Workshop- Clean Water Act 101

Crystal City Marriott, Crystal City, VA

Presented to:

Council of Industrial Boiler Owners (CIBO)

Presented by:

Jamal Y. Shamas, Sc.D., P.E.

Vice President- AECOM

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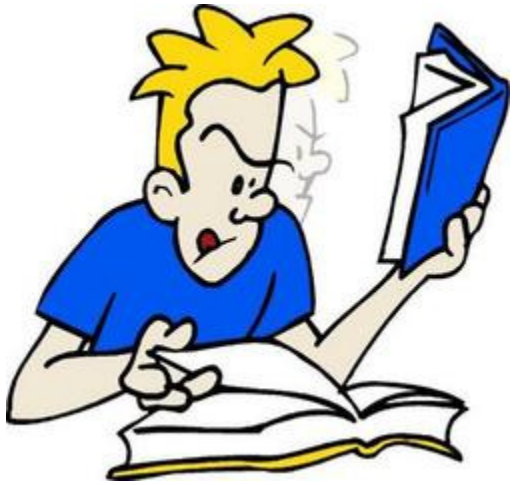
Agenda

- Brief history if the Clean Water Act
- Scope and Regulatory Framework of the Act
- Key Sections and Authorities
- Approach to Protecting Waters of the US and how it Evolved over the years
- Establishing technology and water quality based effluent limitation guidelines
- Water quality criteria and standards
- Approach to the control of point source and non point sources of pollution
- Implementation of the NPDES Program
- Definition of Key Terms and Concepts



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Overview & brief history of the Clean Water Act

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Selected Legislation and Events

- 1899 Rivers and Harbors Act
- 1948 Federal Water Pollution Act (FWPCA)
- 1965 Water Quality Act
- 1970 Executive Order- EPA established
- 1970 Refuse Act Permit Program
- 1972 FWPCA Amendments
- 1977 Clean Water Act (CWA)
- 1987 Water Quality Act

13 fires- 1968, 1952 (largest) , through 1969

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Early Legislation

1899 Rivers and Harbors Act

- Focused on navigable waters
- Placing of dredged or fill material
- Dams and bulkheads

1948 Federal Water Pollution Act (FWPCA)

- Water quality focus
- Pollution prevention
- Amended in 1956 to strengthen enforcement provisions
- Amended in 1965 to establish Water Quality Standards
- Enforcement hampered by
  - Lack of standards
  - Burden of proof to show impact with enforcing agency
  - No criminal or civil penalties

Incremental adjustments through 1970

- Beef up enforcement, reporting, and add antidegradation component
- EPA established by executive order by Richard Nixon

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Federal Water Pollution Control Act Amendments (1972-present)

- Federal Water Pollution Control Amendments (1972)- established the core of today's program (NPDES Program)
- Clean Water Act (1977)- focused on priority pollutants and effluent guidelines
- Water Quality Act (1987)- focused on water quality-based effluent limits and stormwater

Before 1972	• Water Quality Based Approach
Post 1972	• Technology Based Approach
	• Technology Based Backed by Water Quality Based

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Federal Water Pollution Control Amendments of 1972

- Established NPDES(1), pretreatment, and construction grants and programs (Section 402)
- Established maximum permit term of five years
- Established both technology-based and water quality-based requirements
- Established compliance deadlines
- Provided for authorization of state NPDES permitting programs
- Indicated that permit compliance is a shield (Permit as a Shield)
- Established significant penalties for permit violations

(1) National Pollutant Discharge Elimination System

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NRDC Consent Decree-1976

Included list of toxic priority pollutants (65 categories, 129 pollutants)

Included list of primary industries for technology-based controls (21 industries)

Required technology-based effluent standards for these substances and industrial categories

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Clean Water Act-1977

Section 307 (a) adopted provisions of NRDC Consent decree

Clarified that federal facilities are subject to state programs

Delegated pretreatment program

- **Authorized EPA to approve local pretreatment programs**
- **Required NPDES states to modify programs to include pretreatment oversight**

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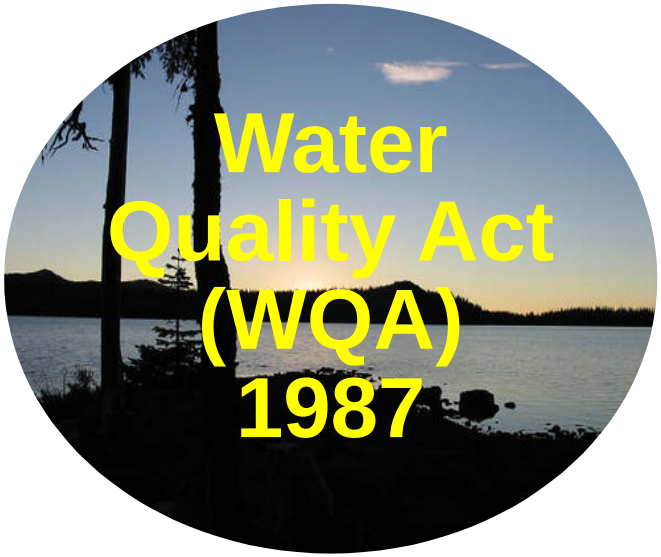
Water Quality Act-1987



- Specified stormwater permitting requirements [section 402(p)]
- Provided that Indian tribes may be considered as states
- Created federal sludge management program
- Increased penalties for non compliance
- Renewed emphasis of surface water toxics control

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Scope and Regulatory Framework of the CWA

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Goals of CWA

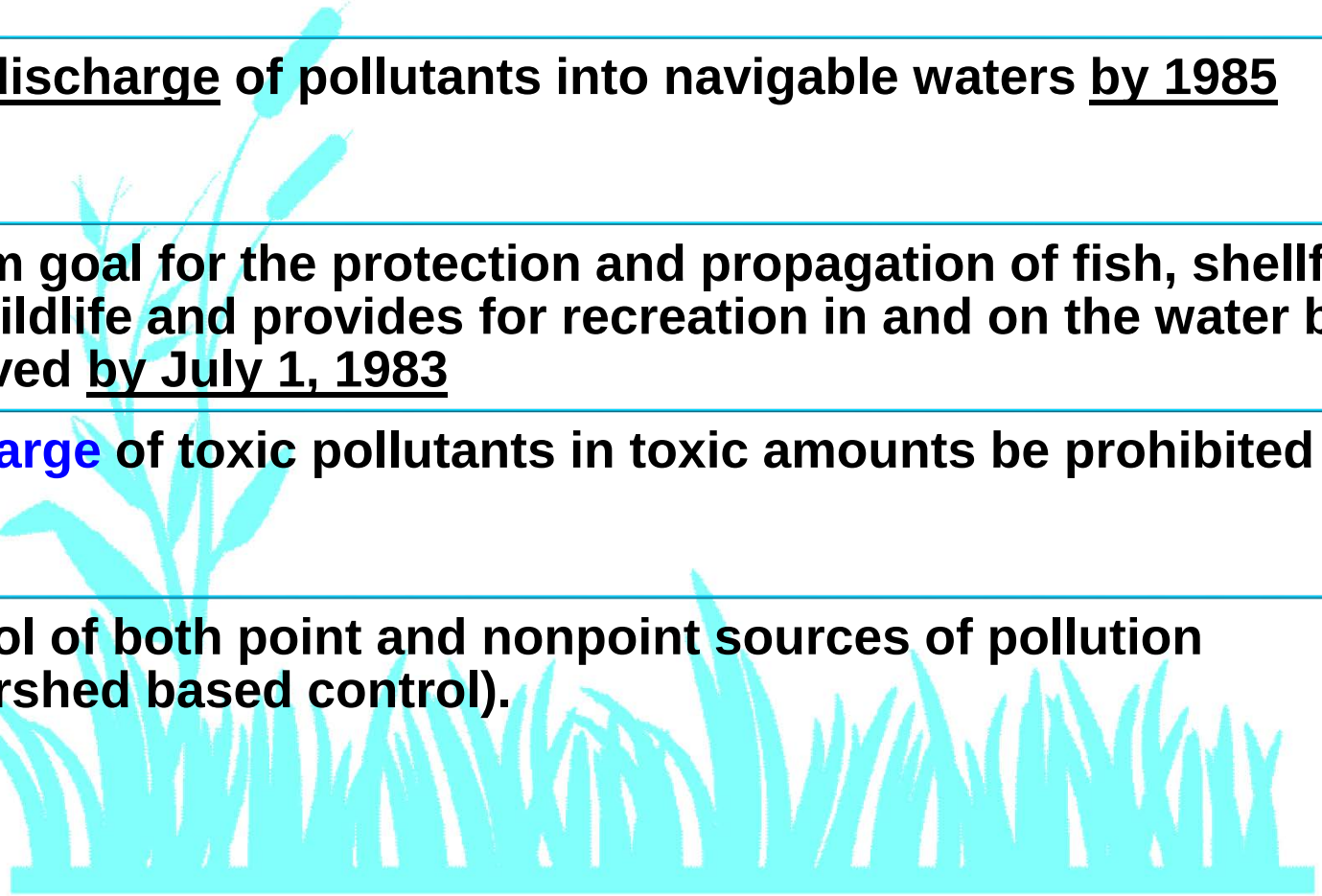
Restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

Zero discharge of pollutants into navigable waters by 1985

Interim goal for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983

Discharge of toxic pollutants in toxic amounts be prohibited

Control of both point and nonpoint sources of pollution (Watershed based control).



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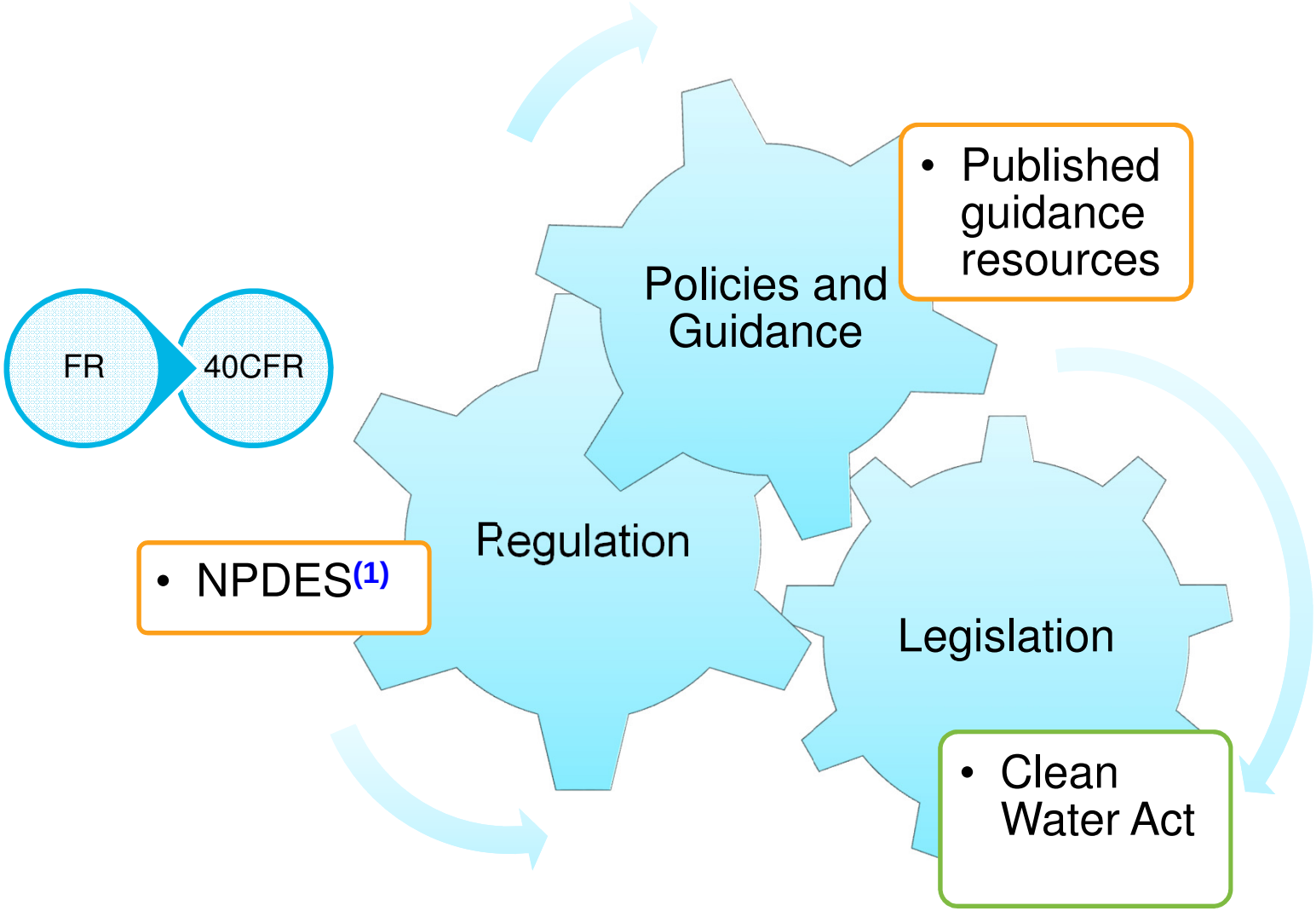
Framework



(1) National Pollutant Discharge Elimination System

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NPDES Statutory Framework

All point sources discharging pollutants into waters of the US (WOTUS) **must** obtain an NPDES permit from EPA or an authorized state, territory, or tribe

A permit is a license…

- Issued by the government
- Granting permission to do something that would be illegal in the absence of the permit
- There is no right to a permit and it is revocable for cause
- An **NPDES permit** is a license to discharge and **may be revoked** for cause

Define

- Water of the US (WOTUS)
- Point Sources
- Pollutants

Jurisdiction

This

CWA

Not This

SDWA

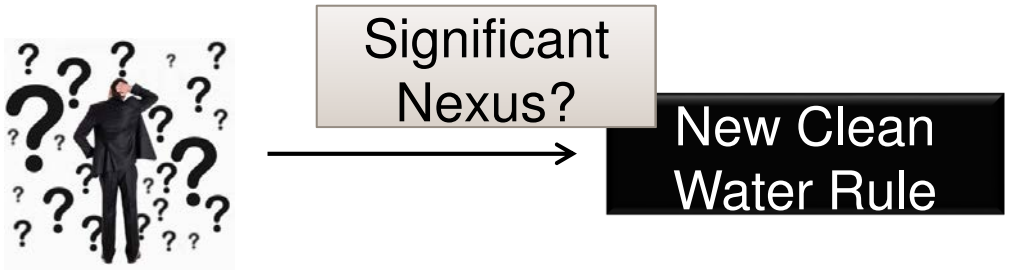
- Jurisdiction over Waters of the US (WOTUS)
- The act does not deal directly with ground water or with water quantity issues (SDWA, RCRA, Superfund)

Jurisdictional Water

- Waters of the US (WOTUS):
  1. Navigable Waters
  2. Interstate Waters
  3. Territorial Seas
  4. Other waters
- Some regulations interpreting the 1972 law have included water features such as intermittent streams, playa lakes, prairie potholes, sloughs and wetlands as "waters of the United States."
- In the 2006 case ***Rapanos v. United States***, a plurality of the Supreme Court held that the term "waters of the United States":
- ...includes only those relatively permanent, standing or continuously flowing bodies of water "forming geographic features" that are described in ordinary parlance as "streams[,] ... oceans, rivers, [and] lakes.“

Jurisdictional Water

- All waters with a "significant nexus" to "navigable waters" are covered under the CWA
- **Significant nexus** - means that a water, including wetlands, either alone or in combination with other waters in the region, significantly affects the chemical, physical, or biological integrity of a jurisdictional water.



