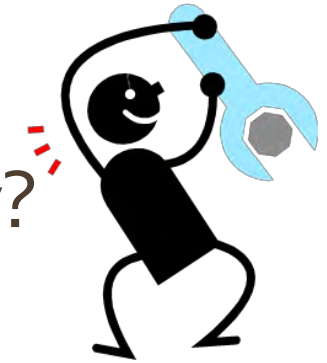
POTWs – What Does Your Permit Say?

January 22, 2024

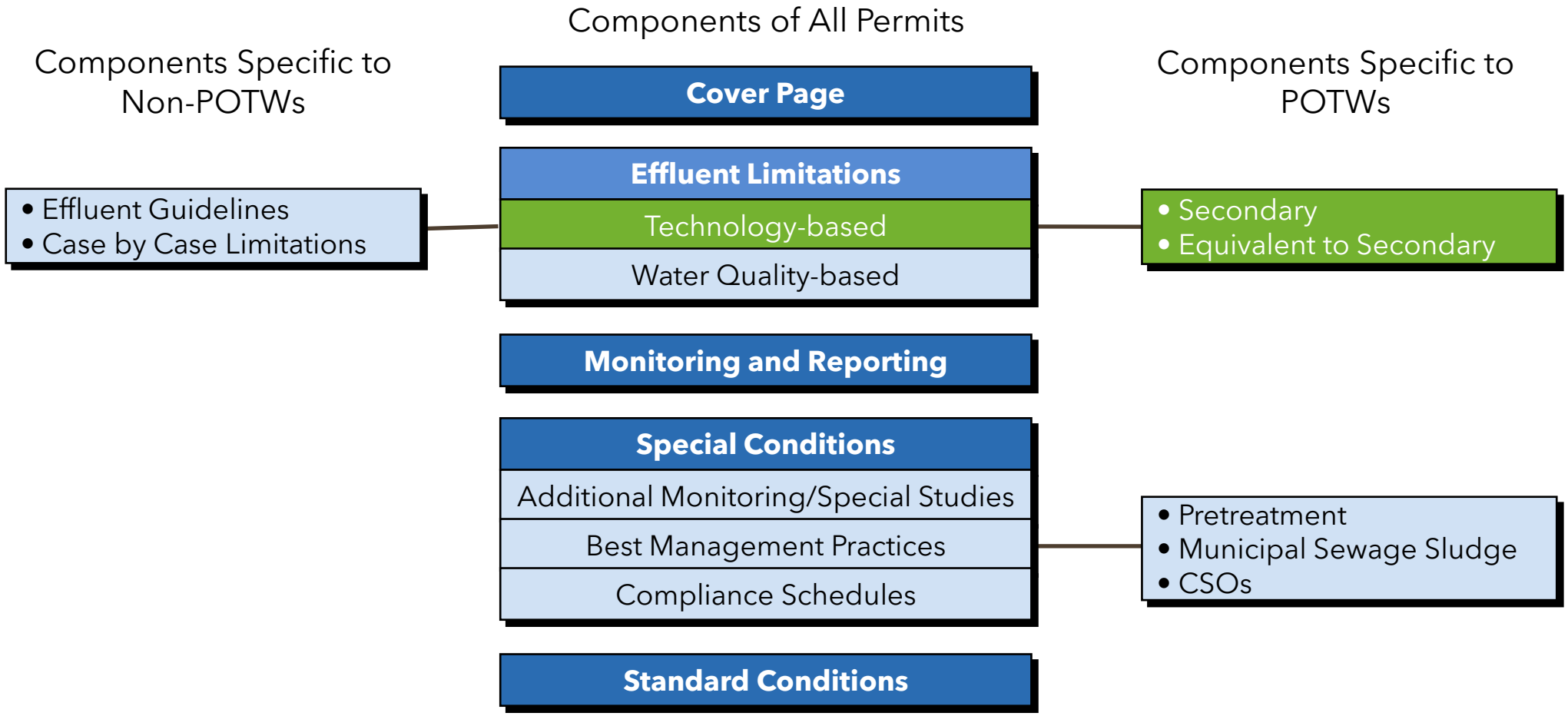
Poll Question

What are you most interested in learning about today?



A. General information about NPDES permits for POTWs
B. What considerations go into developing my NPDES permit conditions
C. Effluent limitation development and interpretation
D. Monitoring and reporting program requirements
E. Special conditions
F. Standard conditions
G. Other

Permit Components



Permit Limits - POTWs

Technology- and Water Quality-based Effluent Limitations

	Technology-based Effluent Limitations (TBELs)	Water Quality-based Effluent Limitations (WQBELs)
Goal or Policy:	▪ Zero Discharge of Pollutants	▪ Fishable and Swimmable Waters ▪ No Toxics in Toxic Amounts
Standards:	▪ Technology	▪ Water Quality
NPDES Regulations:	▪ 40 CFR 122.44(a), (e) ▪ 40 CFR 125.3	▪ 40 CFR 122.44(d)

Develop **TBELs** (derived from technology standards) for all applicable pollutants of concern. Develop **WQBELs** where TBELs are not adequate to meet water quality standards in the receiving water

Secondary Treatment Standards - § 133.102

Parameter	30-Day Average	7-Day Average
5-Day Biochemical Oxygen Demand (BOD_5)	30 mg/L (25 mg/L 5-day Carbonaceous BOD [$CBOD_5$])	45 mg/L (40 mg/L $CBOD_5$)
Total Suspended Solids (TSS)	30 mg/L	45 mg/L
Removal	85% BOD_5 (or $CBOD_5$) and TSS	—
pH	Maintained within the limits of 6.0 – 9.0 standard units*	

** Unless the POTW demonstrates that inorganic chemicals are not added to waste stream as part of treatment process and that contributions from industrial sources do not cause pH to be out of the specified range*

Step 3: Additional Adjustments

- Pollutant parameter substitution
  - Substitution of $CBOD_5$ for BOD_5 [§ 133.102(a)(4)]
    - Appropriate when the effluent has high concentrations of nitrogen/ammonia
      - Eliminates impact of nitrification on discharge limits
    - 5 mg/L less than BOD5 to account for difference due to nitrogenous oxygen demand.
    - Applied directly from the regulations, similar to BOD_5
  - Substitution of COD or TOC for BOD_5 [§ 133.104(b)]
    - Provides data much faster than the longer-term BOD_5 and CBOD tests
    - Requires study to correlate COD or TOC to applicable BOD_5 concentrations

Alternatives to Secondary Treatment

- Equivalent to Secondary Standards – § 133.105
  - Federal regulations allow adjustments to the secondary treatment requirements for BOD_5 and TSS for ***equivalent to secondary*** facilities
  - Facilities with certain types of treatment processes might qualify
    - Trickling filters
    - Waste stabilization ponds
- State Adjusted Standards - § 133.105(d)
  - Applicable to same types of facilities as equivalent to secondary
  - TSS for ponds
  - TSS for trickling filters
  - BOD for ponds and trickling filters

