



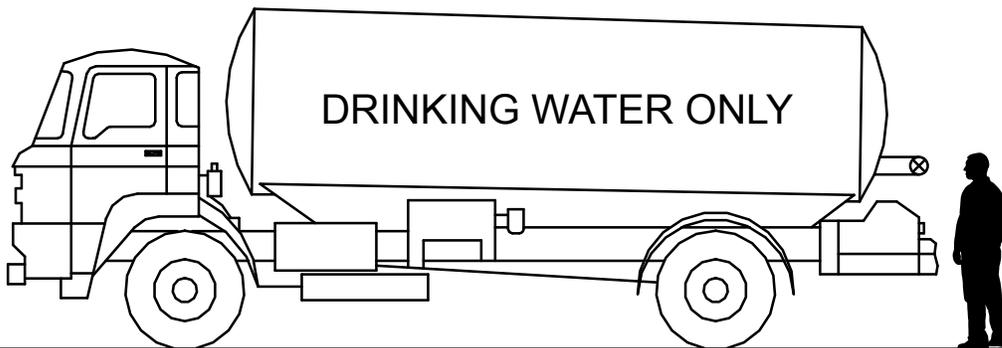
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Guidance on Trucked Drinking Water Delivery in First Nations Communities South of 60°



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**Guidance on Trucked Drinking Water Delivery
in First Nations Communities South of 60°**

Health Canada First Nations and Inuit Health Branch

NOTICE TO READERS

Health Canada has created this guidance document to mitigate the potential public health risks that could arise in case trucked water delivery systems and drinking water cisterns are poorly designed, operated, maintained or monitored.

This *Guidance on Trucked Drinking Water Delivery in First Nations Communities South of 60°* helps drinking water haulers address public health issues and protect the safety of users. It may be helpful to read this document in conjunction with Aboriginal Affairs and Northern Development Canada's *Water and Wastewater Policy and Level of Services Standards; Design Guidelines for First Nations Water Works; and the Protocol for Centralised Drinking Water Systems in First Nations Communities*.

Properly operated and maintained truck systems and well-constructed, operated and maintained drinking water cisterns can provide adequate water service to residents of First Nations communities.

The information contained in this guidance document represents best management practices based on generally accepted concepts of design, installation, operation and maintenance. It is the result of a comprehensive review of existing recommended specifications from a variety of sources. The templates and examples of calculations included in the appendices are recommended guidelines only. Terms which may be unfamiliar to readers are bolded on first use and explained in the glossary at the back of the document.

This guidance document will be updated periodically based on new information, best practices and feedback from users and other stakeholders. To suggest updates to this document, please send an email with the heading "Trucked Drinking Water Delivery" to Health Canada at: **ephd-dsep@hc-sc.gc.ca**

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- FNIHB Regional Environmental Health Managers.
- Health Canada's Healthy Environments and Consumer Safety Branch—Water, Air and Climate Change Bureau.
- Aboriginal Affairs and Northern Development Canada.

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1. Introduction

This guidance document was developed to provide information, from a public health perspective, on how **drinking water haulers** can safely collect, transport and distribute drinking water. It offers minimum recommended criteria and best practices that promote safe and effective water deliveries. It applies to all organizations and individuals involved in the operation, maintenance and monitoring of trucked drinking water delivery systems in First Nations communities, including:

- Chiefs and Councils, responsible for supplying drinking water to their communities;
- Community-based Drinking Water Quality Monitors (CBWMs) and Environmental Health Officers (EHOs), responsible for bacteriological sampling of drinking water in cisterns and for notifying Chiefs and Councils in the event of an adverse sampling result;
- Drinking water haulers, responsible for safely collecting, transporting and distributing drinking water to First Nations communities and individual homes; and
- Home occupants (water users), responsible for protecting their drinking water cisterns from damage.

2. Drinking Water Sources

Drinking water transported by truck should only be obtained from a safe public drinking water supply that meets the criteria outlined in the latest edition of the *Guidelines for Canadian Drinking Water Quality* (GCDWQ).

From the outset, the First Nation and the drinking water hauler should establish where the drinking water will be taken from (known as the point of access). It should be a properly constructed truck-fill station. The station should have protection devices to maintain the safety of the drinking water while the hauler is filling the **drinking water tank** on the truck.

3. Drinking Water Truck Requirements

Drinking water delivery trucks are considered an extension of the drinking water distribution system.

All surfaces and equipment which come in contact with drinking water—including fill-point equipment, the **drinking water truck's** tank, caps, valves, fittings, and other plumbing attachments—must meet NSF/ANSI Standard 61 (entitled “Drinking Water Components—Health Effects”) and should be regularly inspected, disinfected and, when necessary, replaced.

A truck that has been used for hauling sewage, or used for any purpose other than delivering drinking water, **MUST NOT** be used for delivering drinking water **UNDER ANY CIRCUMSTANCES.**

Trucks used for delivering drinking water should be equipped with:

- A stainless steel water tank or a tank made of other certified materials that conform with NSF/ANSI Standard 61;
- A clean, lockable compartment for storing hoses, nozzles, and related couplers and fittings. This compartment should be made of corrosion-resistant materials in order to maintain clean accessories and equipment and to protect the drinking water from possible contamination;
- An access port, with a minimum diameter of 400 mm and fitted with a sealed, water-tight, lockable lid to protect the port from tampering, insects and rodents;
- Valves on all fill and drain pipe connections that allow the truck's water tank to be completely closed;
- A goose-necked/inverted U-shape vent pipe that is screen-protected to prevent dust, rainwater, insects, birds, animals and other contaminants from entering. The vent pipe should be closed when the truck is not in use;
- A sign with the words **DRINKING WATER** written in bold letters in permanent, weather-resistant ink. The sign should be at least six inches or larger in size and permanently and prominently affixed to the truck's water tank. This will clearly indicate that the truck's water tank is not to haul anything but drinking water;
- A chlorine test kit capable of reading at least 3.5 mg/L (milligrams per litre) of free and total chlorine residuals, in increments of no more than 0.1 mg/L (Nova Scotia Environment and Labour, 2005);
- A disinfection kit containing a spray bottle, or a similar device, filled with a 750 mg/L chlorinated water solution (see Section 4.4); and
- Appropriate safety ladder and railings mounted on the drinking water truck.

