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Poly Met Mining, Inc. Antidegradation Analysis - Preliminary MPCA Determination

Summary

Poly Met Mining, Inc. (PolyMet) submitted an NPDES/SDS application for a proposed new discharge. Every new NPDES permit requires an antidegradation review. The purpose of an antidegradation review is to achieve and maintain the highest possible quality in surface water of the state (Minn. R. 7050.0250).

Current antidegradation standards and requirements are in Minn. R. 7050.0250 to Minn. R. 7050.0335. Nondegradation standards in Minn. R. 7052.0300 to Minn. R. 7052.0330 for bioaccumulative chemicals of concern in the Lake Superior basin also apply. PolyMet's antidegradation analysis sought to satisfy the requirements of both rules. The full antidegradation analysis including tables, figures and appendices discussed in the write-up below can be found in Appendix A of Volume III of the NPDES/SDS application which can be found as Attachment 1 to this document and at the following link: <Link>.

PolyMet's application provided the Minnesota Pollution Control Agency (MPCA) with the necessary information in the permit application to satisfy antidegradation standards in Minn. R. 7050.0265, 7052.0300, and 7052.0330. The submittal demonstrates that water quality degradation caused by the proposed project will be prudently and feasibly minimized, existing and beneficial uses will be protected, and the proposed activity is necessary to accommodate important economic or social changes in the geographic area in which degradation of existing high water quality is expected. The proposed project will implement the best technology in practice and treatment.

Background

The project's proposed discharge location is in the headwaters of Trimble Creek, Unnamed Creek (tributaries to the Embarrass River) and Second Creek (tributary to the Partridge River) in the St. Louis River watershed. The immediate receiving waters for the discharges in the Embarrass River watershed are wetlands that drain to Trimble and Unnamed Creeks which are class 2D, 3D, 4C, 5 and 6 waters. Trimble and Unnamed Creeks themselves are class 2B, 3C, 4A, 4B, 5 and 6 waters. The immediate receiving water for the discharge in the Partridge River watershed is Second Creek, which is a class 2B, 3C, 4A, 4B, 5 and 6 waters. All the above-identified waters are located in the Lake Superior basin and are classified as Outstanding International Resource Waters (OIRWs). The nearest downstream restricted Outstanding Resource Value Water (ORVW) is Lake Superior. There are no downstream prohibited ORVWs.

For the purposes of assuring protective antidegradation requirements, all downstream waters will be considered of high quality on a parameter-by-parameter basis as defined in Minn. R. 7050.0255 subp. 21. This ensures that the antidegradation analysis provides "tier 2" protection. "Tier 2" protection prohibits the lowering of high water quality unless lower water quality resulting from the proposed activity is necessary to accommodate important economic or social changes in the geographic area in which degradation of existing high water quality is anticipated. The

antidegradation analysis also considered "tier 3"protection for OIRWs and ORVWs. "Tier 3" protection requires the exceptional characteristics of outstanding resource waters be maintained. MPCA's review included mercury, which is a bioaccumulative contaminant of concern (BCC) for the Lake Superior basin under Minn. R. 7052.0300.

The protective receiving water 7Q10 flow rate for all discharge locations is 0.0 CFS because of the headwaters nature of the site location. A 0.0 CFS receiving water flow rate does not allow for any assimilative dilution.

The remainder of this document documents compliance with each subpart of the applicable antidegradation regulations included in Minn. R. 7050.0265. The rule language of each subpart is followed by MPCA's assessment of how the antidegradation analysis submitted by PolyMet addressed each requirement.

Antidegradation standards apply

Minn. R. 7050.0265, Subp. 1 – Scope.

This part applies to activities regulated by the following control documents:

> *A. new, reissued, or modified individual NPDES wastewater permits…*

PolyMet has applied for a new NPDES/SDS wastewater permit. Thus, the antidegradation standards of Minn. R. 7050.0265 apply.

There will be no physical alteration to surface waters and thus compensatory mitigation is not proposed as a means to preserve an existing use

Minn. R. 7050.0265, Subp. 3 – Compensatory mitigation.

