MUNICIPAL/INDUSTRIAL RELATIONSHIP BUILDING

AS TREATMENT AND EFFLUENT END POINTS EVOLVE, SO TOO SHOULD COMMUNICATIONS

MICHAEL A. SMITH, PE

Hazen

Acknowledgements

Stephanie Ishii, PhD, PE, ENV SP
Hazen and Sawyer

Bob Weinschrott, PE
Hazen and Sawyer

Mary Sadler, PE
Hazen and Sawyer

Outline

- Pretreatment fundamentals and evolving needs
- Establishing a mutual understanding of objectives, constraints, and flexibilities
- Collaborative solution development
  - Operational changes / internal BMPs
  - Product substitution
  - Capital improvements – pretreatment, centralized treatment
- Lessons learned

Pretreatment fundamentals and evolving needs

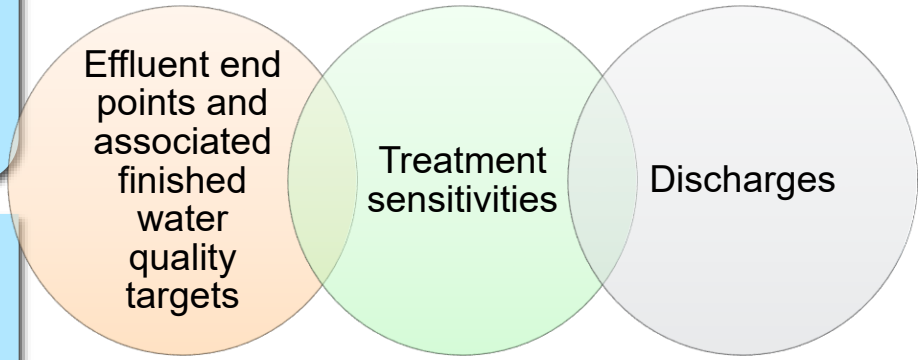
National Pretreatment Regulations

Title 40 CFR Chapter I Subchapter N Part 403

Gives POTW legal authority to control discharges to prevent pass through or interference with collection system, treatment processes, discharge permit, reclaimed water permit, biosolids

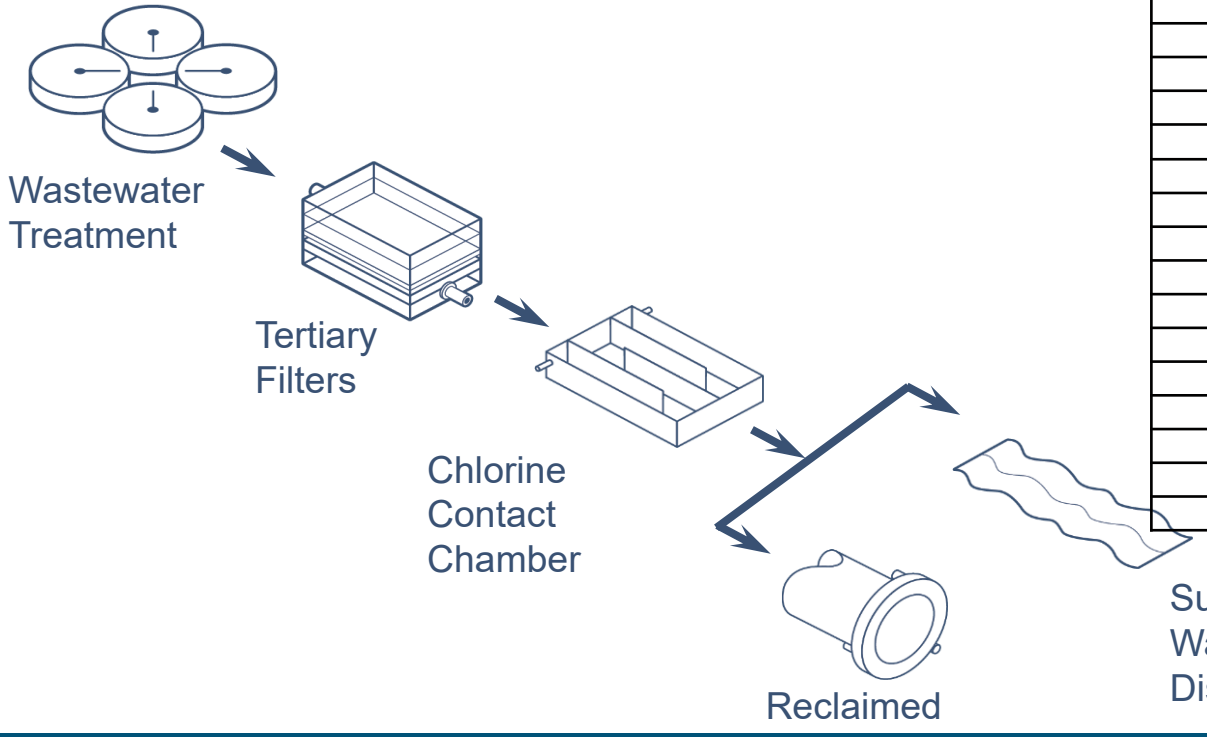
Allows site-specific thresholds for pollutants of concern to be developed in the absence of state and federal criteria

