



Septage Management

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What is septage?

“Septage” is the liquid and solid material that is pumped from a septic tank, cesspool, or other treatment facility after it has accumulated over a period of time. A septic tank will usually retain 60 to 70% of the solids, oil, and grease that enter it. The scum accumulates on top and the sludge settles at the bottom, comprising 20 to 50% of the total septic tank volume when pumped.

Septage has an offensive odor and appearance and contains significant levels of grease, grit, hair, and debris. It is a host for many disease-causing organisms.

Many types of septage exist; however, the focus of this fact sheet will be limited to domestic septage. Treatment and disposal of domestic septage is governed by the U.S. Code of Federal Regulations (40 CFR) Part 503. However, municipalities also establish local regulations for septage handling, treatment, and disposal in addition to the state and federal regulations.

Facilities for septage treatment and disposal can be privately or publicly owned. Larger municipalities are capable of managing the whole process from handling and treatment to disposal. Other municipalities opt to use privately owned facilities that alleviate some of the responsibilities of operating a facility. Land disposal of septage after adequate treatment is also a popular option, while in some cases, pretreatment may not be necessary.

What are the options for septage management?

The basic methods of treating and disposing of septage are by 1) land application, 2) treatment at wastewater treatment plants, and 3) treatment at independent septage treatment plants. Listed below are some of the various options for each of these three approaches:

Land Application

- Surface application
- Subsurface incorporation
- Burial

Treatment at Wastewater Treatment Plants

- Addition to upstream sewer manhole
- Addition to plant headworks
- Addition to sludge handling process
- Addition to both liquid stream and sludge handling processes

Treatment at Independent Septage Treatment Plants

- Stabilization lagoon
- Chlorine oxidation
- Aerobic digestion
- Anaerobic digestion
- Biological and chemical treatment
- Conditioning and stabilization
- Composting

Selecting the appropriate septage management option depends not only on technical issues, but particularly on regulatory requirements. Every management option chosen should be in accordance with local, state, and federal regulations. Some of the factors that influence the process of selection include: land availability and site conditions, buffer zone requirements, hauling distance, fuel costs, labor costs, costs of disposal, and other legal and regulatory requirements.

However, some limitations to certain management options of untreated septage are the lack of available sites or potential odor and pathogen problems, which can be reduced by pretreating and stabilizing the septage before it is applied to the land.

How is septage stabilized?

Stabilization is a treatment method that decreases odors, the levels of disease-causing organisms, and further decay of septage. Pretreatment/stabilization is achieved by physical, chemical, or biological processes. Stabilization options include lime stabilization, aerobic digestion, anaerobic digestion, and composting.

In what ways can septage be applied to the land?

Land application of septage is currently the most commonly used disposal method

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in the U.S. It is relatively simple and cost-effective, uses minimal energy, and recycles organic material and nutrients to the land. With proper management, domestic septage is a resource that contains nutrients that can condition the soil and decrease the reliance on chemical fertilizers for agriculture. Septage management maximizes these benefits of septage while protecting public health and the environment.

Septage can be incorporated into the land on either the surface or subsurface. Surface application includes spreading septage from septage hauler trucks, specially designed land application vehicles, or tank wagons onto sites, or using spray irrigation, ridge and furrow irrigation, and overland flow.

Subsurface incorporation places untreated septage just below the soil surface, reducing odors and health risks while fertilizing and conditioning the soil. Options for subsurface application are 1) plow furrow cover (where liquid septage is discharged from a tank into a narrow furrow and is then covered by a second plow) and 2) subsurface injection (where liquid septage is injected in a narrow cavity created by a tillage tool).

In addition, various burial options exist, including placing septage in trenches, holding lagoons, and sanitary landfills.

What about treating septage at wastewater treatment plants?

A convenient and attractive option for septage treatment would be at a wastewater treatment plant. The constituents of septage are similar to domestic sewage, even though septage is much stronger and more concentrated.

The main approaches to treating septage at a wastewater treatment plant are discussed below:

- *Septage Addition to Upstream Sewer Manhole*—Septage is added to a sewer upstream of the wastewater treatment plant, and substantial dilution of septage occurs prior to it reaching the wastewater treatment plant.
- *Septage Addition to Plant Headworks*—Septage is added to sewage immediately upstream of the screening and grit removal processes.
- *Septage Addition to Sludge Handling Process*—Septage is handled as a sludge and processed with wastewater treatment plant sludge after pretreatment in the receiving station.
- *Septage Addition to Both Liquid Stream and Sludge Handling Processes*—Septage is pretreated to separate liquid and solid fractions, which are then processed accordingly.

However, when wastewater treatment facilities are too distant or do not have adequate capacity, independent septage treatment plants can be of use.

How is septage treated at independent septage treatment plants?

Independent septage treatment plants are designed exclusively for treating septage and usually have many unit processes to handle both the liquid and solid portions of septage. These facilities vary from stabilization lagoons to sophisticated treatment plants. Independent septage treatment plants use such processes as chlorine oxidation, aerobic digestion, anaerobic digestion, and biological and chemical treatment. Many septage treatment plants use lime to provide both conditioning and stabilization before the septage is dewatered. The liquid residual can be discharged to a privately owned treatment works or it can

undergo further treatment and then be discharged. Septage solids can be sent to a landfill, composted, applied to the land, or incinerated.

Another feasible option for septage treatment facilities is composting in locations where bulking agents are available and the humus product is needed as a soil conditioner. It is preferable to dewater septage before composting. Septage is resistant to dewatering, thus the need for conditioning chemicals is considerable and varies among different loads.

What is the cost of a septage management system?

Cost considerations cannot be generalized because of the wide range of options available for septage management. The cost of a septage management system depends on the treatment and disposal method used and the regulatory requirements of a particular area.

Administrators of a septage management program should be aware of disposal options and the cost involved. The median cost of disposal (or tipping fee) typically ranges from 3 to 6 cents per gallon.

How do I stay informed about septage management?

For more information on septage management or a list of other fact sheets, contact the National Small Flows Clearinghouse (NSFC) at West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064. Phone: (800) 624-8301 or (304) 293-4191. Fax: (304) 293-3161. World Wide Web site: <http://www.nsfsc.wvu.edu>.

The NSFC provides free and low-cost informational services and products to help homeowners and small communities address their wastewater needs. Also, information about manufacturers, consultants, regulations, and facilities can be obtained from the NSFC's databases.

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