



Produce Safety Webinar:

Land Application of Domestic Septage

Presented by CFSAN PSN and U.S. EPA

April 16, 2024, 2:00 - 3:00 pm ET



Agenda

- Background and PSR context
 - Kristin.Esch@fda.hhs.gov FDA CFSAN PSN
- U.S. EPA Presentation
 - Tess Richman, Biosolids Program, Office of Water
 - Laura Boczek, Office of Research and Development



Why are we talking about human waste?

- Learned during inspections
 - Human waste was being used as a soil amendment
 - Applied to fields growing produce
 - Realized that some Plain Growers, small farms and those farms calling themselves organic (not NOP) were utilizing human septage
- What about the PSR?
 - “You may not use human waste for growing covered produce, except sewage sludge biosolids used in accordance with the requirements of 40 CFR part 503, subpart D, or equivalent regulatory requirements.”
- Needed more information
 - Reached out to EPA
 - 40 CFR part 503 allows for use of septage in certain circumstances
 - Two fact sheets were developed
 - That’s what we’ll hear about today



USEPA Requirements For Application Of Domestic Septage To Agricultural Land

Tess Richman & Laura Boczek

United States Environmental Protection Agency

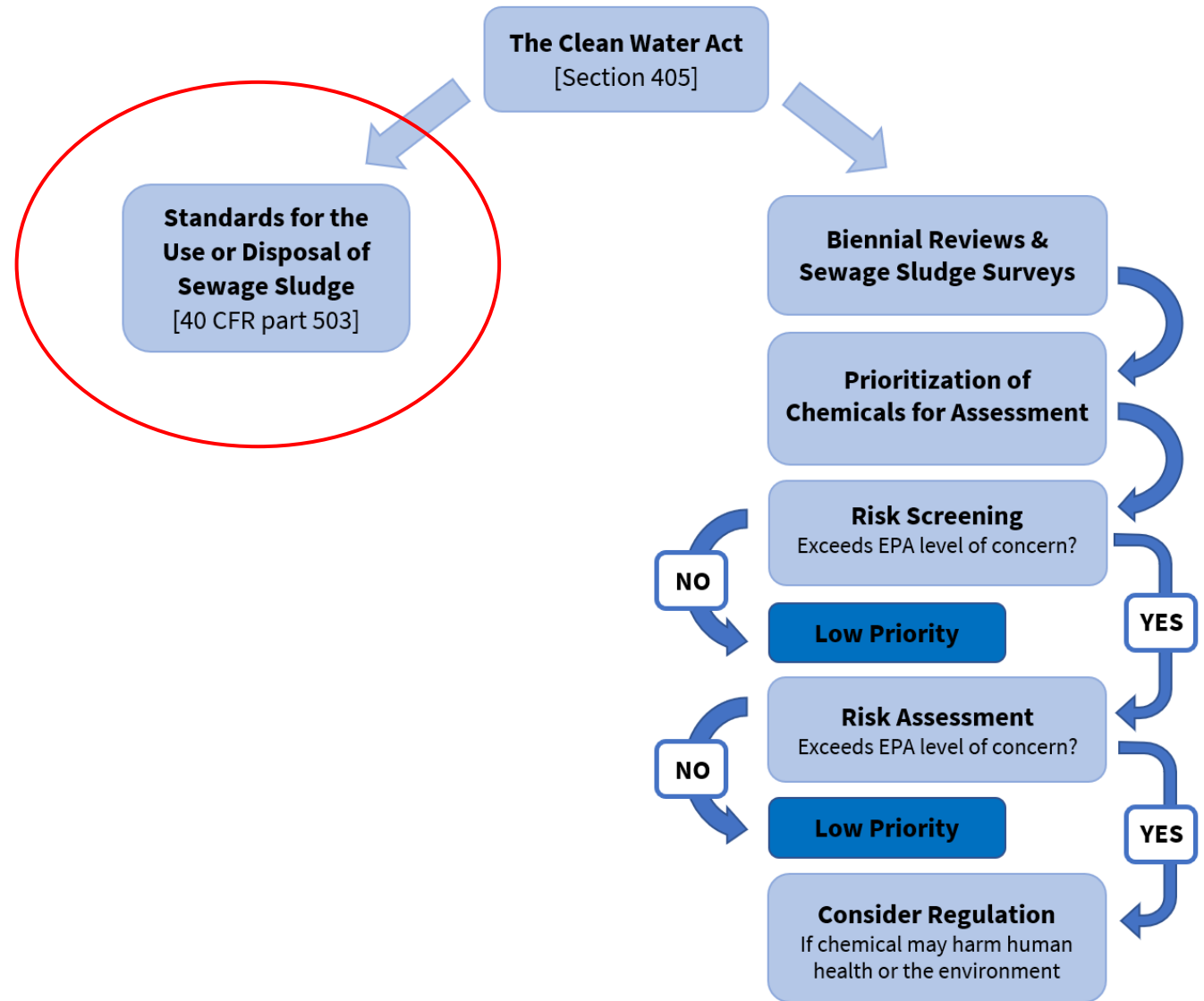
Disclaimer

The views expressed in this presentation are those of the authors and do not necessarily represent the views or policies of the U.S. Environmental Protection Agency.

Purpose

- Domestic septage contains human waste which can contain disease causing microorganisms often referred to as pathogens.
- The EPA has established requirements for land application of domestic septage to reduce or minimize the risk associated with disease-causing organisms the septage may contain.
- When domestic septage is applied to land as a fertilizer or soil amendment the requirements in Part 503 must be met.

Clean Water Act Section 405



40 CFR Part 503 – *Standards for the Use or Disposal of Sewage Sludge*

503.1(a)(1): “**This part establishes standards**, which consist of general requirements, pollutant limits, management practices, and operational standards, **for the final use or disposal of sewage sludge** generated during the treatment of domestic sewage in a treatment works. **Standards are included in this part for sewage sludge applied to the land**, placed on a surface disposal site, or fired in a sewage sludge incinerator. Also included in this part are **pathogen and alternative vector attraction reduction requirements for sewage sludge applied to the land** or placed on a surface disposal site.” [emphasis added]

Part 503 is “self-implementing”

- “[T]he requirements in part 503 must be met even in the absence of a permit for the use or disposal of sewage sludge (i.e., part 503 is self-implementing).” [Preamble to 40 C.F.R. § 503.3 (58 FR 9323 (Feb 19, 1993))].
