

# Antidegradation Availability Session



**September 24, 2009**

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**Water Pollution Control Branch**





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## Antidegradation Implementation

Starting Aug. 30, 2008, all permit applications for new or expanded discharges will be required to follow the new *Missouri Antidegradation Rule and Implementation Procedure*. The Antidegradation Review process will be initiated by requests for water quality based effluent limits.

[Antidegradation Rule and Implementation Procedure PDF](#) **Final**

Approved April 20, 2007 and revised on May 7, 2008.

### Antidegradation Review Request Form and Process Diagram

- Water Quality Review Assistance/ Antidegradation Review Request, Form--MO 780-1893 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- Antidegradation Review Summary - Tier Determination and Effluent Limit Summary, Form--MO 780-2025 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- Antidegradation Review Summary - Attachment A: Tier 2 - Significant Degradation, Form--MO 780-2021 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- Antidegradation Review Summary - Attachment B: Tier 2 - Minimal Degradation, Form--MO 780-2022 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- Antidegradation Review Summary - Attachment C: Temporary Degradation, Form--MO 780-2023 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- Antidegradation Review Summary - Attachment D: Tier 1 Review, Form--MO 780-2024 [Adobe PDF](#) / [Fill-in MS Word DOC](#)
- No Degradation Evaluation - Conclusion of Antidegradation Review, Form--MO 780-2026 [Adobe PDF](#) / [Fill-in MS Word DOC](#)

# Who is Affected?

- State Operating Permits & Construction Permit applications for discharges that are



***New or Expanded!***

# Establish Base Case Limits

- *Federal and State Rules 10 CSR 20-7.015 Effluent Rule*
- *Water Quality Based Effluent Limits 10 CSR 20-7.031 Water Quality Standards*

# Gather Information for Submittal

## Facility Information -

- Facility Name
  - Permit Number (for existing facilities)
  - Facility Type/Description
  - Legal Description
  - Latitude/Longitude
  - Water Quality History
- Outfall Number
    - ◆ **NEW** Design Flow (gpd or MGD)
    - ◆ Treatment Type
      - Primary
      - Secondary
      - Advanced
      - Stormwater

# Gather Information for Submittal

Know your receiving waters-



What is its classification?

Uses? (10 CSR 20-7.031). Endangered species?

Low flow conditions (7Q10, 1Q10, 30Q10)? Others?

