



RICHARD LAKE STEWARDSHIP COMMITTEE



- ❖ Outline the properties and dangers of Hexavalent Chromium CR(VI)
- ❖ Show differences between the Finnish and Coniston sites in risks with chromite smelting
- ❖ Impact of these differences for the City of Greater Sudbury
- ❖ Discuss the known effects and needed research
- ❖ Consider actions to be taken



**HEXAVALENT CHROMIUM
CHROMIUM (VI) OR Cr(VI)
CANCER HAZARD**

CAN DAMAGE SKIN, EYES, NASAL PASSAGES, AND LUNGS.

ABOUT CR(VI) HEALTH EFFECTS

- Hexavalent chromium is produced during the smelting process.
- It is toxic - same category of carcinogen as asbestos (IARC).
- Hexavalent chromium easily binds with human tissue causes inflammation, eczema, open sores and allergic contact dermatitis.
- Ingestion has also been linked to a wide variety of cancers
- Many of these effects have been observed in populations exposed to chromium contaminated drinking water.
- General population exposure to chromium contaminated soils has been linked to lung cancer.

HEALTH CANADA CONCERNS (2015)

- DUE TO THE HEALTH EFFECTS OF CR(VI), WHICH IS MORE TOXIC THAN CR(III), UTILITIES NEED TO ENSURE THAT TREATMENT ADEQUATELY REMOVES BOTH FORMS OF CHROMIUM AS THE WATER CHEMISTRY IN THE DISTRIBUTION SYSTEM (CHLORINATION) WILL ENCOURAGE THE OXIDATION OF CR(III) TO THE MORE TOXIC FORM.
- FOR SIGNIFICANT, LONG-TERM EXCEEDANCES THAT CANNOT BE ADDRESSED THROUGH TREATMENT, IT IS SUGGESTED THAT ALTERNATIVE SOURCES OF DRINKING WATER BE CONSIDERED.
- CR (VI) IS SOLUBLE IN WATER, THIS REPORT RECOMMENDS LESS THAN 1 MICROGRAM PER 3 METERS, CUBED, OF WATER.

A TALE OF TWO "CITIES":
A COMPARISON OF THE CONDITIONS OF THE TWO
SMELTER SITES –
TORNIO FINLAND AND CONISTON



OUTOKUMPU FACILITY, FINLAND



- SITUATED ON A PENINSULA SURROUNDED BY THE BRACKISH WATER OF THE BAY OF BOTHNIA (GRADIENT SALINITY- APPROXIMATELY 20% AT THIS LOCATION) WHICH EMPTIES INTO THE BALTIC SEA.
- IT IS AN INTEGRATED FERROCHROME SMELTER AND STAINLESS STEEL FACTORY CLOSE TO THE KEMI MINE, THE SOURCE OF CHROMITE

