

Threats Factsheet - CHEMICAL & FUEL



OVERVIEW

Now is a great time to start managing your operation so that it does not pose a threat to drinking water sources. The drinking water source that landowners are most likely to impact by their actions is their own. This fact alone should be an encouragement to implement best management practices. Drinking Water Source Protection has been studying local municipal drinking water systems in order to learn where the water that contributes to these systems comes from. The activities that take place in some contributing areas can have an impact on the groundwater or surface water quality.

This factsheet outlines the different threats that might pertain to farmers. It also provides examples of measures that may help manage these threats. Other threats will be covered in other landowner factsheets in this series. If you are in a vulnerable area and there are significant threats on your property, based on the Assessment Report, you will be contacted by the local Drinking Water Source Protection office. Policies will be developed for all significant threats. Information on the threats list and the Assessment Report can be found in "Threats Factsheet - General" and on www.waterprotection.ca.

The material in this factsheet is a summary of legislation. The reader should refer to the complete *Clean Water Act* and associated regulations for full details. Please note that other legislation outside of the work of the *Clean Water Act* may apply to your property. It is suggested that you consult with other regulatory agencies relevant to your operation.

WHAT ARE THREATS?

A threat is an activity that has a harmful effect, or the potential to have a harmful effect, on the quality or quantity of drinking water sources. The Ministry of the Environment for the Province of Ontario created a list of 21 threats, two of which are quantity threats and the rest are quality threats.

Quantity Threats

19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.

Quality Threats

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage.

3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid (DNAPL).
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

The complete Provincial Table of Drinking Water Threats (Threats Tables) can be found on the Ministry of the Environment website at: <http://www.ene.gov.on.ca/en/water/cleanwater/cwa-technical-rules.php>

THE THREATS COVERED IN THIS FACTSHEET

Quality Threats

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid (DNAPL).
17. The handling and storage of an organic solvent.

For chemical threats, the Threats Tables list details such as the substance, the quantity of this substance, the vulnerable area, and the vulnerability score of this vulnerable area. Finally, the hazard rating is defined and the risk rating is listed for each vulnerable area and vulnerability score. Chemical threats can exist in any vulnerable area, but the risk rating decreases with a longer time of travel. Further explanation of these technical details is provided in "Threats Factsheet - General."

THREAT 1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.

Scenario A. The application of hauled sewage to land may be considered a significant drinking water threat in a vulnerable area where hauled sewage: i) is being applied to land that is one or more hectares in size and ii) may result in the presence of nitrogen or phosphorus in groundwater or surface water.

Scenario B. The application of hauled sewage to land may be considered a significant drinking water threat in a vulnerable area where hauled sewage: i) is being applied in any quantity and ii) may result in the presence of one or more pathogens in groundwater or surface water.

Scenario C. A significant threat to groundwater or surface water may occur when a site that is not approved to accept hazardous waste or liquid industrial waste: i) accepts a waste described below and ii) stores the waste at or above grade; stores a portion of the waste, but not all, below grade; or stores the waste below grade and iii) a discharge of this waste may result in the presence of certain compounds (Arsenic, Barium, Cadmium, Chromium VI, Dichlorophenoxy Acetic Acid (D-2,4), lead, mercury, selenium, silver, Trichlorophenoxyacetic acid-2,4,5). The types of waste include:

- waste that is a hazardous industrial waste, hazardous waste chemical, ignitable waste, corrosive waste, leachate toxic waste or reactive waste and that is produced in any month in an amount less than five kilograms or otherwise accumulated in an amount less than five kilograms, or as listed in the definition of hazardous waste in Regulation 347 in the *Environmental Protection Act*,
- waste that is an acute hazardous waste chemical and that is produced in any month in an amount less than one kilogram or otherwise accumulated in an amount less than one kilogram,
- an empty container or the liner from an empty container that contained hazardous industrial waste, hazardous waste chemical, ignitable waste, corrosive waste, leachate toxic waste or reactive waste,
- an empty container of less than twenty litres capacity or one or more liners weighing, in total, less than ten kilograms from empty containers, that contained acute hazardous waste chemical,
- the residues or contaminated materials from the clean-up of a spill of less than five kilograms of waste that is a hazardous industrial waste, hazardous waste chemical, ignitable waste, corrosive waste, leachate toxic waste or reactive waste,
- the residues or contaminated materials from the clean-up of a spill of less than one kilogram of waste that is an acute hazardous waste chemical or
- waste that is produced in any month in an amount less than twenty-five litres or otherwise accumulated in an amount less than twenty-five litres as described in the definition of liquid industrial waste in that regulation.

Uses associated with these compounds relate to industrial, mining and municipal activities.

There are licensed facilities that handle waste products and it is advisable to use these sites or drop off materials at hazardous waste disposal days in order to remove these items from your property. Products or items that contain these contaminants are an environmental liability to your property and can pose a significant threat to groundwater and surface water.

THREAT 15. The handling and storage of fuel.

Many fuels contain hydrocarbons. Hydrocarbons are organic compounds containing only carbon and hydrogen. Hydrocarbons can cause contamination that can be expensive and sometimes impossible to fix. The key is to keep fuel out of water sources by practicing safe storage, handling and transportation of fuel products. Above ground tanks should have a tank contained within a properly sized dike system that can hold 110% of the tank's volume. Ideally it would have a roof to avoid rain and snow from filling up the dike area.

If you have fuel tanks in your home check them regularly for leaks and repair or replace if you notice any damage. Testing water for fuel products should be done if you suspect that a fuel tank has contaminated your drinking water supply. Fuel products can move quite easily once they reach groundwater or surface water so it is important to contain any spills.

Significant threats are associated with the circumstances listed in Table 1 below, where the quantity of fuel stored is greater than 2500L. The amount is the total capacity of tanks on the property. Average fuel tank size for farms is generally 1360 or 2250L, although some larger operations can have 4500L tanks.

The handling and storage of fuel is considered a chemical threat. To determine if your activity is a significant threat, refer to Table 1 below for the quantity that is required and the contaminant that would be released in the event of a spill. In addition, one the following circumstances would also need to apply to your situation:

- The above grade handling of liquid fuel in relation to its storage at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the *Technical Standards and Safety Act*, 2000 or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the *Technical Standards and Safety Act*, 2000, but not including a bulk plant.
- The below grade handling of liquid fuel in relation to its storage at a bulk plant as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the *Technical Standards and Safety Act*, 2000 , or a facility that manufactures or refines fuel.
- The below grade handling of liquid fuel in relation to its storage at a facility as defined in section 1 of O. Reg. 213/01 (Fuel Oil) made under the *Technical Standards and Safety Act*, 2000 or a facility as defined in section 1 of O. Reg. 217/01 (Liquid Fuels) made under the *Technical Standards and Safety Act*, 2000, but not including a bulk plant.

Table 1. Fuel storage circumstances

The quantity of liquid fuel stored	A spill of the fuel may result in the presence of this chemical in groundwater or surface water
More than 2500L	BTEX – (benzene, toluene, ethylbenzene, xylene)
More than 2500L	Petroleum Hydrocarbons F1 (nC6-nC10)

The following are in the Risk Management Measures Catalogue (RMMC) as measures (at time of publication):

Monitoring and inspections - storage and handling of fuel

Surface water and groundwater monitoring programs must be established to ensure there is no contamination due to leaks, spills or runoff. Inspection and re-inspection of underground fuel oil tanks is recommended. Fuel oil suppliers should conduct an initial inspection of a tank the first time they deliver fuel to a new customer. An inspection includes verifying proper gauge and overfill protection device, spills containment, and signs of leakage. Re-inspections should be carried out a least once every 10 years. Fuel oil suppliers that find unsafe equipment are required to stop the delivery of fuel oil until the equipment is fixed.

