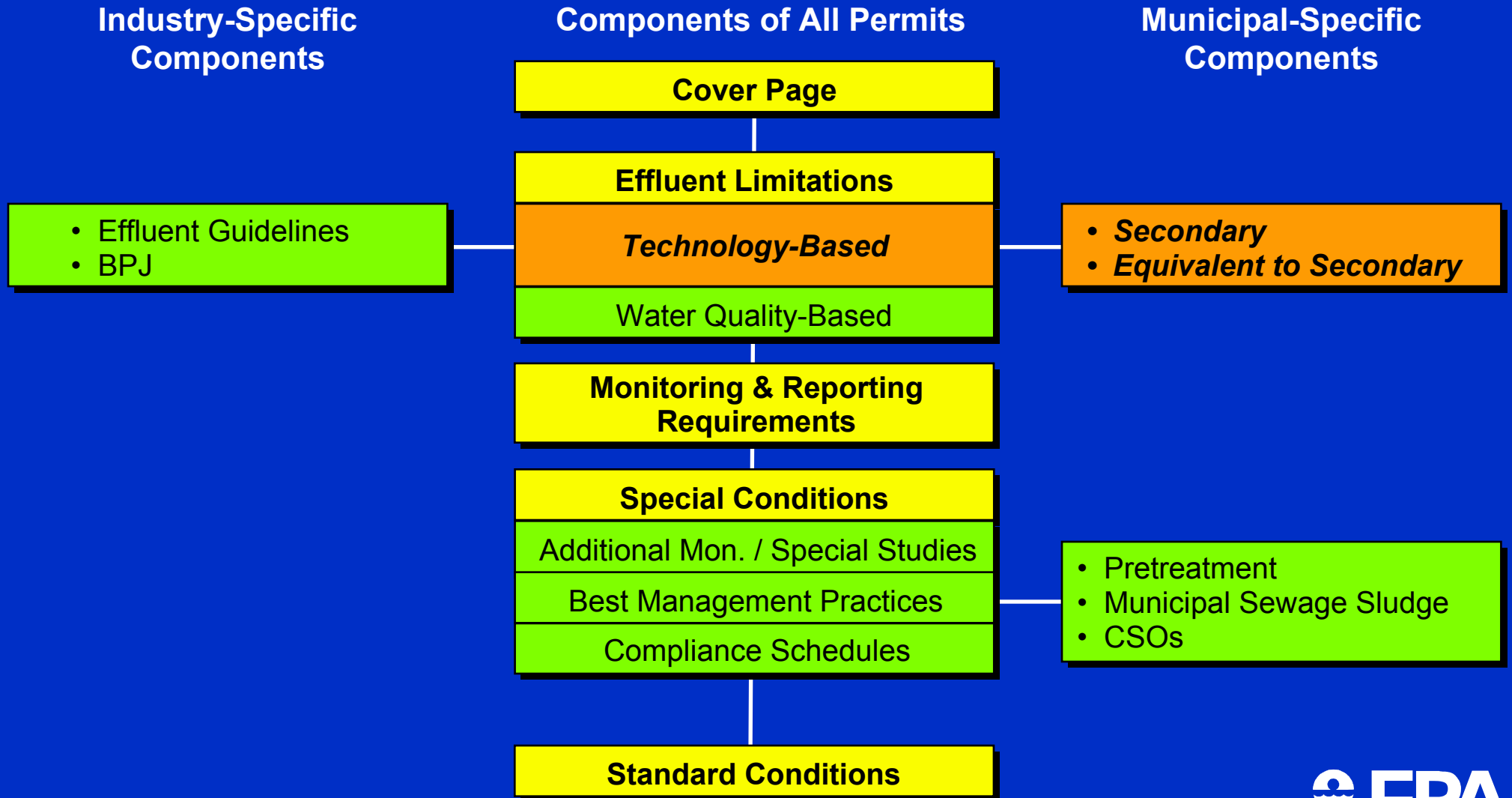


**Secondary Treatment  
Standards for Municipal  
Dischargers**

# Permit Components



# Learning Objectives

- ◆ Describe secondary treatment regulations
- ◆ Explain how secondary treatment requirements are applied in permits
- ◆ Explain how secondary treatment requirements may be modified



# Technology-Based Requirements for Municipal Dischargers – Secondary Treatment

	30-Day Average	7-Day Average
5-Day BOD	30 mg/l	45 mg/l
TSS	30 mg/l	45 mg/l
Removal	85% BOD <sub>5</sub> and TSS	—
pH	6.0 – 9.0 s.u.	