# Gather Information for Submittal

Know your discharge-



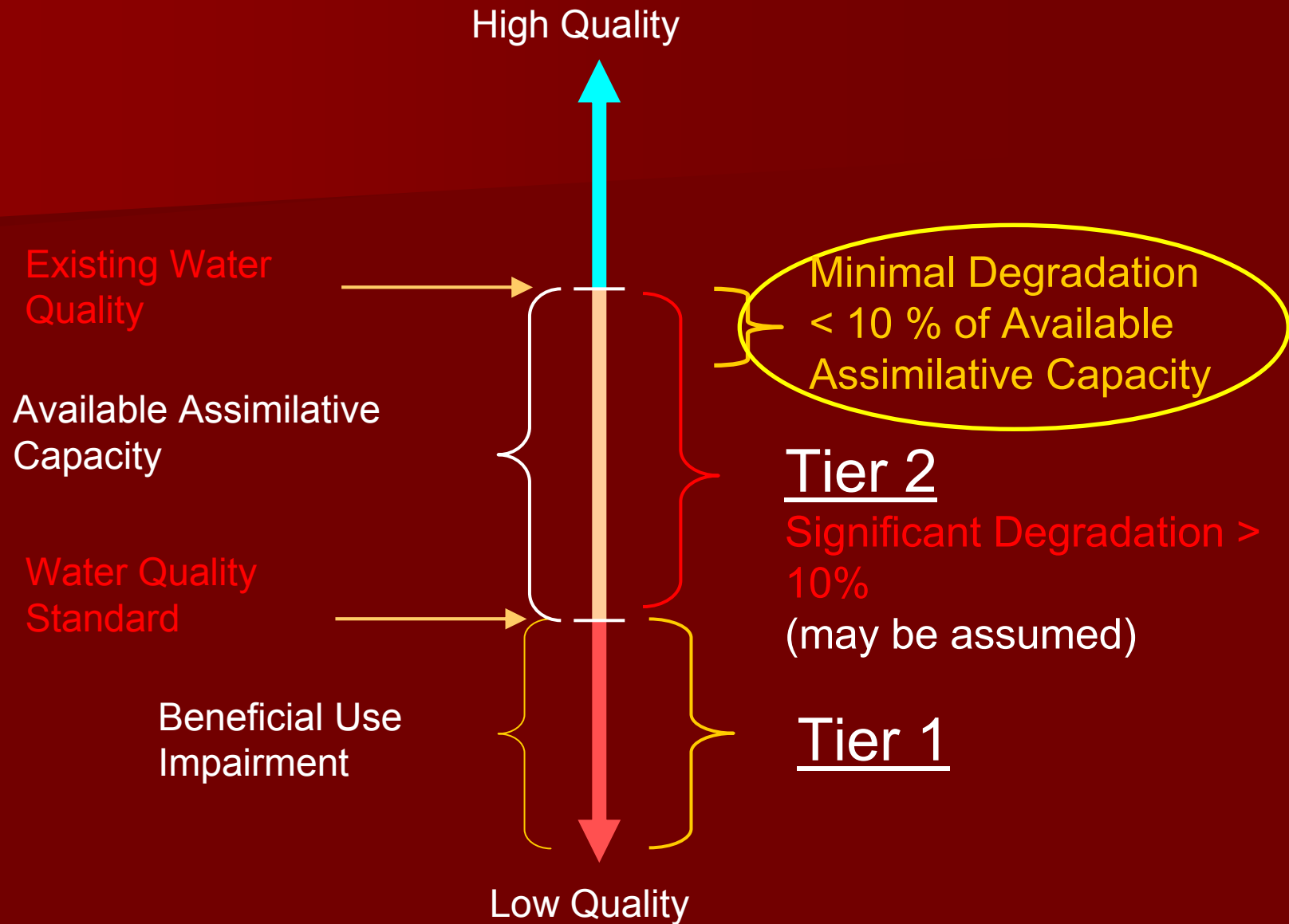
What are its POCs? Pretreatment POCs?  
New or existing? Effluent regulations?  
What water quality standards apply?

# Tiers of Water Quality

## 10 CSR 20-7.031(2)

- **Tier I**: Water is At, Near, or Violating the WQS
- **Tier II**: Water Quality is Better than WQS, and Degradation *May* be allowed if justified.
- **Tier III**: Outstanding National Resource Waters [10 CSR 20-7.031(1)Q.&R.]

# Water Quality, Assimilative Capacity, and Degradation



# Tiers of Water Quality

## 10 CSR 20-7.031(2)

- **Tier I**: Water is At, Near, or Violating the WQS – *Maintain Loading, Demonstrate Meets Water Quality, TMDL WLA*
- **Tier II**: Water Quality is Better than WQS, and Degradation *May* be allowed if justified.
- **Tier III**: Outstanding National Resource Waters [10 CSR 20-7.031(1)Q.&R.] – *No Degradation Allowed.*

# TIER II Review: 3 Options

- 1) Non-Degrading: Demonstrate that expanded loading will be maintained or decreased,
- 2) Minimally Degrading: Demonstrate that the loading will consume less than 10 percent of the assimilative capacity, or
- 3) Significantly Degrading: Demonstrate or assume degradation with alternative analysis and SEI analysis.

