Attachment O

Memorandum from MPCA to DNR on Legacy

Document begins on pdf page 2931 of PolyMet PTM Application Dec. 2017
It is an attachment to the Appendix 15.1 Legacy Closure Plan for Ferrous LTVSMC Areas subject to Assignment from Cliffs Erie, L.L.C. Dec. 2017 (no author named)
Appendix 15 Financial Assurance

Legacy Permitting/Financial Assurance for Change in Assignment
Former LTV Steel Mining Company (LTVSMC) Tailings Basin and Plant Site
Ann Foss, Metallic Mining Sector Director
December 12, 2017

This memo addresses MPCA's views on the State's potential liability for closure of the Cliffs Erie/NorthMet ferrous tailings basin under a very specific scenario described in detail in section II below.

I. Background/Site History

I.A. LTV Steel Mining Company (LTVSMC)

LTVSMC owned a taconite processing facility and associated tailings basin near Hoyt Lakes, mining areas near Hoyt Lakes, Dunka mine, a railroad from Hoyt Lakes to Taconite Harbor, a dock and ship loading/unloading facility at Taconite Harbor, a power plant at Taconite Harbor, and real estate. LTV Corporation, the parent company to LTVSMC, filed for bankruptcy in 2000 and in January 2001 operations at the LTVSMC facilities ceased. As a result of subsequent bankruptcy proceedings, the State of Minnesota entered into a Master Agreement with the purchasers of the property (Cliffs Natural Resources, FKA Cleveland Cliffs, and Minnesota Power) and LTV. The Bankruptcy court approved the sale and closing occurred in October 2001. One goal of the Master Agreement was to preserve the assets for future use. In addition, under the 2001 Master Agreement, Cliffs Natural Resources provided a Corporate Guarantee as financial assurance under the DNR Ferrous Permit to Mine.

Cliffs Natural Resources has successfully transferred a portion of the property to Steel Dynamics, which owns the Mesabi Nugget plant and the neighboring mine area. MPCA and DNR permits covering this portion of the property were transferred/assigned to Steel Dynamics. As part of the Ferrous Permit to Mine, Steel Dynamics provided financial assurance to cover the associated ferrous responsibilities.

I.B. Cliffs Erie, LLC (CE)

Cliffs Erie, LLC (CE), a subsidiary of Cliffs Natural Resources, holds NPDES/SDS (WQ) permits for the remainder of the former LTVSMC property near Hoyt Lakes.

One of the WQ permits covers the taconite processing plant and the tailings basin ("Basin"). The Basin is also regulated by a 2010 Consent Decree between CE and MPCA, which resolves WQ permit compliance issues involving all WQ permits for the remaining portions of the former LTVSMC property, including the Basin. CE is currently in compliance with the Consent Decree. Neither the CE Basin WQ permit nor the Basin portion of the Consent Decree anticipates requiring a treatment facility for the foreseeable future.

I.C. Transfer/Assignment of legacy permits for the Basin

CE and Poly Met Mining, Inc. (PolyMet) have indicated that PolyMet intends to purchase the former LTVSMC processing plant, Basin, and other assets from CE. A condition to closing on that purchase is that the NPDES/SDS permit and Consent Decree obligations held by CE for the Basin be assigned to PolyMet or one of its affiliates (together, "PolyMet").

To facilitate transfer/assignments, proper requests/forms would need to be submitted to the MPCA by CE and PolyMet. MPCA would process the requests and determine whether to transfer the Basin WQ permit to PolyMet. As part of the transaction, obligations related to the Basin in the 2010 Consent Decree between CE and MPCA would be assigned to PolyMet using the process provided in that document.

The Basin is also currently regulated by the DNR under the CE Ferrous Permit to Mine (PTM) along with other remaining portions of the LTVSMC lands. DNR will handle this through their permit to mine process.

The Basin is regulated by a variety of other permits as well. All of these would go through a similar process to transfer or assign to PolyMet.

II. Question

DNR has the regulatory authority for establishing financial assurance related to closure of the ferrous Basin. DNR has asked for specific information from the MPCA to assist in its financial assurance decisions related to the ferrous Basin. MPCA has been asked to address the following:

What actions would the State need to take to close the ferrous Basin in a manner that ensures compliance with Minnesota's water quality requirements under applicable law for the following situation?

