

# **RTCR and Chlorine Residuals - Overall Look From A Utility Perspective**

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*Presentation to TAC*

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# Current vs Proposed Chlorine Residuals in PA

## Current

- Entry Point (SW) 0.2 mg/L
- Entry Point (GW) 0.40 mg/L
  - Higher for some systems
- Distribution System TT
  - “detectable” 0.02 mg/L
  - 95%
  - Coupled with TCR samples
  - If ND, perform HPC
  - If HPC < 500/ml; acceptable residual

## Proposed

- Entry Point (SW) 0.20 mg/L
- Entry Point (GW) 0.40 mg/L
  - Higher for some systems
- Distribution System Min
  - 0.30 free or 0.50 total mg/L
  - 100%
  - Coupled with RTCR samples
  - HPC indicator- not an option
  - 1 hour notification to DEP
  - Tier 2 PN required if Cl<sub>2</sub> < min for > 4 hours

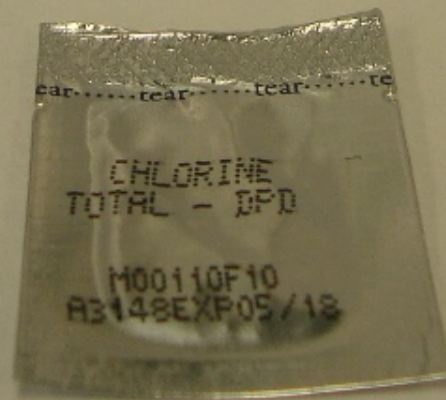
# A look at the Proposed Residuals

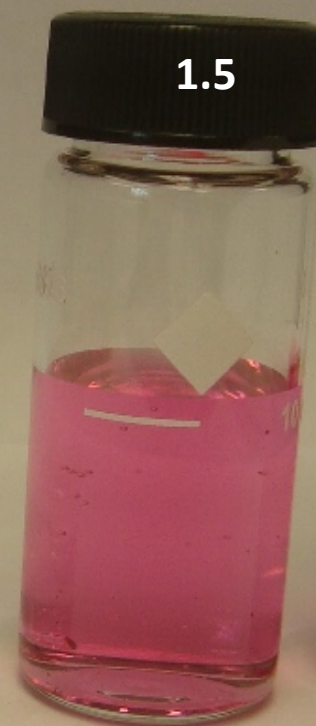
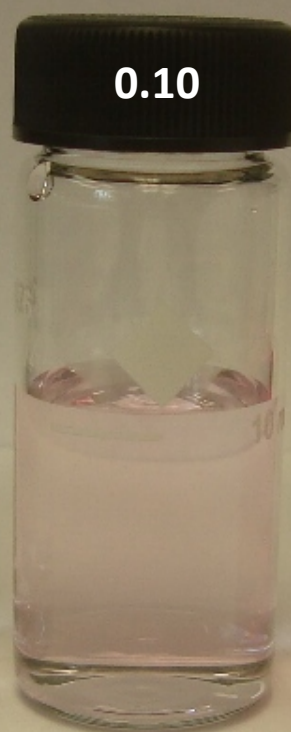
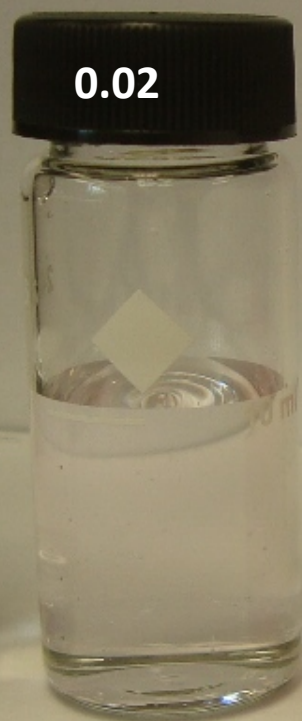
- How confident are we with chlorine residual data, given...
  - Field colorimetric test
  - Easy, economical, long history of use
  - Every measurement has a level or degree of uncertainty
- Field chlorine test has uncertainties or weaknesses in the sample and testing process e.g. volume of sample/sample cell, reagents etc.

# Proposed Residuals Continued

- The right most number of the chlorine residual has some uncertainty (as in 0.28 and 0.34), the 8 and the 4 are uncertain and the result for both readings is 0.3
- *Should we regulate to the level of uncertainty*
  - *(0.30 as proposed) or to what is certain (0.3)?*
- 2 significant figures or 1?









