

## Notification of Continuing Obligations and Residual Contamination

### The affected property is:

- ☐ the source property (the source of the hazardous substance discharge), but the property is not owned by the person who conducted the cleanup (a deeded property)
- ☒ a deeded property affected by contamination from the source property
- ☐ a right-of-way (ROW)
- ☐ a Department of Transportation (DOT) ROW

**Include this completed page as an attachment with all notifications provided under sections A and B.**

### Contact Information

**Responsible Party:** The person responsible for sending this form, and for conducting the environmental investigation and cleanup is:

Responsible Party Name Jose Ochoa

Contact Person Last Name	First	MI	Phone Number (include area code)	
Martinez	Jose	O	(262) 344-9754	
Address		City	State	ZIP Code
3301 - 60th Street		Kenosha	WI	53144
E-mail shelbya1@hotmail.com				

### Name of Party Receiving Notification:

Business Name, if applicable: City of Kenosha

Title	Last Name	First	MI	Phone Number (include area code)	
Mr.	Museutif	Nasser		(262) 657-5712	
Address		City	State	ZIP Code	
3221 - 60th Street		Kenosha	WI	53144	

### Site Name and Source Property Information:

Site (Activity) Name Suggar Property

Address		City	State	ZIP Code
3301 - 60th Street		Kenosha	WI	53144
DNR ID # (BRRS#)		(DATCP) ID #		
03-30-004964				

### Contacts for Questions:

If you have any questions regarding the cleanup or about this notification, please contact the Responsible Party identified above, or contact:

**Environmental Consultant:** Midwest Environmental Consulting

Contact Person Last Name	First	MI	Phone Number (include area code)	
Cranley	Sean		(262) 237-4351	
Address		City	State	ZIP Code
N6395 E. Paradise Rd.		Burlington	WI	53105
E-mail mwenvirocon@gmail.com				

### Department Contact:

To review the Department's case file, or for questions on cleanups or closure requirements, contact:

**Department of:** Natural Resources (DNR)      **Office:** Plymouth

Address		City	State	ZIP Code
1155 Pilgrim Parkway		Plymouth	WI	53073
Contact Person Last Name	First	MI	Phone Number (include area code)	
Delcore	Lee		(920) 893-8524	
E-mail (Firstname.Lastname@wisconsin.gov) Lee.Delcore@wisconsin.gov				

**Section A: Deeded Property Notification: Residual Contamination and/or Continuing Obligations**

**KEEP THIS DOCUMENT WITH YOUR PROPERTY RECORDS**

3221 - 60th Street  
Kenosha, WI, 53144

Dear Mr. Museutif:

I am providing this letter to inform you of the location and extent of contamination remaining on your property, and of certain long-term responsibilities (continuing obligations) for which you may become responsible.

I have investigated a release of:

Petroleum from underground storage tanks

on 3301 - 60th Street, Kenosha, WI, 53144 that has shown that contamination has migrated onto your property.

I have responded to the release and will be requesting that the Department of Natural Resources (DNR) grant case closure. Closure means that the DNR will not be requiring any further investigation or cleanup action to be taken. However, continuing obligations may be imposed as a condition of closure approval.

**You have 30 days to comment on the attached legal description of your property and on the proposed closure request:**

Please review the enclosed legal description of your property, and notify Sean Cranley at N6395 E. Paradise Rd., Burlington, WI, 53105 within the next 30 days if the legal description is incorrect.

The DNR will not review my closure request for at least 30 days after the date of receipt of this letter. As an affected property owner, you have a right to contact the DNR to provide any technical information that you may have that indicates that closure should not be granted for this site. If you would like to submit any information that is relevant to this closure request, or if you want to waive the 30 day comment period, you should mail that information to the DNR contact: 1155 Pilgrim Parkway, Plymouth, WI, 53073, or at [Lee.Delcore@wisconsin.gov](mailto:Lee.Delcore@wisconsin.gov).

**Your Long-Term Responsibilities as a Property Owner and Occupant:**

The responses included

Site investigation and monitoring for natural attenuation

The continuing obligations I am proposing that affect your property are listed below, under the heading **Continuing Obligations**. Under s. 292.12 (5), Wis. Stats., current and future owners and occupants of this property are responsible for complying with continuing obligations imposed as part of an approved closure.

The fact sheet "Continuing Obligations for Environmental Protection" (DNR publication RR 819) has been included with this letter, to help explain the responsibilities you may have for maintenance of a certain continuing obligation, the limits of any liability for investigation and cleanup of contamination, and how these differ. If the fact sheet is lost, you may obtain copies at <http://dnr.wi.gov/files/PDF/pubs/rr/RR819.pdf>.

