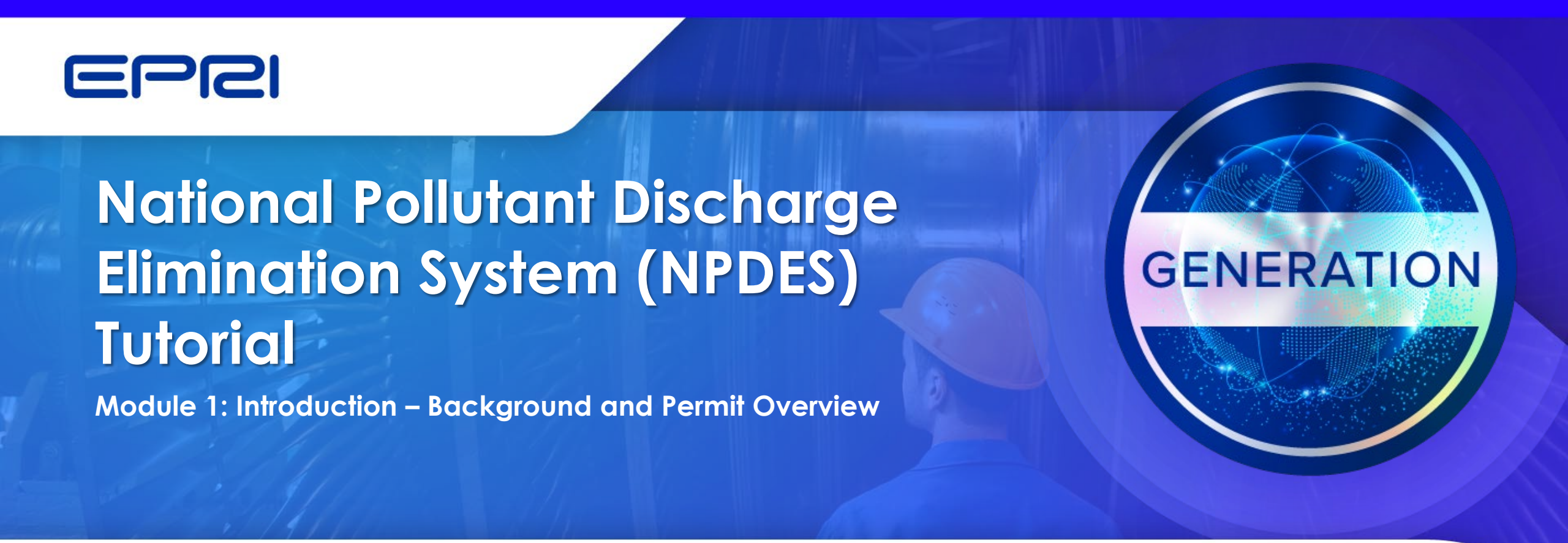
National Pollutant Discharge Elimination System (NPDES) Tutorial

Module 1: Introduction – Background and Permit Overview



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Abstract

In the United States, wastewater discharges must be permitted under the National Pollutant Discharge Elimination System (NPDES), defined by regulations which are derived from the Clean Water Act. Permit requirements flow from the federal regulations, and, in turn, from the US Code of Laws itself. This introductory training module provides an overview of the Clean Water Act, NPDES regulations, and common permit requirements to facilitate development of staff new to wastewater discharge permits, compliance, and the permitting process.

Keywords

Clean Water Act

Compliance

National Pollutant Discharge Elimination System

Permit

Permit Development

Executive Summary

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National Pollutant Discharge Elimination System Tutorial: Module 1: Introduction – Background and Permit Overview

Primary Audience: Utility staff in plant or corporate environmental roles, particularly those that are new to wastewater permits, compliance, and the permitting process in the United States

Secondary Audience: Regulatory staff, particularly those that are new to wastewater permits, compliance, and the permitting process in the United States

KEY RESEARCH QUESTION

As utilities face a changing workforce and increasing turnover, how can development of new employees be facilitated?

RESEARCH OVERVIEW

EPRI has prepared this introductory training module to facilitate development of employees new to wastewater permits, compliance, and the permitting process in the United States. The module includes an overview of the Clean Water Act, National Pollutant Discharge Elimination System (NPDES), and discharge permits and demonstrates how permit requirements flow from federal regulations, and, in turn, the US Code of Laws. Additional modules which discuss the permit development process in detail are anticipated.

KEY FINDINGS

- In the United States, wastewater discharges must be permitted under the NPDES system
- The NPDES system is a series of federal regulations derived from the Clean Water Act, which is part of federal law
- Permit requirements flow from the NPDES regulations which themselves come from the Clean Water Act

Executive Summary

WHY THIS MATTERS

Utilities are facing an evolving workforce and increasing turnover. The training module is designed to assist with development of staff new to wastewater permits and the permitting process in the United States.

HOW TO APPLY RESULTS

Staff should be able to complete the introductory training module over the course of an hour. Staff who seriously engage with the content and explore the linked material will gain an improved understanding of the Clean Water Act, NPDES regulations, permitting process, and permit components.

LEARNING AND ENGAGEMENT OPPORTUNITIES

- Additional modules which focus on permit development in greater detail are anticipated.
- This module should be useful to utility environmental staff who are seeking to improve their understanding of NPDES permits, permit compliance, and the permitting process.

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PROGRAM: Water Quality and Effluent Guidelines Program, P240

NPDES Tutorial: Module 1 Overview

- Why an NPDES Permit is Required
- Clean Water Act History
- Clean Water Act Framework
- National Pollutant Discharge Elimination System Scope and Framework
- Overview of Permit Development
- Permit Requirements
- Resources
- Glossary
- Permit Scavenger Hunt
- Quiz

Module 1: Introduction

Why an NPDES Permit Is Required

Why an NPDES Permit is Required

- Per federal regulations, an NPDES permit is required for the discharge of “pollutants” from any “point source” into “waters of the United States” as defined at 40 CFR 122.1(b)(1).
  - Pollutants, point source, and waters of the United States are each defined at 40 CFR 122.2
  - This requirement – and the individual requirements contained within each permit – are derived from the Clean Water Act.

