

# HOW TO PROTECT YOUR POTW SYSTEM AND OPERATORS FROM DAMAGING INFLUENT

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## PRETREATMENT PROGRAM BASICS FOR SMALL POTWS

Presenters:

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## US EPA Office of Compliance Technical Assistance Webinar Series

Introduction: Seth Heminway, US EPA Office of Compliance ([heminway.seth@epa.gov](mailto:heminway.seth@epa.gov))

- Webinar series supports the national EPA and state initiative to reduce noncompliance among CWA -NPDES permitted facilities. Focus is on helping wastewater system operators return their facilities to compliance, and those interested in fine-tuning their systems.
- The webinar will be recorded and posted.
- Certificates of attendance will be sent to those who have registered.
- You will be in “listen only mode.”
- Use the chat box to ask questions and to suggest other training
- Speakers do not necessarily reflect EPA positions or policy.
- Be sure to download the Chart from Downloads Tab to follow along.
- We strive for continuous improvement. Please complete the post webinar survey.

# AGENDA

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- Basics Principles and Terms of the National Pretreatment Program
- What do operators need to know about their own POTW Plant . . . . and about their service area
- Case Study
- Solutions and Best Practices

# PURPOSE OF THE PRETREATMENT PROGRAM



To prevent the introduction of pollutants into POTWs which will:

- Interfere with plant operations
- pass through untreated




To improve opportunities to recycle and reclaim wastewaters and sludges



To protect POTW workers

# WHAT IS THE PRETREATMENT PROGRAM?

- Clean Water Act Regulatory Program
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- 40 CFR part 403
  - Pollutant control requirements for nondomestic (industrial) sources discharging wastewater to publicly owned treatment works (POTWs):
    - *indirect* dischargers or “industrial users”
  - National program implemented through partnerships with state and local governments
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# PRETREATMENT PROGRAM COMPONENTS

## 40 CFR 403.8

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- Legal authority
- Local limits
- Procedures
- List of Industrial Users
- Enforcement (Enforcement Response Plan)
- Funding



# WHO MUST DEVELOP A PROGRAM?

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- POTWs with:
  - combined design flow > 5 million gallons per day (MGD), **AND**
    - receiving flow subject to Pretreatment Standards **or**
    - receiving pollutants which pass through or interfere
- Approval Authority may require program to be developed, regardless
- NPDES States may assume responsibility

*... But what about a Small POTW ??*

# 2012 Clean Watershed Needs Report to Congress

Total Needs: \$271 billion

- Small community: defined as serving less than 10,000 population
- \$32.9 billion or 12%
- 23 States - 80 to 95 percent of the POTWs service small communities
- **80% of all United States POTWs service small communities**



# Office of Inspector General (OIG) Report

(2004-P-00030, September 28, 2004)

## “EPA Needs to Reinforce its Pretreatment Program”

- Pass-Through:
  - Approved Pretreatment programs - 17 percent
  - POTWs without approved programs - 40 percent
- Discharge to Impaired Waters:
  - Approved Pretreatment programs - 25 percent
  - POTWs without approved programs - 60 percent

# NPDES Permit Application

## 40 CFR Part 122.21(j) (6)(i-ii)

- Applicants must submit the following information about industrial discharges to the POTW
  - (i) Number of significant industrial users (SIUs) and non-significant categorical industrial users (NSCIUs)... including SIUs and NSCIUs that truck or haul waste to the POTW

See definitions at 40 CFR 403.3(v)

# NPDES Permit Application (*continued*)

- (ii) POTWs with one or more SIUs shall provide the following information for each SIU, as defined at 40 CFR 403.3(v), that discharges to the POTW:
  - Name and mailing address;
  - Description of all industrial processes that affect or contribute to the SIU's discharge;
  - Principal products and raw materials of the SIU that affect or contribute to the SIU's discharge;
  - Average daily volume of wastewater discharged, indicating the amount attributable to process flow and non-process flow;
  - Whether the SIU is subject to local limits; or categorical standards (and which categories), and
  - Whether any problems at the POTW (e.g., upsets, pass through, interference) have been attributed to the SIU in the past four and one-half years.

# NPDES Regulatory Background

## POTW Permit Condition: 40 CFR Part 122.42(b)(i-iii)

All POTWs must provide adequate notice to the Director of the following:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and
2. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
3. For purposes of this paragraph, adequate notice shall include information on
  - the quality and quantity of effluent introduced into the POTW, and
  - any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

# NPDES Regulatory Background

POTW Permit Conditions: 40 CFR Part 122.44(j)

Requirements for POTWs to:

- (1) Identify, in terms of character and volume of pollutants, any Significant Industrial Users discharging into the POTW subject to Pretreatment Standards under section 307(b) of CWA and 40 CFR part 403.
- (2)(i) Submit a local program *when required* . . .
- (2)(ii) Provide a written technical evaluation of the need to revise local limits under 40 CFR 403.5(c)(1), following permit issuance or reissuance.

# SIGNIFICANT INDUSTRIAL USERS (SIU)

40 CFR 403.3(v)

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- IUs subject to Categorical Pretreatment Standards (CIU)
- IUs discharging  $\geq 25,000$  gpd (ave.) process wastewater
- IUs discharging  $\geq 5\%$  ave. dry weather hydraulic or organic capacity of the POTW
- IUs designated for reasonable potential for adversely affecting the POTW operation or violating any Pretreatment Standard or requirement

# TYPES OF PRETREATMENT STANDARDS FOR INDUSTRIAL USERS

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- General and Specific Prohibitions
- Categorical standards
- Local pretreatment standards

Can be expressed as numeric limits, narrative prohibitions, and best management practices (BMPs)

# NATIONAL PRETREATMENT STANDARDS

## GENERAL PROHIBITIONS

40 CFR § 403.5(a)

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A nondomestic discharger may not introduce into a POTW any pollutant(s) which cause **pass through** or **interference**. These general prohibitions and the specific prohibitions apply to each nondomestic discharger introducing pollutants into a POTW whether or not the nondomestic discharger is subject to other national pretreatment standards or any national, State, or local pretreatment requirements.



