Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

October 24, 2012

TO: INTERESTED PARTIES

RE: 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 Elimination System/State Disposal System Permit MN0067687

On October 23, 2012, the Minnesota Pollution Control Agency (MPCA) Citizens' Board voted to approve the Findings of Fact, Conclusions of Law, and Order approving the issuance of the NPDES/SDS Permit No. MN0067687 to Mesabi Nugget Delaware, LLC, Hoyt Lakes, Minnesota. The Findings of Fact, Conclusions of Law, and Order document concludes that the decision to reissue the Mesabi Nugget Delaware, LLC Permit satisfied the requirements of Minn. Stat. chs. 115 and 116.

We appreciate the time and effort of those who submitted comments on the NPDES/SDS Permit for the Mesabi Nugget Delaware, LLC facility.

Sincerely,

John Linc Stine
Commissioner

JLS/KF:rm

ATTACHMENT 1

STATE OF MINNESOTA
MINNESOTA POLLUTION CONTROL AGENCY

IN THE MATTER OF THE REISSUANCE OF
NPDES/SDS PERMIT NO. MN0067687,
INCLUDING A VARIANCE FROM WATER QUALITY STANDARDS,
TO MESABI NUGGET DELAWARE, LLC
ST LOUIS COUNTY
HOYT LAKES, MINNESOTA

FINDINGS OF FACT
CONCLUSIONS OF LAW
AND ORDER

The above-entitled matter came before the Minnesota Pollution Control Agency (MPCA) Citizens' Board at a regular meeting held in St. Paul, Minnesota on October 23, 2012. Based on the MPCA staff review, comments and information received during the comment period, and other information in the record of the MPCA, the MPCA hereby makes the following Findings of Fact, Conclusions of Law, and Order:

FINDINGS OF FACT

This matter involves the application of Mesabi Nugget Delaware LLC (Mesabi Nugget) for reissuance of a National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Permit authorizing operation of wastewater treatment facilities and the discharge of treated wastewater from the Mesabi Nugget iron nugget facility in Hoyt Lakes, Minnesota to Second Creek, a water of the state. The application for reissuance of the NPDES/SDS Permit included an application for a variance from water quality standards for certain Class 3 (industrial consumption) and Class 4A (agriculture) parameters in the discharge. The MPCA must decide whether, under applicable statutes and rules, it should reissue the permit and grant the variance.

BACKGROUND

1. Mesabi Nugget owns and operates a commercial scale iron nugget production facility (Large Scale Demonstration Plant) in Hoyt Lakes, Minnesota. The facility is located on a portion of the former LTV Steel Mining Company taconite operation in Hoyt Lakes. LTV Steel Mining Company, and its predecessor Erie Mining Company, conducted mining operations from the mid 1950s to 2001 at which time LTV Steel Mining Company went bankrupt and the property on which LTV Steel Mining Company operated was acquired by Cliffs Erie LLC. The predecessor to Mesabi Nugget Delaware LLC, Mesabi Nugget LLC, purchased a portion of the property from Cliffs Erie LLC in 2005 for construction and operation of the iron nugget production facility.

2. The facility is a commercial scale demonstration iron nugget manufacturing facility which produces iron nuggets from iron ore concentrate. The facility has the capacity to produce 600,000 metric tons of iron nuggets per year. The nuggets are 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, various coals, fluxes, and binders.

3. Mesabi Nugget, LLC was issued NPDES/SDS Permit No. MN0067687 in 2005 authorizing the construction and operation of wastewater treatment facilities at the then-proposed facility and for discharge of treated wastewater from the facility to Second Creek, a water of the state. This initial permit included a variance from the Class 3 and Class 4 water quality standards for hardness, bicarbonates, total dissolved solids (TDS) and specific conductance. This variance expired upon permit expiration in June 2010 at which time the interim effluent limitations in the permit were no longer applicable and the final effluent limitations in the permit became effective. Mesabi Nugget Delaware, LLC submitted a timely application for the reissuance of the permit and thus continues to operate, albeit without discharge, under the terms and conditions of the expired permit.

4. The permit was modified in November 2007 to reflect a change in ownership from Mesabi Nugget, LLC to Mesabi Nugget Delaware, LLC, which is owned by Steel Dynamics, and in February 2011 to allow the use of the neighboring Area 2WX Pit to provide operational flexibility for continued storage of treated wastewater for purposes of complying with the terms and conditions of the permit.

5. Although the facility was originally permitted in 2005, construction was delayed until 2009 because of financing issues and a change in ownership. The facility became operational on a limited, commissioning basis in January of 2010 and has gradually increased production levels over time. The facility reached a cumulative production amount of 200,000 tons in November 2011, at which point a number of air studies were initiated by Mesabi Nugget as required under its Air Emissions Permit. The results of these studies may affect the final water treatment design at the facility.

6. As stated above, final effluent limitations became effective at the time of permit expiration in June 2010. Since the discharge would not have been in compliance with the final effluent limitations, Mesabi Nugget ceased its discharge in July 2010 and utilized available storage capacity in the Area 1 Pit and, after the permit was modified in February 2011, additional storage capacity in the Area 2WX Pit. The Area 1 Pit and Area 2WX Pit are inactive mining areas and are water bodies under an NPDES/SDS permit and are not “waters of the state” as defined in Minn. R. ch. 7050.0130 subp. 2. Mesabi Nugget continues to operate its production facility and wastewater treatment systems without a discharge utilizing remaining storage capacity in the two pits.

7. Mesabi Nugget is seeking reissuance of the NPDES/SDS permit to authorize continued operation of wastewater treatment facilities and discharge of treated wastewater to Second Creek. An application for reissuance of the permit and an application for continuation of the variance were submitted by Mesabi Nugget in December 2009.