# TIER II - Alternatives Analysis

## ■ Practicability

- Good “fit”
- Technically feasible

## ■ Economic Efficiency

- Cost does not exceed 120% of the least expensive technology that meets WQS  
(rule of thumb)

## ■ Affordability

- Apply EPA’s nonbinding Guidance: “Interim Economic Guidance for Water Quality Standards,” EPA-823-B-95-002 (1995)

# Costs Comparison

- Compare alternatives based on annualized costs
- Time horizon should be consistent for comparisons
- Projects can be economically efficient yet not affordable

# Establish Final Limits

- *Federal and State Rules 10 CSR 20-7.015 Effluent Rule*
- *Water Quality Based Effluent Limits 10 CSR 20-7.031 Water Quality Standards*
- **PALs = Preferred Alternative Limits**



# Antidegradation Summary Forms

Submit with the full antidegradation report and Water Quality Review Assistance/Antidegradation Review Request form.

- Tier Determination and Effluent Limit Summary
- Attachment A: Tier 2 – Significant Degradation
- Attachment B: Tier 2 – Minimal Degradation
- Attachment C: Temporary Degradation
- Attachment D: Tier 1 Review
- No Degradation Evaluation – Conclusion of Antidegradation Review

These forms are available at <http://www.dnr.mo.gov/forms/index.html> or <http://www.dnr.mo.gov/env/wpp/permits/antideg-implementation.htm>