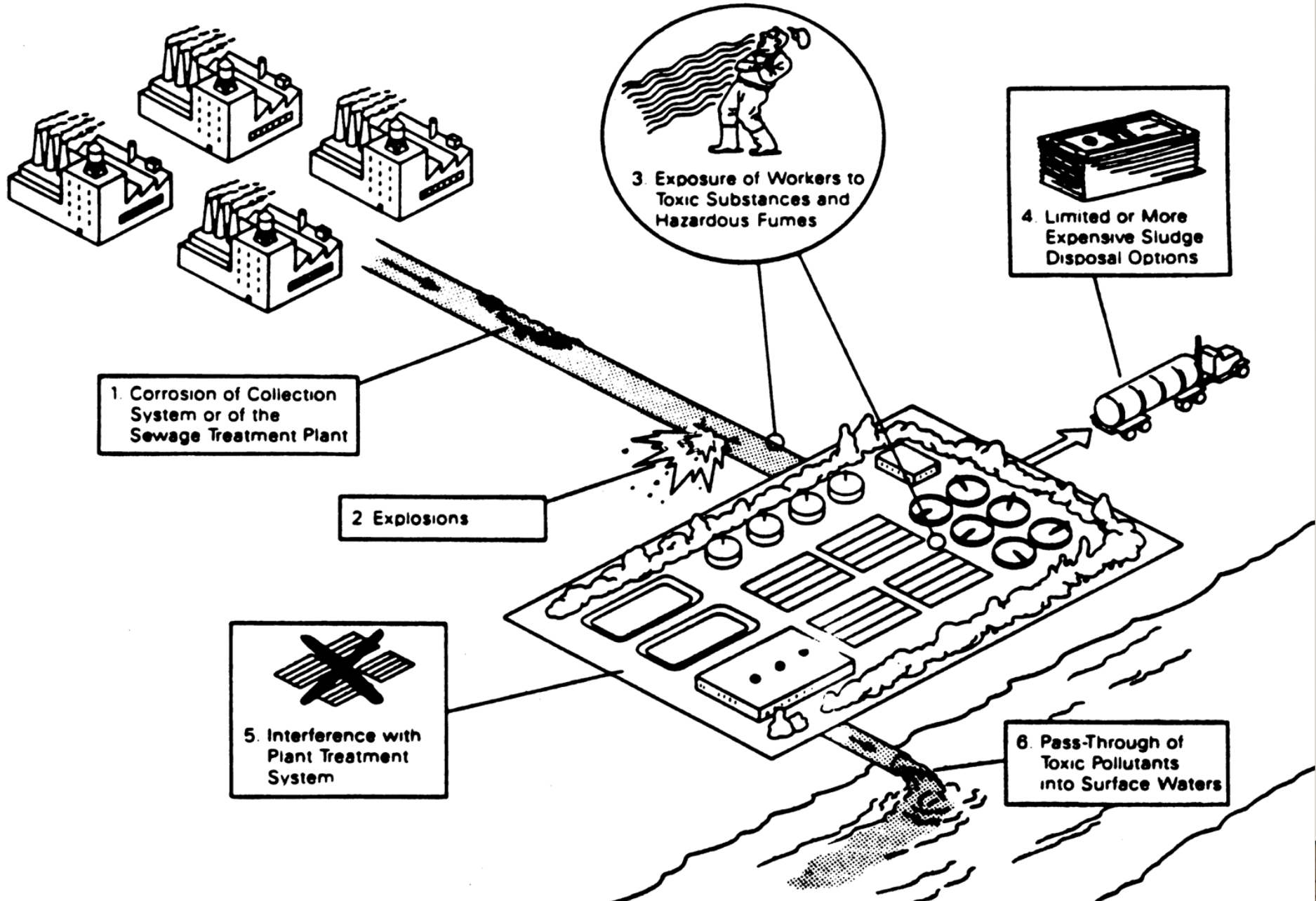
# NATIONAL PRETREATMENT STANDARDS

## SPECIFIC PROHIBITIONS

### 40 CFR § 403.5(b)

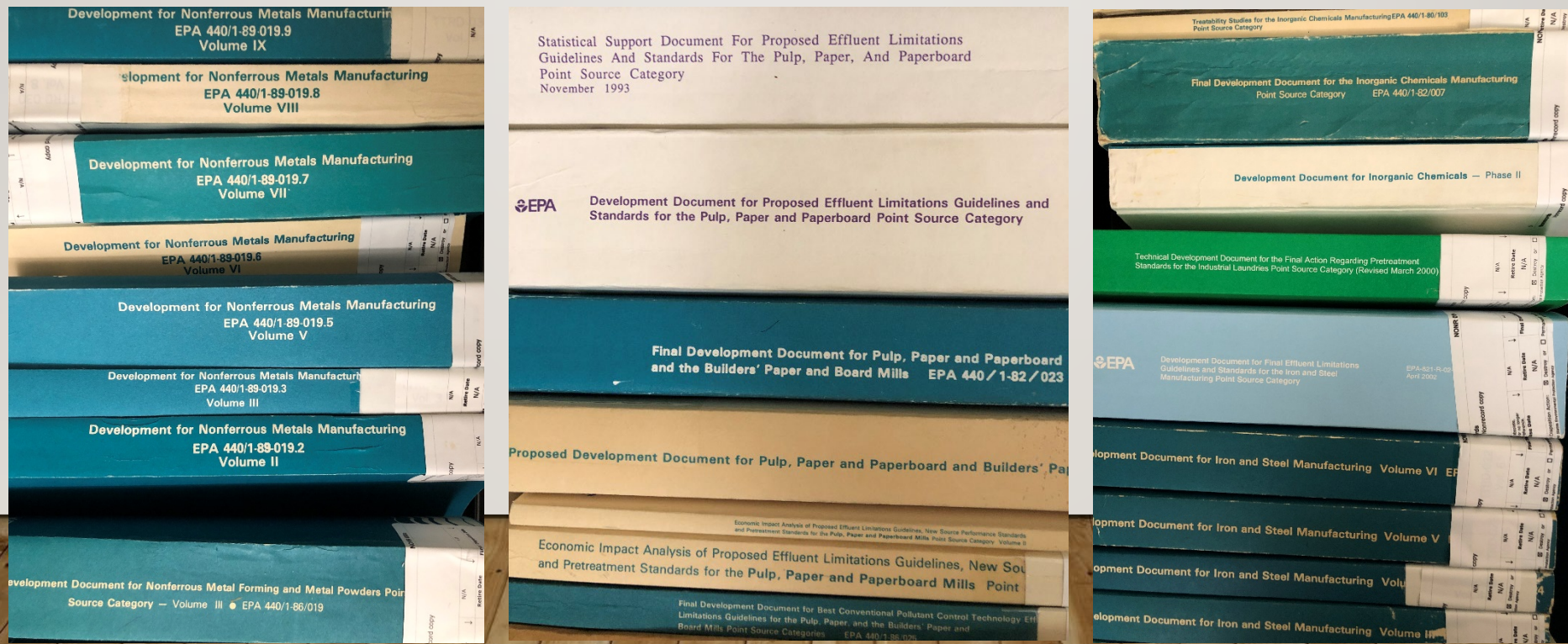
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1. Pollutants which create a fire or explosion hazard
2. Pollutants which will cause corrosive structural damage to the POTW
3. Solid or viscous pollutants causing obstruction and resulting in interference
4. Pollutants released at a flow rate and/or concentration causing interference
5. Heat in amounts which will inhibit biological activity in the POTW resulting in interference
6. Oils in amounts that will cause interference or pass through
7. Pollutants which result in the presence of toxic gases, vapors, or fumes
8. Trucked or hauled pollutants, except at discharge points designated by the POTW