Clean Water Act History

Clean Water Act History: Precursors

- Rivers and Harbors Appropriations Act (1899) – Established congressional authority over some projects and activities in navigable waters and forbade deposition of dredge spoils or fill without approval
- Federal Water Pollution Control Act (FWPCA) (1948) – First major federal law focused on *"prevention, control, and abatement of water pollution."* Amended several times through 1970 to require and enhance reporting, establish water quality standards, and to consider antidegradation.
- The EPA was founded in 1970 to bring together federal efforts to protect the environment

Source: EPA *Water Academy Web*, EPA *Milestones and History*

Clean Water Act History

- The “Clean Water Act” is the popular name for amendments to the FWPCA which were signed into law in 1972. The EPA was designated to administer the new law and related regulations.
  - Made point-source discharges of any pollutant into navigable surface waters illegal without a permit
  - Did not regulate groundwater or water quantity/withdrawals
  - Established the National Pollutant Discharge Elimination System (NPDES) for permits
- Key Amendments:
  - 1977 – Reduced discharge of toxic substances through implementation of technology-based standards for individual wastewaters
  - 1987 – Developed permitting requirements for stormwater discharges
  - 1990 – Implemented Great Lakes Water Quality Agreement of 1978
  - 2006 – Provided funding for National Aquatic Resource Survey Program

Source: EPA *History of the Clean Water Act*

Clean Water Act Framework

Clean Water Act Text

- Most-current version published 2018, US Code of Laws Title 33, Chapter 26
  - Subchapters I through VI, Sections 1251 – 1388
  - *Where do all the references to "300" and "400" sections come from? (e.g., 303, 311, 316, 401, 404?)*
    - *Come from original text of rule. 1972 rule "titles" roughly correspond to US Code of Laws "subchapters," and sections roughly correspond as well*

A Great Deal of Permitting Jargon Comes From the Original Clean Water Act Text

Clean Water Act Text: Abbreviated Index

1972 CWA Text Section	2018 US Code of Laws, Title 33, Chapter 26 Section
301 – Effluent Limitations (Technology Based)	1311
302 – Water Quality (WQ) Based Effluent Limitations	1312
303 – WQ Standards and Implementation Plans	1313
307 – Toxic and Pretreatment Effluent Standards	1317
308 – Records, Reports, and Inspections	1318
309 - Enforcement	1319
311 – Establishes Reportable Quantities for Oil and Hazardous Substances	1321

1972 CWA Text Section	2018 US Code of Laws, Title 33, Chapter 26 Section
316 – Thermal Discharges and Cooling Water Intakes	1326
n/a ***Section 319 enacted 1987***	1329 – Nonpoint Source Management
401 – State Certification of Federal Permits	1341
402 – National Pollutant Discharge Elimination System	1342
404 – Federal Permits for Dredge/Fill (Wetlands)	1344

The Clean Water Act Sections Do Not Precisely Correspond to the US Code of Laws!

NPDES Scope and Framework

The Regulations

- Regulations are derived from laws. Neither the text of the original CWA nor the associated text within the US Code of Laws precisely corresponds with the structure found in the Code of Federal Regulations (CFR)
- NPDES regulations of interest are largely found at these locations in 40 CFR Subchapter D:
  - 40 CFR 122: The National Pollutant Discharge Elimination System
  - 40 CFR 125: Criteria and Standards for the NPDES
  - 40 CFR 127: NPDES Electronic Reporting
  - 40 CFR 130: Water Quality Planning and Management
  - 40 CFR 131: Water Quality Standards
  - 40 CFR 136: Test Procedures for the Analysis of Pollutants
- Effluent Guidelines and Standards are found in Subchapter N
  - 40 CFR 423: Steam Electric Power Generating Point Source Category
  - 40 CFR 445: Landfills Point Source Category

The Regulations Do Not Precisely Correspond to the CWA or US Code Text!

Read the Regulation

- It's important to read regulations of interest repeatedly and in context
- At a minimum, that would involve reading introductory matter (***purpose and scope***, ***definitions***, and ***exclusions***) at the beginning of each part and subpart
- The regulation of interest must be read in context: generally, clear, explicit sections should interpret less-clear sections or any supposed implied meanings
- When in doubt, consult an attorney
- Often, the agency releases guidance on difficult-to-understand portions. Attorneys, colleagues, and trade associations may be a good source of information on important historic guidance. (e.g., the Hanmer Memo of August 22, 1985 on flow weighted total suspended solids and oil and grease limitations at the final outfall for co-mingled dry- and wet-weather flows)
- When a new rule is issued, the preamble and rule development documents can provide helpful context
- Always read a new rule in context with the rest of the regulation. Don't read only the new material published in the *Federal Register*

Where's My [Federal] Regulation? (1/2)

- Wastewater Definitions & General Program Requirements – 40 CFR 122.1-7
- Wastewater Permit Applications – 40 CFR 122.21
- Stormwater Discharges – 40 CFR 122.26
- General Permits – 40 CFR 122.28
- New Sources and Dischargers – 40 CFR 122
- Stormwater MS4 Requirements – 40 CFR 122.30-37
- Permit Conditions – 40 CFR 122.41-50
- Permit Transfer, Modification, Renewal, Revocation – 40 CFR 122.61-64

Additional Requirements Per State Law or Special Zone of Regulation (Great Lakes)

Where's My [Federal] Regulation? (2/2)

- Criteria and Standards for Technology-Based Standards – 40 CFR 125.1-3
- Alternative Effluent Limitations – 40 CFR 125.70-73
- Cooling Water Intake Structure Requirements 40 CFR 125.80-89 (new) and 90-99 (existing)
- Electronic Reporting – 40 CFR 127
- Toxic Pollutants – 40 CFR 129
- Water Quality Standards and Planning – 40 CFR 130, 131, and 132
- Established Analytical Methods – 40 CFR 136
- Effluent Guidelines and Standards – 40 CFR 423 (Steam Electric), 445 (Landfills)

Additional Requirements Per State Law or Special Zone of Regulation (Great Lakes)

Who Has Jurisdiction? (1/2)

- States, territories and tribes may receive authorization for NPDES program components. Their rules must be the same as the federal rules or more stringent in order to obtain designated authority.
- Some have partial authorization, a few have an approved biosolids program
- A table containing a list of each state's authorizations may be found at EPA's NPDES State Program Authority page