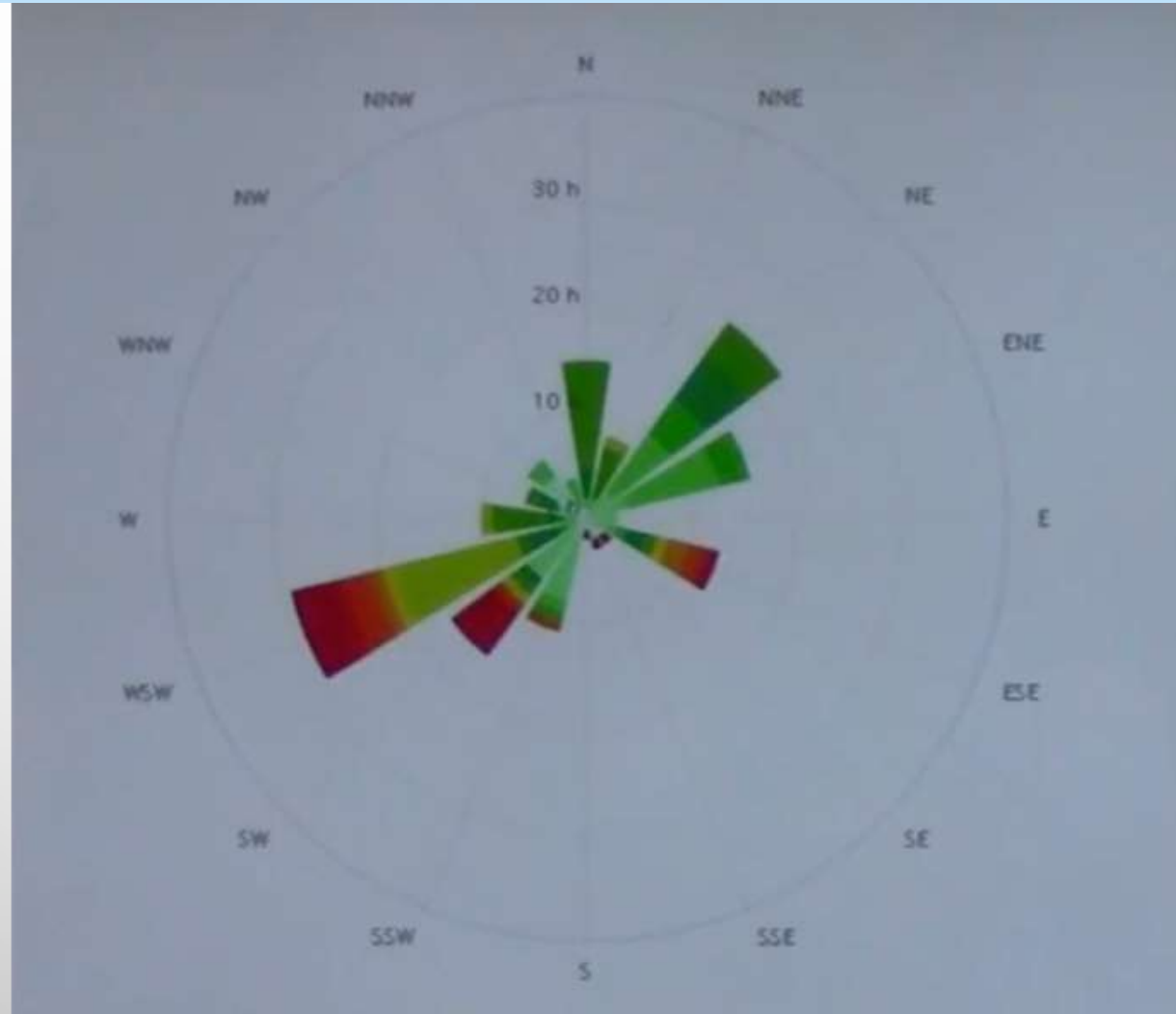
TORNIO, THE NEAREST TOWN, IS 10 KM AWAY FROM THE PERIMETER OF THE FACILITY, WELL UPSTREAM FROM THE FACILITY ON THE BANKS OF THE TORNE RIVER (354 KM LONG).



