Land Application of Septage

Agricultural • Forest • Reclamation

EPA 503 PROGRAM

December 2017: Updated by the Kansas State University Pollution Prevention Institute and paid for, in part, by KDHE.

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DISPOSAL AND LAND APPLICATION OF DOMESTIC SEPTAGE IN KANSAS PER EPA 503 REGULATIONS

This document and associated forms describe options and requirements for disposal and land application of domestic septage in non-public contact sites, in accordance with EPA 503 procedures.

Background

After Feb. 19, 1994, septage haulers operating in the United States have been required to fully comply with federal regulations, "Standards for the Use or Disposal of Sewage Sludge," commonly called 503 rules. Information in this domestic, septage land application guidance is provided to help handlers, recyclers, and disposers of septage understand and follow the 503 rules. Requirements for persons who apply domestic septage to non-public contact sites (sites not frequently visited by the public, which includes agricultural land) are outlined in this bulletin. By carefully following these rules for the septage land application process, septage pumpers will help to significantly reduce potential contamination of surface and groundwater in application areas.

Domestic Septage Definition and Characteristics

According to EPA 503 rules, domestic septage is the liquid or solid material removed from a septic tank, cesspool, portable toilet, type III marine sanitation device, or similar system that receives only household, non-commercial, non-industrial sewage. Domestic septage does NOT include grease from grease traps.

Common characteristics of domestic septage are as follows:

- Sixty to seventy percent of solids found in domestic wastewater are retained in the septic tank.
- Approximately nine times more nitrogen and phosphorus are found in septage than in domestic wastewater.
- Large numbers of disease-causing microorganisms, including bacteria, viruses, and pathogenic human parasites, are present in septage.

The Kansas Department of Health and Environment Bureau of Water (KDHE BOW) has developed this guidance document based on the EPA document titled "A Guide to the Federal EPA Rule for Land Application of Domestic Septage for Non-Public Contact Sites (Agricultural Land, Forests, and Reclamation Sites)," dated September 1993. This current version of the guidance document was developed in November 2017.

Disposal Options for Pumped Domestic Septage

At a minimum, **ALL** septage pumpers should keep a complete record of every load of septage, noting the location of where it was pumped, how it was handled, and the location where it was disposed. **Form 1**, which can be found at the FORMS section of this guidance document, provides a sample method for recording this information. Once the information about the load is recorded, the load must be disposed using Option A or Option B below.

Option A. ***Disposal at a municipal wastewater plant***

This method is preferred and highly recommended for the following reasons:

- EPA 503 defines requirements for the septage hauler for a specific load end once the septage is properly discharged and accepted by the municipal plant operator. The municipal plant then assumes responsibility for compliance.
- It is the best option to ensure pathogens are destroyed, as well as providing significantly better protection of surface and groundwater from excessive loading of nutrients and other contaminants.
- It significantly reduces paperwork requirements for the septage hauler. If domestic septage is disposed at a municipal wastewater treatment plant, then the septage hauler's record keeping responsibility ends once the load is accepted at the plant.

The Kansas Department of Health and Environment Bureau of Water (KDHE BOW) also recommends the following:

- Septage haulers should contact the municipal wastewater plant(s) in their service area to determine if the plant accepts domestic septage, and to inquire about dumping requirements and fees.
- Domestic septage should NOT be disposed at a public or private wastewater treatment lagoon or sludge lagoon.

OR

Option B. ***Land application of septage***

Land application is the spraying or spreading of domestic septage onto the land surface, or the incorporation or injection of domestic septage into soil so that sewage sludge can condition the soil and fertilize vegetation grown in that soil.

To legally land-apply septage, the following four requirements MUST be met and documented by the septage pumper/applier:

1. Determine the allowed annual rate for land application of septage.
2. Provide the alternative used for pathogen reduction.
3. Provide the method used for vector-attraction reduction.
4. Retain records for EPA 503 land application requirements for five years.