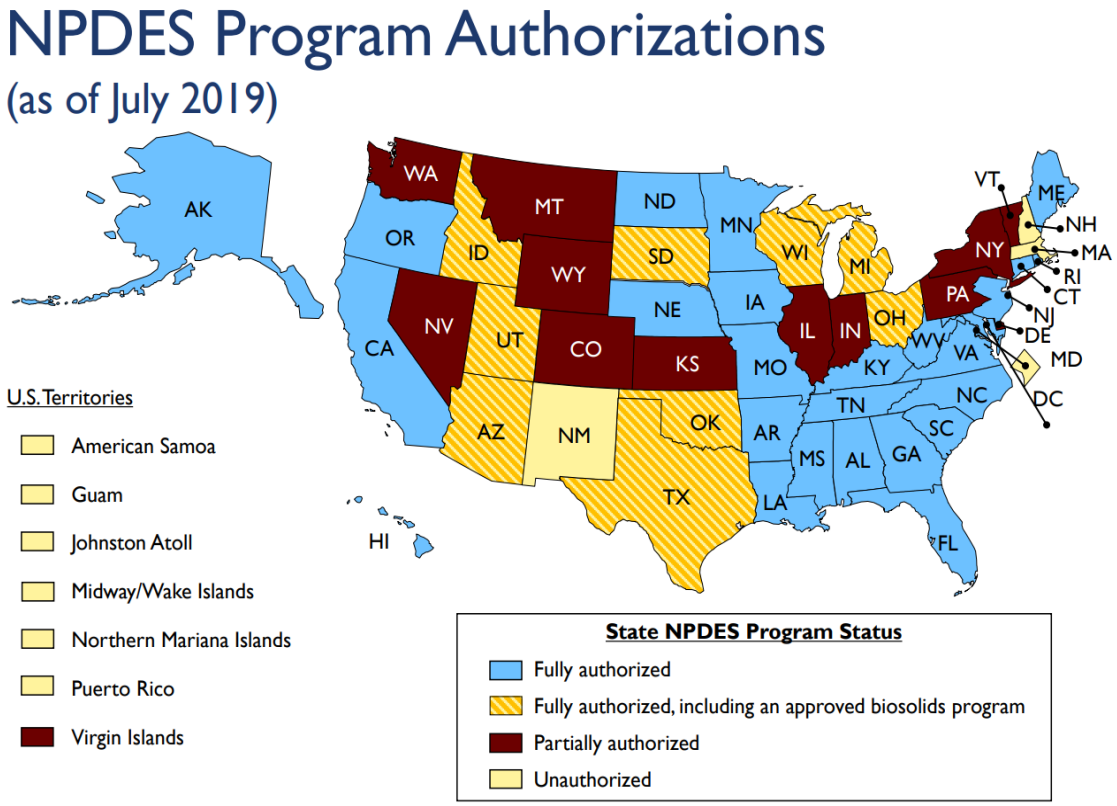


Image Credit: EPA

Check Individual State Rules for Additional Requirements

Who Has Jurisdiction? (2/2)

- Not every state has designated authority for NPDES programs. In these cases, EPA regional offices issue permits. This currently is the case in Massachusetts, New Hampshire, New Mexico, the District of Columbia, most U.S. territories, and for almost all tribal lands
- In states with designated authority, EPA typically reviews draft permits through EPA regional offices. EPA can also withdraw a state's designated authority, but this is unusual and has previously only happened after extended disagreement and communication.

Region	Regional Office	Region	Regional Office
1	Boston	6	Dallas
2	New York City	7	Kansas City
3	Philadelphia	8	Denver
4	Atlanta	9	San Francisco
5	Chicago	10	Seattle

EPA Regions

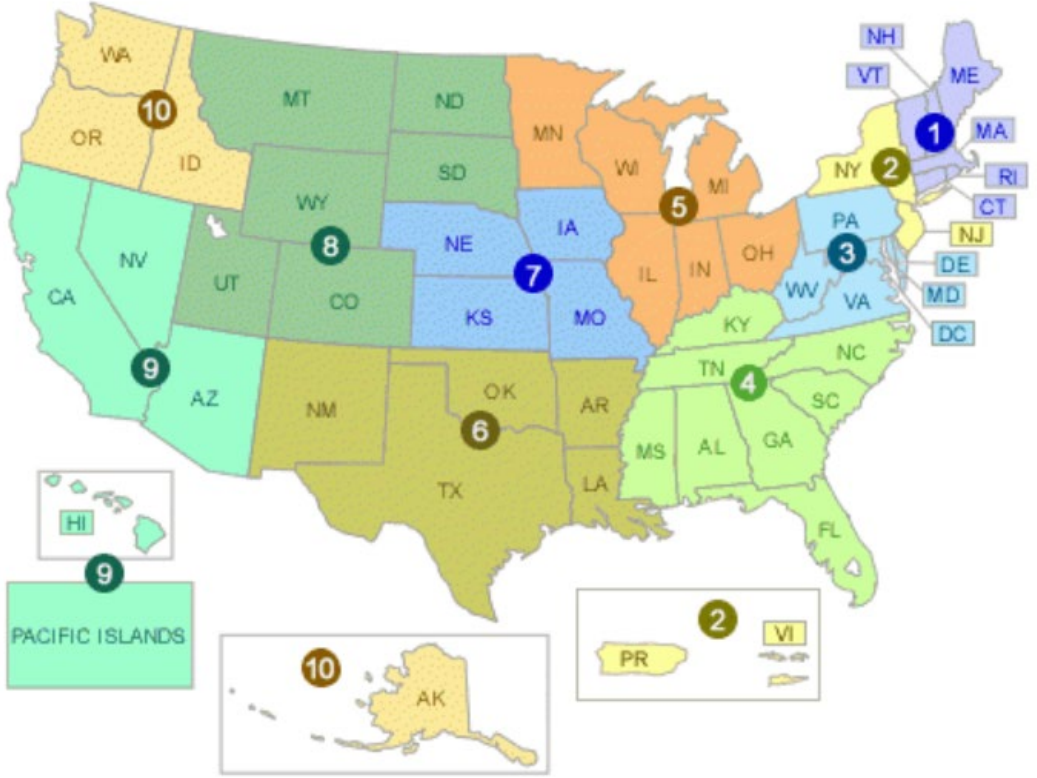


Image Credit: EPA

Types of NPDES Permits (1/4)

