint of the permitted mine is sequenced in phases or intervals based on the rate of mining over the projected life of the mine. The sequence of mining and reclamation within the mining area is set out in an applicant's mining and reclamation plan, which may be modified by special conditions imposed by the DNR, and subsequently updated through the annual reporting process required by the Rules.

45. The operator's mining and reclamation plan must "address the goals and meet the requirements" of the reclamation standards set forth in Minn. R. 6132.2000 to 6132.3200. Subpart 1 of each of these rules sets forth goals for reclamation. These goals are "reclamation targets of achievement toward which the specific requirements of parts 6132.0100 to 6132.5300 are directed." Minn. R. 6132.0100, subp. 8. The other subparts within these rules set forth specific requirements or prohibitions on mining and reclamation activities.

46. Under the applicable rules, a permit holder is required to submit an annual report to the DNR on or before March 31 of each year. Minn. R. 6132.1300, subp. 1. It is through the submission of annual reports that a permit holder continues to revise the specific operating details and inform the DNR of its ongoing operations. This iterative process is necessary given the scale and nature of mining operations. As the DNR explained in the Statement of Need and Reasonableness ("SONAR") associated with the development of the Nonferrous Reclamation Rules set forth in Chapter 6132 of the Minnesota Rules:

Because of the dynamic nature of mining it is reasonable to assume that at some time throughout the life of the operation there might be the necessity to deviate from the plans developed in the permit application. The annual update will allow both the permittee and the [DNR] to evaluate whether there may be deviations from the permitted mining and reclamation plan. Such an evaluation is required to determine whether amendments to the permit to mine are necessary, thereby ensuring that permit conditions continue to be current and reflect changes in the mining plan.

SONAR at 16. Upon DNR request, PolyMet must provide any data that it is required to submit to the DNR in a format in which raw data is accessible (e.g., spreadsheet, GIS) along with narrative explanations of the data. Special Condition 15.

47. The annual report includes a description of mining, reclamation, and postclosure maintenance activities undertaken in the prior year. Minn. R. 6132.1300, subps. 2.A-2.C. In addition, the permit holder must discuss any differences between the activities actually undertaken and those initially anticipated within the mining and reclamation plan. *Id.*, subp. 2.D.

The permit holder must also disclose in the annual report results of characterization studies for any new rock types or formations encountered during mining. *Id.*, subp. 2.E. The annual report must also include a description of actual wetland replacement activities undertaken in the previous year. *Id.*, subp. 2.G. As the DNR noted in the SONAR, these information requirements require the operator to “provide an auditing of the mining and reclamation activities” and provide the information necessary for the DNR “to monitor compliance with the rules and the permit to mine.” SONAR at 16.

48. The annual report also includes information from the permit holder detailing anticipated mining and reclamation activities for the upcoming year. In discussing anticipated mining activities, the permit holder must identify the types, amounts, sequence, and schedule of anticipated mining and any changes in the beneficiating process, including any potential effects on waste disposal. Minn. R. 6132.1300, subps. 3.A-B. In addition, the permit holder must detail anticipated reclamation activities including methods, schedules and research and notify the DNR of any intent to close any portion of the mining area in the coming year. *Id.*, subps. 3.C-D. The permit holder must identify how its anticipated mining and reclamation activities differ in scope and schedule from its previously approved mining and reclamation plan. *Id.*, subp. 3.E. This annual update ensures that the DNR “will be made aware of any proposed modifications, dictated by changing technology, environmental conditions, economics, or other factors.” SONAR at 17. Thus, Chapter 6132 recognizes that mining and reclamation plans change over time and requires the permit holder to report any such changes.

49. In addition, a permit holder must update its reclamation plan and reclamation cost estimates annually as part of its annual report. This annual update must reflect the reclamation activities to be implemented if the permittee were to cease operations in the upcoming year, including the methods, sequence, and schedule of reclamation to address the goals and meet the requirements of Chapter 6132. Minn. R. 6132.1300, subp. 4.A-C. The purpose of such annual updates is to identify all necessary reclamation activities in the event the operator were to become insolvent or cease activities. SONAR at 17. This periodic updating ensures that financial assurance is updated to compensate for the opening of new areas to mining disturbance. *Id.* Financial assurance may also be decreased upon approval of reclamation or release of portions of a mining area.

50. The DNR reviews annual reports to determine whether the operator is in compliance with the issued permit to mine. Minn. R. 6132.4000, subp. 5. If there is non-compliance, then the DNR may order the operator to provide an explanation for non-compliance and a proposal to achieve compliance, may direct the operator to take corrective action to address any violations or deficiencies reported to have occurred in the prior year, or may require the operator to develop a new plan for mining and reclamation activities in the coming year that will comply with the permit to mine. *Id.*, subp. 5.B.

51. Chapter 6132 sets forth general reclamation standards for mining and reclamation plans. *See* Minn. R. 6132.2000-.3200. These standards are written in general terms in order to address the many variable conditions that exist in a particular mining operation. It is for the applicant to propose and tailor a mining and reclamation plan aimed at satisfying these standards. It is for the DNR to review an applicant’s proposed reclamation plan to determine if it satisfies

legal requirements. The administrative law judge reviewing the rules proposed in Chapter 6132 explained:

These proposed rules do set some specific standards in particular areas (e.g., siting, vegetation, and blasting), however, the bulk of these rules only establish performance criteria to be applied in the various stages of mining under a permit to mine. The MPCA recommended that specific standards be set for operations to aid enforcement of the rules. The Department has declined to set those standards beyond the extent already present in the proposed rules. None of the commentators with experience in mining objected to the Department's approach. The commentators generally opposed to the expansion of mining operations in Minnesota urged specific technologies be prohibited, but did not object to the Department's approach. DNR has demonstrated that, over all, its performance criteria are needed and reasonable to minimize the adverse environmental impact arising from mining operations by arriving at specific standards which will vary from site to site.

ALJ Report at 10.

52. This intent that permit conditions will be tailored to address the unique site-specific character of a particular mining operation is expressly included within Minn. R. 6132.0200. B

B. Other Permits Associated With the NorthMet Project

53. The permit sought by PolyMet in this proceeding is the Permit to Mine for the NorthMet Project under Chapter 6132 of the Minnesota Rules and the Minnesota Mineland Reclamation Act. *See* Minn. Stat. §§ 93.44-.51. In addition to the Permit to Mine, the NorthMet Project is subject to regulation under a variety of other state and federal permits. *See* Permit to Mine § 6.3. The NorthMet Project is further subject to city and county zoning and building requirements. *Id.* at Table 1-2.

54. Water and air quality issues associated with the NorthMet Project will be regulated by the Minnesota Pollution Control Agency ("MPCA") pursuant to National Pollutant Discharge Elimination System ("NDPES") and State Disposal System ("SDS") permits, and Air Emissions Permits. PolyMet's appropriations of water for the NorthMet Project are regulated under water appropriations permits issued and enforced by the DNR under Minnesota Statutes Chapter 103G and Minnesota Rules Chapter 6115. The FTB and Hydrometallurgical Residue Facility ("HRF") at the Plant Site are subject to regulation by the DNR under separate Dam Safety Permits in addition to the Permit to Mine. Monitoring and mitigation for direct and indirect wetland impacts associated with operations at the NorthMet Project will be required under the Permit to Mine in accordance with the State Wetland Conservation Act and under a federal Clean Water Act Section 404 Permit issued by the USACE. Any take of a state-listed species resulting from the NorthMet Project will require a takings permit from the DNR.

55. On April 14, 2016, the State of Minnesota launched a web portal dedicated to the permitting process for the proposed NorthMet Project. *See* <http://polymet.mn.gov/>. Individuals

accessing the portal had the option to sign up for email updates regarding the NorthMet Project through a GovDelivery notice. In addition, the DNR established a PolyMet-specific permitting web page where the public could access materials, such as applications and draft public-comment versions of permits, relating to the NorthMet Project. *See* <https://www.dnr.state.mn.us/polymet/permitting/index.html>. The DNR issued a GovDelivery notice of the establishment of the permitting portal to those individuals who had subscribed for updates on the PolyMet environmental-review process. The DNR also advised these individuals of the opportunity to sign up for future GovDelivery notices regarding PolyMet permitting.

56. On July 11, 2016, PolyMet submitted Dam Safety and Water Appropriation Permit Applications for the proposed NorthMet Project to the DNR. That same day, the DNR issued a GovDelivery notice informing the public that these applications were available for review on the DNR's PolyMet permitting website.

57. PolyMet applied for six separate Water Appropriation Permits. In general terms, PolyMet requests the identified Water Appropriation Permits for the following purposes: (i) to conduct mine-pit dewatering in three mine pits in order to mine ore at the Mine Site; (ii) to operate engineering controls at the Mine Site and Plant Site; (iii) to construct buildings and other infrastructure that extend below the water table at the Mine Site and Plant Site; and (iv) for mine-processing activities at the Plant Site. Water Appropriation Application § 3.0. PolyMet's water appropriations will be subject to ongoing monitoring requirements. The applicable Monitoring Plans include groundwater monitoring to identify the effects of appropriations on groundwater levels in the surficial and bedrock aquifers, surface water monitoring to assess any potential changes related to groundwater withdrawals and associated discharges to surface water flow or basin water levels, macroinvertebrate monitoring and fish community monitoring. Appropriate adaptive management or mitigation strategies may be implemented to address any unacceptable impacts to resources in the event monitoring identifies impacts." The Water Appropriation Application included completed application forms for each individual permit, and described the water conservation and reuse approach for the NorthMet Project as a whole. *See* Water Appropriation Application § 3.2. PolyMet's proposed use of waters is detailed in separate project water management plans for the Mine Site and the Plant Site. Version 5, dated July 11, 2016, of each of these project water management plans was incorporated into the Water Appropriation Application via reference and considered as part of the Application. *See* Water Appropriation Application - References (2), (3). The water management strategy for the NorthMet Project is integrated across the Mine and Plant Sites in order to maximize water conservation and recycling of appropriated water for reuse. Water Appropriation Application § 3.2. Water appropriated at the Mine Site will be routed to the Plant Site via the Mine-to-Plant Pipeline and will serve as process water. *Id.* In addition, seepage captured by the FTB seepage containment system will also be reused as process water. *Id.* This strategy of reuse and recycling of water at the Mine and Plant Sites will minimize the amount of make-up water appropriated from Colby Lake. PolyMet anticipates that this water management strategy will provide 88% to 98% of necessary process water, thereby limiting the amount of make-up water appropriated from Colby Lake. *Id.* Table 3-1 presented information related to each of the following six individual permit applications consolidated within the Water Appropriation Application:

2016-1363 – East Pit Dewatering – for dewatering at the East Pit at the Mine Site;

2016-1364 – Central Pit Dewatering – for dewatering at the Central Pit at the Mine Site;

2016-1365 – West Pit Dewatering – for dewatering at the West Pit at the Mine Site;

2016-1367 – Mine Site Infrastructure – for construction and operation of infrastructure at the Mine Site;

2016-1369 – Plant Site Infrastructure – for construction and operation of infrastructure at the Plant Site; and

2017-0260 – Colby Lake – for withdrawal of water for use as make-up water at the Plant Site.

58. PolyMet sought a dam safety permit for the proposed FTB (the “FTB Permit”), which would be located on the site of the existing tailings basin of the historic LTV Steel Mining Company (“LTVSMC”) iron ore mine and would receive tailings from PolyMet’s processing activities. The second Dam Safety Permit (the “HRF Permit”) would cover the proposed HRF, and would receive residue (mostly gypsum) generated from PolyMet’s processing activities.

59. In February and April 2017, PolyMet submitted revised Water Appropriation Permit Applications. On April 14, 2017, the DNR circulated PolyMet’s Water Appropriation Permit Applications to governmental units for review. The DNR also circulated these Applications to the Bois Forte Band of Chippewa, the Grand Portage Band of Lake Superior Chippewa, and the Fond du Lac Band of Lake Superior Chippewa for review.

60. In May 2017, PolyMet submitted a revised FTB Permit Application and an HRF Permit Application (collectively, “Dam Safety Permit Applications”). These revised Applications included changes made by PolyMet in response to feedback on its initial Application from the DNR and its external consultant, Emmons & Olivier Resources, Inc. (“EOR”). The DNR circulated the revised Dam Safety Permit Applications to technical experts from the DNR and other local units of government. *See* Min. R. 6115.0250. The DNR also circulated these Applications to the Bois Forte Band of Chippewa, the Grand Portage Band of Lake Superior Chippewa, and the Fond du Lac Band of Lake Superior Chippewa for review. As part of this revised Application, PolyMet submitted an updated FTB Instrumentation and Monitoring Plan, an updated FTB Contingency Action Plan, and a new FTB Template Pilot Test Plan for Bentonite Amendment of Tailings.

61. On May 15, 2017, the DNR received a dam safety geotechnical report on the proposed NorthMet Project from its consultant and an external group of geotechnical experts, who assessed and commented on the proposed design, operation, and maintenance of the NorthMet facilities.

62. On May 16, 2017, PolyMet submitted a Public Waters Work Permit Application to the DNR for a culvert extension associated with the widening of the Dunka Road for the NorthMet Project. On June 19, 2017, the DNR circulated this Application to government units for review and comment. In addition, the DNR provided a copy of this Application to the Bois Forte Band of Chippewa, the Grand Portage Band of Lake Superior Chippewa, and the Fond du Lac Band of Lake Superior Chippewa for review.

63. On August 11, 2017, the DNR opened a 30-day public comment period on draft Water Appropriation Permits for the proposed NorthMet Project.

64. On September 15, 2017, the DNR opened a 30-day public comment period on draft Dam Safety and Public Waters Work Permits for the proposed NorthMet Project.

65. In October 2017, PolyMet submitted an initial application for a Permit to Take Endangered or Threatened Species to the DNR for review.

66. On November 28, 2017, PolyMet submitted a revised application for a Permit to Take Endangered or Threatened Species to the DNR for review.

67. On April 18, 2018, the DNR informed PolyMet that due to the modification of the NorthMet Project footprint over time, the DNR recommended surveys for *Botrychium* (moonwort) species and *Caltha natans* (floating marsh marigold) be conducted in June 2018.

68. On May 24, 2018, PolyMet submitted a sensitive plant species survey work plan to the DNR describing a work plan for conducting the sensitive plant species surveys suggested by the DNR in April 2018.

69. In June 2018, PolyMet conducted a sensitive plant species survey at the Mine Site in accordance with its survey work plan.

70. On September 26, 2018, the DNR sent a GovDelivery notice informing the public that the agency had received a revised application from PolyMet for a permit to take endangered and threatened species.

71. The DNR will resolve any conflict between or among the Permit to Mine, Water Appropriation Permits, Public Waters Work Permit(s), Dam Safety Permits, Wetland Replacement Plan, or Takings Permits governing activity in the mining area. Permit to Mine Special Condition 12. The DNR will consult with other agencies, as needed, to coordinate resolution of conflicts between or among any permits (including, without limitation, the Permit to Mine, Water Appropriation Permits, Public Waters Work Permit(s), National Pollution Discharge Elimination System Permits, State Disposal System Permits, Dam Safety Permits, Wetland Replacement Plan, Takings Permits, etc.) governing activity in the mining area. Permit to Mine Special Condition 13. Deposition of NorthMet generated tailings in the FTB must not begin until a NPDES/SDS permit is issued for the operation of the FTB. Permit to Mine Special Condition 13a. PolyMet must inform the DNR within 30 days after any amendment, modification, or transfer of a related NPDES/SDS permit. Permit to Mine Special Condition 13b. The DNR hereby incorporates by reference the DNR-issued permits and findings listed in this paragraph.

V. DEVELOPMENT OF APPLICATION AND SPECIAL CONDITIONS FOR THE PERMIT TO MINE

A. Pre-Application Requirements – Mine Waste Characterization

72. Under Minn. R. 6132.1000, subp. 1, persons intending to submit an application for a nonferrous permit to mine must meet with the DNR “to outline chemical and mineralogical analyses and laboratory tests to be conducted for mine waste characterization.” The results of this characterization are then used by the DNR when evaluating the applicant’s proposed mining and reclamation plan.

73. Mine waste is defined broadly by Minn. R. 6132.0100, subp. 16, to mean a “material, such as surface overburden, rock, lean ore, leached ore, or tailings that in the process of mining and beneficiation has been exposed or removed from the earth.” PolyMet has characterized ore in addition to the different types of mine waste. If the mine waste characterization program shows that certain mine wastes will “release substances that adversely impact natural resources”, then the regulations define such waste to qualify as “reactive mine waste” and impose specific requirements on the management of those wastes per Minn. R. 6132.0100, subpart 28, and Minn. R. 6132.2200.

74. Mine waste rock and ore characterization began in 2004 with preliminary meetings, comments, and discussions with PolyMet and its consultant, SRK. Meetings, comments, and discussions continued through 2005 and 2006, with PolyMet submitting the final Waste Rock Characterization Work Plan in May 2006. The implementation, modification and reporting occurred during years 2005- 2015, with progress reports, updates, and meetings from mid-2006 through 2014. The program continues, and results of mine waste characterization must be submitted in the PolyMet’s annual report throughout the life of the NorthMet Project.

75. Flotation Tailings and Hydrometallurgical Residue Geochemical Characterization began in the second half of 2005, with a series of meetings, comments, and discussions. The final Flotation Tailings and Hydromet Characterization Workplan was also submitted in May 2006 (concurrently with the final Waste Rock Characterization Work Plan). The implementation and reporting occurred during years 2005- 2015, with progress reports, updates, and meetings from mid-2006 through 2015. The program continues, and updates will continue to be provided to the DNR in the Permit to Mine Annual Reports.

76. Mine Site Overburden Geochemical Characterization began in the second half of 2007, with a series of meetings, comments, and discussions. An initial sampling and analytical plan was submitted in early 2008, with subsequent supplemental sampling collaboration, and an updated Overburden Sampling and Analysis Plan was submitted in early 2010. The implementation, modifications, and reporting occurred during years 2008- 2015. The program continues to date and updates will continue to be provided to the DNR in the Permit to Mine Annual Reports. If unknown rock types are discovered during mining, PolyMet is required to inform the DNR through the annual report, per Permit to Mine Special Condition 45. Permit to Mine Special Conditions 46 through 48 ensure that waste characterization that is conducted during the life of the operation is coordinated, reviewed, and approved by the DNR.

77. PolyMet, through its consultants, SRK and Barr Engineering, submitted a number of reports on waste characterization throughout the pre-application process. Permit to Mine, Appendix 2 (Mine Waste Characterization Documentation and Results). Mine waste characterization has been ongoing for the NorthMet Project over the past ten years, and has included humidity cells/kinetic tests, along with static tests such as mineralogical, geochemical, petrological, and particle size testing. *Id.* at § 10 (Characterization and Management of Mine Waste).

78. Consistent with Minn. R. 6132.1000, subp. 2, PolyMet's mine waste characterization program is "based on chemical, physical, and mineralogical analyses and laboratory tests of material generated by exploration, preproduction sampling, and process testing." The mine waste characterization program includes: (i) chemical analysis of mine waste; (ii) mineralogical and petrological analysis of mine waste; and (iii) laboratory tests describing acid generation and dissolved solids released from mine waste. Throughout this process, PolyMet and the DNR continued to evaluate the mine waste characterization program data needs, and adjusted or supplemented the analyses as needed to ensure the data collected were sufficient to meet the requirements of the rule.

79. Waste rock and ore characterization work at the Mine Site involved 82 samples of waste rock and three ore composite samples. The waste rock samples were identified according to a sampling matrix developed by PolyMet in collaboration with the DNR. All 85 waste rock and ore composite samples were analyzed using chemical, physical, mineralogical, and laboratory tests. Permit to Mine § 2.2. In addition to the detailed characterization of these 85 samples, the waste rock and ore characterization includes an evaluation of bulk chemical analyses from approximately 18,800 drill core samples. *Id.*

80. Sections 5.2.13, 6.2.2, and 6.2.13 and Appendices 16.18 (Waste Characterization Data Package) and 16.12 (Rock and Overburden Management Plan) of the FEIS concern mine waste characterization. Additionally, reports on the continuing mine waste characterization were provided in order to include any newer information through environmental review and into the permitting process. Related reports are listed as references seven to twelve in Appendix 2 of the Permit to Mine and a March 15, 2011 memo that is Attachment A to the Waste Characterization Data Package, version 12.

B. Pre-Application Conference, Site Visit, and Informational Meeting

81. Under Minn. R. 6132.1100, subp. 1, persons intending to submit an application for a nonferrous permit to mine must meet with the DNR for a pre-application conference and site visit. The purpose of such meetings is "to review the proposed mining operation and to provide direction on the preparation of an application for a permit to mine." *Id.* In addition, this rule requires a public informational meeting to occur in conjunction with the pre-application conference. *Id.*

82. Beginning in December 2015 through March 2016, the DNR had a series of pre-application meetings with PolyMet to discuss the application process and preliminary permitting topics. At these meetings, the DNR and PolyMet discussed a variety of topics, including permit sequencing, wetland replacement, mitigation and monitoring plans, waste characterization,

financial assurance, monitoring of potential northward groundwater flow from the Mine Site, ownership and legacy issues, and the pre-application site visit and public meeting.

83. The DNR issued a press release on March 17, 2016, notifying the public of the opportunity to attend the public informational meeting. As required by Minn. R. 6132.1100, subp. 1.A-.B, notice of this informational meeting was published in the State Register, the EQB Monitor, and in the Range Times, a qualified newspaper circulated in the locality of the proposed operation in accordance with Minn. R. 6132.1100, subp. 1.B.

84. On March 23, April 6, and April 13, 2016, the DNR held pre-application conferences with PolyMet to preview the proposed mining operations and to provide direction on the preparation of an application for a permit to mine under Chapter 6132 of the Minnesota Rules. Under Minnesota Rule 6132.4000, subp. 1, “[t]he process for requesting a Permit to Mine begins with a preapplication conference and site visit” under Minnesota Rule 6132.1100, subp. 1.

85. At the March 23, 2016 meeting, the DNR and PolyMet discussed the logistics for application submittal, the DNR’s application review process, and the content of an application.

86. At this March 23, 2016 meeting, the DNR and PolyMet developed an outline of major headings to be included in any permit to mine application. This outline included 16 separate topics. In addition, the DNR and PolyMet discussed planned appendices. At the meeting on April 6, 2016, the DNR and PolyMet discussed project-specific topics related to required qualifications and documentation for issuance of a permit to mine, an overview of proposed operations, descriptions and maps of the proposed mining area, an overview of other environmental setting maps to be included in any application, siting criteria and buffer requirements, and mining and reclamation plans.

87. At the April 13, 2016 meeting, the DNR and PolyMet discussed updated mine waste characterization data and the need for continued data collection during mining operations to confirm the existing waste characterization data. They discussed the format and requirements of the annual reports that are required to be submitted under a permit to mine. In addition, they discussed potential wetland replacement through a wetland mitigation submitted under the permit to mine. Finally, they discussed financial assurance requirements under the Permit to Mine, including estimated reclamation costs and a timeline for financial assurance across the life of NorthMet Project, including long-term costs estimates.

88. On the afternoon of April 19, 2016, the DNR and PolyMet held a pre-application final conference meeting and site visit at PolyMet’s office in Hoyt Lakes. During this meeting, the DNR and PolyMet summarized the prior pre-application conference meetings, and discussed the application submittal process and the required contents of the application. PolyMet reviewed its proposed mining operations at the Mine Site, Plant Site and in the Corridors. The participants also visited the Plant Site and reviewed maps and aerial information of the Mine Site. That evening, the DNR hosted a public informational meeting in Aurora to discuss the proposed NorthMet Project. As required by Minn. R. 6132.1100, subp. 1, the DNR invited the participation of the MPCA and the EQB, along with the Cities of Aurora, Babbitt, and Hoyt Lakes, and Saint Louis County. The meeting included a formal presentation that provided an overview of the proposed NorthMet Project and the permit-to-mine process along with a

summary of other required state permits. In addition, the DNR and PolyMet had staff available to answer questions about permitting processes and the proposed NorthMet Project.

C. The DNR's Application Review Process and Engagement of External Experts

89. The DNR's standard practice for review of applications for permits to mine is an iterative process. An applicant first submits an application for a permit to mine, which is then reviewed by the agency's subject-matter experts who develop comments on the application within a comment spreadsheet. The applicant reviews the comments and submits revisions addressing agency concerns. The goal of the process is to develop a permit to mine application that comprehensively addresses all of the regulatory requirements and details the applicant's mining operations and reclamation plans. After such review and revision, the application is noticed and becomes the basis of the permit to mine. If the DNR believes additional conditions beyond those detailed in the application are necessary, the DNR develops special conditions that impose additional obligations on the permittee. The DNR has long used this spreadsheet commenting process to review and approve applications for permits to mine for ferrous mining operations under Chapter 6130 of the Minnesota Rules. The DNR employed this process in reviewing PolyMet's applications for water appropriation, dam safety, and public waters work permits related to the NorthMet Project.

90. The DNR's reviewers of PolyMet's Permit to Mine Application include individuals with expertise in mining operations, waste characterization, wetland mitigation, reclamation, and financial assurance. In addition, portions of mining operations involving dam-safety concerns were separately reviewed by technical experts within the DNR's dam safety program, and concerns related to hydrology and watershed implications were reviewed by technical experts within the DNR's Water Appropriation program. In addition to this internal review by agency experts, the DNR engaged outside experts to assist the agency in reviewing PolyMet's applications. In April 2007, the DNR awarded a contract to EOR to assist the agency in permitting related topics. EOR is a nationally recognized group of environmental and design professionals located in Oakdale, Minnesota. EOR's expertise includes water-resources engineering, watershed modeling and planning, environmental compliance, biological surveying, restoration, and environmental regulation and permitting. In the course of its review activities, EOR used a project team including Spectrum Engineering ("Spectrum"). Spectrum is an internationally recognized mining engineering, reclamation, and consulting firm located in Billings, Montana. It has inventoried and supervised the reclamation of hundreds of mines and abandoned mines, including large open-pit metal mines. The EOR Team conducted reviews of documents PolyMet submitted throughout the Permit to Mine pre-application, EIS process, and the Permit to Mine Application.

91. In addition to the ongoing EOR Permit to Mine Application review process, a Review Panel, which included senior leaders from the DNR, the MPCA, the Minnesota State Board of Investment ("SBI") and others with public and private sector expertise in nonferrous mining and financial analysis conducted an evaluation of potential experts on mining financial assurance issues. Based upon this review, on April 13, 2016, the DNR announced that it had awarded a contract to EOR to assist the agency in its review of financial assurance information related to PolyMet's application for a Permit to Mine. The contract award to EOR was based, in

part, on EOR's proposal to subcontract with Spectrum and JLT Specialty USA ("JLT") for additional expertise.

92. The EOR Team for financial assurance included Spectrum and JLT to aid in the review and analysis of financial assurance proposals related to the NorthMet Project. JLT is an expert on insurance, reinsurance, and surety bonds related to the mining industry. In addition to the financial assurance review, the DNR and EOR convened an external independent review team for review of dam safety issues associated with the NorthMet Project. This team included Dirk van Zyl and Steven Gale. Dr. van Zyl consults with mining companies worldwide on tailings basin design. He has authored or co-authored more than 120 papers on mining topics, including tailings basin management. He was a member of the review panel that investigated the Mount Polley dam failure in British Columbia. Mr. Gale has 30 years' experience working as a geotechnical engineer and has provided consulting services on all aspects of tailings basin design, management and closure. He has worked on many of the tailings basins at mines on the Iron Range. This external review included a review of PolyMet's Dam Safety Permit Applications and related technical documents and the DNR's comment tracking spreadsheets. In addition, in September 2016, the panel visited the Plant Site to review the FTB and proposed HRF sites. During this visit, the review panel met with PolyMet's designers to discuss design elements and ask questions regarding the design. On May 15, 2017, this external review team submitted a report and comments on PolyMet's Dam Safety Permit Applications.

93. In working with the EOR project team, the DNR established financial and technical criteria for evaluating PolyMet's Permit to Mine submittals. EOR developed three reports on financial assurance to help guide the DNR's review of PolyMet's application. On November 2, 2016, EOR submitted a Financial Capabilities report assessing PolyMet's ability to provide the financial assurance required for the NorthMet Project and assessed potential financial risks to the State. On December 7, 2016, EOR submitted a Financial and Technical Metrics report identifying potential liabilities related to the NorthMet Project that would require financial assurance. The potential liabilities related to reclamation, long-term water treatment and site maintenance, legacy issues associated with the Plant Site, and contingency liabilities associated with unanticipated or underestimated costs. On December 7, 2016, EOR also submitted a Case Studies report detailing case studies of nonferrous mines with both adequate and inadequate financial assurance and analyzing factors for long-term compliance. Each of these reports was posted to the DNR's PolyMet permitting webpage on January 11, 2017. In addition, EOR submitted its PolyMet Financial Capabilities Update on October 31, 2018.

D. The DNR's Review of PolyMet's Applications and Development of Special Conditions

94. On November 3, 2016, PolyMet submitted Version 1 of its Permit to Mine Application for the proposed NorthMet Project to the DNR ("Version 1").

95. The DNR then developed comment-review spreadsheets whereby the DNR and its outside consultants reviewed Version 1. Individual spreadsheets were developed for each section of the application and for each appendix. The reviewers provided detailed comments on PolyMet's application in these spreadsheets. In addition to this internal agency review, EOR also reviewed and provided comments to the DNR on Version 1 of the Permit to Mine

Application. PolyMet and the DNR then held numerous meetings in an attempt to resolve concerns and address issues identified during the agency's review of Version 1.

96. On August 20, 2017, PolyMet submitted a revised Permit to Mine application ("Version 2") to the DNR. In conjunction with this revised application, PolyMet submitted responses to the DNR's spreadsheet comments on Version 1 describing how it believed the agency's concerns or comments were addressed in Version 2. DNR technical staff and the agency's outside consultants then reviewed Version 2 and again developed spreadsheet comments aimed at addressing specific issues and continuing topics that had not been resolved in the revised application.

97. On November 30, 2017, PolyMet submitted a further revised Permit to Mine Application ("Version 3") to the DNR for review. As with the earlier review, PolyMet also submitted responses to the DNR's comments on Version 2.

98. On December 13, 2017, PolyMet submitted a further revised version of its Permit to Mine Application (Version 3.1, hereinafter referred to as the "Permit to Mine Application"), which included modified proposals for final assurance and an updated wetland replacement plan. The DNR and its external consultants then reviewed the Permit to Mine Application for completeness and to determine whether it addressed the DNR's earlier comments. As with its review of earlier versions, the DNR developed a spreadsheet detailing comments on specific portions of the Permit to Mine Application.

99. In addition, during the course of review of PolyMet's various versions of a permit to mine application, the DNR was reviewing PolyMet's proposed wetland replacement plan, which was submitted as part of the Permit to Mine Application.

100. As part of its review of PolyMet's various versions of a permit to mine application, the DNR reviewed historic comment spreadsheets that were developed during the course of environmental review, to ensure that the application addressed permitting issues identified in the earlier review processes.

101. Throughout the DNR's review of PolyMet's various versions of a permit to mine application, EOR reviewed and assessed PolyMet's financial assurance proposals. This review also included individuals from SBI, Minnesota Management and Budget, Spectrum Engineering and JLT. This team met multiple times in order to develop the financial assurance requirements for the NorthMet Project.

102. In December 2017 and early January 2018, the DNR developed special conditions for the NorthMet Project in addition to the requirements set forth in the Permit to Mine Application. The DNR developed 90 draft special conditions relating to the operation and reclamation of the NorthMet Project generally. In addition, the DNR developed additional special conditions relating to mitigation of wetland impacts to FPN6 – Northern Rich Spruce Swamp and comprehensive special conditions governing the financial assurance required for the NorthMet Project. These financial assurance requirements included a schedule of required financial assurance, the types of financial assurance required, and the required development of a trust fund for costs associated with long-term treatment and maintenance. In addition, the special

conditions comprehensively detailed reclamation cost estimates associated with legacy reclamation requirements at the Plant Site along with estimates of reclamation costs and long-term costs. These financial assurance special conditions were informed by EOR, JLT, Spectrum, and SBI.

E. Permit to Mine Application

103. As detailed in Minn. R. 6132.4000, subp. 1, “[t]he process for requesting a permit to mine begins with a preapplication conference and site visit,” which is then “followed by the submission of an application to the [DNR] under parts 6132.1000 to 6132.1400.”

104. Under Minn. Stat. § 93.481, subd. 1, any mining operation for metallic minerals within Minnesota must obtain a permit to mine from the DNR. Minn. Stat. § 93.481, subd. 1 requires the applicant for a permit to mine to submit “such information as the [DNR] may require.” The statute further provides that the applicant must submit a “proposed plan for the reclamation or restoration, or both, of any mining area affected by mining operations.” *Id.*, subd. 1(1). In addition, the applicant must provide a certificate showing that the applicant “has a public liability insurance policy in force for the mining operation for which the permit is sought.” *Id.*, subd. 1(2). The insurance must “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.” In addition, the statute requires the applicant to pay an application fee. *Id.*, subd. 1(3). PolyMet paid the statutorily required application fee, and the Permit to Mine Application contains PolyMet’s proposed reclamation and restoration plans for the NorthMet Project. In addition, PolyMet provided a Certificate of Liability Insurance showing that it had commercial general liability, automobile liability, and excess liability insurance. *See* Permit to Mine Application, Appendix 1.8; *see also* Minn. R. 6132.1100, subp. 3.C.

105. Under Minn. R. 6132.0300, subp. 2, “[w]hen two or more persons are or will be engaged in a mining operation, all persons shall join in the application, and the permit to mine shall be issued jointly.” Both PolyMet Mining Corp. and Poly Met Mining, Inc. have applied for a Permit to Mine for the NorthMet Project and will be liable as permittees for meeting the responsibilities imposed under the Permit to Mine. Permit to Mine Application § 2.2.

106. On January 5, 2018 the DNR issued GovDelivery and News Release announcing Notice of the Draft Permit to Mine for PolyMet NorthMet Project public comment and objection period, open through March 6, 2018, and that the DNR to hold 2 Public Meetings in February. Permit information was posted on a newly created Website (multi-agency) for the NorthMet permitting process. On January 8, 2018, the DNR published Notice of Receipt of an Application for a Permit to Mine for the NorthMet Project in the State Register and the EQB Monitor.

107. Beginning on January 5, 2018, PolyMet published advertisements regarding the Application on four successive weeks in the Babbitt Weekly News, a qualified newspaper circulated in the locality of the NorthMet Project. *See* Minn. R. 6132.4000, subp. 1; Minn. R. 6132.4900, subp. 1. This advertisement included the information required under Minn. R. 6132.4900, subp. 1. In addition, PolyMet published weekly advertisements regarding the Application in the Mesabi Daily News and the Duluth News Tribune throughout January 2018.

On January 29, 2018, PolyMet submitted a copy of the advertisement and affidavit of publication. The Permit to Mine Application was then deemed filed with the DNR. *See* Minn. R. 6132.4000, subp. 1.

108. The Permit to Mine Application contains the information and documentation required under Minn. R. 6132.1100 and a detailed plan for the activities planned during the first year of operations, including the information required under Minn. R. 6132.1300, subparts 3-6. *See* Permit to Mine Application at Table 1-1; *see also* Permit to Mine Application, Appendix 1.1 (completeness checklist). The environmental setting information required under Minn. R. 6132.1100, subp. 5.B, is set forth in figures within the Permit to Mine Application as detailed in Table 5-1.

109. The Permit to Mine Application included contingency reclamation cost estimates as required under Minn. R. 6132.1200, subp. 2. *See* Permit to Mine Application § 16.1. After review, the DNR and EOR refined these estimates within an appendix to the Permit to Mine's special conditions governing financial assurance. These estimates were included in the public-comment draft of the Permit to Mine issued in January 2018. These estimates have been further refined to address financial assurance associated with the reclamation of one utility tunnel that must be removed or filled prior to the construction of the HRF, a stretch of powerline, a stretch of road, and a landfill which must be closed and capped in compliance with MPCA landfill permit requirements.

110. The Permit to Mine includes a Legacy Closure Plan (Appendix 15.1) addressing reclamation obligations for specific areas of the former LTV site that have been transferred from Cliffs Erie L.L.C. to PolyMet. For these areas, the Legacy Closure Plan replaces the current Cliffs Erie Closure Plan under Permit to Mine #1.1 (the permit to mine associated with the former LTV operation) with PolyMet acting as assignee of the assigned reclamation obligations. The Legacy Closure Plan is part of PolyMet's mining and reclamation plan and is financially assured under the Permit to Mine. The inclusion of the Legacy Closure Plan for specific areas of the former LTV site transferred to PolyMet within the Permit to Mine requires PolyMet to perform all outstanding reclamation obligations for the assigned areas in accordance with applicable law.

111. The Application included two variance requests related to closure activities. PolyMet requested a variance to leave the Colby Lake Pipeline in place at closure and to leave the existing Utility Tunnels at the Plant Site in place at closure. *See* Permit to Mine Application, Appendix 14 §§ 1.2.1, 1.2.2. Both variances were publicly noticed by PolyMet in conjunction with its public notice of the Application. As detailed in section VII.P below, the DNR has granted a partial variance to allow certain utility tunnels to remain in place at closure upon certain conditions. The other requested variance is not granted as part of this decision on the Permit to Mine. *See* Special Conditions 20, 20b.

112. PolyMet has paid all applicable fees associated with the Application. *See* Minn. Stat. § 93.482, subd. 2(d).

VI. PUBLIC COMMENT PROCESS¹

A. Public Hearings / Public Comments

113. On January 5, 2018, the DNR opened a public comment, objection, and petition period on the draft Permit to Mine and wetland replacement plan for the proposed NorthMet Project. The draft Permit to Mine for public comment consisted of the Application of PolyMet's Permit to Mine application and the draft special conditions.

114. The DNR published Notice of Receipt of an Application for a Permit to Mine for the NorthMet Project in the State Register and the EQB Monitor on January 8, 2018. The notice informed the public that the comment and objection period would conclude on March 6, 2018. On January 30, 2018, the DNR sent a GovDelivery notice to subscribers reminding them of the public meetings and opportunity to submit comments on the draft Permit to Mine. As part of the public comment and objection process, the DNR, in conjunction with the MPCA, held a public meeting on February 7, 2018 in Aurora and on February 8, 2018 in Duluth. These meetings included both a public comment forum in which speakers had the opportunity to place their public comments into the record and an open house allowing members of the public to ask questions of agency staff and PolyMet staff.

115. On January 29, 2018, the DNR deemed PolyMet's Permit to Mine Application filed in accordance with Minn. R. 6132.4000, subp. 1. That same day, the DNR issued a GovDelivery notice informing the public that the deadline for submitting a petition for a contested case hearing was February 28, 2018, in accordance with Minn. Stat. § 93.483, subd. 1.

116. WaterLegacy submitted Objections and Petition for a contested case hearing to the DNR on February 27, 2018 ("WaterLegacy Petition"). Minnesota Center for Environmental Advocacy, the Center for Biological Diversity, and the Friends of the Boundary Waters Wilderness (together, "Joint Petitioners") submitted a Joint Petition for a contested case hearing on February 28, 2018 ("Joint Petition").

117. On March 7, 2018, the DNR opened a response period on the submitted petitions under Minnesota Statutes § 93.483, subd. 2(d). The DNR sent a GovDelivery notice informing subscribers of this response period. The deadline for submission of responses was April 6, 2018. WaterLegacy, the Joint Petitioners, PolyMet, and certain individuals submitted timely responses to the petitions.

B. Review of Objections and Comments

118. The DNR received more than 14,000 public comments, which included 105 comments that were reviewed as potential objections² on the draft Permit to Mine and wetland

¹ In addition to the permits under the DNR's authority outlined below, PolyMet made numerous submissions to the MPCA related to air-quality and water-quality issues. This documentation is publicly available on the MPCA's PolyMet permitting website at: <https://www.pca.state.mn.us/northmet>.

² Until recently, Minn. Stat. § 93.481, subd. 2, provided for an optional hearing to be held upon receipt of "objections" from certain specified parties. Minn. R. 6132.4000 subp. 2.B sets forth information required that

replacement plan for the proposed NorthMet Project. These comments were tabulated by EOR into a master spreadsheet and organized according to the themes and issues raised. The DNR technical staff reviewed and considered each of the themes and issues raised by these comments and objections. As part of this review, the DNR considered information in the FEIS addressing the themes or issues along with information within the Permit to Mine Application and Special Conditions. DNR's review also considered whether the concerns at issue related to permits other than the Permit to Mine, such as the Dam Safety Permits or the NPDES/SDS Permits. The DNR developed documents detailing this review on a theme-by-theme basis, which are contained within the administrative record and incorporated herein by reference.

119. All public submissions were reviewed to determine whether they contained the information necessary to constitute objections under Minn. R. 6132.4000, subp. 2.B. This rule requires objections to contain (i) a statement of the person's interest in the proposed mining operation; (ii) a statement of the action that the person wants the commissioner to take "including specific references" to applicable statutes and rules or the permit to mine application, and (iii) "the reasons supporting the person's position, stated with sufficient specificity to allow the commissioner to investigate the merits of the person's position."³ If a submission does not meet these requirements, it is deemed not to be an objection. Under the rule, if a submission satisfies the criteria to constitute an objection, then the DNR must review to determine if the submitter has standing for a contested case hearing. Standing, under the rule, is available to submitters who "own[] property that will be affected by the proposed operation," any "federal, state, or local governmental agency having responsibilities affected by the proposed operation," or "raise[] a material issue of fact, relating to the proposed operation, for which the commissioner has jurisdiction under Minnesota Statutes, section 93.44 to 93.51,⁴ and there is a reasonable basis underlying the issue of fact such that holding a hearing would allow the presentation or introduction of relevant information that would aid the commissioner in resolving the issues and in making a final determination on the issuance of the permit to mine."

120. After review, review, the DNR determined that none of the submissions established both the requisite standing and satisfied the criteria to constitute objections under this Rule. The vast majority of the reviewed submissions did not qualify as objections because they failed to include specific references to the Permit to Mine Application or to applicable statutes and rules, but, rather, stated general concerns with the NorthMet Project. Similarly, others failed

would allow the commissioner to determine if the person objecting meets the statutory requirements of Minn. Stat. § 93.481, subd. 2, or raises an issue relating to the proposal over which the commissioner has jurisdiction, and whether holding a hearing might potentially resolve the objection.

3 In 2017, the Legislature amended Chapter 93 and eliminated all reference to "objections" within Minnesota Statutes § 93.481, subd. 2. See 2017 Minn. Laws. Ch. 93 Art. 2 § 57. In its place, the Legislature created a petition for contested case hearing process under Minnesota Statutes § 93.483. Given these statutory changes, it appears that the Legislature intended to repeal the objection process set out in Minn. R. 6132.4000. Even so, the DNR informed the public of the potential opportunity to submit objections because of the uncertainty surrounding the continuing validity of Minn. R. 6132.4000. This notice informed the public of the need to submit specific information in order to constitute an objection under Minn. R. 6132.4000.

4 Standing under Minnesota Rule 6132.4000, subp. 2.C.(3) is only established if the matter at issue involves issues arising under the Mineland Reclamation Act (i.e., a permit to mine), and not to issues involving issues under other permits or authorizations under the jurisdiction of the commissioner.

to establish standing to demand a hearing as an objector.⁵ The administrative record includes a spreadsheet detailing the DNR’s review of potential objectors against the requirements of Minnesota Rule 6132.4000, subp. 2.

C. Overview of Petitions

121. Minn. Stat. § 93.483, subd. 1 provides that any person “owning property that will be affected by the proposed operation . . . identified in the application for a permit to mine under section 93.481 may file a petition with the commissioner to hold a contested case hearing on the completed application.”

122. In response to the Permit to Mine Application, several organizations—WaterLegacy and Joint Petitioners—have filed Petitions for a contested case hearing.

123. As with comments and objections, the DNR reviewed the Petitions and responses, and organized the concerns raised by theme and issue for consideration by technical staff. The DNR’s consideration of these concerns is contained within the administrative record and incorporated herein by reference.

i. Joint Petitioners’ Petition

124. Joint Petitioners timely submitted their “Petition for a Contested Case Hearing Regarding Poly Met Mining, Inc.’s Permit to Mine Application for the NorthMet Project on February 28, 2018” (“Joint Petition”).

125. The Joint Petition seeks “an order of the Commissioner denying issuance of the Permit to Mine unless the Permit and the Project are substantially revised to address the material issues of fact described below.” Joint Petition at 2.

126. In support of the Joint Petition, Joint Petitioners relied on documents already in the record from the environmental review and new reports from six experts. According to Joint Petitioners, these experts would testify on the following issues:

- Dr. Chambers is an Engineer and Professional Geophysicist who will provide analysis concerning the inherent safety and stability of upstream dam construction for slurry impoundments as well as the availability of technologies such as filtered or paste tailings to reduce the risks of both dam collapse and perpetual water treatment. *Id.* at 3.
- Mr. Kuipers has over 35 years of experience in mining and environmental process engineering, design, operations management, regulatory compliance, waste remediation, reclamation and closure, and financial assurance. Mr. Kuipers will offer analysis and evidence concerning the financial soundness of the financial assurance proposal for the NorthMet Project; best practices in the storage of mine waste in other states, provinces

⁵ As detailed in Section IX, below, none of the submissions raise a material issue of fact such that holding a contested case hearing would aid the commissioner in making a final decision on whether to issue the Permit to Mine. Similarly, none of the submitters established standing under either Minn. R. 6132.4000, subp. 2.C.(1) or (2), or Minn. Stat. § 93.483, subd. 1.

and countries; an analysis of the best available technology for safe and responsible storage of mine waste; and the availability of passive water treatment technologies. *Id.*

- Dr. Maest is a leading expert in geochemistry and water resources who will provide analysis and evidence concerning the geochemistry of mine-impacted water and geochemical characterization of mine waste. *Id.* at 4.
- Dr. Malusis is a Professor of Civil and Environmental Engineering at Bucknell University specializing in waste containment barriers, the transport of contaminants through soils, and the design and performance of soil-bentonite cutoff walls. Dr. Malusis will offer evidence and analysis evaluating the predicted efficacy of the proposed cutoff walls at the Plant Site and Mine Site. Dr. Malusis will also offer analysis evaluating the proposed pilot testing of the bentonite amendment plan to prevent infiltration of oxygen and water into tailings. *Id.*
- Dr. Miller is a Professor in the Department of Natural Resources and Environmental Science at the University of Nevada, Reno, specializing in the transport and transformation of organic and inorganic compounds, including the removal of metals and sulfate from effluent streams in mining operations. Dr. Miller will offer analysis and evidence concerning the geochemistry of mining pit lakes and the long-term environmental impact from the water quality conditions of those lakes. Dr. Miller will also offer analysis and evidence detailing the current state of the art for passive water treatment, particularly as applied to the water treatment demands of the NorthMet Project. *Id.*
- Dr. Myers is a hydrologist who has conducted water modeling to demonstrate the pathways that metals and other constituents will travel at both the FTB and the Mine Site. He will offer evidence and analysis establishing the potential for surface and groundwater contamination for the NorthMet Project. *Id.*

127. Joint Petitioners also included thirteen exhibits and incorporated its comments to the Dam Safety Permit Applications and thirty-two exhibits related to those Applications.

Standing

128. Joint Petitioners contend that they have standing because they have members that own property that will be affected by the proposed operation of the mine. According to Joint Petitioners, three of their members “own property downstream of the proposed mine site, and believe that their property values are intimately tied to the proximity of clean natural resources such as the St. Louis River.” *Id.* at 5.

129. Joint Petitioners maintain that “a contaminated river would devalue Petitioners’ members’ property[.]” *Id.* Joint Petitioners also argue that its members “use and value resources, such as the Partridge River, Embarrass River, and St. Louis River, that have the potential to be negatively impacted by the Project.” *Id.* Joint Petitioners add that “members’ health and recreational interests would be significantly impacted by contamination of those

waterways by pollutants such as sulfate and mercury.” *Id.* at 6-7. Joint Petitioners submitted three declarations to support these claims.

130. Next, Joint Petitioners argue that they have standing because the statute “should not be interpreted to restrict the DNR from granting petitions to other persons, including organizations with members who use and value resources potentially impacted by a permit to mine.” *Id.* at 7.

131. Joint Petitioners also argue that they have participated in the administrative process concerning the NorthMet Project since the late 2000s. *Id.* at 12.

132. In support of these arguments, Joint Petitioners filed three declarations from property owners in northern Minnesota.

133. Lori Andresen’s family owns property in northern Minnesota near the town of Isabella, near the headwaters of the Boundary Waters Canoe Area Wilderness, where she canoes, fishes and hikes. Ms. Andresen has also gone fishing in, and eaten the fish from, many of the rivers and lakes in the St. Louis River watershed, and she takes many photographs of local wildlife and the Partridge, Embarrass, and St. Louis Rivers. She has also gone wild ricing on the Embarrass, St. Louis, and Partridge Rivers. She visited the proposed site of the NorthMet Project, toured the processing plant, and did some hiking and berry picking at the potential mine site. She is concerned that the rivers, wildlife, and ecosystems will be destroyed or damaged by sulfate and heavy metal pollution from the NorthMet Project. Ms. Andresen also believes that the NorthMet mine could negatively affect her ability to see moose and other wildlife on hikes, canoe and boat trips in the area because the mine will disrupt wetlands and moose habitat. She is also concerned that polluted water from the NorthMet Project could harm her dogs and taint the local (including Duluth) food and water supply. She also contends that the real estate market in northeastern Minnesota has been “destabilized” by the potential for nonferrous mining projects. *Id.* at 5-6, Exhibit 8.

134. Scott Mead lives on Lake Pequaywan, upriver from the Little Cloquet River and the Cloquet River, in the Cloquet River Watershed. Mr. Mead is an avid fisherman and he fishes regularly in Lake Pequaywan, which primarily hosts walleyes and crappies. He also hunts for ducks, pheasant, deer, and grouse across northern Minnesota, including on public lands. He uses groundwater for drinking, washing, and bathing. Mr. Mead’s wife also paints and takes photographs across northern Minnesota. Mr. Mead is concerned that the NorthMet Project will cause pollution to the watershed and about the impacts it would have on the rivers, lakes, and groundwater near to and supporting his family’s home. He is also concerned about the impacts to the lands and where he travels. *Id.* at 5-6, Exhibit 8.

135. Richard Staffon owns property in Cloquet and worked as a wildlife manager for the DNR for 36 years. He fishes, hunts, canoes and camps on a regular basis and is a hand-harvester of wild rice. Mr. Staffon is concerned that his property will be affected by the proposed NorthMet Project if it is allowed to go forward without proper controls because part of the value of that property is its proximity to the St. Louis River, which is downstream from the project. He explains that his property will be affected by the NorthMet Project “because part of its value is its proximity to areas where fish and wildlife abound, and these resources may be affected by

pollutants released by the project unless it is appropriately controlled.” Mr. Staffon requests a contested case hearing to determine “whether this project will in fact pose the threat to wild rice, fish, and other wildlife in the St. Louis River watershed that I love.” *Id.* at 5-6, Exhibit 8.

Common Claims Between Permit to Mine & NPDES Permit

136. Joint Petitioners argue that there are many disputed issues of material fact that are common to both the Permit to Mine and the NPDES/SDS Permit. Joint Petition at 10. According to Joint Petitioners, a representative but non-exhaustive list of material facts common to both the Permit to Mine and the draft NPDES/SDS Permit include:

- Whether geochemical data and analysis in the application materials indicate that the mine pits will be a source of contamination. This issue is central to Permit to Mine regulations concerning the storage of reactive mine waste, but it is also central to determining whether the NPDES/SDS Permit complies with lawful requirements for discharges of cobalt, copper, arsenic, manganese, sulfate, mercury, and aluminum.
- Whether the barrier walls surrounding the FTB and the Category 1 waste rock stockpiles will function as predicted to capture nearly 100% of mine-impacted surface and groundwaters. Under the Permit to Mine, Minn. R. 6132.2200 requires that reactive mine waste be managed “to prevent the release of substances that result in adverse impacts on natural resources.” Similarly, issuance of the NPDES/SDS permit turns on a finding that PolyMet will comply with conditions established in the permit, including the condition requiring recapture of the contaminated groundwater leaving the FTB and Category 1 waste rock storage pile, in order to maintain compliance with applicable water quality standards.
- Whether the waste rock storage pile liners and collection systems will adequately capture contamination generated by the stored waste rock in the Category 2/3 and 4 storage piles, for the same reasons identified in the item above.
- Whether the Permit to Mine Application materials have accurately projected the quality and quantities of water that will be generated by the mining operation such that the wastewater treatment system as currently designed can treat that water prior to discharge.
- Whether the groundwater and surface water monitoring system is adequate to detect issues at the mine site or at the plant site such that corrective actions can be taken in a meaningful time period.

Id. at 11.

137. Based on the foregoing, Joint Petitioners request that the MPCA and the DNR hold one contested case hearing to avoid duplication and the risk of inconsistent judgment.

Applicable Legal Requirements

138. Joint Petitioners discuss at length why they do not believe that the NorthMet Project, as designed, meets the requirements of Chapter 6132 rules.

Joint Petitioners write that the Minnesota law does

not allow mine designs that would place a 900-acre lake 250 feet in the air, held in place with an earthen berm that began construction 50 years ago and is riddled with erosion and animal burrows, on the assumption that such a precarious arrangement will hold for 900 years. Nor do the regulations allow the agency to defer to the Applicant's promises that they will create and fine-tune technologies and practices, currently untested and unproven, to lessen the risks of this uniquely dangerous and outdated mine plan.

Joint Petition at 17.

139. Joint Petitioners also discuss “the risks of upstream dam construction, the risks of long term slurry impoundments, the dam instability caused by bentonite amendment, and the failure to drain the basin at closure[.]” *Id.* at 18. Joint Petitioners note that when reviewing PolyMet’s proposed Dam Safety Permit Applications, DNR Dam Safety Engineers Jason Boyle and Dana Dostert commented: “[w]e agree dam breach is unlikely during the 20 years of plant operation but think there is a much higher possibility of dam failure during the indefinite post closure phase. This should be addressed in the documents.” *Id.* at 18.

140. Joint Petitioners add that “the inherent risks of upstream dam construction identified by Dr. Chambers, Mr. Kuipers, and countless technical resources are well-known to the agency. Staff has bluntly concluded that upstream construction is not a good method for a dam that is required to last for centuries.” *Id.* at 19 (internal quotations omitted).

