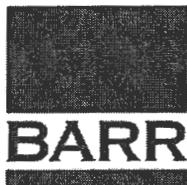


***Area 1 Pit Water Treatment Evaluation in
Support of the Non-Degradation Analysis***

Mesabi Nugget Phase II Project

***Prepared for
Steel Dynamics, Inc.
Mesabi Mining, LLC***

November 2009



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Mesabi Nugget Phase II

November 2009

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Executive Summary

Area 1 Pit is in the process of being dewatered to provide a reservoir for process water to be used in its Large Scale Demonstration Plant (LSDP) and to provide a disposal location for tailings resulting from mining operations. At the initiation of dewatering, the Area 1 Pit contained approximately 13.7 billion gallons of water, with a surface elevation of approximately 1548 ft MSL. In order to stop seepage in the southeast corner of the pit the water level in the pit was lowered to 1546 ft MSL. Additionally lowering of the water elevation to between 1541.7 and 1545.2 ft MSL (seasonally dependent) was necessary to provide a minimum of six months of storage. The water being pumped from the pit is being discharged to Second Creek under an existing NPDES/SDS discharge permit (MN0067687); however, the new *Water Management Plan* for the Phase II project (Barr, estimated issue date November 2009) includes a proposal to relocate this discharge to the Partridge River. The chemistry of the Area 1 Pit water has been analyzed throughout 2008 and 2009 and the future chemistry has been modeled and projected in the *Dissolved Solids and Chemical Balance Report* (Barr, estimated issue date November 2009). The Area 1 Pit discharge is projected to have concentrations of total dissolved solids (TDS), alkalinity, and hardness that may exceed in-stream water quality standards. Sulfate concentrations may also need to be considered as they are a significant portion of the TDS. Additionally, the water from the Area 1 Pit has caused intermittent chronic toxicity to *Cerodaphnia dubia*. This report presents detailed evaluations of technical feasibility and preliminary costs for implementation and operation for four treatment strategies for the Area 1 Pit discharge water.

In accordance with MN Rules 7050.0185 subpart 4, the evaluation of discharges that have the potential to degrade the quality of the receiving water, even though they may meet water quality standards, needs to include an evaluation of potential treatment technologies. The treatment technologies evaluated were:

- Eliminating the return of treated process water from the LSDP to the Area 1 Pit by using reverse osmosis (RO). The treated RO permeate would be returned directly to the LSDP as make-up water, while the RO concentrate would be treated using evaporation and crystallization to achieve a zero liquid discharge (ZLD).
- Eliminating the return of treated process water from the LSDP to the Area 1 Pit using RO with concentrate ZLD and treatment of the Area 1 Pit discharge using lime softening.

- Eliminating the return of treated process water from the LSDP to the Area 1 Pit using RO with concentrate ZLD and membrane softening of the Area 1 Pit discharge.
- Treatment of the Area 1 Pit discharge using RO with evaporation and crystallization of the RO concentrate.

Of key importance to developing these alternatives was the determination that a significant contributor to the Area 1 Pit water quality is the return of treated process water from the LSDP. This flow of only 445 gpm, contains 22,000 kg/d of TDS. This flow represents only 11 percent of the projected maximum dewatering rate from Area 1 pit of 4,000 gpm, however it contributes up to 45 percent of the total mass of dissolved solids under Mine Alternative 1 and up to 50 percent of the total mass of dissolved solids under Mine Alternative 2. Eliminating this concentrated load before it is discharged into the Area 1 Pit removes a substantial portion of the TDS load to the pit and, as shown in the cost estimates, provides the most economical method of removing TDS on a mass basis. Tables E1 and E2 summarize the results of the evaluations for Mine Alternative 1 and 2, respectively.

Table E1. Results of Treatment Alternatives Evaluations for Mine Alternative 1

Treatment at the LSDP	Treatment at the Area 1 Pit Discharge	Maximum Mass of TDS removed ¹ (kg/d)	Average Mass of TDS removed ² (kg/d)	Net Present Value
RO/ZLD	none	22,000	22,000	\$ 42,700,000
RO/ZLD	Lime softening	27,900	26,700	\$ 87,200,000
RO/ZLD	RO/ZLD	26,400	25,500	\$ 110,400,000
none	RO/ZLD	24,000	19,200	\$ 112,600,000

Notes:

1. Mass removal treating maximum permitted flow of 4,000 gpm
2. Mass removal treating 20-year average flow of 3,200 gpm

Table E2. Results of Treatment Alternatives Evaluations for Mine Alternative 2

Treatment at the LSDP	Treatment at the Area 1 Pit Discharge	Maximum Mass of TDS removed ¹ (kg/d)	Average Mass of TDS removed ² (kg/d)	Net Present Value
RO/ZLD	none	22,000	22,000	\$ 42,700,000
RO/ZLD	Lime softening	28,100	25,400	\$ 83,400,000
RO/ZLD	RO/ZLD	30,100	26,500	\$ 109,700,000
none	RO/ZLD	30,500	17,200	\$ 109,500,000
Notes:				
1. Mass removal treating maximum permitted flow of 4,000 gpm				
2. Mass removal treating 20-year average flow of 2,250 gpm				

Even with the elimination of the load from the LSDP, some alkalinity and hardness remains in the pit that may require additional softening to avoid any degradation of the receiving stream – either Second Creek or the Partridge River. However, the costs for this incremental additional treatment are significant.

None of the treatment alternatives are cost effective for the treatment of Area 1 Pit water, and none are “additional control measures [which] are reasonable”, per the requirement of MN Rules 7050.0185, Subpart 8. All of the alternatives have present worth values that are the same order of magnitude as the entire cost of the Phase II project.

AUG 30 2005

WQ-16J

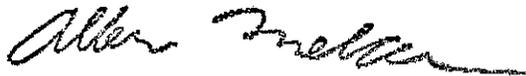
Leo Raudys, Director
Regional Environmental Management Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Dear Mr. Raudys:

On August 9, 2005, the United States Environmental Protection Agency (USEPA) received a letter from the Minnesota Pollution Control Agency (MPCA) requesting approval of the proposed variance from meeting water quality standards for the Mesabi Nugget LLC. The proposed action would grant the Mesabi Nugget facility (Permit MN0067687) a variance from meeting the hardness, total dissolved solids (salts), specific conductivity and bicarbonates water quality standards for the protection of agricultural and industrial water supply uses applicable to Second Creek in St. Louis County, Minnesota. The August 9, 2005, letter documents the MPCA Citizen Board approval of the variance request based on Minnesota Rule Parts 7050.0190, Subpart 1, and 7000.7000 Subpart 2.

Federal regulations of 40 CFR 131.21 require USEPA review and approval of State water quality standards. USEPA has reviewed the information submitted in support of the proposed variance and hereby approves the proposed variance and permit variance conditions submitted by the State of Minnesota pursuant to Section 303 of the Clean Water Act and Federal regulations at 40 CFR 131.21. If you or your staff has any questions regarding this approval, please contact David Pfeifer of my staff. Mr. Pfeifer may be reached at (312) 353-9024.

Very truly yours,



Jo Lynn Traub
Director, Water Division

cc: Richard Clark, MPCA
Gary Kimball, MPCA

bcc: Peter Swenson, NPDES Branch
George Azevedo, NPDES Branch

*Am for JT
8/30/05
DP 8/29/05
130 8/26/05*

BAND EX. 13

Use Attainability Analysis/Variance Checklist

Mesabi Nugget, Permit # MN0067687

Prepared by: David Pfeifer

Date: August 29, 2005

(NOTE: This checklist must be completed for each water body with a new or revised designated use that is less stringent than the requirements of sections 101(a)(2) and 303(c)(2) of the CWA as well as for each variance adopted by a State/Tribe.)

Name of affected water body: Second Creek, St. Louis County, Minnesota

Uses designated for the water body by the State/Tribe:

[NOTE: In designating uses, the State/Tribe must consider all of the following. If any of these are not designated, it is presumed that the water body does not support that use (water quality is not sufficient to support the use) and a UAA is required]

Aquatic Life: 2B (cool or warmwater aquatic life)

Recreation

Primary (direct and sustained) contact (bathing water)

Primary, seasonal (identify season): April 1 – October 31

Secondary (incidental) contact

No recreational use

Agricultural water supply: yes

Industrial water supply: yes

Navigation: yes

List uses identified that are less stringent than those identified in sections 101(a)(2) and 303(c)(2) of the CWA. NOE

The new or revised uses are at least as protective as the existing uses Y/N

States rationale for the new or revised designated use (see 40 CFR 131.10(g)) (circle applicable bases below):

Naturally occurring pollutant concentrations prevent attainment of 101(a)(2) uses

Natural flow conditions or water levels prevent attainment (lack of habitat)

Human caused conditions or pollution sources prevent attainment and cannot be remedied or would cause more environmental problems to solve than leave in place

Hydrologic modifications prevent attainment of uses

Physical features of the water body prevent attainment of the aquatic life use (habitat)

Controls more stringent than those required by sections 301 and 306 of the CWA would result in widespread economic and social impact - MPCA determined that attaining the criteria for agricultural and industrial water supply is not feasible

Documentation to support use designation/variance provided by State/Tribe? Y/N
(Attach documentation)

Documentation adequately supports designation/variance decision?

Y/N

If the answer to question 7 is no, then the issue is placed on the issue list and processed accordingly (see week 2).

Notes (Dave Pfeifer, 8/26/05):

Key issues from preliminary review:

GLI Prohibition on variances for new discharges

Issue: This facility is a new discharge. The Great Lakes Water Quality Guidance prohibits variances for new discharges for pollutants covered by the Guidance. Table 5 of the Guidance identifies pollutants that are not covered by the Guidance and are therefore not subject to the requirements of the Guidance. Among the pollutants included in Table 5 are alkalinity, dissolved solids and salinity. The variance for Mesabi Nugget is from Minnesota's water quality criteria for hardness (250 milligrams per liter (mg/L), Class 3B), bicarbonates (5 milliequivalents (250 mg/L) for Class 4A), dissolved solids (700 mg/L for total dissolved salts (solids) for Class 4A), and specific conductance (1,000 micromohs per centimeter (umohs/cm) for Class 4A). In its preliminary review EPA determined that the variance for the applicable criterion for total dissolved solids is allowable because total dissolved solids are listed in table 5. EPA also asked for additional information from MPCA demonstrating that the other parameters are indicators for pollutants contained in table 5.

Resolution: MPCA provided the following information from the Citizen Board package: "MPCA finds that the four TDS or salinity related parameters that are the subject of the variances are covered by and in Table 5 of 40 CFR part 132.6. Consequently, these four parameters are excluded from application of GLI requirements regarding the prohibition of the granting of variances for a new Great Lakes discharger found in 40 CFR part 132, Appendix F, procedure 2.A.1. The MPCA was not required to apply the procedures of Appendix F, including the variance prohibition, in establishing controls on the discharge of any pollutant set forth in Table 5 of part 132. See 40 CFR part 132.4(e)(2). Alkalinity and TDS are specifically listed in Table 5. Alkalinity includes bicarbonate, and hardness and alkalinity are considered part of TDS. Specific conductance is simply an electronic measure of TDS. The GLI guidance methodologies are not scientifically and technically appropriate for hardness and specific conductivity, just as EPA asserts they are not appropriate for alkalinity and dissolved solids in the Supplementary Information Document (SID) to the Water Quality Guidance for the Great Lakes System (SID at page 49 and 53). The methodologies in Minn. R. ch. 7052 relate to aquatic life uses, not industrial or agricultural uses. The variance is not sought for aquatic life uses, but for industrial use and agricultural (irrigation) uses. An existing discharge, which currently does not meet water quality standards for these parameters, will be taken over by Mesabi Nugget. In addition, EPA has not established in regulation, outside of the GLI Guidance, a general prohibition of variances for new discharges. Therefore, Mesabi Nugget is eligible for water quality standard variances for these TDS related parameters. EPA reviewed the information provided by MPCA and concurs with MPCA's conclusions that

the parameters in question are covered by the exclusion for table 5 pollutants and the variance does not conflict with the prohibition on variances for new discharges under the Great Lakes Water Quality Guidance.

Demonstration of widespread social and economic impacts

Issue: Minnesota’s rules allow for variances based on a demonstration that compliance with the water quality standards is not feasible. Federal regulations require a demonstration that complying with the water quality standards would cause, “substantial and widespread economic and social impacts.” The proponent of the project contends, and MPCA agrees, that treatment of the effluent to remove hardness, bicarbonates and dissolved solids and to reduce specific conductance is not feasible. The basis for this determination is that removal of these pollutants would require softening, reverse osmosis and crystallization of the effluent. These technologies are problematic because of the cost, the uncertainty that they would produce the required effluent quality consistently, technical problems with scaling and fouling of the RO membranes, high energy costs and the need to dispose of solid wastes. This type of treatment has never been applied to an effluent such as this. Application of this treatment was estimated by the proponent to increase the cost of the project by \$30 million dollars from \$130 million to \$160 million. Given the uncertainty regarding the efficacy of treatment and the increased cost, the project would not proceed if the facility were required to comply with the water quality standards according to Richard Clark, MPCA. If the project were abandoned, there would be a loss of economic benefits to the community including up to 500 construction jobs and 50 full-time jobs during Project operation. Taxes paid to local and state governments are expected to be on the order of \$40 million over 30 years.

