

Situation:

- **North Star Manganese requests State for mineral leases on 800 acres northwest of Emily** (Map of requested area)
 - > Subsidiary of Crow Wing Power
 - > In the Pine River Watershed
 - > 3 miles from Little Pine Lake and the Whitefish Chain; 7 miles from Camp Knutson
 - > Manganese (Mn) is the twelfth most abundant mineral within the Earth.
 - > 2nd largest manganese deposit in USA
 - > Mn used to make steel and now electric vehicle batteries
 - > Currently there are no Mn mines in USA
- **DNR to evaluate request and make recommendation to Executive Council regarding approval.** DNR can determine specific land and special conditions to protect natural resources.
 - > DNR has requested comments by October 30, 2021.
- The Pine River Watershed, as part of the Mississippi River Watershed, **supplies 15,000,000 people** with clean drinking water from St. Cloud to Cairo, Illinois. *1W1P*
- Private wells are the source of drinking water for nearly all households around the Whitefish Chain. The **aquifer that most of the wells pump from flow from roughly Emily to the Whitefish Chain.** The same aquifer has no Tritium, a radio-active isotope introduced after 1952 from atomic testing during the Cold War. This indicates a significant ground-water residence time [a good characteristic]. *Geologic Atlas of Crow Wing County, 2007 - See Map*
- **Manganese mining will use water** to either mine the ore or to separate the Mn from unwanted soils after it is mined. Therefore, water will carry significant amounts of Mn directly into the aquifer or be discharged as runoff.

Concerns & Issues:

- Health: “Your body needs some Mn to stay healthy, but **too much can be harmful.** Children and adults who drink water with high levels of Mn for a long time **may have problems with memory, attention, and motor skills.** Infants (babies under one year old) may develop **learning and behavior problems** if they drink water with too much Mn in it.” *MDH*
- Health: Several epidemiology studies have suggested there could be subtle **IQ and memory effects in children exposed to manganese in drinking water...**
 - > Manganese has also been **associated with neurological effects in adults** exposed to manganese in drinking water for over 10 years... *MDH*

“Chronic manganese exposure is a health hazard associated with the mining and processing of Mn ores. Children living in an area with increased environmental exposure to Mn may have symptoms of chronic toxicity that are different from adults who experience occupational exposure. Impaired growth and rickets-like skeletal deformities were observed 33% of the children. This was significantly higher than in the reference region (15%) [over twice as common]. The review revealed that 53% of the mothers of the children enrolled in the Mn-affected area had chronic disease, 46.5% of which involved complicated pregnancy and/or delivery. These percentages were significantly higher than those observed in the control region. These findings indicate the deleterious health consequences of living in a Mn-mining area.”

Emerging Health Threats, Ukraine

- Acute exposure effects [to occupational manganese] can manifest in psychiatric symptoms, also known as Mn madness with hallucinations and emotional, compulsive, and aberrant behavior; whereas chronic exposure effects result in symptoms that mimic Parkinson Disease. *Researchgate.net*
- Manganese exposure limits, regulations, and guidelines need to be reevaluated - this process can only be informed by research, and enforced by legislation [Note: Much of the need to reevaluate the impact of Mn is due to the recent and rapid expansion of the use of MN.] *Researchgate.net*
- Cloquet closed one of their municipal wells in 2019 to build a **new treatment facility to remove manganese** from their drinking water. *MDH*

Net:

Based on the health issues created by the distribution of manganese in the Pine River Watershed and through the eastern portions of the Whitefish Chain due to surface water runoff, the introduction of significantly high levels manganese from the ground water in the aquifer, and manganese mining dust in the air, the DNR should require frequent and periodic testing to determine the health threat to all residents but particularly to infants and children. The results of the testing should be made public after each test.

The applicant, North Star Manganese, should be required to obtain a bond or other financial arrangement that would enable residents to filter out manganese from their well and drinking water at no cost to the residents.

If manganese levels are found to be too high in the surface waters of the Pine River, the applicant, North Star Manganese, should be required to address and remediate the potential problem wherever it becomes a detrimental issue along the courses of the Pine River and the Mississippi River from the Whitefish Chain to Cairo, Illinois.

WAPOA should draft a letter signed by WAPOA, Pine River Watershed Alliance, Crow Wing Soil & Water, affected cities and towns, other impacted or potentially impacted lake property owners associations, and community organizations (i.e., Crosslakers) to submit to the DNR by October 30 that underscores the significant threat. It should also note that a very significant portion of the taxes in Crow Wing County would be impacted if and when manganese in the water or the air is found to be a threat to property values in the northern portion of the county.

Other Comments to DNR: