March 10, 2011

Commissioner Paul Aasen
Minnesota Pollution Control Agency
520 Lafayette Road N
St. Paul, MN 55155-4194

RE: Dunka Pit NPDES/SDS Permit Inconsistencies with Federal and State Law

Dear Commissioner Aasen:

Paula Maccabee is an attorney representing WaterLegacy and Bruce Johnson is a member of the Advisory Committee of WaterLegacy and a former employee of the Minnesota Department of Natural Resources (MDNR) and the Minnesota Pollution Control Agency (MPCA). In his prior capacity as agency staff, Mr. Johnson had direct responsibility for various aspects of study and control of discharge from the Dunka Mine. Mr. Johnson has since done extensive research regarding the discharge from the Dunka Mine and the federal and state rules that are applicable to this discharge.

Ms. Maccabee and Mr. Johnson jointly submit this letter expressing WaterLegacy's concerns pertaining to the inconsistency of the Dunka Mine National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permit *MN0042579* with applicable federal and state regulations enacted pursuant to the Clean Water Act.

Although the MPCA entered into a Consent Decree on March 25, 2010 regarding the violation by Cliffs Erie L.L.C. of this Dunka Mine NPDES/SDS permit, the Consent Decree fails to address the underlying and serious concern that the year 2000 NPDES/SDS permit for the Dunka Mine is itself deficient and inconsistent with applicable federal and state regulations. We are requesting that the MPCA, with oversight of the U.S. Environmental Protection Agency (USEPA), review and reissue appropriate permits for the Dunka Mine to address the issues and concerns discussed herein.

As discussed in more detail below, the Dunka Mine NPDES/SDS permit *MN0042579* is deficient and inconsistent with federal and state regulations in the following respects:

1. The initial NPDES/SDS permit for the Dunka Mine predates the USEPA's implementation recommendations to categorize permits as "major" permits based on the level and toxicity of discharge. Since 1990, it does not appear that the Dunka Mine NPDES/SDS permit has been classified as a major discharge permit or that the USEPA has reviewed the permit for compliance with Clean Water Act requirements. The nature of metals and other toxic releases from the Dunka Mine support major permit status and greater scrutiny at both a state and federal level.

2. The year 2000 NPDES/SDS permit for the Dunka Mine does not cover all relevant pollutants and seeps. Two of the five outfalls from the mine have variances and lack discharge standards for copper, nickel, cobalt and zinc. The additive toxicity limit in the permit does not include cobalt. The NPDES/SDS permit does not set a limit for mercury, hardness or specific conductance, although discharges are likely to exceed Minnesota surface water quality standards.

3. The NPDES/SDS permit for the Dunka Mine sets toxicity standards based on high levels of hardness contributed by mine pollution, rather than according to the

uncontaminated background hardness of receiving waters.

4. The NPDES/SDS permit for the Dunka Mine sets toxicity limits based on the Final Acute Value (FAV), although the seven-day 10-year low flows (7Q10) for receiving waters (Unnamed Creek and Flamingo Creek) are zero, so that toxicity should be set using a more protective Chronic Standard (CS).

5. The NPDES/SDS permit for the Dunka Mine contains no limit for sulfates, which are routinely discharged at levels exceeding 1000 milligrams per liter (mg/L), although receiving waters drain into Birch Lake and the Kawishiwi River, both of which are known to contain stands of wild rice.

6. The NPDES/SDS permit for the Dunka Mine expired on June 30, 2005 and has not been reissued, while variances have gone more than a decade without public review. The MPCA has neither required operation of the Dunka water treatment plant nor comprehensive reductions of waste stockpile infiltration.

WaterLegacy would request that the following actions be taken by the MPCA, under the review and scrutiny of the USEPA:

A. Categorize the Dunka Mine as a major NPDES facility, permits for which are subject to USEPA oversight.

B. Reissue NPDES/SDS permits for the Dunka Mine, voiding variances from the year 2000 permit and imposing discharge limits as follows:
   - Limits on metals (copper, nickel, cobalt and zinc) for all seeps and outfalls in compliance with federal and state chronic (not acute) water quality standards;
   - Limits on mercury, hardness and specific conductance in compliance with federal and state surface water quality standards;
   - Additive aquatic toxicity standards including cobalt as well as copper, nickel and zinc, based on background hardness of receiving waters;
   - Sulfate limits based on the presence of wild rice in receiving waters.

C. Require Cliffs Erie L.L.C. to take immediate steps to mitigate toxic discharge and make changes that will reasonably result in compliance with state and federal water quality standards, including but not limited to the following:
   - Operation of the on-site active water treatment plant to treat seepage water;
   - Reshaping of stockpiles so that they can be completely covered by a synthetic membrane to reduce leaching from precipitation;
   - Escrow of funds to allow for active water quality treatment, maintenance and periodic replacement of the synthetic membrane over waste rock stockpiles for at least 200 years.