141. In addition, Joint Petitioners assert that “DNR has also long known that wet closures are inherently risky. The DNR’s Dam Safety Engineers have for years warned that wet closures pose serious risks to the public and to taxpayers[.]” *Id.* at 19. Joint Petitioners add that these “concerns were shared by DNR’s consultants, who urged the serious consideration of environmentally preferable alternatives to wet closure.” *Id.*

142. Joint Petitioners also share the DNR’s consultants’ concerns that although “PolyMet’s reclamation plan could work for a while,” it is difficult to see “how it will function forever without falling apart unless it is continuously maintained; which is a major leap of faith.” *Id.* at 20. The “stair step FTB embankment sealed with bentonite is geomorphologically unstable and will erode . . . 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.” *Id.*

143. Joint Petitioners conclude that it has “established that there is a reasonable basis underlying these disputed material issues of fact such that a contested case hearing would allow

the introduction of information that would aid the Commissioner in resolving the disputed facts in order to make a final decision on the Application.” *Id.* at 21.

Alleged Deficiencies with Permit to Mine Application

144. Joint Petitioners raise a number of concerns with the Permit to Mine Application. *Id.* at 25-45.

First, Joint Petitioners specifically claim that (i) the proposed Permit to Mine’s content is not clear, which frustrates public review; (ii) the lack of a term violates regulatory requirements; (iii) the DNR fails to include in the Permit to Mine specific permit requirements or terms and conditions to ensure that regulatory standards and goals are met; (iv) the proposed Permit allows PolyMet to develop plans in the future, which frustrates public review; (v) the proposed special conditions are deficient or unenforceable; and (vi) the FTB does not meet the stability requirements set out in the regulations. Joint Petition at 19-25. Based on these concerns, Joint Petitioners request that the DNR deny, revise, and re-notice the Permit to Mine Application for public comment. *Id.* at 23. Alternatively, Joint Petitioners request a contested case hearing to determine whether the Permit as proposed is adequate under the applicable rules. *Id.* at 35.

Second, Joint Petitioners argue that allowing for wet closure violates Rule 6132.3200. As a result, Joint Petitioners argue that the DNR should reject the Permit to Mine Application and should require PolyMet to design the facility with a dry closure. If the DNR does not reject the Permit to Mine Application, Joint Petitioners demand a contested case hearing to adjudicate its concerns about wet closure. *Id.* at 41.

Third, Joint Petitioners maintain that the bentonite amendment proposal will reduce FTB Dam stability because the proposed bentonite-amended tailings layers could be susceptible to erosion or degradation due to wet-dry cycling, root penetration, animal burrowing, and freeze-thaw cycles. Joint Petitioners request a contested case hearing to adjudicate whether the bentonite amendment will function as proposed. *Id.* at 45.

Fourth, Joint Petitioners claim that the commissioner has not conducted an “examination of alternative practices” like dry stack or filtered tailing or the optimal tailings dam designs to determine whether the proposed design as the “most effective and workable means of achieving reclamation.” *Id.* at 46. Joint Petitioners also argue that the FTB design fails to meet the closure standard for reactive mine waste and depends on technology that is not available. Joint Petitioners request a contested case hearing to adjudicate whether the bentonite amendment will function as proposed and to evaluate alternative practices to determine if the proposed tailings closure and design is the “most effective and workable means of achieving reclamation.” *Id.* at 45-46, 50.

Fifth, Joint Petitioners assert that PolyMet’s tailing basin design fails to meet the closure standard for reactive mine waste and depends on technology that is not available. Joint Petitioners contend that a contested case hearing is necessary to resolve a material issue of fact regarding whether (i) the tailing basin design satisfies applicable rules, (ii) the bentonite technology proposed is “available”; and (ii) the proposed FTB liners will perform as proposed. *Id.* at 58-59.

Sixth, Joint Petitioners contend that the seepage collection system will fail to perform as projected. Joint Petitioners therefore argue that a contested case hearing is necessary to resolve these issues. *Id.* at 59.

Seventh, Joint Petitioners argue that the proposed monitoring plan for the FTB is inadequate to detect whether the FTB is leaking pollutants into the groundwater or is causing water contamination. Joint Petitioners demands a contested case hearing to determine whether the proposed monitoring system is sufficient to allow PolyMet to take required corrective action. *Id.* at 62.

Eighth, Joint Petitioners argue that the reactive mine waste that the NorthMet Project will generate has not been accurately characterized and cannot be reliably sorted. Joint Petitioners add that the waste rock storage pile liners and collections systems are deficient and the monitoring plans will not find leakage. Joint Petitioners therefore request that the DNR deny the Permit to Mine or, alternatively, grant a contested case hearing on the adequacy of the characterization and the implications of the inadequacy on the facility designs. Joint Petitioners also request a contested case hearing on the adequacy of the monitoring plane and the waste rock on the liner system. *Id.* at 64-77.

Ninth, Joint Petitioners claim that PolyMet's plans for post-closure wastewater treatment does not comply with Minnesota law and that the proposed passive treatment system is unproven. Joint Petitioners request a contested case hearing on the efficacy of the proposed passive treatment system. *Id.* at 77-81.

Tenth, Joint Petitioners argue that the proposed financial assurance is inadequate and violates the regulatory requirements. Joint Petitioners specifically claim that the financial assurance proposal fails to ensure sufficient funds to address reclamation; the estimates for reclamation costs are artificially low; the financial assurance instruments are not bankruptcy proof; and PolyMet does not have the necessary capital or access to capital to conduct the mining operations or to fund the financial assurance requirements. *Id.* at 81-83.

Finally, Joint Petitioners raise concerns about the stability of the ground under the HRF. *Id.* at 93-94.

Summary of Joint Petitioners' Issues for Contested Case Hearing

145. Joint Petitioners conclude their Petition by summarizing the issues that it believes need to be raised at a contested case hearing:

- Whether the Permit to Mine is adequate under applicable rules because it lacks specific terms and conditions and relies on plans that have not been developed, depriving the public of a meaningful opportunity for review and frustrating the future enforcement of the Permit to Mine, should it be issued.
- Whether the plan for operation and closure of the FTB approved by the Permit to Mine complies with applicable laws when that plan puts natural resources and the public at risk due to the use of unsafe and untested dam construction techniques (such as bentonite amendment of the dam faces and upstream construction), use

of unproven technologies to prevent oxygen and water infiltration, and involves the need to maintain dams and associated structures throughout a perpetual “wet closure,” and where the DNR failed to consider feasible and prudent alternatives to the dam construction techniques and proposed wet closure, including dry tailings management techniques.

- Whether the Permit to Mine meets applicable requirements for reclamation of reactive waste facilities because the FTB will include perpetually maintained wet and dry sections which will employ unproven technologies (e.g., bentonite amendment) that will not reduce infiltration as required by the rules, and which (in contravention of applicable laws) will rely on a system for recapture of seepage, in particular where that system is unlikely to function at the level of recapture assumed due to construction issues and operational issues, making it inadequate to control potential releases that have the potential to cause degradation of water quality.
- Whether the Permit to Mine is based on adequate characterization of the reactive qualities of the waste rock under applicable law and whether the proposed segregation of the waste rock will be feasible, such that the conditions in the Permit to Mine (in particular conditions governing the Category 1 waste rock storage pile) are adequate to comply with applicable laws protecting natural resources.
- Whether the Permit to Mine meets applicable requirements for waste rock storage because the proposed control systems are inadequate to capture and control releases that have the potential to cause degradation of water quality and violate applicable standards.
- Whether the Permit to Mine meets applicable requirements for protection of natural resources due to the inadequacy of the proposed placement of monitoring wells at the plant and mine site.
- Whether the Permit to Mine meets applicable requirements for financial assurance due to the fact that the contribution schedule defers the vast majority of contributions to a later date, the reclamation cost estimates are no longer based on industry standard estimators, and it is unclear whether PolyMet has the necessary capital to adequately fund the full cost of closure, including long-term reclamation, water treatment, operations and maintenance costs.

Id. at 92-93.

Joint Petitioners’ Supplement to the Contested Case Hearing Petition

146. Joint Petitioners submitted a twenty-four page “Joint Supplement to the Petition for a Contested Case Hearing” on April 6, 2018 (“Joint Supplement”). The Joint Supplement was based on additional information that it received from the DNR in response to a Data Practices Act request and PolyMet’s release of the Updated Form NI 43-101 Technical Report

for the NorthMet Project. Attached to the Joint Supplement, Joint Petitioners included nineteen Exhibits.

147. Joint Petitioners reiterate eight issues that they believe are ripe for a contested case hearing:

First, Joint Petitioners amplify their concerns about the FTB by citing to the DNR’s consultant Don Sutton⁶, who wrote to the DNR that the plan gives him “severe indigestion because a lake on top of a pile of sand is inherently unstable and irresponsible. The dam embankments are a stair step arrangement that is inherently geomorphically unstable[.]” Joint Supplement at 3. Sutton goes on to state that the stair step design will encourage erosive gullying, causing a catastrophic release of tailings. *Id.* Sutton believes the risk of FTB Dam failure is “likely” to occur. *Id.* Joint Petitioners conclude that the stability of the FTB is a material issue of disputed fact that needs to be adjudicated in a contested case hearing. *Id.* at 4.

Second, Joint Petitioners reiterate their objection to wet closure by supplementing the record with concerns raised by the DNR’s consultants. According to Joint Petitioners, the consultants believe that wet closure is “inherently unsafe[.]” *Id.* at 6. Joint Petitioners conclude that wet closure “does not comply with lawful requirements, and cannot be permitted.” *Id.*

Third, Joint Petitioners repeat their longstanding request for the DNR to consider dry stacking (also known as filtered tailings) and dry closure. *Id.* at 6-9.

Fourth, Joint Petitioners dispute the financial assurances will adequately protect the state. Joint Petitioners support this position by quoting the DNR’s consultant who recommended that the trust fund must be fully funded within the first few years of operation. Joint Petitioners also raised concerns about the accuracy of the reclamation estimates. Finally, Joint Petitioners dispute whether PolyMet has the capital or access to capital to conduct its proposed operations and fund its financial assurance obligation and questions the profitability of the NorthMet Project. *Id.* at 9-13.

Fifth, Joint Petitioners again question the efficacy of the bentonite amendment and seepage containment systems and disputes the “overly optimistic assumptions about the efficacy of the bentonite barrier and seepage containment systems.” *Id.* at 15.

Sixth, Joint Petitioners supplement their argument that the reactive mine waste generated by the NorthMet Project will not be adequately characterized by quoting the DNR’s consultants, who question “how much confidence” the DNR should have that sufficient testing has been done. *Id.* Joint Petitioners are particularly concerned about this issue because it believes that the Category 1 waste rock stockpile, which will be unlined, contains more sulfates and heavy metals than the DNR has assumed. *Id.* at 15-16.

⁶ Mr. Sutton was not retained by the DNR to consultant on issues related to the tailing basin.

ii. WaterLegacy's Petition for a Contested Case Hearing

148. On February 27, 2018, WaterLegacy submitted “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” (“WaterLegacy Petition”). In support of its Petition, WaterLegacy includes specific objections to the Permit to Mine Application, fifty-five exhibits, and three declarations. Similar to Joint Petitioners’ Petition, WaterLegacy provides an overview of the Minnesota statutes and mining rules and contends that the NorthMet Project fails to comply with Minnesota statutes and rules. WaterLegacy raises nine specific concerns with the draft Permit to Mine and seeks requests that the DNR either reject the Permit to Mine Application or add conditions to the Permit to Mine. On certain issues, WaterLegacy also requests a contested case hearing but often fails to expressly link its objections to the draft Permit to Mine, or the proposed conditions, to a request for a contested case hearing.

Standing

149. According to WaterLegacy, it 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. WaterLegacy claims that it has focused much of its work “on protecting the Lake Superior Basin from threats to groundwater, surface water, and other natural resources posed by the proposed PolyMet project.” WaterLegacy Petition at 63.

150. WaterLegacy claims to have “thousands of members and supporters,” and that it represents “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.” *Id.*

151. WaterLegacy includes declarations of three members of WaterLegacy who own property that would be adversely affected by the proposed NorthMet Project. *Id.*

152. Roland Ring-Jarvi grew up in Two Harbors, Minnesota and currently owns a cabin and sauna on 1.5 acres of land on Wynne Lake in Biwabik, Minnesota. Mr. Ring-Jarvi uses that cabin throughout the year and is active in the area. Mr. Ring-Jarvi is “very concerned about the threat of pollution if there is a toxic release from tailing dam failure.” He also is concerned about the wet tailing storage method and believes that by denying the Permit to Mine, it would protect his property interest, the value of his land, and his purpose in buying the property. Mr. Ring-Jarvi requests a contested case hearing “so that an administrative judge can help examine the project and evaluate whether the permit should be denied or stronger project conditions required.”

153. Shelley Strohmaier’s family has had a cabin in Gilbert, Minnesota on Lake Esquagama for sixty years. She bought land and a cabin on Lake Esquagama eight years ago. Ms. Strohmaier and her family are active in the area and fish, kayak, and water ski. She is “very

concerned that this mine will ruin the water and harm the fish, damaging the value of our property and our purpose in buying the property[.]” Ms. Strohmaier also is concerned that a tailing breach will release polluted water and tailings and harm her property on Lake Esquagama. She requests that the DNR “hold a contested case hearing on the draft PolyMet permit to mine so that an objective administrative judge can make recommendations on whether the permit should be granted and, if so, under what conditions.”

154. Timothy Wallace is a biologist who worked for the DNR for 26 years. He owns with his wife 52.96 acres of undeveloped land with riparian frontage on the St. Louis River near Zim, Minnesota. Mr. Wallace declares that his “way of life depends upon the quality of water and natural resources. . . . Water pollution and hydrologic changes in the St. Louis River headwaters from PolyMet’s proposed mine project would have a potential adverse affect on the value of property we own[.]” Mr. Wallace requests a “contested case hearing on the draft PolyMet permit to mine so that an impartial administrative judge could make recommendations on whether the permit should be granted and, if so, under what conditions.”

Alleged Deficiencies with Draft Permit to Mine

155. The bulk of WaterLegacy’s Petition focuses on alleged deficiencies with the draft Permit to Mine in an effort to have the DNR issue a decision that either denies the Permit to Mine or issue or clarify conditions that will strengthen the Permit to Mine.

First, WaterLegacy believes that the proposed method of tailing storage does not minimize adverse impacts to property, water or other natural resources because of the risks of “either tailing dam failure or tailings waste facility seepage.” *Id.* at 6. WaterLegacy maintains that only dry closure can satisfy Minnesota law and that the existing design creates an unconscionable risk to the environment. This concern is compounded by WaterLegacy’s belief that the “PolyMet is expecting to obtain a Permit to Mine without completing a dam design that meets the required minimum factors of safety.” *Id.* at 10.

Second, WaterLegacy claims that the draft Permit to Mine fails to provide an appropriate site, foundation, or long-term management plan to prevent structural failure and the release of waste. WaterLegacy alleges that concerns exist about the stability of the foundation underlying the HRF and the lack of a plan to address water management in the event of an extreme precipitation event. *Id.* at 13. WaterLegacy lists additional concerns related to the liner system, which it believes is “vulnerable to deformation and rupture due to its location on an unstable foundation.” *Id.* at 13. In support, WaterLegacy quotes consultants retained by the DNR who allegedly raised concerns about the ground stability beneath the HRF and the durability of the liner. WaterLegacy also raises concerns related to climate change and severe rain events, which it believes will destabilize the slope and increase the risk of dam failure.

Third, WaterLegacy claims that the tailings storage and Category 1 waste rock storage proposed by PolyMet fail to comply with Minnesota rules requiring that reactive waste be disposed of to prevent the release of hazardous substances and fail to provide adequate collection and disposal of residual waters. *Id.* at 16. WaterLegacy specifically calls into question PolyMet’s modeling of seepage at the tailings toe and claims that PolyMet’s modeling of seepage concentration likely understates the actual tailings chemistry. WaterLegacy adds that

the FEIS erroneously assumed that nearly all of the tailing seepage will be at the surface. *Id.* at 17. WaterLegacy also questions whether nearly all of the seepage would be captured.

Compounding these concerns, WaterLegacy believes that the draft special conditions for the Permit to Mine fail to require that PolyMet keep the commitments relied upon by the DNR to conclude that the PolyMet FEIS was “adequate.” WaterLegacy Petition at 9-11, 18-19. In particular, WaterLegacy claims that the draft special conditions “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 must be effectively collected. The DNR, instead, allows PolyMet to submit seepage capture designs until after a permit is issued and sets no standards for performance.” *Id.* at 19-20. WaterLegacy continues that 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.” *Id.* at 20. WaterLegacy, with the support of a purported expert, concludes that the proposed drainage system is unlikely to work as anticipated. *Id.* at 23.

Fourth, WaterLegacy argues that reclamation, closure and postclosure maintenance of the tailings waste facility proposed in the PolyMet draft Permit to Mine fails to comply with Minnesota law. WaterLegacy does not believe that wet closure complies with Minnesota law and re-iterates concerns raised by the DNR’s consultant, Don Sutton. WaterLegacy also argues that the application of bentonite is not a proven technology and that PolyMet’s proposed bentonite amendment will likely fail to perform as claimed. *Id.* at 27.

Fifth, WaterLegacy claims that by eliminating the Mine Site Wastewater Treatment Facility (“WWTF”) and proposing early adoption of non-mechanical treatment, the 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. WaterLegacy contends that moving the WWTF from the Mine Site is a material change from what was analyzed during the environmental review and believes that it will increase the toxicity of material being piped across wetlands. *Id.* at 33. WaterLegacy is also concerned that by eliminating the WWTF from the Mine Site means that the treatment of contaminated process water from the Mine Site would depend on operation of pumps and pipelines and “[i]n 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.” *Id.* at 34. WaterLegacy adds that elimination of the Mine Site WWTF “would create obstacles to effective adaptive mitigation and contingency mitigation[.]” *Id.* at 34.

Sixth, WaterLegacy claims that the proposal to store process wastewater at the Mine Site, fails to prevent the release of substances that result in adverse impacts or to minimize impacts on surface water and groundwater. *Id.* at 35. WaterLegacy believes that the 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.” *Id.* WaterLegacy suggests that the DNR include additional special conditions to the Permit to Mine to address this concern.

Seventh, WaterLegacy claims that the 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. WaterLegacy also contends that PolyMet has failed to conduct an adequate analysis to assess the extent of damage that a dam breach would cause. *Id.* at 40. WaterLegacy concludes that the deficient analysis of the damages that would be posed by failure of the PolyMet FTB and HRF Dams, and by spills, leaks, uncontained seepage, make it impossible “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.” WaterLegacy adds “there is no basis for PolyMet or the DNR to assert that \$10 million in pollution insurance is ‘adequate.’” *Id.* at 46.

Eighth, WaterLegacy claims that the 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. WaterLegacy adds that the financial assurance package does not comply with Minnesota Rules because the DNR is only requiring \$10 million prior to issuance of the Permit to Mine. WaterLegacy also claims that PolyMet’s cost proposal violates the Clean Water Act because the calculation of legacy reclamation and remediation costs is allegedly “based on an explicit exclusion of any ‘treatment activities or costs’ to remedy legacy pollution at the LTVSMC tailings facility[.]” *Id.* at 50.

Ninth, WaterLegacy claims that the 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. *Id.* at 52. WaterLegacy claims that the draft permit is vague and non-specific, thereby rendering its provisions unenforceable. *Id.* WaterLegacy adds that the proposed special conditions are too vague to require compliance with factors of safety for tailings dam stability and fail to set meaningful or enforceable limits on a host of issues, including seepage escapement from containment systems, and fail to define standards that must be met. *Id.* at 53. WaterLegacy requests that the DNR add special conditions that ensure that PolyMet’s activities comply with Minnesota standards. *Id.* WaterLegacy concludes that the “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.” *Id.* at 59.

156. WaterLegacy concludes by suggesting a number of modifications or conditions that the DNR should impose on the NorthMet Project. *Id.* at 60-62.

Summary of Issues for Contested Case Hearing

157. WaterLegacy requests a contested case hearing on the following issues:

- whether the siting, technology, design and methods of operation for the tailings waste storage facility proposed in the draft Permit to Mine comply with applicable Minnesota law;
- whether the siting, preparation of foundation, method of operation and long-term maintenance for the HRF proposed in the draft Permit to Mine comply with applicable Minnesota law;

- whether 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;
- whether the reclamation, closure and postclosure maintenance of the tailings storage facility proposed in the draft Permit to Mine comply with applicable Minnesota law;
- whether the elimination of the mine site Wastewater Treatment Facility and plans for adoption of mine site non-mechanical treatment proposed in the draft Permit to Mine comply with applicable Minnesota law;
- whether the storage of process wastewater at the mine site proposed in the draft Permit to Mine complies with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules;
- whether the environmental liability insurance proposed in the draft Permit to Mine complies with applicable Minnesota law; and
- whether the draft Permit to Mine contains information and specificity required to comply with applicable Minnesota law.

Id. at 64-65.

158. WaterLegacy also requests that the DNR commissioner, as a matter of his own motion, order a contested case hearing on the Permit to Mine.

WaterLegacy's Supplemental Petition

159. On April 5, 2018, WaterLegacy submitted an 11 page supplemental filing based on PolyMet's March 2018 Technical Report NI 43-1-1FI and related materials.

160. WaterLegacy supplemental petition primarily focuses on whether NorthMet Project is financially feasible, which in turn would jeopardize PolyMet's capacity to provide financial assurance.

iii. PolyMet's Response to Petitions for Contested Case Hearing

161. On April 6, 2018, PolyMet submitted a 107-page Response to Petitions for Contested Case Hearing ("PolyMet Response"). PolyMet claims that a contested case hearing is "neither necessary nor appropriate" because the NorthMet Project has been exhaustively reviewed and subjected to many rounds of public comment. PolyMet Response at 1. PolyMet notes that the draft Permit to Mine "stands atop a 2,000-page Environmental Impact Statement (EIS), prepared over the course of a decade, with unprecedented public input." PolyMet Response at 1. PolyMet also observes that during the environmental review, the reviewing agencies, including the DNR, received over 57,700 written submissions and addressed the public comments and information that they received, including from Petitioners, in an extensive Final

EIS, which includes a 776-page appendix that “carefully catalogued the agencies’ specific responses.” *Id.* at 2. After the FEIS was published, the DNR offered another opportunity for public comment and received another 30,000 written submissions, which were addressed in the Adequacy Determination. *Id.* PolyMet concludes that “[t]he issues addressed by MDNR during this process include the same issues raised here by the Petitioners. Yet no one challenged MDNR’s determination that the Final EIS was adequate under state law.” *Id.* at 2.

162. Based on the foregoing, PolyMet argues that there is no need to hold a contested case hearing because Petitioners’ concerns were addressed during the environmental review and they offer “no information beyond what was already raised and thoroughly considered[.]” *Id.* at 2. PolyMet contends that a contested case hearing is simply not designed “for project opponents to present previously considered information in a ‘quasi-judicial’ setting. Rather, contested cases are for adjudicating reasonable factual disputes that MDNR is unable to resolve on its own.” *Id.* (citing *In re NSP Red Wing Ash Disposal Facility*, 421 N.W.2d 398, 404 (Minn. Ct. App. 1988) (affirming agency denial of a petition from a contested case hearing because the petitioner failed to provide the agency “with any indication of what specific *new facts* an expert might testify to at a contested case hearing”) (emphasis in original)).

163. PolyMet adds that a petitioner may not demand a contested case hearing based on disagreements over the interpretation or application of the law, or general policies. “Questions of law or policy are not the proper subject of a contested case.” *Id.* (citing *In re Little Rock Creek*, 2016 WL 6923602, at *9 (Minn. Ct. App. Nov. 28, 2016) (“MPCA did not err by declining to grant a contested-case hearing where the petitions asserted legal, rather than factual, arguments”)).

164. And, according to PolyMet, raising a mere factual dispute – even ones supported by new information or expert reports – is insufficient to trigger a contested case hearing. Instead, the new information must have adequate support and, ultimately, must be the kind of disputed information that the adjudication of the dispute would aid the commissioner in making a final determination on the permit to mine application. *Id.* at 3. PolyMet concludes that disputed factual issues are “best resolved by agency experts who have ample time to review and carefully consider them, not an ALJ who is hearing about them for the first time during a contested case proceeding. When agency experts have done their job, as they have here, there is no need for an inexperienced ALJ to check their work.” *Id.*

165. PolyMet goes on to address the factual issues raised by Joint Petitioners and WaterLegacy and explains at length why none of these issues satisfy the criteria for holding a contested case hearing. *Id.* at 5-18, Appendices A-K. PolyMet also argues that WaterLegacy’s Petition “does not contain the specificity required by Minnesota Statutes § 93.483 and should be rejected on that basis alone. That Petition broadly requests a contested case in a number of general areas but does not specify the exact material issues of fact that are in dispute, nor does it provide specific new evidence it would present at a contested case.” *Id.* at 10 n. 54.

166. Finally, PolyMet argues that neither the Petitioners nor their members own property that “will be affected” by the NorthMet Project and, therefore, they do not have standing to request a contested case hearing. *Id.* at 18-20.

D. Tribal Outreach

167. In recognition of their unique role as cooperating agencies during the environmental review process, the DNR engaged in a tribal-outreach process with the Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa, Grand Portage Band of Lake Superior Chippewa, GLIFWC, and the 1854 Treaty Authority. These Bands and their representatives had submitted comments to the agency during the public comment process. Once received, these comments were transferred to a spreadsheet to facilitate the DNR's review. The DNR denoted its consideration of these comments within the same spreadsheet. After this review process, the DNR offered to meet in person with any of the representatives of these tribal entities.

168. The DNR met with representatives of most of these tribal entities on August 29, 2018 to discuss the concerns that they raised during the public comment process. During this meeting, representatives of the DNR offered these tribal entities the opportunity to discuss any of the concerns they had raised during the public-comment process. The DNR updated the spreadsheet to summarize these discussions and their outcome.

169. As a result of these discussions with the Bands, additional monitoring conditions were included within the Permit to Mine and PolyMet's Water Appropriation Permits. For example, the DNR added Special Condition 57a to the Permit to Mine, requiring an additional monitoring location for railcar spillage at Unnamed Creek along the railroad corridor. In addition, certain special conditions were revised from the Draft Permit that was circulated for public comment. For example, Special Condition 55 was amended to require that the final designs for the cut-off wall for the FTB Seepage Containment System and the Category 1 Stockpile Groundwater Containment System be keyed to bedrock and maintain inward flow gradient in accordance with the NPDES/SDS permit and as demonstrated through ongoing monitoring. The monitoring plans associated with the Water Appropriation Permits for the East Pit and West Pit at the Mine Sites were modified to include additional hydrogeologic testing and monitoring of bedrock wells for potential northward groundwater flow from the Mine Site. The Notice of Decision approving PolyMet's wetland replacement plan requires that any revisions to the wetland delineation determined by the U.S. Army Corps of Engineers related to the Wetland Mapping at the PolyMet Mine Site, Great Lakes Indian Fish and Wildlife Memo dated August 6, 2017 will supersede the approved delineation.

E. Revisions to Special Conditions

170. After review of all of the petitions, objections, and public comments and continued agency review of the Permit to Mine Application, the DNR revised dozens of the 90 non-financial-assurance special conditions within the draft Permit to Mine and added several dozen new special conditions to the issued Permit to Mine. The final Permit to Mine now includes 140 special conditions, as well as an attachment with 28 items addressing financial assurance conditions, and an attachment addressing rare natural communities. These revisions addressed a broad array of concerns related to the FTB, the HRF, the Category 1 waste rock stockpile, backfilled pits, monitoring, and final designs, among other aspects of the NorthMet

Project. These revisions clarified the requirements of the Permit to Mine, including additional monitoring and reporting to the DNR.⁷

VII. ANALYSIS OF APPLICATION AND SPECIAL CONDITIONS AGAINST RECLAMATION RULES

A. Declaration of Policy – Minn. Stat. § 93.44

171. Under the Minnesota Mineland Reclamation Act it is the policy of the State of Minnesota:

to provide for the reclamation of certain lands hereafter subjected to the mining of metallic minerals or peat where such reclamation is necessary, both in the interest of the general welfare and as an exercise of the police power of the state, to control possible adverse environmental effects of mining, to preserve the natural resources, and to encourage the planning of future land utilization, while at the same time promoting the orderly development of mining, the encouragement of good mining practices, and the recognition and identification of the beneficial aspects of mining.

Minn. Stat. § 93.44. This policy is implemented through nonferrous metallic mineral mineland reclamation rules found in Chapter 6132 of the Minnesota Rules.

B. Purpose and Policy – Minn. R. 6132.0200

172. “A mining operation entails the substantial disruption of the physical environment of the mining area.” SONAR at 23. The purpose of parts 6132.0100 to 6132.5300 is to “control possible adverse environmental effects of nonferrous metallic mineral mining, to preserve natural resources, and to encourage planning of future land utilization, while at the same time promoting orderly development of nonferrous metallic mineral mining, encouragement of good mining practices, and recognition and identification of the beneficial aspects of nonferrous metallic mineral mining.” Minn. R. 6132.0200.

173. In order to accomplish these purposes, it is the DNR’s policy “that mining 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.” *Id.*

⁷ For example, in response to concerns raised in the public comments and the Petitions, the DNR revised Special Condition 65 to the Permit to Mine to provide that any future transition to non-mechanical water treatment would be deemed a substantial change requiring amendment to the Permit to Mine, which would be publicly noticed in accordance with the applicable rules. Similarly, the DNR added Special Condition 3a, which provides that a change in the terms of the financial assurance requirements outlined in Attachment 1 to the Permit to Mine (other than a change to specific dollar amounts attributable to calculations using the methods set forth in Attachment 1) would also be publicly noticed as a substantial change amendment.

C. Permit Required – Minn. R. 6132.0300

174. This rule prohibits the mining of nonferrous metallic minerals without first obtaining a permit to mine from the commissioner. Minn. R. 6132.0300, subp. 1. The person seeking the permit to mine “must possess capital and provide financial and operational decision making necessary to conduct the mining operation.” *Id.*

175. As set forth in the Affidavits of Jess Richards (Director of the DNR’s Lands and Minerals Division) and Joseph Henderson (Manager for Mine Permitting and Coordination for the DNR’s Lands and Minerals Division) dated November 1, 2018, the DNR has reviewed a number of documents and concluded that PolyMet possesses capital, pursuant to the rule.

176. The DNR has reviewed publicly available document titled “PolyMet Mining Corp. Consolidated Financial Statements As at December 31, 2017 and January 31, 2017 And for the 11 months ended December 31, 2017 and 12 months ended January 31, 2017.” This document is an audit of PolyMet’s financial statements by PricewaterhouseCoopers LLP (PWC). It serves as a “Report of Independent Registered Public Accounting Firm” to the shareholders and board of directors of PolyMet. It is signed by PWC and also signed by PolyMet CEO Jonathan Cherry and CFO Patrick Keenan. The document provides statements on PolyMet’s Consolidated Balance Sheets which indicate among other details total assets of \$409,042,000 and total liabilities of \$210,367,000. One section of the PWC document states, “Management believes, based on the underlying value of the NorthMet Project, the advanced stage of permitting, the history of support from its shareholders (see Notes 7, 8, 9 and 16) and the ongoing discussions with investment banks and investors, that financing will continue to be available allowing the Company to obtain financing necessary to complete the development of NorthMet and generate future profitable operations. While in the past Company has been successful in closing financing agreements, there can be no assurance it will be able to do so again. Factors that could affect the availability of financing include the state of debt and equity markets, investor perceptions and expectations, and the metal markets.”

177. The DNR also reviewed a publicly available document titled “AMENDMENT NO. 25 RELATING TO PURCHASE AGREEMENT”[.] This is a signed agreement between PolyMet and Glencore AG which established an equity commitment from Glencore AG for the project. The agreement commits to provide \$80,000,000 in equity for the project. To date PolyMet has taken \$45,000,000 in equity distributions from the agreement. There is \$35,000,000 in additional equity available under this agreement. The DNR also reviewed PolyMet’s account with Wells Fargo Bank, which indicates that PolyMet has over \$25,000,000 as of October 29, 2018 in cash available.

178. In addition to the above, PolyMet intends to close on a real estate transaction with Cleveland Cliffs, prior to any decisions on the permit to mine, which will provide PolyMet with physical capital in the form of property and facilities that would be necessary for the mining operation.

179. Based on review of the above documents and on the physical capital that will be available prior to a decision on a permit to mine, the DNR concludes that PolyMet has met the intent of the rule to “possess capital.”

180. The term of the Permit to Mine is “the period determined necessary by the [DNR] for the completion of the proposed mining operation including postclosure maintenance, based on information provided” in the application. Minn. R. 6132.0300, subp. 3. The DNR concludes, for reasons set forth herein, that the term of the Permit to Mine is for a period necessary to complete the proposed mining operation.

D. Siting – Minn. R. 6132.2000

181. Minn. R. 6132.2000, subp. 1: This rule sets forth a goal that the NorthMet Project be “conducted on sites that minimize adverse impacts on natural resources and the public,” that separations “be maintained between mining areas and adjacent conflicting land uses,” and that all sites incorporate setbacks or separations “needed to comply with air, water, and noise pollution standards[,] local land use regulations[,] and requirements of other appropriate authorities.” As detailed in the Permit to Mine Application, the NorthMet Project complies with applicable zoning ordinances and land use plans. Permit to Mine Application § 5.12, Figure 5-37. And as explained in greater detail below, the NorthMet Project is located on sites that minimize adverse impacts on natural resources and the public.

182. Minn. R. 6132.2000, subp. 2: This rule prescribes the areas where mining is prohibited (i.e., excluded) except as allowed under state and federal laws. The NorthMet Project will not occur in any of the listed exclusion areas. *See* Permit to Mine Application Table 5-10 (detailing distances between NorthMet Project site and exclusion areas).

183. Minn. R. 6132.2000, subp. 3: This rule prescribes the areas where surface disturbance is prohibited. No feature of the NorthMet Project is within or on the surface uses described in subparts 3.A through 3.M.(1). Figure 5-37 of the Application graphically depicts where surface disturbance is prohibited, *i.e.*, in the yellow cross-hatched areas. Except for a stretch of County Highway 666, all of the yellow areas were avoided by the NorthMet Project. That stretch of County Highway 666 is a public roadway which is currently being used as the access to the PolyMet site. The Rules, specifically Minn. R. 6132.2000, subp 3 M (2), allows for surface disturbance “where mine access or haul roads cross the right-of-way.” The mining area where there is overlap between County Road 666 is the Colby Lake Pipeline. The pipeline has a 150-foot buffer on each side which approaches the outside right-of-way of County Road 666. At some locations, the Colby Lake Pipeline is in close proximity to County Road 666, especially in the vicinity of the Plant entrance. Both the Colby Lake Pipeline and County Road 666 were constructed to support previous mining activities and for access purposes. Any necessary maintenance or repair of the pipeline that could disturb the surface would not impact the roadway of County Road 666. Permit to Mine Application Table 5-10. This existing pipeline corridor complies with the requirements of the rule.

184. Minn. R. 6132.2000, subp. 4: This rule prescribes the areas where mining may be conducted only if there is no prudent and feasible siting alternative. Additionally, in the prescribed areas, “[m]ining shall be allowed only if there will be either no adverse impacts on the natural resources, or provisions acceptable to the [DNR] are proposed to either mitigate adverse effects, or replace, reroute, or in some other manner reclaim the affected natural resources.”

185. No mineral excavation or stockpiling will occur in any of the areas listed in subparts 4.A – 4.D of this rule. The NorthMet Project does, however, include three crossings where the Transportation and Utility Corridors cross public waters and two places where roads cross public waters just southwest of the FTB. Each of these crossings already exists and require no additional permitting. The only crossing that requires action for the NorthMet Project is a crossing of an unnamed tributary to Wyman Creek for an extension of a culvert for the proposed expansion of the Dunka Road. PolyMet has applied for a work in public waters permit for this culvert extension. In addition, Special Condition 79 of the Permit to Mine specifically requires PolyMet to revise its reclamation plans based on the final design of Dunka Road. Unless the culvert extension is approved to remain as part of future use of the site, the culvert would be removed and the area reclaimed.

186. Minn. R. 6132.2000, subp. 5(A): This rule requires that “[p]ortions of a mining operation for which there is flexibility in site selections, such as storage piles, tailings basins, water reservoirs, processing plants, offices[,] interconnecting roadways, and auxiliary facilities, shall be sited to the extent practicable so that . . . impacts on the public and natural resources due to wind erosion, noise, and air emissions are minimized.”

187. As detailed in the Permit to Mine Application and the FEIS, the location of the NorthMet Deposit drives the location of the Mine Site. *See* Permit to Mine Application § 7.1; FEIS § 3.2.3.4. The relatively remote location of the Mine Site minimizes potential for audial disturbance by blasting or other noise generating activities. Blasting at the Mine Site is expected to occur once every two to three days. Typically, rock blasting generates a single event noise level ranging from 111-115 A-weighted decibels (“dBA”) at 50 feet from the blasting site. Within most of the Mine Site, the sound from the blast will be similar to a loud clap of thunder (see section 5.2.1.5.1 of the Wetland Data Package within the Permit to Mine Application).

188. Much of the infrastructure at the Plant Site and Transportation and Utility Corridors involves the reuse and refurbishment of existing facilities at the former LTVSMC processing site rather than undisturbed areas. *See* Permit to Mine Application § 8.0; FEIS § 3.1.1.4. With the exception of two sections of rail line, all of the area in the Plant Site that PolyMet proposes to use is currently disturbed from prior mining activities. Noise sources at the Plant Site involve placement and construction of FTB containment system, construction of the FTB Dam, operation of various types of pumping equipment used to transport the tailings slurry and recovered water from the FTB containment system, and general construction sounds from building refurbishment and construction. Additional sources of noise along the transportation networks come from haul trucks, smaller trucks, and rail traffic. For example, noise along the transportation corridors will be generated by trucks along Dunka Road and trains. Noise from trucks passing along Dunka Road is estimated to range from 67 dBA for light trucks to 90 dBA for larger dump trucks. The decibel level of a passing freight train at approximately 50 feet is 80 dBA. A locomotive’s horn decibel level is 96 dBA at 100 feet ahead of the locomotive (see section 5.2.3.3.1 of the Wetland Data Package within the Permit to Mine Application). During construction, blasting noise along the transportation corridors will be somewhat reduced relative to the Mine Site. For portions of transportation corridors within one mile of the Mine Site, the noise generated from a blast will range from 71-75 dBA. Tree cover and atmospheric absorption will decrease these levels further.

189. As further detailed in Section VII.K below discussing Minn. R. 6132.2800, air emissions of fugitive dust from the storage piles will be managed using effective dust suppression techniques. *See* Permit to Mine Application § 13.2.1.2. The size of the rock in the stockpiles renders the rock minimally susceptible to wind erosion once placed in the stockpile. All facilities are covered by the two Fugitive Emissions Control Plans, which specifically address wind erosion. The MPCA regulates noise, fugitive dust, and other air emissions.

190. Minn. R. 6132.2000, subps. 5(B), 5(C): These rules require that “[p]ortions of a mining operation for which there is flexibility in site selections, such as storage piles, tailings basins, water reservoirs, processing plants, offices[,] interconnecting roadways, and auxiliary facilities, shall be sited to the extent practicable so that . . . potential injury to life” and “potential damage to property and natural resources” “due to floods, caving, or slope failure” are minimized.

191. The storage piles, water reservoirs, the processing plant, and auxiliary facilities at both the Mine and Plant Site are located relatively far from the public and thus the potential injury to life due to slope failure is minimal. PolyMet’s open-pit mining operations do not pose any threat of caving. The FTB and storage piles were designed by a professional engineer and will be maintained to meet all applicable factors of safety. The FTB will be monitored and maintained as directed in the management plans to ensure the required factors of safety continue to be met. *See* FTB Permit Conditions 28, 33.

192. Seepage and runoff collection in and around the storage piles and haul roads will minimize potential damage to property and natural resources due to flooding since the water will be captured and controlled. Stormwater ponds are located and sized to manage non-contact stormwater, construction stormwater, and industrial stormwater. Stormwater will be managed in accordance with the permitting requirements of the MPCA, and associated agency-approved Stormwater Pollution Prevention Plan (‘SWPPP’). The stormwater ponds are sited to minimize major modification of watersheds, including the diversion of stormwater, and provide appropriate retention for settling of total suspended solids (‘TSS’) to minimize impacts on surface water. The design allows for stormwater management up to the 100-year, 24-hour storm event. The ponds are designed with primary outlets to provide flood attenuation capacity up to the 10-year, 24-hour storm event, and emergency outlets to pass runoff from larger storms up to and in excess of the 100-year, 24-hour storm event. This will minimize the potential for injury to life or damage to property and natural resources due to flooding. Application § 11.3.4.3.

193. PolyMet will design the stormwater infrastructure for the Plant Site based on the 10-year, 24-hour storm event, with consideration and evaluation of depth of flooding so as not to enter buildings or overtop railroad tracks up to the 100-year, 24-hour storm, thus protecting natural resources from flooding. Application § 11.4.4.2. The FTB design incorporates the freeboard required for the FTB to safely accommodate the Probable Maximum Precipitation event—30 inches of rain within a 72-hour period—without overtopping the dams to protect the surrounding natural resources from flooding.⁸ Emergency overflow structures will be designed, constructed, and maintained as a safeguard for large, less frequent rain events. These structures

⁸ For reference, the 2012 flooding rains in the Duluth area involved a two-day total rainfall of 7.24 inches with a 24-hour total of 10.45 inches in Two Harbors.

are important such that a controlled overflow through an emergency structure is much preferred to a breach of the dam should internal water pressures build or the rising water overtop to dams. *Id.* § 11.4.6.2. Such emergency overflow structures are a standard dam safety measure for many types of dams, including tailings dams.

194. Portions of the mining operation for which there is flexibility on site selection are sited to the extent practicable so that potential injury to life, property, and natural resources are minimized. Various special conditions, mitigation measures, and adaptive management will ensure compliance with this requirement.

195. Minn. R. 6132.2000, subps. 5(D), 5(E): These rules require that “[p]ortions of a mining operation for which there is flexibility in site selections, such as storage piles, tailings basins, water reservoirs, processing plants, offices[,] interconnecting roadways, and auxiliary facilities, shall be sited to the extent practicable so that . . . major modifications of watersheds, including diversions of surface water and alterations of groundwater levels, are minimized” and that “runoff and seepage can be managed to minimize water impacts on surface water and groundwater.”

196. The FTB has been designed to capture seepage such that effects on surface and ground water are minimized. Tailings basin seepage currently provides water to certain wetlands and tributaries of the Embarrass River. In order to avoid ecologic and hydrologic impacts to the Embarrass River watershed, PolyMet has agreed to augment flows in to Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek (“Embarrass River Tributaries”). Application § 11.4.8. PolyMet will augment streamflow in the Embarrass River Tributaries through discharge of treated effluent from the WWTS and diverting runoff that currently flows into the FTB via a drainage swale. The aim of this augmentation is to limit the change in average annual streamflow to +/- 20% of existing conditions. *See* FEIS § 5.2.2.3.3; Appendix 11.3 § 2.7, page 27. These discharges will occur under the terms of an NPDES/SDS permit issued by the MPCA. Application § 11.4.8. This augmentation of water to the watershed will continue during operations and into post-closure. The potential effects of the NorthMet Project on groundwater levels was analyzed in the FEIS and thoroughly addressed in water-appropriation permitting.

197. The storage piles are all located within the Partridge River watershed, which reduces the potential for the transfer of water from one watershed to another. Upon closure, the two temporary stockpiles will be removed and the ground reclaimed, thus maintaining the same water flow directions as were there prior to the NorthMet Project. Similarly, the Transportation and Utility Corridor is within the Partridge River watershed. Culverts currently exist along the Dunka Road to ensure that water can move freely within watershed.

198. Seepage from the FTB and the Category 1 waste rock stockpile will be collected and treated prior to either reuse in processing release or to the environment. Recycling and reusing water reduces the need to draw more water directly from the environment. Seepage from the lined, temporary stockpiles and haul roads is also collected and treated. Releasing treated water in this way protects the surface and ground water quality of the receiving water body or watershed. *See* FEIS Table 5.2.2-21 and FEIS § 5.2.2.

199. Water management for the entire site has been designed generally to collect and treat that which is predicted to adversely impact surface or ground water. Water which does not require treatment prior to release is either allowed to seep into the ground or collected and released in quantities that would not damage the receiving water body channel. Monitoring for water quality and quantity will verify that the designs are in fact protective. Adaptive management is available in case an aspect of the facility functions outside of the predictions.

200. Portions of the mining operation for which there is flexibility on site selection are sited to the extent practicable so that major modifications of watersheds, including diversions of surface water and alterations of groundwater levels, are minimized, and runoff and seepage can be managed to minimize water impacts on surface water and groundwater. Various special conditions, mitigation measures, and adaptive management will ensure compliance with this requirement.

201. Minn. R. 6132.2000, subp. 5(F): This rule requires that “[p]ortions of a mining operation for which there is flexibility in site selections, such as storage piles, tailings basins, water reservoirs, processing plants, offices[,] interconnecting roadways, and auxiliary facilities, shall be sited to the extent practicable so that . . . conflicts with natural and historical heritage sites, identified during environmental review, are minimized.”

202. The potential for conflicts with natural and historical heritage sites, identified during environmental review, have not changed since the summary presentation in Table 4.2.9-1 of the FEIS. The NorthMet Project will be implemented in accordance with the stipulation measures outlined in the signed Memorandum of Agreement among the USFS, USACE, Minnesota State Historic Preservation Office (“SHPO”), Advisory Council on Historic Preservation, and PolyMet in December of 2016 and thus minimizes the conflicts.

203. Minn. R. 6132.2000, subp. 5(G): This rule requires that “[p]ortions of a mining operation for which there is flexibility in site selections, such as storage piles, tailings basins, water reservoirs, processing plants, offices[,] interconnecting roadways, and auxiliary facilities, shall be sited to the extent practicable so that . . . former mining areas are used in preference to areas undisturbed by mining.”

204. A number of aspects of the NorthMet Project at the Plant Site were sited there for express reuse of an existing brownfield site previously disturbed by mining. The NorthMet Project will also utilize a mostly existing transportation network for access between the Mine and Plant Sites. Application § 10.3.3.

205. Minn. R. 6132.2000, subp. 6: This rule requires that “[m]ining activities that result in the draining or filling of wetlands, identified pursuant to Minnesota Statutes, section 103G.005, subdivision 19, shall not be conducted unless the wetlands are replaced by restoring or creating wetland areas under a replacement plan approved pursuant to [Minn. R. 6132.5300].”

206. The wetland replacement plan must “meet[] the same principles and standards for replacing wetlands under parts 8420.0500 to 8420.0528 and provide[] for construction certification and monitoring according to parts 8420.0800 and 8420.0810.” *See* Minn. R. 8420.0930. A wetland replacement plan (Permit to Mine Application, Appendix 18.1) has been

approved by the commissioner as satisfying the applicable requirements of Chapter 8420. This approved wetland replacement plan is incorporated into PolyMet’s mining and reclamation plans and is part of the approved Permit to Mine.

E. Buffers – Minn. R. 6132.2100

207. Minn. R. 6132.2100, subp. 1: This rule sets forth a goal that the NorthMet Project “be designed, constructed, and maintained so that it is compatible with surrounding nonmining uses.”

208. Surrounding nonmining land uses are compatible with the NorthMet Project as it is designed. The Mine Site is entirely within a district zoned as “mineral mining district” and is adjacent to an area zoned “industrial” on the eastern end. *See* Permit to Mine Application § 7.1; Figure 5-38. Almost the entire Plant Site is within an area zoned “mining district.” *See id.* at Figure 5-38. The northern end of the FTB and an access road to the west of the basin are in an area zoned “industrial.” *Id.* Therefore, the NorthMet Project was designed such that it is compatible with surrounding nonmining uses. *See also id.* at § 9.0.

209. Minn. R. 6132.2100, subp. 2(A): This rule requires that “[e]xisting terrain and vegetation, or revegetated berms, must be used to diminish impacts of the mining activities.”

210. At the Plant Site, the existing terrain and vegetation and distance from neighboring land uses will diminish impacts of the mining activities. The closest private residence is 0.8 miles to the north. At the Mine Site, the existing terrain and vegetation and distance from neighboring nonmining land uses will diminish impacts of the mining activities. *See* FEIS § 5.2.4.

211. Minn. R. 6132.2100, subp. 2(B): This rule requires that buffers “be constructed before beginning operations and may be located within the areas described in part 6132.2000, subpart 3, item M.”

212. This rule is inapplicable to the NorthMet Project as there are no plans for constructed buffers at either the Plant Site or the Mine Site. Constructed buffers are not required for the NorthMet Project due primarily to the location of the facilities. The NorthMet Project was designed such that it is compatible with surrounding non-mining uses. *See* Permit to Mine Application § 9.0.

F. Reactive Mine Waste – Minn. R. 6132.2200

213. Minn. R. 6132.2200, subp. 1: This rule sets forth a goal that reactive mine waste “be mined, disposed of, and reclaimed to prevent the release of substances that result in the adverse impacts on natural resources.” Minn. R. 6132.2200, subp. 1.

214. As discussed in Section V.A above, mine waste characterization has been an ongoing process for the NorthMet Project over the past ten years, and has included static testing, humidity cells/kinetic tests, along with others such as mineralogical, geochemical, petrological, and particle size testing.

215. During environmental review, the Final Scoping Decision required detailed analysis of potentially reactive mine wastes in the EIS, including alternatives (FEIS §§ 2.3.1, 2.3.2, 2.5.1-5.4, 2.7.1), EIS issues requiring detailed analysis (FEIS §§ 3.3.4-3.7, 3.3.9), and special studies or research (FEIS §§ 6.2-6.4, 6.6, 6.7, 6.10). The Project Description addresses overburden and waste rock characterization in terms of potential reactivity in FEIS § 3.2.2.1.7 and Table 3.2-8, while FEIS § 3.2.2.1.8 and Table 3.2-9 address engineered water controls for waste storage. FEIS Table 3.2-17 details previous project alternatives screened over the course of environmental review (as identified in EIS scoping). As detailed in the FEIS, water control systems that were initially planned to be constructed at the Mine Site to capture water that comes into contact with surfaces disturbed by mining activity (e.g., process water) as well as collected on stockpile liners, will now go to the WWTs; all captured water will be treated at the WWTs. *See* FEIS § 3.1.1.3; FEIS Response to Comments Issues A.5.2 ALT 07, A.5.9 GT 10, and A.5.24 WR 029. The WWTs will contain the two separate treatment processes that were initially housed in separate locations (the Mine Site WWTF and the Plant Site Waste Water Treatment Plant (“WWTP”). The WWTs will house the same engineering controls as the WWTF to provide the reliability and flexibility to meet WWTs effluent targets before release to the environment. *See* FEIS Table 5.2.2-29 (WWTF Preliminary Water Quality Targets). At the Plant Site, the FTB pond would become the primary source of contaminants due to the pond water’s infiltration into the tailings. Thus, a series of engineering controls (formerly housed in the WWTP) are proposed to reduce the release and transport of solutes from the FTB. *See* FEIS § 5.2.2.3.3 and Table 5.2.2-38. Table 5.2.2-52 provides an overview of monitoring requirements within the Partridge River Watershed (e.g., Mine Site) and Table 5.2.2-53 provides an overview of monitoring requirements in the Embarrass River Watershed (e.g., Plant Site). These monitoring requirements have been refined during permitting.

216. Section 10 (Characterization and Management of Mine Waste) and Appendix 11 (Management Plans) of the Permit to Mine describe how the proposed NorthMet Project is designed such that reactive and non-reactive rock will be mined, stored, managed, disposed of, and reclaimed so as to prevent the release of substances that may result in adverse impacts to the natural resources. Additionally, the Permit to Mine contains special conditions governing management of mine waste and construction materials (including 16 (Submission of Monitoring Data), 21a (Lean Ore), 23-25 (BIF Construction Rock), 26-28 (Tailings Basin Buttress Material), 43-44 (Saturated Mineral Overburden) 45 (Characterization of Material), 46- 48 (Future Waste Characterization), 51 (Mine Sump Performance), 55 (cutoff wall designs), 55c (inspection schedule for the reactive mine waste storage facility), and 71 (Category 1 Waste Rock Stockpile Cover), 88-89 (Pilot and Field Scale Testing of Bentonite Amendment)) that address preventing the release of substances that could result in the adverse impacts on natural resources.

217. Appendix 2 to the Permit to Mine provides detail on the development and contents of the mine waste characterization program, including a summary of key outcomes to date. Appendix 11.1 (Rock and Overburden Management Plan) to the Permit to Mine includes classification of waste rock and overburden based on waste characterization studies (provided in Waste Characterization Data Package), stockpile design details, and construction uses of waste rock and overburden. Appendix 11.4 (Adaptive Water Management Plan) Section 3 of the Permit to Mine provides design, monitoring and maintenance components of the Category 1 waste rock stockpile cover. Additionally, the Permit to Mine contains special conditions on mine

waste and construction materials (including Special Conditions 16, 21, 23-28, 43-48, 51, 55, 55c, 71, and 88-89) aimed at meeting the goal set forth in this rule.

218. All of this information describes how the proposed NorthMet Project is designed such that reactive and non-reactive rock will be mined, stored, contained, monitored, and reclaimed so as to prevent the release of substances that may result in adverse impacts to the natural resources.

219. Minn. R. 6132.2200, subp. 2(A): This rule requires that chemical and physical characterization of mine waste “be conducted before the submission of an application for a permit to mine and continuously after that during the process of mining”

220. As discussed in Section V.A above, mine waste characterization has been an ongoing process for the NorthMet Project over the past ten years and continued throughout the course of permit review. Section 10.1 of the Permit to Mine describes PolyMet’s mine waste characterization program, including the technical professionals responsible for performing the work, the process for developing the program, the materials analyzed, the methods of analysis, the results, and the application of the results for the NorthMet Project design and review. Appendix 2 of the Permit to Mine presents additional detail relating to the mine waste characterization program and the results of that program.

221. Additionally, verification of the predictive water models will be an ongoing process during operations as detailed in the Permit to Mine and under Special Conditions 32-34 within the Permit to Mine. Permit to Mine Appendix 11.2, § 6.3, Appendix 11.3, § 6.3. A component of the verification will be analysis of the kinetic waste characterization tests that continue to this day. Permit to Mine §§ 10.1.3.2, 10.1.3.3; Appendix 2 § 2.1.1. This verification and review is necessary given that the waste management plans were developed in large part upon these predictive water models.

222. Minn. R. 6132.2200, subps. 2(B), 2(C)(1): These rules require that a reactive mine waste storage facility “be designed by professional engineers registered in Minnesota proficient in the design, construction, operation, and reclamation of facilities for the storage of reactive mine waste, to either: (1) modify the physical or chemical characteristics of the mine waste, or store it in an environment, such that the waste is no longer reactive; or (2) during construction to the extent practicable, and at closure, permanently prevent substantially all water from moving through or over the mine waste and provide for the collection and disposal of any remaining residual waters that drain from the mine waste in compliance with federal and state standards.” Subpart 2(C)(1) requires that the reactive mine waste storage facility design “describe all materials, construction, and operating performance specifications and limitations that must be maintained to ensure protection of natural resources.”

