



Industrial Pretreatment Standards

by

Mark Ludwigson, P.E.

**Course 439
5 PDH (5 Hours)**

**PO Box 449
Pewaukee, WI 53072
(888) 564 - 9098
eng-support@edcet.com**

Industrial Pretreatment Standards

Course Outline:

- Overview of Industrial Wastewater Pretreatment Regulations
- National and State Pretreatment Program
- Local Pretreatment Programs
- Types of Industrial Users
- Pollutant Limits
- Inspections and Sampling
- Reporting Requirements
- Helpful References
- Examination

Industrial Pretreatment Standards

Overview of Industrial Wastewater Pretreatment

Wastewater from an industrial or commercial facility is assumed to be a pollutant as it may contain fats, oils, greases (FOG), excess solids, high biochemical oxygen demand (BOD), toxic chemicals, or abnormal pH. To address this, a wastewater treatment and disposal method must be carefully engineered to meet environmental regulations while minimizing costs to the owner. Figure 1 and Table 1 summarize the common wastewater disposal options. This course covers standards for the indirect discharge method which is boxed in red.

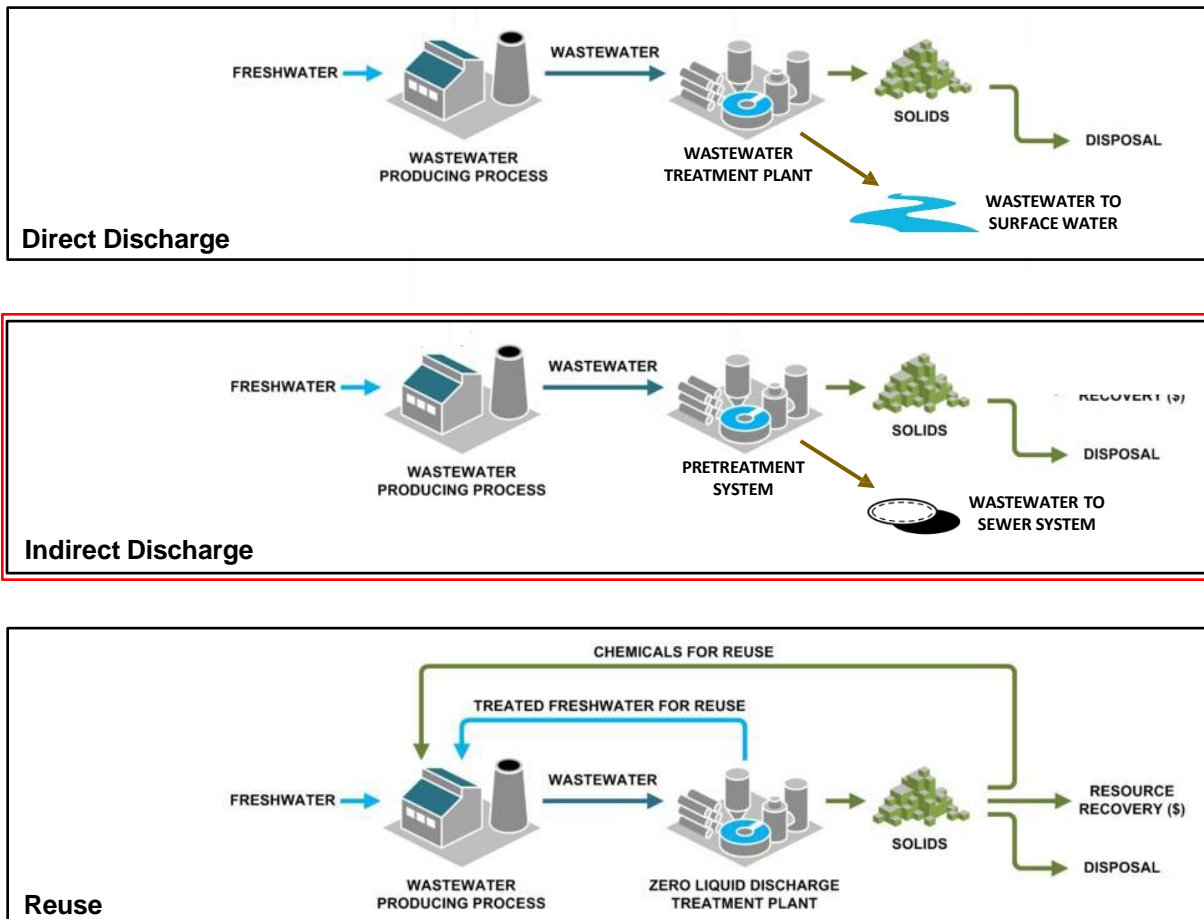


Figure 1: Industrial Wastewater Disposal Options.

Source: https://en.wikipedia.org/wiki/File:What_is_Zero_Liquid_Discharge_Diagram.png,
Saltworks Technologies, Modified, CC-BY-SA-4.0

Industrial Pretreatment Standards

Table 1: Industrial Wastewater Disposal Options					
Method	Receiving Body	Examples	Treatment Requirements	Permit Type	Cost Comparison
Direct Discharge	Surface or Groundwater	River, Lake, Ocean, Injection Well	Wastewater Treatment Plant	NPDES Permit	High Cost for Advanced Treatment
Indirect Discharge	Municipal Sewer System	Gravity Sewer, Force Main	Industrial Pretreatment System	Industrial User Discharge Permit	Municipal Fees
Reuse	Onsite Processes	Irrigation, Cooling Water	Reuse Treatment Plant	None or Zero Discharge Permit	High Cost for Advanced Treatment and Solids Disposal
Multi-Discharge	Combination of Above	Combination of Above	Wastewater/ Reuse Treatment Plant	NPDES Permit or Industrial User Discharge Permit	Balance of Above Costs

Industrial and commercial entities that have an indirect discharge of wastewater are called Industrial Users (IUs) for permitting purposes. Most IUs have a wastewater treatment system that partially treats the wastewater before being discharged into the municipal sewer collection system. This is called an “industrial pretreatment system”, or just a “pretreatment system”. Each pretreatment system is a highly specialized process that should be carefully designed by an experienced Professional Engineer.

See Figures 2 through 7 for examples of industrial pretreatment systems.

Industrial Pretreatment Standards



Figure 2: Example of a wet well with a basket screen, as part of a small industrial pretreatment system with primary treatment.

Source: [https://commons.wikimedia.org/wiki/File:Pr%C3%A9traitement_\(Maroc\)_\(13264700814\).jpg](https://commons.wikimedia.org/wiki/File:Pr%C3%A9traitement_(Maroc)_(13264700814).jpg), SuSanA Secretariat, CC-BY-2.0

Industrial Pretreatment Standards



Figure 3: Example of a large industrial pretreatment system with secondary treatment and digestion.

Source: https://commons.wikimedia.org/wiki/File:Dry_-_solid-state_anaerobic_digestion_AD_biogas_plant.jpg, Thzorro77, CC-BY-SA-4.0

Industrial Pretreatment Standards

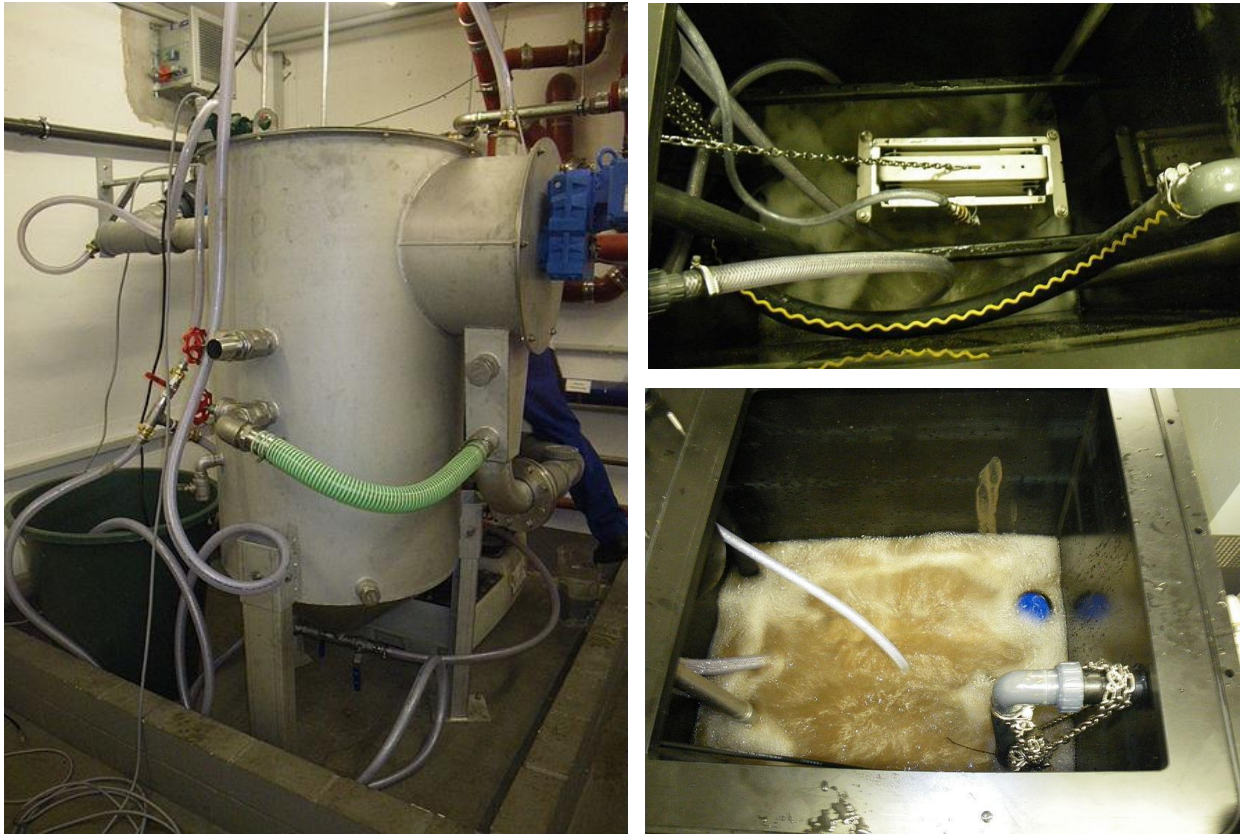


Figure 4: Example of a small industrial pretreatment system with a bioreactor for secondary treatment.

Source: [https://commons.wikimedia.org/wiki/File:Brownwater_treatment-_Intermediate_storage_tank_with_preliminary_treatment_\(5597700655\).jpg](https://commons.wikimedia.org/wiki/File:Brownwater_treatment-_Intermediate_storage_tank_with_preliminary_treatment_(5597700655).jpg), SuSanA Secretariat, CC-BY-2.0

Industrial Pretreatment Standards



Figure 5: Example of a manufacturing facility with a pretreatment system circled in white (top) and at ground level (bottom). The system includes a large equalization tank and a pH neutralization system.

Industrial Pretreatment Standards



Figure 6: Example of a dissolved air flotation pretreatment system. These are common at oil refineries, chemical plants, and paper mills.

Source: https://commons.wikimedia.org/wiki/File:REDOX_DAF_unit_225_m3-h-1000_GPM.jpg, SmileJohn (enWP), CC-BY-SA-3.0

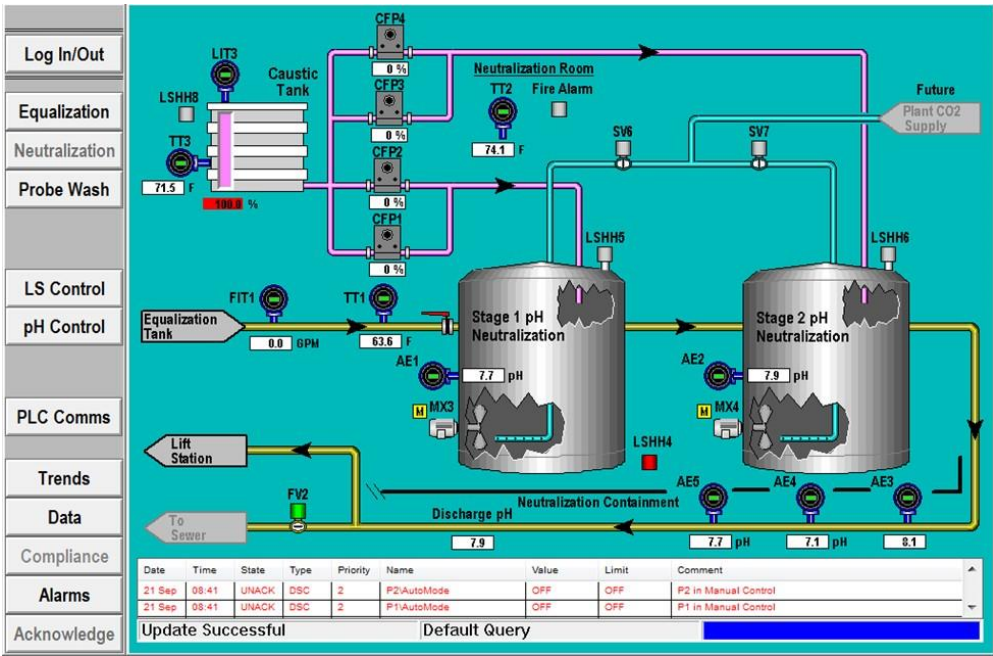


Figure 7: Example SCADA/HMI control screen for a pretreatment system.

