

Dense Non-Aqueous Phase Liquids (DNAPLs)

What are DNAPLs?

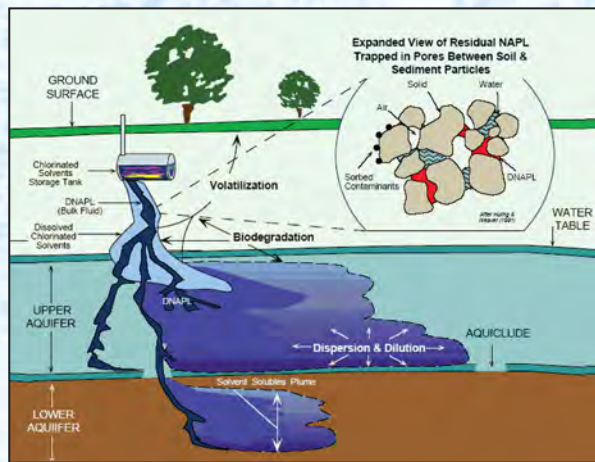
Dense non-aqueous phase liquids, or DNAPLs, are chemicals that are denser than water.

Even a small amount of DNAPL can cause a toxic level of contamination for human health and the environment.

If spilled, they tend to sink into the ground and even in small amounts can contaminate the deepest groundwater resources.

These chemicals are so expensive and difficult to remove, and so harmful to human and environmental health, that we need to make sure they don't get into a water source in the first place. That is what drinking water source protection is all about.

These liquids can form insoluble and highly mobile pools that defy all conventional clean-up methods.

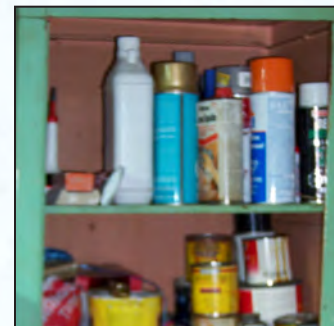


They generally do not dissolve readily in water, but remain as a separate phase liquid in ground or surface waters. Some compounds persist in the environment for decades. Examples are PCBs (polychlorinated biphenyls) and mercury. Other chemicals can become more toxic as they break down (such as chlorinated ethenes).

DNAPLs have been found in products that have been used extensively in commercial and industrial applications. The Ontario *Clean Water Act, 2006* pays special attention to DNAPLs because once they get into the water they are almost impossible to get out. You must recover 99.999 per cent of DNAPLs in the ground to successfully clean a spill or release.

What are the commonly used DNAPLs?

DCM (dichloromethane)	Paint stripper, metal cleaning, pharmaceuticals, aerosols.
TCM (chloroform)	Pharmaceuticals, fats, oils, rubber, resins.
TCA (trichloroethane)	Metal/plastic cleaning, adhesives, aerosols, inks, fats, waxes.
CTC (carbontetrachloride)	Fats, oils, laquers, varnishes, waxes, resins, seed oil.
TCE (trichloroethylene)	Metal cleaning, dry cleaning, paint removers, adhesives.
PCE (perchloroethylene)	Dry cleaning, metal cleaning, intermediates in processes.



How will this affect me?

Dense non-aqueous phase liquids can contaminate groundwater over large areas and for a long time – from decades to centuries.

Landowners who own property near sources of municipal drinking water, and who handle or store DNAPLs, may pose a significant threat to municipal drinking water supplies.

A committee of people from your region is developing

source protection plans that will have implications for those landowners on whose property activities or conditions have been identified as a threat to municipal drinking water.

The Ontario *Clean Water Act, 2006* requires that the risk associated with all significant threat activities must be reduced.

Find out more about source protection planning policies to protect water by visiting sourcewaterinfo.on.ca

Why are DNAPLs so dangerous?

Even at low levels, these liquids can lead to serious health issues, such as cancer, in humans. They can also harm the environment.

The density (mass per volume) of these chemicals means it only takes a small amount to travel deep into the water table.

Dense non-aqueous phase liquids don't dissolve readily, which means they sink into the ground and create pools which may remain for decades to centuries.

DNAPLs are relatively heavy which means they can get into groundwater sources (aquifers, from where many people draw their drinking water through municipal wells) quickly. They can even get into small fractures and spaces underground where they are difficult to find.



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