A. *The commissioner shall allow compensatory mitigation as a means to preserve an existing use when there is a physical alteration to a surface water only when all of the following conditions are met….*

The proposed activity will not result in a physical alteration to a surface water and thus, compensatory mitigation as a means to preserve an existing use is not needed, nor is it proposed.

Existing uses will be maintained and protected and attainment of water quality standards would not be precluded

Minn. R. 7050.0265, Subp. 2 – Protection of existing uses.

The commissioner shall approve a proposed activity only when existing uses and the level of water quality necessary to protect existing uses are maintained and protected

Minn. R. 7050.0265, Subp. 4 - Protection of beneficial uses.

The commissioner shall not approve a proposed activity that would permanently preclude attainment of water quality standards.

Minnesota rules require protection of existing uses and maintenance of the level of water quality necessary to protect those uses. Minn. R. 7050.0265 subp. 2; Minn. R. 7052.0300 subp. 2. To evaluate whether the discharge will reduce

water quality or would remove an existing use, MPCA compared the available information describing the expected discharges from the proposed activity to the applicable water quality standards.

PolyMet conducted its antidegradation analysis using a set of projected effluent concentrations (Section 3.1.1, Table 3-2 (page 19) of the antidegradation analysis). Most concentrations were derived for the FEIS. However, the concentrations of boron, chloride, pH, total dissolved solids, hardness and specific conductance were derived from design modeling completed since the FEIS. Table 3-1 (page 17) of the antidegradation analysis shows the distinction between the FEIS concentrations and the design model concentrations.

The distinction between these two sets of projected effluent concentrations is important in understanding how designated uses will be protected with the projected discharge.

> FEIS concentrations: Projected effluent quality from GoldSim modeling used in the FEIS effects analysis. Conservative/protective assumptions were made in GoldSim modeling regarding the WWTP effluent for the purposes of assessing downstream/downgradient project impacts in the FEIS. The assumptions were conservative/protective since confidence was high that actual effluent quality would be better than these assumptions (based on pilot testing).
>
> Design model concentrations: Projected effluent quality based on data, including effluent data, collected during bench and pilot testing. Advanced engineering design modeling was performed using this data to provide detailed engineering information necessary to scale up the wastewater treatment system design from pilot scale to full-scale. This resulted in refined projections of effluent water quality for most parameters.

The FEIS concentrations are based on modeling required during the FEIS process and do not directly incorporate information obtained from a combination of testing at the bench and pilot scale and advanced wastewater modeling of the likely projected performance of the WWTP. The new information obtained through more recent advanced engineering design of the treatment system demonstrates that every parameter except for boron and chloride will be treated to equivalent or lower levels than assumed in the FEIS effects analysis. This conclusion is supported by the results of the "Plant Site Wastewater Treatment Plant Pilot Testing" report <Link> and the "Wastewater Treatment System Design and Operation Report"<Link> submitted as part of the NPDES/SDS permit application. The MPCA considered both the FEIS concentrations and the design model concentrations when evaluating the antidegradation analysis.

The figure below provides a visual representation of the difference between the FEIS concentrations and the design model concentrations for selected parameters of concern (Figure 6-3 on page 62 of the antidegradation analysis). This figure for Unnamed Creek shows that the design model concentrations of key parameters of interest are below the FEIS concentrations, are less than or comparable to existing monitoring averages and are mostly below the limits of detection. Similar figures for Trimble Creek and Second Creek are included in the antidegradation analysis on pp. 61 and 63 respectively.