# NATIONAL PRETREATMENT STANDARDS CATEGORICAL INDUSTRIAL USERS (CIU)

*National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories will be established as separate regulations under the appropriate subpart of 40 CFR chapter I, subchapter N. These standards, unless specifically noted otherwise, shall be in addition to all applicable pretreatment standards and requirements set forth in this part.*



# NATIONAL PRETREATMENT STANDARDS CATEGORICAL STANDARDS (cont.)

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- National, uniform, technology-based standards called effluent limitations guidelines (ELGs)
  - Specific industrial categories
  - Specific processes covered
  - Specific pollutants limited
  - Contain direct **and** indirect discharge standards
    - Standards applicable to indirect discharges are labeled “PSES” and “PSNS”
  - 40 CFR Parts 405-471

Additional information available at <https://www.epa.gov/eg>

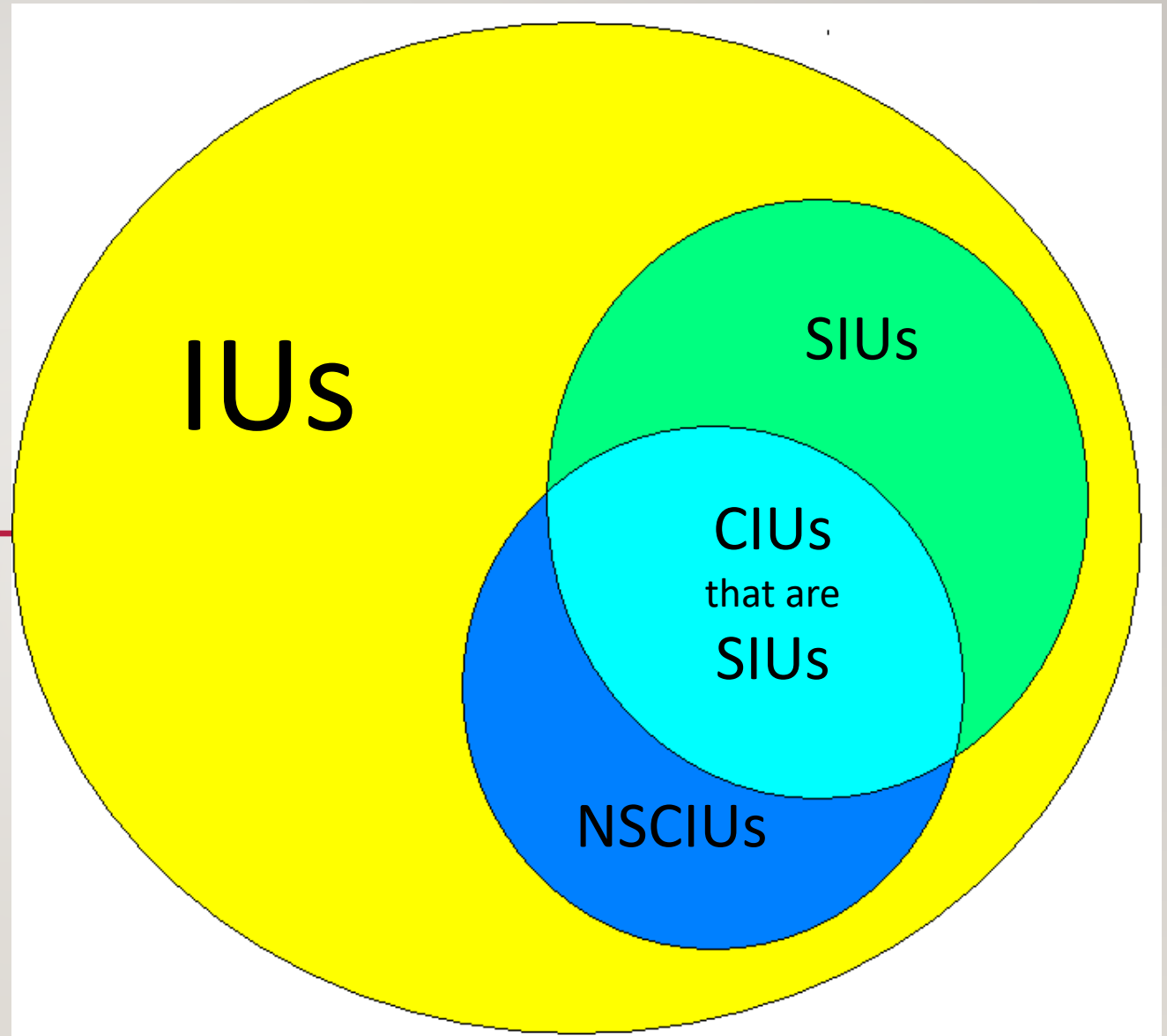
# LOCAL PRETREATMENT STANDARDS “LOCAL LIMITS”