Examples: total dissolved solids, refractory nitrogen (rDON), sulfate, fats, oils, and grease (FOG)…



POCs are a function of site-specific sensitivities and targets

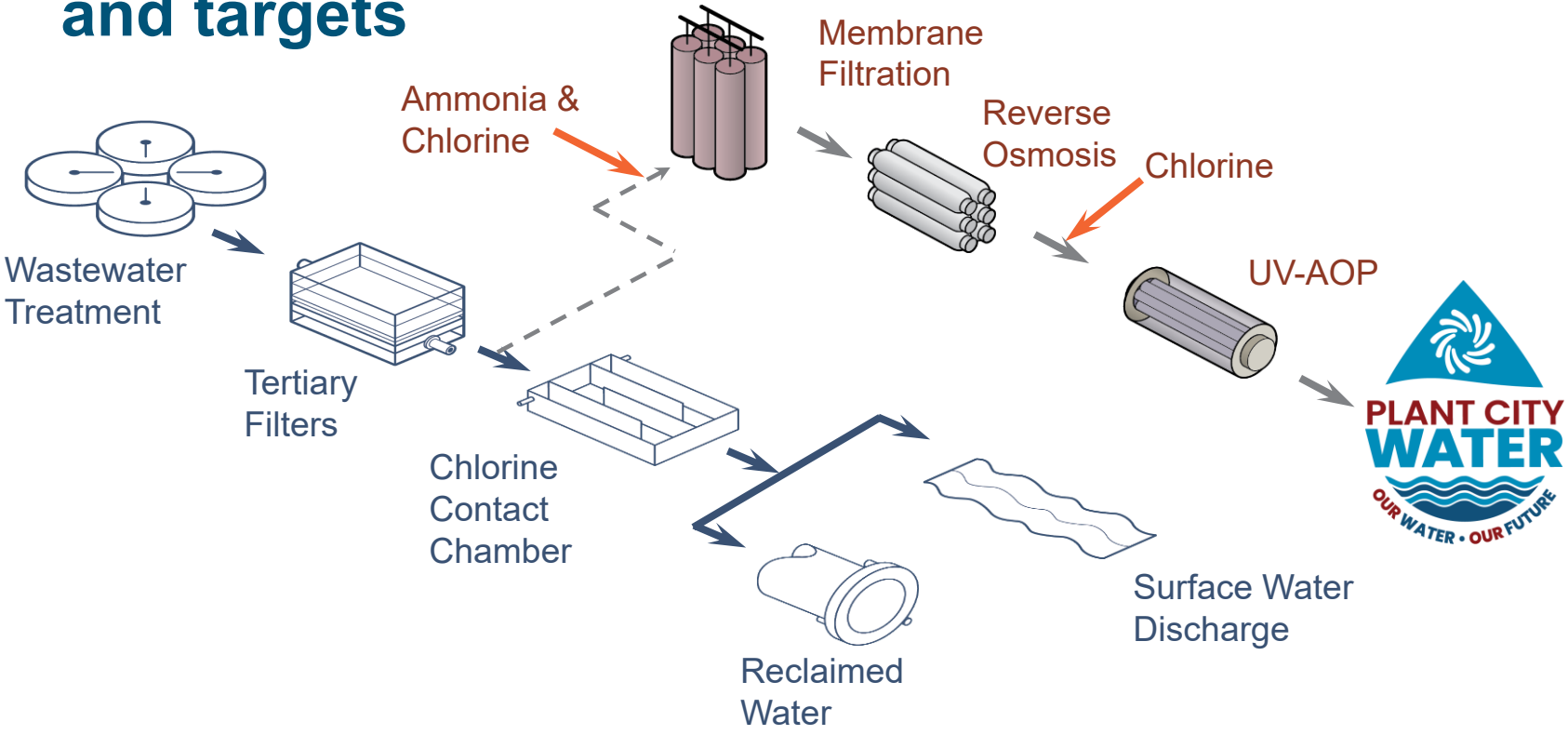
Example: City of Plant City, FL



Arsenic
Bis (2-ethylhexyl) phthalate
BOD
Cadmium
Carbazole
CBOD
Chloride
Chromium
Cobalt
Copper
Cyanide
n-Decane
Fluoranthene
Lead
Manganese
Mercury
Molybdenum

Nickel
Nitrogen (total)
n-Octadecane
Ortho-cresol
Para-cresol
Phosphorus (total)
Selenium
Silver
Sodium
Specific conductance
Sulfate
Tin
246 Tri-chlorophenol
TSS
Zinc
Oil and grease