**Contract for responsibility for continuing obligation:**

Before I request closure, I will need to inform the DNR as to whom will be responsible for the continuing obligation/s on your property.

No contract has been executed.

Under s. 292.12, Wis. Stats., the responsibility for maintaining all necessary continuing obligations for your property will fall on you or any subsequent property owner, unless another person has a legally enforceable responsibility to comply with the requirements of the final closure letter. If you need more time to finalize an agreement on the responsibility for the continuing obligations on your Property, you may request additional time from the DNR contact identified in **Contact Information**.

*(Note: Future property owners would need to negotiate a new agreement.)*

## Notification of Continuing Obligations and Residual Contamination

### **Groundwater Contamination:**

Groundwater contamination originated at the property located at 3301 - 60th Street, Kenosha, WI, 53144 . Contaminated groundwater has migrated onto your property at:

3221 - 60th Street

The levels of

Benzene, ethylbenzene, naphthalene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene

contamination in the groundwater on your property are above the state groundwater enforcement standards found in ch. NR 140, Wis. Adm. Code.

However, the environmental consultants who have investigated this contamination have informed me that this groundwater contaminant plume is stable or receding and will naturally degrade over time. I believe that allowing natural attenuation, or the breakdown of contaminants in groundwater due to naturally occurring processes, to complete the cleanup at this site will meet the case closure requirements of ch. NR 726, Wis. Adm. Code. As part of my request for case closure, I am requesting that the DNR accept natural attenuation as the final remedy for this site.

The following DNR fact sheet (RR 671, "What Landowners Should Know: Information About Using Natural Attenuation to Clean Up Contaminated Groundwater") has been included with this notification, to help explain the use of natural attenuation as a remedy. If the fact sheet is lost, you may obtain a copy at <http://dnr.wi.gov/files/PDF/pubs/rr/RR671.pdf>.

**Continuing Obligations on Your Property:** As part of the cleanup, I am proposing that the following continuing obligations be used at your property, to address future exposure to residual contamination. If my closure request is approved, you will be responsible for the following continuing obligations.

To construct a new well or to reconstruct an existing well, the property owner at the time of construction or reconstruction will need to obtain prior approval from the DNR. See **Well Construction Requirements**. Typically, this results in casing off a portion of the aquifer during drilling, when needed, to protect the water supply.

Continued monitoring was requested/required for certain monitoring wells

### **Maintenance and Audits of Continuing Obligations:**

If compliance with a maintenance plan is required as part of a continuing obligation, an inspection log will need to be filled out periodically, and kept available for inspection by the DNR. Submittal of the inspection log may also be required. You will also need to notify any future owners or occupants of this property of the need to maintain the continuing obligation and to document that maintenance in the inspection log. Periodic audits of these continuing obligations may be conducted by the DNR, to ensure that potential exposure to residual contamination is being addressed. The DNR provides notification before conducting site visits as part of the audit.

### **Well Construction Requirements:**

If this site is closed, all properties within the site boundaries where contamination remains, or where a continuing obligation is applied, will be listed on the Bureau for Remediation and Redevelopment Tracking System (BRRTS) on the Web, at <https://dnr.wi.gov/topic/Brownfields/WRRD.html>. Inclusion on this database provides public notice of remaining contamination and of any continuing obligations. Documents can be viewed on this database, and include final closure letters, site maps and any applicable maintenance plans. The location of the site may also be viewed on the Remediation and Redevelopment Sites Map (RR Sites Map), at the same internet address listed above.

DNR approval prior to well construction or reconstruction is required in accordance with s. NR 812.09 (4) (w), Wis. Adm. Code. This requirement applies to private drinking water wells and high capacity wells. Special well construction standards may be necessary to protect the well from the remaining contamination. The property owner needs to first obtain approval from a regional water supply specialist in DNR's Drinking Water and Groundwater Program. A well driller can help complete this form. The well construction application, form 3300-254, is on the internet at <https://dnr.wi.gov/files/PDF/forms/3300/3300-254.pdf>.

## Notification of Continuing Obligations and Residual Contamination

### Site Closure:

If the DNR grants closure, you will receive a letter which defines the specific continuing obligations on your property. The status of the site (open or closed) may also be checked by searching BRRTS on the Web. You may view or download a copy of the closure letter (sent to the responsible party) from BRRTS on the Web. You may also request a copy of the closure letter from the **responsible party** or by writing to the DNR contact, at Lee Delcore, Lee. Delcore@wisconsin.gov, (920) 893-8524 . The final closure letter will contain a description of the continuing obligation, any prohibitions on activities and will include any applicable maintenance plan.