Equivalent to Secondary Standards - § 133.105

Parameter	30-Day Average	7-Day Average
5-Day Biochemical Oxygen Demand (BOD_5)	Not to exceed 45 mg/L (40 mg/L $CBOD_5$)	Not to exceed 65 mg/L (60 mg/L $CBOD_5$)
Total Suspended Solids (TSS)	Not to exceed 45 mg/L	Not to exceed 65 mg/L
Removal	As low as 65% BOD_5 (or $CBOD_5$) and TSS	—
pH	Maintained within the limits of 6.0 – 9.0 standard units*	

** Unless the POTW demonstrates that inorganic chemicals are not added to waste stream as part of treatment process and that contributions from industrial sources do not cause pH to be out of the specified range*

- 30-day average based on monthly performance capability
- 7-day average based on 30-day average X 1.5

Step 2: Calculate Effluent Limitations Using Applicable Standards

- Limits expressed as average monthly and average weekly limits for POTWs unless impracticable [§ 122.45(d)(2)]
- BOD_5 and TSS limits should be concentration-based (at a minimum) because secondary treatment standards are expressed in concentration units [§ 122.45(f)(1)(ii)]
  - Concentration limits often supplemented by mass loading limits
- Percent removal permit requirement for BOD_5 and TSS must be included (with some exceptions for dilute influent)
- pH is applied as an instantaneous minimum and maximum

Effluent Limitations Calculated from Secondary Treatment Standards

Parameter	Average Monthly Limitation	Average Weekly Limitation
BOD_5	30 mg/L (25 mg/L $CBOD_5$)	45 mg/L (40 mg/L $CBOD_5$)
TSS	30 mg/L	45 mg/L
BOD_5 and TSS Percent Removal (concentration)	≥ 85%	—
pH	Must be maintained within the limits of 6.0 – 9.0 standard units at all times.	

Calculating Mass Loading Limitations

- Use ***design flow*** of POTW to calculate mass loading limitations if used to supplement concentration limitations [§ 122.45(b)]
- Example mass loading limitation calculation:
  - POTW Design Flow = **5.00 MGD**
  - BOD_5 Average Monthly Limitation = **30 mg/L**
  - BOD_5 Average Monthly Mass Loading Limitation =
    (5.00 MGD)(30 mg/L)(8.34*) = **1,250 lbs/day**

** 8.34 is the conversion factor for converting to lbs/day*

Step 3: Additional Adjustments

Now that we've reviewed the applicable standards and calculated limits, are there any additional adjustments or regulatory flexibility that we might consider?

Yes, under specific circumstances we may consider:

- Pollutant parameter substitution
- Adjustments for special influent characteristics
- Modification of percent removal under specific circumstances
- 301(h) waivers

Note: Applicability and appropriateness of these adjustments are generally considered prior to calculating our final technology-based effluent limits.

Step 3: Additional Adjustments

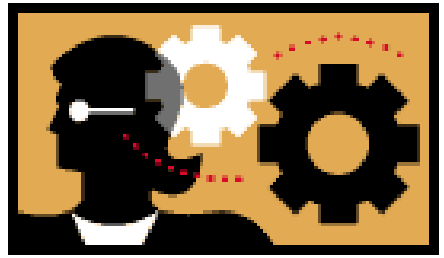
- Modification of percent removal requirement for some POTWs
  - Adjustment or deletion for POTWs with less concentrated influent received from combined sewers during wet weather [§ 133.103(a)]
  - Adjustment or substitution of mass limit for POTWs with less concentrated influent from separate sewer systems or from combined sewers during dry weather [§ 133.103(d), § 133.103(e)]

Determining the Need for WQBELs

40 CFR 122.44(d)(1)(ii)

When determining whether a discharge causes, *has the reasonable potential to cause*, or contributes to an in-stream excursion above a narrative or numeric criteria within a State water quality standard, the permitting authority shall use procedures which account for:

- Existing controls on point and nonpoint sources of pollution
- The variability of the pollutant or pollutant parameter in the effluent
- The sensitivity of the species to WET testing
- Where appropriate, the dilution of the effluent in the receiving water



Reasonable Potential Analysis (RPA)

- We conduct a "reasonable potential analysis" based on:
  - Numeric criteria
  - Narrative criteria
    - Numeric interpretation
    - Qualitative interpretation
- A reasonable potential analysis can be assessed:
  - With effluent data
  - Without effluent data
    - Data from other sources or from similar discharges
    - Qualitative information

Establishing WQBELs

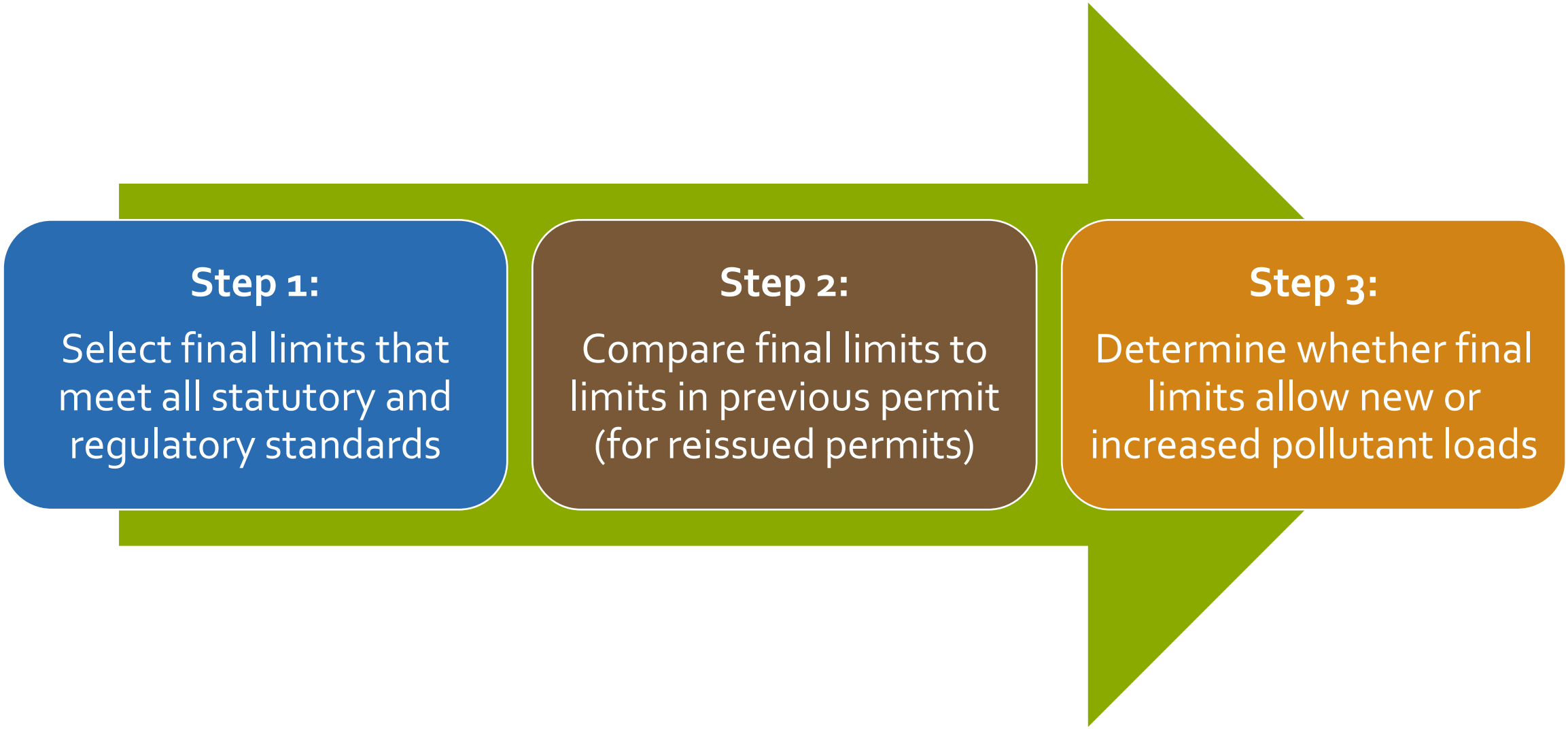
- If reasonable potential is identified, the permit writer must establish limits and provisions in the permit necessary to protect water quality.
  - Limits are derived from the applicable water quality criteria using various methods
    - Based on lowest applicable water quality criteria
    - May allow for dilution/mixing
    - WQBELs are generally more stringent than technology-based limits
  - If a total maximum daily limit (TMDL) is applicable, limits must be included based on the requirements of the TMDL.