8. The current processing facility has one surface water discharge point. The proposed reissuance of the permit does not authorize expansion of the facility beyond the 2005 permit authorization and does not change the operation of currently permitted treatment systems associated with the Mesabi Nugget processing plant or the daily or annual maximum volume of discharge of treated wastewater to Second Creek.

9. In April 2011, the MPCA entered into a stipulation agreement with Mesabi Nugget for violations that occurred between March 2007 and March 2010 pertaining to reporting violations, effluent limit violations and discharge flow rate violations. Mesabi Nugget has satisfactorily completed the requirements specified in the stipulation agreement.

PROJECT DESCRIPTION

10. Mesabi Nugget appropriates water from the inactive and water-filled 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 at approximate average and maximum rates of 2.9 million gallons per day (MGD) (2000 gallons per minute – gpm) and 7.2 MGD (5000 gpm), respectively. 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 is routed to a multi-stage wastewater treatment system for treatment prior to discharge into the Area 1 Pit. The primary pollutants in the wastewater are suspended solids, dissolved solids (sulfate, hardness, bicarbonates), metals, and mercury.

11. The wastewater treatment system consists of conventional chemical (lime) precipitation followed by filtration through a Mesabi Nugget-developed mercury filtration system that utilizes taconite tailings as the filtration media. Wastewater from the scrubbers is routed through the chemical precipitation unit for sulfate, fluoride, solids and metal removal, then to the first of two available 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 is then pumped to Outfall SD001 (with the option for additional treatment in the second mercury filtration unit, if needed) for ultimate discharge into Second Creek.

12. Mesabi Nugget is authorized under the current permit to discharge at a maximum rate of 5.8 (MGD). The initial receiving water is Second Creek, a tributary to the Partridge River, which is part of the St. Louis River Watershed that ultimately drains to Lake Superior.

13. Second Creek is a Class 2B, 3C, 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) List of Impaired Waters, however portions of the St. Louis River downstream of the discharge are listed for mercury-related (fish consumption) and other impairments (for pollutants not anticipated to be present in the Mesabi Nugget discharge). The Partridge River and portions of Second Creek downstream of the discharge have been determined by the MPCA staff to be waters used for the production of wild rice to which the Class 4A 10 mg/L wild rice standard would be applicable. Since the last permit reissuance, the industrial use classification for unlisted waters in Minn. R. 7050.0430 has changed from Class 3B to Class 3C. This has resulted in a change in the water quality standard for hardness applicable to Second Creek and Partridge River from 250 mg/L to 500 mg/L.

VARIANCE APPLICATION

14. Mesabi Nugget applied for reissuance of its NPDES/SDS permit on December 30, 2009. The application for permit reissuance included a variance proposal based on provisions in Minn. R. 7050.0190, subp. 1 and pursuant to Minn. R. 7000.7000, requesting a temporary variance from water quality standards for four pollutants in the discharge: hardness, bicarbonates, total dissolved salts (solids) and specific conductance.

15. Water quality standards for the four pollutants in question are specified in Minn. R. 7050.0223, subp. 4, (Class 3C standards) and 7050.0224, subp. 2, (Class 4A standards). The relevant standards are: 500 milligrams per liter (mg/L) for hardness (Class 3C), 5 milliequivalents (250 mg/L) for bicarbonates (Class 4A), 700 mg/L for total dissolved solids (Class 4A), and 1,000 micromhos per centimeter (umhos/cm) for specific conductance (Class 4A). Class 3C 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 is no known historic, existing or foreseeable future use of Second Creek or Partridge River for the Class 3C or Class 4A designated uses. Mesabi Nugget is NOT requesting a variance from any Class 2B water quality standards in place for the existing designated use of protection of aquatic life and recreation.

16. Concentrations of these four pollutants currently exceed water quality standards in the existing discharge to Second Creek as monitored under the existing NPDES/SDS Permit. Approximate average concentrations of these four pollutants in the existing discharge are: 740 mg/L for hardness, 330 mg/L for bicarbonate, 824 mg/L for total dissolved solids (TDS), and 1194 umhos/cm for specific conductance.

17. Monitoring data indicates that concentrations of these four pollutants exceed applicable water quality standards in Second Creek at least some of the time. Under certain circumstances (which, in part, is dependent on other activities/discharges in the watershed) flow in Second Creek consists solely or primarily of the Area 1 Pit discharge during significant portions of the year. As a result, a technical determination was made by the MPCA staff 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.

18. 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, including 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. If the applicant is seeking a variance on the grounds that compliance is not technically feasible, the applicant must submit a report from a registered professional engineer, or other person acceptable to the agency, stating fully the reasons why compliance is not technologically feasible.

19. The MPCA determined under Minn. R. 7000.7000, subp. 3 that the application for a variance was complete.

20. The existing permit issued in 2005 included a variance, with corresponding interim effluent limitations, for the same parameters as in the current variance request. The currently requested variance is in essence a continuation of the existing variance. For three of the four parameters (bicarbonate, specific conductivity and TDS), however, the magnitude of the current requested variance is less than that granted in the previous variance. Interim limits (monthly average and daily maximum, respectively) for bicarbonate decreased from 396 mg/L and 445 mg/L in the existing permit to 363 mg/L and 378 mg/L in the reissued permit, specific conductivity went from 2159 umhos/cm and 2425 umhos/cm to 1889/cm umhos/cm and 1965 umhos/cm, and TDS went from 1619 mg/L and 1818 mg/L to 1160 mg/L and 1228 mg/L. The interim limits for hardness increased from 740 mg/l and 831 mg/L in the existing permit to 831 mg/L and 863 mg/L in the reissued permit.

