Water & Solids
Your Problem

Septage
Grease trap
Sludge

Mixed waste
{Your truck}

Solids
Liquid
Dealing with Septage
Operation models

Handling
- Complete discharge
- Land application

Treatment
- Thickening
- Dewatering
- Other products

Finished Product handling
- Effluent
  - WWTP Discharge
  - Effluent Treatment
- Solids
Facility Outline

Odor Control

Processing
- Transfer
- Thickening
- Dewatering

Final Resting
- Solids
- Effluent
- Treatment

Receiving
- Solid waste
- Grit
- Storage

Storm water
SCREENING AND DIRECT DISCHARGE TO WWTP
TRANSFERRING TO WWTP
DEWATERING TREATMENT FACILITY

- Thickening
- Dewatering
- Further treatment
  - Class A
  - Composting

NEW PRODUCT
Final Resting
Final resting place

Two products
- Solids
  - Class B
  - Class A
- Water
  - Waste strength
    - BOD
    - TSS
  - FOG
Septage Treatment Levels

Class A
- Set treatment level
  - Methods & testing
- Marketable product
- No tracking of final resting

Class B
- 503 Regulations
- Records & Reporting
Land Application

BENEFICIAL REUSE THRU THE SOIL & BEYOND
Choices for Emptying your truck

Landfill
Incineration
Composting
Storage
Land application
Pass the buck
  ◦ Wastewater treatment plant
Treatment of Septage

WWTP

Septage Treatment
  • Composting
  • Treatment

LAND APPLICATION
WWTP
Get permission
NO Mess
Permission

- In writing
- Acceptance of Septage
- Testing requirements
- Cost
- Timing: Operation hours
- Truck options
Septage Regulations

- 503 Regulation
- EPA Bio-solids Rule
- Sludge
  - Grease trap waste NOT included
- Septage
Review of the 503’s
Defines Septage
Records
Treatment
Application Rates
DOMESTIC SEPTAGE

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
What is Septage?

Waste from Living
- House
- Apartments
- Restaurants

Portable Toilets
Composting Toilets
Domestic Septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.
Non-domestic Septage must be managed and disposed in accordance with:

- EPA's 40 CFR Part 503 if the non-domestic septage (commercial septage, industrial septage, grease trap pumpings, or mixtures of domestic and non-domestic septage) is discharged for treatment into a treatment works that also receives domestic sewage.

- EPA's 40 CFR Part 257 if non-domestic septage is directly used or disposed in all but a municipal solid waste [MSW] landfill.

- EPA's 40 CFR Part 258 if non-domestic septage is disposed in a MSW landfill.
Non-domestic Septage must be managed and disposed in accordance with:

- EPA's 40 CFR Part 261 if the septage is classified as a hazardous waste.
- Other applicable Federal, State, and local rules.
NOT Septage

- Industrial sludge
- Hazardous waste
- Commercial waste?
- Sand pits, Grease Traps
- Animal Waste
The Case for Septage Recycling

Fertilizer Savings
Increased Crop Yields
Determining the Allowed Annual Rate for Applying Domestic Septage to Non-Public Contact Sites

Annual Application Rate (gallons/acre/year) = \frac{\text{Annual Pounds of Nitrogen Required for the Crop and Expected Yield}}{0.0026}

NON-PUBLIC CONTACT SITES INCLUDE AGRICULTURAL LAND, FORESTS, AND RECLAMATION SITES.
<table>
<thead>
<tr>
<th>Crop</th>
<th>Expected Yield (bushel/acre/year)</th>
<th>Nitrogen Requirement (lb N/acre/year)</th>
<th>Annual Application Rate (gallons/acre/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>100</td>
<td>100</td>
<td>38,500</td>
</tr>
<tr>
<td>Oats</td>
<td>90</td>
<td>60</td>
<td>23,000</td>
</tr>
<tr>
<td>Barley</td>
<td>70</td>
<td>60</td>
<td>23,000</td>
</tr>
<tr>
<td>Grass &amp; Hay</td>
<td>4 tons/acre</td>
<td>200</td>
<td>77,000</td>
</tr>
<tr>
<td>Sorghum</td>
<td>60</td>
<td>60</td>
<td>23,000</td>
</tr>
<tr>
<td>Peanuts</td>
<td>40</td>
<td>30</td>
<td>11,500</td>
</tr>
<tr>
<td>Wheat</td>
<td>150</td>
<td>250</td>
<td>96,100</td>
</tr>
<tr>
<td>Soybeans</td>
<td>40</td>
<td>30</td>
<td>11,500</td>
</tr>
<tr>
<td>Cotton</td>
<td>1 bale/acre</td>
<td>50</td>
<td>19,200</td>
</tr>
</tbody>
</table>
Suggested Good Practices
Do Not Land Apply:

- When the surface soil temperature is less than 32° Fahrenheit.
- When the site is snow covered.
- When the soil is saturated.
- Under any other condition that could possibly result in run-off of the wastewater from the site.
- No discharge to or allowed to drain to waters of the state.
Pathogen Reduction Alternative 1
(no additional treatment)

Crop Restrictions:

i) 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.

ii) Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of domestic septage.

iii) 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.

iv) 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 a high potential for public exposure, unless otherwise specified by the permitting authority.
Pathogen Reduction Alternative 1 (no additional treatment) cont.