New Water Rule

- In March 2014, USEPA and the Corps proposed a “new and improved” definition of WOTUS aimed at clarifying the definition of “other waters.” published on June 29th, 2015 in the Federal Register. Effective date of August 29th, 2015
- The regulation was issued as a joint Army Corps of Engineers and USEPA regulation
- The 6th Circuit Court of Appeals in Cincinnati, in a 2-1 ruling, issued a temporary nationwide stay of the regulation pending outcome of court proceedings.

Does your ditch have a:

- **Bank?**
- **Bed?**
- **Ordinary high water mark (OHWM)?**

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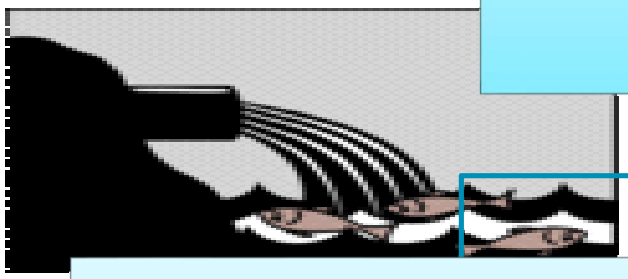
What is a Point Source (40 CFR 122.2)

Any discernable, confined, and discrete conveyance



Includes: Any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft from which pollutants may be discharged

Does not include return flows from irrigated agriculture or agricultural stormwater runoff

Everything else is non-point source

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What is a Pollutant?

A pollutant under CWA Section 502 (40 CFR 122.2) is

- Dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954), heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged to water
- Does not include:
  - Sewage from vessels or injected wastes
  - Other material which is injected into a well to facilitate production of oil or gas
  - Water derived in association with oil or gas production and disposed of in a well provided no impact on ground or surface water resources

Classes of Pollutants under the CWA

Conventional Pollutants	Toxic Pollutants/Priority Pollutant List	Non-conventional pollutants
• Biochemical oxygen demand (BOD) • Fecal coliform bacteria • Oil and grease • pH (exceeding regulatory limits) • Total suspended solids (TSS)	• Heavy metals* • Organic compounds	• Everything else • Chlorine, ammonia, nitrogen, phosphorus • Pesticides

*** 65 pollutants (and pollutant groups) defined in 1977 CWA Amendments aka Priority Pollutant List (126 compounds) defined by EPA (40 CFR 401.15)**

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CWA Administration/ Authorizations

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Administration

- Administrator of the EPA administers the Clean Water Act (CWA Section 101)
- Authorization for states, tribes, and territories is through a process that is defined by Clean Water Act (CWA) Section 402 (b) and 40 CFR Part 123
- A state may receive authorization for one or more of the NPDES program components
- If EPA disapproves the program, EPA remains the permitting authority for that state, tribe, or territory
- If EPA approves the program, the state assumes permitting authority. Submission of all new permit applications would go to the state agency for NPDES permit issuance

States Authorized to Administer NPDES Program

All states are fully authorized to administer all programs except:

Primacy

Delegation

Status of State Approval

State	Authorized State NPDES Permit Program	Authorized to Regulate Federal Facilities	Authorized State Pretreatment Program	Authorized General Permits Program
American Samoa				
Colorado	3/27/1975			3/4/1982
Delaware	4/1/1974			10/23/1992
District of Columbia				
Guam				
Guam				
Idaho				
Illinois	10/23/1977	9/20/1979		1/4/1984
Indiana	1/1/1975	12/9/1978		4/2/1991
Indiana	1/1/1975	12/9/1978		4/2/1991
Johnston Atoll				
Kansas	6/28/1974	8/28/1985		11/24/1993
Massachusetts				
Midway Island				
Montana	6/10/1974	6/23/1981		4/29/1983
Nevada	9/19/1975	8/31/1978		7/27/1992
New Hampshire				
New Mexico				
New York	10/28/1975	6/13/1980		10/15/1992
Northern Mariana Islands				
Pennsylvania	6/30/1978	6/30/1978		8/2/1991
Puerto Rico				
Vermont	3/11/1974		3/16/1982	8/26/1993
Virgin Islands	6/30/1976	12/26/2007		12/26/2007
Wake Island				
Washington	11/14/1973		9/30/1986	9/26/1989
Wyoming	1/30/1975	5/18/1981		9/24/1991

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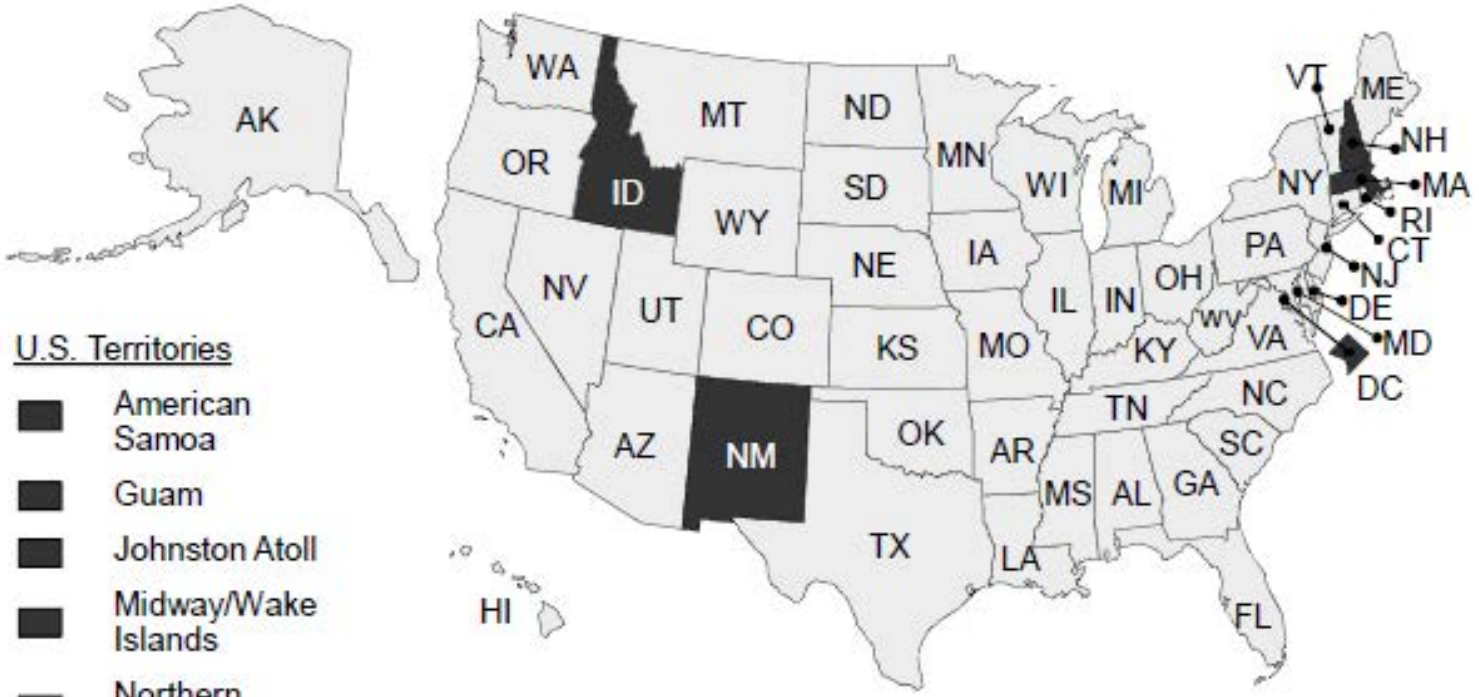
NPDES Program Authorizations



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CWA Key Sections and Authorities

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TITLE I--RESEARCH AND RELATED PROGRAMS

- SEC. 101 Declaration of Goals and Policy
- SEC. 102 Comprehensive Programs for Water Pollution Control
- SEC. 103 Interstate Cooperation and Uniform Laws
- SEC. 104 Research, Investigations, Training, and Information
- SEC. 105 Grants for Research and Development
- SEC. 106 Grants for Pollution Control Programs
- SEC. 107 Mine Water Pollution Control Demonstrations
- SEC. 108 Pollution Control in Great Lakes
- SEC. 109 Training Grants and Contracts
- SEC. 110 Application for Training Grant or Contract; Allocation of Grants or Contracts
- SEC. 111 Award of Scholarships
- SEC. 112 Definitions and Authorizations
- SEC. 113 Alaska Village Demonstration Projects
- SEC. 114 Lake Tahoe Study
- SEC. 115 In-Place Toxic Pollutants
- SEC. 116 Hudson River PCB Reclamation Demonstration Project
- SEC. 117 Chesapeake Bay
- SEC. 118 Great Lakes
- SEC. 119 Long Island Sound
- SEC. 120 Lake Champlain Management Conference
- SEC. 121. LAKE PONTCHARTRAIN BASIN
- SEC. 121. WET WEATHER WATERSHED PILOT PROJECTS.

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TITLE II--GRANTS FOR CONSTRUCTION OF TREATMENT WORKS

- SEC. 201 Purpose
- SEC. 202 Federal Share
- SEC. 203 Plans, Specifications, Estimates, and Payments
- SEC. 204 Limitations and Conditions
- SEC. 205 Allotment
- SEC. 206 Reimbursement and Advanced Construction
- SEC. 207 Authorization
- SEC. 208 Areawide Waste Treatment Management
- SEC. 209 Basin Planning
- SEC. 210 Annual Survey
- SEC. 211 Sewage Collection Systems
- SEC. 212 Definitions
- SEC. 213 Loan Guarantees for Construction of Treatment Works
- SEC. 214 Public Information
- SEC. 215 Requirements for American Materials
- SEC. 216 Determination of Priority
- SEC. 217 Cost-Effectiveness Guidelines
- SEC. 218 Cost Effectiveness
- SEC. 219 State Certification of Projects
- SEC. 220. PILOT PROGRAM FOR ALTERNATIVE WATER SOURCE PROJECTS
- SEC. 221. SEWER OVERFLOW CONTROL GRANTS

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TITLE III--STANDARDS AND ENFORCEMENT

- SEC. 301 Effluent Limitations
- SEC. 302 Water Quality Related Effluent Limitations
- SEC. 303 Water Quality Standards and Implementation Plans
- SEC. 304 Information and Guidelines
- SEC. 305 Water Quality Inventory
- SEC. 306 National Standards of Performance
- SEC. 307 Toxic and Pretreatment Effluent Standards
- SEC. 308 Inspections, Monitoring and Entry
- SEC. 309 Federal Enforcement
- SEC. 310 International Pollution Abatement
- SEC. 311 Oil and Hazardous Substance Liability
- SEC. 312 Marine Sanitation Devices
- SEC. 313 Federal Facilities Pollution Control
- SEC. 314 Clean Lakes
- SEC. 315 National Study Commission
- SEC. 316 Thermal Discharges
- SEC. 317 Financing Study
- SEC. 318 Aquaculture
- SEC. 319 Nonpoint Source Management Programs
- SEC. 320 National Estuary Program

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TITLE IV--PERMITS AND LICENSES

- **SEC. 401 Certification**
- **SEC. 402 National Pollutant Discharge Elimination System**
- **SEC. 403 Ocean Discharge Criteria**
- **SEC. 404 Permits for Dredged or Fill Material**
- **SEC. 405 Disposal of Sewage Sludge**
- **SEC. 406. COASTAL RECREATION WATER QUALITY MONITORING AND NOTIFICATION.**

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TITLE V--GENERAL PROVISIONS

- SEC. 501 Administration
- SEC. 502 General Definitions
- Sec. 507. Definition of Point Source.
- SEC. 503 Water Pollution Control Advisory Board
- SEC. 504 Emergency Powers
- SEC. 505 Citizen Suits
- SEC. 506 Appearance
- SEC. 507 Employee Protection
- SEC. 508 Federal Procurement
- SEC. 509 Administrative Procedure and Judicial Review
- SEC. 510 State Authority
- SEC. 511 Other Affected Authority
- SEC. 512 Separability
- SEC. 513 Labor Standards
- SEC. 514 Public Health Agency Coordination
- SEC. 515 Effluent Standards and Water Quality Information Advisory Committee
- SEC. 516 Reports to Congress
- SEC. 517 General Authorization
- SEC. 518 Indian Tribes
- SEC. 519 Short Title