(40 CFR §133.102)

**Note: Compliance Deadline = 7/1/88**



# Calculating Permit Limits

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- ◆ **BOD<sub>5</sub> and TSS limits must be concentration-based because secondary treatment standards are expressed in concentration units [122.45(f)(1)(ii)]**
- ◆ **May add mass-based limits**
  - **If calculating mass-based, use design flow of the treatment plant [122.45(b)]**
- ◆ **Limits generally expressed as average monthly and average weekly limits based on requirements in 40 CFR §122.45(d)(2)**

# Calculating Permit Limits (Continued)

**Example mass-based limit calculation:**

**5 day BOD: 30-day average = 30 mg/L**

**POTW Design Flow = 5.00 mgd**

**BOD<sub>5</sub> Average Monthly Limit =**

$$(5.00 \text{ mgd})(30 \text{ mg/L})(8.34^*) = 1,250 \text{ lbs/day}$$

**\* 8.34 is the conversion factor**



**What if:**

**POTW Actual Flow = 7.00 mgd ?**

**POTW Actual Flow = 2.50 mgd ?**



# Percent Removal Requirement

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- ◆ Percent removal permit requirement for BOD<sub>5</sub> and TSS must be included
- ◆ Compliance is determined based on the 30-day (monthly) average removal efficiency calculated using influent and effluent concentrations [133.101]

$$\text{Percent Removal} = \frac{\text{Monthly average influent conc.} - \text{Monthly average effluent conc.}}{\text{Monthly average influent conc.}} \times 100$$



# Modifications to Secondary Treatment Standards

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- ◆ “Equivalent to secondary”
- ◆ Other modifications

# Equivalent to Secondary Treatment

## 40 CFR §133.105

◆ “Equivalent to secondary” requirements may be applied to facilities where:

- A trickling filter or waste stabilization pond is the principal process (i.e., provides at least 51% of BOD removal)
- The BOD<sub>5</sub> and TSS concentrations consistently achievable with proper O&M exceed secondary treatment requirements
- The facility provides significant biological treatment of municipal wastewater (i.e., consistently achieves at least 65% removal of BOD<sub>5</sub> by aerobic or anaerobic biological treatment)



# Equivalent to Secondary Treatment (Continued)

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- ◆ Regulations allow adjustments to the secondary treatment requirements for BOD<sub>5</sub> and TSS for “equivalent to secondary” facilities
- ◆ Treatment works operating beyond design hydraulic capacity or organic loading limit should not be considered eligible for equivalent to secondary limitations
- ◆ New facilities with trickling filters and waste stabilization ponds:
  - Should be analyzed separately from older plants
  - Generally have better treatment and thus would not qualify for an equivalent to secondary adjustment



# Equivalent to Secondary Treatment (Continued)

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- ◆ **Equivalent to secondary treatment adjustments for BOD<sub>5</sub> and TSS**  
[133.105(a)]
  - Up to 45 mg/L, 30-day average
  - Up to 65 mg/L, 7-day average
  - No less than 65% removal (30-day average)

# Calculating Equivalent to Secondary Limits – 40 CFR §133.105(f), §133.101

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- ◆ Calculate average monthly limits based on 95<sup>th</sup> percentile of actual average monthly effluent quality
  - Based on at least the past two years of operational data
  - Excludes upsets, bypasses, operational errors, etc.
- ◆ Weekly limits are 1.5 times monthly limits
- ◆ Limits can be flow-weighted to account for different types of treatment at the same facility (i.e., secondary and equivalent to secondary)