Resolution: The project proponent provided additional economic data on the costs of treatment. These data, combined with the information on feasibility of treatment demonstrate that controls more stringent than those required by sections 301(b) and 306 of the Act would have substantial and widespread economic and social impact. In addition, the uses that the criteria are intended to protect are not existing uses because there are no know agricultural or industrial water intakes in the affected segment and the criteria are already exceeded due to the uncontrolled discharge from mine pits. 40 CFR 131.10(g)(3) allows for removal of a use in situations where the use is not an existing use and “human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied .” Since the agricultural and industrial uses are not existing uses and the use is not attainable because of human caused sources of pollution, MPCA’s decision to allow a temporary variance from the standards is consistent with Federal regulations at 40 CFR 131.10(g).

Attachment 1, Minnesota Pollution Control Agency Request for approval

MPCA request for EPAapproval080905.pdf

Attachment 2, Minnesota Pollution Control Agency Notification of Adoption

Mesabi Nugget-MPCA Board Approval8-2-05.pdf

Attachment 3, Minnesota Pollution Control Agency

**STATE OF MINNESOTA
POLLUTION CONTROL AGENCY**

**IN THE MATTER OF THE PROPOSAL
TO ISSUE AN NPDES/SDS PERMIT
AND VARIANCES TO
MESABI NUGGET, LLC
HOYT LAKES, MINNESOTA**

**FINDINGS OF FACT
CONCLUSIONS OF LAW
AND ORDER**

The above-entitled matter came before the Minnesota Pollution Control Agency (MPCA) at a MPCA Citizens' Board (Board) Meeting held in St. Paul, Minnesota, on July 26, 2005. After reviewing the record before it and allowing opportunity for public comment, the MPCA finds, concludes, and orders as follows:

FINDINGS OF FACT

This matter involves the application of Mesabi Nugget, LLC, (Mesabi Nugget) for issuance of a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Permit authorizing construction and operation of wastewater treatment facilities at and a treated wastewater discharge from the proposed Mesabi Nugget iron nugget facility (Project) at Hoyt Lakes. The application for an NPDES/SDS Permit included an application for variances from water quality standards for the discharge. The permit includes the variances and various terms and conditions related to the variances. The MPCA must decide whether, under applicable statutes and rules, it should issue the permit and grant the variances.

DESCRIPTION OF THE PROJECT

The Project is an iron nugget manufacturing facility which will produce iron nuggets from iron ore concentrate. The Project will have the capacity to produce 600,000 metric tons of iron nuggets per year. The nuggets will be approximately 96 to 98 percent iron, and can be fed directly into electric arc furnaces (mini-mills) as well as to blast furnaces at conventional integrated steel manufacturing facilities. Raw materials for nugget manufacturing consist of iron ore concentrate from the Northshore Mining Company's taconite facility in Silver Bay, Minnesota, various coals, fluxes, and binders.

The Project will appropriate water from the water-filled (formerly LTV Steel Mining Company) Area 1 Pit for water supply for process temperature control (noncontact and contact cooling) and for process water, including for the wet scrubber air emissions control system. The makeup water is sequentially cycled and cascaded from the noncontact cooling system to the contact cooling system to the wet scrubber system. Blowdown from the scrubber system will be routed to a multi-stage wastewater treatment system for treatment prior to discharge. The primary pollutants in the wastewater will be suspended solids, dissolved solids (sulfate, hardness, bicarbonates), metals, and mercury.

The wastewater treatment system consists of conventional chemical coagulation and precipitation followed by two stages of filtration through a Mesabi Nugget developed mercury filtration system that will utilize taconite tailings as the filtration media. Wastewater

from the scrubbers will be routed through the chemical precipitation unit for sulfate, fluoride, solids and metal removal, then to the first of two mercury filtration units for enhanced mercury and solids removal, and from there into the west end of the Area 1 Pit. Water from the east end of the Area 1 Pit will then be routed into the second mercury filtration unit for additional mercury removal prior to discharge into Second Creek.

The Project will utilize an existing permitted discharge authorized by NPDES/SDS Permit No. MN0042536 which permit was issued to Cliffs Erie, LLC. The Cliffs Erie, LLC's NPDES/SDS Permit will be modified simultaneously with the final issuance of the Mesabi Nugget permit to formally transfer the NPDES/SDS Permit and discharge responsibilities, from Cliffs Erie to Mesabi Nugget.

The Project is expected to have average and maximum discharge rates of 1.5 and 5.8 million gallons per day (MGD) respectively through the permitted outfall to the downstream receiving waters. The initial receiving water is Second Creek, a tributary to the Partridge River, and it is part of the St. Louis River Watershed that ultimately drains to Lake Superior.

Second Creek is a Class 2B, 3B, 4A, 4B, 5 and 6 water under Minn. R. 7050.0430, Unlisted Waters, and is classified for the protection of aquatic life and recreation, industrial use, agriculture and wildlife, aesthetic enjoyment and navigation, and other uses, and is an Outstanding International Resource Water under Minn. R. Ch. 7052. Second Creek is not listed on the MPCA Clean Water Act Section 303(d) Total Maximum Daily Load (TMDL) List of Impaired Waters.

In accordance with the requirements of Minn. R. 7001.0100, the MPCA prepared a draft permit for the Project (NPDES/SDS Draft Permit No. MN0067687) which was placed on 30-day public notice on May 13, 2005, with the comment period extending until 4:30 pm on June 13, 2005. The NPDES/SDS Permit was co-noticed with the proposed Air Emission Permit No. 13700318-001 for the Project.

VARIANCE APPLICATION

Mesabi Nugget has submitted a variance application with its permit application based on provisions in Minn. R. 7050.0190, subp. 1 and pursuant to Minn. R. 7000.7000, requesting temporary variances from water quality standards for four pollutants in the discharge: hardness, bicarbonates, total dissolved salts (solids) and specific conductance.

Water quality standards for the four pollutants in question are specified in Minn. R. 7050.0223, subp. 3, (Class 3B standards) and 7050.0224, subp. 2, (Class 4A standards). The relevant standards are: 250 milligrams per liter (mg/L) for hardness (Class 3B), 5 milliequivalents (250 mg/L) for bicarbonates (Class 4A), 700 mg/L for total dissolved salts (solids) (Class 4A), and 1,000 micromohs per centimeter (umohs/cm) for specific conductance (Class 4A). Class 3B standards are protective for use of the water for industrial consumption and Class 4A standards are protective for use of the water for agricultural irrigation. There are no known existing uses of Second Creek water for industrial use (Class 3B) or for agricultural irrigation (Class 4A).

Concentrations of these four pollutants currently exceed water quality standards in the existing discharge as monitored under the existing Cliffs Erie, LLC, NPDES/SDS Permit. Average concentrations of these four pollutants in the existing discharge are: 740 mg/L for hardness, 396 mg/L for bicarbonate, 1099 mg/L for total dissolved solids, and 1466 umohs/cm

for specific conductance. No effluent limitations for these parameters were applied to the existing discharge in the existing Cliffs Erie, LLC, NPDES/SDS Permit.

Concentrations of these four pollutants are anticipated to exceed water quality standards in Second Creek at least some of the time because, based on the limited flow monitoring information available, Second Creek consists solely or primarily of the Area 1 Pit discharge during significant portions of the year. Flows of the receiving water near the Area 1 Pit discharge location are not well understood given the mining activities in the area and the limited flow monitoring, and for purposes of the permit terms and conditions, a technical determination was made that the annual 7Q10 low flow for Second Creek is zero. The term 7Q10 means the lowest flow over a seven day period with a once in ten year recurrence frequency.

Minn. R. 7050.0190, subp. 1 allows for a variance from water quality standards in a situation where the MPCA finds by reason of exceptional circumstances the strict enforcement of any provisions with the standards would cause the discharger undue hardship, that the disposal of the sewage, industrial waste or other wastes is necessary for the public health, safety or welfare, and that strict conformity with the standards would be unreasonable, impractical or not feasible under the circumstances.

Minn. R. 7000.7000 governs the procedure for issuance of variances by the MPCA and specifies the information that must be included in the written application for a variance. Such information includes: the nature of the variance sought, economic and/or technical basis for the requested variance, a description of the facility and materials handled pertinent to the requested variance, alternatives considered, a plan for reducing discharges to the lowest levels practical, and concise statements on the effects on air, land and water resources and on business, trade, and other economic interests.

Mesabi Nugget is requesting the variances on the basis that the level of treatment needed for strict conformity with the standards is not technically feasible at the projected flow volumes. The needed level of treatment is considered to be reverse osmosis (RO) followed by brine concentration and crystallization. Mesabi Nugget asserts that the RO-related treatment is technically infeasible due to likely fouling and scaling of RO membranes and heat input surfaces of the concentrator/crystallizer leading to excessive downtimes for membrane replacement, and that such operational liabilities are not conducive to the treatment of a constant or continuous, large volume, wastewater flow.

Mesabi Nugget asserts that because the Project would combine new mercury filtration treatment technology not tried elsewhere with reverse osmosis technology that has been applied successfully, albeit on a smaller scale and under different circumstances, overall it is not a demonstrated feasible technology capable of producing an effluent that can comply with the Class 3 and Class 4 water quality standards. The combination of the two treatment technologies (mercury filtration and reverse osmosis) presents an overall treatment process that may be capable of meeting mercury effluent limitations, but is complex with respect to equipment and operation, and is risky in regard to meeting effluent limitations for all pollutants.

Cost of treatment is not the primary basis for the variance request, though a reverse osmosis treatment systems for the wastewater flow projected represents a significant expense (approximately \$15 million capital cost and \$2 million per year operating cost). Also, an economic feasibility argument hinges on the fact that to be economically feasible the treatment would first have to be technically feasible.

The options for wastewater treatment are driven by the decisions made for air pollution control equipment. Current air quality rules and technology requires the use of a wet scrubber to provide sufficient removal of particulate matter and acid gases to meet the various ambient air quality standards, including those related to Class I areas. The use of a wet scrubber for air emission control results in the transfer of those pollutants to the wastewater stream at sufficiently high concentrations to limit the number of wastewater treatment technologies that are capable of providing the degree of treatment and removal to achieve the water quality standards.

The air emission permit for the Project requires that various raw material and fuels be tested to determine which combination may provide optimal reductions in air emissions. It is anticipated that whatever choices are made on raw materials and fuels to reduce emissions will also likely reduce loadings to the wastewater treatment system and to the wastewater discharge.

Effects upon air, land, and water resources were evaluated in the variance application review process. Direct effects upon air and land are expected to be minimal. The most notable potential impact to water resources would be potential impact to freshwater species exposed to high concentrations of these major ions. The effect on aquatic organism osmoregulation of these ions was reviewed and evaluated. The MPCA determined that the concentrations of these ions expected in the receiving water would not likely cause toxicity or be detrimental to species expected to be present, or to representative species.

The effects on business, commerce, trade and other factors were considered. Mesabi Nugget asserts that the \$130 million Project will employ up to 500 persons during the construction phase and provide 50 full-time jobs during Project operation. Taxes paid to local and state governments are expected to be on the order of \$40 million over 30 years.

VARIANCE REVIEW AND RECOMMENDED PERMIT CONDITIONS

The MPCA has reviewed the variance application and has determined that the information presented supports the conclusion that treatment capable of meeting the water quality standards for the four pollutants in question is not technically feasible at this time. These variances are temporary in nature and will expire at the same date as the expiration of the NPDES/SDS Permit; that is, the variances will be granted for a period of five years, corresponding to the life of the NPDES/SDS Permit.

A public notice of the MPCA's preliminary determination to grant the variances was completed pursuant to the requirements of Minn. R. 7000.7000. The public notice of the variance recommendation was included as part of the public notice for the draft NPDES/SDS Permit.

As a condition of granting the variances, MPCA is including additional conditions into the NPDES/SDS Permit that accompanies the variances. The purpose of the additional conditions is to measure and document potential impacts of granting the variances and to provide assurance that Mesabi Nugget will be making reasonable progress in ultimately achieving compliance with the water quality standards.

40 CFR 122.44 (d)(1) requires that pollutants be evaluated for the potential to exceed water quality standards using acceptable technical procedures and accounting for variability in the effluent. Evaluation of the data submitted with the permit and variance applications indicates that the four pollutants in question currently exceed, and are expected to continue to exceed, their

respective water quality standards in the receiving water for the near future. Effluent limitations for the four pollutants are included in the NPDES/SDS Permit.

Final Water Quality Based Effluent Limits. Water Quality Based Effluent Limitations (WQBELs) based on the underlying water quality standards in Minn. R. 7050.0223 and 7050.0224 were calculated using a coefficient of variation of 0.1 and a twice monthly monitoring frequency. The calculated monthly average and daily maximum WQBELs are, respectively, 268 mg/L and 301 mg/L for hardness, 268 mg/L and 301 mg/L for bicarbonates, 752 mg/L and 842 mg/L for total dissolved solids, and 1074 umhos/cm and 1203 umhos/cm for specific conductance.

Interim limits for variance pollutants. The NPDES/SDS Permit contains interim limits effective upon permit issuance for the four pollutants in question based on current concentrations in the discharge for hardness and bicarbonate and on projected levels in five years for total dissolved salts (solids) and specific conductance. Actual monthly average and daily maximum interim effluent limitations included in the NPDES/SDS Permit are, respectively, 740 mg/L and 831 mg/L for hardness, 396 mg/L and 445 mg/L for bicarbonates, 1619 mg/L and 1818 mg/L for total suspended solids, and 2159 umhos/cm and 2425 umhos/cm for specific conductance. The ratio of monthly average to daily maximum interim effluent limitations (0.890) is based on the ratio established for the WQBELs.

The interim limits will be in effect for approximately five years at which time the final WQBELs will take effect and will be applicable to the permitted discharge.