Test kits should be calibrated per the manufacturer's requirements. Test kits and all testing products (including calibration standards), need to be replaced regularly in order to ensure the integrity of the test results. Test kits, or any other product required for testing, should not be used after the manufacturer's expiry or "best before" date.

3.1 Trucked Drinking Water Tank Requirements

The drinking water tank should be mounted on the truck in a way that allows all the water inside to be drained and that prevents the water from freezing in winter months. Ideally, the tank should have rounded corners and a smooth interior surface that can be thoroughly drained, cleaned and disinfected.

3.1.1 Bottom-filled Drinking Water Tanks—Backflow Preventer

Drinking water trucks designed with bottom-filled tanks should be equipped with a backflow preventer (a double check valve) on the fill pipe to prevent water from flowing back from the water tank into the public drinking water supply. Backflow prevention devices should meet CSA Standard B64—Backflow preventers and vacuum breakers. See *Figure 1—Minimum Tanker Truck Requirements* for an illustration of the minimum requirements for these kinds of tanks.

3.1.2 Top-filled Drinking Water Tanks—Air Gap Requirements

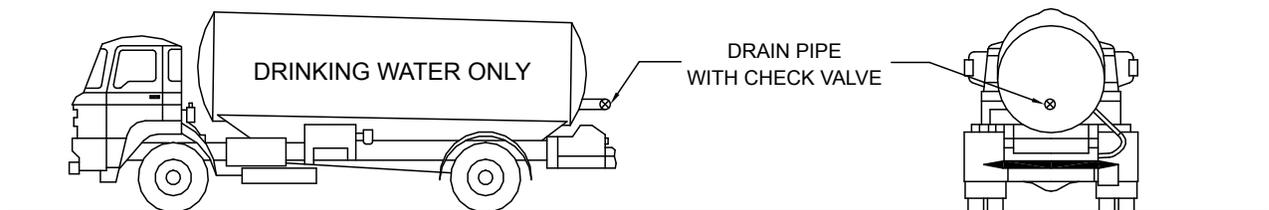
Drinking water trucks designed with top-filled water tanks should not be over filled. An air gap should be maintained between the fill pipe and the water in the truck’s drinking water tank **at all times** to protect the public drinking water supply from possible contamination. The air gap should be at least three times as big as the inside diameter of the loading hose (Utah Department of Environmental Quality, 1999). For example, the air gap should be:

- 150 mm for a 50 mm fill pipe/hose;
- 225 mm for a 75 mm fill pipe/hose; and
- 300 mm for a 100 mm fill pipe/hose.

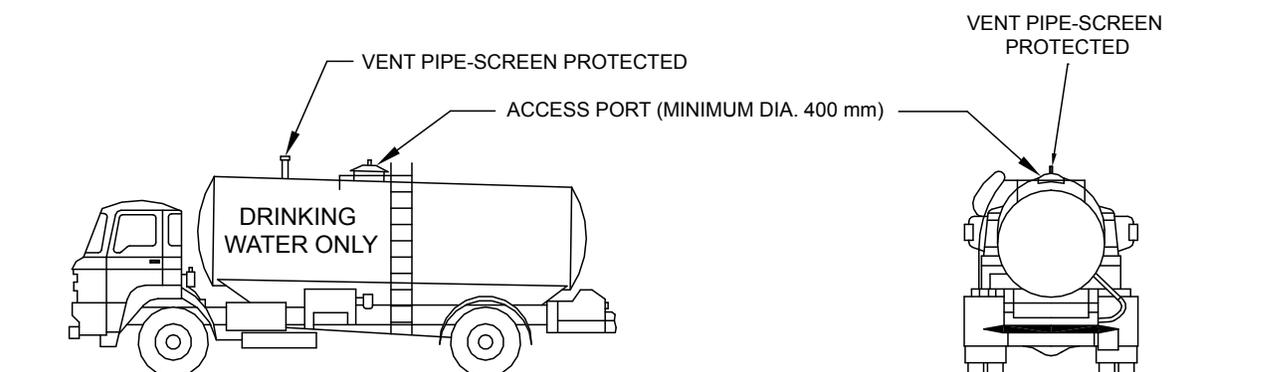
Refer to *Figure 1—Minimum Tanker Truck Requirements* for an illustration of the minimum requirements for these kinds of tanks.

Figure 1—Minimum Tanker Truck Requirements

DRINKING WATER TRUCK WITH BOTTOM-FILLED WATER TANK



DRINKING WATER TRUCK WITH TOP-FILLED WATER TANK



3.2 Handling Equipment

All equipment associated with collecting, transporting and delivering drinking water (such as hoses, valves and nozzles) should be specifically designed for drinking water. All equipment should be constructed of materials that can be disinfected and are certified as meeting NSF/ANSI Standard 61.