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TITLE VI--STATE WATER POLLUTION CONTROL REVOLVING FUNDS

- **SEC. 601 Grants to States for Establishment of Revolving Funds**
- **SEC. 602 Capitalization Grant Agreements**
- **SEC. 603 Water Pollution Control Revolving Loan Funds**
- **SEC. 604 Allotment of Funds**
- **SEC. 605 Corrective Action**
- **SEC. 606 Audits, Reports, and Fiscal Controls: Intended Use Plan**
- **SEC. 607 Authorization of Appropriations**

Regulation- 40CFR Parts

40 CFR Part	Description
121	State certification of activities requiring a federal license
122	EPA administered permit programs- NPDES
123	State program requirements
124	Procedures for decommissioning
125	Criteria and standards for NPDES
130	Water quality planning and management
131	Water quality standards
132	Water quality guidance for the Great Lakes System
133	Secondary treatment regulation
136	Guidelines for establishing test procedures for analysis of pollutants
401	General provisions
403	General pretreatment regulations
405-499	Effluent limitations, guidelines and standards

SEC. 301 Effluent Limitations

– Two techniques/approaches:

- Technology Based Effluent Limitations (TBELs): Set effluent limitations from knowledge of the technology that is available for control of those particular pollutants from that particular category of facility (ELGs and BPJ)

- Water Quality Based Effluent Limitations (WQBLs): Establish effluent limitations based on what is necessary to protect the quality of the water into which the pollutants are discharged (WQC and WQS)

- ***This is similar to the Clean Air Act where some emissions limitations are based on technology and some are based on air quality***

Technology Based Effluent Limitations

Clean Water Act 304 (m) Plan

CWA establishes technology-based performance requirements and compliance dates for different types of dischargers

Performance requirements developed through effluent guidelines

- Direct Dischargers
  - NSPS (CWA Section 306)
  - Existing sources (CWA sections 301 and 304)
- Indirect Dischargers
  - Pretreatment standards for new sources
  - Pretreatment standards for existing sources

Technology Based Effluent Limitations

TBELs for a particular pollutant are not the same for all categories of facilities

Recognizes that the manufacturing process and mix of pollutants and wastewater matrix varies between industries

Effluent Limitations are established based on:

- Best Practicable Control Technology Currently Available (BPT)
- Best Available Technology Economically Achievable (BAT)
- Best Conventional Pollutant Control Technology (BCT)
- New Source Performance Standard (NSPS)- (SEC. 306)

Technology Based Effluent Limitations

How do you know what is considered BPT, BCT, BAT, or NSPS?

- Determined by EPA through effluent limitations guidelines (ELGs) required under SEC. 304, 306 and 307 of the CWA (ELGs are found in CFR Parts 405-499)
- ELGs are given to the States and regulated community as the basis for setting effluent limitations in permits
- BPT, BCT, BAT, and NSPS are listed in the ELGs
- Best Professional Judgement (BPJ) are established by EPA or delegated State on a case by case basis when:
  - No effluent guidelines promulgated, or
  - Effluent guidelines applicable, but pollutants or processes present are not considered in the guideline
- Feel free to question case-by-case limits based on BPJ. Assumptions used by the agency may not always be accurate

Technology Based Effluent Limitations Guidelines and Standards for Industrial Discharges Requirements Matrix

Control level	Discharger	Conventional	Non conventional	Toxic
BPT	Direct-existing	X	X	X
BCT	Direct-existing	X		
BAT	Direct-existing		X	X
NSPS	Direct-new	X	X	X
PSES	Indirect-existing	X	X	X
PSNS	Indirect-new	X	X	X

Existing ELGs

Airport Deicing
Aluminum Forming
Asbestos Manufacturing
Battery Manufacturing
Canned and Preserved Fruits and Vegetable Processing
Canned and Preserved Seafood (Seafood Processing)[1]
Carbon Black Manufacturing
Cement Manufacturing
Centralized Waste Treatment (Possible Revision)
Coal Mining
Coil Coating
Concentrated Animal Feeding Operations (CAFO)
Concentrated Aquatic Animal Production (Aquaculture)
Construction and Development
Copper Forming
Dairy Products Processing
Electrical and Electronic Components
Electroplating
Explosives Manufacturing
Ferroalloy Manufacturing
Fertilizer Manufacturing
Glass Manufacturing
Grain Mills Manufacturing
Gum and Wood Chemicals
Hospitals
Ink Formulating
Inorganic Chemicals
Iron and Steel Manufacturing
Landfills
Leather Tanning and Finishing
Meat and Poultry Products
Metal Finishing (Possible Revision)
Metal Molding and Casting (Foundries)
Metal Products and Machinery
Mineral Mining and Processing
Nonferrous Metals Forming and Metal Powders
Nonferrous Metals Manufacturing
Oil and Gas Extraction[1]
Ore Mining and Dressing (Hard Rock Mining)
Organic Chemicals, Plastics and Synthetic Fibers (OCPSF)
Paint Formulating
Paving and Roofing Materials (Tars and Asphalt)
Pesticide Chemicals
Petroleum Refining (Possible Revision)
Pharmaceutical Manufacturing
Phosphate Manufacturing
Photographic
Plastics Molding and Forming
Porcelain Enameling
Pulp, Paper and Paperboard
Rubber Manufacturing
Soap and Detergent Manufacturing
Steam Electric Power Generating (New)
Sugar Processing
Textile Mills
Timber Products Processing
Transportation Equipment Cleaning
Waste Combustors

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Application of Effluent Guidelines

– ELGs are defined in terms of actual effluent limits not a particular technology

– Could be expressed in concentration terms or mass per production units

BPT EFFLUENT LIMITATIONS

Pollutant or pollutant property	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Concentration in mg/l	
Iron, total	7.0	3.5
Manganese, total	4.0	2.0
TSS	70	35
pH	[1]	[1]

[1] Within the range of 6.0 to 9.0 at all times.

BAT EFFLUENT LIMITATIONS

Pollutant or pollutant property	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Concentration in mg/l	
Iron, total	7.0	3.5
Manganese, total	4.0	2.0

– EPA does not require a particular technology to be used- only the effect to be achieved

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Variances

- Fundamentally Different Factors- Request for an alternative set of effluent limitations must be made within 180 days after the promulgation of the effluent limitation guidelines for that type of facility
- Economic availability- EPA-HQ (Non-conventional pollutants only)
- Non-conventional pollutants- EPA-Regions
- Thermal discharges- NPDES (State)
- Intake-discharge net basis (net/gross)- NPDES (State)

Water Quality Related Effluent Limitations

Section 101(a) (2), and (3) establishes fishable and swimmable goal and no toxics in toxic amounts policy

Section 303(c) establishes framework for water quality standards program and requires states to establish water quality standards

Section 304(a) requires EPA to develop and publish recommended water quality criteria

Section 301(b)(1)(C) requires compliance with effluent limitations necessary to meet water quality standards

Water Quality Standards (Section 303 (c))

- requires States, Territories, and Indian Tribes to establish water quality standards (WQS) for each body of water in the state
- Standards are reviewed every 3 years
- EPA has oversight authority to review, approve, and promulgate standards
- Standards not effective until EPA approves them
- WQS are quantifiable measurements to meet the CWA objectives
- WQS apply to the WOTUS

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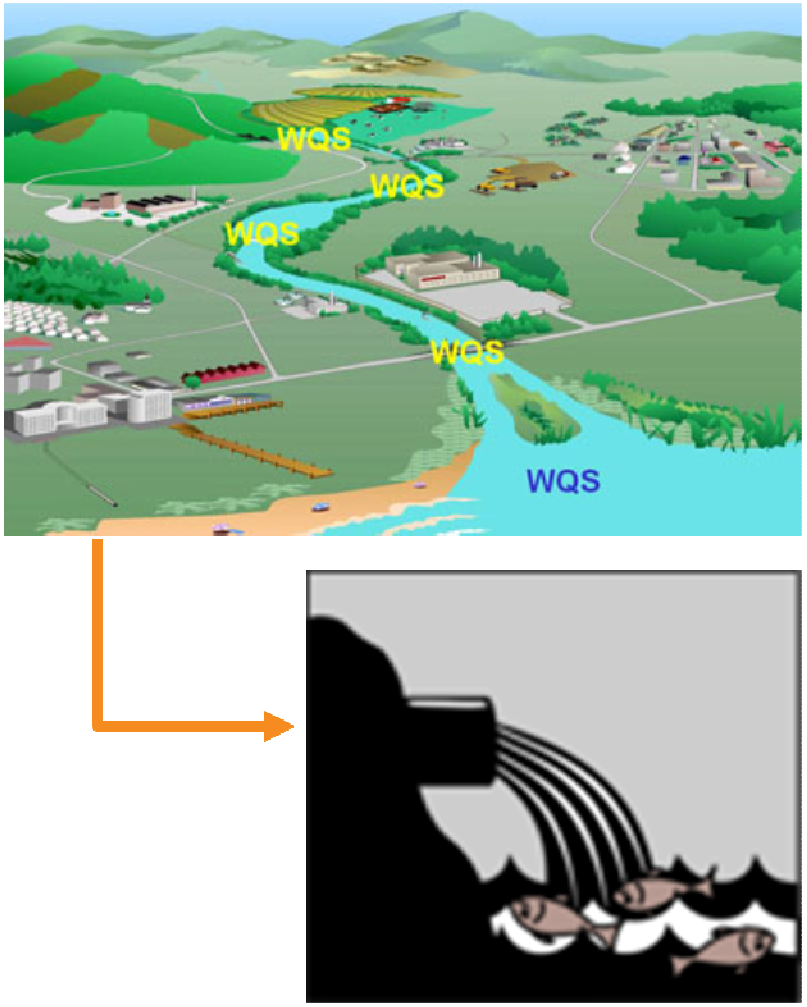
Relationship Between WQS and Effluent Limitations

- Water quality standards apply throughout the waterbody (or segment of a waterbody) as defined by the state, territory, or tribe
- Effluent limitations apply at the compliance point established in the permit (generally “end of pipe”)- Enforceable



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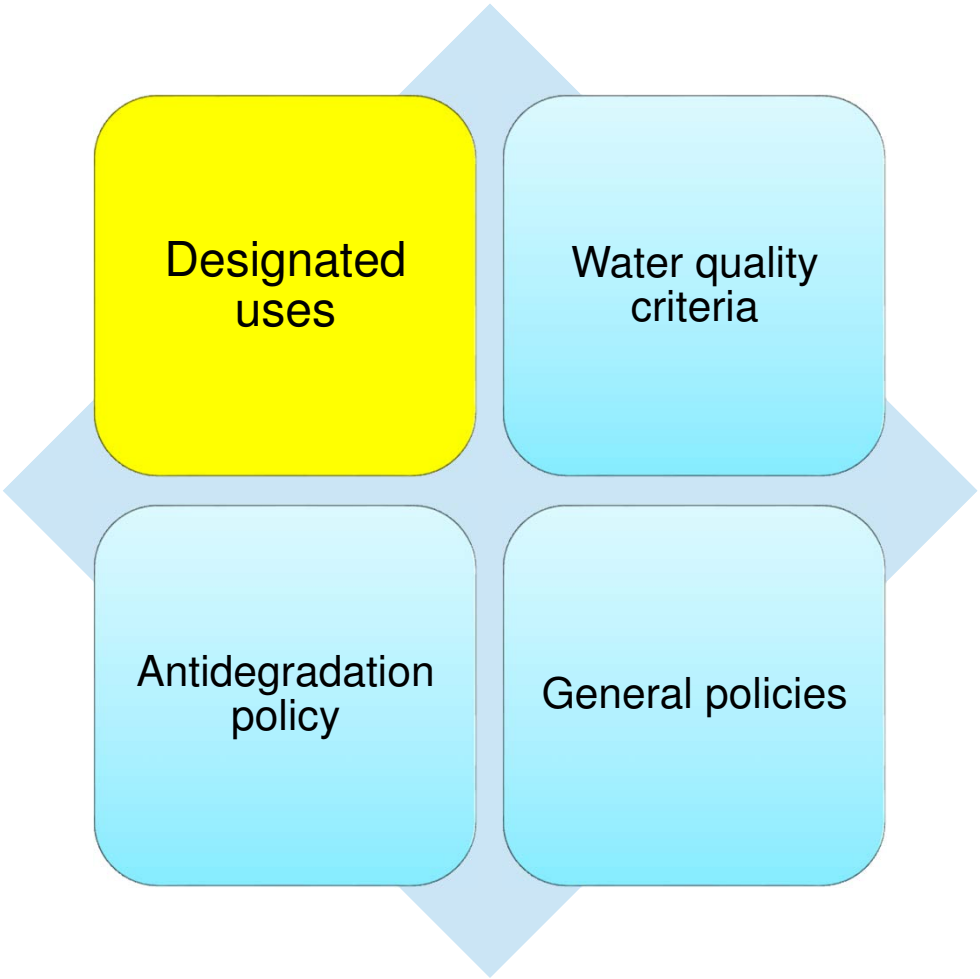
Components of water quality standards include:



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Designated Uses – 40 CFR 131/10

Water quality standards must specify appropriate uses to be achieved and protected

Common use categories

- Aquatic life habitat and propagation
- Wildlife propagation
- Recreation
  - primary
  - secondary
- Public water supply
- Agricultural water supply
- Industrial water supply
- Navigation

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Designated Uses--Existing Uses

–Cannot be removed and must always be included as designated uses in the water quality standards.

–What are existing uses?

- Uses actually attained in the water body on or at any time after November 28, 1975

Designated Uses- Can they be removed?

- Designated uses may be removed if:
  - they are not existing uses and
  - attaining the use is not feasible, as demonstrated by a use attainability analysis (UAA)

- Use Attainability Analysis (UAA): A structured scientific assessment of the factors affecting the attainment of a designated use, which may include physical, chemical, biological, and economic factors as described in 40 CFR 131.10(g)
- Removing a designated use is a permanent change to water quality standards.