# Residuals

- PWS must meet 100% of the time
- If chlorine residuals are regulated at 0.3/0.5 and result is  $<$  minimum, then...
- Implement BMPs e.g. flushing, storage tank maintenance..., pipe replacement etc.
- PWSs would likely implement localized flushing to increase the residual as a first step

# ? The Perspective

- The benefit of localized flushing
  - Length of flushing and the expected resultant, increased residual duration depends on system design, system demand, time of day, sample location etc.
  - What happens when flushing ceases
  - Temporary increase in residual
  - Is there a benefit or protection of public health?
  - Is this an economically, realistic practice?





# Dollars and Sense

## Operational

### O&M

- Increase Chemical Costs
- Increase Violations & PN
- Increase personnel or increase OT to flush
- Increase NRW
- Increase Booster Disinfection
- Increase DEP Permitting
- Increase Complexity- more vulnerability and security
- Increase Rates

## Customer Perception

### Negative

- T & O complaints
- Why are we flushing?
  - We are in drought; wasting water, etc.
- *Decrease or loss of Fire Protection*
- *What's wrong with my water this time?*
- *Loss of customer confidence*
- *Increase Bottled Water and POE/POU devices*
- Increase costs to customers

# Regulatory Impacts

- Increased Violations and Public Notification (PN)
  - 100% compliant; 100% of the time is not feasible
- Possible exceedances of MRDLs
  - (Max Residual Disinfectant Levels)
- Increased Disinfection Byproducts (DBPs)
- Increased Operational Evaluation Level (OEL) exceedances

# What's Required

- Is there a risk to public health with lower than proposed chlorine residuals?
- *What's the number?*
- ND chlorine residuals w/o presence of Total Coliform or E coli
- Positive Total Coliform or E coli in samples with chlorine residuals > 0.3, 0.5, 1 mg/L, etc.
- Does the Federal RTCR require higher chlorine residuals?
- Is EPA RTCR Assessment and Corrective Action Guidance Manual an enforceable regulation?
- Does RTCR or the EPA Guidance Manual instruct or require PA DEP to set and regulate higher residuals at a specific value?
- **Answers: No, No and No**



# EPA RTCR Assessments and Corrective Actions and Guidance Manual



## DISCLAIMER

This manual is intended to provide information to assist public water systems in complying with the Level 1 and Level 2 assessment and corrective action requirements under the Revised Total Coliform Rule (RTCR).

This guidance is not a substitute for applicable legal requirements, nor is it a regulation itself. Thus, it does not impose legally-binding requirements on any party, including EPA, States or the regulated community. While EPA has made every effort to ensure the accuracy of the discussion in this guidance, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

## § 142.16 Special primacy requirements

- (q) *Requirements for States to adopt [40 CFR part 141](#) subpart Y—Revised Total Coliform Rule...* **State regulations be at least as stringent as federal requirements,...**
  - **Note: (EPA has not set a minimum residual level in the distribution system by regulation or in the RTCR)**
- (1) ...the primacy application must indicate what baseline and reduced monitoring provisions of [40 CFR part 141](#), ...
- (2) ...Application for primacy for subpart Y must include a written description for each provision included in paragraphs (q)(2)(i) through (viii) of this section.
- (iii) Assessments and Corrective Actions—The process for implementing the new assessment and corrective action phase of the rule, including the elements in paragraphs (q)(2)(iii)(A) through (D) of this section.
  - **This addresses sanitary defects, but low chlorine residual is not defined as a sanitary defect.**

# § 142.16 Special primacy requirements

- (A) Elements of Level 1 and Level 2 assessments.  
This must include an explanation of how the State will ensure that Level 2 assessments provide a more detailed examination of the system (including the system's monitoring and operational practices) than do Level 1 assessments ...
- (B) Examples of sanitary defects.
- (C) Examples of assessment forms or formats.
- (D) Methods that systems may use to consult with the State on appropriate corrective actions.

Level 1 assessment  
forms do not  
reference residuals

residual is not a sanitary defect



# Revised Total Coliform Rule: A Quick Reference Guide

## Assessments and Corrective Action

The RTCR requires PWSs that have an indication of coliform contamination (e.g., as a result of TC+ samples, *E. coli* MCL violations, performance failure) to assess the problem and take corrective action. There are two levels of assessments (i.e., Level 1 and Level 2) based on the severity or frequency of the problem.