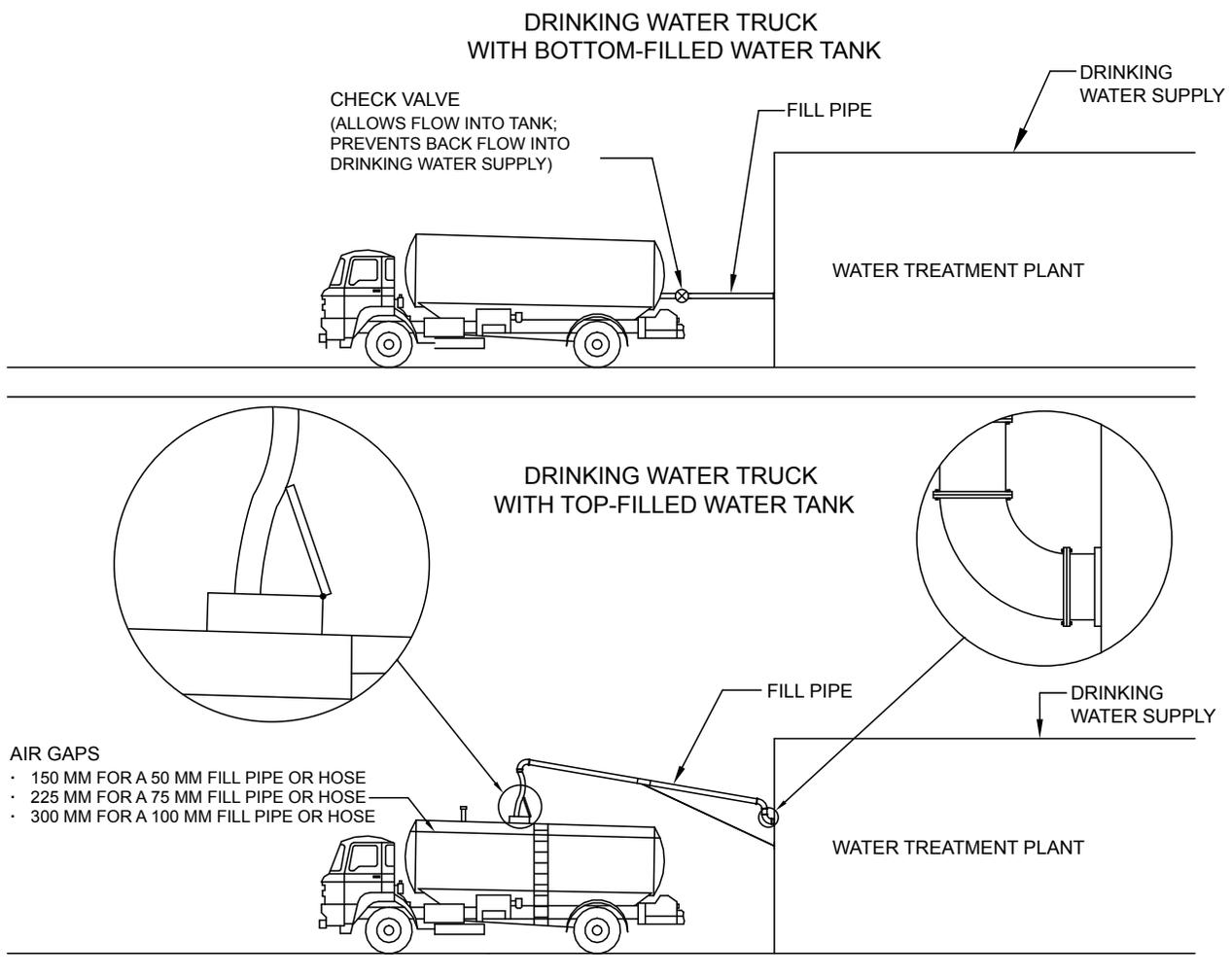
Pumps, valves and equipment other than hoses should be permanently mounted on the truck’s drinking water tank. If the equipment requires lubrication, use a mineral or vegetable oil that is suitable for human consumption and meets the manufacturer’s specifications.

Hoses and other handling equipment must be stored and kept off the ground at all times. Hoses which are not in use should be capped at each end to prevent dirt or other contaminants from entering. Hose attachments should be mounted on the water tank to allow for easy removal for cleaning and disinfection.

Hoses need to be drained after each use to remove any water residue and to prevent stagnant water from accumulating in the hose. Hoses must be thoroughly flushed, disinfected and then flushed again with drinking water prior to use. Hoses and other handling equipment should be disinfected with the same solution used to disinfect the truck's water tank.

Hoses should be clearly, prominently and permanently labelled or otherwise identified with the words **DRINKING WATER** written in capital letters using permanent, weather resistant ink.

Figure 2—Tanker Truck Filling Requirements



If a hose is used to fill the truck's drinking water tank through the access hatch, the end of the hose should be kept above the water level at all times. This practice will prevent backflow and cross contamination. See *Figure 2—Tanker Truck Filling Requirements* for an illustration of typical bottom-filled and top-filled trucked drinking water tanks.

4. Operating and Maintaining Drinking Water Trucks

To ensure the safety of drinking water, all equipment used for trucked drinking water delivery should be maintained in a clean and sanitary condition. The equipment should be operated in a way that prevents possible drinking water contamination and potential **cross connections** between the drinking water system and any non-drinking water sources.

4.1 Storing Water in the Truck's Drinking Water Tank

Drinking water should not be stored in the truck's drinking water tank for more than 24 hours after loading. After 24 hours, any water in the drinking water tank should be drained and not used as drinking water. However, this water can be used for other purposes such as washing cars and watering lawns.

The 24-hour maximum for keeping water in the tank is necessary to prevent potential risks to the safety and quality of water.

