



Securing safe drinking water for Canadians and reducing potential risk to the community We acknowledge that Chemtrade operates on the unceded territory of the Squamish, Tsleil-Waututh, and Musqueam Nations



Agenda

- Safety is our culture
- Why are we talking with you now, what has changed?
- Significance in protecting drinking water
- Safety history and future safety enhancements
- Intentions moving forward reducing the risk to the community





Proven safe operations

- Operated safely for over 65 years
- **\$500 million spent to upgrade safety** of the plant since 2010
- Well established Process Safety management systems
- Active member of Chlorine Institute of North America
- Platinum award from CI Institute (zero process safety related events)
- CN Safe Handling Award Gold level (no nonaccidental releases)
- Working with BakerRisk safety consultants to further address community concerns











Why are we engaging with communities now?

Responsibility to raise concerns regarding chlorine supply, as we produce up to 70 per cent of the chlorine for Western Canada and 60 per cent for Northwestern US – critical for the treatment of municipal drinking water supplies.

- Equates to 40 per cent of all of Canada's available liquid chlorine from our North Vancouver facility.
- A 2015 Stats Canada survey showed that 96 per cent of Canadian municipalities use chlorine to treat the domestic water, supplying over 30.7 million Canadians.

The market for chlorine in Canada has changed significantly in recent years.

- The US has implemented new policies and a number of chlorine plant closures which will make getting chlorine more challenging.
- The pandemic taught us the importance of having a secure domestic supply chain.

Intention to further reduce potential risk to the community through additional safety investments, which will require time to complete engineering studies, costing and scheduling.

- Working with BakerRisk to develop updated risk mapping for the region using recent operational changes and significant investment in safety and reliability, with the goal of reducing potential risk beyond the property line.
- This work would need to be completed during facility maintenance shutdowns, scheduled every two years.



Chemtrade North Vancouver overview



- Chemtrade provides industrial chemicals and services to customers in North America and Brazil. Listed on the TSX since 2001, Chemtrade has 1,400 employees across 60+ locations.
- The North Vancouver site has operated safely since 1957, and since 2010, over \$500 million has been invested to improve safety, reliability and modernize the facility.
- The facility has 118 direct, full-time employees with an annual payroll of \$21 million. The facility also injects an additional \$165 million into the BC and Canadian economy through spending with suppliers, contractors, and businesses.
- The North Vancouver facility is a modern chlor-alkali plant, which produces chlorine, caustic soda, and hydrochloric acid, supporting industries like water treatment, innovation and technology, oil and gas, pulp and paper and the automotive industry.
- Creation of clean, carbon neutral hydrogen as a co-product, with potential to go to market as a carbon-free power source.
- The facility is one of the greenest producers of chlorine in North America, run almost exclusively on green, renewable hydroelectricity or self produced hydrogen, and solar-dried ocean salt.



The important role chlorine plays in securing Canada's safe drinking water supply





Why is this site important for Canada?

- At the Chemtrade North Vancouver Chlor-Alkali facility, we produce over 40 per cent of all liquid chlorine available in Canada.
 - This equates to 70 per cent of the liquid chlorine used to treat drinking water in Western Canada and 60 per cent of the chlorine used to treat drinking water in the Western United States.
- 96 per cent of Canadian communities supplying almost 31 million Canadians – rely on chlorine to treat their drinking water
- The site has access to both rail and port critical for both raw material import and shipping of completed products.





Importance of chlorine in water treatment

Chlorine is critical for safe drinking water

- Conventional water treatment systems use chlorine in some form – mostly in the form of bleach. Bleach when added to water forms free chlorine.
- Chlorine disinfects the water eliminating bacterial pathogens.
- In May 2000, in Walkerton, Ontario seven people died and 2,300 became ill from E. coli contamination of the water system from improper treatment

Backgrounder on Chlorine's Importance by HealthLink BC www.healthlinkbc.ca/healthlinkbc-files/drinking-waterchloringtion-facts

Figure 1-1: Historical Death Rates for Typhoid Fever in the United States





US mandating chlorine to drinking water

The US will protect its own drinking water and limit chlorine supply to Canada - paired with recent closure of chlorine plants - puts Canadian supply at high risk

- In 2021, the EPA and Department of Homeland Security were concerned re: reliable supply of chlorine for safe drinking water
- Approximately five per cent of the North American chlorine supply shut down in 2020 & 2021
 - Plants had asbestos diaphragm technology, unwilling to convert (see next slide for details)
- Result is a stretched chlorine supply chain that is sensitive to any disruptions



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

JUN 3 0 2021

THE ADMINISTRATOR

Dear Chemical Sector Partners:

Ensuring that drinking water and wastewater services are fully operational is critical to protecting our nation's public health and environment, as well as maintaining a functioning economy. I would like to request that chemical manufacturers and suppliers prioritize drinking water and wastewater systems as customers of critical water-treatment chemicals, such as gaseous chlorine, sodium hypochlorite and calcium hypochlorite.

