



Maryland  
Department of  
the Environment

# Sewage Sludge Utilization In Maryland

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Land and Materials Administration  
Biosolids Division

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# What is Sewage Sludge?

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- Sewage sludge is not raw sewage. It is one of the final products of the treatment of municipal waste water at a Waste Water Treatment Plant.
- After treatment breaks down the organic compounds and kills disease-causing organisms, the remaining fine particles ultimately become sewage sludge which is a nutrient-rich organic product.



# How is it Utilized?

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Agricultural land application

Reclamation/marginal land application

Distribution

Energy generation or Incineration

Disposal or alternative utilization at a municipal landfill

Research and Innovative projects



# How is it Utilized?

## Agricultural land application

- Recycles a byproduct
- Returns essential nutrients to the soil
  - Nitrogen, phosphorus, zinc, and copper
- Adds organic matter to the soil
- Reduces fertilizer costs to farmers
- Has high water content
- Can contain lime that raises the pH of soil

Reclamation/marginal land application

Distribution

Energy generation or incineration

Disposal or alternative utilization at a municipal landfill

Research or innovative and project



# Why & How is it Regulated?

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- Regulated to...
  - Protect public health and the environment
  - Protect the quality of groundwater and surface water of the State
- Through...
  - Treatment at the WWTP
  - A site-specific permit

- *Sewage sludge has been regulated in Maryland since 1974*
- *Annotated Code of Maryland, Environment Article*
  - *§§ 9-230-249, 269, and 270*
- *Code of Maryland Regulations*
  - *COMAR 26.04.06*
- *Current regulations since 2014*



# Treatment Requirements

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- Sewage sludge sources are permitted for land application
  - Review of historical sewage sludge analysis
  - Review and monitoring of the treatment method
  - Facility inspections
  - On-going monitoring of nutrients, metals, and PCBs content
  - Record keeping and annual reporting
  - At a minimum, must meet Class B standards (EPA's 40 CFR Part 503)
  - 34 Class B sources currently approved



# Treatment Requirements

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- Pathogen Reduction
  - Class A – pathogens are below detectable limits
  - Class B – pathogens are detectable but reduced to levels that do not pose a threat to public health and the environment with proper controls
- Constituent Limits
  - Arsenic, Cadmium, Copper, Lead, Mercury, Nickel, Selenium, Zinc, PCBs
- Vector Attraction Reduction
  - Vectors are organisms, such as rodents and insects, that can spread disease by carrying and transferring pathogens



# Treatment – Pathogen Reduction

- Class B (3 alternatives)

- Monitoring of Indicator Organisms
- Use of PSRP (Process to Significantly Reduce Pathogens)
- Use of a Process Equivalent to PSRP



- Aerobic Digestion
- Anaerobic Digestion
- Lime Stabilization
- Air Drying
- Composting

- Class A (6 alternatives)

- Thermally Treated Biosolids
- Biosolids Treated in a High pH-High Temperature Process
- For Biosolids Treated in Other Processes
- Biosolids Treated in Unknown Processes
- Use of a PFRP (Process to Further Reduce Pathogens)
- Use of a Process Equivalent to PFRP



- Composting
- Heat Drying
- Heat Treatment
- Thermophilic aerobic digestion
- Beta ray or Gamma ray irradiation
- Pasteurization





# Treatment – Constituent Limits

- Sewage sludge land applied to agricultural sites must meet constituent limits

Constituent	Ceiling Concentration (milligrams per kilogram)*	Cumulative Constituent Loading Rates (kilograms per hectare)	Monthly Average Concentration (milligrams per kilogram)*	Annual constituent loading rates (kilograms per hectare per 365 day period)
Arsenic (As)	75	41	41	2.0
Cadmium (Cd)	85	39	39	1.9
Copper (Cu)	4,300	1,500	1,500	75
Lead (Pb)	840	300	300	15
Mercury (Hg)	57	17	17	0.85
Molybdenum (Mo)	75	420	420	21
Nickel (Ni)	420	100	100	5.0
Selenium (Se)	7500	2800	2800	140
Zinc (Zn)	10			
PCBs				