Mine Site

223. Section 10.4 of the Permit to Mine summarizes the management and disposition of overburden, waste rock, and ore at the Mine Site, including methods for identifying, segregating, storing and managing through construction, operation, closure and reclamation. Overburden is separated into unsaturated mineral overburden, peat, and saturated mineral

overburden. Unsaturated mineral overburden will be used for general construction material as needed and may be screened or crushed according to its needs and specifications. Peat will be used for restoration and reclamation activities or in wetland reclamation activities, and may be mixed with unsaturated mineral overburden to increase the organic content for reclamation uses. Unsaturated mineral overburden and peat will be temporarily stored at the Overburden Storage and Laydown Area (“OSLA”). Saturated mineral overburden from the Mine Site will only be used for specific on-site construction applications. These applications include uses where contact water can be collected, where the material is placed in saturated conditions (i.e., under the water table), and where applicable surface and groundwater standards can be maintained. Saturated mineral overburden that is not used for construction will go into the lined Categories 2/3 and 4 waste rock stockpiles or directly into the East and Central Pit once mining in those pits have ceased. Permit to Mine § 10.4.

224. Sections 10.2.3, 10.3.3, 10.4, 11.3, and Appendices 1.10 and 4 of the Permit to Mine provide detail on PolyMet’s engagement of independent professional engineers and engineering firms, including Barr Engineering, registered in the state of Minnesota who are proficient in the design, construction, operation and reclamation of tailings basins, dams, and reactive mine waste disposal facilities. Permit to Mine, Appendix 11.1 (Rock and Overburden Management Plan) of the Permit to Mine includes classification of waste rock and overburden based on waste characterization studies (provided in Waste Characterization Data Package), stockpile design details, and construction uses of waste rock and overburden. Permit to Mine, Appendix 11.4 (Adaptive Water Management Plan) Section 3 of the Permit to Mine provides design, monitoring and maintenance components of the Category 1 waste rock stockpile cover. Additionally, the Permit to Mine contains special conditions (including 49 and 50 Professional Engineer) that address professional engineer requirements as part of the NorthMet Project.

225. Waste rock will be generated at the NorthMet Project from bedrock blasting and will be separated from ore using the Block Model/Blast hole drilling. Ore will be stored at the temporary Ore Surge Pile (“OSP”) that will have a composite liner and drainage collection system. Waste rock will be classified based on sulfur content for determining temporary storage or disposal location. Permit to Mine, Appendix 11.1.

226. Waste rock identified as Category 2/3 and Category 4 (potentially acid-generating material), will be stockpiled on temporary structures with composite liners and drainage collection systems. Category 2/3 and Category 4 waste rock will be backfilled into the East Pit starting in Mine Year 11. Permit to Mine § 7.3.

227. Permit to Mine Special Condition 71 requires that the Category 1 waste rock stockpile be progressively developed with a seepage collection system and be progressively covered with an engineered geomembrane cover system. Most Category 1 waste rock will be placed in a permanent stockpile with a groundwater collection system and be progressively developed through operations. A seepage collection system will be constructed around the perimeter of the Category 1 waste rock stockpile to collect seepage for treatment. Permit to Mine § 10.4. Special Condition 55 of the Permit to Mine requires the seepage containment system for the Category 1 waste rock stockpile to be keyed to bedrock in order to capture seepage such that natural resources are protected and maintain an inward flow gradient in accordance with the draft NPDES/SDS permit issued by the MPCA. The remainder of the

Category 1 waste rock will be backfilled into the East Pit. The Category 1 waste rock stockpile and groundwater collection system will have long term maintenance and monitoring to ensure that seepage is prevented into the future.

228. Compliance with these special conditions must be further demonstrated through ongoing monitoring throughout the life of the NorthMet Project.

229. Collectively the objective of these measures is to ensure that reactive mine waste from the Category 2/3 and Category 4 stockpiles is stored in an environment such that it is no longer reactive and to provide for the collection and disposal of residual waters that drain from the mine waste in compliance with federal and state standards. In addition, the Category 1 waste rock stockpile cover system serves to prevent substantially all water from moving through or over the mine waste. Engineering controls further provide for the collection and disposal of any remaining residual waters that drain from the mine waste in compliance with federal and state standards.

FTB

230. Tailings will be placed in the FTB constructed on top of the existing LTVSMC tailings basin. Permit to Mine § 10.2. During operations and reclamation, PolyMet will add a bentonite amendment to the FTB side slopes, final pond bottom, and final beaches to limit oxidation of sulfide minerals and release of metals from the tailings within the basin. *Id.* at § 10.1 Seepage from the FTB will be collected by the FTB seepage capture systems, which includes both the FTB Seepage Containment System and FTB South Seepage Management System. Application § 11.4. Special Condition 55 of the Permit to Mine requires the seepage containment system for the FTB to be keyed to bedrock in order to capture seepage such that natural resources are protected and maintain an inward flow gradient in accordance with the NPDES/SDS permit issued by the MPCA. Compliance with these conditions must be further demonstrated through ongoing monitoring throughout the life of the NorthMet Project.

231. Section 10.2 of the Permit to Mine summarizes the management and disposal of the tailings at the FTB, including the FTB design, relevant construction and operational activities and reclamation. PolyMet will be constructing the FTB on top of the existing LTVSMC tailings basin as follows: (i) using existing coarse tailings for FTB Dam construction; (ii) installing a seepage collection system; and (iii) placing the tails below a wet cover system (pond) with bentonite amended beach and side slope design features which serve to minimize oxidation and potential water quality impacts from the FTB, in the short term and in the long term. The design of the FTB Dam is based on seepage and slope stability analyses and will include amending the exterior face of the dams with a bentonite layer. Appendix 6 of the Permit to Mine contains the FTB Permit Application support drawings. Tailings will be deposited by slurry through a system of pumps and moveable pipelines. Regular dam safety inspections will be conducted in accordance with Appendix 11.5 – FTB Dam Safety Inspection Plan. Additionally, a Contingency Action Plan (“CAP”) has been prepared to address unplanned events. Permit to Mine, Appendix 11.5 - Attachment F. The FTB will have long-term maintenance and monitoring.

232. Collectively, the objective of these measures is to ensure that reactive mine waste within the FTB is stored in an environment such that the waste is no longer reactive (*i.e.*, wet closure at the legacy site, coupled with the bentonite amendments and seepage capture systems).

HRF

233. The HRF residue will be placed in the HRF, a single cell basin constructed with a double liner system consisting of geomembrane and geosynthetic clay liners. Permit to Mine § 10.3. The HRF double liner system will include a leakage collection system between the liners. *Id.* Special Condition 16d of the Permit to Mine requires PolyMet to submit a revised monitoring plan for the HRF. Special Condition 95 prohibits disposal of coal ash or any other non-mining waste into the HRF.

234. Section 10.3 of the Permit to Mine summarizes the management and disposal of residue generated by the Hydrometallurgical Plant, at the HRF, including the HRF Design, relevant construction and operational activities and reclamation. PolyMet will use hydrometallurgical processing to recover metals from concentrate, and the combined residue will be placed in the HRF. The HRF is designed to be a closed-loop system. Appendix 7 of the Permit to Mine contains the HRF permit application support drawings. Residue deposition at the HRF will be transported by slurry via pipeline, and the HRF will function as a large-scale sedimentation basin, with a pond and levels of both solids and liquid within the cell increasing over time. A cover system will be constructed after the pond is dewatered. Regular dam safety inspections will be conducted in accordance with Permit to Mine, Appendix 11.6 – FTB Dam Safety Inspection Plan. Additionally, a CAP has been prepared to address unplanned events. Permit to Mine, Appendix 11.6 - Attachment F. The HRF will have long-term maintenance and monitoring.

235. Collectively, the objective of these measures is to ensure that reactive mine waste from the HRF is stored in an environment such that it is no longer reactive and to provide for the collection and disposal of residual waters that drain from the mine waste in compliance with federal and state standards. The HRF cover system serves to prevent substantially all water from moving through or over the mine waste. Engineering controls further provide for the collection and disposal of any remaining residual waters that drain from the mine waste in compliance with federal and state standards.

236. Minn. R. 6132.2200, subp. 2(C)(2): This rule requires that the reactive mine waste storage facility design “identify monitoring locations to ensure compliance with the design.”

237. Section 14 of the Permit to Mine (Project Monitoring Programs) provides an overview of the NorthMet Project monitoring as part of the Permit to Mine and as required under other permits (NPDES/SDS, Construction and Industrial Stormwater Permits, Wetland Permits, Air Permit, Water Appropriation Permits, and Dam Safety Permits). Details are also discussed and outlined in Appendix 11 – Management Plans. Additionally, Section 14.3 of the Permit to Mine provides a summary of additional monitoring relevant to the protection of natural resources.

238. Monitoring is required under the Permit to Mine to ensure compliance with the design requirements for reactive mine waste storage facilities. At the Mine Site, such monitoring includes monitoring for rock stability, blasting (Appendix 12.3), groundwater inflows into pits (Appendix 17.3) and dust control (Section 14.2.6).

239. At the Transportation and Utility Corridors monitoring is required for potential ore spillage (cars and track inspections), surface water quality (Appendix 11.2), and dust control (Section 14.2.6).

240. At the FTB and the HRF, monitoring includes verification of material characterization, evaluation of geomembrane installation, stability, vegetation, erosion control, seepage (Appendix 11.3), and dust control (Section 14.2.6). Specific monitoring for the flotation tailings includes split spoon, cone penetrometer, bulk sampling, particle size distribution, hydraulic conductivity, in situ strength/density, and mineralogy.

241. Additionally, the Permit to Mine contains special conditions relating to monitoring (including 32-34 (Water Modeling and Data Verification) 35-37 (SPCC Plan), 51, 57-59 (Rail Ore Car Loading and Spillage), 63 (Reporting Dust), 64-65 (Non-Mechanical Water Treatment), 80 (Adaptive Water Management), 88 and 89 (Pilot and Field Scale Testing)) that address compliance with design and preventing the release of substances that result in the adverse impacts on natural resources.

242. Minn. R. 6132.2200, subp. 2(C)(3): This rule requires that the reactive mine waste storage facility design “include a schedule for inspection of the reactive mine waste storage facility construction, operation, and reclamation including closure and postclosure maintenance, by the design engineers, to ensure compliance with the design.”

243. Sections 10.2.6.2 (FTB) and 10.3.4.2 (HRF), and Appendices 11.5 and 11.6 of the Permit to Mine address dam safety inspection requirements. Section 3.4.3 discusses inspections within the Transportation and Utility Corridor. Additionally, the Permit to Mine contains a Special Condition 55c requiring PolyMet to submit a detailed inspection schedule to be conducted by the designer throughout the permitted life of each reactive mine waste facility, in order to ensure continued design compliance. The detailed inspection plan must be submitted to the DNR for review and approval no later than 30 days prior to the start of construction of each reactive waste storage facility. A summary of these inspections will be included in PolyMet’s annual reports.

G. Overburden Portion of Pitwalls – Minn. R. 6132.2300

244. Minn. R. 6132.2300, subp. 1: This rule sets forth a goal that the overburden portion of pitwalls “be designed, developed, and reclaimed to be structurally sound and promote progressive reclamation.”

245. As detailed in the FEIS, PolyMet proposed approaches to facilitate reclamation and long term closure of the mine pits, including that the toe of the overburden portion of all pit walls be set back at least 20 feet from the crest of the rock portion of the pit wall, lift heights would be no higher than 60 feet, and the sloped area between benches would not be steeper than 2.5:1. FEIS § 3.2.2.1.10.

246. The Permit to Mine details plans for the overburden portion of pitwalls that are consistent with the FEIS and the goal of the rule, which mitigate the hazards associated with near vertical walls of overburden at the top of the pits associated with the NorthMet Project. The overburden portions of pitwalls are sloped to a moderate angle while providing a surface that can be readily stabilized through progressive reclamation and outlines the steps to meet the requirements of 6132.2300, subp. 2 as detailed below. The overburden portions of pitwalls will be progressively reclaimed, including the establishment of vegetation in advance of cessation of operations. Permit to Mine §§ 7.1, 7.4, 10.4.6.5. A licensed engineer designed the pitwalls.

247. Minn. R. 6132.2300, subp. 2(A)(1): This rule requires that “the toe of the surface overburden portion shall be set back at least 20 feet from the crest of the rock portion of the pitwall.”

248. The toe of the surface overburden portions will be “set back about 30 feet (and in no event less than 20 feet).” Permit to Mine § 7.4. Additionally, the setback will allow ditching along the toe of the overburden slope to intercept and direct runoff water to stormwater control structures.

249. Minn. R. 6132.2300, subp. 2(A)(2): This rule requires that “lift heights shall be no higher than 60 feet and shall be selected based on the need to protect public safety, the location of the pitwall in relation to the surrounding land uses, the soil types and their erosion characteristics, the variability of overburden thickness, and the potential uses of the pit following mining.”

250. From borehole data, the overburden thickness along the perimeter of the open pits ranges from five feet to 29 feet below the maximum lift height. Borehole data from areas located within the proposed pits shows a range of eight feet to 28 feet of overburden above bedrock with an isolated area in the West Pit with a depth to bedrock of greater than 40 feet. Permit to Mine § 5.1.1. The overburden portions of the pit walls will be sloped, graded and reclaimed by scarifying the surface and seeding. Permit to Mine § 10.4.6.5.

251. Minn. R. 6132.2300, subp. 2(A)(3): This rule requires that “the sloped area between benches shall be no steeper than 2.5:1.”

252. PolyMet will grade final overburden bank slopes at a horizontal (H) to vertical (V) slope not steeper than 2.5H:1V. Permit to Mine § 7.4.

253. Minn. R. 6132.2300, subp. 2(A)(4): This rule requires that “runoff water shall either be temporarily stored on benches or removed by drainage control structures.”

254. PolyMet will build and vegetate an exclusion dike on top of the overburden portion of the pitwall to minimize water runoff into the pit. Permit to Mine § 10.4.6.5.

255. A pit rim berm will also be constructed to prevent water runoff into the pit and minimize erosion of the pitwalls, as well as providing a safety buffer between the pit and toe of overburden stripping. Permit to Mine § 15.3.1.4; Figure 7-9.

256. In addition to the exclusion dike and the pit rim berm, ditches will be installed along the toe of the overburden slope to prevent runoff water by intercepting and directing runoff water to stormwater control structures. Permit to Mine § 7.4.

H. Storage Pile Design – Minn. R. 6132.2400

257. Minn. R. 6132.2400, subp. 1: This rule sets forth a goal that storage piles “be designed and constructed to minimize hydrologic impacts, enhance the survival and propagation of vegetation, be structurally sound, control erosion, promote progressive reclamation, and recognize the conservation of the mineral resources.”

258. Under Minnesota Rule 6132.0100, subp. 31, “storage pile” refers to “a land form used for the disposal of material generated during mining, such as surface overburden, rock, lean ore, and leached ore.”

259. Reclamation and long-term closure management of the temporary (Category 4 and Category 2/3) and permanent (Category 1) stockpiles at the Mine Site were described in § 3.2.2.1.10 of the FEIS. Figure 3.2-14 provides a schematic cross-section of the waste rock stockpiles for Mine Year 11 and in closure. Figure 3.2-15 provides a conceptual cross section of the permanent Category 1 cover system. The FEIS describes the engineered water controls at the HRF, a summary of relevant geotechnical parameters, and preconstruction design considerations for stability and water management. FEIS §§ 4.2.14.3.5, 5.2.14.2.3, Tables 4.2.14-2, 4.2.14-3, Figure 5.2.14-9. The covers for both the Category 1 waste rock stockpile and HRF will be seeded and vegetated to control runoff. Details of the geomembrane systems are addressed in FEIS Response to Comments Issue A.5.9 (GT – 10, 12) and A.5.10 (PD – 16, 17, 20). Section 3.2.2 of the FEIS identifies that the NorthMet Project is required to have a Rock and Overburden Management Plan to govern overburden treatment over the life of the NorthMet Project. Table 3.2.2 indicates overburden removal and stockpiling would occur over Mine Years 1-11, and § 3.2.2.1.3 indicates construction of the OSLA as the place to sort and temporarily store overburden. Table 3.2-4 identifies that saturated overburden will be backfilled into the East Pit. The types of overburden requiring management at the site are detailed in § 3.2.2.1.7 of the FEIS.

260. Under the Permit to Mine, the active portions of the waste rock stockpiles and the ore storage pile are designed to manage stormwater and runoff thereby minimizing hydrologic impacts and facilitating erosion control. Permit to Mine § 10.4.4.3. A major component of progressive reclamation lies in the fact that the Category 2/3 and 4 stockpiles are temporary stockpiles. *Id.* at Figures 7-11, 7-12, and 7-13. Starting in Mine Year 11, once the East Pit has had all the ore removed, the rock in those stockpiles will be backfilled into the empty pit. The OSP is also temporary. Any ore in the pile will either be processed as ore or backfilled into the East Pit upon closure. Unsaturated mineral overburden and peat will be stored at the OSLA or in areas near its final reclamation use. The purpose of the OSLA is to screen, sort and as a temporary staging area for this material for later use, including possible construction use and as reclamation material.

261. During reclamation, stockpiles will be shaped, fertilized, seeded, and mulched to ensure self-sustaining vegetation with at least 90% vegetative cover. A stability analysis for the cover system was conducted for the Category 1 waste rock stockpile. The analysis concludes

that an adequate slope stability safety factor can be achieved using the geomembrane types and soil types proposed for the stockpile cover system, which will be installed incrementally. *See Permit to Mine § 10.4.4.4.* Lifts of the stockpiles will be shaped and vegetated as each are completed. In the case of the Category 1 waste rock stockpile, the engineered cover will be installed in sections as the pile is built out horizontally, starting no later than Mine Year 14. In order to promote progressive reclamation and reduction of constituent loading, the DNR will evaluate the potential for the cover installation to begin prior to Mine Year 14. Special Condition 71.

262. Special Condition 52 of the Permit to Mine provides for DNR review of final designs to verify storage piles will be constructed as permitted. Additionally, for the Category 1 waste rock stockpile, Special Condition 54 requires that the cover design and construction be installed under the direct oversight of a professional engineer, while Special Condition 55 requires that the seepage collection cutoff wall be tied into bedrock, capture the seepage as intended, and maintain an inward flow. In addition, Special Condition 56 requires PolyMet to submit as-built drawings for all facilities (including the storage piles).

263. As part of its operations, PolyMet will implement a program of routine inspection and surveying to monitor the waste rock stockpiles to ensure that the piles are stable. Monitoring will include surveying for settlement and placement, inspections of surfaces and outcrops for proper material placement, and inspection for proper drainage. *Permit to Mine § 14.2.2.* In closure, monitoring and inspections will continue to verify the Category 1 waste rock stockpile remains stable. All other stockpiles will be removed by the time of long term closure. Additionally, the Permit to Mine contains a Special Condition 55c requiring PolyMet to submit a detailed inspection schedule to be conducted by the designer throughout the permitted life of each reactive mine waste facility, including the Category 1 waste rock stockpile, in order to ensure continued design compliance.

264. The Category 1 waste rock stockpile, the only permanent stockpile proposed in the Permit to Mine Application, is located away from the mineral deposit so as not to encumber the ore below, thus conserving mineral resources. *See FEIS § 5.2.*

265. Approximately 10 years after the end of operations, when dewatering of the HRF is complete, PolyMet will install a permanent multilayer HRF cover system. Final grading of this new cover system will create a gently sloping closure surface that sheds surface water runoff, accommodates future differential settlement of the underlying residue, and minimizes ponding of water on the closed HRF surface. Drainage pipes will be installed within a layer of granular material above the geomembrane, to collect and direct runoff away from the HRF cell. These actions will prevent water from collecting inside the cell, resulting in a so-called “bathtub” effect. These actions taken collectively minimize hydrologic impacts, enhance the survival and propagation of vegetation, are structurally sound, and control erosion. *See Permit to Mine § 15.4.2.*

266. All of these aspects of the mining and reclamation plan will be verified over time through required Annual Reports submitted by PolyMet and reviewed by the DNR. Annual, on-site inspections will also serve to verify the success of the design, operation, maintenance, reclamation, and closure of the storage piles. *See FEIS § 6.1.1.2.1.*

267. Minn. R. 6132.2400, subp. 2(A)(1): This rule governs storage piles and provides that “[w]hen mine waste is deposited on areas with unstable foundations . . . a professional engineer, registered in this state and proficient in the design, construction, operation, and reclamation of facilities on unstable foundations, shall examine the foundation and design the storage piles to ensure stability.”

268. Before construction commences, the foundation condition and the final design of each of the waste rock stockpiles and the OSP will be examined by appropriate professional engineers registered in this state and proficient in the design, construction, operation, and reclamation of facilities on unstable foundations. Permit to Mine §§ 10.4.1, 10.4.4.3, 10.4.4.4, 10.4.6.2. Any peat and other unsuitable soils will be removed from the perimeter of the Category 1 waste rock stockpile prior to placement of any waste rock. *Id.* at § 10.4.5.2. Special conditions within the Permit to Mine require that the facilities are designed and constructed under the supervision of a registered engineer. Special Conditions 49, 50, 50a, 51a, 52.

269. PolyMet will preload to consolidate the foundation in preparation for the construction of the HRF. Permit to Mine § 10.3.3.6. A professional engineer will monitor the settlement and confirm the removal of preload fill to ensure stability. *Id.* DNR has included special conditions within the Permit to Mine and HRF Permit that address the siting and stability of the HRF. Specifically, HRF Permit Condition 25 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the foundation preload design prior to preloading the HRF foundation. HRF Permit Condition 26 provides that “[a]dditional analysis of the HRF foundation is needed to confirm that the foundation will provide adequate support for the HRF,” and requires PolyMet to seek further guidance from the MPCA to ensure that differential settlement will not cause excessive liner strain. HRF Permit Condition 30 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the Contingency Action Plan prior to dam construction. And Special Condition 52 of the Permit to Mine requires final design drawings for the HRF to be submitted to the DNR at least 30 days prior to construction of the HRF. These design drawings will include designs for the foundation of the HRF, which the DNR must review prior to the commencement of construction.

270. Finally, the design of the HRF basin has been reviewed by both DNR’s dam safety team experts and the MPCA SDS permitting team, which have extensive experience and expertise in the foundations and liners for waste basins. The permit conditions for the HRF Permit and the MPCA’s waste storage facility permit contain extensive requirements aimed at ensuring stability and preventing dam failure. Specifically, the dam features downstream construction with a geosynthetic liner on the upstream face. This design has a high factor of safety, and the DNR’s review indicates that even if all the tailings liquefied—which is highly unlikely—the dam would neither fail nor deform. The Dam Safety Permit also requires PolyMet to “preload” the HRF site by compressing the slimes, peat, and tailings concentrate, thereby making the area firmer and creating a more stable foundation.

271. Minn. R. 6132.2400, subp. 2(A)(2): This rule provides that “[p]ractices such as the use of vegetated buffer strips, hay bale dikes, silt fences, or settling basins shall be used to control erosion” on storage piles.

272. The Category 1, 2/3, and 4 waste rock stockpiles consist predominantly of competent coarse rock with low erosion potential. During operations, the stockpiles will be sloped away from the crest to shed the water off the bench and minimize potential for erosion or ponding of water. Permit to Mine §§ 10.4.4.3, 11.3.2.2. The Category 2/3 and 4 waste rock stockpiles are temporary and will be used to backfill the East Pit. Also, the OSLA and the OSP are also temporary and will be used for purposes outlined in their respective management plans. No permanent storage of overburden is contemplated in the Permit to Mine that would require erosion controls. After the geomembrane barrier layer and cover soils have been placed and vegetation is established on the Category 1 waste rock stockpile, precipitation on the stockpile will run off the surface and be managed as stormwater. The vegetated surface also serves to slow water and reduce erosion potential.

273. Minn. R. 6132.2400, subp. 2(A)(3): This rule provides that “[r]ills or gullies shall be observed to determine dominant runoff flow paths, which shall be stabilized to control runoff.”

274. Benches and top surfaces of stockpiles will be sloped away from the crest to shed the water off the bench and minimize potential for erosion or ponding of water. Permit to Mine § 10.4.4.3. The coarse nature of the waste rock will also help to prevent erosion and ponding of water. For the permanent Category 1 waste rock stockpile, outslope drainage “will be managed in part by using channels constructed on the inboard side of the stockpile ramps.” Additionally, “drainage and any surface runoff from active portions of the stockpile will be collected in the groundwater containment system along the base of the stockpile.” Permit to Mine, Appendix 11.1, § 2.1.2.1. As part of its operations, PolyMet will implement a program of routine inspection and surveying to monitor the waste rock stockpiles to evaluate compliance with permit to mine regulations. As part of this monitoring, PolyMet will inspect for irregular surfaces that may be due to minor localized settlement in the stockpiles. PolyMet will address irregular surfaces that could impede surface drainage of the stockpile. In particular, the final grade of the Category 1 waste rock stockpile surface will allow the installation of the cover system as designed. Section 14.2.2 of the Permit to Mine provides details associated with the inspection and surveying of waste rock stockpiles. Additionally, Special Condition 55c requires PolyMet to develop a schedule for inspection for reactive waste rock storage piles and determining dominant flow paths will be an aspect of the inspections.

275. Minn. R. 6132.2400, subp. 2(A)(4): This rule provides that “[s]torage piles containing reactive mine waste must also comply with the requirements of part 6132.2200.”

276. The storage piles containing reactive mine waste comply with the reactive mine waste requirements as detailed in Section VII.F above.

277. Minn. R. 6132.2400, subp. 2(B)(1): This rule provides that, for the final exterior slopes of lean ore, waste rock, and leached ore storage piles, “no lift shall exceed 40 feet in height.”

278. A major component of progressive reclamation is backfilling East Pit with Category 2/3 and 4 waste rock. As such, the Category 2/3 and 4 waste rock stockpiles are temporary. The permanent Category 1 waste rock stockpile is required to have maximum lift of

40 feet, final bench width of 30 feet, and slopes between benches at or flatter than the angle of repose of the waste rock. Permit to Mine § 10.4.4.3.

279. Minn. R. 6132.2400, subps. 2(B)(2), 2(B)(3): These rules provide that, for the final exterior slopes of lean ore, waste rock, and leached ore storage piles, “no bench shall be less than 30 feet, measured from the crest of the lower lift to the toe of the next lift” and that “the sloped area between benches shall be no steeper than the angle of repose.”

280. The permanent Category 1 waste rock stockpile will be required to have maximum lift of 40 feet, final bench width of 30 feet, and slopes between benches at or flatter than the angle of repose of the waste rock during operation and final reclamation slopes between benches of 3.75H:1V. *See* Permit to Mine § 10.4.4.3, Table 10-17.

281. Minn. R. 6132.2400, subp. 2(B)(4): This rule provides that, for the final exterior slopes of lean ore, waste rock, and leached ore storage piles, “when vegetation is required under part 6132.2700, subpart 2, item A, subitem (13), the sloped areas between benches shall be prepared to support vegetation.”

282. This rule is inapplicable because the mining area is not sufficiently near to any of the identified features identified to trigger the vegetation requirements of Minnesota Rule 6132.2700, subp. 2.A(13).

283. Minn. R. 6132.2400, subp. 2(C)(1): This rule provides that “[w]hen surface overburden is generated, it shall be placed in layers on the completed tops and benches of lean ore and waste rock storage piles to enhance reclamation potential.”

284. As outlined above, a major component of progressive reclamation is backfilling East Pit with Category 2/3 and 4 waste rock. As such, the Category 2/3 and 4 waste rock stockpiles are temporary, and will be removed as part of reclamation activities. The Category 1 waste rock stockpile is the only permanent stockpile in the application and will be progressively reclaimed. *See* Permit to Mine § 10.4.5.4, Category 1 Waste Rock Stockpile Cover System. Appropriate cover soils will be placed over the geomembrane barrier layer to promote vegetation and assist with runoff. *Id.* at Figure SKP-034.

285. Minn. R. 6132.2400, subp. 2(C)(2): This rule provides that, “[i]f no completed tops or benches are available, or if such sites are not within economic haul distances of surface stripping activities, surface overburden storage piles shall be created so that the final exterior slopes shall consist of benches and lifts” that meet the requirements set forth therein.

286. If there is an excess of unsaturated mineral overburden such that permanent stockpiling becomes necessary, PolyMet will work with the DNR to determine if there are additional permitting requirements. The stockpiles will be designed to adhere to the rules with no lift exceeding 40 feet in height, no bench less than 30 feet wide and an interbench slope no steeper than 2.5H:1V. Saturated mineral overburden will be commingled in the Categories 2/3 and 4 waste rock stockpiles or placed directly into the East or Central Pits. Water will be temporarily stored on benches and removed through water control structures. *See* Permit to Mine § 10.4.3.2.

287. Minn. R. 6132, subp. 2(D): This rule provides that “[l]ean ore and waste rock shall not be used to cover surface overburden storage piles to avoid compliance with sloping and vegetation requirements.”

288. There is no rock classified as lean ore in the NorthMet Project and waste rock will not be mixed with unsaturated mineral overburden in the OSLA.

I. Tailings Basins – Minn. R. 6132.2500

289. Minn. R. 6132.2500, subp. 1: This rule sets forth a goal that “[t]ailings basins shall be designed, constructed, and operated to be structurally sound, control air emissions, minimize hydrologic impacts, promote progressive reclamation, and enhance the survival and propagation of vegetation.”⁹

290. PolyMet applied for two separate dam safety permits as part of its proposed NorthMet Project.

291. On or about July 19, 2016, PolyMet submitted a Dam Safety Permit Application (2016-1383) to the DNR for construction of the Hydrometallurgical Residue Facility (“HRF Permit Application”). The HRF Permit Application included a report that outlines the references that contain the information required in Minnesota Rule 6115.0410, including the HRF Management Plan and the HRF Geotechnical Data Package. The HRF Management Plan contains several attachments, including plan drawings, specifications, an instrumentation and monitoring plan, a contingency action plan, and a dam break analysis.

292. The Dam Safety Permit Applications included the information required for an initial application and preliminary report under Minn. Rule 6115.0410, subp. 2 and 3. Barr Engineering submitted preliminary reports, including a general statement indicating the effect of the NorthMet Project on the environment; maps showing the specific location of the NorthMet Project; a report outlining the topographical and geologic surface conditions; a cross section of the dam showing elevations, proposed impoundment levels and top width; log borings; preliminary design assumptions; preliminary cost estimates; future plans on ultimate NorthMet

⁹ Tailings are produced during the process of ore beneficiation. The ore is usually ground into the consistency of a fine sand, or powder, and the economic mineral portion is separated from the uneconomic mineral portion. The economic minerals are usually referred to as concentrate, while the remainder is called tailings. During the grinding of the ore, water is added to the process, to control dust, and to form a slurry that acts as a transport media to move the ground ore through the beneficiating process. Most often the tailings are very fine and must be disposed of within a special disposal area called a tailings basin. The tailings basin not only provides a place for storing the waste, but also provides a quiescent location for clarifying the tailings water, so it can be recirculated back to the beneficiating plant for subsequent use. Sometimes a portion of the tailings can be coarse enough to be transported by mechanical means, such as by truck or conveyor belt. These tailings are sometimes stockpiled in storage piles, similar to the waste rock, lean ore, and leached ore regulated in accordance with Minnesota Rule 6132.2400. However, most often these coarse tailings are used to construct dams to form the tailings basin within which the fine tailings are stored.

With nonferrous mining, the portion of the ore that will become tailings usually far exceeds the volume of concentrate produced. The result is that the tailings basin often becomes the largest structure associated with a mining area, sometimes covering square miles of area. This section of the Rules gives direction on the factors that should be incorporated into tailings basin design and construction, in order to facilitate effective reclamation.

Project size including the impoundment area; and a general description of all other activities and elements related to and part of the total dam project. See FTB Permit Application, Large Table 1; HRF Permit Application, Large Table 1.

293. The FTB will be constructed on top of the Cells 1E and 2E of the existing LTVSMC tailings basin. The FTB Dam will be constructed on the perimeter of the FTB in multiple stages using LTVSMC bulk tailings, which will consist primarily of coarse tailings with small amounts of finer grained tailings. The FTB Dam will be constructed using the upstream method, meaning that as the FTB Dam goes up in height, its centerline will move toward the center of the basin. The downstream face of the FTB Dam will have a slope of 4.5 horizontal to 1 vertical.

294. Flotation tailings produced at the Plant Site will be piped in slurry form and deposited within the FTB. The tailings settle out in the basin and the decanted water is pumped back to the plant for reuse in the plant process. The tailing basin will have capacity to store tailings over the 20-year life of operations. As proposed, by the end of that period of operations, the top of the dam would be 250 feet high and would have a storage capacity of approximately 145,000 acre-feet. The basin would cover over two square miles in area.

295. Additional features related to the FTB Dam include the rock buttress, the seepage collection system, an emergency overflow channel, and the bentonite amendment. The rock buttress will be constructed on the downstream face of the FTB Dam to provide stability to the dam. The seepage collection will be constructed downstream of the rock buttress and around much of the FTB to collect seepage water, preventing it from flowing into the surrounding environment. The emergency overflow channel will be constructed on the east end of the FTB to prevent overtopping of the dam in the event of unforeseen circumstances leading to higher than expected water levels within the basin. The bentonite amendment is a thin layer of soil that will be “amended” to incorporate a small percentage of bentonite, which will limit oxygen from reacting with the Poly Met flotation tailings by creating a layer of saturated soil between the atmosphere and the Poly Met flotation tailings.

296. The HRF will be constructed on both natural ground and on the former “emergency basin” south of Cell 2W. The HRF Dam will be constructed in stages on the perimeter of the basin using traditional construction materials and/or LTVSMC coarse tailings. Residue from the hydrometallurgical plant will be piped in a slurry and deposited in the HRF, along with wastes from other sources. The HRF will be a double lined storage facility with a drainage collection system to dewater the basin at the end of operations, as well as leakage collection system to collect any leakage that might find its way through the upper liner. As proposed, the top of the HRF Dam will be 90 feet high and have a capacity of 4,653 acre-feet covering approximately 97 acres.

297. PolyMet has retained Barr Engineering to design, plan, and engineer the NorthMet Project and to prepare the NorthMet Project Applications, including the Dam Safety Permit Applications and supporting materials. Tom Radue, P.E., is the engineer of record, who certified that the plans, specification, and reports comprising the application materials were prepared by him or under his direct supervision. Mr. Radue is a qualified Minnesota registered

professional engineer, and is proficient in dam safety engineering. Permit to Mine Appendix 1.10.

298. On or about July 11, 2016, PolyMet submitted a Dam Safety Permit Application (2016-1380) to the DNR for construction of the FTB (“FTB Permit Application”). The FTB Permit Application a report that outlines the references that contain the information required in Minnesota Rule 6115.0410, including the FTB Management Plan and the FTB Geotechnical Data Package. The FTB Management Plan contains several attachments, including plan drawings, specifications, a hydrologic study, an instrumentation and monitoring plan, a contingency action plan, dam break analysis, and the bentonite pilot study.

299. The DNR reviewed the Dam Safety Permit Application materials that PolyMet submitted for the FTB Permit and the HRF Permit pursuant to Minnesota Rule 6115.0410, subp. 6.

300. The DNR required revisions to the initial FTB Permit Application as PolyMet made modifications to the dam design after the initial application was submitted. Expert reviewers provided comments on the proposed changes to the dam design between July 20, 2016 and May 16, 2017. PolyMet proposed eliminating the use of Cement Deep Soil Mixing (CDSM) and modifying the design for the FTB Dam buttress in December of 2016.

301. On May 16, 2017, the DNR received updated permit application materials, including an updated reference report, management plan, and geotechnical data package, as well as an instrumentation and monitoring plan, contingency action plan, template for pilot testing of the bentonite amendment, and seepage containment drawings for the FTB Permit Application.

302. On May 16, 2017, the DNR received updated permit application materials, including an updated reference report and management plan, for the HRF Permit Application.

303. PolyMet submitted plans and specifications that included the appropriate information listed in Minn. Rule 6115.0410, subp.7 (plans and specifications). PolyMet’s plans included drawings scaled appropriately for drafting and construction. PolyMet also submitted specifications of the rights, duties, and responsibilities of the owner, designer, and contractor and of the prescribed order of work, along with technical provisions describing approved work methods, equipment, materials, and desired end results, and special conditions. *See* Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan); Permit to Mine, Appendix 11.6 (Residue Management Plan).

304. To supplement its own review, the DNR sought top experts to assess and comment on the proposed design, operation, and maintenance of the proposed dams.

305. During the environmental review process, the DNR dam safety team retained Environmental Resources Management (“ERM”) and Knight-Piesold (“KP”) to assist in the technical review of the proposed NorthMet Project. ERM and KP are multi-national companies with experience in mine planning and mine development. Geotechnical experts at ERM and KP provided technical guidance to the DNR dam safety team during the environmental review process.

306. During the permit review process, the DNR assembled another team of outside experts experienced in mining geotechnical engineering. The team included Dirk van Zyl, PhD, PE, of EOR. EOR is a nationally recognized group of environmental and design professionals located in Oakdale, Minnesota. Mr. Van Zyl previously served on the review panel investigating the Mount Polley dam failure. He consults worldwide on tailings basin design, and has authored or co-authored over 120 papers on mining topics, including tailings basin management. *See* EOR Memorandum of Dirk van Zyl, Steve Gale, et al., to Jason Boyle on Dam Safety Permit Application Review (May 15, 2017) (“EOR Report”) at 1-2.

307. The outside expert permit review team also included Steve Gale, PE, a geotechnical engineer with over 30 years of experience and special expertise on Minnesota’s Iron Range. Mr. Gale regularly consults on tailings basin design, management, and closure, including dam safety analysis and permitting. EOR Report at 1-2.

308. The outside expert team reviewed PolyMet’s Dam Safety Permit Applications and related technical documents. They also visited the NorthMet Project site to review the areas for the proposed FTB and HRF. During this visit, they met with PolyMet’s designers to discuss the NorthMet Project design. The team summarized their findings in the EOR Report.

309. On December 30, 2016 Poly Met proposed strengthening the buttress for the Cell 2E North Dam to achieve the required stability for the FTB Dam, (Modified Buttress Proposal) rather than creating the cement deep soil mixing (“CDSM”) zone previously proposed. *See generally*, Barr Engineering Co. Technical Memorandum from Tom Radue, P.E., to Jason Boyle, MNDNR: “Tailings Basin Cell 2E North Dam – Modified Buttress as Alternative to Cement Deep Soil Mix Zone” (December 30, 2016) (“Barr Technical Memo on Modified Buttress”); DNR Division of Ecological and Water Resources Memorandum, to Randall Doneen, Supervisor, Environmental Policy & Review Unit, from Bill Johnson, Planning Director, re: NorthMet Mining Project/Elimination of CDSM Zone from Project Assessment of EIS Supplement Requirement (March 21, 2017) (Johnson Buttress SEIS Memo) at 1.

310. Barr Engineering, the consulting firm retained by PolyMet to oversee design of the NorthMet Project, provided technical support information and analysis relating to the Modified Buttress Proposal. *See generally* Barr Technical Memo on Modified Buttress and information cited therein.

311. The DNR’s independent expert team had raised potential concerns about implementation of CDSM for the FTB Dam. *See* EOR Report at 3-4; *See* Barr Tech Memo on Buttress Modification at 1. The experts noted that, to their knowledge, CDSM has not been used before in this context. *See* EOR Report at 3-4. EOR further indicated that if CDSM were used, close ongoing monitoring should be undertaken to assure that this system was working effectively. *See* EOR Report at 3-4. Further, ongoing monitoring of the effectiveness of the CDSM “columns” intended to stabilize the dam materials would be beneath the surface of the dam. *See* EOR Report at 3-4.

312. Barr Engineering indicated that several additional factors contributed to its reconsideration of the initial CDSM design. Barr Engineering noted that the enhanced buttress design is a relatively simple solution in comparison to the complexity of CDSM. Replacing

CDSM with an enhanced buttress would also add flexibility to the construction process, as the enhanced buttress could be built over a longer period of time. Finally, changing to an enhanced buttress would not create meaningful additional wetlands or water quality impacts. *See* Barr Technical Memorandum on Modified Buttress at 1.

313. The DNR reviewed, analyzed, and considered applicable regulatory requirements, the information and analysis from Barr Engineering, the input from DNR's independent expert reviewers, and information from other sources, including comments from the public. DNR found that the proposal to modify the buttress rather than using CDSM satisfied applicable dam safety and other regulatory requirements and did not require completion of a Supplemental EIS. *See, e.g.,* Johnson Buttress SEIS Memo at 1-6.

314. The DNR has issued comprehensive findings discussing the design, construction and operation of the FTB Dam enclosing the tailings basin, and

315. +explaining the basis for the DNR's conclusion that the FTB Dam will be structurally sound. *See generally In the Matter of the Applications for Dam Safety Permits*, 2016-1380 and 2016-1383, for the proposed NorthMet Mining Project, Findings of Fact, Conclusions and Order of Commissioner, dated November 1, 2018 ("Dam Safety Findings"). The findings from the Dam Safety Permits are hereby incorporated.¹⁰

316. The DNR has considered whether the FTB and HRF Dams, as proposed and permitted, would be adequate with respect to compliance with prudent, current environmental practice throughout its existence. The proposed NorthMet Project, including the proposed FTB and HRF Dams have been subject to extensive environmental review. The FTB and HRF Dam

¹⁰ The DNR relies on the environmental review analyses in the FEIS in its consideration of the Applications. In addition, the Permits require monitoring for impacts to public health, public safety, or the public interests in lands and waters resulting or potentially resulting from the permitted appropriations. In the event actual or potential impacts are identified through the required monitoring, the Permits require development and implementation of appropriate adaptive management or mitigation strategies. Continued monitoring and reporting is required under the Permits even in the event of period of temporary idle or shutdown. *See e.g.,* Permit to Mine Conditions 16, 16c, 51, 55, 55a-b. The NorthMet Project would generate approximately 11.3 million short tons of flotation tailings to be stored on top of part of the existing unlined LTVSMC Tailings basin as detailed in § 3.2.2.3.5 and Figure 3.2-25. The Final Scoping Decision for the EIS identified the following aspects of tailings management for evaluation in the EIS: alternatives (§ 2.3.2, § 2.5.1, § 2.5.3, § 2.7.1, § 2.7.2); EIS issues warranting detailed analysis (§ 3.2.9, § 3.3.4, § 3.3.5, § 3.3.6, § 3.3.7, 3.3.8.10); and special studies or research (§ 6.1, § 6.6, §6.12, § 6.13). Table 3.2-17 of the FEIS details the tailings management alternatives screened for consideration, while § 3.2.2 identifies a Flotation Tailings Management Plan would be prepared detailing the design, seepage and stormwater management, modeling outcomes, monitoring and reporting, and reclamation and closure requirements for the facility. Buttressing would be provided to increase geotechnical stability; see § 3.2.2.3.5. The emergency overflow for the Tailings Basin is discussed at § 3.2.2.3.10, which allows for no overflow under the probable maximum precipitation (PMP) event. As noted at § 3.2.2.3.12 regarding reclamation and long-term closure, fugitive dust would be controlled on the upland areas by mulching and permanent vegetation. Existing conditions at the LTVSMC Tailings Basin are detailed in § 4.2.14.2 and Figures 4.2.14-3 to -5. The geotechnical stability of the proposed facility was assessed in § 5.2.14.2.2, including factors of safety, design and construction, closure, and long-term closure stability conditions. As discussed in the FEIS, monitoring includes use of piezometers (for pore pressures), inclinometers (movement of dams), and survey monitoring points (horizontal and vertical deformation); see § 5.2.14.2.2. Comments submitted on tailings management were addressed in the following FEIS Responses in Issue Areas: A.5.2 (ALT – 06, 10, 11), A.5.9 (GT – 01, 02, 03, 05, 06, 09, 13), A.5.13 (LU – 02), A.5.17 (PD – 04, 07, 09, 10, 11), and A.5.18 (PER – 21).

Safety Permits would require the Dams to be designed and built in accordance with all applicable dam safety requirements. Numerous permits will apply to the NorthMet Project to assure that all applicable environmental and other regulatory requirements will be satisfied. The FTB and HRF Dam Safety Permits would also require ongoing monitoring, and maintenance to ensure the stability of the Dam and the adherence to permitting requirements in perpetuity, or until closure of the Dams and termination of the FTB and HRF Dam Safety Permits. DNR is requiring financial assurances designed to provide for long-term maintenance of the NorthMet Project facility, including the FTB and HRF Dams. In addition, the FTB Permit Condition 33 requires PolyMet to submit, at least 180 days before the start of construction, a written Operation and Maintenance Plan for review and approval by the DNR Dam Safety Engineer. Construction may not commence until the DNR has issued written approval of the Operation and Maintenance Plan. The Operation and Maintenance Plan must have content sufficient to instruct the basin engineer on how the tailings basin is to be operated, maintained, inspected, and monitored; and shall include at a minimum a tailings spigotting plan (details on pumps and pipelines, when spigot will be moved, emergency shutdown procedures); a water management plan (describing how the water levels will be maintained, actions during both flood and drought conditions, movement of water between basins); a geotechnical instrumentation and monitoring plan (including all instrumentation, underdrain functionality, seepage, freeboard and beach length); and the various triggers and warnings that indicate if any of the above parameters are out of expected ranges. Any changes to the Operation and Maintenance Plan require prior written permission from DNR Dam Safety. FTB Permit Condition 33. FTB Permit Condition 34 provides that PolyMet must operate the dam authorized by this permit in accordance with all dam safety standards and must maintain the dimensions and elevations of the dam as described herein and in accordance with the Operation and Maintenance Plan.

317. The DNR therefore concludes that PolyMet's Permit to Mine has demonstrated that the FTB will be designed, constructed, and operated to be structurally sound. In addition, the DNR has imposed conditions in the Dam Safety Permits and special conditions in the Permit to Mine to monitor performance and ensure compliance with all applicable laws.

318. In order to control air emissions (i.e., dust), the exterior dam faces of the FTB will be permanently vegetated by a qualified reclamation contractor according to Minnesota Rule 6132.2700. Seeding and mulching will be based on PolyMet's Reclamation Seeding and Mulching Procedure (Attachment 2 of Appendix 14 of the Permit to Mine). Additionally, inactive interior beach areas will be temporarily vegetated as necessary for fugitive dust control as required by the Fugitive Emission Control Plan – Plant Site (Permit to Mine, Appendix 12.2).

319. The basin will be built in lifts. This serves to promote progressive reclamation in that as each lift is completed, the side slope will be vegetated in compliance with Minn. R. 6132.2700. The basin will be maintained and operated to minimize erosion which in turn enhances the survival and propagation of vegetation.

320. Tailings basin seepage currently provides water to certain wetlands and tributaries of the Embarrass River. In order to avoid ecologic and hydrologic impacts to the Embarrass River watershed resulting from the NorthMet Project's modifications to the existing FTB (such as installation of the seepage collection system), PolyMet has agreed to augment flows in to Trimble Creek, Unnamed Creek, Second Creek, and Unnamed (Mud Lake) Creek through

discharge of treated effluent from the WWTS and diverting runoff that currently flows into the tailings basin via a drainage swale. These augmentation discharges will occur under the terms of an NPDES/SDS permit issued by the MPCA and as detailed in the Water Appropriation Permits. These controls serve to minimize hydrologic impact of the FTB.

321. Minn. R. 6132.2500, subp. 2(A): This rule provides that “[t]ailings basins shall be designed by professional engineers, registered in this state, who are proficient in the design, construction, operation, and reclamation of tailings basins.” The SONAR explains that “because of the immense size of the tailings basin and the inherent risks associated with impounding great volumes of water and fine solids,” the tailings basin structures must “be designed and constructed only under the supervision of qualified experts.” SONAR at 25.

322. PolyMet retained Barr Engineering, and Tom Radue. The engineer signing the application is Tom Radue, who is a qualified Minnesota registered professional engineer, and is proficient in dam safety engineering. The DNR concludes that Poly Met has satisfied the requirements

323. Minn. R. 6132.2500, subp. 2(B)(1): This rule provides that the tailings basin design shall “provide rationale for site selection, with regard to dam safety and characteristics of the site that could affect, or could be affected by, the tailings basin.”

324. The DNR has evaluated the potential hazards to the health, safety, and welfare of the public and the environment associated with the facilities proposed in the HRF Permit Application and the FTB Permit Application. The DNR has reviewed and considered in detail information including, without limitation, the Permit Application materials and other relevant information in the Administrative Record, the FEIS, and comments submitted on the proposed NorthMet Project, including, without limitation, comments from local government units on the Permit Applications, comments from cooperating tribal nations on the Draft FTB and HRF Permits, and comments from the public on the Draft FTB and HRF Permits.

325. As discussed in more detail in the Dam Safety Findings, the DNR has also determined that the planned location for the FTB Dam is preferable to other available options because there is a lack of other suitable feasible and practical alternative sites and because the FTB would be constructed on the area of the former LTVSMC tailings basin, which is preferable to a greenfield site or another non-mining-related site.

326. Minn. R. 6132.2500, subp. 2(B)(2): This rule provides that the tailings basin design shall “describe materials, construction, and operating performance specifications and limitations that must be maintained to ensure protection of natural resources.”

327. The Flotation Tailings Basin Management Plan (Permit to Mine, Appendix 11.5) and the Residue Management Plan (Permit to Mine, Appendix 11.6) describe the materials, construction, and operating performance specifications that must be maintained to ensure protection of natural resources. In addition, the Geotechnical Data Package describes the materials that will be used and to enhance the available data, Poly Met will undertake additional sampling and testing, as directed in additional conditions that are included in the final FTB Permit. Conditions in the Dam Safety Permits requires Poly Met to conduct additional strength

and permeability testing of existing fine tailings and bulk tailings to confirm material properties used in the seepage and stability models. FTB Permit Condition 29. The FTB Permit includes a condition which requires verification sampling and analysis of tailings from the Plant. *See* FTB Permit Condition 41. PolyMet will sample the NorthMet tailings and will analyze those samples within four months of initial operation of the NorthMet beneficiation plant. This testing will be used to confirm the validity of the material properties shown by the pilot plant samples. If needed, Poly Met will update its seepage and stability models to reflect any new material information from this testing.

328. Minn. R. 6132.2500, subp. 2(B)(3): This rule provides that the tailings basin design shall “ensure that precipitation events do not result in overtopping the basin.” The SONAR does explain, however, that it is “reasonable that the commissioner avoid establishing a specific design precipitation event through rule, but to judge the adequacy of the tailings basin design based on the specific conditions of the site, and the results of applying several hydrologic evaluations to the ultimate design.” SONAR at 26.

329. Both the FTB Dam and the HRF Dam are designed to contain the “probable maximum precipitation” (PMP) for the location, as established by the National Weather Service, NOAA. In addition, the HRF Dam will have a minimum of 6 feet of freeboard, and up to a maximum of 36 feet of freeboard, while the FTB Dam will have a minimum of 9 feet of freeboard. *See* Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) at Section 2; Permit to Mine, Appendix 11.5 (Residue Management Plan) at Section 2.

330. An analysis conducted by PolyMet’s engineering firm, Barr, found that overtopping of the FTB Dam was unlikely because the FTB will have an emergency overflow spillway and sufficient freeboard, and because PolyMet will have the ability to draw water out of the Basin via the reclaim water pumps should it prove necessary. *See* Permit to Mine, Appendix 11.5, Attachment H (Flotation Tailings Basin Dam Break Analysis) at 5; Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) at 23, 30.

331. DNR has concluded that the Dam designs provide more than sufficient freeboard to contain waters from a PMP event. *See* FEIS at A-122. In addition, both basins will have the ability to pump water out as needed, including after operations. DNR also retains the ability to impose additional requirements as needed.

332. The HRF Dam is designed to safely store the Probable Maximum Precipitation event without overtopping and to meet the required factors of safety for stability.

333. Minn. R. 6132.2500, subp. 2(B)(4): This rule provides that the tailings basin design shall “describe the specific steps that must be taken to achieve reclamation on tailings and dam surfaces.”

334. The Flotation Tailings Management Plan details how PolyMet will achieve reclamation of the FTB in Section 7, beginning during construction and operations, and continuing through cessation of ore processing operations and through subsequent long-term oversight and maintenance of the FTB Dam, consistent with the “perpetual maintenance”

requirements applicable under Minnesota Dam Safety regulations. *See* Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) at 38-42.

335. Minnesota’s dam safety regulations direct that dam owners “shall perpetually maintain the dam and appurtenances to ensure the integrity of the structure until such time that it is removed.” Minn. Rules 6115.0390, subp. 1. The DNR’s dam safety permits for the FTB Dam and the HRF Dam will require PolyMet to comply with this provision and to maintain the dams in perpetuity or until they are not longer in use. *See* FTB Permit Conditions 39, 47; HRF Permit Conditions 37, 43. The regulations also specify that dam owners may be required to provide financial assurance for “carrying out the activities required for perpetual maintenance” of the dam. Minn. Rules 6115.0390, subp. 2. These obligations are part of PolyMet’s financial assurance commitments for the Project. The FTB and HRF Permit Conditions require that PolyMet comply with the financial assurance and environmental insurance requirements set forth in the Permit to Mine. *See* FTB Permit Condition at 25; HRF Permit Condition at 27. Finally, the Dam Safety regulations also require dam owners to submit plans for termination, which must address: perpetual maintenance and safety of the dam; disposal and treatment of ponded and channeled waters; monitoring and mitigation of surface water and groundwater pollution; silt, sedimentation, and erosion control; and vegetation and landscaping. *See* Minn. Rules 6115.0390, subp. 3. The Dam Safety Permits require PolyMet to submit Closure Plans to address these requirements. *See* FTB Permit Condition 39, 45-46; HRF Permit Condition 37, 42.

336. The Flotation Tailings Management Plan specifies that reclamation of the FTB will include periodic evaluation of the stability of the FTB Dam by a qualified geotechnical engineer, and also provides incremental reclamation of the exterior slopes of the dam as they are constructed. The exterior slopes will be permanently vegetated in accordance with the requirements in the Fugitive Emissions Control Plan, Minnesota Rules, part 6132.2700, and the Reclamation Seeding Plan. Attachment G to the Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) also contains template construction specifications. *See* Flotation Tailings Management Plan at 38.

“Final Reclamation” provisions in the FT Management Plan address activities after operations have ceased, but while the FTB Dam and the pond within the FTB are still in place. *See* FT Management Plan at 38-39. Among other things, the Plan provides for annual inspections to identify any detrimental effects from differential settlement and erosion. Additional erosion control measures may be imposed. *See* Flotation Tailings Management Plan at 38-39.