21. By eliminating the discharge to Second Creek for portions of the year, Mesabi Nugget is proposing to reduce the duration and maximum potential loading of the requested variance as compared to the previous variance. Mesabi Nugget is proposing to eliminate the discharge to Second Creek from April 1 through August 31 due to the potential for impacts to downstream wild rice from sulfate in the discharge. As part of the permit development, the MPCA staff determined that the downstream waters used for production of wild rice are susceptible to damage from high sulfate levels during the months of April through August. In addition, because intermittent seasonal chronic toxicity in the discharge has been observed in the past, the discharge would need to be restricted during the month of September each year pending demonstration by Mesabi Nugget through whole effluent toxicity (WET) testing that chronic toxicity does not exist in the discharge. Thus, the current variance request represents a reduction in both magnitude and duration as compared to the previously granted variance.

22. 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.

23. The MPCA staff have determined that the 'exceptional circumstances' applicable to Mesabi Nugget's variance request relate to the pre-existing water quality of the Area 1 Pit and to the unanticipated delay in construction and operation of the manufacturing and wastewater treatment facilities. As a result of previous mining activity by LTV Steel Mining Company, the discharge from the Area 1 Pit already exceeded water quality standards for the variance parameters prior to the initial permitting of the then-proposed Mesabi Nugget facility in 2005. In addition, as stated above in the Procedural History section of this document, a change of facility ownership subsequent to 2005 and financing difficulties resulted in a delay in construction and operation of the facility until early 2010, thus precluding the development and implementation of potential mitigation envisioned by the 2005 permit.

24. In accordance with Minn. R. 7050.0190, subp. 1, Mesabi Nugget is requesting a variance primarily on the grounds that "strict conformity with the standards would be unreasonable, impractical, or not feasible under the circumstances." In particular, requiring construction of additional

wastewater treatment systems, such as reverse osmosis (RO), *at this time* to meet the final effluent limitations is not technically feasible under the circumstances. The MPCA staff reviewed and concurred with Mesabi Nugget's assessment that a treatment technology such as RO may at some point in time be capable of achieving applicable effluent limitations, but such treatment cannot be implemented immediately without further evaluation of future wastewater characteristics and undergoing facility-specific engineering design and testing.

25. The options for wastewater treatment are driven by the decisions made for air pollution control equipment. The current air emissions permit requires the use of a wet scrubber to provide sufficient removal of particulate matter and acid gases to meet the various air quality standards, including visibility in the Boundary Waters Canoe Area. The use of a wet scrubber for air emission control results in the transfer of pollutants to the wastewater stream.

26. Since the facility was the first commercial installation of its kind, there was considerable question on how to scale emission factors from testing that had been done on the previous pilot plant and the efficiency of the new air control equipment to be used on the full-scale plant. As a result, the original Air Emissions Permit was issued with requirements for additional testing related to determining optimum scrubber efficiency, to determine whether additional nitrogen oxide (NO_X) controls were needed, and whether mercury emissions could be reduced.

27. Mesabi Nugget is in the process of conducting various studies on its air emission control/scrubber systems as required by the facility's Air Emissions Permit, which may result in significant changes in the nature of the influent to a RO treatment system. In particular, Mesabi Nugget is required to complete a Wet Scrubber Optimization Study, a NO_X Control Study and a Mercury Reduction Study. Changes in liquid flow rate as a result of the Scrubber Optimization Study could result in the presence of additional dissolved solids and particulate matter in the influent. A requirement to install a selective noncatalytic reduction system (SNCR) or alternate technology for NO_X control would result in significant quantities of nitrogen compounds reporting to the wastewater treatment system. These nitrogen compounds can be detrimental to the performance of RO membranes and may require the installation of additional pretreatment. If additional control equipment is required to remove mercury in the air emissions, the most likely candidate would be the injection of activated powdered halogenated carbon. This would likely change the composition of the influent by adding monovalent ions, thereby affecting the selection of an effective membrane, as well as the selection of pretreatment technology due to the addition of the very finely divided activated carbon.

28. Given that these air emission control studies are still in progress and the determination of what, if any, air control improvements will be implemented has not yet been made, it would be difficult and infeasible to design and install the wastewater pretreatment and RO treatment systems at this time. The results of the air emission control studies are expected to be submitted to the MPCA no later than the end of May 2013; therefore, the proposed variance schedule in the draft NPDES/SDS, in part, considers this timeframe.

29. Mesabi Nugget investigated the technical feasibility of several wastewater treatment technologies that were identified as having a potential of effectively treating the discharge including biological treatment (anaerobic reactors, wetlands), chemical precipitation (lime softening, ettringite

precipitation, barium precipitation), ion exchange (Sulf-IX) and membrane treatment (nanofiltration, reverse osmosis). Of those technologies evaluated, the only option considered potentially technically capable of reducing the levels of the variance parameters to water quality standards was reverse osmosis with evaporation and crystallization of the reject water.

30. Even with RO, however, some technological uncertainty remains for the Mesabi Nugget discharge, particularly with respect to pretreatment requirements, selection of an effective membrane(s) for variable influent quality, likely fouling and scaling of the heat transfer surfaces, disposition of the reject brine and general design/scale-up considerations for a system capable of treating up to 3,000 gallons per minute. At a minimum, Mesabi Nugget has indicated that in order to make an informed decision on the potential installation of addition wastewater treatment, a reasonable amount of time would be needed to fully characterize future wastewater characteristics resulting from potential changes or enhancements to the air quality control systems–and to conduct the bench and/or pilot testing necessary for engineering design and detailed economic evaluation.