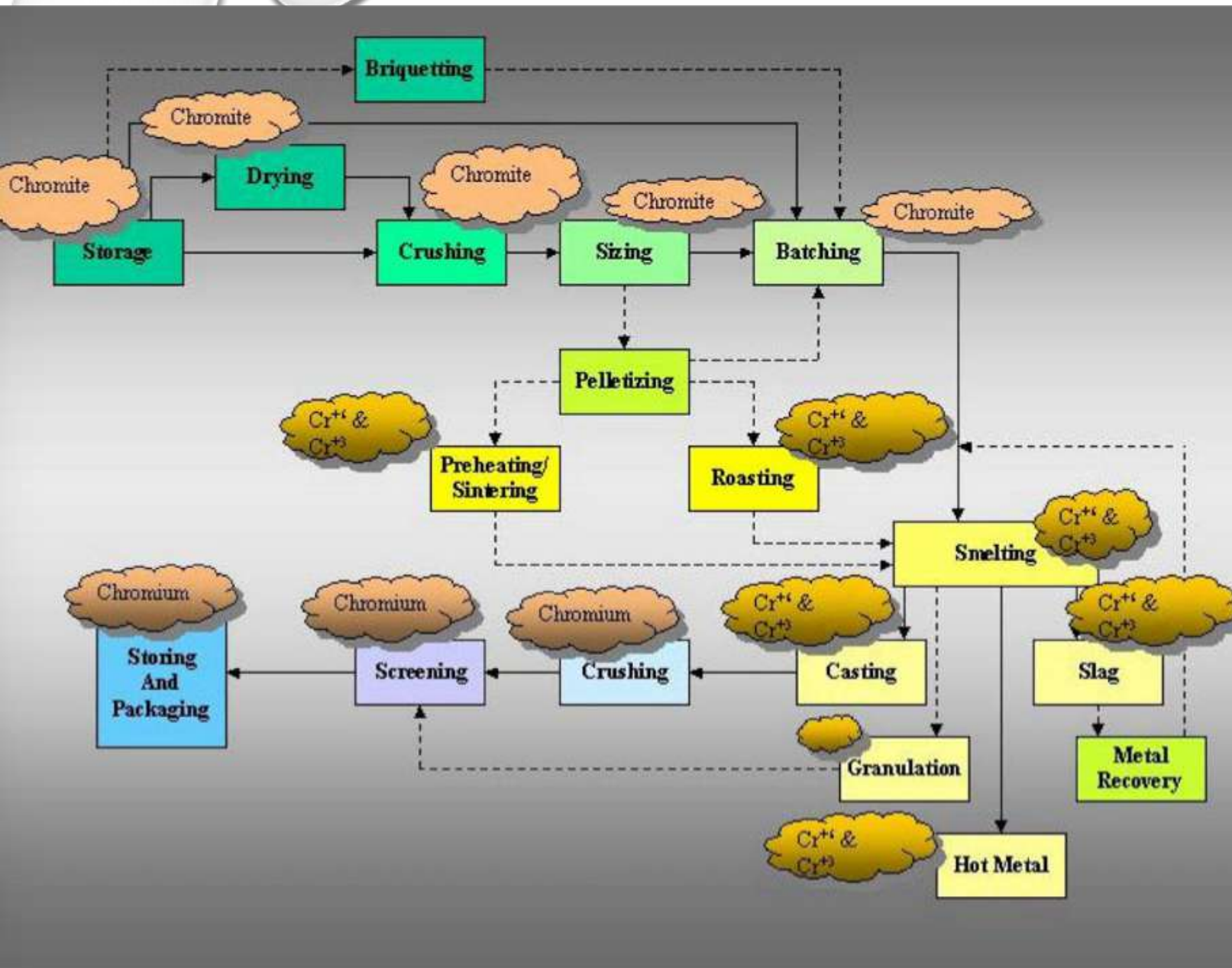
SOME CONTRASTING FACTORS IN THE CONISTON SITE DISBURSING AND DISTRIBUTING CR(VI)

- Fewer Natural Scrubbing Effects From Fog and Rain
- Colder temperatures keeping contaminated snow on the ground
- Huge quantities of water needed from the Wahnapiatae River