BACKGROUND

From its inception, enforcement of water quality standards at the Dunka Mine near Babbitt, Minnesota has posed unique challenges due to the presence of Duluth Complex sulfide-mineralized rock at the mine. Although the Erie Mining Company and later LTV Steel Mining Company operated an open-pit taconite mine rather than a metallic sulfide mine, at Dunka their mine encountered and excavated millions of tons of sulfide rock to mine the underlying taconite.

In the mid-1970's, the Minnesota Environmental Quality Board (MEQB) and the MPCA

determined to refrain from water quality enforcement at the Dunka Mine until Minnesota had completed its *Regional Copper Nickel Study 1976-1979* and studied the chemistry of leaching, including toxicity and mitigation.[1] Excavation of sulfide-mineralized rock was recognized to pose distinctive problems.

Dunka Mine waste rock stockpiles drain into the waters of Unnamed Creek and Flamingo Creek, which flow into Bob Bay of Birch Lake. Although LTV requested that Unnamed Creek be classified as an industrial ditch (class 7), the MPCA, MDNR, and USEPA have determined Unnamed Creek should be classified under Minnesota Rules as Minnesota water. Unnamed Creek, Flamingo Creek and Birch Creek are class 2B, 3C, 4A, 4B, 5 and 6 waters under Minn. R. 7050.0430.

Birch Lake drains into the Kawishiwi River, which is classified as a 1B, 2Bd, 3C water. Minn. R. 7050.0470, Subp. 2(A)(29). The waters from the Kawishiwi River ultimately discharge to surface waters in the Boundary Waters Canoe Area, and from there to Canada's Quetico National Park. The watershed is part of the Rainy Lake Basin, is considered international waters and is under International Joint Commissions purview.

DISCUSSION

1. The NPDES/SDS Permit for the Dunka Mine Should be Considered a Major Permit.

In May of 1975 the first NPDES/SDS permit for the Dunka Mine was issued. At that time it was considered to be a "minor" permit.[2] This may have been because the mine was assumed to be similar to other taconite mines in the district, where discharges were fairly well understood. Major permits receive higher levels of USEPA permit and enforcement review, while minor permits are almost wholly left to states for permitting and enforcement.

In 1990, the USEPA included toxic releases in their evaluation of major permits; since then, the rating worksheet for NPDES permits includes toxic discharge considerations.[3] A facility discharging to surface water with an EPA rating score of more than 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact is a "major permit."

Minnesota Rules provide that a facility with an actual or potential discharge of toxic pollutants under section 307(a)(1) of the Clean Water Act, United States Code, title 33, section 1317 must be considered a "major NPDES facility." Minn. R. 7002.0220, subp. 4(D). The list of toxic pollutants under section 307(a)(1) is provided in USEPA regulations at 40 CF.R. §401.15. Copper, mercury, nickel and zinc and compounds containing these metals are explicitly listed by the USEPA as "toxic pollutants." 40 CF.R. §401.15(22), (45), (47), (65).

The MPCA has been aware of discharge of toxic metal pollutants at the Dunka Mine since at least 1976.[4] Although it is basic to the NPDES program that permits and effluent

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[1] MEQB Letter, Paul Eger to Abner Fisch, MPCA (Dec.14, 1976) ("Eger 1976 Memo"), Attachment A.
[2] USEPA, email response to Bruce Johnson re FOIA Request, #05-FOI-01595-10 (Oct. 25, 2010) Attachment B.
[3] USEPA, James Elder, *New NPDES Non-Municipal Permit Rating System* (June 27, 1990) and rating http://www.epa.gov/npdes/pubs/owm0116.pdf (last visited Mar. 8, 2011)("USEPA NPDES Memo").
[4] Eger 1976 Memo, *supra*.

limitations be reviewed and reissued every five years,[5] the USEPA has no records that the status of the Dunka permit has ever been reevaluated to determine whether it is a major permit under current rating systems.[6]

Based on its discharge of toxic pollutants, the MPCA should rate the Dunka Mine NPDES/SDS permit as a major NPDES facility, and the USEPA should exercise oversight in developing new NPDES/SDS requirements in compliance with the Clean Water Act. The Discussion below demonstrates that this oversight would demonstrate that, in addition to questions of non-compliance addressed in the Consent Decree, the underlying Dunka Mine NPDES/SDS permit fails to comply with federal and state rules implementing the Clean Water Act.

