

DATE: February 9, 2018

TO: MPCA Advisory Committee Members

FROM: Jeff Smith
Division Director
Industrial

PHONE: 651-757-2735

MEETING DATE: February 20, 2018

SUBJECT: PolyMet Mining, Inc.'s Proposed NorthMet Project
Status of Project Permits and Public Engagement

I. Status

PolyMet Mining, Inc. (PolyMet) is proposing to develop a mine and processing plant to extract copper, nickel, and precious metals from the NorthMet Deposit located in St. Louis County in Northeastern Minnesota. The mine would be the first of its kind in the state. PolyMet must obtain a number of required permits and approvals for the project, including several from the Minnesota Pollution Control Agency (MPCA).

The Advisory Committee will be provided with background information about the project, the current status of the permitting process, an overview of the draft permits and draft certification, and an update on public engagement efforts. **It should be noted that the draft air permit, draft water quality permit, and draft 401 water quality certification are currently on public notice through March 16, 2018. Formal public comments will not be taken on the draft permits during the Advisory Committee meeting.**

II. Background

PolyMet's proposed NorthMet project is located in the St. Louis River watershed on the eastern end of the Mesabi Iron Range. Processing of the ore would take place at the former LTV taconite plant near Hoyt Lakes. The proposed NorthMet project includes:

- An open pit copper, nickel, cobalt, and precious metals mine with adjacent temporary and permanent storage/stockpiles with containment systems, rail transfer hopper, and a wastewater treatment facility.
- A refurbished portion of the former LTV Steel Mining Company processing plant and construction of a new hydrometallurgical plant.
- An upgraded tailings basin and water containment system on the site of the existing LTV tailings basin, and a wastewater treatment plant.
- Both additional and refurbished utility infrastructure and rail lines.

A. Environmental Review

Prior to the current permitting phase, the proposed NorthMet project went through an extensive environmental review process. PolyMet submitted its initial project proposal to the Department of Natural Resources (DNR) in February 2005. In accordance with state and federal laws, Environmental Impact Statement (EIS) was prepared under the leadership of the DNR, U.S. Army Corps of Engineers (USACE), and the U.S. Forest Service (USFS). MPCA assisted in the development and review of the EIS. The final EIS was deemed adequate by the DNR in March 2016, marking the end of the state's environmental review process.

For more information about the state and federal environmental review of the proposed PolyMet project, see:

- DNR's environmental review website:
<http://www.dnr.state.mn.us/input/environmentalreview/polymet/index.html>
- USFS's environmental review website:
<https://www.fs.usda.gov/project/?project=33908>
- USACE's environmental review website:
<http://www.mvp.usace.army.mil/Missions/Regulatory/PolyMet.aspx>

B. Permitting

PolyMet needs multiple approvals from federal, state, and local agencies, including the MPCA, in order to proceed. The MPCA's role to protect air, water, and land is done, in part, through the issuance of environmental permits. The major permits the company would need from the MPCA include an air permit, a water quality permit, and a 401 water quality certification.

Attachment 1 depicts the steps in MPCA's permitting process and the current status.

i. Air Quality Permit

The air quality permit identifies the units that generate air pollutants, details the conditions under which the facility must operate to comply with rules and regulations and, where applicable, sets limits on those emissions.

On August 24, 2016, PolyMet submitted an application to the MPCA for an air quality permit for its proposed NorthMet mining project. MPCA staff processed the application and began preparing a draft permit. This resulted in additional information and clarifications being provided to the Agency. To reflect this additional information, PolyMet submitted an updated version of the permit application in January 2018.

MPCA staff have completed the review of the permit application and supporting materials and have prepared a draft permit and Technical Support Document for the proposed project. The draft permit and technical support document were provided to interested Tribes and PolyMet for their pre-public notice review on January 24, 2018.

The draft air permit opened for public comment January 31, 2018. The comment period closes on March 16, 2018.

The draft air permit and supporting documents, including the Technical Support Document, can be found on the MPCA website at <https://www.pca.state.mn.us/quick-links/air-quality-permit-northmet>.

In order to provide additional permit-related information to the public on specific topics of interest, the MPCA developed several fact sheets. The fact sheets help clarify the permitting process and certain conditions included in the permit.

Attachment 2 is the Fact Sheet – Overview of the PolyMet air permit

Attachment 3 is the Fact Sheet – PolyMet's mercury air emissions

Attachment 4 is the Fact Sheet – Fiber requirements in the PolyMet air permit

ii. Water Quality Permit

The water quality permit, formally known as the individual National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) Permit, authorizes the discharge of process wastewater to waters of the state, and contains the conditions under which the facility must operate to comply with rules and regulations.

On July 11, 2016, PolyMet submitted an application to the MPCA for an NPDES/SDS water quality permit for its proposed NorthMet mining project. MPCA staff processed the application and began preparing a draft permit. This process resulted in additional information and clarifications submitted to the Agency. To reflect this additional information, PolyMet submitted an updated version of the permit application in October 2017.

MPCA staff have completed their review of the updated permit application and supporting materials and have prepared a draft permit and supporting Fact Sheet for the proposed project. The draft permit and Fact Sheet were provided to interested Tribes, US Environmental Protection Agency (EPA) Region 5, and the Permittee for a pre-public notice review period on January 17, 2018.

The draft water quality permit opened for public comment on January 31, 2018. The comment period closes on March 16, 2018.

The draft water quality permit and supporting documents, including the Fact Sheet, can be found on the MPCA website at <https://www.pca.state.mn.us/quick-links/water-quality-permit-northmet>

In order to provide additional permit-related information to the public on specific topics of interest, the MPCA developed several fact sheets. The fact sheets help clarify the permitting process and certain conditions included in the permit.

- Attachment 5 is the Fact Sheet – NPDES Permit and PolyMet requirements
- Attachment 6 is the Fact Sheet – PolyMet permit highlights
- Attachment 7 is the Fact Sheet – NPDES/SDS permit and sulfate
- Attachment 8 is the Fact Sheet – Reverse osmosis

iii. 401 Water Quality Certification

Since Polymet proposes to alter (fill and/or excavate) protected wetlands for the NorthMet project, the company has applied for a permit under Section 404 of the federal Clean Water Act (CWA), governing placement of dredged or fill material into wetlands. Section 404 permits are issued by the USACE, which oversees such activities.

The 404 permit requires the applicant to also request a water quality certification from the state under CWA Section 401. This allows the state (in this case the MPCA) to review the proposed activity in order to determine if it will comply with applicable water quality standards, and identify any conditions needed to ensure compliance. If the review finds that water quality will be protected, the 401 certification is issued and the certification and conditions become part of the 404 permit.