Industrial Pretreatment Standards

IU Discharge Permits

Each IU is issued a discharge permit with conditions that include prohibitions, standards, and limits. The permit is normally issued by the local publicly owned treatment works (POTW), which is the owner of the collection system, wastewater treatment plant, and related infrastructure. The POTW must have an Industrial Pretreatment Program which issues permits, monitors IUs, and reports to the Environmental Protection Agency (EPA). Further details on this are provided in the following sections of this course.

Purpose of a Pretreatment System

The goal of a pretreatment system is to modify the wastewater so that the water quality consistently meets the permit conditions while also minimizing treatment costs and municipal discharge fees.

Generally, POTWs have large wastewater treatment plants (WWTPs) that are designed to treat domestic/household sewage and biodegradable commercial/industrial sewage.

A typical POTW WWTP includes the following processes:

- Primary treatment (i.e., screening, clarification),
- Secondary treatment (i.e., aeration),
- Disinfection (i.e., chlorination), and
- Solids handling (i.e. thickening, dewatering, digestion).

The Code of Federal Regulations (CFR), title 40, section 401.16 (40 CFR 401.16), define these five conventional pollutants that must be treated in a POTW WWTP:

1. Biochemical Oxygen Demand (BOD)
2. Total Suspended Solids (TSS)
3. Fecal Coliform (an indicator organism for the presence of fecal waste)
4. High/low pH
5. Oil and Grease (O&G)

Commercial and industrial facilities often produce wastewater with toxic pollutants and other non-conventional pollutants that the POTW WWTP cannot normally remove. This wastewater can interfere with the WWTP processes and/or pass through into the receiving waterbody. The main goal of the national and local pretreatment programs is to prevent interference and pass through of industrial wastewater.

Industrial Pretreatment Standards

The approach to achieve this goal is by requiring each IU to pretreat the wastewater to strict standards. Treating wastewater onsite before discharging to a POTW is referred to as “pretreatment”.

Additional Benefits

Although the main goal of pretreatment is to prevent POTW interference and pass through, there are several other important concerns that an engineer should be aware of when designing or modifying a pretreatment system. The following is a list of problems associated with industrial wastewater that can be solved or minimized by a pretreatment system:

- Land Pollution: When sewage sludge is land applied, high concentrations of toxins can pollute the land or limit sludge disposal. Many municipalities apply treated sewage sludge (or soil conditions products) to pastures and parklands.
- Air Pollution: High concentrations of toxins can be released into the air (volatilization) in the POTW collection system, WWTP, or during incineration of sewage sludge.
- Groundwater Pollution: High concentrations of toxins can leak through joints in the collection system, wet wells, and other structures. Any nearby potable water system or raw water well can become contaminated.
- Corrosion: Acidic discharges or high levels of sulfate (which can form corrosive hydrogen sulfide) can degrade the pipes, pumps, and other components in the POTW collection system and WWTP.

See Figure 8 for a depiction of some of these problems, highlighting the need for industrial pretreatment systems.

Industrial Pretreatment Standards

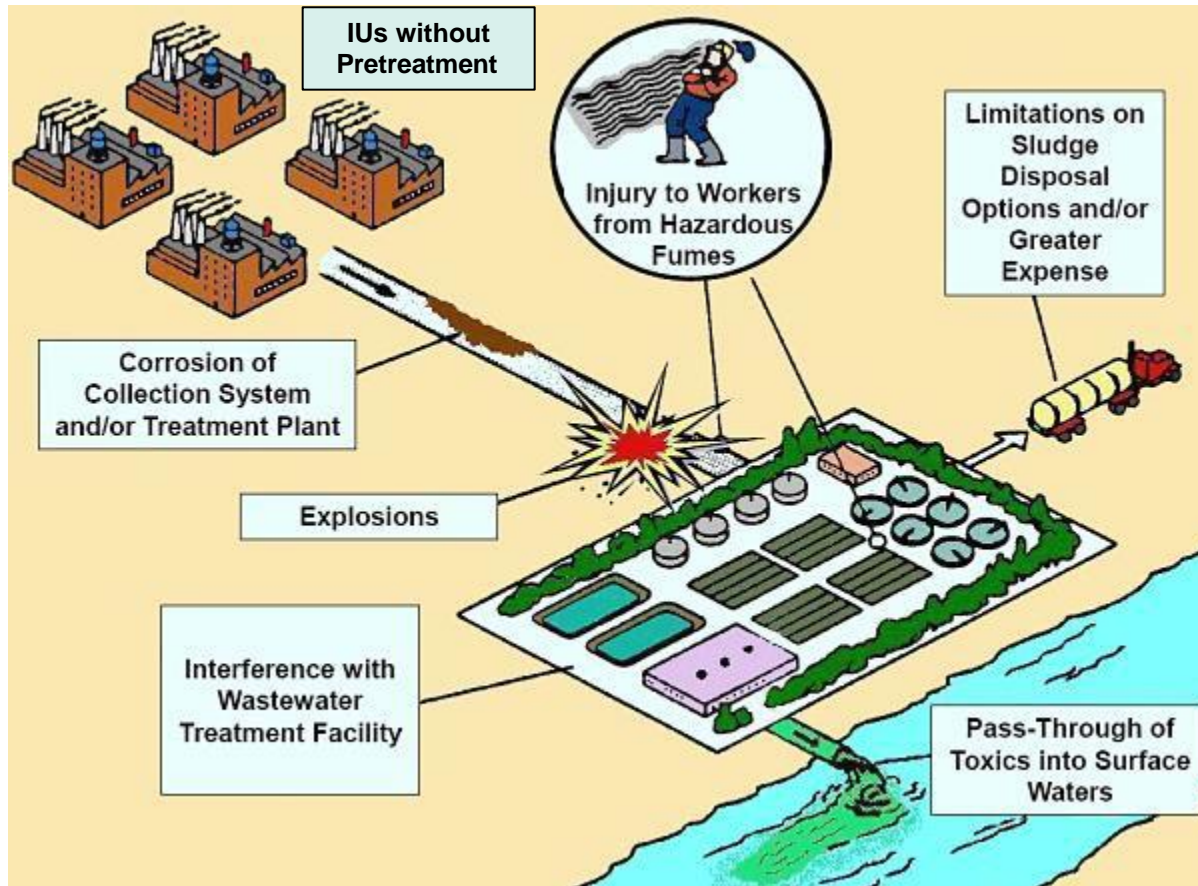


Figure 8: Problems that can occur without industrial pretreatment systems.

Source: www.deq.ok.gov/water-quality-division/wastewater-stormwater/industrial-pretreatment

Hauled Wastes

Industrial and commercial facilities also have the option of trucking wastewater to the local WWTP and paying a fee for the wastewater to be dumped directly into the WWTP. This may be economical for facilities with small or irregular wastewater flows and for disposing of sludge. Hauled wastewater may cause adverse impacts at WWTPs because the pollutants are usually more concentrated and not equalized by the collections systems. For this reason, hauled waste is to be managed by the POTW through the Industrial Pretreatment Program. The wastewater is subject to many of the same pretreatment regulations, including the need for an IU discharge permit and allowing inspection of the facility.

Industrial Pretreatment Standards

Regulations

Clean Water Act

Regulations for industrial wastewater pretreatment started in 1972 as the Federal Water Pollution Control Act, which is now known as the Clean Water Act (CWA). This established and directed the Environmental Protection Agency (EPA) to develop and implement regulations for limiting pollutants discharged to surface waters. The main goals of the CWA are to prevent the discharge of pollutants into the nation's navigable waters and to achieve fishable and swimmable water quality levels.

The EPA has the legal authority to manage the following:

- National Pollutant Discharge Elimination System (NPDES) Program for regulating direct discharges to surface waters. NPDES permits are issued to POTW WWTPs and direct industrial dischargers.
- National Industrial Pretreatment Program for regulating industrial wastewater discharges (indirect discharges) to POTWs. Industrial User Discharge Permits are issued to indirect dischargers, typically by Local Pretreatment Programs.

This course explains both the National and Local Industrial Pretreatment Programs. The National Pretreatment Program requires industrial and commercial facilities, called industrial users (IUs), to obtain permits (or similar control mechanisms) to discharge wastewater to the POTW. These permits specify the minimum effluent quality, which often necessitates that an IU pretreats its wastewater before discharging it to a POTW.

40 CFR Part 403

Starting in 1978, the EPA promulgated 40 CFR Part 403, General Pretreatment Regulations, which establishes general prohibitions against WWTP interference and pass through, and sets national pretreatment standards for the discharge of incompatible pollutants from specific industrial categories. The General Pretreatment Regulations also establish responsibilities among the federal government, state government, local municipalities/POTWs, industrial users, and the public. The regulations consist of 20 sections and seven appendices. They have been revised several times with minor additions and changes.

The National Pretreatment Program has three objectives, per 40 CFR 403.2:

1. To prevent the introduction of pollutants into POTWs that will **interfere** with the operation of a POTW, including interference with its use or disposal of municipal sludge.
2. To prevent the introduction of pollutants into POTWs that will **pass through** the treatment works or otherwise be incompatible with such works.
3. To improve opportunities to recycle and **reclaim** municipal and industrial wastewaters and sludge.

Industrial Pretreatment Standards

Definitions

To better understand the 40 CFR Part 403 regulations, it is helpful to know the following definitions:

- Approval Authority: Party with responsibility to administer the National Pretreatment Program. The EPA region or an authorized state.
- Categorical Industrial User (CIU): IU that fits into one of the industrial categories listed in 40 CFR §405-471. Each category has specific pollutants and limits.
- Control Authority: Party with responsibility to implement and enforce the Local Pretreatment Program. The POTW in an approved program. The EPA region or state in a non-approved program.
- Industrial User (IU): Any non-domestic source that introduces pollutants into a POTW regulated under section 307(b), (c), or (d) of the Act.
- Interference: An IU discharge which alone or in conjunction with discharges from other sources, inhibits or disrupts the POTW treatment processes, operations, sludge processes, or sludge disposal; and, therefore is a cause of a violation of any requirement of the POTW's NPDES permit.
- Local Limits: Technically developed pollutant limits adopted by the POTW. The limits are the concentrations or loadings of pollutants that a POTW can accept to prevent interference, pass through, or a violation of General and Specific Prohibitions. Local limits include the final approved limits, the MAHLs, MAILs, other loadings set by the POTW.
- Maximum Allowable Headworks Loading (MAHL): WWTP data is used to calculate removal efficiencies for each pollutant and to calculate the MAHLs. After subtracting contributions from unpermitted sources, the available industrial loading is either evenly distributed among the IUs or allocated to those IUs discharging the pollutant above background levels
- Maximum Allowable Industrial Load (MAIL): The MAIL is the total daily mass that a POTW can accept from all permitted IUs and still ensure that the POTW is protecting against pass through and interference. The MAIL is usually calculated by applying a safety factor to the MAHL and discounting for uncontrolled sources, hauled waste, and growth allowance.
-

Industrial Pretreatment Standards

- Middle-Tier Categorical Industrial User (MTCIU): Control Authorities may reduce oversight of certain Industrial Users that are classified as MTCIU, with reduced flow and load, per 40 CFR 403.12(e)(3).
- Non-Significant Categorical Industrial User (NSCIU): Control Authorities may reduce oversight of certain Industrial Users that may be classified NSCIU, with reduced flow and load, per 40 CFR 403.3(v)(2).
- Non-Categorical Significant Industrial User (NCSIU): Control Authorities may reduce oversight of certain Industrial Users that do not fit into one of the Industrial Categories but meet one of the SIU conditions, and thus are classified as NCSIU, per 40 CFR 403.3(v).
- Pass Through: An IU discharge that enters and exits the POTW into national waters, which alone or in conjunction with discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit.
- POTW: Either a treatment works system that is owned by a state or municipality, or the owner of said system. The term includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It includes sewers, pipes, and other conveyances if they convey wastewater to the treatment plant.
- Pretreatment Standards: This term includes categorical standards, local limits, general and specific prohibitions, and Best Management Practices (BMPs). Once these are adopted by the POTW, pretreatment standards become Federally enforceable. These standards are referenced or defined in individual permits.
- Significant Industrial User (SIU): IUs that discharge an average of 25,000 gpd of process wastewater, contribute 5% or more of a POTW's average dry weather hydraulic or organic capacity, or are determined to have "reasonable potential" to adversely affect the POTW, per 40 CFR 403.3(v).