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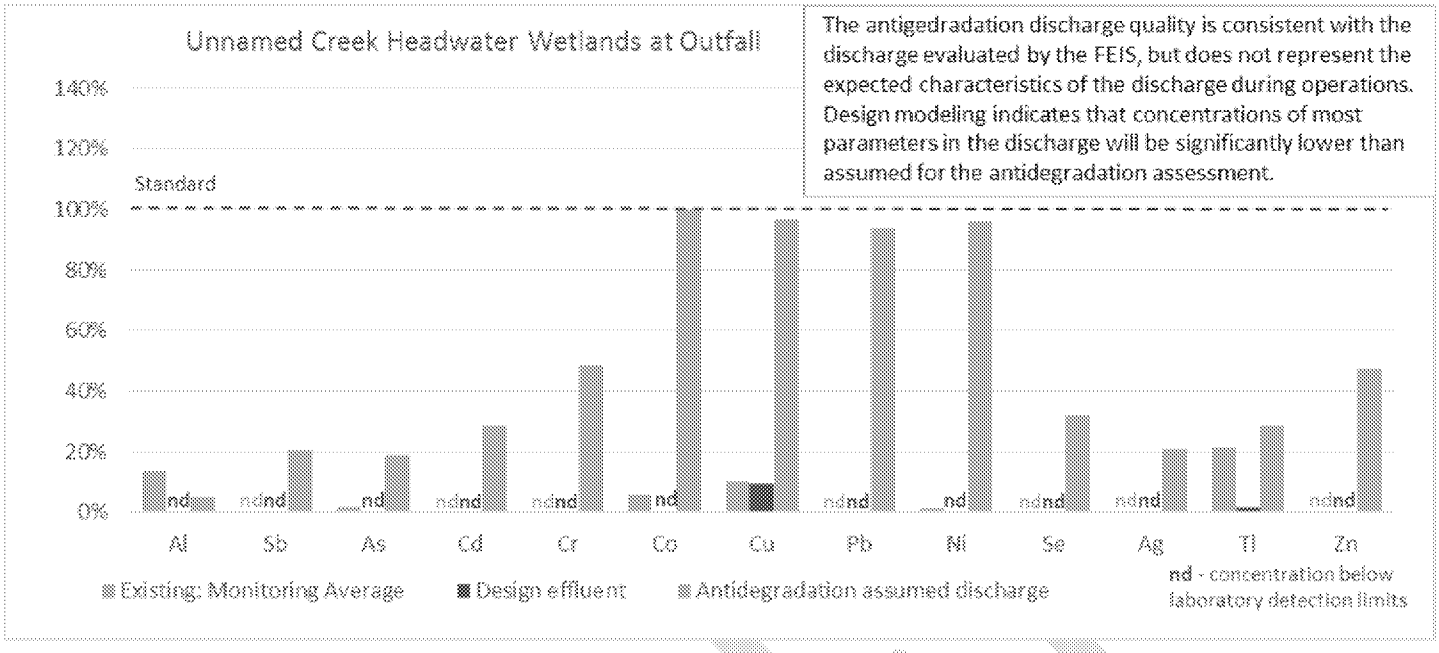

The design model concentrations are less than the FEIS effects analysis concentrations for all parameters of concern except boron and chloride. These parameters are discussed in greater detail below.

Design modeling estimated higher chloride concentrations than FEIS modeling result from different assumptions about chloride retention (*Note: more detailed justification for this increase will be described in PolyMet's anticipated revision of the antidegradation review)*.

The most restrictive water quality standard applicable for boron is 500 µg/L in Class 4A waters, Minn. R. 7050.0224. The FEIS estimated discharge concentrations of 180 µg/l. Using the information from design modeling, boron is projected to be discharged at a concentration of 210 µg/L, which is in the range of ambient concentrations measured in the Second Creek and Unnamed Creek headwater segments (Table 1). In the Trimble Creek headwater wetlands, the 210 µg/L effluent concentration is 25 µg/L higher than the highest ambient boron concentrations measured (Table 1). However, the minimal degradation of boron in the immediate receiving waters will not impact any designated use.

Table 1. Existing boron concentrations in µg/L as measured at the Second Creek, Trimble Creek and Unnamed Creek headwaters (from Large Table 2 on pg. 110 of the antidegradation analysis).