2. The NPDES/SDS Permit for the Dunka Mine Should Be Rewritten to Cover all Pollutants and all Seeps.

Under the Clean Water Act, it is "national policy that the discharge of toxic pollutants in toxic amounts be prohibited." 33 U.S.C. § 1251. Copper, nickel, zinc and mercury are "priority toxic pollutants" under Section 304(a) of the Clean Water Act. Federal regulations enacted pursuant to the Clean Water Act require NPDES permits to include effluent limitations for every individual pollutant that causes, has the reasonable potential to cause, or contribute to and excursion above numeric water quality criterion. 40 C.F.R. § 122.44 (d)(l)(iii). The Dunka Pit NPDES/SDS permit fails to comply with the Clean Water Act and these implementing regulations.

In 1976, Dunka Mine waste rock seepages were determined to contain 10 to 10,000 times background levels of copper (Cu), nickel (Ni), cobalt (Co) and zinc (Zn). Total hardness, specific conductivity, and sulfate were found to exceed water quality standards, while some seepages were pH neutral and some had acid pH. Even where Dunka seepages were in a near neutral range for pH, seepages discharged nickel, cobalt, copper and zinc above biologically toxic levels. Nickel was the major trace metal discharged from the seeps.[7]

Since 1978, Dunka Mine stockpile metal releases have been tested by MPCA and others using bioassays and have been determined to be toxic.[8] Both Unnamed Creek and Bob Bay of Birch Lake have documented impacts on their natural biological characteristics, including elevated concentrations of metals in the fish, clams, and plants.[9] These impacts are measurable more than three miles from the farthest Dunka seepages.

Even now, 32 years after the completion of Minnesota's *Regional Copper Nickel Study 1976-1979*, the current Dunka NPDES/SDS permit limits copper, nickel, cobalt and zinc at only three of the five outfalls from the waste rock piles and fails to include cobalt in additive aquatic toxicity calculations. The permit sets no limit for mercury, hardness or specific conductance and, as discussed separately in section 5 of this Discussion, sets no sulfate limit despite discharge into wild rice waters. *See* Dunka Mine NPDES/SDS permit *MN0042579.*

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[5] *See* U.S. EPA NPDES Permit Program Basics Frequently Asked Questions, available at http://cfpub.epa.gov/npdes/faqs.cfm?program_id=45 (last visited Mar. 8, 2011).
[6] USEPA, FOIA Request, #05-FOI-01595-10, Oct. 25, 2010 phone response to B. Johnson.
[7] MDNR, *Environmental Leaching of Duluth Gabbro In Laboratory and Field Conditions; Oxidative Dissolution of Metal Sulfide and Silicate Minerals,* DNR, 1980, pp. 191 & 202 ("MDNR 1980"), available from authors on request.
[8] MPCA Memo, Jerry Flom to Curt Sparks, "Mine Dump Seeps," Sept. 1, 1988, Attachment C.
[9] MPCA Memo, Mark Schmitt to Carri Lohse, "Birch Lake Fish Tissue Data," July 26, 1985, Attachment D; MPCA Memo, Virginia Reiner to Ken Haberman, "Bob Bay Monitoring," Jan. 5, 1984; Attachment E.

After the MPCA and MEQB agreement not to enforce discharge limits on the Dunka Mine until completion of the *Regional Copper Nickel Study,* no subsequent permits contained discharge limits for copper (Cu), nickel (Ni), cobalt (Co), zinc (Zn), hardness, sulfates or specific conductance for an additional 15 years. Only after the Dunka Mine closed in September 1994 did the September 30, 1994 permit establish a few discharge standards and compliance locations. Three out of the five outfalls: 040 (Seep EM-8), 060 (seep W2-3d), and 050 (seep W-1d) were given limits for Cu, Ni, Co, Zn. No limits were set for mercury, hardness, sulfates or specific conductance.

The most recent year 2000 NPDES/SDS permit for the Dunka Mine changed the 1994 permit's approach of using single standards for metals to an additive model, as allowed in Minn. R. § 7050.0222 Subp.7. The 2000 permit used additive calculation values for copper, nickel and zinc, applying a maximum hardness value of 400 mg/L. The permit set a cobalt limit of 50 ug/L,[10] but did not include cobalt in its additive toxicity calculation.

Cobalt's aquatic toxicity does not diminish with increased hardness, but is solely toxicity-based. Minn. R. § 7050.0222. Although cobalt discharge from various seepages at the Dunka Mine have been documented above chronic surface water quality levels (5 ug/L) and even above the level of 50 ug/L set by the MPCA in the 2000 NPDES/SDS permit,[11] the MPCA's Dunka Mine permit did not include cobalt in additive calculations to protect aquatic species from toxic metals. This omission makes any toxicity assessment under the permit incomplete and inaccurate.