If you have any questions regarding this notification, I can be reached at: (262) 237-4351  
mwenvirocon@gmail.com

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Signature of responsible party/environmental consultant for the responsible party

Date Signed 5/4/2020

### Attachments

#### Contact Information

#### Legal Description for each Parcel:

#### Maps:

#### Maintenance plan

#### Factsheets:

RR 819, Continuing Obligations for Environmental Protection

RR 671, What Landowners Should Know: Information About Using Natural Attenuation to Clean Up Contaminated Groundwater

(http://www.co.kenosha.wi.us/)

Search powered by



# Kenosha County Property Information Web Portal

(http://www.gcssoftwa

Tax Year	Prop Type	Parcel Number	Municipality	Property Address	Billing Address
2020 ▼	Real Estate	01-122-01-203-002	241 - CITY OF KENOSHA	3221 60TH ST	NASTER INC 6021 33RD AVE KENOSHA WI 53144-4141
Tax Year Legend:  = owes prior year taxes  = not assessed  = not taxed Delinquent Current					

## Property Summary

Parcel #:	01-122-01-203-002
Alt. Parcel #:	0112201203002
Parcel Status:	Current Description
Creation Date:	1/1/1994
Historical Date:	
Acres:	0.130
Zoning:	
Frontage (ft):	43.000
Depth (ft):	136.000

## Property Addresses

Primary ▲	Address
<input checked="" type="checkbox"/>	3221 60TH ST KENOSHA 53142

## Owners

Name	Status	Ownership Type	Interest
NASTER INC	CURRENT OWNER		

## Parent Parcels

No Parent Parcels were found
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## Child Parcels

No Child Parcels were found
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## Workflow History and Messages

No Flag/Messages were found
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## Abbreviated Legal Description

(See recorded documents for a complete legal description)

W 42.6 FT OF LOT 2 PAUL SCHROEDER SUB PT OF NW 1/4 SEC 1 T1 R 22 DOC#1481771 DOC#1717352 & 1717353 AGREEMENT
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## Public Land Survey - Property Descriptions

Primary	Section ▲	Town	Range	Qtr 40	Qtr 160	Gov Lot	Block/Condo Bldg	Type	#	Plat
<input checked="" type="checkbox"/>	01	01 N	22 E		NW			N/A	2	PAUL SCHROEDER SUB