Reach	Location	Min	Max	Average
Second Creek	SD026/PM-7	179	242	210
Trimble Creek	TC1-a	117	159	138
Unnamed Creek	PM-11	176	238	207

The most restrictive water quality standard for chloride is 230 mg/L in Class 2B waters. Based on the design modeling estimates, chloride is projected to be discharged at a concentration of 23.4 mg/L, which is in the range of ambient concentrations measured in the headwaters of Trimble Creek and Unnamed Creek (Table 2). In the Second Creek headwaters the 23.4 mg/L effluent concentration is 1.9 mg/L higher than the highest ambient chloride concentrations measured (Table 2). The minimal degradation of chloride in the immediate receiving waters will not impact any designated use.

Table 2. Existing chloride concentrations in mg/L as measured at the Second Creek, Trimble Creek and Unnamed Creek headwaters (from Large Table 2 on pg. 110 of the antidegradation analysis).

Reach	Location	Min	Max	Average
Second Creek	SD026/PM-7	10.3	12.5	11.4
Trimble Creek	TC1-a	15.6	19	17.3
Unnamed Creek	PM-11	15.3	18.7	17.0

The antidegradation analysis conducted by PolyMet used the conservatively high effluent concentrations from the FEIS to ensure the antidegradation analysis was protective of all existing water quality standards and designated; the analysis did not rely on the lower effluent concentrations that resulted from the subsequent engineering design modeling. All projected effluent concentrations will be below water quality standards based on both the concentrations from the FEIS effects analysis and the projected engineering design modeling concentrations. The agency does not anticipate the proposed discharge, in combination with any other discharges to the receiving waters, will cause an exceedance of water quality standards.

Existing water quality was determined using the methods in Minn. R. 7050.0260 (as described in Sections 6.2 (pp. 48-54) and 8.2 (pp. 83-84) of the antidegradation analysis) and the potential for a measurable change in water quality was assessed in Sections 6.3 (pp. 54-64) and 8.3 (pp. 84-90). The analysis compared projected effluent concentrations to average measured receiving water values, which is acceptable for this evaluation. For nearly all pollutants, no degradation is projected from the discharge. In the cases of boron and chloride, where a small negative measurable change (i.e., degradation) in water quality would occur, the degradation was minimized and allowed only to the extent necessary to accommodate important economic or social development as described below and in antidegradation analysis Sections 7.4 (pp. 69-76) and 9.3 (pp. 93-96).

The class 3 hardness standard and the class 4A sodium, bicarbonate, total dissolved solids and specific conductance water quality standards will all be met. See Minn. R. 7050.0223, 7050.0224. The proposed project will cut off movement of existing polluted groundwater. As a result, the headwaters of Second Creek, Trimble Creek and Unnamed Creek will experience a measurable improvement in water quality with regards to sulfate, salty parameters and mercury when treated effluent is discharged to those locations. Because the effluent will not cause an exceedance of any water quality standard, designated uses in the downstream receiving waters will be protected.

The only bioaccumulative chemical of concern as defined in Minn. R. 7052.0010, subparts 4 and 5, in the effluent is mercury. The net loading of mercury will be minimized because the effluent from the wastewater treatment system is expected to be below the applicable water quality standard of 1.3 ng/L. The receiving water wetlands and downstream creeks are not listed as an impaired water for mercury under Section 303(d) of the Clean Water Act; however, observed values in the downstream creeks are periodically in excess of applicable water quality standards, primarily as a result of atmospheric deposition (Section 8.1 (pp. 82-83) of the antidegradation analysis). Existing water quality with respect to mercury is discussed in Section 8.2 (pp. 83-84) of the antidegradation analysis. Section 8.3 (pp. 84-90) of the antidegradation analysis provides a comparison of existing and estimated water quality for mercury as a result of the project. With the exception of Second Creek at SD026, all downstream waters show either no measureable change or a decrease in estimated mercury concentrations as compared to existing conditions. For Second Creek at SD026, the projections indicate a small increase in estimated mercury concentrations as compared to existing conditions; however, concentrations are expected to remain below the applicable water quality standard. Additionally, because of flow (and

resulting mercury loading) reductions to the Partridge River from the project upstream of the confluence with Second Creek, the overall loading of mercury to the Partridge River downstream of Second Creek is estimated to decrease from current conditions. As a result, downstream OIRW and ORVW waters will be protected including Lake Superior.