31. The MPCA staff have reviewed the information submitted by Mesabi Nugget and agree that of the technologies evaluated, the RO with evaporation/crystallization technology has the greatest likelihood of being able to meet effluent limitations. The MPCA staff also agree that given the uncertainty at this time over the nature and volume of the wastewater (due to the ongoing air emission control studies and the subsequent need for site-specific bench and/or pilot testing) and the lack of a successful full-scale demonstration at a similar facility, a reasonable period of time for additional evaluation and testing is needed before an informed decision on the selection and/or design of additional treatment can be made.

32. Since immediate installation of an additional wastewater treatment system at Mesabi Nugget given the current state of knowledge on the subject is technically infeasible at this time, further investigation of RO with evaporation/crystallization technology is warranted. The proposed permit contains variance conditions and a schedule in which Mesabi Nugget would be required to further investigate the feasibility of applying this technology at its facility.

33. Mesabi Nugget is also requesting the variance on the grounds that "by reason of exceptional circumstances the strict enforcement of any provision of these standards would cause undue hardship" as stipulated in Minn. R. 7050.0190, subp. 1. Mesabi Nugget indicated that it would be unreasonable to require construction and operation of a complex treatment facility, which is not technically feasible at this time, which would require extensive pilot testing and engineering to determine whether the technology could achieve the results, and which is estimated to cost approximately $29.5 million in capital costs and $1 million in operating costs translating to a an annualized cost of $4.3 million and a net present value of approximately $37.6 million over the 10 year financing period.

34. The 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.

35. The Mesabi Nugget Large Scale Demonstration Plant is the first and only plant of its kind in the world. The facility started production, on a limited basis, in January 2010 and has yet to achieve a

full production level. Mesabi Nugget has indicated that the first two years of operation have been difficult for a number of reasons. First, the scale up of the process from the pilot facility to the full-scale facility has been more difficult and time-consuming that anticipated. Second, the cost of operating the facility is substantially higher than expected. This has been driven by factors across the operation from raw material pricing to energy pricing, process yield and maintenance requirements. And third, the price received for iron nuggets has not kept pace with the historically high prices for the iron concentrate and coal raw materials.

36. Mesabi Nugget has provided a brief evaluation of how the projected cost for immediate installation of treatment (assuming that all the design uncertainties were resolved), could affect the cost of iron nugget production and how that could affect market competitiveness. The company concluded that with the current worldwide competition in iron supply, even a relatively small percentage increase in operating costs would present the company with a significant competitive disadvantage during all economic cycles and particularly so during downturns in iron nugget/pig iron pricing such as occurred in 2009.

37. Mesabi Nugget has indicated that it is currently operating at a loss. The company states that while short term losses are not entirely unexpected with a first commercial development of a new technology, the current and future projected losses are considerably larger than the company expected, are not sustainable, and will jeopardize the future of this facility, and the ITMk3 technology overall, if costs cannot be controlled in the near future. Mesabi Nugget has determined that the addition of an annualized cost of $4.3 million for the immediate installation of an additional RO wastewater treatment system capable of meeting final effluent limitations for the variance parameters would add unsustainable losses for the foreseeable future such that the entire $300 million project would be jeopardized.

38. Mesabi Nugget has estimated that closure of the existing facility would result in the permanent lay-off of 111 people from the facility and up to an additional 200 contractors and suppliers according to studies on impacts of layoffs to other industries. In addition, Mesabi Nugget states that closure of the Large Scale Demonstration Plant would likely result in the abandonment of the Mesabi Mining project (iron ore concentrate from the proposed mining project would no longer be needed for the LSDP) resulting in the future loss of an estimated 240 additional jobs.

39. Mesabi Nugget states that the total county and state taxes, royalties and leases paid by Mesabi Nugget was approximately $1.4 million in 2011 and is projected to be approximately $3.1 million in 2012. Closure of the facility would eliminate a significant portion (but not all) of these tax and related payments. In 2010 and 2011, Mesabi Nugget indicated that it paid over $133 million in wages and benefits to its employees and payments to Minnesota vendors and contractors and that shutdown of the facility would result in the loss of this economic contribution to the local community.

40. The MPCA staff have also reviewed information that indicates “that disposal of the sewage, industrial waste, or other waste is necessary for the public health, safety or welfare” in accordance with Minn. R. 7050.0190, subp. 1. MPCA staff concur that if the facility were to shut down because of the costs associated with the immediate installation of additional advanced treatment facilities,

the Area 1 Pit would continue to discharge to the environment without the benefit of the treatment currently provided by Mesabi Nugget.

41. The Area 1 Pit would continue to discharge through SD001 whether the Mesabi Nugget plant is in operation or not, albeit without the wastewater treatment of pit waters that the nugget facility is currently providing. Area 1 Pit watershed hydrology is such that total water inflows exceed water losses to groundwater and evaporation resulting in a long-term overflow or discharge of the pit to Second Creek. This overflow would occur naturally and there is no way to stop it. This overflow discharge, when it last occurred naturally prior to the permitting of the original Mesabi Nugget facility in 2005, did not meet water quality standards for the variance parameters. Even if the Mesabi Nugget plant was not present or operating, discharges from the Area 1 Pit to Second Creek would continue at levels exceeding water quality standards and, if the permit associated with the requested variance is not approved and issued, the discharge would occur year-round rather than be seasonally controlled thereby potentially adversely affecting downstream wild rice resources.

42. The MPCA staff have reviewed the permit and variance applications and supporting information and concur that the three conditions for granting a variance specified in Minn. R. 7050.0190, subp. 1 have been satisfied.