337. Attachment 2 of Appendix 14 of the Permit to Mine describes the seeding and mulching procedure with details such as fertilizer rates and work-in depths, planting seasons, litter reduction, plowing, seed mixes, mulch types and methods of application. These are examples of specific steps that PolyMet will take to achieve reclamation on both the FTB surfaces and dam slopes.

338. The plans for a water cover (the pond bottom cover system) over the FTB that will be maintained until such time that it can be shown that it is not necessary for protection of natural resources, are detailed in Section 5 of the Adaptive Water Management Plan (Appendix 11.4 of the Permit to Mine). It includes descriptions of the objectives of the cover, plans to inject

bentonite into the tailings to reduce infiltration of water through the tailings below, how it will interact with the FTB beaches, and maintenance.

339. Minn. R. 6132.2500, subp. 2(B)(5): This rule provides that the tailings basin design shall “identify monitoring locations to ensure compliance with the design.”

340. The Permit to Mine, Dam Safety Permits and other permits pertaining to the NorthMet Project require PolyMet to undertake ongoing monitoring and inspections, undertake additional analyses and modeling, evaluate a dry closure alternative, provide for substantial financial assurances, obtain environmental insurance, and subject itself to approvals for various aspects of planning, construction, and ongoing operations, maintenance, and closure, conduct regular inspections, and reporting. *See* Permit to Mine, Appendices 6, 10, 11.4, 11.5, and 11.6. For example, the FTB Management Plan contains several attachments, including plan drawings, specifications, a hydrologic study, an instrumentation and monitoring plan.

341. The DNR also retains extensive authority over design, construction, operation, and maintenance of the Dams under the Dam Safety Permits and applicable law.

342. Minn. R. 6132.2500, subp. 2(B)(6): This rule provides that the tailings basin design shall “comply with the requirements of part 6132.2200, if the tailings basin contains reactive mine waste.”

343. The FTB’s compliance with the reactive mine waste requirements is detailed in Section VII.F above.

344. Minn. R. 6132.2500, subp. 2(B)(7): This rule provides that the tailings basin design shall “include a schedule for the design engineers to inspect the construction, operation, and reclamation of the tailings basins, including closure and postclosure maintenance, to assure compliance with the design.”

345. The FTB Permit require inspections of the construction, operation, and reclamation of the tailings basins, including closure and postclosure maintenance, to assure compliance with the design. *See* FTB Permit Conditions 16-17, 22, 27-29, 29b, 30-48.

346. The Permit to Mine contains Special Condition 55c, which requires PolyMet to submit a detailed inspection schedule to be conducted by the designer throughout the permitted life of the FTB in order to ensure continued design compliance. The detailed inspection plan must be submitted to the DNR for review and approval no later than 30 days prior to the start of construction of each reactive waste storage facility. A summary of these inspections will be included in PolyMet’s annual reports

347. Minn. R. 6132.2500, subp. 2(C): This rule provides that “[d]uring the mining operation, dust generation shall be reduced by maximizing progressive reclamation, or controlled by the application of dust suppression techniques under part 6132.2800, subpart 2.”

348. As detailed in Section VII.K below, the NorthMet Project complies with the dust-suppression requirements of Minnesota Rule 6132.2800, subp. 2. These dust-suppression techniques and requirements will apply to the FTB as well.

J. Vegetation – Minn. R. 6132.2700

349. Minn. R. 6132.2700, subp. 1: This rule sets forth the goal that “[v]egetation shall be established to control erosion, screen mining areas from noncompatible uses, and provide for subsequent land uses such as wildlife habitat or timber production.”

350. The FEIS addresses revegetation requirements in reclamation and closure for the Plant Site and Mine Site. FEIS §§ 3.2.2.1.10, 3.2.2.3.12. Detailed review of revegetation measures, including control of invasive plant species, was also discussed in the FEIS. FEIS §§ 5.2.4.2.1, 5.2.4.2.3.

351. PolyMet proposes to progressively reclaim and vegetate areas disturbed by mining activity to fulfill the requirements of Minn. R. 6132.2700. Progressive reclamation, specifically with respect to vegetation of the basins and stockpiles, will help dust suppression and minimize erosion. Reclamation and vegetation after operations, including removal and reclamation of site infrastructure, will help promote natural vegetation to provide wildlife habitat and increase the land use productivity of the area. PolyMet’s seeding and mulching procedures are outlined in Permit to Mine, Appendix 14, Attachment 2. Figure 3-9 highlights the timing of reclamation within the mining area.

352. The existing terrain and vegetation in and around the Plant Site are compatible with non-mining areas and aid in screening the mining areas, as does the distance to the nearest residential dwellings. Permit to Mine § 8.0, Figure 5-37. At the Mine Site, the need for screening the mining area from noncompatible uses is minimal due the location of the mine features in an area zoned for mining. Permit to Mine § 7.1; Figure 5-38.

353. Minn. R. 6132.2700, subps. 2(A)(1), 2(A)(4): These rules provide that vegetation must be established on surface overburden storage piles and on “benches and tops of lean ore, waste rock, and leached ore storage piles.”

354. There are no plans for permanent surface overburden storage piles. Unsaturated surface overburden will be moved to the OSLA or to areas near its final reclamation use. The goal of the OSLA is to screen and sort this material in a temporary staging area for later use, including possible construction use and as reclamation material. Saturated mineral overburden will be commingled in the Categories 2/3 and 4 waste rock stockpiles or placed directly into the East or Central Pits. If there is an excess of unsaturated mineral overburden such that permanent stockpiling becomes necessary, PolyMet will work with the DNR to determine if there are additional permitting and reclamation requirements, including the requirement of vegetating surface overburden storage piles.

355. A major component of progressive reclamation is backfilling the East Pit with Category 2/3 and 4 waste rock. As such, the Category 2/3 and 4 waste rock stockpiles are temporary. The Category 1 waste rock stockpile is the only permanent stockpile proposed and will be progressively reclaimed, and ultimately covered in reclamation. *See* Permit to Mine § 10.4.5.4. Unsaturated mineral overburden and peat will be stored at the OSLA or in areas near its final reclamation use.

356. At the HRF, a permanent cover system will be installed to prevent oxygen infiltration (including a layer of LTVSMC tailings, a geosynthetic clay liner, drainage pipes to collect and direct runoff and additional LTVSMC coarse tailings). On top of this will be open-meadow vegetation, as described in Attachment 2 of Appendix 14, which will have a gently sloping closure surface that sheds surface water runoff and accommodates settling of the HRF. Permit to Mine, Appendix 14 § 3.1.4.2.

357. Minn. R. 6132.2700, subp. 2(A)(2): This rule provides that vegetation must be established on “exposed soils along diversion channels and roads.”

358. Roads that are not necessary for access during the closure and postclosure maintenance phases will be reclaimed and vegetated within three years after the reclamation phase begins. This will account for approximately 65 acres of haul roads on site. *See* Permit to Mine, Appendix 14 § 2.1.2.

359. Where roads are reclaimed, culverts will be removed and replaced with channels. These areas will be graded and vegetated to provide a stable bank, approximating a natural channel and floodplain configuration. Any potential erosion will be controlled by best management practices (e.g., installation of wattles, filter fabric, riprap, etc.). Permit to Mine, Appendix 14 § 3.1.1.

360. Minn. R. 6132.2700, subp. 2(A)(3): This rule provides that vegetation must be established on “cuts, pits, trenches, and other areas disturbed during the process of obtaining borrow materials.”

361. Potential borrow sources at the site (Large Figure 15 in Appendix 11.1) and borrow source criteria are described in Appendix 11.1. Borrow sources may be necessary at the start of the Mine Site development or when there is a greater demand than supply of on-site construction materials. Any areas that are disturbed as part of a borrow source will be graded, reclaimed, and vegetated according to Reclamation Seeding and Mulching Procedure. Permit to Mine §§ 10.2.4, 10.2.5, 10.3.3.2, Appendix 14 § 3.1.4.2.

362. Special Conditions 40 through 42 of the Permit to Mine require PolyMet to update its reclamation plan once it has selected sites for its borrow source material. Such updated plans will include vegetation requirements to meet applicable regulatory standards and will be tailored to the location of the borrow sites as ultimately selected.

363. Minn. R. 6132.2700, subps. 2(A)(5), 2(A)(7): These rules provide that vegetation must be established on tailings basins and on dikes and dams.

364. The FTB will be progressively reclaimed-including through stabilization and vegetation-during operation in order to minimize dust, wind and water erosion. This procedure will require that the exterior faces of the dams be sloped and stabilized, then amended with a bentonite layer to limit oxygen infiltration and topped with dam construction material. These exterior dam faces will then be permanently vegetated based on PolyMet’s Reclamation Seeding and Mulching Procedure. *See* Permit to Mine § 10.2.5 and Attachment 2 of Appendix 14 of the Permit to Mine).

365. Interior beach areas will be temporarily vegetated to control for fugitive dust as required by the Fugitive Emissions Control Plan – Plant Site. *See* Permit to Mine, Appendix 12.2. After operations cease, interior portions will be graded to control stormwater runoff and accommodate settling of the FTB. Similar to the exterior dam slopes, the interior portion will be amended with a bentonite layer to limit oxygen infiltration and topped with dam construction material. Vegetation will be established on top of this and will be chosen to limit root penetration into the underlying bentonite layer. *See* Permit to Mine, Appendix 14 § 3.1.3.1. An exclusion dike will be constructed on the overburden portion of the pitwall to minimize stormwater flow into the pits. This will be sloped and vegetated. Permit to Mine § 10.4.6.5.

366. Minn. R. 6132.2700, subp. 2(A)(6): This rule provides that vegetation must be established on heap and dump leaching facilities.

367. “Heap and dump leaching” refers to a hydrometallurgical process that extracts metals from broken rock piles, called heaps or dumps, by application of leaching solutions. No portion of the NorthMet Project meets this definition, so this rule is inapplicable.

368. Minn. R. 6132.2700, subp. 2(A)(8): This rule provides that vegetation must be established on “exposed soils adjacent to water reservoirs.”

369. The plant will draw make-up water, as needed, from the Plant Reservoir, which will receive water from Colby Lake. Permit to Mine § 11.2. LTVSMC constructed Whitewater Reservoir and the Colby Lake Pipeline and Pumphouse in the early 1950s to provide make-up water to the beneficiation plant at the Plant Site. These are existing facilities and have established vegetation. Permit to Mine § 9.2.1.

370. Minn. R. 6132.2700, subp. 2(A)(9): This rule provides that vegetation must be established on “areas exposed or disturbed through the activities associated with the reclamation of building sites, parking lots, pipeline routes, storage areas, transmission routes, and roads not used for subsequent access.”

371. The removal and reclamation of auxiliary facilities not used for subsequent access will be accomplished in a four-year period after operations end, from approximately Mine Year 21 through Mine Year 24. This is defined as the reclamation period and it will end when structures not needed during closure and postclosure maintenance are demolished and footprints are reclaimed, including vegetation. *See* Permit to Mine § 3.2. Figure 8-5 of the Permit to Mine shows the geographic location of the sites that will be reclaimed.

372. During the reclamation phase at the Mine Site, reclaimed buildings will include: Fueling and Maintenance Facility and Rail Transfer Hopper and approximately 65 acres of parking lots and roads. After demolition of Mine Site buildings, two feet of overburden material will be placed on the footprints and vegetated. *See* Permit to Mine, Appendix 14 § 2.1.1.

373. During the reclamation phase at the Plant Site, PolyMet will remove the tailings pipeline and associated pumping systems and will also demolish the Beneficiation Plant, Hydrometallurgical Plant, and associated facilities. As at the Mine Site, after demolition, two feet of overburden will be placed over the facility’s former footprint and vegetated. Plant Site

roads not necessary for subsequent use will be scarified and vegetated. *See* Permit to Mine, Appendix 14 § 3.1.1.

374. Site infrastructure related to the Transportation and Utility Corridors that is not being utilized for reclamation activities, will be reclaimed during the reclamation phase. *See* Permit to Mine § 3.5.3. The Colby Lake Pipeline route will require reclamation, if not ultimately approved to remain in place as requested in PolyMet’s variance request. Permit to Mine, Appendix 14 § 1.2.1. Reclamation plans and associated costs for financial assurance have been included in the Application. The infrastructure (e.g., pipes and pumphouse) would be removed and the ground graded as needed and the site restored, which would include revegetation. Permit to Mine, Appendix 15.1 § 2.0, figures 1, 2, and 3 and Appendix A-1 (“Legacy Reclamation Estimate”). PolyMet’s financial assurance currently includes these amounts. Special Condition 21 of the Permit to Mine provides that PolyMet must provide the DNR with evidence of agreement with affected landowners prior to any approval of the variance request to leave the Colby Lake Pipeline in place at closure. Such variance is not approved at this time.

375. Upon final closure and release of the site, any features that are not needed for future, subsequent use would be revegetated according to the rule.

376. Minn. R. 6132.2700, subp. 2(A)(10): This rule provides that vegetation must be established on “surface overburden portions of pitwalls.”

377. This is specifically addressed in section 10.4.6.5 of the Permit to Mine, which requires that the overburden portions of pitwalls are sloped to a moderate angle while providing a surface that can be readily stabilized through progressive reclamation. The overburden portions of the pitwalls will then be scarified and seeded. The overburden portions will be progressively reclaimed, including vegetation established in advance of cessation of operations.

378. Minn. R. 6132.2700, subp. 2(A)(11): This rule provides that vegetation must be established on buffers.

379. This rule is inapplicable as there are no plans for constructed buffers at either the Plant Site or the Mine Site. Constructed buffers are not required for the NorthMet Project due primarily to the location of the facilities. The NorthMet Project was designed such that it is compatible with surrounding non-mining uses. *See* Permit to Mine § 9.0.

380. Minn. R. 6132.2700, subp. 2(A)(12): This rule provides that vegetation must be established on “subsided areas not permanently covered by water.”

381. As the proposed NorthMet Project is an open pit mine and there are no known historical underground workings, there is minimal potential for subsidence, which is caused by the sinking of the ground surface overlying an underground mine.

382. The competent nature of the waste rock will mitigate the potential for any slumping on waste stockpiles. Permit to Mine Reference 8. Additionally, waste rock will be backfilled into the East Pit as part of the NorthMet Project’s progressive reclamation. Permit to Mine § 7.3 Operating Life of Mine and Mine Rate, Amount, Sequence, and Schedule.

383. Minn. R. 6132.2700, subp. 2(A)(13): This rule provides that vegetation must be established on “lean ore, waste rock, and leached ore storage pile slopes, within one-fourth mile of residential and designated public use areas, except designated trails.”

384. This rule is inapplicable because the mining area is not sufficiently near to any of the identified features as to trigger the rule requirements.

K. Dust Suppression – Minn. R. 6132.2800

385. Minn. R. 6132.2800, subp. 1: This rule sets forth a goal that areas disturbed by mining be managed to control dust.

386. The effects of dust from mining and ore transport would generally be confined to areas disturbed by NorthMet Project activities. The FEIS acknowledges the importance of controlling fugitive dust emissions at both the Mine and Plant Sites and along the Transportation Corridor. Table 3.2-3 identifies a Cat 77D or similar-type water truck for dust suppression. The FEIS required Air Quality Management Plans for the Mine and Plant Sites to address fugitive dust control in § 3.2.2, while § 3.2.2.3.12 identifies controlling dust as a project feature in the Reclamation Plan. All active project areas will be subject to a Fugitive Dust Control Plan approved by the MPCA. Comments on the issue of fugitive dust control were addressed in the FEIS Response to Comments Issue A.5.1 (AIR – 05).

387. Included in the Permit to Mine are two Fugitive Emission Control Plans, one for the Mine Site and one for the Plant Site. *See* Permit to Mine Appendices 12.1, 12.2. Each of these plans will be developed as part of PolyMet’s Air Emissions Operating Permit (“air permit”) issued by the MPCA, but they also serve to meet the goals of Minnesota Rule 6132.2800. The Plans establish practices and procedures to reduce emissions and respond to observed fugitive emissions (i.e., Dusty Conditions) in a timely and effective manner. Activities such as drilling, blasting, truck and rail loading, hauling on unpaved roads, and crushing are addressed in the Mine Site Plan, while FTB wind erosion and construction, limestone and bentonite operations, truck traffic, and material movement are contained in the Plant Site Plan. As such, these Plans serve to meet the goal of this rule.

388. Minn. R. 6132.2800, subp. 2: This rule requires that dust “be controlled by techniques approved by the commissioner such as water spray, anchored mulches, vegetation, enclosure and containment, and limited chemical binders as last alternatives.”

389. The Fugitive Emission Control Plans (in table 4-1 of each plan) describe the primary and contingent control strategies for dust management at each of the listed facilities and potential sources. Various techniques, such as water application, compaction, water level control, seeding, mulching, material size, drop distance, equipment selection, and chemical dust suppressants are presented as options. The Plans also provide that, if dusty conditions cannot be controlled, associated activities would be suspended. Thus, PolyMet has agreed to suspend activities under their approved Blasting Plan and the DNR has also added special conditions to suspend activities. Special Conditions 62 and 63.

390. In addition to the Plans, special conditions within the Permit to Mine ensure that PolyMet’s activities satisfy the requirements of this rule. Special Condition 59 addresses dust

emissions specifically along all rail lines within the mining area. Special Condition 63 requires PolyMet to report any suspension of activities based on dusty conditions. Special Condition 90 requires PolyMet to submit finalized Fugitive Emission Control Plans to the DNR for review and approval prior to ground disturbance in the relevant portion of the mining area.

L. Air Overpressure and Ground Vibrations from Blasting – Minn. R. 6132.2900

391. Minn. R. 6132.2900, subp. 1: This rule sets forth a goal that the “[e]ffects of air overpressure and ground vibrations from production blasts shall be kept at levels that will not be injurious to human health or welfare and property outside mining areas.”

392. The FEIS describes drilling and blasting activities that are to be codified into a plan based on standard design that considers specific aspects of the NorthMet deposit. *See* FEIS § 3.2.2.1.5 and Table 3.2-5. Potential noise and vibration impacts were addressed in FEIS at § 4.2.8, § 4.3.8, § 5.2.5, 5.2.8, § 5.2.8.1.2, 5.2.8.2.2, and Figure 5.2.8-1. Noise and vibration comments were addressed FEIS Response to Comments Issue Areas: A.5.15 (N – 01, 02, 03, 04, 05, 06), A.5.21 (WET – 11), and A.5.24 (WR – 016, 025-1, 025-16, 032).

393. The Permit to Mine includes production blast monitoring and production blast plans that meet requirements set forth in Minnesota Rule 6132.2900. The Application distinguishes between production blasting and construction blasting activities. Minnesota Rule 6132.2900 apply specifically to production blasts. Aside from the Minnesota Rules, there are no specific federal or local vibration regulations associated with blasting for construction or final reclamation purposes. PolyMet proposes adaptive blast designs that will continue to be refined based on monitoring data and video recordings. Blast designs and safety protocols are in place to ensure overpressure and ground vibrations from production blasts are below levels established in Minnesota Rule 6132.2900, thereby avoiding injury to human health or welfare and property outside mining areas. Appendix 12.3 of the Permit to Mine is herein referred to as “Mine Site Blasting Plan.” The DNR’s determination of specific requirements is further described below.

394. Special Condition 92 of the Permit to Mine requires PolyMet to report to the DNR any blast that exceeds the standards as laid out in Minn. R. 6132.2900 within 30 days. This condition will alert the DNR to such an event well in advance of the annual reporting process to allow investigation and follow-up as needed in a timely manner.

395. Minn. R. 6132.2900, subps. 2(A)(1), 2(A)(2): These rules provide that “[a]ir overpressure on lands not owned or controlled by the permittee shall not exceed 130 decibels as measured on a linear peak scale, sensitive to a frequency band ranging from six cycles per second to 200 cycles per second” and “[m]onitoring stations shall be located adjacent to the nearest structure located on lands not owned or controlled by the permittee, and where the commissioner considers necessary to investigate complaints,” respectively.

396. The Application identifies Minn. R. 6132.2900 subp. 2 (A)(1) as a threshold, with monitoring occurring for each production blast. *See* Mine Site Blasting Plan § 2.3. While the rule requires the threshold be met at the property line, monitoring is required at the nearest structure located on lands not owned or controlled by the permittee. Location requirements for air overpressure monitoring are the same for ground vibration monitoring. If the DNR deems

that property line monitoring is necessary to investigate complaints, the DNR has the authority to change the air overpressure monitoring plan.

397. Minn. R. 6132.2900, subp. 2(A)(3): This rule requires all open pit mining operators to keep a blaster's log of production blasts meeting the requirements set forth therein. PolyMet will collect and maintain a log of each production blast.

398. The information to be collected in the production blast log specified within the Permit to Mine meets the requirements of this provision. The production blast log will be retained for a period of at least six years and will be made available to the DNR commissioner on request. *See* Permit to Mine, Appendix 12.3 (Mine Site Blasting Plan) §§ 2.2 and 2.3.

399. Minn. R. 6132.2900, subp. 2(A)(4): This rule requires that blasting be postponed until a condition that could cause the blast to adversely affect populated areas is no longer present.

400. The Permit to Mine indicates that blasting and drilling will be postponed, if needed, until conditions improve for fugitive emissions. Blasts will be conducted only when meteorological conditions provide appropriate control of air overpressure and ground vibrations, and control of fugitive emissions. Meteorological conditions will be monitored by employing an aircraft flying service. *See* Permit to Mine, Appendix 12.3 §§ 4.1, 4.1.2 and 4.1.3.

401. Minn. R. 6132.2900, subp. 2(A)(5): This rule requires that blasting in open pits "take place only during daylight hours unless a hazardous condition requires blasting at another time."

402. The Permit to Mine specifies that initiation of production blasts will occur in daylight hours. *See* Permit to Mine, Appendix 12.3 (Mine Site Blasting Plan) §§ 1.2 and 2.1; *see also* FEIS § 5.2.8.2.2.

403. Minn. R. 6132.2900, subp. 2(B)(1): This rule provides that "[t]he maximum peak particle velocity from blasting shall not exceed one inch per second at the location of a structure located on lands not owned or controlled by the permittee."

404. PolyMet modeled ground vibrations from blasting using the Site Law formula and diagrammed the predicted ground vibration emanating from the mine site. No receptor (building or structure) is close enough to the Mine Site to fall within the specified limit of this provision. *See* FEIS § 5.2.8.2.2 and FEIS Figure 5.2.8-2. Maximum ground vibration levels were modeled from the Mine Site. The model indicates that the threshold for the provision will be met. *See* Final EIS § 5.2.8.1 and FEIS Figure 5.2.8-1.

405. Minn. R. 6132.2900, subp. 2(B)(2): This rule provides that "[t]he permittee shall monitor production blasts for peak particle velocity using a seismograph capable of measuring three mutually perpendicular peak particle velocities, with the peak particle velocity being the largest of these measurements."

406. Permit to Mine, Appendix 12.3 § 2.3 describes the seismograph capabilities as being able to measure three mutually perpendicular peak velocities.

407. Minn. R. 6132.2900, subp. 2(B)(3): This rule requires seismic measurements to “be conducted adjacent to the nearest structure located on lands not owned or controlled by the permittee and where the commissioner considers necessary to investigate complaints.”

408. The Permit to Mine specifies seismic and ground vibration monitoring as well as video recordings of production blasts will occur as part of an ongoing production blast monitoring program and production blast implementation plan. At the time of the Permit to Mine Application submission, the nearest structure located on lands not owned or controlled by PolyMet is located on Cliffs Natural Resource Northshore Mining property. *See* Permit to Mine §14.2.1.2; Permit to Mine, Appendix 12.3 (Mine Site Blasting Plan) §§ 2.1 and 2.2. Prior to the first production blast, PolyMet will confirm the location of the nearest structure located on lands not owned or controlled by PolyMet. *Id.* § 2.3.

409. Minn. R. 6132.2900, subp. 2(B)(4): This rule requires the DNR to require permittees using underground mining methods to maintain a blaster’s log to assess ground vibration control when ground vibrations have or are likely to exceed the one-inch-per-second standard.

410. This provision is not applicable to the NorthMet Project because NorthMet is an open pit mine. *See* Permit to Mine §7.4.

411. Minn. R. 6132.2900, subp. 2(C): This rule requires that all monitoring data collected be made available to the DNR upon request.

412. The documentation and retention plan will include blast monitoring data for air overpressure and maximum peak particle velocity which will be retained by PolyMet for a period of at least six years, Permit to Mine, Appendix 12.3 § 2.3. If blast monitoring indicates an exceedance of air overpressure and/or maximum peak particle velocity, corrective measures will be implemented, Permit to Mine, Appendix 12.3 § 2.4.

M. Subsidence – Minn. R. 6132.3000

413. Minn. R. 6132.3000, subp. 1: This rule sets forth the goal that mining be “conducted in a manner that will minimize hazardous conditions that result from subsidence.”

414. The NorthMet Project involves an open pit mine in a location without any known historical underground workings, so there is minimal potential for subsidence, which is caused by the sinking of the ground surface overlying an underground mine. *See* SONAR at 31. If PolyMet were to identify a potential for subsidence in the future, it will implement mining techniques to maintain safe operating conditions and minimize potential for hazards. *See* Application § 7.4. Hazardous conditions related to slumping have been minimized through mine design and as part of the NorthMet Project. Permit to Mine § 7.5.1.

415. Minn. R. 6132.3000, subp. 2(A): This rule requires that mining techniques “be used that minimize subsidence to the extent practicable.”

416. PolyMet retained Golder to perform a geotechnical evaluation and kinematic assessment to develop a recommendation for slope designs. The findings from this evaluation

and assessment are summarized in the Application in Tables 7-6 and 7-7. *See also* Permit to Mine § 7.5.2, and Reference 8. During operation PolyMet will manage pit slope through pit slope stability monitoring and analysis such that changes could be implemented to minimize slumping.

417. Minn. R. 6132.3000, subp. 2(B): This rule provides that “[i]f actual or likely subsidence occurs, the permittee shall establish ground control survey locations and conduct surveys to document the extent of ground movement.”

418. PolyMet has committed to conduct stability monitoring, including weekly surveys of pit slopes, survey monuments, and inclinometers and daily visual inspections of pit walls and other features. *See* Permit to Mine §§ 7.5.2.3, 14.2.1.1.

419. Minn. R. 6132.3000, subp. 2(C): This rule requires that areas affected by subsidence be “contoured or filled to protect public health and safety or natural resources.”

420. The competent nature of the waste rock will mitigate the potential for any slumping on waste stockpiles. *See* Permit to Mine, Reference 8. Additionally, waste rock will be backfilled into the East Pit as part of the NorthMet Project’s proposed progressive reclamation. Permit to Mine § 7.3. Any overburden stockpile that slumps will need to meet the requirements of Minn. R. 6132.2300, which requires the surface overburden portions of pitwalls be to be structurally sound and promote progressive reclamation.

N. Closure and Post-Closure Maintenance – Minn. R. 6132.3200

421. Minn. R. 6132.3200, subp. 1: This rule sets forth a goal that the mining area “be closed so that it is stable, free of hazards, minimizes hydrologic impacts, minimizes the release of substances that adversely impact other natural resources, and is maintenance free.”¹¹

422. The reclamation and closure plan for the NorthMet Project is directed at leaving a site that is stable, free of hazards, minimizes hydrologic impacts, and minimizes the release of substances that adversely impact other natural resources at closure. Permit to Mine, §§ 14 and 15 and Appendices 11.2-11.6, 14. Examples of how closure is planned to meet these goals are the following.

423. The FTB will have a water cover to reduce infiltration and thus limit the amount of seepage of constituents of concern into the water that seeps from the basin. However, the travel time of the seepage from the basin to the seepage collection system is of long enough duration that the water entering the collection system is not expected to meet applicable water quality standards in order to be released without treatment for an extended period of time. The water collected at the collection system is the water that left the basin many years prior during operations. The purpose of the water cover is that, eventually, there will be so little seepage that it can be released without treatment, but it will take many years before that “post-operation” water stops arriving at the collection system. Until that occurs, the closure design minimizes the release of substances that adversely impact other natural resources. Permit to Mine, §§ 14 and

¹¹ While it is the goal that the mining area will be maintenance free, Section VIII, A(iv) discusses in detail why Chapter 6132 of the Minnesota Rules authorizes long-term treatment at closure.

15; Appendices 11.1, 14; *see also* FEIS § 3.2.2.1.8. Special Conditions 16a, 16b, and 16c address the requirement for monitoring of the FTB to confirm the facility is functioning as required.

424. The buildings and other auxiliary facilities in the mining area will be removed and the areas graded and revegetated. This reclamation will leave behind a stable landscape and an area free from hazards. Permit to Mine, § 15 and Appendix 14.

425. The HRF is designed with a double liner and geomembrane cover. Both of these features are intended to minimize the release of substances that adversely impact other natural resources.

426. All of the temporary stockpiles will have the liner systems removed and disposed of properly, leaving behind land to be regraded and revegetated. The revegetated land surface will be stable, free of hazards, reintegrated with the watershed to minimize hydrologic impacts, and maintenance free.

427. The Category 2/3 and 4 waste rock will be backfilled into the East Pit and the pit allowed to fill with groundwater. That subaqueous disposal of the waste rock will significantly limit the exposure of the rock to oxygen, thus reducing its reactivity. Over time, the quality of the water leaving the East Pit is expected to improve because the contaminant load coming from the rock is reduced. Water leaving the East Pit will travel to the West Pit, where it will be collected and treated for as long as needed to meet applicable water quality standards. *See* Permit to Mine, Appendix 14 § 2.2.1.2. The backfilled pit will be stable upon closure. During operations, closure, and post-closure the mine pits are monitored to verify pit wall and slope stability. Special Conditions 16a, 16b, and 16c of the Permit to Mine require detailed monitoring plans to be developed as each phase of the NorthMet Project advances. The East Pit backfill is expected to begin in Mine Year 11 and monitoring will verify stability of the backfill (i.e., evaluate and monitor for subsidence of the fill) and vegetative cover. Permit to Mine, Appendix 14 § 2.2.1.2. Monitoring and verification on pit wall and slope stability during operations should establish slopes that last in perpetuity.

428. The Category 1 waste rock stockpile will have a seepage collection system to capture and treat water that seeps through the pile during operations. That system will continue to function into closure. At closure, a cover will be placed on the top of the Category 1 waste rock stockpile to reduce the precipitation percolating through the cover. That reduction is intended to reduce the seepage to the point that it would not need to be treated to meet applicable water quality standards. PolyMet will also be required to submit monitoring plans, for the DNR's approval, that will verify that the systems in place are performing as required. Special Condition 16e. This monitoring plan must specify triggers for evaluation of adaptive management if data reveals that the system is not performing as required. *Id.*

Because it is not predicted with certainty that water will eventually meet applicable water quality standards and thus be able to be released without treatment, the NorthMet Project has been permitted with requirements for long-term active water treatment and maintenance and associated financial assurance. In addition, the Dam Safety Permits contain a condition requiring that, within five years of permit issuance, and every five years thereafter, PolyMet shall provide

a report to the DNR Dam Safety Engineer detailing future closure options, such as a dry cap or other technologies that may improve closure conditions and may lead to a shorter post closure monitoring and maintenance period. Ongoing future closure plans shall be developed in consultation with the DNR Dam Safety Engineer and any future closure plan must receive all applicable State and Federal approvals. FTB Permit Condition 45.

429. Minn. R. 6132.3200, subp. 2: This rule sets forth the requirements for maintenance after a temporary or permanent shutdown.

430. Parts B through D under subpart 2, refer to the process for a temporary shutdown of the operation which does not apply at this time. If the DNR were notified of either a temporary or permanent shutdown, Minnesota Rule 6132.3200 would be implemented as appropriate.

431. Minn. R. 6132.3200, subp. 2(E): For a permanent shutdown, this rule requires the permittee to implement the contingency reclamation plan under Minnesota Rule 6132.1300.

432. Upon initiation of closure, PolyMet will need to implement the contingency closure plan and comply with Minnesota Rule 6132.3200, subp. 2.E(1) to (6). No release from the Permit to Mine under Minnesota Rule 6132.4800 would be granted by the DNR for those portions of the mining area that require postclosure maintenance until the need for maintenance ceases.

O. Criteria of Financial Assurance – Minn. R. 6132.1200, subp. 5

433. Minn. R. 6132.1200, subp. 5(A): This rule sets forth a goal that a permittee's financial assurance be sufficient to cover the costs of reclamation and corrective action estimated under Minn. R. 6132.1200, subp. 2 and 3.

434. Minn. R. 6132.1200, subp. 2, requires a permittee to “submit, as part of the application for a permit to mine, a documented estimate of costs necessary to implement the contingency reclamation plan This estimate shall include closure and postclosure maintenance activities required if operations cease within the first calendar year.” This rule further requires the permittee to “annually adjust the contingency reclamation cost estimate” *Id.*

435. The DNR and EOR conducted detailed financial assurance reviews with PolyMet on cost estimates for contingency and legacy reclamation. This review exceeded the rule requirement by addressing financial assurance beyond the first calendar year. Permit to Mine Section 16 covers the overall financial assurance requirements for the NorthMet Project. Permit to Mine Section 16.2 addresses costs and Appendix 15 more specifically addresses how cost estimates were calculated for various components of the NorthMet Project. Special Conditions Attachment 1 (items 11, 12, 17, and 18) and Appendix A (Financial Assurance Calculations) and the Trust Fund Agreement also address calculation methods and identify the required amounts of financial assurance, in addition to requiring PolyMet to recalculate the financial assurance annually. The DNR and EOR compared PolyMet's cost estimates with the reclamation and postclosure maintenance that would be required and verified that the amount of financial

assurance proposed by PolyMet would be sufficient to cover these costs. Indeed, as structured, PolyMet's financial assurance requirements are conservative because they include an additional 10% contingency factor for reclamation costs (incurred within three years of the cessation of mining operations), and an additional 15% contingency factor for long-term costs (incurred more than three years after the cessation of mining operations). *See* Special Conditions Attachment 1, items 12a-12b. There are no corrective actions required at this time and thus, a cost estimate is not required for corrective action.

436. Minn. R. 6132.1200, subp. 5(B): This rule requires "assurance that the funds will be available and made payable to the commissioner when needed."

437. Permit to Mine Section 16 and Appendix 15, and Attachment 1 of the Special Conditions, cover the overall financial assurance requirements for the NorthMet Project. Special Conditions Attachment 1, items 13 and 14, specifically subitems g thereto, address the requirements of this portion of the rule. The terms and conditions contained in the referenced sections assure that the funds will be available and made payable to the commissioner when needed. Any financial instruments used by PolyMet for its financial assurance obligations will have to meet the requirements of this rule. For example, the ILOCs provide that the bank "agrees that the commencement of any administrative or judicial appeal by Poly Met (for greater certainty, excluding any order, ruling or decision issued by a court or other body with jurisdiction over the Bank) shall not delay, hinder, or otherwise affect the Bank's obligations under this Letter of Credit in accordance with the terms and conditions hereof, up to the maximum amount of this Letter of Credit."

438. Minn. R. 6132.1200, subp. 5(C): This rule requires "assurance that the funds will be fully valid, binding, and enforceable under state and federal law."

439. Permit to Mine Section 16 and Appendix 15, and Attachment 1 of the Special Conditions cover the overall financial assurance requirements for the NorthMet Project. Special Conditions Attachment 1, items 13 and 14, and specifically subitem a thereto, address the requirements of this rule and mandate that PolyMet's financial assurance instruments are valid, binding and enforceable under Minnesota law.

440. Minn. R. 6132.1200, subp. 5(D): This rule requires "assurance that the funds will not be dischargeable through bankruptcy."

441. Permit to Mine Section 16 and Appendix 15, and Attachment 1 of the Special Conditions cover the overall financial assurance requirements for the NorthMet Project. Special Conditions Attachment 1, items 13 and 14, specifically subitems e thereto, address the requirement that financial assurance be non-dischargeable in bankruptcy. Item 13e states that any bonds would be written to pay cash to the DNR prior to any settlement in bankruptcy court. Item 14e states that any irrevocable letter of credit ("ILOC") must not include language that the ILOC is an asset of PolyMet in the event of bankruptcy. This requirement is intended to maintain the default rule that an ILOC is not an asset of the permittee in the event of a bankruptcy proceeding.

442. Minn. R. 6132.1200, subp. 5(E): This rule requires that all terms and conditions of the financial assurance be approved by the commissioner, who shall use individuals with documented experience in the analysis when evaluating the assurance.

443. Permit to Mine Section 16 and Appendix 15, and Attachment 1 of the Special Conditions cover the overall financial assurance requirements for the NorthMet Project. Special Conditions Attachment 1, items 13 and 14, specifically subitems b and c thereto, address approval by the DNR. The DNR's comprehensive review of PolyMet's proposed financial assurance included extensive review and analysis of the proposals by its own internal experts and by EOR and its subcontractors.

P. Variance - Minn. Stat. § 93.48; Minn. R. 6132.4100, subps. 1, 2

444. Minn. Stat. § 93.48; Minn. R. 6132.4100, subps. 1, 2.(B): This statute provides that "[t]he commissioner may, upon application by the landowner or mine operator, modify or permit variance from the established rules adopted hereunder if it is determined that such modification or variance is consistent with the general welfare." Under Minn. R. 6132.4100, subp. 1, an application for a variance must "include information necessary for the commissioner to determine that the proposed variance is directed toward the attainment of the goals" of Chapter 6132 and is "consistent with the general public welfare."

445. An application for a variance must show "how the alternative measure proposed is equivalent or superior to that prescribed in the rule." *Id.*, subp. 1.A. In addition, the application for variance must show "how strict compliance with the rule will impose an undue burden on the applicant." *Id.*, subp. 1.B. The DNR may not grant a variance to a statutory requirement. *Id.*

446. This rule provides the DNR the authority to grant a variance if the DNR determines that the variance is in the public interest and meets the goals of parts 6132.0100 to 6132.5300.

447. The Permit to Mine contains requests for two variances from the nonferrous rules relating to closure activities. *See* Permit to Mine § 1.2. Specifically, PolyMet requests a variance to leave the Colby Lake Pipeline and Pumphouse in place after operations, rather than removing this infrastructure. *See* Permit to Mine § 3.5.4. The basis for this variance request is that this is legacy regional infrastructure potentially suitable for use by third parties after closure. Permit to Mine, Appendix 14 § 1.2.1. PolyMet further noted that changes to surface use after installation of the pipeline create significant geotechnical concerns and potential hydrologic impacts in the event the pipeline is removed. *Id.* At the time of permit issuance, the DNR will not grant the variance request to leave the Colby Lake Pipeline and Pumphouse in place after operation. PolyMet has not provided to the DNR the documentation required for the DNR to make a decision on this variance (Special Condition 21). The DNR may grant the requested variance in the future, but at this time, no variance has been granted. Accordingly, PolyMet's reclamation costs estimates include the costs associated with removal of this infrastructure.

448. PolyMet also seeks a variance to leave the existing Utility Tunnels at the Plant Site in place rather than removing them. *See* Permit to Mine § 1.2.2. PolyMet seeks a variance to leave these tunnels in-place after the operations phase on grounds that the tunnels are stable

and collapsing or filling in the tunnels would require blasting activities and impose significant environmental effects associated with excavation of necessary fill materials without providing a clear benefit to the public welfare. *Id.*

449. On September 24, 2018, the DNR received a Barr Engineering report titled: Plant Site Utility Tunnel Existing Conditions Assessment and Closure Plan (“Barr Report”). This submittal was in response to DNR Draft Special Condition 20, which stated that prior to a determination on the variance request to leave the existing utility tunnels in place at closure, PolyMet must provide, and the DNR must approve:

- a geotechnical review and report of long-term tunnel stability;
- a plan for capping and sealing access routes; and
- a plan for wildlife enhancement of the utility tunnels for potential bat habitat.”

450. The DNR worked through its consultant EOR to have Gale-Tec Engineering, Inc. review and comment on the Barr Report as it related to the requested variance and above special condition criteria. On October 1, 2018, Gale-Tec Engineering supplied the DNR with a report outlining its review and findings (“Gale-Tec Report”).¹² Based on this Gale-Tec Report, the DNR requested additional petrographic analysis of the concrete, and concrete cores were tested for their comprehensive strength. Data on the comprehensive core strength was sent to Gale-Tec Engineering. Based on Gale-Tec Engineering’s assessment of these data and the Barr Report, the DNR has partially granted a variance to leave certain existing electrical and service tunnels (as depicted in the “Plant Site Utility Tunnels Existing Layout” Figure of Attachment A of the September 2018 Barr Report) in place at closure. Special Conditions 20a and 20b of the Permit to Mine impose additional requirements upon this variance approval. These conditions require grading to divert run-off water; a timeline of inspections for cracks, settlement, and erosion; petrographic analysis; and inclusion of a deed restriction identifying the remaining tunnels. The DNR did not grant the requested variance for the D-3 tunnel, which is required to be removed or filled prior to construction of the HRF. In addition, the DNR did not grant the variance for tailings tunnels D-1N, D-2N, D-1S, D-2S, T-1N, T-2N, T-3N, T-1S, T-2S, the western half of S-1, and S, N, and E-7 tunnels in the western two-thirds of the existing concentrator building footprint. PolyMet must demolish and fill these tunnels during demolition of infrastructure within the existing concentrator building and construction of the flotation process infrastructure prior to operation. The reclamation plan for these tunnels is outlined in Section 4 (“Utility Tunnel Future Use and Reclamation Plan”) of the Barr Report. Accordingly, PolyMet’s reclamation costs estimates include the costs associated with removal of this infrastructure.

451. Special Condition 20b of the Permit to Mine further provides that PolyMet must provide an updated tunnel closure plan and revised financial assurance in the event that future

¹² Gale-Tech Engineering, Inc., Review of PolyMet “Plant Site Utility Tunnel Existing Conditions Assessment—Tunnel Concrete Core Compressive Strength Tests” (October 24, 2018).

information indicates that external loading, chemical deterioration, or settling is affecting the long-term stability or safety of the tunnels allowed to remain in place under the variance.

452. PolyMet initially sought the variance to leave utility tunnels in place at closure, in part, on the grounds that such tunnels might be suitable for bat habitat. PolyMet subsequently provided a professional opinion from a wildlife conservation expert on the potential suitability for wildlife enhancements of the tunnels for bat habitat. That evaluation indicated that the utility tunnels are not currently well suited for bat hibernacula. Further, the absence of bats during the recent tunnel inspections performed for the evaluation of PolyMet's variance request is evidence that conditions for bat hibernacula in the utility tunnels are currently absent. The tunnels, their condition, and opportunity for modification may be evaluated again in the future to determine to what degree if any suitable bat hibernacula may be established.

453. The DNR has determined that granting the requested variance for the utility tunnels, subject to the requirements of Special Conditions 20a and 20b, is directed toward the attainment of the goals of Chapter 6132 and is consistent with the general public welfare. Based on inspection and testing, the tunnels that PolyMet seeks to leave in place at closure are stable. Requiring PolyMet to collapse or fill in these tunnels would require blasting activities, and result in significant environmental effects associated with the excavation of necessary fill materials without providing a clear benefit to the public welfare. Demolishing all the existing tunnels at the Plant Site would impose an undue burden upon PolyMet. Subject to Special Conditions 20a-20b, including the installation of bulkheads and caps, closure can be achieved in a way equivalent or superior to that prescribed in the rule. PolyMet has provided a closure plan and financial assurance for the demolition or filling of the D-3 tunnel, and tailings tunnels D-1N, D-2N, D-1S, D-2S, T-1N, T-2N, T-3N, T-1S, T-2S, and the western half of S-1, and S, N, and E-7 tunnels in the western two-thirds of the existing concentrator building footprint and no variance will be granted for these tunnels.

454. Minn. R. 6132.4100, subp. 2(A): This rule provides that “[i]f the commissioner determines that a substantial change would result [from the variance], the applicant shall follow the procedures for permit to mine applications as provided in part 6132.4000.”

455. The DNR does not consider granting this variance to leave some of the utility tunnels in place at the time of closure a substantial change. However, PolyMet's variance requests were included within the Permit to Mine that was put on public notice in accordance with Minnesota Rule 6132.4000.

Q. Wetlands – Minn. R. 6132.5300; Minn. R. 8420.0930

456. Minn. R. 6132.5300, subp. 1: This rule provides that “no draining or filling of wetlands resulting from mining shall occur unless a wetland replacement plan, approved by the commissioner, is incorporated into the mining and reclamation plans” The wetland replacement plan must “meet[] the same principles and standards for replacing wetlands under

parts 8420.0500 to 8420.0528 and provide[] for construction certification and monitoring according to parts 8420.0800 and 8420.0810.” See Minn. R. 8420.0930.¹³

457. A wetland replacement plan (Appendix 18.1 of the Permit to Mine) has been approved by the DNR as satisfying the applicable requirements of Chapter 8420. This wetland replacement plan is incorporated into PolyMet’s mining and reclamation plans and is part of the approved Permit to Mine.

R. DNR Review – Minn. Stat. § 93.481, subd. 2

458. This statute provides that the DNR shall grant (with or without modifications) or deny a permit within 120 days after receiving a complete application, unless a contested case hearing is requested or ordered. Once a contested case hearing was requested, the 120-day timeline for a permit decision was no longer applicable. “The commissioner in granting a permit with or without modifications shall determine that the reclamation or restoration planned for the operation complies with lawful requirements and can be accomplished under available technology and that a proposed reclamation or restoration technique is practical and workable under available technology.”

459. The rule-by-rule discussion set forth herein details how PolyMet’s mining and reclamation plan complies with lawful requirements. Reclamation under this plan can be accomplished and is practical and workable under available technology.

S. Term of Permit – Minn. Stat. § 93.481, subd. 3

460. Minn. Stat. § 93.481, subd. 3(a): This statute provides that “[a] permit issued by the commissioner pursuant to this section shall be granted for the term determined necessary by the commissioner for the completion of the proposed mining operation, including reclamation or restoration.”

461. The NorthMet Project requires a permit to mine. The term of the permit is for a two-year construction period, a 20-year mine life, a four-year reclamation period, followed by closure and post closure (terms used here are as defined by PolyMet in the Permit to Mine). As noted in the general conditions, the term of the Permit is that which is deemed necessary for the completion of the proposed mining operation, including reclamation or restoration and postclosure maintenance.

¹³ Minn. R. 6132.5300, subp. 1 refers to “the principles and standards contained in the section entitled ‘Standards and Procedures for Evaluating Wetland Replacement Plans’ of chapter 8420, wetland rules, adopted pursuant to Minn. Stat., section 103G.2242.” This referred to Minnesota Rules 8420.0500-.0630 as originally adopted by the Board of Water and Soil Resources in 1993. Chapter 8420 has been revised multiple times since its initial adoption and no longer contains a section as named in Minn. R. 6132.5300. Minn. R. 8420.0930 specifically identifies the principles and standards that the commissioner must apply in reviewing wetland replacement plans associated with a permit to mine.

T. Minnesota Environmental Rights Act – Minnesota Statutes Chapter 116B

462. The Minnesota Environmental Rights Act (“MERA”) requires the DNR to consider whether the conduct that is to be permitted will result in “pollution, impairment or destruction of natural resources.” Under MERA, no conduct that results in pollution, impairment, or destruction of natural resources shall be authorized unless there is no feasible and prudent alternative. Minn. Stat. § 116B.09, subd. 2. “Pollution, impairment, or destruction” under MERA “is any conduct by any person which violates, or is likely to violate, any environmental quality standard, limitation, rule, order, license, stipulation agreement, or permit of the state or any instrumentality, agency, or political subdivision thereof which was issued prior to the date of the alleged violation occurred or is likely to occur or any conduct which materially adversely affects or is likely to materially adversely affect the environment.” *Id.*, § 116B.02, subd. 5.

463. In reviewing the record and the Application, the DNR considered the quality and severity of any adverse effects of the proposed action on the natural resources that might be affected by the proposed NorthMet Project, including any potential long-term adverse effects to those resources, the types of resources at issue, the potential significant consequential effects of the proposed appropriations on other natural resources, and the direct and consequential impacts of the proposed appropriations on the affected resources. *See State ex rel Schaller v. County of Blue Earth*, 563 N.W.2d 260, 267 (Minn. 1997).

464. As detailed herein, mining operations under the Permit, subject to the conditions therein, will comply with all applicable state and federal environmental protection standards, including the requirements of Minnesota Statutes chapter 93 and Chapter 6132 of the Minnesota Rules. The potential effects on natural resources resulting from the NorthMet Project, possible alternatives, and possible mitigation measures for such effects were comprehensively analyzed within the FEIS. As detailed herein, the DNR has imposed requirements, mitigation measures, and adaptive management strategies that will be protective of natural resources. In addition, wetland impacts associated with the NorthMet Project must be mitigated in accordance with the Approved Wetland Replacement Plan. PolyMet’s mining activities that impact wetlands will also be subject to other state and federal requirements and must comply with all applicable state and federal environmental protection standards, including the requirements of the separate water-appropriation permits, the requirements of the USACE’s Section 404 Permit, the requirements of an NPDES/SDS permit under the regulatory authority of the MPCA, and the requirements of the Permit to Mine. Special Condition 13a of the Permit to Mine provides that no NorthMet generated tailings can be placed in the FTB until an NPDES/SDS Permit is issued for the operation of the FTB. Comprehensive wetland monitoring is required under the Approved Wetland Replacement Plan and additional wetland mitigation will be required in the event such monitoring identifies additional wetland impacts not detailed in the Approved Wetland Replacement Plan. Similarly, water-level and streamflow monitoring is required under the Water Appropriation Permits for the NorthMet Project and water-quality monitoring will be required under the NPDES/SDS permit issued by the MPCA. Compliance with these regulatory requirements serves to ensure that wetland impacts associated with the NorthMet Project will not result in pollution, impairment, or destruction of natural resources.

465. The DNR has considered the proposed operations under the proposed Permit to Mine in accordance with MERA, and determines the Permit satisfies the applicable statutory requirements.

VIII. CONCERNS RAISED IN PETITIONS, OBJECTIONS, AND PUBLIC COMMENTS

466. As noted in Section VI.A, the DNR received comments, purported objections, and petitions on the Application and Special Conditions that were noticed for public review.

A. Concerns Related to the Tailings Basin

467. PolyMet applied for two separate Dam Safety Permits as part of its proposed NorthMet Project. PolyMet requests these dam safety permits for the construction and operation of dams for a proposed FTB and a proposed hydrometallurgical residue facility (“HRF”).

468. DNR dam safety engineers have reviewed the progression of the design of the proposed FTB and the proposed HRF for over 10 years. To supplement its own review, the DNR sought top experts to assess and comment on the proposed design, operation, and maintenance of the proposed dams.

469. The DNR issued findings on the FTB Dam and HRF Dam. *See* Dam Safety Permits. These findings are incorporated herein.

i. Siting, Stability, and Engineering

(a) Stair Step Design

470. Petitioners raised concerns about the construction of the downstream face of the FTB Dam due to the “stair step” design. Joint Petition at 43. Petitioners cited discussions with an external consultant reviewing the stair step design and financial assurance requirements related to the Permit to Mine, suggesting that the stair step design would encourage surface erosion and gullying and connecting this erosion to a potential dam breach. *Id.* The Petitioners also suggested that the “stair step” surface of the dam face is “geomorphologically unstable”. *Id.*

471. Different dam face structures may present different potential erosion challenges. For example, a stair step design may more easily collect water on its horizontal surfaces, but, at the same time, that design can also tend to limit the downward extension of a small erosional feature, that would extend more quickly on a smooth dam face.

472. As a general matter, surface erosion rarely affects slope stability. That is particularly true where, as here, the scale of the structure and the distances involved are significant. For any type of dam face, however, creating a relatively stable surface, and maintaining the surface to protect against any significant erosion, is essential. Indeed, the DNR’s Dam Safety experts agree that there is no material risk of FTB Dam failure if the FTB Dam is monitored and maintained. For this reason, the Dam Safety regulations expressly provide for perpetual maintenance of permitted dam structures, and the Dam Safety Permit for

the FTB includes conditions to address inspection and maintenance. In addition, the Permit to Mine also provides for long-term maintenance expressly aimed at preventing erosion.

(b) FTB Siting and Factors of Safety

473. The FTB Dam would be constructed on top of the LTVSMC Basin and Dam. The LTVSMC Basin and Dam, in turn, were built upon natural ground, which included a layer of peat in some areas. FEIS ES-17 and § 3.1.1.5. The LTVSMC Basin tailings have been compressing the peat below for more than sixty years. *Id.* at §§ 3.2.2.3.5 and 4.2.14.2.2.

474. Barr Engineering's modeling indicates that the FTB Dam would be stable and would meet or exceed the required factors of safety.¹⁴ The DNR established these factors of safety after lengthy consideration of many expert opinions and references, including standards by the U.S. Army Corps of Engineers and others used by the U.S. Mining Safety and Health Administration.

475. In addition, Barr Engineering's review indicates that postclosure slope stability factors of safety will exceed the target value, as dewatering and strength gain will increase FTB Dam stability after operations end. *See* FEIS § 2.2.4; FTB Permit Application: Appendix A 6.2.

476. Petitioners, however, raised concerns that peat, which is present beneath portions of the LTVSMC Basin, and very fine particles of crushed rock known as "slimes," which are present in the LTVSMC Tailings and would be present in the NorthMet tailings, may cause the FTB Dam to become unstable. WaterLegacy Petition at 8-9; Joint Petition at 92

477. The DNR has examined the information in the FTB Permit Application and Permit to Mine Application on the strength and stability of the planned FTB Dam, including information on the LTVSMC tailings and the NorthMet tailings.

478. The DNR also exhaustively reviewed and analyzed Barr Engineering's geotechnical analysis. The DNR specifically examined Barr Engineering's sampling procedures, testing procedures, field and lab results from the various tests, materials characterization and properties, and other information used to demonstrate the stability of the FTB Dam. The DNR also met with its own outside expert consultants, as well as with Barr Engineering and Barr Engineering's consultants, and held workshops to discuss the various methodologies in testing, sampling, and results. *See* Memorandum: PolyMet NorthMet Project Flotation Tailings Basin – Geotechnical, Barr Engineering, (Feb 28, 2013).

479. But the DNR is not merely relying on modeling. The FTB Permit requires PolyMet to undertake additional materials testing, as well as to satisfy numerous additional

¹⁴ The factor of safety, as it applies to the FTB Dam and the HRF Dam, is the ratio of the resisting forces (shear strength of the dam materials) to the driving forces (applied load such as embankment construction, the weight of the tailings and water, or other loading events such as seismic activity or extreme precipitation) along a potential failure surface. FEIS 5-627. A factor of safety of 1.0 represents equilibrium between the estimated resisting shear strength and the applied shearing load along a specific plane of potential movement. A factor of safety of 2.0 indicates that the resisting forces are two times greater than the driving forces.

review and approval conditions to confirm that the FTB Dam will meet or exceed required factors of safety and other Dam Safety mandates. *See* Dam Safety Findings; FTB Permit Conditions 15-17, 22, 27-29, 29b, 30-48. The FTB Dam will also be inspected and monitored on a regular basis for stability.¹⁵ *See* Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) and Appendix 11.5, Attachments D (Dam Stability Instrumentation and Monitoring Plan) and E (Dam Safety Inspection Form); FTB Permit Conditions 27-29, 30-48.

