Regulation of Industrial Users & Wastewater Discharge

IDNR P2 Webinar

March 26, 2025

Paul Ebert

Regulatory Compliance Manager

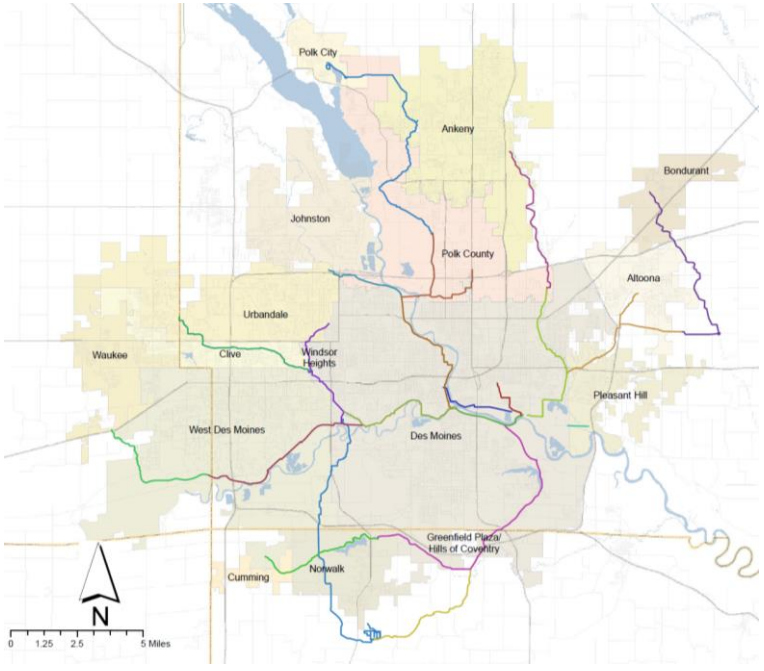
Des Moines Metropolitan WRA

Outline

- Background Info. on WRA
- Historical Need for Wastewater Pretreatment
- Clean Water Act Basics
- Types of Industrial Users (IUs)
  - SIUs, CIUs, NSNC IUs
- Common Problems with Industrial Users
- Surcharges vs. Permit Limits & Fines
- Enforcement Response
- The IU – WWTP Relationship

Des Moines Metropolitan WRA

- Flow and Treatment Stats:
  - 50 million gal/day avg.
  - 200 million gal/day max.
- 18 Participating Municipalities in DSM Metro
- Service population: 550,000
- Permitted Industrial Users
  - SIUs: 20
  - CIUs: 25
  - IUs: 35
  - TOTAL: 80
- Pretreatment Program:
  - Est. October 1983



Historical Need for Pretreatment

- Industrial boom of the mid-1900s resulted in uncontrolled levels of pollution
- Pollutants of all types:
  - Metals
  - Solvents
  - Organics
  - Plastics
  - Petroleum compounds
  - and huge increase in production wastewater volumes
- All this discharged, unchecked, to local POTW or directly to surface waters

Historical Need for Pretreatment

- WWTPs (if they existed) were not, and still are not, designed to treat many industrial wastes
  - Designed to treat "conventional pollutants": BOD, TKN, TSS, *some* O&G
- Industrial wastes include such things as:
  - Metals: just end up in WWTP biosolids
  - Salts: just pass through to receiving waters
  - Solvents: toxic to aquatic organisms, explosive, etc.

Clean Water Act

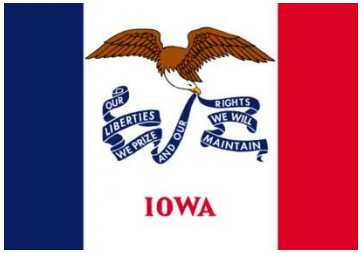
- Federal Water Pollution Control Act (1948)

- Amendments in 1972 lead to Clean Water Act
  - Funded construction of sewage treatment plants
  - Established water quality standards
  - Gave EPA authority to implement control programs
    - NPDES permits
      - To control direct dischargers
      - 40 CFR 122
    - National Industrial Pretreatment Program
      - To control direct & indirect dischargers
      - 40 CFR 403 = General pretreatment regulations