Drinking water can easily become contaminated if you drop equipment on the ground or use equipment from a sewage truck when delivering drinking water.

4.2 Delivering Drinking Water

Only haulers who are trained in trucked drinking water delivery should transport and deliver bulk drinking water to be stored in residential cisterns for domestic use.

As mentioned in Section 2, water delivered to the cistern must be microbiologically safe. It should only be obtained from the community water treatment plant or another public drinking water system that, at a minimum, meets the requirements of the latest edition of the GCDWQ or the applicable regulations of neighbouring jurisdictions if these are more stringent.

4.3 Before Filling the Truck's Water Tank

Before you fill the truck's drinking water tank, clean and disinfect the source water fitting at the public drinking water supply, the fill hose nozzle and all other connecting accessories. To disinfect using a spray bottle or other similar device, spray the fitting, fill hose nozzle and other connecting accessories with a 750 mg/L chlorinated water solution.

Keep a kit containing the spray bottle and related cleaning and disinfection materials in the delivery truck at all times. A new chlorinated water solution should be prepared each week.

Creating a 750 mg/L chlorinated water solution

This solution can either be a mixture of 15 mL of unscented household bleach (5.25% sodium hypochlorite) per litre of water or a mixture of 7 mL of industrial strength bleach (12% sodium hypochlorite) per litre of water (Nova Scotia Environment and Labour, 2005).

When preparing this solution, the chlorine must be measured to ensure an adequate level of disinfectant.

4.4 Using Chlorine in the Truck's Drinking Water Tank

Drinking water to be transported by drinking water truck should contain a minimum free chlorine residual of 0.2 mg/L (or the concentration required by provincial guidelines) at the time of delivery to the last drinking water cistern. This concentration is recommended to make sure a free chlorine residual of at least 0.2 mg/L

Since free chlorine concentrations decrease over time, make sure the free chlorine residual concentration is greater than 0.2 mg/L when you fill the truck's drinking water tank. This will ensure that a free chlorine residual of no less than 0.2 mg/L is available at the time of the last delivery to drinking water cisterns (Nova Scotia Environment and Labour, 2005).

is present at the time of water consumption. This concentration ensures the water's bacteriological safety. Test the free chlorine residual of the water at the last delivery to make sure it is still 0.2 mg/L.

To maintain the chlorine residual in the drinking water and to minimize the risk of water contamination, the volume of water delivered to each drinking water cistern should ideally correspond to the average amount of water consumed between deliveries. Most of the water should be used between delivery periods.

4.5 Before Filling the Drinking Water Cistern

Before you fill the cistern with drinking water:

1. Clean all debris out of the water delivery nozzle and cistern fill pipe.
2. Disinfect the delivery nozzle and cistern fill pipe with the 750 mg/L chlorine solution (see Section 4.3), using a spray bottle or other similar device.

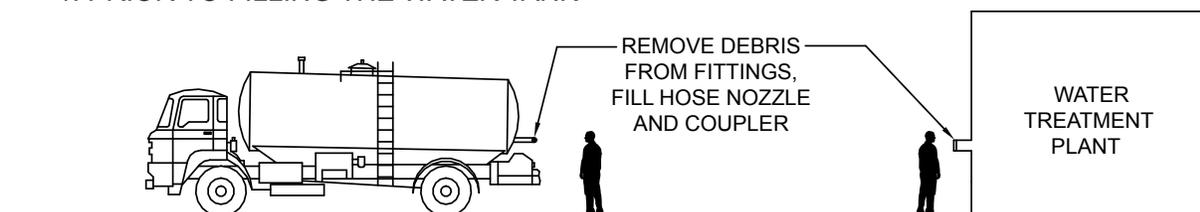
The delivery nozzle and/or coupler must be visibly clean (free of dirt and grime).

If the nozzle or the coupler touches the ground—or any other potential source of contamination—immediately remove all debris and then disinfect it by spraying it with the 750 mg/L chlorine solution.

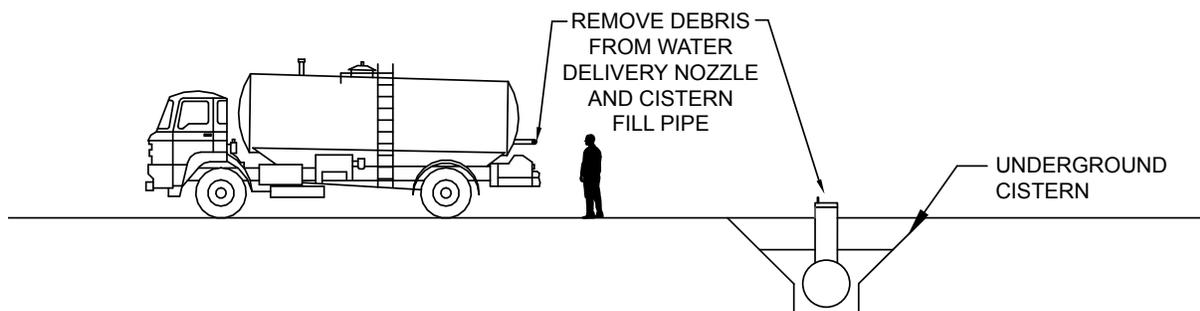
For more information, see *Figure 3—Procedures for Filling the Tanker Truck*.