- Although construction stormwater and industrial stormwater permits are covered under the NPDES program, we will focus on industrial discharge permits in this series of tutorials. Sometimes these may be referred to as NPDES permits or “operating” permits, to distinguish them from industrial construction permits. It’s important to be careful with our terms!
- **Industrial discharge permits** provide authorization for ongoing industrial wastewater discharges within defined limits and cannot exceed a 5-year term
  - An initial application will require an antidegradation study – these are generally relatively simple studies to demonstrate that a new discharge won’t cause a new impairment of a receiving waterbody
  - Renewal applications must be submitted well before permit expiration. The local permitting authority should be consulted to determine the renewal application deadline.
  - Initial installation of a wastewater treatment system or any changes to it requires construction permits
  - Required for steam electric sites, remote landfill sites, and many other industrial activities

Types of NPDES Permits (2/4)

- **Construction stormwater permits** are NPDES permits that govern site development, and typically focus on the control of stormwater, sediment, and construction debris via retention ponds to prevent flooding, installation of sediment best management practices (BMPs), and housekeeping requirements
  - These permits are generally active for the duration of construction activities

- **Industrial stormwater permits** are NPDES permits that govern discharge of stormwater from industrial sites that fall into particular, defined industrial categories. The multisector general permit might require that a site obtain coverage and maintain compliance for the steam electric sector; the landfill sector; the glass, clay, cement, concrete, and gypsum products sector; other relevant sectors; or some combination (EPRI 2019).
  - In addition to applying the multisector general permit to individual stormwater discharges to receiving water bodies, many states incorporate content from the multisector stormwater permit into individual wastewater permits, for stormwater discharges which run into the site's wastewater system

Types of NPDES Permits (3/4)

- **General Permits** – Agencies may develop a general permit to cover common activities with common requirements. Construction Stormwater and Industrial Stormwater permits are common examples of General Permits. In these cases, the application demonstrates that the general permit will cover the site's activity, and the permittee follows applicable portions of the permit to maintain compliance.

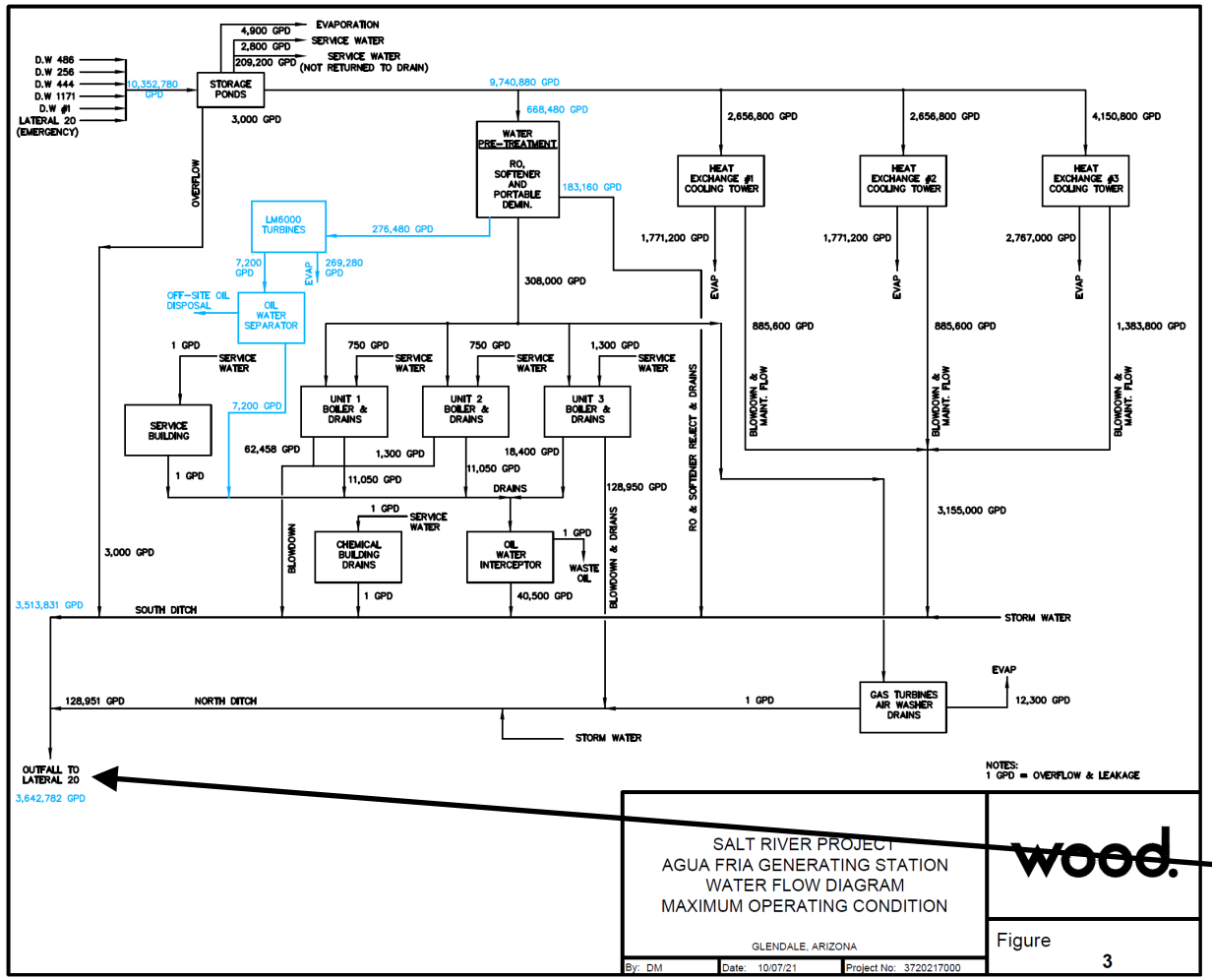
- **Individual Permits** – Individual permits are typically required for major dischargers and may include details unique to a given facility, although the agency should work to maintain reasonable consistency as well. Each individual permit application is subject to thorough review for water quality and technology-based effluent limitations and guidelines (discussed in Module 2). This series of tutorials is primarily focused on individual NPDES discharge permits, which would represent the majority of large generation facilities.

