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Mr. Paul Moyer

Minnesota Department of Health

625 Robert Street North

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Saint Paul, MN 55164-0975

Paul.Moyer@state.mn.us

RE: Proposed Amendments to Rules Governing Health Risk Limits for Groundwater,
Minnesota Rules, Chapter 4717, Part 7860 and Part 7500.

Dear Mr. Moyer:

This letter provides official comments on behalf of WaterLegacy concerning the Proposed Amendments to Rules Governing Health Risk Limits for Groundwater. WaterLegacy is a grassroots organization founded to protect Minnesota's water resources and the communities, human and biological, that depend on them. Our area of focus to date has been on sulfide mining activities, so our comments pertain only to the proposed changes that are significant to protection of drinking water from the pollution generated by sulfate mining.

On behalf of WaterLegacy, we strongly oppose the proposal by the Minnesota Department of Health ("MDH") to repeal the Health Risk Limit ("HRL") pertaining to manganese, Minn. R. 4717.7500, Subp. 61, and preserve only informal risk assessment "advice" for this important pollutant. Manganese in drinking water poses a human health risk for neurological symptoms that has been well-documented by the United States Environmental Protection Agency ("EPA") and acknowledged by the MDH.

We believe that the current HRL of 100 ug/L for chronic exposure to manganese in drinking water, rather than a 300 ug/L limit, is appropriately protective of human health, given the increased susceptibility to excessive manganese of infants, elderly people and persons with reduced liver function.

WaterLegacy, further, strongly opposes the MDH proposal to address health concerns about neurological impairments caused by manganese in informal risk assessment "advice" rather than a Health Risk Limit. HRLs are the legal mechanism provided in Minnesota statutes and rules to address pollutants that impair human health. This issue is not academic, but highly salient to proposals for copper sulfide mining activities proposed near Minnesota drinking water wells and bodies of water used for municipal water supplies.

The Draft Environmental Impact Statement for the PolyMet NorthMet mine documents elevated manganese in groundwater, surface water and drinking water wells downstream of

the LTVSMC tailings basin. Discharge of manganese from various sources at the PolyMet mine and tailings basin could exacerbate contamination in drinking water if State rules that protect public health were to be repealed.

WaterLegacy takes the position that the PolyMet sulfide mine and any subsequent hard rock mining projects must conform to State regulations to protect human health and water ecosystems. Weakening or eliminating standards to ease the environmental review or permitting process is contrary to the public interest and lacking in integrity.

1. Manganese in Drinking Water Poses a Human Health Risk.

The EPA has advised that adverse health effects can be caused by chronic over-exposure to manganese and that manganese deficiency is rare because manganese is present in many common foods. The EPA has concluded that the primary target organ for health effects from manganese over-exposure is the nervous system and that epidemiological studies associate adverse neurological effects with exposure to manganese from drinking water. (U.S. EPA, *Drinking Water Health Advisory for Manganese* (2004), hereinafter “US EPA 2004,” p. 1.)

One epidemiological study cited by the EPA describes adverse neurological effects, including decreased performance in school and on neurobehavioral examinations, in 11- to 13-year-old children exposed to excess manganese through ingestion of contaminated water and consumption of food made of wheat fertilized with contaminated water. The average manganese concentration of the drinking-water was 0.241 mg/L for the exposed area compared to the control level of 0.04 mg/L. (US EPA 2004, p. 16)

Other studies cited by the EPA suggest that elevated manganese exposure is associated with neurological syndromes characterized by muscle atrophy and weakness, and by ataxia (lack of muscle coordination) and oculomotor disturbances (impairment of eye function). Studies have also associated manganese with amyotrophic lateral sclerosis (ALS) and with neurotoxicological symptoms that resemble Parkinsonism. (US EPA 2004, pp. 17, 31).

The Minnesota Department of Health recognized in 2008 that ingestion of manganese had a toxicological endpoint of “neurological effects” and that the Department’s provisional limit of 1000 ug/L (1.0 mg/L) for manganese was inadequately protective. (Manganese: Replacement of the 1997 Health Based Value for Manganese in Groundwater, available at <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/manganese.html>). High levels of manganese in drinking water are not just a matter of taste or aesthetic concern, but pose a risk of serious adverse health effects to the neurological system for children and adults.

2. The Limit of 100 ug/L for Manganese in Drinking Water is Appropriately Protective.

Minnesota’s current rules contain a 100 ug/L Health Risk Limit for manganese. Minn. R. 4717.7500, Subp. 61. Based on Minnesota law requiring a margin of protection for infants and children, this limit should be retained.