POTWs

While the EPA manages the National Pretreatment Program, the regulations require local POTWs to establish and manage Local Pretreatment Programs, per 40 CFR 403.2. Interestingly, the National Pretreatment Program is the only environmental program where the EPA has directly authorized local governments (POTWs or states) to implement and enforce Federal Regulations. There are approximately 1,600 POTWs in the United States with Local Pretreatment Programs, as of 2021.

Industrial Pretreatment Standards

The General Pretreatment Regulations of the National Pretreatment Program require the following POTWs to establish Local Pretreatment Programs:

- All large POTWs designed to treat flows of more than 5 million gallons per day (MGD).
- Small POTWs that accept wastewater from IUs that could affect the treatment plant or its discharges.

POTWs with Local Pretreatment Programs must enforce all national pretreatment standards and requirements (per 40 CFR 403) and any more stringent local requirements deemed necessary to protect the collection system and WWTP.

Significant revisions of the General Pretreatment Regulations, 40 CFR 403, were made in 2005 under the pretreatment Streamlining Rule. This increased POTW flexibility in program implementation. In certain instances, that flexibility can allow for a reduction in minimum program requirements.

Pretreatment Standards

The National Pretreatment Program objectives are achieved by applying and enforcing three types of pretreatment standards:

- General and specific prohibitions,
- Categorical pretreatment standards, and
- Local limits

All three types of standards are enforced by EPA, the state, and local government (POTWs). Pretreatment standards and requirements can be expressed as numeric limits, narrative prohibitions, and best management practices (BMPs).

Industrial Categories

The EPA created a list of industrial categories along with the typical pollutants found in wastewater from each industry. The EPA also set discharge limits for these pollutants for each category, as found in 40 CFR 405 to 471. There are currently 55 distinct industries (as of 2021), as shown in Table 2. IUs that fit into these categories are called Categorical Industrial Users (CIUs).

The regulations also recognize IUs with large discharges as significant industrial users (SIUs). There are approximately 23,000 SIUs in the United States.

Industrial Pretreatment Standards

Table 2: Industrial Categories with Established Pretreatment Standards					
40 CFR	Industrial Category	40 CFR	Industrial Category	40 CFR	Industrial Category
405	Dairy products processing	425	Leather Tanning & Finishing	444	Waste Combusters
406	Grain mills	426	Glass Manufacturing	446	Paint formulating
407	Canned & preserved fruits & veg.	427	Asbestos Manufacturing	447	Ink formulating
408	Canned & preserved seafood	428	Rubber Manufacturing	454	Gum & Wood Chemicals Mfg.
409	Sugar processing	429	Timber products processing	455	Pesticide Manufacturing
410	Textile Mills	430	Pulp, paper, and paperboard	457	Explosives Manufacturing
411	Cement Manufacturing	431	Builders paper & board mills	458	Carbon black Manufacturing
412	Feedlots	432	Meat products	459	Photographic supplies
413	Electroplating	433	Metal finishing	460	Hospitals
414	Organic Chemicals, Plastics, & Synthetic Fibers	434	Coal Mining	461	Battery Manufacturing
415	Inorganic chemical Manufacturing	435	Oil & gas extraction	463	Plastics molding and forming
417	Soap & Detergent Manufacturing	436	Mineral mining and processing	464	Metal molding and casting
418	Fertilizer Manufacturing	437	Centralized Waste Treatment	465	Coil Coating
419	Petroleum Refining	439	Pharmaceutical Manufacturing	466	Porcelain enameling
420	Iron & Steel Manufacturing	440	Ore mining and dressing	467	Aluminum Forming
421	Nonferrous Metals Manufacturing	441	Dental Office	468	Copper Forming
422	Phosphate Manufacturing	442	Transportation Equipment Cleaning	469	Electrical, electronic components
423	Steam Electric power Generation	443	Paving and roofing materials Mfg.	471	Nonferrous Metal, Form & Powders
424	Ferro alloy Manufacturing				

The National Pretreatment Program regulations identify specific requirements that apply to all IUs, additional requirements that apply to all SIUs, and certain requirements that apply only to CIUs. See Table 3 for a summary of which pretreatment standards apply to different types of industrial users.

Industrial Pretreatment Standards

Table 3: Applying Pretreatment Standards				
	General Prohibitions	Specific Prohibitions	Categorical Pretreatment Standards	Local Limits
Regulations	40 CFR 403.5(a)	40 CFR 403.5(b)	40 CFR 405 to 471	Sewer Use Ordinances and Permit Provisions
All Industrial Users (IUs)	Applies	Applies	Only for CIUs	Applies
Significant Industrial Users (SIUs)	Applies	Applies	Only for CIUs	Depends on allocation method
Categorical Industrial Users (CIUs)	Applies	Applies	Applies	Depends on allocation method; categorical standards may be more stringent

Permit Conditions

The control authority (POTW or state) develops specific permit conditions for each IU based on meeting the pretreatment standards in 40 CFR 403 and any local limitations to prevent interference or pass through. A summary of common permit conditions is provided in Figure 9.

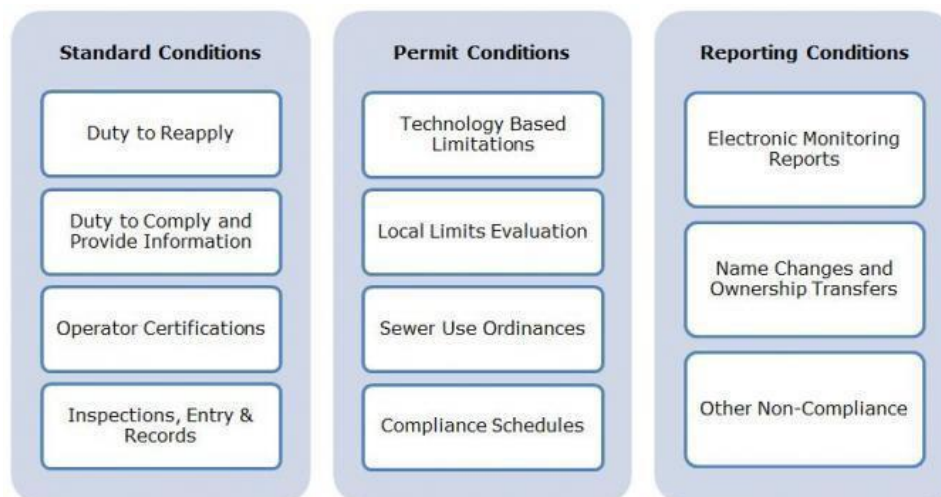


Figure 9: Typical industrial pretreatment permit conditions.

Source: <https://epd.georgia.gov/forms-permits/watershed-protection-branch-forms-permits/wastewater-permitting/industrial>

Industrial Pretreatment Standards

Pollutant Limits

The EPA regulates the discharge of 65 categories of pollutants for both direct and indirect discharges. Many of these pollutant categories are too broad to be tested directly. Therefore, the EPA broke down the list into 126 priority pollutants, each of which can be tested directly. The priority pollutant list is in 40 CFR 423, Appendix A, and included in Table 11 of this course.

General Prohibitions in 40 CFR 403.5(a)(1) forbid the discharge of any pollutant that may cause interference or pass through of the POTW WWTP, regardless if it is a priority pollutant or not. Therefore, several conventional and non-conventional pollutants are also included with limitations in IU discharge permits, as shown in Figure 10.

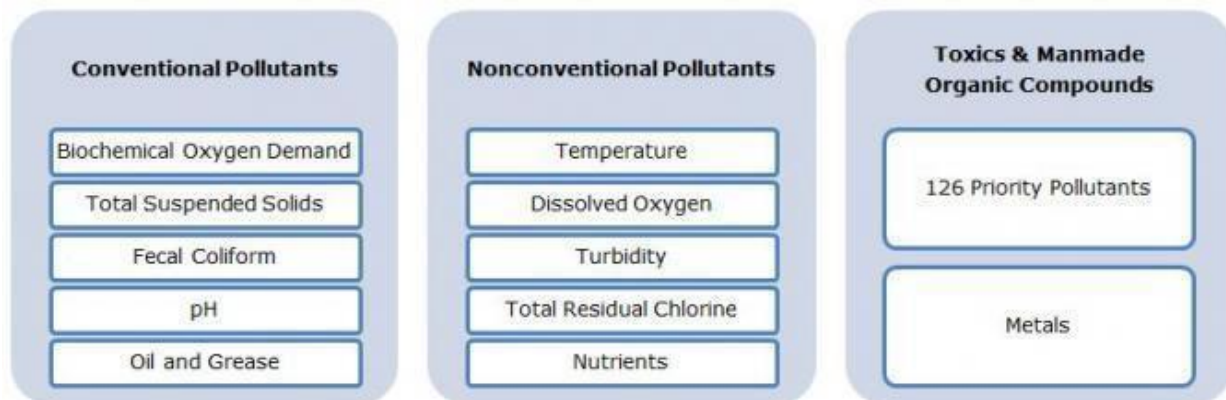


Figure 10: Pollutants commonly included in IU discharge permits.

Source: <https://epd.georgia.gov/forms-permits/watershed-protection-branch-forms-permits/wastewater-permitting/permit-conditions>

IUs and POTWs should regularly check waste sources and water quality data to identify pollutants of concern before a problem arises. Specific Prohibitions in 40 CFR 403.5(b) forbid the following types of pollutant discharges:

1. Pollutants that create a fire or explosion hazard;
2. Pollutants that cause corrosive structural damage to the POTW, but in no case discharges with pH less than 5.0 S.U.;
3. Solid or viscous pollutants causing obstruction and resulting in interference;
4. Pollutants released at a high flow rate and/or concentration causing interference;
5. Heat in amounts that will inhibit biological activity in the POTW resulting in interference;
6. Oils in amounts that cause interference or pass through;
7. Pollutants which result in the presence of toxic gases, vapors, or fumes; and
8. Trucked or hauled pollutants, except at discharge points designated by the POTW.

Industrial Pretreatment Standards

Business Pretreatment Programs

Many industrial and commercial companies have their own internal wastewater pretreatment programs for managing pretreatment systems at multiple locations. These business programs are not recognized explicitly in the 40 CFR 403 regulations.

However, these programs are beneficial for the following reasons:

- Programs help ensure that operations and maintenance staff are properly trained in pretreatment standards.
- Programs typically have written procedures that staff can quickly reference to make sound decisions for operating a pretreatment system.
- Written procedures for operation, maintenance, testing, and reporting, can be submitted to the POTW when applying for a new discharge permit or for modifying an existing permit.
- Programs help ensure that capital funding is available for pretreatment system upgrades.

EPA Manuals

The EPA has released more than 40 manuals providing guidance on various National Pretreatment Program requirements and policy determinations. Through such guidance, the National Pretreatment Program has maintained consistency in interpreting and applying the various regulations. Engineers working on industrial pretreatment projects can review these manuals to get an understanding of how the regulations apply to a particular industrial user.

Electronic versions of the manuals and other helpful tools are available through EPA's website at:

<http://www.epa.gov/npdes/pretreatment>

Industrial Pretreatment Standards

National and State Pretreatment Programs

The National Pretreatment Program is a cooperative effort of federal, state, and local agencies established to protect water quality in the United States. The program is designed to protect POTW infrastructure and reduce conventional and toxic pollutant levels discharged by industrial and commercial wastewater sources into municipal sewer systems and ultimately into the environment.

The EPA and authorized states **oversee** local municipalities (POTWs) to perform permitting, administrative, and enforcement tasks for indirect industrial discharges. This is similar to the NPDES Program which applies to direct discharge permits. The EPA has very little direct interaction with industrial users since that is done by a State or Local Pretreatment Program, with a few exceptions.

Approval Authority

The EPA has the default **Approval Authority** in the National Pretreatment Program. However, this Approval Authority has been delegated to authorized states with an approved State Pretreatment Program. A State Pretreatment Program approves and oversees the various Local Pretreatment Programs throughout the state (typically at mid to large size cities) and any IUs that discharge to smaller POTWs without a Local Pretreatment Program.

The Approval Authority (EPA or an authorized state) is responsible for ensuring that Local Pretreatment Programs meet all applicable federal requirements and are achieving the National Pretreatment Program goals. To carry out that responsibility, the Approval Authority must ensure compliance with pretreatment regulations and take responsive actions as needed to bring about compliance. The Approval Authority has three tools for ensuring compliance:

- 1) Program audits (every 5 years),
- 2) Pretreatment compliance inspections (every 2 years), and
- 3) Reviewing the Local Pretreatment Program's performance report (every year).

Control Authority

Local Pretreatment Programs are created under the approval of the State Pretreatment Program or the EPA region if the state does not have a program. Local Pretreatment Programs have **Control Authority** and produce regular reports to the state and EPA region. State and Local Pretreatment Programs are considered subparts of the overall National Pretreatment Program.