480. Petitioners noted the concern that one of Barr Engineering's technical documents referred to a Safety Factor of 1.07 relating to a particular scenario in which local erosion could trigger liquefaction. *See* Geotechnical Data Package, Table 7-9. Petitioners explained that this is below the minimum agreed-upon factors of safety from the Geotechnical Modeling Work Plan. *See* FTB Application, Appendix B, Attachment A. The DNR agrees that a higher factor of safety of 1.10 is applicable to this scenario. The DNR informed PolyMet that it would be required to demonstrate that the Dam will meet a factor of safety of at least 1.10 under the specified liquefaction triggering scenario. PolyMet conducted more detailed analyses, which demonstrated that the Dam will meet a factor of safety of 2.07 for this scenario. FTB Permit Application, Appendix B.

481. The DNR has considered the specific conditions at the site in evaluating the potential effects of peats and slimes. FEIS § 5.2.14.2.2; *see also* Permit to Mine Special Condition 28b. A geotechnical evaluation is underway at the Plant Site with a focus on foundation and dam stability. The results of this evaluation will be used as final designs are completed for the FTB construction. Special Conditions 50, 50a, 50b, 51a, 52, and 52a describe requirements related to final designs and construction review.

482. Petitioners next raised concerns about the presence of peat in the soils of the area where the buttress would be located and argue that the DNR should require removal of peat soils below the area of the planned buttress prior to construction of the buttress. Joint Petition at 60; WaterLegacy Petition at 9-11. The plan drawings provide for removal of the peat in this area. Drawing No. FTB-009 (Flotation Tailings Basin North Dam Typical Cross Section) calls for "remov[al of] peat from buttress foundation area" and cross references the notes on Drawing No. FTB-008. That drawing (Flotation Tailings Basin North Dam Mine Year 20 Layout) contains the note "Peat to be removed from buttress foundation area under the direction of a geotechnical engineer."¹⁶ Thus, the DNR and PolyMet have addressed concerns about peat removal in the area below the planned buttress. *See* FEIS § 5.2.14.2.2 and Figure 5.2.14-4; Permit to Mine Special Condition 28b.

(c) Review of Mount Polley Report

483. Petitioners also raise generalized concerns that dam failures at other locations, including well publicized failures at the Mount Polley dam, in British Columbia, and the

¹⁵ For example, PolyMet submitted a Tailings Basin Geotechnical Instrumentation and Monitoring Plan ("Plan") that describes the plan for geotechnical instrumentation and monitoring for the FTB. The purpose of this Plan is to guide monitoring of the dams to maintain safe operation of the FTB.

¹⁶ Peat removal is to be performed "under the direction of a geotechnical engineer" to ensure that the operation will be executed in accordance with the best professional judgment of an engineer qualified to assess circumstances at the site and direct appropriate action.

Samarco dam, in Brazil, suggest that the NorthMet dams would be likely to fail. WaterLegacy Petition at 6-7, 9; Joint Petition at 37-39. Many of these comments do not identify specific issues or concerns with the NorthMet design. Others note design features that the NorthMet Dams would have in common with one or more of the failed dams as evidence that the NorthMet Dams would also be likely to fail. The fact that other dams have failed, however, does not provide reliable bases for concluding that the NorthMet Dams would be likely to fail. The Mount Polley Report referenced by commenters, for example, identifies many factors leading to the failure of that dam.

484. The DNR has evaluated the PolyMet's Dam Safety Applications and Permit to Mine Application and supporting materials and has determined that the NorthMet Dams as planned would meet applicable factors of safety and satisfy permitting requirements intended to ensure the safety and stability of the Dams. Nothing in the comments, objections, or petitions about these other dam failures undermines the technical support for the Dam Safety Permits.

485. The DNR also fully considered and reviewed the technical investigation report on the Mount Polley failure, as part of its dam safety review of the permit applications. Together with its external consultant EOR and a team of top geotechnical dam safety experts, the DNR assessed the design, construction, operation, and maintenance of the proposed NorthMet Dams. This team included experts in mining and geotechnical engineering with both Minnesota and worldwide experience. The group included a member of the review panel that previously investigated the Mount Polley dam failure in British Columbia. As the DNR has explained: "DNR and its team determined that the proposed NorthMet dams contain significant differences in design from the Mount Polley dam, including: the slopes of the proposed NorthMet dams are flatter (less steep and therefore more stable); the foundation conditions at the PolyMet site have been researched in greater depth and are much better understood; and long-term construction plans are better developed for dam raises and future operations." See DNR Fact Sheet on Mount Polley Dam Failure at 2.

(d) Upstream Construction Method

486. Petitioners also expressed concerns about the "upstream construction method" in light of dam failures at Mount Polley and Samarco. Mount Polley was actually constructed using the modified centerline method. It failed due to a foundation failure. WaterLegacy Petition at 6-7, 9; Joint Petition at 37-39, 41.

487. "Upstream construction" is the most commonly used construction method for tailings dams in the world. Tailings dams are typically built in stages. Each stage involves construction of a trapezoidal layer, referred to as a "lift." The first lift is constructed on the existing surface. In "upstream construction," tailings are deposited along the basin edge of each lift before the next lift is built. Each successive lift is built primarily on the preceding lift. A portion of the new lift projects beyond the edge of the underlying lift, resting upon the tailings deposited in the basin. Thus, as the dam is built, it projects farther into the basin. The Mount Polley Report itself does not suggest that upstream construction is per se inappropriate or that downstream construction is per se correct for all circumstances. Rather, selection of a construction method should be based on the specific circumstances of the proposed dam. See SONAR at 25 ("The topographic, hydrologic, and foundation conditions at the site of the tailings

basin will essentially dictate the specific techniques and practices that will be incorporated into the ultimate design.”).

488. Selecting a construction approach is not a one-size-fits-all determination. As is common for any major project, key design and construction decisions for a dam are likely to depend upon the facts and circumstances pertaining to that particular dam. This is particularly true for deciding whether upstream construction, downstream construction, or center line construction would be preferable for a particular dam. *See, e.g.*, U.S. EPA, “Design and Evaluation of Tailings Dams,” at 18 National Service Center for Environmental Publications (NSCEP) (1994) nepis.epa.gov. For example, the mill size of the tailings available, and the amount of material available for the dam may be relevant. The location of the dam and the surrounding environment may be relevant. The dam’s dimensions, location, purpose and cost may also be factors.

489. PolyMet’s selection of upstream construction is consistent with this type of multi-factor decision making process. One of the advantages of the upstream approach for the FTB is that it minimizes the impact on wetlands by creating a smaller footprint for the FTB. FEIS § 4.2.3. Using downstream construction at the FTB would mean building a dam that would project a substantial distance into nearby wetlands. In addition, the configuration of the existing tailings basin embankments would make using downstream construction more difficult. *See* Dam Safety Findings.

490. In many cases, the availability of construction materials may influence selection of a construction approach. FTB Permit Application: Appendix A 3.6. That is the case with respect to the FTB Dam. *Id.* PolyMet must excavate the LTVSMC coarse tailings from the perimeter of the existing LTVSMC dams to obtain the material that will be used to build the new FTB Dam, and the supply of these materials is likely to be limited. FTB Permit Application: Appendix B, Attachment F. Each of these factors would also weigh against the use of center line construction, albeit not as significantly.

491. In this case, PolyMet’s Permit to Mine Application and supporting materials provide the engineering and technical data necessary to show that the NorthMet Dams would be structurally sound. *See* Permit to Mine, Appendix 11.5; *see also* FEIS at 5-646, 657-661. In addition, the NorthMet Dams would be subject to continuing oversight, operation and maintenance requirements, financial assurances and other requirements aimed at assuring continuing compliance with all applicable Dam Safety requirements.

(e) FTB Dam Breach

492. Petitioners have also raised concerns about a potential breach of the FTB Dam. It is very unlikely that the FTB Dam will breach. The dam itself will be robust and will be constructed of materials with well-defined properties. The slope of the downstream embankment will be flatter than most tailings basin dams. The design meets required factors of safety. The liquefaction analysis for the Dam used conservative assumptions. The design has been reviewed by multiple experts. Proper maintenance will ensure long-term stability. The FTB Permit requires detailed instrumentation, monitoring, and inspection. *See* Permit to Mine Application, Appendix 11.5 (Flotation Tailings Management Plan), Attachments A-I.

493. DNR dam safety experts have reviewed and accepted the design for the FTB Dam, which has demonstrated the capacity to safely store a large flood, withstand up to a 2500-year earthquake, resist static liquefaction, and withstand other rare events and occurrences. PolyMet also completed a Dam Breach Analysis that considered the potential impacts of a dam breach. *See* Permit to Mine, Appendix 11.5, Attachment H (Flotation Tailings Basin Dam Break Analysis).

494. The DNR has concluded that the potential for breach of the FTB Dam is unlikely, in light of the numerous regulatory requirements and ongoing monitoring and controls that will be in place.

495. The DNR is, however, requiring PolyMet to prepare a Contingency Action Plan (“CAP”) for the FTB. *See* FTB Permit Condition 32. The CAP includes a dam breach analysis and further identifies 34 properties that could be at risk in the potential event of a dam breach. *See* Appendix 11.5 – Attachment F. PolyMet has submitted an initial draft of the CAP. *See id.* The DNR is requiring further refinement of the CAP, including requiring revised dam breach models, a field survey of elevations of properties at risk, and a table of emergency contact information including addresses and phone numbers. *See* FTB Permit Condition 32. The purpose of the post-permit breach analysis is primarily to develop a more accurate inundation map to inform those affected downstream. It will also extend the analysis further downstream and will also look at breaches in other locations on the dam that are less likely to cause damages.

496. In sum, the DNR has undertaken a robust evaluation of the proposed design and construction of the FTB Dam and has concluded that the dam will satisfy all applicable requirements, including mandatory factors of safety. The FTB Application and supporting materials provide the engineering and technical data necessary to show that the FTB Dam will be structurally sound. *See* FEIS at 5-646, 657-661. The DNR’s adaptive management approach will enhance the DNR’s ability to enhance public safety and protection of the environment. *See, e.g.,* Special Conditions 55a, 80, 80a, 89f, 89g. Long-term monitoring, operation, and management requirements will further assure the safety and stability of the FTB Dam. *See* Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan). PolyMet’s financial assurance obligations, including its obligations to provide for ongoing maintenance of the facility and to obtain environmental insurance, provide further protection. Finally, the DNR and the other regulatory agencies overseeing the NorthMet Project will provide additional assurance that the FTB Dam, as well as other aspects of the operation, will continue to meet safety and environmental standards.

ii. Consideration of Tailings Storage and Closure Alternatives

497. Petitioners argue that the Permit to Mine Application needs to be rejected because the DNR purportedly failed to undertake the alternative analysis related to several key issues, including closure and construction methods for the FTB Dam. Joint Petition at 93.

498. Minnesota’s nonferrous rules state that “it is the policy of the [DNR] that mining be conducted in a manner that will reduce impacts to the extent practicable.” Minn. R.

6132.0200. Mining must also be done on sites that “minimize adverse impacts on natural resources and the public.” Minn. R. 6132.2000, subp. 1. And a mine must be closed “so that it is stable, free of hazards, minimizes hydrologic impacts, minimizes the release of substances that adversely impact other natural resources, and is maintenance free.” Minn. R. 6132.3200, subp. 1. Thus, if the DNR permits a mine, it must strive towards permitting a mine that will “minimize” adverse impacts.

499. The DNR’s determination related to closure options must be based on an “examination of alternative practices” supporting the proposed design as the “most effective and workable means of achieving reclamation, including being technologically, economically, and practically applicable.” Minn. R. 6132.0100 subp. 17.¹⁷

500. During the course of the environmental review process, the Co-Lead Agencies considered numerous alternatives and mitigation measures (including those relating to siting, technology, and modifications to designs and layouts, among others) to avoid, minimize, and mitigate potential adverse impacts. In conjunction with this process, PolyMet made numerous refinements to incorporate benefits and avoidance or mitigation measures that will produce substantial environmental benefits and other advantages to the NorthMet Project. The full alternatives analysis discussion is located in Section 3.2.3 of the FEIS (starting on page 3-143). Project refinements made in connection with the 2013 SDEIS process include, among other things, the following:

- removal of the existing LTVSMC Coal Ash Landfill from within the FTB footprint prior to inundation
- additions to the seepage capture systems for the FTB
- modification to the stream augmentation plan such that only treated mine water will be discharged to three streams downstream from the FTB
- stability enhancements to strengthen the existing LTVSMC tailings basin dams
- wet vs. dry cover closure options for the FTB
- siting for tailings disposal: in mine pit, greenfield, or alternate brownfield sites

501. As discussed herein, after addressing alternatives for the FTB location and design, consulting with other agencies, and considering public input, the DNR concluded that locating the FTB on a brownfield site with wet closure had advantages over dry stacking (also known as

¹⁷ Minn. R. 6132.0100 subp. 17 defines “minimize to the extent practicable” to mean:

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.

filtered tailings) or dry closure.¹⁸ The DNR made this determination based on a number of factors, including that wet closure improves ongoing water quality from the legacy site, minimizes additional impact to “undisturbed” locations (*i.e.*, wetlands, water, and landforms), and has cost advantages.

502. The DNR acknowledges that there are concerns, and trade-offs, associated with locating the FTB at a legacy site and with wet closure, in particular long-term treatment and dam stability. Indeed, all alternatives have benefits and costs; there is no ideal solution that eliminates risks and impacts.

503. To identify the most effective and workable means of achieving reclamation from a technological, economical, and practical standpoint, the DNR extensively considered concerns raised by Petitioners, and others, during the environmental review and permitting processes. The DNR then concluded that the approach proposed in the Permit to Mine Application (*i.e.*, wet closure at the legacy site, coupled with the bentonite amendment and seepage capture systems) combined with a robust inspection and monitoring required by the Permit to Mine special conditions, is the most effective and workable means of achieving reclamation, from a technological, economical, and practical standpoint. This conclusion is based on predictive modeling, problem assessment, examination of alternative practices, and input from appropriate regulatory authorities.

504. Petitioners, however, asserted that the DNR has failed to adequately consider the use of dry stacking or dry closure as alternative technologies for tailings storage and closure. Joint Petition at 47-51.

505. Petitioners are mistaken. The agencies evaluated these alternatives during the environmental review, and the DNR continued to consider these issues during permitting. Based on this extensive review and on the predictive water modeling, the DNR determined that such methods are not feasible or economical and/or would not result in any meaningful environmental benefits.

(a) Consideration of Dry Stack / Filtered Tailings

506. As an initial matter, Petitioners appear to confuse “dry stack” with “dry closure.” They are very different. There are about 100 “dry stack” operations worldwide, being mostly newer, small mines in arid environments. “Dry stack” is a new technology that has some advantages, including water conservation. But it also has some significant downsides, including being expensive, being labor and equipment intensive, and potentially generating significant pollution.

For example, dry stack tailings are prone to wind erosion because dry fine tailings are easily mobilized and can be blown over significant distances. Dry stack tailings can release pollution after precipitation or can become saturated in humid climates like Minnesota. *See Dam Safety Findings.*

¹⁸ In support of its Dam Safety Permit Applications and the Permit to Mine Application, PolyMet also conducted detailed technical analysis, including more than ten years of waste characterization and geotechnical studies, and developed its dam designs with concurrent review by the DNR.

507. The DNR and the MPCA carefully considered the use of “dry stacking” as an alternative to a wet tailings basin during the environmental review process. FEIS App. A-72; Table A-3, A.5.2.

508. And in response to comments on the SDEIS, the DNR considered the Mount Polley Expert Panel Report, which was issued in response to the Mount Polley tailings storage facility breach in British Columbia. FEIS App. A-534. As discussed in the Dam Safety Findings, the DNR’s geotechnical staff reviewed this report and its recommendations and determined that while dry stacking, or filtered tailings, technology would increase tailings basin stability, when other site specific and environmental factors are taken into account, adequate tailings basin stability will be achieved with the proposed design.

509. The DNR also concluded that the dry stack tailings alternative technology would not have significant environmental benefits over the proposed wet tailings method. *See, e.g.*, Dam Safety Findings; FEIS App. A-315 Theme ALT 10.

510. In particular, use of a separate dry stack tailings basin would not address LTVSMC tailings basin legacy issues. The DNR concluded that dry stacking would require a liner, which could not feasibly be placed on the existing tailings basin; to use dry stacking, a new tailings basin would have to be built, which could affect hundreds of acres of wetlands and have significant environmental impacts. FEIS at A-315.

511. Dry stacking would also require the transportation of dry stacked tailings from the processing plant to a dry stack storage area. This, in turn, would likely require haul trucks, which would likely result in substantial emissions of fugitive dust and would be costly to put in place and operate. Trucks and other heavy equipment required for other phases of dry stacking also would create additional air emissions because the tailings would have to be transported from the dry stack storage area to the basin. This transportation would ordinarily produce substantial amounts of airborne fugitive dust from the tailings, including potentially reactive materials, such as sulfur. This potentially reactive dust could spread over nearby forests or lakes or could be carried to populated or tourist areas. After delivery to the tailings basin, the tailings would be spread out by graders and dozers, compressed by rollers, and sprayed with a chemical for dust suppression. FEIS ES-52, and Figure 4.2.9-4.

512. If the NorthMet tailings were kept exposed to the air, they would be exposed to oxygen, potentially creating reactive materials, including sulfuric acid, and leaching out heavy metals. These products could then be mobilized by rain, snow melt, or wind. *Id.* at § 3.2.2.3.12.

513. In addition, keeping dry stacked tailings “dry” is difficult in a wet climate, such as that in the project area. Rainwater would wash through the dry stack, so that minerals, including heavy metals and reactive sulfur, would leach and constituents of concern could seep out of the dry stack. A perimeter dam or seepage collection system thus would be essential for the long-term maintenance of the dry stack area. Ultimately, the tailings would likely become saturated, although they would be unlikely to be covered by water.

514. Dry stacked tailings are also difficult to revegetate for purposes of closure.

515. At the scoping stage of the environmental review process, the DNR therefore determined that it would not evaluate alternative sites for the tailings basin for dry stack because “an alternative site . . . has not been identified that would likely have significant environmental benefits over the proposed site” and an alternative site “may not be feasible or achievable in the time frame of the project.” FEIS §§ 1.4.2.2 and 3.2.3.3.1.

516. Accordingly, the contention that the DNR has not considered dry stacking as a mine waste storage option is simply incorrect. The issues presented in the Petitions on these issues have been raised previously and considered at length. Moreover, Petitioners have failed to present any new information regarding the use or feasibility of dry stacking that would aid the DNR in its decision making.

(b) Dry Closure

517. Dry Closure involves removing water from the FTB at the conclusion of operations. Petitioners’ experts, along with the DNR’s Dam Safety experts, favor dry closure. Joint Petition at 46-50.

518. The DNR therefore evaluated dry closure issues in the 2009 Draft EIS and in the 2013 SDEIS, where the Co-Lead Agencies, including the DNR, concluded that when considering the combined environmental impacts and the predictive water modeling, wet closure has more environmental benefits than dry closure. For example, wet closure allows PolyMet to address legacy water quality issues at the existing LTVSMC tailings basin, has fewer environmental impacts, minimizes additional impacts to wildlife, and preserves hundreds of acres of wetlands, relative to dry closure.

519. Given the preference of dry closure by some, the DNR worked closely with federal agencies and PolyMet during the environmental review to assess six different alternatives for the tailings basin cover system at closure and discussed the benefits and risks associated with each alternative. December 30, 2010 ERM Report. The review considered how various alternatives would:

- affect water quality – in particular, whether tailings basin discharges would meet the wild rice standard of 10 mg/L of sulfate;
- avoid or minimize the need for any long-term operation, maintenance, or treatment of groundwater seepage from the tailings basin; and
- provide an adequate factor of safety – *i.e.*, provide geotechnical stability.

520. The primary goal of the review was to identify the best alternative that would reduce future water quality impacts, while maintaining an appropriate factor of safety.

521. The December 30, 2010 ERM Report concluded that the various wet closure options would reduce the sulfate load and sulfate concentrations and would be the most protective of wild rice. The report also concluded that the wet closure options provide an acceptable factor of safety.

522. Water modeling projected that the dry closure options, in contrast, would result in higher sulfate load, increased sulfate concentrations, and increased concentrations of various metals. The ERM Report also found that one dry closure option would likely not meet the wild rice standard.

523. Petitioners do not dispute these findings. In fact, the Petitions do not address the trade-offs involved in wet closure versus dry closure or the many environmental benefits associated with reusing existing infrastructure.

524. The DNR's review of dry closure continued through the environmental review and permitting process. As part of its review of alternatives, the DNR assembled a team of top experts (EOR Review Team) to assess and comment on the proposed design, operation and maintenance of the tailings basin facilities. The EOR Review Team went through the following documents:

- Technical Memorandum: NorthMet Geotechnical Data Package – Volume 1 (Flotation Tailings Basin) – Version 4 Modeling Outcomes Summary. Barr Engineering, April 2, 2013.
- NorthMet Dam Safety Permit Application: Flotation Tailings Basin. Barr Engineering, July, 2016.
- NorthMet Dam Safety Permit Application: Hydrometallurgical Residue Facility. Barr Engineering, July 2016.
- 2015 Tailings Basin Dam Safety Inspection Report. Barr Engineering, August 2016
- Technical Memorandum: DNR Review of PolyMet's Dam Safety Permit Application – Tailings
- Basin Comment 9 – LTVSMC Coarse Tailings Strength. Barr Engineering, December 30, 2016.
- Technical Memorandum: Tailings Basin Cell 2E North Dam – Modified Buttress as Alternative to Cement Deep Soil Mix Zone. Barr Engineering, December 30, 2016

525. The EOR Team (along with the DNR, PolyMet, and Barr Engineering) conducted a site visit to the LTVSMC tailings basin site and proposed HRF facility in September 2016. The EOR Review Team also met with PolyMet and Barr Engineering on several occasions to discuss comments and questions on the proposed NorthMet Project.

526. The review specifically considered various alternatives, including dry closure versus wet closure. The EOR Review Team recommended that if wet closure is permitted, then the DNR should require PolyMet to continually review the current state-of-the-practice for dry closure techniques prior to starting any tailings basin closure activities. This recommendation has been included as a condition within the FTB Permit. FTB Permit Condition 45.

527. In short, wet closure and dry closure each could provide benefits and could present engineering, environmental, or other challenges. The DNR has evaluated various closure options, including both wet and dry closure. The DNR hired experts to assist in reviewing alternatives. And after extensive review, the DNR concluded that wet closure is the preferred alternative at this time. While dry closure has advantages, it also must be stressed that it has downsides, including deleterious impacts to water quality based on the predictive water modeling and more impacts to wetlands, sensitive habitat, and wildlife. Nonetheless, the Dam Safety Permits require PolyMet to re-evaluate closure options prior to initiating closure. Specifically, the Dam Safety Permits contain a condition requiring that, within five years of permit issuance, and every five years thereafter, PolyMet shall provide a report to the DNR Dam Safety Engineer detailing future closure options, such as a dry cap or other technologies that may improve closure conditions and may lead to a shorter post closure monitoring and maintenance period. Ongoing future closure plans shall be developed in consultation with the DNR Dam Safety Engineer and any future closure plan must receive all applicable State and Federal approvals. FTB Permit Condition 45.

(c) Alternative Locations for the Tailings Basin

528. Dry stack would require the development of a new green field site for the tailings basin. At the scoping stage of the environmental review process, the DNR determined that it would not evaluate alternative sites for the tailings basin for dry stack because “an alternative site . . . has not been identified that would likely have significant environmental benefits over the proposed site” and an alternative site “may not be feasible or achievable in the time frame of the project.” FEIS §§ 1.4.2.2. and 3.2.3.3.1.

529. Later in the EIS process, however, the DNR carefully considered using alternative sites for the tailings basin to determine whether a new site would be advisable. *Id.*; FEIS at A-230. Specifically, the DNR considered a greenfield site to the west of the existing LTVSMC tailings basin, but eliminated this site because it would have additional environmental and wetlands impacts. Using the existing tailings basin, on the other hand, would both reduce the overall quantity of wetlands impacted and limit some of the impacts to lower quality wetlands. *Id.* at 3.2.3.3.1. As noted in the SDEIS, “[r]eusing existing infrastructure limits wetlands effects . . . to previously disturbed areas.” *Id.* at § 5.2.3.3.2.

530. The DNR also considered various other benefits of reusing the existing tailings basin. For example, many of the engineering controls will address problems caused by seepage from the existing LTVSMC tailings as well as the NorthMet tailings. The SDEIS noted that the groundwater containment system around the FTB will capture “seepage from the existing LTVSMC tailings that are responsible for . . . baseline [total dissolved solids] exceedances.” SDEIS § 4.2.

531. Using the existing basin would also minimize impacts on wildlife because the existing basin “provides poor habitat, is not likely to be heavily used by wildlife, and currently obstructs animal movement.” *Id.* at § 2.2.3, § 5.2.3.3.1. Thus, using this site would be preferable to constructing a new tailings basin at an undisturbed site which is likely to provide better habitat and may serve as a wildlife corridor. The DNR made similar findings regarding the benefits of using the existing tailings basin in the FEIS. Simply put, reusing existing infrastructure would minimize impacts to topography, drainage, soils, water supply, wetlands, habitat, ecosystems,

wildlife, recreation, cultural resources, aesthetic resources, and land use. It also has significant economic advantages. *Id.* at § 5.2.11.2.2.

532. Thus, the DNR considered alternative locations and concluded that dry stacking at a different site was not a preferable alternative because it would require the conversion of additional green space and would not address the existing tailings basin legacy issues that are addressed by the Application.

iii. Bentonite

533. Petitioners raised concerns with the proposed use of the bentonite amendment. First, they claim that it is not an available technology and, therefore, cannot be relied on by PolyMet. Second, they argue that bentonite will not be an effective means to eliminating water and oxygen infiltration into the FTB. And third, they argue that the bentonite amendment will cause erosion and instability to the FTB.

(a) Background on the Bentonite Amendment and Pilot Tests

534. The design, operation, and closure of the FTB will include three separate but related applications of the bentonite amendment:

- During construction of FTB Dam, the exterior face of the dams will be amended with a bentonite layer
- In closure, exposed beach areas on the interior of the basin will be amended with a bentonite layer
- In closure, the pond bottom will be amended with bentonite

535. The bentonite amended layer on the exterior face of the FTB Dam will be covered with an additional three feet of soil to isolate the bentonite from the Dam's exterior. This exterior soil layer will be revegetated. The bentonite amendment applied to the exterior face of the dams will also reduce rainwater infiltration into the dams, which has a small benefit in terms of an increased slope stability safety factor. FEIS § 3.2.2.3.12.

536. The objective of applying the bentonite amendment to exposed beach areas on the interior of the basin is to limit oxygen infiltration into the FTB. *See e.g.*, FEIS § 5.2.4.2.3.

537. The purpose of the bentonite-amended pond bottom is to reduce the percolation from the FTB Pond, thereby maintaining a permanent pond that will provide an oxygen barrier and reduce oxidation and resultant production of chemical constituents in the underlying tailings. It will also reduce the amount of water collected by the FTB Seepage Containment System and the South Seepage Management System that will require treatment.¹⁹

¹⁹ The bentonite amendment of the pond bottom may not, however, be required if the hydraulic conductivity of the deposited flotation tailings without bentonite amendment would maintain a positive pond water balance

538. The Permit to Mine imposes two special conditions to ensure the effectiveness of the bentonite amendment. Special Condition 88 requires PolyMet to prepare a bentonite amendment of tailings pond bottom workplan for DNR review and approval no later than 90 days following permit issuance. The work plan must include any bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the pond bottom will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. As Special Condition 89f points out, if any of the testing of the FTB (i.e., pond bottom) reveals that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings.

539. Special Condition 89 requires PolyMet to provide to the DNR the results of the analyses required by the bentonite amendment of tailings pond bottom workplan. The workplan must also include a detailed construction quality assurance and quality control plan.

540. Special conditions within the Permit to Mine also contain similar conditions for the analysis of the bentonite amendment for the dam slopes and the FTB beaches. *See* Special Conditions 89a-89g.

541. The primary objectives of the dams and beaches pilot/field-test will be to: (i) assess and demonstrate systematic and repeatable means and methods of earthwork construction to consistently create (i.e., mix bentonite and tailings) and place the bentonite layer in conformance to engineering specifications; (ii) assess the consistency/variability in the maintenance of a continuous areal zone of saturation within the 18-inch thick layer of compacted bentonite-amended tailings throughout the pilot/field-test; (iii) observe the potential for other factors to inhibit, interfere with or degrade the sustained maintenance of a continuous areal zone of saturation within an 18-inch thick layer of bentonite-amended tailings related to things like cracking, settlement, erosion, deep plant root penetration, freeze-thaw degradation, water chemistry, etc. *See e.g.*, FEIS § 4.2.14.1.4.

542. The primary objectives of the pond bottom pilot/field-test will be to: (i) demonstrate systematic and repeatable means and methods of introducing bentonite to the pond bottom in a relatively uniform manner and (ii) assess the performance of bentonite introduction in achieving a positive pond water balance. *Id.* at § 4.2.2.2.2.

(b) Bentonite is an Available Technology

543. Minnesota Statutes § 93.481, subd. 2 provides that the commissioner can only grant a permit if “the reclamation or restoration planned for the operation complies with lawful requirements and can be accomplished under available technology and that a proposed reclamation or restoration technique is practical and workable under available technology.”

544. Petitioners argue that the DNR cannot make the necessary finding that the bentonite amendment, which will be applied at closure to the beaches and pond bottom, is a practical and workable available technology. WaterLegacy Petition at 28 and Joint Petition at 41.

545. As an initial matter, it is worth underscoring that the DNR's regulations do not preclude innovative designs or technologies. To the contrary, the performance-based rules are intended to accommodate site-specific conditions requiring innovative designs that are equally protective, but may be more practical and cost effective.²⁰ In addition, the Statement of Need and Reasonableness ("SONAR") from the rulemaking makes clear that the DNR's focus should be on requiring "the use of existing technologies, practices, guidelines, standards, or engineering safety standards developed for and commonly used by mining or reasonably similar activities." SONAR at 6

546. Bentonite is not an unknown technology and has been used in other applications to reduce water infiltration and limit oxygen. FEIS at A-549 and A.5.2.4. Indeed, during the Office of Administrative Hearings ("OAH") hearing on the proposed rules relating to Nonferrous Metallic Mineral Mineland Reclamation, the ALJ heard from experts who testified about the use of clays to form membranes under and around tailings basins. ALJ Hearing, December 7, 1992 at 82-83 (testimony of Paul Eger); December 8, 1992 at 174-175, 176 (testimony of Andrew Robertson) (explaining how low permeability covers are an established technology; how it is essentially the same technology that is applied to the prevention of long-term contaminant migration; and that "we're not looking for anything new and different in applying this technology.").

547. Moreover, the application of bentonite was extensively reviewed and studied during the NorthMet environmental review, and studies indicate that the bentonite may reduce oxygen infiltration by up to 90%. FEIS 3-133, App. A, A-585. The DNR, along with the Co-Lead Agencies, determined that the bentonite amendment will "have the long-term effect of reducing influent flow rates and chemical loads" to the wastewater treatment system. A-564.

548. Indeed, Petitioners' argument that bentonite is not an available technology is belied by their argument that not only is bentonite available, but that PolyMet should apply a higher percentage of bentonite to be a more reliable barrier. Joint Petition at 55.

549. Based on the foregoing, bentonite is an available technology. It exists. It is used in other applications. It has been tested and the DNR, along with the other agencies, has determined that it will be effective. FEIS A-524 and A-549. Thus, the use of bentonite to reduce hydraulic conductivity, provide water flow retardant, and limit oxygen infiltration is an available technology. But because more site-specific information is required for the specific uses proposed for the NorthMet Project, the DNR has imposed conditions in the Permit to Mine that will require additional testing before bentonite is applied. *See* Special Conditions 88, 89, 89a-89g. These tests will ensure its effectiveness or, for the pond bottom application, determine whether it is even needed. The test will also determine the optimal dose of bentonite, and, in the off chance the pilot tests demonstrate that the bentonite is not effective, then PolyMet must devise an

²⁰ Indeed, one reason why the DNR rejected specific design standards during rulemaking was because such standards can discourage innovative solutions and retard the development of new technology. During the hearings before the administrative law judge, the DNR testified that "We have designed these rules with a great deal of flexibility in them because we have found that each site is different, and the material that we're going to have to deal with within a site is highly variable as well. And so we need the flexibility in the rule in order to address the problem and to resolve it the best way that one can." ALJ Hearing, December 7, 1992 at 181 (testimony of Paul Pojar).

alternate plan to operate, maintain, and close the basin to ensure protection of natural resources and compliance with all applicable standards. As Special Condition 89f points out, if any of the testing of the FTB (*i.e.*, pond bottom) reveals that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings.

(c) Bentonite's Effectiveness

550. As they did during the environmental review, Petitioners now question the effectiveness of the bentonite amendment.²¹ In particular, they claim that (i) no studies exist to show that the bentonite will function as suggested (Joint Petition at 53-59; WaterLegacy Petition at 26-27); (ii) the bentonite amendment will not limit oxygen infiltration (Joint Petition at 45, 53-57; WaterLegacy Petition at 24, 26-27); and (iii) PolyMet will not be able to apply the bentonite as proposed (Joint Petition at 56-59).

551. As an initial matter, Petitioners, at times, seem to misconstrue the purpose of the bentonite amendment, which is *intended to limit*, not prevent, oxygen infiltration and reduce water seepage. *See, e.g.*, Joint Petition at 56 (“bentonite cannot be relied on by the Applicant to prevent infiltration of water and oxygen”). Thus, any suggestion that the bentonite amendment will not prevent oxidation or seepage misses the point. As the DNR has explained, the goal of the bentonite amendment in the FTB Dam faces, within the FTB beaches, and within the FTB pond bottom liner is to “reduce tailings seepage and its chemical load during reclamation and postclosure” and manage water balance of the pond.

552. Petitioners are also mistaken that no studies exist to show that bentonite will function as suggested. The studies and work completed during the environmental review and permitting establish that the bentonite amendment should function as designed. FEIS at App. A, A-585. After considering these issues, the DNR issued the FEIS and concluded that the bentonite amendment would “have the long-term effect of reducing influent flow rates and chemical loads” to the wastewater treatment system. *Id.* The DNR also evaluated field-scale tests demonstrating that “bentonite layers remain effective through freeze-thaw cycles” and considered a study demonstrating that a bentonite amendment could reduce oxygen diffusion by as much as ninety percent. *Id.*

553. Nonetheless, Petitioners argue, as they did during the environmental review, that there is 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 vegetative layer will provide adequate protection against wet-dry or freeze-

²¹ During the environmental review, commenters asserted that the bentonite amendment would be ineffective unless the “bentonite-amended soils are maintained in a fully saturated state.” They argued that the DNR failed to “support the assumption that bentonite will perform as expected” and to adequately consider the effects of freeze-thaw cycles. They suggested that the DNR should further evaluate “potential problems with the use of bentonite” and methods for solving those potential problems. Commenters also asserted that additional field and laboratory tests should be conducted to demonstrate the “effectiveness of bentonite amendments and application to the pond bottom.” Finally, commenters argued that tailings metals could interact with the bentonite, inhibiting its effectiveness as a water and oxygen barrier. The DNR considered all of these issues during the environmental review and permitting.

thaw cycling.” WaterLegacy Petition at 27. Petitioners add that they do not believe that PolyMet will be able to effectively put the bentonite in place on the pond bottom. Joint Petition at 56.

554. In response to these concerns, the DNR has required rigorous testing protocols to ensure that the bentonite is effective. Special Conditions 89, 89a-89g; FTB Permit Condition 31 (“Prior to dam construction, [PolyMet] shall obtain written approval from the DNR Dam Safety Engineer of the results of the pilot/field-testing of the bentonite amended side slopes . . .”).

555. In particular, the pilot tests require PolyMet to evaluate the potential for environmental factors that will inhibit, interfere with or degrade the sustained maintenance of a continuous areal zone of saturation within an 18-inch thick layer of bentonite-amended tailings related to cracking, settlement, erosion, deep plant root penetration, freeze-thaw degradation, and water chemistry. FTB Permit Application: Appendix A 3.1 and 6.3.

556. PolyMet must demonstrate systematic and repeatable means and methods of introducing bentonite to the pond bottom in a relatively uniform manner, which may include: (i) broadcasting of granular or pelletized bentonite from a GPS route controlled barge; (ii) injection/mixing of bentonite with pond bottom from a GPS route controlled barge; and (iii) placement of geosynthetic clay liner over the pond bottom from a GPS route controlled barge. This pilot test will also assess the performance of bentonite introduction in achieving a positive pond water balance. FTB Permit Application: Appendix B 6.2.

557. But even if the bentonite does not function as intended, the Permit to Mine special conditions require PolyMet to develop alternative measures. Special Conditions 89a-g. As Special Condition 89f points out, if any of the testing of the FTB (i.e., pond bottom) reveals that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings. Moreover, additional controls are in place, such as seepage controls and treatment, to address water quality concerns. FTB Permit Application: Appendix B 6.2, 6.8, and 7.2

(d) Bentonite’s Impact on FTB Stability

558. Petitioners also raise concerns about the bentonite’s impact on slope stability. They cite one of the DNR’s retained experts who opined that the bentonite will reduce stability and cause erosion. Joint Petition at 44. They also rely on their experts to support this claim. Joint Petition at 41-45; WaterLegacy Petition at 27. Based on this concern, Petitioners argue that the application of the bentonite as part of the FTB design will violate the requirements of Minn. R. 6132.2500, subp. 1, which requires basins to “be designed, constructed, and operated to be structurally sound” and “minimize hydrologic impacts.”

559. Petitioners add that the Permit to Mine Application does not contain studies of veneer slope stability of a bentonite amended dam face based on site-specific data and no future studies of the dam face are proposed as special conditions of the permit. Joint Petition at 44.

560. The DNR has thoroughly considered the potential impacts that the bentonite amendment could have on dam stability. As explained above, the DNR retained a team of third-party geotechnical dam safety experts to review the PolyMet Dam Safety Permit Applications.

This team was assembled to assess and comment on the proposed design, operation and maintenance of the FTB and other facilities, and evaluated whether bentonite use would affect dam stability. FTB Permit Application: Appendix B 6.6.

561. The DNR specifically evaluated whether this bentonite use would affect the stability of the FTB Dam. The Geotechnical Data Package includes analysis of the potential effect of bentonite on seepage, on dam veneer stability, and on overall dam stability. This analysis evaluated the use of a bentonite layer consisting of three percent bentonite mixed with LTVSMC coarse tailings (as proposed in the FTB Permit Application in Attachment G of Appendix 11.5) on the side slopes of the FTB Dam. *See, e.g.,* Bentonite Amendment Template for Pilot/Field Testing (FTB Management Plan, Attachment I). Based on its consideration of this analysis and other information in the record, the DNR finds that if PolyMet uses bentonite in the manner evaluated, the FTB Dam will satisfy the required factors of safety and other Dam Safety requirements.

562. The DNR team of third-party geotechnical dam safety experts also recommended “developing material and installation specifications and a detailed protocol for both a laboratory and a field pilot study” of the bentonite application method. As a result of this independent expert review, a new “Flotation Tailings Basin Template Pilot Test Plan for Bentonite Amendment of Tailings” was drafted by PolyMet, discussed with the DNR, and submitted as part of the updated Dam Safety Permit Applications and is part of the Permit to Mine Application.²² This Template Pilot Testing Plan is included within Attachment I to Appendix 11 of the Permit to Mine. The DNR has carefully considered the potential impacts that the bentonite amendment may have on dam stability and, relying on independent expert review to supplement its own expertise, determined that the dam will be sufficiently stable with the bentonite amendment.

563. In addition, the FTB Permit and the Permit to Mine each require that Poly Met undertake pilot and field testing to confirm that bentonite will function as intended. *See* FTB Permit Condition 31; Permit to Mine at Special Conditions 89a, 89b. If pilot or field testing shows that bentonite must be used in a different manner than previously considered (e.g., if a ten percent bentonite mixture must be used), then the DNR would require additional dam stability analysis. *See, e.g.,* FTB Permit Condition 31; Special Conditions 89a, 89b.

564. And to address the concerns raised by Petitioners that the bentonite testing may show that it will not be effective, the DNR has imposed several special conditions that will ensure that the bentonite will function as intended and, in the event that it does not, require PolyMet to develop a revised facility plan prior to the fourth year of deposition of NorthMet tailings that complies with the regulatory requirements. *See* Permit to Mine Special Conditions 88, 89, 89a-89g.

²² *See* Geotechnical Data Package in Application 6.0-6.5 of App. B. The Geotechnical Data package information from the Permit Application includes analysis of the potential effect of bentonite on seepage, and on dam veneer stability, as well as on overall dam stability. The DNR found that the FTB Dam would satisfy the required safety factors if bentonite were used. To confirm that bentonite will function as intended, and that required safety factors will be met, the Permit requires that the Permittee undertake pilot testing to assess how best to implement the bentonite amendment and how to maintain the zone of saturation in the bentonite amendment.

iv. *The Permit's Wet Closure and "Perpetual Treatment" Do Not Violate Minnesota Law*

565. Petitioners and others have opined that Minnesota law prohibits the issuance of a nonferrous metallic mineral permit to mine if the mining operation proposes perpetual water treatment for reactive mine waste. See, e.g., WaterLegacy Petition at 38; Joint Petition at 11, 16.

566. This concern hinges on the legal scope and effect of Minn. R. 6132.2200, which governs reactive mine waste, and Minn. R. 6132.3200, which governs closure and post-closure maintenance of mining operations. Neither the express language of the Rules nor the purpose of the Rules supports Petitioners' arguments that wet closure and perpetual treatment are not allowed under Minnesota law.

567. Chapter 6132 of the Minnesota Rules sets forth an outcome-based regulatory framework rather than detailing specific performance standards for mining operations. The text of the Rules, and the rule-making record, show that the intent of the Rules was to allow for a case-by-case, site-specific review of applications for nonferrous metallic mineral permits to mine. The language of the Rules, combined with the evidence presented at the rule-making hearing, do not establish that perpetual water treatment of reactive mine waste is categorically prohibited under Chapter 6132.²³

568. Chapter 6132 of the Minnesota Rules provides the regulatory framework for mining and reclamation of nonferrous metallic minerals in Minnesota. The general purpose and policy of this framework is detailed in Minn. R. 6132.0200. This rule provides, in relevant part, that

[I]t is the policy of the Department of Natural Resources that mining 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. This shall be accomplished according to parts 6132.0100 to 6132.5300 through the use of mining, mine waste management, and passive reclamation methods that maximize physical, chemical, and biological stabilization of areas disturbed by mining, as opposed to the use of ongoing active treatment technologies. The department recognizes that in some cases passive treatment alone will not entirely meet all reclamation goals. In these cases, active treatment technologies may be necessary and provisions for continued maintenance of the treatments will be required.

²³ As repeatedly emphasized at the rule-making hearing, Chapter 6132 was designed to incorporate flexibility and address site-specific conditions during permitting with the aim of meeting the reclamation goals of the Rules, noting that they provide for "[a]n iterative approach, it's not just one cookbook recipe that can be gone through in order to determine the drainage quality that would be generated by the waste and if the water resources of the state are adequately protected." ALJ Hearing, December 7, 1992 at 154 (testimony of Kim Lappako); *see also* ALJ Report at 4 ("The proposed rules do not set performance standards for mining operations. Rather, the Rules require that mining operations minimize adverse impacts on the environment. . . . outcome-based regulation allows site-specific tailoring of waste containment and treatment, thereby lessening costs").

569. Id. The rule further recognizes that “[b]ecause of the unique character of each mining operation and the extreme diversity of the possible types and sizes of operations, specific permit requirements shall be established within the framework established” by Chapter 6132. Id.

570. To this end, each of the reclamation standards within Chapter 6132 identifies a goal for reclamation and specific requirements for meeting that identified goal. See Minn. R. 6132.2000-.3200. Chapter 6132 further defines “goals” as “reclamation targets of achievement toward which the specific requirements of parts 6132.0100 to 6132.5300 are directed.” Minn. R. 6132.0100, subp. 8. As directed by Minn. R. 6132.0200, “[p]ermit terms and conditions shall be directed toward attaining the goals while fulfilling the requirements described in parts 6132.0100 to 6132.5300.”

571. The rule-making history provides evidence of the DNR’s contemporaneous understanding of this framework. As explained in the SONAR,

572. [I]t is recognized, by the department, that all the goals in the proposed rule may not be fully attainable, they provide needed targets for achievement and a framework within which reasonably effective and attainable requirements have been developed, and they will provide guidance and a measurement of success by which any requests for variance from stated requirements can in part be judged.

573. SONAR at 5. Like the Rules themselves, the SONAR emphasized the flexibility of this regulatory approach:

574. [T]he rules are designed to act as a framework within which specific permit requirements are to be developed to address the unique problems anticipated to exist at each individual mine site. The actual reclamation, conducted at a given mine, will have to be custom designed to account for each site and operation’s uniquely specific characteristics. In order to make the proposed rules workable, it is necessary and reasonable to build in enough flexibility, while still providing basic direction on how reclamation can be achieved.

575. Id. at 8 (emphasis added).

576. The flexibility of this regulatory framework was repeatedly highlighted in the SONAR, supported by witnesses at the rule-making hearing, and accepted by the ALJ in her final report. ALJ Report at 10 (“DNR has demonstrated that, overall, its performance criteria are needed and reasonable to minimize the adverse environmental impact arising from mining operations by arriving at specific standards which will vary from site to site.”).

577. Minnesota Rule 6132.0100 provides separate definitions for “mine waste” and “reactive mine waste.” Under this rule, “mine waste” is defined as “a material, such as surface overburden, rock, lean ore, leached ore, or tailings that in the process of mining and beneficiation has been exposed or removed from the earth.” Id., subp. 16; see also Minn. Stat. § 93.46, subd. 3 (setting forth substantially the same definition). “Reactive mine waste” is separately defined as “waste that is shown through characterization studies to release substances that adversely impact natural resources.” Id., subp. 28. There is no statutory definition for “reactive mine waste.” In the SONAR accompanying Chapter 6132, the DNR explained that “reactive mine waste” is defined “because nonferrous metallic mining often generates mine wastes with characteristics

that can cause water that might contact such waste to assume an unacceptable quality due to contamination. Since such waste will have to [be] reclaimed in a manner different from that without such characteristics it is reasonable to require its identification.” SONAR at 7.

578. Minnesota Rule 6132.2200 specifically governs “reactive mine waste” under Chapter 6132. Subpart 1 of this rule provides as its goal: “[r]eactive mine waste shall be mined, disposed of, and reclaimed to prevent the release of substances that result in the adverse impacts on natural resources.”

579. Under subpart 2.A, “[c]hemical and physical characterization of mine waste must be conducted before the submission of an application for a permit to mine and continuously after that during the process of mining” in accordance with Minn. R. 6132.1000.

580. Subp. 2.B. of the rule requires reactive mine waste storage facilities to either:

581. (1) modify the physical or chemical characteristics of the mine waste, or store it in an environment, such that the waste is no longer reactive; or

582. (2) during construction to the extent practicable, and at closure, permanently prevent substantially all water from moving through or over the mine waste and provide for the collection and disposal of any remaining residual waters that drain from the mine waste in compliance with federal and state standards.

583. As explained by the DNR in the SONAR, Minn. R. 6132.1000, subp. 2, provides two requirements for dealing with reactive mine waste. To meet the first requirement, measures have to be taken to prevent substances that adversely impact natural resources from forming within the mine waste. In the event it is not possible to prevent the formation of unacceptable substances, a design must be presented that: (i) prevents substantially all water from contacting unacceptable substances within the mine waste or (ii) provides for the collection and treatment of water that is contaminated because it cannot be kept away. SONAR. at 22. Put simply, “[t]he operator must either modify the waste or contain it.” ALJ Report at 13.

584. The ALJ Report made clear that the rule allows disposal of tailings in bodies of water “but prohibits allowing water to come into contact with reactive mine waste and then allowing untreated leachate to move into the environment.” ALJ Report at 13-14 (emphasis added); id. at 13 (“DNR explained that the desired result of mine waste disposal is to minimize the potential for leaching of harmful substances from the waste. . . . [instead,] water draining from the waste was to be collected.”) (emphasis added).

585. Nonetheless, Petitioners (and others) interpret Minnesota Rule 6132.2200 as requiring nonferrous mine waste and mine pits to be closed in a way that does not result in water that will have to be treated before it can be discharged to the environment. Petitioners add that Rule 6132.2200(2)(B) precludes perpetual or long-term water treatment as a closure option. WaterLegacy Petition at 38; Joint Petition at 64.

586. Petitioners’ arguments related to wet closure and perpetual treatment are not supported by the text and purpose of Minnesota Rule 6132.2200 and conflict with other Rules dealing with closure and post-closure, which expressly authorize long-term treatment.

587. During the rule-making hearing, DNR witnesses specifically recognized the potential for long-term treatment of reactive mine waste in conjunction with nonferrous metallic mining under Chapter 6132. At no point did any of these witnesses testify that such long-term treatment was barred under the Rules. These witnesses noted that Chapter 6132 was designed to require characterization of reactive mine waste at the outset of permitting and throughout mining operations with the aim of designing a containment system to prevent adverse impacts to water quality, without specifically detailing the requirements of such a system.

588. In short, the aim of the design requirements of Minn. R. 6132.2200 is to keep water away from reactive mine waste, and, if that is not possible, then such water “must be collected and treated.” ALJ Hearing, December 7, 1992 at 165 (testimony of Paul Eger); see also SONAR at 13 (“The location of drainage patterns of waters contacting reactive mine wastes is necessary because such waters have the potential of adversely impacting natural resources and therefore may need to be collected and treated.”) (emphasis added); SONAR at 22 (the rule “provides for the collection and treatment of water that is contaminated because it can not be kept away”). As one DNR witness testified,

589. So this is the conceptual approach behind the mine waste characterization program. Figure out in advance what the drainage quality is going to be, design and cost the procedures necessary to prevent, control or treat that mine waste drainage.

590. ALJ Hearing, December 7, 1992 at 136 (testimony of Kim Lappako); see also Paul Pojar Testimony at 223 (“[T]he other option that we recognized would have to be done would be to construct the facility in such a way that water is substantially kept away from [reactive] mine waste and to provide for the collection and disposal and treatment of any residual waters that may contact that mine waste.”).

591. After the rule-making hearing, certain environmental groups submitted written comments on the proposed rules. In these comments, the groups suggested that a time-limited monitoring requirement be added to Minn. R. 6132.2200, subp. 2.C.(2). Significantly, the ALJ rejected this request and noted that the DNR recognized that Minn. R. 6132.2200, subp. 2.B (1) and (2), “require permittees to either modify the waste or permanently provide for collection and disposal of leachate.” ALJ Report at 13. The ALJ further noted that subp. 2 requires “the permittee to bear the costs of monitoring, without a time limit, until the leachate is no longer reactive.” *Id.* (emphasis added).

592. Accordingly, the rule-making record establishes that the DNR specifically contemplated (i) the disposal of reactive mine waste in water bodies; (ii) the collection and treatment of water that is contaminated because it cannot be kept away from the reactive mine waste; and (iii) the possibility of long-term water treatment of reactive mine waste under Minn. R. 6132.2200, subp. 2.B. The rule-making record also establishes that the rule was not intended to prohibit such treatment options.

593. Long-term water treatment of reactive mine waste is also supported by the numerous provisions within Chapter 6132 of the Minnesota Rules that address maintenance requirements and obligations of permittees. Minnesota Rule 6132.0200 identifies one of the over-arching policies of Chapter 6132 as that “mining be conducted in a manner that will . . .

ensure that the mining area is left in a condition that protects natural resources and minimizes to the extent practicable the need for maintenance.”

594. Rule 6132.0200 expressly recognizes, however, that “active treatment technologies may be necessary and provisions for continued maintenance of the treatments will be required.” This language was added to the rule from prior drafts, evidencing a recognition from the DNR that ongoing active maintenance of a mine site was permissible. See, e.g., Draft Rules 03/18/1991, 6132.0200; Hearing Tr., Dec. 4, 1992, W. Lynott Test’y at 41:5-9 (“[The MPCA is] pleased to note in the latest iteration of the rules . . . [a]cknowledgment that active treatment and long-term maintenance of closed sites may be necessary in some circumstances.”).

595. The SONAR further recognizes that on-going maintenance of a site may be required after the cessation of mining activities. SONAR at 6 (referring to the definition of ‘post closure maintenance’ and explaining that “[s]ince continued maintenance of the mine area, though not desir[able], may be inevitable it is reasonable to address this time period”); id. at 8 (“the best way of ensuring permanent reclamation is to promote the use of practices that will require little [to] no maintenance, but if such maintenance is necessary it must be the responsibility of the mine operator.”).

596. Even so, Petitioners rely on Minnesota Rule 6132.3200, which sets forth the goal and requirements of reclamation standards for closure and post-closure maintenance of a permitted facility, and claim that long-term treatment is prohibited. FEIS App. A-16.

597. As explained in the SONAR, “[f]reedom from maintenance[] is an overall goal of these rules.” SONAR at 32.

598. Nonetheless, the Rules repeatedly recognize that ongoing maintenance after cessation of mining activities may be required. See, e.g., Minn. R. 6132.0100, subp. 26 (defining postclosure maintenance); 6132.0300, subp. 3 (defining term of a permit to mine to include the time for postclosure maintenance); 6132.1100, subp. 6.C (requiring a reclamation plan to include “the engineering design, methods, sequence, and schedules of reclamation including closure and postclosure maintenance”); 6132.1200, subp. 4.H (only allowing a release from financial assurance upon inspection showing that “conditions necessitating postclosure maintenance no longer exist and are not likely to recur”); 6132.1300, subp. 2.C (annual report to include status of ongoing postclosure maintenance activities); 6132.2300, subp. 2.C(3) (reactive mine waste storage facility design to include a schedule for reclamation “including closure and postclosure maintenance”); 6132.2600, subp. 2.B(7) (tailings basin design to include a schedule for reclamation “including closure and postclosure maintenance”); 6132.3200, subp. 2.E (detailing postclosure maintenance requirements); 6132.4800, subp. 3 (barring release from a permit to mine for any portion of a mining area requiring postclosure maintenance).

