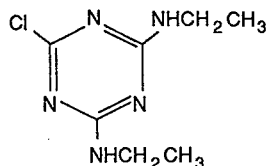




# National Pesticide Survey

## Simazine



Simazine

The U.S. Environmental Protection Agency (EPA) has completed its five-year National Survey of Pesticides in Drinking Water Wells (NPS), a study of the presence of 127 pesticides, pesticide degradates, and nitrate in community water system (CWS) wells and rural domestic drinking water wells. Simazine was one of the pesticides detected in the Survey. This fact sheet provides a description of simazine, its potential health effects, and guidance on both treating and preventing well contamination.

### What is Simazine?

Simazine is the common name of an herbicide which is a member of the chemical family of triazines. Simazine was registered for use in the late 1960s. It has been sold under the trade names of Aquazine, Princep, Gesatop, Weedex, Drexel Simazine and the discontinued trade names of Framed and Simadex. Simazine is also a component of other herbicides such as Amizine, Pramitol 5PS, Simazol, Simazat, and Remtal. Simazine is used to control broadleaf and grass weeds in corn, citrus, deciduous fruits and nuts, olives, pineapple, established alfalfa, and perennial grasses grown for seed or pasture, turf grasses grown for sod, ornamentals, nursery plantings, christmas tree plantations, sugarcane, asparagus, and artichokes. It is also used as a nonselective herbicide for vegetation control in non-agricultural land and for selective control of algae and submerged weeds in ponds. It is approved for algae control in swimming pools, large aquaria, ornamental fish ponds, fountains, and recirculating water cooling towers.

### How Does Simazine Behave in Soil and Ground Water?

The behavior of a pesticide after it is released to the environment is dependent upon its movement in air, water, and soil as well as the rate at which it is transformed, or broken down. Pesticides applied to crops or the soil surface may volatilize (vaporize) to the atmosphere, be carried off by surface runoff, be carried to ground water through leaching, or remain in the soil through adsorption (adherence) to soil particles and undergo little movement in air or water. Pesticides may be transformed by reaction with water, microorganisms, and exposure to sunlight. The likelihood that simazine will migrate into ground water is influenced by its tendency to be transported (move) from soil to air and water and to be transformed by these various processes, as well as by the characteristics of the site, such as soil type, moisture, temperature, and depth to ground water. Simazine has a medium potential to be transported, and a low potential to be transformed.



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### **How Does Simazine Get into Ground Water?**

Simazine migration into ground water could result from the presence of simazine in the soil due to agricultural and other applications. Non-agricultural applications of simazine include use on golf courses. Simazine could also reach ground water from direct entry into a well through accidental chemical spills or improper storage near a well.

### **Findings of the National Pesticide Survey**

Based on the results of the NPS, EPA estimates that simazine is present, at or above the analytical detection level of 0.38  $\mu\text{g/L}$  used in the Survey, in about 1,080 (1.1%) CWS wells and 25,100 (0.2%) rural domestic wells nationwide. Considering the precision of the Survey, EPA estimates that the number of CWS wells could be as low as 350 or as high as 2,540, whereas the number of rural domestic wells could be as low as 590 or as high as 141,000. Simazine is measured in micrograms per liter ( $\mu\text{g/L}$ ) which is equivalent to parts per billion (ppb). Simazine was not detected at concentrations above EPA's drinking water Lifetime Health Advisory Level (HAL) and proposed Maximum Contaminant Level (MCL) of 1.0  $\mu\text{g/L}$ . Other studies, however, indicate concentrations above the HAL and MCL.

### **What Health Effects Might be Caused by Simazine in Drinking Water?**

**Non-Cancer Effects:** EPA has set a Lifetime Health Advisory Level for simazine in drinking water at 1  $\mu\text{g/L}$ . EPA believes that water containing simazine at or below this level is acceptable for drinking every day over the course of one's lifetime, and does not pose any health concerns. Lifetime HALs are based on health effects that were found in animals given high doses of the pesticides in laboratory studies. This level includes a margin of safety. Consuming simazine, however, at high levels well above the Lifetime Health Advisory Level over a long period of time has been shown to result in adverse health effects in animal studies, including tremors, damage to the testes, kidneys, liver, and thyroid, disturbances in sperm production, and gene mutations.

**Cancer Risk:** EPA currently considers Simazine to be a possible human carcinogen (cancer-causing agent). EPA estimates that if an individual consumes water containing simazine at 0.3  $\mu\text{g/L}$  over his or her entire lifetime, that person would theoretically have no more than a one in a million chance of developing cancer as a direct result of drinking water containing this pesticide.

**Standard:** EPA sets enforceable standards for public water systems, called MCLs. These regulations set achievable levels of drinking water quality to protect human health. The proposed MCL for simazine is 1  $\mu\text{g/L}$  (July 25, 1990).