- PolyMet has obtained control of the property;
- Necessary ferrous permit transfers/assignments have been made to PolyMet.
- DNR has completed the permit to mine process related to the Basin and the associated financial assurance.
- The NorthMet project has not been fully constructed and is not operational (in particular, the seepage collection system and the wastewater treatment system). It is important to note that operation of the proposed NorthMet project resolves any legacy water quality issues at the ferrous Basin.
- The state becomes responsible for closure of the Basin.

This would occur sometime after DNR and MPCA permit decisions related to the NorthMet project. It is reasonable to assume that the soonest the events above would occur is one to two years after the NorthMet permit decisions. This puts the timeframe of the State's decision related to closure somewhere in the early 2020's or later. In the interim, the Basin will be operated in compliance with the Basin WQ permit and the Basin portion of the Consent Decree.

III. MPCA Response

The Basin will continue to be regulated under the CE Basin WQ Permit and the Basin portion of the CE Consent Decree while the NorthMet project permitting process continues.

The MPCA focus, in the closure scenario described above, would be protection of surface water quality and existing uses in the area of the Basin. Specifically, surface water quality in Mud Lake Creek, Unnamed Creek, Trimble Creek, and Second Creek would be the priority. Water quality data from existing monitoring points in these streams would be used in any assessments.

It is important to note that operation of the proposed NorthMet project resolves any legacy water quality issues at the ferrous Basin.

MPCA staff recommend the following activities in the near term. MPCA will work with CE and PolyMet to ensure these activities occur using the Consent Decree work plans or some other tool. If the property transfer from CE to PolyMet occurs, the portion of the Consent Decree assigned to PolyMet will include these activities:

1. Continuation of existing monitoring of surface and groundwater
2. Addition of a groundwater monitoring well near existing well GW006 with ongoing sampling for the same parameters, at the same frequency as the existing wells. Well installation completed.
3. Redevelopment and potential eventual replacement of GW010 to eliminate well construction materials as a potential contributor to groundwater pollutant levels.
4. Installation of a shallow piezometer in the wetland area adjacent to GW010. This will assist in determining the adjacent wetland influence on groundwater pollutant levels. Piezometer installation completed.

MPCA staff recommend the following be incorporated into DNR's PTM closure plan if the State becomes responsible for closure (the scenario in II. above):

1. The State needs to consider how long to continue to preserve the Basin asset before proceeding with final closure activities, including:
    - Commencement of dewatering of the Basin (pool water in cell 2E would be pumped to cell 1E in the Basin and then pumped to SD026 to remove the pools from the top of the Basin) as soon as reasonable following a decision to proceed with closure;
    - Discontinuation of current pump-backs from SD004, SD006 and SD026 as soon as reasonable following a decision to proceed with closure;
    - Grading at the Basin to allow for proper drainage; and
    - Construction of a permanent outlet structure to allow storm water to drain off the top of the Basin.
2. Regular evaluation of the monitoring data in the context of this memo and its conclusions. In particular, this should be done upon completion of any revision to the Class 3 and 4A standards and the wild rice sulfate numeric standard.
3. Additional sampling, biological testing and/or wild rice monitoring if deemed necessary by the MPCA.

<u>No treatment/mitigation</u> for alkalinity, hardness, total dissolved solids (TDS), specific conductance, sulfate, and mercury should be required.

<u>IV. Basis for MPCA Response</u>

MPCA reviewed the October 30, 2017, Barr technical memorandum titled "Tailings Basin Legacy Permitting/Financial Assurance for Title Transfer" (PolyMet's report).

MPCA's response considers the following:

1. Timing considerations
    a. As noted above, the facility has been closed since January 2001 and the current MPCA WQ permit for the Basin prohibits operation of the ferrous facility. No additional pollutants from processing have been added since January 2001 nor will they be added under the scenario discussed in this memo.

b. As noted above, the State Master Agreement had a goal of preserving assets for the future. This included the Basin. If the scenario above occurs, the State will need to consider how long to continue to preserve the Basin asset before proceeding with final closure.
c. The soonest this scenario will occur is the early 2020's.
d. If the State decides to proceed with final closure of the ferrous Basin, the MPCA will evaluate the environmental conditions at that time and the regulatory tools (see part V.C.4. of this document) available to the agency at that time to determine how to best resolve any remaining legacy water issues.