Grazing Restrictions:

i) Animals shall not be allowed to graze on the land for 30 days after application of domestic septage.

Site Restrictions:

i) 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 of site, posting with no trespassing signs, and/or simple fencing.
Pathogen Reduction Alternative 2 (with pH treatment)

The domestic septage pumped from the septic tank or holding tank has had its pH raised to 12 or higher by the addition of material such as hydrated lime or quicklime and, without adding more alkaline material, the domestic septage remains at a pH of 12 or higher for at least 30 minutes prior to being land applied.
Crop Restrictions:

i) 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.

ii) 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.

iii) 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.
Pathogen Reduction Alternative 2 (with pH treatment)

iv) 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.

v) 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 a high potential for public exposure, unless otherwise specified by the permitting authority.

Grazing Restrictions: None

Site Restrictions: None
## Crop Restrictions

<table>
<thead>
<tr>
<th>Crop</th>
<th>Time limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Crops</td>
<td>14 months</td>
</tr>
<tr>
<td>Below surface</td>
<td>38 months (20 if not plowed for 4 m)</td>
</tr>
<tr>
<td>Feed</td>
<td>1 month</td>
</tr>
<tr>
<td>Turf</td>
<td>12 months</td>
</tr>
<tr>
<td>Grazing</td>
<td>1 month (0)</td>
</tr>
<tr>
<td>Public access</td>
<td>12 months (0)</td>
</tr>
</tbody>
</table>
Public Access requirements

**High**
- Populated areas
- Turf farms
- Plant nurseries

**Low**
- Ag land
- Forests
- Rural
Lime Stabilization

PH Adjustment
Goals

pH Adjustment
  ◦ > 12 [Temperature corrected]

Pathogen Control
  ◦ Treatment

Vector Control

Odor Reduction
Method

Pump Tank
ADD LIME
Check pH
  ◦ Temp.
Reaction Time
Check pH
  ◦ Temp.
Land Apply
Record

- Powder
- Slurry
Lime addition

- Powder
- Slurry
pH Meter
pH Definition 40 CFR 503.31(g)

pH mean the logarithm of the reciprocal of the hydrogen ion concentration measured at 25° Centigrade or measured at another temperature and then converted to an equivalent value at 25° Centigrade.
NOT on your pH Meter

Temperature correction

Ten

503 Requirements
pH Correction Formula

\[ \text{pH}_{\text{meas}} + \text{pH}_{\text{cor}} = \text{pH}_{25^\circ\text{C}} \]

where:

\[ \text{pH}_{\text{cor}} = 0.03 \times \text{pH units} \times (\text{Temp } ^\circ\text{C}_{\text{meas}} - 25 ^\circ\text{C}) \]

1.0 ^\circ\text{C}
Equation

\[ \text{pH} = \text{Measured pH} + \{0.0167 \times (\text{Temp}^\circ[F] - 77)\} \]

Measured pH

◦ 12.3

Temp of Septage

◦ 68°

12.3 + \{0.0167 \times (68^\circ - 77)\}

12.3 + \{-0.1503\}

12.1
Vector Attraction Reduction Alternative 1

**Injection**

Domestic septage shall be injected below the surface of the land, AND no significant amount of the domestic septage shall be present on the land surface within one hour after the domestic septage is injected;
Vector Attraction Reduction Alternative 2

Incorporation

Domestic septage applied to the land surface shall be incorporated into the soil surface plow layer within six (6) hours after application, unless otherwise specified by the permitting authority;
pH Adjustment

The pH of domestic septage shall be raised to 12 or higher by addition of alkaline material and, without the addition of more alkaline material, shall remain at 12 or higher for 30 minutes.
Record Keeping Requirements

1] The location of the site where domestic septage is applied, either the street address, or the longitude and latitude of the site (available from the U.S. Geological Survey maps).

2] The number of acres to which domestic septage is applied at each site.

3] The date of each domestic septage application.

4] The nitrogen requirement for the crop or vegetation grown on each site during the year. Also, while not required, indicating the expected crop yield would help establish the nitrogen requirement.
Farming Information

- Owner
- Crop
- Yield
- Planting/ Timing issues
- Other concerns
Record Keeping Requirements (cont.)

5] The gallons of septage which are applied to the site during the specified 365-day period.


7] A description of how the pathogen requirements are met for each batch of domestic septage that is land applied.

8] A description of how the vector attraction reduction requirement is met for each batch of domestic septage that is land applied.
Certification Statement

"I certify under penalty of law, that the information that will be used to determine compliance with the pathogen requirements in [insert either 503.32(c)(1) or 503.32(c)(2)] and the vector attraction reduction requirements in [insert 503.33(b)(9), 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."