- “The final part 503 rule is designed to be self-implementing, and therefore, clearly spells out how the requirements apply to persons using or disposing of sewage sludge.” Preamble to 40 C.F.R. § 503.3 (58 FR 9252 (Feb 19, 1993))].
- “Recordkeeping requirements are included in this subpart because the regulation is self-implementing (i.e., the requirements apply even when a person does not receive a permit). Without the requirement to keep records, there is no way to demonstrate that the part 503 requirements are met.” [Preamble to 40 C.F.R. § 503.27 (58 FR 9347 (Feb 19, 1993))].

Applicable Part 503 Definitions & Meanings

1. Domestic Septage
2. Land Application
3. Agricultural Land
4. Pathogens
5. Vector Attraction Reduction

Domestic Septage

§ 503.9(w): “Sewage sludge is solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. **Sewage sludge includes, but is not limited to, domestic septage**; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge...” [emphasis added]

§ 503.9(c): “**Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage...**” [emphasis added]

Land Application

§ 503.11(a): “Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of **sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.**” [emphasis added]

Agricultural Land

- **§ 503.11(h):** “Agricultural land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.”
 - § 503.9(j): “Feed crops are crops produced primarily for consumption by animals.”
 - § 503.9(k): “Fiber crops are crops such as flax and cotton.”
 - § 503.9(l): “Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.”
 - § 503.11(j): “Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.”
 - § 503.11(j): “Range land is open land with indigenous vegetation.”

Pathogens

Bacteria, viruses, protozoa, and eggs of parasitic worms, etc. that could cause disease or harm to humans and ecological receptors (e.g., plants and animals).

Vector Attraction Reduction

Requirements for destroying or reducing those characteristics of sewage sludge, including domestic septage, that attract birds, insects, rats and other animals (so-called “vectors”) which could transfer pathogenic organisms to humans. These measures include the destruction of the odor causing properties of sludge that lure insects and animals.

This webinar summarizes the Part 503 requirements when domestic septage is applied to agricultural land.

Requirements under Part 503

1. Application Rates

2. Pathogens & Vector Attraction Reduction

a. Alkali Addition ++

b. Injection or Incorporation ++

3. Recordkeeping

Application Rates

The land application rate for domestic septage shall not exceed the rate calculated using the following equation:

$$AAR = N \div 0.0026$$

AAR = Annual Application Rate in gallons per acre per 365-day period

N = amount of nitrogen in pounds per acre per 365-day period needed by the crop or vegetation grown on the land.