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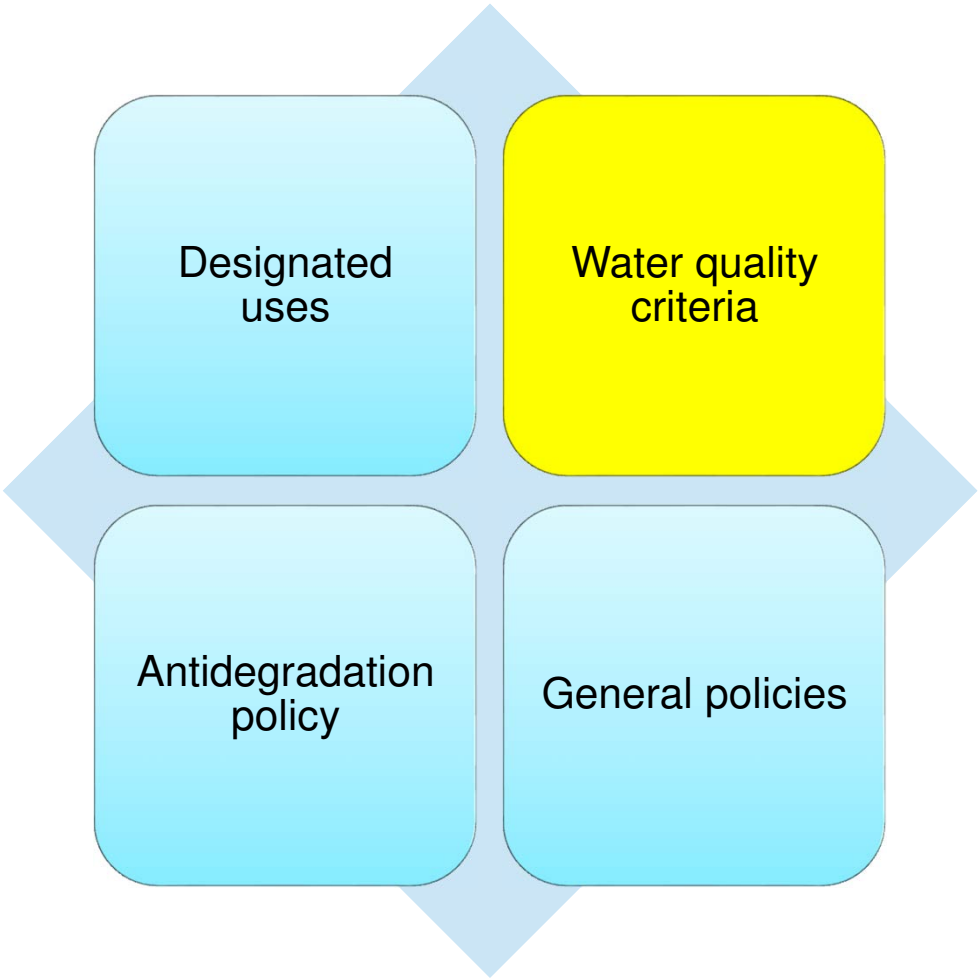
Components of water quality standards include:



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Water Quality Criteria

- EPA responsible for establishing guidance and procedures
  - Establish and publish scientifically derived ambient criteria [CWA Section 304(a)]
    - 1968 Green
    - 1973 Blue
    - 1976 Red
    - 1980 Toxics
    - 1986 Gold
  - Establish procedures for deriving criteria

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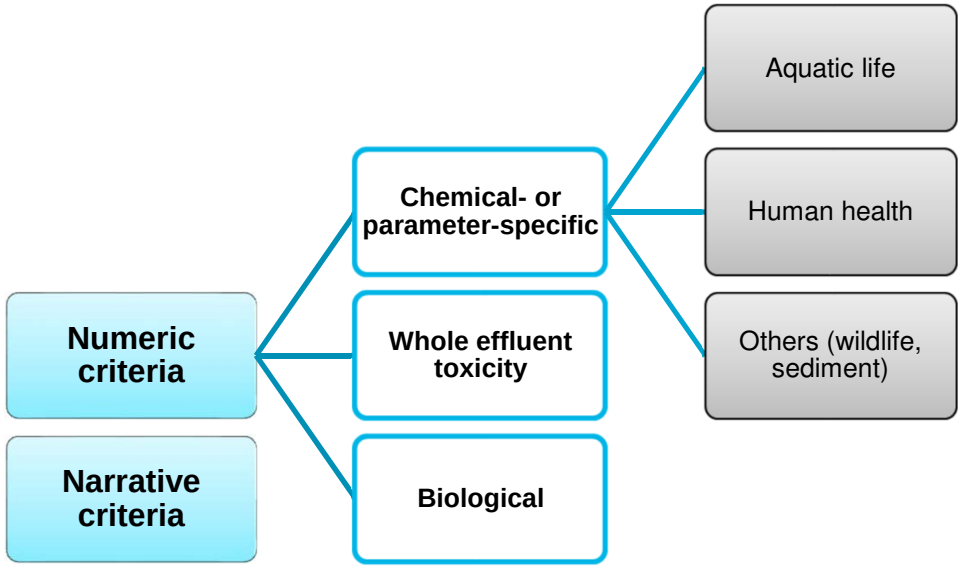
Water Quality Criteria (CWA Section 304; 40 CFR 131.11)

- Water quality criteria (WQC) are numeric and narrative descriptions of the conditions in a water body necessary to support the DUs.
- Can be expressed as concentrations of pollutants, temperature, pH, turbidity units, toxicity units, or other quantitative measures:



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Numeric Aquatic Life Criteria (Examples)

- Temperature criteria may be species, water body, and seasonally dependent-
  - absolute temperature values (e.g., temperature may not exceed 18ºC)
  - Restrictions on causing changes in temperature in water body (e.g., discharges may not warm receiving waters by more than 0.3ºC)
- Dissolved Cd (Hardness dependent): the 4-day average concentration (in µg/L) does not exceed the numerical value given by:

$$e^{(0.7409[\ln(\text{hardness})]-4.719)}\ (1.101672-[(\ln \text{hardness})(0.041838)])$$

Example: Numeric Aquatic Life Criteria for Cadmium

– **Cadmium (dissolved)**—Except possibly where a locally important species is very sensitive, freshwater aquatic organisms and their uses should not be affected unacceptably if:

– the 4-day average concentration (in µg/L) does not exceed the numerical value given by:
  • e(0.7409[ln(hardness)]-4.719) (1.101672-[(ln hardness)(0.041838)])

– more than once every three years on average the 1-hour average concentration (in µg/L) does not exceed the numerical value given by:
  • e(1.0166[ln(hardness)]-3.924) (1.136672-[(ln hardness)(0.041838)])

more than once every three years on average

Aquatic Life Criteria

Designed to protect aquatic organisms, including animals and plants

Typically two types of aquatic life criteria

- acute
- chronic

Developed based on tests measuring effect on aquatic life

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Whole Effluent Toxicity (WET)

Measures the aggregate toxic effect of effluent

Exposes aquatic test organisms directly to an effluent

Measures lethal and sub-lethal effects

Uses standard EPA test methods (freshwater and saltwater)

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Human Health Criteria

Toxic Pollutants

- Single expression of highest pollutant concentration not expected to pose significant long-term risk to human health
- Consider chronic exposure via:
  - consumption of aquatic life
  - consumption of aquatic life and water

Other Pollutants

- Generally shorter-term exposure (e.g., bacteria)

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Biological Criteria

- Quantitative expressions of desired condition of the aquatic community
- Derived using data from sites representing least impacted attainable condition for a specific waterbody type within an ecoregion or watershed
- Traditionally use benthic invertebrate and fish sampling

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Narrative Criteria

Statements that describe desired water quality goal, often expressed as "free from" statements.

- All waters must be free from toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life
- No toxic chemicals in toxic amounts
- Waters must be free from discoloration that causes nuisance or adversely affects designated uses
- Waters must be free from floating material in amounts that cause nuisance or adversely affect designated uses (e.g. Sheen)

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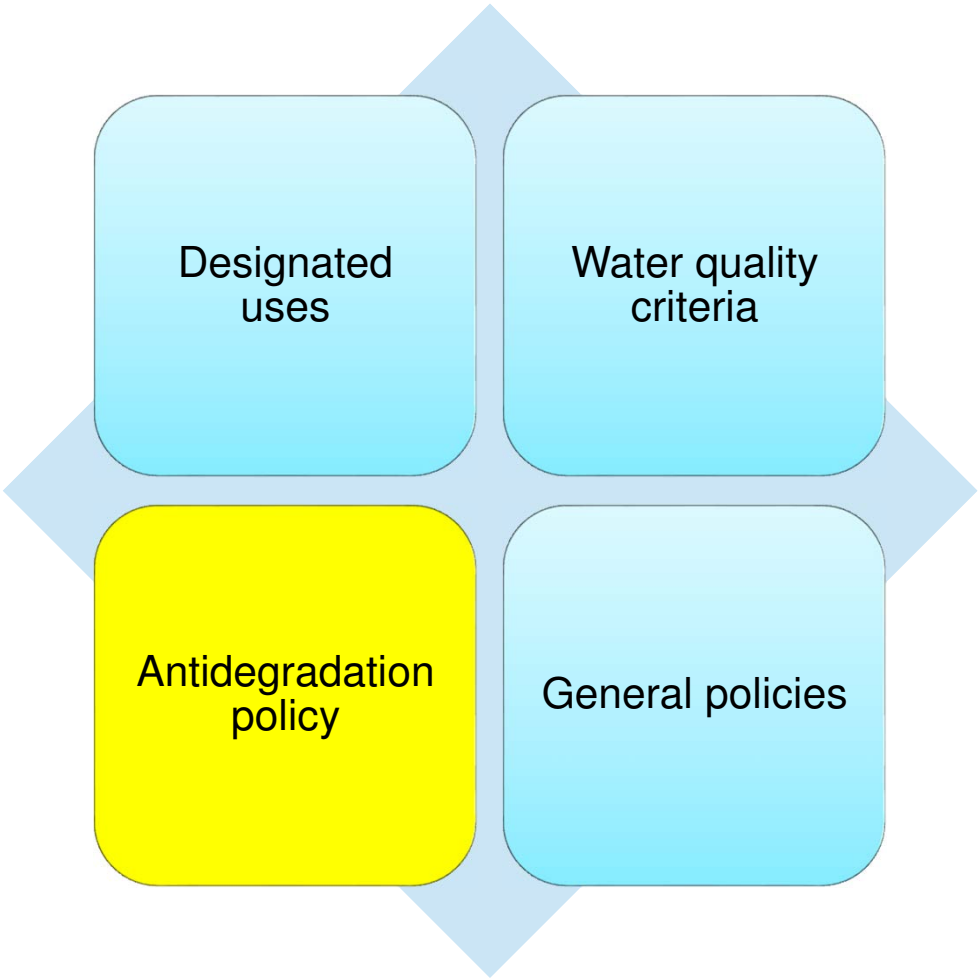
Components of water quality standards include:



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Antidegradation Policy – 40 CFR 131.12

- An antidegradation policy is a required policy that:
  - Ensures that once a use is achieved it will be maintained to protect high quality waters
  - Protects Outstanding National Resource Waters
- Each state, territory, or tribe is required to adopt an antidegradation policy as part of its water quality standards and to adopt a method of implementation

Antidegradation Policy Tiers

– Three tiers:

I. Ensures level of quality necessary to protect existing uses

II. Protects actual water quality where water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water (i.e., protection of high quality waters)

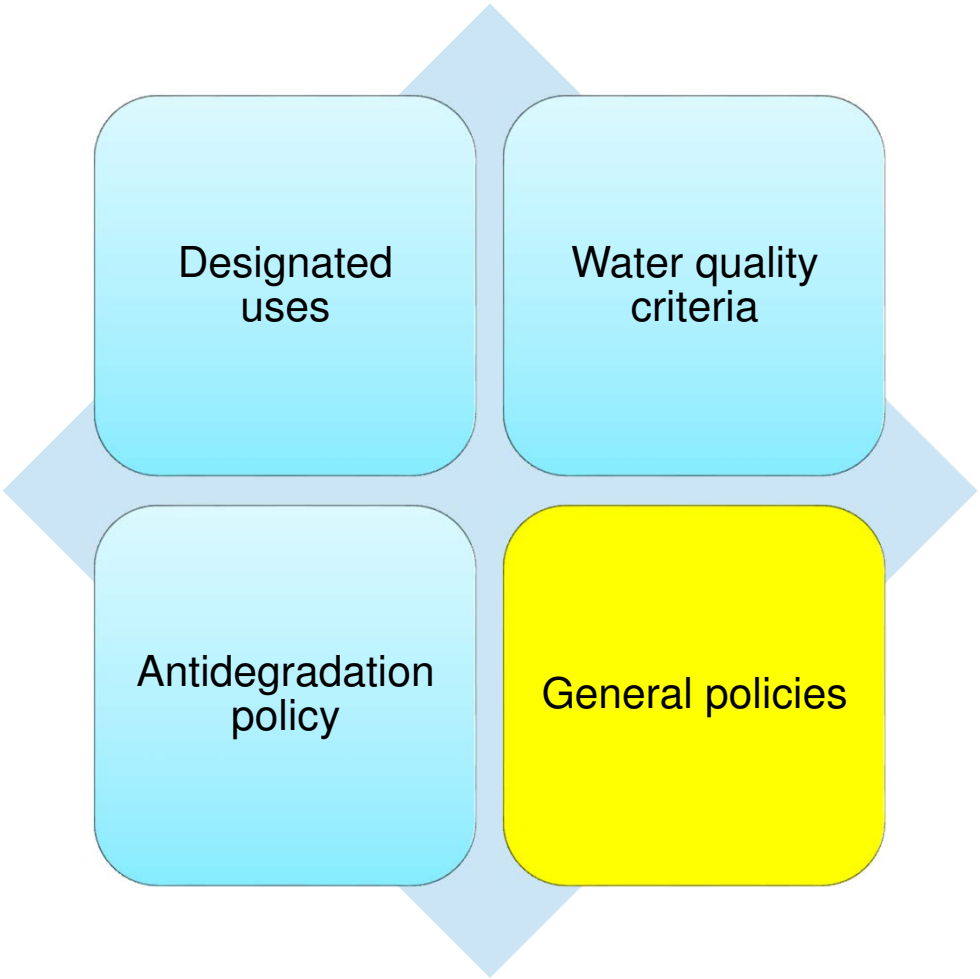
III. Provides special protection of waters designated as Outstanding National Resource Waters (ONRWs)

- National and state parks
- Wildlife refuges
- Ecologically unique waters that need additional protection or are of special significance (i.e., swamps, hot springs, etc.)