Requirement for evaluation of technologies to reduce loadings/improve treatment. The NPDES/SDS Permit requires that Mesabi Nugget investigate and implement alternate technologies to improve treatment performance and establish a downward trend in pollutant concentrations towards meeting the water quality standards. As part of this requirement, the permit requires that Mesabi Nugget complete and submit a Source Minimization and Alternate Treatment Technology Evaluation Plan that requires the company to evaluate alternative raw materials, processing techniques, waste minimization and wastewater treatment technologies with the goal of reducing the loading of pollutants to the wastewater treatment system and/or to improve the degree and efficiency of wastewater treatment.

Permit re-opener language. The NPDES/SDS Permit contains specific language stating that the permit and variances may be modified by the MPCA if revisions to water quality standards are applicable to the pollutants involved in the variances.

Instream flow and parameter monitoring. The NPDES/SDS Permit requires instream monitoring of Second Creek for the four variance parameters upstream and downstream of the discharge. The purpose is to determine the degree to which either station does not comply with water quality standards as a result of the discharge, to determine any seasonality of noncompliance with the underlying water quality standards, to help determine the source of any noncompliance with the underlying water quality standards, and to establish the criteria for potential future modification of the variances based on receiving water information.

Chronic Whole Effluent Toxicity (WET) Testing. The NPDES/SDS Permit requires the completion of annual chronic toxicity test batteries on the discharge for the purpose of assessing the potential for the discharge to exceed whole effluent toxicity thresholds and to track any potential effects of increased total dissolved solids (TDS) on toxicity. The tests are to

be conducted in accordance with published U.S. Environmental Protection Agency (EPA) protocol and include the fathead minnow and ceriodaphnia dubia as the test organisms.

The application of nondegradation was considered. Mass loadings of the applicable variance parameters to Second Creek will decrease under the variance scenario since the maximum flow rates authorized by the NPDES/SDS Permit, when compared to the existing discharge, will decrease by a larger factor than the Projected concentration increase reflected in the interim effluent limitations. Maximum flow rates for the discharge will decrease from the 14.4 MGD rate currently authorized by the existing NPDES/SDS Permit issued to Cliffs Erie, LLC, to 5.8 MGD authorized by the Mesabi Nugget NPDES/SDS Permit, an approximate 60 percent reduction, whereas the increase in concentration reflected in the interim limits represents an approximate 47 percent increase. Consequently, mass loading of the applicable pollutants will be decreased for the Project's discharge.

There are no effluent limitations for the existing discharge in the existing Cliffs Erie, LLC, permit for the four variance parameters, nor a listing of Second Creek as an impaired water, and there will not be a mass loading increase above existing mass loadings of the applicable pollutants. Therefore, nondegradation provisions do not apply and a nondegradation analysis is not required.

MERCURY

Mercury monitoring of the discharge from the Area 1 Pit is required by the existing NPDES/SDS Permit issued to Cliffs Erie, LLC. The thirteen data points available (with two points not being included for reason of having either insufficient quantification or being a suspected outlier) indicate an average concentration of 1.18 nanograms per liter (ng/L) and a median of 0.80 ng/L.

A Reasonable Potential determination was completed for mercury based on projected effluent mercury concentrations. A reasonable potential to exceed water quality standards was indicated in this evaluation. Thus, effluent limitations for mercury are included in the NPDES/SDS Permit.

As a new discharger of mercury (i.e. a Great Lakes Initiative (GLI) regulated parameter) in the Lake Superior basin, Mesabi Nugget must meet the mercury water quality standard of 1.3 ng/L at the point of discharge, upon commencement of discharge, without benefit of a mixing zone, and with no eligibility to apply for a variance from the mercury standard. Providing for effluent variability at an expected coefficient of variation of 0.6 and a monitoring frequency of twice monthly, effluent limitations based on the underlying 1.3 ng/L water quality standard were calculated at 1.8 ng/L monthly average and 3.2 ng/L daily maximum.

Twice monthly monitoring of the discharge for mercury using low-level EPA analytical method 1631 and EPA clean sampling method 1669 is included in the NPDES/SDS Permit.

Because of the location of the facility and the discharge in the Lake Superior basin, certain administrative remedies for mercury noncompliance are not available to Mesabi Nugget in the event the mercury filters do not provide the degree of mercury removal projected. Mesabi Nugget is not eligible to apply for a variance for mercury, so the company must follow stringent permit terms and conditions for addressing compliance with the mercury effluent limitations. Therefore, to eliminate or minimize the potential for a noncomplying discharge, the permit

contains certain provisions on actions the company must take if monitoring data indicates the mercury effluent limitations are being exceeded.

If monitoring of the discharge indicates that the mercury monthly average effluent limitation is not being achieved, the NPDES/SDS Permit requires that Mesabi Nugget cease the discharge to Second Creek. The permittee may continue to manufacture product provided it has previously pumped the Area 1 Pit down to create excess storage capacity (thus eliminating the immediate need for a discharge to Second Creek) and it continues to treat wastewater through at least the first two treatment units (chemical precipitation and mercury filter #1) prior to storage in the Area 1 Pit.

For the purposes of the above provision only, the trigger that initiates the cessation of discharge requirement is defined in the NPDES/SDS Permit as three exceedances of the mercury monthly average effluent limitation in any rolling 12 month period or four exceedances of the monthly average limitation in any 60 month period. This exceedance frequency is based on a 95 percent compliance level. The NPDES/SDS Permit allows that the permittee may propose for MPCA approval an alternative statistical criteria for determining an exceedance in this context, provided it is based on an equivalent statistical level of compliance as that forming the basis of the criteria stipulated in the NPDES/SDS Permit.

If excess storage capacity becomes unavailable and the Area 1 Pit fills to the point where it will start to discharge on its own, the NPDES/SDS Permit requires that the company cease its manufacturing process and cease generating wastewater until such time that compliance with the mercury effluent limitations can be demonstrated.

If the permit conditions discussed under Findings 39-40 above occur, a major modification of the permit with public notice is required before the discharge to Second Creek can resume, and the permittee must demonstrate that it can comply with the mercury effluent limitations.

TREATMENT SYSTEM APPROVAL

The proposed wastewater treatment system relies heavily on two mercury filtration units, employing taconite tailings as the filtration media, for the removal of mercury from the wastewater. The mercury filtration treatment systems for mercury removal to nanogram per liter levels is a first of its kind technology for which there is no operating information. To address this issue regarding a lack of operating treatment data, the NPDES/SDS Permit includes detailed provisions for MPCA review and approval of the mercury filter design, to include pilot testing protocol, pilot testing results, preliminary engineering design and final plans and specifications.

The NPDES/SDS Permit requires that mercury filtration pilot testing use a continuous flow process to simulate a full-scale treatment system and the pilot testing must demonstrate that full-scale mercury filtration technology is technically feasible and capable of achieving compliance with the mercury effluent limitations contained in the NPDES/SDS Permit. The NPDES/SDS Permit requires that the design and sizing of the full-scale system be based on the specific design and operating parameters established in accord with the approved pilot testing results.

The NPDES/SDS Permit also requires that approval of the pilot testing results be approved by the MPCA prior to the beginning of actual construction of the manufacturing plant, with limited exceptions for some building preparation and footing activities. The permittee must not begin

construction of the facility until pilot test results have been approved, even if this occurs at some later date after final issuance of the NPDES/SDS Permit.

FINANCIAL ASSURANCE

The Area 1 Pit is incorporated into the wastewater treatment system for the facility; specifically, it lies in between the two mercury filtration units prior to the discharge to Second Creek. As such there is the potential that the Area 1 Pit may accumulate some concentration of pollutants that may remain present at the time of facility closure and that may require continued treatment prior to discharge during the closure period.

In order to ensure that funding is available to continue operation of relevant portions of the treatment system after closure (in particular mercury filtration unit #2), the NPDES/SDS Permit contains a provision for financial assurance. Specifically, the NPDES/SDS Permit requires that a letter of credit in the amount of \$5 million be provided and that the submittal of the letter of credit is required before construction of the manufacturing plant can begin.

The specific amount of financial assurance was based on the estimated cost of operating the treatment facility, based on the design information available at the time of permit drafting, for the amount of time necessary to return Area 1 Pit water quality to its natural background levels. The estimated time for additional treatment needed to achieve natural background levels was determined to be approximately three to five years. The NPDES/SDS Permit provides for an annual review of the amount of financial assurance, at which time the dollar amount may be adjusted upwards or downwards.

PUBLIC COMMENTS AND MPCA CONSIDERATION OF PUBLIC COMMENTS

During the public notice period for the draft permit, members of the public expressed a variety of opinions and concerns about the Project, ranging from full support of the Project and the desire for immediate issuance of the permit and variances to significant concerns about land ownership issues, mercury requirements, and the content and legality of the proposed variances.

The MPCA staff reviewed each of the comments and provided a detailed response to each. The responses of MPCA staff are set out in the Responses to Comments document (Attachment 5).

Significant comments by Mesabi Nugget (the Project proposer), joint comments from the National Wildlife Federation/Sierra Club, and comments from surface and mineral rights owners are also itemized below, along with a MPCA response to each comment.

The MPCA concurs with the reasoning of MPCA staff in its Responses to Comments document (Attachment 5) and adopts that reasoning by reference in these Findings.

MESABI NUGGET COMMENTS AND MPCA RESPONSE

Mesabi Nugget submitted comments on the draft permit for the Project. The comments focused on five categories: discharge limitations, monitoring requirements, exceedance of mercury effluent limitation requirements, schedules and financial assurance.

Mesabi Nugget requests that the interim effluent limitations for hardness and bicarbonates be raised to accommodate expected natural variation in the discharge. The company asserts that available information on water chemistry is limited to very few actual analyses and the variability of the data is not well understood. Furthermore, the company notes that the proposed interim limit is below the Projected effluent concentration submitted as part of the permit application.

The MPCA finds that the interim effluent limitations for hardness and bicarbonates are based on the Level Currently Achievable using the accepted EPA methodologies that are employed in the NPDES/SDS permitting and water quality programs. In addition, the data used for the interim effluent limit determination was that provided by the company in the final variance application submitted subsequent to the company's original permit application. The variance application included data on current discharge concentrations of the variance parameters and their projected discharge concentration after five years. The MPCA used the less stringent of the current versus projected values in the determination of the interim limits for each of the variance parameters. In the case of hardness and bicarbonates, concentrations are expected to decrease so the current concentrations were used in the effluent limitation determination. For total dissolved solids and specific conductance, levels are expected to initially increase so projected values were used for effluent limitations. The MPCA believes the interim limits in the NPDES/SDS Permit are not an unreasonable burden to Mesabi Nugget, particularly since Mesabi Nugget is expected to eventually achieve compliance with the more stringent final effluent limitations by the end of the permit term. Any less stringent interim limitations would not lead the company in the direction of ultimately achieving compliance with the final effluent limitations.

Mesabi Nugget requests that monitoring frequencies be reduced for those parameters that have no discharge limits ("monitor only"), that monitoring for molybdenum be eliminated, and that flow monitoring at internal monitoring points be changed from once monthly to continuous.

The MPCA finds that the monitoring frequency for "monitor only" parameters is already at a less frequent rate than for the parameters with limits. Twice monthly monitoring is required for parameters with limits while once monthly monitoring (sulfate, sodium, chloride, etc.) or once annually monitoring (metals) is required for the "monitor only" parameters. This frequency is considered reasonable given the volume and nature of the discharge. No water quality standards apply for molybdenum for the proposed discharge, however, research has suggested that elevated concentration of molybdenum may be of concern with respect to drinking water. Although drinking water standards do not apply to the discharge location, there is enough uncertainty about the potential effects of elevated molybdenum concentrations to warrant monitoring of the discharge. Monthly monitoring of molybdenum without limits is considered reasonable to track any concentration increase. Finally, monthly monitoring for flow is sufficient for internal monitoring points. Mesabi Nugget may, if it wishes, monitor flow more frequently than that specified in the permit.

Mesabi Nugget requests that the mercury exceedance "trigger" specified in Chapter 1.6.6 of the draft permit be based on three consecutive exceedances of the monthly average mercury effluent limitation rather than three exceedances in any rolling 12-month period or four exceedances of the monthly average in a 60-month period, and that the "trigger" only be effective after iron nugget production has begun rather than immediately upon issuance of the permit.

The MPCA finds that the original "trigger" of three exceedances of the mercury monthly average effluent limitation in a rolling 12-month period or four exceedances in a 60-month period is based on and represents a 95 percent level of compliance assuming twice monthly monitoring, a

compliance level that is routinely applied within the NPDES/SDS permitting and water quality program, and is reasonable for this application. The “trigger” suggested by Mesabi Nugget does not meet the level of compliance expected within the NPDES/SDS permitting and water quality program. Further Mesabi Nugget’s proposed trigger would cause exceedances of the mercury water quality standard in downstream waters if upstream concentrations remain at or near the current standard. The MPCA finds it is reasonable to include language into the permit specifying that this “trigger” becomes effective upon the commencement of iron nugget production rather than immediately upon issuance of the permit.

Mesabi Nugget requests alternative time or date requirements related to the drawdown of the Area 1 Pit to create storage capacity (from three years’ capacity to five years’ capacity and six months of freeboard to three months of freeboard) specified in Chapter 1.6.9 and 10 of the NPDES/SDS Permit, and to the submittal date for the Mesabi Nugget Mercury Filtration Media (Tailings) Acquisition and Disposal Plan required by Chapter 5.4.13 of the NPDES/SDS Permit.