### Purpose of Level 1 and Level 2 Assessments

To find sanitary defects at the PWS including:

- ▶ Sanitary defects that could provide a pathway of entry for microbial contamination, or
- ▶ Sanitary defects that indicate failure (existing or potential) of protective barriers against microbial contamination.

*Guidance on how to conduct Level 1 and Level 2 Assessments and how to correct sanitary defects found during the Assessments can be found at:*

*[http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation\\_revisions.cfm](http://water.epa.gov/lawsregs/rulesregs/sdwa/tcr/regulation_revisions.cfm).*

### Deadline for Completing Corrective Actions

When sanitary defects are identified during a Level 1 or Level 2 Assessment, they should be corrected as soon as possible to protect public health. The PWS must complete corrective actions by one of the following timeframes:

- ▶ No later than the time the assessment form is submitted to the state, which must be within 30 days of triggering the assessment, or
- ▶ Within state-approved timeframe which was proposed in the assessment form.

# Can PA meet primacy requirements w/o setting a defined minimum residual?

- EPA has not defined minimum residual, as a sanitary defect, nor set minimum residual requirements via RTCR and EPA is **NOT** requiring States to define residual as a fixed number
- Should Pennsylvania more strictly regulate a minimum residual without the science to support that public health is better protected at “X” residual
- Is it possible for Pennsylvania to set minimum residuals in a guidance manual or policy, to provide support for Level 1 and 2 assessments and corrective actions in lieu of a Rule?
- BAT for RTCR as in § 141.63(e)(2) includes “Maintenance of a disinfectant residual throughout the distribution system” but it does not define or set fixed residual level

## Disinfection Requirements

05/04/2015

***Pre-DRAFT: FOR DISCUSSION PURPOSES ONLY***

(c) Failure to maintain the minimum disinfectant residual at any location is a treatment technique violation. A public water system that experiences a treatment technique violation shall notify the Department within 1 hour in accordance with § 109.701(a)(3) (relating to reporting and recordkeeping) and issue a Tier 2 public notice in accordance with § 109.409 (relating to Tier 2 public notice—categories, timing and delivery of notice).

***Was it intended to remove the 4 hour timeframe to give the PWS the opportunity to increase the residual through BMPs prior to issuing a Tier 2 PN?***



# Can we draw these conclusions to get from Point A to Point B - does this make sense?

- PA DEP current reporting - average residual/month per system in PADWIS
- PA DEP has made assumptions/decisions
  - Average data represents entire system residuals
  - Injustice to make decisions based solely on average data
  - About 7% of PA systems are currently below the proposed min residuals of 0.3 free and 0.5 total chlorine
  - PWSs will meet by implementing BMPs- flushing, manage water age etc w/o increasing residuals
    - *Really, it's not that easy*
  - Implementation time frame- 6 months - not realistic
- Bad science – not utilizing representative data, underestimating impacts to PWSs and to the number of systems affected

# Actual Residuals vs Avg Residuals

	Total Chlorine Residual						Distribution			EP	% samples < 0.5	% samples < 0.8
Year	<0.1	<0.2	<0.3	<0.5	<0.8	<1.0	AVG	MAX	MIN			
3	23	56	86	125	210	255	1.74	3.1	0.05		8	14
2	37	81	116	167	236	283	1.54	3.1	0.03		11	16
1	7	23	48	99	159	196	1.66	3.1	0.03		7	11