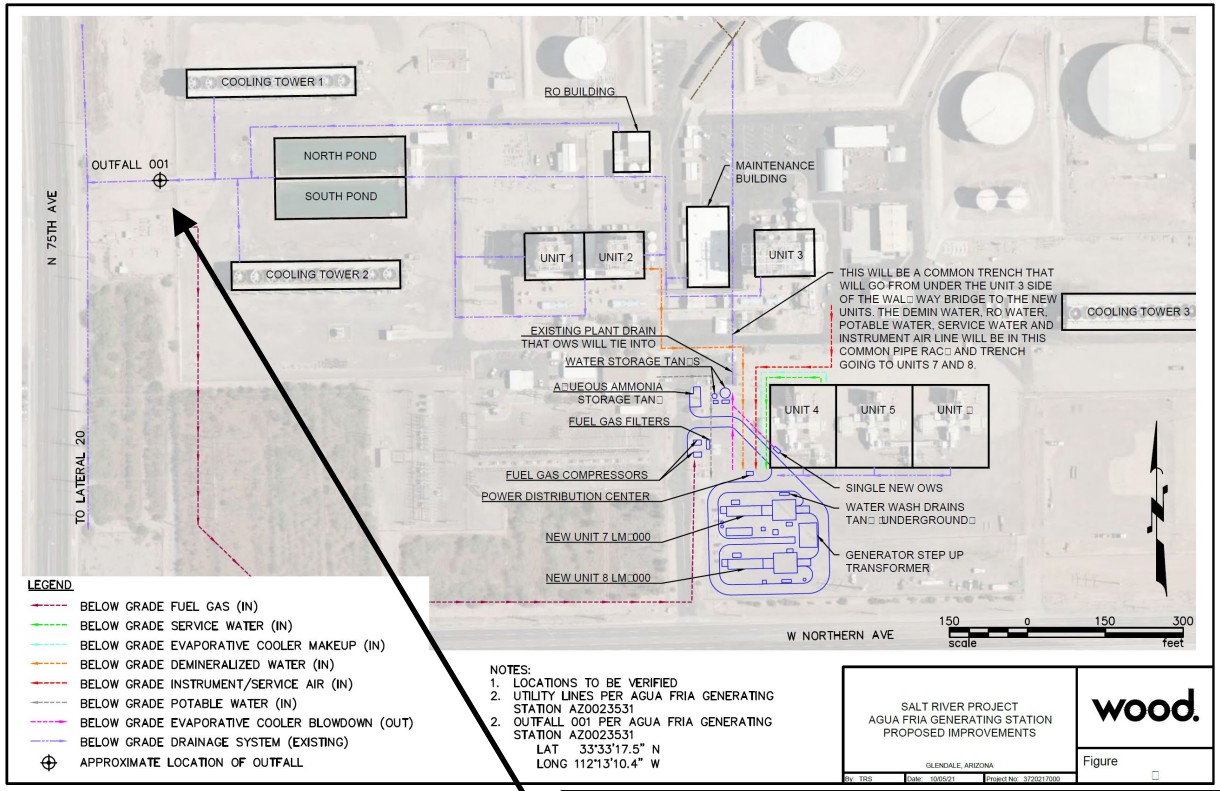
Types of NPDES Permits (4/4)

- **Direct Discharge** – Most major facilities discharge directly to a receiving stream, so their permit application is reviewed by the permitting authority (either state or EPA, depending on jurisdiction as discussed previously) and compared to water quality standards for the receiving waterbody along with technology-based effluent limitations and guidelines. In some cases, this may depend on a determination of whether a waterbody is a water of the state or a water of the United States (WOTUS).

- **Pretreatment Permits** – Pretreatment permits are for facilities which discharge to a treatment system owned by another entity. In most cases, this would be a publicly owned treatment works (POTW).
  - Pretreatment permits are typically issued by the treatment facility; industrial dischargers may be subject to different rules for technology-based effluent limitations and guidelines for pretreatment prior to discharge to a POTW than via direct discharge to a waterbody.
  - Because the final treatment facility's discharge has already been compared to water quality standards for the receiving waterbody, the facility will review the application to ensure the industrial discharge won't cause a violation of their permit. The permitting authority will review the POTW's determination.
  - Pretreatment permits may be subject to review by a different division within the permitting authority

Example Water Balance and Facility Diagram Showing Industrial Wastewater Outfall





Outfall location. It is also common to have "internal outfalls" (e.g., for cooling tower blowdown, FGD wastewater, etc.) prior to combined facility outfall to receiving waterbody.

Image Credits: Salt River Project

Overview of Permit Development

Permit Development Within the NPDES Program (1/3)

- Permits are developed by applying Technology-Based Effluent Limitations and Standards (TBELs) and Water Quality-Based Effluent Limitations and Standards (WQBELs) for a given facility
- TBELs are defined by federal regulation (see EPA Permit Writer's Manual, Chapter 5). These are often referred to as "ELGs" (Effluent Limitations Guidelines and Standards).
  - TBELs are incorporated directly from federal standards into wastewater permits

For More Information, See Module 2

Permit Development Within the NPDES Program (2/3)

- WQBEL implementation is more complex than for TBELs (EPA Permit Writer's Manual, Chapter 6):
  - EPA establishes water quality criteria for particular types of receiving waters (i.e., salt water vs. fresh water, trout streams, etc.). These standards determine whether or not the receiving water quality is suitable. If water quality is worse than the established criteria, the waterbody is said to be impaired.
    - Water quality criteria become immediately binding in the next permit renewal cycle for facilities located in EPA-administered states
  - In states with designated authority, the states will generally adopt some variant of the EPA criteria through their triennial review process, but it may take several years and be handled differently than the federal water quality criteria. Upon adoption, the new state criteria will be applied in the next permit renewal cycle.
  - The permit authority will evaluate facility wastewater discharge data versus the appropriate water quality criteria to evaluate "reasonable potential" per 40 CFR 122.44
    - Is there reasonable potential that the discharge will contribute to a water quality impairment for the receiving stream?
    - The analysis may include considerations of effluent dilution if the receiving waterbody is not already impaired
    - WQBELs are implemented if a statistical analysis indicates that the discharge may contribute to an impairment

For More Information, See Module 2

Permit Development Within the NPDES Program (3/3)

- Permit development is complex, iterative, and time consuming, with many complications. As a result, many permits expire during the renewal process, which sometimes takes years.
- When a permit expires during the renewal process, the old permit is said to be “administratively continued” and remains in force as long as the renewal application was submitted on time
- The following can contribute to complications and delays:
  - Changing standards, either for WQBELs or TBELs
  - Changing water quality of the permitted facility or the receiving waterbody
  - Public interaction – pressure, comments, permit challenges, or lawsuits
  - Disagreement between the state and Regional EPA office
  - Evolving circumstances which cause the facility to change its future plans

For More Information, See Module 2

Permit Requirements

Permit Requirements

- Most permits will have numeric effluent limits and narrative conditions
- Numeric limits are typically based on water quality standards or technology-based effluent limitation guidelines. These usually require ongoing monitoring/reporting and are easily tracked in laboratory management systems or environmental management systems.
- Narrative permit conditions may be difficult to track and can be somewhat subjective, so it is important to understand permits very well and to discuss proposed narrative conditions with the permit writer. An example might be a special reporting requirement.
- Both numeric limitations and narrative conditions may require special reporting under various upset conditions (described in upcoming slide), in addition to routine reporting

Know the Permit: Don't Neglect Narrative Criteria!