The MPCA has examined the Project Revised Wetland Permit Application dated August 19, 2013, the Final Environmental Impact Statement dated November 2015, the NorthMet Project Wetland Replacement Plan dated December 2017, the Anti-Degradation Assessment – NorthMet Project Section 401 Certification dated December 2017, and other information furnished by PolyMet that is relevant to water quality considerations. The MPCA has determined there is reasonable assurance that the proposed activities will be conducted in a manner that will not violate applicable water quality standards, and proposes to certify the project with conditions. The draft 401 water quality certification and supporting documents were provided to interested Tribes, EPA Region 5, and the Permittee for a pre-public notice review period on January 17, 2018.

The draft 401 water quality certification opened for public comment on January 31, 2018. The comment period closes on March 16, 2018.

The draft 401 water quality certification and supporting documents can be found on the MPCA website at <https://www.pca.state.mn.us/quick-links/401-certification-northmet>.

In order to provide additional certification-related information to the public on specific topics of interest, the MPCA developed two fact sheets. The fact sheets help clarify the 401 certification process and certain conditions included in the draft certification.

Attachment 9 is the Fact Sheet – Clean Water Act Section 401 water quality certification
Attachment 10 is the Fact Sheet – 401 water quality certification for PolyMet

C. Public Engagement

In response to the public interest in this project, the MPCA has made a significant effort to engage the public. MPCA's efforts include a web portal, a project website that is routinely updated, and email subscription list, public comment period, and public meetings during the public comment period.

i. PolyMet permitting portal

The State of Minnesota launched a web portal dedicated to Minnesota's permitting process for PolyMet. The web portal provides basic permitting information and directs users to agency websites (DNR and MPCA) with more detail.

The PolyMet permitting portal can be found at www.mn.gov/polymet.

ii. MPCA project website

The MPCA created a project website to keep the public informed about the status of air quality and water quality permitting as well as the 401 certification. The website includes descriptions of the permitting processes, contains links to the permit applications, and any relevant submittals or correspondence.

The MPCA project website can be found at <https://www.pca.state.mn.us/northmet>.

iii. Email subscription list

Together with the DNR, the MPCA maintains an email subscription list for the project. The list is used to inform the public with regular updates and share information about key steps in the permitting/certification processes, including opportunities for public comment. There are over 7,000 subscribers. Messages are archived on the PolyMet permitting portal.

iv. Public comment period

Once drafted, most permits require a formal public notice where the draft permits are made available for public review and comment. The public is encouraged to provide comments on draft permits during the formal public comment periods. The MPCA considers all written comments received during the comment periods. Comments can and often do result in changes to the final permit. After public notice, the MPCA revises permits to reflect any changes that may result from public comments. To issue the permit, the MPCA must be satisfied that the permit ensures all applicable rules and regulations will be met and that the agency anticipates the applicant will comply with all conditions of the permit.

The MPCA is required by rule to provide a 30 day comment period for the air and water quality permits, and at least a 10 day notice period for the 401 water quality certification. Due to the significance of the PolyMet project and the level of public interest, the MPCA extended the public notice period for the draft permits and draft certification to 45 days. In addition, the draft water permit and draft 401 certification

documents were placed on the project website and made available to the public 2 weeks before the start of the public notice period. The draft air permit was available to the public 1 week before the start of the public comment period.

During the public comment period, comments can be submitted in one of three ways:

- Submit comments online using the PolyMet Permitting portal.
- Mail comments to the MPCA.
- Provide comments at the public meetings.
 - Stenographers were available to record oral comments offered individually and during the public comment forum.
 - Comment boxes were available for submitting written comments.

v. Public meetings

The MPCA held two public meetings on the draft permits, jointly with the DNR, at the locations and dates below:

Wednesday, February 7, 2018
Mesabi East High School
601 N 1st St W, Aurora, MN 55705
4:00-9:00 p.m. Open house
6:00-9:00 p.m. Public comment forum

Thursday, February 8, 2018
DECC – Duluth Entertainment Convention Center
350 Harbor Drive, Duluth, MN 55802
1:00-9:00 p.m. Open house
6:00-9:00 p.m. Public comment forum

vi. Tribal consultation

The Commissioner initiated the consultation process with Tribes and Tribal Organizations that have expressed interest in projects in St. Louis County. The consultation on the PolyMet project draft permits is scheduled for Thursday, March 1 in Duluth.

III. Advice

The Commissioner is seeking advice from the Advisory Committee on the following:

- A. What factors should the MPCA consider in determining whether the comment period should be extended, if requested?
- B. Do you see any gaps in our public outreach and engagement strategy?
- C. Are there areas that the Commissioner should focus on in his review of public comments?

Attachments (see link for electronic access)

- Attachment 1 – MPCA Permitting Processes and Status
- Attachment 2 - Overview of the PolyMet air permit
- Attachment 3 - PolyMet's mercury air emissions
- Attachment 4 - Fiber requirements in the PolyMet air permit
- Attachment 5 - NPDES Permit and PolyMet requirements
- Attachment 6 – PolyMet permit highlights
- Attachment 7 – NPDES/SDS permit and sulfate
- Attachment 8 – Reverse osmosis
- Attachment 9 – Clean Water Act Section 401 water quality certification
- Attachment 10 – 401 water quality certification for PolyMet

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MPCA permitting processes



Air Permitting Process



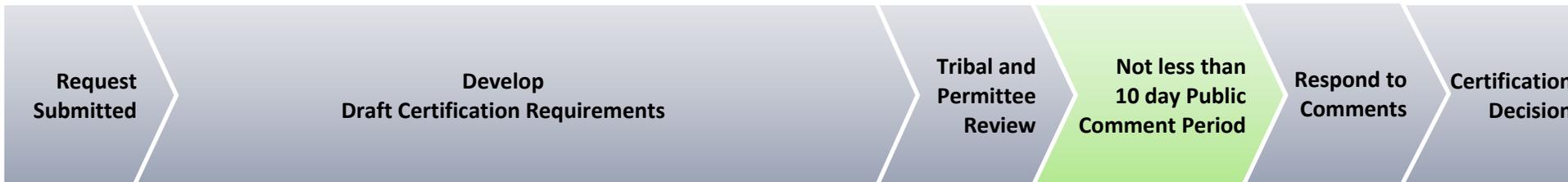
Current Status

Water Permitting Process



Current Status

401 Certification Process



Current Status

*Includes coordination with EPA

Overview of PolyMet's air permit

Poly Met Mining Inc. (PolyMet) is proposing to develop a mine and processing facility for the extraction of copper, nickel, and platinum group elements from the NorthMet Deposit in northeastern Minnesota. The purpose of this fact sheet is to provide information about air permitting and some key elements of PolyMet's air permit.