Industrial Pretreatment Standards

See Table 4 and Figure 11 for depictions of the responsibilities of the EPA, States, and POTWs under the three different arrangements available:

1. Authorized States (with a State Pretreatment Program)
2. Non-Authorized States (without a State Pretreatment Program)
3. States Assuming Direct Responsibility (with a State Pretreatment Program but no Local Pretreatment Programs)

Table 4: Pretreatment Authority Arrangements			
Authority	For Authorized States	For Non-Authorized States	For Direct Responsibility States
Overall	EPA	EPA	EPA
Approval	State	EPA Region	EPA Region
Control (for IUs without an Approved POTW)	State	EPA Region	State
Control (for IUs with an Approved POTW)	POTW	POTW	N/A

As explained in the Regulations section of this course, POTWs are required to have a Local Pretreatment Program if flows are over 5 MGD or if there are IUs with the potential to negatively affect the WWTP. Part of the responsibility of the State Pretreatment Program is to determine when a Local Pretreatment Program is required for smaller POTWs. IUs discharging to smaller POTW without a Local Pretreatment Program are to be monitored/controlled by the state (if authorized) or EPA region.

Direct Responsibility

A state may choose to assume direct responsibility for control of IUs, per CFR 403.10(e). In this case, there is a single State Pretreatment Program with no other Local Pretreatment Programs in the state. Five states have elected to assume direct responsibility: Alabama, Connecticut, Mississippi, Nebraska, and Vermont. These states are the Control Authority for all IUs in the state, regardless of the size of the POTW. These states are shown in green in Figure 12.

The following EPA website provides an updated status on which states have an authorized pretreatment program:

<https://www.epa.gov/npdes/npdes-state-program-authority>



SOURCE: EPA INTERNAL REVISED NFDES INSPECTION MANUAL, 2017

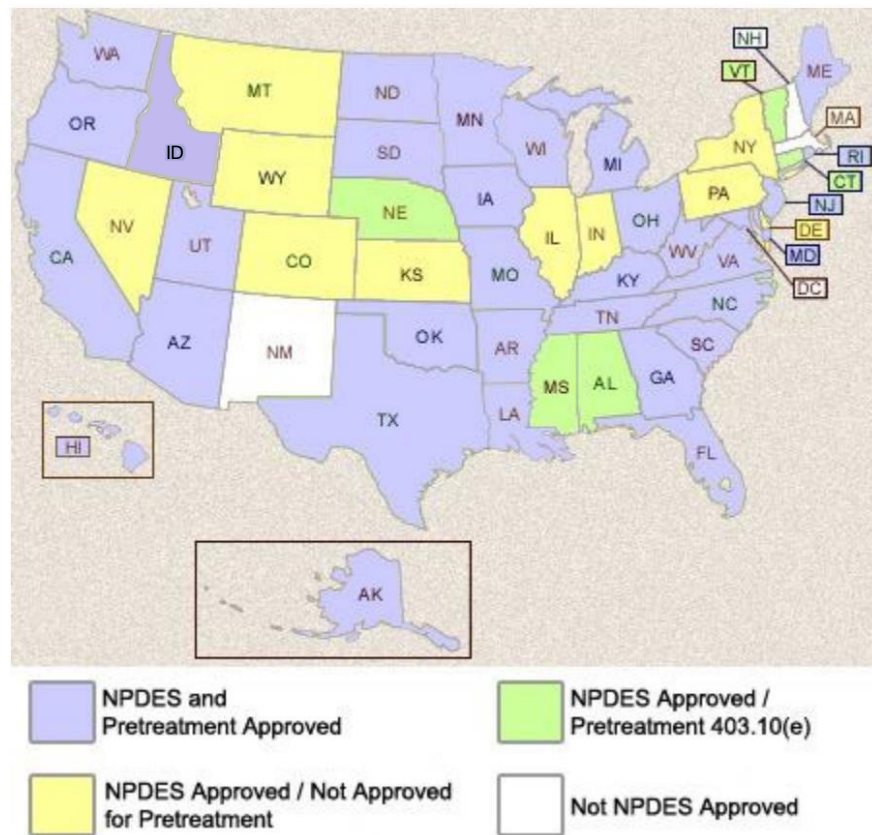


Figure 12: States with an approved State Pretreatment Program (purple), states with a direct responsibility program (green), and states without a program (yellow and white), as of 2021.

Source: Best Practices for NPDES Permit Writers and Pretreatment Coordinators, 2016, modified for Idaho

The responsibilities for each entity are summarized in Table 5.

Industrial Pretreatment Standards

Table 5: Responsibilities for Pretreatment Entities	
Entity	Responsibilities
EPA Headquarters	<ul style="list-style-type: none"> • Oversee program implementation • Develop and modify regulations for the program • Develop policies to clarify and further define the program • Develop technical guidance for program implementation • Take enforcement actions as appropriate
EPA Regions	<ul style="list-style-type: none"> • Oversee State Pretreatment Program implementation • Perform Approval Authority responsibilities for states without a State Pretreatment Program • Take enforcement actions as needed
Approval Authorities	<ul style="list-style-type: none"> • Oversee Local Pretreatment Program implementation • Notify POTWs of their responsibilities • Review and approve requests for Local Pretreatment Program initiation or modification • Review requests for site-specific modifications to categorical pretreatment standards • Provide technical guidance to POTWs • Take enforcement actions against non-compliant POTWs or IUs.
Control Authorities	<ul style="list-style-type: none"> • Develop, implement, and maintain approved Local Pretreatment Program • Evaluate compliance of regulated IUs • Submit reports to Approval Authorities • Develop local limits where required • Demonstrate any reduced or eliminated limits for IUs • Review requests for net/gross variances • Take enforcement action against non-compliant IUs • Develop and implement an enforcement response plan
IUs	<ul style="list-style-type: none"> • Comply with all applicable pretreatment standards and reporting requirements

Industrial Pretreatment Standards

Local Pretreatment Programs

POTWs are required to have a Local Pretreatment Program if flows are over 5 MGD or if there are IUs with the potential to pass through or interfere with the WWTP. Once the Approval Authority determines that a POTW needs a pretreatment program, the POTW's NPDES permit is modified to include requirements for a Local Pretreatment Program. Details of the proposed program are submitted to the Approval Authority for review and approval. There are approximately 1,600 Local Pretreatment Programs in the United States, as of 2021.

Local Pretreatment Programs are governed by regulation 40 CFR 403.8. Local Pretreatment Programs must contain these six elements:

1. Legal Authority
2. Written Procedures
3. Funding
4. Local Limits
5. Enforcement Response Plan (ERP)
6. List of SIUs (including NSCIUs and MTCIUs)

Program Procedures

Local Pretreatment Programs are required to perform the following actions:

- Conduct annual inspections of permitted IU pretreatment systems
- Maintain a compliance monitoring database
- Issue Notices of Violation
- Apply enforcement actions consistent with the Enforcement Response Plan
- Develop, enforce, and update Local Limits

Local Pretreatment Program procedures are specified in the following subsections of 40 CFR 403.8(f)(2):

- | | |
|----------------------|--|
| • 403.8(f)(2) | POTW Pretreatment Requirements: Procedures |
| • 403.8(f)(2) (i) | Identify and locate all possible IUs |
| • 403.8(f)(2) (ii) | Identify character and volume of pollutants from IUs |
| • 403.8(f)(2) (iii) | Notify IUs of applicable pretreatment standards |
| • 403.8(f)(2) (iv) | Receive and analyze reports from IUs |
| • 403.8(f)(2) (v) | Randomly sample and analyze effluent from IUs |
| • 403.8(f)(2) (vi) | Evaluate whether IUs need slug discharge control plans |
| • 403.8(f)(2) (vii) | Investigate instances of noncompliance |
| • 403.8(f)(2) (viii) | Comply with public participation requirements |

Industrial Pretreatment Standards

Program Updates

Local Pretreatment Programs are to be updated when there is a significant change in the operation of a program that differs from the originally proposed program. Significant changes include increased pollutant loadings from IUs or less stringent requirements on IUs. For example, a POTW may request a reduction in a Local Limit after completing a headworks loading analysis. Proposed changes are submitted to the Approval Authority for review and approval.

Regulated Industries

The following IUs are to be regulated by the Local Pretreatment Program:

1. All CIUs regardless of flow.
2. All SIUs, which are IUs that:
 - a. Discharge an average of 25,000 gpd of process wastewater
 - b. Contribute 5% or more of a POTW's average dry weather hydraulic or organic (i.e., BOD) capacity, or
 - c. Are determined to have "reasonable potential" to adversely affect POTW systems or violate pretreatment requirements.
3. Any other non-domestic user that discharges pollutants of concern.

Monitoring Requirements

POTWs are to monitor IUs as follows:

- Inspect each CIU and SIU at least once per year
- Sample each CIU and SIU at least once per year for all regulated pollutants, including local limits.
- Require semi-annual self-monitoring reports from each CIU and SIU for all regulated pollutants, including local limits.

Local Limits

One of the most challenging tasks for a Local Pretreatment Program is to set the IU discharge limits. A significant amount of process engineering is required to properly set discharge limits and to periodically evaluate and modify these limits. Although several specific pollutant limits are specified in the 40 CFR regulations, it is common for a Local Pretreatment Program to set local limits with different values or additional parameters.

Local limits are developed to regulate all IUs. These limits are typically referenced in IU discharge permits and imposed at the IU's point of connection to the POTW's collection system. More details on setting pollutant limits are provided in a later section of this course.

Industrial Pretreatment Standards

Issuing Permits

Significant industrial users must be issued a permit, an equivalent individual control mechanism, or a general control mechanism for meeting regulatory conditions. Permits must be renewed every 5 years, or sooner. Permits must contain enforceable requirements for:

- Effluent limits
- Self-monitoring
- Sampling
- Reporting
- Notifications
- Recordkeeping

The permitting process usually consists of the following phases:

- Phase I — Collection and verification of information
- Phase II — Data interpretation and fact sheet development
- Phase III — Permit development and issuance

See Figure 13 for typical processes. These processes apply for both new applications, renewals, and permit modification requests.

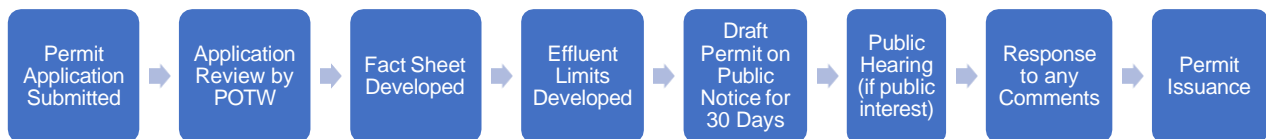


Figure 13: Permitting process flow diagram.

Permit conditions should contain clear and explicit requirements. Vague terms should be avoided. See Table 6 for a comparison of clear/enforceable terms versus vague terms.

Table 6: Permit Terminology	
Clear Terms	Vague Terms
Must	Recommend
Shall	May
Will	Might
Maximum	Should
Minimum	Could
Limit	Prefer
Required	Optional

Industrial Pretreatment Standards

General Permits

A POTW may choose to issue a general permit that applies to multiple IUs. This allows for more efficient and consistent management of multiple similar IUs. To qualify, all of the facilities to be covered must:

- Have the same or very similar types of operations,
- Discharge the same types of wastes,
- Have the same effluent limitations,
- Be subject to the same or similar monitoring, and
- Be better controlled under a general permit than under individual permits.

Fees

Publicly owned treatment works typically charge fees and/or surcharges for discharging industrial wastewater. Fees are meant to recover POTW costs for managing the Pretreatment Program and for the proportional costs of constructing and operating the WWTP. See Table 7 for example fees.