MPCA finds that the permit application provided information that suggests the water volume of the Area 1 Pit contributes to the treatment of the wastewater and as such, is a necessary and integral element of the total treatment system. The capacity and freeboard timeframe requirements were included in the NPDES/SDS Permit to ensure that an adequate volume of water was retained in the Area 1 Pit to accomplish the predicted necessary treatment required to achieve and maintain effluent limit compliance. Maintaining higher water levels increases the volume of water available in the pit for dilution and settling. An insufficient volume of water in the pit would contribute to decreased dilution, increased concentration of pollutants, and an increased chance that effluent limitations would be exceeded. The MPCA finds that the originally specified Area 1 Pit capacity and freeboard timeframes represent a reasonable balance between the needs of maintaining pit water quality at acceptable levels for achieving permit compliance and providing the company adequate operational flexibility.

The MPCA will extend the submittal deadline for the Mesabi Nugget Mercury Filtration Media (Tailings) Acquisition and Disposal Plan from 90 days following MPCA written approval of pilot testing results to 180 days following approval since such extension will not affect the intent and need to have the Plan completed and approved prior to initiation of iron nugget production.

Mesabi Nugget requests that the financial assurance provisions in Chapter 5.4.19 through 5.4.28 be revised to include the allowance of a performance bond, as an alternative to a Letter of Credit (with standby trust account) or a fully-funded cash trust fund specified by the NPDES/SDS Permit and that the timing of implementation of financial assurance be more in line with the timing of potential impacts on the Area 1 Pit. Specifically, Mesabi Nugget asserts that “front-loading” of the financial assurance is not necessary to meet the underlying goal of financial assurance and is unnecessarily punitive to project financing. The company suggests that annual payments into financial assurance over the life of the permit is more appropriate.

The MPCA finds that a performance bond would be unacceptable as an alternative form of financial assurance for several reasons. First, a bond offers considerably less certainty of payment (e.g. high risk of nonpayment), at least relative to the liquidity of a letter of credit or to cash. Recovery under any bond is much less predictable than that under a letter of credit. In addition, a performance bond is highly unsuitable to these circumstances, and may not even be available. Normally a performance bond is used to assure completion of a project for which funding is already secured and available, and the bond is used to assure completion of work in cases of unforeseen interruption in the flow of progress of the Project, on account of which additional costs are incurred. The bond would not be provided to cover all costs of a project for

which funding might become wholly or partially unavailable, which is the purpose of financial assurance in this instance. For this Project, only the letter of credit with standby trust account or the fully-funded cash trust fund provides adequate assurance that funds will be available when needed to cover the costs of providing immediate treatment of the discharge from the Area 1 Pit during facility closure.

Originally, MPCA had drafted the NPDES/SDS Permit to include the U.S. based parent companies to Mesabi Nugget, LLC (i.e., Cleveland Cliffs, Inc. and Steel Dynamics) as 'official' permittees to the NPDES/SDS and Air Emission Permits in an effort to ensure that funds for closure costs, specifically to include treatment of the Area 1 Pit water, would be available at the onset of the Mesabi Nugget Project. During permit negotiations, both Mesabi Nugget and the parent companies made it clear that including these parent companies as permittees was unacceptable. As an alternative approach intended to accomplish the same goal of having funds available at the onset of the Project, MPCA included into the NPDES/SDS Permit the provision for the \$5 million letter of credit to be paid prior to construction of the nugget plant.

MPCA finds it is prudent and necessary to have the funds available at the beginning of the Project and not be contingent upon the probability of the future success of the Project and the resulting uncertain availability of funds. In addition, the financial assurance requirements of the permit allow for an annual review of the sufficiency of the dollar amount and at which time that dollar amount may be adjusted upwards or downwards depending on the information available at the time of the review. It is quite possible that once results of the pilot testing of the mercury filtration systems are more complete and/or operating information from the full scale system is available, the resulting cost of treatment during closure will be determined to be less than what was estimated with the information currently available and upon which the current financial assurance level was based. In that event, the amount of the letter of credit can be adjusted downwards providing some financial flexibility to the company while still ensuring that adequate funds for treatment during closure are available.

NWF/SIERRA CLUB COMMENTS AND MPCA RESPONSE

The National Wildlife Federation (NWF) and the Sierra Club submitted joint comments on the draft permit and variances and requested the denial of the variances and withdrawal of the draft permit.

NWF/Sierra Club believe the draft permit should not be issued because it will cause saline conditions in Second Creek and the Partridge River that will impair aquatic life. NWF/Sierra Club reference data in the variance application that TDS in the discharge will increase from 1099 mg/L to 1624 mg/L and specific conductance will increase from 1466 umho/cm to 2159 umho/cm. NWF/Sierra Club claim that commonly used levels for the protection of aquatic life are 1000 mg/L TDS and 1500 umho/cm specific conductance, and thus, the groups are concerned that "Mesabi Nugget's discharge is likely to take a situation that is marginal for aquatic life and push it over the edge."

NWF/Sierra Club acknowledge that the Class 4A water quality standards in MPCA's rules are set at a level based on the use of water for agricultural irrigation. However, they assert that because virtually all waters are subject to the more stringent standards to protect irrigation uses, higher standards to protect for aquatic life have not been promulgated for these TDS-related parameters. This does not mean, they claim, that these parameters do not affect aquatic life, nor that Minnesota's water quality standards do not provide this protection. NWF/Sierra Club cite a portion of the Class 2B aquatic life standards that reads "No... industrial

waste... shall be discharged into any waters of this category so as to cause any material change in any other substances or characteristics which may impair the quality of waters of the state or the aquatic biota of any of the classes in subparts 2 to 6 or in any manner render them unsuitable or objectionable for fishing, fish culture, or recreational uses.”

NWF/Sierra Club raise concern that although improvements through successive rounds of permitting are promised, nothing in the draft permit or support documents indicate that this situation will not worsen over the years. They cite the concern that the MPCA is currently dealing with other mining related discharge problems that have developed over the years and now prove extremely intransigent. They further state that although the current Cliffs Erie discharge from the Area 1 Pit exceeds water quality standards, “the proposed course of action simply takes a bad situation and makes it worse.”

As background, the Mesabi Nugget application for variances was reviewed for the four parameters in an existing discharge that currently does not meet water quality standards for Class 3 industrial uses and class four agricultural irrigation uses (hardness, bicarbonates, TDS, and specific conductance). The variances do not apply to Class 2 aquatic life uses because the discharge concentrations of the four parameters will not be at levels anticipated to cause toxicity. The toxicity of the various major ions that make up TDS related parameters is affected by the relative proportions of these ions in solution, and their individual contributions to toxicity. The variance application includes a discussion of this relative toxicity as it relates to the potential for overall toxicity of the discharge. There are no aquatic life water quality standards for the major ions other than chloride, and chloride concentrations in the discharge are projected to remain well below the aquatic life water quality standard of 230 mg/L.

The MPCA finds that MPCA’s evaluation of the variances’ proposal assumed conservatively that the discharge is the only water in Second Creek. This assumption may be applicable during the driest time of year, but very often Second Creek is highly influenced by runoff and the effects of flow from other upstream sources which can reduce the levels of these ions substantially. These flow regimes are not well understood at this time because this headwater situation has not been monitored comprehensively. Consequently, comprehensive monitoring of Second Creek upstream and downstream of the Mesabi Nugget discharge is included in the NPDES/SDS Permit.

The MPCA, in the past, has relied on whole effluent toxicity (WET) testing to resolve the issues of relative toxicity of the ions as well as aggregate toxicity related to the sum of constituents in discharges. For example, Southern Minnesota Beet Sugar Cooperative (SMBSC) recently was granted a variance from water quality standards for related major ions with a requirement for WET testing. The concentration of these ions in the current discharge from the Area 1 Pit, as well as what is projected in the future in the discharge, do not rise to the levels of the SMBSC discharge, nor are they in the same proportion with respect to relative toxicity (i.e., less potential toxicity than SMBSC). The MPCA finds that the WET testing requirements included in the NPDES/SDS Permit will satisfactorily address any concern for aquatic life toxicity, particularly for the more sensitive invertebrate species.

NWF/Sierra Club assert the draft permit should not be issued because the variance is prohibited by federal law. They cite Federal regulations in 40 CFR 122.4(i) that reads in part “No permit may be issued... to a new source or a new discharger, if the discharge from its construction or operation will cause or contribute to the violation of water quality standards”, and the groups assert that EPA regulation does not allow a variance from water quality standards for new dischargers. NWF/Sierra Club further claim that federal GLI regulations prohibit the granting of

variances for new Great Lakes dischargers, and that this prohibition is not limited to a limited set of GLI-designated pollutants, but applies to all pollutants for which water quality standards apply.

EPA-approved MPCA water quality standards for non-GLI regulated parameters allow for variances from water quality standards and there is no MPCA rule prohibition on consideration of such variances for new dischargers of the non-GLI regulated parameters. The MPCA is also not aware of any EPA regulation, guidance, or policy that interprets 40 CFR part 122.4(i) in the manner that would prohibit the variances in this situation as argued by NWF/Sierra Club. In addition, MPCA finds that the four TDS or salinity related parameters that are the subject of the variances are covered by and in Table 5 of 40 CFR part 132.6. Consequently, these four parameters are excluded from application of GLI requirements regarding the prohibition of the granting of variances for a new Great Lakes discharger found in 40 CFR part 132, Appendix F, procedure 2.A.1. The MPCA was not required to apply the procedures of Appendix F, including the variance prohibition, in establishing controls on the discharge of any pollutant set forth in Table 5 of part 132. *See* 40 CFR part 132.4(e)(2).

Alkalinity and TDS are specifically listed in Table 5. Alkalinity includes bicarbonate, and hardness and alkalinity are considered part of TDS. Specific conductance is simply an electronic measure of TDS. The GLI guidance methodologies are not scientifically and technically appropriate for hardness and specific conductivity, just as EPA asserts they are not appropriate for alkalinity and dissolved solids in the Supplementary Information Document (SID) to the Water Quality Guidance for the Great Lakes System (SID at page 49 and 53). The methodologies in Minn. R. ch. 7052 relate to aquatic life uses, not industrial or agricultural uses. The variance is not sought for aquatic life uses, but for industrial use and agricultural (irrigation) uses. An existing discharge, which currently does not meet water quality standards for these parameters, will be taken over by Mesabi Nugget. In addition, EPA has not established in regulation, outside of the GLI Guidance, a general prohibition of variances for new discharges. Therefore, Mesabi Nugget is eligible for water quality standard variances for these TDS related parameters.

NWF/Sierra Club assert the draft permit should not be issued because the variance is prohibited by state law. They cite Minn. Stat. § 116D.04, subd. 6 which states that no permit may be issued where such permit “is likely to cause pollution, impairment, or destruction of the air, water, land or other natural resources located within the state, so long as there is a feasible and prudent alternative consistent with the reasonable requirements of the public health, safety, and welfare and the state’s paramount concern for the protection of its air, water, land and other natural resources from pollution, impairment, or destruction. Economic considerations alone shall not justify such conduct.” NWF/Sierra Club argue that in this situation not permitting the plant and requiring the plant to treat its discharge to reduce TDS are feasible and prudent alternatives.

NWF/Sierra Club assert that the “technical infeasibility’ justification advanced by Mesabi Nugget is not valid, and that treatment for dissolved solids is routinely used at other types of facilities. They further assert that, instead, the request for variance was made primarily because Mesabi Nugget determined that treatment is too expensive for this type of operation, that an issue of economic feasibility is being transformed into one of technical feasibility, and that even if treatment was technically infeasible, there is no support for a determination that denying the variance is not a “feasible and prudent alternative”.

The MPCA finds that, upon consideration of the variance application and supporting information available at this time, treatment capable of meeting the Class 3 water quality standards for hardness and the Class 4 water quality standards for bicarbonate, total dissolved solids and

specific conductance is technically infeasible for the Project given the Projected wastewater flow rates and wastewater makeup. Mesabi Nugget is providing considerable treatment to reduce the concentration of pollutants in the wastewater, including the four variance pollutants, but treatment to the level necessary for its discharge to fully comply with the industrial and agricultural use standards is not feasible under the circumstances known at this time. Furthermore, the MPCA has determined that with the level of treatment that is provided and the interim effluent limitations and other requirements that are included in the NPDES/SDS Permit, the discharge will not likely cause pollution, impairment or destruction of water resources. As discussed previously (see item 28), Mesabi Nugget must complete and submit a Source Minimization and Alternate Treatment Technology Evaluation Plan that requires the company to evaluate alternative raw materials, processing techniques, waste minimization and wastewater treatment technologies with the goal of reducing the loading of these pollutants to the wastewater treatment system and to establish a downward trend in pollutant concentrations towards meeting the water quality standards.

The variance application and subsequent follow-up information submitted by Mesabi Nugget provided specific technical details on the technical infeasibility of reverse osmosis (RO) treatment technology as it relates to the Project. The primary aspect that makes RO technically infeasible is the unacceptably high degree of fouling and scaling of the RO membranes that would occur given the chemistry of the wastewater. Such fouling and scaling of the membranes would necessitate the frequent cleaning and/or replacement of the membranes resulting in greatly reduced usable flow ratings and removal efficiencies. Although reverse osmosis has been known to work on some low flow, high strength wastewaters, these systems are designed primarily to reduce the strength of wastewater prior to its discharge to additional treatment units such as a Publicly Owned Treatment Works, they are not designed to meet the applicable water quality standards in and of themselves. They also tend to require very frequent replacement of membranes and as such are nearly 'batch' systems not conducive to a constant or continuous wastewater flow, with downtime being nearly as much as uptime. Such an option is not feasible when treating a wastewater flow on the order of 1.5 MGD that must meet water quality standards immediately upon discharge.