Poll Question

The permitting authority must include effluent limitations in the permit which:

A. Meet applicable technological standards for my POTW
B. Protect water quality and the uses of the receiving water
C. Are consistent with any applicable total maximum daily limit
D. Are generally at least as stringent as the previous permit limits, with some exceptions
E. All of the above

Considerations for Final Effluent Limits



Monitoring and Reporting Requirements

CWA Authority for Monitoring, Reporting, and Recordkeeping

CWA section 402(a)(2) states that "The Administrator shall prescribe conditions for such permits to assure compliance…including conditions on data and information collection, reporting, and such other requirements as he deems appropriate."

Purpose of Monitoring

- Determine compliance with permit conditions
- Establish a basis for enforcement actions
- Provide data for evaluating treatment efficiencies
- Assess and resolve issues before they become permit condition violations
- Improve characterization of the effluent during permit reissuance

Key Regulatory Requirements - Monitoring

- Permits must specify the type, intervals, and frequency of monitoring sufficient to yield data representative of the monitored activity [§ 122.48(b)]
- Permit must include monitoring requirements to assure compliance with permit limitations [§ 122.44(i)(1)]
  - The mass or other measurement specified in the permit for each pollutant limited in the permit
  - The volume of effluent discharged from each outfall
  - Other measurements as appropriate (e.g., internal waste streams and determination of compliance with narrative requirements)

Types of NPDES Monitoring

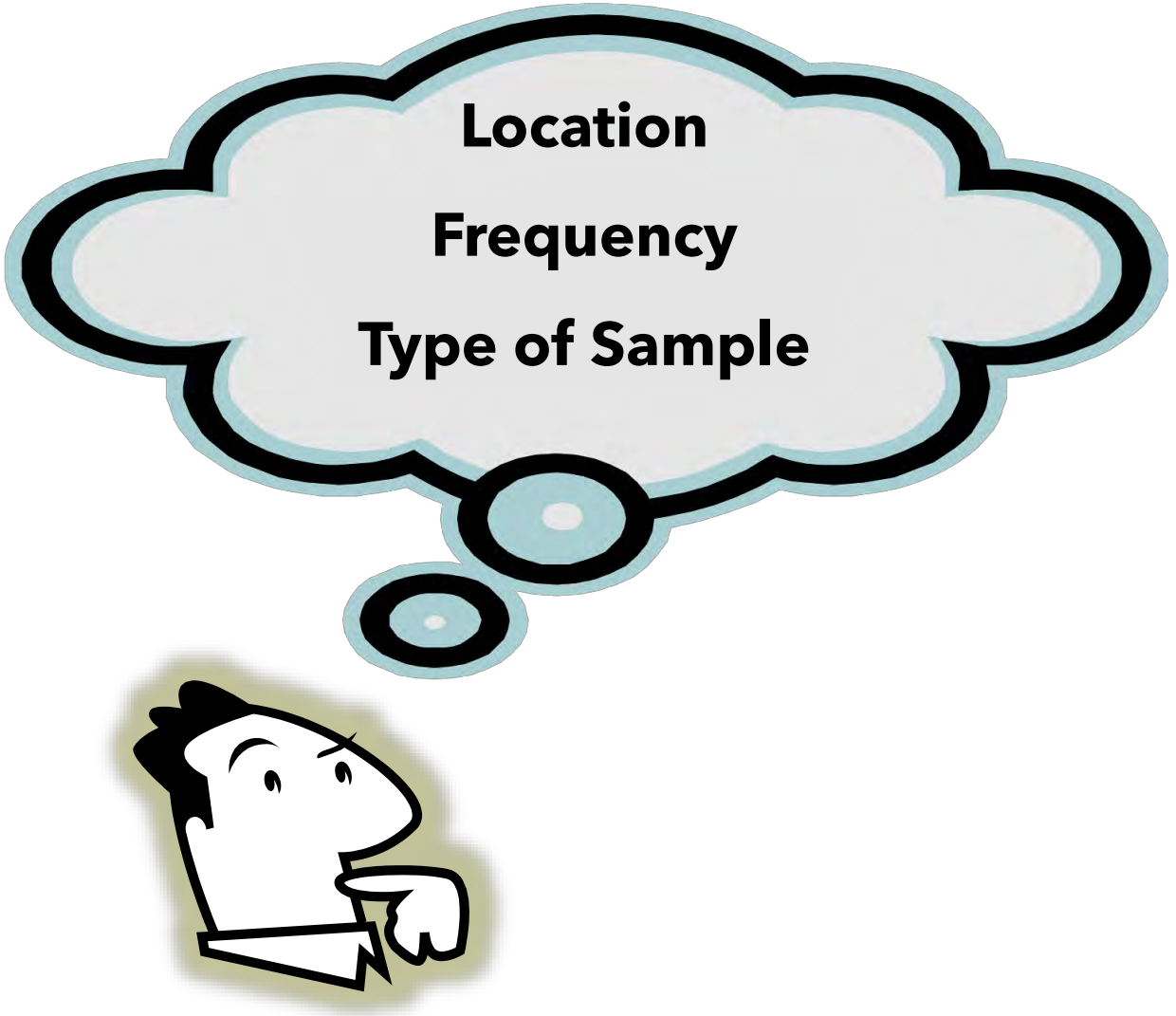
Self-monitoring

- Primary method of monitoring for NPDES program
- Permittee performs sampling and analysis
- Results determine compliance with permit limits and conditions
- Requirements should be clear and precise