Antidegradation Policy – Additional Tiers

– "Tier 2 1/2"
  - Additional "tier" included in some antidegradation policies
  - Provides greater level of protection than Tier 2 but less protection than Tier 3

Components of water quality standards include:



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General Water Quality Standards Policies – 40 CFR 131.13

- States, territories, and tribes may include in their standards, at their discretion, policies affecting water quality standards application and implementation, such as
  - mixing zones
  - low flows
  - variances

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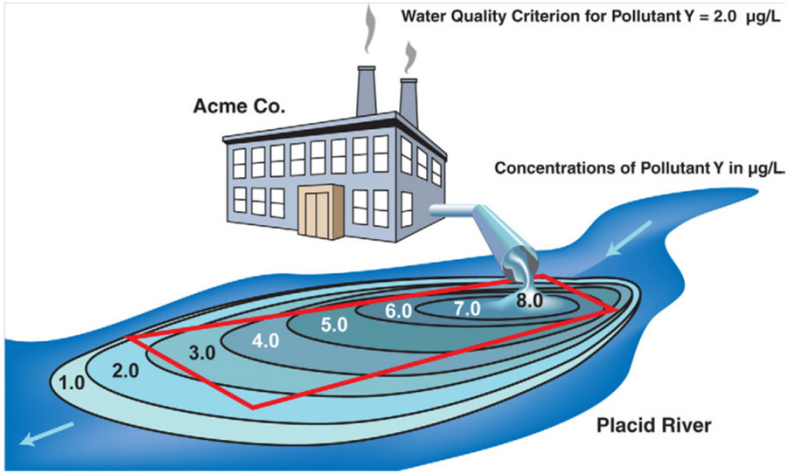
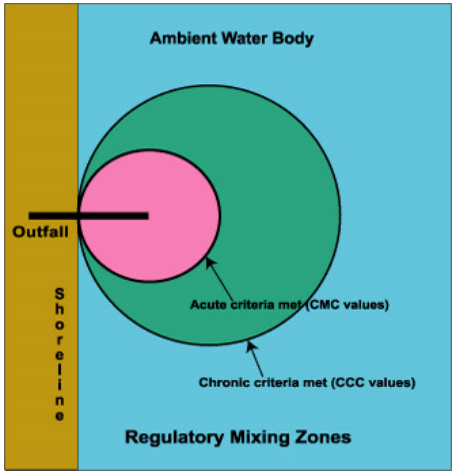
Mixing Zone

States can establish and allow mixing zones:

– Where water quality standards do not allow consideration of dilution or mixing zones, water quality criteria must be attained at point of discharge.

– Where water quality standards allow consideration of dilution or mixing zones, water quality criteria must be met in the receiving water after accounting for allowable dilution or at the edge of the regulatory mixing zone.





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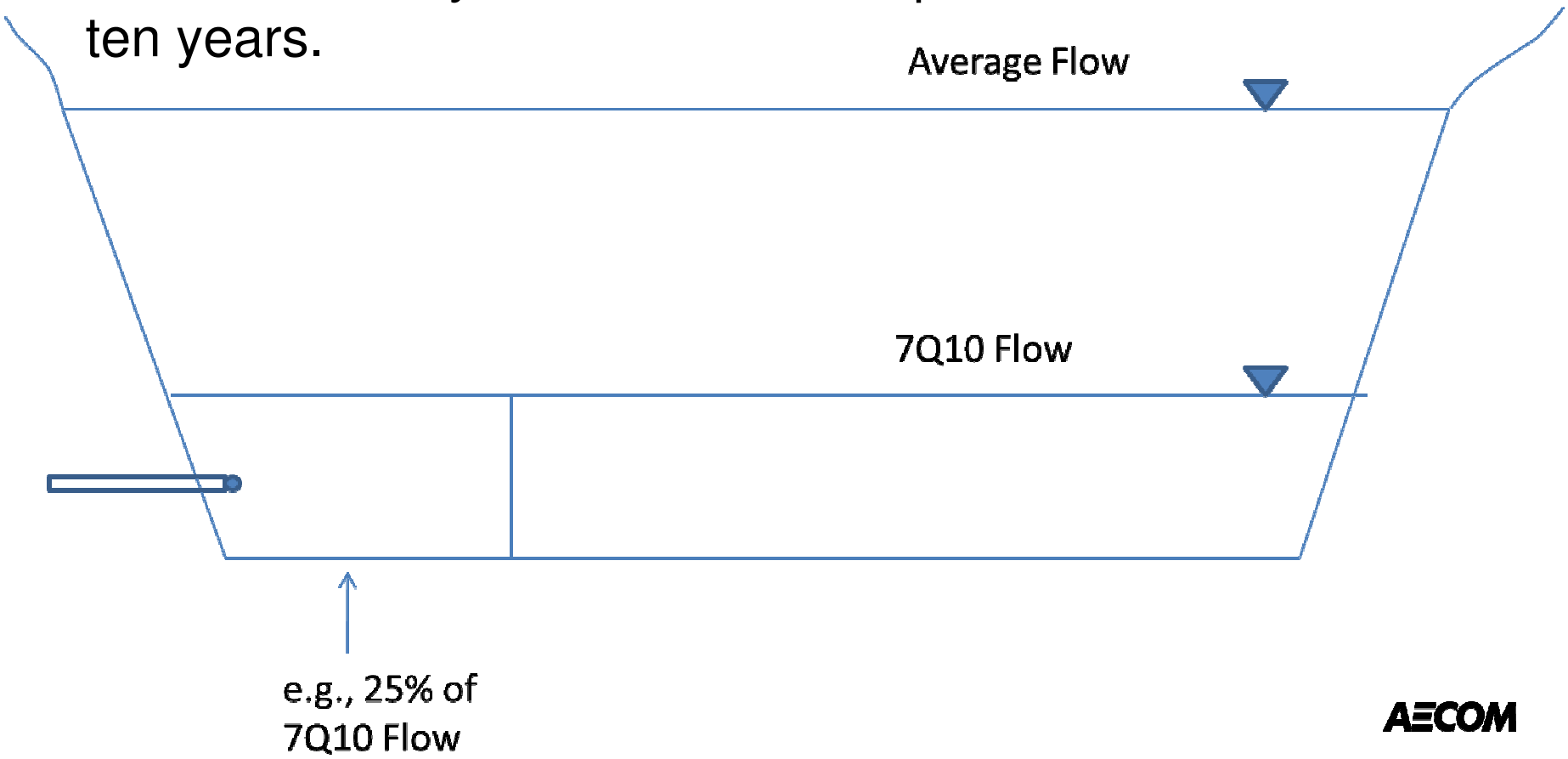
Example Mixing Zone Size

- 1/4 of stream width and 1/4 mile downstream
- <1/2 stream width and longitudinal limit of 5X stream width
- Default dilution of no more than 25% of critical flow (7Q10)
- No more than 5% of the lake surface
- Default of no more then 4:1 dilution for lake discharges

In terms of Critical Low Flow

– 7Q10: Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.



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What if WQS are exceeded?

–If WQS exceeded:

- Place the water body on the state's CWA Sec. 303(d) list (Threatened and impaired waters list)
- Develop TMDL(s) for each pollutant exceeding WQC
- Reduce effluent limits in NPDES permits for regulated facilities and activities to the degree necessary to prevent any cause of or contribution to violations of WQS and to achieve wasteload allocations (WLAs) in any relevant TMDLs

CWA section 303(d)(1)

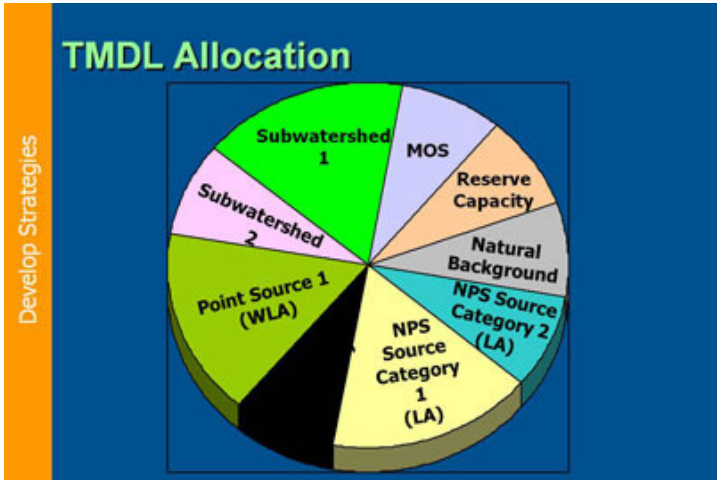
Requires states, territories, and tribes to identify waters that will not achieve water quality standards after implementation of technology-based limitations

Requires ranking of identified waters based on severity of pollution and uses

Requires TMDL for priority waters

Total Maximum Daily Load (TMDL)

- Defined as the amount of pollutant that may be discharged into a water body with water body still meeting water quality standards
- Used as a tool for implementing water quality standards
- TMDL Elements:
  - Allowable pollutant load (Cap)
  - Margin of Safety (MPS)
  - Waste Load Allocations among sources



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Watershed Analysis

- Even where TMDL is not required, a watershed analysis might consider all the sources of a pollutant or stressor contributing to the waterbody
- Like a TMDL, watershed analysis could be used to:
  - Identify point sources that need WQBELs
  - Assign allocations to those point sources

SEC. 308 Inspections, Monitoring and Entry

–Gives EPA authority under the CWA to:

- Conduct facility inspections- has right of entry
- Request data and information to verify compliance or to support the development of effluent limitation guidelines, effluent standards, pretreatment standard, etc.
- Ability to make data public except when trade secrets are at stake (does not apply to effluent discharge data)

SEC. 311 Oil and Hazardous Substance Liability

- Regulates oil discharges into waters of the US other than what is covered by an NPDES permit under Section 402.
  - Direct release to surface waters (river, creek, drainage swale)
  - Direct release into stormwater drains
  - Spillage on soil that reaches groundwater
- U.S. EPA definition of oil
  - Any kind or in any form, including (but not limited to) petroleum, fuel, oil, sludge oil refuse, oil mixed with wastes other than dredged spoil, vegetable and animal oil. Mineral oil, transformer oil, and other oils
- Federal law under 40 CFR 112 (Pollution Prevention) promulgated under the Clean Water Act (CWA) requires facilities affected by rule to prepare and implement SPCC plans

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Applicability Thresholds

- Facilities that store 1,320 gallons or more (aboveground) of petroleum-based oil within bulk storage containers or electrical equipment
- Facilities that store 42,000 gallons or more (underground) of petroleum-based oil
- Over 1 million gallons also can make facility subject to Facility Repose Plan (FRP) requirements

Applicability Thresholds

- Aboveground storage tanks (ASTs)
- Container and drum storage areas
- Fluid transfer equipment
- Fuel transfer and use
- Oil-filled processing equipment

What is an SPCC Plan?

– Document that contains specific instructions on:
  - On-site oil containers or equipment
  - Containment on site for preventing spills
  - Actions required in event of a spill
  - Required inspections
  - Information on loading/unloading areas
  - Spill prevention procedures
  - Notifications lists
  - Primary steps on what to do in a spill incident to prevent oil from reaching water and whom to call

SEC. 316 Thermal Discharges

- Section 316(a)- the Administrator (or, if appropriate, the State) may impose an effluent limitation with respect to the thermal component of such discharge, that will assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on that body of water
- Section 316(b) of the federal Clean Water Act (CWA) requires that the design, construction, capacity and location of cooling water intake structures represent best technology available (BTA) for minimizing adverse environmental impact.
  - Impacts occur when small aquatic organisms pass through an industrial facility's cooling water system (entrainment) and when larger life stages of fish and invertebrates are caught on the intake screens (impingement).

316(b) Rule History

- The rules were published in three phases reflecting specific classes of industrial facilities:
  - Phase I: New power generating or manufacturing facilities (published 2001 and amended in 2003)
  - Phase II: Existing Electric Power Plants, 2004 rule- **Withdrawn**
  - Phase III: New offshore oil and gas facilities (published 2006)
  - Final Rule for Existing Electric Generating Plants and Factories: (Published May 19, 2014)
    - Existing electric generating facilities and manufacturing facilities
    - New unit at an existing generating or manufacturing facility
    - Existing offshore oil and gas, and offshore seafood processing facilities

316(b) Key Requirements

- This rule covers roughly 1,065 existing facilities that are designed to withdraw at least 2 million gallons per day of cooling water. EPA estimates that 521 of these facilities are factories, and the other 544 are power plants.
- The facilities are required to choose one of seven options to reduce mortality to fish and other aquatic organisms.
- Facilities that withdraw at least 125 million gallons per day must conduct studies to help their permitting authority determine whether and what site-specific controls, if any, would be required to further reduce mortality of aquatic organisms.
- New units added to an existing facility are required to reduce mortality of aquatic organisms that achieves one of two alternatives under national entrainment standards.

SEC. 319 Nonpoint Source Management Programs

- The CWA does not provide a detailed definition of nonpoint sources. Rather, they are defined by exclusion—anything not considered a “point source”
- All nonpoint sources of pollution are caused by runoff of precipitation (rain and/or snow) over or through the ground. This includes stormwater associated with industrial activity, construction-related runoff, and discharges from municipal separate storm sewer systems (MS4s).
- Atmospheric deposition also is a form of nonpoint source according to the CWA and EPA regulations: pollutants discharged into the air and returned directly or indirectly to surface waters in rainfall and snow, as well as so-called dry deposition between precipitation events
- Pollutants commonly associated with NPS include nutrients (phosphorus and nitrogen), pathogens, clean sediments, oil and grease, salt, and pesticides.
- Under the Clean Water Act section 319, states, territories, and delegated tribes are required to develop nonpoint source pollution management programs (if they wish to receive 319 funds)

SEC. 319 Nonpoint Source Management Programs

- Sec. 319 funds also can be used for developing and implementing TMDLs in watersheds where nonpoint sources are a substantial contributor of loadings of the pollutant(s) causing impairment
- A state, tribe, or territory receiving section 319 funds must complete and update an NPS management plan every five years
- A watershed management plan defines and addresses existing or future water quality problems from point sources and nonpoint sources of pollutants.