Table 7: Example POTW Fees for IUs

Example 1:

Surcharges			
Type	In Excess of	Per mg/L per 100 CF	Per 100 pounds
Biochemical Oxygen Demand (BOD)	282 mg/L*	\$0.000129	2.07
Total Suspended Solids (TSS)	261 mg/L*	0.000630	10.08
Total Phosphorus (TP)	6 mg/L*	0.009871	158.12
Total Kjeldahl Nitrogen (TKN)	47 mg/L*	0.003378	54.11

Example 2:

MONTHLY INDUSTRIAL WASTEWATER SURCHARGE (IWS)

$$\text{IWS} = 8.34(V) [\text{\$0.15}^1 (\text{B.O.D.} - 480) + \text{\$0.15}^2 (\text{SS} - 480) + \text{\$1.46}^3 (\text{OG} - 120)]$$

Industrial Wastewater Surcharge in dollars per month

8.34 = Conversion factor of 1 milligram per liter (mg/L) = 8.345 lbs./million gallons

V = Volume in million gallons per month based on metered water

B.O.D. = Biochemical Oxygen Demand - 5 days @ 20° Celsius (C), in mg/L

SS = Suspended Solids of industrial waste in mg/L

OG = Oil and Grease in mg/L

¹ = Capital and operating costs per mg/L per million gallons for B.O.D. greater than 480 mg/L which includes a 20% buffer on the surcharge standard of 400 mg/L

² = Capital and operating costs per mg/L per million gallons of suspended solids greater than 480 mg/L which includes a 20% buffer on the surcharge standard of 400 mg/L

³ = Capital and operating costs per mg/L per million gallons of oil and grease greater than 120 mg/L which includes a 20% buffer on the surcharge standard of 100 mg/L

Industrial Pretreatment Standards

Example 3:

INDUSTRIAL WASTE		
Industrial Waste Charges		
Usage Charges (per 1,000 gallons of contracted capacity):	N/A	\$ 43.00

Example 4:

	Fee
Initial Application	\$ 775
Annual Permitting	2,300
Re-Inspection Fee	150
Permit Modification	460
Permit Appeals Fee	300
FOG Annual Inspection Fee	160
FOG Re-Inspection Fee	85

Example 5:

$$\text{Excess Strength Fee (\$)} = [Y/X - 1] \times [Z] \times [0.5 \times A]$$

$$Y = \text{Measured concentration of wastewater constituent.}$$

$$X = \text{Concentration of constituent in normal strength wastewater.}$$

$$Z = \text{Thousands of gallons of excess strength wastewater discharged into the County's wastewater system.}$$

$$A = \text{Normal strength wastewater rate per thousand gallons.}$$

Excess strength charges shall be applicable only to the following conventional constituents: COD, Total Suspended Solids and Total Kjeldahl Nitrogen. When COD is indicative of the excess wastewater strength, it shall be the preferred measurement parameter. Where the wastewater contains no more than one excess strength constituent, the charge shall be based on the constituent, which results in the greatest charge.

Legal Authority

State law must grant regulatory authority to POTWs to enforce Local Pretreatment Programs. Typically, POTWs will also establish local regulations to legally implement and enforce pretreatment requirements. The legal authority for the Local Pretreatment Program is often spelled out in a City or County sewer use ordinance (SUO). Regional POTWs can adopt similar provisions as part of their rules and regulations.

Industrial Pretreatment Standards

Types of Industrial Users

Pretreatment regulations and programs recognize different types of IUs. Table 8 provides a summary of IU types along with examples. There are several regulations in 40 CFR that apply only to specific types of IUs. For example, Periodic Compliance Reports need to be submitted by CIUs twice a year, while MTCIUs only need to submit once a year. Therefore, it is to the benefit of the IU to check that the type of IU is correctly identified in the discharge permit.

Table 8: Types of Industrial Users				
Acronym	Label	Regulation	Example	Notes
IU	Industrial User	40 CFR 403.3(j)	All of the below	
SIU	Significant Industrial User	40 CFR 403.3(v)	Dairy Processing Plant	CIU regulations apply unless the user is an NCSIU
CIU	Categorical Industrial User	40 CFR 405-471	Large Canning Plant	Multiple categories may apply to a single IU
MTCIU	Middle-Tier Categorical Industrial User	40 CFR 403.12(e)(3)	Medium Canning Plant	Reduced reporting and oversight
NSCIU	Non-Significant Categorical Industrial User	40 CFR 403.3(v)(2)	Small Canning Plant	Reduced reporting and oversight
NCSIU	Non-Categorical Significant Industrial User	40 CFR 403.3(v)	Large Medical Complex	SIU regulations apply CIU regulations do not apply
NCNSIU	Non-Categorical Non-Significant Industrial User	-	Bakery	

Industrial Pretreatment Standards

All IUs

Most of the general pretreatment regulations in 40 CFR 403 apply to all IUs. For example, all IUs must:

- Allow the POTW to randomly sample discharges for possible violations,
- Notify the POTW of any discharge that could cause problems for the treatment works,
- Notify the POTW of any pretreatment standard violation within 24 hours, and
- Report data on wastewater discharges per the schedule specified by the POTW.

Significant Industrial Users

IUs with large discharges are recognized as significant industrial users (SIUs). There are many requirements in 40 CFR 403 that apply only to SIUs. The presumption is that the strict control measures for SIUs will provide adequate protection of the POTW since SIUs tend to be the sources of high pollutant loads.

An SIU is defined as having any one of the following criteria, per 40 CFR 403.3(v):

1. An IU subject to federal categorical pretreatment standards,
2. Discharges an average of 25,000 gallons per day (gpd) or more of process wastewater to the POTW,
3. Contributes a process waste stream making up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW WWTP, or
4. Has a reasonable potential to adversely affect the POTW's operation or violate any pretreatment standard or requirement.

SIUs normally have specific permits issued by the POTW. To be covered by a general permit that applies to multiple IUs, an SIU must file a written request for coverage with backup documentation per 40 CFR 403.8(f)(1)(iii)(A)(2). An SIU may NOT be covered by a general permit if any of the following apply, per 40 CFR 403.6(e) and 403.15:

- Categorical pretreatment standards are production-based,
- Categorical pretreatment standards are expressed as mass of pollutant discharged per day,
- Limits are based on the combined waste stream formula (CWF), or
- Limits are based on net/gross calculations.

Industrial Pretreatment Standards

Categorical Industrial Users

Similar to SIUs, there are many requirements in 40 CFR 403 that apply only to categorical industrial users (CIUs). There are currently 55 categorical industries (as of 2021), as shown in Table 2. Most IUs are grouped into one of these categories.

Many categories have subcategories with specific requirements. For example, Soap and Detergent Manufacturing, 40 CFR 417, has 19 subcategories, or subparts, with a few listed here:

- Subpart A—Soap Manufacturing by Batch Kettle Subcategory
- Subpart B—Fatty Acid Manufacturing by Fat Splitting Subcategory
- Subpart C—Soap Manufacturing by Fatty Acid Neutralization Subcategory
- ...
- Subpart S—Manufacture of Detergent Bars and Cakes Subcategory

Specific discharge limits are specified for each category or subcategory, as shown in Table 12, and as found in 40 CFR 405 to 471. These limits are concentration (mg/L) or mass-based limits with daily maximum and average values for a time period, typically 30 days. In many cases, different limits are stated for new sources versus existing sources.

New and Existing Sources

The categorical standards make a distinction between new and existing IUs. These are defined as Pretreatment Standards for New Sources (PSNS) and Pretreatment Standards for Existing Sources (PSES) in 40 CFR 403.3(m). Facilities are classified as PSNS if construction of the facility or pretreatment system commenced after the publication date of the applicable categorical standard.

For PSES, an IU is required to comply with the standards by a specified date, typically within 3 years after the publication date of the categorical standard. For PSNS, an IU is required to achieve compliance within 90 days from commencement of discharge. PSNS limits are more stringent than PSES limits because of the opportunity for new IUs to install the best available technology and operate more efficient production processes. See Table 9 for an example in which two pollutant restrictions exist only for PSNS.

Industrial Pretreatment Standards

Table 9: PSES versus PSNS Limits for 40 CFR 415.674 & 675 Inorganic Chemicals Manufacturing - Zinc Chloride Production Subcategory			
Pollutant	Maximum Day (mg/L)		Difference
	PSES Limit	PSNS Limit	
Arsenic (T)	3.0	3.0	None
Zinc (T)	2.3	2.3	None
Lead (T)	0.18	0.18	None
TSS	N/A	28	Pollutant/parameter added for new sources only.
pH	N/A	6-10	Pollutant/parameter added for new sources only.

NSCIU

The POTW may classify a nonsignificant categorical industrial user (NSCIU). This designation reduces the reporting requirements for the NSCIU and reduces the oversight requirements for the POTW. However, it does not relieve the IU of the need to comply with the other categorical pretreatment standards.

To be considered an NSCIU, the IU must meet all the following conditions, per 40 CFR 403.3(v)(2):

- Never discharges more than 100 gpd of total categorical wastewater. This excludes sanitary, noncontact cooling, and boiler blowdown wastewater, unless specifically included in the categorical standard.
- The IU has consistently complied with all applicable categorical pretreatment standards and requirements.
- The IU submits an annual certification statement per 40 CFR 403.12(q).
- The IU never discharges untreated concentrated wastewater.

MTCIU

The POTW may classify a middle-tier categorical industrial user (MTCIU). This designation reduces the reporting requirements for the MTCIU and reduces the oversight requirements for the POTW. However, it does not relieve the IU of the need to comply with the other categorical pretreatment standards.

Industrial Pretreatment Standards

To be considered an MTCIU, the IU must meet all the following conditions, per 40 CFR 403.12(e)(3):

- <0.01% of the design dry-weather hydraulic capacity of the POTW, or 5,000 gpd, whichever is smaller.
- <0.01% of the design dry-weather organic treatment capacity of the POTW.
- <0.01% of the MAHL for any pollutant with approved local limits.
- Has not been in significant noncompliance (SNC) for any time in the past two years.
- Does not have daily flow rates, production levels, or pollutant levels that vary so significantly that decreasing the reporting requirement for the IU would result in data that are not representative of conditions occurring during the reporting period.

Industrial Pretreatment Standards

Pollutant Limits

Each IU discharge permit contains, or makes reference to, a list of pollutants with limits for each pollutant. These pollutant limits are referred to as discharge limits or effluent limits. The purpose of pollutant limits is as follows:

- Protect the POTW from interference and pass through
- Protect POTW staff from gases and explosions
- Improve sludge disposal options
- Protect water quality and the environment
- Maintain compliance with NPDES permit limits for the WWTP

These discharge limits are set by the Control Authority, which is usually the POTW, but may be the state or EPA region as explained previously in this course. The Control Authority also sets the Local Limits which apply to all IUs and are the basis for the discharge limits in IU permits. See Table 10 for an overview of the different limits involved in industrial pretreatment permitting.

Table 10: Comparison of Categorical Limits, Local Limits, and Discharge Limits			
	Categorical Limits	Local Limits	Discharge Limits
Regulations	40 CFR 405-471	-	-
Where to Find	40 CFR 405-471	Local Ordinance, Sewer Use Ordinance	IU permit
Responsible for Development	EPA	Control Authority (usually POTW)	Control Authority (usually POTW)
Main Objective	Uniform national control of industrial discharges	Protection of POTW and environment	Protection of POTW and environment
Pollutants Regulated	Priority Pollutants (toxic and non-conventional)	Any pollutant that may cause pass through or interference	Pollutants in Local Limits and facility-specific pollutants of concern
Basis	Pretreatment technology-based	Technically based on: <ul style="list-style-type: none"> • WWTP allowable headworks loading • Toxicity reduction evaluation • WWTP Technology • Management practices 	Local Limits and IU application review

Regulated Pollutants

Industrial Pretreatment Standards

Regulated pollutants found in IU permits fit into the following groups:

1. Priority Pollutants:
 - Metals (Fe, Pb) and Toxic Organics (solvents, pesticides)
2. Conventional Pollutants:
 - BOD₅, TSS, Fecal Coliform, pH, Oil & Grease (O&G), etc.
3. Nonconventional Pollutants:
 - Temperature, Dissolved Oxygen (DO), Turbidity, Total Residual Chlorine, Nutrients (P, N), etc.

POTWs are to regularly check waste sources and water quality data to identify pollutants of concern and develop limits before a problem arises.

Priority Pollutants

The EPA regulates the discharge of 126 priority pollutants for both direct and indirect discharges. Priority pollutants are a set of specific chemical pollutants which EPA has published analytical test methods. For each priority pollutant, the EPA has established ambient water quality criteria and general effluent limitations. The EPA has identified the likely industrial sources for each pollutant and developed rules and discharge limits for specific industrial categories. The rules and limits are based on the best available technology economically achievable at the time of publication.

The priority pollutants are listed in 40 CFR 423, Appendix A, and in Table 11.

Table 11: List of Priority Pollutants per 40 CFR 423, Appendix A.