43. Effects upon air, land, and water resources were evaluated in the variance application review process. The MPCA staff have determined that if the proposed variance is approved there will be no impacts on air resources and only a very slight potential for minor impacts to land resources (i.e., soils) should downstream waters be “unofficially” used as a source of water for private gardens or grasses (such use is not known to exist at this time). There are no endangered species impacts associated with this discharge.

44. The potential exists for impact on sensitive macroinvertebrates as a result of the discharge. Chronic toxicity testing conducted on the existing discharge and on the Area 1 Pit indicates no effect on fathead minnows but the potential for effect on *Ceriodaphnia dubia*. Testing results seem to suggest that this potential for impact to *C. dubia* is of greater concern in late summer and is intermittent in nature (i.e., toxicity is not observed in each testing event). Given these observations, the potential for impact within the receiving water itself, if it were to occur at all, would be intermittent and temporary in nature and would be localized to the immediate area of discharge given the larger flows of downstream waters such as the Partridge and St. Louis Rivers relative to the discharge.

45. As a result of these toxicity test results, Mesabi Nugget has begun the Toxicity Reduction Evaluation (TRE)/Toxicity Identification Evaluation (TIE) process. The continuation of the TRE/TIE process and facility specific requirements for the duration of this process have been included in the NPDES/SDS permit in order to identify and eliminate the source of intermittent toxicity observed. In order to avoid adverse impacts on the receiving water, the permit contains a condition prohibiting discharge from SD001 during September of each year unless Mesabi Nugget can demonstrate through WET testing that toxicity exceeding one chronic toxicity unit is not present.

46. It is anticipated that total dissolved solids (TDS) and specific conductance may in the short term increase in the discharge if the variance is approved (hardness and bicarbonate are expected to continue to decline). To evaluate the potential effect that such an increase in TDS and/or specific conductance may have on the chronic toxicity of the discharge, Mesabi Nugget compared specific conductance values taken at the time the toxicity sample was collected against the results of the toxicity test. This evaluation indicates that an observable increase in the toxicity of discharge would not be expected even if specific conductance and/or TDS were to increase over the short term, and that this existing Class 2B (aquatic life and recreation) use of the water would not be removed or materially degraded with granting of the variance.

47. Mesabi Nugget has evaluated the potential for impact on downstream waters if the variance is granted. This evaluation included potential impacts on the concentration of the variance parameters (hardness, TDS, specific conductance and bicarbonate) and sulfate to the immediate receiving water, Second Creek, as well as potential impacts to the downstream waters of the Partridge and St. Louis Rivers. The evaluation included projections for both average stream flow and 'worst-case' 7Q10 low flow conditions.

48. In general, under average stream flow conditions the applicable water quality standards for the variance parameters would continue to be exceeded in Second Creek downstream of the SD001 discharge over the short term; however, water quality standards for these parameters would continue to be met in the Partridge and St. Louis Rivers. Under "worst-case" 7Q10 low flow conditions (which by definition would occur only approximately 0.2 percent of the time), the SD001 discharge when considered alone was projected to result in standards continuing to be exceeded in Second Creek for all four variance parameters and exceedances being extended to the Partridge River for TDS and specific conductance.

49. The water quality standards for the variance parameters applicable to these waters are the Class 3C (Industrial Use) standard for hardness and the Class 4A (Irrigation) standards for specific conductance, TDS and bicarbonate. There is no known historic, present or foreseeable actual use of these waters for the Class 3C or 4A use classifications. In addition, the proposed permit includes a provision that prohibits the discharge to Second Creek from April 1 to August 31 of each year, which is generally the same timeframe as any irrigation would potentially occur and for which the Class 4A standards would be most protective of an agricultural designated use. Based on the MPCA staff review of the data submitted by Mesabi Nugget, the MPCA staff conclude that granting of a variance to Mesabi Nugget for the four listed parameters will not result in the removal of an existing actual use of these waters.

50. U.S. Environmental Protection Agency (EPA) must approve any MPCA variance to its water quality standards. Under federal regulations (40 CFR § 131.10(g)(6)) and EPA guidance on variances, a "states may remove a designated use" (for example, through a temporary variance) "which is not an existing use… if the state can demonstrate that attaining the designated use is not feasible because… controls more stringent than those required by sections 301(b) and 306 of the [Clean Water] Act would result in substantial and widespread economic and social impact."

51. The MPCA staff have reviewed the information submitted by Mesabi Nugget to support the variance from EPA regulations (summarized in Findings of Fact No. 33 through No. 39 above) and

concur that the information would support an EPA determination under EPA regulations that the temporary removal of the industrial consumption and agricultural uses based on substantial and widespread economic and social impact would result if the variance was not granted.

52. EPA staff have indicated that, based on the information provided by Mesabi Nugget and on extensive discussions with MPCA staff, they 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.

DRAFT PERMIT

53. The monitoring requirements, reporting requirements, and special conditions included within the proposed permit are enforceable permit requirements. As a result, the MPCA believes the monitoring requirements are adequate, enforceable, and will provide sufficient protection of surface waters.

54. The MPCA discussed the proposed draft permit with water program staff and managers from Region 5 of the EPA during development of the draft permit. During these discussions, which occurred over a period of several months, the EPA understood and did not object to the MPCA's permitting approach. As discussed above, EPA staff indicated that it is likely that the variance request meets the requirements specified in federal rule 40 CFR 131.10(g)(6) and that the variance is warranted based on substantial and widespread economic and social impacts that are anticipated to occur without this variance.