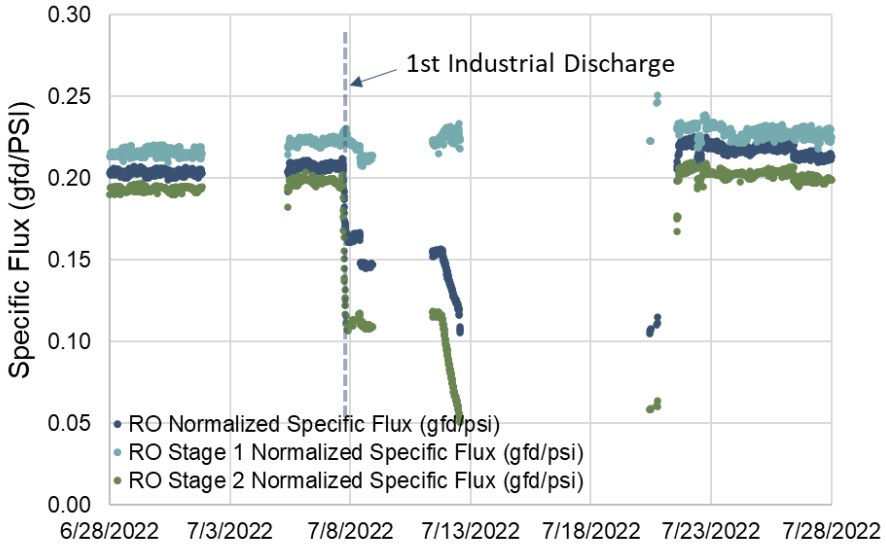
POCs are a function of site-specific sensitivities and targets



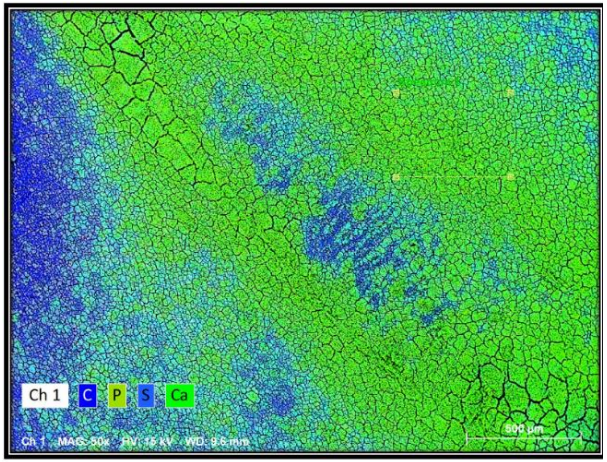
POCs are a function of site-specific sensitivities and targets

Example: City of Plant City, FL

- Industrial discharge event caused scaling of downstream RO process

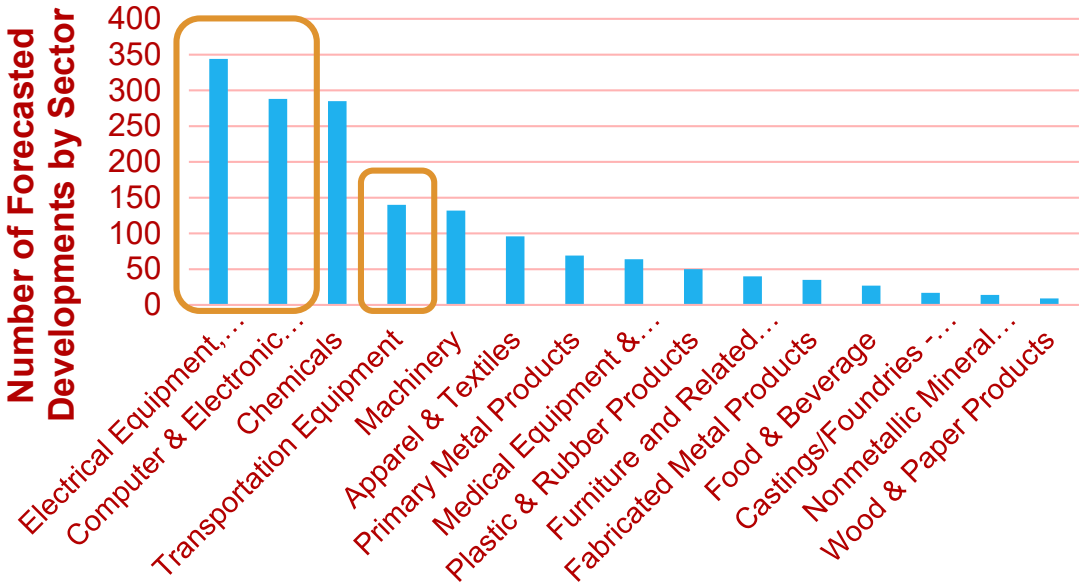


- RO autopsies would later reveal that scaling was caused by elevated calcium and phosphorus



Forthcoming Industry: The Past ≠ The Future

Majority of industrial development was not the basis of existing sewer use ordinances



	Electrical Equipment, etc.	Computer & Electronic Products	Trans-portation Equipment
TDS	X	X	X
Lithium			X
Fluoride		X	
Heavy Metals	X	X	X
Ammonia		X	

Source: https://reshorenow.org/content/pdf/1H2023_RI_Report.pdf

Complex One Water System – Chandler Arizona

Domestic Load

Industrial Users

Future Industrial Users

SEWER

Ocotillo WRF

- Aquifer Recharge (Liquids)
- Irrigation (Liquids)
- Landfill (Solids)