Clean Water Act

- 40 CFR 403: General Pretreatment Regulations
  - Grants authority to States or local POTWs to enforce Federal Clean Water Act
    - Cities with approved pretreatment programs:
      - State/DNR is the “Approval Authority”
      - Local POTW is the “Control Authority”
    - Cities without pretreatment programs:
      - State/DNR is both the “Control & Approval Authority”
    - Iowa cities with local pretreatment programs:
      - Ames, Boone, Burlington, Cedar Falls, Cedar Rapids, Clinton, Council Bluffs, Davenport, Des Moines, Dubuque, Fort Dodge, Fort Madison, Iowa City, Keokuk, Marshalltown, Mason City, Muscatine, Ottumwa, Sioux City, and Waterloo.
    - State Pretreatment Coordinator:

      Ben Hucka, ben.hucka@dnr.iowa.gov



Iowa Pretreatment Cities

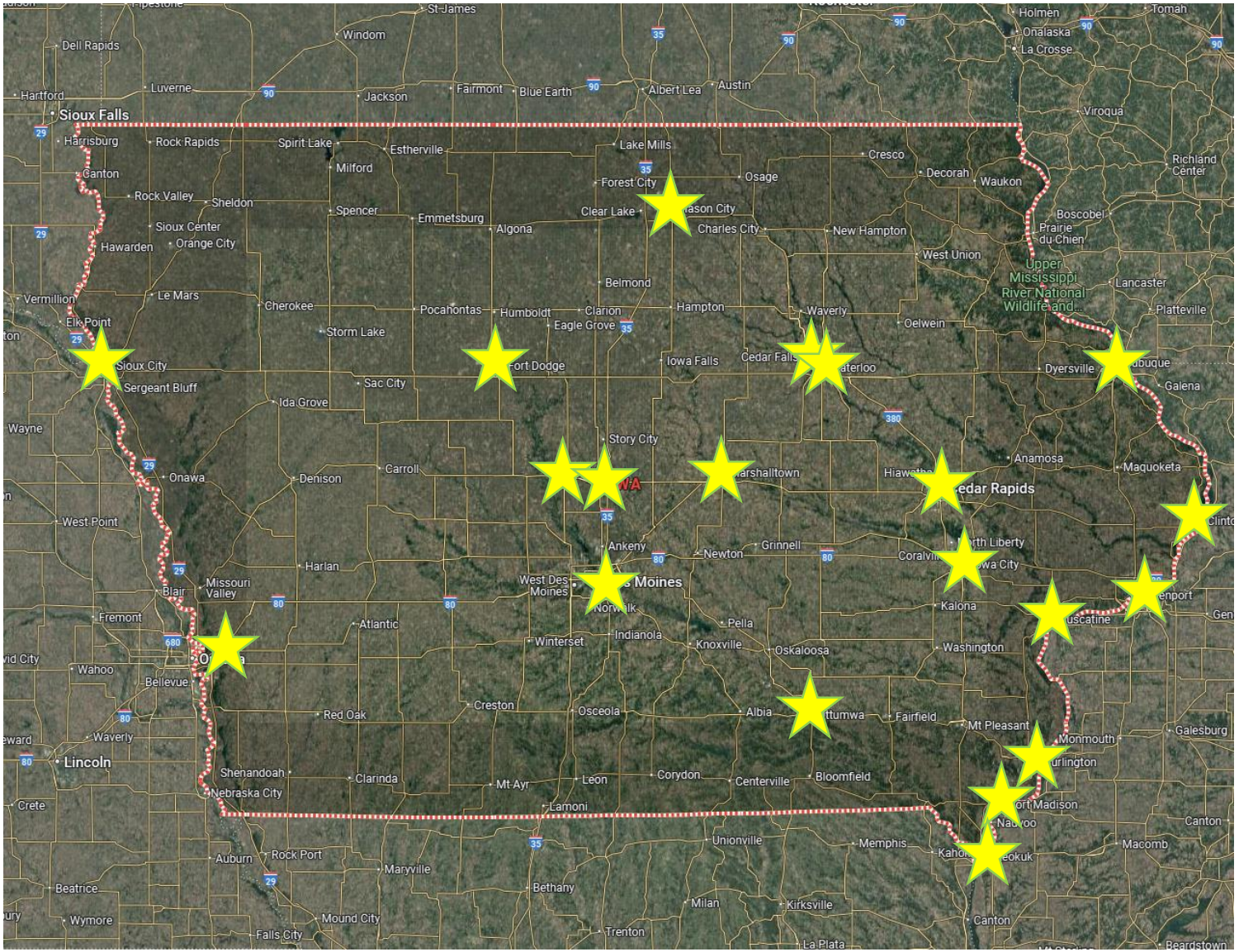


Image courtesy of Google Maps

Clean Water Act

- 40 CFR 403: (continued)
  - Program rules & requirements regarding permitting
  - Industrial User (IU) = any non-domestic discharger
  - Significant Industrial User (SIU)
    - >25,000 gpd process water discharge
      - (non-contact cooling water, RO reject, etc. = non-process water)
    - Potential to impact POTW
    - >5% of POTW design capacity for a conventional pollutant
    - Conventional pollutants:
      - BOD, TSS, TKN / ammonia, oil & grease