The most recent NPDES/SDS permit for the Dunka Mine also failed to place permit limits for mercury. Both Birch Lake and the Kawishiwi River, receiving waters for the Mine, are impaired waters for mercury. Minnesota Rules establish a limit of 0.2 parts per million of mercury in edible fish tissue, Minn. R. § 7050.0220, and Minnesota's Statewide TMDL sets a water column water quality standard for mercury in the Northeast Region of 1.3 ng/L.[12] Minnesota's approved statewide TMDL includes the Dunka Mine in the Northeast Region to which this 1.3 ng/L limit applies.[13] DMR summary data suggests that even discharges from the Dunka Mine's "treatment" wetland have exceeded this level.[14]

Minnesota water quality standards limit hardness in Class 3B waters to 250 mg/L. Minn. R. § 7050.0223, Subp. 3. Under Minnesota Rules, exceedance of this hardness standard is among the conditions "indicative of a polluted condition which is actually or potentially deleterious, harmful, detrimental, or injurious with respect to the designated uses." Minn. R. § 7050.0223, Subp. 1. According to the *Regional Copper Nickel Study*, background hardness conditions in ambient waters in northeastern Minnesota range from 2 to 45

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[10] The MPCA Dunka Mine permit, MN00042579 pp. 8, 9, sets a cobalt standard of 50 ug/L, rather than the 5 ug/L chronic standard that should be applied based on flow levels, as explained in section 4 of this discussion.

[11] MPCA discharge monitoring reports (DMR) for MN00042579, for example, indicate SD009 (Seep X) cobalt discharge exceeding 100 ug/L to the "treatment" wetland in 2009; SD008 (Seep I) regularly exceeding 5 ug/L, with one sample as high as 101 ug/L.

[12] MPCA, *Strategy Framework for Implementation of Minnesota's Statewide Mercury TMDL*, July 7, 2008, p. 23, Appendix 1 to MPCA, *Implementation Plan for Minnesota's Statewide Mercury Total Maximum Daily Load* (Oct. 2009) http://www.pca.state.mn.us/index.php/view-document.html?gid=11481 (last visited Mar. 8, 2011).

[13] MPCA, *Minnesota Statewide TMDL Final*, March 27, 2007, p. vii, http://www.pca.state.mn.us/index.php/view-document.html?gid=8507 (last visited Mar. 8, 2011).

[14] *See e.g.* 2009 DMR for Dunka Mine, MN00042579, Surface Discharge Station SD007 (Seep EM-8 (041) Wetland Trmt Dschrg), average mercury of 2.2 ng/L.

mg/L.[15]

The hardness measured in Dunka Mine seepages ranges between 1000 to 2000 mg/L.[16] Yet, the MPCA has failed to set limits for Dunka Mine hardness, even in the most recent 2000 permit. Given that Dunka Mine seepages are permitted to discharge over one million gallons per day (NPDES/SDS Permit MN00042579, p. 3), failure to limit hardness from Dunka seeps could have a significant impact on receiving waters. The Dunka Mine NPDES/SDS permit also sets no limit for specific conductance.

Minnesota's *Regional Copper Nickel Study* defined specific conductance as follows:

> Specific conductance is a measure of water's ability to conduct electrical current, which in turn is the result of the presence of charged ionic species. In undisturbed igneous basins, characterized by insoluble rock, weathering is expected occur slowly. This should be reflected in low concentrations of dissolved ionic species and, consequently, low conductivity levels. This pattern was observed in the Study Area. Sites downstream from disturbed areas had median specific conductance levels almost six times higher than background sites.[17]

Peer-reviewed literature concludes that major ion imbalances can produce toxic effects in bioassays.[18] Plant osmotic balances can be sensitive to dissolved ionic species. Elevated charged ionic species such as sulfate, calcium, magnesium, potassium, sodium, chlorides, heavy metals and other combinations of ions, individually or in aggregate, can disrupt plants' osmotic balances, stunting plant growth or killing plants.

Minnesota Rules recognize that significant ecological damage can result from elevated specific conductance levels. A specific conductance limit of 1,000 micromhos per centimeter (μmhos/cm) at 25 degrees Centigrade is applicable to classes 2B, 2C, or 2D; 3A, 3B, or 3C; 4A and 4B; and 5 surface waters. Minn. R. §7050.0224, subp. 5a (A)(17). The use of conductivity for dissolved ionic species and osmotic balances is analogous to the MPCA's use of the additivity model for toxic metals; both are established to protect the health of aquatic systems.

Overall specific conductance can be demonstrated with a simple and inexpensive test. Historically, Dunka Mine seepages have routinely exceeded the conductivity standard of 1000 umhos/cm, ranging as high as 4250 umhos/cm.[19] Yet, even the most recent NPDES/SDS permit for the Dunka Mine fails to set a limit for specific conductance.