1. Acenaphthene	44. Methylene chloride	87. Trichloroethylene
2. Acrolein	45. Methyl chloride	88. Vinyl chloride
3. Acrylonitrile	46. Methyl bromide	89. Aldrin
4. Benzene	47. Bromoform	90. Dieldrin
5. Benzidine	48. Dichlorobromomethane	91. Chlordane
6. Carbon tetrachloride	49. (Removed)	92. 4,4-DDT
7. Chlorobenzene	50. (Removed)	93. 4,4-DDE
8. 1,2,4-trichlorobenzene	51. Chlorodibromomethane	94. 4,4-DDD
9. Hexachlorobenzene	52. Hexachlorobutadiene	95. Alpha-endosulfan
10. 1,2-dichloroethane	53. Hexachlorocyclopentadiene	96. Beta-endosulfan
11. 1,1,1-trichloroethane	54. Isophorone	97. Endosulfan sulfate
12. Hexachloroethane	55. Naphthalene	98. Endrin
13. 1,1-dichloroethane	56. Nitrobenzene	99. Endrin aldehyde
14. 1,1,2-trichloroethane	57. 2-nitrophenol	100. Heptachlor
15. 1,1,2,2-tetrachloroethane	58. 4-nitrophenol	101. Heptachlor epoxide
16. Chloroethane	59. 2,4-dinitrophenol	102. Alpha-BHC
17. (Removed)	60. 4,6-dinitro-o-cresol	103. Beta-BHC
18. Bis(2-chloroethyl) ether	61. N-nitrosodimethylamine	104. Gamma-BHC
19. 2-chloroethyl vinyl ethers	62. N-nitrosodiphenylamine	105. Delta-BHC
20. 2-chloronaphthalene	63. N-nitrosodi-n-propylamine	106. PCB-1242 (Arochlor 1242)
21. 2,4,6-trichlorophenol	64. Pentachlorophenol	107. PCB-1254 (Arochlor 1254)
22. Parachlorometa cresol	65. Phenol	108. PCB-1221 (Arochlor 1221)
23. Chloroform	66. Bis(2-ethylhexyl) phthalate	109. PCB-1232 (Arochlor 1232)
24. 2-chlorophenol	67. Butyl benzyl phthalate	110. PCB-1248 (Arochlor 1248)
25. 1,2-dichlorobenzene	68. Di-N-Butyl Phthalate	111. PCB-1260 (Arochlor 1260)
26. 1,3-dichlorobenzene	69. Di-n-octyl phthalate	112. PCB-1016 (Arochlor 1016)
27. 1,4-dichlorobenzene	70. Diethyl Phthalate	113. Toxaphene
28. 3,3-dichlorobenzidine	71. Dimethyl phthalate	114. Antimony
29. 1,1-dichloroethylene	72. Benzo(a) anthracene	115. Arsenic
30. 1,2-trans-dichloroethylene	73. Benzo(a) pyrene	116. Asbestos
31. 2,4-dichlorophenol	74. Benzo(b) fluoranthene	117. Beryllium
32. 1,2-dichloropropane	75. Benzo(k) fluoranthene	118. Cadmium
33. 1,3-dichloropropylene	76. Chrysene	119. Chromium
34. 2,4-dimethylphenol	77. Acenaphthylene	120. Copper
35. 2,4-dinitrotoluene	78. Anthracene	121. Cyanide, Total
36. 2,6-dinitrotoluene	79. Benzo(ghi) perylene	122. Lead
37. 1,2-diphenylhydrazine	80. Fluorene	123. Mercury
38. Ethylbenzene	81. Phenanthrene	124. Nickel
39. Fluoranthene	82. Dibenzo(h) anthracene	125. Selenium
40. 4-chlorophenyl phenyl ether	83. Indeno (1,2,3-cd) pyrene	126. Silver
41. 4-bromophenyl phenyl ether	84. Pyrene	127. Thallium
42. Bis(2-chloroisopropyl) ether	85. Tetrachloroethylene	128. Zinc
43. Bis(2-chloroethoxy) methane	86. Toluene	129. 2,3,7,8-TCDD

The priority pollutants fall into two categories:

1. Metals:

- Lead, mercury, chromium, cadmium, etc.
- Cannot be destroyed or broken down through treatment or environmental degradation.
- Toxic metals can cause human health problems, such as lead poisoning and cancer.
- The consumption of contaminated seafood and agricultural food crops can result in exposures exceeding recommended safe levels.

2. Toxic Organics:

- Solvents, pesticides, dioxins, polychlorinated biphenyls (PCBs), etc.
- Can cause cancer, kidney damage, liver damage, anemia, and heart failure.
- The EPA identified 4,249 waterbodies as having unsafe levels of toxic organics for fish and wildlife.

Total Toxic Organics

Several categorical standards in 40 CFR 405-471 list limits for Total Toxic Organics (TTO). The TTO is the sum of the masses or concentrations of a group of specific toxic organic compounds. Each categorical standard lists which toxic organics are to be included in the TTO. IUs must monitor this TTO discharge and report results as the total TTO (instead of the individual toxic organics).

Categories that contain TTO standards are as follows:

- 40 CFR 413: Electroplating
- 40 CFR 433: Metal Finishing
- 40 CFR 465: Coil Coating (Can-Making subcategory)
- 40 CFR 468: Copper Forming
- 40 CFR 467: Aluminum Forming
- 40 CFR 469: Electrical and Electronic Components (Phases I and II)

For three of these industries (electroplating, metal finishing, and electrical and electronic components), the CIU can request to the Control Authority to prepare and implement a toxic organic management program (TOMP) instead of TTO monitoring and reporting.

Industrial Pretreatment Standards

The TOMP should identify all potential sources of toxic organics, potential ways toxic organics could enter the wastewater, and proposed control measures to eliminate the possibility of discharge. If a TOMP is allowed, an IU can demonstrate compliance by submitting certification statements attesting that no dumping or discharge of concentrated toxic organics has occurred and that the TOMP is being implemented.

Conventional Pollutants

The National Pretreatment Program is also charged with preventing excess loadings of conventional pollutants such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solids (TSS), fecal coliform bacteria, oil and grease, and abnormal pH. Although POTWs are designed to treat conventional pollutants, these pollutants can still cause violations or operational problems in the collection system and WWTP. Many POTWs have experienced events in which excessive loadings of BOD and TSS from industrial and commercial sources have caused pass through or interference at the WWTP, corrosion in collection system pipes, buildups and blockages, and odor problems.

Nonconventional Pollutants

A nonconventional pollutant is any pollutant that is neither a toxic pollutant nor a conventional pollutant. In recent years, permitting agencies have sought to reduce the amount of nonconventional pollutants such as nutrients (e.g., ammonia, nitrogen, phosphorus) and other chemicals being discharged to surface waters. As new limits are placed on the WWTP through the NPDES permit, the POTW then includes new limits on the IUs through the IU discharge permits.

Molybdenum is another example of a nonconventional pollutant. Molybdenum is a corrosion inhibitor added to cooling water systems and boiler water systems, which ends up in the IU wastewater. Technology upgrades at POTW WWTPs have enabled nutrient and other nonconventional pollutant reductions. These reductions can relieve the IU from meeting more stringent limits.

Industrial Pretreatment Standards

Categorical Standards

Categorical standards are established by the EPA for each industrial category, as listed in 40 CFR 405-471. Table 12 provides a list of the regulated pollutants and if they apply to existing or new sources (PSES or PSNS).

Table 12: Regulated Pollutants for Industrial Categories										
40 CFR	Industrial Category	PSES	PSNS	BOD ₅	O&G	pH	TSS	COD	TTO	Other Pollutants Required
405	Dairy products processing	X	X	X		X	X			
406	Grain mills		X	X		X	X			
407	Canned & preserved fruits & veg.	X	X	X	X	X	X			
408	Canned & preserved seafood	X	X	X	X	X	X			
409	Sugar processing	X	X	X		X	X			temperature
410	Textile Mills	X	X	X		X	X	X		sulfide; phenols
411	Cement Manufacturing	X	X			X	X			temperature
412	Feedlots		X	X						fecal coliforms, P, N
413	Electroplating	X				X	X		X	Ag, Cd, CN, CN(A), Cr, Cu, Ni, Pb, Zn, total metals
414	Organic Chemicals, Plastics, & Synthetic Fiber Manufacturing	X	X	X		X	X			CN, Cr, Cu, Ni, Pb, Zn; and organic pollutants
415	Inorganic chemical Manufacturing	X	X		X	X	X	X		As, Ag, Ba, Cd, CN, CN(A), Co, Cr, Cr(VI), Cu, Fe, fluoride, Hg, NH ₃ , Ni, Pb, Sb, Se, sulfide, total residual chlorine, Zn; TOC
417	Soap & Detergent Manufacturing		X	X	X	X	X	X		surfactants
418	Fertilizer Manufacturing		X	X		X	X			fluoride, NH ₃ , NO ₃ , organic nitrogen, total phosphorus
419	Petroleum Refining	X	X	X	X	X	X	X		Cr, Cr(VI), NH ₃ , sulfide; phenolic compounds, TOC
420	Iron & Steel Manufacturing	X	X		X	X	X			CN, Cr, Cr(VI), NH ₃ , Ni, Pb, total residual chlorine, Zn; benzo(a)pyrene, naphthalene, phenols, tetrachloroethylene, TCDF

Industrial Pretreatment Standards

421	Nonferrous Metals Manufacturing	X	X		X	X	X	X	Ag, Al, As, Au, Be, Cd, CN, Co, Cr, Cu, Fe, fluoride, Hg, In, Mo, NH ₃ , Ni, Pd, Pb, Pt, Sb, Se, Sn, Ta, Ti, W, Zn, combined metals; total phenolics, benzo(a)pyrene, hexachlorobenzene
422	Phosphate Manufacturing		X			X	X		total phosphorus, fluoride
423	Steam Electric power Generation	X	X		X	X	X		Cu, Fe, free available chlorine, total residual chlorine; all 126 priority pollutants (Cr and Zn have numerical limits; the rest are to be non-detect)
424	Ferro alloy Manufacturing		X			X	X		CN, Cr, Cr(VI), Mn, NH ₃ ; phenols
425	Leather Tanning & Finishing	X	X	X	X	X	X		Cr, sulfide
426	Glass Manufacturing		X	X		X	X	X	oil, fluoride, NH ₃ , Pb, phosphorus; phenol
427	Asbestos Manufacturing	X	X			X	X	X	
428	Rubber Manufacturing		X	X	X	X	X	X	Cr, Pb, Zn
429	Timber products processing	X	X	X	X	X	X	X	As, Cr, Cu, settleable solids; phenols
430	Pulp, paper, and paperboard		X	X		X	X	X	settleable solids, Zn; AOX, COD, TCDD, TCDF, chloroform, pentachlorophenol, tetrachlorocatechol, tetrachloroguaiacol, 2,3,4,6-tetrachlorophenol, 3,4,5- trichlorocatechol, 3,4,6-trichlorocatechol, 3,4,5- trichloroguaiacol, 3,4,6-trichloroguaiacol, 4,5,6-trichloroguaiacol, trichlorosyringol, 2,4,5-trichlorophenol, 2,4,6-trichlorophenol
432	Meat products	X	X	X	X		X		fecal coliform, NH ₃ , total N
433	Metal finishing	X	X		X	X	X	X	Cd, CN, CN(A), Cr, Cu, Pb, Ni, Ag, Zn
434	Coal Mining	X	X			X	X		acidity, alkalinity, Fe, Mn, settleable solids
435	Oil & gas extraction	X	X		X				Cd, Hg, total residual chlorine; base fluid retained on cuttings, base fluid sediment toxicity (10-

Industrial Pretreatment Standards

										day LC50 ratio), biodegradation rate, diesel oil, drilling fluid sediment toxicity (4-day LC50 ratio), floating solids, foam, formation oil, free oil, garbage, PAHs, SPP toxicity (96-hr LC50)
436	Mineral mining and processing					X	X			Fe, total fluoride
437	Centralized Waste Treatment	X	X	X	X	X	X			Ag, As, Ba, Cd, CN, Co, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Se, Sn, Ti, V, Zn; acetone, acetophenone, aniline, 2-butanone, butyl benzyl phthalate, carbazole, o-cresol, p-cresol, n-decane, 2,3-dichloroaniline, bis(2-ethylhexyl) phthalate, fluoranthene, n-octadecane, phenol, pyridine, 2,4,6-trichlorophenol
439	Pharmaceutical Manufacturing	X	X	X		X	X	X		CN, NH ₃ ; acetone, acetonitrile, n-amyl acetate, amyl alcohol, benzene, n-butyl acetate, chlorobenzene, chloroform, o-dichloro benzene, 1,2- dichloro ethane, diethylamine, dimethyl sulfoxide, ethanol, ethyl acetate, n-heptane, n-hexane, isobutyraldehyde, isopropanol, isopropyl acetate, isopropyl ether, methanol, methyl cellosolve, methyl formate, methyl-2-pentanone, methylene chloride, phenol, tetrahydrofuran, toluene, triethylamine, xylenes
440	Ore mining and dressing		X			X	X	X		As, Al, Cd, Cu, Fe (total and dissolved), Hg, NH ₃ , Ni, Pb, Ra226 (total and dissolved), settleable solids, U, Zn
441	Dental Office	X	X							BMP's only
442	Transportation Equipment Cleaning	X	X	X	X	X	X			Cd, Cr, Cu, Hg, Ni, Pb, Zn; non-polar material, fluoranthene, phenanthrene
443	Paving & roof materials Mfg.		X	X	X	X	X			