This request is a result of concerning challenges that some water systems have recently experienced in procuring gaseous chlorine, sodium hypochlorite and calcium hypochlorite. Several water utilities across multiple states – California, Idaho, Illinois, Indiana, New York, Oregon and Washington – have received *force majeure* notifications, even reducing chlorine allocations in some cases, from suppliers due to supply shortages across the industry. While drinking water and wastewater disinfection accounts for less than 5 percent of all chlorine consumed in the United States, this usage is vital to ensuring the health and well-being of our citizens and businesses.

If drinking water systems cannot obtain a sufficient and reliable supply of gaseous chlorine, sodium hypochlorite and calcium hypochlorite, they will be unable continue to provide safe drinking water to their communities. Similarly, if wastewater systems lack adequate chlorine supplies, they will be unable to disinfect treated wastewater prior to discharge to surface waters, potentially leading to an increase in the concentration of pathogens in the surface water. A loss of drinking water or wastewater services, even for short durations, would have cascading impacts on hospitals, manufacturing, government facilities, private offices and restaurants – essentially all of the critical services necessary to sustain a community.

By prioritizing delivery of chlorine and other critical water treatment chemicals to drinking water and wastewater systems and the retail vendors that sell chlorine to these systems, you can help to ensure the uninterrupted supply of safe drinking water and treatment of wastewater across the nation.

I also request that we maintain open lines of communication between the water and chemical sectors so that we can collectively maintain situational awareness of threats to the water treatment chemical supply chain. This awareness is particularly important as we enter what is forecast to be an active hurricane season with the potential to impact chemical manufacturers in states along the Gulf and Atlantic coasts.

US EPA finalizes ruling which impacts US chlorine production



- On March 18, the US Environmental Protection Agency (EPA) finalized its previous ruling under the Toxic Substance Control Act, prohibiting the use of chrysotile asbestos.
- Currently, eight chlor-alkali facilities in the US use asbestos diaphragms to make both sodium hydroxide and chlorine.
- These eight facilities represent 30 per cent of the annual chlorine production in North America (US, Canada and Mexico).
- Six of the eight US facilities have been given five years to convert to non-asbestos diaphragms or to modern membrane technology, making the deadline March 2029. The other two were given eight and 12-years respectively.

• Things to note:

- Converting technologies is a significant cost (approximately \$1 billion), but also requires a significant facility shut down to convert the equipment. This will remove a significant amount of production from the US, making it is even more critical that Canada secures its own domestic supply.
- The timeline for conversion, approximately one year in advance of our current lease restriction going into effect, would make the loss of our production in North Vancouver even more significant.
- The North Vancouver facility has been converted to modern membrane technology, and will not be affected by the new EPA regulations.



What happens if Chemtrade's facility closes?

Extremely high risk to reliable chlorine supply to Western Canada

- US will secure domestic chlorine supply before exporting to Canada.
- Bulk of production resides in southern US creating logistical challenges in shipping to Canada shipping chlorine requires specialized containers, which are in short supply.
- Western US demand is ~10 times western Canadian demand

If Chemtrade stops producing chlorine?

- Insufficient chlorine produced in Canada (the other three Canadian sites don't have capacity to replace Chemtrade's production).
- Chemtrade supplies up to 60 per cent of Western US with chlorine, so US domestic requirements will dramatically increase, further reducing likelihood of exports to Canada.
- US population will likely exhaust available US manufactured chlorine supply.

Water treatment demand vs. chlorine production locations



- Black/orange circles represent chlorine production sites and size of capacity
- Yellow to grey heat map represents population density (drinking water consumption)



Enhancing community safety





Safety improvements and operational changes at site

- Since 2010, over \$500 million has been invested to modernize the facility, resulting in improvements to safety and reliability
 - Plant is fully automated and is continuously monitored by a state-of-the-art system
 - Automatically notifies operators of any abnormality in operation
 - System will implement shutdown and isolate areas should something outside of the normal operating ranges be detected
 - Equipped with 72 sensors capable of detecting chlorine as low as 0.1ppm
 - In the case of a power outage, the system will automatically close all valves, securing the chlorine within the system.

Improved risk mapping technology

- Updated technology allows for better mapping of potential risk, and creation of scenario modeling
- Significant operational changes, reducing onsite storage of liquid chlorine by over 94 per cent using year 2000 as the benchmark
 - An effective way to reduce risk from liquid chlorine is to minimize the quantity of liquid chlorine onsite
 - Potential to reduce risk even further through additional operation changes and capital investments





Reduction in liquid chlorine storage onsite



Community safety is critical. Updating area risk mapping with current technology

A bit about BakerRisk

- BakerRisk is an independent consulting firm that specializes in technical risk management solutions.
- A global company, operating or over 40 years in eight countries around the world.
- Internationally recognized for expertise in risk management services that prioritize hazard mitigation.
- BakerRisk engineers use a sophisticated computer modelling software that accounts for the various chemical and thermodynamic properties of the material.
- Then applies real weather and topographical data to accurately model various identified failure scenarios to provide quantitative risk curves.