Figure 3—Procedures for Filling the Tanker Truck

1. PRIOR TO FILLING THE WATER TANK



2. PRIOR TO CONNECTING THE HOSE TO THE CISTERN FILL PIPE



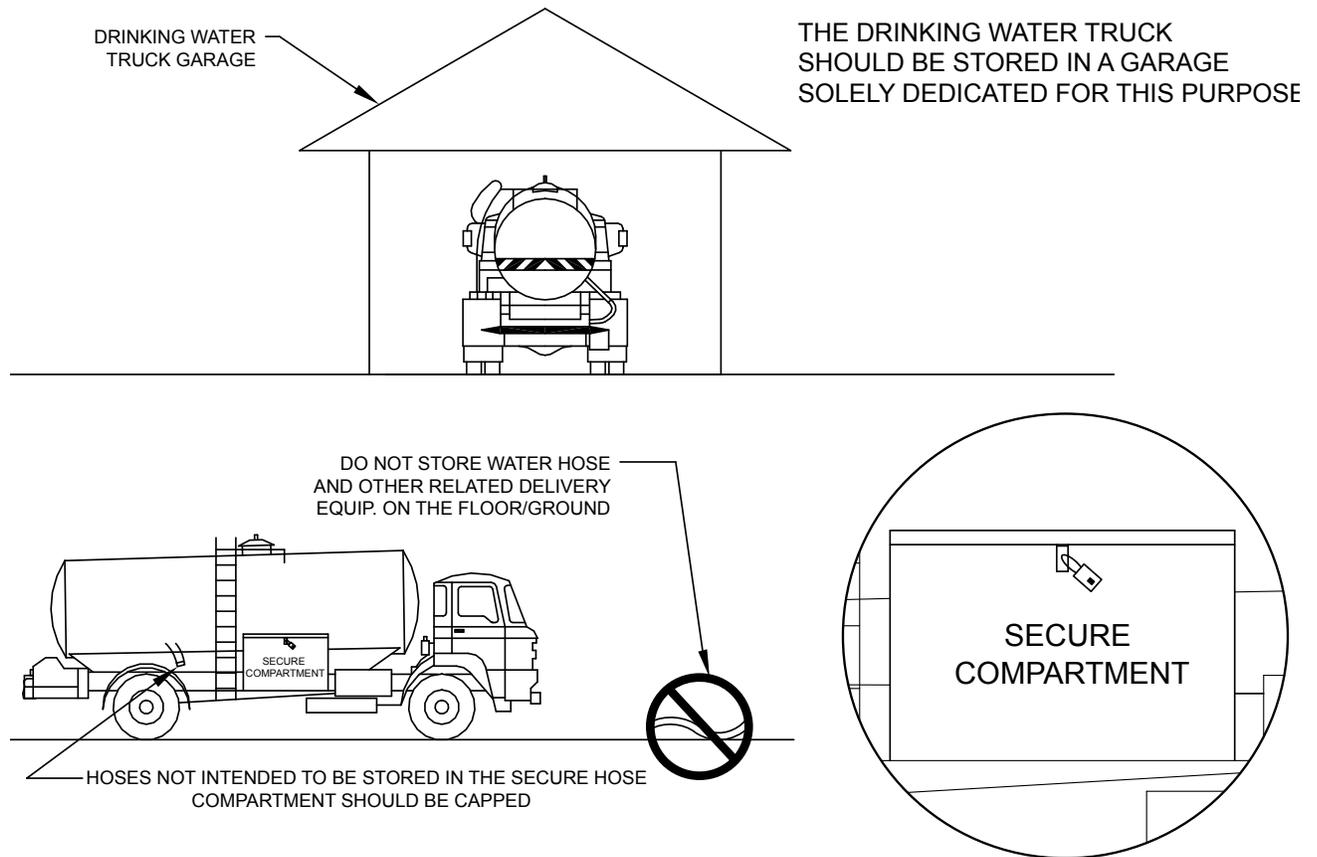
4.6 Storing Drinking Water Trucks and Equipment

When the drinking water truck is not in use, it should be stored in a garage or similar structure located away from potential sources of contamination. Ideally, it should be stored in a dedicated garage.

Drinking water delivery hoses and other related delivery equipment should be protected from potential contamination. They must be drained, covered and then disinfected before each use. Ideally, they should be stored in a secure compartment.

See *Figure 4—Storing Tanker Truck and Equipment* for typical storage practices for drinking water trucks and equipment.

Figure 4—Storing Tanker Truck and Equipment



5. Cleaning and Disinfecting Drinking Water Tanks on Trucks

CAUTION

Hazardous gases and/or low oxygen levels may be present inside a truck's drinking water tank. The drinking water tank is considered a "confined space". Only individuals trained in "confined space entry" are allowed to enter the tank to perform maintenance or cleaning, as stated in the *Canada Labour Code's* occupational health and safety requirements.

To maintain the quality and safety of drinking water, the drinking water tank's interior and any delivery equipment that may come in contact with drinking water (for example: hoses, fittings and nozzles) should be cleaned and disinfected:

- Prior to their first use for drinking water delivery;
- When a chlorine residual of 0.2 mg/L has not been maintained at the time of the last delivery; and
- Once every three months (between cleanings).¹

As a good maintenance practice, it is also important to make sure equipment storage compartments are kept clean.

5.1 Cleaning the Drinking Water Tank

To maintain drinking water safety and quality, the truck's drinking water tank must be cleaned regularly. To clean it:

1. Drain the drinking water tank completely.
2. Wash all internal surfaces by scrubbing them with brushes and non-corrosive detergents, or with a pressure washer that delivers a cleaning solution at a velocity sufficient to remove all dirt from the tank's interior.
3. Rinse the tank with drinking water to remove any remaining dirt, debris and detergent residue.
4. Disinfect the tank by following the procedures outlined in Section 5.2.