# Treatment – Vector Attraction Reduction

**1**

Reduce the mass of volatile solids by a minimum of 38 percent

**2**

Demonstrate vector attraction reduction with additional anaerobic digestion in a bench-scale unit

**3**

Demonstrate vector attraction reduction with additional aerobic digestion in a bench-scale unit

**4**

Meet a specific oxygen uptake rate (SOUR) for aerobically treated biosolids

**5**

Use aerobic processes at greater than 40°C (average temperature 45°C) for 14 days or longer (e.g., during biosolids composting)

**6**

Add alkaline materials to raise the pH under specified conditions

**7**

Reduce moisture content of biosolids that do not contain unstabilized solids from other than primary treatment to at least 75 percent solids

**8**

Reduce moisture content of biosolids with unstabilized solids to at least 90 percent

**9**

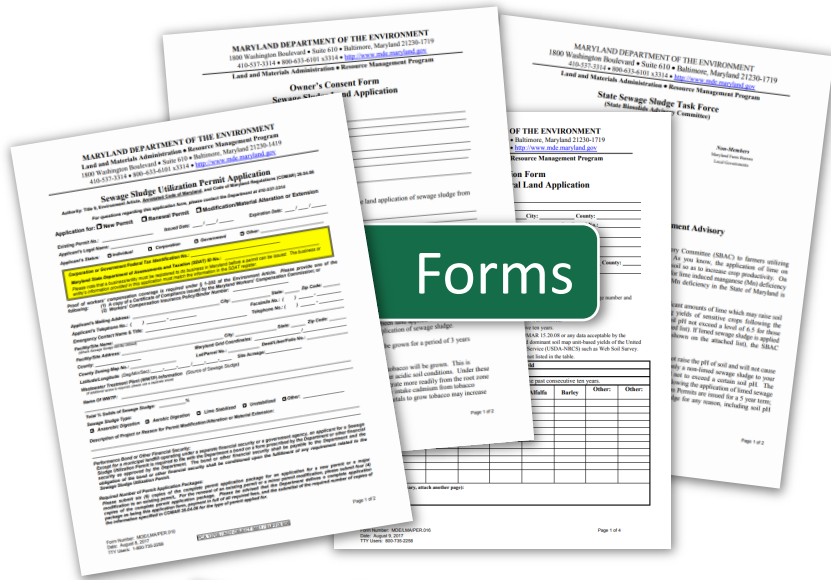
Inject biosolids beneath the soil surface within a specified time, depending on the level of pathogen treatment

**10**

Incorporate biosolids applied to or placed on the land surface within specified time periods after application to or placement on the land surface