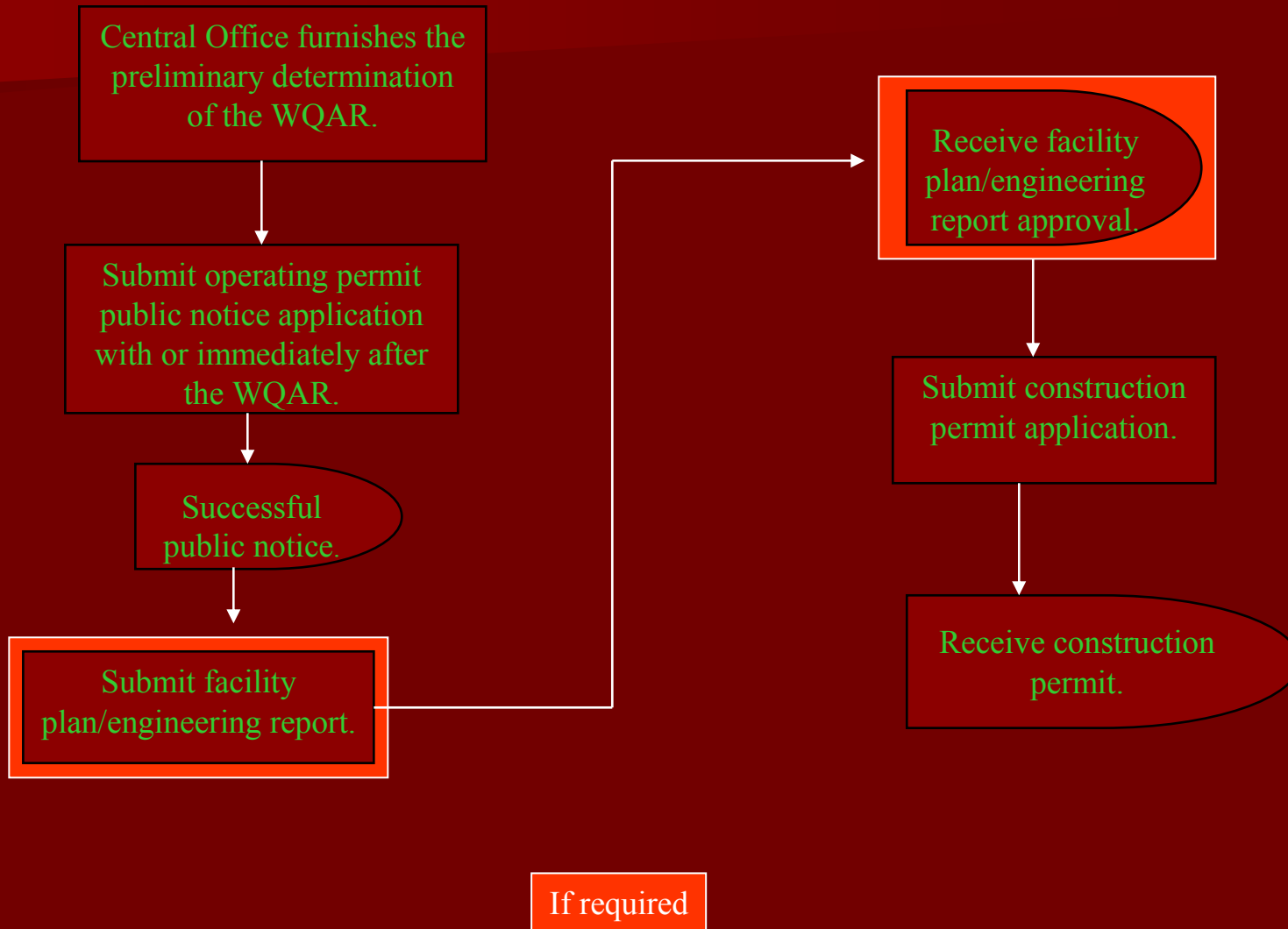
# Preliminary WQAR

- Providing comment period--5 days.
- Once finalized--30 days for applicant appeal.

Additional information:

<http://www.dnr.mo.gov/env/wpp/permits/antideg-implementation.htm>

# Preferred Pathway



# Tips to Move Your Review Forward

- Make a Realistic Schedule
- Involve Internal and External Experts
- Pre-consultation Meetings with the Department
- Identify the Type of Antidegradation Review
- Make a Complete Submittal
- Make Sure it is Well Organized
- Respond Promptly to Request



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# How Effluent Limits Are Determined

## ■ Technology-Based Limits (TBELs)

- *Effluent Limitations Regulations (10 CSR 20-7.015) & Federal Regulations (ELGs, secondary treatment limits)*
- Alternative Analysis Technology-based

## ■ Water Quality-Based Limits (WQBELs)

- *Mass balance equation*
- “Technical Support Document for Water Quality-based Toxics Control”, EPA/505/2-90-001
- *Draft guidance: "Guidance for Water Quality and Antidegradation Review Assistance"*
- Minimally Degrading Effluent Limits (MDELs)
  - *Draft guidelines: "Antidegradation Wasteload Allocation Procedure for Minimal Degrading Discharges"*

# Scenario #1: Streeter Phelps BOD5

## INPUT

### 1. EFFLUENT CHARACTERISTICS

Discharge (cfs):	5.3
CBOD5 (mg/L):	21.3
NBOD (mg/L):	5
Dissolved Oxygen (mg/L):	2.4
Temperature (deg C):	26

### 2. RECEIVING WATER CHARACTERISTICS

Upstream Discharge (cfs):	0.01
Upstream CBOD5 (mg/L):	0.0
Upstream NBOD (mg/L):	0
Upstream Dissolved Oxygen (mg/L):	0
Upstream Temperature (deg C):	26
Elevation (ft NGVD):	630
Downstream Average Channel Slope (ft/ft):	0.0066
Downstream Average Channel Depth (ft):	1
Downstream Average Channel Velocity (fps):	<sup>21</sup> 1.4

Based on a 4 foot wide effluent dominated stream

# Scenario #1: Streeter Phelps BOD5 (cont'd)

3. REAERATION RATE (Base e) AT 20 deg C (day<sup>-1</sup>): 63.00

Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	16.07
O'Connor and Dobbins	.1 - 1.5	2 - 50	15.33
Owens	.1 - 6	1 - 2	27.06
Tsivoglou-Wallace	.1 - 6	.1 - 2	63.82

4. BOD DECAY RATE (Base e) AT 20 deg C (day<sup>-1</sup>): 3.33

Reference	Suggested Value
Wright and McDonnell, 1979	3.33 <sub>22</sub>

# Modeling Level Decision Diagram