For a list of the recommended contents of a cleaning kit, see Appendix A.

5.2 Disinfecting the Trucked Drinking Water Tank

To maintain drinking water safety and quality, disinfect the truck's drinking water tank after it is cleaned. To disinfect the tank:

1. Add 400 mL of unscented household bleach (5.25% sodium hypochlorite) for every 1,000-litre volume of water in the drinking water tank. Or, add 200 mL of industrial strength sodium hypochlorite (12%) for every 1,000 litre volume of water in the drinking water tank.
2. Fill the tank to its maximum holding capacity with drinking water. The chlorine concentration of the water solution in the truck's drinking water tank should be 15 mg/L. The water is now considered heavily chlorinated. It is NOT suitable for use as drinking water. Water with a chlorine concentration greater than 1.0 mg/L is considered heavily chlorinated.
3. Verify the chlorine concentration (also known as the chlorine demand) of the heavily chlorinated water with a chlorine test kit that can measure concentrations of 15 mg/L or higher.

¹ Nova Scotia Environment and Labour, Potable Water Hauler Guidelines Section, (2005).

4. Leave the chlorinated water in the trucked drinking water tank and delivery hose for 24 hours to allow adequate contact time for disinfection. **THIS WATER SHOULD NOT BE DELIVERED TO CISTERNS or consumed.** An alternative drinking water truck should be used if water delivery is required. If the drinking water truck is needed urgently, the quantity of chlorine added to the drinking water tank and delivery hose can be doubled and left in the tank for an 8 hour contact time. In such cases, add 800 mL of unscented household bleach (5.25% sodium hypochlorite) for every 1,000 litre volume of water in the trucked drinking water tank or 400 mL of industrial strength sodium hypochlorite (12%) for every 1,000 litre volume of water in the drinking water tank volume.
5. After 24 hours, verify the chlorine concentration. If the free chlorine residual is less than 1.0 mg/L, the water can be disposed of directly into the environment. If it is more than 1.0 mg/L, follow the instructions in Section 5.3 for disposing of heavily chlorinated water.
6. Drain the chlorinated water from the trucked drinking water tank and delivery hose and thoroughly rinse the equipment twice with drinking water (Nova Scotia Environment and Labour, 2005).
7. To disinfect external nozzles and/or couplers, spray them with the 750 mg/L chlorine solution (see Section 4.3).
8. After filling the tank with new drinking water, and before delivering or using it, test the drinking water in the tank for bacteriological contamination.

In addition to regularly scheduled disinfection, carry out disinfection in any of the following cases:

- If the drinking water truck has not been in regular use but will go back into use;
- If any part of the drinking water truck or delivery equipment has been repaired or replaced;
- If the drinking water truck, tank or equipment is known or suspected to have been contaminated; and
- If the quality of the drinking water does not meet the requirements of the latest edition of the GCDWQ. Disinfecting the truck will help get rid of contamination in the drinking water tank but not in the drinking water itself.

5.3 Disposing of Heavily Chlorinated Water

CAUTION

According to the health and safety requirements in the *Canada Labour Code*, only suitably trained personnel are allowed to dispose of heavily chlorinated water. Handling and use of these chemicals is extremely dangerous.

The heavily chlorinated water created when disinfecting the truck's drinking water tank, including the rinse water, should be disposed of in a way that does not harm the environment. Disposal should comply with provincial regulations, the Department of Fisheries and Ocean's *Fisheries Act*, 1985, and Environment Canada's *Environmental Protection Act*, 1999.

Consult regulatory authorities for acceptable disposal options. These options may include:

- **Option 1: Disposal into local sanitary sewers.**

To dispose of heavily chlorinated water in the local sanitary sewer system, first get written approval from the local sewer department. Heavily chlorinated water must meet the conditions required by the local sewer department. Most wastewater treatment plants use biological treatments to treat the wastewater, which means heavily chlorinated water disposed of in sewage systems could affect water treatment. You may need to de-chlorinate the water before disposal. To do so, follow the guidelines in Option 2.

- **Option 2: Disposal into the environment.**

To dispose of heavily chlorinated water into the environment, first de-chlorinate it by adding the appropriate amount of a neutralizing chemical such as sulphur dioxide, sodium bisulphite, sodium sulphite or citric acid. Add a small amount of the neutralizing chemical while continually monitoring the free chlorine residual in the water. Keep adding the neutralizing chemical until the free chlorine reaches a concentration of less than 1 mg/L. Once the required concentration of chlorine has been achieved, the water can be safely disposed of. Consult Appendix B to estimate how much neutralizing chemical you may need.

6. Testing the Quality of Trucked Drinking Water

6.1 Daily Testing of Free Chlorine Residual Levels

Trucked drinking water should be sampled routinely. Every day that water is delivered, the drinking water hauler (or qualified person) should take a sample of drinking water from the truck's drinking water tank and measure the free chlorine residual. Testing should be done at the time of the first delivery each day.

6.2 Monthly Laboratory Bacteriological Analysis

Once per month or, if this is not feasible, at least four times per year, the drinking water hauler or designated person should take water samples from the water tank's fill and delivery hoses. He or she should submit these samples to an accredited or community laboratory (for example: a water treatment plant laboratory) for bacteriological analysis (*E.coli* and total coliforms). Check your local authority for the frequency of sampling and means of collection.

The water hauler should follow standard sampling protocols when collecting, storing and delivering samples to the laboratory. Sampling protocols can be found in Health Canada's First Nations and Inuit Health Branch's *Procedure Manual for Safe Drinking Water in First Nations Communities South of 60°* (the Procedure Manual).