In compliance with 40 C.F.R. 122.44(d)(1)(iii), which requires NPDES permits to include effluent limitations for every pollutant that causes or contributes to an excursion above a numeric water quality criterion as well as the Minnesota Rules specifically identified above, the Dunka Mine NPDES/SDS permit should be rewritten to include all seeps, to include cobalt in its additive toxicity model, and to set limits for mercury, hardness and specific conductance.

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[15] Thingvold D., *Water Quality Characterization of the Copper Nickel Research Area* (Dec. 1979) Table II; Legislative Library # TN443.M6M55#153, ("Thingvold 1979").
[16] *See e.g.* 2009 DMR for Dunka Mine, MN00042579.
[17] Thingvold 1979, *supra*, p. 18.
[18] See e.g. "Major Ion Toxicity in Effluents: A Review With Permitting Recommendations," *Environmental Toxicology and Chemistry*, Vol. 19, No.1 pp. 175-182, 2000; "Toxicity of Total Dissolved Solids Associated With Two Mine Effluents To Chironomid Larvae And Early Life Stages of Rainbow Trout," *Environmental Toxicology and Chemistry*, Vol. 19, No. 1 pp. 210-214, 2000.
[19] See Dunka Mine DMR, MN00042579; for example, the 7/31/90 DMR for seep 40500 (W1-d).

3. The NPDES/SDS Permit for the Dunka Mine Should Reduce Limits for Copper and other Metals Based on Background Hardness of Receiving Waters.

Water quality standards in relation to hardness in Minnesota have been based on USEPA's last revised National Ambient Water Quality Criteria (AWQC) set in 1985 and adopted by MPCA in 1990. These criteria are published by EPA under requirements of Section 304(a) of the Clean Water Act and analytical methods for the determination of whole effluent toxicity (WET) are provided in 40 C.F.R. §136. In 2004, the USEPA published guidance on the establishment of whole effluent toxicity limits in permits. The USEPA recommended that dilution water for WET limits be "uncontaminated" receiving water or lab synthetic of similar pH and hardness.[20]

Data taken from the *Regional Copper Nickel Study* suggests that uncontaminated receiving water near the Dunka Mine would have an average hardness of approximately 27 mg/L.[21] Yet, the hardness value used by MPCA in calculating the limits for Dunka Mine discharge for copper and zinc appears to be 400 mg/L and the hardness for nickel appears to be around 200 mg/L.[22] These hardness values fall far outside the uncontaminated natural conditions of the area's receiving waters.

Dunka Mine waste rock seepages above 1000 mg/L, as described previously, suggest that contamination from the leaching process at the mine is the source of any hardness in receiving waters exceeding historical levels. It is well known that rock surface exposure to precipitation leaches cations, increasing hardness levels. Natural water hardness in the area is predominantly from calcium, with approximately 20 percent from magnesium and other minor sources.[23] Leachate from the Dunka Mine has a different chemical composition as well as a higher hardness level than uncontaminated waters. For example, Seep 3 from the Dunka Mine has had hardness calculated to be 1596 mg/L, based almost 50 percent on magnesium leachate.[24]

Setting Dunka Mine copper, zinc and nickel levels or whole effluent toxicity limits based on a hardness value of 200 or 400 mg/L conflicts with the practice of basing standards on uncontaminated receiving water and inappropriately elevates the allowable concentration of metals in the discharges. A particular risk to the aquatic environment is posed by nickel discharge, since nickel does not form permanent or tight bonds with elements in hard water that might precipitate the nickel or detoxify its effects.[25] If large volumes of lower hardness surface water are mixed with mine leachate, the stability of nickel in the aquatic ecosystem cannot be assumed.

The NPDES/SDS permit should use background hardness levels, rather than hardness resulting from Dunka Mine leachate contamination to set whole effluent toxicity permit

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[20] USEPA, *National Whole Effluent Toxicity (WET) Implementation Guidance Under the NPDES Program,* p. 28, (Dec. 28, 2004) http://water.epa.gov/scitech/swguidance/methods/wet/upload/2004_12_28_pubs_wet_draft_guidance.pdf (last visited Mar. 8, 20110.

[21] Thingvold 1979, *supra*, Table p. 240, pp. 18-19, Tables 13 & 14. Hardness can also be calculated from Minnesota *Regional Copper Nickel Study 1976-1979 Volume 1*, Executive Summary, August 31, 1979, Table 4, http://www.leg.state.mn.us/docs/pre2003/other/792632.pdf (last visited Mar. 8, 2011).