Permit Sections Common to Direct Discharge NPDES Permits

40 CFR 122.41 establishes conditions applicable to all permits – these include standard language about

- Compliance
- Monitoring
- Recordkeeping
- Reporting requirements
- Compliance schedules
- 24-hour reporting of maximum daily discharge limitations, upsets, and bypasses
- Administrative concerns, such as permit transfer upon facility sale and signatory authority

These are typically located in a section named ***Standard Conditions***, ***General Provisions***, or something similar

2. Reporting of Noncompliance

a. 24-Hour Reporting

In the case of any noncompliance which could cause a threat to public drinking supplies, or any other discharge which could constitute a threat to human health or the environment, the required notice of non-compliance shall be provided to the Division of Water Resources in the appropriate Environmental Field Office (EFO) within 24-hours from the time the permittee becomes aware of the circumstances. (The EFO should be contacted for names and phone numbers of environmental response personnel).

A written submission must be provided within five days of the time the permittee becomes aware of the circumstances unless this requirement is waived by the Director on a case-by-case basis. The permittee shall provide the Director with the following information:

i. A description of the discharge and cause of noncompliance;
ii. The period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue; and
iii. The steps being taken to reduce, eliminate, and prevent recurrence of the noncomplying discharge.

b. Scheduled Reporting

For instances of noncompliance which are not reported under subparagraph 2.a. above, the permittee shall report the noncompliance on the Discharge Monitoring Report. The report shall contain all information concerning the steps taken, or planned, to reduce, eliminate, and prevent recurrence of the violation and the anticipated time the violation is expected to continue.

Permit Sections Common to Direct Discharge NPDES Permits

- Additional standard language in utility sector permits comes from 40 CFR 122.42, establishing additional reporting requirements for unusual or exceptionally high detections of chemicals between permit renewal applications. These may be located in the Standard Conditions section or in another section, such as an ***Other Requirements*** section.
- In addition, each permit will have a ***Definitions*** section. Definitions are critically important but often overlooked.

The permittee shall notify the Division of Water Resources as soon as it knows or has reason to believe:

1. That any activity has occurred or will occur which would result in the discharge on a routine or frequent basis, of any toxic substance(s) (listed at 40 CFR 122, Appendix D, Table II and III) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. One hundred micrograms per liter (100 ug/l);

   b. Two hundred micrograms per liter (200 ug/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   c. Five (5) times the maximum concentration value reported for that pollutant(s) in the permit application in accordance with 122.21(g)(7); or

   d. The level established by the Director in accordance with 122.44(f).

2. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   a. Five hundred micrograms per liter (500 ug/l);

   b. One milligram per liter (1 mg/L) for antimony;

   c. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 122.21(g)(7); or

   d. The level established by the Director in accordance with 122.44(f).

Upset vs. Bypass

- Definitions of ***Upset*** and ***Bypass*** for unusual conditions

4. Upset

a. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. An upset shall constitute an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee demonstrates, through properly signed, contemporaneous operating logs, or other relevant evidence that:

i. An upset occurred and that the permittee can identify the cause(s) of the upset;
ii. The permitted facility was at the time being operated in a prudent and workman- like manner and in compliance with proper operation and maintenance procedures;
iii. The permittee submitted information required under "Reporting of Noncompliance" within 24-hours of becoming aware of the upset (if this information is provided orally, a written submission must be provided within five days); and
iv. The permittee complied with any remedial measures required under "Adverse Impact."

6. Bypass

a. "Bypass" is the intentional diversion of wastewater away from any portion of a treatment facility. "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypasses are prohibited unless the following 3 conditions are met:

i. The bypass is unavoidable to prevent loss of life, personal injury, or severe property damage;

ii. There are not feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment down-time or preventative maintenance;

iii. The permittee submits notice of an unanticipated bypass to the Division of Water Resources in the appropriate environmental field office within 24-hours of becoming aware of the bypass (if this information is provided orally, a written submission must be provided within five days). When the need for the bypass is foreseeable, prior notification shall be submitted to the Director, if possible, at least 10 days before the date of the bypass.

Bypasses not exceeding limitations are allowed only if the bypass is necessary for essential maintenance to assure efficient operation. All other bypasses are prohibited. Allowable bypasses not exceeding limitations are not subject to the reporting requirements of 6.b.iii, above.
Bypass does not include diverting from one treatment unit of treatment facility to another for alternate treatment.

Effluent Limitations and Monitoring Requirements (1/3)

- The permit will have a separate section that identifies each individual outfall or discharge point (some internal and some that discharge to the receiving stream)
- Each outfall will include a list of the types of wastewater that are discharged there. It is important that this description be correct.
- Typically, internal outfalls have limits based upon technology based effluent limitations and guidelines from 40 CFR 423
- Typically, final combined outfalls to receiving streams will have limits based upon the permitting authority's application of water quality standards per 40 CFR 44(d)(1)(ii)

6. OUTFALL 002

This permit authorizes following discharges from Outfall 002: once-through condenser cooling water discharge plus flows from Outfall 001; boiler blowdown; discharge from underflow ponds with fire protection flushes, raw water leakage and transformer/switchyard runoff; intake screen backwash from Outfall 004 and FGD strainers; discharge from FGD stormwater pond IMP 01A; and discharge from Outfall 006. In addition, the thermal variance of 36.1 degrees C will be extended in the permit.