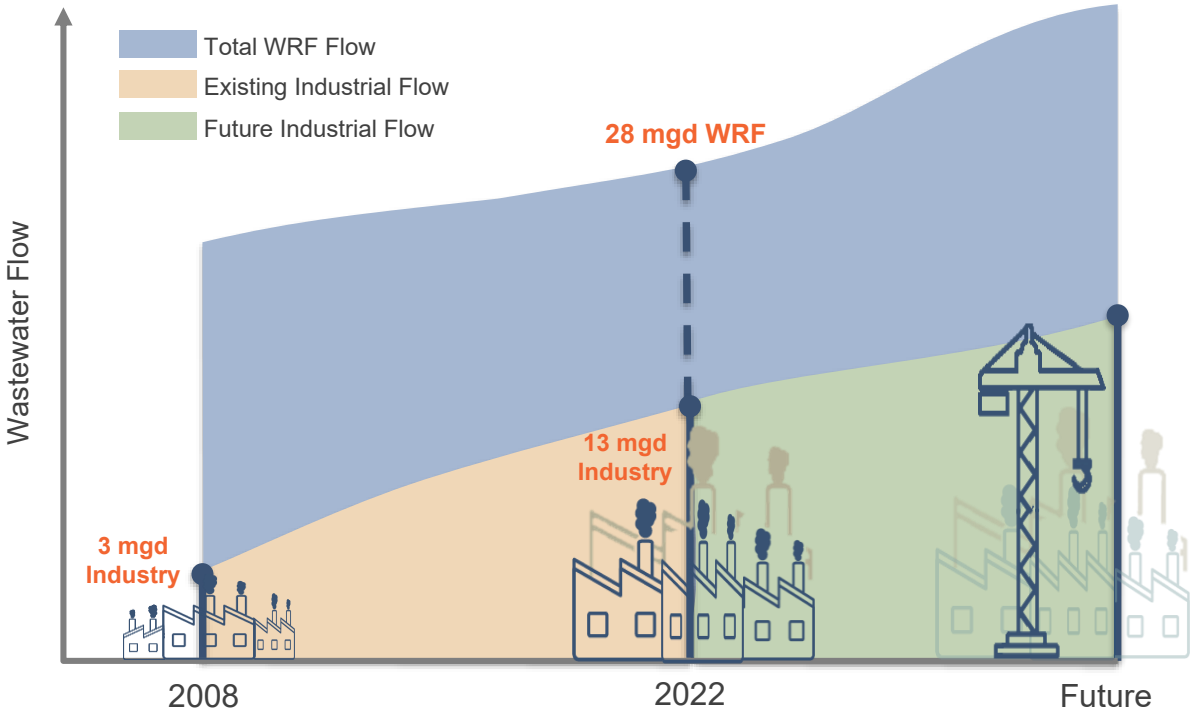
Lone Butte WRF

- Irrigation (Liquids)

Airport WRF

- Aquifer Recharge (Liquids)
- Irrigation (Liquids)
- Landfill (Solids)

Significant Changes to System Since 2008



- All treated effluent discharged to groundwater
- Drinking water is 100% groundwater
- Local Limits update needed to re-align program with City's development
- Industrial growth (30% total annual average WRF flow is from industry)
- More protective regulatory thresholds

Local Limit Solutions

- A more formal process was considered for Wasteload Allocation method in combination with UC Method
  - Mitigate stringent updated local limits based solely on a uniform concentration
  - Industries sorted by size (e.g., volume of industrial discharge)
  - Wasteload allocation for larger industries removed from 2022 MAIL
    - Wasteload allocation based on the maximum discharged in the current data set
    - Future industrial flow included
  - Capacity available for small to mid-sized industries
  - In a few cases, an iterative process was used for a few pollutants / industries

Establishing a mutual understanding of objectives, constraints, and flexibilities

Objectives, constraints, flexibilities

A mutual understanding of objectives, constraints, and flexibilities across municipal and industrial perspectives provides:

- A shared appreciation for the community benefits enabled by each
- A foundation for collaborative solution development

What data / information needs to be requested?

Objectives, constraints, flexibilities

Municipal perspective

Objectives

- Consistently meet finished water quality targets
- Maximize beneficial reuse
- Minimize resource intensity of treatment
- Positive public perception

Constraints

Flexibilities

Objectives, constraints, flexibilities

Municipal perspective

Objectives

- Consistently meet finished water quality targets
- Maximize beneficial reuse
- Minimize resource intensity of treatment
- Positive public perception

Constraints

- **Immediate interferences**
- **Single sample limits**
- **Unavoidable effluent outlets**

Flexibilities

- Time averaged limits
- As-needed effluent management outlets
- Operational strategies (SRT, chemical dose, etc.)

Objectives, constraints, flexibilities

Industrial perspective

Objectives

- Maximize yield
- Minimize cost
- Achieve sustainability metrics, e.g., 120% freshwater replenishment
- Positive public perception

Constraints

Flexibilities

Objectives, constraints, flexibilities

Industrial perspective

Objectives

- Maximize yield
- Minimize cost
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Constraints

- **Process inputs with no alternatives**
- **Confidentiality**
- **Rigid production schedules**

Flexibilities

- Substitutable product inputs
- Discharge schedule
- Sustainability metric boundary

Identifying Critical Information for Collaborative Solutions

- Current and projected demand / discharge timeline?
- Discharge information:
  - Typical discharge quality and quantity?
  - Intermittent / event-related discharge quality and quantity?
  - Chemical inventory?
  - Discharge schedule (times, frequencies, durations)?

