

How State Plan Approval Programs Deal With New Innovative Technologies

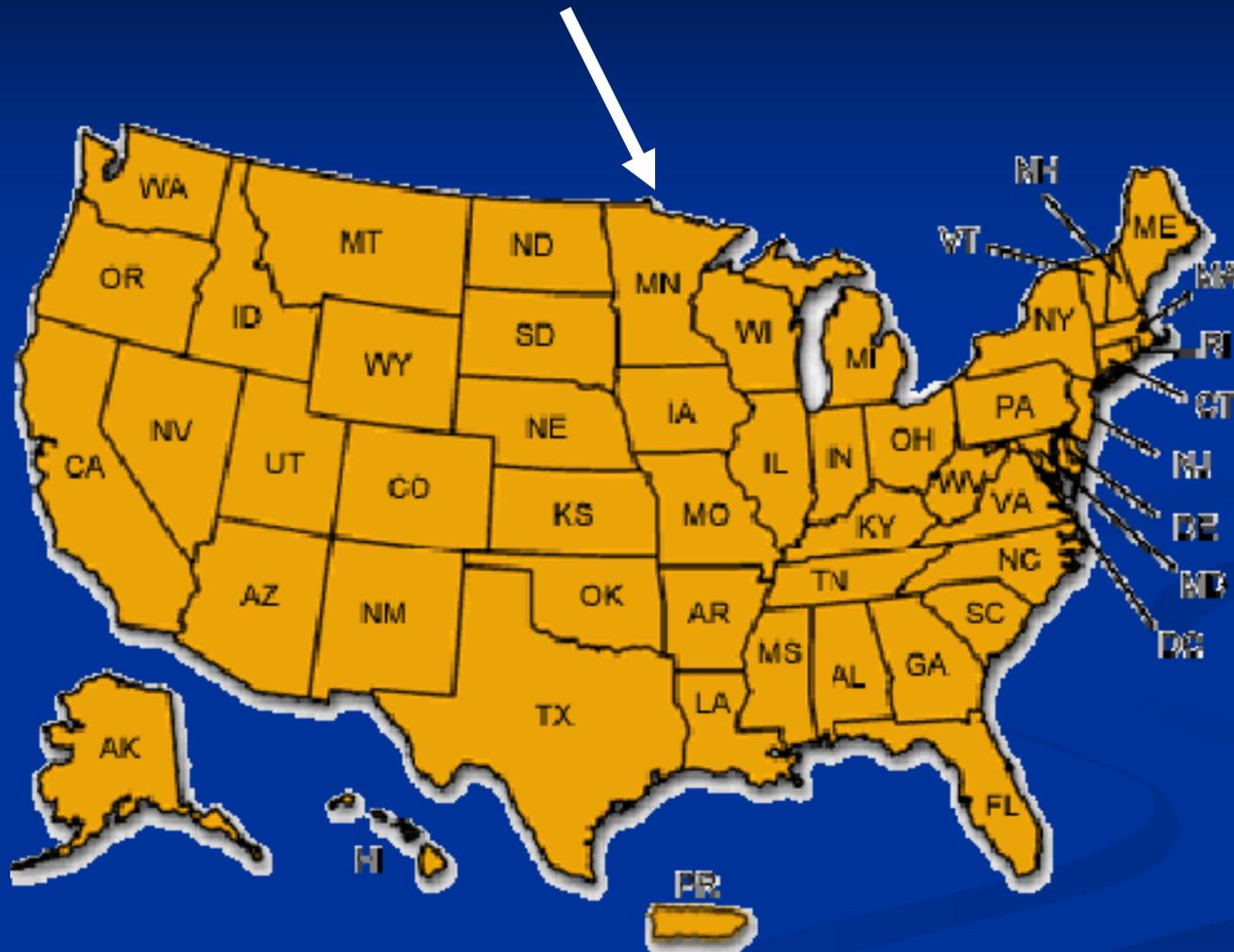
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Location of Minnesota



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TOPICS

- Facility Plan Requirements
- Ten States Standards
- MPCA Reliability Criteria
- New Technologies in/coming to Minnesota



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CWRF Facility Plan Requirements

- MN Rule 7077.0272, Subp. 2.D.

“An analysis of all feasible treatment alternatives that are capable of meeting the applicable effluent, water quality, and public health requirements for 20 years.”



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Designs in Minnesota

- Minnesota does not have design rules
- Guidance – based on Ten States Standards
- MPCA Reliability Criteria



Ten States Standards Foreword

“Lack of description or criteria for a unit process or equipment does not suggest it should not be used, but only that consideration by the reviewing authority will be on the basis of information submitted with the design”.