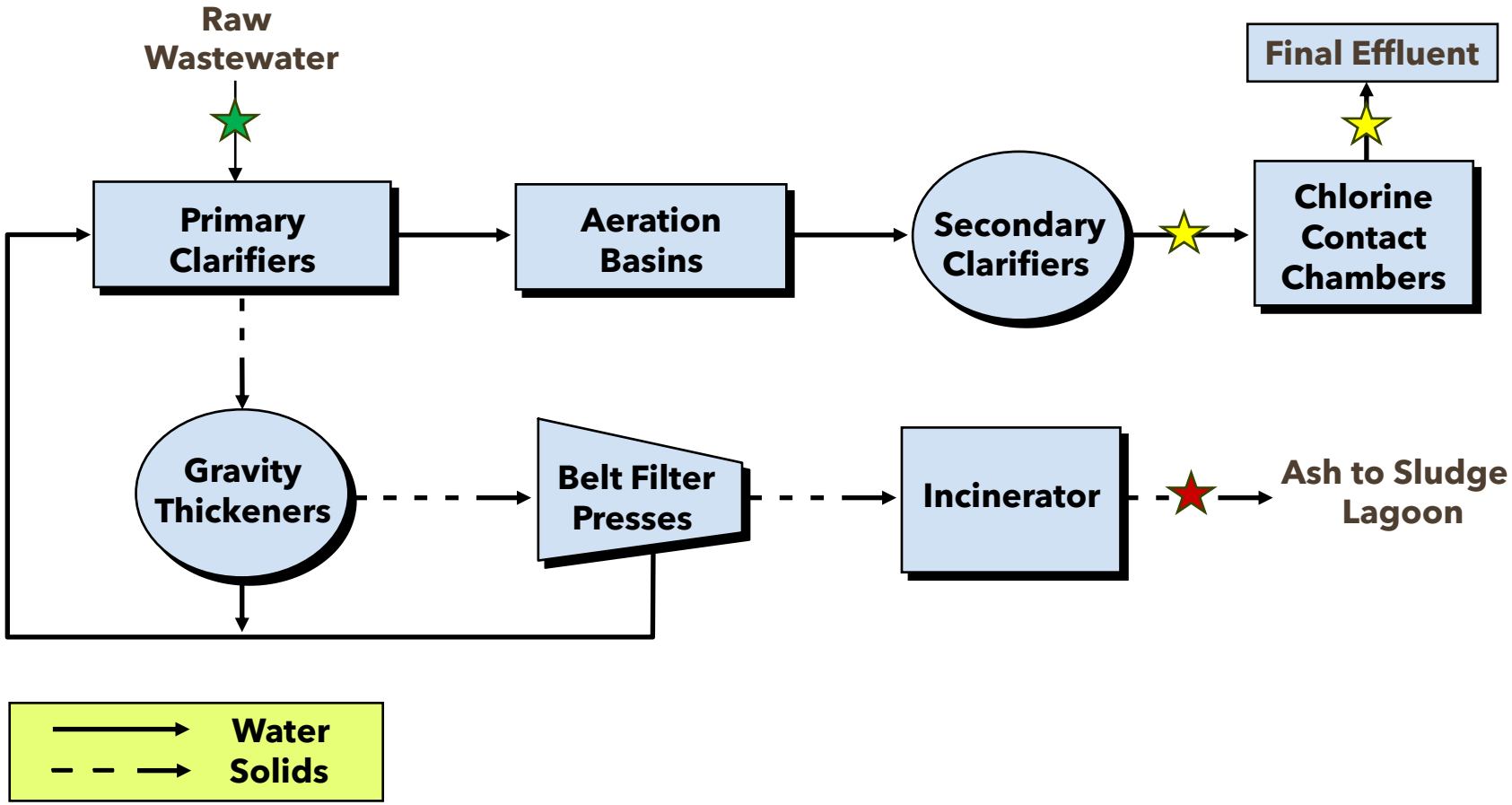
Compliance Monitoring

- Monitoring may be conducted by the permitting authority to confirm self-monitoring data.
- May be conducted due to environmental complaints from the public.

Permitting Considerations



Monitoring Location Example: POTW Flow Diagram

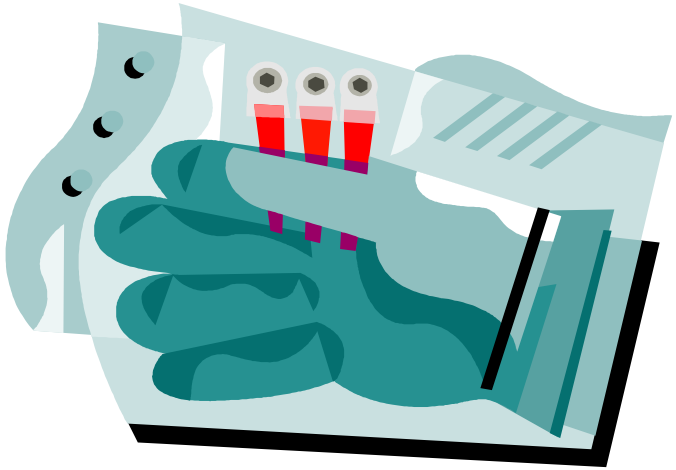


Accessibility

Representativeness

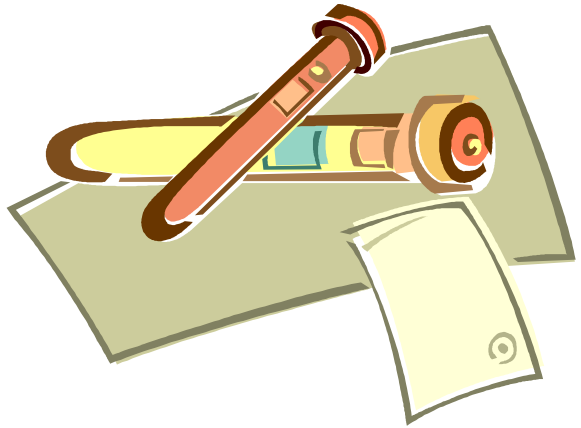
Specifying Monitoring Frequency in a Permit

- Federal requirements
  - Must be sufficient to yield data representative of the monitored activity [§ 122.48(b)]
  - Waivers available for certain effluent guideline-based pollutants [§ 122.44(a)(2)]
- Permitting authority requirements
  - Consult policy and procedures



Factors Impacting Monitoring Frequency

- Size and design of facility
- Type of treatment
- Location of discharge
- Frequency of discharge (batch, continuous)
- Compliance history
- Nature of pollutants
- Number of monthly samples used developing permit limit
- Cost



