Protecting Water Quality: What’s Next for Dental Discharges?

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Before the Clean Water Act...

• Nation’s waters: open receptacles for untreated sewage and industrial waste

• Cuyahoga River: “chocolate-brown, oily, bubbling with subsurface gases, it oozes rather than flows.”
Clean Water Act - 39th Anniversary

- CWA Objective: “restore and maintain the physical, chemical, and biological integrity of the nation’s waters”
- Significant improvements made through “end of pipe” regulations
Publicly Owned Treatment Works (POTWs)

- Over 16,000 sewage treatment plants in the U.S.
- Over 32 billion gallons of wastewater treated each day
- POTWs designed to treat municipal wastewater
Dental Discharges to POTWs

- EPA: “Dental amalgam contributes a small portion of all the mercury released to the environment” and air emissions are the principle source of mercury to water
- ADA: Up to 50% of mercury entering POTWs is from dental offices
- EPA: 3.7 tons of mercury per year discharged from dental offices
Combined Sewer Systems
Separate Sewer Systems
Wastewater Treatment Facility

1. Bar Screen
2. Grit Tank
3. Settling Tank
4. Aeration Tank
5. Clarifier

How it works:
- Homes
- Office & Industry
- Receiving Water
- Chlorine
- UV
- Landfill
- Incineration
- Agriculture
- Electricity & Heating

Output:
- Electricity & Heating

Where Does the Water Go?
Where Do the Biosolids Go?

Most POTWs meet “High Quality” Biosolids mercury limit of 17 mg/kg
Pollution Prevention

• Prevent discharge of waste into sewer system
• Remove at wastewater treatment facility
• Require pretreatment at non-domestic sources for pollutants that:
  – Pass through treatment process
  – Interfere with treatment process
National Pretreatment Program

• General Pretreatment Regulations require local pretreatment programs for:
  – POTWs treating over 5 million gallons per day
  – Smaller POTWs serving industrial users with potential for pass through or interference

• Approximately 1,600 POTWs (treating 80% of U.S. wastewater) have local pretreatment programs
  – POTWs regulate over 20,000 significant industrial users
Pretreatment Regulations

• Priority Pollutant List – 126 pollutants, including mercury
• Over 50 regulated industrial categories
• Industrial Users (IUs) – non-domestic sources
  – Significant industrial users
  – Non-significant industrial users
    • Reduced reporting requirements
    • Reduced oversight requirements for the POTW
Effluent Guidelines and Pretreatment Standards

- Effluent Limitation Guidelines (ELGs) developed by EPA – greatest pollutant reduction economically achievable for an industry
  - For direct discharges, implemented through national permit program
- Categorical pretreatment standards
  - For indirect discharges, implemented through POTW
- ELG Plan published every two years
Pretreatment Standards

• Types of categorical pretreatment standards:
  – Concentration-based
  – Mass-based
  – Best management practices (BMPs)
  – Prohibitions

• Local Limits
  – Address specific needs of a POTW, its biosolids, and its receiving waters
POTW Responsibilities

• Identify and classify all IUs
• Issue permits to SIUs and general permit/agreement with all IUs
• Inspect SIUs (usually once a year)
• Sample SIUs at least once per year and require self-monitoring twice per year
• Review IU reports
• Enforce regulations as needed
Pretreatment for Dental Amalgam

• 2008 Final ELG Plan, EPA decided not to initiate an ELG for dental amalgam
  – EPA will “continue to examine the percentage of dentists using amalgam separators and their effectiveness at recovering dental amalgam”

• Memorandum of Understanding on Reducing Dental Discharges signed by EPA, NACWA, and ADA in 2008
Proposed Rule

• August 2011 – EPA announced that it would propose a rule to reduce mercury discharge from dental offices

• 2010 Final ELG Plan:

  “Given the human health and aquatic-life impacts associated with mercury, the level of stakeholder interest, and the availability of a technological solution, EPA decided to initiate rulemaking to develop pretreatment standards for dental mercury to more thoroughly and expeditiously address this water pollution problem.”

• Release of proposal expected early 2012
What Will Be Required?

• Based on communications with EPA, NACWA expects that:
  – Dental amalgam separators will be required
  – Separators will need to meet a specified standard (perhaps ISO 11143)
  – Existing separators will be grandfathered
  – General Pretreatment Regulation will be amended to create a new dental office category
# Mercury Reductions at San Francisco Bay Area POTWs

<table>
<thead>
<tr>
<th>Agency</th>
<th># Dental Practices</th>
<th>Influent</th>
<th>Effluent</th>
<th>Biosolids</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>640</td>
<td>26%</td>
<td>64%</td>
<td>54%</td>
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<tr>
<td>2</td>
<td>306</td>
<td>47%</td>
<td>45%</td>
<td>56%</td>
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<td>3</td>
<td>134</td>
<td>35%</td>
<td>52%</td>
<td>43%</td>
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<tr>
<td>4</td>
<td>321</td>
<td>74%</td>
<td>67%</td>
<td>77%</td>
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<tr>
<td>5</td>
<td>820</td>
<td>45%</td>
<td>23%</td>
<td>31%</td>
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</table>
### Biosolids Mercury Concentrations (mg/kg) for one NACWA member

<table>
<thead>
<tr>
<th>Year</th>
<th>Average</th>
<th>Maximum</th>
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<tbody>
<tr>
<td>2007</td>
<td>0.36</td>
<td>0.684</td>
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<tr>
<td>2008</td>
<td>0.28</td>
<td>0.836</td>
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<tr>
<td>2009</td>
<td>0.27</td>
<td>0.410</td>
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<tr>
<td>2010</td>
<td>0.12</td>
<td>0.276</td>
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<tr>
<td>2011 (4 months)</td>
<td>0.12</td>
<td>0.183</td>
</tr>
</tbody>
</table>

“High Quality” Biosolids Mercury Limit = 17 mg/kg
Mercury Removal Rates for this POTW: 89-98%
Questions?

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