HIGHER PREVAILING WINDS FOR GREATER CITY OF SUDBURY



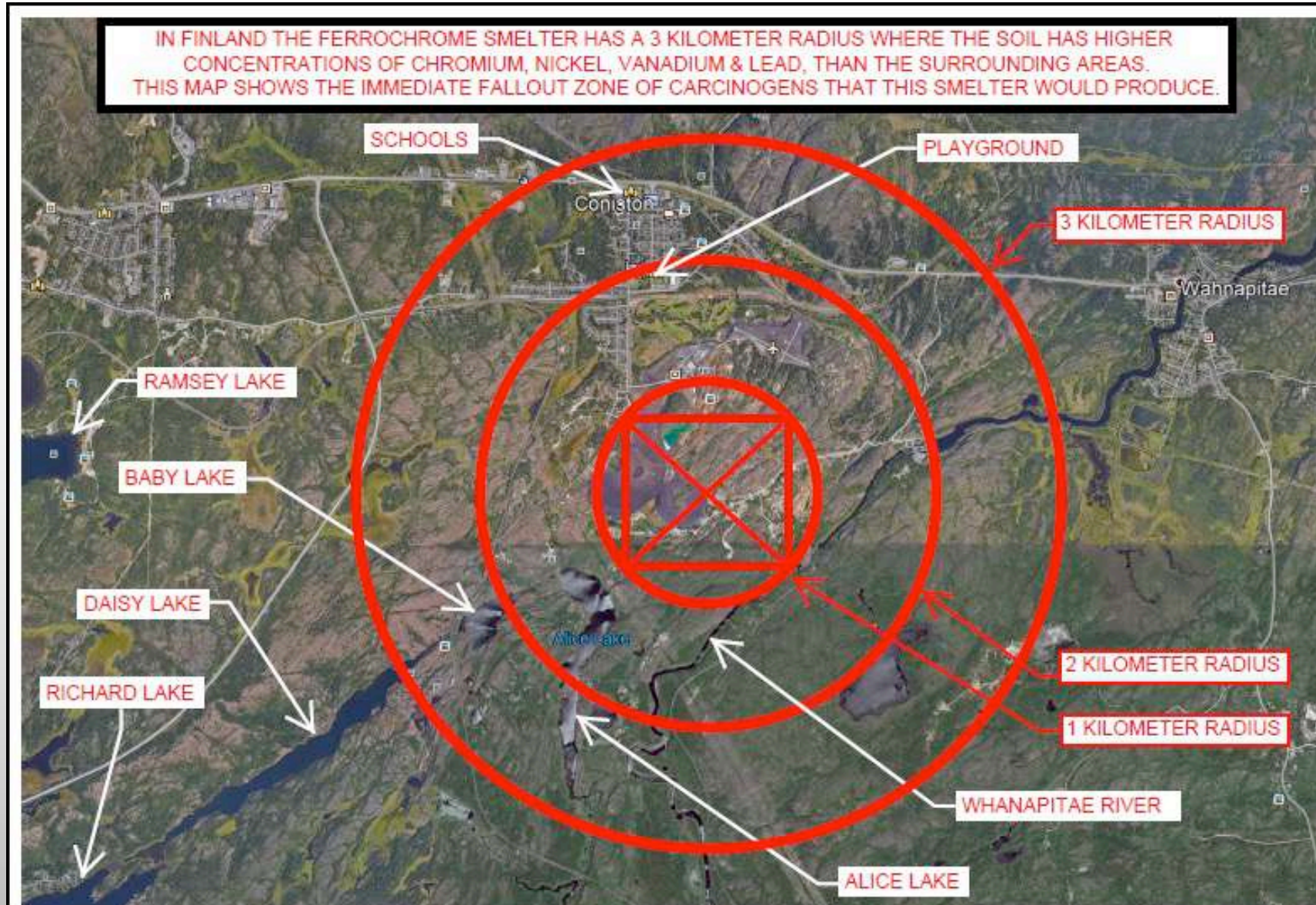
WIND ROSE SHOWS THE STRONGEST AND MOST FREQUENT WINDS BLOW TO THE NORTH EAST TOWARD THE DRINKING WATER INTAKE ON THE WAHNAPITAE RIVER. BUT THE SECOND MOST STRONG AND FREQUENT WINDS BLOW TO THE SOUTH WEST TOWARD DAISY AND RICHARD LAKES, ETC



- Cr(VI) is unintentionally formed during several FeCr production steps.
- The extent of Cr(VI) formation is currently not quantified.
- The risks and ways to address them must be evaluated separately at each step and as they affect one another (Beukes, 2017).

Figure 1. Simplified flowchart indicating potential locations of chromium emissions.

CONISTON, GREATER CITY OF SUDBURY



CONDITIONS FOSTERING CR(VI)

- It is transmitted through groundwater, soil and air
- Various forms of it are extremely water soluble
- Cr(III), which is harmful at higher levels, oxidizes under various conditions to form the Cr(VI) form (which requires much greater study to determine what are the activating factors singly and in combination):
 - pH of water & soil (only neutral pH does not interact with Cr(III) to form Cr(VI))
 - Manganese in the water and soil
 - Pre-existing contaminants in the water and soil