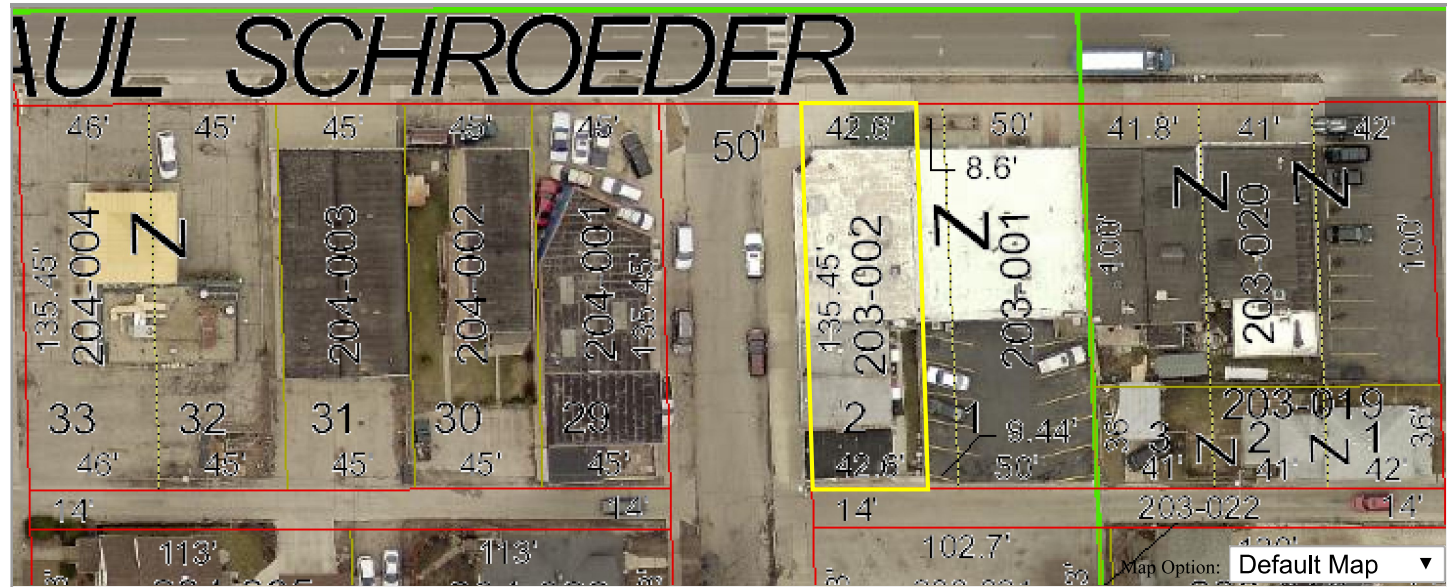
District

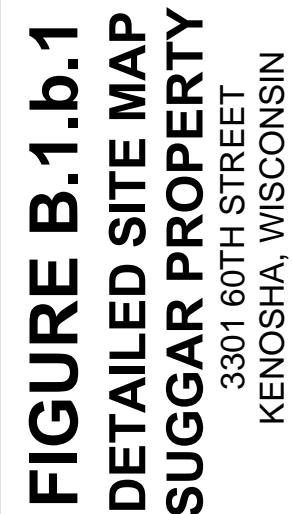
Code ▲	Description	Category
	KENOSHA COUNTY	OTHER DISTRICT
	LOCAL	OTHER DISTRICT
	STATE OF WISCONSIN	OTHER DISTRICT
2793	KENOSHA UNIF SCHOOL DIST	REGULAR SCHOOL
0600	GATEWAY TECHNICAL COLLEGE	TECHNICAL COLLEGE

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<http://www.gcssoftware.com>

GIS Map





## LEGEND

- |   |  |   |  |  |                  |
|---|--|---|--|--|------------------|
|  | - SUGGAR GROUNDWATER MONITORING WELL LOCATION                      |  | - SUGGAR SUB-SLAB VAPOR SAMPLING LOCATION        |  | - GAS            |
|  | - MUELLERS GROUNDWATER MONITORING WELL LOCATION                    |  | - TANK CLOSURE SOIL SAMPLE LOCATION              |  | - ELECTRICAL     |
|  | - SUGGAR DIRECT-PUSH SOIL BORING LOCATION                          |  | - 3305 60th STREET PHASE II SOIL BORING LOCATION |  | - WATER          |
|  | - SUGGAR DIRECT-PUSH SOIL BORING / GROUNDWATER SAMPLING LOCATION   |  | - FLOOR DRAIN                                    |  | - SANITARY SEWER |
|  | - MUELLERS DIRECT-PUSH SOIL BORING / GROUNDWATER SAMPLING LOCATION |   |  |  | - STORM SEWER    |
|   |  |   |  |  | - TELECOM        |

- NS - NO SAMPLE  
NE - NO EXCEEDANCE  
ND - NO DETECTS  
NIDC - ONE OR MORE CONTAMINANTS EXCEED NON-INDUSTRIAL  
DIRECT CONTACT RESIDUAL CONTAMINATION LEVELS  
GWP - ONE OR MORE CONTAMINANTS EXCEED GROUNDWATER  
PROTECTION RESIDUAL CONTAMINATION LEVELS  
ES - ONE OR MORE GROUNDWATER CONTAMINANTS  
EXCEED ENFORCEMENT STANDARDS  
PAL - ONE OR MORE GROUNDWATER CONTAMINANTS  
EXCEED PREVENTIVE ACTION LIMITS

- 
- The diagram illustrates four levels of contamination, each represented by a colored line and a text description:
- NIDC** (Non-Industrial Direct Contact): Represented by an orange line. The text describes it as "INFERRED EXTENT OF SOIL CONTAMINATION EXCEEDING NON-INDUSTRIAL DIRECT CONTACT RESIDUAL CONTAMINATION LEVELS".
  - GWP** (Groundwater Protection): Represented by a brown line. The text describes it as "INFERRED EXTENT OF SOIL CONTAMINATION EXCEEDING GROUNDWATER PROTECTION RESIDUAL CONTAMINATION LEVELS".
  - ES** (Enforcement Standards): Represented by a blue line. The text describes it as "INFERRED EXTENT OF GROUNDWATER CONTAMINATION EXCEEDING ENFORCEMENT STANDARDS".
  - PAL** (Preventive Action Limits): Represented by a dark blue line. The text describes it as "INFERRED EXTENT OF GROUNDWATER CONTAMINATION EXCEEDING PREVENTIVE ACTION LIMITS".



Approved By:	<b>S. Cranley</b>
Date Approved:	<b>5/1/2020</b>
Date Drawn:	<b>5/1/2020</b>
Drawn by:	<b>R. S.</b>

Figure  
**B.1.b.1**



## Remediation and Redevelopment Program

June 2017

# Continuing Obligations for Environmental Protection Responsibilities of Wisconsin Property Owners

## Wis. Stat. § 292.12

### Purpose

This fact sheet is intended to help property owners understand their legal requirements under s. 292.12, Wis. Stats., regarding continuing obligations that arise due to the environmental condition of their property.