Air permitting basics

An air permit is a legal document that describes how a facility must operate in order to meet federal and state air quality requirements. The type and quantity of pollutants emitted determines what type of permit is needed and what regulations apply. On August 24, 2016, PolyMet submitted an air permit application to the Minnesota Pollution Control Agency (MPCA) for its proposed project. The application contains information about the sources of air pollution at the facility and any pollution control measures that will be used to reduce emissions.

When reviewing the application materials, the MPCA determines how each piece of equipment must operate, often setting maximum production rates, emission limits, monitoring, and recordkeeping requirements. The MPCA drafts an air permit detailing these requirements and a technical support document (TSD) which contains the justification for the permit requirements. The draft permit and TSD are made available for public review and comment for at least 30 days. The MPCA considers all written comments it receives during this period when making the decision whether to issue the permit. Public comments may result in changes to the draft permit. A permit can only be issued if the facility is able to meet all applicable requirements.

Most of the time, and in the case of PolyMet, an air permit must be issued before a facility can be constructed. The permit is issued for a five-year term, after which it can be renewed for another five years.

PolyMet's air emissions

Sources of air emissions at the PolyMet facility include emissions from equipment such as crushers used to grind the rock into fine powder, space heaters used to warm buildings, and an autoclave, which is a high-pressure, high-temperature vessel used to process the ore. Emissions control equipment such as fabric filters and scrubbers are used to decrease emissions from these types of sources. The permit requires that control equipment be installed, operated, and maintained to ensure emissions are reduced.

Air emissions that cannot be exhausted through a stack are called fugitive emissions. PolyMet's fugitive emissions include sources such as dust blowing off stockpiles and unpaved roads. Fugitive emissions are controlled by using water or a dust suppressant and work practices to minimize emissions. The fugitive dust control plan details the actions PolyMet must take to minimize fugitive dust. At the mine, where most of the air emissions are fugitive, PolyMet will operate air monitors to inform whether current dust control measures are working or whether additional actions are needed to control fugitive dust. Fugitive emissions do not count toward applicability of some federal regulations.

The draft air permit contains requirements that limit the facility's emissions in order to meet ambient air quality standards, comply with state and federal rules that apply to specific types of equipment, and avoid being subject to regulations that apply to the largest emitters.

The table below shows maximum emissions the draft permit allows as well as the facility's expected actual emissions.

PolyMet Emissions Summary, in tons per year

	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO	CO _{2e}	VOC	Single HAP	All HAPs
Maximum emissions, excluding fugitive emissions	179	170	166	7	101	113	160,679	49	5	19
Maximum emissions, including fugitive emissions	2,530	885	267	8	107	114	160,679	50	5	19
Estimated actual emissions, including fugitive emissions	2,468	826	209	5	41	49	NA	42	NA	NA

Particulate matter (PM), particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), carbon dioxide equivalents (CO_{2e}), volatile organic compound (VOC), hazardous air pollutant (HAP)

PolyMet's impact on air quality

Air dispersion modeling is used to quantify how a facility's emissions will affect nearby air quality. Before a facility does any air modeling, the MPCA must agree to the technical approach and the data used. When it receives results, the MPCA determines whether the approved protocols were followed and whether the predicted pollutant concentrations meet standards. PolyMet did two different types of modeling to quantify its impact on air quality called Class I modeling and Class II modeling.

Class I modeling evaluates the impact of PolyMet's emissions in places with special air quality protections. PolyMet is near four Class I areas (which have special protections under the Clean Air Act): Boundary Water Canoe Area Wilderness, Voyageurs National Park, Isle Royale National Park, and Rainbow Lake Wilderness. The Class I modeling demonstrates that PolyMet's emissions, as limited by its permit, will not deteriorate air quality in nearby Class I areas. In addition, visibility impacts will be below perceptible levels.

Class II modeling determines whether PolyMet would cause exceedances of air quality standards near the facility, where the highest emissions occur. The U.S. EPA sets air quality standards, which are the maximum allowed concentration of pollutants. PolyMet's Class II modeling demonstrates its stack and fugitive emissions will not exceed air quality standards. The permit contains requirements that detail what changes at the facility, such as adding or changing emissions sources or changing stack height, would require PolyMet to re-model.

PolyMet's impact on health

An Air Emissions Risk Analysis uses a scientific process to estimate the potential human health risks from air pollution emitted by a proposed project. This analysis evaluates health risks posed to individuals who work at and live around the facility. Each health impact evaluation showed PolyMet's emissions, as limited by its permit, would not result in unacceptable risks to human health.

Evaluating compliance with the permit

To determine whether PolyMet is meeting its emission limits and complying with its permit, the air permit requires monitoring, documentation, and reporting, including:

- Conducting stack tests to measure actual emissions
- Monitoring control equipment operating parameters to tell us whether it is operating correctly
- Tracking and recording material throughput, hours of operation, miles traveled, etc. when the permit contains a restriction
- Operating ambient monitors to evaluate the effectiveness of the fugitive emissions controls
- Submitting regular notifications and reports disclosing any time it did not meet its permit requirements.

In addition, the MPCA conducts on-site inspections to evaluate whether PolyMet is complying with its permit requirements.

PolyMet's mercury air emissions

Minimizing mercury emissions to prevent water quality impacts

Poly Met Mining Inc. (PolyMet) is proposing to develop a mine and processing facility for the extraction of copper, nickel, and platinum group elements from the NorthMet Deposit in northeastern Minnesota. The MPCA and its partners are working to reduce mercury in our lakes and streams. The purpose of this fact sheet is to provide information about PolyMet's emissions of mercury and the actions it must take to minimize those emissions.

Statewide goal: Reducing mercury emissions

Mercury is a neurological toxin that accumulates in the food chain. Airborne mercury is deposited over land and water. Water runoff from land brings mercury into lakes. As big fish eat smaller fish, mercury concentrations build up in fish tissue. Fish in many of the lakes and rivers in Minnesota have elevated concentrations of mercury.