55. EPA must grant its final approval of the variance request before the variance, and draft permit, can be issued by the MPCA and become effective (40 CFR § 131.10; 40 CFR § 122.44(d)). EPA must make their determination for approval of the variance application within 60 days after MPCA's decision or for denial of the variance application within 90 days after MPCA's decision (40 CFR 131.21).

56. The Commissioner of the MPCA made a preliminary determination that the variance should be granted and provided public notice of the preliminary determination pursuant to the requirements of Minn. R. 7000.7000. The public notice of the preliminary determination was included as part of the public notice for the draft NPDES/SDS Permit.

VARIANCE SCHEDULE

57. The proposed NPDES/SDS Permit contains conditions associated with granting the variance. The purpose of the additional conditions is to measure and document potential impacts of granting the variance and to ensure that Mesabi Nugget will make reasonable progress in ultimately achieving compliance with the water quality standards.

58. 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. Interim and final effluent limitations for the four pollutants are included in the NPDES/SDS Permit.

59. The proposed permit contains Water Quality Based Effluent Limitations (WQBELs) based on the underlying water quality standards in Minn. R. 7050.0223 and 7050.0224 that 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, 512 mg/L and 532 mg/L for hardness, 257 mg/L and 267 mg/L for bicarbonates, 726 mg/L and 768 mg/L for total dissolved solids, and 1025 umhos/cm and 1066 umhos/cm for specific conductance. Final effluent limits calculated for the permit reissuance were based on monitoring data from the facility which had been generated over the permit term. Since the issuance of the current permit in 2005, the industrial use classification for unlisted waters in Minn. R. 7050.0430 has changed from Class 3B to Class 3C. This has resulted in a change in the water quality standard for hardness applicable to Second Creek and Partridge River from 250 mg/L to 500 mg/L.

60. The proposed permit contains interim effluent limits for variance pollutants. The NPDES/SDS Permit contains interim limits effective upon permit issuance for the four pollutants based on current concentrations in the discharge for hardness and bicarbonates and on projected levels in five years for TDS and specific conductance. The interim limits for specific conductivity and TDS are based on projected levels because they may be affected by changes to the facility related to optimization of air controls or fully-operational process components. Actual monthly average and daily maximum interim effluent limitations included in the NPDES/SDS Permit are, respectively, 831 mg/L and 863 mg/L for hardness, 362 mg/L and 378 mg/L for bicarbonates, 1160 mg/L and 1228 mg/L for total dissolved solids, and 1889 umhos/cm and 1965 umhos/cm for specific conductance.

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

62. The NPDES/SDS Permit requires in-stream monitoring of Second Creek for the four variance parameters upstream and downstream of the discharge. The purpose of the monitoring is to determine whether the discharge complies with water quality standards, 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 or permit limits based on receiving water information.

63. The proposed permit includes a schedule for completion of required studies that will ultimately result in a plan to accomplish reductions in TDS-related parameters over the short term as well as the development of a specific plan of action with a schedule for the longer term that will result in reductions in the concentrations of the variance parameters in the discharge such that compliance with final effluent limitations is achieved as soon as possible but no later than August 1, 2021.

64. The short-term permit requirements include completion and implementation of a Short Term Water Quality Improvement Study to identify improvements that could be made to the existing processing

and wastewater treatment facilities to reduce TDS-related pollutants, including potentially sulfate, in the discharge and to reduce the levels of TDS and specific conductance in the SD001 discharge. These improvements may include actions that would result in pollutant reductions that may not necessarily be sufficient to result in compliance with final effluent limitations. The timeframe for implementation of the short-term improvements is within 18 to 24 months of permit reissuance.

65. Over the longer term, completion of a series of studies is required, including:

- A Water Balance Study which will identify and quantify water flows into and out of the Area 1 Pit;

- A Chemical Balance Study which will identify the source and fate of pollutant loadings into the Area 1 Pit including those from operation of the plant and from watershed sources such as from leaching of adjacent stockpiles; and

- A Pollutant Reduction Study. The Pollutant Reduction Study will be informed by the Short Term Water Quality Improvement Study, the Water Balance Study and Chemical Balance Study. This study will also include an evaluation of source control strategies, treatment technologies and process optimizations and will propose a detailed plan and schedule that will result in compliance with effluent limitations as soon as possible. The timeframe for submittal of the Pollutant Reduction Study and commencing the implementation of the approved plan and schedule is expected to be three to three and a half years from the date of permit issuance. Subsequent compliance with final effluent limitations is required as soon as possible thereafter but no later than August 1, 2021.

66. The term of the variance is based on potential time required for Mesabi Nugget to complete studies, as well as time for implementation of any final plans for attaining compliance, including time for obtaining various regulatory approvals. The schedule does not automatically grant the maximum timeframe, but requires MPCA approval at interim steps and requires that all interim steps proceed to compliance with final effluent limitations as soon as possible. The schedule requires the Permittee to make progress toward meeting the final effluent limitations for the variance parameters for the duration of the variance.

67. The interim requirements described above and which are included in the permit as conditions include completion of the Short Term Water Quality Improvement Study, the Water Balance Study, the Chemical Balance Study, and the Pollutant Reduction Study for the facility. The permit also requires ongoing progress reports. The permit specifies maximum timeframes for completion of the interim requirements. All aspects of the schedule for compliance with final effluent limitations are enforceable terms of the permit.

MERCURY

68. Mercury monitoring of the discharge from the Area 1 Pit is required by the existing NPDES/SDS Permit.

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

70. 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. The mercury effluent limitations were calculated using EPA approved methodology. Providing for effluent variability and a monitoring frequency of twice monthly, effluent limitations based on the underlying 1.3 ng/L water quality standard were calculated to be 1.8 ng/L monthly average and 3.2 ng/L daily maximum.