Description: External Outfall, Number: 002, Monitoring: Effluent Gross, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	<=	36.1	deg C	Calculated	Daily	Daily Maximum
00400	pH	>=	6.0	SU	Grab	Weekly	Minimum
00400	pH	<=	9.0	SU	Grab	Weekly	Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Daily Maximum
50050	Flow	Report	-	Mgal/d	Pump Log	Daily	Monthly Average
71900	Mercury, total (as Hg)	<=	30	ng/L	Grab	Monthly	Value
78739	Chlorination duration	<=	120	min	Pump Log	Daily	Value
81381	Duration of discharge	<=	120	min	Pump Log	Daily	Value
TRP3B	IC25 Static Renewal 7 Day Chronic Ceriodaphnia	>=	100	%	Composite	Annual	Minimum
TRP6C	IC25 Static Renewal 7 Day Chronic Pimephales promelas	>=	100	%	Composite	Annual	Minimum

Description: External Outfall, Number: 002, Monitoring: Intake from Stream, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
00010	Temperature, water deg. C	Report	-	deg C	Recorder	Continuous	Value

Description: External Outfall, Number: 002, Monitoring: See Comments, Season: All Year

Code	Parameter	Qualifier	Value	Unit	Sample Type	Monitoring Frequency	Statistical Base
34044	Oxidants, total residual	<=	.011	mg/L	Grab	Weekly	Monthly Average
34044	Oxidants, total residual	<=	.019	mg/L	Grab	Weekly	Daily Maximum

Effluent Limitations and Monitoring Requirements (2/3)

- Each outfall will list the constituents which must be monitored, with their frequency and required permit limitations
  - Note that some constituents may only have monitoring requirements with no numeric or narrative limits assigned
  - The permit will include a discussion of allowable analytical methods
- Most permits require monitoring for toxicity (either acute, chronic, or both) at the facility's combined final discharge point
- Each permit limitation should be described in the permit's rationale, frequently included as an appendix

F. BIOMONITORING REQUIREMENTS, CHRONIC – OUTFALL 002

The toxicity tests at Outfall 002 specified herein shall be conducted annually during a period of biocide application. Reports will be attached to the monthly DMR.

The permittee shall conduct a 3-Brood *Ceriodaphnia dubia* Survival and Reproduction Test and a 7-Day Fathead Minnow *(Pimephales promelas)* Larval Survival and Growth Test on the same samples of final effluent from Outfall 002.

The measured endpoint for toxicity will be the inhibition concentration causing 25% reduction (IC25) in survival, reproduction, or growth of the test organisms. The IC25 shall be determined based on a 25% reduction as compared to the controls. The average reproduction and growth responses will be determined based on the number of *Ceriodaphnia dubia* or *Pimephales promelas* larvae used to initiate the test.

Test shall be conducted and its results reported based on appropriate replicates of a total of five serial dilutions and a control, using the percent effluent dilutions as presented in the following table:

Serial Dilutions for Whole Effluent Toxicity (WET) Testing					
Permit Limit (PL)	0.50 X PL	0.25 X PL	0.125 X PL	0.0625 X PL	Control
% effluent					
100	50	25	12.5	6.25	0

Effluent Limitations and Monitoring Requirements (3/3)

- The permit will also include instructions for submitting monitoring results via electronic Discharge Monitoring Reports (DMRs)
- DMRs must be completed and signed by a responsible official before submission. Besides the data, other descriptive information may be submitted, such as a description of any sampling and analysis challenges or upsets.
- DMR results will be public and are often used to develop corporate submissions under a different program, the Toxic Release Inventory (TRI) program. Results are also available online through EPA's ECHO database.
- In addition, any data submitted through the DMR program may be used to develop future permit limits

Intake Monitoring

- Monitoring of the facility intake(s) for certain trace elements may also be required by the permit, or as part of permit renewals (e.g., mercury, PFAS)
- If so, it is important to consider why these data are being collected and how they may be used
  - It would be wise to record Quality Assurance (QA)/Quality Control (QC) data for these analyses and for final discharge data, and to calculate and report propagation of errors across "netting" calculations if data are likely to be used to evaluate reasonable potential at a later date.
- 40 CFR describes some circumstances in which pollutants in intake water may be considered in section 122.45(g). *Review this short section now.* Generally, states have broad latitude in how to consider pollutants in intake water.
- Many states will use their discretion to ***deduct*** existing pollutant loads and apply ***stricter*** standards at the outfall (e.g., Georgia regulation 391-3-6-06(4)(d)(5)(iv))
- While possible in some instances, site-specific criteria, based upon existing pollutant loadings, are unusual and subject to public comment and EPA review

What's In Your Intake Water?

Other Requirements (1/2)

- ***Schedule of Compliance*** – A schedule for completing tasks required by the state or federal government. An example would be a schedule for implementing new treatment or retirement as required by the ELG rule.
- ***316(b) Requirements*** – The permit will likely have a section establishing requirements for reporting elements of 316(b) compliance related to entrainment and/or impingement
- ***316(a) Requirements*** - Relate to discharge of heat and covered in Module 2

F. SCHEDULE OF COMPLIANCE

Except for those provisions listed in this section, full compliance shall be attained from the effective date of this permit.

Biological Sampling to support the thermal variance:

The permittee will submit a Revised Biological Sampling Plan within 90 days of the Permit Effective Date. The Plan will update existing biological sampling methods and will provide details of additional monitoring to address extreme summer reservoir temperatures, data on chlorophyll during June-October when fish community samples are collected, and additional information on thermal tolerance for individual fish species found to date in the mixing zone.

Cooling Water Intake Structure Requirements

A schedule of compliance is granted for the 5-year period of the permit term to complete compliance requirements under Section 316(b) of CWA. Due to the number and complexity of studies, reports, and peer reviews to be conducted and the time needed to complete such efforts, this renewed permit establishes an alternate schedule for submittal of information specified in § 122.21 (r)(2) through § 122.21 (r)(13) no later than 180 days prior to the expiration date.

Other Requirements (2/2)

- ***Pollutant Minimization Plans*** – These are commonly required in lieu of permit limitations as a part of compliance with state water quality standards
- ***Best Management Practices Plans*** – These are similar to stormwater plans, mostly requiring good maintenance and housekeeping practices
- There may be a requirement to report use of any new chemicals or fuel additives or to maintain some sort of plan concerning their use
- There may also be special requirements if the intake and/or discharge are located in habitat populated by threatened or endangered species

Thank You!