Because 99 percent of mercury in Minnesota's lakes and streams is from atmospheric deposition, mercury emissions reductions are needed to reduce mercury concentrations in fish. The Statewide Mercury Total Maximum Daily Load (TMDL) sets a statewide goal for reducing mercury emissions. Achieving this goal relies on the existing sources of mercury emissions making large reductions and new sources minimizing mercury emissions.

The MPCA and its partners created guidelines to ensure new sources of mercury emissions would not jeopardize meeting the statewide reduction goal. Therefore, any new sources of mercury emissions in Minnesota must:

- Complete environmental review (an Environmental Assessment Worksheet or an Environmental Impact Statement [EIS])
- Install the best mercury emissions controls available
- Accept a limit on the amount of mercury the new source is allowed to emit
- If a new source has mercury emissions greater than three pounds per year (lb/yr) and will impede TMDL reduction goals, it must submit a mercury mitigation plan.

In accordance, PolyMet has done an EIS, is installing the best available mercury controls, and the air permit contains a limit on the amount of mercury emitted. Due to faster than expected reductions in statewide mercury emissions and because PolyMet's projected mercury emissions are small (4.6 lb/yr), the MPCA determined the proposed PolyMet project will not impede progress toward the TMDL reduction goals.

PolyMet's mercury emissions

PolyMet's waste rock, ore, and fuels contain trace amounts of mercury. When the ore is processed or fuel is combusted mercury is released to the environment. Total maximum mercury emissions allowed from PolyMet will be 4.6 lb/year. The majority of the emissions are from the autoclave and there is a small amount emitted from fuel combustion and ore processing.

Issue summary

The state of Minnesota has long-term goals to reduce mercury in the state. PolyMet must minimize its mercury emissions in order to ensure it won't jeopardize those goals.

PolyMet's air permit limits its mercury emissions to no more than 4.6 lb/year. Actual emissions will be less. The permit does this by requiring installation, operation, and maintenance of mercury control equipment, and monitoring and recordkeeping.

The autoclave is a high-pressure, high-temperature vessel used to extract platinum group elements, precious metals, and base metals. The draft air permit limits mercury emissions from the autoclave to no more than 4.1 lb/yr. To meet this limit, PolyMet is installing mercury emissions controls consisting of a venturi scrubber followed by a wet scrubber. The venturi scrubber removes particle-bound mercury and the wet scrubber will remove any oxidized mercury which has not been captured in the venturi scrubber. This two-stage mercury control system is the best available for mercury emission control. The scrubber effluent is recycled within the hydrometallurgical process to conserve water. Water and waste solids discharged from the process, which may contain mercury, are sent to the Hydrometallurgical Residue Facility where they will be safely managed and remain isolated from further transport to the environment.

PolyMet would emit up to 0.4 lb/yr of mercury from fuels used for space heating and generating steam. The permit requires the use of natural gas, which has the lowest mercury content of fossil fuels available.

There is a small amount of mercury emitted from the processing of the ore and as fugitive dust from the facility (0.1 lb/yr). These mercury emissions are in the form of particulate-bound mercury. Emissions from processing the ore will be controlled by fabric filters, which have been identified as the most effective emission controls for particulates. By controlling fugitive dust emissions, PolyMet will control the particulate-bound mercury emitted from the ore.

Determining compliance

The draft air permit contains conditions requiring that control equipment is properly operated and maintained, documentation of ongoing performance, and routine compliance demonstrations, including:

- Stack tests to measure mercury emissions and set acceptable operating parameters for the scrubbers
- Continuous monitoring and recording of the pressure drop and liquid flow rate for each scrubber and requirements to take corrective actions if outside the acceptable ranges
- Retaining records of all monitoring and maintenance of the control equipment
- Reporting the results of all stack tests, any deviations of allowable pressure drop and liquid flow rates, and annual emissions.

The compliance demonstration requirements will ensure the mercury limit is met on an ongoing basis as well as provide information about actual emissions.

Fiber requirements in the PolyMet air permit

Poly Met Mining, Inc. (PolyMet) is proposing to develop a mine and processing facility for the extraction of copper, nickel, and platinum group elements from the NorthMet deposit in northeastern Minnesota. On August 24, 2016, PolyMet submitted an air permit application to the Minnesota Pollution Control Agency (MPCA) for its proposed project. The purpose of this fact sheet is to provide information about fibers and the fiber requirements contained in PolyMet's air permit.

What are fibers?

PolyMet proposes to mine and process ore that contains amphibole minerals, a common mineral found throughout the world. When the ore is processed it is possible that amphibole mineral particles, or fibers, will be released in the particulate emissions from the facility.

This is of interest because amphibole minerals are found in two different forms: asbestiform and non-asbestiform. PolyMet's ore body contains non-asbestiform amphibole minerals. It is not known whether inhalation of non-asbestiform minerals has any impact on health. However, inhalation of asbestiform amphibole minerals, like commercial asbestos, is known to increase the risk of lung cancer and mesothelioma.

Therefore, as a precautionary measure, the PolyMet Environmental Impact Statement committed the company to activities to minimize the release of airborne fibers and monitor their concentration in the air. These requirements are contained within the air permit for PolyMet.

PolyMet's fiber requirements

Any potential impacts of fiber emissions are anticipated to be minimized based on the use of high efficiency particulate control equipment, the implementation of a robust fugitive emission control plan, and ongoing fiber monitoring.

Minimize particulate emissions

Fibers are about the same size as fine particulate matter (PM_{2.5}), a common pollutant emitted and controlled by industrial facilities. For this reason, we believe any actions PolyMet takes to minimize PM_{2.5} emissions will also minimize fiber emissions. The permit requires installation of the best available PM_{2.5} control equipment on sources that have the potential to emit fibers.

At the processing plant, this means installing, operating, and maintaining control equipment on activities and equipment associated with crushing, concentrating, and handling the ore. Particulate control equipment required by the permit includes fabric filters on sources that vent air to the exterior of a building, and high efficiency particulate air (HEPA) filters when air is recirculated inside buildings. Throughout the draft permit, there are requirements to operate and maintain these controls.

Minimize fugitive dust

Fibers are also associated with some sources of fugitive dust, which is particulate matter that is not emitted from a stack or building vent, like dust from unpaved surfaces. To minimize emissions of fibers from fugitive dust PolyMet is required to follow a robust fugitive emission control plan. This plan describes the actions it will take to prevent and minimize fugitive dust emissions. PolyMet is required to document all fugitive dust control activities.