Industrial User Types

Industrial User (IU)

- **Significant Industrial User (SIU)**
- **Categorical Industrial User (CIU)**
- **Non-Significant Categorical IU (NSCIU)**
- **FSE or Other User**

All CIUs are SIUs!

• 40 CFR 405 - 471: Categorical Pretreatment Regs.

- Asbestos Manufacturing
- Battery Manufacturing
- Can Making
- Canned and Preserved Fruit and Vegetable Processing
- Canned and Preserved Seafood
- Carbon Black Manufacturing
- Cement Manufacturing
- Centralized Waste Treatment
- Coal Mining
- Coil Coating
- Concentrated Animal Feeding Operation & Feedlots
- Concentration Aquatic Animal Production
- Copper Forming
- Dairy Product Processing or Manufacturing
- Electric and Electronic Components Mfg.
- Electroplating
- Explosives Manufacturing
- Fertilizer Manufacturing
- Glass Manufacturing
- Grain Mills
- Gum and Wood Chemicals
- Hospital
- Ink Formulation
- Inorganic Chemicals
- Iron and Steel
- Landfill
- Leather Tanning and Finishing
- Meat and Poultry Products
- Metal Forming
- Metal Finishing
- Metal Products and Machinery
- Mineral Mining and Processing
- Oil and Gas Extraction
- Ore Mining
- Organic Chemicals Manufacturing
- Paint and Ink Formulating
- Paving and Roofing Manufacturing
- Pesticides Chemical Manufacturing, Formulating, and/or Packaging
- Petroleum Refining
- Pharmaceutical Manufacturing
- Phosphate Manufacturing
- Photographic Processing
- Plastic and Synthetic Materials Manufacturing
- Porcelain Enameling
- Printed Circuit Board Manufacturing
- Pulp, Paper, and Fiberboard Manufacturing
- Rubber Manufacturing
- Soap and Detergent Manufacturing
- Steam Electric Power Generating
- Sugar Processing
- Textile Mills
- Timber Products
- Transportation Equipment Cleaning
- Waste Combustors

Common Problems with IUs

- Communications
  - New industry construction (no notification to POTW)
  - Slug discharges / process upsets
  - Equipment failures (esp. sampling or flow monitoring)
  - Change in chemicals being used
  - Addition of new processes / expansions

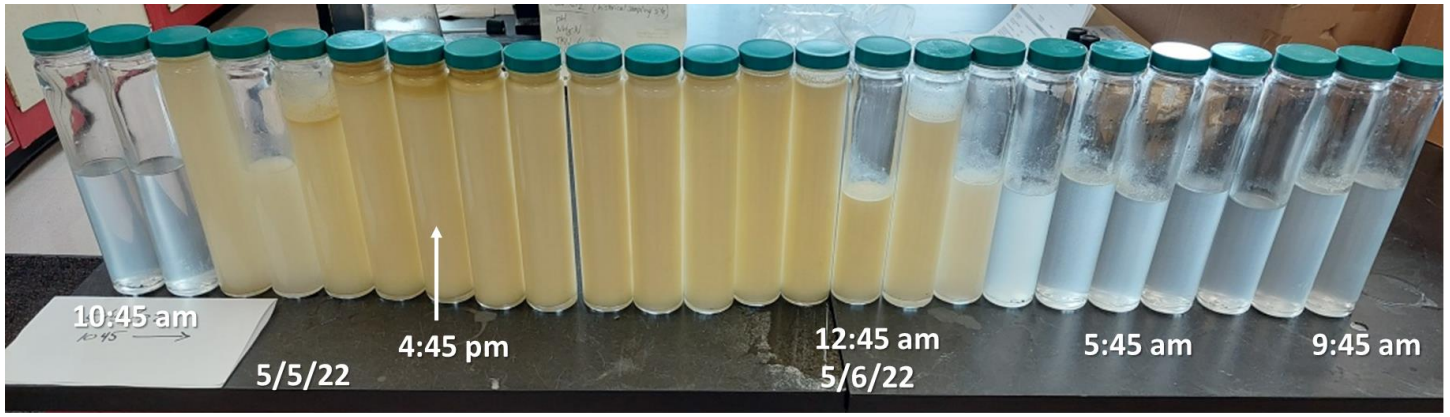
EXAMPLE: Metal finisher adding new "ancillary" process (CFR 433)