2. Groundwater
   a. Data shows groundwater quality is generally better than applicable groundwater standards at the property line. For aluminum, iron, manganese and pH, natural background exceeds the groundwater criteria. For arsenic and barium, an evaluation of tracer pollutants indicates these exceedances are not due to the Basin.
3. Mercury
   a. For mercury, in locations where surface water quality surrounding the Basin exceeds the standard, the higher concentrations are most likely due to influences from precipitation and background concentration, not from seepage from the existing Basin.

   MPCA concludes no treatment/mitigation is necessary in final closure for mercury.

4. Sulfate and wild rice
   a. Continuation of the current conditions associated with the Basin will likely not result in an exceedance of the calculated sulfate standard (or alternative sulfate standard in the proposed rule) if the MPCA's proposed rule revision goes into effect. Closure is not anticipated to change this conclusion, so no treatment/mitigation for sulfate would be required for protection of wild rice.
   b. If the wild rice rulemaking is not completed, another regulatory option available to the State would be to consider developing a site-specific standard based on the science at that time.

5. Class 3 and 4 pollutants
   a. As noted in V.C.1., MPCA is in the process of evaluating the existing water quality standards for alkalinity, hardness, TDS and specific conductance. MPCA has made this rulemaking a high priority and expects to propose revisions in 2018. Based on current information, MPCA expects that these standards will either remain unchanged or become less stringent. The rulemaking will provide clarity as to where the standards apply and how to determine whether the surface water meets the applicable standard. This clarity will be provided even in the event the numeric standards remain unchanged. This rulemaking should be complete prior to the early 2020's.
   b. Monitoring data indicates current compliance, future compliance, and uncertain compliance with the current standards using a protective compliance method.
   c. MPCA recommends regular evaluation of the monitoring data, especially upon completion of the revision to the Class 3 and 4A standards. In addition, based on evaluations, MPCA may recommend additional sampling or biological testing to support alternative regulatory approaches (see V.C.4).

   Considering the information above, MPCA concludes that if the scenario in part II. above occurred and the Basin had to be closed, no treatment/mitigation for alkalinity, hardness, TDS and specific conductance would be required.

V. Detailed Basis for Response based on Surface Water Quality

Surface water monitoring data was reviewed. The only parameters of concern identified were sulfate, mercury, alkalinity, hardness, total dissolved solids (TDS), and specific conductance. These will be discussed in the following order:

1. Mercury
2. Sulfate
3. Alkalinity, hardness, TDS and specific conductance

V.A. Mercury

- The applicable mercury standard is 1.3 ng/L.
- Monitoring data for Second Creek from 2010-2017 have been below the standard.
- Monitoring data for Mud Lake Creek, Unnamed Creek and Trimble Creek have fluctuated above and below the standard. The highest measured concentration was 6 ng/L.
- Data from four groundwater monitoring wells at the toe of the Basin indicate concentrations of mercury in Basin seepage are not increasing. Mercury levels in seepage to groundwater have generally been less than the surface water standard of 1.3 ng/L since 2013.
- Mercury levels in seepage are not expected to change (are not expected to increase). Final Basin closure will not change this.
- In addition, studies conducted by state agencies have found that taconite tailings appear to be a sink for mercury in northern Minnesota (e.g., Berndt (2003)). In particular, the sequestering of mercury through adsorption to solids in the tailings basin and subsequent burial in the sediments results in an overall permanent retention of mercury within the basin and decreases the mercury load released to receiving waters. The analysis in the NorthMet Final EIS demonstrates that mercury released to surface waters during taconite processing is insignificant with respect to mercury concentrations found in local precipitation and existing background surface waters. Surface water monitoring around the former LTVSMC tailings basin found mercury concentrations in surface water seepage around the tailings basin to be consistent with baseline levels, which confirms there is no significant addition of mercury to the environment from seepage from the existing Basin (FEIS, page 5-229, Table 4.2.2-4).
- It is important to note that, as indicated in Minnesota's Statewide Mercury TMDL, atmospheric deposition supplies almost all of the mercury reaching the environment (e.g., atmospheric deposition is the source of 99.5% of mercury in fish), and the great majority of mercury deposition in Minnesota (approximately 90%) originates from outside of the state. See https://www.pca.state.mn.us/water/statewide-mercury-reduction-plan. Concentrations of mercury in rainfall are around 10 ng/L.
- In locations where surface water quality surrounding the Basin is worse than the standard, the higher concentrations are most likely due to influences from precipitation and background influences, not from seepage from the existing Basin.