### **How is Water Treated to Remove Contaminants?**

Simazine can be detected in drinking water by a laboratory using an EPA method such as #507. If simazine is detected in well water and confirmed by retesting to be above 1  $\mu\text{g/L}$ , State or County health officials should be consulted. They may advise periodic retesting to get an accurate overall picture of the water quality because changes in seasonal precipitation and changes in pesticide use can cause variations in the amount of chemicals found in water wells. They also may advise using an alternative drinking water supply (bottled water is an example of a temporary alternative), treating the water, or drilling a new or deeper well. Public water suppliers are required to notify customers if the drinking water that they deliver contains a contaminant that exceed its MCL.

You may also be able to treat your well water to remove pesticides and other contaminants. Treatment technologies that can remove simazine from water include granular and powder activated carbon adsorption. Other technologies such as ion exchange, reverse osmosis, ozone oxidation, and ultraviolet irradiation are in the experimental stages for this pesticide and are not necessarily appropriate or available in every situation. Certain treatment methods are more suitable for large community water systems than for individual domestic wells. State or County health officials should be able to provide advice on the best approach to follow.

## **How Can Water Contamination be Prevented?**

Several steps may be taken to prevent pesticides or nitrate from entering wells, such as eliminating direct entry through the well wall, drilling a new well, or modifying or reducing pesticide and fertilizer use.

### ***Eliminate Direct Entry Through the Well Wall***

If pesticides or nitrate are present in well water, they may be entering the ground water through the well itself rather than through the soil. If the well is old or poorly constructed, or if there are visible cracks in the well casing, obtain expert advice on whether or not improvements can be made to the well. In addition, investigate simple methods of capping the well or sealing it at the surface to prevent entry. Do not conduct any mixing activities near the well if you use well water to mix pesticides because a spill could lead to direct contamination of the well.

### ***Drill a New Well***

If the soil surrounding the well is the source of contamination, drilling a new or deeper well may make sense if water can be drawn from a deeper, uncontaminated aquifer. Unfortunately, it often is difficult to know the quality of the ground water without drilling or extensive testing. Seek expert advice before you drill.

### ***Learn More about Pesticide Use***

If you use pesticides, whether for agricultural or home lawn and garden purposes, you should consider attending training courses given by your State or County agriculture department on how to reduce activities that can contaminate ground water. You may also find that you can lessen the frequency or quantity of your pesticide usage by choosing alternative methods of pest control.

## **Why was the National Pesticide Survey Conducted?**

EPA conducted this Survey to determine the frequency and concentration of pesticides, pesticide degradates, and nitrate in drinking water wells nationwide and to examine the relationship between the presence of pesticides in drinking water wells and patterns of pesticide use and ground-water vulnerability. The Survey sampled 566 community water system wells and 783 rural domestic wells for 127 pesticides, pesticide degradates, and nitrate. The wells were selected as a representative statistical sample to provide nationwide estimates of the presence of pesticides and nitrate in drinking water wells, and are not meant to provide an assessment of pesticide contamination at the local, County, or State level.

## **Where to Go for More Information**

This fact sheet is part of a series of NPS outreach materials, fact sheets and reports. The following additional fact sheets are available through EPA's Public Information Center (401 M Street SW, Washington DC 20460, (202) 382-2080):

<b><i>Survey Design</i></b>	<b><i>Analytical Methods</i></b>	<b><i>Project Summary</i></b>
<b><i>Survey Analytes</i></b>	<b><i>Summary Results</i></b>	<b><i>Glossary</i></b>
<b><i>Quality Assurance/Quality Control</i></b>	<b><i>Fact Sheet for each detected analyte</i></b>	<b><i>How EPA Will Use The NPS Results</i></b>

Additional information on the Survey and on pesticides in general can be obtained from the following sources:

U.S. EPA Safe Drinking Water Hotline 1-800-426-4791 (In Washington, DC (202) 382-5533) Monday-Friday, 8:30 am to 4:30 pm Eastern Time	Information on regulation of pesticides in drinking water
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National Pesticide Telecommunications Network  
1-800-858-7378  
24 hours a day

Information on health  
effects and safe  
handling of pesticides

U.S. EPA Office of Pesticide Programs (OPP) Docket  
401 M Street, SW Room NEG004  
Washington, DC 20460  
(202) 382-3587

Background documents  
for Survey (available  
for review)

National Technical Information Service (NTIS)  
5285 Port Royal Road  
Springfield, VA 22161  
(703) 487-4650

Copies of the  
NPS Phase I Report  
(available 1991)  
and  
NPS Phase II Report  
(when available)

If you are concerned about the presence of pesticides and nitrate in your private water well, contact your local or State health department. Other experts in your State environmental agency or agriculture and health departments may also be helpful to you. If you receive your drinking water from a community water system and have questions about your water quality, contact your local community water system owner/operator or the State water supply agency.

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