PROPOSED CHROMITE SMELTER SITE : ON THE SITE OF THE RE-GREENED AREA OF CONISTON AND THE WAHNAPITAE RIVER



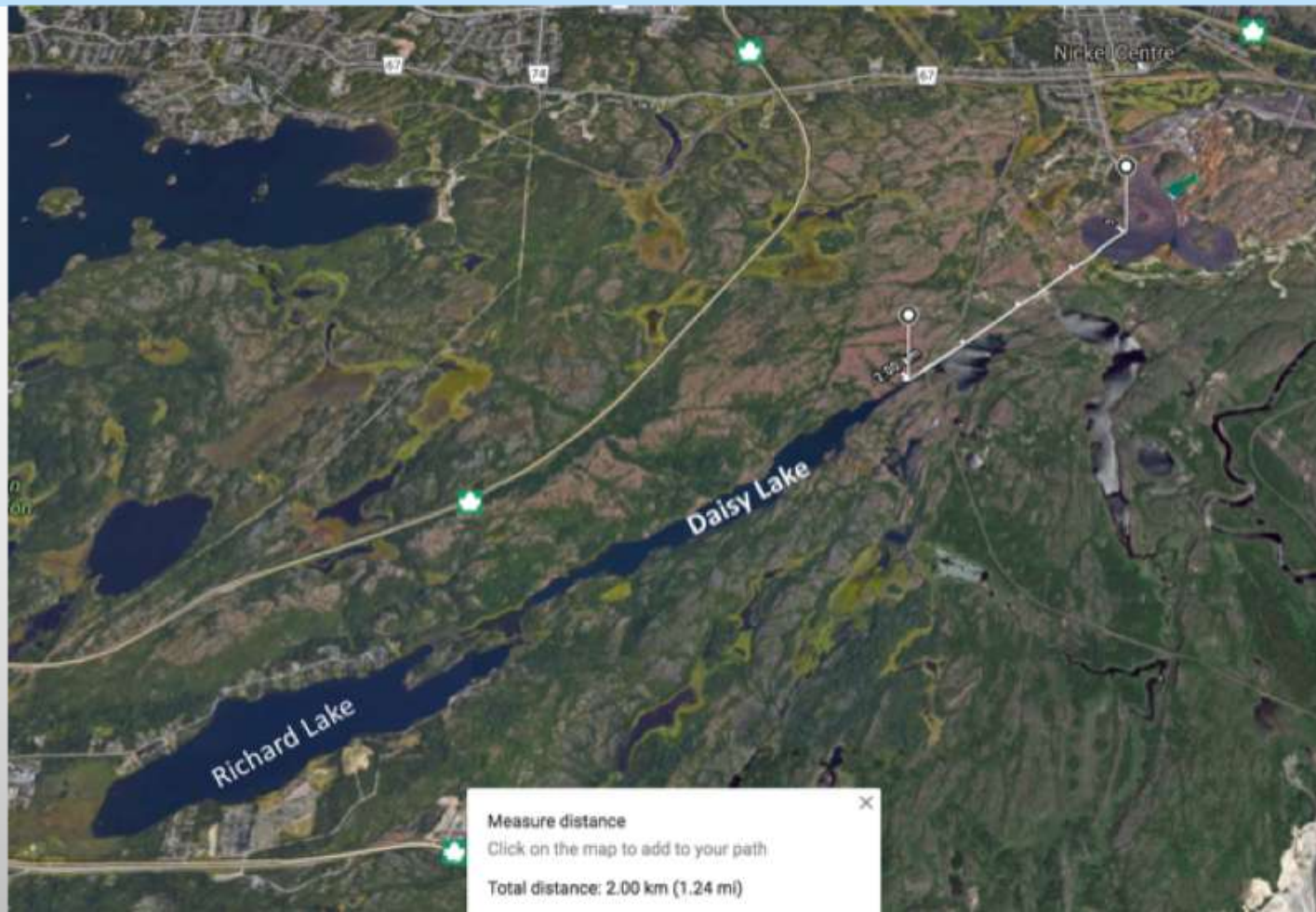
Concerns:

CO² emissions very high and, together with Cr(VI) in the air and leaching from tailings ponds, can threaten City of Greater Sudbury Drinking Water and private drinking water sources