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- Required for all approved pretreatment programs
- Can include:
  - Chemical-specific
  - Best management practices (BMPs)
  - Additional specific prohibitions
  - Industrial user management plans
  - Case-by-case discharge limits

# TYPES OF INDUSTRIAL USERS

- Significant Industrial Users
- Categorical Industrial Users
- Non-Significant Categorical Industrial Users
- Industrial Users



# PRETREATMENT PROGRAM COMPONENTS

## 40 CFR 403.8

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- Legal authority
- Local limits
- Procedures
- List of Industrial Users
- Enforcement Response Plan
- Funding



# **“AN OUNCE OF PREVENTION IS WORTH A POUND OF CURE” – BENJAMIN FRANKLIN**

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## **PRETREATMENT PROGRAM TOOLS FOR A SMALL POTWS**

### Legal Authority – POTW Ability to Control its Destiny

- IU Inventory – establish definitions
- Obtain Information
  - Right of Entry/Inspections
  - Request Information, Reports
- Right of Denial or to Condition Discharges -
  - Permit “Control Mechanism” issuance





# “AN OUNCE OF PREVENTION ...” TECHNICAL TOOLS FOR SMALL POTWS

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## LOCAL LIMITS: POTW LEARNING ABOUT ITSELF

- Local limits Development Guide (7/1/2004)
- Local Limits Development Guidance Appendices (7/1/2004)
- Supplemental Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment: Residential and Commercial Toxic Pollutant Loadings and POTW Removal Efficiency Estimation (1991)

# “AN OUNCE OF PREVENTION ...” TECHNICAL TOOLS FOR SMALL POTWS

## LOCAL LIMITS: POTW LEARNING ABOUT ITSELF

Domestic  
Wastewater  
Quality & Flow

Overall  
“Headworks”  
Wastewater  
Quality & Flow

Other Influent  
Wastewater  
Quality & Flow

EPA's 15 POCs	
<b>10 Original POCs</b>	
Arsenic	Lead
Cadmium	Mercury
Chromium	Nickel
Copper	Silver
Cyanide	Zinc
<b>5 New POCs</b>	
Molybdenum	
Selenium	
5-day Biochemical Oxygen Demand	
Total Suspended Solids	
Ammonia (for plants that accept non-domestic sources of ammonia)	

