

Drinking Water Threats from DNAPLs

The storage and handling of DNAPLs are considered drinking water threats under Ontario's *Clean Water Act, 2006*. Dense non-aqueous phase liquids or DNAPLs are chemicals that are heavier or denser than water and do not dissolve easily in water. DNAPLs are considered dangerous and toxic to human health even at low levels. Some have been classified as carcinogenic to humans and animals.

When spilled on the ground, these substances sink below the water table, creating contamination of the groundwater that can last for decades or centuries. DNAPLs are difficult to locate and remove from below the ground and complete cleanup is considered unattainable. DNAPLs are considered a very high risk based on the likely inability to remediate the aquifer and the time needed to replace a well.

DNAPLs are used widely in many industries and are also found in smaller quantities in common household products like adhesives and cleaners. Some common DNAPLs are dry cleaning chemicals, cleaning and degreasing solvents and varnishes. The most common DNAPLs are chlorinated solvents, for example, Trichloroethylene (TCE), which is used to clean metal products, and is also found in paint removers or strippers, spot removers and rug-cleaning fluids.

Which DNAPLs are considered a threat to drinking water sources?

DNAPLs pose a threat at greater distances from wells than some other chemical threats because they are persistent in the environment.

DNAPLs are widely and commonly used and so the potential exists for future contamination through spills and leaks from storage. Ontario has identified the following DNAPLs that could make their way into groundwater as a result of handling or storage. They are:

- 1,4-Dioxane
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Tetrachloroethylene (also known as perchloroethylene or PCE)
- Trichloroethylene (TCE)
- Vinyl Chloride (VC)

Types of threats to our drinking water sources:

Waste Disposal Sites

On-site Sewage Systems (septic systems)

Sewage Works (sewage treatment plants, municipal sewers)

Fuel Oil (residential heating oil)

Liquid Fuel

Nutrients (manure, biosolids, outdoor livestock areas)

Commercial Fertilizer

Pesticides

Road Salt and Snow Storage

Chemicals (DNAPLs (toxic chemicals) and Organic Solvents)

Aquaculture

Aircraft De-icing Runoff

Where are the threats from DNAPLs in the Lower Trent Region?

Policies in the Trent Source Protection Plan address the use of DNAPLs in the specific vulnerable areas. Activities can be considered significant drinking water threats when they occur in the most sensitive areas near municipal drinking water sources. In the Lower Trent Source Protection Area, this includes: the most vulnerable zones surrounding wells, called Wellhead Protection Areas (WHPAs) and the most vulnerable zones surrounding some surface water intakes, called Intake Protection Zones (IPZs).

There is the potential for significant threats from DNAPLs handling and storage:

- In the most vulnerable portions of the WHPAs for the Brighton, Colborne, Stirling, and Grafton municipal wells
- In the most vulnerable portions of the IPZs for the surface water intakes in Campbellford, Trenton, Frankford, Hastings, and Warkworth

Maps showing the vulnerable zones surrounding municipal water sources in the Lower Trent Source Protection Area are available at www.trentsourceprotection.on.ca.

How are threats from DNAPLs being addressed?

Policies in the Source Protection Plan address both existing and future handling and storage of DNAPLs that are or would be significant drinking water threats in the specific vulnerable areas.

Education and Outreach: A general education policy calls for a program to raise awareness about the location of vulnerable areas and actions that can be undertaken to protect municipal drinking water supplies.

Prohibition: In the future, new commercial and industrial storage and handling of DNAPLs located in close proximity to municipal drinking water sources, where they would be a significant threat, will be prohibited.

Risk Management Plans: Risk management plans will be required for existing commercial and industrial handling and storage of DNAPLs in specific vulnerable areas. The risk management plan will consider each property on a case-by-case basis and incorporate any other existing measures that are already in place. The risk management official will work with the property or business owner to develop a plan to ensure the safe handling and storage of DNAPLs. A Risk Management Official will be in touch with anyone requiring a risk management plan.

Restricted Land Use: This allows the municipality to identify areas where the handling and storage of DNAPLs are either prohibited or require a risk management plan. This will assist municipalities to create their own internal process to ensure compliance with the Source Protection Plan.

Lower Trent Source Protection Area