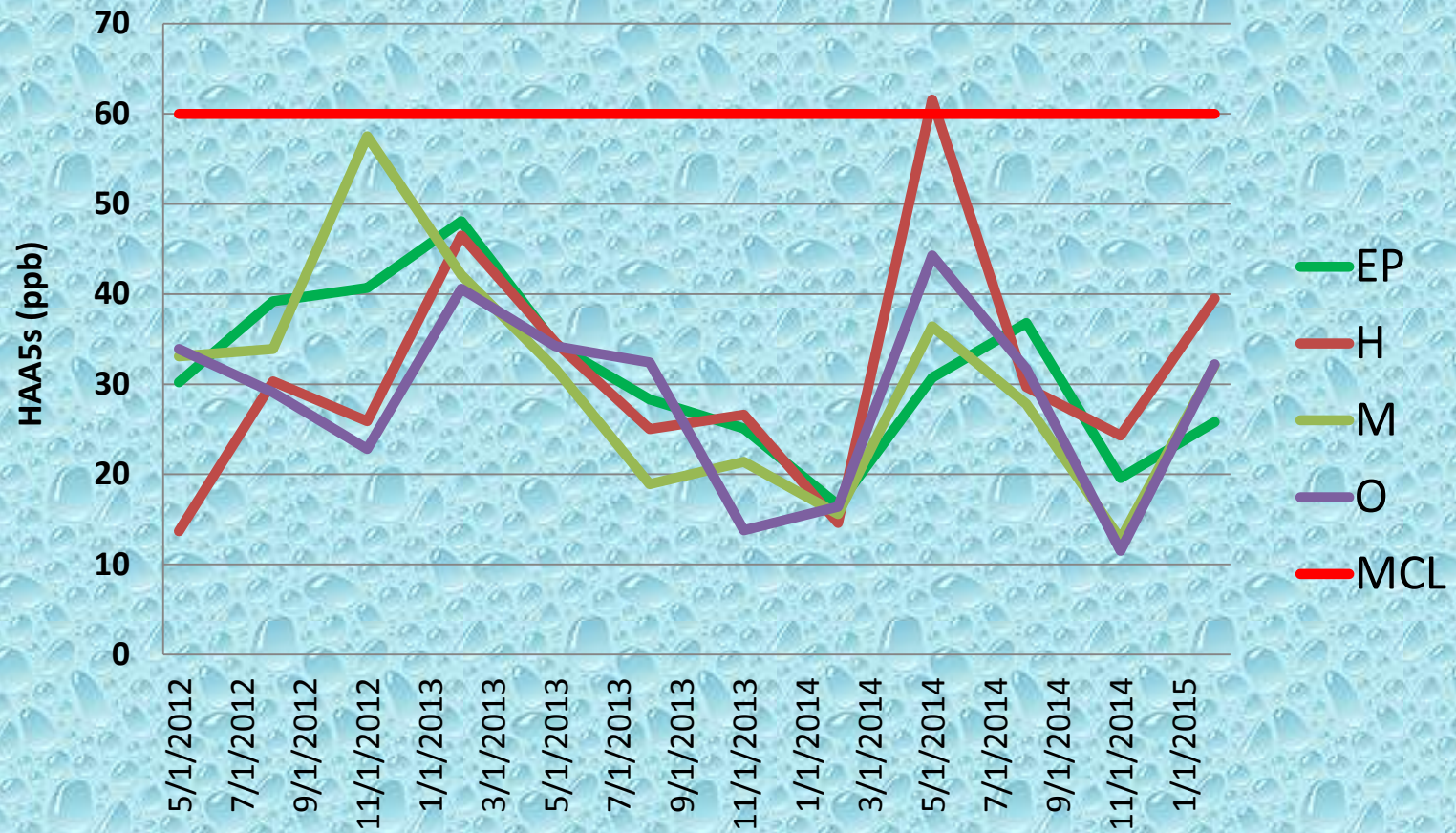
# Impact to DBPs

	EP			H			M			O		
	chlorine	HAA	TTHM	chlorine	HAA	TTHM	chlorine	HAA	TTHM	chlorine	HAA	TTHM
5/8/2012	2.4	30.2	26.0	0.1	13.7	42.2	1.3	33.1	46.5	1.2	33.9	42.3
8/8/2012	2.8	39.2	46.0	0.4	30.3	49.3	0.5	33.9	58.5	0.1	29.1	58.0
11/13/2012	2.6	40.7	21.7	0.3	25.9	77.0	0.7	57.5	66.4	0.2	22.8	64.5
2/11/2013	2.7	48.1	20.7	0.9	46.5	44.2	1.9	42.1	36.2	2.0	40.6	30.5
5/7/2013	2.9	34.4	28.6	0.3	34.6	39.8	1.0	31.7	37.5	1.1	34.2	40.0
8/13/2013	2.9	28.3	41.5	0.6	25.0	60.0	0.1	18.9	62.8	0.7	32.4	56.7
11/12/2013	2.7	25.1	21.5	1.0	26.6	36.7	0.6	21.4	31.5	0.2	13.8	32.4
2/7/2014	2.6	16.6	17.7	0.8	14.6	31.3	1.7	15.6	26.4	1.9	16.4	24.6
5/12/2014	2.7	30.7	37.0	0.4	61.6	60.2	1.0	36.4	52.4	2.2	44.3	53.2
8/11/2014	2.9	36.8	38.9	0.8	29.7	52.7	1.0	27.8	51.0	1.1	31.7	47.7
11/7/2014	3.0	19.6	30.2	1.4	24.3	51.4	0.7	12.8	51.4	0.7	11.5	49.8
2/11/2015	2.8	25.8	16.7	1.3	39.5	45.0	1.8	32.1	31.9	2.0	32.2	31.3