NPDES  
Permit Limits

Water Quality Standards

Sludge/Biosolids Criteria

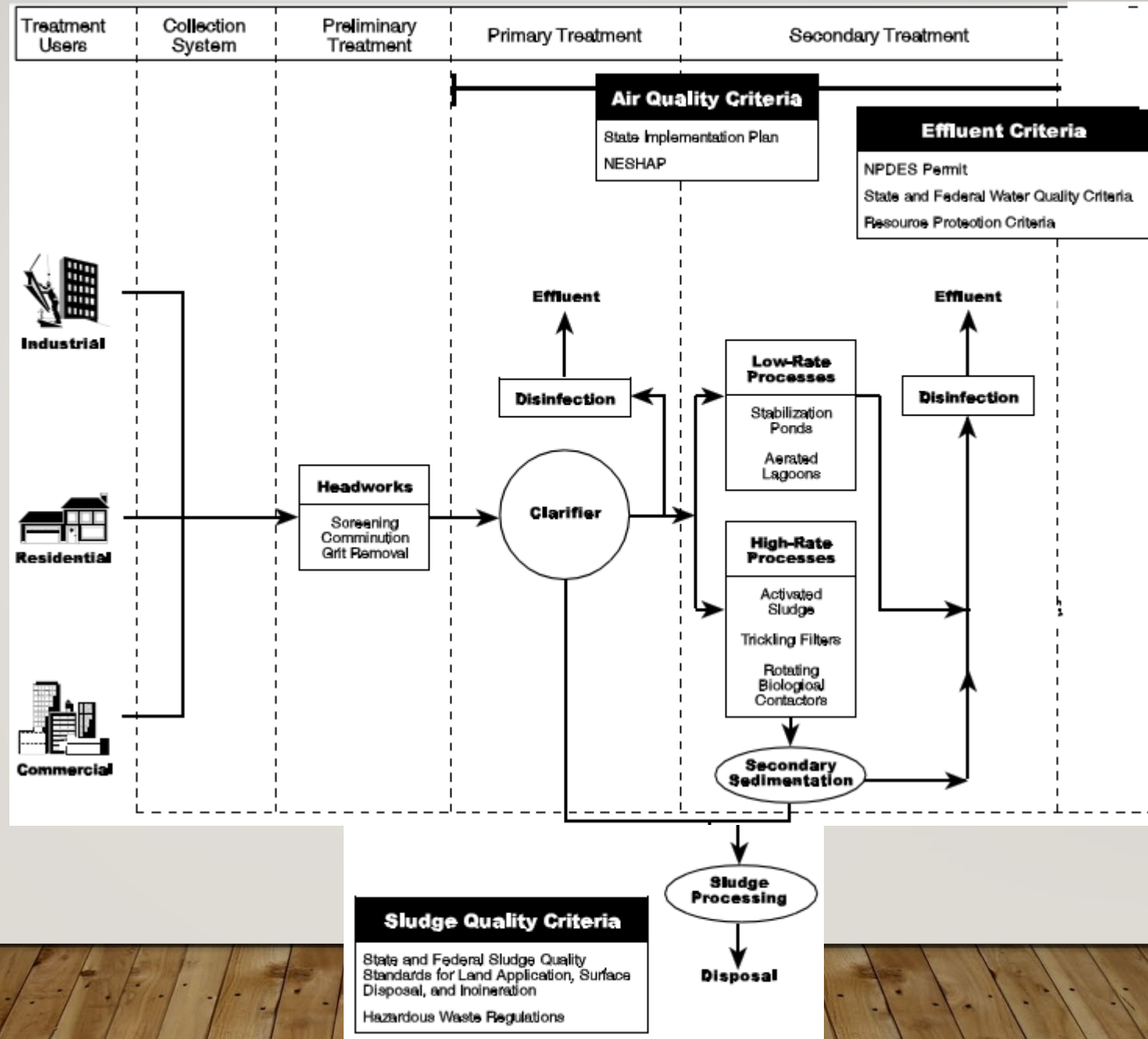
## General POTW Schematic

### Local Limits are:

- site-specific limits
- developed by the POTW
- to enforce general and specific prohibitions on Industrial Users  
→ to prevent Pass Through and Interference.

### Removal Efficiency:

Treatment      Out  
IN → Capacity    → Put



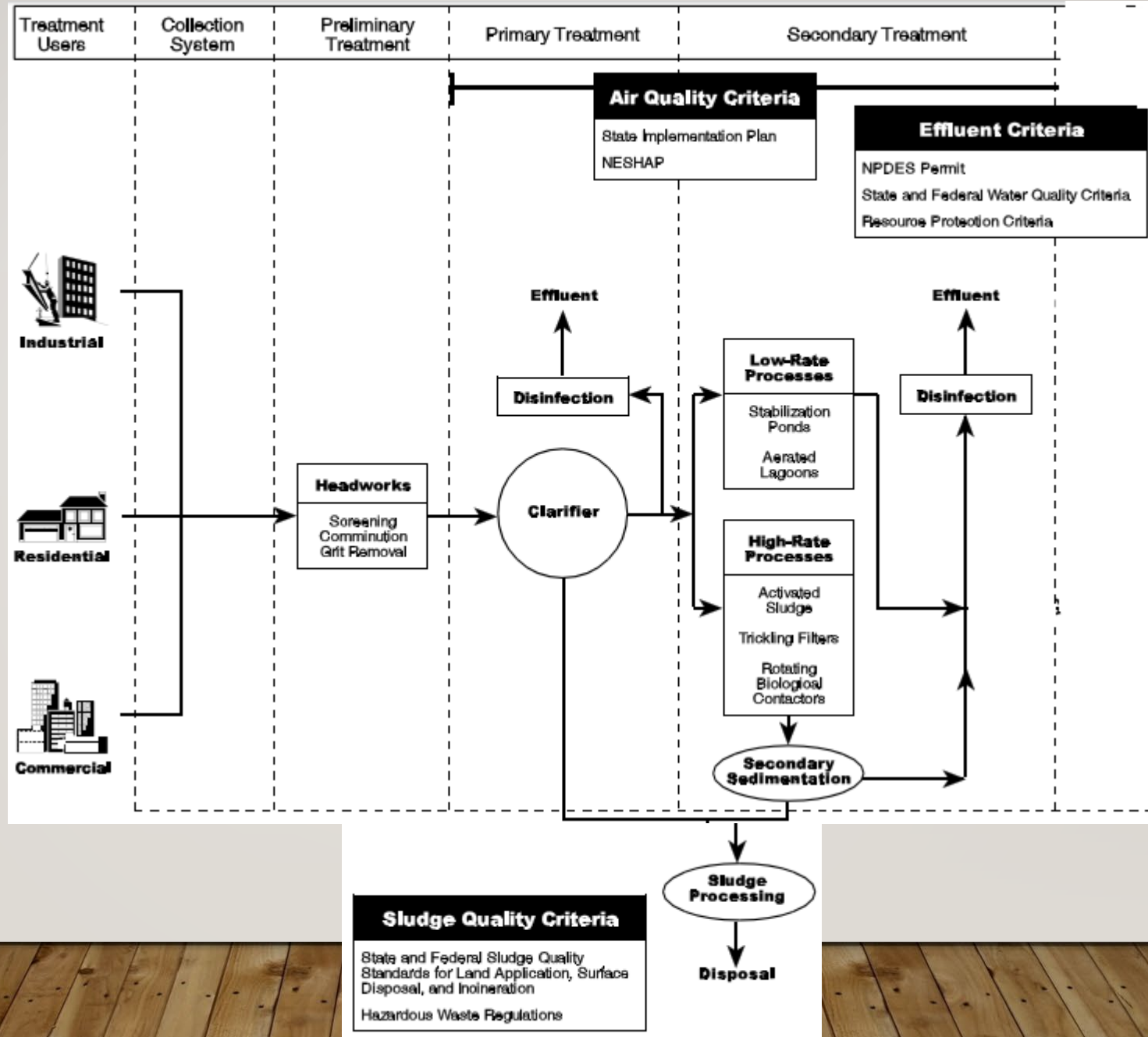
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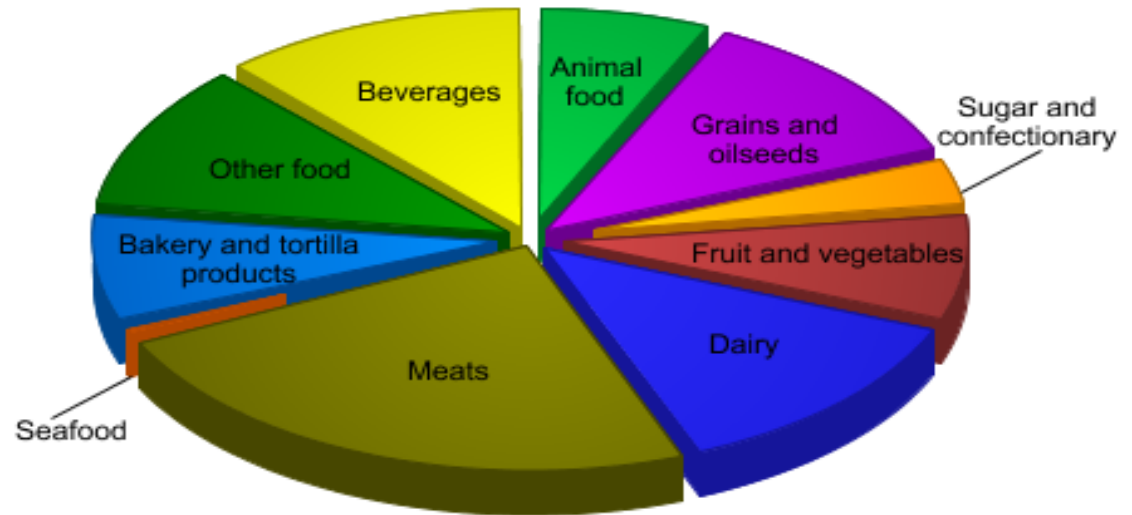