Future Limits??

Existing NPP-based Limits

EPA Priority Pollutant List:

- Metals
- Cyanide
- Ammonia
- Total suspended solids (TSS)
- Biochemical oxygen demand (BOD)
- Any other constituent on Priority Pollutant List (phenol, BTEX, etc.)

Plant Specific Parameters:

- Total Kjeldahl nitrogen
- Phosphorus
- FOG
- Total petroleum hydrocarbon (TPH)
- TDS
- Calcium
- Other CECs for enhanced source control

- Capacity of WRF to take intermittent discharges
- Existing NPP limits and anticipated future limits
- Maximum allowable contaminant concentrations in their discharge

Objectives, constraints, flexibilities

A mutual understanding of objectives, constraints, and flexibilities across municipal and industrial perspectives provides:

- A shared appreciation for the community benefits enabled by each
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What data / information needs to be requested?

Can a “flexibility” on one side be leveraged to further achieve an objective on another side?

Any potential for mutually beneficial projects?

Are any objectives conflicting? Are any aligned?

How do the anticipated benefits and burdens of a project compare across perspectives?

Collaborative Solution Development

Collaborative Solution Development

Site-specific contaminant analysis

Can the industry and/or WRF optimize its operations to simultaneously meeting objectives?

Yes

No

Can the industry substitute products/chemicals to meet WRF's goals?

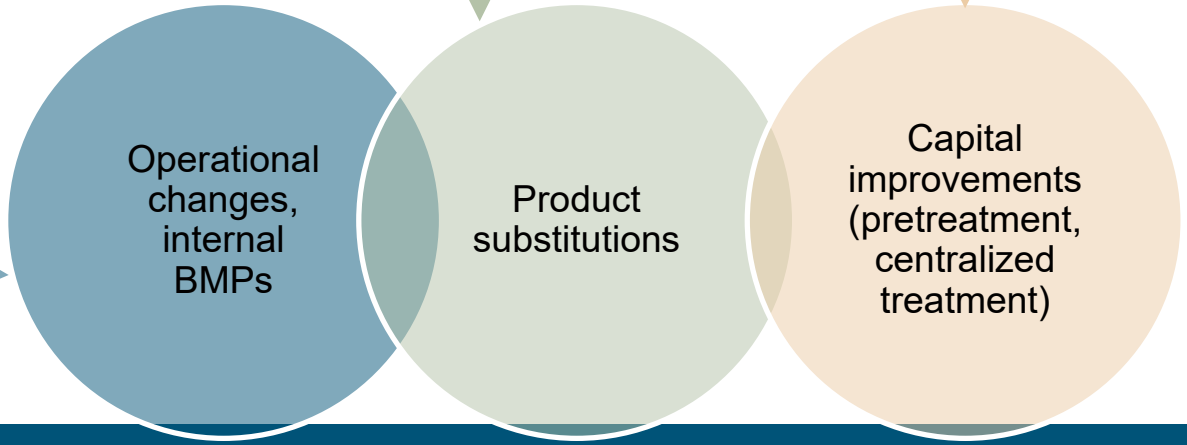
Yes

No

Can the industry find alternate disposal?
Can the WRF find an alternative effluent end point with different water quality requirements?

Yes

Effluent diversion



Operational Changes, Internal BMPs

Positive water stewardship

Meeting finished water quality targets

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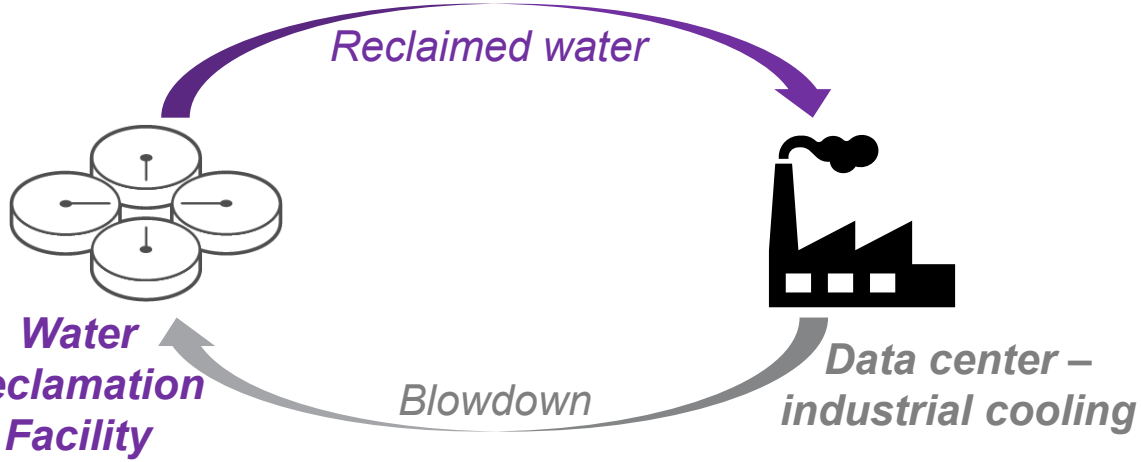
Manage influent TDS