71. 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.

72. Due to 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; thus, the company must follow existing stringent permit terms and conditions for addressing compliance with the mercury effluent limitations. Therefore, to eliminate or minimize the potential for a noncompliant mercury discharge, the existing permit prescribes actions the company must take if monitoring data indicates that the mercury effluent limitations are being exceeded. These conditions remain unchanged with this reissuance.

73. 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 the Area 1 Pit has previously been pumped down to create excess storage capacity (thus eliminating the immediate need for a discharge to Second Creek) and provided treatment of wastewater through at least the first two treatment units (chemical precipitation and mercury filter #1) continues prior to discharge into the Area 1 Pit.

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

SULFATE AND PROTECTION OF WATERS USED FOR THE PRODUCTION OF WILD RICE

75. The Class 4A sulfate numeric standard for wild rice included in Minn. R. 7050.0224, subp. 2 is "10 mg/L, applicable to water used for production of wild rice during periods when the rice may be susceptible to damage by high sulfate levels." Application of the wild rice sulfate standard, is made on a case by case basis. The first step is to develop a staff recommendation related to which waters in the area are waters used for production of wild rice. Whether a seasonal discharge should be considered and if so, the period when wild rice is susceptible to damage by high sulfate

levels is determined by the MPCA and Minnesota Department of Natural Resources (MDNR) staff on a site-specific basis.

76. The evaluation of the Partridge River with regard to the sulfate standard is summarized in the August 27, 2012, the MPCA draft staff recommendation, "Seasonal Application of the Wild Rice Sulfate Standard - Partridge River," (Attachment 2). In that memo, the MPCA concluded that the 10 mg/L sulfate standard is applicable to portions of the Partridge River used for wild rice production April 1 through August 31. Based on this conclusion, the permit prohibits the discharge from Area 1 Pit from April 1 through August 31. As outlined in the draft staff recommendation, these dates take into account general variability associated with annual climatic variations, geographic locations and individual stand variability within the Partridge River watershed.

77. The application of the 10 mg/L sulfate standard on a seasonal basis for the Partridge River considers the travel and residence time of the river system from the discharge point to the location of wild rice. It also recognizes that hydrogen sulfide toxicity is less likely in flowing water conditions, such as those found in the Partridge River, than in stagnant water conditions – due to oxygenated sediment conditions preventing the formation of hydrogen sulfide and the moving water preventing accumulation of any hydrogen sulfide that may form.

78. Since the permit will prohibit a discharge from the April 1 to August 31 period, no effluent limit for sulfate is required in the permit. However, the permit requires twice monthly monitoring for sulfate concentrations in the facility discharge when a discharge does occur outside of the April 1 to August 31 period.

79. In addition, the permit requires Mesabi Nugget to complete a Wild Rice Impact Study within 48 months after MPCA approval of the work plan, which is required to be submitted within 90 days after permit issuance. This study will include monitoring and measuring the effects on water chemistry, hydrology and wild rice resources downstream of SD001. The 48 month timeframe for completion of the Wild Rice Impact Study is intended to take into account to the extent possible in a five-year permit the known cyclic nature of natural wild rice crops. Written annual progress reports, including a preliminary evaluation of data collected to date, are required by the permit. Further details on work plan and study requirements are included in the permit.

80. The permit requires the completion of a Sulfate Transport Study within 12 months after the MPCA approval of the associated workplan, which is required to be submitted within 90 days after permit issuance. The Sulfate Transport Study is a modeling effort intended to evaluate and predict sulfate concentrations in the waters between the SD001 discharge and the confluence of the Partridge River, taking into account multiple stream flow and discharge scenarios. The Study is intended to provide facility-specific information that may, in combination with the results of the state sponsored wild rice/sulfate studies, be used to inform future decisions on permit requirements. Further details on work plan and study requirements are included in the permit.

WHOLE EFFLUENT TOXICITY

81. WET testing has been conducted on Area 1 Pit since 2006. Area 1 Pit water has not shown evidence of having chronic toxicity to fathead minnows, but has been intermittently chronically

toxic to *C.* d*ubia.* The TIE/TRE process began in 2008 and has continued through 2011. The intermittent chronic toxicity has resulted in a reduction in the number of young per bearing female, but not complete reproduction failure (i.e. zero young per bearing female).

82. Mesabi Nugget is required to continue with the TIE and TRE process as required in the permit. For the duration of this TIE/TRE process, Mesabi Nugget will also be required to conduct monthly chronic WET tests for the discharge, (or water samples representative of the discharge). In addition, quarterly updates regarding the progress of the TIE and TRE are required to be submitted to the MPCA, and an annual summary of all WET-related activities which occurred in the previous year.

83. Once the TRE process has been completed, Mesabi Nugget is also required to continue conducting monthly chronic toxicity testing on the station SD001 discharge to Second Creek in order to track the potential effects of the facility discharge on toxicity. A total of twelve consecutive monthly tests must pass the chronic toxicity standard (<1.0 TUc) before the facility will be allowed to reduce the level of monitoring to every other month for the duration of the permit. Since testing must be conducted during periods of discharge, the twelve monthly tests will equate to approximately two years of passing monthly chronic WET tests prior to the reduction in monitoring. These requirements provide assurance that the facility's discharge has no further reasonable potential for chronic toxicity.

84. The toxicity testing must follow standardized procedures as outlined in the EPA's Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002 (EPA-821-R-02-013), and the permit specifies the required organisms, dilution series, sampling method and reporting requirements.

FINANCIAL ASSURANCE

85. The Area 1 Pit is a part of the wastewater treatment system for the facility. 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.