Microfiltration, ultrafiltration, nanofiltration and ion exchange systems were also considered, but were determined to be technically infeasible at this time for a Mesabi Nugget type application, either because the technology could not achieve the concentrations necessary to comply with the standards or because the technology resulted in the generation of relatively high volumes of highly concentrated waste slurries or backwash water generated that was not amenable to further treatment and posed disposal problems of their own.

An additional consideration was that many of these alternative treatment technologies were considered to be very high energy users, particularly in the brine concentration, evaporation and crystallization stages that would be required for the Project. Estimates made on the evaporation and crystallization process for the Southern Minnesota Sugar project with a similar strength wastewater suggest that such energy use would be on the order of 330 kilowatts per hour per 1,000 gallons treated. Providing the energy to operate the systems at the scale that would be needed for projected Mesabi Nugget wastewater flow rates would indirectly result in increased air emissions from the power plants providing the energy, and is not considered a good 'tradeoff' for the relatively small amount of additional TSD-related pollutant removal that would be obtained.

The variances are not being sought on the grounds of economic burden so detailed financial information is not presented or required for MPCA's consideration of the variances.

However, EPA has expressed an interest in economic factors associated with the variances so a general comparison of costs of treatment is presented. An approximate estimate on the costs of a treatment system to include reverse osmosis, brine concentration, crystallization/evaporation and temporary solids holding basin in addition to the chemical precipitation, lime softening and mercury filtration units already proposed calculates out to approximately \$53 million (net present value of upfront capital costs and annual operating costs assuming four percent interest over 20 years) versus a cost estimate of approximately \$22 million for the system without the RO components using the same assumptions, a difference of over \$30 million.

NWF/Sierra Club assert the draft permit should not be issued because the MPCA failed to comply with federal and state regulations governing the granting of variances. NWF/Sierra Club asserts that even if MPCA's reliance on its general variance regulations were correct (which NWF/Sierra Club disputes), the MPCA ignored a pertinent requirement of those regulations, namely that it satisfy all three of the listed factors allowing for the consideration of a variance request. NWF/Sierra Club further assert that these three findings are first "that be reason of exceptional circumstance the strict enforcement of any provision of these standards would cause undue hardship", second "that disposal of the sewage, industrial waste, or other waste is necessary for the public health, safety, or welfare", and third, "that strict conformity with the standards would be unreasonable, impractical, or not feasible under the circumstances". NWF/Sierra Club assert the MPCA staff did not consider the second factor in its consideration of the variance application.

MPCA finds that its evaluation of the variance application and applicable requirements gave consideration of all three parts of Minn. R. 7050.0190, including the second part regarding "...public health, safety and welfare." As acknowledged by NWF/Sierra Club, the first and third parts were expressly addressed in the support documents for the variances and the NPDES/SDS Permit developed during the MPCA review of the variance application. The second part was less explicitly addressed, but still included as part of the underlying analysis of the variances. The economic development associated with a \$130 million project in the form of construction and full-time employment, indirect business development, and taxes paid to local and state governments is considered to benefit the economic health of northeastern Minnesota, particularly in an area hard hit by the closing of the LTV Steel Mining facility. In addition, development of a value-added iron project of this type will contribute to the diversification of the economy of the Iron Range, an area that has traditionally been heavily dependent on primarily one industry, taconite processing. While not expressly included as a section of the support documents for the variances, these general public 'welfare' aspects were still included as an underlying part of the analyses and from this respect, the requirements of Minn. R. 7050.0190 have been satisfied.

NWF/Sierra Club assert MPCA should follow nondegradation procedures for this permit because the discharge will degrade water quality in Second Creek and the Partridge River. While they believe that the prohibition on new discharges that violate water quality standards applies to this situation and thus obviates the nondegradation requirement, they argue in the alternative that if a variance is available, at the very least, nondegradation procedures must be followed. They reference wording in Minn. R. 7050.0185 (2)(B) that states that an expanded discharge is "a discharge that changes in volume, quality, location, or any other manner... such that an increased loading of one or more pollutants results". They further argue that the term "loading" is not defined and that the MPCA's determination that it applies to mass loading, and not loading per volume, is not in conformance with the policy behind the nondegradation rules.

When the nondegradation rule, Minn. R. 7050.0185 (All Waters) was promulgated, the context of loading was “mass loading.” Discussion and examples provided by the SONAR for the All Waters 1988 rulemaking were described in the context of “mass loading.” The MPCA’s “Guidance Manual for Applying Nondegradation Requirements for All Waters in Minnesota” also expresses loading as mass loading. The terms loading and mass loading are interchangeable terms for the purposes of applying MPCA’s nondegradation rule.

A nondegradation evaluation in this situation is not required because the mass loading for the TDS related parameters will not increase above the mass loading that is currently in the discharge from the Area 1 Pit, even when projected concentration increases for the parameters are considered. Mass is determined as a product of flow and concentration. The flow of the discharge will be reduced substantially from the current flow once Mesabi Nugget operations are initiated (primarily as a result of evaporative losses in processing). The concentration of hardness and bicarbonates is projected to decrease, so mass loading of these two pollutants is not increased. The concentration of TDS is expected to increase, but will not increase enough to outweigh the reduction in flow rate, so again, mass loading will not increase. Specific conductance by definition is not expressed in mass per unit volume but in an electric measurement, so mass is not applicable and irrelevant. Therefore, the MPCA’s nondegradation evaluation rule is not triggered for these parameters under the circumstances of the Project and its discharge.

NWF/ Sierra Club requests that MPCA add a requirement that an average concentration of 1.3 ng/L of mercury be met over the course of time. The MPCA has calculated an average monthly effluent limitation of 1.8 ng/L based on the underlying 1.3 ng/L water quality standard using a typical effluent variation and a twice monthly monitoring frequency. NWF/Sierra Club understand that at the specified twice monthly frequency of monitoring, statistically speaking the monthly average mercury concentration may appear to be higher than it actually is. That is, there is a certain probability that the two samples will both be taken when the concentration is higher than average. However, they assert that this should be less true over time and that the permit might allow the discharge to be consistently above the 1.3 ng/L water quality standard so long as no two consecutive tests average above 1.8 mg/L. NWF/Sierra Club requests that the permit reflect this scenario and include lowered ‘interim’ limits over the course of the five year permit.

The MPCA finds that the water quality based effluent limitation for mercury adheres to the provisions set forth in Minn. R. ch. 7052. The water quality standard is applied at the point of discharge as a waste load allocation that must be met (1.3 ng/L), and permit limits are statistically derived as upper bound limitations based on a characterization of effluent variability that comply with the waste load allocation. Effluent variability, by rule (Minn. R. 7052.0200), is characterized by a coefficient of variation (CV). Relatively few low level mercury data is available for the current discharge (n=11) and the variability in these few data points may change during operation, therefore, an assumed (default) CV of 0.6 is used in this case. The calculated upper bound daily maximum and monthly average limits become 3.2 ng/L and 1.8 ng/L respectively, and these limit determinations are consistent with the waste load allocation and variability. The limits can be adjusted, if necessary, at the next issuance of the permit when more data are available and a more accurate assessment of variability is determined. This reassessment of possible adjustment during the consideration of any proposed permit reissuance may lead to lower mercury limits, but they will still be consistent with the waste load allocation of 1.3 ng/L.

NWF/Sierra Club comment that the limited time for review has made review of this permit difficult, and that the 30-day review time available was not consistent with what was stated by MPCA staff to the legislature when the exemption from environmental review

was considered. Also, NWF/Sierra Club object to the short timeframe that MPCA staff has requested for EPA review and that this does not allow adequate time for EPA consideration of public comment.

When MPCA staff originally spoke before the legislature of having a 45-day public comment period, the MPCA staff's goal was to allow enough time to hold a public meeting during the comment period and still allow two weeks following the public meeting for the public to finalize their comments. This outcome was achieved within the 30-day public notice period, particularly since the public meeting itself was public noticed separately approximately two weeks prior to the start of the public notice period for the permits. The draft permit and related variance preliminary determinations were available for public comment for a full thirty day period as prescribed by MPCA rules.

With respect to timeframes requested of the EPA, the June 17, 2005, date referred to by NWF/Sierra Club was related to MPCA's request for the submittal of *preliminary* EPA comments on the draft permit and variances, not final EPA review of the documents; this date was in reference to getting subsequent Findings of Fact and Response to Comments completed in as timely a manner as possible in response to those preliminary EPA comments. EPA is continuing to review the permit and variances and will continue to submit questions and comments, if necessary, to MPCA as that EPA review proceeds. As a matter of timing, EPA's final review and consideration of the variances will not occur until after all necessary final MPCA decisions have occurred.

NWF/Sierra Club request that the MPCA Board deny the draft permit because they believe, as stated above, the variance is prohibited by state and federal law. They further request that if the Board does not deny the permit that the MPCA withdraw the current draft permit, and re-notice it with a new public comment period only after all necessary changes to it have been included.

The MPCA finds it has addressed the issues raised by NWF/Sierra Club. The revised NPDES/SDS Permit will be issued and the related variances will be granted in accordance with applicable federal and state requirements. Adequate time and opportunity has been provided for public scrutiny of and comment on the variances and permit, and the bases for each proposed action. Necessary changes and revisions in response to comments have been made. The MPCA finds there is no current basis or reason for withdrawing consideration of the revised permit and requiring any renoticing of the permit or variances which would result in delay on any final decision on the variances or permit.

MINERAL AND SURFACE RIGHTS OWNERS COMMENTS AND MPCA RESPONSE

Specific comments on the draft permit were received from entities representing corporations, trusts or groups holding surface and mineral ownership interests in several parcels of land that are part of the Mesabi Nugget Project. The comments included statements that Mesabi Nugget has no authority to conduct any Project operations without first obtaining consent of the owners and an appropriate agreement. The comments also included more general questions and comments on potential impacts the Project may have on the land/minerals owners' access and economic interests.

Comments were received from attorneys for the Fiduciary Trust Company which serves as the trustee for the Tupancy Harris Foundation of 1986 and The Jacqueline Stephens Sperry 1996 Trust (jointly the Stephens Trusts). The comment stated that 520 acres of the

proposed Project site are wholly or substantially owned by the Stephens Trusts, and the Stephens Trusts have not authorized or otherwise agreed to allow Mesabi Nugget to use these lands, much less operate any type of wastewater disposal and treatment activities on them. They further claim that the activities allowed under the draft permit constitute an unlawful trespass on the surficial ownership rights, create pollution on and in the waters located on these lands and may permanently affect the mineral rights of the Stephens Trusts. The Stephens Trusts has, in a June 6, 2005, letter, formally informed Mesabi Nugget of its position on this matter. The comment further states that the Stephens Trusts, will if necessary, initiate formal court proceedings to protect their ownership interests in the lands in question. The Stephens Trusts requests that the MPCA defer issuing the draft permit until Mesabi Nugget has entered into an agreement with the Stephens Trusts authorizing Mesabi Nugget's proposed use of the Stephens Trusts' lands for the purposes described in the draft permit.

Comments were received from Meriden Engineering, LLC, which represents four separate landowner groups that own surface property and minerals within the planned Mesabi Nugget project boundary, and these properties include taconite reserves that are of commercial quality that could be developed in the future through reopening and expansion of the Area 1 Pit . The comment stated that neither Meriden nor the owners were contacted regarding the proposed Project and they are concerned about the effect of the Project on the future development of the owners' taconite reserves. They also expressed concerns about the impact of the proposed Project on the water quality of the Area 1 Pit.

The MPCA finds the ownership issues raised by the comment letters were significant issues that needed resolution. Mesabi Nugget was required to complete a number of actions pertaining to mineral and surface ownership and control before the NPDES/SDS and Air Emission Permits could be issued.

Mesabi Nugget was required to retain an independent, qualified entity to conduct and complete the title and property owner searches, to document the results of those searches and to certify the results.

Mesabi Nugget, through the qualified entity, was required to conduct and complete title and property owner searches for all properties (e.g., surface estates, mineral estates, etc.), within the Project boundary as defined by a revised map that will be included in the NPDES/SDS Permit and all surrounding properties immediately adjacent to the Area 1 Pit, to the extent these properties are not within the revised project boundary as defined by the revised map to be included in the NPDES/SDS Permit.

Mesabi Nugget was required to obtain from property owners (e.g., surface estate owners, mineral estate owners, etc.) identified by the title search written contractual authorizations to conduct and perform the activities authorized by the NPDES/SDS Permit and to obtain and maintain exclusive control over the subject properties.

Mesabi Nugget was required to submit to the MPCA the documents identifying the title and property ownership results from the title and property searches, a report documenting that the written contractual authorizations had been obtained, and certifications from the independent entity conducting the search and from Mesabi Nugget certifying the truth, accuracy, and completeness of the subject documents.

The NPDES/SDS Permit has been revised to include language specific to the comments regarding the surface and mineral ownership issue. For example, the NPDES/SDS Permit has

been revised to include permit terms and conditions clarifying that the permit does not authorize Mesabi Nugget's invasion, entry or trespass of property or its use, hindrances, encumbrance, etc. of property. Mesabi Nugget is solely responsible for obtaining from all property owners access to, possession and control of any and all property necessary to implement and comply with the terms and conditions of the NPDES/SDS Permit. In order to ensure integrity (including operational integrity and reliability) of the wastewater treatment system, including Area 1 Pit, the permit was revised to include specific requirements that Mesabi Nugget exclude public access to the Area 1 Pit, prohibit discharges to or appropriations from the Area 1 Pit except as authorized by the NPDES/SDS Permit, and prohibit activities, including mining or mineral exploration activities, that interfere with or are inconsistent with the operations of the Area 1 Pit as authorized by the NPDES/SDS Permit. The permit requires that Mesabi Nugget obtain and maintain exclusive possession and control of the Area 1 Pit property (e.g., surface estates, mineral estates, etc.) and surrounding property immediately adjacent to the Area 1 Pit.

