# Nutrient Industrial Sources and Pretreatment

#### Al Garcia

Nutrients Permitting Workshop June 5, 2018

#### Nutrient Control - POTWs

 Nutrient Removal Strategies -Treatment technology -POTW optimization -Source control Pretreatment as a tool for POTW permitting Nutrient Non-domestic sources

**Progress on Establishing** Nutrient Criteria – Region 8 CO – Nutrient Table Values for the State (Regulation 31.17) -Control Reg 85 for TP (1.0 mg/L) and TIN (15 mg/L) MT – Eco-Regional Nutrient Criteria for wade-able streams; variances • UT – TBEL for P ND, SD, WY – criteria in progress

# Biological Nutrient Removal (BNR)

#### Oxygen Poor Habitat (Anoxic)

- Denitrification: Nitrates as N (NO<sub>3</sub>) converts to Nitrogen<sub>(g)</sub> N<sub>2</sub>
  - Phosphorus
    - Bacteria break down BOD to create volatile fatty acids (VFAs)
    - Phosphate Accumulating organisms (PAO) use VFAs as a fuel source, release soluble ortho-P

## Biological Nutrient Removal (BNR)

**Oxygen Rich Habitat** 

 Nitrification: Ammonia-N (NH<sub>4</sub>) converts to Nitrates-N (NO<sub>3</sub>)

Phosphorus

- PAOs assimilation of soluble P

P Removal -convert soluble P to TSS: PAOs are wasted to digesters

#### **Existing Activated Sludge Plant**





## Biological Nutrient Removal (BNR) Treatments

IFAS - Integrated Fixed Film Activated Sludge
SBR - Sequential Batch Reactor
Oxidation Ditch
MBR – Membrane Biological Reactor
MBBR - Moving Bed Biofilm Reactor
Step Feed Process

#### **POTW Optimization**

 Creating optimal habitat for bacteria involved in N and P removal

 Denitrifying bacteria will outcompete PAOs for VFAs

– Dial in anaerobic, anoxic, and aerobic habitats

Utilizing skills, expertise, and institutional knowledge of WWTP operators

#### Pretreatment 101

 Established in the Clean Water Act; regulations for commercial and industrial process wastewaters.

 <u>Direct Dischargers</u> - National Pollution Discharge Elimination System

 <u>Indirect Dischargers</u> – National Pretreatment Program





**Goals of the National Pretreatment Program Prevention:** Pass Through of Pollutants Interference of the wastewater facilities operations Contamination of the treatment sludge Impact to worker health and safety

#### **Non-Domestic Sources**

Characterize Service Area: Non-Domestic Sources or Industrial Users (IU)
Characterize IUs in service area

Determine impact to POTW

Determine and Control SIUs

#### **Pretreatment Standards**

• Effluent Limitation Guidelines -Based on processes **Establish National level of technology General/Specific Prohibited Standards**  Local Limits -Calculated based on NPDES Standards

Who Needs a Pretreatment **Program?**  POTWs with a total design flow greater than 5 MGD Receive pollutants from IUs which Pass Through or Interfere with the operation of the POTW or are otherwise subject to Pretreatment **Standards** 

## **Smaller POTWs**

16,000 POTWS in U.S. • 1,600 POTWs with approved programs -Treat <u>~80% of the national wastewater</u> flow to waters of the U.S -23,000 Significant Industrial Users (SIUs) that account for <u>at least 30% of all</u> industrial wastewater generated in the U.S.

**Region 8 Non-Approved Program Initiative**  Outreach to Region 8 non-approved programs Wastewater Operator Training Non-Approved Programs Traveling Road Show **Phone Calls, Visits** • NPDES Requirements and Pretreatment Authority Region 8 Non-Approved Programs Ordinance example NPDES Permit Language

## Establishment of Nutrient WQ Criteria/NPDES permit limits

• Establishes Pollutants of Concern Develop local limits based on NPDES Standards, including variances - "maintain current conditions or loadings" without quantifying baseline Determine loadings from IUs in service area and provide control

#### **Nutrient Point Sources**

• Fish hatcheries • Oil and gas lagoons Metal Finishing – phosphate coating Ortho-phosphate corrosion controldrinking water distribution lines Breweries/distilleries, car washes, industrial laundries - detergents Mining – explosives Food Processing Facilities

## **Food Processing Facilities**

Slaughterhouse Cheese Processing Bacon Processing **Egg Processing**  Meat Packing Poultry Packing • Food Products

## EPA National Enforcement Initiative

Food Processing Facilities

 Ties to nutrients

 Pressures on smaller POTWs to address nutrient loadings when NPDES permit limits are established

## Small Town, CO

#### Design Capacity -BOD - 238 lbs/day -Flow - 0.109 MGD



#### Non-Compliance History

 The Town often receives more flow and BOD than the design capacity.

• The Town consistently fails to meet limits for BOD, BOD percent removal, TSS, and flow when it discharged in 2012-2014.

## **Blue Ribbon Processing**

Slaughter Monday-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
- The facility discharges an average of 15,620 gpd on processing days















# EPA Investigation and Sampling Event

 Operating days, the facility is discharging an average of 14.3% of the POTW's daily flow capacity and about 21% of the POTW's BOD capacity.

Facility appears to be discharging process wastewater in concentrations and amounts that are causing pass through and/or interference.

# Nutrient Loadings

#### Cheese Plant –

- process 3 million lbs milk/day, expand to 9 million lbs/day
- WWTP expansion
  - Flow 2MGD
  - -COD 55,000 lbs/day
  - TKN 928 lbs/day
  - $-NO_3-N-618$  lbs/day  $-NH_4-N-234$  lbs/day
  - $-PO_4$ -P -234 lbs/day

#### **Nutrient Loadings**

• Egg Processing Facility-1.25 million per day Flow - 0.1 MGD- TKN - 158 lbs/day BOD - 1,986 lbs/dayMeat Packing Facility-after anaerobic lagoon treatment - Flow - 2.83 MGD - TKN - 2,891 lbs/day  $-NH_4$ -N -2,529 lbs/day -BOD - 11,389 lbs/day

## Summary

Nutrient compliance will impact smaller POTWs

affordability of treatment

Pretreatment authority can used as a source control tool

Need complete permit applications
Adequate Permit conditions

"Pollutant minimization plans as conditions for variances

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## Questions??