Specifying Sample Type

Permit should clearly specify the required sample ach monitored parameter

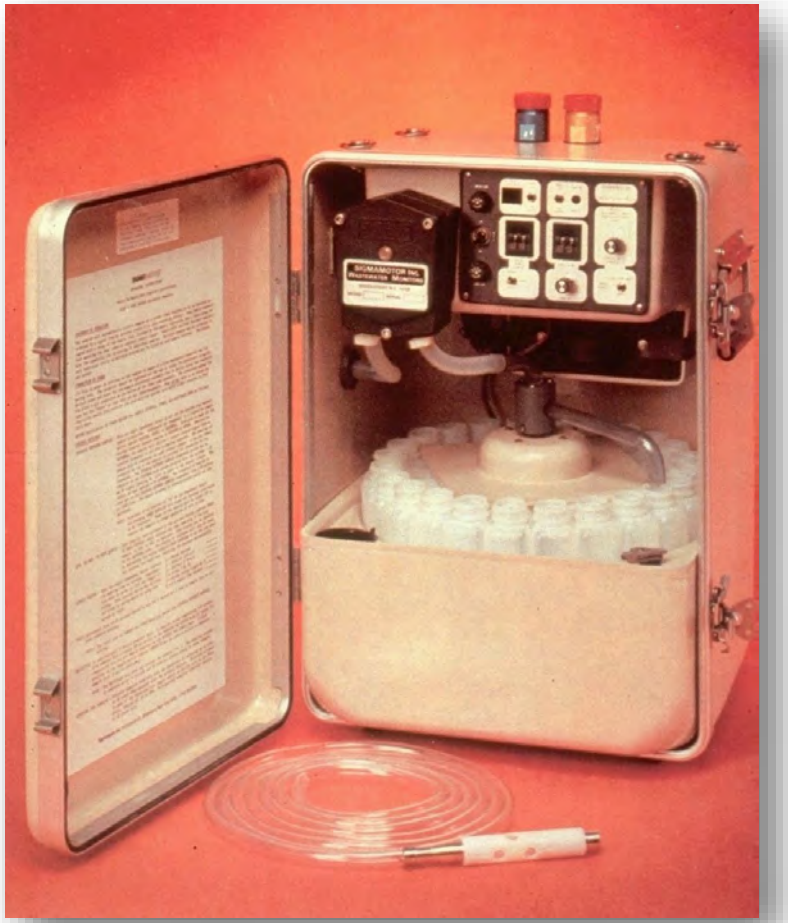
Grab

- Sample taken from a waste stream on a one-time basis without consideration of the flow rate of the waste stream and without consideration of time
- Must be specified for certain parameters [e.g., pH (unless continuous), volatile organics]
- Typically specified for monitoring batch discharges

Specifying Sample Type

Composite

- Sample composed of two or more discrete aliquots that represents average effluent quality over the sample period
- Specified when expecting:
  - Variability in pollutant concentration and discharge flow rate (flow proportional composite)
  - Variability in pollutant concentration only (time proportional composite or flow proportional composite)



Sequential Discrete Composite Sampler

Specifying Sample Type

Continuous

- Automated collection and analysis of a parameter in a discharge
- Typically used for flow, pH, and temperature
  - Excursions of effluent guideline range allowed for pH when sampling continuously [§ 401.17]
- Immediate feedback systems combining software and hardware
  - Stop or modify operations remotely
  - Send immediate alerts via email, text message, sound, or flashing lights

Specifying Sample Type

Visual Monitoring

- Snapshots
  - Discrete inspections
  - Installation or maintenance documentation
  - Photos document effluent effects on receiving water (e.g., foam, visible sheen)

- Remote, automatic, time-lapse cameras
  - Photos at regular intervals (e.g., every 3 hours during daylight)

Required Analytical Methods

- 40 CFR 122.41 requires use of approved methods found in 40 CFR Part 136
  - Standard Methods for the Analysis of Water and Wastewater
  - Methods for the Chemical Analysis of Water and Wastes
  - Test Methods: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater
- See National Environmental Methods Index (NEMI) at http://www.nemi.gov
- Alternative methods

Specifying Analytical Requirements

- ***Method Detection Limit (MDL):*** the minimum concentration of analyte that can be measured and reported with 99% confidence that the analyte concentration is distinguishable from the method blank results [§ 136.2(f)]
- ***Method Detection Limit (MDL):*** A concentration at which pollutant can reliably be detected

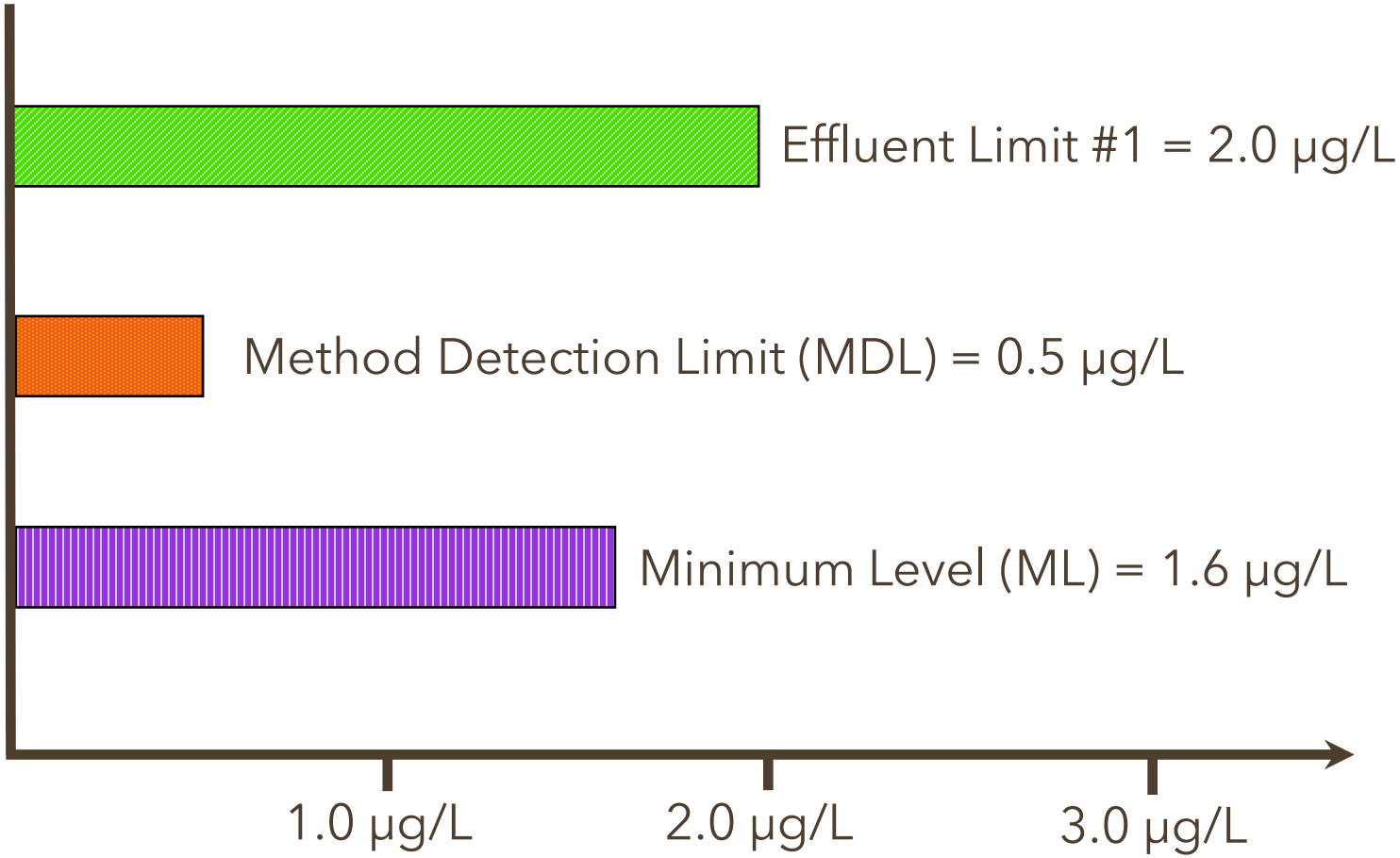
- ***Minimum Level (ML):*** concentration at which the entire analytical system gives a recognizable signal and acceptable calibration point
- ***Minimum Level (ML):*** A concentration at which pollutant can accurately be quantified