# Other Modifications

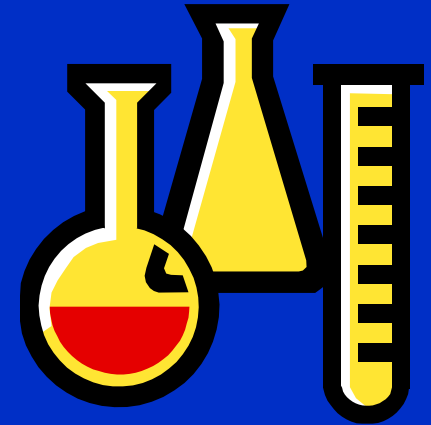
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- ◆ **Other modifications to:**
  - BOD<sub>5</sub> requirements
  - TSS requirements
  - Percent removal requirements
- ◆ **These modifications may be based on:**
  - Pollutant parameter substitution
  - Alternative State Requirements
  - Special considerations for waste stabilization ponds
  - Special considerations for certain influent or collection system characteristics

# Modifications to BOD<sub>5</sub> Requirements

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- ◆ **Substitution of CBOD<sub>5</sub> for BOD<sub>5</sub>**  
[133.102(a)(4)]
  - 25 mg/L, 30-day average
    - (40 mg/L for equivalent to secondary)
  - 40 mg/L, 7-day average
    - (60 mg/L for equivalent to secondary)
- ◆ **Substitution of COD or TOC for BOD<sub>5</sub>**  
[133.104(b)]
  - Site-specific relationship must be developed



# Modifications to BOD<sub>5</sub> Requirements (Continued)

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## ◆ Alternative State Requirements (ASRs) for BOD<sub>5</sub> [133.105(d)]

- Facilities must be eligible for treatment equivalent to secondary
- State may set BOD<sub>5</sub> requirements less stringent than equivalent to secondary requirements
- ASR maximum (“ceiling”) concentration based on performance of median facility from a representative sample within the State or other geographic area
- Limits for each facility determined case-by-case based on actual performance (95<sup>th</sup> percentile)



# Modifications to TSS Requirements

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- ◆ **Alternative State Requirements (ASRs) for TSS [133.105(d)]**
  - ASRs for TSS apply only to trickling filters eligible for treatment equivalent to secondary
  - ASR “ceiling” and individual TSS limits set in same manner as requirements for BOD<sub>5</sub>

# Modifications to TSS Requirements (Continued)

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- ◆ **Waste Stabilization Ponds [133.103(c)]**
  - Special consideration applies to TSS limitations in lieu of ASRs
  - State may set TSS minimum effluent quality requirements less stringent than equivalent to secondary requirements
  - Allowable concentration set differently than ASRs
    - 90<sup>th</sup> percentile TSS value for ponds in same geographic area that are achieving the equivalent to secondary monthly average requirements for BOD<sub>5</sub>



# Modifications to BOD<sub>5</sub> or TSS Requirements

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## ◆ Industrial Wastes [133.103(b)]

### – Modification of BOD<sub>5</sub> and TSS requirements available if:

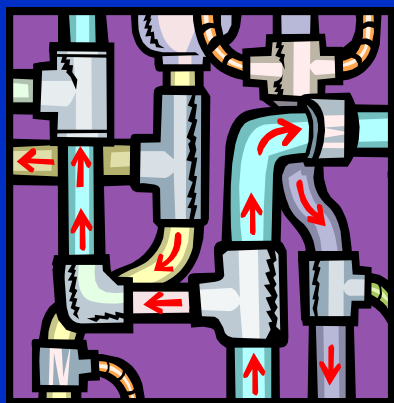
- industrial category contributes >10 percent of design flow or loading
- Industrial category would have limits less stringent than secondary or equivalent to secondary if a direct discharger

### – POTW monthly and weekly limits may be adjusted to consider industrial contribution (i.e., flow-weighted calculation)



# Modifications to Percent Removal Requirements

- ◆ Adjustments to secondary or equivalent to secondary percent removal requirements or substitution of mass loading limit allowed for:



- Less concentrated influent from combined sewers during wet weather [133.103(a)]
- Less concentrated influent from combined sewers during dry weather [133.103(e)]
- Less concentrated influent from separate sewers [133.103(d)]

# Sources of Facility Information

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- ◆ Existing permit and fact sheet
- ◆ Application Form 2A
- ◆ Supplemental information (sludge, toxicity, CSOs, pretreatment)
- ◆ Discharge Monitoring Reports (DMRs)
- ◆ Pretreatment program submissions
- ◆ Annual pretreatment reports
- ◆ Pretreatment audits