[22] Compare the numerical limits on p. 15, Dunka Mine NPDES/SDS permit MN00042579 with Minn. R. §7050.0222, subp. 2 and Minn. R. 7050.0205 subp. 2 and 13.

[23] USFS, Superior National Forest, BWCA Lake Data Analysis Report, Bonnie Dovenmuehle, Forest Hydrologist, June 1980, p. 6.

[24] MDNR 1980, *supra*, p. 209.

[25] *Id*., p. 202; Thingvold 1979, *supra*, pp. 56-57.

levels for copper, zinc and nickel.

4. Dunka Mine NPDES/SDS Permit Limits for Copper and other Metals Should Be Reduced to Comply with Chronic Standards at the Point of Release.

In addition to using an incomplete additive model for aquatic toxicity and artificially elevating the whole effluent toxicity level by considering hardness pollution from the Dunka Mine, the 2000 Dunka Mine NPDES/SDS permit improperly relaxed toxicity standards by using acute rather than chronic toxicity limits.

The Dunka Mine NPDES/SDS permit calculates toxicity limits using the Final Acute Value (FAV) although MPCA internal documents suggest that water quality staff recognized that "standards derived from chronic criteria would be controlling."[26]

The Final Acute Value is only applicable where receiving waters have sufficient flows to dilute the impact of toxic effluent. Minnesota Rules require that water standards be met when a discharge *enters* waters of the state, in this case where seepages are released to Unnamed Creek and Flamingo Creek. The "7Q10" value reflects the stream flow that occurs over 7 consecutive days and has a 10-year recurrence interval period, or a 1 in 10 chance of occurring in any one year. State Rules do not allow mixing zones when the receiving water has a 7Q10 of zero. Minn. R. 7050.0210, subp. 7. Where 7Q10 stream flows are insufficient to dilute effluent, a Chronic Standard (CS) must apply. Minn. R. 7050.0222, subp. 7(C).

Currently, four of the Dunka Mine seepages discharge into Unnamed Creek[27] and approximately one-third of the 4.25 square mile Unnamed Creek sub-watershed is covered with waste rock stockpiles.[28] Unnamed Creek has a 7Q10 water flow of zero.[29]

One of the Dunka Mine seepages drains into Flamingo Creek, an intermittent stream that also discharges into Birch Lake. Flamingo Creek also has a 7Q10 water flow of zero. Since the 7Q10 of both Unnamed Creek and Flamingo Creek are zero, the Dunka Mine NPDES/SDS permit must establish toxicity based on a Chronic Standard.

The Dunka Mine Case Study prepared by the MDNR in August 2010 reflects the impacts on water quality standards resulting from setting an artificially high hardness level and substituting an acute limit for the appropriate chronic water quality standard. For example, in the case of copper, the chronic water quality standard at even the hardness level of 50 mg/L would be 6.4 ug/L, while the acute water quality standard at 400 mg/L would be 126 ug/L, *nearly 20 times as high*.[30] Chronic water quality standards at actual background hardness levels for these waters (approximately 30 mg/L) would be yet more stringent.

The 2000 Dunka Mine NPDES/SDS did not use valid procedures to determine compliance with the Clean Water Act as required by 40 C.F.R. 122.44 (d)(l)(ii) and must be revised to set appropriate chronic standards for discharge of toxic metals.

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[26] MPCA Memo, Carri Lohse to Mark Tomasek, "Standards Information Request from Erie Mining Company," Feb. 28, 1985, Attachment F.
[27] See MDNR, Dunka Mine Case Study (August 2010), ("MDNR Dunka Case Study"), Figure 1-1, available at http://www.itrcweb.org/miningwaste-guidance/cs_dunka_mine.htm (last visited Mar. 8, 2011)
[28] See Thingvold 1979, *supra*, Table 1 regarding watershed size and see Attachment G, Schematic of Dunka Mine waste locations, taken from MDNR Case Study, *supra*.
[29] MPCA Memo, Carol Sinden to Richard Clark, "7Q10 Determinations for Unnamed Creek to Bob Bay," Feb. 1, 1991, Attachment H.
[30] MDNR Dunka Case Study, *supra*, Table 5-1, Attachment I.

5. The NPDES/SDS Permit for the Dunka Mine Should Limit Sulfate Discharge in Compliance with the Wild Rice Sulfate Water Quality Standard.