CONCLUSION: Considering all of the information above, MPCA concludes that if the scenario in II. above occurred and the Basin had to be closed, no treatment/mitigation for mercury would be required.

V.B. Wild Rice Surface Water Quality Standard

V.B.1. Background on the standard.

There is an existing surface water sulfate standard in state rule of 10 mg/L sulfate that applies to "water used for production of wild rice." The rule provides no further clarity on where the standard applies. Instead, it has been a case-by-case determination by the MPCA. In these case-by-case determinations, the MPCA staff review the available information to recommend whether the water in question was a wild rice *production* water (not simply if wild rice was present). In addition, the existing standard applies "when the rice is susceptible to damage from high sulfate levels," which is undefined. The MPCA has sometimes interpreted this to mean the wild rice growing season.

Data from groundwater monitoring wells (GW007, GW001, GW008 and GW0012) at the toe of the Basin indicate concentrations of sulfate in Basin seepage are not increasing. Following dewatering of the Basin in closure, seepage flow will decrease as the system stabilizes, so with stable concentrations in seepage, the impact on streams would not be expected to increase.

Due to issues related to implementing the existing standard and debate about the scientific details of the standard, MPCA is in the process of developing a revision to the wild rice rule. In addition, current state law prohibits MPCA from requiring expenditure of "money for design or implementation of sulfate treatment technologies or other forms of sulfate mitigation" until the current 10 mg/L sulfate wild rice rule is amended.

Recent scientific studies have found that sulfide in the sediment porewater where wild rice grows impacts wild rice; there is not a direct impact from sulfate in the surface water. Research has further shown that sulfide levels are largely controlled by three variables: surface water sulfate, sediment total carbon, and sediment total extractable iron levels. Based on this new information, the MPCA is currently pursuing a revised standard that would establish a protective sediment pore water sulfide level, then use the relationship between sediment sulfide, iron, and carbon to determine the numeric water column sulfate standard for a given wild rice water that maintains sediment pore water levels at or below the protective sulfide level. MPCA public noticed a revision to the standard in August 2017.

It is anticipated that the rule revision will be complete prior to the early 2020's.

V.B.2. Review of sulfate and sediment data

PolyMet collected sediment data from each of the waterbodies downstream of the Basin that MPCA included in the MPCA 2017 proposed rule.

In all but two instances, the calculated allowable sulfate concentrations using the proposed rule were higher than the corresponding measured surface water sulfate concentrations.

In Wynne Lake, of the nine sediment samples (4 grab samples and 5 composite) collected over three years, only one sample resulted in a calculated allowable sulfate concentration lower than the associated measured surface water sulfate concentration.

Regarding Second Creek, PolyMet's report states: "PolyMet's sampling in Second Creek downstream of the tailings basin relied on grab samples based on earlier proposed protocols rather than the composite samples required in MPCA's 2017 proposed rule." "Of the four grab sediment samples collected on Second Creek in 2015 and 2016, two of the samples had calculated allowable sulfate values higher than

the associated measured surface water sulfate concentrations. The two exceptions to this outcome are with grab samples SED-92 and SED-07, which had a calculated allowable sulfate concentration of 367 mg/L and 389 mg/L, with a corresponding measured surface water sulfate concentration of 380 mg/L and 451 mg/L, respectively."

The proposed rule allows for establishment of an alternate standard for sulfate "when the ambient sulfate concentration is above the calculated sulfate standard and data demonstrates that sulfide concentrations in pore water are 120 micrograms per liter or less." An alternate standard might be based on a proportional relationship between the maximum allowable increase in porewater sulfide concentrations and an increase in ambient sulfate. MPCA's sulfide sampling in Second Creek found pore water concentrations of less than 120 micrograms per liter, even where sulfate levels were higher than the MPCA's proposed equation-based standard would allow. The proposed rule proposes 120 micrograms per liter pore water sulfide as protective of wild rice.