Steps to further increase safety to community

If operation onsite was to extend beyond 2030, Chemtrade is looking to implement a series of risk reduction capital projects intended to drastically reduce the risk that liquid chlorine poses to the surrounding area.

Major Industrial Accidents Council of Canada (MIACC) Guidelines

Steps to further enhance safety

- Reduce liquid chlorine to absolute minimum
 - All loading activities in a sealed building with air scrubbing
 - Remove all bulk storage and load directly to railcars
 - Remove reboiler from distillation column
 - Install seismically activated safety shutoff valves
 - Remove all liquid chlorine from Port-owned land

Reducing the risk to the surrounding community

2006 risk curves

Potential risk curves following mitigation

In 2006, QRA risk curves (left) developed by recognized professional Dr. Alp. The new curves (right) were developed by BakerRisk using improved modelling software, enhanced techniques, and using a more conservative approach, resulting in a more accurate map.

Potential risk reduction curves

- Essentially, outside of the 10⁻⁶ curve, you would have a better chance of winning an Olympic medal (1 in 662,000), or being hit by lightning (1 in 775,000) than being harmed by our North Vancouver operations (1 in a million)
- There would be very limited restrictions on land development outside of Chemtrade fence line and potential risk to the surrounding community would be greatly reduced.

Implementation of safety improvements

Roughly four years to complete full improvement projects (late 2028)

- Engineering work has started with cost estimates expected in fourth quarter of 2024
- Begin sourcing and ordering required equipment and materials in 2025
- All construction work would be done during plant turnarounds that are scheduled every two years
 - Next planned turnarounds are scheduled for 2026 and 2028

Transportation safety procedures

We have strict safety protocols in place that start with our production and continue through to our products reaching our customers.

- We provide comprehensive training for employees, rigorous safety protocols and procedures at all stages of production, facility safety drills, and emergency response planning.
- We have a group of employee volunteers who are highly trained to respond to a chlorine or caustic soda transportation incident, including specialized equipment and training the primary Chlorep Team in BC and Alberta.
- Industry and railroad-specific procedures followed by Chemtrade include employee training, train speeds, inspections, rail yard practices, locomotive operation, adhering to hazmat shipping routes. All of this is regulated through provincial and federal regulations.

Since taking ownership of the facility in 2017, Chemtrade has never experienced a release of Chlorine during transportation – neither because of an accident or a Non-Accidental Release (NAR). Awards:

- 2022 American Association of Railroads Non-Accidental Release (NAR) Grand Slam Award Awarded to companies with operations on at least four Class 1 railroads and have had zero non-accident releases within the year) involving their shipments the previous calendar year.
- 2023 Canadian National Railway (CN) both the Platinum award for Zero Process Safety Related Incidents, and the Gold Level CN Safe Handling award for no NARs.

Using "next gen" cars to ship our products

Railroads are the safest way to move materials - including chlorine - over land (reference AAR.org).

- On January 13, 2009, the Canadian Department of Transportation issued new tank car safety regulations for the transportation of toxic by inhalation (TIH) materials.
- The designs required the construction of any tank car built for the purpose of transporting TIH material to have a tougher and thicker tank shell and heads, stand-alone full-height head shields, and top-fitting protection capable of surviving nine mile per hour (almost 15 km per hour) rollover speeds.

Changes/improvements included:

- 600 PSI pressure rating
- Tank shell thickness increased 25% to 0.981"
- Tank head thickness increased 44% to 1.136"
- Protective housing thickness (rollover protection) increased 67% to 1.25"
- Addition of 0.5" head shields

Proven Head Shield & Jacket Configuration

Shell Thickness

Next steps

Intentions moving forward

Our intentions are to further invest in the facility with the goal of eliminating risk to the community at the property line of our facility once we secured necessary approvals and a long-term lease renewal.

- We feel there is a case to be made to continue liquid chlorine production in North Vancouver, and western Canada.
- Our facility supplies over 40 per cent of all liquid chlorine in Canada, which equates to over 70 per cent in BC and Alberta. We also provide up to 60 per cent of the chlorine used in the western US.
- It is unlikely that the other three Canadian facilities or US producers will be likely to replace this demand if the facility closed.
- 96 per cent of Canadian communities rely on chlorine to treat municipal water supplies.
- We have a long history of safe operations, and are committed to working with the community, local Nations, government and stakeholders.

Ways to stay in touch

- Visit AskChemtrade.ca for up-to-date information on upcoming engagement opportunities and information, as well as to submit a question or subscribe to our community update newsletter.
- Visit our Facebook page https://www.facebook.com/chemtrade
- Visit our website at https://www.chemtradelogistics.com/
- Contact Amy Jonsson, Director, Corporate Communications at <u>ajonsson@chemtradelogistics.com</u>