Minnesota's law requires that safe drinking water standards established or revised by the Commissioner of the Department of Health must "include a reasonable margin of safety to adequately protect the health of infants, children, and adults" and must specifically take into consideration the health outcome of "development of the brain and nervous system." Minn. Stat. §144.0751(a)(2).

The U.S. EPA 2009 Edition of Drinking Water Standards and Health Advisories includes a secondary drinking water regulation of 50 ug/L (0.05 mg/L) for manganese and a 300 ug/L (0.3 mg/L) chronic health-based limit for manganese in drinking water.

The EPA acknowledges that the oral toxicity data from which the health risk assessment has been derived is somewhat limited. (US EPA 2004, p. 31). Further, and particularly salient under Minnesota law, the EPA has documented concerns about increased susceptibility of certain populations, including children and infants. For infants younger than 6 months, the EPA advises that the chronic exposure level should apply even for an acute exposure of 10 days "because of the concerns for differences in manganese content in human milk and formula and the possibility of a higher absorption and lower excretion in young infants." (US EPA 2004, p. 2).

Considering both human and animal data, the EPA explained:

Manganese retention may be greater for young animals and infants due to the fact that the biliary system, the primary route of excretion, is not completely developed in human infants. . . . When considered together, these data indicate that human infants, at certain ages, may not have developed the capacity to completely excrete manganese following ingestion." (US EPA 2004, pp. 10-11, references omitted)

The EPA noted that the majority of studies have suggested that persons over 50 years of age are more susceptible to manganese neurotoxicity than the general population. (US EPA 2004, p. 20). The EPA summarized conditions that could increase sensitivity to manganese over-exposure:

Individuals that have an impaired excretion and increased retention would be sensitive to manganese toxicity. Reasons for such susceptibility are genetic make-up, developmental stage, age, health and nutritional status. First, individuals with decreased excretion or impaired liver function can be at risk from exposure to excess manganese because the liver is the main organ for excreting manganese. This group may include the elderly who may have declining organ function, the very young who may have immature and developing organs, and those with liver disease. (US EPA 2004, p. 20)

Given the sensitivity of various populations to manganese and the clear direction in Minnesota statutes to provide an adequate margin of protection for infants, children and adults, it is appropriate to retain the 100 ug/L (0.1 mg/L) health risk limit for manganese to

avoid adverse effects on the nervous systems of vulnerable infants, children and elderly persons.

3. Minnesota Rules Must Include a Manganese Health Risk Limit.

The suggestion that contaminants to drinking water known to have adverse effects on human health would no longer be reflected in Health Risk Limits is contrary to both Minnesota statutes and rules.

Minnesota statutes set a goal of preventing the degradation of ground water. Minn. Stat. 103H.001. In connection with this goal, Minnesota statutes require that Health Risk Limits be adopted by rules for substances degrading the groundwater, derived from U.S. EPA information among other sources. Minn. Stat. 103H.201, Subd. 1 and Subd. 2 (a). Minnesota statutes define Health Risk Limits as “a concentration of a substance or chemical adopted by rule of the commissioner of health that is a potential drinking water contaminant because of a systemic or carcinogenic toxicological result from consumption.” Minn. Stat. 103H.005, Subd. 3.

These statutes do not authorize the commissioner to repeal the HRL for a drinking water contaminant with systemic human toxicity as proposed with respect to manganese in the Statement of Need and Reasonableness (“SONAR”) and the Supplemental Explanation on Proposed Repeal of Guidance for Selected Groundwater Contaminants (“Supplemental Explanation”) in these Proposed Amendments to Rules.

Minnesota rules clarify that human health-based groundwater standards based on either cancer or noncancer health effects must be reflected in promulgated Health Risk Limits, whether the HRL will be used for regulatory or advisory purposes:

Health risk limits are for use by public agencies and private entities in Minnesota in determining whether groundwater, impacted by human activity, is subject to regulatory or advisory actions based on human health concerns. HRLs specify a minimum level of quality for water used for human consumption, such as ingestion of water, and do not imply that allowing degradation of water supplies to HRL levels is acceptable. Minn. R. 4717.7810, Subp. 2(B).

Minnesota statutes and rules require that health risk assessment advice be reflected in HRLs adopted in rules, not in some vague internal documentation that has no force of law. Adverse human health consequences of manganese in drinking water are clearly established in applicable EPA reports. To repeal the Health Risk Limit limiting this contamination and resulting neurological impairment is not only inadequately protective of human health; it is contrary to Minnesota law.

