


Septage Land Application Module

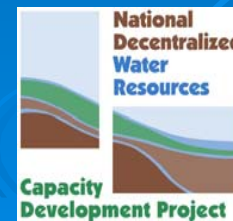
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Management



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Septage

- Septage is a product of onsite wastewater treatment
- Collected through pumping of septic systems



Keys for Pumping Tanks

- Open the tank
- Remove all the solids
- Tools



Septage Characteristics

Parameter	Concentration (mg/L)		
	Average	Minimum	Maximum
Total solids	34106	1132	130475
Total volatile solids	23100	353	71402
Total suspended solids	12862	310	93378
Volatile suspended solids	9027	95	51500
Biochemical oxygen demand	6480	440	78600
Chemical oxygen demand	31900	1500	703000
Total Kjeldahl nitrogen	588	66	1060
Ammonia nitrogen	97	3	116
Total phosphorus	210	20	760
Alkalinity	970	522	4190
Grease	5600	208	23368
pH	-	1.5	12.6

EPA (1994)

Characteristics of Septage: Organics

Parameter	Concentration (mg/L)		
	Average	Minimum	Maximum
Organics			
Methyl alcohol	15.8	1	396
Isopropyl alcohol	14.1	1	391
Acetone	10.6	0	210
Methyl ethyl ketone	3.65	1	240
Toluene	0.17	0.005	1.95
Methylene chloride	0.101	0.05	2.2
Ethylbensene	0.067	0.005	1.7
Benzene	0.062	0.005	3.1
Xylene	0.051	0.005	0.72

EPA (1994)

Characteristics of Septage: Metals

Parameter	Concentration (mg/L)		
	Average	Minimum	Maximum
Metals			
Iron	39.3	0.2	2740
Zinc	9.97	<.001	444
Manganese	6.09	0.55	17.1
Barium	5.76	0.002	202
Copper	4.84	0.01	261
Lead	1.21	<0.025	118
Nickel	0.526	0.01	37
Chromium (total)	0.49	0.01	34
Cyanide	0.469	0.001	1.53
Cobalt	0.406	<0.003	3.45
Arsenic	0.141	0	3.5
Silver	0.099	<0.003	5
Cadmium	0.097	0.005	8.1
Tin	0.076	<0.015	1
Mercury	0.005	0.0001	0.742

EPA (1994)

Choices for Septage Handling

- WWTP
 - Second most popular method
- Septage Treatment Plant
 - Very rare due to high costs
- Land Application
 - Most popular method

Wastewater Treatment Plant

- Transfers treatment to different entity
- Treatment plant must have capacity for additional loading
- Follow receiving facility's guidelines for discharging

Septage Treatment Plant

- Usually process septage for land application
- Remove grit and debris from septage
- Transfer products to other vehicle for transport
 - Effluent
 - Sewer
 - Land Application
 - Solids
 - Landfill
 - Land Application
 - Grit
 - Landfill



Methods for Land Application

➤ Surface

1. Box Spreader, Tractor Towed
2. Slurry Irrigation
3. Tank Truck
4. Tank Wagon, Tractor Towed

➤ Sub-Surface

1. Plow- Furrow- Cover
2. Injection from Tank Wagon or Truck
3. Injection from Crawler Tractor

Criteria for Selecting Application Equipment

- Sludge Moisture Content
- Sludge Quantity
- Type of Storage System
- Application Rate
- Application Schedule (frequency, season)
- Topography
- Transport Distance
- Cost and Availability

Septage Application Methods vs. Solids Content

Solids Content	Application Method
1-6%	Slurry Irrigation
4-10%	Tank Wagon or Tank Truck; Surface Spread
4-15%	Tank Wagon or Tank Truck; Soil Injection
25-80%	Box Spreader
40%+	Spreader Truck

Direct Injection

- Incorporate septage as passing across field
- Tank trucks can inject septage into soil
- Drag hose can supply liquid to an injection implement



Liquid Spreading

- Spreading with the tank truck hauling septage
- Pan at end of outlet spreads liquid on ground behind truck



Semi Solid Material Spreading

- Load into a spreader
- Distribute material onto the land surface



Potential Septage Issues

- Perceptions
- Nutrients
- Odors
- Public Health
 - Pathogens
 - Vectors



The solution for Perception

- Professionalism
 - Records
- Procedures
 - Timing
 - Locations
- Education
 - You
 - Public