Sufficiently Sensitive Methods (SSM)

- Regulations at §122.44(i) and Part 136 require the permitting authority to establish in the permit a sufficiently sensitive method
- A method is sufficiently sensitive if:
  - The method ML is at or below the limit established in the permit or
  - The method has the lowest ML of the approved analytical methods
- Many states ensure use of SSM by establishing required MLs for specific parameters

Specifying Analytical Methods

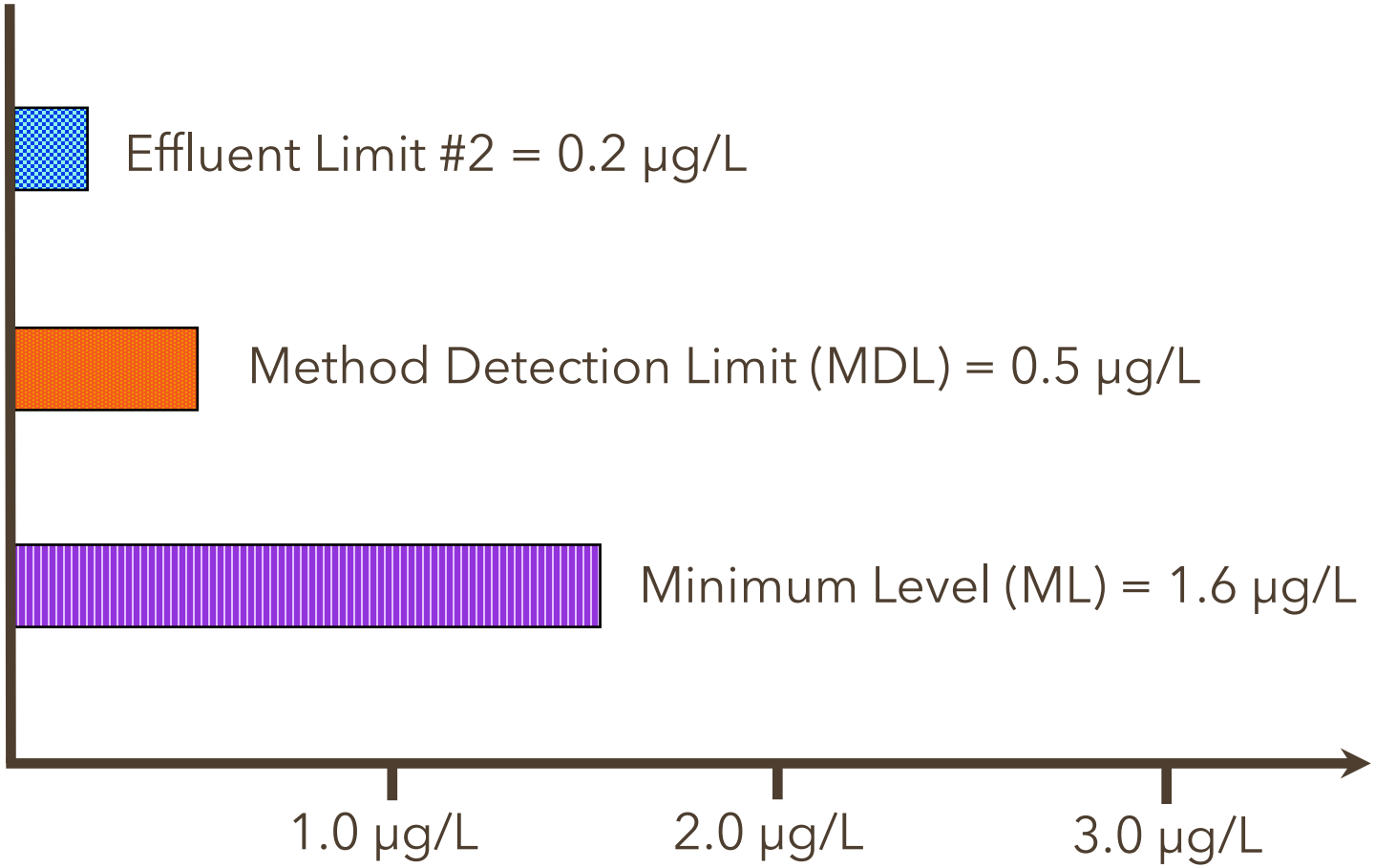
Example #1: Effluent limit is greater than both the MDL and ML



Determine compliance using results from Part 136 method

Specifying Analytical Methods

Example #2: Effluent limit is below both the MDL and ML



Determine compliance using results from ??

Key Regulatory Requirements - Reporting

- Permit establishes what must be reported
  - Monitoring results as required in permit [§ 122.41(l)(4)]
  - Data for pollutants monitored more frequently than required using approved methods [§ 122.41(l)(4)(ii)]
- Permit establishes when information will be reported
  - Reporting requirements must be established on a case-by-case basis with the frequency dependent on the nature and effect of the discharge, but in no case less than once a year [§ 122.44(i)(2)]

Key Regulatory Requirements - Reporting

- Who must sign monitoring reports?
  - The permittee [§ 122.22(b)]
- What format is used for reporting?
  - Discharge Monitoring Reports (DMR) [§ 122.41(l)(4)(i)]
    - Authorized programs may substitute agency name, address, and logo in place of EPA's
    - Permitting authority may require additional reporting
  - Electronic Reporting Rule (40 CFR 127)
    - **Phase 1:** permittees must submit DMRs electronically starting **12/21/16** (e.g., via state eDMR or EPA NetDMR)
    - **Phase 2:** general permit reports and other NPDES program reports must be electronically submitted starting **12/21/25**
    - Authorized programs electronically submit information to EPA and data are available to the public through EPA's website (ECHO)

Key Regulatory Requirements - Record Keeping

- Permit standard conditions require that:
- Records of monitoring must be kept [§122.41(j)(2):
  - 3 years for wastewater
  - 5 years for sewage sludge use and disposal activities and CAFOs
- Monitoring records include [§ 122.41(j)(3)]:

  - Date, place, and time
  - Individual performing sampling
  - Date of analysis
  - Individual performing analysis
  - Analytical methods used
  - Analytical results

Other Requirements

- Special conditions may include activities that require monitoring, reporting, and recordkeeping.
  - Ambient monitoring
  - Visual monitoring of treatment systems
  - Equipment inspection records
  - Postings or public notice
  - Transparency measures

Poll Question

True or False:

Sufficiently Sensitive Methods (SSMs) must always be below the applicable effluent limitations contained within the NPDES permit?