Updating equipment, instrumentation and measures to prevent leaks and spills

Equipment, instrumentation and measures to prevent leaks and spills include: double-walled tanks, a containment or catchment area, a full enclosure at the loading area to ensure spills can be collected separately and will not enter the surface water drainage system, and double-walled pipelines. Equipment designed with leakage sensors will alert the operator to a leak or spill. High level alarms, low level alarms and liquid level indicators will prevent overfilling the tank. Adequate training and instrumentation posted around the storage facility will ensure operators are educated on prevention and emergency measures.

THREAT 16. The handling and storage of a dense non-aqueous phase liquid (DNAPL).

Threats from dense non-aqueous phase liquids (DNAPLs) are a subcategory of chemical threats. Due to their high toxicity, persistence and adverse transport behaviour in groundwater aquifers, the risk rating for DNAPLs is “significant” at any quantity if: i) the vulnerability score is at least two and ii) the activity is located in a zone A, B or C of a wellhead protection area (WHPA).

Dense non-aqueous phase liquids (DNAPLs) are heavier than water and do not dissolve or mix with water. As a result, DNAPLs can quickly enter groundwater aquifers, especially along transport pathways such as wells. They form persistent lenses (blobs of greasy chemical) at the bottom of an aquifer and are difficult to monitor or deal with.

Many DNAPLs are highly toxic and carcinogenic, such as:

- Dioxane-1,4 and other polycyclic aromatic hydrocarbons (PAHs)
- Tetrachloroethylene (PCE)
- Trichloroethylene or other chemicals that degrade to it
- Vinyl chloride or other chemicals that degrade to it

DNAPLs have been used as coolants, as solvents for degreasing and dry cleaning, and as paint strippers and spot removers. They tend to have a greasy texture. These widely used and highly hazardous chemicals may not only be used in industrial facilities, but they may be used and disposed of on residential property.

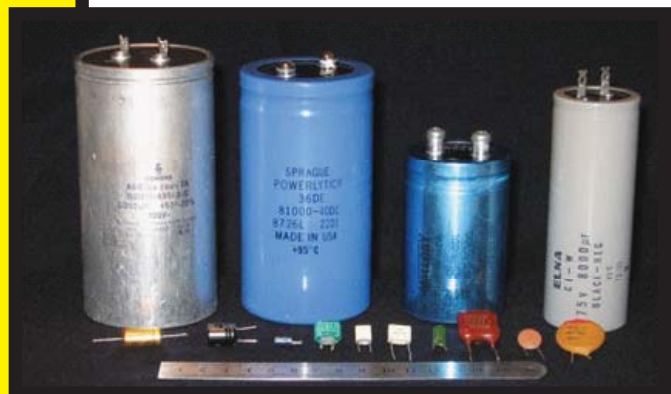
Some examples of products that may contain a DNAPL are:

- Liquid format cooling products that are used by machines or engines
- Paint thinners found in retail stores; some paints may also include DNAPLs
- Transformers
- Product in oil filled capacitors in electronics
- Some flame retardants
- Components of chemical additives

DNAPLs are rarely labeled so that you can identify them specifically, but they can exist in a lot of common products and some that you may have on your property.

Potential DNAPL Source

Many electronics have capacitors inside that may contain DNAPL type chemicals.



THREAT 17. The handling and storage of an organic solvent.

The handling and storage of an organic solvent is considered a chemical threat. Organic solvents need to be stored so that they do not spill into groundwater or surface water. If you are involved with the use of organic solvents, take care with their handling and storage. Use household hazardous collection days as a way to safely dispose of these items.

Examples of organic solvents:

- Carbon Tetrachloride was used in fire extinguishers, is a precursor to refrigerants, and is a cleaning agent, related to Carbofluorocarbons (CFC)
- Methylene Chloride is found in some paint strippers and degreasers
- Chloroform is used in the manufacturing of non-stick coating products
- Pentachlorophenol is in wood treatments

Listed below are various circumstances where a significant threat may occur.