In addition, PolyMet must operate ambient particulate monitors at the mine site to evaluate the effectiveness of the fugitive emissions controls. If the ambient monitors measure elevated levels of particulate, PolyMet must take additional action to reduce fugitive dust. Fugitive emission control plans for the plant site and the mine site are attached to the permit. The requirement to conduct onsite particulate monitoring is found in the total facility requirements section of the permit.

Monitor fibers

PolyMet must also monitor fibers concentrations in the city of Hoyt Lakes when the plant starts operating. This will give us information whether the concentration of fibers in ambient air in Hoyt Lakes changes as a result of the facility's operation. The facility will develop and follow an ambient monitoring plan and must use MPCA-approved monitoring and laboratory methods. The fiber monitoring requirements are in the total facility requirements section of the permit.

NPDES permit and PolyMet requirements

PolyMet applied for an NPDES/SDS (National Pollutant Discharge Elimination System/State Disposal System) permit to construct and operate a wastewater treatment and disposal system and to discharge treated wastewater from its proposed copper and nickel mining operation.

Draft PolyMet permit requirements

The MPCA reviewed the PolyMet permit application and developed a draft NPDES/SDS permit with requirements specific to the proposed facility.

Weekly, monthly, quarterly, and annual monitoring to the MPCA at 167 monitoring locations for a wide variety of parameters specific to copper and nickel mining.

Contains various special conditions to address issues specific to its proposed project. The special conditions in the draft permit include:

- Authorized discharges
- Management of water during construction
- Discharge prohibitions
- Performance monitoring requirements for the wastewater treatment system
- Model verification and evaluation
- Annual groundwater evaluation
- Annual comprehensive performance evaluation
- Various notification requirements
- Authorization to operate a hydrometallurgical residue facility

NPDES background

Under the Clean Water Act, any discharge of pollutants through a point source into a lake, stream, wetland, and other surface water requires a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES permit translates the general requirements of the Clean Water Act into specific provisions tailored to the operations of each facility discharging pollutants

State Disposal System (SDS) permits are used in Minnesota to regulate the construction and operation of wastewater disposal systems, including land treatment systems. In Minnesota, NPDES and SDS permits are often combined. Together, NPDES/SDS permits establish specific limits on what can be discharged, monitoring and reporting requirements, and other provisions to protect Minnesota's surface and groundwater quality for a variety of uses, including drinking water, fishing, and recreation.

An NPDES/SDS permit for an individual industrial facility may cover a number of different waste types and activities, including industrial process wastewater, domestic wastewater, contact and non-contact cooling

water, stormwater, contaminated ground water pump outs, mine pit dewatering, water supply, treatment backwash, and wastewater treatment sludges.

The Minnesota Pollution Control Agency (MPCA) is authorized to issue NPDES/SDS permits for existing and proposed wastewater discharges and currently regulates approximately 1,500 permitted facilities through these permits.

Who must obtain an NPDES permit?

Cities, industries, businesses, and other privately owned facilities that discharge wastewater directly to surface waters must obtain an NPDES permit. The Clean Water Act requires all point source discharges from mining operations, including discharges from associated impoundments, to be authorized under an NPDES permit.

What does an NPDES permit include?

NPDES permits incorporate applicable federal and state rules and laws. They lay out requirements the permittee must meet in order to discharge (NPDES) or dispose of (SDS) wastewater. NPDES permits include facility-specific requirements such as the facility description, map and location of the facility, limit and monitoring requirements, special conditions, and standard permit conditions.

How do NPDES permits protect water?

An NPDES permit will generally specify an acceptable level of a pollutant in a discharge (for example, a certain level of suspended solids). The permittee may choose which technologies to use to achieve that level. NPDES permits make sure that a state's mandatory standards for clean water and the federal minimums are being met.

Permits are regularly reviewed and updated as they expire, allowing the MPCA to incorporate new information about the impacts of pollutants to the environment in subsequent permits. Permits are enforced through a combination of self-reporting (reports to the MPCA, U.S. EPA, or both) and compliance monitoring.

PolyMet permit highlights

Wastewater treatment system performance and sulfate

Sulfate Operating Limit of 10 mg/L (based on 12-month average)

- Internal monitoring location: Guarantees that WWTS/membrane treatment achieves required level of sulfate removal
- Enforceable permit limit
- Monitored weekly
- Consistent with existing Wild Rice Sulfate Water Quality Standard of 10 mg/L, which is protective of downstream wild rice

Sulfate Operating Target of 9 mg/L (based on monthly average)

- Trigger value – If exceeded, requires implementation of pre-approved Sulfate Reduction Plan to ensure that the 10 mg/L Operating Limit is not exceeded

Wastewater treatment system performance and metals removal

Copper Operating Limit of 9.3 ug/L (based on monthly average)

- Internal monitoring location: Guarantees that WWTS/membrane treatment achieves required level of metals removal
- Enforceable permit limit
- Monitored weekly
- Consistent with existing Chronic Water Quality Standard for copper

With membrane treatment, if the WWTS can achieve the operating targets for sulfate and copper, it will achieve the Water Quality Standard for other metals as well.

Permit monitoring requirements

Monitoring requirements are extensive – 167 total monitoring points

- Mine site – 99 monitoring points
 - 13 internal monitoring points
 - 78 groundwater monitoring points
 - 8 surface water monitoring points
- Plant site – 51 monitoring points
 - 6 internal monitoring points
 - 39 groundwater monitoring points
 - 6 surface water monitoring points
- Wastewater treatment system – 17 monitoring points
 - 5 influent and internal monitoring points
 - 1 internal enforceable WWTS performance monitoring point

- 1 centralized effluent water quality monitoring point
- 10 effluent flow monitoring points

Provides assurance that all engineering controls are functioning properly, no unauthorized discharge is occurring, and water resources are protected.

Required reports and submittals

Monthly Discharge Monitoring Reports (DMRs)

- All sample results collected for the previous month reported to the MPCA
- Publicly available on MPCA website

Annual Groundwater Evaluation Report

- Annual assessment of groundwater monitoring data
- Early assessment of potential impact to groundwater
- Assess need for adaptive management to avoid impacts
- Assess potential for a north flow path at the mine site

Annual Comprehensive Performance Evaluation Report

- Uses all data to assess performance of individual engineering controls
 - Seepage capture systems and stockpile liners
 - Mine pit dewatering
 - Wastewater storage ponds and conveyance systems
- Assess need for adaptive management to avoid impacts

Model Verification Reports

- Annual and comprehensive 5-year assessments
- Assess performance of the GoldSim models by comparing predicted water quality and water quantity values against actual observed values

Additional permit requirements

- No discharge of process wastewater allowed from mine site: All mine drainage must be collected and pumped to the WWTS for treatment
- Includes all federally required effluent limits and requirements for copper mines
- Requirements for taking samples and conducting analyses
- Maintenance and inspection of wastewater storage ponds and pipelines: Includes the mine to plant pipeline/utility corridor
- Requirements related to the design and construction of the Hydrometallurgical Residue Facility
 - Subsurface investigation to identify current conditions
 - Review and approval of preload design to address expected subsurface issues
 - Monitoring plan to assess success of the preload design
- Chronic toxicity (WET) testing of WWTS effluent

NPDES/SDS permit and sulfate

PolyMet is proposing an advanced, state-of-the-art wastewater treatment system (WWTS) as part of its project.