Special Conditions

Special Conditions are used in NPDES Permits to…

- Address unique situations
- Incorporate preventive requirements
- Incorporate compliance schedules
- Incorporate narrative requirements from effluent guidelines
  - Best management practices for ancillary activities
  - Treatment practices
  - Monitoring, reporting, and compliance requirements
- Incorporate other NPDES programmatic requirements (e.g., pretreatment, sewage sludge)

Categories of Special Conditions - All Facility Types

- **A**dditional monitoring and special studies
- **B**est management practices (BMPs)
- **C**ompliance schedules

Additional Monitoring and Special Studies

- Used to supplement effluent limitations
- May be used to collect data for future limitation development
- Examples:
  - Ambient monitoring
  - Dilution studies
  - Sediment samples
  - Bioconcentration studies
  - Toxicity Identification Evaluation (TIE) and Toxicity Reduction Evaluation (TRE)

Additional Monitoring and Special Studies

2. Nutrient Optimization and Pollution Prevention

   a. Nutrient Optimization and Pollution Prevention Evaluation Report. The Permittee shall evaluate options to reduce total nitrogen and total phosphorus loading from the Facility through optimization and pollution prevention. The Permittee shall submit a Nutrient Optimization and Pollution Prevention Evaluation Report to the DOH within one (1) year after the effective date of this permit for review and approval. The report shall include:

      (1) A description of the treatment plant, treatment plant process, and service area.

      (2) A description of nutrient optimization and pollution prevention measures that have already been implemented at the facility.

      (3) An evaluation of potential options to reduce total nitrogen and total phosphorus loading from the facility through optimization[1] (including side-stream treatment) that includes:

         (a) The feasibility of the option. In assessing feasibility, the Permittee must consider what, if any, effect the option would have on the removal of other pollutants (e.g., BOD_5, TSS).

         (b) The anticipated total nitrogen and total phosphorus removal levels for each option.

         (c) The beneficial and adverse ancillary impacts of each option (e.g., changes in energy usage, greenhouse gas emissions, or sewage sludge treatment or disposal).

         (d) The planning level costs of each option.

      (4) An evaluation of options to reduce total nitrogen and total phosphorus

6. Dilution Study (Optional)

   The Permittee may conduct a dilution study during the permit term to establish the available dilution consistent with the requirements of HAR 11-55-41.

   If the Permittee elects to conduct a DOH approved dilution study, the Permittee shall submit a study plan to DOH for review and approval within six (6) months of the effective date of this permit. The study plan shall provide the process to be used for evaluating dilution.

   If the Permittee elects to conduct a DOH approved dilution study, the Permittee shall complete the dilution study and submit a final Dilution Study Report to the DOH within four (4) years of the effective date of this Permit or with the renewal application. The dilution study report shall detail the procedures used for establishing appropriate dilution values, a discussion of critical conditions used during the evaluation, discussions on the limitations of the methods and available data and information.

TIE/TRE

- A toxicity identification evaluation/toxicity reduction evaluation (TIE/TRE) is a site-specific special study designed to:
  - Identify the causative agents of whole effluent toxicity (WET)
  - Isolate the sources of the toxicity
  - Evaluate the effectiveness of toxicity control options
  - Confirm the reduction in effluent toxicity after control measures are in place
- A special condition could require initiation of a TIE/TRE when the results of WET tests exceed
  - WET limitations
  - WET "trigger values"
- TIE/TRE implementation might lead to information that supports future permit requirements (i.e., when specific toxicants are identified)

Best Management Practices

- Best management practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the 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.[§ 122.2]

Best Management Practices - § 122.44(k)

Permits shall include, when applicable, BMPs to control or abate the discharge of pollutants when:

(1) Authorized under CWA section 304(e) (effluent guidelines)

(2) Authorized under CWA section 402(p) (stormwater discharges)

(3) Numeric effluent limitations are infeasible

(4) Practices are reasonably necessary to achieve effluent limitations and standards or to carry out purposes of the CWA

Best Management Practices

- Types of specific BMPs
  - Secondary containment, good housekeeping, employee education
  - Posting at discharge locations, online notifications of incidents
  - Flow detection at discharge points for wet weather discharge notification, monitoring downstream dissolved oxygen fluctuation

BMPs should

- Be qualitative
- Indicate **how** or **what**, not how much

BMPs should not

- Substitute for quantitative controls
- Tell managers how to run their plants
- Require costly construction or methods where simple management practices would suffice

Compliance Schedules - § 122.47

- Permit may, when appropriate, specify a schedule of compliance leading to compliance with CWA and regulations
- Technology-based limitations
  - Generally not allowed because CWA compliance deadlines have passed for existing sources
- Water quality-based limitations
  - 40 CFR 131.15 *(effective 10/20/2015)*
  - Office of Wastewater Management (OWM) Memorandum
- Compliance schedule vs. Schedules in enforcement actions