Industrial Pretreatment Standards

444	Waste Combusters	X	X			X	X			Ag, As, Cd, Cr, Cu, Hg, Pb, Ti, Zn
446	Paint formulating		X							Cr, Cu, Hg, Ni, Pb, Zn; benzene, di-n-butyl phthalate, carbon tetrachloride, ethyl benzene, di(2-ethylhexyl) phthalate, naphthalene, tetrachloroethylene, toluene
447	Ink formulating		X							None
454	Gum & Wood Chemicals Mfg.				X	X	X			
455	Pesticide Manufacturing	X	X	X		X	X	X		CN, Pb; COD, 49 organic pesticide chemicals listed in 455.20(d), 93 pesticide active ingredients, 26 organic priority pollutants
457	Explosives Manufacturing			X	X	X	X	X		
458	Carbon black Manufacturing		X		X	X	X			TDS
459	Photographic supplies					X				Ag, CN
460	Hospitals				X	X	X			
461	Battery Manufacturing	X	X		X	X	X	X		Ag, Cd, CN, Co, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Zn
463	Plastics molding & forming	X	X	X	X	X	X			
464	Metal molding and casting	X	X		X	X	X		X	Cu, Pb, Zn; total phenols
465	Coil Coating	X	X		X	X	X		X	Al, CN, Cr, Cu, Fe, fluoride, Mn, phosphorus, Zn
466	Porcelain enameling	X	X		X	X	X			Al, Cr, Fe, Ni, Pb, Zn
467	Aluminum Forming	X	X		X	X	X		X	Al, CN, Cr, Zn
468	Copper Forming	X	X		X	X	X		X	Cr, Cu, Ni, Pb, Zn
469	Electrical, electronic components	X	X			X	X		X	As, Cd, Cr, fluoride, Pb, Sb, Zn
471	Nonferrous Metal, Form & Powders	X	X		X	X	X			Ag, Cd, CN, Cr, Cu, fluoride, Mo, NH ₃ , Ni, Pb, Sb, Zn; n-nitrosodime thylamine, n-nitrosodiphenylamine, n-nitrosodi-n-propylamine

Industrial Pretreatment Standards

Approaches for Categorical Limits

There are several approaches the EPA uses when setting limits for the categorical standards in 40 CFR 405-471. These approaches are summarized in Table 13. It is helpful for an engineer to understand these approaches when justifying a variance, when performing a study related to Local Limits and IU discharge limits, or when preparing IU reports and notifications.

Most of the categorical standards have **concentration-based** limits. These are applied when industrial production and wastewater flows cannot be normalized on a national basis. However, the EPA prefers setting **mass-based, production-normalized** standards, because production-normalized limits can reduce the potential for using dilution instead of actual treatment to reduce a concentration value in the effluent.

Categorical standards and limits are based on reasonable wastewater flow reduction estimates from the best available technology *that is economically achievable* for PSES (less stringent) and the best available *demonstrated* technology for PSNS (more stringent).

Industrial Pretreatment Standards

Table 13: Approaches for Categorical Standards and Pollutant Limits			
Approach	Limits	Example Limit	Description & Notes
Concentration-Based	Concentration	X mg/L	Easy to test and report. Does not depend on production or mass.
Mass-Based, Production-Normalized	Production	X lb/ 1,000 lb product	Limits are based on historical production rates and normal pollutant discharges. Calculated by multiplying the concentration times the flow and dividing by the IU's actual daily production.
Mass-Based, Flow-Normalized	Load	X mg/L times process flow < total discharge load	Focuses on individual process flows. Calculated by multiplying the concentration limit times the individual process flow. This load (lb/d) must be less than the total discharge load (lb/d) which is the discharge concentration times the total discharge flow.
Combination	Concentration & Production	X mg/L & X lb/ 1,000 lb product	Combination of the concentration and production limits described above.
BMPs	Non-numeric	Shall not dilute the wastewater	Standards that allow for the use of best management practices (BMPs).
Prohibited Discharge	Zero Discharge	0	Standards that prohibit discharge of any kind.

Industrial Pretreatment Standards

Calculations for Local Limits

The Control Authority is to regularly evaluate the need for modifications to Local Limits such as changing the pollutant limits or adding new pollutants. The following steps can help evaluate the need for changes to Local Limits:

- a. Conduct an industrial waste survey to identify all IUs with indirect discharge.
- b. Determine the concentration and volume of pollutants contributed by these IUs.
- c. Identify pollutants that have a reasonable potential for pass through, interference, or sludge contamination, based on current WWTP processes.
- d. Identify any additional pollutants of concern.
- e. Determine the maximum allowable headworks loading (MAHL) for identified pollutants of concern, such as ammonia, arsenic, BOD₅, cadmium, chromium, copper, cyanide, lead, mercury, nickel, selenium, silver, TSS, and zinc.
- f. Estimate and subtract contributions from non-IU sources (residential and light commercial) to determine the MAHL from controllable industrial sources. Typically, the MAHL is expressed in terms of pollutant concentrations (mg/L).
- g. Compare the industrial MAHL values to any relevant pollutant limits in 40 CFR 405-471. If MAHL values are lower, most stringent limits may be required.

The following are other approaches for setting local limits:

- Collection system approach: Can be based on any of the following:
 - Worker health exposure criteria for hydrogen sulfide and other gases
 - OSHA lower explosive limits
 - pH limits for corrosion protection.
 - Preventing obstructions from solids or rags. Polar fats, oils, and greases (FOG) can cause blockages when the wastewater cools enough to allow the suspended FOG to congeal.
- Case-by-case discharge limits: This approach usually involves an engineering study with professional judgments concerning available treatment technologies that have been shown through case studies to be economically feasible and are deemed appropriate for IU pretreatment systems and/or the POTW WWTP. This approach is used when insufficient data is available to perform the calculations needed for other methods.

Industrial Pretreatment Standards

- Best management practices: BMPs are management and operational procedures that are intended to prevent pollutants from entering the POTW collection system or WWTP. BMPs include the following:
 - Treatment requirements,
 - Operating procedures,
 - Sludge or waste disposal requirements,
 - Management of drainage from raw materials storage,
 - Oil and grease collection and disposal requirements, and
 - Practices to control plant site runoff, spillage, or leaks.

- Local specific prohibitions: POTW-specific prohibitions may be imposed to address hydraulic, pollutant-specific, or aesthetic concerns. The following are examples:
 - Noxious or odorous liquids, gases, or solids that result in public nuisance,
 - Wastewater with color that passes through the POTW WWTP,
 - Stormwater, roof runoff, or swimming pool drainage,
 - Wastewater containing radioactive wastes or isotopes, and
 - Solid or liquid waste that has been removed by direct discharge treatment systems or indirect discharge pretreatment systems.

For further details, see the EPA Manual entitled “Local Limits Development Guidance”. Many EPA Regions and states have developed additional guidance documents for setting Local Limits and addressing regional and state pollutant issues.

Updating Limits

The following conditions should trigger a study to consider an update to Local Limits and IU discharge limits:

- NPDES Permit change,
- Increase or decrease in the number of SIUs,
- Upgrade of POTW WWTP,
- Increase or decrease in POTW WWTP removal efficiency, or
- Significant increase or decrease in flows to the POTW WWTP.

Industrial Pretreatment Standards

Dilution Prevention

IUs may not use dilution to meet pretreatment standards, per 40 CFR 403.6(d). The Control Authority may impose mass limits rather than concentration limits to ensure that adequate pretreatment is provided, and pollutants are actually being removed. If process flows are mixed with other waste streams, the Control Authority may modify the concentration or mass limits based on the dilution provided by the mixing of multiple waste streams, per 40 CFR 403.6(e).

Removal Credits

If the POTW WWTP is capable of significant removal of a pollutant, CIUs may apply for removal credits to modify the limit required for that pollutant. The amount of removal achieved at the POTW WWTP is accounted for when relaxing the pollutant limit. POTWs must submit a petition to the Approval Authority to gain approval for removal credits, per 40 CFR 403.7(a)(3). The POTW must meet these conditions:

- Has an approved pretreatment program,
- Consistently removes the pollutants, as specified in 40 CFR 403.7(b), and
- Does not exceed any federal, state, or local sludge requirements for the sludge management method utilized.

Removal credits are available for the following pollutants, per 40 CFR 403(a)(3)(vi):

- Pollutants listed in 40 CFR 403, Appendix G, Section I, if a POTW's solids disposal practices meet 40 CFR 503 requirements. The pollutants are listed here:
 - Arsenic
 - Beryllium
 - Cadmium
 - Chromium
 - Copper
 - Lead
 - Mercury
 - Molybdenum
 - Nickel
 - Selenium
 - Zinc
 - Total hydrocarbons
- Pollutants listed in 40 CFR 403, Appendix G, Section II, if the pollutant concentrations in the POTW's solids are less than those specified in Section II.

Industrial Pretreatment Standards

- For any pollutant found in the WWTP sewage sludge if the POTW disposes of all of its sewage sludge in a municipal solid waste landfill that meets the criteria in 40 CFR 258.

Variances

A CIU can request a variance from categorical pretreatment standards, per 40 CFR 403.13. A variance can only be used to modify limits for individual pollutants. The IU must have factors that are fundamentally different from those considered when the EPA established the categorical standard. Differing factors could include the wastewater flow rate, type of production processes, excessive pretreatment costs to be compliant.

Example Problem

Engineer Luisa has been consulted to help determine anticipated maximum day pollutant limits for a new metal finishing plant for making fluid products. The plant is to be located in East Fork, Ohio which has an approved POTW. The POTW website provides the following Local Limits:

Parameter	Approved July 12, 2016 Local Limits mg/l	Basis for Current Limits
Arsenic	0.418	Sludge
Cadmium	0.390	Sludge
Chromium, Total	1.90	Current
Copper	0.8	Current
Cyanide	2.34	Current
Lead	2.22	Sludge
Mercury	0.002	1997 Limit
Molybdenum	1.5	Sludge
Nickel	2.699	Current
Selenium	0.441	Sludge
Silver	1.819	Sludge
Zinc	1.900	Current
Oil & Grease	250	SUR

Solution:

Luisa looks up the categorical standards for metal finishing in 40 CFR 433, Subpart A (Metal Finishing Subcategory). Code 40 CFR 433.17 is entitled “Pretreatment standards for new sources (PSNS)” and lists the following pollutant limits:

Industrial Pretreatment Standards

Pollutant or pollutant property	Maximum for any 1 day	Monthly average shall not exceed
Milligrams per liter (mg/l)		
Cadmium (T)	0.11	0.07
Chromium (T)	2.77	1.71
Copper (T)	3.38	2.07
Lead (T)	0.69	0.43
Nickel (T)	3.98	2.38
Silver (T)	0.43	0.24
Zinc (T)	2.61	1.48
Cyanide (T)	1.20	0.65
TTO	2.13	
Oil and Grease	52	26
TSS	60	31
pH	(¹)	(¹)

¹ Within 6.0 to 9.0.

Luisa compares the Local Limits and the categorical limits and makes a list with the most stringent limit for each pollutant, as shown in Table 14. These are the anticipated limits for the new metal finishing plant, although the POTW can modify the pollutants and limits as part of the permit development process.

Table 14: Maximum Day Pollutant Limits for Example Problem			
Pollutant	Local Limits (mg/L)	Categorical Limits (mg/L)	Most Stringent Limit (mg/L)
Arsenic	0.418	-	0.418
Cadmium	0.39	0.11	0.11
Chromium	1.9	2.77	1.9
Copper	0.8	3.38	0.8
Cyanide	2.34	1.20	1.20
Lead	2.22	0.69	0.69
Mercury	0.002	-	0.002
Molybdenum	1.5	-	1.5
Nickel	2.699	3.98	2.699
Selenium	0.441	-	0.441
Silver	1.819	0.43	0.43
Zinc	1.9	2.61	1.9
Oil & Grease	250	52	52
TTO	-	2.13	2.13
TSS	-	60	60
pH	-	6.0 to 9.0	6.0 to 9.0

Industrial Pretreatment Standards

Inspections and Sampling

Engineers are often asked to participate in inspections, sampling, and water quality assessments for industrial pretreatment discharges. For example, some POTWs are allowed to utilize contracted staff such as engineering consultants to perform inspections, produce inspection reports, obtain samples, and compile analytical reports.

Inspections

There are two types of inspections of IUs:

1. Scheduled/routine inspections, per 40 CFR 403.8(f)(2)(v):
 - Inspect each CIU and SIU at least once every year. Additional inspections may be necessary depending on issues such as wastewater flow and load variability, the effect on the POTW, and the IU's compliance history.
 - Inspect each MTCIU at least once every two years.
 - Evaluate each NSCIU at least every two years to confirm NSCIU status, which typically includes an onsite inspection.
 - Inspect all IUs as part of industrial user surveys to help determine if IUs are subject to the Local Pretreatment Program requirements and if an IU discharge permit is required.
 - Perform other inspections per the Local Pretreatment Program.
2. Unscheduled, on-demand inspections:
 - On-demand inspections occur in response to a concern such as POTW collection system problems downstream from an IU, unusual IU behavior of concern, as part of enforcement actions against an IU, or in response to a complaint from an informant.
 - Unscheduled inspections still require checking in with facility staff to gain approval for access to the property. If rejected, the inspector may need a warrant or police escort to enter the property.