Exhibit E-1. Examples of Crop Nitrogen Requirements*

| Crop | Expected Yield (bushel/acre/year) | Nitrogen Requirement (lb N/acre/year)* |
|---------------|-----------------------------------|--|
| Corn | 100 | 100 |
| Oats | 90 | 60 |
| Barley | 70 | 60 |
| Grass and Hay | 4 tons/acre | 200 |
| Sorghum | 60 | 60 |
| Peanuts | 40 | 30 |
| Wheat | 70 | 105 |
| Wheat | 150 | 250 |
| Soybeans | 40 | 30 |
| Cotton | 1 bale/acre | 50 |
| Cotton | 1.5 bales/acre | 90 |

***These figures are very general and are provided only for illustration purposes.** They should not be used to determine your actual application rate. Crop fertilization requirements vary greatly with soil type, expected yields, and climatic conditions. To get more specific information on crop fertilization needs specific to your location, contact local agricultural extension agents. (Source: *Domestic Septage Regulatory Guidance: A Guide to the EPA 503 Rule*, p. 28 [EPA, 1993].)

Pathogens & Vector Attraction Reduction

Injection / Incorporation or Alkali Addition

Injection or Incorporation

Physical barriers between vectors and volatile solids in the sewage sludge.

1. Meeting VAR through injection or incorporation
2. Pathogen reduction through site and harvesting restrictions

1. Injection or Incorporation - VAR

Injection: Sewage sludge shall be injected below the surface of the land. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

or

Incorporation: Sewage sludge applied to the land surface shall be incorporated into the soil within six hours after application to or placement on the land, unless otherwise specified by the permitting authority.

2. Injection or Incorporation – Pathogen Reduction

Site Restrictions:

1. Animals shall not be grazed on the land for 30 days after application of domestic septage.
2. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of domestic septage sludge. Land with a low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land. The public does not include people who apply domestic septage to the land or farm workers.

2. Injection or Incorporation – Pathogen Reduction, cont.

Harvesting Restrictions:

1. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of domestic septage.
2. Additional requirements for food crops determined by the location of the harvested part

| Food crop with harvested parts that... | Shall not be harvested for... | Examples of Crops | | |
|---|--|--------------------------------|---------------------------------|---|
| Are above the land surface and do not touch the septage/soil surface | 30 days after application of domestic septage | Apples Soybeans Pears | Almonds Wheat Oats | Cotton Walnuts Corn Barley |
| Touch the domestic septage/ soil mixture and are totally above the land surface | 14 months after application of domestic septage. | Cabbage Celery Cucumbers | Eggplant Hay Lettuce | Melons Squash Strawberries Tomatoes |
| Are below the surface of the land | 38 months after application of domestic septage | Beets Leaks Onions | Peanuts Potatoes Radishes | Rutabaga Sweet Potatoes Turnips Yams |

Alkali Addition

Chemical conditions that stop microbial activity.

1. Meeting VAR through alkali addition
2. Pathogen reduction through harvesting restrictions

1. Alkali Addition- VAR

The pH of domestic septage applied to agricultural land, forest, or a reclamation site shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for 30 minutes.

2. Alkali Addition – Pathogen Reduction

Harvesting Restrictions:

1. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of domestic septage.
2. Additional requirements for food crops determined by the location of the harvested part

| Food crop with harvested parts that... | Shall not be harvested for... | | Examples of Crops | | |
|---|--|--|--------------------------------|---------------------------------|---|
| Are above the land surface and do not touch the septage/soil surface | 30 days after application of domestic septage | | Apples Soybeans Pears | Almonds Wheat Oats | Cotton Walnuts Corn Barley |
| Touch the domestic septage/ soil mixture and are totally above the land surface | 14 months after application of domestic septage. | | Cabbage Celery Cucumbers | Eggplant Hay Lettuce | Melons Squash Strawberries Tomatoes |
| Are below the surface of the land | 20 months after application of domestic septage | when incorporated into the soil \geq 4 months after application. | Beets Leaks Onions | Peanuts Potatoes Radishes | Rutabaga Sweet Potatoes Turnips Yams |
| | 38 months after application of domestic septage | when incorporated into the soil <4 months after application. | | | |

Recordkeeping

Records & Certifying Statement

1. Recordkeeping – Records

The following records must be kept for five years:

1. The location (by either street address or latitude and longitude) of each site on which domestic septage is applied.
2. The number of acres in each site on which domestic septage is applied.
3. The date domestic septage is applied to each site.
4. The nitrogen requirement for the crop or vegetation grown on each site during a 365-day period.
5. The rate, in gallons per acre per 365-day period, at which domestic septage is applied to each site.
6. A description of how the pathogen and vector attraction requirements are met.

