

# **Comprehensive Compliance Investigation**

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Water Supply Division  
Public Drinking Water Section

# Construction

- Chemical storage
- Chemical feed rate and dosage control
- Backflow prevention

# Chemical Storage

- Day tanks
  - Prevents chemical overfeeds
- Labels
- Level indicators
  - Alerts staff

# Chemical Storage

- Spill containment
  - 110% of tank volume
  - Compatible chemicals
- 15-day supply of chemicals
- NSF certification



ALUM

FLUORIDE

CA S TIC





Liquid Alum and Caustic Day Tanks  
in Common Containment Area \*

Containment Wall Inadequate  
for Chemical Volume \*

\* Denotes Violation  
or Area of Concern



SAFETY FIRST



# Chemical Feed Rate and Dosage Control

- Feed pump sized to meet full range of expected flows
  - 50% greater than highest dosage
- Provision for accurate measurement of feed rates
  - Calibration cylinders
- Sufficient chemical feed points



**DANGER**  
**CAUSTIC**



# Gaseous Feeders

- Typically used to feed gaseous chlorine and ammonia
- Rotameter for each injector at each application point
- Allows adjustment and measurement of feed rate
- Rotameter
  - 20 – 80%



CHLORINATOR NO. 2



Gas Chlorine Rotometer

FISCHER PORTER **F**

# Liquid Feeders

- 20 – 90% stroke
- 20 – 90% speed
- Calibration cylinders





# Backflow Prevention

- Acceptable backflow prevention for carrier water
  - RPBA- health hazard
  - Air gap

# Up-to-Date Monitoring Plan

- Identifies all sampling locations
  - Plant
  - Point of entry
  - Distribution
  - All regulated constituents
    - *30 TAC 290 Subchapter F*
- Describes the sampling frequency
- Specifies the analytical procedures and laboratories

# Monitoring Plan

- Includes a treatment plant schematic with sample points
- Process control monitoring points
  - Upstream and downstream of chlorine and ammonia application points
  - At the pump station
  - Distribution system



# Monitoring Plan

- PWS Monitoring Plan Guidance (RG-384)
- Check plan vs. actual plant conditions
- Talk to

*Marie Knipfer*

*(512) 239 - 6040*

*mknipfer@tceq.state.tx.us*

# Laboratory

- Acceptable laboratory sampling and testing procedures – observe techniques
- Review of log entries
- FAA at POE, differences between total and mono should be stable
- Secondary standards for lab equipment

# Laboratory Equipment

- Test kits and lab facilities
  - Free Available Chlorine
  - Total Available Chlorine
  - Monochloramine
  - Free Available Ammonia

# Sampling & Documentation

- **FAC** before ammonia injection point (if there's enough time)
- **TAC, Mono, and FAA** upstream and downstream of chlorine and ammonia injection point
- **TAC Mono, and FAA** at the high service pump station



# Sampling & Documentation

- TAC, Mono, and FAA in distribution
- Testing before and after feed rate change
- Periodic testing at high service pump station and in distribution (per exception)

# Operational SOPs

- Performance Goals and Action Levels
- What changes are required if the results are outside the acceptable range?
  - Documented?
  - Operators know what they are?

# Operations & Maintenance

- Prior to and after any changes in source water or ammonia dosages, monitor and record
  - free ammonia
  - mono-chloramine
  - total chlorine
  - free chlorine

# Operations & Maintenance

- The ammonia level in the treated water entering the distribution must be monitored and recorded at least once each week and any time after adjusting either the chlorine or ammonia dosage levels.

# Reporting Requirements

- Disinfectant Level Quarterly Operating Report
- 14-day startup notice
- “free chlorine burnout” notice
  - in writing at least 14 days prior
  - to customers and to TCEQ
  - identify tentative begin and end dates



# Records Retention

- Keep for 3 years
  - Chlorine burnout notifications to customers and to wholesale customers
  - Disinfectant residual monitoring results from the distribution system
  - Calibration records
    - Laboratory equipment
    - Flow meters
    - Rate-of-flow controllers
    - On-line disinfectant residual analyzers

# Out of Compliance?

- If we find problems we will
  - Help you get some technical assistance
  - Revoke exception
  - Possibly take enforcement action

**D. A. M. s**

**How to get some technical  
assistance.**

# What are *D. A. M. s* ?

- “Directed Assistance Modules”
- Training tools and protocols that can be used by the TCEQ's Capacity Development contractors to provide site-specific training

# What **D. A. M. s** are available?

- DAM. 1: Process Control Monitoring Plans
- DAM. 2: Chemical Feed and Adjustment
- DAM. 3: Completing the SWMOR
- DAM. 4: Evaluation of Alternate Disinfectants
- DAM. 5: Applying Chloramines

# DAM No. 5 Overview

- D. A. M. 5 is an 8-hour course designed to provide hands-on training to the staff of any public water system that treats with chloramines.
- D. A. M. 5 is provided at the water treatment plant .



# Who Gives a D. A. M. ?

- Instructor that understands and can demonstrate the steps needed to establish appropriate chlorine and ammonia feed rates.
- Instructor that is able to use the various Feed Rate and Ratio Calculator spreadsheets.
- FMT Assistance Provider

# Provisional Agenda for DAM No. 5

<b>Time</b>	<b>Activity</b>
<b>8:00 – 8:15</b>	<b>Introductions and overview (15 minutes)</b>
<b>8:15 – 9:00</b>	<b>Plant tour (45 minutes)</b>
<b>9:00 – 9:30</b>	<b>Chemistry (30 minutes)</b>
<b>9:30 – 10:15</b>	<b>Breakpoint curve (45 minutes)</b>
<b>10:15 – 10:30</b>	<b>Break (15 minutes)</b>
<b>10:30 – 11:30</b>	<b>Weight-based Dose and Feed Rate (60 minutes)</b>
<b>11:30 – 12:30</b>	<b>Lunch (60 minutes)</b>
<b>12:30 – 1:45</b>	<b>Applying the Concepts (75 minutes)</b>
<b>1:45 – 2:30</b>	<b>Sample Collection, Laboratory Analyses and Data Interpretation – (45 minutes)</b>
<b>2:30 – 2:45</b>	<b>Break (15 minutes)</b>
<b>2:45 – 3:30</b>	<b>Sample Collection, Laboratory Analyses and Data Interpretation – (45 minutes)</b>
<b>3:30 – 4:10</b>	<b>Chloramination Spreadsheet (40 minutes)</b>
<b>4:10 – 4:30</b>	<b>Residual Maintenance and Distribution System Monitoring (20 minutes)</b>
<b>4:30 – 4:50</b>	<b>Action Plan (20 minutes)</b>
<b>4:50 – 5:00</b>	<b>Wrap-up and questionnaire (10 minutes)</b>

# DAM No. 5 Objectives

- Identify suitable points to apply chlorine and ammonia within the plant.
- Explain how chloramines form and how to control operating conditions to minimize competing reactions.

# DAM No. 5 Objectives

- Estimate the amount of chlorine and ammonia to add at each application point.
- Conduct process control tests and interpret the results.
- Make appropriate adjustments to chemical feed rates.

# How Can I Get a D. A. M.?

- TCEQ FMT Assistance Contract
  - [www.trwa.org](http://www.trwa.org)
- Margot Taunton, TCEQ
  - [MTaunton@tceq.state.tx.us](mailto:MTaunton@tceq.state.tx.us)
- TCEQ Region 12, Houston
  - (713) 767-3500

The End



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