- The WWTS includes a combination of reverse osmosis and nanofiltration, which involve pushing water through membranes to remove pollutants.
- Pilot testing and engineering modeling shows the proposed system is capable of consistently producing an effluent below 10 mg/L sulfate.
- Because the water quality standard for wild rice is 10 mg/L sulfate, that value is considered to be the level of treatment necessary for the PolyMet project.

The Clean Water Act requires the MPCA to evaluate whether a discharge will have the “reasonable potential” to cause or contribute to an exceedance of a water quality standard in waters downstream of the discharge.

- MPCA uses a “reasonable potential” analysis to statistically predict whether a proposed discharge is likely to exceed a water quality standard in the receiving water or in waters farther downstream.
- MPCA’s analysis accounts for the projected water quality of the discharge, the volume of the discharge, the existing water quality of the receiving water, and the flow rate of the receiving water.

MPCA determined there is no reasonable potential to exceed the existing 10 mg/L wild rice sulfate standard in downstream waters because the discharge from the WWTS is projected to always be below 10 mg/L.

If a discharge does not have reasonable potential to exceed a water quality standard, then EPA guidance recommends that a “water quality-based effluent limit” is not required in the permit.

- Because MPCA determined there is no reasonable potential for sulfate in the PolyMet discharge, the draft permit does not include a water quality-based effluent limit for sulfate.

However, the final environmental impact statement (FEIS) for the PolyMet project based its analysis of environmental effects on the ability to achieve less than 10 mg/L sulfate in the discharge.

- As part of its project design, PolyMet included a WWTS with reverse osmosis membrane treatment that would be capable of producing a discharge with less than 10 mg/L sulfate.
- PolyMet committed to this treatment system design to reduce any uncertainty about the project’s potential to affect downstream wild rice.

Even though the MPCA found no reasonable potential for sulfate to cause a problem, and no effluent limit is required to be included in the permit, the MPCA wanted assurance that the WWTS would actually achieve less than 10 mg/L sulfate. Therefore, the draft permit includes an Operating Limit of 10 mg/L sulfate for the WWTS.

- The Operating Limit applies at a point immediately after the membrane treatment portion of the WWTS is complete, where the reverse osmosis and nanofiltration water mix.
- The permit prohibits the introduction of additional sulfate into the treated water after this point.
- The Operating Limit is an enforceable limit at both a state and federal level — an exceedance of this limit is a violation of the permit.

To reduce the chance of exceeding the 10 mg/L sulfate Operating Limit, the draft permit also includes an Operating Target of 9 mg/L sulfate.

- The Operating Target is a "trigger" value that, if exceeded, requires additional action by PolyMet but is not automatically a violation of the permit.
- If the Operating Target is exceeded, the draft permit requires PolyMet to implement a pre-approved Sulfate Reduction Plan that is designed to correct what is causing the higher levels of sulfate and prevent the discharge from ever exceeding the 10 mg/L Operating Limit.

With the inclusion of the Operating Limit and Operating Target as permit requirements, the draft permit provides maximum assurance that the discharge will not exceed 10 mg/L sulfate and that the proposed PolyMet project is protective of downstream wild rice.

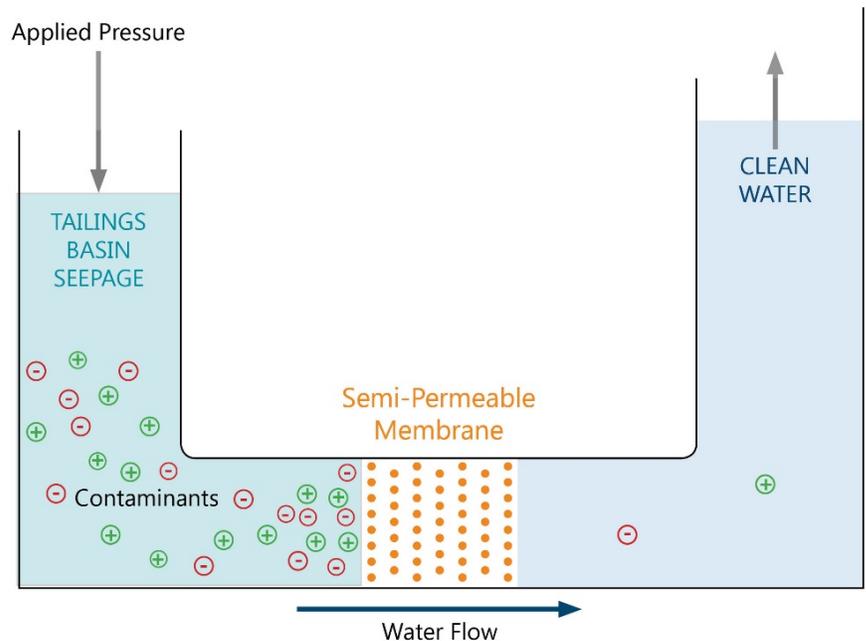
Reverse osmosis

PolyMet will use reverse osmosis, a common type of membrane separation, in its water treatment process.

Reverse osmosis is a common type of water treatment. It uses membrane separation technology that has been in use for more than 40 years. Small reverse osmosis systems are found in many homes, where they are used in “under-sink” treatment systems for improving the taste of tap water by removing salts and other dissolved contaminants. Commercially, reverse osmosis systems treat bottled water and water used in production of other beverages including most canned or bottled soft drinks. In areas with a limited supply of fresh water, reverse osmosis has been used to remove salt from seawater to create drinking water. With continuous improvements in membranes, reverse osmosis remains a state-of-the-art technology for water treatment.

How it works

Using a pump to increase the pressure within a water treatment system, reverse osmosis works by pushing water molecules through a semi-permeable membrane. The size of the pore spaces (holes) through the membrane restricts the flow of charged particles, such as sulfate and other contaminants, while allowing clean water molecules to pass through, as shown in the diagram. The clean water is then stabilized with the addition of calcium and bicarbonate before it is discharged.