2. Recordkeeping – Certifying Statement

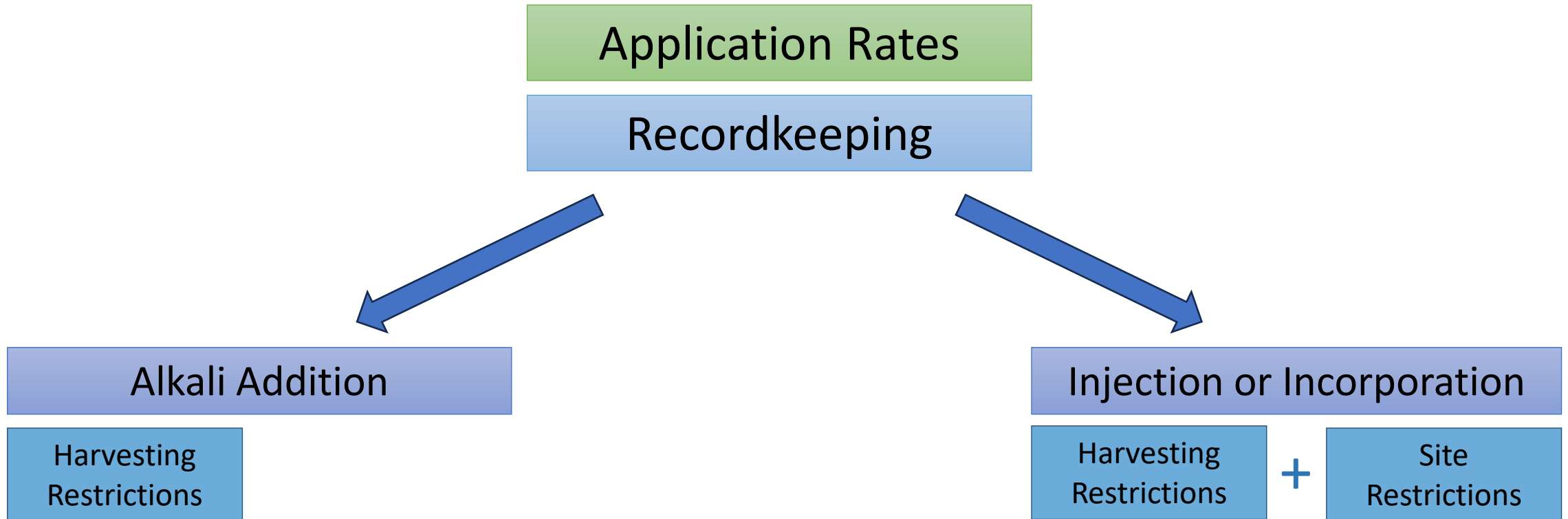
“I CERTIFY, UNDER PENALTY OF LAW, THAT THE INFORMATION THAT WILL BE USED TO DETERMINE COMPLIANCE WITH THE PATHOGEN REQUIREMENTS § [503.32(C)(1) or 503.32(C)(2)] AND THE VECTOR ATTRACTION REDUCTION REQUIREMENT IN § [503.33(B)(9) or 503.33(B)(10) or 503.33(B)(12)] WAS PREPARED UNDER MY DIRECTION AND SUPERVISION IN ACCORDANCE WITH THE SYSTEM DESIGNED TO ENSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THIS INFORMATION. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR FALSE CERTIFICATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT.”