FINAL DETERMINATION ON WHETHER TO GRANT VARIANCES AND ISSUE PERMIT

The MPCA's decision to issue the NPDES/SDS Permit is governed by its permit rule, Minn. R. 7001.0140, which, in part, provides:

Subpart 1. Agency action. Except as provided in subpart 2, the agency shall issue, reissue, revoke and reissue, or modify a permit if the agency determines that the proposed permittee or permittees will, with respect to the facility or activity to be permitted, comply or will undertake a schedule of compliance to achieve compliance with all applicable state and federal pollution control statutes and rules administered by the agency, and conditions of the permit and that all applicable requirements of chapter 116D and the rules adopted under chapter 116D have been fulfilled.

The MPCA's decision to grant the variances is governed by its variance rule, Minn. R. 7000.7000, and by the water quality standards variance provision, Minn. R. 7050.0190, subpart 1. Specifically, Minn. R. 7000.7000 subp. 8 states, in part, that:

Subpart 8. Board decision. The board shall make all final decisions on variance applications pursuant to Minnesota Statutes, section 116.02, subdivision 6, clause (6) or subdivision 8. The board shall approve or deny each application. The board may grant a variance upon such conditions as the board may prescribe.

CONCLUSIONS OF LAW

The MPCA has jurisdiction over the NPDES/SDS Permit and the temporary water quality standard variances for the Mesabi Nugget Project.

A draft permit for the Project was prepared and public noticed in accordance with the requirements of Minn. R. 7001.0100 and public comments on the draft permit were addressed in accordance with Minn. R. 7001.0170.

The variance application submitted by Mesabi Nugget contained the information specified by Minn. R. 7000.7000, subp. 2, items A through H.

Public notice of the temporary variances was completed in accordance with the requirements of Minn. R. 7000.7000, subp. 4 through 7.

The requirements of Minn. R. 7001.0140 for issuance of an NPDES/SDS Permit have been met, including that all applicable provisions of Minn. Stat. ch. 116D have been complied with and in light of legislative actions that exempt this Project from environmental review under Minn. Stat. ch. 116D and Minn. R. ch. 4410. The provisions in Minn. R. 7050.0190 for granting the temporary variances have been met.

The NPDES/SDS Permit contains effluent limitations and special requirements that are protective of the environment and ensure compliance with the Great Lakes mercury water quality standard.

The temporary water quality standard variances are reasonable under the circumstances and MPCA has included necessary and appropriate provisions in the NPDES/SDS Permit to minimize any impact of granting the temporary variances.

The findings of the MPCA justify issuance of the NPDES/SDS Permit and granting of the temporary variances and do not support denial of the permit.

Any finding more properly considered a conclusion shall be considered a conclusion, and any conclusion more properly considered a finding shall be considered a finding.

ORDER

Based on the foregoing Findings of Fact and Conclusions of Law, it is ordered:

The Minnesota Pollution Control Agency authorizes issuance of National Pollutant Discharge Elimination System/State Disposal System Permit No. MN0067687, and grants the requested temporary variances, as conditioned, to Mesabi Nugget, LLC.

IT IS SO ORDERED

Commissioner Sheryl A. Corrigan

Minnesota Pollution Control Agency

Chair, Citizens' Board

Date

Attachment 4, Additional supporting information provided by MPCA

Minnesota Pollution Control Agency/Environmental Outcomes
Division

**Variance Issue Statement
For
Mesabi Nugget, LLC**

Issue Statement

Mesabi Nugget, LLC (MNC) is proposing to construct a new iron nugget production facility located near Hoyt Lakes, Minnesota. MNC proposes to use water from an abandoned mine pit (Area 1 Pit) at the Cliffs Erie mining site for the water supply for process temperature control (contact and non-contact cooling) and for process water (e.g. scrubber water supply). The wastewater generated from the contact cooling water and the process water will be treated prior to return back to the Area 1 Pit. MNC will employ chemical coagulation, precipitation and clarification, followed by a microfilter, and a mercury filter. The treated wastewater will be discharged back into Area 1 Pit before being directed to an additional mercury filter before discharge to Second Creek. The average and maximum rates of flow are 1.5 mgd and 5.8 mgd, respectively.

MNC has submitted an application requesting a variance from water quality-based effluent limitations and the underlying water quality standards for hardness, specific conductance, total dissolved salts (solids or TDS), and bicarbonates for the five-year duration of the permit. The applicable water quality standards are:

250 mg/l for hardness for Class 3B waters;
1000 $\mu\text{mhos/cm}$ ($\mu\text{ S/cm}$) for specific conductivity for Class 4A waters;
700 mg/l for total dissolved salts (solids) for Class 4A waters; and
250 mg/l for bicarbonates for Class 4A waters

There is an existing discharge from Area Pit 1 to Second Creek and these pollutants are currently above their respective water quality standards. Nondegradation is not triggered because loadings are below currently allowed loadings and will remain so for the life of this permit.

The basis for the request is the technical infeasibility of additional treatment to meet the final effluent limitations, which is characterized as technically infeasible, complex, and risky. The request conforms to the requirements for applying for a variance specified in Minnesota Rules, Parts 7050.0190 and 7000.7000.

This memorandum discusses the basis presented by the MNC for requesting a variance from the hardness, specific conductivity, total dissolved salts (solids), and bicarbonate water quality-based effluent limitations, and the conditional Agency staff position for granting the variance.

A. Background

Nugget Plant Proposal

MNC is proposing to construct a 600,000 metric ton/year iron nugget production facility at the Cliffs Erie mining site (formerly LTV Taconite) located in Hoyt Lakes, Minnesota. The nuggets will be approximately 96 to 98% iron, and will be able to be fed directly to

electric arc furnaces (mini-mills) as well as to foundries and conventional integrated iron and steel manufacturing facilities.

MNC proposes to use water from an abandoned mine pit (Area 1 Pit) for the water supply for process contact and non-contact cooling, and for process water for an air pollution control scrubber. All process wastewater generated from the cooling and scrubber water will be treated prior to return back to the Area 1 Pit. This wastewater is treated using a two stage metals removal and softening system utilizing lime, ferric chloride, cationic polymers, caustic (soda ash), and water treatment chemicals to form metal hydroxides and sulfides. Effluent from the solids contact clarifier is passed through a microfilter, a mercury filter (for additional solids and mercury removal) and then enters the Area 1 pit. Water from the pit will be directed through a second mercury filter prior to discharge to Second Creek. The treatment is expected to meet the effluent limitations for the underlying 1.3 ng/l mercury water quality standard applicable to the Lake Superior Basin.

Receiving Water Classification and Applicable Water Quality Standards

Second Creek has been assigned beneficial use classifications under Minnesota Pollution Control Agency (MPCA) rules Chapter 7050.0430, Unlisted waters; 2B, 3B, 4A, 4B, 5, and 6. Second Creek is part of the Partridge River and St. Louis River watershed that ultimately flows to Lake Superior. There are no known existing uses of Second Creek water for industrial or other use, or for irrigation. Other uses are either upstream on the Partridge River, or much farther downstream on the Partridge River.

The following table contains the applicable water quality standards for which MNC is requesting the variance:

Pollutant	Water QUALITY Standard	Classification	Designated Use
Hardness, Ca and Mn as CaCO ₃	250 mg/l	3B	General industrial purposes
Specific Conductivity	1000 μ mhos/cm	4A	Irrigation
Total dissolved salts (solids)*	700 mg/l	4A	Irrigation
Bicarbonates as CaCO ₃	5 milliequivalents or 250 mg/l	4A	Irrigation

*Total dissolved salts and total dissolved solids are used interchangeably and termed TDS

Current Discharge to Second Creek

There is an existing Cliffs Erie NPDES permit (MN0042536) that includes an existing discharge point (SD003) to Second Creek. This outfall is proposed for use by MNC and will be transferred into the MNC permit as outfall SD001. The quality of the water in the

Area Pit 1, which discharges through the existing outfall SD003, indicates that these four pollutants will exceed applicable water quality standards in Second Creek, assuming little or no dilution is available for the discharge. Current water quality in the pit is listed in the table below.

Pollutant	Water QUALITY Standard	Current water quality
Hardness, Ca and Mn as CaCO ₃ , <i>mg/l</i>	250	740
Specific Conductivity, <i>µmhos/cm</i>	1000	1466
Total dissolved salts (solids), <i>mg/l</i>	700	1099
Bicarbonates as CaCO ₃ , <i>mg/l</i> or (milliequivalents)	250 (5)	396

Current flows and water quality in Second Creek near the discharge are not well understood at this time. Flow data collected during April of this year near the proposed discharge point ranged from 1.81 to 11.67 mgd. Higher flows were encountered, but attributed to beaver dam removal. Specific conductance, hardness, and TDS were below water quality standards at that time. Headwaters flow monitoring (outfall SD026 of the Cliffs Erie NPDES Permit No. MN0042536) indicated flows as low as 0.08 mgd at other times of the year. It is expected for substantial parts of the year that water quality standards will not be met for these four pollutants in Second Creek, given the minimal flows monitored at the headwaters to the creek and the predominance of the MNC discharge.

B. Discussion

Variance Request

MNC requested the variance from the water quality standards for hardness, specific conductivity, bicarbonates, and total dissolved salts (solids) based on provisions in Minn. R. part 7050.0190, subpart 1, and in conformance with the provisions included in Minn. R. part 7000.7000, subp. 2. The variance request is directed at the final effluent limitations for hardness derived from the underlying 250 mg/l Class 3B water quality standard in Minn. R. 7050.0223, subp. 3; for specific conductivity from the underlying 1000 µmhos/cm Class 4A water quality standard; for bicarbonates from the underlying 5 milliequivalent (250 mg/l) Class 4A water quality standard; and for total dissolved salts (solids) from the underlying 700 mg/l Class 4A water quality standard in Minn. R. 7050.0224, subp. 2.

The Agency, in proceeding to grant a variance, must consider the items listed in Minn. R. 7000.7000. The discharger has provided the necessary information in their application

for these items, and has provided any additional information that the MPCA has requested.

In addition the GLI regulations at 40 CFR 132.6, Table 5 apply to these four “TDS or salinity related” parameters. Implementation procedures in GLI for these four parameters are not required, but optional (40 CFR 132.4(e)(2)), and are therefore subject to any state requirements. MPCA staff uses Minn. R. 7050 in implementing Table 5 parameters, particularly as it involves Class 3 and 4 designated uses.

Alkalinity and TDS are specifically mentioned in Table 5. Alkalinity includes bicarbonate, and hardness and alkalinity are considered part of TDS because of the ions involved. Specific conductivity is simply an electronic measure of TDS. The Guidance methodologies are not scientifically and technically appropriate for hardness and specific conductivity, just as EPA argues they are not appropriate for alkalinity and dissolved solids (see the Supplementary Information Document to the Water Quality Guidance for the Great lakes System or SID at page 49 and 53). The methodologies in Minn. R. 7052 relate to aquatic life uses, not industrial or agricultural uses. The variance is not sought for aquatic life uses, but for industrial use and agricultural (irrigation) uses. Whole effluent toxicity testing will be used to determine any toxic impacts to aquatic life. The current discharge, which does not meet the industrial and agricultural use water quality standards for these parameters, will be taken over by MNC. Therefore, MNC is eligible for a variance for these TDS related parameters.

Applicability of Variances from Water Quality Standards - Minn. R. 7050.0190, subp.1.
Minn. R. 7050.0190, subp. 1 allows a variance for discharges of hardness, bicarbonates, specific conductivity, and total dissolved salts (solids) in a situation where strict compliance with the standards would cause the discharger undue hardship; and that strict conformity with the standards would be unreasonable, impractical, or not feasible under the circumstances.

Conditions to Grant a Variance -

The discharger must conform to the provisions of Minn. R. 7000.7000

Items A through C – Name, address, signature and facility location and description
MNC has provided this information.

Item D - Nature of the variance sought

MNC has identified the applicable variance provisions and is asking for a variance for the duration of the permit. Permit duration can be no longer than five years. The reasons specified in seeking the variance are in Items F.

Items E - Grounds based on economic burden

The company’s analysis relies predominately on technical infeasibility. The company maintains that the lone optional wastewater treatment alternative (reverse osmosis, brine

concentrator, and crystallizer) to the proposal was substantially more complex, risky, and expensive to operate.

However, EPA has expressed an interest in economic factors associated with the variances so a general comparison of costs of treatment is presented. EPA needs to review the variance from the standpoint of items listed in 40 CFR 131.10(g), designated uses. The applicable item is item (6): Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

An approximate estimate on the costs of a treatment system to include reverse osmosis, brine concentration, crystallization/evaporation and temporary solids holding basin in addition to the chemical precipitation, lime softening and mercury filtration units already proposed calculates out to approximately \$53 million (net present value of upfront capital costs and annual operating costs assuming 4% interest over 20 years) versus a cost estimate of approximately \$22 million for the system without the RO components using the same assumptions, a difference of over \$30 million. This would represent a 136% increase for the RO system above the costs for the proposed system, and the likelihood that the treatment is infeasible to meet the underlying water quality standards.