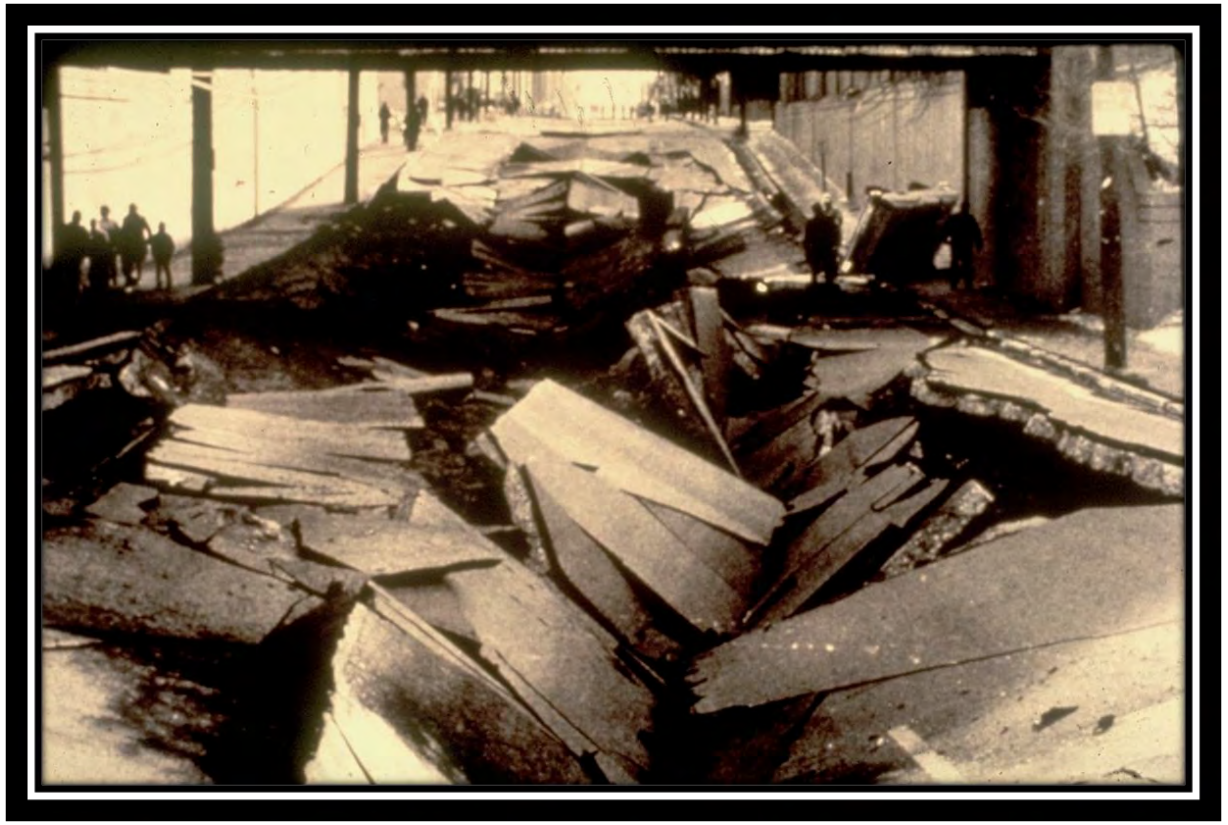
Compliance Schedule Considerations

- OWM Memorandum (May 10, 2007)
  - Demonstrate that permittee cannot immediately comply with new limit
  - Justify and document "appropriateness"
  - Evaluate and justify "as soon as possible"
  - Include enforceable sequence of events leading to compliance (interim milestones as needed)
  - Include enforceable "final" effluent limitation and date for achievement
  - Not appropriate for schedule solely to provide time to develop TMDL or conduct UAA

Special Conditions for POTWs

National Pretreatment Program

- Major goal is controlling discharges in order to:
  - Prevent interference with POTW processes
  - Prevent pass through of pollutants
  - Protect sludge management options
- Additional programmatic goals
  - Encourage recycling and reclamation
  - Ensure POTW personnel health and safety



https://www.epa.gov/npdes/national-pretreatment-program

Pretreatment Regulatory Requirements

- Program Approval Authority
  - Regulates and ensures POTW pretreatment programs comply with the regulations.
  - EPA or the State
- Program Control Authority
  - Implements controls on Industrial Users discharging to the POTW to ensure pretreatment requirements are met.
  - POTW or State
- NPDES permits contain language requiring the POTW to implement the requirements of 40 CFR Part 403 which ensure legal authority, setting of limitations and conditions, compliance program and reporting.

https://www.epa.gov/npdes/national-pretreatment-program-implementation

Pretreatment Regulatory Requirements

- Who is required to have a pretreatment program?
  - POTWs > 5 MGD with dischargers subject to standards
  - POTWs < 5 MGD with past problems
  - Unless state assumes total responsibility for program implementation [§ 403.10(e)]
- General Pretreatment Regulations for Existing and New Sources of Pollution [40 CFR Part 403]
  - National Pretreatment Standards
    - Prohibited Discharges and Local Limits [§ 403.5]
    - Categorical Standards [§ 403.6]
  - Requirements for POTW and state, territorial, or tribal programs
  - Industrial and POTW monitoring and reporting requirements

Permits for Municipal Sewage Sludge (Biosolids)

- Any CWA section 402 permit issued to a POTW should contain requirements for sewage sludge use and/or disposal
- 40 CFR Part 503 requirements should be incorporated into a permit for:
  - Incineration
  - Land application
  - Surface disposal
- https://www.epa.gov/biosolids
- 5 year record retention

Standard Conditions

Standard Conditions Requirements

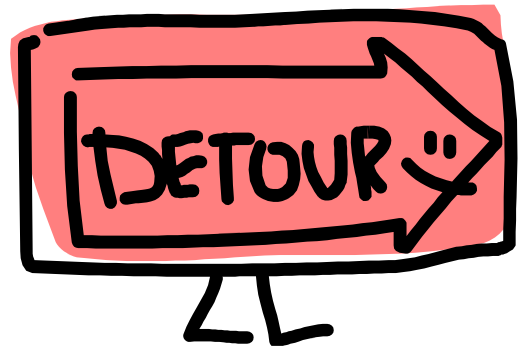
- Standard conditions regulations
  - § 122.41—Conditions applicable to all permits
  - § 122.42—Additional conditions applicable to specified categories of NPDES permits
- Standard conditions must appear in every NPDES permit either
  - Expressly (verbatim) or
  - By reference
- States, tribes, or territories might have more stringent requirements

List of Standard Conditions - § 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. Inspection and entry
j. Monitoring and records
k. Signatory requirements
l. Reporting requirements
    1. Planned changes
    2. Anticipated noncompliance
    3. Transfers
    4. Monitoring reports
    5. Compliance schedules
    6. 24-hour reporting
    7. Other noncompliance
    8. Other information
    9. Identification of initial recipient
m. Bypass
n. Upset

Bypass [§ 122.41(m)]

- Intentional diversion of waste streams from any portion of a treatment facility
- Bypass not exceeding limitations allowed without notification only where for essential maintenance to assure efficient operation [§ 122.41(m)(2)]
- Bypass prohibited otherwise except where [§ 122.41(m)(4)]
  - A bypass was unavoidable to prevent loss of life, personal injury or severe property damage **and**
  - There were no feasible alternatives to the bypass **and**
  - Facility gives notice before bypass or within 24 hours if bypass is unexpected

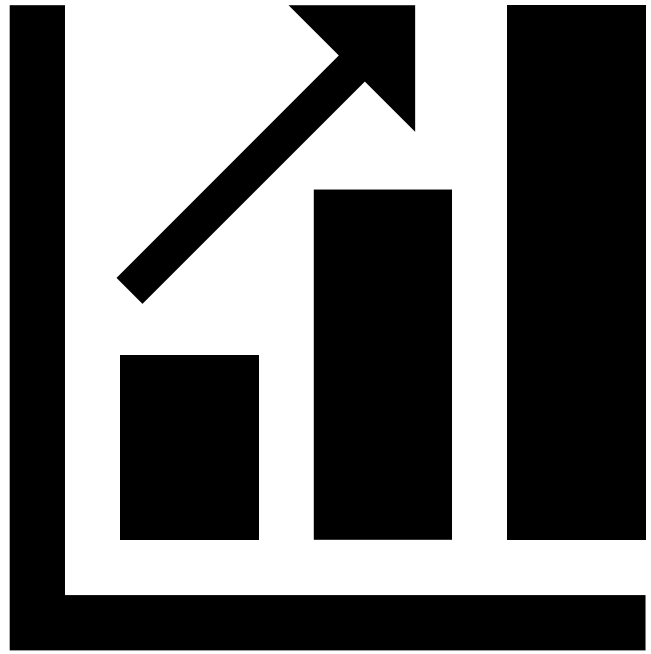


Upset [§ 122.41(n)]

- An exceptional incident that causes an unintentional, temporary non-compliance with a technology-based effluent limitation
- A demonstrated upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based limitations
- Conditions necessary to demonstrate upset:
  - Identify cause of upset
  - Show that facility was operated properly at the time
  - Proper notice to permitting authority (24-hour reporting)
  - Compliance with remedial measures under § 122.41(d)

Additional Standard Conditions - § 122.42

- Notification for POTWs [§ 122.42(b)]
  - Introduction of new pollutants from indirect discharger that would be subject CWA technology requirements if discharging directly
  - Change in pollutant volume or character of pollutants introduced



Poll Question

True or False:

The permit writer can remove irrelevant standard conditions from the permit upon request?