A prudent and feasible alternative that minimizes degradation exists

Minn. R. 7050.0265 subp. 5 – Protection of surface waters of high quality.

A. *The commissioner shall not approve a proposed activity when the commissioner makes a finding that prudent and feasible prevention, treatment, or loading offset alternatives exist that would avoid degradation of existing high water quality. When the commissioner finds that prudent and feasible prevention, treatment, or loading offset alternatives are not available to avoid degradation, a proposed activity shall be approved only when the commissioner makes a finding that degradation will be prudently and feasibly minimized.*

An analysis of alternatives that minimized net increases in loading of all relevant parameters of concern was performed, and an alternative that prudently and feasibly minimizes degradation was identified to manage all the parameters of concern. The parameters of concern are those parameters that have numeric water quality standards in Minn. R. 7050 and Minn. R. 7052 (including whole effluent toxicity standards). A summary of the alternative analysis process is in Sections 7.4 (pp. 69-76) and 9.3 (pp. 93-96) of the antidegradation analysis. PolyMet's antidegradation alternative analysis relies primarily on the alternatives evaluation included in the Final Environmental Impact Statement (FEIS). The alternatives evaluation conducted during the environmental review process considered a wide range of pollution minimization strategies to reduce project impacts, including those related to the proposed discharge. These include:

- Backfilling all of the highest sulfur (Category 4 and Category 2/3) waste rock into the mined-out East and Central pits, which will then be flooded for subaqueous disposal to minimize the release of contaminants from the waste rock and consequently the loading of contaminants to the WWTF. Previously this material had been proposed for permanent storage in surface stockpiles.
- Replacement of permanent stockpiles of Category 2/3 and Category 4 waste rock with temporary stockpiles that will be removed after the first 11 years of mining. The stockpiles will include engineered liner systems with a compacted low permeability subgrade, a geomembrane barrier layer and an overliner drainage layer to convey any leachate to the mine site wastewater collection system. The design of the liner system, as shown by modeling, will maximize capture of any leachate generated by the stockpile;
- Enhanced geomembrane cover system for the Category 1 stockpile to replace the previously proposed soil cover. This will minimize long-term water flow through the stockpile resulting in substantial reduction of stockpile seepage volumes to be treated;
- Incorporation of groundwater collection system encompassing the entire low-sulfur Category 1 waste rock pile that will effectively capture greater than 90% of groundwater and surface seepage from the stockpile for subsequent treatment. The original design for the Category 1 stockpile did not include a groundwater/seepage collection system;
- Bentonite addition to the tailings basin dams, beaches and pond bottom to reduce infiltration into the tailings and the amount of seepage wastewater generated;
- Incorporation of a seepage capture system at the tailings basin which is designed to capture nearly all of the seepage from the basin (from both NorthMet tailings and from existing LTV tailings) for subsequent treatment prior to discharge;

- Pretreatment of mine site water to reduce pollutant loadings to the tailings basin and to increase the suitability of tailings basin water for reuse in the processing circuit; and
- Installation of an advanced state-of-the-art wastewater treatment system that will utilize a combination of nanofiltration and reverse osmosis treatment technologies. This treatment technology treats wastewater to a much higher degree than more conventional chemical precipitation technologies.

The MPCA's review of the antidegradation analysis presented in the NPDES/SDS permit application focused on the proposed discharge from the plant site WWTP. For the duration of the first permit cycle, and for at least the proposed 20 year active mining period of the project, this will be the only process water discharge to surface waters that would be authorized by the permit. There will be no discharge to surface waters from the mine site. In fact, the NPDES/SDS permit, if issued, will include a condition expressly prohibiting a discharge to surface waters from the mine site. During this operational period, process wastewater from the mine site (e.g., mine pit dewatering and stockpile seepage collection) will be captured, treated and routed to the plant site for use in the processing circuit, including storage/disposal in the plant site tailings basin. As a result, water from the mine site will be a component of the water collected by the tailings basin seepage collection system, which will then be treated and discharged from the plant site WWTP as authorized by the permit.