### Introduction

The term “continuing obligations” refers to certain actions for which property owners are responsible following a completed environmental cleanup. They are sometimes called environmental land use controls or institutional controls. These legal obligations, such as a requirement to maintain pavement over contaminated soil, are most often found in a cleanup approval letter from the state.

Less commonly, a continuing obligation may apply where a cleanup is not yet completed but a cleanup plan has been approved, or at a property owned by a local government that is exempt from certain cleanup requirements.

## What Are Continuing Obligations?

Continuing obligations are legal requirements designed to protect public health and the environment in regard to contamination that remains on a property.

Continuing obligations still apply after a property is sold. Each new owner is responsible for complying with the continuing obligations.

## Background

Wisconsin, like most states, allows some contamination to remain after cleanup of soil or groundwater contamination (residual contamination). This minimizes the transportation of contamination and reduces cleanup costs while still ensuring that public health and the environment are protected.

The Department of Natural Resources (DNR), through its Remediation and Redevelopment (RR) Program, places sites or properties with residual contamination on a public database in order to provide notice to interested parties about the residual contamination and any associated continuing obligations. Please see the “Public Information” section on page 3 to learn more about the database. (Prior to June 3, 2006, the state used deed restrictions recorded at county courthouses to establish continuing obligations, and those deed restrictions have also been added into the database.)

## Types of Continuing Obligations

### 1. Manage Contaminated Soil that is Excavated

If the property owner intends to dig up an area with contaminated soil, the owner must ensure that proper soil sampling, followed by appropriate treatment or disposal, takes place. Managing contaminated soil must be done in compliance with state law and is usually done under the guidance of a private environmental professional.



## 2. Manage Construction of Water Supply Wells

If there is soil or groundwater contamination and the property owner plans to construct or reconstruct a water supply well, the owner must obtain prior DNR approval to ensure that well construction is designed to protect the water supply from contamination.

### Other Types of Continuing Obligations

Some continuing obligations are designed specifically for conditions on individual properties. Examples include:

- keeping clean soil and vegetation over contaminated soil;
- keeping an asphalt “cover” over contaminated soil or groundwater;
- maintaining a vapor venting system; and
- notifying the state if a structural impediment (e.g. building) that restricted the cleanup is removed. The owner may then need to conduct additional state-approved environmental work.

It is common for properties with approved cleanups to have continuing obligations because the DNR generally does not require removal of all contamination.

Property owners with the types of continuing obligations described above will find these requirements described in the state’s cleanup approval letter or cleanup plan approval, and *must*:

- comply with these property-specific requirements; and
- obtain the state’s permission before changing portions of the property where these requirements apply.

The requirements apply whether or not the person owned the property at the time that the continuing obligations were placed on the property.

### Changing a Continuing Obligation

A property owner has the option to modify a continuing obligation if environmental conditions change. For example, petroleum contamination can degrade over time and property owners may collect new samples showing that residual contamination is gone. They may then request that the DNR modify or remove a continuing obligation. Fees are required for the DNR’s review of this request and for processing the change to the database (\$1050 review fee, \$300/\$350 database fee). Fees are subject to change; current fees are found in Wis. Admin. § NR 749 online at [http://docs.legis.wisconsin.gov/code/admin\\_code/nr/700/749](http://docs.legis.wisconsin.gov/code/admin_code/nr/700/749).

### Public Information

The DNR provides public information about continuing obligations on the Internet. This information helps property owners, purchasers, lessees and lenders understand legal requirements that apply to a property. The DNR has a comprehensive database of contaminated and cleaned up sites, *BRRTS on the Web*. This database shows all contamination activities known to the DNR. Site specific documents are found under the *Documents* section. The information includes maps, deeds, contaminant data and the state’s closure letter. The closure letter states that no additional environmental cleanup is needed for past contamination and includes information on property-specific continuing obligations. If a cleanup has not been completed, the state’s approval of the remedial action plan will contain the information about

continuing obligations.

Properties with continuing obligations can generally be located in the DNR's *RR Sites Map*. RR Sites Map provides a map view of contaminated and cleaned up sites, including sites with continuing obligations, and links to BRRTS on the Web. *BRRTS on the Web* and *RR Sites Map* are part of the Wisconsin Remediation and Redevelopment Database (WRRD) at <http://dnr.wi.gov/topic/Brownfields/wrrd.html>.

If a completed cleanup is shown in *BRRTS on the Web* but the site documents cannot be found in the documents section, the DNR's closure letter can still be obtained from a regional office. For assistance, please contact a DNR Environmental Program Associate (see the RR Program's Staff Contact web page at [dnr.wi.gov/topic/Brownfields/Contact.html](http://dnr.wi.gov/topic/Brownfields/Contact.html)).