If samples cannot be sent to an accredited laboratory, a community-based lab can be used. However, when using a community-based lab, quality assurance and quality control should be verified using the steps outlined in the Procedure Manual.

If sampling results show that the drinking water does not meet the GCDWQ, the drinking water hauler or other designated person must advise Chief and Council and the EHO responsible for the communities where the drinking water is being delivered.

7. Record keeping

The drinking water hauler or designated person should keep an up-to-date register or log book with all water sampling/test results, water delivery records and truck maintenance and repair records, for at least five years.

The **First Nations authority** may ask to review the register or log book.

7.1 Recording Results of Chlorine Residual Tests

The test results for free chlorine residual levels should include the name of the person who took the sample; the date, time and location where the sample was taken; and the test results.

See Appendix C for a template for recording free chlorine residual levels.

7.2 Recording Results of Bacteriological Tests

The test results from bacteriological sampling should include the name of the person who took the sample; the date, time and location where the sample was taken; and the test results.

See Appendix D for a template for recording the results of bacteriological testing.

In communities where the CBWM takes samples regularly, the delivery truck driver should request bacteriological test results at least a monthly from the CBWM.

7.3 Recording Water Deliveries

Monitoring the water supply helps ensure the continuity of deliveries. Keep records of daily drinking water deliveries, including:

- The name of the water treatment plant;
- The volume of water loaded;
- The date and time of each water delivery;
- The name of the drinking water hauler; and
- For each home where water is delivered, the occupant's name and address.

See Appendix E for a template for recording water deliveries.

7.4 Recording Drinking Water Truck Maintenance

A regular maintenance and inspection recording document, based on the manufacturers' recommendations for the drinking water truck and its equipment, should be kept inside the drinking water truck at all times. Any identified problems should be noted and repaired to avoid major breakdowns and water contamination problems.

Drinking water truck maintenance records should include information on the date and time of all maintenance or repairs to the drinking water truck, a description of the work done and details of any required follow-up actions, including proposed timelines.

See Appendix F for a template for recording drinking water truck maintenance.

8. Training Drinking Water Haulers

Drinking water haulers must be properly trained and, where applicable, hold a valid provincial drinking water hauler certificate. Generally, training programs for drinking water haulers should cover:

- **Personal health and hygiene:** Drinking water haulers need to be aware that they should not work if they are ill, to avoid contaminating the water;
- **Safety issues and protocols:** Drinking water haulers need to know how to safely handle all chemicals used (including sodium hypochlorite, sulphur dioxide, sodium sulphite, bisulphite, and citric acid), the steps to take to minimize potential risks to public health and what to do in the event of an emergency (such as a spill or water contamination);
- **Sanitation:** Drinking water haulers should know how to keep the truck and its drinking water tank clean. They should know how to clean and disinfect the drinking water tank and equipment, including hoses and nozzles;

- **Delivery routing:** Drinking water haulers should know the shortest routes possible to enable fast and effective delivery of drinking water. This will minimize the risk of contamination;
- **Freeze protection:** Drinking water haulers should know how to stop the water in the drinking water tank, hoses and nozzles from freezing;
- **Water truck usage:** Drinking water haulers should know how to use and maintain the integrity of drinking water trucks so drinking water is safely delivered at all times; and
- **Sampling:** Drinking water haulers must know the sampling procedure for chlorine residuals and bacteriological parameters. They must also know how to calibrate sampling instruments.

A copy of the drinking water hauler’s provincial or territorial certificate for completed drinking water hauler training should be kept in the drinking water truck at all times, as per provincial and territorial requirements.

9. Permits to Operate

Where applicable, every drinking water hauler should obtain a permit to operate from the province, territory or reserve authorities. This official permit will normally provide:

- The drinking water truck’s license number;
- A copy of the proof of insurance;
- A copy of the most recent motor vehicle inspection report for the drinking water truck;
- The name and address of the drinking water hauler;
- A copy of the hauler’s driver’s license;
- The name and address of the hauler’s company, including the current business registration number;
- The brand name, model, serial number and the year of production of the drinking water truck;
- Any technical specifications of the drinking water truck (including its capacity), water tank and water delivery equipment;
- Photograph(s) of the drinking water truck being registered; and
- The drinking water supply source(s) to be used.

In addition, the contract between the trucked water delivery company and the First Nations community should include the following:

- A copy of the operating procedures. The procedures should cover topics such as filling the truck’s drinking water tank, carrying out drinking water sampling, testing drinking water, disinfecting the truck’s drinking water tank and related equipment, and storing the equipment at the end of the operating day;
- The proposed drinking water sampling and testing schedule; and
- Contingency and emergency response plans. These plans should cover details such as alternate drinking water supply and delivery plans, backup capabilities for staff and equipment, fire emergency response, accident reporting, what to do with bad samples, and dealing with suspected tampering of the drinking water supply.

The delivery truck driver must advise First Nations authorities immediately if there are any changes to the above information and procedures, including equipment or component changes.

10. Notification Processes

If bacteria or any other contaminant is detected in the drinking water or if contaminants are suspected to be present in the drinking water, the person doing the water testing must immediately notify First Nations Chiefs and Council, EHOs and CBWMs.

Environmental Health Officers should be granted access to the truck's drinking water equipment. They may:

- Inspect the drinking water truck, its drinking water tank, drinking water delivery equipment (such as hoses, couplings, and nozzles) and review drinking water supply routes;
- Review relevant documentation, including repair and maintenance records;
- Carry out testing to confirm compliance with the GCDWQ;
- Request additional information, as appropriate; and
- Require the drinking water hauler to routinely document maintenance and repair activities (using the template in Appendix F).