Land Application Siting

- Slope
- Setbacks
- Soil type
- Water table

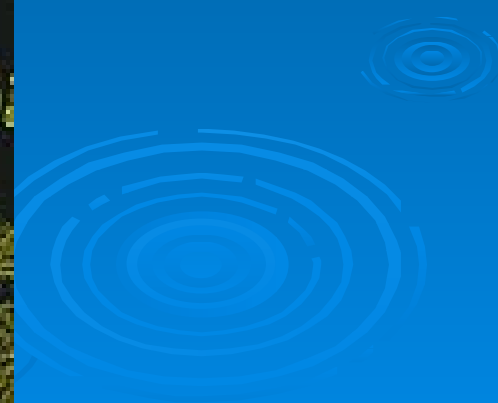


The solution for Nutrients

- CWA Section 503
Based Loading
rates
- Daily
 - 10,000 gal/acre
- Annual
 - Crop need



Septage can make **YOU** sick



The Solution for Public Health: Pathogen and Vector Control

- Lime Stabilization
- Proper timing
- Composting
- Digestion
- Incorporation
- Covered Storage

Lime Treatment

- Pathogen Control
 - Disease causes
- Vector Control
 - Movement
- Odor Mitigation
- Soil Conditioning



One Method for Lime Treatment

- Pump Tank
- ADD LIME
- Check pH
- Reaction Time
- Land Apply



Lime addition

- Powder
- Slurry



Check pH

Typical Septage



How Much Lime?

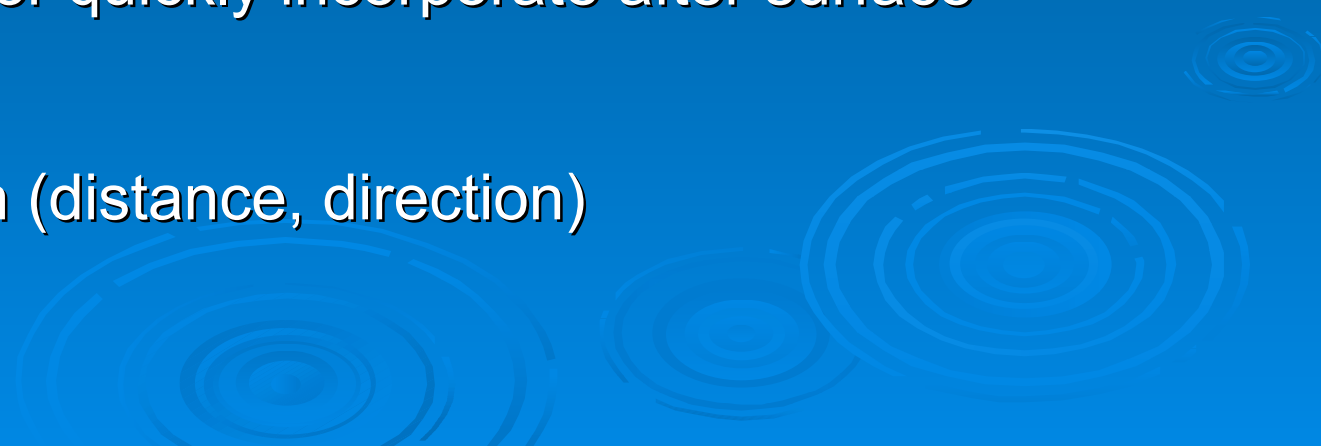
- 25 # per 1,000 gallons
- Stronger waste more lime
- Carry over in the tank



How long for Reaction?

- 30 minutes after mixing above pH of 12 or greater
- Some States require 2 hours

Odor Management

- Use Stabilized Sludge
 - e.g., Composting, digestion, lime treatment
 - Minimize Stockpiling
 - Low Application Rate (surface)
 - Soil Injection or quickly incorporate after surface application
 - Field Location (distance, direction)
- 

Benefits of Good Septage Land Application Practice

- Perception
- Odor reduction
- Soil treatment
- Pathogen reduction



Summary

- Septage land application is generally the first choice for management
- Public Health Protection
- Nutrients are beneficially reused
- Lime stabilization is a simple and cost-effective pretreatment for land application