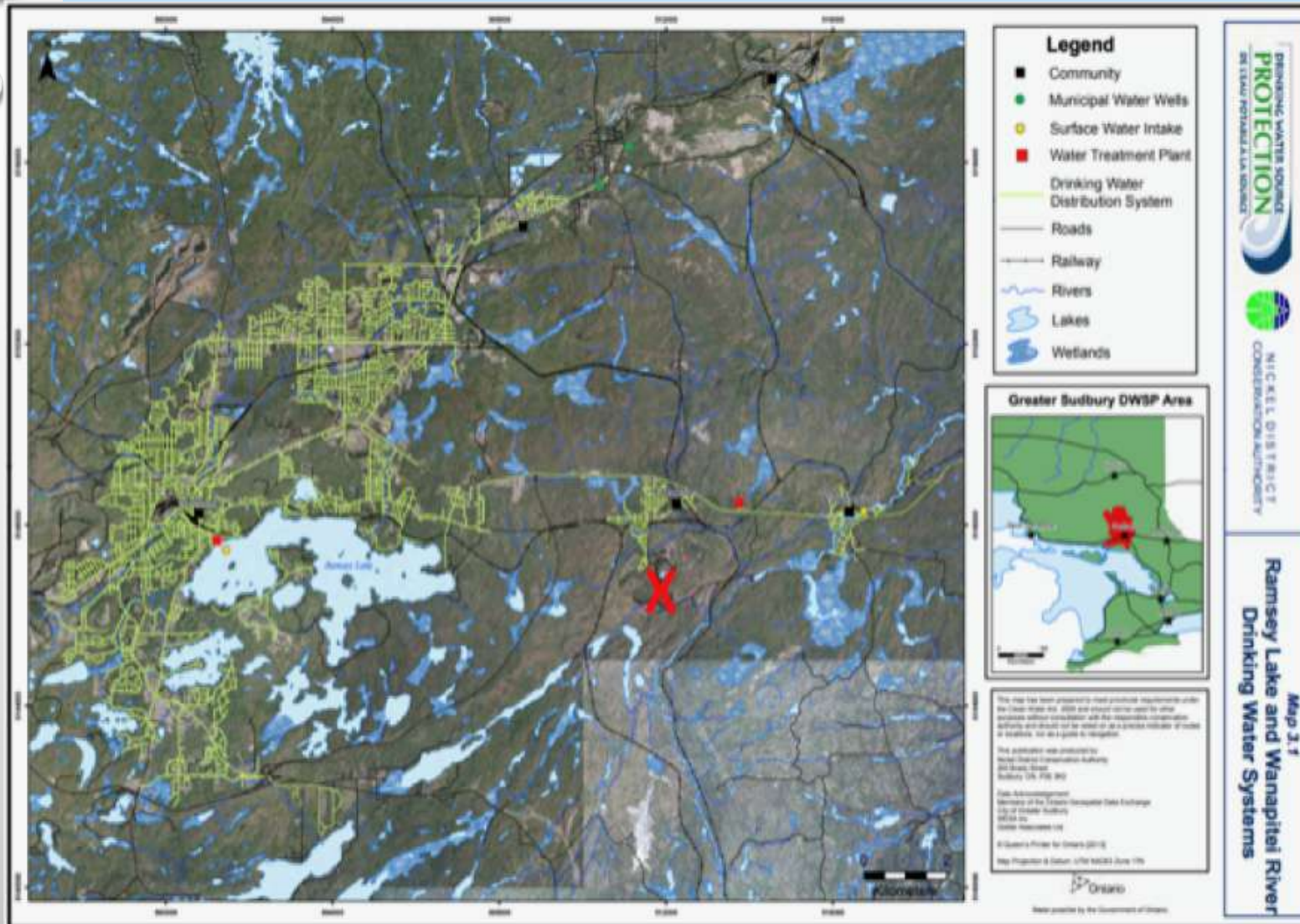
2 major watersheds are within 2 kms of the smelter: Wahnapiatae and Whitefish

A provincial park is within 2 kms of the site

CONISTON, GREATER CITY OF SUDBURY



CONISTON, GREATER CITY OF SUDBURY



WAHNAPITAE RIVER PROVIDES DRINKING WATER TO NEW SUDBURY. SOME ALSO GOES TO THE SOUTH END.

X Proposed Ferrochrome Smelter Location

CONISTON, GREATER CITY OF SUDBURY INLAND AND NEAR DRINKING WATER INTAKES



CONISTON, GREATER CITY OF SUDBURY



WHAT ARE THE CHANCES THAT CR(VI) WILL REACH DRINKING WATER SITES IN SUDBURY?