## **Off-Site Contamination: When Continuing Obligations Cross the Property Line**

An off-site property owner is someone who owns property that has been affected by contamination that moved through soil, sediment or groundwater from another property. Wis. Stat. § 292.13 provides an exemption from environmental cleanup requirements for owners of "off-site" properties. The DNR will generally not ask off-site property owners to investigate or clean up contamination that came from a different property, as long as the property owner allows access to his or her property so that others who are responsible for the contamination may complete the cleanup.

However, off-site property owners are legally obligated to comply with continuing obligations on their property, even though they did not cause the contamination. For example, if the state approved a cleanup where the person responsible for the contamination placed clean soil over contamination on an off-site property, the owner of the off-site property must either keep that soil in place or obtain state approval before disturbing it.

Property owners and others should check the *Public Information* section above if they need to:

- determine whether and where continuing obligations exist on a property;
- review the inspection, maintenance and reporting requirements, and
- contact the DNR regarding changing that portion of the property. The person to contact is the person that approved the closure or remedial action plan.

## **Option for an Off-Site Liability Exemption Letter**

In general, owners of off-site properties have a legal exemption from environmental cleanup requirements. This exemption does not require a state approval letter. Nonetheless, they may request a property-specific liability exemption letter from the DNR if they have enough information to show that the source of the contamination is not on their property. This letter may be helpful in real estate transactions. The fee for this letter is \$700 under Chapter NR 749, Wis. Adm. Code. For more information about this option, please see the RR Program's Liability web page at [dnr.wi.gov/topic/Brownfields/Liability.html](http://dnr.wi.gov/topic/Brownfields/Liability.html).

### **Legal Obligations of Off-Site Property Owners**

- Allow access so the person cleaning up the contamination may work on the off-site property (unless the off-site owner completes the cleanup independently).
- Comply with any required continuing obligations on the off-site property.

## Required Notifications to Off-Site Property Owners

1. The person responsible for cleaning up contamination must notify affected property owners of any proposed continuing obligations on their off-site property **before** asking the DNR to approve the cleanup. This is required by law and allows the off-site owners to provide the DNR with any technical information that may be relevant to the cleanup approval.

When circumstances are appropriate, an off-site neighbor and the person responsible for the cleanup may enter into a “legally enforceable agreement” (i.e. a contract). Under this type of private agreement, the person responsible for the contamination may also take responsibility for maintaining a continuing obligation on an off-site property. This agreement would not automatically transfer to future owners of the off-site property. The state is not a party to the agreement and cannot enforce it.

2. If a cleanup proposal that includes off-site continuing obligations is approved, the DNR will send a letter to the off-site owners detailing the continuing obligations that are required for their property. Property owners should inform anyone interested in buying their property about maintaining these continuing obligations. For residential property, this would be part of the real estate disclosure obligation.

## More Information

For more information, please visit the RR Program’s Continuing Obligations website at [dnr.wi.gov/topic/Brownfields/Residual.html](http://dnr.wi.gov/topic/Brownfields/Residual.html).

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This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statute or administrative rule are referenced. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing statutes and administrative rules to the relevant facts.

The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Chief, Public Civil Rights, Office of Civil Rights, U.S. Department of the Interior, 1849 C. Street, NW, Washington, D.C. 20240.

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# Using Natural Attenuation to Clean Up Contaminated Groundwater: What Landowners Should Know

RR-671

December 2016

## What Is Natural Attenuation?

Natural attenuation makes use of natural processes in soil and groundwater to contain the spread of contamination and to reduce the amount of contamination from chemical releases.

Natural attenuation is an *in-situ* treatment method. This means that contaminants are left in place while natural attenuation works on them. Natural attenuation is relied upon to clean up contamination that remains after the source of the contamination is removed. An example of a source of contamination would be a leaking underground petroleum tank.

## How Does Natural Attenuation Work?

Natural attenuation processes work at many sites, but the rate and degree of effectiveness varies from property to property, depending upon the type of contaminants present and the physical, chemical and biological characteristics of the soil and groundwater.