Stormwater

- Stormwater:
  - Runoff from drainage, snowmelt, and surface runoff
  - Commonly discharged, often untreated, into all kinds of receiving water bodies
- Pollutants in Stormwater:
  - Bacteria
  - Chemicals
  - O&G
  - Heavy metals

Threat to aquatic life, drinking water, and recreational and economic uses of receiving waters

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Stormwater

- EPA and many states have developed a NPDES stormwater program
- Reduce pollution associated with stormwater runoff from industrial activities and sediment from construction activities

Stormwater

- Federal and state-delegated NPDES programs issue both general and individual stormwater discharge permits
- Available general permits vary from state to state
- For discharges, :
  - Obtain an NPDES stormwater discharge permit (individual or general)
  - Develop and implement a stormwater pollution prevention plan
  - Use best management practices (BMPs) to reduce discharge of pollutants into receiving waters

Stormwater BMPs

- Erosion and sediment control measures during and after construction activities
- Designation of staging areas and stockpiles
- Stormwater collection basin
- Stabilization of disturbed areas
- Paved or rock construction designated entrance
- Removal of sediment
- Energy dissipaters
- Sediment basins
- Vegetative control

SEC. 401 Certification

- Applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the United States must provide the federal agency with a Section 401 certification
- The certification, made by the state in which the discharge originates, declares that the discharge will comply with applicable provisions of the act, including water quality standards
- Section 401 provides states with two distinct powers:
  1. the power indirectly to deny federal permits or licenses by withholding certification; and
  2. the power to impose conditions upon federal permits by placing limitations on certification.

SEC. 404 Permits for Dredged or Fill Material

- Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged and fill material into waters of the United States
- The 404 permit program is administered jointly by EPA and the U.S. Army Corps of Engineers in all but two states.
- The Corps handles the actual issuance of permits, individual and general. The Corps has primary responsibility for ensuring compliance with permit conditions, while EPA typically takes the enforcement lead for unpermitted discharges
- Section 404 requires a landowner to obtain a permit from the U.S. Army Corps of Engineers (USACE) or a state with an EPA-approved program prior to placement of dredged or fill material into waters of the United States, including wetlands.
- when you apply for a permit, you must show that you have:
  - taken steps to avoid wetland/stream impacts where practicable.
  - minimized potential impacts to wetlands/streams.
  - provided compensation for any remaining, unavoidable impacts.
  - thorough activities to restore or create wetlands/streams.

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U.S. Army Corps of Engineers (USACE) Permitting Process

Individual Permit

- Full public interest review of an individual application
- After review, final decision is issued
- Decision is based on balancing positive and negative impacts
- Approval granted if project is in public interest
- Processing time 90-120 days unless public hearing or EIS is required
- An application form must be completed

Nationwide Permit (NWP)

- Form of general permit that authorizes a category of activities
- Permit valid only if applicable conditions are met
- If conditions cannot be met, a regional or individual permit is required
- Some NWPs require submitting a preconstruction notification (PCN)

Regional Permit

- Issued for a general category of activity when:
  - The activities are similar in nature and cause minimal environmental impacts
  - Reduces duplication of regulatory control by state and federal agencies

SEC. 402 National Pollutant Discharge Elimination System

- The CWA makes it illegal to discharge **pollutants** from a **point source** (i.e., a manmade conveyance, such as a pipe, ditch, tank, vehicle, etc.) to the **waters of the United States** except in accordance with a permit
- Section 402 of the act creates the National Pollutant Discharge Elimination System (NPDES) regulatory and permitting program
- Point sources must obtain a discharge permit from the proper authority (usually a state, but sometimes the EPA, a tribe, or a territory)

NPDES Program

- NPDES Permit Application Process
- Implementing TBELS into Permit
- Implementing WQBLs into Permit:
  - Identifying applicable standards
  - Characterizing the effluent and receiving stream
  - Determining the need for Chemical Specific WQBLs
  - Calculating Chemical Specific WQBLs
- Monitoring and reporting requirements
- Special or Narrative Conditions in Permits
- Standard Conditions in Permits
- Administrative Process

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NPDES Permit Application Process- Who should apply

- Anyone who discharges pollutants or proposes to discharge pollutants to waters of the United States
- Signatories
  - **Corporation**—responsible corporate officer (president, vice president, secretary, treasurer, some facility managers)
  - **Partnership or sole proprietorship**—general partner or the proprietor
  - **Municipality, state, federal or other public agency**—principal executive officer or ranking elected official

Exclusions

– The following do not require NPDES permits:

- Discharge of sewage from vessels [and discharges incidental to the normal operation of a vessel]
- Discharges of dredged or fill material (Corps)
- Indirect discharges to POTWs (Pretreatment Program)
- Discharges in compliance with instructions of an On-Scene Coordinator pursuant to 40 CFR Part 300 or 33 CFR 153.10(e)
- Discharge from non-point sources

Type of Permits

Individual Permit

- 1 application submitted- 1 permit issued
- Appropriate where site-specific limits, management practices, monitoring and reporting or other facility-specific permit conditions are needed

Type of Permits

General Permit (40CFR 122.28)

– Many applications submitted- 1 permit issued

– Appropriate where:

- Multiple dischargers require permit coverage
- Sources and discharges similar (same processes)
- Sources and discharges within same geographic area
- Permit conditions relatively uniform

General permit must identify:

– Areas of coverage

– Sources covered

– Application process (NOI)

When to Apply?

Type of Permit	Type of Discharge	Schedule*
Individual	New	At least 180 days before date on which the discharge is to commence [§ 122.21(c)]
	Existing	At least 180 days before expiration of existing permit [§ 122.21(d)]
	Stormwater Construction	At least 90 days before date on which construction is to commence [§ 122.21(c)]
General	New	Specified in the general permit
	Existing	Specified in the general permit

* Authorized states may use more stringent deadlines.

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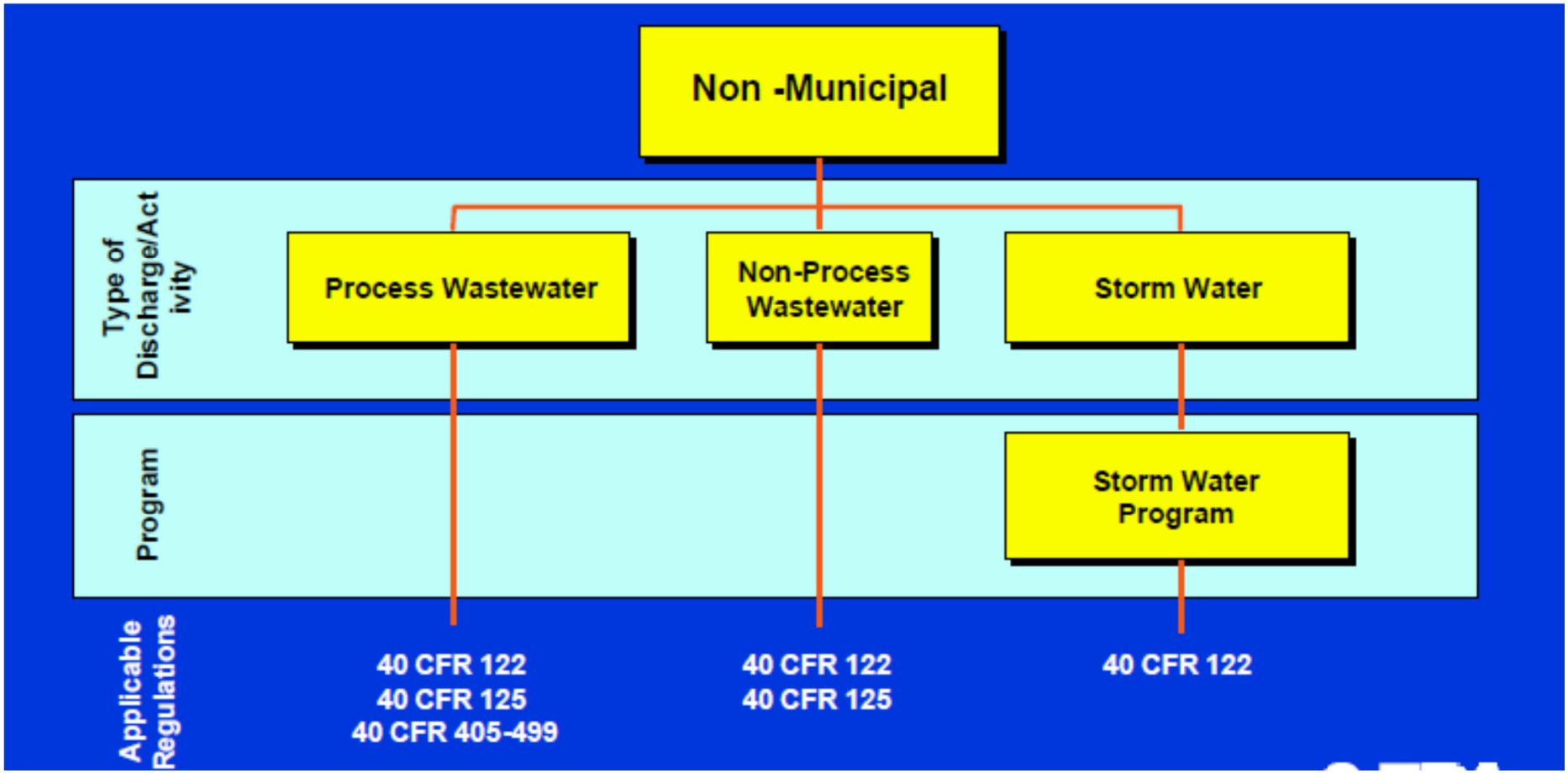
What's Covered in Permits?



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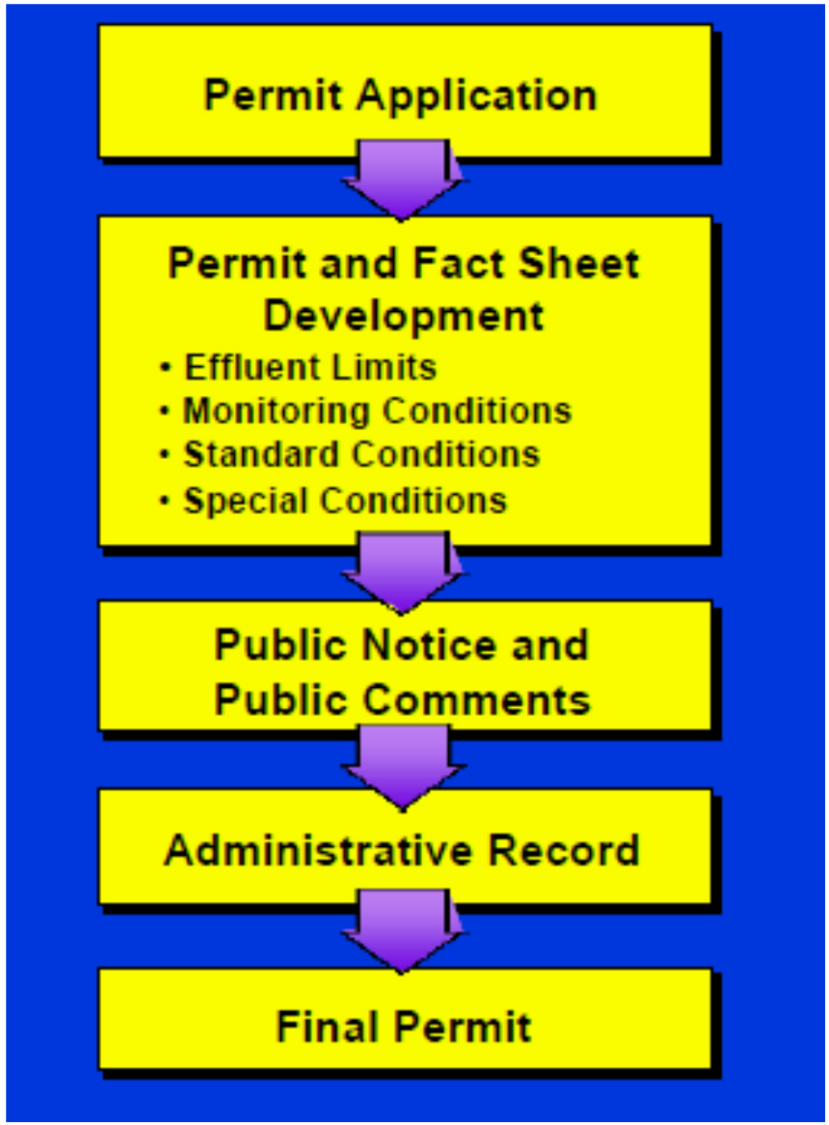
Application Forms For Individual Permits

Form	Title/Applicability	Regulation Cite 40 CFR
1	General Information	122.21(f)
2A	New and existing POTWs	122.21(j)
2S	Treatment Works Treating Domestic Sewage (TWTDS)	122.21(q)
2B	New and existing concentrated animal feeding operations and concentrated aquatic animal production facilities	122.21(i)
2C	Existing manufacturing, commercial, mining, and silvicultural discharges	122.21(g)
2D	New manufacturing, commercial, mining, and silvicultural discharges	122.21(k)