Because of this incorporation of mine site wastewater into the plant site water flowsheet, the MPCA considered mine site design and alternatives in its review of the antidegradation analysis for the proposed discharge at the plant site. MPCA considered the design of mine site infrastructure (including stockpile liners and seepage collection systems), waste rock management during mining operations and the degree of pretreatment provided by the mine site WWTF prior to wastewater delivery to the plant site. The review included an assessment of the design changes and improvements identified above that were incorporated into the proposed project during the EIS process to avoid or minimize potential impacts.

Collectively, the incorporation of these components into the project design at the mine site will minimize the release of pollutants from the mine site, which significantly contributes to the minimization of impacts from the proposed WWTP discharge at the plant site.

PolyMet has selected a combined water management and wastewater treatment system that will minimize or eliminate (i.e., to a level below method detection limit) pollutant loading to the receiving waters. The selected design utilizes proven technology and has been demonstrated to be effective in project-specific pilot testing. The controlling design criterion is that the combined water management and treatment system consistently achieves a sulfate concentration of 10 mg/L or less in the effluent (Section 3.1.1 on page 19 of the antidegradation analysis). The degree of treatment necessary to accomplish an effluent concentration of 10 mg/L sulfate will also result in the effective removal of other parameters of concern from the wastewater. So long as sulfate remains at or below 10 mg/L, the proposed treatment system will ensure other parameters are discharged at concentrations described in the antidegradation analysis.

The design of the wastewater treatment system, which includes chemical precipitation and membrane treatment, will minimize or eliminate (i.e., to a level below method detection limits) the concentration of parameters of concern in the effluent. During bench and pilot testing of the membrane treatment system, PolyMet discovered that achieving a sulfate concentration of less than 10 mg/L in the effluent also resulted in the removal of other constituents in the wastewater such as metals and salty parameters (e.g., calcium, hardness and alkalinity) to very low levels (Attachment A of the Waste Water Treatment System: Design and Operations Report). In fact, the level of treatment required to achieve a

sulfate concentration of 10 mg/L in the effluent removes all parameters of concern to such a degree that stabilizing constituents essential for aquatic life, such as calcium and alkalinity, must be added back to the internal waste stream as part of the treatment process to pass whole effluent toxicity (WET) testing requirements. This is a demonstration of how intensive the pollution minimization system is and how the treatment system is designed to ensure that minimal degradation will occur in the receiving waters for all parameters of concern.

The analysis conducted complies with the alternative analysis process described in Minnesota Rule 7050.0280 subpart 2, and 7052.0320 subparts 2 and 3. The MPCA finds that there are no prudent and feasible alternatives, including pollution prevention or alternative technology, to completely avoid degradation of downstream receiving waters. The combined water management and wastewater treatment system alternatives analysis described above also complies with the requirements to identify alternatives for BCCs and BTPT. PolyMet selected the BTPT for its proposed treatment system.

Degradation of high water quality will be minimized and allowed only to the extent necessary to accommodate important economic or social development

Minn. R. 7050.0265 subp. 5 – Protection of surface waters of high quality.

B. The commissioner shall not approve a proposed activity when the commissioner makes a finding that lower water quality resulting from the proposed activity is necessary to accommodate important economic or social changes in the geographic area in which degradation of existing high water quality is anticipated. The commissioner shall consider the following factors in determining the importance of economic or social changes:

(1) economic gains or losses attributable to the proposed activity, such as changes in the number and types of jobs, median household income, productivity, property values, and recreational, tourism, and other commercial opportunities;

Section 7.5.1 (page 77) of the antidegradation analysis describes direct and indirect employment that will result from the project, tax generation (federal, state and local), direct value to the State economy in the form of wages and rents, and the direct output value of the extracted minerals. These values are considerable particularly in the context of the relatively depressed economic conditions of the area.