Resources, Glossary, Permit Scavenger Hunt, and Quiz to Follow

Additional Modules

(2) Application of Water Quality Criteria and Technology Standards
(3) Best Practices for Permit Renewals

Resources

- Cornell Cross-Referenced Federal Regulations (other tools available from various online vendors as well, some of which also include state regulations)
- EPA Permit Writer's Manual, especially chapters 5 and 6
- EPA NPDES Recorded Training and Webinars
- EPRI Program 240 Resources (Research Results, Events, Trainings, etc.)
- EPRI, 2023b NPDES Permit Database
- EPRI, 2023a Best Practices for Water Quality Monitoring
- EPRI, 2021 Whole Effluent Toxicity Guidance Manual
- EPRI, 2019 Assessment of Recommendations for Improving USEPA's Multi-Sector General Permit for Industrial Stormwater
- US Code of Laws
- Electronic Code of Federal Regulations

Glossary (1/2)

- **Antidegradation** – All implementing authorities must have a policy to prevent degradation of the waterbodies under their authority and to protect existing uses of those waterbodies (40 CFR 131.12)
- **Best management practices (BMPs)** – "Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce pollution of 'waters of the United States.' BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage (40 CFR 122.2)."
- **Biosolids** – 40 CFR 503 contains rules for use and disposal of sewage sludge, as required by the Clean Water Act. NPDES discharge permits often contain references to biosolids disposal in their boiler plate language, and some remote facilities will have their own plants for treating domestic wastewater, so these provisions are applicable to some utility permits.
- **Dredge** – A term used to describe underwater excavation
- **Entrainment** – "The incorporation of all life stages of fish and shellfish with intake waterflow entering and passing through a cooling water intake structure and into a cooling water system." Regulated by section 316(b) of the Clean Water Act (40 CFR 125.83).
- **Housekeeping** – A term to describe the maintenance of general tidiness/cleanliness, and often used to describe approaches (sweeping, dust control, etc.) to prevent migration of sediments
- **Impairment** – 40 CFR 130.7(d)(1) calls for each state to identify streams for which water quality does not meet the requirements for its intended use. This is commonly called an impairment, and is reported every two years to the EPA by submission of a "303(d) report."
- **Impingement** – "The entrapment of all life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal (40 CFR 125.83)." Regulated by section 316(b) of the Clean Water Act.
- **Major discharger** – Any steam electric power plant that generates ≥ 500 MW or whose cooling water discharge exceeds 25% of the receiving stream's low flow is considered a major discharger

Glossary (2/2)

- **Netting** – A general term for a concept which would involve considering the intake water's contribution to the mass discharged from a facility. Specifically addressed in the federal regulations at 40 CFR 122.45(g) and similarly by many states.
- **Nonpoint source** – Any source of pollution which doesn't meet the definition of point source, commonly applied to stormwater runoff
- **Outfall** – A term which describes the location of a point source discharge, often where a pipe, weir, ditch, or other discharge structure drains to the receiving waterbody. Typically used to describe the point at which regulatory compliance is assessed.
- **Point source** – Per 502(14) of the Clean Water Act "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."
- **Pollutant** – "Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (with some exclusions), heat, wrecked or discarded equipment, rock sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. Excludes sewage from vessels and certain water and other materials associated with oil and gas production wells." (40 CFR 122.2)
- **Reasonable potential** – Permitting authorities develop water quality-based permit limits to ensure receiving water quality standards are maintained. Permit limits must control "all pollutants which…are or may be discharged at a level which will cause, have the ***reasonable potential*** [emphasis added] to cause, or contribute to an excursion" above water quality standards (40 CFR 122.44(d)). Each permitting authority evaluates discharges for reasonable potential versus the applicable water quality standards in a process commonly referred to as a "reasonable potential analysis."
- **Retention pond** – A type of stormwater pond whose purpose is to attenuate discharge of stormwater from developed areas to prevent downstream flooding
- **Sediment pond** – A type of stormwater pond whose purpose is to settle sediments in stormwater from sites undergoing construction
- **Spoil** – Soil produced from excavations
- **Toxicity** – An organism's response (mortality and/or reduced reproduction) to a pollutant or combination of pollutants. Commonly evaluated at the point of discharge to the receiving stream via a whole effluent toxicity test to assess acute and/or chronic effects of a combined wastewater.
- **Quality Assurance** – In a laboratory setting, procedures to ensure high quality lab analyses and accurate results by minimizing variability and confounding factors among controllable inputs (Source, Simpler QMS)
- **Quality Control** – In a laboratory setting, procedures to evaluate lab results for expected accuracy (Source, Simpler QMS)
- **Water of the United States** – Waters regulated by the federal government per the lengthy description in 40 CFR 120.2

Permit Scavenger Hunt

Permit Scavenger Hunt

- Find and read the following components of your most complex permit:
  - Required methods for analysis
  - Reporting requirements for permit conditions which exceed the maximum daily limit
  - Reporting requirements for detections of chemicals not limited in the current permit. These would be either unexpected chemicals or unusually high values of chemicals compared to those reported in the facility's most recent permit renewal application.
  - Definitions of ***bypass*** and ***upset***
  - 316(b) requirements
  - Stormwater requirements
  - Compliance schedules
  - Any requirements for dam and dike integrity of CCR impoundments
- Find and read the rationale for TSS and metals at your facility's final point of discharge and for one internal outfall:
  - Identify one water quality-based limit
  - Identify one technology-based limit
  - Does the permit allow dilution of the discharge sample for analysis of toxicity? Why or why not? What is the dilution and how was it determined?
- Find the following state requirements:
  - Water quality standards
  - Requirements for submitting construction permits
  - Requirements for submitting discharge permits for new sources

Deepen and Apply Your Understanding

Quiz

Questions

1) (True/False) There is an exact correspondence between the text of the Clean Water Act, the US Code of Laws, and the Code of Federal Regulations
2) (True/False) All NPDES permits are written by the EPA
3) (True/False) An NPDES permit's narrative criteria are just as important as numeric criteria
4) (True/False) Because my facility discharges to a publicly owned treatment works (POTW), I don't need a permit
5) I'm permitting a brand new facility which will directly discharge to a receiving waterway. Please list the major NPDES-related permit applications I need to submit.

Quiz

Answers

1) False – there is not exact correspondence between the text of the Clean Water Act, the US Code of Laws, and the Code of Federal Regulations
2) False – the EPA issues permits for Massachusetts, New Hampshire, New Mexico, the District of Columbia, and most tribal lands and US territories
3) True – narrative criteria are just as authoritative as numeric criteria, although they maybe be more difficult to manage
4) False – this facility will require a pretreatment permit
5) An application for a new NPDES permit with antidegradation study, an NPDES construction permit application, an application for coverage under the NPDES industrial stormwater general permit, and an application for coverage under the NPDES construction stormwater general permit

Quiz

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