Further, the application at page 17 (Item 5) provides a statement of the economic and social impact to the region, including 500 construction jobs, 50 full time equivalent jobs, and \$40 million in taxes paid out over 30 years.

Item F - Grounds based on technological infeasibility

MNC is requesting the variance on the basis that this level of treatment (e.g. reverse osmosis, brine concentrator, crystallizer) is technically infeasible at the projected flow volumes due to likely fouling and scaling of RO membranes and heat input surfaces of the evaporator and crystallizer. MNC has characterized this level of treatment as technically infeasible “both from a purely technical feasibility perspective and from a risk perspective, on the grounds that constructing an additional removal plant (e.g. reverse osmosis, brine concentrator, crystallizer) for the small reduction in pollutants in the treated water necessary to meet water quality standards is complex and risky”. Because the proposal incorporates new technology not tried elsewhere with technology that has been successfully been applied, albeit on a smaller scale, the company maintains it is not demonstrated feasible technology. The combination of the two presents a treatment scheme that may be capable of meeting the proposed final effluent limitations for mercury, but is complex and risky in regard to meeting all effluent limitations.

The MNC technology infeasibility assessment determined that a reverse osmosis (RO) system would be required to reduce salts to levels where the effluent limitations for the salinity parameters may be met. RO is a pressure driven process that retains ions on one side of a RO filter while passing water through the filter to the other side. The pressure applied exceeds the osmotic pressure of the solution against a semi-permeable membrane, and thus forces water through the membrane leaving ions behind. RO has been used quite successfully for the removal of hardness and total dissolved solids, and certain RO

systems have been applied for removal of specific ions such as chloride and sulfate. RO systems are typically applied on smaller scales (relatively low flows) using relatively clean sources of groundwater or water as make up water for production of boiler water, or other water uses requiring waters with low levels of hardness or salinity. Large scale or high flow RO systems for removal of salinity have seen limited use, and are generally limited to large plants for the desalinization of sea water for drinking water supplies in countries with inadequate freshwater supplies.

To adequately implement an RO system at MNC for treatment of wastewater effluent salinity, pre-treatment would be required to remove the suspended solids and to remove the hardness ions (softening). This is needed to avoid “fouling” of the RO membrane with scale from hardness and solids. The hardness is removed by a lime softening process, and sand filtration is used to control suspended solids. Solids are generated from the softening process, which are ultimately dewatered and require disposal. The RO system has a reject stream, which also requires subsequent treatment to remove the highly concentrated inorganic dissolved solids (salts). The dissolved solids removal is accomplished by total evaporation of the reject stream (brine concentration and crystallization of the solids). The process is very energy intensive in that large amounts of energy are required for the evaporation and crystallization process – an estimated 330 kWhr per 100 gallons treated. The crystallized solids would require disposal.

The conceptual system then required to remove salinity in the MNC effluent would consist of lime softening, sand filtration, the RO process, dewatering and thickening of lime solids, brine concentration (evaporation) and crystallization of the RO reject water, and disposal equipment.

MPCA staff has thoroughly reviewed the technology assessment submitted by MNC’s consultant, which determined that an RO, brine concentration/evaporation, and crystallization system would be the most applicable system for removal of salinity in the MNC effluent. MPCA staff concurs with the MNC consultant’s assessment of this technology and the capital and operating cost derivation.

There are no known large scale sand filtration/RO systems with lime softening and evaporation/crystallization systems in place for the removal of salinity in complex wastewater treatment effluents. Therefore, there is no assurance that this system, if implemented, would work to completely and reliably remove salinity. MPCA staff has been involved in the removal of salinity or total dissolved salts for other wastewater applications and has completed extensive review of technologies that may be applicable for salinity removal. Generally these technologies are limited and may include ultra or nanofiltration, ion exchange, and reverse osmosis systems. MPCA staff concludes that the only potential technology applicable for salinity removal is the RO technology. However, MPCA staff has concluded that RO technology is not practical, and likely infeasible, for salinity removal contained in wastewater effluents on a large scale. MPCA staff also believes that the energy requirements needed for an RO system of this scale are impractical, and production of this energy may also result in unnecessary generation of pollutants. Accordingly, MPCA staff concurs with MNC that an RO system with brine

concentration/evaporation and crystallization is currently an uncertain technology for removal of salinity in industrial wastewater effluents, and that the costs to install these systems would also be prohibitive at this time.

Item G – Other additional data.

No additional data.

Item H.1. – Other relevant data, general description of materials handled or processed nature and quantity of materials discharged.... proposed methods to control these materials.

MNC is proposing to construct a 600,000 metric ton/year iron nugget production facility, which will be able to be fed directly to electric arc furnaces (mini-mills) as well as to foundries and conventional integrated iron and steel manufacturing facilities.

MNC proposes to use water from an abandoned mine pit (Area 1 Pit) for the water supply for process contact and non-contact cooling, and for process water for an air pollution control scrubber. All process wastewater generated from the cooling and scrubber water will be treated prior to return back to the Area 1 Pit. This wastewater is treated using a two stage metals removal and softening system utilizing lime, ferric chloride, cationic polymers, caustic (soda ash), and water treatment chemicals to form metal hydroxides and sulfides. Effluent from the solids contact clarifier is passed through a microfilter, a mercury filter (for additional solids and mercury removal) and then enters the Area 1 pit. Water from the pit will be directed through a second mercury filter prior to discharge to Second Creek. The treatment is expected to meet the effluent limitations for the underlying 1.3 ng/l mercury water quality standard applicable to the Lake Superior Basin.

The primary source of the pollutants in the water is from the Area 1 Pit (source water) and the process (scrubber) water. Removing the wastes from the exhaust gases generates the scrubber water. Current technology requires the use of a wet scrubber to provide sufficient removal of particle matter and acid gases to meet ambient air quality standards and Class I Air Quality Related Values.

Item H.2. – Comprehensive proposed plan to reduce discharges to lowest levels practical.....

MNC states that it is using the most advanced technology for the removal of metals and other pollutants in wastewater. MNC intends to maintain or increase plant performance, and employ new or innovative technologies as it becomes available. MNC will be conducting material balance studies, alternate processing techniques or material substitutions to improve process and establish a downward trend towards meeting the water quality standards for hardness, TDS, specific conductivity, and bicarbonates. It is projected that hardness and bicarbonate concentrations will decrease once process and treatment begins, while specific conductivity and TDS are expected to increase initially.

Pollutant	Current Water QUALITY	Discharge concentration at 5 years
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Hardness, Ca and Mn as CaCO ₃ , mg/l	740	682
Specific Conductivity, μ mhos/cm	1466	2159
Total dissolved salts (solids), mg/l	1099	1619
Bicarbonates as CaCO ₃ , mg/l or (milliequivalents)	396	368

Item H.3 . - Effect upon air, water, land resources of the state and upon the public and other persons affected,.....

MNC concludes that there will be no air impacts, and relatively minor potential impacts to land resources as a result of gardening, or for trees and grasses. There are no endangered species impacts associated with this discharge. The most notable impact could be to freshwater species exposed to high concentrations of these major ions. The effects on osmoregulation of these ions for aquatic species was reviewed and it was concluded that the proportions of these ions expected in the receiving water would not likely cause major ion toxicity to species expected to be present, or to representative species. Whole effluent toxicity testing will be included in the permit to further evaluate this potential as well as effects of any other pollutant that may be in the discharge.

Item H.4 – statement of alternatives.....considered.

The choice for wastewater treatment alternatives is driven by the choices made for MNC's air pollution control equipment. MNC will be running various raw materials and fuels to determine which combination of operations will provide optimum reductions to both media. It is anticipated that whatever choice is made that reduces exhaust gas emissions will possibly reduce subsequent loading to the scrubber and the wastewater treatment system.

Item H.5 – statement of the effect on.....business, commerce, trade, traffic, and other economic factors.....

The plant will employ 500 construction workers for plant construction and 50 full time equivalents once operation begins. This is an area that has experienced long term economic decline. Taxes paid to local government are expected to be on the order of \$40 million over 30 years.

Variance application submittal, public notice of preliminary determination, and notice requirements - Minn. R. 7052.0280, subp. 4.

MNC has submitted the required application information Minn. R. 7000.7000, subp. 2, so that the requirements of Minn. R. 7000.7000 directed at Agency review of the variance application and public notice of the variance can be fulfilled.

Agency final decision; variance requirements – Minn. R. 7050 and Minn. R. 7000.7000

As a condition of granting a variance, the agency includes permit conditions that accompany the variance. Minn. R. part 7050 or 7000.7000 specify provisions necessary

for a permit that contains a variance for hardness, bicarbonates, specific conductivity, total dissolved salts (solids). The permit will include:

Item A. Interim effluent limitation based on currently achievable treatment – The interim permit limitations applicable at issuance for each pollutant are projected based on current levels for hardness and bicarbonates, and on projected levels in 5 years for specific conductivity and TDS provided in the variance application. The daily maximums are calculated from the ratio of daily maximum to monthly average limits (1.123) in establishing the final WQBELs. It is expected that the permittee will be investigating alternate technologies to improve treatment and establish a downward trend towards meeting the water quality standards for TDS, specific conductivity, and bicarbonates. The interim permit limitations applicable at issuance for each pollutant are:

Pollutant Permit Limitation	Hardness	Bicarbonates (as CaCO ₃)	Specific Conductivity	Total Dissolved Salts (solids)
Daily maximum	831 mg/l	445 mg/l	2425 µmhos/cm	1818 mg/l
Monthly average	740 mg/l	396 mg/l	2159 µmhos/cm	1619 mg/l

Item B. Special permit requirements – The permittee will be required to submit a “Source Minimization and Alternate Treatment Technology Evaluation Plan” no later than 3 years from issuance of the permit. The submittal shall evaluate plans to conduct material balance studies, alternate processing techniques, or material substitutions that will reduce loadings to waste treatment or improve efficiency.

Item C. WQBEL to meet the underlying WQ standard – The final WQBEL for the discharge was derived using the WQ standard set as the waste load allocation, and using procedures in Part 7052.0200, Subp. 5, based on a default CV = 0.6 and a twice per month monitoring frequency. The default CV was selected because of the expected change in concentrations to the pit with the commencement of operations and its unknown effect on variability:

Pollutant Permit Limitation	Hardness	Bicarbonates (as CaCO ₃)	Specific Conductivity	Total Dissolved Salts (solids)
Daily maximum	301 mg/l	301	1203 µmhos/cm	842 mg/l
Monthly average	268 mg/l	268	1074 µmhos/cm	752 mg/l

Item D. Permit re-opener – Specific permit language will be inserted allowing for permit modification if revisions to water quality standards during the triennial review indicate applicability to this variance.

Item E. Instream Monitoring – Two ambient monitoring stations will be included in the permit, one immediately upstream of the discharge and one downstream after complete

mixing of the receiving water and effluent. The purpose is to determine the degree to which either station does not comply with water quality standards for the variance parameters; to determine any seasonality of noncompliance; and to help determine the source of any noncompliance with standards.

MNC has provided information and documentation for each part of Minn. R. 7000.7000 that has allowed the Agency to process the application and proceed to make a preliminary determination regarding the variance and any permit conditions that should apply.

C. Conclusion

MNC is proposing a first of its kind innovative treatment for mercury. MNC plans to withdraw water from Area 1 Pit. The wastewater generated from the contact cooling water and the process water will be treated prior to return back to the Area 1 Pit. MNC will employ chemical coagulation, precipitation and clarification, followed by a microfilter, and a mercury filter. The treated wastewater will be discharged back into Area 1 Pit for additional residual treatment before being directed to an additional mercury filter before discharge through outfall SD001 (old Cliffs Erie SD003) to Second Creek. It is technically infeasible to provide additional treatment at the projected flow rates solely for the removal of hardness, bicarbonates, specific conductivity, and total dissolved salts (employing reverse osmosis, a brine concentrator, and a crystallizer). The variance request indicates that this additional treatment presents significant operation and maintenance issues due to fouling and scaling and makes the overall project technically infeasible, complex, and risky.

If the variance request is granted, interim and final water quality-based effluent limitations will be placed in the permit (see permit conditions above). Monitoring data provided by MNC on Area 1 Pit water indicates that current hardness, bicarbonate, specific conductivity, and TDS levels will exceed the water quality-based effluent limits. Interim limits will be based on levels achievable by the end of the permit. Hardness and bicarbonates are projected to decrease. Specific conductivity and TDS are expected to increase initially. The progress will be evaluated by the submittal of an evaluation outlining material or waste minimization activities and alternate treatment technologies. Ongoing process control and material substitution measures must ensure further reasonable progress towards attaining the standard.

D. Recommendations

Agency staff recommends that the Agency Board grant the variance. This recommendation is conditioned upon requirements that the permit include interim and final water quality-based effluent limitations for hardness, bicarbonates, specific conductivity, and total dissolved salts (solids). The permit must also include conditions

that require MNC to submit an evaluation of activities for reducing the levels of these TDS parameters. The submittal must evaluate alternate material substitution, processing techniques, minimization, and treatment technologies with a goal of further reasonable progress towards attaining the water quality standard.

Attachments: Effluent Limit Review



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Karron Holmes, Board Administrator
Minnesota Pollution Control Agency Citizens' Board
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-419

Re: Mesabi Nugget NPDES/SDS Permit MN0067687 and Variance Request

October 17, 2012

Dear Ms. Holmes:

Thank you for the opportunity to provide comments on the draft Mesabi Nugget National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) permit MN 0067687 and variance from Minnesota Water Quality Standards (MN WQS) for specific conductance, total dissolved solids, and bicarbonates.