Continuation of the current conditions associated with the Basin will likely not result in an exceedance of the calculated allowable sulfate concentrations or alternate sulfide standard if the MPCA's proposed rule goes into effect. Closure is not anticipated to change this conclusion.

This data is representative of all potential wild rice waters downstream of the Basin and upstream of the St. Louis River.

If the rulemaking is not completed, another regulatory option available to the State would be to consider developing a site-specific standard based on the science at that time.

CONCLUSION: As a result, MPCA concludes that if the scenario in II. above occurred and the Basin had to be closed, no treatment/mitigation for sulfate would be required for protection of wild rice.

V.C. Alkalinity, Hardness, TDS and Specific Conductance

V.C.1. Background on alkalinity, hardness, TDS and specific conductance standards.

Hardness is a Class 3 standard providing protection for industrial use. When this standard was developed in the 1960s, all waters were protected for this use, whether the use existed or not.

Alkalinity, TDS and specific conductance are Class 4A standards providing protection for irrigation use. These standards were developed in the same timeframe and apply to most waters whether the use exists or not.

At the point in time when the irrigation standards and the industrial use standards were developed, neither the standards nor the background supporting documents for the standards provided guidance on how to determine surface water compliance with the standards. The standards do not include a frequency or duration. For instance, is the standard a never-to-exceed value (an "instantaneous maximum"), a monthly average, an annual average, or some other duration? Minnesota adopted the Class 4A standards to protect irrigation uses, and a longer averaging time may be appropriate since a primary intent of the standards is to protect irrigated soil from the accumulation of salts over the long term. Hardness typically is not a significant concern for industrial water appropriators since surface water appropriated for such use is almost universally treated prior to use.

MPCA is in the process of evaluating these standards, has made them a high priority, and expects to propose revisions in 2018. Based on current information, MPCA expects that the standards will either

remain unchanged or become less stringent. The rulemaking will also provide clarity as to where the standards apply and how to determine surface water compliance. This clarity will be provided even in the event the numeric standards remain unchanged. This rulemaking should be complete prior to the early 2020's.

Neither irrigation nor industrial uses exist at or near the site today. The 7Q10 (low) flow in these headwater streams is zero and thus it seems unlikely someone would request to use these waters for irrigation or industrial use. The closest use for either industrial or irrigation purposes is an irrigation appropriation from Wynne Lake (located downstream in the Embarrass River) for a golf course. This is located over 10 miles downstream and there is significant watershed contribution to the river prior to reaching Wynne Lake that would result in dilution of any contributions from the Basin.

V.C.2. Review of monitoring data – Alkalinity, hardness, TDS and specific conductance

PolyMet's report evaluated the existing surface water monitoring data (2011-2016) using two statistical methods. One method uses the 95% confidence interval and one method uses the 95% prediction interval. The 95% prediction interval upper limit represents the 95% likelihood that all individual data points will be below that limit. Evaluating compliance by using the 95% prediction interval method is protective. As noted above, in V.C.1., neither the standards for these parameters nor the background supporting documents for the standards provide guidance on how to determine surface water compliance with the standards. The standards do not include a frequency or duration. For instance, is the standard a never-to-exceed value (an "instantaneous maximum"), a monthly average, an annual average, or some other duration? The current rulemaking will provide clarity as to how to determine surface water compliance. This clarity could result in a conclusion that these standards will be met.

The table below (from the PolyMet report) shows the approximate year surface water standards for these parameters will be met based on the 95% prediction interval upper limit.

Table 1 Approximate Year to Achieve Compliance with Water Quality Standards based on 95% Prediction Interval Upper Limit

Parameter	Water Quality Standard	Unnamed (Mud Lake) Creek	Trimble Creek	Unnamed Creek	Second Creek
Alkalinity, Bicarbonate as CaCO3	250 mg/L	Uncertain	Uncertain	2022	Uncertain
Hardness, as CaCO3	500 mg/L		Uncertain	2018	2024
Total Dissolved Solids	700 mg/L			2017(1)	
Specific Conductance	1,000 µmho/cm		Uncertain	2018	2018

- Prediction interval currently below standard

(1) Data used in calculations extend through December 2016; the upper limit of the 95% prediction interval reaches compliance in August 2017

- Using the 95% prediction interval upper limit, Mud Lake Creek, Unnamed Creek and Second Creek are in compliance with most of these standards or will be in compliance by the early 2020's. The exceptions are discussed below.