Positive water stewardship

Minimize water demand

↓

Maximize cycles of concentration

↓

Increase blowdown TDS

Solution:

Site-specific definition of positive water stewardship;
win-win strategy development

The Situation

- Multiple mega-industrial projects locating in southeastern US
  - EV batteries
  - Solar panels
  - Large scale food
  - 2nd tier industries to support the mega projects

- Most of the developers want water and wastewater “as a service”
  - Minimize their capital investment/ deploy capital into production
  - Avoid having the industry operate water assets
  - It’s a negotiating point in siting these large developments

New industries brought new challenges

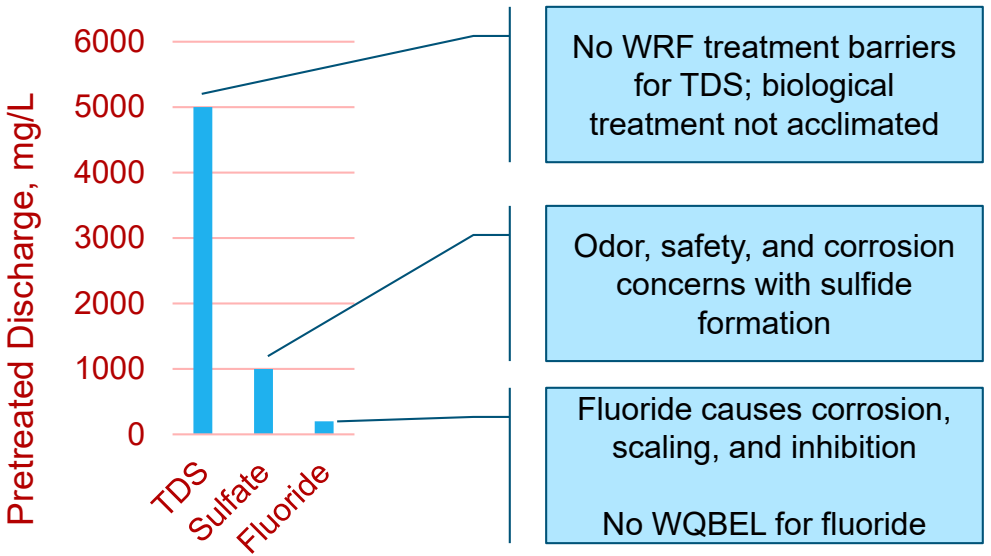
- The community's sewer use ordinance was based on industry pretreating their own wastewaters

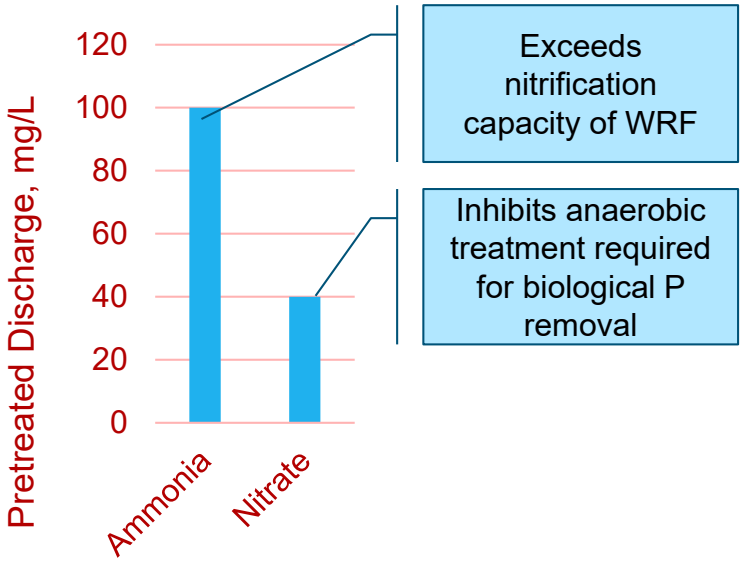
Wastewater discharges between three hundred (300) mg/L and eight hundred fifty (850) mg/L of BOD will be assessed a surcharge. Enforcement shall be initiated for BOD discharges exceeding eight hundred fifty (850) mg/L. Wastewater discharges between three hundred (300) mg/L and one thousand five hundred (1,500) mg/L of TSS will be assessed a surcharge. Enforcement shall be initiated for TSS discharges exceeding one thousand five hundred (1,500) mg/L. The purpose of the surcharge is to encourage treatment of wastes rather than relying on the POTW to handle excess BOD and/or TSS, and to require industries generating high strength waste to bear the cost.