(2) contribution to social services;

Section 7.5.2 (page 78) of the antidegradation analysis describes the local and state tax revenue resulting from the proposed project, which will benefit local social services, local governments and area school systems.

(3) prevention or remediation of environmental or public health threats;

As discussed in Section 7.5.3 (page 78) of the antidegradation analysis, construction of the proposed project will remediate an existing water quality issue at the plant site, which has not operated for more than 15 years. The project will capture seepage from the existing tailings basin and provide treatment of that water through an advanced wastewater treatment system resulting in a net reduction of sulfate loading to the Embarrass River watershed of approximately 1600 tons per year, as well as removal of a variety of other constituents. The project is also predicted to result in a small net reduction of mercury loading to the St. Louis River watershed.

(4) trade-offs between environmental media; and

As described in Section 7.5.4 (pp. 78-79) of the antidegradation analysis, the proposed project has been designed to minimize any degradation of water quality resulting from the project while at the same time addressing the environmental effects related to water quantity issues. The proposed capture of basin seepage could reduce water quantity in streams and wetlands downgradient of the tailings basin. These waters will be augmented with treated wastewater as necessary to maintain existing hydrology. In addition, the location of facility infrastructure such as waste rock stockpiles and mine roads has been designed to minimize impact to wetlands. In general, the proposed treatment will have relatively small impact to other environmental media. Any impacts would primarily be limited to the generation of non-hazardous wastewater treatment residuals (to be disposed of at permitted off-site solid waste facilities and/or the on-site Hydrometallurgical Residue Facility) and air quality effects related to the additional electrical demand for the wastewater treatment system obtained from an off-site power generator.

(5) the value of the water resource, including:

(a) the extent to which the resources adversely impacted by the proposed activity are unique or rare within the locality, state, or nation;

(b) benefits associated with high water quality for uses such as ecosystem services and high water quality preservation for future generations to meet their own needs; and

(c) factors, such as aesthetics, that cannot be reasonably quantified; and

As described in Section 7.5.5 (pp. 79-80) of the antidegradation analysis, the receiving waters and downstream segments of Second Creek, Trimble Creek and Unnamed Creek are not unique or rare locally, within Minnesota or in the United States. With the capture of seepage from the existing ferrous tailings basin, the proposed project is expected to improve the quality of waters downstream from the discharge and benefits associated with high water quality such as ecosystem services should be improved for the future.

(6) other relevant environmental, social, and economic impacts of the proposed activity.

A mineral deposit of this type and size is an uncommon geologic occurrence and the metals in the deposit are needed locally, nationally and globally for a variety of uses. Furthermore, the location of the proposed mineral resource is geologically constrained and cannot be moved elsewhere.

In summary, Section 7.5 (pp. 76-80) of the antidegradation analysis describes the social and economic changes expected from the project as required by rule. Minn. R. 7050.0265; 7052.0320 subp. 2. The social and economic analysis considers economic gains, contributions to social services, prevention or remediation of environmental or public threats, trade-offs between environmental media and the value of the water resources as required in Minn. R. 7050.0265 Subpart 5(b). The social and economic analysis uses the same reasoning and draws the same conclusions as those presented in the FEIS. The analysis appropriately demonstrates that the expected economic and social benefits of the project outweigh the minimal degradation in receiving water quality that will occur. Upon review of the social and economic analysis, MPCA has determined that the projected minimal degradation in water quality is necessary to accommodate the important economic and social development aspects of the project.

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Protection of restricted outstanding resource value waters

Minn. R. 7050.0265, Subp. 6 - Protection of restricted outstanding resource value waters.

The commissioner shall restrict a proposed activity in order to preserve the existing water quality as necessary to maintain and protect the exceptional characteristics for which the restricted outstanding resource value waters identified under part 7050.0335, subparts 1 and 2, were designated.