* Using the 95% prediction interval upper limit, it is uncertain when compliance with the alkalinity standard in Mud Lake Creek, Trimble Creek and Second Creek will occur.
* Using the 95% prediction interval upper limit, it is uncertain when compliance with the hardness and specific conductance standards will occur in Trimble Creek. However, it should be noted that individual monitoring results for hardness and specific conductance in Trimble Creek have been below the standard since 2015.
* Data from four groundwater monitoring wells (GW007, GW001, GW008 and GW0012) at the toe of the Basin indicate concentrations of alkalinity, hardness, TDS and specific conductance in Basin seepage are not increasing.
* It should be noted that data from a fifth groundwater monitoring well (GW006) is very different from the other wells. For purposes of this memo, MPCA is treating GW006 is atypical and not representative of Basin seepage. MPCA recommends that another monitoring well be placed in the same general area as GW006.
* As noted in V.C.1., the current rulemaking related to these standards will provide clarity on the numeric standards themselves, where the standards apply and how to determine whether a water complies with the applicable standard. This is expected to occur prior to the early 2020's.
* For Trimble Creek, it is uncertain whether alkalinity, hardness and specific conductance will be below the existing standard. More data and other regulatory tools may be necessary. This will be determined after the completion of the current rulemaking.

V.C.3. Expected conditions post-closure when the system has stabilized after dewatering (including removal of the pump-backs)

* Conditions will remain the same or improve in Trimble Creek and Mud Lake Creek.
* Current conditions and predictions above for Unnamed Creek and Second Creek are affected by the current operation of the Basin pump-back systems required by the existing Consent Decree.
* If closure of the ferrous Basin were required, the pump-back systems would be removed at some point to allow for dewatering of the Basin.
* PolyMet's report evaluated how the removal of the pump-backs may affect surface water quality in Unnamed Creek and Second Creek.
* PolyMet's report concludes that "continued decreases or stabilization of concentrations can be expected, even if pump-back activities are discontinued …"
* MPCA is uncertain whether the decreased impacts from dewatering the Basin will offset any increase due to cessation of the pump-backs. In particular, alkalinity could be above, below or at the existing standard following closure of the Basin. Therefore, more data and other regulatory tools may be necessary. This will be determined after the completion of the current rulemaking.

V.C.4. Other regulatory tools

At any point, the MPCA can consider other regulatory options such as site-specific standards (SSS), a use attainability analysis (UAA), a use and value demonstration (UVD), or a variance. These regulatory processes are available but are subject to various approvals including approvals by the MPCA and the United States Environmental Protection Agency (EPA). Factors that may be considered in a SSS include: consideration of specific ion concentrations as it relates to impacts to soil structure, the averaging period for determining compliance with the standards (monthly average, annual average, etc.) and the effects of seasonal applicability on the protection of designated uses. As noted above in V.C.1., there are not existing uses for industrial consumption or agricultural irrigation in the immediate vicinity of the Basin. Under these circumstances, one of these tools may be reasonable.

It is important to note that operation of the proposed NorthMet project resolves any legacy water quality issues at the Basin.

If early cessation of pump-backs has a negative effect on water quality, the pump-backs could be resumed and remain in place until standards are met and then be discontinued.

In considering all available regulatory tools, the MPCA would also need to consider the following:

1. The facility has been closed since January 2001 and the current MPCA WQ permit for the Basin prohibits operation of the ferrous facility.
2. MPCA would need to evaluate the environmental tradeoffs of all available approaches to determine the net environmental benefit. This evaluation would also consider environmental tradeoffs of the installation of a collection system to capture the Basin seepage, which could introduce additional environmental concerns (e.g., wetland impacts, hydrology impacts, etc.)

V.C.5. Conclusion

Considering all of the information above, MPCA concludes that if the scenario in II. above occurred and the Basin had to be closed, no treatment/mitigation for alkalinity, hardness, TDS and specific conductance would be required.

MPCA recommends regular evaluation of the monitoring data, especially upon completion of the revision to the Class 3 and 4A standards. In addition, based on evaluations, MPCA may recommend additional sampling or biological testing to support alternative regulatory approaches.