  - Want to minimize pretreatment in their facilities
  - Discharge wastewaters with treatment challenges that are NOT BOD or TSS

Collaborative Solution Development Enables a Long-term "Yes"

- Situation
  - Solar panel manufacturer – 2.5 to 3.6 MGD
  - First submittal focused on sewer use ordinance parameters (BOD, TSS)
  - The challenges were very different





Collaborative Solution Development Enables a Long-term "Yes"

- Situation
  - Multiple industries try
  - Intention is to pretre

City enabling behavior

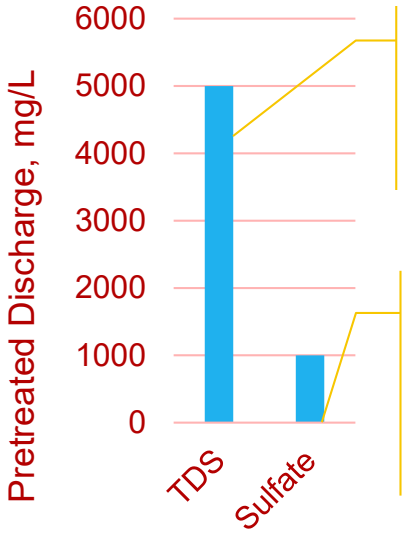
- City wants to say "yes"
- Communicated with economic development agencies
- Took the time to really understand industry needs and loads
- Revised headworks analysis to better define interim and long-term capacity

Industry enabling behavior

- Dug deeper to better define loads over time
- Transparently communicated constraints, as well as flexibilities
- Considered product substitutions and treatment changes

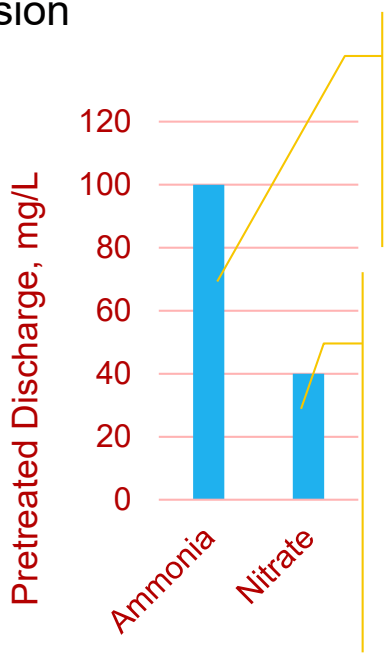
Collaborative Solution Development Enables a Long-term "Yes"

- Interim AND Long Term Limits
- Modified operation of current WRF to accept higher initial nitrogen loads
- Fast track facility plan and design for expansion



Industry will limit non-carbonate TDS to 3,000 mg/L;
WRF evaluating an interim plan of operation

Industry will substitute sulfuric acid with carbonic acid (sulfate < 100 mg/L);
future WRF expansion will accommodate sulfate



Industry will install nitrification (carbonic acid helps!);

WRF using full capacity to fully nitrify in the interim

Industry will install partial denitrification;

future WRF expansion will accommodate increased industrial loads;

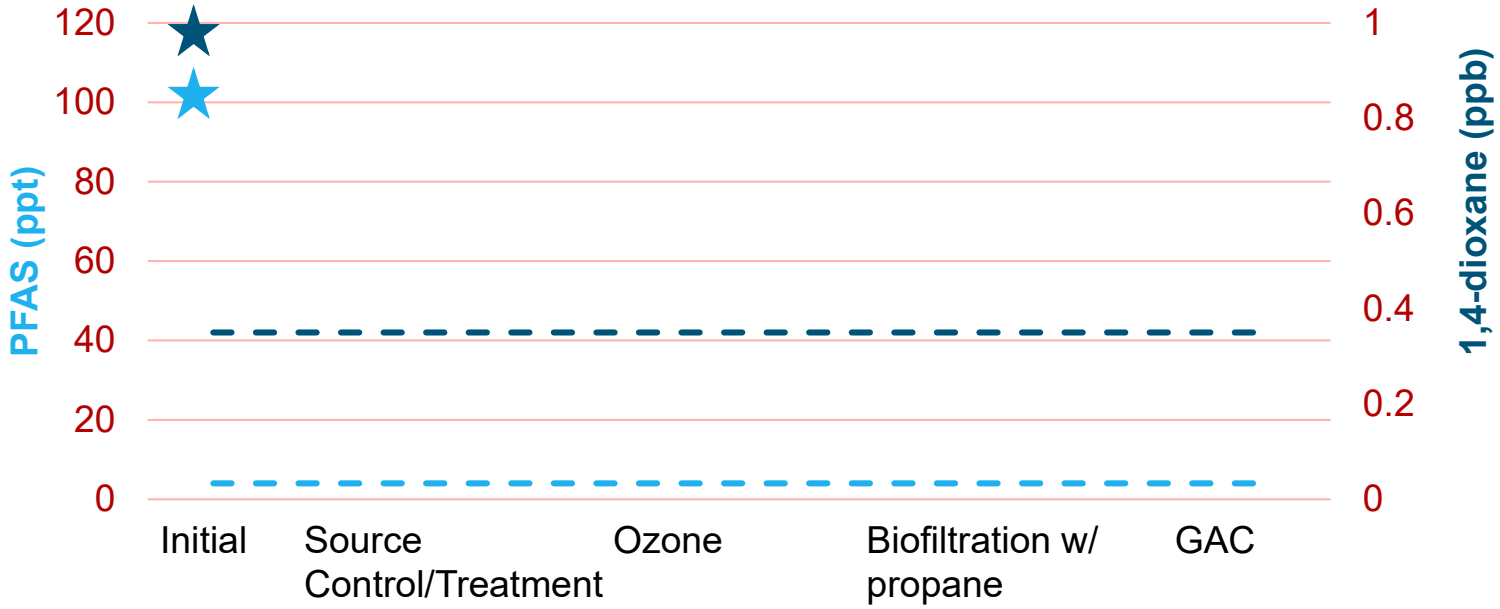
cost-share for chemical feed system (P precipitation)