86. 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 No. 2), the permit contains a provision for financial assurance. Specifically, the permit requires that an irrevocable letter of credit, fully-funded cash trust fund, or another method of financial assurance approved in advance by the MPCA in the amount of $5 million be provided. Mesabi Nugget provided an irrevocable letter of credit in the amount of $5 million to the MPCA in 2005; this financial assurance mechanism and amount is still required under the permit.

87. 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 permit provides for an annual review of

the amount of financial assurance, at which time the dollar amount may be adjusted upwards or downwards.

88. The financial assurance provisions described above are a requirement of the existing permit and remain unchanged in the reissued permit.

PROCEDURAL HISTORY

89. Pursuant to Minn. R. 7001.0100, a draft permit was prepared by the MPCA staff on the proposed permit reissuance.

90. The public comment period for the draft permit began on January 30, 2012, and ended on February 29, 2012, and in accordance with provisions of Minn. R. 7001.0100 was provided to all persons on the mailing list for the county in which the facility is located and to any interested person upon request, and was circulated within the geographic area of the facility.

PUBLIC COMMENTS AND MPCA RESPONSE

91. During the 30-day comment period, comments received by MPCA included those from EPA – Region 5, Mesabi Nugget (the Permittee), WaterLegacy, Sierra Club—North Star Chapter, Minnesota Center for Environmental Advocacy, Save Lake Superior Association, the Grand Portage Band of Chippewa and the Fond du Lac Band of Lake Superior Chippewa, and 5 letter and 166 e-mails from individual citizens. The comments expressed a variety of opinions and concerns about the content and legality of the proposed variance, the sulfate discharge levels from the facility and the seasonal application of the Class 4A water quality standard for sulfate, mercury requirements, ongoing aquatic toxicity, and nondegradation issues.

92. The MPCA reviewed each of the comments and provided a detailed response to each. Comment letters received have been hereby incorporated by reference as Appendix A to these findings. The MPCA responses to comments received are hereby incorporated by reference as Appendix B to these findings.

93. In addition, the Permittee submitted a number of minor edits and administrative comments on the draft permit during the public notice period, which were considered in the finalizing of the permit. Any edits that were accepted are discussed in the Board Item document.

FINAL DETERMINATION ON WHETHER TO GRANT VARIANCES AND ISSUE PERMIT

94. In Minnesota, there are two types of water quality permits, the NPDES permit and the SDS permit. The NPDES permit is issued by the MPCA pursuant to authority delegated by EPA pursuant to the federal Clean Water Act. The SDS permit is issued under authority in Minn. Stat. ch. 115. When both permits are required, the MPCA issues a joint NPDES/SDS permit. Mesabi Nugget's permit is a NPDES/SDS Permit.

95. The MPCA has jurisdiction to reissue the NPDES/SDS permit to Mesabi Nugget under the provisions of Minn. R. 7001.0140.

96. The MPCA has followed the procedures for the reissuance of the NPDES/SDS Permit in accordance with the provisions in Minn. R. ch. 7001.

97. The MPCA's decision to grant the variance is governed by its variance rule, Minn. R. 7000.7000, and by the water quality standards variance provision, Minn. R. 7050.0190, subp. 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.*

The MPCA has followed the procedures for granting of a variance in accordance with the provisions of Minn. R. 7000.7000.

CONCLUSIONS OF LAW

98. The MPCA is authorized to administer and enforce all laws relating to the pollution of the air and water of the state. Minn. Stat. chs. 115 and 116. The MPCA has jurisdiction over the NPDES/SDS Permit and the temporary water quality standard variance for the Mesabi Nugget Project.

99. The MPCA has the authority to reissue the NPDES/SDS Permit under Minn. Stat. chs. 115 and 116 and Minn. R. chs. 7000 and 7001.

100. Under the federal Clean Water Act, the MPCA is delegated the authority from EPA to issue NPDES permits. 33 U.S.C. § 1342; Minn. Stat. § 115.03, subd. 5.

101. The MPCA has the authority to issue an SDS permit for the construction, installation, or operation of disposal systems. Minn. R. 7001.0020. D.

102. A draft permit for the Mesabi Nugget facility was prepared and publicly noticed in accordance with the requirements of Minn. R. 7001.0100.

103. The Commissioner of the MPCA determined that the variance application submitted by Mesabi Nugget was complete in accordance with the requirements in Minn. R. 7000.7000, subp. 4.

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

105. The provisions in Minn. R. 7050.0190 for granting the temporary variance have been satisfied.

106. The MPCA determines that the Permittee will comply with all applicable state and federal pollution control statutes and rules administered by the MPCA, and the conditions of the reissued NPDES/SDS Permit.

107. 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.

108. The temporary water quality standard variance is 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 variance.

109. The findings of the MPCA justify issuance of the NPDES/SDS Permit and granting of the temporary variance and do not support denial of the permit or denial of the request for a variance.

110. The permit will be reissued upon EPA approval of the variance pursuant to provisions in 40 CFR §§ 131.10, 131.21 and 122.44(d).

111. Any findings that might properly be termed conclusions and any conclusions that might properly be termed findings are hereby adopted as such.

ORDER

The Minnesota Pollution Control Agency Board approves the proposed variance and submittal of the variance to EPA for approval. The Minnesota Pollution Control Agency Board also approves the reissuance of the National Pollutant Discharge Elimination System/State Disposal System Permit No. MN0067687 upon EPA approval of the variance.

IT IS SO ORDERED

Commissioner John Linc Stine
Chair, Citizens' Board
Minnesota Pollution Control Agency

10/24/12
Date