## Record Keeping

**SHOWING YOU’RE DOING IT RIGHT**

<table>
<thead>
<tr>
<th>University of Minnesota</th>
<th>Site Specific Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record Keeping Period: September 1, ______ to August 31, ________</td>
<td></td>
</tr>
<tr>
<td>Site Code:</td>
<td>Landowner Name:</td>
</tr>
<tr>
<td>Site Location (provide one or more of the following):</td>
<td>Street Address:</td>
</tr>
<tr>
<td></td>
<td>Latitude / Longitude:</td>
</tr>
<tr>
<td></td>
<td>Quarter of Section:</td>
</tr>
<tr>
<td></td>
<td>Township Coordinate:</td>
</tr>
<tr>
<td></td>
<td>Township Name:</td>
</tr>
<tr>
<td></td>
<td>County Name:</td>
</tr>
<tr>
<td>Site Acreage:</td>
<td>Crop Grown:</td>
</tr>
<tr>
<td>Maximum Allowable Nitrogen Application Rate (lb/ac/year): Determined by using option 1 or 2 from the MNFAA guidelines:</td>
<td></td>
</tr>
<tr>
<td>Maximum Rate of Septage Allowed (gallons/acre/year):</td>
<td></td>
</tr>
<tr>
<td>Maximum Gallons of Septage Allowed (gallons/site/year):</td>
<td></td>
</tr>
</tbody>
</table>

Attach a copy of a soil survey map or another map containing the same information with the site boundaries and unsuitable areas of the field identified.

Describe how pathogen requirements were met at the site:  
_______________________________________________________________________________

Describe how vector attraction reduction requirements were met at the site:  
_______________________________________________________________________________
503 regulations Require records Storage: 5 years Producible SOP
  ◦ Everything you are doing
Truck records
Source of Septage

- Home or Business
- Address
- Invoice is OK
- What is it?
  - Septage
  - Other
When it was pumped

- Date
- Time
Total gallons pumped

- Location
- Treatment
- Amount Removed
- What you did with it
  - Land App
  - WWTP
  - Other
Site Records

Where - It was put
How - It was treated
Location of the site

- Street address
- Latitude
- GPS
- Legal description
Map

- Soil survey
- Unsuitable area identified
- Break up into sub sites
Total acreage

- Good area ‘Useable’
- Setbacks identified
- Any restrictions
  - Time of year
- Unsuitable not included
Total acres used

- Total use per trip
- Acres used
- Truck Gallons ÷ Gallons per Acre
- 2,000 gal ÷ 7,700 gpA = 0.26 Acres/trip
Cropping Record

- Type of Crop
- Crop production [verified]
- Cropping schedule

Form from the Farmer
MANA

Maximum Allowable Nitrogen Application Basis for gallons per acre

\[ \text{MANA} \div 0.0026 \]
Running total of Septage

- Keep track of loading
- Keep track at the site
- Record method of treatment
Pathogen reduction

- Method
  - Lime
  - Injection~Incorporation

- Lime record
  - Pounds of lime
  - Gallons ÷ 1,000 x 25 = Estimated lbs of lime

- Temperature correction
Vector attraction

Method

- Lime
- Injection~

Incorporation
Certified Statement

<table>
<thead>
<tr>
<th>Date of Application</th>
<th>Load #(s)</th>
<th>Gallons Applied</th>
<th>Rate Applied Gallons/Acre</th>
<th>Acreage Used Gallons/App. Rate</th>
<th>Running Total of Gallons Applied per Site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements [check one or both of the following] ☐ 503.33(c)(1) [crop restrictions] or ☐ 503.33(c)(2) [pH adjustment to 12.0 for 30 minutes and crop restrictions] and the vector attraction reduction requirement in [check one or more of the following] ☐ 503.33(b)(9) [injected], ☐ 503.33(b)(10) [incorporated within 6 hours], or ☐ 503.33(b)(12) [pH adjustment to 12.0 for 30 minutes] was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment.”

Signature: ____________________________________________________________

Printed Name: ________________________________________________________  Title: __________________________
Other Records

- Safety plan
  - Driver records

- How you meet requirements
  - SOP
  - Standard operation procedures
## Septage Enforcement Actions

<table>
<thead>
<tr>
<th>State</th>
<th>308 Requests</th>
<th>Penalty Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illinois</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>Indiana</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Michigan</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Minnesota</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Ohio</td>
<td>27</td>
<td>14</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>25</td>
<td>14</td>
</tr>
</tbody>
</table>
Septage Issues
Feelings
Nutrients
Pathogens
Vectors
Odors

SEPTAGE CAN MAKE YOU SICK
The solution for Perception

Professionalism
- Records

Procedures
- Timing
- Locations

Education
- You
- Public
The solution for Nutrients

Loading rates

Daily
  ◦ 10,000 gal/acre

Annual
  ◦ Crop need
Treatment

- Crop restrictions
- PLUS
- Lime Treatment
  - pH Adjustment
- OR
- Incorporation
  - Injection
Vector Attraction
Incorporation  
▪ Injection
OR
Lime Treatment  
▪ pH Adjustment
Questions