11. Definitions

The following are definitions of terms used in this guidance document.

Drinking water cistern

A tank used to store drinking water for domestic, commercial or industrial purposes.

Cross connection

The physical connection of a safe or potable water supply with another water supply of unknown or contaminated quality or such that the potable water could be contaminated or polluted.

Disinfectant

A sodium hypochlorite solution suitable for use with drinking water equipment, which does not contain algaecides, scents, perfumes, or any other additives.

Drinking water

For the purposes of this document, water from a public drinking water supply that has been treated and, at minimum, meets the most recent edition of the *Guidelines for Canadian Drinking Water Quality*.

Drinking water hauler

A trained individual who is employed to deliver bulk quantities of water to drinking water cisterns.

Drinking water tank

A container mounted on the tanker truck used for the delivery of the drinking water.

Drinking water truck

A vehicle constructed or modified to be used exclusively for delivering drinking water.

First Nations authority(ies)

Chief and Council, or any person or group of people with delegated authority to make decisions on behalf of the Chief and Council. Examples could include Health Directors, Housing Managers or Facility Operators.²

Trucked drinking water delivery

The transportation of drinking water in a water tank from the public drinking water supply. The tank is fixed to a truck for delivering water to cisterns at one or more destinations.

Water distribution system

Typically, a piped system for the conveyance of drinking water to users. Trucks used for drinking water delivery are considered an extension of the water distribution system.

² This definition was developed by HC-FNIHB's Environmental Public Health Division.

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APPENDIX A

List of Items in a Standard Cleaning Kit for Drinking Water Trucks

Item
Unscented household bleach (5.25% Sodium Hypochlorite) OR Industrial-strength Sodium Hypochlorite (12%)
Non-corrosive powdered household laundry soap/detergent
Stiff brush
High pressure hose pipe/water jet
Water bucket
Spray bottle
Chlorine Testing Kit for concentrations of at least 3.5 mg/L
Chlorine Testing Kit for concentrations up to 15 mg/L

APPENDIX B

Sample Calculations for Amount of Chemicals Required to Neutralize Various Residual Chlorine Concentrations

The following table is used to estimate the volume of neutralizing chemical required to be added to heavily chlorinated water prior to disposal:

Table 1
Amount of chemicals required to neutralize various residual Chlorine concentrations in 100,000 Imperial gallons (Igal)* (454.6 m³) of water

Starting Residual Chlorine Concentration	Chemical Required**							
	Sulphur Dioxide (SO ₂)		Sodium Bisulphite (NaHSO ₃)		Sodium Sulphite (Na ₂ SO ₃)		Sodium Thiosulfate (Na ₂ S ₂ O ₃ · 5H ₂ O)	
mg/L	lb	kg	lb	kg	lb	kg	lb	kg
1	0.8	0.36	1.2	0.54	1.4	0.64	1.2	.54
2	1.7	0.77	2.5	1.13	2.9	1.32	2.4	1.09
10	8.3	3.76	12.5	5.67	14.6	6.62	12.0	5.44
50	41.7	18.91	62.6	28.69	73.0	33.11	60.0	27.22

* Concentrations are provided in Imperial Gallons (Igal), as this is the most common unit in Canada.

If US gallons are required, a conversion factor of 1 Imperial gallon = 1.2 US gallons should be used to convert units to US gallons.

** The chemicals listed in this table are alternatives; only one chemical is required to neutralize residual chlorine concentrations, not all four.

Source: Adapted from ANSI/AWWA Standard C652-02: Disinfection of Water-storage Facilities, by permission. Copyright © 2002, American Water Works Association.

For truck volume of x, a conversion factor can be used to convert values in Table 1 as follows:

$$\text{Conversion Factor (CF)} = \frac{x}{100,000 \text{ Igal}}$$

Multiply chemical dosages included in Table 1 by the CF above.

For example, if the volume of truck is 1,000 Igal, the following conversion factor is used:

$$\text{CF} = \frac{1,000 \text{ Igal}}{100,000 \text{ Igal}} = 0.01$$

The amount of Sulphur Dioxide (SO₂) to be added is:

$$\text{In lb} = 0.8 \times 0.01 = 0.008 \text{ lb}$$

$$\text{In kg} = 0.36 \times 0.01 = 0.0036 \text{ kg}$$

Using this CF for all values in Table 1, the table below can be produced for a truck volume of 1,000 Igal:

Table 2
Amount of chemicals required to neutralize various residual chlorine concentrations in 1,000 I gal* (4.546 m³) of water

Starting Residual Chlorine Concentration	Chemical Required**							
	Sulphur Dioxide (SO ₂)		Sodium Bisulphite (NaHSO ₃)		Sodium Sulphite (Na ₂ SO ₃)		Sodium Thiosulfate (Na ₂ S ₂ O ₃ · 5H ₂ O)	
mg/L	lb	kg	lb	kg	lb	kg	lb	kg
1	0.008	0.0036	0.012	0.0054	0.014	0.0064	0.012	0.0054
2	0.017	0.0077	0.025	0.0113	0.029	0.0132	0.024	0.0109
10	0.083	0.0376	0.125	0.0567	0.146	0.0662	0.12	0.0544
50	0.417	0.1891	0.626	0.2869	0.73	0.3311	0.6	0.2722

* Concentrations are provided in Imperial Gallons (Igal), as this is the most common unit in Canada.

If US gallons are required, a conversion factor of 1 Imperial gallon = 1.2 US gallons should be used to convert units to US gallons.

** The chemicals listed in this table are alternatives; only one chemical is required to neutralize residual chlorine concentrations, not all four.