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Ten States Standards

- Section 53.2
- Encourage rather than obstruct
- Reliability and effectiveness demonstrated



MPCA Reliability Criteria

- < 100,000 gpd - Single aeration basin with 2 clarifiers
- > 100,000 gpd – Minimum of Dual Units (SBR's – 3)



New Technologies in/coming to Minnesota

- Biological Aerated Filters (BAF)
- Membrane Biological Reactor (MBR)
- Constructed Wetlands



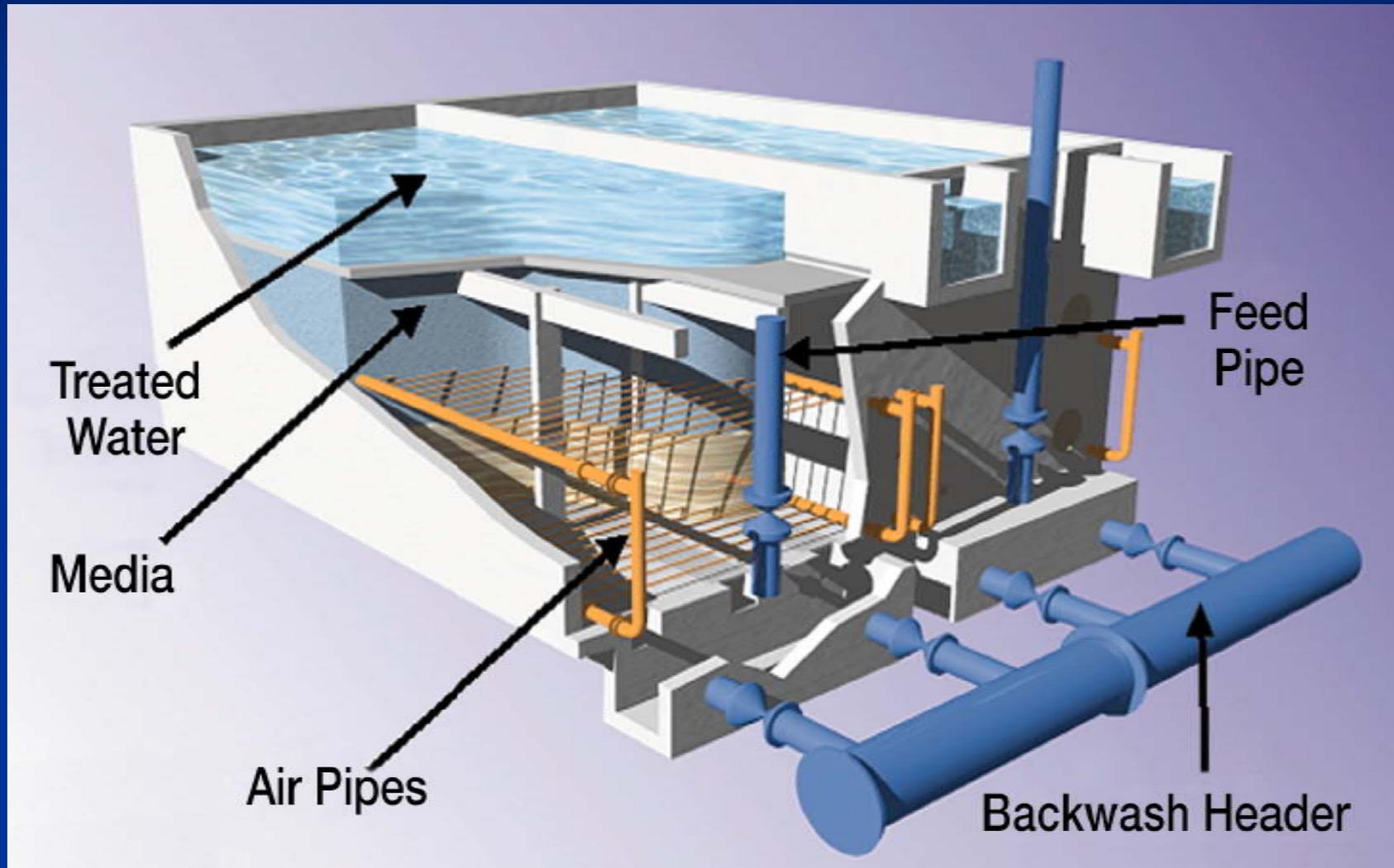
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Biological Aerated Filters (BAF) Design Review