4. Protecting Drinking Water from Sulfide Mining Impacts Requires a Manganese HRL.

WaterLegacy’s concern about the proposed repeal of Health Risk Limits for manganese is not academic. It is based on clear evidence that mining projects, including the proposed PolyMet

NorthMet open pit mine, discharge levels of manganese that degrade groundwater quality and impair human health. Environmental review documents from the PolyMet Project also underscore the importance of reflecting limits on manganese in Health Risk Limits appropriately adopted and retained in rules.

The PolyMet mine site would impact groundwater and municipal drinking water sources. PolyMet's proposed tailings disposal site – the LTCSMC Tailings Basin -- would also be upgradient from numerous residential wells.

The PolyMet NorthMet Draft Environmental Impact Statement (“PolyMet DEIS”) reports that the LTVSMC Tailings Basin has contaminated groundwater and surface water with manganese. Downgradient monitoring wells in the surficial aquifer have a mean concentration of 1,637 ug/L of manganese and downgradient residential drinking water wells have a mean concentration of 579 ug/L, with a range as high as 4,710 ug/L. (PolyMet DEIS, p. 4.1-15, Table 4.1-8). Surface discharges from various seeps at the LTVSMC Tailings Basin have average manganese levels of 3,039 ug/L, 631 ug/L and 100,192 ug/L. Manganese concentrations from surface discharge at the Tailings Basin range as high as 2,950,000 ug/L. (PolyMet DEIS, p. 4.1-43, Table 4.1-30).

The PolyMet DEIS predicts that manganese concentrations along the Embarrass River are likely to range between 453 ug/L and 455 ug/L. (PolyMet DEIS, p. 4.1-158, Table 4.1-84). Maximum magnesium concentrations in flow from the waste rock stockpiles on the mine site are predicted in deterministic modeling to be 900 ug/L for 50 to 2,000 years. (PolyMet DEIS, p. 4.1-80).

In addition to documenting existing and potential groundwater contamination from manganese as a result of mining activities, the PolyMet DEIS also suggests the importance of reflecting health-based standards in Health Risk Limit rules. In discussing what standards apply, the DEIS states, “Groundwater quality standards are USEPA primary (maximum contaminant levels) and secondary drinking water standards and MDH Health Risk Limits.” (PolyMet DEIS, p. 4.1-51). In considering the possibility that the Project would fail to comply with water quality standards, the DEIS similarly states, “Antimony, manganese, and nickel predicted to exceed USEPA primary Maximum Contaminant Levels (MCLs) or MDH Health Risk Limits, potentially for the long term at the Mine Site.” (PolyMet DEIS, p. S-8).

Eliminating the Health Risk Limit for manganese would have the effect of removing a health-based limit set to protect Minnesota citizens from industrial pollution. As the EPA explained in evaluating the risks of manganese contamination, “This report indicates a median manganese level of 16 ug/L in surface waters, with 99th percentile concentrations of 400 to 800 ug/L (Leahy and Thompson, 1994; USGS, 2001). Higher levels in aerobic waters are usually associated with industrial pollution.” (US EPA 2004, p. 4)

CONCLUSION

On the basis of the preceding discussion, WaterLegacy respectfully requests that the Minnesota Department of Health retain the 100 ug/L manganese Health Risk Limit. Given

uncertainties regarding the data and clear requirements in Minnesota statutes to provide a margin of safety to protect vulnerable populations, this standard should be retained to protect infants, children, elderly people and people with compromised liver function.

WaterLegacy further maintains that health risk assessment “advice” regarding manganese contamination in drinking water must be reflected in Health Risk Limits, according to the language of Minnesota statutes and rules. Our objection to repeal of health-based rules and use of some informal means of advice is not merely a formal legal objection. It is based on very real risks of removing rules that protect Minnesota drinking water from dangerous industrial pollution.

Finally, WaterLegacy is concerned that the repeal of manganese Health Risk Limits will be used to allow mining activities, including the PolyMet NorthMet sulfide mine to proceed without implementing designs and conditions that would protect drinking water from exceeding safe limits. To the extent that repeal of groundwater standards has the effect of easing an ongoing permitting process, WaterLegacy is concerned both about human health impacts and about the integrity of Minnesota’s regulatory process.

It is not feasible for WaterLegacy’s counsel to participate in a proposed hearing scheduled for December 8, 2010. If that date can be changed, we would request a hearing on the proposed rule change as it pertains to manganese.

Please do not hesitate to contact me if you have any questions regarding our comments.

Sincerely,

A handwritten signature in blue ink that reads "Paula J. Maccabee". The signature is written in a cursive, flowing style.

Paula Goodman Maccabee
Attorney for Water Legacy

cc: Nikita Moibi (nitika.moibi@state.mn.us)