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

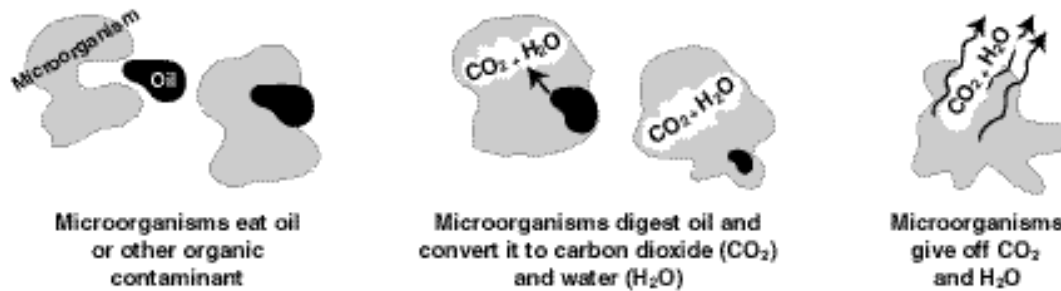
Biodegradation is a process in which micro-organisms that naturally occur in soil and groundwater (e.g. yeast, fungi, or bacteria), break down, or degrade hazardous substances to less toxic or non-toxic substances. Microorganisms, like humans, eat and digest organic compounds for nutrition and energy (organic compounds contain carbon and hydrogen atoms).

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. Once the contaminants are degraded, the microorganism populations decline because they have used their food sources. These small populations of microorganisms pose no contaminant or health risk.

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

Biodegradation can also breakdown other contaminants in groundwater such as trichloroethylene (TCE), a chlorinated solvent used in metal cleaning. However, the processes involved are harder to predict and are less effective at contaminant removal compared to petroleum-contaminated sites.





**Figure 1. Schematic Diagram of Aerobic Biodegradation in Soil**

### **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.

Other processes that lead to reduced concentrations of contaminants include clean groundwater flowing into contaminated areas, and the dispersion of pollutants as they spread out and away from the main path of 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.

This process holds back or retards contaminant movement and reduces the concentration of contaminants in the groundwater. However, like dilution and dispersion, adsorption does not destroy contaminants.

### **Why Consider Natural Attenuation To Clean Up Soil And Groundwater?**

In certain situations, natural attenuation is an effective, inexpensive cleanup option and the most appropriate way to remediate some contamination problems. Natural attenuation focuses on confirming and monitoring natural remediation processes rather than relying on engineered or “active” technologies (such as pumping groundwater, treating it above ground, then disposing of the treated water).

Contaminants from petroleum are good candidates for natural attenuation because they are among the most easily destroyed by biodegradation. Natural attenuation is non-invasive, which allows treatment to go on below ground, while the surface can continue to be used.

Natural attenuation can also be less costly than active engineered treatment options, and requires no special equipment, energy source, or disposal of treated soil or groundwater.

### **Will Natural Attenuation Work At My Property?**

Whether natural attenuation will work at a particular location is determined by investigating the soil and groundwater. These investigations determine the type of contaminants present, the levels of contamination, and the physical and chemical conditions that lead to biodegradation of the contaminants.

In order to rely on natural attenuation, responsible parties are required to confirm that natural attenuation processes are working by monitoring the soil and groundwater over a period of time to show that the contaminant concentrations are decreasing and that the contamination is no longer spreading.



Those conducting the cleanup need to know whether natural attenuation, or any proposed remedy, will reduce the contaminant concentrations in the soil and groundwater to legally acceptable limits within a reasonable period of time.

Natural attenuation may be an acceptable option for sites where active remediation has occurred and has reduced the concentration of contaminants (for instance, removing leaking underground tanks and contaminated soil).

However, natural attenuation is not an appropriate option at all sites. If the contamination has affected a drinking water well, or has entered a stream or lake, active cleanup options may be necessary to make sure people and the environment are protected from direct contact with the contamination.

The speed or rate of natural attenuation processes is typically slow. Monitoring is necessary to show that concentrations decrease at a sufficient rate to ensure that contaminants will not become a health threat in the future.

### **Closure Of Contaminated Sites Using Natural Attenuation As A Final Remedy**

When contamination is discovered at a property (such as a gas station with leaking underground tanks), the person who is responsible for causing the contamination, and persons having possession or control of hazardous substances that have been discharged, have the responsibility to remove the source of contamination and investigate and clean up the contamination that has escaped into the soil and groundwater.

The contaminant release must be reported to the Wisconsin Department of Natural Resources (DNR) and the site investigation and cleanup are overseen by a state agency. Depending on the type of contaminant, the oversight agency could be the Department of Agriculture, Trade and Consumer Protection or Department of Natural Resources.

When the cleanup has complied with state standards, the person responsible for the contamination will ask the state agency for closure of the case. If natural attenuation is relied upon to finish cleaning up a contaminated property after closure, the responsible person will need to show that contaminant concentrations are not spreading, that contaminant concentrations are stable or decreasing, and that the concentrations will decrease in the future until state groundwater standards are met.

Because natural attenuation processes are slow, it may take many years before the properties with contamination are clean. State rules require that all owners of properties where groundwater contamination has spread must be informed of the contamination below their property.