The following pages detail how to fulfill the four requirements for land application of septage.

LAND APPLICATION — STEP-BY-STEP INSTRUCTIONS ON HOW TO COMPLY

The following instructions and forms serve as a basis for operating a domestic septage, pumping and disposal business in accordance with EPA 503 regulations. In addition to completing the four steps to comply with these regulations, state and local authority regarding domestic septage management must also be considered. KDHE BOW recommends the following actions be taken before beginning any new domestic septage pumping and disposal activities.

- Consult with the county sanitarian about local land application requirements. A directory of county sanitarians can be found at the following web address: http://www.kdheks.gov/nps/lepp/lepp.htm.

- Become familiar with the environmental codes of the counties where pumping and disposal activities will be occurring. The following website provides a directory of county environmental codes: http://www.kdheks.gov/nps/lepp/CountyCodes.html.

- If a county does not have more restrictive limits, then the requirements noted below apply.
  - Septage may not be applied within 100 feet of a public or private water supply well.
  - Septage shall not be applied within a 100-year flood plain.
  - Septage shall not be applied within 33 feet of any surface water.

After the local authority has been contacted and the local environmental code has been reviewed, the septage pumper should proceed with completing the following four requirements.

Step 1. Determine the allowed annual rate for land application of septage.

Determine the annual application rate for nitrogen for the planned crop. This amount shall be calculated and the nitrogen amount provided by septage shall not exceed that crop requirement. The maximum volume of domestic septage that may be applied to any site depends on the pounds of nitrogen required per acre by the planned crop for a specific projected yield. This information is listed for all Kansas-grown crops in the KSU Bulletin MF-2586 (Soil Test Interpretations and Fertilizer Recommendations). This bulletin can be found at the following web address: https://www.bookstore.ksre.ksu.edu/pubs/mf2586.pdf or it is also available at local county extension offices. Additionally, local county extension agents may be able to assist with applying and using this bulletin.

Form 2 (included in the FORMS section at the back of this guidance document) can be used to track location and ownership of the land where septage is to be applied, crop selection for the land application parcel, and annual application rate for the crop to be planted. As presented simply in Form 2, the calculation for determining the annual application rate is detailed below:

$$Annual\ Application\ Rate \left\{ \frac{\frac{gallons}{acre}}{year} \right\} = \frac{Annual\ lbs\ of\ Nitrogen\ Required\ for\ Crop\ and\ Yield}{0.0026\ (conversion\ factor)}$$

As an example, if 74 pounds of nitrogen per acre is required to grow a 60-bushel-per-acre crop of wheat, then the annual application rate of domestic septage would be 23,077 gallons per acre.

$$Annual\ Application\ Rate\ = \frac{74}{0.0026} = 28{,}461\ \frac{\frac{gallons}{acre}}{year}$$

The primary reason for this annual rate calculation is to prevent the application of nitrogen in excess of crop needs and its potential movement through soil to groundwater.

Step 2. <u>Provide the alternative used for pathogen reduction.</u>

Domestic septage must be managed so that pathogens (disease-causing organisms) are appropriately reduced. The 503 rules offer two alternatives to meet this requirement. The first is no treatment and its restrictions are presented in Figure 1; requirements of the second option (pH 12 for a minimum of 30 minutes, i.e., mixing 50 pounds of hydrated lime/1,000 gallons of septage) are listed in Figure 2.

Please note both pathogen-reduction alternatives impose crop-harvesting restrictions. However, site-access controls are only required when the soil-incorporation alternative for pathogen reduction has been used. Remember, septage pumpers are required to inform the owner/operator of the land where the domestic septage has been applied about these crop-harvesting and site-access restriction requirements. This notification is required because septage pumpers/appliers must certify these conditions are met.

NOTE: The 503 rules do not restrict access to the site by persons working the land. These regulations assume these persons, as well as the applier, are aware of and will follow appropriate hygiene practices to minimize any problems with domestic septage.