# INDUSTRIES DISCHARGING TO SMALL POTWS?

- Slaughterhouse
- Cheese Processing
- Bacon Processing
- Egg Processing
- Meat Packing
- Poultry Packing
- Food Products

**Components of food and beverage manufacturing value of shipments, 2011**

*Meat processing is the largest single component of food and beverage manufacturing, with 24 percent of shipments in 2011*



Source: Calculated by ERS, USDA, using data from U.S. Census Bureau, 2011 Annual Survey of Manufactures.

# “AN OUNCE OF PREVENTION...”

## TECHNICAL TOOLS FOR SMALL POTWS

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### TO LEARN ABOUT INDUSTRY POLLUTANTS

- Local Limits – *know what your plant can treat to not overload it*
- Development Documents <https://www.epa.gov/eg>
- Toxic Release Inventory
- EPA Databases (Other permits held by industrial users)

# FOOD PROCESSING EFFLUENT GUIDELINES?

→ NOT PSES OR PSNS??

→ → *POLLUTANTS OF CONCERN!*



- Pollutants Regulated:
  - 40 CFR 405 (Dairy Products): BOD, TSS, pH
  - 40 CFR 406 (Grain Mills): BOD, TSS, pH
  - 40 CFR 407 (Canned/Preserved Fruits/Vegetables): BOD, TSS, pH
  - 40 CFR 409 (Canned/Preserved Seafood): Some; BOD, TSS, O&G, pH;  
Some; TSS, O&G, pH;
  - 40 CFR 432 (Meat and Poultry Products): Some; BOD, Fecal Coliform, O&G, TSS;  
Some; BOD, TSS, Some; Ammonia, BOD, Fecal Coliform, O&G, Total Nitrogen, TSS  
Some; Ammonia, Total Nitrogen

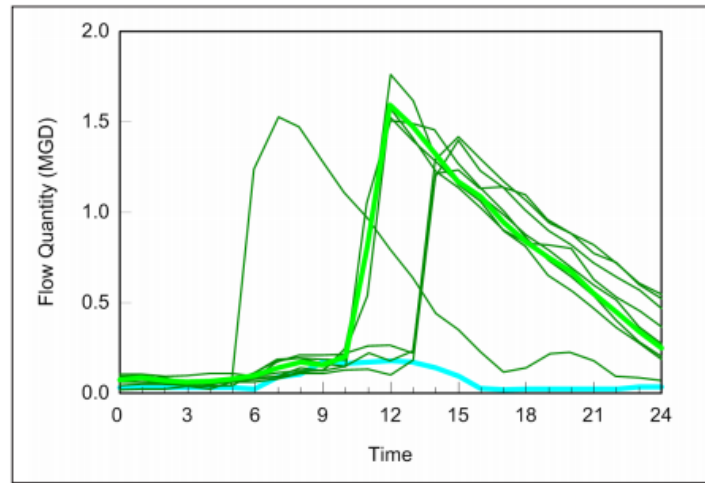
For all Point Source Categories, the BOD, TSS, and O&G limits are Production Based Standards (mass/produced mass). Exceptions: Dairy Products, lbs/100 lbs BOD input, Poultry subcategories of 40 CFR 432 are Concentration Based Standards.

