



Use of Dyes and Tracers to Confirm Septic System Failures

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On-lot sewage disposal systems can fail. Septic tanks can become overloaded or absorption fields can clog. Leaching of untreated sewage can lead to contamination of nearby water wells. In many cases, the signs of a failing system are visible—seepage appears at the soil surface, often with a smell of septage. An inspection by a trained Pennsylvania Septage Management Association (PSMA) certified professional will almost always identify existing or potential on-lot sewage system problems. Testing your drinking water for coliform contamination may also detect system problems.

If however, there are circumstances where additional testing or system conformation is needed to detect malfunctions, commercially available dyes and tracers can be used to establish the flowpath of wastewater and confirm a suspected problem.

When using tracer dyes, it is a recommended practice to provide property occupants with a Materials Data Safety Sheet (MSDS) document from the manufacturer of the dye being used and procure a signed document stating that the present occupant has read the MSDS and permits the use of the dye during the inspection process. Vacant or absent occupant properties do not give such opportunities, therefore, literature stating that dye has been used in the process of inspecting the septic system which may show up in the drinking water of private wells or springs along with an MSDS should be placed in a conspicuous location. Although they have been marketed for many years, available information regarding carcinogenicity is limited and directions for use have not been clearly defined. This fact sheet provides information about the use and availability of different dyes and tracers in Pennsylvania. Since dye tracing is a complex technique, it is not recommended that this fact sheet be used as a “how to” guide.

Types of Dyes and Tracers

Two common dyes used for tracking in septic disposal systems are chemically name Uranine and Rhodamine B. Let’s take a closer look at these two dyes.

Uranine dye (fluorosine #4) is the most common dye used today. It is green-yellow in appearance and has no other commercial application. Uranine is water soluble but becomes unstable in light, heat, or when exposed to bacterial contamination, strong oxidizing or reducing agents. Because it’s retention in soil approximates the renovative properties of soil, this dye is preferred over most other dyes and tracers used for tracking.

How does Uranine work? Before introducing uranine into a system, a water sample should always be taken to determine background uranine levels. Samples should be taken at the drinking water point of use, outfall water or ponded discharge water. Once the background level is known, the dye is introduced into either the septic tank or toilet. **ALWAYS FOLLOW THE DISTRIBUTOR’S INSTRUCTIONS FOR USE AND HANDLING.** If the absorption field is not properly functioning, Uranine may appear around the system within minutes of introduction or it may take several hours and sometimes days to appear. It may show up in the household or neighbor’s tap water or in seepage puddles in the backyard. If uranine is not observed immediately, this does not indicate that it is not present. A water sample must be tested to determine actual concentrations in the system.

Rhodamine B is an alternative dye used in septic system tracking. Rhodamine, an organic, was commonly used in the cosmetics industry. Rhodamine B’s distinct red hue make it ideal for coloring lipsticks and rouges. Because it readily adsorbs to clay particles in the soil, it is not as effective at verifying malfunctioning on-lot systems. However, if background levels of uranine are high, Rhodamine

B is often used. A second limitation to the use of Rhodamine B is its carcinogenicity. The Food and Drug Administration has now regulated its use in the cosmetics industry because at certain levels, it is a known carcinogen. With regards to septic system tracking, the Environmental Protection Agency does not limit Rhodamine B's use at LABEL-SPECIFIED LEVELS. As with Uranine, Rhodamine B is introduced into the system and appears either within minutes or hours of introduction. It may or may not be visibly detectable at surface outfalls or taps so a water sample should always be tested.

Handle with Care

Although the use of dyes and tracers is not regulated at label specified levels, as with most chemicals you should always handle them with care. Distributors of these chemicals use various trade names, but almost all of the marketed dyes contain Uranine or Rhodamine so always follow the directions for use and any handling precautions noted on the label. The table below lists a few of the tradename products, forms, color, and general directions for dyes from four companies.*

Company	Tradename	Forms	Color
Bonneau Dye Corp. 10815 Briggs Road Cleveland, OH 44111 (216)252-7171 (800)767-6363	Bonn Trace	Liquid	Fluorescent purple, Yellow, green, bright red
		Powder	red, yellow, green
Kings Cotes Chemicals, Inc. 3334 South Tech Blvd. Miamisburg, OH 45342 (800)394-0678	Kings Cotes Dye Tracing Products	Tablets, Donuts, Cakes, Powder, Cones, Liquid	Fluorescent red and yellow green; nonfluorescent blue
Norlab, Inc P.O. Box 380 Amherst, OH 44001 (216)282-5265	Liquid Powder Tracing Dye	Liquid Powder	Fluorescent yellow green, violet, orange, and red; high intensity blue
Presto Dyechem Co., Inc. 60 N. Front St. Philadelphia, PA 19106 (215) 627-1863 (800)338-2322		Tablets Powders Liquids	Fluorescent green and red; brilliant blue

Confirming Cross-Contamination

Although dyes and tracers can be used to confirm various types of septic system failures, the following three points should be considered;

1. Dyes and tracers are most efficiently used to confirm cross-contamination of wells by nearby septic systems.
2. Tracking of sewage effluent in groundwater and surface water systems is complex and difficult to predict using dyes and tracers.
3. Because the dye or tracer does not appear does not mean that untreated sewage is not contaminating surface and groundwater systems.

** Where trade names appear, no discrimination is intended and no endorsement by the Cooperative Extension System is implied.*

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