Routine inspections of IUs typically consist of three activities: preparation, on-site assessment, and follow-up communications. Inspection duties include the following:

- Review current data on the IU discharge.
- Confirm the IU's compliance status. Identify any noncompliance issues needing resolution.
- Determine completeness and accuracy of the IU's performance and compliance records.
- Assess the IU's self-monitoring and reporting requirements.
- Assess the monitoring locations and IU's sampling techniques.

Industrial Pretreatment Standards

- Assess the IU permit limits and pollutants of concern.
- Communicate with the IU, including informing them of the inspection status and asking questions about the pretreatment system and operations.
- Evaluate operation, maintenance, and general performance of the IU's pretreatment system.
- Assess the potential for spills and slug loadings.
- Evaluate the effectiveness of the slug control plan.
- Collect samples.
- Suggest pollution prevention opportunities.
- Obtain data to support enforcement actions, including photographs.

For further details, see the EPA Manual entitled “Industrial User Inspection and Sampling Manual for POTWs”.

Sampling

The purpose of sampling is to verify compliance with pretreatment standards and permit conditions. The POTW should develop a Sampling and Quality Assurance Plan that specifies procedures for conducting sampling to meet the requirements of the Local Pretreatment Program and 40 CFR 403.8. Many POTWs have a sampling plan as part of their Standard Operating Procedures (SOPs). The plan should include procedures for:

- Sample equipment maintenance,
- Sample collection,
- Sample documentation,
- Sample shipping,
- Chain-of-custody procedures,
- QA/QC, and
- Safety.

The location for taking samples is called the monitoring location. The POTW has the final say for choosing a monitoring location or multiple locations. The location is selected such that compliance with permitted discharge limits can be determined.

Monitoring locations should be chosen based on the following conditions:

- Inclusive of all waste streams being discharged.
- Flow is sufficiently mixed and representative of the discharge.
- There are no bypass capabilities at that location.
- Allows for unrestricted access with minimal safety concerns.
- Avoids confined spaces.
- Has space for automated sampling equipment, where required.

See Figure 14 for sampling location examples.

Industrial Pretreatment Standards



Figure 14: Poorly chosen sample location due to safety concerns (left), and inspectors setting up a composite sampler at a discharge/sample manhole (right).

Source: <https://www.publicworks.houstontx.gov/pud/ww/pwss.html> (public domain)

Sampling frequency requirements are similar to inspection frequency requirements. Here is a summary:

- Monitor each SIU at least once every year.
- Each SIU is to self-monitor at least once every six months. A POTW may choose to monitor every six months instead of requiring the IU to perform this self-monitoring.
- For MTCIUs, monitor at least once every two years.
- For NSCIUs, the POTW is required to evaluate whether the IU continues to meet the NSCIU criteria at least every two years.
- For an IU that has been approved to forego sampling of an individual pollutant regulated by a categorical pretreatment standard, the POTW must sample for the waived pollutant(s) at least once during the term of the CIU's permit, with a maximum duration of 5 years.

Grab samples are required for pH, cyanide, total phenols, oil and grease, sulfide, and volatile organic compounds. For all other pollutants, 24-hour composite samples are required using flow-proportional composite sampling technology. The POTW may authorize other sampling arrangements when justified.

Industrial Pretreatment Standards

The Control Authority should perform a quality review to confirm the following:

- Adherence to sample collection and handling protocols,
- Approved analytical methodologies, per 40 CFR 136,
- Record-keeping requirements, per 40 CFR 403.12(o)(1),
- Completed and signed chain-of-custody forms, and
- Lab reports with correct parameters and units.

Violations

The Control Authority must identify and respond to instances of IU noncompliance in a timely, fair, and consistent manner. Per 40 CFR 403.8(f)(2)(viii), there are two types of violations:

1. Significant noncompliance (SNC) which meets any of the following:
 - Ongoing violations of pollutant limits of 6 months or more,
 - Discharge that causes imminent endangerment to human health, welfare, or the environment,
 - Failure to meet a compliance schedule milestone within 90 days,
 - Failure to provide a required report with 45 days of the due date,
 - Failure to report noncompliance, or
 - Significant violation of BMPs.
2. Nonsignificant noncompliance, which is a violation that does not meet the SNC criteria and therefore is considered minor.

When a violation is identified through sampling by an IU, the IU must do the following:

- Notify the POTW of noncompliance within 24 hours of awareness of the violation.
- Repeat the sampling and analysis for the pollutant in noncompliance.
- Submit the results within 30 days.

Then the POTW has assumed responsibility for sampling, and a violation is identified, the POTW must repeat the sampling and analysis.

Violation enforcement mechanisms depend on the legal authority granted to the POTW. Enforcement mechanisms could range from an email to a lawsuit seeking significant penalties. Common enforcement mechanisms include the following:

- Informal notice to IU such as phone call or email.
- Informal meetings with the IU.
- Warning letter or Notice of Violation (NOV).
- Administrative orders with compliance schedules.
- Administrative fines, which are in addition to surcharge fees.
- Civil suits.
- Criminal prosecution.
- Termination of service and revocation of IU permit.

Industrial Pretreatment Standards

Reporting Requirements

The following is a summary of the reporting requirements for POTWs with approved Local Pretreatment Programs and for IUs.

POTW Reports

POTWs with Local Pretreatment Programs are required to submit annual reports to the Approval Authority (State or EPA Region), per 40 CFR 403.12(i). At a minimum, annual reports must contain the following:

- IU Inventory: A list of all the IUs, including names, addresses, applicable standards/categories for each user, and any additions or deletions from the previously submitted list. POTWs may gain this information by distributing industrial waste survey (IWS) questionnaires to all IUs.
- Status of IU compliance during the reporting period
- Compliance and enforcement activities conducted by the POTW during the reporting period.
- A summary of changes to the Local Pretreatment Program that have not been previously reported.
- Any other relevant information requested by the Approval Authority.

The POTW also must annually publish a list of IUs that were in SNC at any time during the previous 12 months. Often these are available on the POTW website.

Industrial Users

All SIUs and CIUs must submit periodic compliance reports twice a year, except MTCIUs are allowed to submit once a year. The purpose of compliance reports is to demonstrate compliance with the permit conditions for all regulated pollutants. NSCIUs can submit brief alternate reports once a year. All other IUs are not required to submit regular reports.

A summary of the required IU reports is provided in Table 15, per 40 CFR 403.12.

Industrial Pretreatment Standards

Table 15: Summary of Required IU Reports				
Report Required	Regulation	User Type	Due date	Purpose
Baseline Monitoring Report (BMR)	40 CFR 403.12(b) (1–7)	CIU	<p>PSES: Within 180 days the regulation or a category determination.</p> <p>PSNS: At least 90 days before beginning discharge.</p>	<ul style="list-style-type: none"> Provides basic information on the IU to the POTW. Determine wastewater discharge monitoring locations. Determine appropriate categorical pretreatment standards.
Compliance Schedule Progress Reports	40 CFR 403.12(c) (1–3)	CIU	Within 14 days of each milestone date on the compliance schedule; at least every 9 months.	<ul style="list-style-type: none"> Track progress of IU discharge through the duration of a compliance schedule.
90-Day Compliance Report	40 CFR 403.12(d)	CIU	<p>PSES: Within 90 days of the date for final compliance.</p> <p>PSNS: Within 90 days after beginning discharge.</p>	<ul style="list-style-type: none"> Notify POTW of compliance status for the applicable categorical pretreatment standards. If non-compliant, specify how compliance will be achieved.
Periodic Compliance Report	40 CFR 403.12(e)	CIU	Every June and December after beginning a discharge, unless the frequency is increased by the POTW.	<ul style="list-style-type: none"> Provide POTW with current information on pollutant discharges and confirm compliance with permit conditions.
		MTCIU	Annually	
		NCSIU	Every 6 months on dates specified by the POTW unless the frequency is increased by the POTW.	
Alternate Report	40 CFR 403.12(q)	NSCIU	Annually	<ul style="list-style-type: none"> A certification statement indicating compliance with permit conditions.

Industrial Pretreatment Standards

In addition to reports, several notification requirements apply to all IUs. A summary of the required IU notifications is provided in Table 16, per 40 CFR 403.12.

Table 16: Summary of Required IU Notifications				
Notification Required	Regulation	User Type	Due date	Purpose
Notification of Potential Problems Including Slug Loading	40 CFR 403.12(f)	All	Immediately after the occurrence of slug load or any other discharge that could cause problems at the POTW.	<ul style="list-style-type: none"> Alert the POTW to the potential hazards of the slug load or discharge.
Noncompliance Notification and Repeat Sampling Report	40 CFR 403.12(g)(2)	All	Within 24 hours of becoming aware of a violation. Repeat sampling and analysis and submit the results 30 days after becoming aware of the violation.	<ul style="list-style-type: none"> Alert the POTW of a known violation POTW can react to potential problems occurring due to the violation.
Notification of Changed Discharge	40 CFR 403.12(j) & 40 CFR 122.42(b)	All	Before any substantial changes in the flow or the pollutants in the discharge, or changes at the facility with a potential for a slug discharge.	<ul style="list-style-type: none"> Notify the Control Authority of anticipated changes in wastewater characteristics and flow that could affect the collection system and WWTP.
Notification of Discharge of Hazardous Wastes	40 CFR 403.12(p)	All	Within 180 days of commencement of discharge or rule change.	<ul style="list-style-type: none"> Notify all parties of discharges of hazardous wastes.
Notification of Upset	40 CFR 403.16	CIU	Within 24 hours of becoming aware of the upset. (Five days where 24-hour notification was provided orally)	<ul style="list-style-type: none"> Notify the POTW of unintentional and temporary noncompliance with categorical standards.
Notification of Bypass	40 CFR 403.17	All	Ten days before the date of the bypass or oral notice within 24	<ul style="list-style-type: none"> Notify the POTW of untreated bypass.

Industrial Pretreatment Standards

			hours of the IU's becoming aware of the bypass. Written notification within 5 days of the event.	<ul style="list-style-type: none"> POTW can react to potential problems occurring due to the bypass.
Notification of Production Level Change in the Equivalent Limit Calculation	40 CFR 403.6(c)(9)	CIU	Within 2 business days after the IU has a reasonable basis to know that the production level will significantly change within the next calendar month.	<ul style="list-style-type: none"> Notify the POTW of change in the production level used to calculate the equivalent mass or equivalent concentration limits in its control mechanism.
Notification of Material/Significant Change in the Alternative Limit Calculation	40 CFR 403.6(e)	CIU	Immediately report any material or significant change in the values used in the limit calculation.	<ul style="list-style-type: none"> Notify the POTW of change in the values used in calculating an alternative limit for process flows mixed before treatment with wastewaters other than those generated by the regulated process.
Notification of Waived Pollutant Present	40 CFR 403.12(e)(2)(vi)	CIU	Notify POTW of expected discharge of a waived pollutant and immediately comply with the monitoring requirements in 40 CFR 403.12(e)(1) or more frequent monitoring requirements imposed by the POTW.	<ul style="list-style-type: none"> Alert the POTW that a waived pollutant is found to be present or is expected to be present because of changes that occur in the IU's operations.
Notification of Middle-Tier Categorical Industrial User	40 CFR 403.12(e)(3)(iv)	CIU/ MTCIU	Immediately notify the POTW of changes causing the IU to no longer meet the MTCIU conditions. Upon notification, comply with the minimum reporting requirements in 40 CFR 403.12(e)(1).	<ul style="list-style-type: none"> To alert the POTW that the IU no longer meets the MTCIU conditions and will follow all applicable CIU requirements.

Industrial Pretreatment Standards

Helpful References

Environmental Protection Agency (2016) “Best Practices for NPDES Permit Writers and Pretreatment Coordinators”. EPA-830-B-16-001.

Environmental Protection Agency (2017) “Industrial User Inspection and Sampling Manual for POTWs”. EPA-831-B-17-001.

Environmental Protection Agency (2011) “Introduction to the National Pretreatment Program”. EPA-8330-B-11-001.

Environmental Protection Agency (2004) “Local Limits Development Guidance”. EPA-833-R-04-002A.

Environmental Protection Agency (2017) “NPDES Inspection Manual, Chapter 9: Pretreatment”. EPA- 305-K-17-001.

Environmental Protection Agency (2021) “NDPES National Pretreatment Program”
<https://www.epa.gov/npdes/national-pretreatment-program>

Ford, D. L., Englande, A., Eckenfelder, W. W. (2009) “Industrial Water Quality”. Fourth Ed. United Kingdom: McGraw-Hill Education.

Pimpare, Justin (2011) “EPA’s Industrial Pretreatment Program”. EPA New England; Presentation.

Water Environment Federation (2008) “Industrial Wastewater Management, Treatment, and Disposal”. 3rd Ed. Manual of Practice No. FD-3; Alexandria, Virginia.