The nearest downstream restricted Outstanding Resource Value Water (ORVW) is Lake Superior. As discussed in Sections 7.6 (page 80) and 6.3.6 (page 64) of the antidegradation analysis, a mass balance calculation showed the project will have no measureable effect on water quality in the St. Louis River at Scanlon, prior to the river's entry into Lake Superior. With the selection of the most prudently and feasibly minimized alternative with respect to facility design and wastewater treatment and the incorporation into the permit of protective limitations, monitoring and other requirements, the proposed activity will be restricted as necessary to preserve the existing water quality as necessary to protect Lake Superior.

Protection of prohibited outstanding resource value waters

Minn. R. 7050.0265, Sub. 7 - Protection of prohibited outstanding resource value waters.

The commissioner shall prohibit a proposed activity that results in a net increase in loading or other causes of degradation to prohibited outstanding resource value waters identified under part 7050.0335, subparts 3 and 4.

There are no downstream prohibited ORVWs.

Protection against impairments associated with thermal discharges

Minn. R. 7050.0265, Subp. 8 - Protection against impairments associated with thermal discharges.

When there is potential for water quality impairment associated with thermal discharges, the commissioner's allowance for existing water quality degradation shall be consistent with section 316 of the Clean Water Act, United States Code, title 33, section 1326. When a variance is granted under section 316(a) of the Clean Water Act, United States Code, title 33, section 1326, antidegradation standards under this part still apply.

As discussed in section 7.7 of the antidegradation analysis (page 81) the treatment process will add minimal heat to the water and will be approximately the same temperature of shallow groundwater. No thermal impacts are expected.

Antidegradation Demonstration for New Discharges in the Lake Superior Basin

Minn. R. 7052.0320 requires an antidegradation demonstration for any discharger proposing a new or expanded discharge of a bioaccumulative substance of immediate concern (BSIC) to an outstanding international resource water (OIRW). PolyMet's proposed discharge of treated wastewater containing mercury (a BSIC) to streams within the St. Louis River watershed meets this criterion. The antidegradation demonstration requires an analysis to identify cost-effective pollution prevention alternatives and treatment techniques that would eliminate or reduce the extent of

increased loading of mercury and lowering of water quality. As a discharger proposing a new loading of a BSIC to an OIRW, PolyMet must also provide an analysis of Best Technology in Process and Treatment (BTPT).

PolyMet included an analysis of BTPT in Section 9.3 (pp. 93-96) of the antidegradation analysis. Additional design considerations and constraints, expected performance, and reliability of the least degrading alternative are described in Section 3.0 of the Waste Water Treatment System: Design and Operations Report for the NorthMet project (pp. 13-35). <Link>. Together, these reports provided information on opportunities and technologies the discharger has to minimize the generation of mercury and reduce the loadings in the discharge. The analysis identifies many of the same alternatives and techniques as those described above for non-BSIC pollutants. As identified in the 'Existing Uses' section on page 6 above, the selection of the advanced state-of-the-art treatment technology of nanofiltration plus reverse osmosis into the project design will minimize the extent to which the discharge will result in the lowering of water quality. The expected performance of the system is based on a combination of engineering design, modeling, redundancy of critical treatment components and physical testing of the systems at the bench and pilot scale. Additional project considerations beyond state-of-the-art treatment include a lower mercury content of NorthMet tailings as compared to existing LTV tailings and the demonstrated mercury filtration capabilities of both NorthMet and LTV tailings. The facility and wastewater treatment system design satisfies the requirements of BTPT in Minn. R. 7052.0320 subp. 3.

Conclusion

Based upon the preliminary review of the information provided in the antidegradation analysis, as well as other reliable information available to the commissioner concerning the proposed activity and other activities that cause cumulative changes in existing water quality in the surface waters, the MPCA has made a preliminary determination that the antidegradation analysis submitted by PolyMet satisfies the standards in Minnesota Rules 7050.0265 and 7052.0300, as well as federal surface water pollution control statutes and rules administered by the commissioner.

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