Batch Chlorination Guidance and Regulation
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DDW Emergency Response number
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Batch Chlorination

• Batch disinfection is defined as:
  “the process of periodically adding a disinfecting agent to a water system, in lieu of performing approved continuous disinfection.”

• Batch disinfection is further defined as:
  “when a system adds a disinfectant to avoid coliform positive samples.”
Batch Chlorination

Examples may include but are not limited to:

• Manually adding disinfecting agent at the source or storage tank to address on-going water quality issues in the distribution system.

• The installation of some type of unapproved mechanical means of dispensing disinfecting agents into the distribution system.
Batch Chlorination – The Rules

R309-200(7) Disinfection
Continuous disinfection is recommended for all water sources. It shall be required of all ground water sources which do not consistently meet standards of bacteriologic quality.

R309-520-5 Secondary Disinfectants
Secondary disinfection provides an adequate disinfectant residual in the distribution system to maintain the quality of treated water by controlling microbiological contamination. Secondary chemical disinfection is achieved by maintaining a detectable disinfectant residual throughout the distribution system. Allowable secondary disinfectants are chlorine and chloramine.

R309-520-6 General
Intermittent or batch disinfection, such as adding hypochlorite tablets or concentrated hypochlorite solution to a tank, is not acceptable for ongoing operation if continuous disinfection is required.
Batch Chlorination

Is it really a thing??
**Batch Chlorination - History**

- **Early 2015 –**
  - DDW starts tracking all emergency response incidents.

- **August 2017 –**
  - Emergency Response Workgroup review of past incidents showed a high number of boil orders resulting from batching systems.

- **January 2018 –**
  - DDW Batch Chlorination Workflow was created.
  - Designed to define batch chlorination, provide outline for technical assistance & enforcement.
Emergency Response Events

- Natural Event: 2
- Chem Spill: 4
- Cross Connection: 4
- Customer Complaint: 5
- Intrusion: 6
- MCL Violations: 7
- Operational Issues: 14
- TC+IEC+: 32
- Boil Order/Do Not Drink: 36
Batch Chlorination – Why is it bad?

- It masks quality issues and physical deficiencies
- It can harm infrastructure
- Changes water chemistry
- Uneven dispersal
- Unmonitored
- It can be harmful to public health
Why is it bad? - Biology

Germ inactivation for chlorinated water*

<table>
<thead>
<tr>
<th>Germ</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>E. coli O157:H7 Bacterium</em></td>
<td>Less than 1 minute</td>
</tr>
<tr>
<td>Hepatitis A Virus</td>
<td>About 16 minutes</td>
</tr>
<tr>
<td><em>Giardia Protozoan</em></td>
<td>About 45 minutes</td>
</tr>
<tr>
<td><em>Cryptosporidium</em> Protozoan*</td>
<td>About 15,300 minutes (10.6 days)</td>
</tr>
</tbody>
</table>

* Laboratory testing results using chlorine demand free water with 1 ppm (1 mg/L) at 7.5, 77 °F (25 °C) and in the absence of cyanuric acid.
Why is it bad? - Chemistry

- Intermittent chlorination can harm infrastructure and can be harmful to public health
Why is it bad? - Corrosion
Why is it Bad? - Corrosion
Why is it bad? - Aluminum Corrosion
Why is it bad? – Masking problems
Common Stories:

• System only chlorinates once a month to pass Bact-T samples

• System chlorinates between positive sample and repeat samples

• New operator takes over and Bact-T samples start failing
Batch Chlorination – Is it ever ok?

- Emergencies
- Seasonal Start-Up
- Temporary until permanent disinfection is installed
Chlorine Types

Gas

Liquid (Sodium hypochlorite)

Powder (Calcium hypochlorite)

Tablet (Calcium hypochlorite)
Approved Products and Methods
Approved Products and Methods

- AWWA C651 - Disinfecting Water Mains
- AWWA C652 – Disinfection of Water Storage Facilities
Approved Products and Methods - Injector
Temporary Installation
H.E. Anderson Series #2
Batch Chlorination – How can you tell?

- Public calls
- Site visits
- Ask operators
- Random residual testing
Evidence

- White chalky residue
- Excessive corrosion
- Empty containers
- Undocumented equipment
Evidence
Evidence
Evidence
Evidence – empty containers
Evidence – empty containers
Undocumented Equipment
## GENERAL DISINFECTION

### Question 60

Water system follows AWWA disinfection procedures for new, repaired, or seasonal water mains and tanks.

SIG - 10pts - MR - D018 - DOES NOT USE AWWA DISINFECTION STANDARDS: R309-550-8(10) - R309-550-8(10) states that all new and repaired water mains, appurtenances, reservoirs and seasonal operating systems shall be disinfected in accordance with AWWA Standard C651. 10 demerit points shall be assigned.

**Comments:**

### Question 61

How often do you periodically disinfect all or any parts of your water system (ie batch disinfection) other than for repairs or maintenance?

SIG - 35pts - TR - TD25 - CL2 DISINFECTION PROCESS NOT CONTINUOUS: R309-200-5(7) - Rule requires continuous disinfection of groundwater sources that do not consistently meet bacteriological quality standards, all surface water sources, and groundwater sources under the direct influence of surface water. This significant deficiency must be corrected within 120 days of notification or have a compliance action plan approved by DDW.

**Comments:**

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**Survey Sections:**

- General Disinfection
Sanitary Survey

GENERAL DISINFECTION

60. Water system follows AWWA disinfection procedures for new, repaired, or seasonal water mains and tanks.

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Comments:

61. How often do you periodically disinfect any or all parts of your water system (ie batch disinfection) other than for repairs or

SIG - 20 pts - MR - H018 - DISINFECTION PROCESS NOT CONTINUOUS: R309-200-5(7) - Rule requires continuous disinfection of groundwater sources that do not consistently meet bacteria standards from all surface water sources, and groundwater sources under the direct influence of surface water. This significant deficiency must be corrected within 120 days or the system must develop a corrective action plan approved by DDW.

Survey Sections:

General Disinfection

Refresh Survey  Mailed and Lock  Survey Deficiency PDF  PDF With Reg  PDF No Reg

Validate  Save

0 of 11 Section(s) completed
DDW Actions When Batch Disinfection is Verified

- DDW adds deficiency TD25 (Cl2 disinfection process not continuous, significant deficiency). This deficiency will show on a system’s IPS report.

- If the system does not resolve the TD25 significant deficiency within 120 days then a type 45 groundwater rule violation will be created (35 IPS points), and an NOV sent.

- The system can submit a Corrective Action Plan (CAP) to resolve the deficiency.

- In a Compliance Agreement/Enforcement Order (CA/EO) DDW will give the system a timeline in which to resolve the batch disinfection.
Questions?