In addition, the properties with groundwater contamination exceeding state groundwater enforcement standards must be listed on a database to notify future owners and developers of the presence of contamination. If future monitoring occurs and shows that natural attenuation processes have removed the contaminants to state-required cleanup levels, then the properties can be removed from the database.

The state agency will grant closure if the site investigation and monitoring shows that natural attenuation will clean up groundwater to state standards within a reasonable period of time. All state rules for cleanup must be met and the person who is responsible for the contamination must comply with all conditions of the state's closure approval.

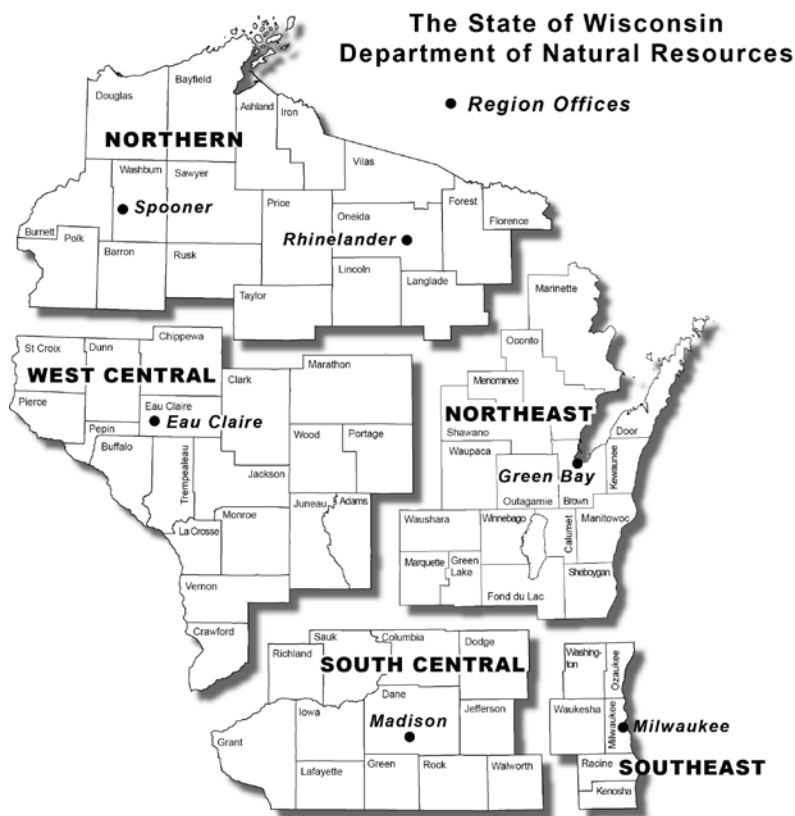
## Publications

The following publications provide additional information on natural attenuation. Websites where these can be downloaded free of charge are also listed.

- *A Citizen's Guide to Bioremediation*, September 2012, EPA 542-F-12-003; [https://www.epa.gov/sites/production/files/2015-04/documents/a\\_citizens\\_guide\\_to\\_bioremediation.pdf](https://www.epa.gov/sites/production/files/2015-04/documents/a_citizens_guide_to_bioremediation.pdf)
- *Commonly Asked Questions Regarding the Use of Natural Attenuation for Petroleum-Contaminated Sites at Federal Facilities*, [www.clu-in.org/download/techfocus/na/na-petrol.pdf](http://www.clu-in.org/download/techfocus/na/na-petrol.pdf)
- *Monitored Natural Attenuation of Petroleum Hydrocarbons: U.S. EPA Remedial Technology Fact Sheet*, May 1999, EPA 600-F-98-021; [www.clu-in.org/download/remed/pet-hyd.pdf](http://www.clu-in.org/download/remed/pet-hyd.pdf)
- *Monitored Natural Attenuation of Chlorinated Solvents*, May 1999, EPA 600-F-98-0022; [www.clu-in.org/download/remed/chl-solv.pdf](http://www.clu-in.org/download/remed/chl-solv.pdf)
- *Guidance on Natural Attenuation for Petroleum Releases, WI DNR, Bureau for Remediation and Redevelopment*, March 2003, PUB-RR-614; [dnr.wi.gov/files/PDF/pubs/rr/RR614.pdf](http://dnr.wi.gov/files/PDF/pubs/rr/RR614.pdf)

## Contact Information

If you have questions about natural attenuation contact a [DNR Environmental Program Associate \(EPA\)](#) in your local DNR regional office. The EPA can direct you to a project manager.



*Note: These are the Remediation and Redevelopment Program's designated regions. Other DNR program regional boundaries may be different.*