Ammonia and Total Nitrogen of 40 CFR 432 are Concentration Based Standards



# SEWER SOCIOLOGY

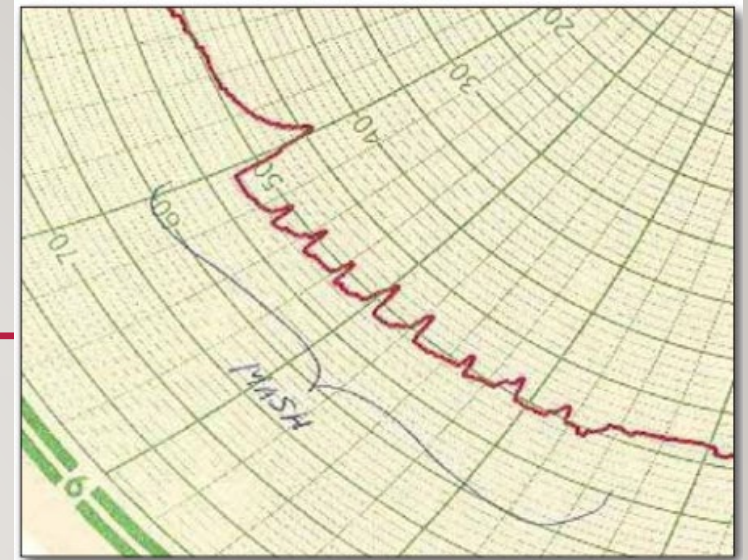
Sewer use at automobile assembly plant



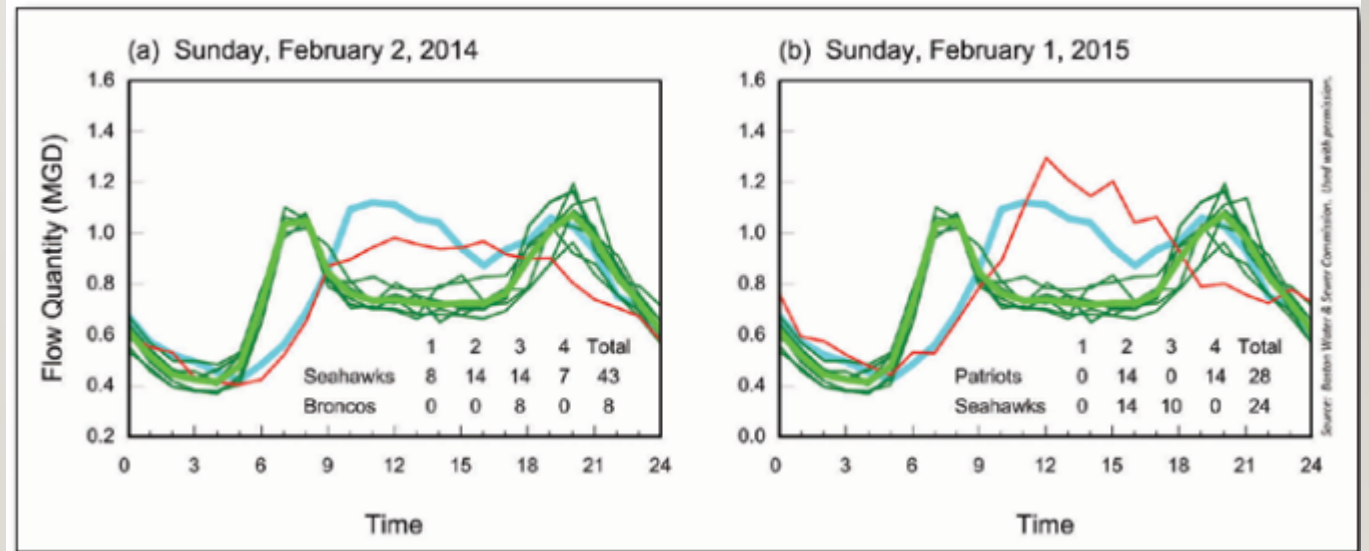
Enfinger, Kevin L. and Patrick L. Stevens, Electric effluent, WE&T, May 2015, page 80

Enfinger, Kevin L. and Patrick L. Stevens, Home Team Advantage, WE&T, April 2015

Enfinger, Kevin L. and Patrick L. Stevens, Mash Says “Goodbye, Farewell and Amen”, WE&T, March 2015



Residential sewer use in South Boston during Super Bowl XLVIII and Super Bowl XLIX



Source: Boston Water & Sewer Commission. Used with permission.

*Learning is a matter of gathering  
knowledge; wisdom is applying that  
knowledge.*

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*ROOPLÉEN*

# Municipalities with Non-Approved Pretreatment Programs

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# Non-Approved Programs

## Pretreatment Tools to Protect its POTW

- Pass Through and Interference
  - Residential or Non-Domestic Discharges?

# Non-Approved Programs

## Pretreatment Tools to Protect its POTW

- Legal Authority – Ordinance/Rules and Regulations
  - Deny or condition
  - Right of entry
  - Incorporate general/specific prohibitions and BMPs
  - Establish enforcement authority

# Non-Approved Programs

## Pretreatment Tools to Protect its POTW

- Industrial User Inventory and investigative tools
- Best Management Practices (Sector Control)
  - Restaurants (Fats, Oils and Grease)
  - Car washes, automotive service (Petroleum-based Oils and Grease)
- Control Mechanisms
- Innovative management of non-domestic waste (brewery, dairy wastes, oil and grease)

# EPA Region 8

- Collaborate with State Pretreatment and NPDES programs
- Evaluate NPDES permits and service areas
- Outreach
  - Non-approved Programs
  - Wastewater Operators
- Provide Compliance Assistance

# Region 8 Outreach/Evaluation

- Visited 20 non-approved POTWs - period of two years
- Legal Authority
- IU inventory and characterization
- Evaluation of Municipality's service area
- Provided training on inspections, sampling, grease/sand interceptors
- Identification and Control of CIUs