- Development is usually driven by
  - Access to skilled labor
  - Low-cost land
  - Transportation advantages
  - Low-cost natural resources
  - State and community incentives
- Developers frequently address water needs late in their siting studies

Tactics	Best practices
Understand the industry's needs	• Know how the industry uses water/ creates wastewater • Engage early with the development team AND stay engaged
One Water/ One Community approach	• Approach developer as a united community, aligned with economic development plans • Look for synergies
Know your system	• Know what your capacity is and what your constraints are • Avoid development that is not a good fit
Fill your "proactive gaps"	• Early permitting • Pre-development capital

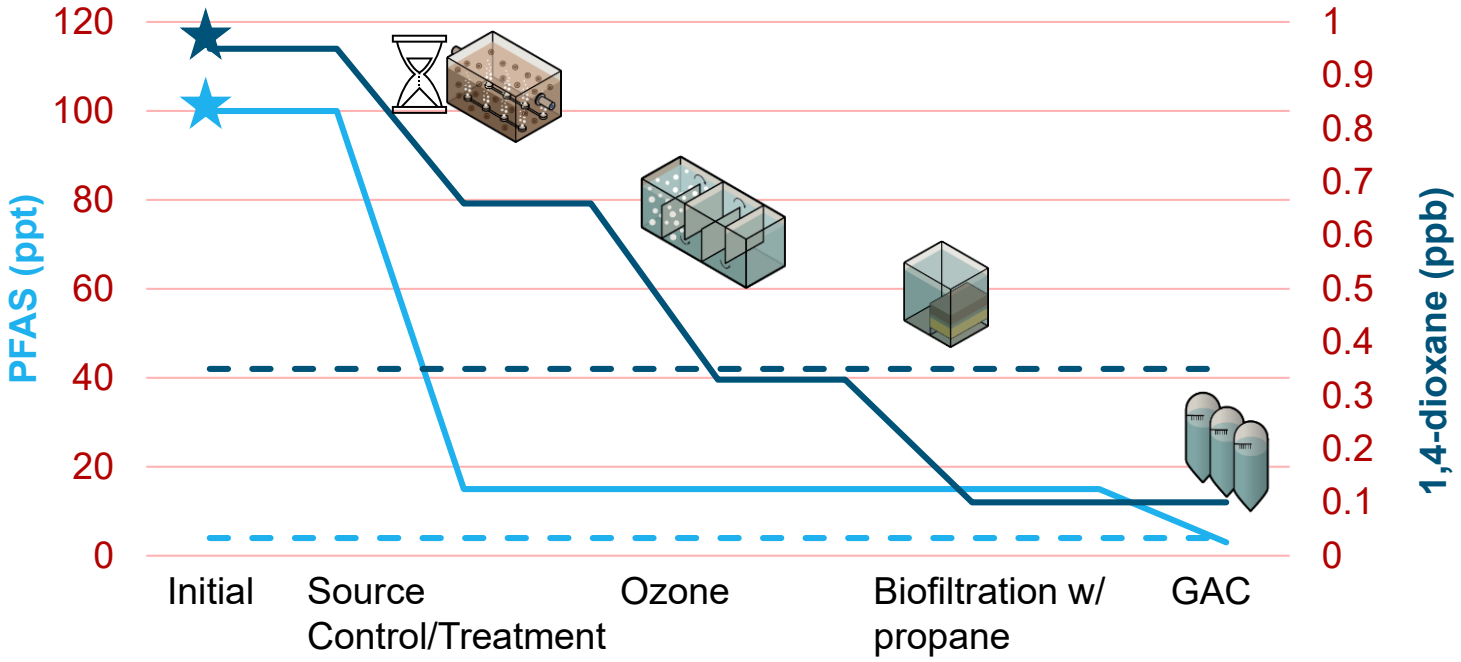
Source Control May be Best Implemented as a Hybrid Solution

HRSD's PFAS and 1,4-Dioxane Management Plan for SWIFT



Source Control May be Best Implemented as a Hybrid Solution

HRSD's PFAS and 1,4-Dioxane Management Plan for SWIFT



Take Home Messages

- Source control is a moving target; must consider current and potential future water quality targets, treatment sensitivities, and dischargers
- A mutual understanding of municipal/industrial objectives, constraints, and flexibilities can serve as a foundation for collaborative solution development
- Collaborative solutions should prioritize net benefit and then use stakeholder-specific benefits/burdens to inform cost share
- Source control may best be implemented as a hybrid solution

Thank you

Michael A. Smith, PE
National Food & Beverage Lead
Hazen and Sawyer
masmith@hazenandsawyer.com

Bob Weinschrott
Industrial Water Practice Leader
Hazen and Sawyer
rweinschrott@hazenandsawyer.com