The built-up particles that do not pass through the membrane stay in a concentrated liquid waste, called a brine. For the PolyMet Project, the brine will be treated and the solids will be disposed of at a permitted facility or processed in the Hydrometallurgical Plant.

PolyMet will continuously monitor the membrane performance. The membranes will be regularly cleaned, and the cleaning solution will be pumped to the tailings basin pond. With regular maintenance, membranes last for many years before they wear out. When they reach the end of their design life, the membranes will be replaced.

Clean Water Act Section 401 water quality certification

Section 401 of the Clean Water Act is designed to ensure that the federal government does not issue a permit or license for a project that will cause a violation of state water quality standards. States are required to set water quality standards under the Clean Water Act. State water quality standards set the conditions that must exist in order to protect beneficial uses, such as drinking water, a healthy aquatic community, and recreational uses such as swimming and fish consumption.

When a project that will impact waters within Minnesota requires a federal permit or license, the Minnesota Pollution Control Agency (MPCA) reviews the project under Section 401 to ensure that it will not violate the water quality standards that the MPCA has established for that water body.

The federal agency cannot issue the permit or license until the MPCA has either certified that the project will comply with water quality standards, or waived its review. This review of federally permitted projects gives the 401 certification program a unique role in water quality protection.

When does a project need a 401 Certification?

If a project meets the following four conditions, it triggers the need for an MPCA 401 Certification:

- 1) The project requires federal authorization.** Most commonly, this means the project needs a federal permit or license, such as a dredge and fill permit issued by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act or a Federal Energy Regulatory Commissioner hydropower license. It also includes projects carried out by a federal agency.
- 2) A potential for a discharge exists.** The project must have the potential to create a discharge. This may be a discharge of pollutants, dredge material, or other discharges including an increase or decrease in flow.
- 3) The discharge is into “Waters of the United States”.** The Clean Water Act only applies to a potential discharge to “Waters of the U.S.” Consequently, the MPCA’s 401 Certification is only required if the potential discharge is to a “Water of the U.S.”
- 4) The discharge is from a point source.** The potential discharge must come from a point source, which simply means that it must be from a distinct and discernible source.

A project that meets all four of the requirements cannot move forward without a 401 certification or waiver. If the potential discharge originates in Minnesota, the MPCA has the authority to issue, waive, or deny a Section 401 certification. Once a project has triggered the requirement for a 401 certification, the MPCA is not limited to addressing only the discharge into the Waters of the U.S. The MPCA may look at the impact of the project on any waters or wetlands protected by state water quality standards or other rules, even if those are not subject to the Federal Clean Water Act.

What is the 401 Certification process?

Individual 404 permits

The most common federal projects that require a 401 Certification are individual 404 permits. The MPCA prioritizes reviewing projects with higher potential for impact to water quality. Individual authorizations of small projects, called Letters of Permission, are currently waived; the MPCA focuses on standard individual permits.

The Section 401 Certification uses a joint state/federal application form.¹ When a project proposer applies to the federal agency for a permit, the federal agency reviews the application and ensures the MPCA receives a copy.

The USACE issues a public notice of application for all individual permits. In most cases, the public notice triggers the MPCA's review process, and an internal team will meet to review the basics of the project and determine what certification outcomes are required. For more complex projects, the MPCA's focuses on early involvement and discussion with the federal agency, the applicant, and related agencies. If the MPCA plans to issue a certification, it will issue a separate public notice after it has developed the draft certification. If the MPCA includes project-specific conditions in its certification, they will become conditions of the federal 404 permit upon issuance.

General 404 permits

The USACE issues Section 404 general permits, which provide coverage for a large number of smaller projects that have the potential for only minor water quality impacts. The MPCA issues a 401 certification that includes conditions that become part of the general permit and apply to all projects authorized under the general permit.

Other permits

The MPCA may also issue Section 401 Certifications for permits issued by the USACE or U.S. Coast Guard under Sections 9 or 10 of the Rivers and Harbors Act. These projects relate to the placing of obstructions – such as dams, bridges, and bulkheads – in or over navigable waters or excavation and fill in navigable waters. The MPCA also issues Section 401 Certifications for Federal Energy Regulatory Commission hydropower licenses. These actions are less frequent and are handled on a case-by-case basis.

What are potential 401 Certification outcomes?

Waive. A waiver means that the state is waiving its authority to review the project or impose conditions. The MPCA often waives review of small projects that appear to have minimal environmental impacts. Under the Clean Water Act, the USACE can assume that the MPCA has issued a waiver if we do not act within one year of the public notice.

Certify. When there is reasonable assurance that a project will comply with applicable water quality standards, the MPCA may certify the project. Most certifications include conditions that must be followed in order to ensure water quality standards are met. Common conditions include compensatory mitigation for the loss of wetlands or streams, use of best management practices to prevent pollutant discharges, and monitoring of wetlands or waters with associated reporting. Like a typical permit, the project proposer must comply with the conditions in the certification, which are incorporated into the federal permit or license.

Deny. The MPCA may deny a certification, in which case the federal agency cannot issue the related permit. A denial may mean that the MPCA believes that the project is unlikely to comply with water quality standards, or that there is not enough information to certify the project. The most common reason for a denial is an incomplete state environmental review, and the one year deadline is approaching. The MPCA cannot issue a 401 Certification before completion of environmental review.

How does the MPCA coordinate within MPCA and with other agencies?

The MPCA 401 program coordinates with other MPCA programs (such as NPDES and stormwater) and other state and federal agencies that have regulatory authority over a particular project (such as the Minnesota Department of Natural Resources, Board of Water and Soil Resources, USACE, etc.). This coordination ensures a common understanding of each project and its potential impacts, helps to identify concerns held by multiple agencies so that the project proposer can ensure that all regulatory concerns are addressed simultaneously, and results in efficient and effective permitting.