The Dunka Mine NPDES/SDS permit contains no limits for sulfate discharge, although both the Kawishiwi River and Birch Lake contain stands of wild rice. An MDNR conservation officer in Ely recently confirmed that Birch Lake bays upstream of Bob Bay (Kangas and Kramer), where Dunka Mine receiving waters enter Birch Lake, have productive stands of wild rice and that the Kawishiwi River also contains wild rice.[31]

It is highly likely that sulfate discharge from the Dunka Mine to Birch Lake and the Kawishiwi River would exceed Minnesota's water quality standard limiting sulfate to 10 mg/L in wild rice waters during periods when the rice may be susceptible to damage from high sulfate levels. Minn. R. 7050.0224. The rate of sulfate release from the Dunka Mine waste rock stockpiles has been relatively consistent over the past 30 years, averaging approximately 1750 mg/L of sulfates.[32] Most of the sulfate data from Dunka Mine seepage ranges from 1000 to 2500 mg/L of sulfate.[33] Releases of sulfate do not demonstrate seasonal variations except in a couple of months in the winter when everything freezes.

Failure to set a sulfate water quality limit in the Dunka Mine NPDES/SDS permit is inconsistent with Minnesota Rule 7050.0224 and with federal regulations requiring permits to include effluent limitations for every individual pollutant that causes, or contributes to an excursion above a numeric water quality criterion. 40 C.F.R. § 122.44(d)(l)(iii).

6. The NPDES/SDS Permit for the Dunka Mine Has Expired - Variances Should be Disallowed and a New Permit Issued.

USEPA limits the effective term of state NPDES/SDS permits to five years. 40 C.F.R. §122.46 (a). The last permit issued by the MPCA for the Dunka Mine was on August 3, 2000. By its own terms, the permit expired June 30, 2005.

Minnesota law also limits variances from water quality standards to a term of three years and requires both agency and public review at least every three years. Minn. R. 7050.0190, subp. 3. The Dunka Mine NPDES/SDS permit explicitly allowed variances from state water quality standards for discharges from two of the wetland "treatment" systems (outfalls SD009 (Seep X) and SD008 (Seep 1). The agency's rationale for these variances was provided in a June 2000 Public Notice with a comment period ending on July 17, 2000.[34] No public review of the variances contained in the Dunka Mine NPDES/SDS permit has taken place since 2000.

The MDNR Case Study suggests that the use of an acute, rather than a chronic water quality standard for Dunka Mine discharge should also be considered as a variance,

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[31] Personal conversation, Bruce Johnson and MDNR Conservation Officer Marty Stage from Ely on or about Dec. 30, 2010.
[32] Eger, P. and Lapakko, K, MDNR, *Environmental Leaching of Duluth Gabbro under Laboratory and FieldConditions: Oxidative Dissolution of Metal Sulfide and Silicate Minerals*, (1980), p. 196. Median average sulfate seepages from Dunka stockpiles were approximately 1250, 2500, 1500 mg/L, comparable to MPCA's more recent DMR data for Dunka Mine MN0042579.
[33] *See e.g.* MPCA DMR Summary Reports for Dunka Mine, MN0042579, SD 005, SD 007, SD 009 for 2007 and 2008.
[34] Public Notice of Intent to Reissue NPDES/SDS Permit 0042579, Public Comment Period June 16, 2000 – July 17, 2000, Attachment J.

subject to public review after three years. The Case Study explains:

> Originally, permit standards for the mine were based on chronic toxicity values, which were up to an order of magnitude lower than acute values. When the company went bankrupt several years after the mine had closed, it sought a variance for several of the discharges. The new permit based on FAV included biological monitoring.[35]

The Dunka Mine NPDES/SDS permit is long overdue for review and reissuance. Both explicit variances for seeps contained in the permit and less obvious variances due to application of an acute water quality standard must be subjected to USEPA oversight and to public review as well as to MPCA scrutiny.

7. Measures to Reduce Non-Compliance, Including Operation of the Water Treatment Plant and Redesign of Waste Stockpiles Should be Immediately Implemented.

Review of documents pertaining to the Dunka Mine suggests that there are measures that would be available immediately to reduce discharge of toxic pollutants and exceedance of water quality standards.

The Dunka Mine currently provides passive treatment of seeps through constructed wetlands. The Dunka Mine also has a lime precipitation plant on site for active water treatment, but the NPDES/SDS permit only requires its use as "backup treatment" if monitoring at outfalls SD007, SD2008 or SD009 indicates that additive toxicity effluent limits are being exceeded or at the determination of the MPCA Commissioner. (NPDES Permit MN00042579, pp. 4, 16, 17). Despite continued violations of permit limits, this plant is not in operation and best information suggests that it has not operated for at least two decades.

