Biosolids Regulations

Natalie Sierra, P.E.
Outline

- Part 503 Rule Overview
- Land Application
  - Class A vs. Class B
  - Metals Reduction
  - Vector Attraction Reduction (VAR)
  - Pathogen Reduction
- Digester Control
Did You Know That Many Cities Have a Permit for Biosolids?
Part 503 – Regulating Biosolids for Their End Use

• Effective March 22, 1993, amended February 25, 1994
• Established Baseline Rules for Biosolids Management:
  ▪ Land Application
  ▪ Land Disposal
  ▪ Incineration*
  ▪ Landfill (by reference to 40 CFR 258)
• Includes general requirements, monitoring, pollutant limits, etc. for each management option
• Pollutant limits and BMPs result of extensive risk assessment
Part 503 is a baseline – States may pass more stringent regulations!!!
Land Disposal

- Monofills, dedicated disposal sites, lagoons, surface impoundments
- Biosolids remain on land for 2 years or longer
- No liner = limits for arsenic, chromium, and nickel
- Liner and leachate collection system – No metals limits
- Management practices: wetlands bans, runoff collection systems, protect groundwater, restrict public access
- Pathogen and vector attraction reduction
Incineration

- Defines sewage sludge fired in an incinerator as a non-hazardous solid waste
- Regulates multiple hearth and fluidized bed units
- Nine regulated pollutants
- Testing, monitoring, recordkeeping, and operator training requirements
Land Application Requirements

• Pollutant Limits
  (nine regulated metals)

• Vector Attraction Reduction

• Pathogen Reduction
Land Application Has Strict Regulations to Protect Human Health
# MA vs. EPA – Class B Biosolids

<table>
<thead>
<tr>
<th>Metal</th>
<th>503 Metals Limit</th>
<th>MA DEP Limit</th>
<th>EU Mandatory Directive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>4300</td>
<td>1000</td>
<td>1750</td>
</tr>
<tr>
<td>Lead</td>
<td>840</td>
<td>1000</td>
<td>1200</td>
</tr>
<tr>
<td>Mercury</td>
<td>57</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Nickel</td>
<td>420</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Zinc</td>
<td>7500</td>
<td>2500</td>
<td>4000</td>
</tr>
</tbody>
</table>
## Dose Comparison

<table>
<thead>
<tr>
<th></th>
<th>Centrum</th>
<th>Biosolids</th>
<th>Compost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copper</strong></td>
<td>0.5 mg</td>
<td>0.15 mg</td>
<td>0.04 mg</td>
</tr>
<tr>
<td><strong>Molybdenum</strong></td>
<td>0.045 mg</td>
<td>0.002 mg</td>
<td>0.001 mg</td>
</tr>
<tr>
<td><strong>Zinc</strong></td>
<td>11 mg</td>
<td>0.269 mg</td>
<td>0.089 mg</td>
</tr>
<tr>
<td><strong>Selenium</strong></td>
<td>0.055 mg</td>
<td>0.001 mg</td>
<td>0.0004 mg</td>
</tr>
<tr>
<td><strong>Nickel</strong></td>
<td>0.005 mg</td>
<td>0.011 mg</td>
<td>0.004 mg</td>
</tr>
</tbody>
</table>
Land Application – Pathogen Reduction

- Establishes Three “Classes” of Biosolids Quality:
  » Class B
  » Class A
  » Class A Exceptional Quality (EQ)
Pathogen Reduction

• Class B:
  ▪ Alternative 1: Monitor Indicator Organisms: Monthly geometric mean of Fecal Coliform <2.0 x 10^6 MPN/dry g
  ▪ Alternative 2: “Process to Significantly Reduce Pathogens”: Anaerobic Digestion with DT > 15 days & temp > 35 °C (95 °F)
  ▪ Site Restrictions to Protect Public Health

• Class A:
  ▪ Alternative 1: Use of One of Four Time-Temperature Regimens
  ▪ Alternative 5: “Use of a Process to Further Reduce Pathogens” - e.g. composting, heat drying
  ▪ All Alternatives: Fecal Coliform <1000 MPN/dry g OR Salmonella <3 MPN/4 dry g
Vector Attraction Reduction

- Want to verify stability prior to land application to reduce odors & vectors
- Need a 38% reduction in Volatile Solids during sewage sludge treatment – this happens during digestion
- Volatile solids are measured in digester feed and cake
- Typically, if process is stable, no problem meeting VSR
Options to Ensure Compliance

• Daily review of all digester temperatures & DT to ensure full compliance
• Annual Training on permit requirements for time and temperature
• Annual training on fecal coliform sampling
• Increase active volume through a program of regular digester cleaning
• Increase DT by ensuring digester contents in storage digesters are > 95 °F – effectively increases active volume
• Manage shutdowns to minimize over-pumping
Questions?

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