599. In fact, Minnesota Rule 6132.3200, subp. 2.E, recognizes that long-term continued maintenance of a former mine site might be required after closure. Minnesota Rule 3200, subp. 2.e(6), expressly authorizes the commissioner to approve a permit to mine that requires continued maintenance if the permittee:

600. (a) implement[s] postclosure maintenance techniques designed to ensure that the requirements of parts 6132.2000 to 6132.3200 will continue to be met following closure;

601. (b) identif[ies] specifically how, when, and by whom the active techniques will be conducted or managed;

602. (c) identif[ies] performance levels or limitations that would have to be achieved before the techniques could be considered successful; and

603. (d) provide[s] for financial assurance under part 6132.1200, subpart 1, item A.

604. Minnesota Rule 3200, subp. 2.e(7), adds that the DNR cannot grant a release from the permit to mine “for those portions of the mining area that require postclosure maintenance until the necessity for maintenance ceases[.]” As explained in the SONAR:

605. This section also addresses the subject of continued maintenance. Although this is not the most desirable means of providing for the reclamation of a mining area, it may be the only means available to ensure that the reclamation requirements will continue to be met after operations cease. When continued maintenance of an area is necessary, it is reasonable that the commissioner be provided with the information necessary to evaluate the proposal, to appraise the ongoing success of the activities that are proposed, and to determine if appropriate levels of funding will be available to support the efforts.

606. It is reasonable that in the event continued maintenance is necessary, the responsibility remain with the permittee until such time as the maintenance is determined to be no longer necessary. This rule ensures that such responsibility is maintained by withholding release from the permit, on those parts of the mine area that require continued maintenance.

607. *Id.* at 33 (emphasis added).

608. At the rule-making hearing, DNR witnesses also specifically acknowledged that long-term post-closure maintenance, including water treatment, are allowed under Minn. R. 6132.3200: “water treatment that might have to be carried on for a considerable period following the cessation of mining. That would be the type of thing that we’re talking about with post-operational and post-closure maintenance.” Hearing Tr., Dec. 7, 1992, P. Pojar Test’y at 95:23-96:2; see also Hearing Tr., Dec. 8, 1992, P. Pojar Test’y at 26:24-27:6 (“[T]his deals . . . with activities that might have to be conducted for a long period of time after mining ceases . . . It could extend to water quality treatment that might have to be conducted in order to maintain the water quality of . . . the waters leaving the mine area.”).

609. Nonetheless, Petitioners and others contend that the plain language of Minn. R. 6132.3200, subp. 1 bars the DNR from issuing a permit to mine to a facility unless, at the outset, the applicant proposes a maintenance-free facility. This restrictive reading, however, is not supported by the language of the rule or the rule-making history. It is plain from the rule-making history that the intent of subpart 1 was simply to identify the “goal” of closure, rather than set forth specific requirements that have to be met for a permit to mine to be granted. This is in line with Chapter 6132’s general course of setting performance criteria rather than setting specific operation and reclamation standards.

610. Based on the foregoing, the DNR concludes that wet closure and long-term water treatment are not barred under Chapter 6132 of the Minnesota Rules.

B. Hydrometallurgical Residue Facility

611. PolyMet has proposed using a hydrometallurgical plant to recover platinum-group elements, precious metals, and base metals from concentrates. In order to store the residue generated from such hydrometallurgical processing, PolyMet has proposed using a hydrometallurgical residue facility (“HRF”) at the Plant Site. The HRF will be a new double-lined, approximately 100-acre surface impoundment with a leakage collection system. The impoundment will be sited on top of the former LTVSMC emergency basin, which was designed to contain taconite tailings discharge from the main LTVSMC tailings thickeners. The double liner system consists of (i) a geomembrane upper liner, (ii) a geocomposite leakage collection layer, and (iii) a geomembrane lower liner. The double liner system will collect any leachate and speed the dewatering process during closure.²⁴

612. The HRF is not needed at the beginning of mining operations. In fact, it will not be built until several years after mining and ore processing commence. The HRF will be built in three stages. Each stage will have a liner height of 30 feet. Once water levels rise to within 10 feet of the top of the liner, the next stage of liner will be installed. Total expected freeboard is expected to vary from six feet to 40 feet. Water levels can be lowered via reclaiming pumps and evaporation.

613. Upon closure, the impoundment will be dewatered, and the resulting drainage will be routed to the Wastewater Treatment System (“WWTS”). After the residue is dewatered, a multi-layer cover system will be placed over the former impoundment. The leakage collection system will continue to operate and will route any collected water to the WWTS, or potentially to a non-mechanical treatment system, if such a system is approved.

614. Petitioners claim that the plans for the HRF violate Minnesota law on a number of grounds pertaining to siting, design, and management. First, Petitioners argue that the HRF violates applicable law because it is sited on wetlands. WaterLegacy Petition at 13. Second, Petitioners claim that the siting of the HRF on wetlands—as well as on legacy mining slimes, peats, and tailings—results in instability that contravenes the law and increases the risk of dam failure. Joint Petition at 92; WaterLegacy Petition at 13-14. Third, Petitioners claim that models regarding dam failure and extreme precipitation either were not conducted or were conducted inadequately, thereby failing to recognize the potential impacts of HRF Dam failure. WaterLegacy Petition at 14-15; Joint Petition at 92. Fourth, Petitioners assert that the long-term management plan for the HRF is inadequate, particularly in regard to water overflow and leakage collection. WaterLegacy Petition at 15-16.

²⁴ Barr Eng’g, NPDES/SDS Permit Appl., Vol. VI (Permit Application), tbl. 1-1, 10 (2017), available at <https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-50z.pdf>.

615. The DNR has thoroughly reviewed and addressed each of the concerns raised by Petitioners in regard to the HRF. Based on this review, the DNR has concluded that the HRF plans do not violate any applicable law.

i. HRF Siting

616. The HRF would be located on 36.1 acres of wetlands. Application, Table 5-2. WaterLegacy asserts that this location “is unsuitable for a facility storing highly concentrated and toxic wastes” and that “[l]ocation of hazardous waste facilities on wetlands is prohibited under Minnesota law”—particularly, Minnesota Rule 7045.0460, subp. 2. WaterLegacy Petition at 13. This rule does not apply to the HRF, because the HRF is not a hazardous waste storage facility. “PolyMet has conducted environmental testing to compare the properties of the hydrometallurgical residue with the RCRA hazardous waste thresholds . . . [which] shows that the [] residue does not have any toxicity characteristics of a hazardous waste.” FEIS App. A, A-231-32. Likewise, “[t]he MPCA has determined that the hydrometallurgical residue is not hazardous by legal definition under RCRA.” FEIS § 5.2.13. Additionally, as WaterLegacy notes, wastes from the “extraction, beneficiation, and processing” of ores—i.e., the wastes that will be stored in the HRF—are exempt from a prohibition of industrial solid waste facilities on wetlands.²⁵ Thus, the siting of the HRF on a wetlands area is not unlawful.

617. In addition, the DNR has concluded that the wetlands impacted by the HRF are low quality because they constitute an existing brownfield site that was formerly used as an emergency basin for LTVSMC tailings. The DNR has further concluded that siting the HRF on this legacy mining site would result in lesser impacts to natural resources than would siting the HRF on an undisturbed location. FEIS at App. A, A-21, A-230-32.

618. Finally, the HRF is double-lined, and the stability of the dam will exceed the required factor of safety of 1.5. As a result, it is unlikely that any residue from the HRF will be released into the surrounding environment, including surrounding wetland areas or other bodies of water.

ii. HRF Stability

619. The ground on which the HRF will be sited consists of up to 30 feet of slimes, peat, and tailings concentrate.²⁶ Petitioners claim that the placement of the HRF at this site will render the foundation unstable and increase the risk of dam failure. Joint Petition at 92; WaterLegacy Petition at 13-14. Petitioners have made similar comments throughout the environmental review process.

620. As a general matter, the design of the HRF falls under the jurisdiction of the MPCA. Nonetheless, the DNR has taken a number of steps to ensure the stability and integrity of the HRF.

²⁵ Minnesota Session Laws, Special Session 2015, ch. 4, sec. 119, amending Minn. Stat. §116.07, subd. 4j; Minn. R. 591 7001.3050, subp. 3, item G; Minn. R. 7035.2525, subp. 2, item G.

²⁶ EOR Dam Safety Review at 5.

621. In response to Petitioners' previously raised concerns regarding the siting of the HRF, the location of the HRF was moved to firmer ground. FEIS at App. A, A-229. Moreover, PolyMet will preload to consolidate the foundation in preparation for the construction of the HRF. Permit to Mine § 10.3.3.6. A professional engineer will monitor the settlement and confirm the removal of preload fill to ensure stability. *Id.*

622. The DNR has also imposed special conditions that address the siting and stability of the HRF. Specifically, HRF Permit Condition 25 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the foundation preload design prior to preloading the HRF foundation. HRF Permit Condition 26 provides that "[a]dditional analysis of the HRF foundation is needed to confirm that the foundation will provide adequate support for the HRF," and requires PolyMet to seek further guidance from the MPCA to ensure that differential settlement will not cause excessive liner strain. HRF Permit Condition 30 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the Contingency Action Plan prior to dam construction. And Special Condition 52 of the Permit to Mine requires final design drawings for the HRF to be submitted to the DNR at least 30 days prior to construction of the HRF. These design drawings will include designs for the foundation of the HRF, which the DNR must review prior to the commencement of construction. Given that the HRF will not be commissioned until several years after the commencement of mining operations, it is not necessary to approve the final design prior to issuing the Permit to Mine.²⁷ Special Condition 50 requires engineer inspection and review during construction and upon completion of construction. Indeed, in order to maximize the effectiveness of its review, it is important that the DNR analyze the designs based on up-to-date information, rather than prospectively analyzing plans that will not be implemented for several years.

623. Finally, the design of the HRF basin has been reviewed by both the DNR's dam safety experts and the MPCA SDS permitting team, which have extensive experience and expertise in the foundations and liners for waste basins. The permit conditions for the HRF Permit and the MPCA's draft waste storage facility permit contain extensive requirements aimed at ensuring stability and preventing dam failure. Specifically, the dam features downstream construction with a geosynthetic liner on the upstream face, a seepage collection system, and well compacted materials. This design has a high factor of safety, and the DNR's review indicates that even if all the tailings liquefied—which is highly unlikely—the dam would neither fail nor deform. In light of these measures, the DNR has concluded that a breach of the HRF Dam is highly unlikely.

624. Petitioners also raised concerns that Barr Engineering did not analyze all factors of safety for the HRF Dam design. Barr Engineering completed a factor of safety analysis for the steady-state conditions of the dam – i.e., for normal operations and conditions ("the effective stress strength conditions"). Barr Engineering's analysis showed that the HRF Dam, as designed, would achieve a factor of safety of 2.27, which exceeds the required factor of safety of 1.50 for this condition. The DNR has reviewed Barr Engineering's analysis and considered the

²⁷ The HRF is a part of the NorthMet Project and does have initial designs, similar to the other facilities, such as the FTB, waste rock stockpiles, etc. With this component of the project, which PolyMet does expect to construct and operate, the project is more complete and was available for public review. There are a number of times when the public is concerned that aspects were not available for review and with this inclusion, the project components are more transparent.

appropriate Safety Requirements at this stage for the HRF Dam and has concluded that additional factor of safety analyses are not necessary at this time to satisfy permitting requirements. Given the nature of the HRF Dam, the other factor of safety scenarios that the DNR is requiring for the FTB Dam (i.e., liquefaction, undrained condition) are not realistic conditions for the HRF Dam. In addition, the DNR is requiring that PolyMet conduct these additional factors of safety analyses and submit results to the DNR for approval prior to construction. HRF Permit Condition 29b.

625. In addition, PolyMet has designed an internal leakage collection system to collect any water that might find its way through the HRF liner. The leakage from this facility into underlying groundwater or adjacent water would be negligible due to the leachate collection system constructed beneath the HRF that would feed collected water back into the HRF basin. FEIS § 5.2.2.3.3; *see also* Permit to Mine, Appendix 11.6 (Residue Management Plan), Section 2.2.2.

626. The DNR has also considered the potential for a breach of the HRF Dam. Such a breach is highly unlikely in view of the location, design, planned construction, use and other conditions and circumstances pertaining to the HRF Dam. *See, e.g.*, FEIS at 5-628; A-370 to 381. PolyMet will construct the HRF using a geo-membrane and geo-synthetic liner. PolyMet will also use well-compacted, well-defined, construction materials. The DNR will require monitoring during construction to assure adherence to the approved plans and specifications. The HRF Dam will be founded on existing silty sand, glacial till, gravel, and Giants Range granite, so that it will have a stable foundation. *See* FEIS at A 5.2.14.2.3 (summary of geotechnical stability themes); FEIS A-370 to 381; HRF GDP at 28.

627. The potential for a breach of the HRF Dam would be so remote, particularly in view of the ongoing review, monitoring, and management obligations associated with the facility, that the FEIS declined to examine the potential environmental impacts of such a breach. FEIS at 5-628.

628. Barr Engineering completed a dam break analysis for the HRF Dam. Barr Engineering examined how the FTB Dam could fail, and found “no plausible HRF Dam failure scenarios.” *See, e.g.*, Permit to Mine, Appendix 11.6 (Residue Management Plan), Attachment L (HRF Dam Break Analysis) at 4.

iii. HRF Modeling

629. Petitioners raise concerns regarding modeling of HRF scenarios with respect to dam failure or overflow. Joint Petition at 91-92; WaterLegacy Petition at 13-17.

630. First, Petitioners claim that “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 [HRF].” WaterLegacy Petition at 40. This assertion is inaccurate. PolyMet has conducted dam break analyses for the HRF, and the DNR has reviewed these analyses. Based on its review of PolyMet’s dam break analysis, the DNR concluded that “no plausible HRF dam failure scenarios have been identified.” Permit to Mine, Appendix 11.6, Attachment L at 2-4. In its independent evaluation, the DNR explained

that the two dam-break scenarios evaluated by PolyMet, “while theoretically possible, have a low probability of occurrence” and that “additional hydrologic and hydraulic modeling to detail the extent of inundation from an HRF dam break is not warranted.”

631. Relatedly, WaterLegacy also raises a concern about overflow of the HRF during a massive precipitation event or in the event of a disruption or blockage of the return water pipeline, as well as the lack of a model for an extreme precipitation event. WaterLegacy Petition at 15. The DNR has reviewed this concern carefully and concluded that overflow is extremely unlikely. The freeboard for the HRF will vary from approximately six feet to approximately 40 feet. Normal annual precipitation in the area is 29 inches, which means there will always be a large buffer in the event of an extreme precipitation event. Moreover, water levels in the HRF can be lowered via reclaiming pumps. If the reclaiming pumps fail, portable pumps can be used as a back-up measure. Based on all of these factors, the DNR has concluded that overtopping of the HRF due to extreme precipitation is very unlikely.

632. Additionally, the DNR’s review indicates that HRF wastes would not travel far downstream even in the highly unlikely event of a dam breach or overflow. The HRF pond is only 33 acres, and this volume of water would be quickly absorbed by the downstream wetlands. Any water that entered the small tributaries downstream of the HRF would be quickly diluted, thereby minimizing environmental impacts.

iv. HRF Long-Term Management

633. WaterLegacy claims that PolyMet’s closure and post-closure maintenance plan for the HRF is unlawful. Specifically, WaterLegacy argues, based on statements from PolyMet’s HRF Management Plan, that: “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.” WaterLegacy Petition at 16.

634. These comments are consistent with comments made by Petitioners throughout the environmental review process. Petitioners’ claims regarding the liners and leakage collection system are based largely on the notion that the liner system is vulnerable to deformation and rupture due to its location on an unstable foundation—specifically, on slimes, peat, and tailings concentrate. *See, e.g.*, WaterLegacy Petition at 13.

635. As for Petitioners’ concerns regarding failure of the leakage collection system after closure, PolyMet must obtain and comply with an NPDES/SDS permit issued by the MPCA. Additionally, HRF Permit Condition 42 requires PolyMet to submit a Closure Plan to the DNR at least two years prior to the planned end of operations, which must detail PolyMet’s post-closure monitoring and maintenance plans for the HRF, as well as PolyMet’s plans to remove HRF pipelines, revegetate the basin, restore the area, and any “such other items as [PolyMet] and DNR deem necessary.” Thus, the DNR will analyze the conditions of the HRF based on up-to-date information prior to approving any closure plan submitted by PolyMet. Moreover, the HRF plans have been revised to include a double liner system with leak detection capability. Additionally, Permit to Mine Special Condition 16d requires PolyMet to submit a

revised monitoring plan for the HRF, and Permit to Mine Special Condition 95 has been added to prohibit disposal of coal ash or other non-mining waste in the HRF. Permit to Mine Special Condition 55c requires PolyMet to submit an inspection schedule for the construction, operation, and reclamation of the HRF for DNR approval prior to construction or initiation of each relevant phase. HRF Permit Condition 31 requires PolyMet to submit an Operation and Maintenance Plan to the DNR at least 180 days prior to the start of HRF Dam construction, and construction may not commence until the DNR has approved this plan. Additionally, HRF Permit Condition 35 requires PolyMet to submit updated documents to the DNR Dam Safety Engineer for written approval as those documents become available, thereby accounting for updates to the design, construction, and operations of the HRF.

636. WaterLegacy also raises a concern regarding seepage from the HRF due to the proposed use of passive treatment. However, no plans for non-mechanical treatment have been approved. Permit to Mine Special Condition 64 requires PolyMet to study the potential for passive treatment, but Special Condition 65 specifies that non-mechanical treatment may not be used unless and until approved by the DNR and would require a substantial change amendment to the Permit to Mine. Before passive treatment can be approved, there must be further study, which DNR will carefully review prior to acting on any request to approve such changes.

637. Each of the issues raised by Petitioners has been addressed during the environmental review and permitting processes. In response to these concerns, the DNR and the MPCA have changed some of the requirements for the HRF. In addition, the DNR has imposed and revised special permit conditions in the Permit to Mine and added conditions to the HRF Permit.

C. Waste Rock Characterization

638. Minnesota Rule 6132.1000, subpart 1 requires an applicant for a nonferrous permit to mine to “meet with the commissioner to outline chemical and mineralogical analyses and laboratory tests to be conducted for mine waste characterization.” Subpart 2 further prescribes the information that must be provided as part of the required mine waste characterization. The SONAR makes clear that the DNR has broad discretion in determining the extent of necessary analysis and tests. SONAR at 10.

639. Petitioners argue that the waste rock characterization for the NorthMet Project is inadequate because it does not meet commonly used methods, specifications, guidelines, standards, and engineering safety factors. Joint Petition at 64-67. Specifically, Petitioners assert that an insufficient number of waste rock and ore samples were analyzed and that samples were not properly analyzed for neutralization potential.

640. There has been extensive waste rock and ore characterization for the NorthMet Project. Such characterization began in 2004 with preliminary meetings, comments, and discussions among the DNR, PolyMet, and PolyMet’s consultants. After an additional series of meetings, comments, and discussions in 2005 and 2006, PolyMet submitted a final Waste Rock Characterization Work Plan in May 2006. Since then, PolyMet has submitted a number of additional progress reports and participated in a number of meetings with the DNR regarding waste rock characterization.

641. In accordance with Minn. R. 6132.1000, subpart 2, the waste characterization program includes: (i) chemical analysis of mine waste; (ii) mineralogical and petrological analysis of mine waste; and (iii) laboratory tests describing acid generation and dissolved solids released from mine waste. Throughout the waste rock characterization process, PolyMet and the DNR have continued to evaluate the data needs, and have adjusted or supplemented the analyses as needed to ensure the data collected were sufficient to meet the requirements of the rule. The Permit to Mine also contains requirements to ensure that future waste rock characterization is adequately performed.

642. Characterization work at the Mine Site involved 82 samples of waste rock and three ore composite samples. The waste rock samples were identified according to a sampling matrix developed by PolyMet in collaboration with the DNR. All 85 samples were analyzed using chemical, physical, mineralogical, and laboratory tests.

643. Petitioners also raise the concern regarding scaling and selectively quote one of DNR's consultants as follows: "Of the 18,800 waste rock and ore samples used to characterize the ore and waste, apparently only 82 samples were used to characterize the waste. This makes me wonder how much confidence we have when scaling up to the full 358 million tons of waste that will be mined, and the 218 million tons that will be stockpiled." While this sounds troubling, the rest of the comment from the consultant, additional information in the Permit to Mine, and special conditions of the Permit to Mine account for this concern regarding scaling of lab data to field conditions.

644. As the comment continues, a rigorous blast hole sampling program (which was included in the Application) will ensure that the waste is properly segregated and therefore managed properly. The DNR followed the suggestions of this consultant. For the Category 1 waste rock stockpile, confirmation sampling on the rock placed in the pile will be conducted (See Application Appendix 11.1, section 4.1.6.5.) which will verify that the stockpile is composed of waste rock with sulfur content less than 0.12 percent. Additional information on blast hole sampling and GPS tracking is in section 4.1 of Appendix 11.1 of the Permit to Mine. Special Condition 4b requires PolyMet to report on the implementation of the GPS tracking system for the tracking and placement of the waste rock in the various stockpiles. As noted in the comment, a contingency was added to the water treatment cost estimates in the contingency cost estimate for reclamation. See Appendix A-2 of Appendix A of Appendix 15.3 of the Permit to Mine. Special Condition 50 requires quality assurance and quality control plans for each of the stockpiles. The Permit to Mine further contains numerous mechanisms (e.g., seepage collection, liners, monitoring, analysis of monitoring data, required reporting to the agencies, ability of DNR to require project changes, etc.) to ensure continued compliance and protection of natural resources.

645. Another way to view the scaling question is directly into the water quality and quantity model (i.e., the "GoldSim model"). During environmental review, an empirical scaling factor was determined for the Category 1 waste rock stockpile. This method used sulfate release rates from laboratory dissolution tests conducted by the DNR and waste rock stockpiles at Dunka Mine. A distribution of empirical scaling factors was derived using multiple laboratory tests and years' worth of field data from the Dunka Mine. This scaling factor distribution was then used in the GoldSim model to scale PolyMet humidity cell release rates to the full scale stockpile.

646. The DNR is aware of the concerns related to scaling for waste-characterization purposes. These concerns were addressed during environmental review and in the course of permitting. The DNR has also imposed special conditions within the Permit to Mine to ensure compliance with applicable law.

647. It is true that the 85 samples analyzed for static testing for the NorthMet Project constitute a lower sample set than the number recommended in some of the available guidance documents referenced by Petitioners. However, this number of static test analyses is sufficient when taken in context to the existing data and observations for rock similar to that from the NorthMet Project. Both previous DNR research and the Waste Rock Characterization Work Plan have identified sulfur concentration as the most consistent variable for gauging the reactivity of Duluth Complex rock—the rock at issue here. Therefore, instead of relying on hundreds of static testing analyses—as recommended in some general guidance documents—PolyMet has used a larger database of approximately 25,000 rock sulfur analyses from the drill core assays, including approximately 16,000 assays from the Category 1 waste rock.

648. It is also true that no acid digestion/titration neutralization potential tests were performed for the NorthMet Project waste rock. This is appropriate given the inability of these particular neutralization potential tests to accurately portray the amount of neutralization potential of Duluth Complex rocks. In fact, standard acid digestion/titration neutralization potential tests would over-predict the neutralization potential of Duluth Complex rocks due to the abundance of plagioclase and olivine. Therefore, the rock neutralization potential was empirically derived based on the leachate chemistry of the humidity cell tests, which provides a more accurate metric than standard acid digestion/titration neutralization potential techniques. White, W.W., Lapakko, K.A., and Cox, R.L. 1999. Static-test methods most commonly used to predict acid-mine drainage - Practical guidelines for use and interpretation. Reviews in economic geology: The environmental geochemistry of mineral deposits, Part A: Processes, techniques and health issues, pgs. 325-338. Based on the humidity cell tests, it was identified that Duluth Complex rock with < 0.12 wt% sulfur has sufficient neutralization capacity such that acid conditions cannot occur. SRK memo from Stephen Day, Requested Detail on Derivation of Sulfur Thresholds for Waste Rock Characterization, July 21, 2014. As a secondary precaution, the Category 1 waste rock stockpile will be sampled and analyzed as it is constructed to confirm no rock with a sulfur concentration greater than 0.12 wt% sulfur has been placed in the pile. Permit to Mine Application, Appendix 11.1, Section 4.1.6.5. If rock is identified above that sulfur threshold, it will be removed and placed in the appropriate storage facility.²⁸

²⁸ Petitioners also argue that the waste characterization is based upon an incorrect assumptions related to pH recovery. Joint Petition at 68. The NorthMet water quality prediction models did not incorporate pH recovery, but, rather, were modeled to continuously release sulfate and metals until all the reactants has been exhausted. The Petitioners state that the model's incorrect assumptions about acid drainage and contaminant leaching which have led to underestimation of the impact of mine water on the environment at and around the mine and plant sites. These include assuming that once wastes go acidic the pH will "recover," ignoring the contribution of secondary salts to leaching of wastes and ore, and incorrect conceptual models about release rates and concentration caps. It is known that long term increases in leachate pH from mine waste does occur (a.k.a, 'pH recovery'). Although it was observed in the kinetic data with from NorthMet humidity cells, pH recovery is not incorporated into the NorthMet water quality prediction models. Instead the pit walls and stockpile rock are modeled to continuously release sulfate and metals until all the reactant has been exhausted.

649. Relatedly, Petitioners claim that the inadequacies in waste rock characterization will result in an inability to reliably sort waste rock into the proposed stockpiles—Categories 1, 2/3, and 4. Joint Petition at 67-69.

650. After thorough review, the DNR has concluded that the waste rock characterization is sufficient to sort waste rock into the appropriate stockpiles. Specifically, Permit to Mine, Appendix 11.1 (Rock and Overburden Management Plan) has a plan for segregating waste rock. This plan calls for a number of steps that ensure adequate segregation. First, blast hole sampling will be used to assess the pile to which the waste rock must be delivered. Once the appropriate stockpile is determined, GPS tracking will be used to ensure that the delivery trucks report to the correct pile. Finally, sampling will be used to confirm that the Category 1 waste rock stockpile (which is used for permanent storage) has in fact received the correct rock. Notably, each stockpile has capacity that exceeds the amount of rock anticipated under current plans. Thus, if the blast hole sampling indicates that there is more of a particular category of waste rock than anticipated, there is reserve capacity in the appropriate stockpile.

651. Relatedly, the overlap in bulk metal content among different waste rock categories will not adversely affect the segregation of waste rock categories. Although there are instances of overlap in bulk metal content among different waste rock categories, metal content was not the primary factor for distinguishing the relative reactivity of rock. Instead, bulk sulfur content is the primary distinguishing factor and therefore is the metric by which waste rock categories are defined.

652. Finally, the Permit to Mine includes a number of conditions designed to ensure continued compliance with Minn. R. 6132.1000. Specifically, Special Condition 45 requires PolyMet to inform the DNR if new rock types or formations are encountered during mining and for that rock to be placed in the Category 4 waste rock stockpile or backfilled into the East Pit until such time as it can be characterized and appropriate management plans developed for DNR review and approval. Likewise, Special Conditions 46-48 require PolyMet to continue to coordinate with the DNR in the future regarding waste characterization testing after the Permit to Mine is issued.

D. Concerns Relating to Efficacy of Seepage Capture Systems

653. The FTB design includes a containment system consisting of a cutoff wall, with a collection trench and drain pipe installed on the upgradient side of the cutoff wall. Permit to Mine § 10.2.3.4 and Appendix 11.1. Similarly, the Category 1 waste rock stockpile design includes a surface water and groundwater containment system to capture surface water and groundwater flows from the stockpile. An engineered geomembrane cover system will be added progressively during operations. The temporary stockpiles of Category 4 waste rock, combined Category 2/3 waste rock, and the Ore Surge Pile contain a composite geomembrane liner system, which includes a foundation underdrain system if necessary, an impermeable composite liner barrier, and an overliner drainage layer.

654. Petitioners claim that the seepage collection systems for the FTB and Category 1 waste rock stockpile will fail to perform as projected, in violation of Minnesota Rule 6132.2200,

subpart 1, which provides that reactive mine waste “shall be . . . disposed of . . . to prevent the release of substances that result in the adverse impacts on natural resources.” Joint Petition at 59-61, 69-75.²⁹

i. Cutoff Walls

655. Among Petitioners’ specific arguments is that the proposed cutoff walls for the FTB and the Category 1 waste rock stockpile may not be effective in recapturing seepage because the Permit to Mine Application does not require the cutoff walls to be keyed into the bedrock. Without a commitment to key the cutoff walls to bedrock, Petitioners claim that the estimation of seepage capture is likely inflated. Joint Petition at 60, 72. Similarly, Petitioners claim that the cutoff walls will be ineffective as a long-term pollution control barrier unless a sufficient inward head difference is maintained in order to prevent pressure-induced outward transport. Joint Petition at 61, 73. Because the Permit to Mine Application does not dictate a minimum head difference or gradient along the cutoff wall, Petitioners claim that there is no way to ensure that the current design will “prevent[] the release of substances that result in the adverse impacts on natural resources.” Minn. R. 6132.2200.

The Permit to Mine addresses these concerns in Appendix 11.1 and through revised Special Conditions 55 requires the cutoff walls to: (i) be keyed to bedrock; (ii) capture seepage such that natural resources are protected; and (iii) maintain an inward flow gradient in accordance with the NPDES/SDS permit as demonstrated through monitoring. If the DNR requests further information, then PolyMet must submit the requested information to the DNR at least 14 days prior to construction of such system. The relative pressures on either side of the barrier will be reviewed. If a sufficient inward gradient cannot be maintained, adaptive mitigation measures must be implemented to ensure that an inward gradient is re-established. Furthermore, Special Conditions 55a and 55b require detailed monitoring plans for verification that the respective cutoff walls will perform as required.

ii. Category 2/3 Waste Rock Stockpile Liner

656. Petitioners also argue that the Category 2/3 waste rock stockpile liner is inadequate to prevent contamination. Joint Petition at 74-75. Specifically, Petitioners claim that the Category 2/3 liner system should meet the same standards as the Category 4 liner system, particularly in light of the alleged inability to effectively segregate waste rock into discrete categories. *Id.*

There is no basis for identical standards for the Category 2/3 and Category 4 liner systems. Category 2/3 waste rock is predicted to react differently than Category 4 waste rock. Thus, the liners for the various stockpiles were designed with specific hydraulic conductivity in accordance with segregated rock and its characteristics. The Category 4 waste rock contaminant load is higher than that of Category 2/3, which results in the liner conductivity for Category 4 being lower than that of Category 2/3. Moreover, there is no basis for concluding that waste

²⁹ This regulation does not, as Petitioners imply, set forth permitting requirements or performance standards. Instead, Rule 6132.2200, subpart 1, sets forth a goal.

rock will not be effectively segregated. As detailed in the Rock and Overburden Management Plan, a number of steps will be used to ensure adequate segregation.

iii. Mine Site Wastewater Overflow

657. Petitioner claims that there are inadequate safeguards to prevent overflow of the Mine Site Equalization Basins, ponds, and sumps—particularly during extreme rain events—and that this shortcoming is amplified by the relocation of the Equalization Basins closer to the Partridge River. WaterLegacy Petition at 36-38.

The Permit to Mine contains a number of safeguards to prevent seepage of wastewater during heavy rain events. First, Mine Site wastewater will be pumped to the Plant Site for treatment using pumps at the central pumping station. Second, there will be sensors in place to detect when the Equalization Basins are nearing capacity, at which point the rate of pumping will be increased. Third, as an emergency precaution, PolyMet will have portable pumps on hand in order to pump wastewater back into the mine pits if necessary. Taken together, these measures create a very low risk of Mine Site wastewater overflow, even during extreme rain events. Because of the low risk of overflow, the relocation of the Equalization Basins closer to the Partridge River is unlikely to have any effect on water resources. *See* Permit to Mine, Appendix 11.2, Section 4.4.1.

iv. Bedrock Fractures

658. Petitioners claim that the environmental review has failed to adequately consider the role of bedrock fractures in transmitting groundwater at the tailings site. WaterLegacy Petition at 18.

659. The DNR has carefully considered the role of bedrock fractures in transmitting groundwater at the tailings site. Specifically, the FEIS re-evaluated the possibility of fractures and faults at the Mine Site and Plant Site to determine what (if any) changes needed to be made to modeling assumptions (from those used in the SDEIS) to accurately predict potential environmental effects for purposes of environmental review.

660. The bedrock flowpaths in the Mine Site GoldSim model are physically situated in Duluth Complex rocks, so it is appropriate to use the Duluth Complex as the basis for bedrock hydraulic conductivity. The sorption values used in the model are based on EPA guidance documents.

661. Over 14,000 rock quality designation (RQD) measurements for the Duluth Complex were taken using rock cores obtained from hundreds of Mine Site boreholes. RQD is a measure of fracture density in a segment of rock drill core, where 100 percent indicates no breaks and 0 percent indicates that all pieces of core within a core run are less than 10 centimeters long. The collected RQD data indicate that the upper 5 to 15 meters of bedrock tend to be more fractured and have higher hydraulic conductivity than deeper bedrock.

662. The DNR used the RQD data to alter the Mine Site GoldSim model in the FEIS. Specifically, bedrock flowpaths have been reconfigured with a bulk hydraulic conductivity that is approximately one order of magnitude higher than what was used in the SDEIS. In addition,

the flowpaths were remodeled to be 15 meters thick, consistent with the concept of an upper more-permeable bedrock zone interpreted from RQD data (in the SDEIS model, the bedrock flowpath was 100 meters thick). Fracture flow in bedrock is considered by using an appropriate bulk hydraulic conductivity and low effective porosity (0.05) as a reasonable surrogate for fracture porosity and chemical diffusion into the matrix between fractures. In addition, the bulk hydraulic conductivity of the bedrock flowpaths is two to three orders of magnitude lower than the hydraulic conductivity of the surficial flowpaths, so it is reasonable to neglect flow between bedrock and surficial deposits.

663. For the Plant Site, no change was made to GoldSim. However, the extensive no-flow boundary condition used in the SDEIS Plant Site MODFLOW model was corrected in the FEIS model by assigning a greater distribution of drain and river cells along the perimeter of the FTB. Significant wetlands are observed between the tailings basin and the Embarrass River. Drain and river cells allow the potential for groundwater discharge to ground surface, which is prevented by “no-flow” cells in MODFLOW. While this change better accounts for the observed conditions at the periphery of the tailings basin, mathematical incorporation of a no-flow boundary at the base of the surficial aquifer in both the Plant Site MODFLOW and GoldSim models is consistent with the idea that flow/transport at this location is dominated by the hydrology of the surficial aquifer and that flow/transport in bedrock is comparatively insignificant.

664. The FEIS indicates that structural faults may exist between mine facilities and perennial streams that receive groundwater discharge. Because the landscape is covered with surficial deposits and there are limited bedrock outcrops, the existence of faults is conjectural and locations, at best, can only be inferred. It is unknown if faults (if and where they exist) behave as conduits or barriers to groundwater flow. Given these uncertainties, it is unlikely that a new, practical field program, with a goal to identify faults, would provide data to reasonably inform the impact assessments. The management approach is to set up a robust monitoring program during operations and closure to provide direct or indirect evidence on the existence of hydrologically significant faults. If significant faults are identified (i.e., faults which could lead to violation of water quality standards), then adaptive measures will be employed to mitigate the fault-related effects. See Special Conditions 55a-55b, 66, 80.

v. Percolation Rate

665. Petitioners take issue with the estimate for the percolation rate through the tailings pond bottom. Joint Petition at 53.

666. The closure plans have been designed to have enough water percolating through the tailings to avoid the pond becoming too large, while holding enough water volume to maintain the pond. The current prediction is that reducing percolation to 25% of annual rainfall will manage the potential reactive waste in a way to render it non-reactive.³⁰ This will be verified through testing, monitoring, and analysis. The size of the FTB pond is connected to

³⁰ It was determined that 25% percolation of precipitation through the pond bottom would maintain the width of the beaches appropriately. More detail on related model parameters is in version 12 of the Waste Characterization Data Package (page 149) referenced in the Application and in the AWMP (V12) in the Application.

both dam stability and water quality and quantity. Section 2.2.3 of the Permit to Mine, Appendix 11.5 (Flotation Tailings Management Plan) describes the determination of the freeboard requirements of the FTB as determined by a hydrology study. The beach width was one of the inputs to both the stability analysis and the water model. It was determined that 25% percolation of precipitation through the pond bottom would maintain the width of the beaches appropriately. More detail on related model parameters is in Version 12 of the Waste Characterization Data Package (page 149) referenced in the Permit to Mine Application and in Appendix 11.4 thereto (Adaptive Water Management Plan).

vi. Modeling of Seepage Concentrations

667. Petitioner argues that PolyMet's modeling of seepage concentrations at the tailings toe is likely to understate actual tailings chemistry because leachate from copper-nickel tailings from MinnAMAX bulk sampling was not considered in modeling of NorthMet tailings seepage. WaterLegacy Petition at 17.

668. It is true that leachate data from the tailings in the "AMAX field study" were not directly used in the NorthMet Project water quality model. This was due to the fact that the NorthMet Project tailings are compositionally much different than the tailings in the "AMAX field study." For example, pilot tests of NorthMet ore processing generate tailings with an average sulfur concentration of about 0.12 wt%, whereas the tailings from the "AMAX field study" were about 0.38 wt%, which is over three times that of the NorthMet tailings.

669. The NorthMet Project water quality model uses leachate data from humidity cell tests of the pilot test NorthMet tailings to simulate seepage concentrations. The pilot test tailings are anticipated to represent the NorthMet Project tailings and therefore are much more representative than supplementary data, such as that from the "AMAX field study." In addition, modeled seepage concentrations from the NorthMet tailings incorporate solute concentration limit values derived for the Category 1 waste rock which have values for calcium, sulfate, nickel, copper, cobalt, and zinc that are greater than the values from the "AMAX field study." Thus, the maximum thresholds for modeled NorthMet tailings seepage are greater than those of the data from the "AMAX field study."

vii. Special Conditions

670. Petitioners argue that the Permit to Mine is deficient because it (i) does not specify limits on the amount of untreated seepage that will be released from the Category 1 waste rock stockpile, and (ii) improperly defers design and analysis until after a Permit to Mine is issued. See, e.g., WaterLegacy Petition at 23.

Discharges must meet the water quality standards prescribed by an NPDES/SDS permit issued by the MPCA. Additionally, revised Permit to Mine Special Conditions 54-55 provide additional safeguards to prevent seepage. The designs for the containment systems for the FTB and Category 1 waste rock stockpile must include installation of the cutoff walls such that they are keyed to competent bedrock, maintain an inward head difference, and meet designated performance standards. Final designs for the cutoff walls for the FTB containment system and Category 1 waste rock stockpile containment system must be submitted to the DNR for review at

least 45 days prior to construction of such system. Special Condition 55. And Special Conditions 55a and 55b require DNR review and approval of the monitoring plans for the FTB and Category 1 stockpile containment systems, respectively. *See also* Special Conditions 51a and 52.

E. Water Quality Monitoring

671. Petitioners question whether the groundwater and surface monitoring systems are adequate to detect pollution at the mine site or plant site so that corrective actions can be taken in a meaningful time. Joint Petition at 11, 62-64. They note that the design of the monitoring systems is key to ensuring that the mining operation can be conducted safely. Joint Petition at 75. Petitioners specifically allege that the design of the monitoring system for the waste rock piles will not be adequate to protect natural resources because “[t]he monitoring wells are quite simply spaced too widely to detect contaminant plumes from the mine operations.” Joint Petition at 76.

672. As detailed in the FEIS, PolyMet conducted multiple aquifer tests at the Mine Site during the course of environmental review to analyze the hydraulic characteristics of the various geologic units in the Mine Site:

- Ten aquifer tests were conducted using borings in the surficial aquifer (including three borings that were turned into permanent monitoring wells);
- Ten aquifer performance tests were conducted using boreholes completed in the Duluth Complex bedrock;
- Four aquifer tests were conducted on the Virginia Formation bedrock
- One long-term (30-day) aquifer test using bedrock well P-2, with water levels monitored in wetland piezometers located north of the pumping well; and
- Specific capacity tests were conducted using wells P-3 and P-4, which are open exclusively in the Virginia Formation.

FEIS § 4.2.2.2.1. Similarly, the FEIS contained a comprehensive discussion of the hydrogeology and hydraulic conductivity at the Mine Site. *Id.* These tests informed the monitoring plans that were developed by PolyMet during permitting.

673. As detailed in the FEIS, PolyMet defined the hydraulic characteristics of the surficial deposits and shallow bedrock in the FTB area from multiple aquifer tests at the Plant Site during the course of environmental review:

- Eight single-well pumping tests conducted in monitoring wells in the surficial deposits.
- Multiple slug tests performed in standpipe piezometers located in the surficial deposits of Cell 2W.

- Slug tests performed in 10 standpipe piezometers installed in surficial deposits, typically right above bedrock, around the perimeter of the FTB, as well as in four accessible wells that were installed in 2008.
- Packer tests performed in five of the 12 bedrock borings completed along the northern, northwestern, and western perimeters of the FTB. In total, 10 tests were performed at one to three depth intervals of each tested boring. Drilling of those bedrock borings produced rock cores and RQD data.

FEIS at § 4.2.2.4.1. Similarly, the FEIS contained a comprehensive discussion of the hydrogeology and hydraulic conductivity at the Plant Site. *Id.*

674. Proper long-term management of water quality and quantity at the Mine Site and Plant Site will depend, in part, on systematic monitoring plans that will be finalized in NPDES/SDS and water appropriation permitting. Monitoring will be used to determine compliance with permits, improve model accuracy, identify potential causes of changes to water quality or quantity, and identify options, if necessary, to ensure the NorthMet Project can maintain or come into compliance. See Permit to Mine, Appendix 11. As operations proceed, the monitoring plans associated with these permits will be updated as required. See Special Conditions 55a, 55b, 55c; FTB Permit Conditions 28, 29b, 33-36.

675. The NPDES/SDS Permit and associated monitoring plan will provide a comprehensive and thorough evaluation of water flow rates, water levels, and water quality on a continuous, monthly, or quarterly basis, depending upon the component being monitored.

676. The NorthMet Project's NPDES/SDS Permit Application specifically includes proposed monitoring relating to water quality. The NPDES/SDS Permit will require monitoring for groundwater, surface water, surface water discharge from the WWTS, and internal waste streams. PolyMet will also apply for construction stormwater and industrial stormwater general permit coverage via two or more separate permits from the MPCA. Monitoring stations are divided between the Plant Site and the Mine Site and Transportation and Utility Corridors combined. The proposed monitoring that was included in the NPDES/SDS Permit Application (Reference (54)) is included in the Water Management Plan – Mine (Appendix 11.2) and the Water Management Plan – Plant (Appendix 11.3). In these management plans, the Transportation and Utility Corridors are grouped with the Mine Site, whereas the WWTS, Beneficiation Plant, FTB, and HRF are grouped with the Plant Site.

677. As detailed in Appendix 11.2 § 5.1, groundwater monitoring wells will be established at the Mine Site and Plant Site to accomplish the following:

- Compliance monitoring – This will be performed at locations where the NorthMet Project will need to demonstrate compliance with applicable permit limits. Locations are downgradient of potential NorthMet Project impacts, typically at or near property boundaries.
- Indicator monitoring – This type of monitoring will be conducted at locations between NorthMet Project features and the compliance monitoring stations to allow for early detection of potential NorthMet Project impacts. This type of monitoring is

also used to monitor water levels for potential north flow from the NorthMet pits toward the Northshore Mine, as described in Reference (10).

- Performance monitoring – This type of monitoring will be performed to assess the performance of engineering infrastructure (e.g., liner systems, containment systems). Performance monitoring stations will include monitoring wells, paired monitoring wells, paired piezometers, and stockpile underdrains (if utilized to control pore water pressure in stockpile foundations).
- Background monitoring – This type of monitoring will be performed to document groundwater quality upgradient of the NorthMet Project.
- Monitor-only – At these types of stations, no limits or standards will apply; however, there may be triggers that will initiate further investigation required by NPDES/SDS permits.

678. Surface water monitoring will consist of sampling at upstream and downstream locations off-site to assess potential surface water quality impacts from the NorthMet Project. See Appendix 11.2 § 5.3. Following are the types of monitoring that are proposed:

- Background monitoring – Background water quality monitoring will be conducted to document surface water quality upstream of potential NorthMet Project impacts.
- Monitor-only – At these types of stations, no limits or standards will apply; however, there may be triggers that will initiate further investigation required by NPDES/SDS permits. These will be located downstream of potential NorthMet Project impacts.

679. Surface water discharge monitoring will measure the quality and quantity of treated WWTS discharge.

680. In short, the draft NPDES/SDS permit includes monitoring wells and piezometers at the Mine Site and piezometers at the Plant Site to verify the protection of the groundwater and surface water resources. In addition, the MPCA will require PolyMet to evaluate on an annual basis the suitability of the groundwater monitoring network and the groundwater monitoring results to determine if adequate protections are in place. This annual groundwater evaluation “will provide early identification of potential impacts such that adaptive management, corrective actions, or mitigation can be implemented, if needed.”³¹ The MPCA is the state agency charged with primary responsibility for “water quality monitoring and reporting and the development of best management practices and regulatory mechanisms for protection of groundwater from nonagricultural chemical contaminants.” Minn. Stat § 103A.204(a)(2). The DNR, in contrast, is charged with “water quantity monitoring and regulation, sensitivity mapping, and development of a plan for the use of integrated pest management and sustainable agriculture on state-owned lands[.]” Minn. Stat § 103A.204(a)(5).

³¹ MPCA’s National Pollutant Discharge Elimination System /State Disposal System (NPDES/SDS) Permit Program Fact Sheet, available at <https://www.pca.state.mn.us/sites/default/files/Fact Sheet - MN0071013 - 2018.pdf>.

681. In addition, Permit to Mine Special Condition 66 provides that prior to blasting within any mine pit footprint, PolyMet must submit a report and supporting data assessing the potential for future northward bedrock groundwater flow, based on “Monitoring Wells North of the Mine Site: Installation and Hydrogeologic Monitoring Plan - NorthMet Project, October 2016.” If the DNR concludes that this report, or other monitoring data, indicates a possibility of northward bedrock groundwater flow, then the DNR will require adaptive management or mitigation.

682. Well spacing and locations have been determined and reviewed by the DNR and the MPCA. If monitoring data (or other information) indicates that well spacing or locations need to change, it will be addressed through review of that monitoring data. Monitoring of the seepage containment system has been added and another well was added on the west side of the FTB. Data will be collected and reported through the NPDES/SDS permit and the Water Appropriation Permits.

683. For these reasons, DNR concludes that the groundwater and surface monitoring systems are adequate to detect pollution at the Mine Site or Plant Site so that corrective actions can be taken in a meaningful time.

F. Elimination of Mine Site Wastewater Treatment Facility

684. PolyMet notified the DNR in 2017 that it wanted to house the Mine Site Waste Water Treatment Facility (“WWTF”) with the Plant Site Waste Water Treatment Plant (“WWTP”), now called the Waste Water Treatment System (“WWTs”) sited at the Plant Site.

685. No changes are proposed for the actual Mine Site and Plant Site wastewater treatment processes from those evaluated in the FEIS. The modified configuration to one central facility retains all the same treatment units and the same operating configuration as the original two-building system. This configuration increases the physical footprint of the proposed WWTs facility to approximately 81,000 square feet compared to the original WWTP footprint of approximately 61,000 square feet. Mine water from the Mine Site and FTB seepage capture water from the Plant Site will continue to be treated through separate treatment circuits under the proposed WWTs scenario.

686. No change is projected in the volume of wastewater that will be treated through the WWTs from the original configuration. And no changes in the WWTs discharge quantity and quality are anticipated during operations, reclamation, and closure from that projected under the original two-facility design.

687. To transport mine water to the Plant Site for treatment, the single Treated Water Pipeline will be replaced by a three-pipeline system. The three Mine-to-Plant Pipelines will deliver three types of mine water (high concentration mine water, low concentration mine water, and construction mine water) to their respective destinations at the Plant Site (additional details below).

688. In support of this change, PolyMet identified a series of operating efficiencies associated with the proposed project changes. See Section 2.4, Operating Efficiencies, Barr

Technical Memorandum “Proposed Waste Water Treatment System (WWTS) Relocations” (Version 3; April 11, 2017), which noted:

- Elimination of reject concentrate transport between the original facilities, which in turn eliminates the need for a rail spur at the Mine Site.
- Elimination of precipitation chemical transport by truck or rail to the Mine Site.
- Reduce hauling distance of solids generated from the chemical precipitation process to the HRF by eliminating solids generation at the Mine Site.
- Reduced heating requirements.
- Reduced operations and maintenance requirements at the Mine Site with associated cost reductions.
- Reduced staffing, potable water and sewer operations, instrumentation, monitoring, and control systems management.

689. Implementing the single facility WWTS will not result in additional mining roads, production rates, plant emission rates, or dewatering rates from those currently proposed and evaluated in the FEIS. Moreover, WWTS discharge quantity, quality, and location of discharge to the environment would be unchanged during operations, reclamation, closure, and postclosure maintenance. There would be no change in the type, amount, or rate of water supplied to the Mine Site in the pertinent timeframes to accelerate mine pit flooding, so waste rock in the East Pit would be submerged at the same rate evaluated for the FEIS and the West Pit flooding would also be consistent with the FEIS. *See* FEIS § 5.2.2.3.3.

690. Based on these changes, WaterLegacy claims that this change will increase impacts because “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.” WaterLegacy Petition at 30, 31. According to WaterLegacy “these [changes] will not minimize hydrologic impacts, prevent the release of substances that adversely affect natural resources, or mitigate unavoidable impacts as required under Minnesota law.” *Id.* at 35. WaterLegacy specifically claims that the change will increase the likelihood of environmental consequences from pipe rupture and flooding and could increase the chance of direct discharge to surface water from West Pit overflow because 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. *Id.* at 31, 33.

691. There is no basis to conclude that pumping untreated water longer distances creates significant risks. PolyMet is required to have robust safety measures to ensure pipeline integrity, including leak detection, regular inspections, and additional pipeline covering. Special Condition 93 provides: “The Permittee must include an increased factor of safety in the final designs of the Mine to Plant Pipeline that carries high concentration water from the Mine Site Equalization Basins to the Waste Water Treatment System at the Plant Site. The increased factor of safety will be as determined by an October 16, 2018 memo entitled “PolyMet NorthMet Mine

to Plant Pipeline HDPE Pipe Design Factors” with confirmation documented in an October 17, 2018 email from PolyMet to the DNR entitled “PolyMet Design of High Concentration Mine Water Pipeline.””

692. Relying on the FEIS, WaterLegacy also claims that eliminating the Mine Site WWTF will reduce PolyMet’s ability to mitigate harm to natural resources during closure and post closure because the Mine Site WWTF was intended to address contingency mitigation if PolyMet’s predictions about water quality were overly optimistic. WaterLegacy Petition at 31. The same WWTF treatment process originally proposed and reviewed during environmental review will be at the WWTS to address contingency mitigation. The major difference is the distance required to pump untreated water; actual treatment processes and measures remain in place. Special Condition 93 provides that an increased factor of safety in the final design of the Mine to Plant Pipeline that carries high concentration water from the Mine Site Equalization Basins to the WWTS:

The Permittee must include an increased factor of safety in the final designs of the Mine to Plant Pipeline that carries high concentration water from the Mine Site Equalization Basins to the Waste Water Treatment System at the Plant Site. The increased factor of safety will be as determined by an October 16, 2018 memo entitled “PolyMet NorthMet Mine to Plant Pipeline HDPE Pipe Design Factors” with confirmation documented in an October 17, 2018 email from PolyMet to the DNR entitled “PolyMet Design of High Concentration Mine Water Pipeline.”

Special Condition 93.

693. As explained in Section VIII.D.iii above, the relocation of the Equalization Basins closer to the Partridge River is unlikely to have any effect on water resources.

694. The DNR carefully considered all issues related to the Applicant’s request to shift from dual WWTFs to a single WWTS. The DNR determined that consolidating the waste water treatment facilities has a demonstrable net environmental and economic benefits for the Project.

G. Non-Mechanical Treatment

695. WaterLegacy argues that the DNR is approving, or will approve, passive non-mechanical treatment for post closure and that this approval “conflicts with Minnesota policies that 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 and maximize the physical, chemical, and biological stabilization of areas disturbed by mining.” WaterLegacy Petition at 30-31. The Joint Petitioners also argue “that the assumption that biological treatment alternatives actually exist and could treat water being discharged from the various contaminated sources from the closed mine is unreasonable.” Joint Petition at 79-80.

696. It is important to clarify, as the DNR has done on multiple occasions, that the DNR is not authorizing passive treatment or non-mechanical treatment. The DNR is requiring

the use of mechanical treatment for as long as necessary. Special Condition 64. The DNR has only mandated that PolyMet conduct a thorough evaluation of non-mechanical treatment systems. Special Conditions 64; Adaptive Water Management Plan, 6.0 Non-Mechanical Treatment Systems. And PolyMet will be permitted to use passive treatment only if it can demonstrate to the DNR that passive treatment will meet all applicable standards, and only if PolyMet provides the necessary financial assurances. *See* Special Conditions 64-65.

697. Moreover, if PolyMet can demonstrate that passive treatment is effective and viable, this will necessitate an amendment to the Permit to Mine's closure plans, which in turn would subject the Permit to Mine to public review and comment.

H. Financial Assurance

698. Petitioners claim that the financial assurance for the NorthMet Project is insufficient and in violation of Minn. R. 6132.1200, subpart 5, which provides:

Financial assurance for reclamation and for corrective action must meet the following criteria:

- A. assurance of funds sufficient to cover the costs estimated under subparts 2 and 3;
- B. assurance that the funds will be available and made payable to the commissioner when needed;
- C. assurance that the funds will be fully valid, binding, and enforceable under state and federal law;
- D. assurance that the funds will not be dischargeable through bankruptcy; and
- E. all terms and conditions of the financial assurance must be approved by the commissioner. The commissioner, in evaluating financial assurance, shall use individuals with documented experience in the analysis. The reasonable cost of the evaluation shall be paid by the applicant.

699. The special conditions of the Permit to Mine include an entire attachment devoted exclusively to conditions of financial assurance. These conditions prescribe the amount of financial assurance (including the amount that must be in the form of cash or cash equivalents and the requirement that financial assurance be based on expected liabilities a certain amount of time into the future), as well as the terms of the requisite environmental insurance policy, surety or reclamation bonds, irrevocable letters of credit, and the trust fund. Each of these requirements exceeds the regulatory minimums for financial assurance set forth in Chapter 6132 of the Minnesota Rules, but are necessary for the DNR to deem PolyMet's financial assurance satisfactory under Minnesota Statutes § 93.49. Although Minnesota law requires only an estimate for "closure and postclosure maintenance activities required if operations cease within the first calendar year," Minn. R. 6132.1200, subp. 2, the review for the NorthMet Project has considered costs and financial assurance much further into the future.