I. THE DRAFT PERMIT DOES NOT COMPLY WITH APPLICABLE MINNESOTA WATER QUALITY STANDARDS 7060 (GROUNDWATER) RULE.

The State of Minnesota protects *all groundwater* as a drinking water source and applies Safe Drinking Water Act criteria to ensure its protection regardless of whether a particular location is accessed by an individual or community as its' drinking water source¹. The Biwabik Iron Formation, the formation Area 1 Pit is located in, is considered the most important aquifer in the region for domestic consumption. The request for variance from MN WQS is only for surface waters, even though it is known by MPCA staff through studies conducted for environmental

¹ MN 7060 Rule

review that Mesabi Nugget's Area 1 Pit discharges to both surface water and groundwater². The groundwater discharge from Area Pit 1 far exceeds MN WQS of 250 milligrams per liter (mg/l) for sulfate, 500 mg/l total dissolved solids, 0.05 mg/l manganese³. Therefore, the NPDES/SDS permit must require groundwater pollution limits, and enforceable interim limits with an enforceable date for achieving MN 7060 WQS before this permit can be reissued.

Mesabi Nugget purchased the southwestern portion of the LTV mining site from Cliffs Erie (now Cliffs Natural Resources) that included several mine pits and stockpiles. As a result of the purchase, Mesabi Nugget is now the responsible party for clean-up activities related to previous mining activities at the site. The Cliffs Erie Closure Plan⁴ for the entire property states that the objective of activities listed are to achieve and maintain compliance with MN surface and groundwater WQS. The Closure Plan has not been sufficient for WQS compliance. As part of the permitting process in 2007, Mesabi Nugget provided financial assurance to ensure funds were available for property clean-up, including polluted water from pits discharging to groundwater and surface water.

Mesabi Nugget National Pollutant Discharge Elimination System (NPDES) permit MN006768 dated November 30, 2007, states: "*The Permittee shall provide for treatment until such time that the water quality of the Area 1 Pit is returned to natural conditions as defined by the water quality monitoring data collected from the Area 1 Pit, including data from monitoring station SW003, in the period prior to commencement of iron nugget production.*" Iron nugget production commenced in 2010⁵. Interim effluent limitations were not achieved when the permit expired. Instead, effluent was diverted to Area Pit 2WX to seep into the surrounding groundwater.

VARIANCES DO NOT COMPLY WITH STATE AND FEDERAL REQUIREMENTS

A. Mesabi Nugget did not achieve 2007 permit or variance requirements, the permit received a major modification after expiration, and Mesabi Nugget did not comply with the modified permit.

The 2007 NPDES permit MN0067687 expired June 30, 2010. Page 5 of the 2007 NPDES Permit grants a variance from MN WQS stating: "*A variance from the Class 3B water quality standards for hardness and the Class 4A water quality standards for specific conductance, total dissolved salts (solids) and bicarbonates is included in this permit. As a result of the variance, the permit includes interim effluent limitations for the variance parameters during the life of the permit with final effluent limitations becoming effective upon expiration of the permit and variance.*"⁶ Mesabi Nugget did not achieve the final effluent limitations required by the 2007

² Barr Engineering, Mine Pit Hydrogeology and Water Balances, Mesabi Nugget Phase II, October, 2009.

³ Barr Engineering, Area 1 Pit baseline data 2008-2009

⁴ MN DNR, Cliffs Erie Closure Plan, May 23, 2003

⁵ Minnesota Pollution Control Agency Industrial Division, October 23, 2012, Mesabi Nugget Delaware, LLC – Request for Approval of Findings of Fact, Conclusions of Law, and Order and Authorization to Grant a Variance and to Reissue National Pollutant Discharge and Elimination System/State Disposal System Permit MN0067657.

⁶ Exhibit 1, attached

variance, and in fact water quality measurements shown from baseline monitoring and monitoring required by the permit indicate that concentrations of the variance pollutants became considerably more concentrated between 2007 and 2010. The expired permit received a modification February, 24, 2011⁷, without public notice or comment. One of the requirements contained in both permits in Chapter 5 *Total Facility Requirements*, part 4 *Special Requirements*, subpart 4.9 states: “Within 90 days of MPCA approval of the preliminary engineering design, the Permittee shall submit for MPCA approval final plans and specifications for the wastewater treatment system.” And “4.11 The Permittee shall not commence production of iron nuggets at the manufacturing plant until the wastewater treatment plant has been fully constructed and is in a fully operational status. The Permittee may conduct limited commissioning of plant equipment provided such commissioning does not result in the generation of wastewater.” The requirement to provide wastewater treatment legally cannot be applied solely to mercury compliance, but must include all regulated constituents. In 2011, MPCA also issued a Stipulation Agreement between MPCA and Mesabi Nugget that states: “During the past three years there are alleged to have been violations of the permit including effluent limit violations, violations for failure to submit required reports/notifications, failure to conduct required monitoring and construction without MPCA approval. Currently the Facility is not discharging at outfall SD001.” In effect, Mesabi Nugget has already been granted a seven-year opportunity to pilot test and construct an adequate wastewater treatment facility.

B. Existing uses must be maintained and protected and effluent limits must be imposed to achieve designated uses

The cause of intermittent toxicity to aquatic life in Area 1 Pit, particularly in the month of September, has not been identified or resolved. However, based on WET testing, toxicity is thought to be related to high concentrations of total dissolved solids, of which sulfate is a significant portion⁸. Flow from the rotary hearth furnace and scrubber blow down process water has been estimated to be 445 gallons per minute, containing approximately 9,000 mg/l of total dissolved solids, resulting in an addition of 22,000 kilograms per day of total dissolved solids to Area 1 Pit.⁹ The chemical interactions resulting from existing pit water with the in-pit waste rock stockpile are thought to also contribute a significant load of pollutants.¹⁰ And, over time, the concentrations of chloride, sodium, sulfate, total dissolved solids, specific conductance, hardness and alkalinity are not only projected to increase in Area 1 Pit¹¹, but have shown remarkable increases in concentration from the 2008-2009 baseline water quality data collected by Barr Engineering.¹² Although additional chronic WET testing requirements have been added to the permit, biological monitoring is one of the assessment tools MPCA uses to determine if a

⁷ Exhibit21, attached

⁸ *I.d.*

⁹ Barr Engineering, Area 1 Pit Water Treatment Evaluation in Support of the Non-Degradation Analysis, Mesabi Nugget Phase II Project, November, 2009.

¹⁰ *I.d.*

¹¹ *I.d.*

¹² Barr Engineering, Area 1 Pit Water Treatment Evaluation in Support of the Non-Degradation Analysis, Mesabi Nugget Phase II Project, November, 2009.

waterbody is impaired. If a waterbody is considered to be impaired, additional water quality-based effluent limits must be applied. WET testing simply indicates if the water being discharged is toxic or not. Therefore, biological monitoring should be required.

In the Findings of Fact, on page 4, MPCA states: “There is no known historic, existing or foreseeable future use of Second Creek or Partridge River for the Class 3C or Class 4A designated uses.”¹³ However, in Appendix I – Supporting Information, MPCA acknowledges: “Second Creek below the confluence of First Creek, and the Partridge River from Colby Lake to the St. Louis River, are waters used for the production of wild rice¹⁴.” Waters used for the production of wild rice is an **existing use**. An “existing use” (by definition under the Clean Water Act, a use that was attained on a waterbody by November 28, 1975, whether or not the waterbody was included in the water quality standards)¹⁵ cannot be modified or changed unless designated uses are added that require more stringent criteria. “Existing beneficial uses and the water quality necessary to protect the existing uses must be maintained and protected from point and nonpoint sources of pollution.”¹⁶ Regarding the “Seasonal Prohibition of Facility Discharge, MPCA maintains that it would be appropriate to apply the 10 mg/l sulfate standard for waters used for the production of wild rice on a seasonal basis, because hydrogen sulfide toxicity is less likely in flowing water conditions. The agency assumes, without site-specific data, that the Partridge River is well-oxygenated throughout the year¹⁷, when in fact its headwaters characteristics suggest that low oxygen conditions are probable on a seasonal or diurnal basis, and in fact, wild rice requires a period of anaerobic conditions through the winter for successful germination.

The statement that: “[b]oth of the pits are currently holding treated wastewater without discharging, regardless of whether the permit is reissued. Currently Mesabi Nugget has estimated that the Area 1 Pit may overflow prior to or during the next period when downstream wild rice resources are most sensitive¹⁸,” suggests that Mesabi Nugget will not be held

¹³ Minnesota Pollution Control Agency Industrial Division, October 23, 2012, Mesabi Nugget Delaware, LLC – Request for Approval of Findings of Fact, Conclusions of Law, and Order and Authorization to Grant a Variance and to Reissue National Pollutant Discharge and Elimination System/State Disposal System Permit MN0067657.

¹⁴ *I.d.* Appendix I – Supporting Information

¹⁵ 40 C.F.R. §131.3 (e).

¹⁶ Minn. R. 7050.0185, Subpart 1

¹⁷ Minnesota Pollution Control Agency Industrial Division, October 23, 2012, Mesabi Nugget Delaware, LLC – Request for Approval of Findings of Fact, Conclusions of Law, and Order and Authorization to Grant a Variance and to Reissue National Pollutant Discharge and Elimination System/State Disposal System Permit MN0067657. Attachment 2.

¹⁸ Minnesota Pollution Control Agency Industrial Division, October 23, 2012, Mesabi Nugget Delaware, LLC – Request for Approval of Findings of Fact, Conclusions of Law, and Order and Authorization to Grant a Variance and to Reissue National Pollutant Discharge and Elimination System/State Disposal System Permit MN0067657.

responsible for remediation of existing surface and groundwater contamination of a site that they own, and an existing beneficial use could be eliminated unless the variance is approved. This is not consistent with the MN WQS or the Clean Water Act (CWA),.

At a minimum, the CWA states that a designated use like 3C (industrial water use) cannot be removed if the use can be attained by implementing effluent limits and best management practices.¹⁹ Therefore, attainable uses are, at a minimum, the uses (based on the State's system of water use classification) that can be achieved: (1) when effluent limits under sections 301 (b)(1)(A) and (B) and section 306 of the Act are imposed on point source dischargers; and (2) when cost-effective and reasonable best management practices are imposed on nonpoint source dischargers. Designated uses may be changed only based upon findings of a use attainability analysis that has demonstrated that attaining the designated use is not possible because of naturally occurring pollutant concentrations, natural flow conditions, hydrologic modifications, substantial widespread economic impact resulting from more stringent controls, or human-caused pollution that cannot be remedied.²⁰ MPCA has not performed a Use Attainability Analysis for either Second Creek or the Partridge River.

C. Mesabi Nugget has not demonstrated technological infeasibility or shown substantial and widespread social and economic impact as required by federal law.

Mesabi Nugget has not been required to assess the social and economic benefits to clean water that include human health, tourism, tribal usufructuary rights and subsistence. Taconite and pig iron prices are at a record high and have been for the past three years²¹. Mesabi Nugget has not shown that wastewater treatment is economically infeasible, and in fact has stated that wastewater treatment is not technically feasible. A cost analysis of various treatment options was performed by Mesabi Nugget in 2009²². Reverse osmosis/nano filtration was found to be the least expensive option. This treatment option was favorably tested by US Steel Minntac²³ and demonstrated minimal scaling or fouling. On property adjacent to Mesabi Nugget and also on the old LTV property, PolyMet has demonstrated through pilot testing that reverse osmosis/nano filtration is not only technically feasible, but can result in compliance with all

¹⁹ Per 40 C.F.R. Section 131.10(d), “[w]hen designating uses, States may wish to designate only the uses that are attainable. However, if the State does not designate the uses specified in section 101(a)(2) of the Act, the State must perform a use attainability analysis under section 131.10(j) of the regulation. States are encouraged to designate uses that the State believes can be attained in the future.”

²¹USGS Publications, Commodities Minerals Publications for Iron Ore, available on-line at http://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/ (last visited October 17, 2012)

²² Barr Engineering, Area 1 Pit Water Treatment Evaluation in Support of the Non-Degradation Analysis, Mesabi Nugget Phase II Project, November, 2009.

²³ General Electric, ZeeWeed 500 Tertiary Membrane Technology and NF Post Treatment Pilot Scale Demonstration Final Report, May1, 2008.

water quality standards including the MN WQS for the protection for wild rice ²⁴. And, PolyMet is not waiting for operations to commence to design and pilot the reverse osmosis/nano filtration wastewater treatment facility. Mesabi Nugget’s claim that they must wait a few years to pilot test an adequate wastewater treatment system is a stalling tactic not allowed under the CWA.

D. Conclusion

We urge the MPCA Citizens’ Board to deny Mesabi Nugget’s request for a variance from Minnesota Water Quality Standards (MN WQS) for specific conductance, total dissolved solids, and bicarbonates. Although MPCA staff “reviewed and concurred with Mesabi Nugget’s assessment that the immediate installation of additional advanced wastewater treatment facilities would cause Mesabi Nugget undue hardship”, and suggests that EPA staff “would support a determination that the temporary removal of the industrial consumption and agriculture designated uses is warranted on the basis that substantial and widespread economic and social impact would result if the variance was not granted” , we bring to your attention that at no time have affected tribal governments been consulted or threats to treaty-protected resources been considered as part of the ‘economic and social impact’ of this regulatory decision.

Sincerely,

Margaret Watkins, Water Quality Specialist
Grand Portage Environmental Department

Nancy Schuldt, Water Projects Coordinator
Fond du Lac Environmental Program

²⁴ Duluth News Tribune, October 11, 2012, PolyMet Says New Sulfate Removal System Works.