Application Forms for Individual Permits

Form	Title/Applicability	Regulation Cite 40 CFR
2E	Manufacturing, commercial, mining, and silvicultural facilities that discharge only non-process wastewater	122.21(h)
2F	Stormwater discharges associated with industrial activity and discharges associated with small construction activity	122.26(c)
None	Stormwater discharges from large and medium MS4s	122.26(d)
None	Stormwater discharges from small MS4s	122.33
None	Cooling water intake structures	122.21(r)

Issuance Process for Individual and General Permits



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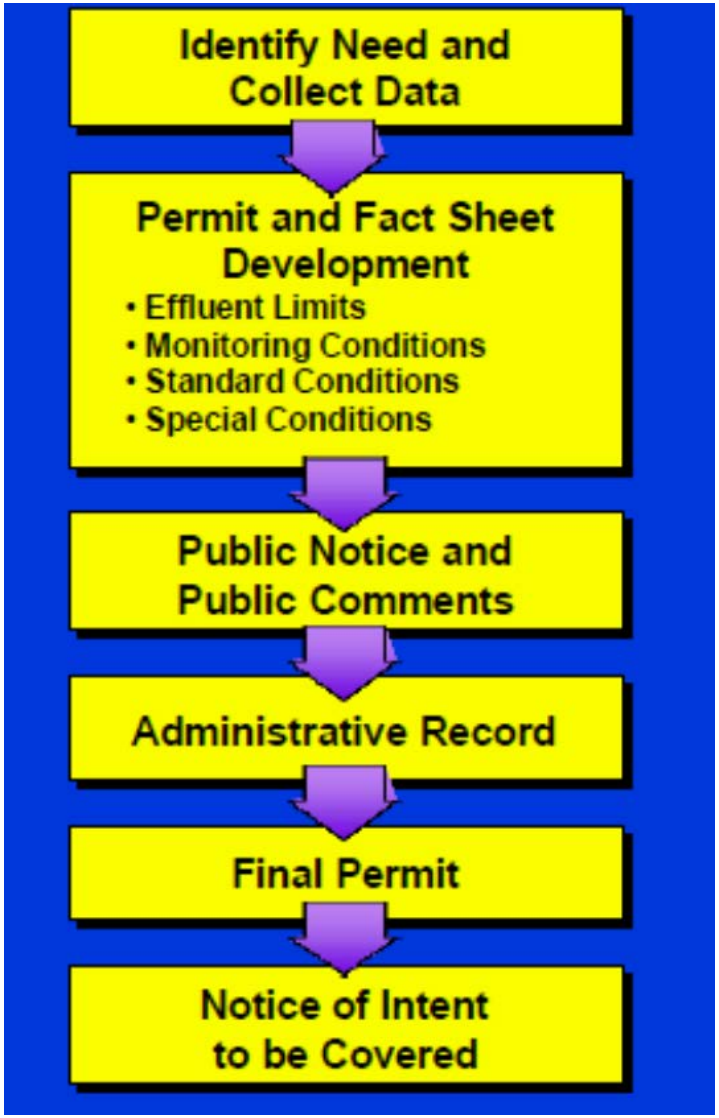

General

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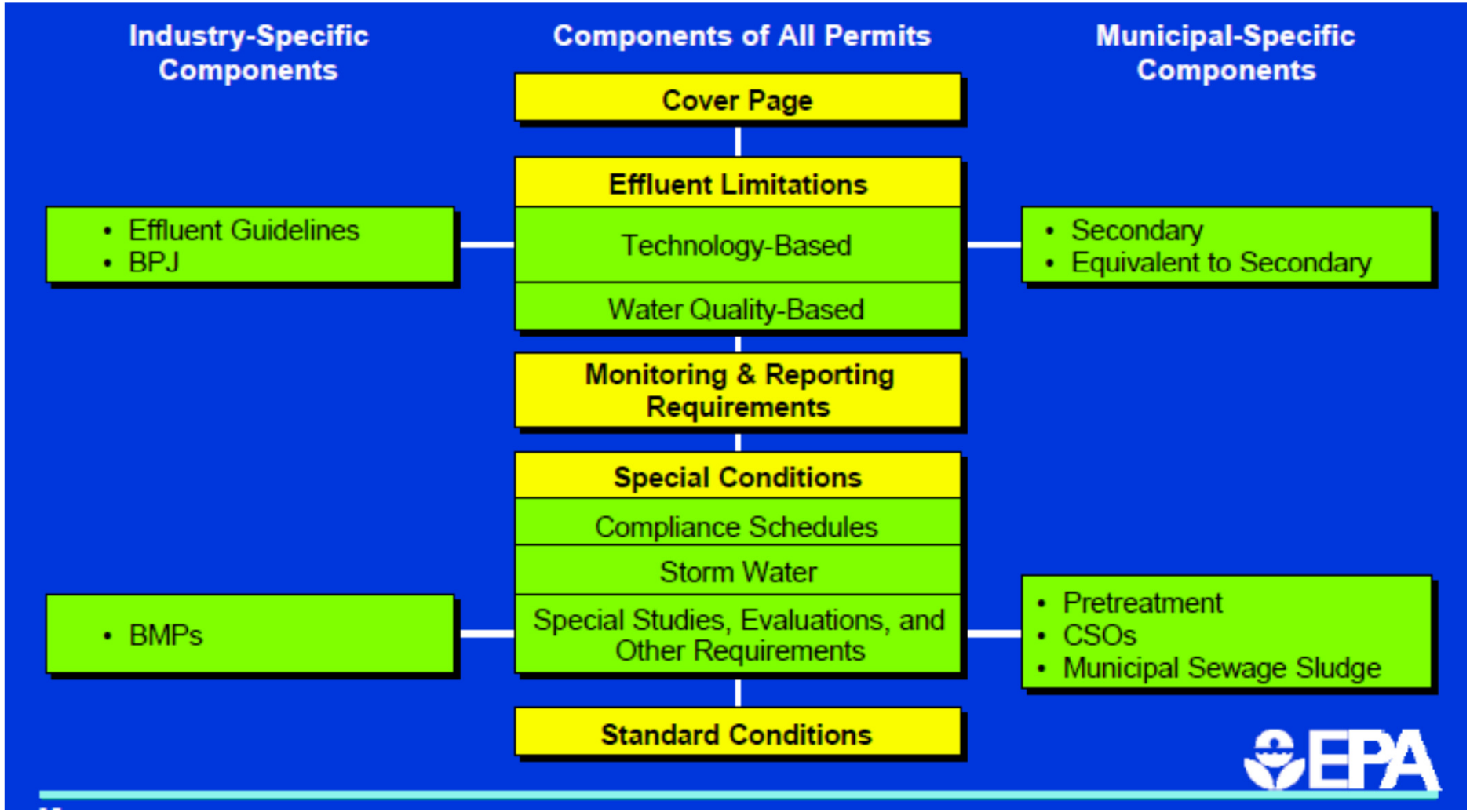
Permit Components



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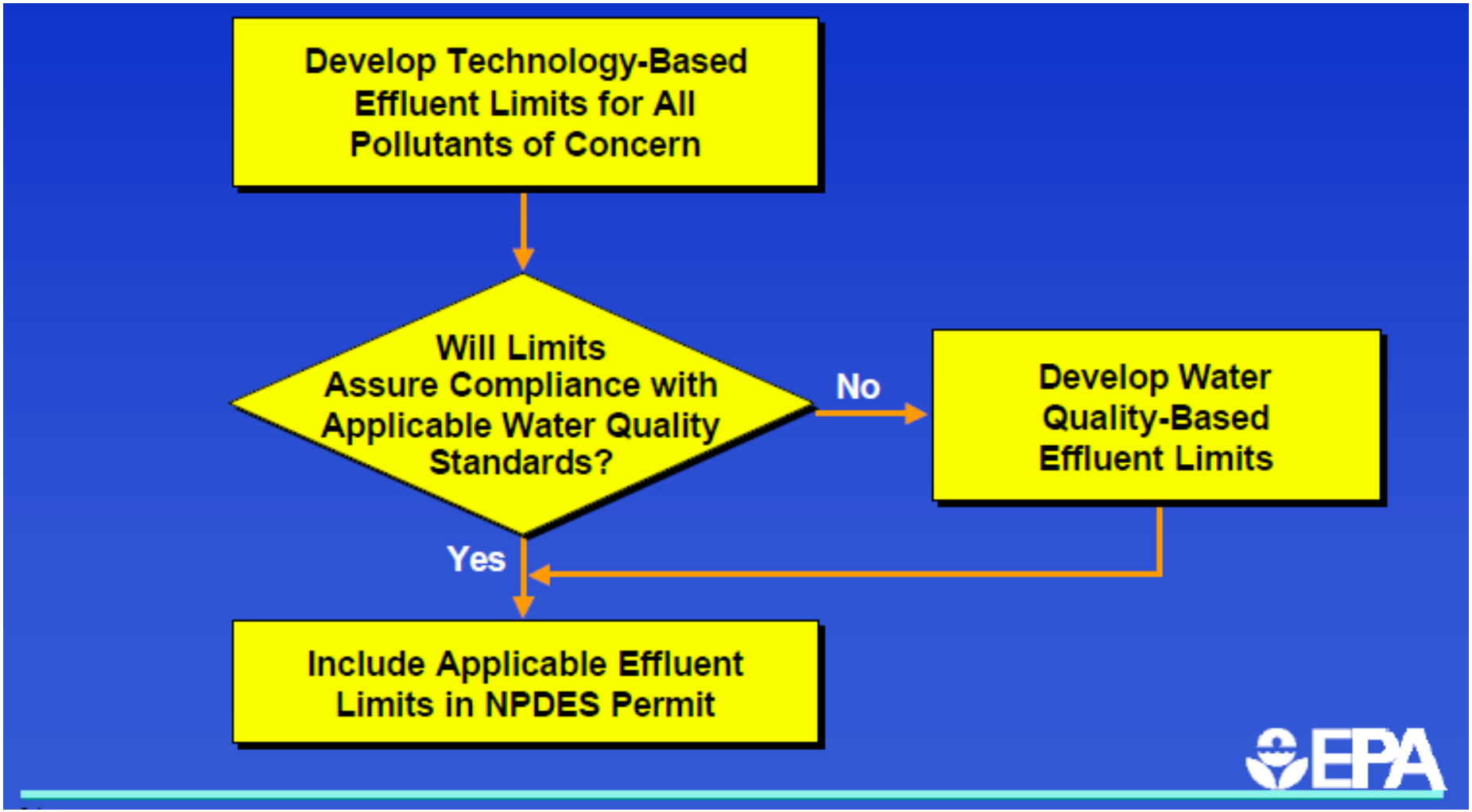
Applying Effluent Limitations



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Calculating TEBLs Limitations based on ELG

Effluent Limitation Calculation Example: Mass-based, Production-normalized AMLs

- BOD_5 $\frac{\text{200,000 lbs raw material}}{\text{day}} \times \frac{\text{0.30 lbs}}{\text{1,000 lbs raw material}} = \text{60 lbs/day}$

- TSS $\frac{\text{200,000 lbs raw material}}{\text{day}} \times \frac{\text{0.40 lbs}}{\text{1,000 lbs raw material}} = \text{80 lbs/day}$

- pH Within the range of 6.0 to 9.0 standard units

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WQBLs

- Identify Applicable Water Quality Standards
- Characterize the effluent and receiving water
  - Believed present (Form 2C/2F)
  - TBEL established
  - Waste Load Allocation from TMDL
  - Mixing zone?
  - Critical Low Flow (1Q10-Acute and 7Q10-Chronic low flow)
  - Harmonic mean flow or 30Q5 low flow for human health criteria
- Determine the need for Chemical Specific WQBLs- Reasonable Potential
- Calculate Chemical Specific WQBLs
  - Mass balance approach
  - Models

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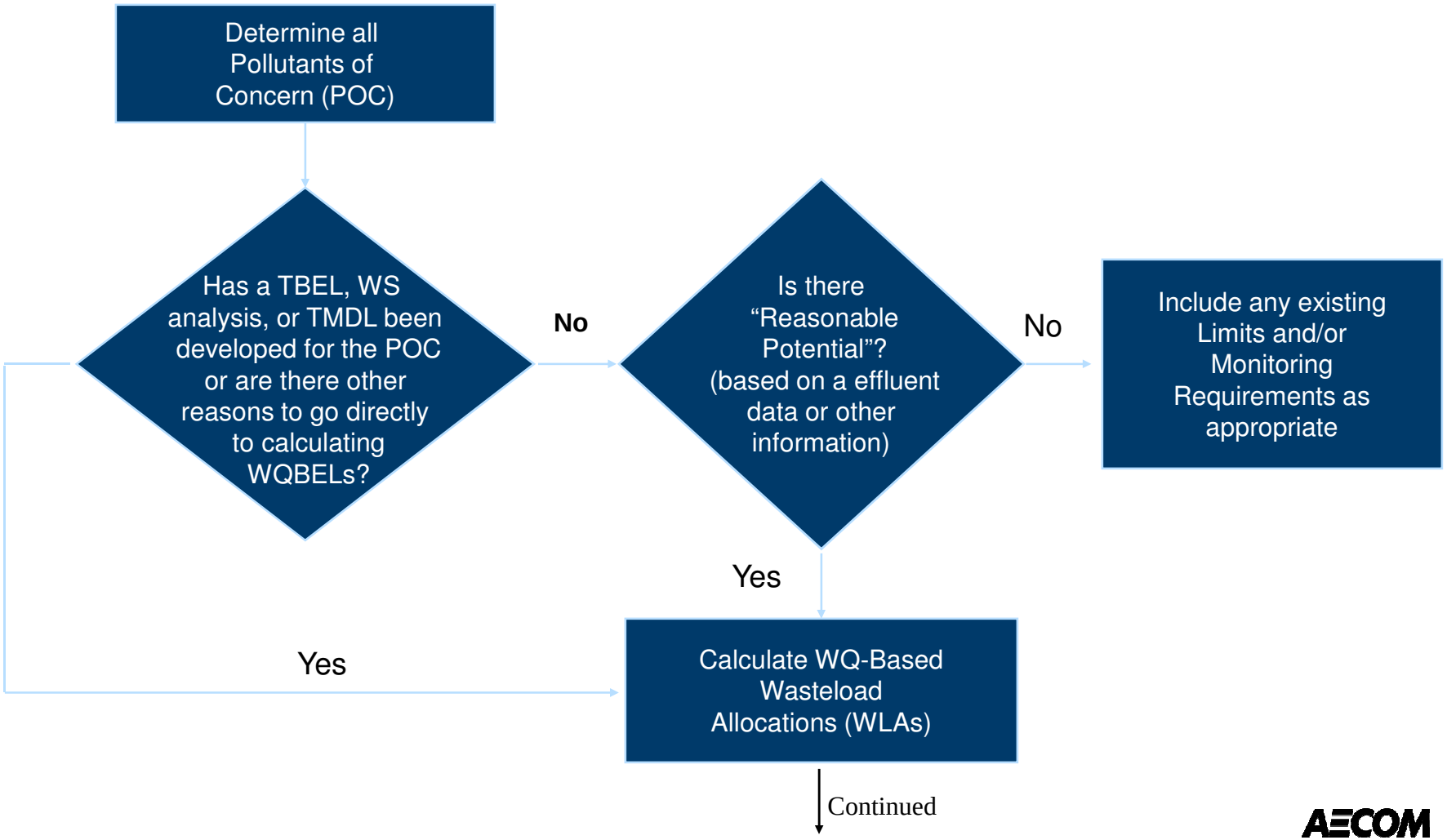
Standards-to-Permits Process