700. Petitioners' concerns are based on a number of alleged shortcomings of the financial assurance for the NorthMet Project. First, Petitioners claim that the DNR has failed to ensure adequate financial assurance that does not rely on the potential for passive remediation systems to substitute for active wastewater treatment systems. Joint Petition at 80-81. Second, Petitioners claim that the schedule for deposits in the trust fund does not adequately ensure the funds will be sufficient and available when needed. *Id.* at 82. Third, Petitioners claim that the estimates for reclamation costs were unreasonably lowered between the initial and revised permit applications by using contractor quotes instead of the Standard Reclamation Cost Estimator (SRCE) methodology. *Id.* at 82. Fourth, Petitioners claim that the DNR failed to have the financial assurance documents reviewed by an attorney with expertise in contract and bankruptcy law. *Id.* Fifth, Petitioners claim that PolyMet does not have the necessary capital or access to capital to conduct the mining operations or fund the financial assurance requirements set forth in the draft special conditions. *Id.* Sixth, Petitioners claim that the financial assurance is insufficient because an amount equal to the contingency reclamation cost estimate for the first year of mining operations has not been provided. WaterLegacy Petition at 46. And seventh, Petitioners claim that the calculation of legacy reclamation and remediation costs is based on an explicit exclusion of any treatment activities or costs to remedy legacy pollution at the LTVSMC tailings facility, in violation of the Clean Water Act. *Id.* at 49-50. Relatedly, Petitioners claim that the required environmental liability insurance is insufficient. WaterLegacy Petition at 40.

701. The DNR has thoroughly reviewed all of the comments regarding the purported insufficiency of financial assurance. PolyMet has already provided the financial assurance required before a permit to mine can be issued, and the Permit to Mine's special conditions ensure that financial assurance will remain sufficient throughout the NorthMet Project's operations, closure, and reclamation.

i. Reliance on Passive Wastewater Treatment

702. Petitioners claim that the DNR must "ensure that adequate financial assurance funding is available that in no way relies on the potential for . . . passive remediation systems to substitute fully for the active wastewater treatment systems." Joint Petition at 80-81. This assertion is based on the false premise that the Permit to Mine allows for passive (non-mechanical) wastewater treatment. In reality, the Permit to Mine does not authorize any passive wastewater treatment, and there is no basis for requiring financial assurance provisions based on passive treatment when passive treatment is not authorized in the first place. Although PolyMet is required to "develop a plan for investigation, design, and pilot testing of non-mechanical water treatment systems," Special Condition 64, no passive treatment has yet been approved. Thus, the required financial assurance is based on the long-term mechanical treatment that is required in the Permit to Mine. Moreover, the special conditions provide that PolyMet "must provide financial assurance sufficient for the DNR to implement [a] plan to evaluate non-mechanical water treatment in the event of unplanned closure." Special Condition 65. If non-mechanical treatment is adopted at some point in the future, the DNR will ensure that the required financial assurance is adjusted to account for such treatment, as requested by Petitioners and required by Minnesota law.

ii. Schedule for Deposits in the Trust Fund

703. Petitioners assert that “the schedule for making deposits into the trust fund for long term water treatment is so heavily back-weighted as to make the entire enterprise almost entirely aspirational.” Joint Petition at 82. According to Petitioners, the “required contributions increase dramatically” in Mine Year 9, and “[t]here is no evidence to support the assumption that [PolyMet’s] financial prospects could remotely support such a dramatic ramp-up in contributions.” *Id.* at 83. This argument is based on analysis performed by a purported “financial assurance expert” hired by Petitioners, which shows that the NorthMet Project’s “revenue generation tapers off exactly when [PolyMet’s] trust fund obligations go vertical.” *Id.* at 83.

704. PolyMet’s required trust fund contributions are governed by the special conditions to the Permit to Mine. Specifically, PolyMet was required to contribute at least \$10 million to the trust fund prior to issuance of the Permit to Mine. *See* Special Conditions Attachment 1, item 17b. Additionally, Special Conditions Attachment 1, item 19, requires PolyMet to contribute at least \$2 million per year to the trust fund between Mine Year 1 and Mine Year 9. Beginning in Mine Year 9, PolyMet must commence an accelerated contribution schedule, the terms of which are set forth in Special Conditions Attachment 1, item 20.

705. Petitioners’ argument ignores the fact that the trust fund is but one of multiple forms of financial assurance, all of which must be taken into account when examining the adequacy of the financial assurance plan. Although PolyMet was required to contribute only \$10 million to the trust fund prior to the issuance of the Permit to Mine, PolyMet was required to provide \$74 million in total financial assurance—which can be met through a combination of reclamation or surety bonds, irrevocable letters of credit (“ILOCs”), and cash or cash equivalents. Special Conditions Attachment 1, items 17, 21-22. PolyMet has provided the \$74 million in financial assurance through a combination of ILOCs (\$15 million), surety or reclamation bonds (\$49 million), and trust fund contributions (\$10 million). And the financial assurance must be recalculated at least annually, thereby accounting for any potential increases in expected liabilities. Special Conditions Attachment 1, items 11, 18. Indeed, Petitioners’ own financial “expert” admits that “given the requirement for other forms of financial assurance in lieu of the trust fund, [the trust fund requirement] appears to be a reasonable requirement from a regulatory standpoint.”³² Because Petitioners have ignored the forms of financial assurance other than the trust fund, there is no basis to conclude that the financial assurance is not sufficient and available, as required by Minn. R. 6132.1200.

706. Relatedly, Petitioners argue that the “severe back-weighting” of the trust fund contributions is “particularly troubling” given the “DNR’s refusal to require [PolyMet] to update its [Draft Feasibility Study], despite their own consultants urging this very concern.” Joint Petition at 85. As noted above, Petitioners focus on the trust fund at the exclusion of the other forms of financial assurance—reclamation or surety bonds, ILOCs, and cash.

³² Jim Kuipers, PolyMet NorthMet Mine Economic Analysis 5 (Feb. 23, 2018), attached as Exhibit 13 to the Joint Petition.

707. Furthermore, the DNR, along with EOR, has carefully reviewed the Form NI 43-101F1 Technical Report issued by PolyMet in March 2018, and in light of such review, has reaffirmed the adequacy of the financial assurance plan for the NorthMet Project.³³

708. Finally, the DNR and EOR have reviewed PolyMet's financial capabilities throughout the course of permitting. *See* Phase I – Task 1B Report – PolyMet Financial Capabilities (November 2, 2016); PolyMet Financial Capabilities Update (October 31, 2018). This review of PolyMet's financial capabilities belies Petitioners' suggestion that the adequacy of financial assurance relies on "a leap of faith." Joint Petition at 86. In addition, the DNR is required to ensure PolyMet provides adequate financial assurance. Here, the DNR has met these obligations by detailing a comprehensive financial assurance plan for the life of the NorthMet Project. And PolyMet has already provided financial assurance in an amount of \$74 million. Moreover, the DNR has the authority to suspend, revoke, or modify the Permit to Mine in the event PolyMet fails to meet its financial assurance requirements. Minn. R. 6132.1200, subp. 7; 6132.4200-4700.

iii. Reclamation Cost Estimates

709. Petitioners further argue that the decline in the revised reclamation cost estimates—from \$146 million to \$114 million—is the result of a switch from using the Standard Reclamation Cost Estimator (SRCE) to using individual contractor estimates for reclamation activities. Petitioners claim that "[b]ecause contractors have a built in incentive to underestimate their cost of services in these circumstances," "the reclamation costs are likely underestimated by 25% to 50%." Joint Petition 88.

710. The DNR has carefully considered Petitioners' concern and determined that it lacks merit for a number of reasons. First, Minnesota law does not require the DNR to use any particular methodology when estimating the contingency reclamation costs. Second, Petitioners have provided no evidence to support their conclusory assertion that contractor estimates typically underestimate the costs of reclamation.

711. In addition, the SRCE Manual itself cuts against Petitioners' unsupported assertion that independent contractor estimates are generally deflated. To the contrary, the SCRE Manual states that contractors are more likely to "intentionally provide an inflated rate to protect a competitive advantage." SRCE User Manual, Version 2.0 at 16 (Dec. 2017).

712. Petitioners argue that the reclamation cost estimates are too low because they fail to properly account for the full costs of reclamation of legacy infrastructure at the Plant Site due to additional costs associated with compliance with applicable water quality standards. WaterLegacy Petition at 50-51. This concern is misplaced. The MPCA analyzed the potential water quality requirement that would apply in the event that the NorthMet Project ceases prior to Plant Site engineering controls (seepage capture system and WWTS) becoming fully operational. The DNR asked the MPCA to identify the reclamation obligations that would need

³³ The NI 43-101F1 Technical Report is not a document required by or formally submitted to the DNR, nor has DNR received any proposal from the Permittee to expand the production capacity of the NorthMet Project beyond that evaluated in the environmental review process.

to be addressed in such a scenario in order for PolyMet to be in compliance with its financial assurance obligations. On October 19, 2018, the MPCA issued a “Supplement to December 12, 2017 MPCA ‘Legacy Memo’” to DNR (“Supplemental Legacy Memo”). In the Supplemental Legacy Memo, the MPCA re-affirmed its original analysis that no treatment/mitigation would be required for alkalinity, hardness, total dissolved solids, specific conductance, sulfate, or mercury. The MPCA specifically noted that sulfate concerns could be addressed through the development of site-specific standards. The Permit to Mine requires full financial assurance to complete the engineering controls at the Plant Site in advance of production blasting at the Mine Site. Based on the MPCA’s conclusions and the financial assurances required under the Permit to Mine, WaterLegacy’s concerns miss the mark.

iv. Independent Review of Financial Assurance Instruments

713. Petitioners next assert that financial assurance instruments are “routinely bound up in bankruptcy proceedings” and that “independent review of all financial assurance instruments is critical to ensure the funds will be available when needed.” Joint Petition at 88.

714. Although not required by Minnesota law, the DNR has already complied with Petitioners’ suggestion. Specifically, the DNR has performed an independent review of PolyMet’s most recent cost estimates. As part of this independent review, the DNR relied on the input of attorneys with expertise in both contract and bankruptcy law. Moreover, the special conditions require any surety or reclamation bonds used as financial assurance to “be written to pay cash to the DNR prior to any settlement in bankruptcy court.” Special Conditions Attachment 1, item 13e. Likewise, any ILOCs used to satisfy the financial assurance requirement “[m]ust not include language stating that the ILOC is an asset of [PolyMet] in the event of a bankruptcy proceeding.” Special Conditions Attachment 1, item 14e. Item 14e was revised from the draft Item 14e, which provided that any ILOCs used to satisfy the financial assurance requirement “[m]ust include language stating that the ILOC is not an asset of [PolyMet] in the event of a bankruptcy proceeding.” This revision was made in order to facilitate financial institution participation in the ILOC. However, the revised condition still meets the same goal as the original language given that established case law indicates that the default rule is that an ILOC is not an asset of the permittee in the event of a bankruptcy proceeding.

715. PolyMet’s financial assurance requirements are conservative because they include an additional 10% contingency factor for reclamation costs (incurred within three years of the cessation of mining operations), and an additional 15% contingency factor for long-term costs (incurred more than three years after the cessation of mining operations). See Special Conditions Attachment 1, items 12a-12b.

v. Adequacy of Capital or Access to Capital

716. Petitioners claim that “the record before the DNR establishes that [PolyMet] does not have the capital, or access to capital, necessary to conduct its mining operations, in violation of Minn. R. 6132.0300.” Joint Petition at 88. As noted above, the DNR and EOR have reviewed PolyMet’s financial capabilities throughout the course of permitting. See Phase I – Task 1B Report – PolyMet Financial Capabilities (November 2, 2016); PolyMet Financial Capabilities

Update (October 31, 2018). The DNR is required to ensure adequate financial assurance. As set forth in the Affidavits of Jess Richards (Director of the DNR's Lands and Minerals Division) and Joseph Henderson (Manager for Mine Permitting and Coordination for the DNR's Lands and Minerals Division), both dated November 1, 2018, the DNR has reviewed a number of documents and concluded that PolyMet possesses capital, pursuant to Minn. R. 6132.0300.

717. The DNR has also required a financial assurance package consisting of a trust fund, surety or reclamation bonds, ILOCs, and/or cash. But in any event, the DNR has arranged for independent analysis of the NorthMet Project's economics. And based on that review, "all of the economic evaluations . . . concluded that the NorthMet Project was economical, even assuming fairly conservative (i.e., low) metal prices." EOR, Jardine Lloyd Thompson, and Spectrum Engineering, Financial Assurance Review and Evaluation for the NorthMet Project: Phase I – Task 1B Report: PolyMet Financial Capabilities 22 1B at 23 (2016). *See also* PolyMet Financial Capabilities Update (October 31, 2018).

718. Moreover, the financial assurance requirement will be re-evaluated annually, at a minimum. Special Conditions 4; Special Conditions Attachment 1, item 11. In the event that PolyMet fails to satisfy the updated requirement after the Permit to Mine has been issued, the DNR has the authority to suspend, revoke, or modify the Permit to Mine. Minn. R. 6132.1200, subp. 7.

719. The special conditions regarding financial assurance impose a number of detailed requirements to ensure that finances for reclamation or long-term costs are available if needed. For example, Special Conditions Attachment 1, items 13 and 14, prescribe requirements for any surety or reclamation bonds and ILOCs, respectively, that PolyMet uses to satisfy its financial assurance requirement. Furthermore, the financial assurance requirements are conservative because they include an additional 10% contingency factor for reclamation costs (incurred within three years of the cessation of mining operations), and an additional 15% contingency factor for long-term costs (incurred more than three years after the cessation of mining operations). *See* Special Conditions Attachment 1, items 12a-12b.

vi. Financial Assurance for the First Year of Operations

720. Minnesota Rule 6132.1200 provides that "[f]inancial 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." Minn. R. 6132.1200, subp. 4, item B. The referenced subpart 2 in turn provides that the contingency reclamation cost estimate must include closure and postclosure maintenance activities "if operations cease within the first calendar year." Minn. R. 6132.1200, subp. 2.

721. PolyMet has estimated the cost for the first year of operations to be \$74 million. The financial assurance for this amount is provided through a combination of ILOCs (\$15 million), surety or reclamation bonds (\$49 million), and trust fund contributions (\$10 million). WaterLegacy argues that this estimate is woefully deflated. However, this argument is based on WaterLegacy's flawed interpretation of the term "operations" under Minnesota Rule 6132.1200. WaterLegacy asserts that "operations," as used in subpart 2, refers to mining operations, not construction operations. *Id.* at 47-48. This interpretation is not consistent with the applicable

rules. As WaterLegacy itself states, “mining” has a very specific meaning—“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.” Minn. R. 6132.0100, subp. 18. Notably, the relevant provision—6132.1200, subp. 2—does not use the term “mining” but rather uses the broader term “operations.” “Operations” includes construction operations that take place before actual mining.

722. Furthermore, the DNR has made clear that financial assurance calculations must be conducted annually. Special Conditions 4; Special Conditions Attachment 1, item 11. Thus, the reclamation costs associated with Mine Year 1—the financial assurance for which WaterLegacy mistakenly claims must be provided prior to the issuance of the Permit to Mine—must still be calculated prior to the start of Mine Year 1. In the event PolyMet fails to provide the requisite financial assurance, the commissioner has the authority to revoke, suspend, or modify the Permit to Mine.

vii. Financial Assurance for Legacy Issues

723. WaterLegacy also argues that the calculation of legacy reclamation and remediation costs is based on an explicit exclusion of any treatment activities or costs to remedy legacy pollution at the LTVSMC tailings facility, in violation of the Clean Water Act. WaterLegacy Petition at 49-50. This is inaccurate. The special conditions explicitly provide:

Construction Period financial assurances are calculated based on three components:

- Legacy reclamation costs
- Legacy long term costs
- Construction reclamation costs

Special Conditions Attachment 1, Appendix A-1. Special Conditions Attachment 1, item 17a, further specifies that financial assurance includes “the reclamation costs associated with the facilities within the former LTVSMC plant site and tailings basin acquired by Permittee from Cliffs Erie, L.L.C.”

viii. Environmental Liability Policy

724. In addition to the financial assurance package, the DNR has also required PolyMet to maintain an environmental liability policy for the NorthMet Project. Pursuant to Minnesota Rule 6132.1200, Special Conditions Attachment 1, items 7 through 9, provide:

7. 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 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.

Permittee's environmental liability insurance policies must be in a form and amount acceptable to the DNR (collectively "environmental liability insurance").

8. Annually, Permittee must submit an analysis of all potential environmental liabilities in the mining area and an analysis of the commercial availability of environmental liability insurance for such liabilities in the upcoming year. These analyses must be submitted to the DNR as part of Permittee's annual report. Permittee must annually update its environmental liability insurance to reflect changes to its potential environmental liabilities in the mining area. 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.

9. 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. This evaluation and report must be submitted to the DNR no later than two years after tailings are placed in the tailings basin. This evaluation and report must estimate the environmental liability insurance premium costs that the State of Minnesota might incur due to the conditions anticipated to exist in Mine Years 11, 20, and 50 as identified in the Application, notwithstanding the actual occurrence dates. Permittee must include these premium cost estimates in its annual Financial Assurance Calculations.

725. Despite the \$10 million insurance requirement prior to the issuance of the Permit to Mine, WaterLegacy argues that "it is clear that a \$10 million environmental liability policy would be inadequate under Minnesota law." WaterLegacy Petition at 40. This argument is based on an assertion that the insurance requirement must be based on the potential damages and remediation costs associated with a catastrophic dam break. WaterLegacy ignores the fact that the \$10 million is provided upfront, before any mining takes place, before any tailings are added to the FTB, and before the HRF is constructed. Special Condition 8 is clear that the insurance calculation must be updated annually. And Special Condition 7 makes clear that the policy must be sufficient to cover "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." Moreover, the DNR will review PolyMet's annual insurance calculations. There is no basis in Minnesota law for requiring upfront insurance coverage for liabilities that will not exist for several years. Indeed, any attempt to prospectively guess the extent of future liabilities would be subject to gross error.

726. An insurance policy of \$10 million is more than sufficient to cover liabilities associated with the first year of operations. Per the Permit to Mine, the requisite amount of insurance will thereafter be adjusted accordingly based on up-to-date information. Special Conditions Attachment 1, item 9.

I. Goals versus Requirements

727. Peppered throughout the Petitions is the argument that various aspects of the draft Permit fail to comply with various goals set forth in Chapter 6132 of the Minnesota Rules.

Petitioners, for example, argue that “[u]nder Minn. R. 6132.0200, the DNR must issue a permit that contains specific permit requirements that are directed to attain the regulatory goals established by law[.]” Joint Petition at 23.

728. Petitioners confuse goals with permitting requirements. Minnesota Rules are structured such that subpart 1 sets forth “goals” while subpart 2 sets forth “requirements.” Minn. R. 6132.0100, subp. 8 defines “goals” to mean “reclamation targets of achievement toward which the specific requirements of parts 6132.0100 to 6132.5300 are directed.” The SONAR explains:

While it is recognized, by the department, that all the goals in the proposed rule **may not be fully attainable, they provide needed targets for achievement** and add a framework within which reasonably effective and attainable requirements have been developed, and they will provide guidance and a measurement of success by which any requests for variance from stated requirements can in part be judged.

SONAR at 5 (emphasis added).³⁴

729. A Permit to Mine, therefore, does not violate a rule if PolyMet fails to specify how it will satisfy one of the goals set forth in the Rules.

730. Nonetheless, Petitioners argue throughout the Petitions that the Application should be rejected because it violates a goal. For instance, Petitioners argue that wet closure violates Minn. R. 6132.3200, subp. 1, which requires a mining area to “be closed so that it is stable, free of hazards, minimizes hydrologic impacts, minimizes the release of substances that adversely impact other natural resources, and is maintenance free.” Petitioners are mistaken.³⁵ As explained above, Minn. R. 6132.3200 expressly authorizes post-closure maintenance.

731. Petitioners also imply that PolyMet must propose operations that avoid adverse impacts and that any operation that fails to eliminate adverse impacts violates the law. Petitioners are mistaken. Chapter 6132 recognizes that “mining causes undesirable effects which are not avoidable[.]” ALJ Report at 13. While the DNR acknowledges that some impacts cannot be avoided, it does, however, require permittees to minimize adverse impacts.

J. The Permit to Mine Application

732. Petitioners argue that the Application does not comply with the law for four reasons: (i) the Application is too voluminous for meaningful public review; (ii) the draft Permit

³⁴ During the hearing, the DNR provided: “We think the targets are important because they sort of establish a policy for each section. We recognize the fact that these goals may not be attainable, but we feel that they are at least targets that one should shoot for. One will not be considered out of compliance if the goal is not met, but the specific requirements that have been developed will be the things that we will be looking at to determine compliance.” ALJ Hearing, December 7, 1992 at 214 (testimony of Paul Pojar).

³⁵ WaterLegacy appears to agree: “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.” WaterLegacy Petition at 24.

terms and conditions are too vague; (iii) PolyMet submitted incomplete plans, or no plans, which prevents the public from having meaningful review; and (iv) the Permit to Mine lacks a finite term. *See, e.g.,* WaterLegacy Petition at 52.

733. Before addressing these concerns, it is helpful to summarize the process that led up to the submission of the Application and how the Application has been revised during the permitting process to address concerns raised by the public, the DNR, and other agencies.

734. As discussed above, the extensive environmental review serves as the foundation for the Application. The Application is based primarily on the extensive data collection and technical analyses conducted as part of the development of the FEIS and expanded upon where necessary.

735. Joint federal-state environmental review of the proposed NorthMet Project began in 2004. The DNR, USACE, and, beginning in 2009, USFS were Co-Lead Agencies in preparing the EIS for the proposed NorthMet Project. The Bois Forte Band of Chippewa, Fond du Lac Band of Lake Superior Chippewa and Grand Portage Band of Chippewa participated in the environmental review process as cooperating agencies because of the location of the proposed NorthMet Project. The Great Lakes Indian Fish & Wildlife Commission (“GLIFWC”) and the 1854 Treaty Authority assisted the Bands in their roles as cooperating agencies throughout environmental review.

736. On October 27, 2009, the DNR and the USACE issued the DEIS for the proposed NorthMet Project. On February 18, 2010, the United States Environmental Protection Agency (“EPA”) submitted comments on the DEIS and assigned it a rating of EU-3 (Environmentally Unsatisfactory – Inadequate Information). Particularly, EPA expressed concerns about base flow and cumulative impacts, model calibration, and contradictory information. Based on these concerns, the Co-Lead Agencies developed an SDEIS for the proposed NorthMet Project. The EPA became a cooperating agency for development of the SDEIS to help resolve the issues identified in its February 2010 comment letter.

737. In December 2013, the DNR released the SDEIS for public comment. A 90-day public comment period closed on March 13, 2014. In addition, public meetings were held in Duluth, Aurora, and St. Paul in January 2014. Over 58,000 comments were submitted on the SDEIS. On November 6, 2015, the Co-Lead Agencies released the FEIS on the proposed NorthMet Project. The FEIS responded to all substantive comments received during the public review of the DEIS and the SDEIS. In addition, the public had the opportunity to review and submit comments on the FEIS.

738. On December 21, 2015, EPA sent a letter to the Co-Lead Agencies stating that the “FEIS adequately resolves EPA’s comments on the Preliminary FEIS pertaining to base flow and cumulative impacts, model calibration, and contradictory information.” EPA stated that its remaining comments on the DEIS should be addressed by the USFS and the USACE.

739. On March 3, 2016, the DNR issued its Record of Decision (“ROD”), which concluded that the FEIS was adequate under the Minnesota Environmental Policy Act. Notice of the ROD was published in the EQB Monitor on March 14, 2016. The ROD was not appealed, so

it is a final agency decision no longer subject to judicial review. *See* Minn. Stat. § 116D.04, subd. 10 (certiorari review of an adequacy decision must be initiated within 30 days of publication of notice of the final decision in the EQB Monitor).

740. The purpose of the FEIS is to inform the public and decision-makers of the proposed actions, assess potential environmental consequences, identify potential mitigation measures and reasonable and feasible alternatives, and address the no-action alternative. The FEIS analyzed existing conditions at the area of the NorthMet Project and its surrounding environment. The FEIS described in detail those elements of the natural and human environment that would be affected by the NorthMet Project. The ROD concluded that the FEIS adequately analyzed significant environmental impacts associated with the NorthMet Project, appropriately presented alternatives and analyzed their impacts, and presented methods by which adverse environmental impacts associated with the NorthMet Project could be mitigated. Nobody appealed the ROD.

741. The DNR followed its standard practice for review of applications for permits to mine, which consists of an iterative process. On November 3, 2016, PolyMet submitted Version 1 of its Permit to Mine Application for the proposed NorthMet Project to the DNR. Version 1 was reviewed by the DNR and EOR. PolyMet and the DNR then held numerous meetings in an attempt to resolve concerns raised by the DNR.

742. On August 20, 2017, PolyMet submitted Version 2. The DNR and its outside consultants then reviewed Version 2 and again developed a spreadsheet raising identifying issues and concerns with the revised application. In response to these concerns, PolyMet submitted a further revised application, Version 3, to the DNR for review. The DNR again developed a spreadsheet detailing its concerns with the application. The DNR also initially developed 90 draft special conditions for the NorthMet Project, which was updated in the final Permit to Mine to include 140 special conditions.

743. On January 8, 2018, the DNR published Notice of Receipt of an Application for a Permit to Mine for the NorthMet Project.

i. Volume of Materials Does Not Make the Permit to Mine Application Unreviewable

744. Petitioners argue that the Permit Application violates Minnesota law because it contains a voluminous amount of materials that make it very difficult for the public to meaningfully review. *See* Joint Petition at 21-23.

745. While the volume of material does undoubtedly make the Application difficult to review for individuals lacking technical expertise, that very volume of highly technical information is absolutely essential for the DNR to perform its regulatory role. Minnesota law expressly requires an applicant for a permit to mine to provide this information, recognizing that the state's first interest is in ensuring the DNR has the information needed to make sound regulatory decisions that protect public health and safety and the environment. Facilitating the review of that information by non-experts, while also a state interest, is secondary. It is simply not possible for a permit application to be concise. For example, Minnesota Rule 6132.1100

requires an applicant to submit documents relating to the environmental setting of the proposed mining area, which requires the applicant to submit a copy of the environmental statement and all environmental reports related to the mining operation; maps showing the bedrock geology of the ore body, water basins, water courses, wetlands, and boundaries of watersheds that could be affected by mining; identification and description of hydrogeologic information; surface water and groundwater compliance monitoring sites; a soil inventory; recorded locations of rare, endangered, and threatened species; past mining facilities including storage piles; recorded archeological or historic sites; all known surface and subsurface uses, such as pipelines and cables; and zoning ordinances and associated land use plans applicable to the proposed mining area. Minnesota Rule 6132.1000 requires the applicant to submit chemical and mineralogical analyses and laboratory tests on mine waste characterization, which must include chemical analysis of mine waste; mineralogical and petrological analysis of mine waste; and laboratory tests describing acid generation and dissolved solids release. All told, Minnesota Rules require an applicant to submit many thousands of pages of documents to support their permit to mine application.

746. Nonetheless, Petitioners argue that the large volume of materials submitted in support of a mining project makes the permit application unreviewable. *See* Joint Petition at 21-23. Requiring a permittee to submit less information could render the application non-compliant and would interfere with the applicant's right to submit the information it believes is necessary to demonstrate that its application complies with Minnesota law.

747. Moreover, throughout the environmental review and permitting process, the DNR has undertaken many steps to help the public understand the contents of the draft Permit to Mine and the NorthMet Project and its impacts, including hosting public meetings, publishing fact sheets, and maintaining a portal that contains all pertinent information related to the NorthMet Project. Taken together, these efforts represent an unprecedented effort by the DNR to foster public understanding, ensure access, and promote transparency.

ii. *Permit to Mine Application Contains Specific Information and Enforceable Terms and Conditions*

748. Under Minn. R. 6132.0200, the DNR must issue a permit that contains specific permit requirements with the intent of satisfying the rule's goals "to control possible adverse environmental effects of nonferrous metallic mineral mining, to preserve natural resources, and to encourage planning of future land utilization." The rule specifies that:

Because of the unique character of each mining operation and the extreme diversity of the possible types and sizes of operations, *specific permit requirements* shall be established within the framework established by parts 6132.0100 to 6132.5300. *Permit terms and conditions* shall be directed toward attaining the goals while fulfilling the requirements described in parts 6132.0100 to 6132.5300.

Minn. R. 6132.0200 (emphasis added).

749. Petitioners allege that the Application and the Permit to Mine are deficient because they fail to include specific permit requirements, terms and conditions to ensure that the standards and goals in Chapter 6132 of the Minnesota Rules are met. Joint Petition at 23-24; WaterLegacy Petition at 24. Instead, according to Petitioners, the “DNR has simply incorporated the Application as the Permit.” Joint Petition at 24. This is incorrect. As explained above, the Application satisfies all permitting requirements set forth in Chapter 6132.

750. Moreover, the DNR has not simply converted the Application into the Permit to Mine. The Permit to Mine Application is derived from an extensive ten-year environmental review in which all aspects of the NorthMet Project were extensively reviewed and revised. Based on this work, PolyMet submitted an initial Application, which was reviewed and revised by the DNR and its experts several times before the final Application and draft special conditions, were put out for public notice, were put out for public notice. During the public review, the DNR consulted with its experts and received public comments, objections, and petitions, and conducted consultations with tribes. Based on the input it received, the DNR has imposed, or clarified, many special conditions, often in response to concerns raised by Petitioners, tribes, or the public.

751. The Permit terms satisfy all legal requirements and the special conditions ensure compliance with Chapter 6132. Moreover, if PolyMet fails to comply with Permit to Mine terms, approved work plans, special conditions, or the applicable law, then the DNR can, among other remedies, require corrective action, prohibit certain activities, issue orders to modify or suspend the Permit, or assess civil penalties.

752. Even so, WaterLegacy identifies ten areas where it alleges the Application lacks specific information and renders aspects of the draft Permit unenforceable. WaterLegacy’s concerns are identified in the bullets with the DNR’s response below in the sub-bullet.

- 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. WaterLegacy Petition at 53.
 - As explained above and in the FEIS at Section 5.2.13, waste has been adequately characterized and the MPCA has determined that the hydrometallurgical residue is not hazardous. Characterization of the hydrometallurgical residue was conducted and is discussed in the Application, Appendix 2, Section 2.2. This characterization included mineralogical, ABA (Acid Base Accounting), chemical composition, leachate composition (Toxicity Characteristic Leaching Procedure (TCLP), Synthetic Precipitation Leaching Procedure (SPLP), and shake flask test), and humidity cell testing. In addition, the water management system for the hydrometallurgical residue had been refined over the course of environmental review and permitting and will have a double liner system with leak detection capability. A new special condition has been added to ensure that no non-mining waste is deposited into the HRF. Special Condition 95.

- 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. WaterLegacy Petition at 53.
 - Barr Engineering submitted a technical memo on September 26, 2018 stating that WaterLegacy correctly identified an error in the Water Management Plan. PolyMet therefore changed the Plan to have the correct table.
- 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. WaterLegacy Petition at 53.
 - Table 10.1 of the Application discusses this issue and illustrates that PolyMet did characterize both saturated and unsaturated mineralized overburden. Special Condition 16 also makes clear that this area will also be monitored and any data provided to the MPCA will be provided to the DNR. See also FTB Permit Conditions 29, 35, 37, 43-44.
- 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 Site wastes or ores before a permit to mine can be issued. WaterLegacy Petition at 4.
 - Mercury has been analyzed and predicted for both air and water at both the Mine Site and the Plant Site. Mercury compliance standards for both air and water have been included as appropriate in permits, and will be monitored primarily by the MPCA, with data disclosed to the public.
- 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 Site wastes or ores before a permit to mine can be issued. WaterLegacy Petition at 54.
 - Conductance monitoring is a part of the NPDES/SDS permit and these data will be disclosed to the public.
- 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. WaterLegacy Petition at 54.
 - Filter waste from the RO plant was accounted for in the loadings contributing to the FTB pond water quality. These loadings are discussed in the Plant Site Water Management data package (V10), Section 6.1.5. Specific loading tonnages are depicted in the culpability analysis Figures E-01-01 through E-01-27.

- 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 a 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. WaterLegacy Petition at 57.
 - The Application provides maps of bedrock fractures and map comparison. Figure 5-1 in the Permit to Mine is a modified representation of the 2005 Minnesota Geological Survey (“MGS”) map with respect to faults (Large Figure 2 of reference 9 to the Permit to Mine). Large Figure 1 of reference 9 shows a more detailed depiction of the MGS fault locations. Reference 9 represents work conducted, in part, to evaluate the hydraulic conductivity around the facility. Several aspects of the project plans, work to come, final designs, special conditions, and monitoring would assist with identifying if fracture flow is affecting water management. Modeling used higher conductivities to assess the potential impacts of fracture flow.
- 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. WaterLegacy Petition at 58.
 - The water quantity and quality model (GoldSim) was based on waste characterization, the block model, and appropriate sorting of the waste rock during mining. The seepage from the Category 1 waste rock stockpile will be captured and analyzed. That analysis will confirm if the predictions were accurate. If the predictions are not verified, adaptive management will be undertaken to ensure standards would be met. *See* Special Conditions 16e, 80.
- 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. WaterLegacy Petition at 58.
 - Based on the water modeling of the constituents of concern contribution from the East Pit Virginia Formation highwall, it is the current understanding that backfilling of the East Pit in the closure plans will comply with all legal requirements. However, more information may become available (e.g. during construction, additional drilling, monitoring, etc.), which is why Special Condition 82 ensures that an assessment would be made confirming the backfilling plan.
 - Additionally, based on the water modeling, the disposal of the waste rock subaqueously will limit oxygen and subsequent reactions to the point that, after treatment of the initial flush of stored contaminants, the pit water will comply with receiving water body applicable water quality standards.

- The 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. WaterLegacy Petition at 58.
 - Special Condition 51 has been revised to make clear that the Permittee must develop performance monitoring for stockpile sumps and mine pit sumps, subject to review and approval by the DNR prior to initiation of construction of any stockpile or blasting of waste rock. The performance criteria for the sumps are described in the application and this special condition would be confirmatory, thus it is reasonable for the monitoring plan to come in after issuance. *See also* Special Conditions 57-59, 82.

753. The Permit to Mine therefore contains specific and enforceable terms and conditions.

iii. The Draft Permit Does Not Evade Meaningful Public Review

754. Petitioners argue that the public cannot review and comment on the draft Permit to Mine because it includes plans that do not exist and plans and supporting documents that are outdated. Joint Petition at 23, 24-25. Petitioners add that instead of incorporating specific plans to address key issues related to the regulation of the mine and its associated facilities so that the public can review and comment on such plans, the Permit's special conditions provide only that PolyMet will develop and submit these plans to the DNR in the future.

755. It is customary for projects of this nature to have incomplete plans that will be finalized during construction or operations, when more is known. Indeed, this approach typically results in better plans that are informed by data that may only be available after some level of construction or operation is completed. Recognizing this, and understanding that Minnesota law anticipates and allows for this approach, the DNR has a long, well established practice of issuing permits to mine with the understanding that the permittee will gather data, conduct studies, and submit finalized plans. It is understood that mining is an iterative process and the DNR rarely, if ever, will issue a permit a mine to an applicant who has fully completed all applicable plans and studies. Importantly, however, the DNR will not issue a permit to mine if it does not see viable engineering solutions to outstanding issues for which additional data collection, evaluation, and planning is being required under the permit to mine.

756. Nonetheless, Petitioners argue that the public must have an opportunity to review work plans, designs, drawings, specifications, and other materials, and they contend that by allowing PolyMet to develop key plans in the future, the public is deprived of a meaningful opportunity to review those plans to assess whether they are sufficient and enforceable. Joint Petition at 25-26.

757. In the bullets below, Petitioners identify the following materials that they believe need to be included in the draft Permit. In the sub-bullet, the DNR addresses Petitioners' concerns:

- Final geographic information system (GIS) data package for each mine feature (Special Condition 17).
 - PolyMet has already provided information to the DNR and the public on the size of the proposed mining footprint. The GIS information required by Special Condition 17, which will be submitted by PolyMet after the permit is issued, will be used to verify that over time (through annual reporting) the facility is staying within its permitted footprint. This condition exists to ensure that PolyMet provides the DNR the information necessary to confirm compliance with the regulatory requirements and has been amended to address concerns raised by the public. The environmental features within the mining area have been extensively detailed in the Application. The final GIS data package is therefore not required at this stage in the process to assess whether to issue a Permit to Mine, and the public has been provided information related to the proposed footprint of the NorthMet Project.
- Biwabik Iron Formation (“BIF”) construction rock work plan (Special Conditions 23-25)
 - The modeling conducted on the construction work assumed that essentially no contaminant load from construction rock that would be used around the site. If PolyMet wants to use BIF rock, it would need to show that the BIF rock does not add load that makes the site non-compliant. The DNR is therefore requiring a BIF construction work plan. Special Conditions 23-25 specifically require PolyMet to submit workplans before using BIF construction rock. If PolyMet fails to do so, it cannot use the BIF construction rock. Conditions were expressly developed to ensure that the Permittee will only be permitted to use the BIF construction rock if the use of that material will comply with the applicable regulatory standards.
- The FTB buttress material workplan (Special Conditions 26-28)
 - The DNR is requiring an FTB buttress material work plan because it is unclear what rock PolyMet will use for the buttress. Special Conditions 26-28 require PolyMet to submit workplans before finalizing the design of the buttress. In order to predict the potential impacts of the buttress material on resultant water quality, it was assumed for the purposes of modeling that the chemical composition and dissolution behavior was the same as the Category 1 waste rock. These special conditions were developed to ensure that whichever rock PolyMet decides to use as buttress material, the resultant facility will comply with the applicable regulatory standards. The special conditions require PolyMet to submit workplans before using buttress material. If PolyMet fails to do so, the special conditions provide that it cannot use the buttress material.
- Water modeling and data verification workplan (Special Conditions 32-33)
 - During the environmental review, a GoldSim model was built to predict water quality and water quantity. This model was based on the best estimates of the

materials and the conditions. Special Conditions 32-33 provide that the Permittee must develop, in consultation with the DNR, a modeling and data verification workplan that must be submitted to and approved by the DNR within 12 months of permit issuance. This workplan is intended to create controls that will verify existing data and predictions that have been submitted to the DNR and reviewed by the public. The purpose of this workplan is to confirm the predictions from the modeling results that are in the record with field data rather than estimated or assumed information. The Permittee has started the consultation process to develop these work plans, but this process is ongoing and cannot be completed until certain construction and operational activities are completed. In short, once actual data become available through construction and operations, these Special Conditions require the Permittee to either demonstrate the reasonableness of the earlier model output or document deviations from predictions and develop proposals for how to respond. This type of condition is common in permit to mine decisions.

- Final construction material specifications for construction materials associated with each mine pit, stockpile, tailings basin, and auxiliary facility (Special Conditions 38-39)
 - Based on the modeling completed to date, the DNR expects that construction materials will be non-reactive. Special Conditions 38-39 are aimed at requiring PolyMet to provide information sufficient for the DNR to audit compliance. Since the facilities have not reached final design status, this information is not available at this time and therefore cannot be included in the draft Permit. It is worth noting that it is common practice for construction material specifications to be determined close to the time of construction.
- Future waste characterization testing and results work plans (Special Conditions 46-48)
 - These work plans are aimed at ensuring compliance with Minnesota Rule 6132.1000, which requires continued waste rock testing during operations. The DNR will review the results to ensure compliance with the applicable regulations. Moreover, additional information may be learned during mine operations through monitoring results, or additional drilling, that may necessitate further testing or possibly modified waste management. The determination of appropriate waste characterization analysis is case by case, and thus it is not possible to list detailed standards to which all future waste characterization testing plans would need to adhere to secure approval. Special Conditions 46-48 are therefore aimed at ensuring that additional testing will be discussed, coordinated, and approved by the DNR as required by Minnesota Rule 6132.1000. This information is not available at this time and therefore cannot be included in the Application.
- Performance monitoring for stockpile sumps and mine pit sumps (Special Condition 51)
 - The Permit to Mine describes the performance criteria for the sumps and the monitoring plan. This special condition was revised based on comments and is

intended to confirm performance with these criteria and requires PolyMet to provide information sufficient for the DNR to audit compliance in operations. This information is not available at this time and therefore was not included in the draft Permit. Special Condition 51 requires PolyMet to develop performance monitoring for stockpile sumps and mine pits sumps prior to initiation of construction of any such stockpile or blasting of waste rock. In addition, performance and design criteria for sumps are separately required under PolyMet's Water Appropriation Permits. Similarly, these permits require ongoing monitoring and reporting to the DNR.

- Category 1 waste rock containment system and cover design (Special Condition 54)
 - This special condition, which requires that the Category 1 waste rock containment system and cover design be completed under the direct oversight of a Minnesota licensed professional engineer, will require PolyMet to confirm that the final design is the same as the design proposed in the draft Permit. Both the containment system and the stockpile cover are permanent features. This special condition, which was revised to address concerns raised during the permitting process, is aimed at assuring that the design and construction of both features are carefully engineered. This special condition is also aimed at providing information sufficient for the DNR to audit compliance in operations. This information is not available at this time because additional field information needs to be collected and therefore cannot be included in the Application.
- Final designs for the cutoff wall for the FTB containment system (Special Condition 55)
 - Special Condition 55 requires PolyMet to confirm that the final design for the FTB cutoff wall is the same as the design proposed in the draft Permit and subjected to public review. This special condition is aimed at providing information sufficient for the DNR to audit compliance in operations. This information is not available at this time because additional field information needs to be collected and therefore cannot be included in the draft Permit. However, the final designs must conform to what has already been submitted and reviewed. This special condition is, therefore, another case where the burden is on PolyMet to finalize designs in line with what is permitted. If designs need to be changed, it may trigger the need for a permit amendment.
- Detailed operational plans (Special Condition 61)
 - This special condition has been eliminated because the operational plans were included in the Application in appropriate management plans. Moreover, the Dam Safety Permits will require detailed operational plans to be submitted once designs are finalized.
- Ore processing deviations showing chemical or physical changes to the tailings proposed in the Application (Special Condition 62)

- Special Condition 62, which has been revised, requires PolyMet to report any proposed deviation in the processing of the ore that would result in chemical or physical changes to the resultant tailings generated, relative to the tailings proposed in the Permit to Mine Application to the DNR for review and approval. This report must include detailed analysis (which may include modeling) of potential impacts to environmental conditions (e.g., water quality, tailings deposition, tailings chemical composition, etc.). Any such changes may necessitate a permit amendment. The intent of this condition is to make clear the requirement of PolyMet to notify and analyze as appropriate how proposed changes in processing may affect the properties of the tailings. Due to the importance of the behavior of those tailings in the environment, advance analysis must be conducted to determine if that behavior would deviate from the current predictions. This information is not available at this time and therefore is included in the Application. The Permittee is not proposing any change at this time, but it is not unusual for operators to seek to modify ore processing. Special Condition 62 is intended to address what happens in such an event.
- Plan for investigation, design, and pilot testing of non-mechanical water treatment systems (Special Condition 65)
 - The Permit provides that long-term water treatment will be through active treatment. Special Condition 65 has been revised and requires the Permittee to investigate and test non-mechanical water treatment and requires the Permittee to provide financial assurance to allow the DNR to evaluate and implement non-mechanical water treatment. Given that these tests and plans do not exist at this time, there can be no expectation that the Permittee could include such information in the Application. Moreover, if the results of the evaluation demonstrate that non-mechanical treatment is viable, the closure plans will need to be modified, which in turn would trigger an amendment to the Permit and adjustments to financial assurances.
- Northward groundwater flow mitigation plan (Special Condition 66)
 - The FEIS and ROD noted that there was uncertainty as to whether there was a likelihood of northward groundwater flow from the Mine Site. *See, e.g.,* FEIS § 5.2.2.2.3; ROD at 78. The FEIS detailed specific monitoring, including the expansion of the existing system of bedrock groundwater monitoring wells, that could be used to determine future bedrock flow direction immediately north of the proposed NorthMet pits at the Mine Site. FEIS § 5.2.2.3.6. The goal of such monitoring would be to determine whether additional engineering measures aimed at preventing such flow would be necessary. The FEIS detailed potential engineering controls and a variety of known mitigation strategies that could be successfully implemented in the event that monitoring data indicates northward flow. FEIS § 5.2.2.3.5. The Water Appropriation Mine Site Permits require monitoring of groundwater levels at GW 472, GW 473, GW 478, GW 479, GW 518, GW 519, GW 522, and GW 523 to determine future bedrock flow direction

north of the NorthMet mine pits. In addition, under this condition, the Permittee must monitor and report on the potential for current and future northward groundwater flow at the Mine Site. DNR-approved adaptive management or mitigation is required in the event that the DNR finds such flow to be reasonably likely. The MPCA and the DNR's water appropriation team have reviewed and approved a Northward Flow Workplan to be implemented prior to blasting. If the DNR concludes that this report, or other monitoring data, indicates a possibility of northward bedrock groundwater flow, then the DNR will require adaptive management or mitigation. Special Condition 67 has also been revised to require approval of any adaptive mitigation prior to blasting in the mine footprint. Because such information is not available at this time, it cannot be included in the Application.

- Mine pit bench slope stability plan (Special Condition 68)
 - Spacing of mine pit benches has been determined by a DNR-reviewed geotechnical report, as is common agency practice. The intent of this Special Condition 68 is to ensure that the DNR is informed prior to any deviation from current pit shell plans. These changes may never ultimately occur, but this condition ensures that the DNR will receive geotechnical analysis in advance. Because this information is not available at this time, it cannot be included in the draft Permit.
- Adaptive water management review process plan (Special Condition 80)
 - PolyMet has submitted an adaptive water management review process plan for public review. This draft plan is also referred to in the NPDES/SDS and other permits. This special condition requires PolyMet to submit a revised and updated adaptive water management review process plan. The public has, therefore, already had an opportunity to review the draft plan. This condition requires a more detailed plan be submitted at a later date.
- Verification of East Pit closure workplan (Special Condition 82)
 - PolyMet must prepare a verification of East Pit closure workplan for DNR review and approval at least two years prior to the anticipated start of backfilling the East Pit. The workplan must include data analyses or modeling to demonstrate that the closure of the East Pit will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources. This special condition ensures that the DNR has the best information available prior to closure; it requires PolyMet to continue to gather data and model verification results to determine if an alternative closure plan will be required for a portion of the East Pit. Because this information does not exist at this time, it cannot be included in the Application.
- Mine pit pipeline monitoring and spill response procedures (Special Condition 85)

- Special Condition 85 provides that, within 60 days of completion of construction of the mine pit pipeline, or prior to use, whichever comes first, the Permittee must provide to the DNR for its review the pipeline monitoring plan and spill response procedures. The Permittee must provide to the DNR any revisions to these plans once completed. This condition ensures that the DNR is aware that such procedures are actually in place. These plans are required by the MPCA, and this condition ensures the DNR is informed when the plan is updated. Because this information does not exist at this time, it cannot be included in the Application.
- Pilot and field scale testing of bentonite amendment of tailings pond bottom liner cover workplan (Special Conditions 88, 89f, and 89g)
 - Under Special Condition 88, which has been revised, and new Special Conditions 89f and 89f that have been drafted to address these concerns, PolyMet must prepare a bentonite amendment of tailings pond bottom workplan for DNR review and approval no later than 90 days following Permit issuance. The workplan must include any bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the pond bottom will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result. PolyMet must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings pond bottom workplan for review and approval prior to the third year of NorthMet tailings deposition. In addition, under Special Condition 89f, if any of the testing of the two uses of bentonite in and around the FTB (i.e., pond bottom or beach amendment) reveal that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings. Within 60 days of the approval of each bentonite usage workplan results (tailings dams, tailings pond beaches, and tailings pond bottom), PolyMet must submit to the DNR for review and approval adaptive management plans that describe the action or actions that would be implemented if water quantity, water quality, or dam safety objectives are not met through the use of the bentonite amendments. This information could not be submitted with the Application because PolyMet does not have enough tailings at this time to conduct the testing.
- Mitigation of impacts to the FPN62-Northern Rich Spruce Swamp rare natural community (Appendix).
 - The decision regarding which specific lands would be provided as mitigation for impacts to the rare natural community will not be made at the time of the Permit decision. The amount of lands has been determined and the lands are being

selected. Thus, the DNR is requiring potential future mitigation if there are unavoidable indirect impacts to the plant community.

758. As discussed above, most of the information and data required for the reports, work plans, and other documents that Petitioners believe need to be included for the draft Permit, simply do not exist at this time for several reasons. First, it is not reasonable to require an applicant to spend millions of dollars refining engineering plans or collecting data that is not needed by the DNR to determine whether the permit to mine application complies with the law. Second, some of the information needed for the work plans will not be available until construction or operations commence and more data are gathered. And third, some of the special conditions require PolyMet to develop new plans only if new information becomes available.

759. It is also worth underscoring that no permittee can be expected to have perfect knowledge at this stage of the process. Embedded in the Rules is an understanding that more information will be submitted as more becomes known. For example, the Rules obligate a permittee to continue to evaluate the physical and chemical characterization of the mine waste and submit updates in the annual reports under Minnesota Rule 6132.1000, .2200. Likewise, Minnesota Rule 6132.1300 mandates annual reports, which require the permittee to discuss its activities and the activities that it plans to conduct in the upcoming year.

760. Indeed, it is customary to approve a permit to mine with the expectation that the permittee will continue to conduct studies, gather information and make necessary changes, subject to the DNR's approval, as more is learned. For example, the Permit to Mine, and other permits, include monitoring plans and impose ongoing monitoring requirements on a host of issues, including tailings stability monitoring, stockpile monitoring, groundwater monitoring to identify the effects of appropriations on groundwater levels, surface water monitoring, macroinvertebrate monitoring, and fish community monitoring. *See, e.g.,* Permit to Mine Appendix 11, 12, 17. Appropriate adaptive management or mitigation strategies may be implemented to address any unacceptable impacts to resources in the event monitoring identifies impacts. Special Conditions 16a, 16b, 16c, 16d, 16e.

761. The regulations specifically allow the DNR to accept additional information and to permit projects in anticipation of receiving additional design details and specifications after issuance of the permit, in accordance with the provisions of the permit.

762. The DNR has flexibility to determine when a design is "final" because different projects are likely to have final designs that reflect the variability of their circumstances. Major projects like the NorthMet Project, for example, are subject to longer timelines, more variables, and, greater opportunity for changed circumstances.

763. This approach is necessary, particularly in permitting projects with long-term continuous construction. For example, the final development of the FTB design might be adjusted based on additional information developed as part of further site investigations, materials testing, or other site-related activities. Assuring long-term protection of health, safety, public welfare, and the environment, requires adapting post-permitting activities to on-site conditions and developing information.

764. In short, the DNR's regulations provide the flexibility to adjust its directives to fit the conditions of the project and to meet its regulatory obligations even after a permit is issued. As information about the site, project implementation, environmental conditions, or other factors may change, or as additional details are developed, the DNR has the ability to adjust requirements to assure adequate protection of the public and the environment. And the DNR's permitting authority provides the means to continue to impose whatever requirements may be necessary to assure compliance with all applicable regulations.

765. Given the comprehensive nature of the testing, modeling, and analyses within the FEIS and during permitting, the DNR concludes that the record contains studies sufficient to allow proper assessment of the effects of PolyMet's proposed actions. The DNR further concludes that additional analyses are not required at this time. The public has had opportunity to review and comment on the proposed action. Moving forward, baseline monitoring data continue to be gathered by PolyMet and additional monitoring requirements are imposed under the Permit to Mine and other permits. The permits recognize that additional studies and modeling may be required if monitoring data appear to show adverse impacts to the resource. In addition, the permits recognize that models will continue to be updated as new data are collected in operations. And, in certain circumstances, if the Permit to Mine needs to be modified, the public would have an opportunity to comment on changes to the Permit to Mine.

766. It is also unrealistic, and unwise, to demand that PolyMet submit completed work plans on all matters subject to the DNR's regulation. After all, PolyMet, and the DNR, need flexibility to adapt as more information, some of which is only available in construction and operation, becomes available. Mining projects are subject to change, and it is accepted that mines are works-in-progress well into actual operation. That certain details of operation are not yet firmly in place, or that alternatives are still under consideration for some aspects of the design or operation, is acceptable and contemplated by the Rules.

767. Even so, Petitioners maintain that such a process contravenes the law, which is intended to ensure that the public has a meaningful opportunity to review and comment on the Permit and contemplated operations. Joint Petition at 25 (citing *Minnesota Center for Environmental Advocacy v. MPCA*, 660 N.W.2d 427 (Minn. Ct. App. 2003)).

768. This argument lacks merit. Unlike the cases cited by Petitioners, the public has been given multiple opportunities to weigh in on this Project, including the draft Permit to Mine and draft special conditions. The DNR has hosted public meetings, provided fact sheets, and created a portal containing volumes of relevant information related to the NorthMet Mining Project. The public was also given an opportunity to review and comment on the decisional documents issued during the environmental review, including the ROD. And the public has provided comments on the draft Permit.

769. Simply put, at the permit stage, the DNR cannot, and does not, demand exhaustive plans complete in every detail. Instead, the plans and proposed operations contained in the Application need to be sufficiently complete and detailed to allow the DNR to evaluate them and identify needed Special Conditions. As discussed above, PolyMet's Permit to Mine Application, as amended, is sufficiently detailed to allow the DNR to determine that it, in

combination with the DNR's Special Conditions, complies with all applicable requirements, and has provided sufficient public review and participation.

iv. The Permit Term

770. Minnesota Statutes § 93.481, subd. 3, provides that “[a] permit issued by the commissioner pursuant to this section shall be granted for the term determined necessary by the commissioner for the completion of the proposed mining operation, including reclamation or restoration[.]” Minnesota Rule 6132.0300, subp. 3 provides: “The term of a permit to mine shall be the period determined necessary by the commissioner for the completion of the proposed mining operation including postclosure maintenance, based on information provided under part 6132.1100[.]” The statute and rule give the commissioner the discretion to determine the length of the term.

771. Petitioners argue that the Permit cannot be issued because it lacks a term. *See* Joint Petition at 23. This is incorrect.

772. As with every permit to mine issued by the DNR, the Permit term here will come to an end once reclamation is complete. And as noted above, the term of the Permit is for a two-year construction period, a 20-year mine life, a four-year reclamation period, followed by closure and postclosure (terms used here are as defined by PolyMet in the Application). As noted in the general conditions, the term of the Permit is that which is deemed necessary for the completion of the proposed mining operation, including closure and postclosure.

IX. CONTESTED CASE PETITIONS

A. Legal Criteria for Granting a Contested Case Hearing

773. Minnesota Statutes § 93.483, subd. 1 provides that any person “owning property that will be affected by the proposed operation . . . identified in the application for a permit to mine under section 93.481 may file a petition with the commissioner to hold a contested case hearing on the completed application.”