Figure 1: PATHOGEN REDUCTION ALTERNATIVE 1 for Domestic Septage Applied to Non-Public Contact Sites

Domestic septage is pumped from the septic tank or holding tank and is land-applied without treatment; i.e., septage is injected **OR** spread on soil, and incorporated within six hours.

<u>Crop restrictions:</u>

a. Food crops with harvested parts that touch the septage/soil mixture and are totally above ground shall not be harvested for 14 months after application of domestic septage.
   Examples — melons or strawberries
b. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage.
   Examples — potatoes, onions, and radishes
c. Animal feed, fiber, and those food crops that do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage.
   Examples — wheat, corn, peaches, and hay
d. Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage, when the harvested turf is placed on either land or a lawn with a high potential for public exposure, unless otherwise specified by the permitting authority.

<u>Grazing restriction:</u> Animals shall not be allowed to graze on the land for 30 days after application of domestic septage.

<u>Site-access restriction:</u> Public access to land with a low potential for public exposure shall be restricted for 30 days after application of domestic septage. Examples of restricted access include remoteness, posting with no trespassing signs, and/or simple fencing.

Figure 2: PATHOGEN REDUCTION ALTERNATIVE 2 for Domestic Septage (with pH Treatment) Applied to Non-Public Contact Land
Domestic septage pumped from the septic tank or holding tank has had its pH raised to 12 or higher by the addition of alkali such as hydrated lime and, without adding more alkali, the domestic septage remains at a pH of 12 or higher for at least 30 minutes prior to being land-applied. To accomplish this goal, 50 pounds of hydrated lime shall be mixed and thoroughly agitated in each 1,000 gallons of septage. <u>Crop restrictions:</u> a. Food crops with harvested parts that touch the septage/soil mixture, and are totally above ground, shall not be harvested for 14 months after application of domestic septage. Examples — melons or strawberries b. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of domestic septage, when the domestic septage remains on the land surface for four months or longer prior to incorporation into the soil. Examples — potatoes, onions, and radishes c. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage, when the domestic septage remains on the land surface for less than four months prior to incorporation into the soil. Examples — potatoes, onions, and radishes d. Animal feed, fiber, and those food crops whose harvested parts do not touch the soil surface shall not be harvested for 30 days after application of the domestic septage. Examples — wheat, corn, peaches, and hay e. Turf grown on land where domestic septage is applied shall not be harvested for one year after application of the domestic septage, when the harvested turf is placed on either a lawn or land with high potential for public exposure, unless otherwise specified by the permitting authority. <u>Grazing restrictions:</u> None <u>Site-access restrictions:</u> None

Step 3. <u>Provide the method used for vector reduction.</u>

Choose one of the following methods for reducing vector attraction:

1. Inject septage immediately below the soil surface.

OR

2. Apply septage to the land surface, and incorporate it into the soil surface plow layer within six hours.

OR

3. Raise the pH of the septage to 12 or above, and hold above 12 for 30 minutes. The suggested procedure is to use a 50-pound bag of hydrated lime per 1,000 gallons of septage (see procedure in text box).

Procedure — Raising pH with Hydrated Lime

1. Agitate septic tank contents with a truck vacuum hose.
2. Withdraw 200-400 gallons of septage from the septic tank.
3. Add 50 pounds of hydrated lime to the septage through the vacuum hose. The dry lime (available at hardware stores and lumber yards) can be emptied into five-gallon buckets or can be vacuumed directly from the original paper bag.
4. The balance of the 1,000 gallons of septage should then be vacuumed into the truck.
5. Agitate septage/lime mixture for 15 minutes by frequent opening and closing of the main hose vacuum valve. Air bubbling through the mixture, as well as sloshing of the material inside the truck tank during transport to the field disposal site, will accomplish adequate mixing.
6. Thirty minutes after the lime has been added, the mixture can be surface-spread on the soil.
7. This example illustrates a 1,000-gallon mix. If the truck has only a 500 gallon capacity, use 25 pounds of lime. Similarly a 1,500-gallon tank will require 75 pounds of hydrated lime.
8. Follow all label safety instructions printed on the lime package, i.e. wear rubber boots, gloves, and eye protection.