¹ *Joint Application Form for Activities Affecting Water Resources in Minnesota* http://www.bwsr.state.mn.us/wetlands/forms/MN_joint_appl_form.pdf

401 Water Quality Certification for PolyMet

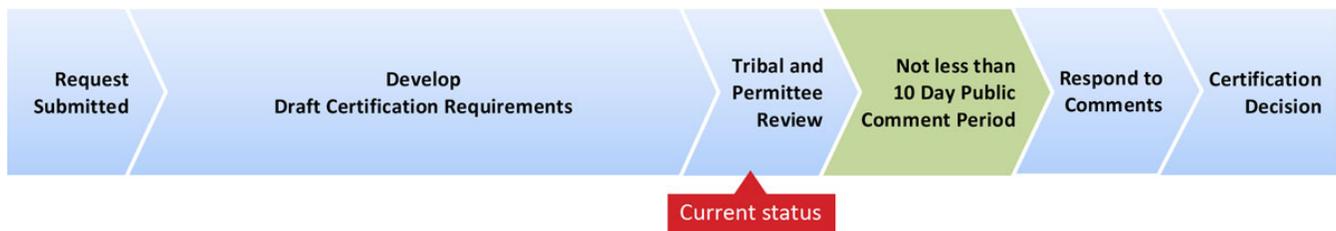
Poly Met Mining, Inc. (PolyMet) is proposing to develop a mine and processing facility to extract copper, nickel, and platinum group elements from the NorthMet deposit in northeastern Minnesota (known as the NorthMet project). The purpose of this fact sheet is to describe the 401 certification process and draft 401 certification for the project.

401 Certification process

Section 401 of the Clean Water Act allows states to review certain federal permits or projects to determine if authorized activities will comply with applicable state water quality standards. These standards are set by states in order to identify and prescribe the conditions that must exist in order to protect beneficial uses, such as drinking water, healthy aquatic communities, or fishing and swimming, in state waters.

A federal agency cannot issue a permit or approve a project until the state has either certified that the project will comply with water quality standards or waived its review. In certifying a project, a state may impose certain conditions to protect water quality, which are then incorporated into the federal permit or authorization.

The MPCA follows the general process below for processing 401 certification requests.



Draft 401 certification for the PolyMet project

In 2013, PolyMet first submitted a request for Clean Water Act (CWA) 401 water quality certification of the project to the Minnesota Pollution Control Agency (MPCA). PolyMet has updated its request and supporting information periodically since 2016.

Why does PolyMet need a 401 certification?

In developing the mine and plant sites and associated utility and transportation corridors, PolyMet proposes to impact approximately 930 acres of wetlands. The project will need a CWA Section 404 permit from the U.S. Army Corps of Engineers before any of these wetland impacts can occur. The 404 permit triggers the need for an MPCA-issued 401 certification.

What's in the draft 401 certification?

The MPCA's draft 401 certification provides a brief description of the proposed NorthMet project and location, and indicates the agency's decision to propose certification of the project, with a number of conditions. With the inclusion of these conditions, the MPCA provides its preliminary determination that the project will be conducted in a manner that will not violate state water quality standards.

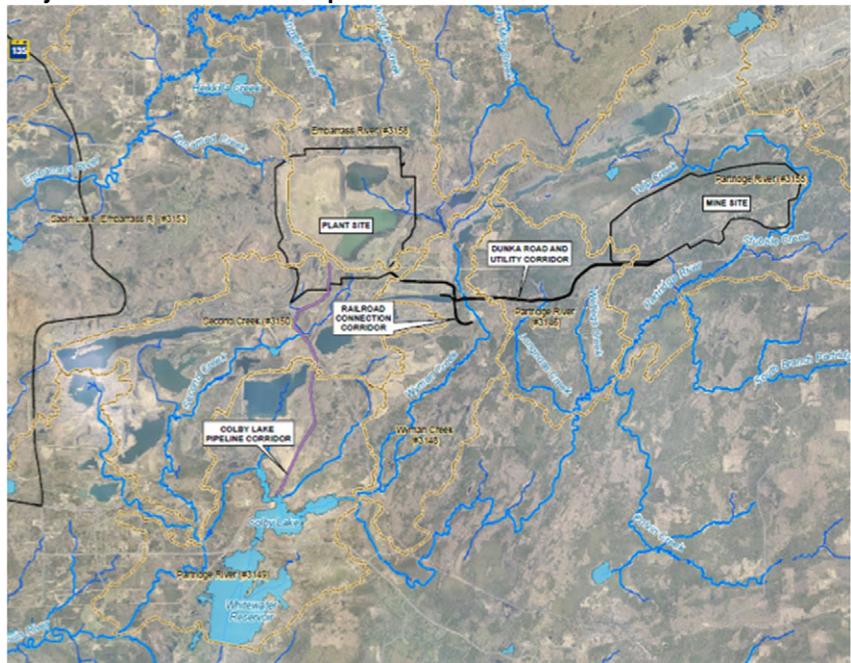
Project information

The project is located near Babbitt and Hoyt Lakes, in St. Louis County, Minnesota.

In developing its proposed mine and processing facilities for the NorthMet project, PolyMet proposes to impact 127 wetlands, covering a total of approximately 930 acres.

The project's excavation and/or fill activities will directly affect approximately 903 acres of wetland, and about an additional 27 acres of wetlands will be indirectly impacted by fragmentation (loss of wetland connectivity). PolyMet has proposed to offset these wetland impacts through purchasing wetland mitigation credits from the Superior Mitigation Bank, which is located in the same watershed (St. Louis River) as the project.

Project area watersheds and public waters



Draft 401 Certification conditions

The MPCA proposes to certify the project, with these conditions:

Water quality and wetland hydrology and vegetation monitoring: Proposed conditions would require stream and wetland water quality monitoring, both before and during the project, to provide data to assess potential effects on water quality that may result from air deposition of sulfur and air emissions of metals associated with the project. Additionally, the MPCA also proposes to require wetland hydrology and vegetation monitoring, both before and during the project, to provide data that will help the agency ensure that wetland functions and values are adequately protected and/or replaced where necessary.

Reporting: The MPCA proposes to require annual monitoring reports (for agency review and approval) that include raw data, analysis and interpretation of data, and recommendations for any needed adaptive management strategies, such as increased monitoring or mitigation methods to protect water quality. If the project is found to result in additional physical changes to wetlands (such as a change in hydrology that results in a change to, or loss of, a wetland), proposals for additional compensatory mitigation are required with the annual report.

Stream hydrology monitoring: The Minnesota Department of Natural Resources expects to require monitoring for certain streams through its water appropriations permits. Proposed conditions in the 401 certification would require that such monitoring data be provided to the MPCA if it shows significant changes in stream hydrology; the MPCA would review the data to determine if compensatory mitigation for stream impacts is needed.

Compensatory mitigation: Proposed conditions require mitigation for all permanent impacts to surface waters and notification of any proposed changes to the mitigation plan.

Standard conditions: These include general requirements that the MPCA is required by rule to incorporate into a 401 certification.