Minnesota Statutes § 93.483, subd. 2(a) provides that the petition must include:

- (1) a statement of reasons or proposed findings supporting the commissioner's decision to hold a contested case hearing pursuant to the criteria in subdivision 3; and
- (2) a statement of the issues proposed to be addressed by a contested case hearing and the specific relief requested or resolution of the matter.

774. Minnesota Statutes § 93.483, subd. 3 provides that the commissioner must grant the petition for a contested case hearing if the commissioner finds that:

- (1) there is a material issue of fact in dispute concerning the completed application before the commissioner;

(2) the commissioner has jurisdiction to make a determination on the disputed material issue of fact; and

(3) there is a reasonable basis underlying a disputed material issue of fact so that a contested case hearing would allow the introduction of information that would aid the commissioner in resolving the disputed facts in order to make a final decision on the completed application.

775. To satisfy the first requirement in Minnesota Statutes § 93.483, subd. 3, a petitioner must show there is a material issue of fact in dispute as opposed to a disputed issue of law or policy. To satisfy the second requirement in Minnesota Statutes § 93.483, subd. 3, a petitioner must show that the DNR has jurisdiction or authority to make a determination on the disputed issues of material fact. And to satisfy the third requirement in Minnesota Statutes § 93.483, subd. 3, the petitioner has the burden of demonstrating that a contested case hearing would introduce information that would aid the commissioner in making a final decision on the disputed issue.

776. All three criteria in Minnesota Statutes § 93.483, subd. 3 must be satisfied for the commissioner to grant a petition for a contested case hearing.

777. After independent review of the record, including consideration of all themes and issues raised in the public comment process, along with the Petitions discussed herein, the DNR has determined that a contested case hearing would not aid the commissioner in making a final decision on the Permit to Mine.

B. Petitioners Lack Standing

778. As a threshold matter, each of the Petitioners—WaterLegacy, MCEA, CBD, and FBWW—fails to satisfy the standing requirements for submitting a petition for a contested case hearing. A petition may be properly submitted only by “[a]ny person owning property that will be affected by the proposed operation or any federal, state, or local government having responsibilities affected by the proposed operation identified in the application for a permit to mine” Minn. Stat. § 93.483, subd. 1. None of the Petitioners is a governmental entity, and none of the Petitioners has provided evidence that either it or its members own property that will be affected by PolyMet’s proposed operations at the NorthMet Project.

779. Neither WaterLegacy, MCEA, CBD, nor FBWW claims that it owns property that will be affected by the NorthMet Project. Rather, Petitioners seek to establish standing through property ownership of their individual members. Specifically, MCEA, CBD, and FBWW rely on the declarations of Lori Andresen, Scott Mead, and Richard Staffon; and WaterLegacy relies on the declarations of Roland Ring-Jarvi, Shelley Strohmaier, and Timothy Wallace. None of these declarations contain statements sufficient to meet the requirements of Minn. Stat. § 93.483.

780. None of the declarants on which Petitioners rely for standing claim that they own property that “will be affected” by the NorthMet Project. Rather, each declarant expresses concerns about speculative events that the DNR has already determined are unlikely to occur.

781. For WaterLegacy, Roland Ring-Jarvi expresses a concern about a “risk to water quality” and “threat of pollution if there is a toxic release from tailings dam failure.” Ring-Jarvi Decl. ¶¶ 8-9. Shelley Strohmaier’s declaration is likewise based on speculation—specifically, the belief that “[m]any aspects of the PolyMet draft permit to mine have the potential to negatively affect [her] interests and the interests of [her] family in the property” owned by her and her husband. Strohmaier Decl. ¶ 12. Timothy Wallace expresses a concern about “the threat of water pollution of the river due to PolyMet operations and the threat of catastrophic failure of the tailings dam” and that “[i]f there is a toxic release from failure of the PolyMet tailings dam, water quality changes could diminish the value of [his] land as well as severely degrade the value of the ecology of the river.” Wallace Decl. ¶¶ 8-9.

782. For MCEA, CBD, and FBWW, Lori Andresen avers that she and her family “own multiple properties in northern Minnesota, including in Duluth and on the northshore, and in the heart of the Superior National Forest near Isabella.” Andresen Decl. ¶ 22. Ms. Andresen further states that she and her family “have become increasingly concerned that if [the NorthMet Project] is approved, large areas of northeastern Minnesota may be adversely impacted, including our land. Lands near PolyMet and the nearby sulfide deposits would be devalued, as no one wants to live near a copper sulfide mine.” *Id.* However, property records do not list Lori Andresen as record owner of any such property. Richard Staffon states that he is “concerned that [his] property will be affected by the proposed Poly Met (NorthMet) mining project if it is allowed to go forward without proper controls because part of the value of that property is its proximity to the St. Louis River, which is downstream from the project.” Staffon Decl. ¶ 4. Mr. Staffon expresses a similar concern that hunting and fishing resources near his property in Cloquet “may be affected by pollutants released by the project unless it is appropriately controlled.” *Id.* Scott Mead lives on Lake Pequaywan and expresses a concern “about the impacts [the NorthMet Project] would have on the rivers, lakes, and groundwater near to and supporting [his] family’s home” and “impacts to the lands and waters to which [he] travel[s].” Mead Decl. ¶ 21.

783. These vague and speculative assertions are insufficient to meet the “will be affected” standard set forth in Minnesota Statutes § 93.483. All of the property impacts mentioned by the declarants are either conclusory or premised on the occurrence of adverse impacts to water quality that the DNR has already determined are not likely to occur and are not within the DNR’s jurisdiction. As the DNR has concluded in the FEIS and ROD for the NorthMet Project, the NorthMet Project is not expected to have significant adverse effects on downstream or upstream water quality. *See* FEIS at 5-9 (“With the proposed engineering controls, the water quality model predicts that the NorthMet Project Proposed Action would not cause any significant water quality impacts”); ROD at 46 (“No significant water quality impacts are predicted”); *id.* at 47 (“The Final EIS does not predict any significant changes to groundwater and surface water flows.”). Indeed, the NorthMet Project is projected to reduce the sulfate load and improve water quality.

784. Moreover, even if Petitioners identified issues of material fact that justify a contested case hearing, the DNR does not have jurisdiction over water quality. MPCA does. Minn. Stat. § 103A.204(a). The MPCA is the state agency responsible for adopting and enforcing water quality standards in Minnesota under the CWA. *See In re Cities of Annandale and Maple Lake NPDES/SDS Permit Issuance for the Discharge of Treated Wastewater*, 731

N.W.2d 502, 510 (Minn. 2007) (“Under state and federal law, the MPCA is the Minnesota state agency charged with enforcing and administering the CWA and its attendant regulations.”). Thus, Minn. Stat. § 93.483, subd. 3(2) prohibits the DNR from granting a contested case hearing on water quality issues because the commissioner does not have jurisdiction to make a determination on any disputed material issue related to water quality. *Cf.* ALJ Hearing, December 7, 1992 at 44 (noting that even if an objector presents a material issues, the DNR cannot hold a contested case hearing over a water quality issue because MPCA handles those concerns) (testimony of Paul Pojar).

785. Moreover, the final design for the NorthMet Project will be subject to the requirements of the Dam Safety Permits and Permit to Mine and the MPCA-issued NPDES/SDS permit. These permits will have mandatory controls to minimize the risk of pollutant seepage and dam failure—the events on which declarants’ concerns are based. *See, e.g.*, FTB Permit Conditions 16-17, 28, 29, 29b, 33-37, 41; HRF Permit Conditions 16-17, 29, 31-33, 43.³⁶

786. In addition, none of the declarants provide any support for the contention that their property values have declined, or will decline, because of the NorthMet Project. Given that the NorthMet Project is located in a mining district and will put in controls that are projected to improve water quality, there is no basis to support declarants’ contention that the mining and its effects on water quality will lower property values. After all, surrounding non-mining land uses are compatible with the NorthMet Project as it is designed. The Mine Site is entirely within a district zoned as “mineral mining district” and is adjacent to an area zoned “industrial” on the eastern end. *See* Permit to Mine § 7.1; Figure 5-38. Almost the entire Plant Site is within an area zoned “mining district.” *See id.* at Figure 5-38. The northern end of the FTB and an access road to the west of the basin are in an area zoned “industrial.” *Id.* Therefore, the NorthMet Project was designed such that it is compatible with surrounding nonmining uses. *See also* Permit to Mine § 9.0. Indeed, the socioeconomic analysis within the FEIS noted that the NorthMet Project’s effects on area housing values would be minimal given the history of mining within the region, and, further, noted that there could be a minor increase in housing demand and prices in the area, with a moderate effect closer to the NorthMet Project site. FEIS § 5.2.10.2.4.

787. Given that significant adverse water quality impacts are unexpected and none of the declarants own property in close proximity to the NorthMet Project, there is no basis to conclude that declarants’ property is likely to be—much less “will be”—affected by the NorthMet Project.

788. Petitioners’ lack of standing is further evidenced by the location of the properties owned by the declarants. The closest property to the NorthMet Project—that of Mr. Ring-Jarvi—is over eight miles from the Mine Site or Plant Site and over 25 river miles away from these sites. Each of the other properties—those owned by Ms. Strohmaier (15.1 miles), Mr.

³⁶ Draft NPDES/SDS permit, at page 5 of 103, provides: “There will be no discharge of mine water or other process wastewater to surface waters from the Mine Site.” Page 10 of 103: “The Hydrometallurgical Plant and HRF will operate as a closed-loop system with no discharge to the environment or to the FTB/WWTS system.” § 6.10.23 re: Cat 2/3, Cat 4, OSLA, OSP and EBs: “The Permittee shall operate and maintain its engineering controls associated with these infrastructure facilities to ensure there is no discharge to surface waters from the Mine Site. These engineering controls may include, among other things, liner systems, sumps, underdrains (if used), ponds, pumps, and pipelines”

Wallace (32 miles), Ms. Andresen (55 miles for a property owned by Donna Mae Andresen), Mr. Staffon (66 miles), and Mr. Mead (32 miles)— are at a significant distance from the Mine Site or the Plant Site. *See* Maps – Properties of Petitioners Asserting Standing (dated Oct. 22, 2018) and Property of Declarant Ring-Jarvi (Oct. 23, 2018).

789. Moreover, the distance over water from the Mine Site or Plant Site to declarants’ property—which is more pertinent than the straight-line distance given that declarants’ concerns are based on the NorthMet Project’s impacts to water near their property—is much farther. In the unlikely event of a catastrophic dam failure, the water from the FTB will go into a swamp and wetlands, and the pollutants would have to travel approximately three miles before reaching a flowing river. Similarly, declarants’ property will not be affected by any discharged pollutants from the Mine Site given the distances at issue and the engineering controls in place. Thus, even in the unlikely event that the NorthMet Project has adverse impacts on water quality, Petitioners have provided no evidence that such impacts will be of sufficient geographic scope to affect the distant properties owned by Petitioners’ members.

790. The expression of concern that the Project *might* violate standards and, as a result, affect a distant property does not approach Minnesota Statutes 93.483’s “will be affected” standard for standing. Because Petitioners have failed to establish that either they or their members own property that “will be affected” by the NorthMet Project, the DNR concludes that Petitioners are not authorized to file petitions for a contested case hearing pursuant to Minnesota Statutes § 93.483. Indeed, if Petitioners could satisfy the new standing requirements—based on the speculative claim that property far removed from the NorthMet Project will be affected in the unlikely event that PolyMet violates Minnesota law or a catastrophic dam failure occurs—then the limitations imposed by the legislature on who has standing would be rendered practically meaningless.

791. In short, Petitioners do not have standing because they have not made a showing regarding how their property would be impacted by the proposed operations set forth in the Permit to Mine Application and because the DNR does not have jurisdiction over water quality.

C. Even if Petitioners Have Standing, They Have Not Raised Issues that Meet the Required Criteria in Minnesota Statutes § 93.483, subd. 3.

792. Petitioners identify issues that they believe need to be addressed in a contested case hearing. Even if these issues were raised by petitioners with standing, which they were not, a contested case hearing is not needed for the following reasons:

First, most of the issues identified by Petitioners center on whether PolyMet’s draft Permit to Mine complies with Minnesota law or policy or violates “goals” set out in Chapter 6132. Such issues do not need to be adjudicated in a contested case hearing. Compliance with legal requirements, or whether a project advances a particular policy, are questions of law and policy, not factual issues appropriate for an evidentiary hearing.³⁷

³⁷ The recommendations of an administrative law judge (“ALJ”) after a contested case are just that: recommendations. *See In re Excess Surplus Status of Blue Cross and Blue Shield of Minnesota*, 624 N.W.2d 264,

Second, many of Petitioners' objections are premised on the contention that the DNR is permitting a project that will authorize PolyMet to violate applicable law. But it is unnecessary to hold a contested case hearing to gather evidence on whether the DNR would allow PolyMet's operations to violate the law because the Permit and conditions make it very clear that PolyMet must operate in compliance with the applicable law.

Third, nearly all issues raised by Petitioners have been analyzed, many extensively, during the environmental review and permitting processes. And, as Petitioners note, many of these issues have been debated by the DNR's subject matter experts, and between the cooperating agencies and the public. It should not surprise anyone that aspects of the NorthMet Project remain controversial. On these issues, the DNR has heard the concerns and made determinations that are well supported by the record. Accordingly, because Petitioners have not presented any new material data for these issues, there is no basis for concluding the commissioner's decision would be better informed by a contested case hearing.

Fourth, some issues identified by Petitioners will not benefit from a contested case hearing because no data or information support the Petitioners' position. Indeed, some of the concerns raised by Petitioners cannot be addressed at this phase of the NorthMet Project. Not because critical information has yet to be supplied, but, rather, because the development of all mining projects is iterative—as more is learned through construction and operations, plans change. But Petitioners seem to suggest that to satisfy Minnesota law, design and operational details must be firmly in place once the Permit to Mine Application is submitted. No mining project could ever get permitted if this were the applicable standard. In short, a contested case hearing is not needed to address certain issues because no evidence on disputed issues can be marshalled at a hearing that will inform the decision-making process.

Fifth, the DNR agrees with some of the issues or concerns raised by Petitioners. On these points, there is no dispute.

Sixth, Petitioners point to the DNR's experts or staff to support claims that a factual dispute exists. But the DNR does not need a contested case hearing to evaluate information and claims that have already been reviewed by its experts or staff and subsequently addressed by requiring special conditions in the Permit.

Seventh, many of the concerns raised by Petitioners have become moot because the DNR has revised special conditions, or imposed new special conditions, that address their concerns.

Finally, on some issues, Petitioners fail to provide the specificity required by Minnesota law. Requesting a contested case hearing based on a generalized grievance does not satisfy the requirements set out in Minnesota Statutes § 93.483. When Petitioners dispute an issue but fail to point to specific information that would aid the commissioner in rendering a decision, there is no need for a contested case hearing.

278 (Minn. 2001) (“[T]he agency decision-maker owes no deference to any party in an administrative proceeding, nor to the findings, conclusions, or recommendations of the ALJ.”)

793. What follows addresses the areas that Petitioners believe should be resolved in a contested case hearing.

i. Adequacy of the Permit

794. Petitioners contend that a contested case hearing is necessary to address “[w]hether the Permit is adequate under applicable rules because it lacks specific terms and conditions and relies on plans that have not been developed, depriving the public of a meaningful opportunity for review and frustrating the future enforcement of the Permit, should it be issued.” Joint Petition at 92. Similarly, WaterLegacy disputes that “the 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.” WaterLegacy Petition at 65.

Petitioners specifically argue that the Permit to Mine Application violates Minnesota law because (i) the content and form of the draft Permit frustrates public review for several reasons including its length, vagueness, and unenforceable or non-specific requirements; (ii) the draft Permit lacks a term; (iii) the draft Permit and conditions fail to include specific enough requirements; and (iv) the draft Permit allows PolyMet to develop plans in the future.

795. These concerns regarding the adequacy of the Permit are, on their face, legal and policy issues that do not create a material issue of fact and have been addressed above. None of these issues raise a material issue of fact. Nor would a contested case hearing help develop facts that would allow the commissioner to resolve the dispute, which, again, centers on legal or policy questions.

ii. Flotation Tailings Basin Dam & Wet Closure

796. Joint Petitioners requested a contested case hearing to address whether “the plan for operation and closure of the FTB approved by the Permit complies with applicable laws” because, according to Joint Petitioners, the draft Permit creates risk to natural resources and the public due to (i) the use of unsafe and untested dam construction techniques; (ii) the use of unproven technologies to prevent oxygen and water infiltration; and (iii) concerns that PolyMet will be unable to properly maintain dams and associated structures throughout a perpetual wet closure. Joint Petitioners also argue that the draft Permit violates applicable laws because the “DNR failed to consider feasible and prudent alternatives to the dam construction techniques and proposed wet closure, including dry tailings management techniques.”³⁸

Similarly, WaterLegacy disputes that the proposed (i) siting, technology, design and methods of operation for the tailings waste storage facility; (ii) waste storage and seepage containment technologies and methods for the tailings storage facility; and (iii) reclamation,

³⁸ Joint Petitioners’ April 6, 2018 Joint Supplement to the Petition concedes that the DNR considered alternatives. Joint Supplement at 8.

closure and postclosure maintenance for the tailings storage facility “comply with applicable Minnesota law in Chapter 93 of Minnesota Statutes and Chapter 6132 of Minnesota Rules.”³⁹

797. Whether the design, operation and closure of the FTB Dam complies with the applicable law or violate best practices are legal and policy questions that do not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.⁴⁰ These issues have been addressed above and in the Dam Safety Findings.

798. Petitioners specifically raise many issues related to the design, operation, maintenance and closure of the FTB. For example, Petitioners have long argued that:

- the proposal to amend the FTB Dam with bentonite will reduce stability and may increase erosion. Joint Petition at 41-45; WaterLegacy Petition at 27.
- the bentonite amendment will not limit oxygen infiltration. Joint Petition at 45, 53-57; WaterLegacy Petition at 24, 26-27.
- no studies exist to show that the bentonite will function as suggested. Joint Petition at 53-59; WaterLegacy Petition at 26-27.
- PolyMet will not be able to apply the bentonite as proposed. Joint Petition at 56-59;

³⁹ WaterLegacy’s Petition does not specifically link the issues and objections to its request for a contested case hearing.

⁴⁰ Petitioners’ arguments focus on a number of legal and policy issues, including claims that (i) wet closure is prohibited by Minnesota law and does not meet current mining standards because dry closure is the preferred alternative for mining projects (“wet covers are a thing of the past, a dangerous relic of a form of mining undertaken before the passage of environmental protection laws.”); (ii) the bentonite amendment violates the nonferrous rules and goals that the tailings basin design shall be designed, constructed and operated to be structurally sound; (iii) the bentonite amendment violates the applicable law because it is an unproven technology that is not available; (iv) the project proposal violates the law because it “does not provide for drainage of the tailings basin at closure, does not minimize the potential for failure as required by rule, does not comply with lawful requirements to design and construct dams in accordance with current, prudent engineering practice, and closure of the site as proposed does not result in a mining area that is stable and free of hazards and that is maintenance free.”; (v) “this unsafe dam design violates state statutes and regulations governing dam safety, as well as the requirement of Minn. Stat. § 93.481 that permits to mine comply with all lawful requirements.”; (vi) the DNR violated Minnesota law because it failed to undertake the alternative analysis related to dry closure and construction methods for the tailing basin dam; (vii) the tailings basin design fails to meet the closure standard for reactive mine waste and depends on passive treatment, which is a technology that is not available (the “plan for closure of the tailings basin . . . does not succeed in achieving the goal of the rule, which is to ensure that the mining area is left in a condition that protects natural resources and minimizes the need for maintenance . . . the project fails to meet the closure standard in Minn. R. 6132.2200”); (viii) the seepage design system violates applicable law; (ix) the design of the tailings basin monitoring plan violates the applicable law; (x) it violates the applicable law to “authorize closure of the FTB in a wet condition requiring permanent active treatment of the water recaptured in the seepage collection system.”; (xi) it violates the applicable law to allow for an iterative tailings dam design process; (xii) it is improper to authorize an Observational Method to “adjust” the “subsequent design, construction, and operation” of the tailings facility “if needed to meet specified factors of safety”; and (xiii) “permanent ponding on top of its flotation tailings, as proposed by PolyMet, conflicts with the requirement in Minnesota non-ferrous mining rules”[.]

- the FTB design will allow a large volume of water to move through and over the mine waste and will fail to neutralize the waste or store the waste in an environment that will control reactivity. Joint Petition at 53-59;
- the seepage collection system will not function at the level assumed by PolyMet and the modeling that PolyMet relies on was “biased”. Joint Petition at 59-60; WaterLegacy Petition at 19-20.
- the cutoff wall will not function properly because it will not be keyed into the underlying bedrock. Joint Petition at 60; WaterLegacy Petition at 23.
- the cutoff wall will be ineffective as a long-term pollution control barrier unless a sufficient inward head difference is maintained. Joint Petition at 61, 73.
- monitoring of the FTB will not detect water contamination because PolyMet will not drill enough wells to detect water contamination, which in turn makes corrective action impossible. Joint Petition at 62-63.
- the proposed factors of safety for the PolyMet tailings dam are insufficiently protective and fail to achieve the minimum factor of safety. WaterLegacy Petition at 10.
- no case studies, pilot tests or other reliable evidence demonstrate that passive, nonmechanical treatment would successfully treat tailings seepage to meet Minnesota’s existing water quality standards. WaterLegacy Petition at 28.

Both Petitions rely on expert reports to support most of these objections.⁴¹

799. Some of Petitioners’ objections do not warrant a contested case hearing because they are based on a misunderstanding of the draft Permit.

For example, Petitioners misconstrue the draft Permit as abandoning the requirement that the cutoff wall must be keyed into the bedrock. Consistent with the FEIS, the Permit to Mine, and now the final Permit to Mine, require the cutoff wall to be keyed into the bedrock. Special Conditions 55, 55a, 55b.

Petitioners also misapprehend the purpose of the bentonite amendment and appear to believe that it is the only engineering control that will serve as a *complete* barrier and prevent oxygen and water from penetrating into the basin. But the bentonite amendment is intended to increase moisture retention in the amended layer, limit oxygen infiltration and associated sulfate release, and reduce rainwater infiltration into the stored tailings. FEIS at 3-133, 5-8; Permit to

⁴¹ Petitioners also make much of the fact that one of DNR’s consultants, Don Sutton, appears to agree with the objections to wet closure. DNR has fully considered and understands Sutton’s concerns related to dam safety and wet closure, as well as the concerns raised by the Petitioners’ experts. However, for the reasons set forth herein, DNR has determined that wet closure can be managed to comply with all legal requirements. This is distinct from the question of whether dry closure might, ultimately, be determined to be a preferable closure option. Special Conditions 64 and 65.

Mine, Appendix 11.5 (Flotation Tailings Management Plan) Attachment I. Based on modeling and studies, and the work completed during the environmental review, the DNR concluded that the bentonite amendment would have the long-term effect of reducing influent flow rates and chemical loads. Thus, contrary to Petitioners' characterization, the DNR has never believed that the bentonite amendment would act as a complete barrier.

Petitioners also seem to assume that the bentonite amendment is the exclusive control that PolyMet will rely on to protect natural resources. If so, they are mistaken. The Permit to Mine and Dam Safety Findings discuss multiple engineering controls designed to address oxidation and water infiltration, with bentonite being one of those controls. Thus, the bentonite amendment works in conjunction with the containment system and the water treatment system.

Similarly, Petitioners argue that the FTB design will allow a large volume of water to move through and over the mine waste and will fail to neutralize the waste or store the waste in an environment that will control reactivity. *See, e.g.*, Joint Petition at 53-59. Petitioners add that the seepage collection system will not function at the level assumed by PolyMet and the modeling that PolyMet relies on was "biased". Joint Petition at 59-60; WaterLegacy Petition at 19-20.

800. As discussed above, the Permit to Mine and its Special Conditions impose a number of requirements, the collective objective of which is to ensure that reactive mine waste within the FTB is stored in an environment such that the waste is no longer reactive (*i.e.*, wet closure at the legacy site, coupled with the bentonite amendments and seepage capture systems).

Final designs for the cut-off wall for the FTB Seepage 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 PolyMet must submit the requested information to the DNR at least 14 days prior to construction of such system. Special Condition 55. "The design must achieve the following: (i) cut-off wall keyed to bedrock, (ii) seepage is captured such that natural resources are protected, and (iii) inward flow gradient maintained in accordance with the NPDES/SDS permit and demonstrated through monitoring." Special Condition 55.

In addition, prior to construction of the FTB Seepage Containment System, PolyMet must submit for review and approval by DNR a detailed monitoring plan for verification that the system will perform as required. Special Condition 55a. This monitoring plan must specify triggers for evaluation of adaptive management if data reveals that the system is not performing as required. And PolyMet must submit a schedule for inspection for the construction, operation, and reclamation, including closure and post closure maintenance of the FTB, by the design engineers, to ensure compliance with the design. Special Condition 55c. The schedule may be developed in phases based on (i) construction, (ii) operation, (iii) reclamation, and (iv) closure and post closure maintenance. The schedule, or schedule by phase, must be submitted to the DNR for review and approval at least 30 days prior to initiation of construction of each facility, or initiation of each phase as appropriate.

In short, there is no need to hold a contested case hearing on issues that the Petitioners have misconstrued or misapprehended.

801. Petitioners next doubt the effectiveness of the bentonite amendment. After extensive review, the DNR has concluded that the bentonite will be effective. But to confirm the effectiveness of the bentonite amendment, and to ensure that it will not cause instability to the dam, the DNR has also imposed special conditions, which were added, in part, in response to concerns raised by Petitioners.

These new special conditions require PolyMet to prepare a bentonite amendment of tailings dam side slopes workplan for DNR review and approval no later than 90 days following permit issuance. The workplan must include any plans for bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the dam exterior slopes will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result. Permit to Mine Special Condition 89a.

PolyMet must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of tailings dam side slopes workplan for review and approval prior to FTB Dam construction. Special Condition 89b.

If any of the testing of bentonite amendment in tailings dam side slopes reveals that the planned use of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to NorthMet FTB Dam construction. Special Condition 89c.

Likewise, PolyMet must prepare a bentonite amendment of FTB beaches workplan for DNR review and approval no later than 90 days following permit issuance. The workplan must include any plans for bench or field scale work, sampling, and analyses necessary to demonstrate to the DNR that the tailings amendment with bentonite for the FTB beaches will perform as intended to meet all applicable standards, statutes and regulations to be protective of natural resources, and function in perpetuity. The workplan must also include a detailed construction quality assurance and quality control plan and a schedule for implementation of the workplan and any anticipated phases of work that may result. Special Condition 89d.

PolyMet must provide to the DNR the results of the analyses conducted under the approved bentonite amendment of FTB beaches workplan for review and approval prior to the third year of NorthMet tailings deposition. Special Condition 89e.

If any of the testing of the two uses of bentonite in and around the FTB (i.e., pond bottom-or beach amendment) reveal that the planned uses of bentonite would not achieve the necessary condition(s) to allow the facility to be operated in a manner that meets all applicable standards, a revised facility plan must be submitted to the DNR prior to the fourth year of deposition of NorthMet tailings. Special Condition 89f.

Within 60 days of the approval of each bentonite usage workplan results (tailings dams side slopes, tailings pond beaches, and tailings pond bottom), PolyMet must submit to the DNR for review and approval adaptive management plans that describe the action or actions that

would be implemented if water quantity, water quality, or dam safety objectives are not met through the use of the bentonite amendments. Special Condition 89g. Special Condition 50 also requires that periodic construction and post-construction reviews be documented to confirm whether construction has satisfied the applicable requirements.

Because the DNR has determined that the bentonite amendment will function as proposed and has also imposed special conditions to address the effectiveness of the bentonite amendment, there is no need for a contested case hearing on this issue.

802. A contested case hearing is also not needed because virtually all objections raised by Petitioners are based on information, reports, and concerns that have been thoroughly aired over the past decade. Indeed, as discussed above, and in the Dam Safety Findings, the DNR thoroughly considered, and responded to, many, if not all, of Petitioners' concerns, which were raised as objections during the environmental review process. *See generally* PolyMet's Response at App. A, B, C, D, and H.

For example, the DNR evaluated dry closure issues in the 2009 DEIS and in the 2013 SDEIS, where the DNR concluded that when considering the combined environmental impacts, wet closure has more environmental benefits than dry stacking—*e.g.*, wet closure allows PolyMet to address legacy water quality issues at the existing LTVSMC tailings basin, has fewer environmental impacts than dry closure, minimizes additional impacts to wildlife, and would preserve hundreds of acres of wetlands. SDEIS at 5-311, 5-375.

In the FEIS, the DNR also considered and responded to the Mount Polley Expert Panel Report. FEIS at App. A, A-315. The DNR ultimately found, as it had earlier in the environmental review, that while dry stacking provides dam stability benefits, it lacks many of the environmental benefits of wet closure. FEIS at 5-5, 5-363, 5-448, App. A, A-315, A-639.

In fact, in 2010, the DNR worked closely with federal agencies and PolyMet to assess six different alternatives for the tailings basin cover system at closure and discussed the benefits and risks associated with each alternative. The report concluded that the various wet closure options would reduce the sulfate load and sulfate concentrations and would be the most protective of wild rice.⁴² The report also concluded that the wet closure options will provide an acceptable factor of safety.

The dry closure options, in contrast, were expected to result in higher sulfate load, increased sulfate concentrations, and increased concentrations of various metals; one dry closure option would likely not meet the wild rice standard at Embarrass Lake.

Joint Petitioners and WaterLegacy do not dispute these findings. In fact, they do not meaningfully address the trade-offs involved in wet closure versus dry closure or the many environmental benefits associated with reusing existing infrastructure.

And Petitioners have not made a showing that a contested case hearing is necessary to adjudicate a point that is not in dispute—dry closure has advantages from a geotechnical stability

⁴² Environmental Resources Management, Memorandum: NorthMet Mine Tailings Basin Cover Options Evaluation and Recommendations (Dec. 30, 2010).

standpoint but has downsides, including deleterious impacts to water quality and more impacts to wetlands, sensitive habitat, and wildlife.

803. Regarding dam stability and closure concerns, the Applications for the Permit to Mine and Dam Safety Permits discuss, at length, measures to address FTB geotechnical stability, including rock buttressing, repairing eroded surfaces, and repair or replacement of damaged monitoring and operational infrastructure.

804. The special conditions in the Permit to Mine and the conditions in the FTB Permit also address, and in some instances incorporate, Petitioners' concerns related to the design, operation, monitoring, and closure of the FTB Dam. Because of these special conditions, PolyMet is required to complete significant workplans and studies to establish that the FTB will operate in a manner that will meet all applicable standards, statutes and regulations to be protective of natural resources. Permit to Mine Special Conditions 1-2, 4a-4b, 12-13, 15, 16a-16d, 19, 26-28, 28a, 32-39, 39a-39b, 40-42, 45-48, 45a-45b, 49-50, 50a-50b, 51a, 52, 55-56, 55a-55b, 60, 62, 64, 65, 77, 88-89, 89a-89g, and 95; FTB Permit Conditions 28-38. These special conditions therefore moot many of the Petitioners' concerns related to the FTB.

805. In sum, there is not a reasonable basis underlying a disputed material issue of fact related to the FTB or wet closure, and a contested case hearing on these topics would not introduce information that would aid the commissioner in resolving any disputed facts in order to make a final decision on the completed application.

iii. Hydrometallurgical Residue Facility

806. Petitioners ask for a contested case hearing on a handful of issues related to the HRF. Specifically, Petitioners contend that the siting of the HRF violates applicable law because it is sited on wetlands and on legacy mining slimes, peats, and tailings, which, in turn, decreases the stability of the HRF Dam. Joint Petition at 93; WaterLegacy at 13-14. Petitioners also claim a number of models and tests were either not conducted or were conducted in an inadequate manner, thereby failing to recognize the potential impacts of an HRF Dam failure. Joint Petition at 92; WaterLegacy Petition at 14-15. And Petitioners question whether the HRF has an adequate long-term management plan, particularly with regard to water overflow and leakage collection. WaterLegacy Petition at 15-16.

807. Whether the HRF siting and proposed operations comply with the law centers on questions of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

To the extent Petitioners' comments do pertain to factual issues, the DNR has thoroughly considered them. Because Petitioners have not presented any new material data, the commissioner's decision would not be better informed by a contested case hearing.

Specifically, during the environmental review, the DNR thoroughly addressed the concerns surrounding the impacts to wetlands, stability, and durability and efficacy of the HRF liner system. The DNR explained that siting the HRF on a legacy mining site minimized impacts to water resources, wetlands, and ecosystems. FEIS at App. A, A-230-32. The DNR also addressed concerns about the HRF's short-term and long-term stability of the site. *Id.* at A-230-

32, A-246-47. And the DNR explained why it had confidence in the liner system. *Id.* at App. A, A-229-30, A-378-79, A-443-44.

808. Although Petitioners' comments in their petitions for a contested case hearing are largely duplicative of prior comments, the DNR has again carefully considered and responded to them in these findings and in the Dam Safety Findings.

809. Moreover, the DNR addressed concerns raised by Petitioners during the environmental review by moving the location of the HRF to place it on firmer ground, requiring a second liner, and changing the downstream construction method. FEIS at App. A, A-229.

810. The DNR has also imposed special conditions to the Permit to Mine and conditions to the HRF Permit regarding the HRF. For example, HRF Permit Condition 25 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the foundation preload design prior to preloading the HRF foundation. HRF Permit Condition 26 provides that "[a]dditional analysis of the HRF foundation is needed to confirm that the foundation will provide adequate support for the HRF," and requires PolyMet to seek further guidance from the MPCA to ensure that differential settlement will not cause excessive liner strain. HRF Permit Condition 30 requires PolyMet to obtain written approval from the DNR Dam Safety Engineer of the Contingency Action Plan prior to dam construction. And Special Condition 52 of the Permit to Mine requires final design drawings for the HRF to be submitted to the DNR at least 30 days prior to construction of the HRF. Given that the HRF will not be commissioned until years after the commencement of mining operations, it is not necessary to approve the final design prior to issuing the Permit to Mine. Indeed, in order to maximize the effectiveness of its review, it is important that the DNR analyze the designs based on up-to-date information, rather than prospectively analyzing future plans. Also, Permit to Mine Special Condition 95 prohibits the disposal of coal ash and other non-mining waste from being disposed in the HRF.

811. In addition to the DNR, the MPCA draft NPDES/SDS permit would also impose requirements to address concerns raised by Petitioners regarding the HRF. For example, PolyMet must work with the MPCA to address differential settlement and liner strain issues. PolyMet also must submit a Preload Design Investigation Work Plan, which will require PolyMet to obtain additional information on subsurface soil conditions to better understand the in-situ soil conditions and refine the HRF preload design to minimize the uncertainty associated with the differential settlement. In short, the issues identified by Petitioners related to the HRF have already been analyzed during the environmental review and permitting processes. In light of many of these comments, the DNR and the MPCA have required changes to the HRF and the DNR has imposed special conditions. The commissioner would, therefore, not benefit from having any disputed facts adjudicated before an ALJ. Moreover, there is not a reasonable basis underlying a disputed material issue of fact related to the FTB or HRF, and a contested case hearing on these topics would not introduce information that would aid the commissioner in resolving any disputed facts in order to make a final decision on the Permit to Mine.

iv. Waste Rock Characterization

812. Petitioners raise concerns about whether the draft Permit is based on adequate characterization of the reactive qualities of the waste rock under applicable law and whether the proposed segregation of the waste rock will be feasible, such that the conditions in the Permit (in particular, conditions governing the Category 1 waste rock stockpile) are adequate to comply with applicable laws protecting natural resources. Joint Petition at 64-67.

813. Whether the characterization of waste rock is adequate to comply with applicable laws protecting natural resources centers on questions of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

To the extent Petitioners' comments do pertain to factual issues, the DNR has thoroughly considered them. Because Petitioners have not presented any new material data, the commissioner's decision would not be better informed by a contested case hearing.

814. Moreover, concerns raised by Petitioners related to waste rock characterization, and the feasibility of the proposed segregation of the waste rock, are addressed in the Permit to Mine and Special Conditions. Therefore, neither a material nor a reasonable basis exists for a contested case hearing.

Special Conditions 45-48 provide that:

- PolyMet must inform the DNR through the Annual Report if new rock types or formations are encountered during mining, and any new rock types or formations must be placed in the Category 4 temporary stockpile or backfilled into the East Pit until the new rock types or formations can be characterized and appropriate alternate management plans are developed and submitted to the DNR for review and approval.
- PolyMet must coordinate future waste characterization testing and results with the DNR for review and approval;
- PolyMet must submit work plans for waste characterization to the DNR for review and approval prior to initiation of any such characterization testing or data analysis; and
- Waste characterization testing done without DNR review and approval may not be accepted by the DNR

Additionally, Special Condition 54 requires that all final design drawings and analyses for the Category 1 waste rock containment system and cover be presented to the DNR for review at least 30 days before construction commences. Likewise, Special Condition 55 requires that the final designs for the cutoff wall for the Category 1 waste rock containment system be submitted to the DNR at least 45 days before construction commences. And Special Condition 55b requires DNR review and approval of the monitoring plan for the Category 1 stockpile

containment system. *See also* Special Conditions 4b, 16a, 23-28, 28a, 38-45, 39a – 39b, 45a-45b, 46-48, 50a -50b, 51a, 52, 54a, 55b, 62, 71, 83a-83b, and 91.

815. In sum, there is not a reasonable basis underlying a disputed material issue of fact related to waste rock characterization, and a contested case hearing on this topic would not introduce information that would aid the commissioner in resolving any disputed facts in order to make a final decision on the Permit to Mine.

v. Concerns Relating to Efficacy of Seepage Capture Systems

816. Petitioners raise concerns that the draft Permit does not meet applicable requirements for waste rock storage because the proposed control systems, pile liners, and seepage collection systems are allegedly inadequate to capture and control releases that have the potential to cause degradation of water quality and violate applicable standards. Joint Petition at 59-61, 69-75. Petitioners assert that, in order to capture seepage, the cutoff walls for the FTB and Category 1 waste rock stockpile must be keyed to bedrock and maintain a sufficient inward head difference to prevent outward transport. Petitioners also raise concerns about the liner system for the Category 2/3 waste rock in light of the alleged inability to effectively segregate waste rock into discrete categories. Joint Petition at 75. Additionally, Petitioners claim that the storage of wastewater at the Mine Site violates the applicable law because it will not prevent the release of substances, WaterLegacy Petition at 36; that the DNR failed to properly consider the role of bedrock fractures in transmitting groundwater at the tailings site, WaterLegacy Petition at 18; that the percolation rate estimate is flawed, Joint Petition at 53; that modeling of seepage concentrations is likely to understate actual tailings chemistry, WaterLegacy Petition at 17; and that the special conditions are inadequate as pertains to seepage, WaterLegacy Petition at 23.

Whether the storage of wastewater complies with the applicable law centers on questions of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

To the extent Petitioners' comments do pertain to factual issues, the DNR has thoroughly considered them. Because Petitioners have not presented any new material data, the commissioner's decision would not be better informed by a contested case hearing.

Furthermore, the DNR has addressed a number of Petitioners' concerns by imposing special conditions regarding seepage prevention. Special Condition 55 requires the final designs for cutoff walls for the FTB and Category 1 waste rock stockpile to be submitted to the DNR at least 45 days prior to construction. This Special Condition also provides that the cutoff wall must be keyed to bedrock, seepage must be captured such that natural resources are protected, and an inward flow gradient must be maintained in accordance with the NPDES/SDS permit and demonstrated through monitoring. And Special Conditions 55a and 55b require DNR review and approval of the monitoring plans for the FTB and Category 1 stockpile containment systems, respectively. Similarly, discharges must meet the water quality standards prescribed by the NPDES/SDS permit issued by the MPCA.

Concerns raised by Petitioners related to the adequacy of the control systems are therefore addressed in the Permit to Mine and Special Conditions, and new special conditions,

some of which were urged by Petitioners, have been added. Special Conditions 1-4, 12, 15-16, 16a-16d, 28a, 32-39, 39a, 45-52, 45b, 50a-5-b, 51a, 54a, 55b, 60, 62, 65-71, and 91.

817. Neither a material nor a reasonable basis exists for a contested case hearing regarding waste rock storage pile and collection systems, and Petitioners have not raised a material issue that the commissioner would benefit from having adjudicated before an ALJ.

vi. Water Quality Monitoring

818. Joint Petitioners contend that the draft Permit violates the applicable requirements for protection of natural resources due to the “inadequacy of the proposed placement of monitoring wells at the plant and mine site.” Joint Petition at 93. Joint Petitioners also raise concerns about the monitoring system for the waste rock storage piles. *Id.* at 75. The gist of these concerns centers on whether monitoring systems at the Mine Site and Plant Site are robust enough to detect contamination plumes. Joint Petitioners’ expert opines that, based on his models, the monitoring wells are “spaced too widely to detect contaminant plumes from the mine operations.” *Id.* at 76. Joint Petitioners propose additional conditions that the DNR should impose to ensure the monitoring system will be able to identify contaminant plumes.

819. Whether the draft Permit requirements related to the placement of monitoring wells comply with the law centers on questions of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

820. Bedrock features and fracture zones, and the placement of monitoring wells, have been extensively analyzed during the environmental review, where the DNR repeatedly addressed Petitioners’ concerns about these issues. *See, e.g.*, FEIS §§ 4.2.2.2.1; 5.2.2.2.1.

Moreover, as Petitioners acknowledge, the MPCA is the state agency responsible for adopting and enforcing water-quality standards in Minnesota under the Clean Water Act (CWA). *See In re Cities of Annandale and Maple Lake NPDES/SDS Permit Issuance for the Discharge of Treated Wastewater*, 731 N.W.2d 502, 510 (Minn. 2007) (“Under state and federal law, the MPCA is the Minnesota state agency charged with enforcing and administering the CWA and its attendant regulations.”). The Proposed NorthMet Project is subject to the CWA and PolyMet has applied for required federal and state discharge permits, which are under the jurisdictional authority of the MPCA and not the DNR. To date, the MPCA has not issued any NPDES/SDS permits to PolyMet for the NorthMet Project, but in January and October 2018, the agency published draft NPDES/SDS permits for public comment. *See* <https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-51j.pdf> (January 2018 version) and <https://www.pca.state.mn.us/sites/default/files/wq-wwprm1-51z.pdf> (October 2018 version). The draft NPDES/SDS permit would impose numerous requirements upon PolyMet and strictly control discharges from the Mine Site, Plant Site, and the Mine-to-Plant Pipeline. In addition to the specific requirements detailed below, the draft NPDES/SDS permit provides that “[e]xcept for discharges from outfalls specifically authorized by this permit, overflows, discharges, spills, or other releases of wastewater or materials to the environment, whether intentional or not, are prohibited.” (Draft NPDES/SDS Permit § 6.16.36). In addition, the Draft NPDES/SDS Permit further imposes construction of seepage capture systems to collect seepage from the FTB, treatment of seepage water, and monitoring of surface and groundwater.

821. Moreover, Petitioners' concerns are addressed in the Permit to Mine and Special Conditions, which require extensive monitoring during mine operations and closure. Special Conditions 2, 4a-4b, 12-13, 13b, 16, 16a -16d, 28a, 32-37, 39b, 51, 54-55, 55b, 60, 62-67, 77 80, 83a-83b, and 85. For example, Special Condition 32 requires PolyMet to develop, in consultation with the DNR, a modeling and data workplan. Special Condition 33 sets out the requirements for data analysis and reporting, which includes modeling, monitoring data, data reporting requirements, etc. Special Condition 66 requires PolyMet, prior to blasting within the mine pit footprint, to submit a report and supporting data assessing the potential for current and future northward groundwater flow at the Mine Site.

822. For these reasons, Petitioners have not raised a material issue that the commissioner would benefit from having adjudicated before an ALJ.

vii. Elimination of Mine Site Wastewater Treatment Facility

823. WaterLegacy claims that the elimination of the Mine Site Wastewater Treatment Facility and plans for adoption of Mine Site non-mechanical treatment proposed in the draft Permit to Mine violates the applicable law. WaterLegacy Petition at 33-34.

Whether relocating the location of the WWTF water treatment process to the WWTS and the new plans to address wastewater at the Mine Site comply with the applicable legal requirements centers on questions of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

Moreover, most of the focus of WaterLegacy's objections center on why the DNR should impose additional conditions. But it is difficult to discern what, if any, issues related to the WWTF involve any claimed issues of material fact that need to be adjudicated at a contested case hearing.

viii. Financial Assurance

824. Petitioners argue that the financial assurance package violates the law because it "defers the vast majority of contributions to a later date, the reclamation cost estimates are no longer based on industry standard estimators, and it is unclear whether PolyMet has the necessary capital to adequately fund the full cost of closure, including long-term reclamation, water treatment, operations and maintenance costs." Joint Petition at 93.

825. Whether the financial assurance package complies with the applicable legal requirements centers on the meaning of Minn. Rule 6132.0300 and 6132.1200. This is a question of law and policy and does not raise a dispute over a material issue of fact that needs to be adjudicated before an ALJ.

826. To the extent Petitioners' comments do pertain to factual issues, the DNR has thoroughly considered them. Because Petitioners have not presented any new material data, the commissioner's decision would not be better informed by a contested case hearing.

827. Moreover, concerns raised by Petitioners related to financial assurance are addressed in the Permit to Mine and Special Conditions. Specifically, the Special Conditions of

include an entire attachment devoted exclusively to conditions of financial assurance. These conditions prescribe the amount of financial assurance (including the amount that must be in the form of cash or cash equivalents and the requirement that financial assurance be based on reclamation costs two years in advance), as well as the terms of the requisite environmental insurance policy, surety or reclamation bonds, irrevocable letters of credit, and the trust fund. Each of these requirements exceeds the regulatory minimums for financial assurance set forth in Chapter 6132, but are necessary for the DNR to deem PolyMet's financial assurance satisfactory under § 93.49.

828. Specifically, the financial assurance must be recalculated at least annually. *See* Special Conditions 4; Special Conditions Attachment 1, items 11, 18. Moreover, the Special Conditions set forth a number of requirements for the trust fund and any surety or reclamation bonds or irrevocable letters of credit (ILOCs) used as financial assurance. *See* Special Conditions Attachment 1, items 13-14, 19-20. Additionally, PolyMet's financial assurance requirements are conservative because they include an additional 10% contingency factor for reclamation costs (incurred within three years of the cessation of mining operations), and an additional 15% contingency factor for long-term costs (incurred more than three years after the cessation of mining operations). *See* Special Conditions Attachment 1, items 12a-12b. Relatedly, Special Conditions Attachment 1, items 7 through 9, prescribe requirements for the environmental liability insurance policy that PolyMet must maintain.

829. In short, even if Petitioners have standing they have not met their burden of demonstrating that a contested case hearing is necessary.

X. POTENTIAL OBJECTORS LACK STANDING

830. As noted above, the Legislature appears to have repealed the objection process set out in Minnesota Statutes § 93.481, subd. 2. *See* 2017 Minn. Laws ch. 93, Art. 2 § 57 (eliminating language referring to written objections to a proposed application and adding reference to the petition process under § 93.483); *cf.* Minn. R. 6132.4000, subp. 2 (“Objection related to a proposed mining operation may be filed with the commissioner according to Minnesota Statutes, sections 93.44 to 93.51”).

831. The DNR nonetheless reviewed sorted public comments to determine whether they included the information necessary to satisfy the criteria to constitute an objection under Minnesota Rule 6132.4000, subp. 2.B.(1)-(3). The vast majority of submissions sorted as potential objections failed to include sufficient specificity to constitute an objection under this Rule provision. The DNR then reviewed the 13 submissions that met the criteria of subpart 2.B to determine if the submitters had standing under subp. 2.C. As detailed in the review of potential objectors spreadsheet in the administrative record, none of the submitters established the requisite standing under the Rule.

CONCLUSIONS

1. The Permit to Mine supports “the policy of the state to provide for the reclamation of lands subjected to mining of metallic minerals where such reclamation is necessary, both in the interest of the general welfare and as an exercise of the police power of the state, to control possible adverse environmental effects of mining, to preserve the natural resources, and to encourage the planning of future land utilization” Minn. Stat. § 93.44. The Permit to Mine further serves to “promot[e] the orderly development of mining” and the “encouragement of good mining practices.” *Id.*; *see also* Minn. R. 6132.0200.

2. In accordance with the authority granted under Minn. Stat. § 93.47, subd. 3, the DNR has adopted rules governing nonferrous metallic mineral mining within the State. *See* Minn. R. ch. 6132. These rules govern the Permit to Mine.

3. The DNR has the authority to administer and enforce Minn. Stat. §§ 93.44 to 93.51 and Minnesota Rule Chapter 6132. Minn. Stat. § 93.47, subd. 4.

4. The DNR has the authority to “modify or permit variance from the established rules adopted [under Minn. Stat. § 93.47] if it is determined that such modification or variance is consistent with the general welfare. PolyMet’s request for a variance for leaving certain utility tunnels in place, is partially approved, subject to Special Conditions 20a and 20b of the Permit to Mine, as consistent with the general public welfare and directed toward attainment of the goals of Chapter 6132 of the Minnesota Rules. *See* Minn. R. 6132.4100, subps. 1.B.

5. PolyMet’s NorthMet Project, which involves nonferrous metallic mineral mining, requires a Permit to Mine. Minn. Stat. § 93.481, subd. 1; Minn. R. 6132.0300, subp. 1.

6. PolyMet possesses capital and provides the financial and operational decision making necessary to conduct the NorthMet Project. Minn. R. 6132.0300, subp. 1.

7. Poly Met Mining, Inc. and PolyMet Mining Corp. are jointly engaged in the NorthMet Project, and, thus, the Permit to Mine is issued to them jointly. Minn. R. 6132.0200, subp. 2.

8. PolyMet’s Permit to Mine application contains the information required by applicable law. *See* Minn. Stat. § 93.481, subd. 1; Minn. R. 6132.1100.

9. PolyMet has paid the required application fees. Minn. Stat. § 93.481, subd. 1(3) and 93.482, subd. 2.

10. As detailed in the findings set forth above, the DNR has determined that the reclamation and restoration planned for the NorthMet Project complies with lawful requirements and can be accomplished under available technology and that the proposed reclamation and restoration techniques are practical and workable under available technology.

11. The Permit to Mine is granted for the term “deemed necessary by the commissioner for the completion of the proposed mining operation, including reclamation or restoration.” Minn. Stat. § 93.481, subd. 3. The conditions of the Permit to Mine shall apply to

“all mining, auxiliary facilities, reclamation and postclosure activities conducted at the mine facility until the lands are released from reclamation obligations.” These obligations shall continue “until such time that continued compliance with the Minnesota Rules 6132.2000 to 6132.3200 has been established and the necessity for postclosure maintenance has ceased.” *See* Minn. R. 6132.0300, subp. 3.

12. As detailed in the Permit to Mine, PolyMet, as assignee of designated portions of Permit to Mine #1.1 and the Cliffs Erie Closure Plan, will perform all outstanding obligations in accordance with applicable law. *See* Minn. Stat. § 93.481, subd. 5, Minn. R. 6130.500, Minn. R. 6132.4700.

13. No person “owning property that will be affected by the proposed operation or any federal, state, or local government having responsibilities affected by” the NorthMet Project filed a petition to hold a contested case hearing. Minn. Stat. § 93.483, subd. 1; *cf.* Minn. R. 6132.4000, subp. 2.C.(1)-(2).

14. After review and consideration of the Petitions received, and the responses thereto, and based upon the findings set forth above, the DNR has determined that there are no material issues of fact in dispute concerning PolyMet’s application or the Permit to Mine and that a contested case hearing would not aid the DNR making a final decision. Minn. Stat. § 93.483, subd. 3(a); *cf.* Minn. R. 6132.4000, subps. 2.C.(3), 2.E, 4.A.(2).

15. The Permit to Mine includes detailed conditions regarding the financial assurance that PolyMet is required to provide for the NorthMet Project. Compliance with these conditions is an essential requirement of the Permit to Mine. In reliance upon these required conditions throughout the life of the operation, the DNR concludes that the financial assurance that PolyMet is required to provide under the Permit to Mine is satisfactory. *See* Minn. Stat. § 93.49. PolyMet shall not be released from the responsibility to maintain financial assurance in accordance with the Permit to mine until “(1) all reclamation activities have been completed according to [Minn. R. 6132.1200] and the [P]ermit to [M]ine, (2) conditions necessitating postclosure maintenance no longer exist and are not likely to recur, and (3) corrective actions have been successfully accomplished.” Minn. R. 6132.1200, subp. 4.H.

16. As detailed in the findings set forth above and after evaluation of the value of the resources at issue and the degree of impacts, the DNR has determined that operations under the Permit to Mine, including reclamation, closure, and postclosure maintenance, and subject to the conditions therein will not adversely impact natural resources. *See* Minn. R. 6132.0100, subp. 3. The Permit to Mine requires that the NorthMet Project will 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.” Minn. R. 6132.0200. Operation of the NorthMet Project under the Permit to Mine, subject to the terms and conditions therein, will not result in pollution, impairment, or destruction of natural resources. Minn. Stat. § 116B.02, subd. 5.

17. At this time, passive treatment alone “will not entirely meet all reclamation goals,” and, thus, as detailed in the Permit to Mine, active treatment technologies are necessary

and conditions within the Permit to Mine for continued maintenance of the treatments are required. Minn. R. 6132.0200.

18. As detailed in the findings set forth above, the specific requirements and conditions of the Permit to Mine have been established within the framework established under Chapter 6132. Minn. R. 6132.0200. The terms and conditions of the Permit to Mine are “directed toward attaining the goals while fulfilling the requirements” described in Chapter 6132. *Id.* The terms and conditions of the Permit to Mine were crafted to address the unique character of the NorthMet Project. *Id.*

19. Any Findings of Fact that might properly be termed Conclusions and any Conclusions that might properly be termed Findings of Fact are hereby adopted as such.

ORDER

Based upon the foregoing Findings of Fact and Conclusions, the DNR now orders the following:

1. WaterLegacy’s Petition for Contested Case Hearing and Joint Petitioners’ Joint Petition for a Contested Case Hearing are denied.
2. The Permit to Mine is granted subject to the general and special conditions set forth therein.
3. The assignment of designated portions of Permit to Mine #1.1 and the Cliffs Erie Closure Plan from Cleveland-Cliffs, Inc. and Cliffs Erie, L.L.C. to PolyMet is granted as set forth in the Ferrous Closure Permit to Mine and subject to general and specific conditions set forth therein.

Approved and adopted this 1st day of November, 2018

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

/s/ Tom Landwehr
TOM LANDWEHR
Commissioner
Minnesota Department of Natural Resources