Certification of pathogen and vector reduction

Septage pumpers must complete and sign for each application site, the certification shown in **Form 3**. This will document that pathogen and vector-attraction reduction activities have met requirements of the EPA 503 program.

Step 4. Retain records for EPA 503 land application requirements.

The preceding three steps must not only be followed to comply with 503 rules, but they also must be documented with records kept for all septage pumping and disposal activities. Septage pumpers must retain records for five years after any application of domestic septage to a site but are not required to report this information under 503 regulations. However, local authorities may require reporting certain information to them. These required records may be requested for review at any time by the permitting or enforcement authority. Record keeping requirements for EPA 503 domestic septage are summarized in the following table.

RECORD KEEPING REQUIREMENTS
1. Record the location of the site where domestic septage is applied: Provide the legal description and, if available, street address, and longitude and latitude of the site (available from U.S. Geological Survey maps). 2. Record the number of acres to which domestic septage is applied at each site. 3. Record the date and time of each domestic septage application. 4. Record the nitrogen requirement for the crop or vegetation grown on each site during the year. Indicate the expected crop yield to help establish the nitrogen requirement on the form. 5. Record the gallons of septage applied to the site during the specified 365-day period. 6. Complete the certification shown in Form 3. 7. Record a description of how pathogen requirements are met for each batch of domestic septage that is land-applied. 8. Record a description of how the vector-attraction reduction requirement is met for each batch of domestic septage that is land-applied.

If the following three forms are used and properly completed, the requirements above would be considered a satisfactory record of septage pumping, disposal, and land application activities.

FORMS FOR DOMESTIC SEPTAGE MANAGEMENT
AND
LAND APPLICATION OF DOMESTIC SEPTAGE

Form 1

LAND APPLICATION SITE: _____ RECORD YEAR: _____

NAME & ADDRESS WHERE SEPTAGE WAS PUMPED	DATE OF APPLIC. TO SITE	GALLONS APPLIED TO SITE	TOTAL GALS APPLIED Y.T.D.	WAS SEPTAGE INCORPORATED?#	WAS SEPTAGE INJECTED?#	IF SEPTAGE WAS pH TREATED, INDICATE* *			
						Type	Amount	How mixed	pH 12 held for 30 min#
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No

* If septage was incorporated, how many hours after it was applied to the site?

* * Type means what kind of alkaline material was used, e.g., lime.
Amount means how many pounds were added.
How mixed means how did you mix the alkaline material into the septage.

Example Form 1 Completion Example

LAND APPLICATION SITE: _____ RECORD YEAR: _____

NAME & ADDRESS WHERE SEPTAGE WAS PUMPED	DATE OF APPLIC. TO SITE	GALLONS APPLIED TO SITE	TOTAL GALS APPLIED Y.T.D.	WAS SEPTAGE INCORPORATED?#	WAS SEPTAGE INJECTED?#	IF SEPTAGE WAS pH TREATED, INDICATE* *			
						Type	Amount	How mixed	pH 12 held for 30 min#
Willis Brown 231 Wilson Hays, KS	3/25/17	1000	5000	Yes No hours*	Yes No	Hydrated lime	50 lbs	Agitated with vacuum valve	Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No
				Yes No hours*	Yes No				Yes No

Form 2

SECTION 503 RECORD FORM
LAND APPLICATION OF DOMESTIC SEPTAGE AT NON-PUBLIC CONTACT SITES

All records must be maintained by the septage hauler for five (5) years.

