Long Term 2 Enhanced Surface Water Treatment Rule (LT2) Cryptosporidium Monitoring

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409,000 PEOPLE INFECTED

Cryptosporidium
Massive Outbreak of Cryptosporidium Infection

• Largest waterborne disease outbreak in documented United States history
• Over 400,000 people were sickened, and approximately 100 people died
• Total cost of outbreak-associated illness was $96 million in medical costs and productivity losses
• Standards and testing for Cryptosporidium were not adequate to detect this outbreak
Lifecycle of Cryptosporidium
Hosts

- Humans
- More than 150 animals including
  - Dogs
  - Cats
  - Birds
  - Deer
  - Cattle
  - Horses
  - Mice, Rats
  - Snakes
  - Rabbits, skunks, chipmunks
  - Etc, etc, etc
Health Effects

- Diarrhea, cramps, loss of appetite, low-grade fever, nausea and vomiting
- Can be prolonged, invasive and life-threatening in immuno-compromised persons
- Possible links to reactive arthritis and irritable bowel syndrome
- Suggested relapse in inflammatory bowel disease e.g. Crohn’s
- Developing countries:
  - children exhibit poor growth, depressed cognitive function
Key LT2 Rule Requirements

- Disinfection Profiling And Benchmarking
- Source Water Monitoring (Round 2)
- Uncovered Finished Water Reservoirs

- Risk Bin Classification

- Implement Treatment from Microbial Toolbox If Required

- Systems have the option to provide maximum treatment and avoid source water monitoring
Disinfection Profiling And Benchmarking

Source Water Monitoring (Round 2)

Risk Bin Classification

Implement Treatment from Microbial Toolbox If Required

Uncovered Finished Water Reservoirs

Systems have the option to provide maximum treatment and avoid source water monitoring
Source Water Monitoring

- Large systems (≥10,000) monitor for Cryptosporidium, E. coli and turbidity for 24 months (or provide 5.5 log Cryptosporidium treatment).
- Small systems (<10,000) may monitor for E. coli for 12 months and, if their E. coli level is above a trigger, they monitor for Cryptosporidium.
  - EPA guidance includes a trigger of 100cfu/100mL
  - States may approve an alternate trigger level and/or alternate indicator level
Cryptosporidium Monitoring Start Dates Round 2 - Large Systems

<table>
<thead>
<tr>
<th>Frequency /Duration</th>
<th>Systems serving</th>
<th>Begin Monitoring no later than</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly 24 Months</td>
<td>At least 100,000</td>
<td>April 1, 2015</td>
</tr>
<tr>
<td></td>
<td>50,00-99,999</td>
<td>October 1, 2015</td>
</tr>
<tr>
<td></td>
<td>10,000-49,000</td>
<td>October 1, 2016</td>
</tr>
</tbody>
</table>
Start Dates for Systems serving less than 10,000

<table>
<thead>
<tr>
<th>Monitor for</th>
<th>Frequency /Duration</th>
<th>Begin Monitoring no later than</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. coli</em></td>
<td>Once every two weeks/ 12 Months</td>
<td>October 1, 2017</td>
</tr>
<tr>
<td><em>If triggered by source water E. coli monitoring</em></td>
<td>Semi-monthly for 12 Months or monthly for 24 months</td>
<td>April 1, 2019</td>
</tr>
</tbody>
</table>

10/20/2015
Monitoring Responsibilities for Public Water Systems

• Follow State Requirements
• Procure Certified Laboratory Services or Establish In-house Capability & Certification
• Review Laboratory Reports
§ 40 CFR 141.705 Approved laboratories

State Certification must be Equivalent to EPA’s Cryptosporidium Laboratory QA Program

- Pass OGWDW’s crypto cert course
- Use the checklists in Supplement 2 to the Manual for the Certification of Laboratories Analyzing Drinking Water
§ 40 CFR 141.704 Analytical Methods

The required Methods use similar processes

• Method 1623.1: Cryptosporidium & Giardia (June 2012)
• Method 1623: Cryptosporidium & Giardia (Dec 2005)
• Method 1622: Cryptosporidium only (Dec 2005)
Meet the Bugs
Method Overview

10 L → Filter → Centrifuge Tubes → Magnetic Purification → 100 µl → Microscope Slide
§ 40 CFR 141.704 Quality Control Requirement

- Matrix spike (MS) samples are required
  - 2nd sample spiked with pre-determined number of Cryptosporidium oocysts
  - Typically two matrix spikes for each source
Reviewing Lab Reports

- Positive Results documented by Lab as “Total FA Count”
- Written descriptions with each individual count
  - Size measurement
  - Cell shape and features
  - Stain characteristics
Review Sample Holding Times

- 4 days collection to process
- 1 day process
- 3 days process to stain
- 7 days for microscopy
EPA’s Technical Support Center Assistance

- Train Certification Officers
- Provide written guidance
- Tech Support for States and labs
- Maintain list of certified labs on EPA’s website
Region 6

- 4 certification officers that have passed TSC’s crypto course
- 2 laboratories
  - Louisiana State Office of Public Health Laboratory in Baton Rouge
  - Accurate Environmental in Oklahoma City
- Another state lab and a municipal lab are gearing up
- At least one state has been monitoring since before federal involvement
**Naegleria fowleri**

- Causes primary amebic meningoencephalitis (PAM)
- Primarily in Southern states in US
- Oral consumption of contaminated water has not been implicated
- Infections traced to contaminated water entering the nasal cavity