6 core processes: Electroplating, Electroless Plating, Anodizing, Coating, Chemical Etching and Milling, and Printed Circuit Board Mfg.

40 ancillary processes: Cleaning, Machining, Grinding, Polishing, Tumbling, Burnishing, Impact Deformation, Pressure Deformation, Shearing, Heat Treating, Thermal Cutting, Welding, Brazing, Soldering, Flame Spraying, Sand Blasting, Other Abrasive Jet Machining, Electric Discharge Machining, Electrochemical Machining, Electron Beam Machining, Laser Beam Machining, Plasma Arc Machining, Ultrasonic Machining, Sintering, Laminating, Hot Dip Coating, Sputtering, Vapor Plating, Thermal Infusion, Salt Bath Descaling, Solvent Degreasing, Paint Stripping, Painting, Electrostatic Painting, Electropainting, Vacuum Metalizing, Assembly, Calibration, Testing, and Mechanical Plating

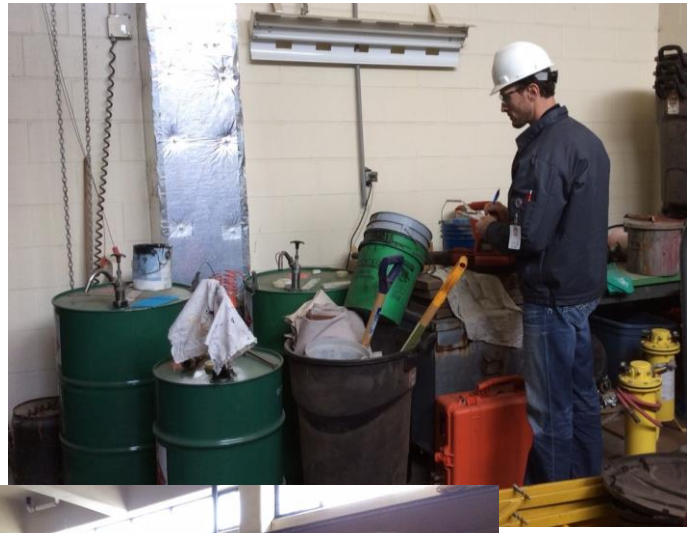
Common Problems with IUs

- Proper operation of onsite pretreatment systems
  - New equipment = learning curve (increase in violations)
  - Change in chemicals for treatment
  - Expansion = increased loading to system (*over-loaded*)
- Staffing Changes
  - New management or plant personnel = potential issues



Common Problems with IUs

- Chemical storage concerns
  - Poorly labeled
  - Improperly stored
    - No spill containment
    - Near floor drains
  - No nearby spill kits
  - Spill response training?



Common Problems with IUs

- Monitoring equipment issues
  - Wastewater flow meter communication issues
    - Needed for flow-paced composite sampling
      - 1 sample aliquot per every X,000 gallons discharged
    - Interim: time-paced sampling
      - 1 sample aliquot per every 20 minutes
  - Pump or tubing failures
  - Refrigeration failure
    - 4 deg. C
    - Keep small reference thermometer in sampler

Foam in wastewater flume

Types of Pollutants

- WWTPs are designed to treat organic pollutants
  - BOD (biochemical oxygen demand)
  - TSS (total suspended solids)
  - TKN (total Kjeldahl nitrogen)
  - NH_3 (ammonia)
  - O&G (oil & grease…in residual amounts)
- Surcharges are typically assessed on these "conventional pollutants" above
- Metals
  - Limits determined by "Local Limits"; sludge calculations
  - Metals aren't "treated", just end up in WWTP biosolids

Storage of Biosolids at WRF's "Biobarn"

Types of Pollutants

- Inorganic solids
- Dissolved solids / salts
- VOCs / petroleum compounds / oil
- Total Toxic Organics (TTOs)
- Solvents
- Soaps / detergents
- Dyes / inks
- Trash / debris
- etc.