PART 1: BUSINESS AND LAND APPLICATION SITE INFORMATION

REPORT YEAR _____ DATE _____

SEPTAGE HAULER

NAME: _____

ADDRESS: _____

COUNTY LICENSE OR PERMIT NUMBER: _____

LAND APPLICATION SITE

OWNER: _____

LOCATION: _____
(street address, GPS coordinates, and/or legal location)

SITE NUMBER OR NAME: _____

TOTAL ACRES AT SITE: _____

SITE OWNER'S SIGNATURE: _____

PART 2: ANNUAL APPLICATION RATE AND PUBLIC CONTACT INFORMATION

PUBLIC ACCESS CONTROL (check all that apply)

(1) Site remotely located _____
(2) Signs are posted _____
(3) Property is fenced _____

ANNUAL APPLICATION RATE (AAR) $AAR = \frac{Nitrogen\ requirement\ of\ crop}{0.0026}$

CROP(S)	$\frac{EXPECTED\ YIELD}{(bushels/acre)}$	$\frac{NITROGEN\ REQUIREMENT}{(pounds\ N/year)}$	$\frac{AAR}{(gal/acre)/(year)}$
CROP 1			
CROP 2			
CROP 3			

PLANTING/HARVESTING SCHEDULE

	PLANTING DATE	HARVEST DATE
CROP 1		
CROP 2		
CROP 3		

Example Form 2 Completion Example

SECTION 503 RECORD FORM
LAND APPLICATION OF DOMESTIC SEPTAGE AT NON-PUBLIC CONTACT SITES

All records must be maintained by the septage hauler for five (5) years.

PART 1: BUSINESS AND LAND APPLICATION SITE INFORMATION

REPORT YEAR 2017 DATE 3/25/17

SEPTAGE HAULER

NAME: Joe's Septic Pumping Service

ADDRESS: 1591 E. Highway 21, Hays, KS 67601

COUNTY LICENSE OR PERMIT NUMBER: #981

LAND APPLICATION SITE

OWNER: Jones Farms

LOCATION: SE/4 – 6 – 7N – 3 West
(street address, GPS coordinates, and/or legal location)

SITE NUMBER OR NAME: ---

TOTAL ACRES AT SITE: 40

SITE OWNER'S SIGNATURE: _____

PART 2: ANNUAL APPLICATION RATE AND PUBLIC CONTACT INFORMATION

PUBLIC ACCESS CONTROL (check all that apply)

(1) Site remotely located X
(2) Signs are posted _____
(3) Property is fenced X

ANNUAL APPLICATION RATE (AAR) $AAR = \frac{Nitrogen\ requirement\ of\ crop}{0.0026}$

CROP(S)	$\frac{EXPECTED\ YIELD}{(bushels/acre)}$	$\frac{NITROGEN\ REQUIREMENT}{(pounds\ N/year)}$	$\frac{AAR}{(gal/acre)/year)}$
CROP 1 Fallow Wheat	60	74	28,461
CROP 2			
CROP 3			

PLANTING/HARVESTING SCHEDULE

	PLANTING DATE	HARVEST DATE
CROP 1	Estimated Oct 1, 2017	Estimated July 1, 2018
CROP 2		
CROP 3		

Form 3

CERTIFICATION STATEMENT

I certify under penalty of law that the pathogen requirement shown on Form 1 for each site (specify restrictions on harvesting, and public access or pH treatment), and the vector-attraction reduction requirements shown on Form 1 for each site (specify injection, incorporation, or pH treatment), have been met. This determination has been made under direction and supervision in accordance with the system designed to assure that qualified personnel properly gather and evaluate the information used to determine that the pathogen requirements and vector-attraction reduction requirements have been met. I am aware there are significant penalties for false certification, including the possibility of fine and imprisonment.

SIGNATURE: _____

PRINTED NAME: _____

TITLE*: _____

* For example, owner or employee of Joe's Septic Pumping Service