- There are deficiencies in current treatment strategies; it is highly likely that sparingly water-soluble Cr(VI) compounds will leach from waste storage facilities over time. -Dupreez, 2017
- Cr(VI) is present in solid/liquid waste due to human activities, such AS... metal processing... Cr(VI) is a hazardous contaminant as it readily spreads beyond the site of initial contamination through aquatic systems and groundwater.”-Dhal, 2013

2017 VALE PROPERTY IN CONISTON PART OF REGREENING
EFFORTS RECLAIMED FROM NICKEL BUT FERROCHROME
SMELTING PRODUCES CR(VI) WHICH IS INVISIBLE



DR. JARI TAUNO NATUNEN IN FINLAND



Expressed Concerns about health

- “I have a speculative idea about potential cancer effect in cancer maps around some tens of km from Tornio smelter by air fallout.”
- While industry monitors workers and Finnish Occ. Health have norms and risks for workers, stricter norms should be in place for those living nearby.

DR. NATUNEN ON ENVIRONMENTAL STANDARDS



Concerns about water & waste

- CrVI is a major threat to ground water. Limits are the lowest of any inorganic compound.
- the waste stone heaps in Kemi produce waters which are problematic in comparison with EU environmental quality standards and best norms of other countries
- Heat entering into the surrounding waters have unknown effects
- salt and sulfate levels as even temporarily layering of salts on fresh water lake bottoms may be harmful

WARNING SIGNS FROM DR. TERO MUSTONEN....



Dr. Mustonen was the lead author in the Finnish government's Arctic Biodiversity Assessment and is the president of the Snochange Co-operative in North Karelia, Finland. His words suggests that Finnish researchers have difficulties learning about the Outokumpu environmental effects:

“Our authorities are understaffed and underfunded and tend to ignore both environmental and social impact assessments.”-

UNKNOWN EFFECTS



- WE NEED TO KNOW THE TRUE IMPACT OF THE OUTKOPMU FACILITY ON THE POPULATION? ENVIRONMENT? CURRENT RESEARCH IS LIMITED.
- UNKNOWN EXPERTISE IN CANADA TO REGULATE AND MONITOR THIS INDUSTRY. 1ST CHROMITE SMELTER IN NORTH AMERICA.
- SMELTERS ARE NOT REGULATED THROUGH ENVIRONMENTAL LEGISLATION IN CANADA.
- THE CLIMATE, GEOLOGY & PROXIMITY TO PEOPLE AND FRAGILE ECOSYSTEMS CONISTON/SUDBURY: EFFECTS OF CONTAMINATION AND OUTCOME COMPLETELY UNKNOWN/UNTESTED.
- RISKS INVOLVED WITH TRANSPORTATION, LOADING AND UNLOADING ORE (40 KM VS. 1000KM AND BEYOND) IN THIS UNINTEGRATED OPERATION

REQUESTED SUPPORT



1. A LETTER TO NORONT, TO THE CGS COUNCIL AND MAYOR EXPRESSING CONCERNS ABOUT DRINKING WATER
2. WRITE A LETTER THAT STEWARDSHIP COMMITTEES COULD SHARE WITH THEIR MEMBERS WITH INFORMATION ABOUT THE EFFECTS ON LAKES IN THE WATERSHEDS THAT WILL BE AFFECTED. CONSIDER WHETHER THE COMMITTEES WOULD WANT TO PURCHASE LAWN SIGNS THAT WILL SHOW THE DISTANCE OF VARIOUS SITES FROM THE PROPOSED CONISTON FERROCHROME SMELTER SITE.
3. HELP TO ADVERTISE THE INFORMATION SESSION THAT WILL BE HELD AT THE END OF APRIL BY THE COALITION FOR A LIVEABLE SUDBURY.

SOURCES TO CONSULT FOR FURTHER INFORMATION

1. SaveConiston.ca (soon to be www.NoFerrochromeSudbury.com)
2. Coalition for a Liveable Sudbury Website- www.liveablesudbury.org
3. Others:
 - World Health Organization- www.who.int
 - IARC- www.iarc.fr
 - Environment Canada www.gc.ca
 - Public Health Ontario www.publichealthontario.ca