Surcharges vs. Permit Limits

- Surcharge limit = an "allowable" amount of pollutants above which surcharges are assessed
  - The greater the pollutant concentration, the greater the bill for treatment
- Permit limit = a threshold above which becomes a regulatory and fineable violation

EXAMPLE: Des Moines WRA*:

Oil & Grease	
100 mg/L	surcharge limit
400 mg/L	violation limit

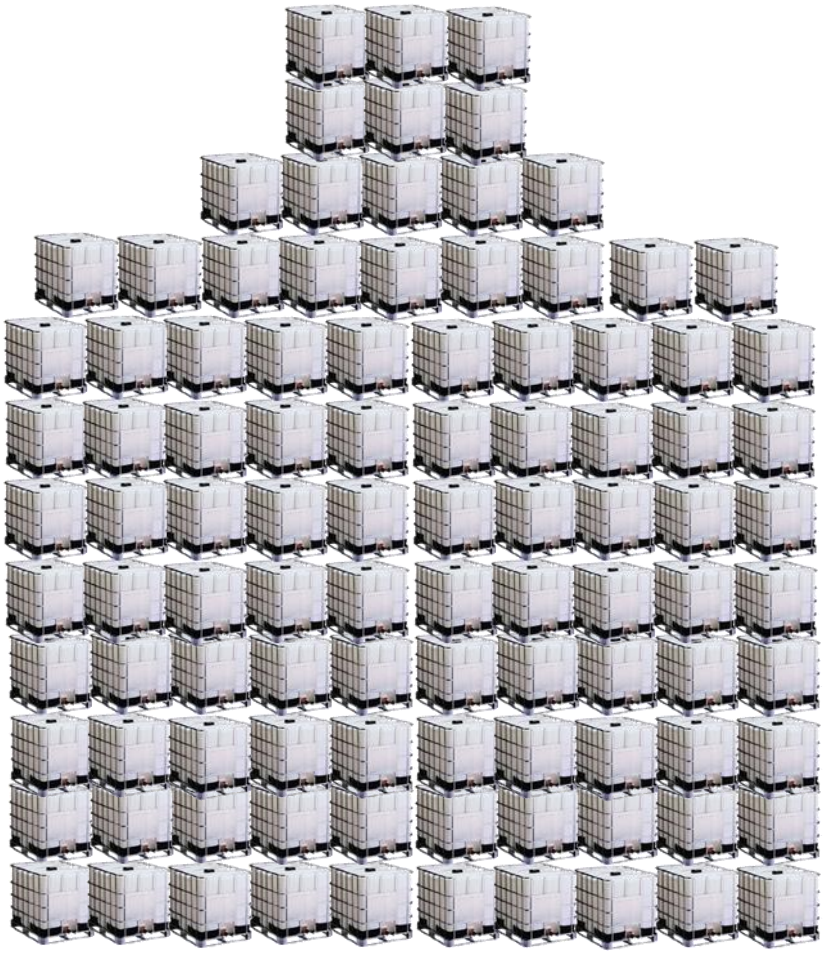
* surcharge limits and violation limits differ by wastewater treatment plant (WWTP)

- Permit limits could exist for BOD, TSS, TKN or NH_3, etc.
- Depends on WWTP's available treatment capacity (lbs./day)
- One industry's pollutant loading could exceed rest of entire town!

- ***For visual comparison:***

Average household:

- 200 gal/day
- COD = 500 mg/L



Distillery:

200-gal. tote

- 200 gal/day
- COD = ~50,000 mg/L
- **Equivalent to over 100 households**

Enforcement Response

- Each Pretreatment Program has its own Enf. Response Plan
- Permit violation:
  - Notification of a permit exceedance
    - Provided to the IU from the Control Authority (CA) if CA does sampling
    - Provided to the CA if the IU performs its own sampling
  - Fine or prohibitive waste charge ($) per violation
- Slug discharge violation:
  - CA may calculate a discharge fee based on magnitude of violation

EXAMPLE:

($250) x (result / slug concentration limit) = Slug Fee Assessment

Violation #1: ($250) x (6240 / 2000) = $780.00

mg/L O&G mg/L O&G

Enforcement Response

- Excessive permit violations may result in “SNC” status
  - SNC = Significant Non-Compliance
- Back-to-back compliance periods of SNC status = escalated enforcement actions must be taken by CA
  - ADMINISTRATIVE ORDER: Notice of Violation with requirement to submit a *Return to Compliance Plan*
    - Typically, 6-12 months in duration
- Should this not result in compliance → CIVIL ACTION
  - Consent Order filed with public courts, civil penalties, etc.
- Should this not result in compliance → Permit Revocation & Termination of Sewer Service
  - Possible criminal investigation, fines, and involvement with DNR/EPA

IU – WWTP Relationship

- Surcharges
  - Cost recovery charges for additional pollutants

WRA	Allowed (mg/L)	Actual (mg/L)	Difference (mg/L)	Rates ($ / lb.)
CBOD	200	1000	800	$0.21
TSS	250	500	250	$0.22
TKN	30	130	100	$0.42
O&G	100	300	200	$0.11

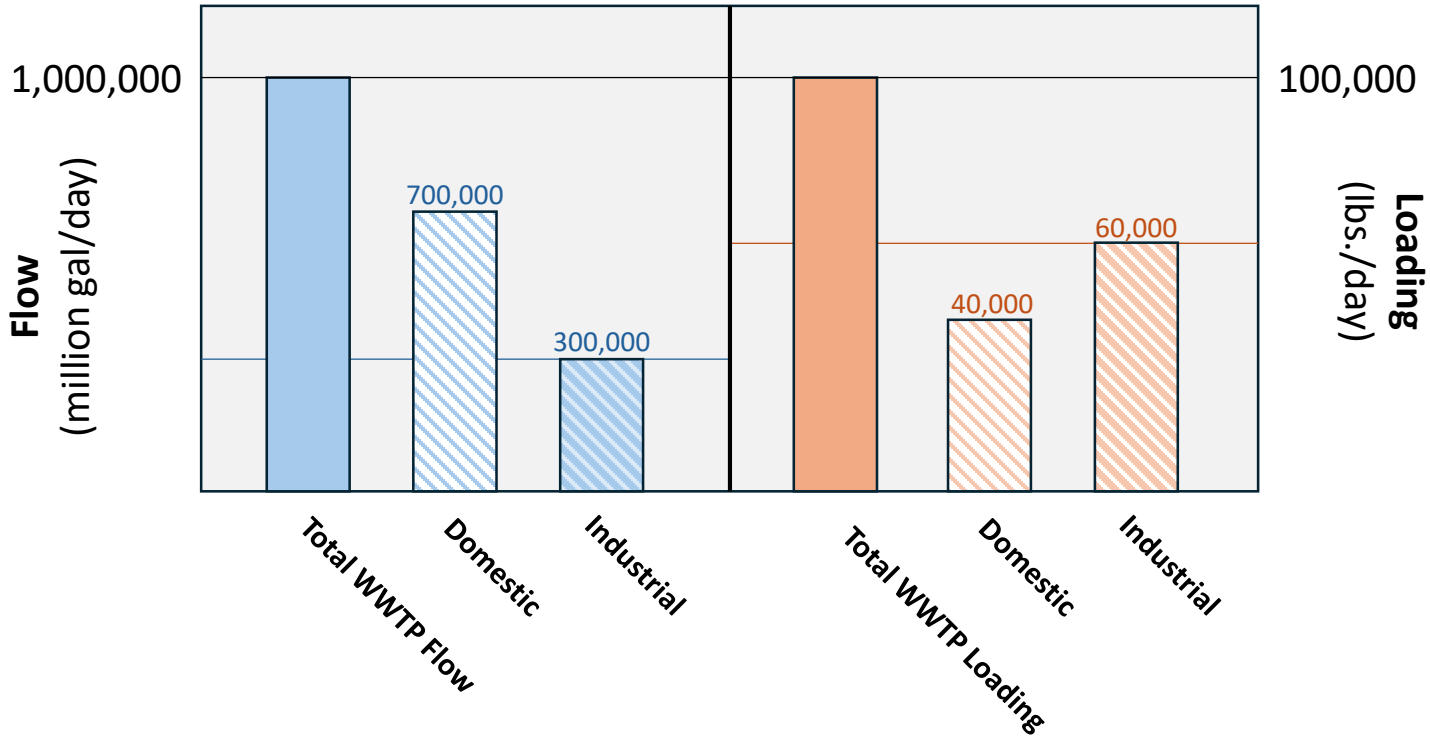
Ex: CBOD (800 mg/L) (1.25 MG/month) = 8,340 lbs. CBOD

(8,340 lbs.) ($0.21/lb.) = **$1,751.40**

IU – WWTP Relationship

- IU is paying for the usage of the POTW
- Should pay “their fare share” for Operation & Maint.