The MDNR Dunka Case Study explains that rejection of active water quality treatment was a choice made by Cliffs Erie based purely on operating cost considerations:

> In 1986, LTV conducted a preliminary feasibility study to determine the best method to mitigate the drainage problem at the Dunka Mine, examining both active treatment systems (lime treatment, reverse osmosis) and passive alternatives (limiting infiltration into stockpiles, wetland treatment) (Barr Engineering 1986). An active treatment plant which would treat all the stockpile drainage was projected to have a capital cost of $8.5 million and an annual operating cost of $1.2 million. The passive alternative was projected to cost $4 million to construct but only $40,000 in annual maintenance. Since mine drainage problems can persist for over 100 years, LTV decided to pursue passive alternatives.[36]

The MPCA's failure to require operation of the Dunka Mine water treatment plant both results in excursions above water quality limits and provides misleading information to future permittees as to the costs of protecting water quality from ongoing acid mine drainage. Consistent and continuous use of an active water treatment system should be required for Dunka Mine discharge.

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[35] MDNR Dunka Case Study, *supra*, p. 8.
[36] MDNR Dunka Case Study, *supra*, p. 2, emphasis added.

Treatment in constructed wetlands reduces some toxic metals discharge, but wetlands removal is inconsistent and as much as 80 percent of nickel from Dunka Mine leachate may remain.[37] Capping of stockpiles to reduce infiltration is a more effective way to reduce leachate,[38] and is also required by Minnesota mineland reclamation rules.

The majority of the Dunka Mine waste rock was stockpiled using methods that were commonly used in taconite mining for non-sulfide waste rock. As explained in the MDNR Dunka Case Study, this design does not facilitate capping:

> [T]he piles were constructed to place the maximum amount of material in the minimum area. Stockpiles were generally built in 10-15 m lifts with 45° side slopes. Only the flat top portions of the stockpiles could be economically covered.[39]

Regulators have not required Cliffs Erie to reshape the stockpiles so that capping can minimize infiltration through side slopes. In addition, local availability of clay is limited, and clay was rejected in favor of soil for covering the waste rock stockpiles due to transportation costs.[40]

In order to achieve compliance with water quality standards and to accurately determine the costs of mine reclamation in sulfide-bearing rock, MPCA should require operation of active water treatment and work with MDNR to require stockpile redesign and capping of stockpiles with non-permeable material to reduce infiltration.

CONCLUSION

NPDES/SDS permits protect waters of the United States and waters of the State of Minnesota from unacceptable levels of pollutants. As detailed above, the MPCA's existing NPDES/SDS permit for the Dunka Mine fails to provide this protection. By limiting the scope of permit coverage and misapplying water quality standards, these permits may create a misleading impression of compliance or that non-compliance has a limited scope.

Minnesota's continuing lack of appropriate NPDES/SDS limits for copper, nickel, zinc, cobalt, mercury, hardness, specific conductance and sulfates from the Dunka Mine results in failure to protect the waters of Unnamed Creek, Flamingo Creek, Birch Lake and the Kawishiwi River. In addition, these practices could set precedent for much larger scale sulfide mines proposed in the Duluth Complex formation. Providing implicit variances by deviating from appropriate application of water quality standards is a practice that must be rejected as contrary to the Clean Water Act and misleading to the public.

In addition, failure to require Cliffs Erie to utilize active water quality treatment, reshape and cover stockpiles and take such other measures to achieve compliance creates a false understanding of the costs of meeting water quality standards. The MPCA, MDNR and proponents of sulfide mine projects need accurate and complete information as to the

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[37] MDNR, *Long Term Wetland Treatment of Mine Drainage at LTV Steel Mining Company's Dunka Mine*, December 2000, p. vi, Executive Summary attached to MDNR letter from Paul Eger to Pat Cary, MPCA (Jan. 10, 2001), Attachment K, "Nickel removal within the pretreatment system averaged only 15-20%, and occurred primarily in the vertical down-flow section of the system. The major reduction in nickel load appears to be related to capping of the stockpile, and not to removal within the pretreatment system."
[38] *Id*.
[39] MDNR Dunka Case Study, *supra*, p. 3.
[40] *Id*.

costs of meeting federal and state water quality standards over a period of hundreds if not thousands of years during which mine drainage problems can persist.

Before NPDES/SDS permits are proposed for new proposed mining incursions into sulfide-bearing rock, the MPCA and USEPA must review historic discharge and permitting at the Dunka Mine, establish rigorous and fair application of water quality standards, subject permitting and variance proposals to public scrutiny and require implementation of measures that would bring discharge into compliance with federal and state rules.

We would welcome the opportunity to discuss our issues and concerns with you. Mr. Johnson can be reached at 763-444-4579 or bmjohnson@sprintmail.com and Ms. Maccabee can be reached at 651-646-8890 or pmaccabee@justchangelaw.com.

Thank you for your consideration of our comments and suggestions.

Sincerely yours,

Bruce L Johnson

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Enclosures