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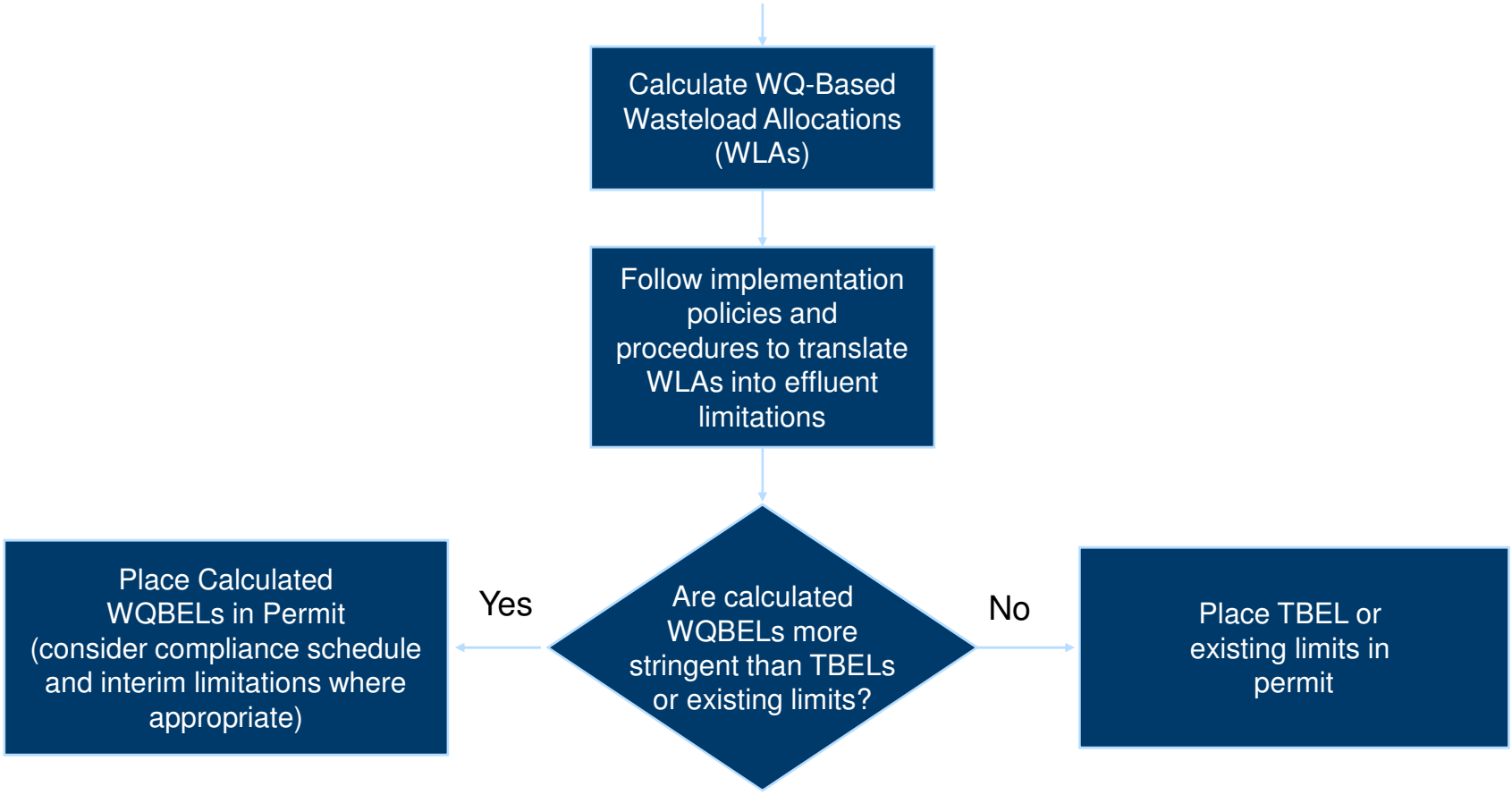
Standards-to-Permit Process (Continued)



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Anti-backsliding

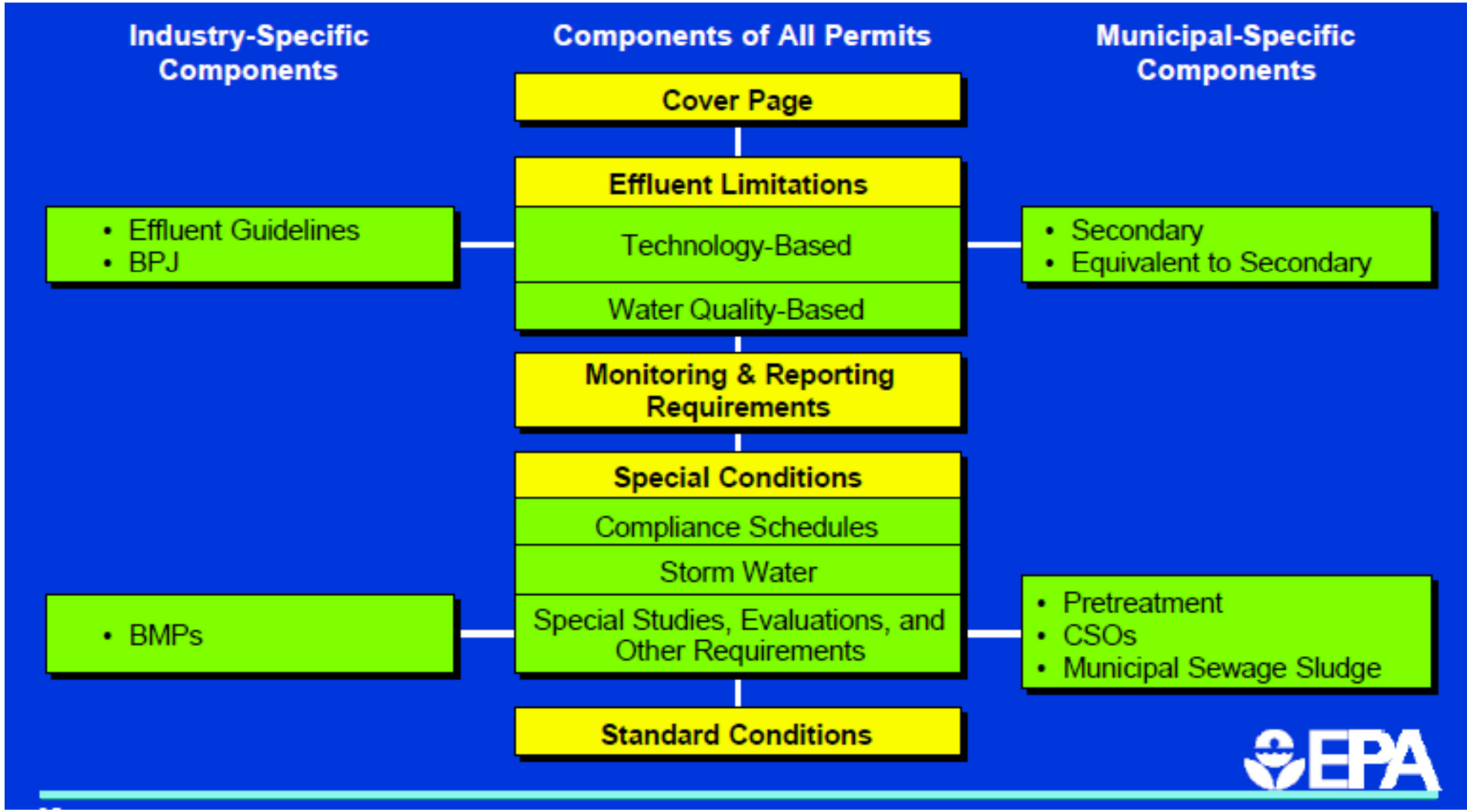
- Anti-backsliding requirements may prohibit less stringent limitations than those in the previous permit
- Permit writers must complete anti-backsliding analysis where calculated limitations would be less stringent than existing limitations

Antibacksliding Exceptions

CWA section 402(o)(2) specifies six exceptions for case-by-case limitations:

1. Substantial alterations or additions to permitted facility
2. New information not available at the time of permit issuance
3. Technical mistakes or misinterpretations of law in permit issuance
4. Events beyond permittee's control and no reasonable available remedy
5. Variance granted under one of several CWA sections
6. Permittee unable to meet permit limitations after properly operating and maintaining required treatment facilities

Permit Components



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Reporting Monitoring Results

- What is reported?
  - Data required in permit
  - Data for pollutants monitored more frequently than required using approved methods
- Who is responsible for reporting?
  - Permittee
- What format is used for reporting?
  - Discharge Monitoring Reports
  - Supplemental reporting forms from permitting authority

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if Different)
NAME

ADDRESS

FACILITY
LOCATION

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)

(2-16)	(17-19)
PERMIT NUMBER	DISCHARGE NUMBER

	MONITORING PERIOD						
	YEAR	MO	DAY		YEAR	MO	DAY
FROM				TO			
	(20-21)	(22-23)	(24-25)		(26-27)	(28-29)	(30-31)

Form Approved.
OMB No. 2040-0004
Approval expires 05-31-98

☐ Check here if No Discharge

NOTE: Read Instructions before completing this form

PARAMETER (32-37)		(3 Card Only) QUANTITY OR LOADING (46-53)	(54-61)		(4 Card Only) QUALITY OR CONCENTRATION (38-45)	(46-53)	(54-61)		NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
	SAMPLE MEASUREMENT										
	PERMIT REQUIREMENT										
	SAMPLE MEASUREMENT										
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NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM, OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.		TELEPHONE		DATE		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

COMMENTS AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

Other Requirements (continued)

– All sampling data from permitted outfalls becomes regulated and subject to review by agency

Record Keeping

- Records of monitoring must be kept:
  - 3 years for wastewater
  - 5 years for sewage sludge use and disposal activities
- Monitoring records include:
  - date, place, and time
  - individual performing sampling
  - date of analysis
  - individual performing analysis
  - analytical methods used
  - analytical results
- Permit should specify where records should be located

Other Requirements

– Permitting authorities sometimes include other requirements related to monitoring, reporting, and recordkeeping with routine monitoring requirements or as special conditions .
  - Special studies
  - Visual monitoring of treatment systems
  - Equipment inspection records
  - Postings or public notice

Standard Conditions in Permit

- 40 CFR 122.41—Conditions applicable to all permits
- 40 CFR 122.42—Additional conditions applicable to specified categories of NPDES permits
- Standard conditions must appear in every NPDES permit either
  - Expressly (verbatim) or
  - By reference

List of Standard Conditions – 40 CFR §122.41

a. Duty to comply

b. Duty to reapply

c. Need to halt or reduce activity not a defense

d. Duty to mitigate

e. Proper O & M

f. Permit actions

g. Property rights

h. Duty to provide information

i. Inspections and entry

j. Monitoring and records

k. Signatory requirement

l. Reporting requirement

1. Planned change
2. Anticipated noncompliance
3. Transfers
4. Monitoring reports
5. Compliance schedules
6. 24 hour reporting
7. Other non-compliance
8. Other information

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List of Standard Conditions (continued)

– Bypass [40 CFR 122.41(m)]

- intentional diversion of waste streams from any portion of treatment facility
- bypass not exceeding limitations allowed without notice under some circumstances [§122.41(m)(2)]
- bypass prohibited otherwise except where [§122.41(m)(3)]:
  - o Unavoidable to prevent loss of life, personal injury or severe property damage
  - o No feasible alternative exists
  - o Facility gives notice before bypass or within 24 hours if bypass is unexpected

List of Standard Conditions (continued)

– Upsets [40 CFR 122.41(n)]

- Exceptional incident that causes unintentional, temporary non-compliance with a technology-based effluent limit
- conditions necessary to demonstrate upset:
  - o Identify cause of upset
  - o Facility operated properly
  - o Proper notices provided to permitting authority
  - o Compliance with appropriate mitigation procedures
- Demonstrated upset constitutes an affirmative defense for violation of technology-based limits

Additional Standard Conditions – 40 CFR 122.42

- Notification levels for existing industrial dischargers [§122.42(a)]
  - Requirement for toxic pollutants not limited in permit
    - Discharged on routine or frequent basis
    - Discharged on non-routine or infrequent basis
- Requirements for storm water discharges [§122.42©,(d)]

Wrap up and questions

Contact Information

Jamal Y. Shamas, ScD, PE, Vice President
Industrial Water & Wastewater Market Sector Leader

D 1-303-796-4688 C 1-303-319-4774
jamal.shamas@aecom.com

AECOM
8181 East Tufts Avenue
Denver, CO 80237

www.aecom.com

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Thank You!

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