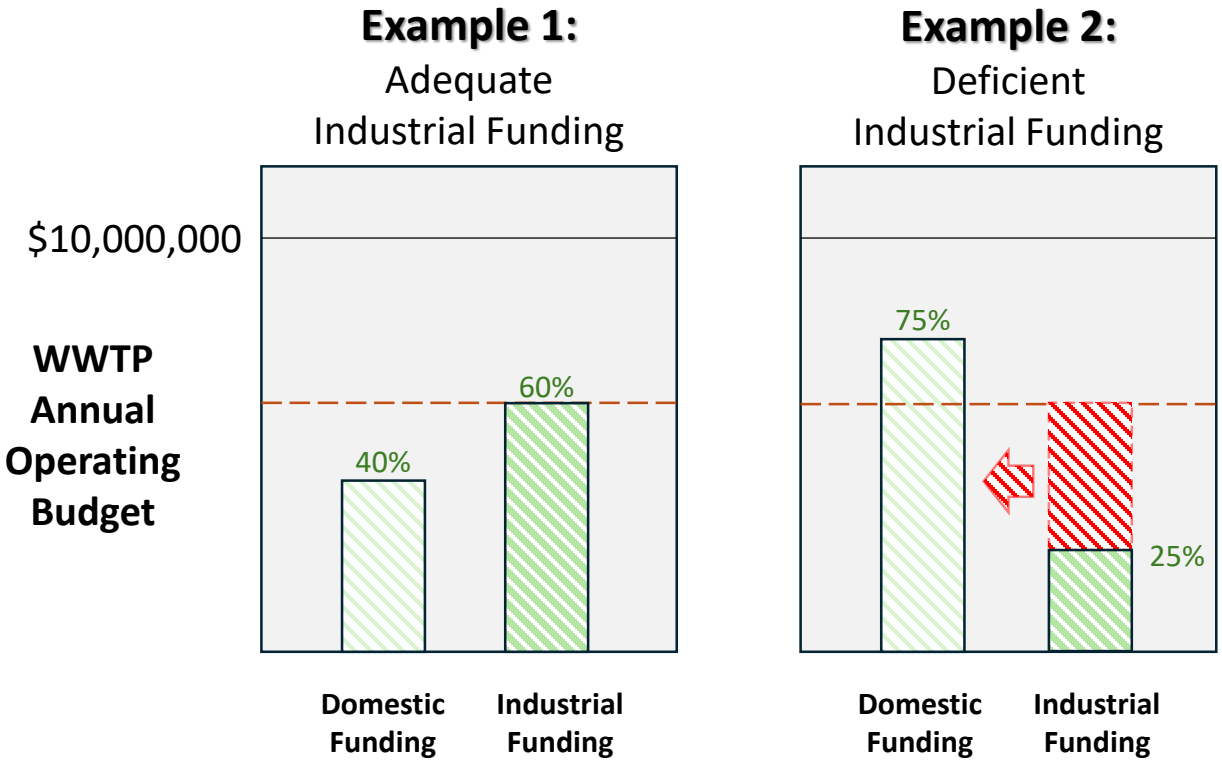
Generic Example Graph:



- IUs discharge only 30% of flow but <u>60% of pollutant loading</u>

IU – WWTP Relationship

- In this example, IUs should be paying for 60% of the operational costs of this WWTP
- Up to the WWTP to ensure they are adequately charging their Industries for pollutant discharges



Inadequate industrial surcharge revenue shifts industrial treatment costs to other rate payers.

IU – WWTP Relationship

- Ideal condition: **IU + Municipality = Partnership**
  - Municipality needs jobs, tax revenue, robust economy
  - IUs need efficient and dependable wastewater treatment 24/7, 365
  - WWTP needs adequate treatment capacities for all customers
    - i.e. WWTP has design treatment capacities:
      - BOD: 200,000 lbs./day
      - TSS: 400,000 lbs./day
      - TKN: 30,000 lbs./day
  - Hence the need for:
    - Wastewater discharge permits and permit limits
    - Pretreatment requirements (remove & concentrate pollutants)

Questions / Comments?

Paul Ebert
Des Moines Metropolitan WRA
pcebert@dmgov.org