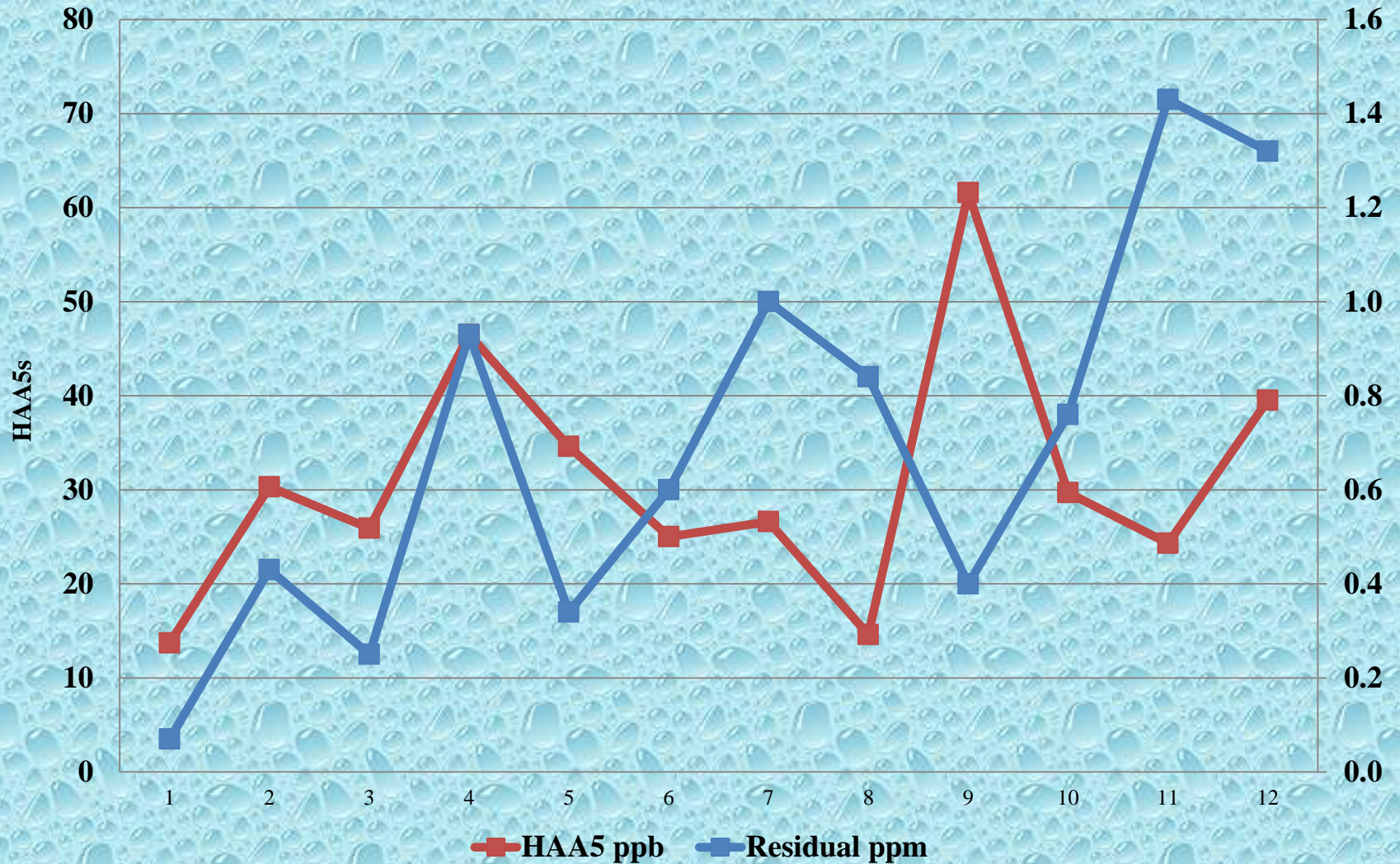


# EP and Dist HAAs

## 2nd qtr 2012- 1st 2015

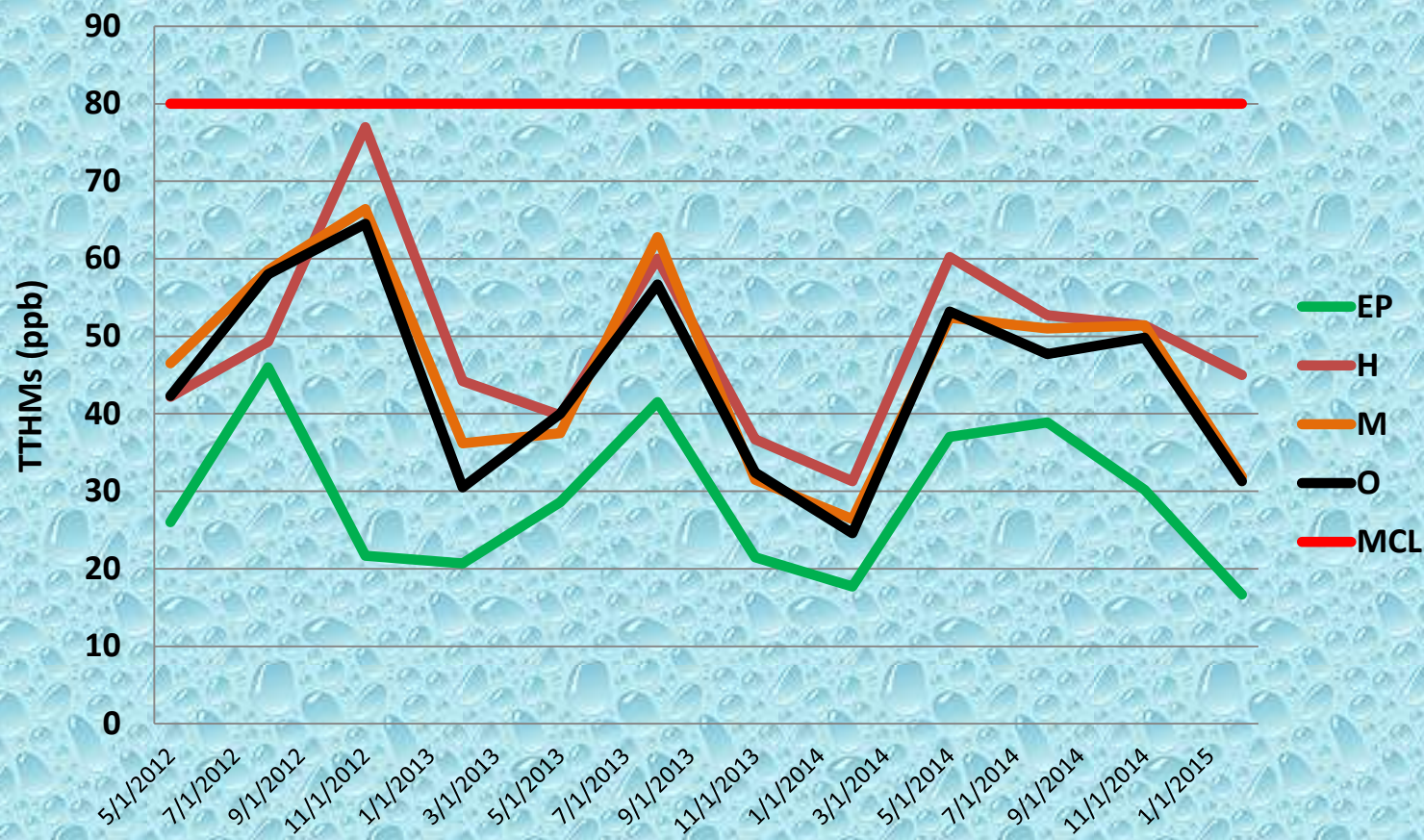


# HAA and Chlorine Residual Site H



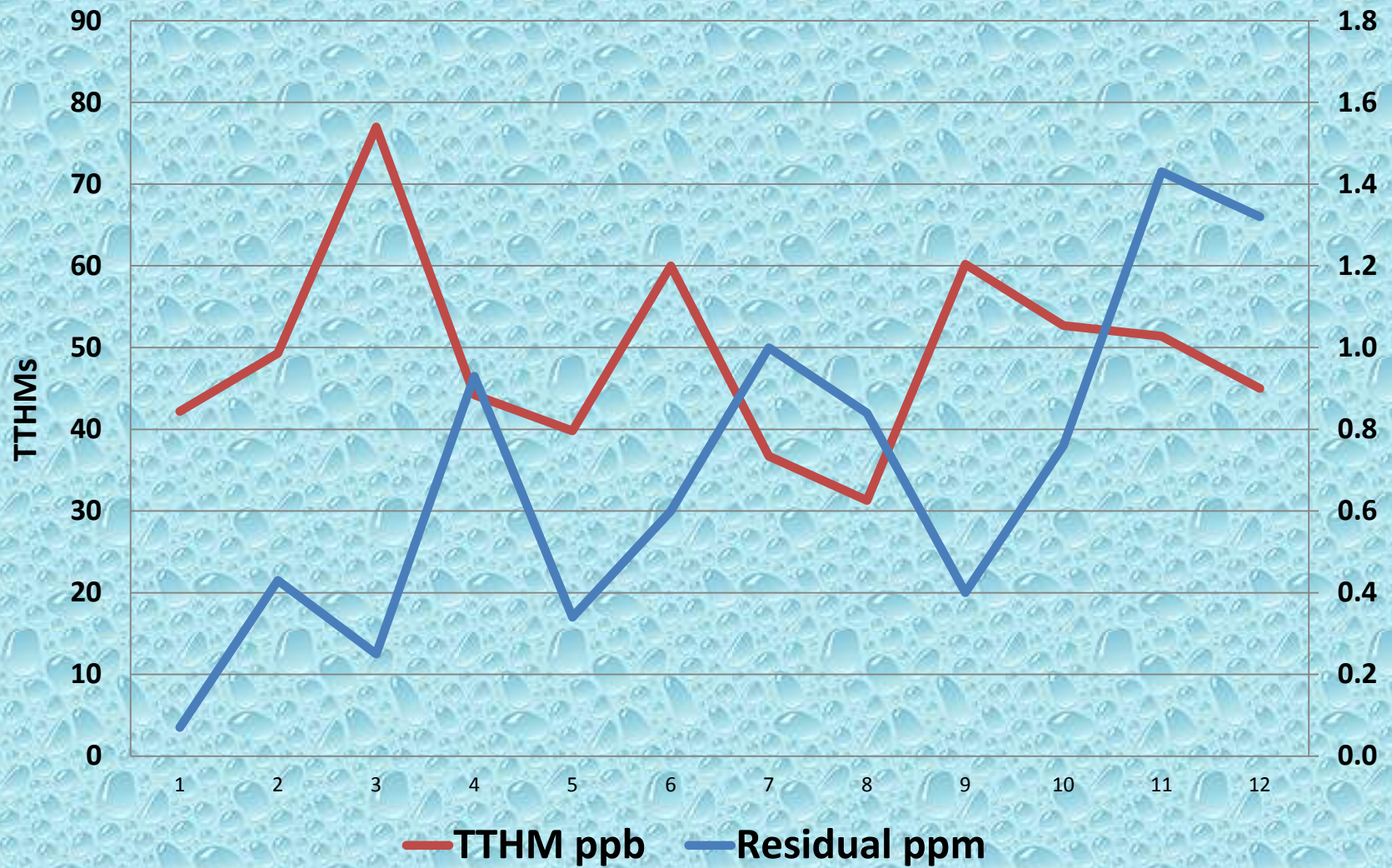
# EP and Dist TTHMs

## 2nd qtr 2012- 1st qtr 2015





## TTHM and Chlorine Residual Site H



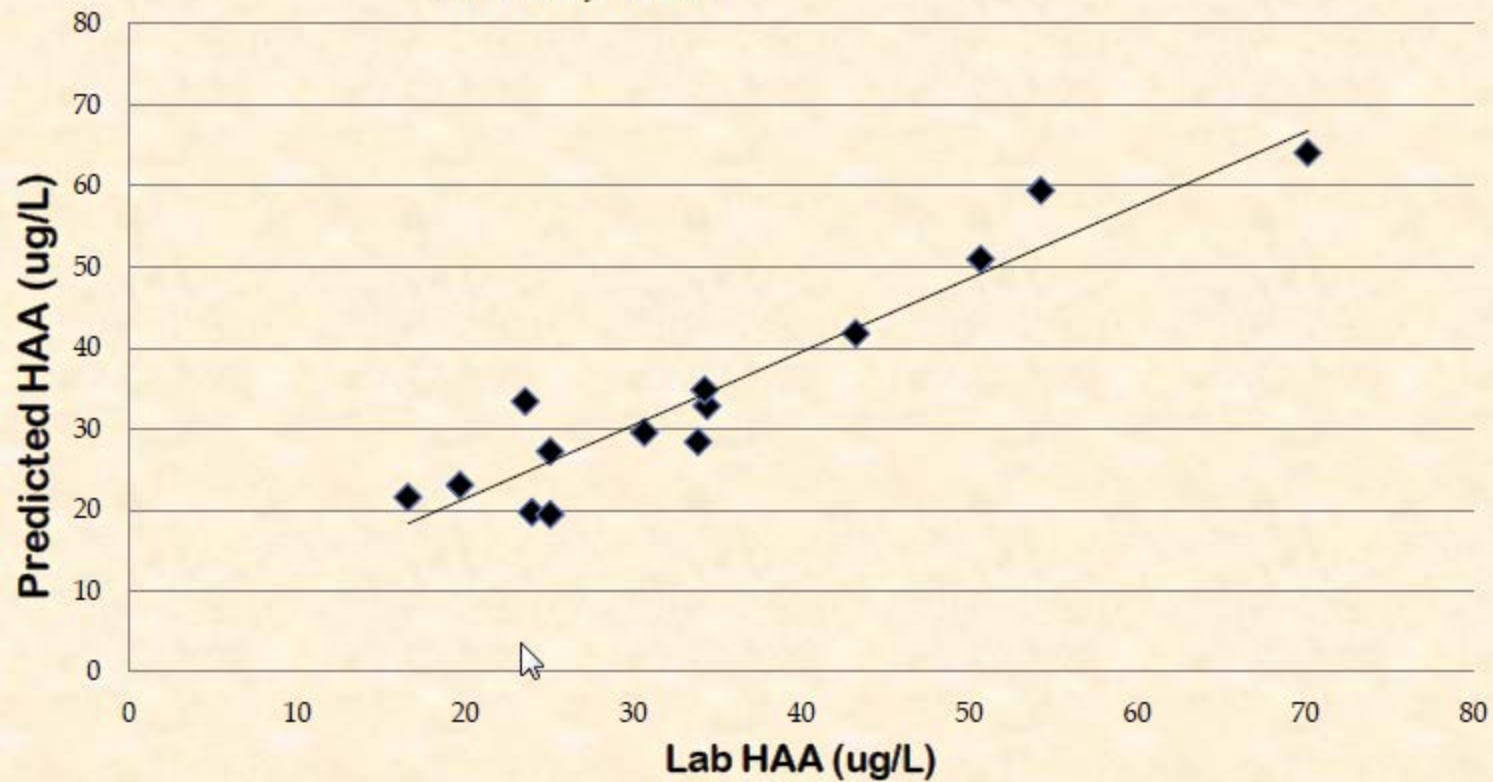
# DBP Issues at Site H

- Current TTHM and HAA5s avg 49 and 31 ppb
- Current EP residual 3 ppm
- Current Site H min residual  $< 0.1 - 0.3$  ppm
- Chlorine demand from EP to H is  $> 2.7$  ppm
