# DNR Remediation & Redevelopment Program Guidance For Public Comment

*The Remediation and Redevelopment Program is seeking input on the publication below. Email the staff contact listed below to share feedback.*

## Document Tracking Number

RR-671

## Document Title

**Guidance: What Landowners Should Know About Using Natural Attenuation to Clean Up Contaminated Groundwater**

### Background/Summary

This publication provides guidance for persons who perform investigation and remediation of sites with contamination under Wisconsin Administrative (Wis. Admin.) Code chs. NR 700 – 799 and Wisconsin Statute (Wis. Stat.) ch. 292. Specifically, this guidance is intended for responsible parties, property owners, environmental consultants and attorneys involved with the investigation and remediation of soil contamination.

Wis. Admin. Code ch. NR 720 establishes soil cleanup standards for soil contamination. This guidance describes how to establish and apply soil cleanup standards at a site or facility where a hazardous substance discharge impacted the soil.

## Public Comment Period Close Date

March 31, 2026

## Staff Contact & Email Address (For Public Comments)

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Please use subject line: “RR-671 Comments”

# Guidance: What Landowners Should Know About Using Natural Attenuation to Clean Up Contaminated Groundwater (RR-671)

**Wis. Admin. Code § NR 725.07(4)(a)**

**Purpose**

The purpose of this guidance is to clarify the process and requirements for using natural attenuation as a final remedy where residual groundwater contamination persists. It is intended to help property owners understand what natural attenuation is and how it can be applied to achieve case closure criteria and ensure long-term protectiveness of public health, safety, and the environment.

This guidance must be provided by responsible parties to owners of property impacted by contamination where natural attenuation is used as a final remedy to address the contamination, as required by Wis. Admin. Code § NR 725.07(4)(a).

**Related Guidance**

Find additional Department of Natural Resources (DNR) guidance on this topic by visiting dnr.wi.gov and searching "natural attenuation."

Natural attenuation takes advantage of natural processes in soil and groundwater to reduce concentration and the spread of contamination in the environment from chemical releases. Natural attenuation processes can effectively reduce the mass and concentration of contaminants. For example, if an underground storage tank leaked, the leaking tank and contaminated soil might be removed, then remaining contaminated groundwater is left in place to be cleaned up by natural attenuation processes.

The rate and degree of effectiveness of natural attenuation varies from site to site, depending upon the type of contaminants present and the physical, chemical and biological characteristics of the soil and groundwater.

## How Does Natural Attenuation Work?

Natural attenuation processes can be divided into two broad categories – destructive and non-destructive. Destructive processes destroy contaminants. The most common destructive process is biodegradation. Non-destructive processes do not destroy the contaminant, but reduce contaminant concentrations in groundwater through dilution, dispersion or adsorption.

### Biodegradation

Biodegradation is a process in which microorganisms that naturally occur in soil and groundwater (e.g., yeast, fungi, bacteria) break down or degrade hazardous substances to less toxic or non-toxic substances. Microorganisms consume organic compounds for nutrition and energy.

Some types of microorganisms can digest organic substances such as fuels or solvents that are

hazardous to humans. Microorganisms break down the organic contaminants into harmless products – mainly carbon dioxide and water.

Many organic contaminants, like petroleum, can be biodegraded by microorganisms in the underground environment. For example, under certain conditions, biodegradation processes can effectively cleanse soil and groundwater of fuels such as gasoline and compounds like benzene, toluene, ethylbenzene, and xylene.

Biodegradation can also be considered an effective remedial alternative for chlorinated hydrocarbons like trichloroethylene (TCE) in groundwater when site conditions support sustained microbial activity that transforms these compounds to harmless end products such as ethene, ethane, carbon dioxide, chloride, and water.

### Dilution and Dispersion

The effects of dilution and dispersion reduce contaminant concentrations but do not destroy contaminants. Clean water from the surface seeps underground to mix with and dilute contaminated groundwater. Pollutants can also be dispersed when clean groundwater flows into contaminated areas causing pollutants to spread out and away from the contaminated plume.

### Adsorption

Adsorption occurs when contaminants attach or "sorb" to underground particles. Most oily substances (like petroleum compounds) repel water and escape from the groundwater by attaching to organic matter and clay minerals in the subsurface. Like dilution and dispersion, adsorption does not destroy contaminants, but the process can slow down the contaminant movement, resulting in reduced concentrations of contaminants in the groundwater.

## Why Consider Natural Attenuation to Clean Up Soil and Groundwater?

Natural attenuation can be an effective, inexpensive cleanup option and an appropriate way to clean up some contaminated sites. Natural attenuation focuses on confirming and monitoring natural remediation processes rather than relying on engineered or active technologies (such as pumping and treating groundwater).

Natural attenuation requires no special equipment, energy source, or disposal of treated soil or groundwater. Natural attenuation is non-invasive, which allows treatment to go on below ground, while the surface can often continue to be used.

Sites impacted by contaminants from petroleum are generally good candidates for natural attenuation because the contaminants are amongst the most easily destroyed by biodegradation.

## Will Natural Attenuation Work at My Property?

If a party responsible for cleaning up a site would like to rely on natural attenuation as a remedy to address groundwater contamination, they are required to confirm that natural attenuation processes are working. An investigation is conducted to determine the type of contaminants present, the levels of contamination, and if the naturally occurring physical, chemical, and biological processes are likely to lead to the reduction in the concentration and mass of the substance and its breakdown products. In addition, the groundwater is monitored over time to show that the contaminant

concentrations are decreasing and that the contamination is no longer spreading (Wis. Admin. Code §§ 716.13(13) and NR 726.05(6)(a)6.).

The party conducting the cleanup then needs to demonstrate that natural attenuation will reduce the contaminant concentrations in the groundwater to legally acceptable limits within a reasonable period of time (Wis. Admin. Code § NR 726.05(6)(b)).

Monitoring is necessary to show that concentrations are decreasing at a sufficient rate to ensure that contaminants will not become a health or environmental threat in the future (Wis. Admin. Code §§ NR 724.17, 726.05(6)(a)6., and 726.05(7)(c)).

## Closure Of Contaminated Sites Using Natural Attenuation as a Final Remedy

Natural attenuation may be used as a final remedy to clean up a contaminated site when:

- the contaminant plume is not spreading,
- contaminant concentrations are stable or decreasing,
- contaminant concentrations are protective of public health and the environment, and
- within a reasonable period of time, the contaminant concentrations will decrease and meet environmental standards.

Because natural attenuation processes are slow, it may take many years before the contaminant concentrations meet environmental standards.

The DNR may grant case closure if all applicable case closure criteria are met, including the requirements for natural attenuation.

Restrictions may be placed on the property at the time of case closure. The property owner must comply with those restrictions, called continuing obligations, as specified in the case closure approval letter (Wis. Stat. § 292.12(2), Wis. Admin. Code § NR 726.15).

## Required Notifications to Property Owners

State law requires the responsible party to notify all property owners where contamination has spread of the contamination before they apply for closure (Wis. Stat. § 292.12(4)).

## Public Database

Properties with residual contamination at the time of case closure, including those that used natural attenuation as a final remedy, must be listed on a public database (Wis. Stat. § 292.12(3)). The property may be removed from the database if future monitoring shows that natural attenuation processes have reduced the contaminants to meet environmental standards (Wis. Stat. § 292.12(6)).