# Preliminary Observations

- Generally, non-approved POTWs have not developed an IU inventory, have not characterized the wastes from the IUs to determine the impact of the industrial contributions
- CIUs in these areas are not controlled/compliance with the Pretreatment Standards
- Correlation between POTWs with violations and high organic/flow discharges from IUs



# Non-Approved Programs Case Studies

- Slaughterhouse
- Trucked/Hauled Waste
- Restaurants - SSOs



# Colorado Town

- Town in Southeast Colorado Plains
- 2018 population – 1,144
- POTW – Lagoons, 9 cells, non-aerated
- Design Capacity
  - BOD – 238 lbs/day
  - Flow – 0.109 MGD

# Colorado POTW

- The POTW consistently receives more flow and BOD than the design capacity.
- NPDES Permit Application
  - Daily average Influent Flow – 102,467 gallons per day
  - Evaluation of Inflow and Infiltration
    - Residential flow = 42%
    - Estimated influent flow = 36 gallons per capita/day (below the 120 gallon/capita/day)

# Colorado POTW

- The Town consistently failed to meet limits for BOD, BOD percent removal, TSS, and flow.
- Influent inspected daily
  - Visual evidence of red influent color

# EPA Investigation and Sampling

- Evaluation of Service area
- Slaughterhouse
- Slaughters typically from Monday through Wednesday
  - 20 cattle are processed per week, can process up to 12 cattle in a day.
  - 20 to 25 hogs are processed one day every other week.
  - 20 lamb are processed every other week.
- 14 employees

# Slaughterhouse Process

- Loading Chute
- Kill floor
  - Blood pit and additional floor drain
  - Skinning, washing
- Hides – gut room (floor drain)
- Drip cooler (floor drain) and aging cooler
- Quartering/Butchering (floor drains and sink)
- Packaging room (floor drain)
- Daily Cleaning @ 4:30 pm– pressure washer



02/18/2016 11:30





# EPA Investigation and Sampling

- Review of Water Usage – monthly water bills that do not account for variation throughout the weekday
  - Daily average water usage of 15,620 gpd
  - ~ 20 operating days per month
  - Most likely higher on processing days (Mon – Wed)
  - Subtracted 20 gallons per employee per day
  - Estimated daily average process = 10,020 gpd




Downstream Manhole


Upstream Manhole


Jensen's Blue Ribbon Processing

Fowler Mini Storage

**Key**

Manhole 

Sewer Line (arrow indicates direction of flow) 

Grease Interceptor 

# EPA Investigation and Sampling

- No other non-domestic sources between the manholes.
- Upstream manhole – normal domestic flow characteristics
- Downstream manhole – evidence of slaughterhouse wastewater flow
  - Visual
  - BOD, TSS data

# EPA Investigation and Sampling

- The slaughterhouse discharges an average of 9.2% of the POTW's daily flow capacity and about 14% of the POTW's BOD capacity during operating days.
- Most likely higher wastewater flow and BOD loading during processing days (estimated to be 21% of the Town's BOD design capacity)

# POTW Protection Tools

- The Town was required in the 2019 permit renewal to develop a Pretreatment program for EPA approval.

# Montana Town

- Town in Northern Montana, 1.5 hours from Canada border
- 2010 population – 658
- POTW – 3-celled lagoon, aerated
- Design Capacity
  - Flow – 0.0894 MGD
  - BOD – 108 lbs/day
  - TSS – 119 lbs/day

# Compliance Issues

- BOD
- TSS
- Ammonia
- e-Coli



# Service Area

- Restaurants
- Tire and automotive service shop
- Gas Station – RV dump station



ATM

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# POTW Protection Tools

- Update Legal Authority – Town Ordinance
- Establish trucked and hauled waste requirements

# Sanitary Sewer Overflows (SSO)

- Raw sewage overflows from municipal sewer systems
- EPA estimates there are at least 23,000 - 75,000 SSOs per year in the U.S.
- Public Health Issue
- Contribute to disease outbreaks, beach and shellfish bed closings, fishing advisories and basement backups of sewage.

# Sanitary Sewer Overflows

- Blockages due to fats, oils and grease (FOG) and inappropriately discharged household products such as “flushable” wipes,
- Tree roots and leaky sewers,
- Cross-connections
- Inadequate maintenance and cleaning of sewers,
- Undersized sewers and/or pumps, and
- Equipment failures and breaks

# Reducing SSOs

- Sewer system cleaning and maintenance
- Reducing infiltration and inflow
- Enlarging or upgrading sewer, pump station, or sewage treatment plant capacity and/or reliability
- Controls limiting fats, oils and grease (FOG) into the sewer systems
- Public Education/Outreach

# EPA's 2004 Impacts and Controls of CSO/SSO Report to Congress

- “Grease from restaurants, homes, and industrial sources are the most common cause (47%) of reported blockages. Grease is problematic because it solidifies, reduces conveyance capacity, and blocks flow.”

# POTW Protection Tools

- Legal Authority
- Implement enforceable Best Management Practices
  - Sizing of Technology (Grease Interceptors)
  - Operation and Maintenance
  - Records/Documentation
  - Good Housekeeping
- 2012 Fact Sheet – Controlling FOG Discharges from Food Service Establishments



# Summary

- Every municipality has the authority to protect its POTW from the impacts of pollutants in non-domestic wastewater.
- Pretreatment Tools:
  - Legal authority update  
[https://www.epa.gov/sites/production/files/2020-02/documents/epa\\_region\\_8\\_-\\_non-approved\\_programs-example\\_ordinance.pdf](https://www.epa.gov/sites/production/files/2020-02/documents/epa_region_8_-_non-approved_programs-example_ordinance.pdf)
  - IU inventory
  - Implement the Pretreatment Tools, as applicable

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