- To meet the proposed 0.5 ppm, residual, the EP residual would be increased by roughly 0.5 ppm
  - MRDL is 4 ppm
- TTHMs and HAAs estimated increase by 40% and 200% respectively – based on DBP modeling

# CWA FIN Predicted HAA vs Actual Lab HAA

Model Developed  
Mar 2013-Jun 2014

$$y = 0.9032x + 3.3583$$
$$R^2 = 0.9032$$





# CWA Options- Booster Disinfection & Main Replacement

- Install at least 7 Booster Disinfection Facilities in Distribution System
- Estimated Costs to purchase land, permit, build facilities and install SCADA controls
  - At least \$3.5 Million
- Increased O&M- TBD – additional certified operators, chemical costs, maintenance etc.
- Increased risk and vulnerability
- Main Replacement > \$20 Million

# Let's Be Real...

- Take the time to gather data from PWSs
- Use the data to make analytically sound, scientific decisions - is this needed and to this extent? Look at overall impacts, costs vs benefits, compliance issues
  - Do we want to be the State with the most Violations?
- Understand the simultaneous issues: Customer Satisfaction, DBPs, PN Rule changes, Costs to Customers
- Question – what's required by regulation vs what has been proposed? What public health protection can be gained, if any? How do we measure this?
- Work together to collectively take a step back and revisit the residual issue
- Question- does this make sense?
- **Separate RTCR Federal Requirements from Chapter 109 updates for chlorine residuals**

# Thank You



Questions  
are  
a  
way  
of  
seeing.

*Leadership Freak*