Scenario A. The organic solvent is stored in a container that is located below grade. To determine if your activity is a significant threat, refer to Table 2 below for the quantity that is required and the contaminant that would be released in the event of a spill.

Table 2. Quantity and contaminants for below grade handling and storage of organic solvents

The quantity of organic solvent stored	A spill of the solvent may result in the presence of item below in groundwater
More than 25, but not more than 250L	Carbon Tetrachloride
	Chloroform
More than 25, but not more than 250L	Methylene Chloride (Dichloromethane)
More than 2500L	Carbon Tetrachloride
	Chloroform
	Methylene Chloride (Dichloromethane)
	Pentachlorophenol

Scenario B. The organic solvent is stored in a container a part of which, but not all, is below grade. To determine if your activity is a significant threat, refer to Table 3 below for the quantity that is required and the contaminant that would be released in the event of a spill.

Table 3. Quantity and contaminants for partially below grade handling and storage of organic solvents

The quantity of organic solvent stored	A spill of the solvent may result in the presence of item below in groundwater or surface water
More than 25, but not more than 250L	Carbon Tetrachloride
More than 250, but not more than 2500L	Carbon Tetrachloride
	Chloroform
	Methylene Chloride (Dichloromethane)
More than 2500L	Carbon Tetrachloride
	Chloroform
	Methylene Chloride (Dichloromethane)
	Pentachlorophenol

Scenario C. The organic solvent is stored in a container at or above grade. To determine if your activity is a significant threat, refer to Table 4 below for the quantity that is required and the contaminant that would be released in the event of a spill.

Table 4. Quantity and contaminants for at or above grade handling and storage of organic solvents

The quantity of organic solvent stored	A spill of the solvent may result in the presence of item below in groundwater or surface water
More than 250, but not more than 2500L	Carbon Tetrachloride
More than 2500L	Carbon Tetrachloride
	Chloroform
	Methylene Chloride (Dichloromethane)
	Pentachlorophenol



Examples of Best Management Practices

If you are storing chemicals or fuels, you should be prepared for the possibility of spills. A spill response kit will keep the materials that you need close at hand.



Barriers can help protect tanks from damage.

Tanks should be inspected regularly for leaks.

Funding Programs Available to the Agricultural Community

Environmental Farm Plan: An excellent way to take inventory of your farm activities is to complete an Environmental Farm Plan. There is cost-sharing through this program that can provide funds for on-farm projects. The Environmental Farm Plan is administered by Ontario Soil and Crop Improvement Association. Contacts for these programs locally can be found at www.ontariosoilcrop.org.

Ontario Drinking Water Stewardship Program: The Early Response Program, administered by Drinking Water Source Protection, will be available to landowners with significant threats. Eligible projects must be risk management measures in the Ministry's Provincial Risk Management Measures Catalogue. To access this catalogue use the following URL: <http://maps.thamesriver.on.ca/swpCAMaps/rmc/disclaimer.aspx>. For more information, contact Drinking Water Source Protection at 519-470-3000 or 1-877-470-3001.

Municipal or County programs: Check with your county or municipality. They may have a program available for clean water projects.



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"Threats Factsheet - Chemical & Fuel" is one in a series of Commodity Best Management Practice factsheets related to the Drinking Water Source Protection program. These factsheets give an overview of potential drinking water threats and circumstances that are significant. Also included are some possible measures to manage these circumstances. Visit www.waterprotection.ca to view them online or visit your local OMAFRA office for a copy.

Titles in the Threats Factsheet series: General; Row Crop; Livestock; Horticulture; Chemical & Fuel.

This factsheet was prepared for the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Region. This region covers the Saugeen Valley and Grey Sauble watershed regions, as well as the Municipality of Northern Bruce Peninsula.



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