Alkali Addition = 503.32(C)(2) + 503.33(B)(12)

Injection = 503.32(C)(1) + 503.33(B)(9)

Incorporation = 503.32(C)(1) + 503.33(B)(10)

Summary



Fact Sheets

[Requirements for Application of Domestic Septage to Agricultural Land Utilizing Injection or Incorporation](#)

[Requirements for Application of Domestic Septage to Agricultural Land Utilizing Alkali Addition](#)

Office of Water
822F24004
April 2024

Requirements For Application of Domestic Septage to Agricultural Land Utilizing Injection or Incorporation

Purpose
This fact sheet summarizes the requirements for land application of domestic septage to agricultural land utilizing injection or incorporation. Domestic septage is either liquid or solid material removed from a tank, cesspool, portable toilet, or similar device, including an outhouse. Agricultural land is land on which a crop, feed crop, or fiber crop is grown. Agricultural land also includes land used as pasture. When domestic septage is applied to land as a fertilizer or soil amendment the requirements in 40 CFR Part 503, *Standards for the Use or Disposal of Sewage Sludge*, must be met.

Sewage sludge, including domestic septage, typically includes microbial pollutants like bacteria and viruses which can cause disease. The requirements in Part 503 reduce the risk of disease to humans by requiring treatment and reducing exposure to pathogens. One option for reducing risk of pathogen exposure in Part 503 is the incorporation of domestic septage.

This fact sheet is intended for use by farmers that apply domestic septage to agricultural lands to grow crops and graze animals. There may be additional requirements in Part 503 for land application of domestic septage to public contact sites with high potential for public exposure (i.e., public parks, ball fields, cemeteries, plant nurseries, and golf courses). Further, this fact sheet only summarizes the Part 503 regulations for land application of domestic septage. There may be additional state or local regulations that are more stringent. Following this fact sheet may not guarantee compliance with all applicable regulations.

Background
Section 405(d) of the Clean Water Act (CWA) required the U.S. Environmental Protection Agency (EPA) to develop a regulation to protect public health and the environment from any reasonably anticipated adverse effects of pollutants that might be present in sewage sludge. This regulation, 40 CFR Part 503, *Standards for the Use or Disposal of Sewage Sludge*, was published on February 19, 1993 (58 FR 9248). 40 CFR Part 503 (or "Part 503") contains requirements for sewage sludge, including domestic septage, when it is applied to land, incinerated in a sewage sludge incinerator (SSI), or placed on a surface disposal site.

Requirements under Part 503
Application Rates:
The land application rate for domestic septage shall not exceed the rate calculated using the following equation:
$$AAR = N \div 0.0026$$

Where AAR = Annual Application Rate in gallons per acre per 365-day period and N = amount of nitrogen in pounds per acre per 365-day period needed by the crop or vegetation grown on the land.
Crop and vegetation nitrogen requirements should be obtained from a knowledgeable source such as a state agricultural or environment agency or a local extension service.

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Office of Water
822F24005
April 2024

Requirements For Application of Domestic Septage to Agricultural Land Utilizing Alkali Addition

Purpose
This fact sheet summarizes the requirements for land application of domestic septage to agricultural lands utilizing alkali addition. Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, or similar device, including an outhouse. Agricultural land is land on which a food crop, feed crop, or fiber crop is grown. Agricultural land also includes land used as pasture. When domestic septage is applied to land as a fertilizer or soil amendment, the requirements in 40 CFR Part 503, *Standards for the Use or Disposal of Sewage Sludge*, must be met.

Sewage sludge, including domestic septage, typically includes microbial pollutants like bacteria and viruses which can cause disease. The requirements in Part 503 reduce the risk of disease to humans by requiring treatment and reducing exposure to pathogens. One option for reducing risk of pathogen exposure in Part 503 is the addition of alkali to domestic septage.

This fact sheet is intended for use by farmers that apply domestic septage to agricultural lands to grow crops. There may be additional requirements in Part 503 for land application of domestic septage to public contact sites with high potential for public exposure (i.e., public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses). Further, this fact sheet only summarizes the Part 503 regulations for land application of domestic septage. There may be additional state or local regulations that are more stringent. Following this fact sheet may not guarantee compliance with all applicable regulations.

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Section 405(d) of the Clean Water Act (CWA) required the U.S. Environmental Protection Agency (EPA) to develop a regulation to protect public health and the environment from any reasonably anticipated adverse effects of pollutants that might be in sewage sludge. This regulation, 40 CFR Part 503, *Standards for the Use or Disposal of Sewage Sludge*, was published on February 19, 1993 (58 FR 9248). 40 CFR Part 503 (or "Part 503") contains requirements for sewage sludge, including domestic septage, when it is applied to land, incinerated in a sewage sludge incinerator (SSI), or placed on a surface disposal site.

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Questions?