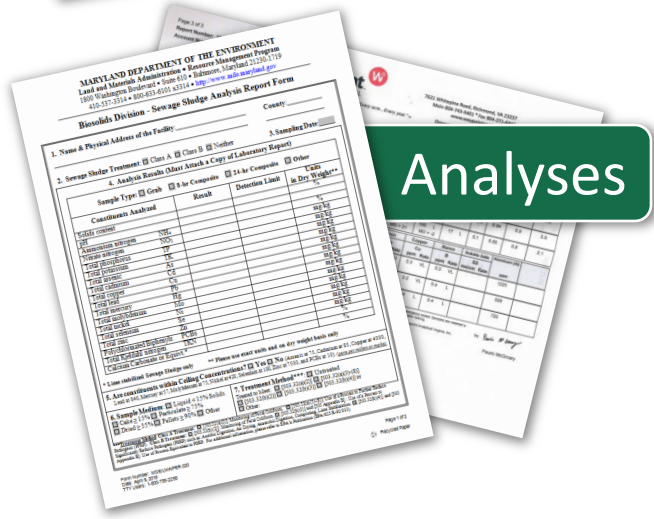
# Ag Land Permit – Information Required



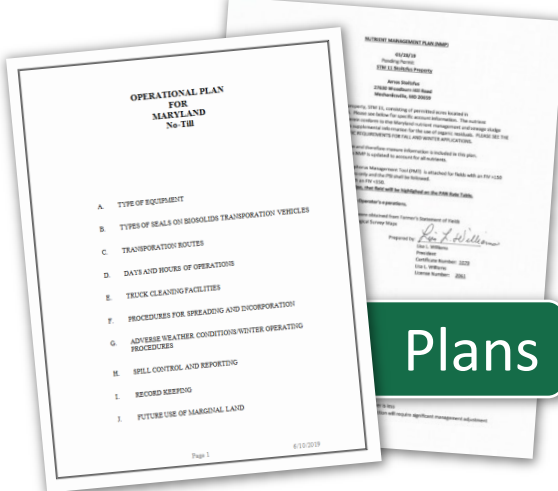
Forms



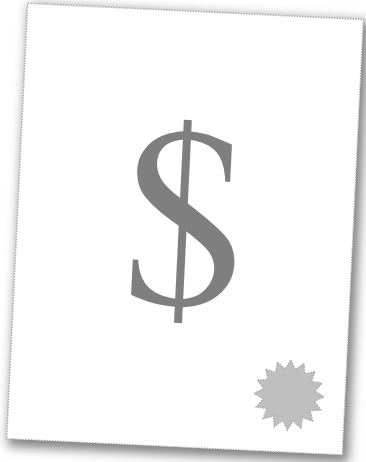
Maps



Analyses



Plans





# Ag Land Permit – Site Requirements

- Site Inspection
- Application rates based on expected crop yield and plant-available nitrogen in sewage sludge
- Slope restrictions
- Buffers areas (marked with stakes or flags)
- Minimum soil pH of 6.0
- Adverse weather condition restrictions
- Trucks must be cleaned on site to prevent drag-out of soil or sewage sludge onto public roads

Feature of Concern	Minimum Buffer Distance	
	Surface Application of Sewage Sludge with no Incorporation	Injection of Sewage Sludge or Surface Application of Sewage Sludge with Incorporation
Bedrock	20 inches	20 inches
Bedrock outcrops	50 feet	25 feet
Field ditches	10 feet	10 feet
Incorporated municipality boundary lines	1,000 feet	400 feet
Occupied off-site dwelling	200 feet	100 feet
Occupied on-site dwelling	200 feet	100 feet
Property lines	50 feet	25 feet
Public roads	25 feet	15 feet
Surface waters unless Equivalent Best Management Practices are installed	100 feet	35 feet
Water table	20 inches	20 inches
Wells, nonpotable	25 feet	25 feet
Wells, potable	100 feet	100 feet



# Ag Land Permit – Site Requirements

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- Following application
  - Signs may be required for 30 days
  - Animal grazing restricted for 30 days
  - Public access to the site must be controlled for 1 year
  - Crops to be eaten raw by humans restricted for 3 years



# Ag Land Permit – General Provisions

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- Permit is issued for 5 years and can be renewed
- Prior to land application the permittee informs
  - MDE
  - County Health Department, Environmental Health Division
- Recordkeeping and reporting
  - Source, type and quantity of sewage sludge received and applied on each field
  - Soil pH
  - Updated NMP
  - Cumulative and annual constituent loading rates
  - Records kept on site during operations
  - Records sent to MDE



# Summary

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MDE's control measures are designed to protect the public health and the environment.



# Informational Websites

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- Maryland Department of the Environment
  - [www.mde.maryland.gov](http://www.mde.maryland.gov)
- U.S. Environmental Protection Agency
  - [www.epa.gov](http://www.epa.gov)





# Contact Us

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