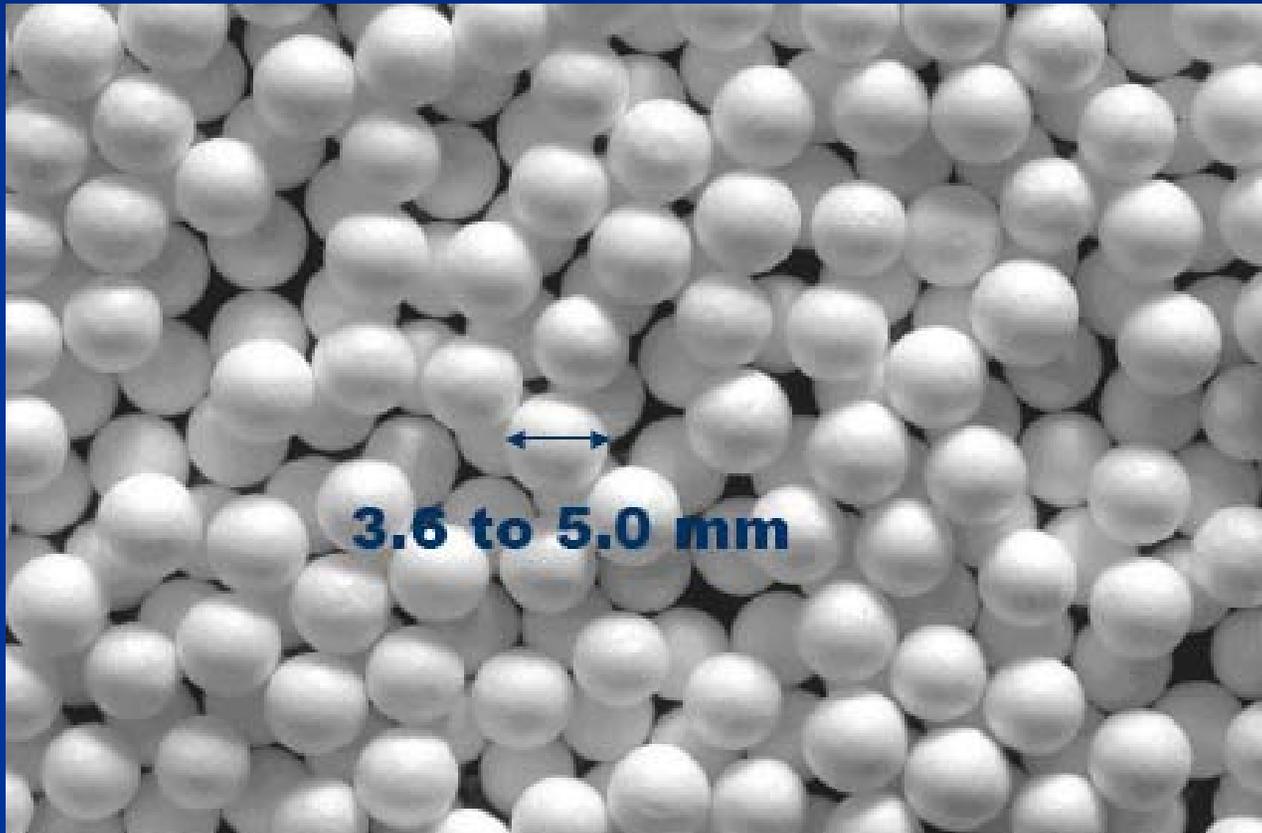
- Trip to Europe
- Supporting Design Information and Full Scale Effluent Quality
- St. Peter & Northfield



Floating Media - Biological Aerated Filters



Floating Filter Media



St. Peter & Northfield 2007 Effluent Data

■ St. Peter

- 1.2 mgd avg
- CBOD₅ 4 mg/L
- TSS 10 mg/L
- NH₃-N 0.4 mg/L
- TP 0.6 mg/L
- FC 73/100 mL

■ Northfield

- 3.4 mgd avg
- CBOD₅ 5 mg/L
- TSS 12 mg/L
- NH₃-N 0.2 mg/L
- TP 0.7 mg/L
- FC 42/100 mL



Membrane Biological Reactors (MBR)

- Traverse City, MI Site Trip
- Five Facilities in Georgia Site Trips
- Facilities from 0.2 to 3.5 MGD



Traverse City, MI - MBR



MBR Design Review

- Design Information from Manufacturer
- Textbooks and Papers
- Effluent data from Operating Facilities in Michigan & Georgia
- Direct Site Visit Operator Interviews in Georgia – Ease of Operation & Actual O & M costs



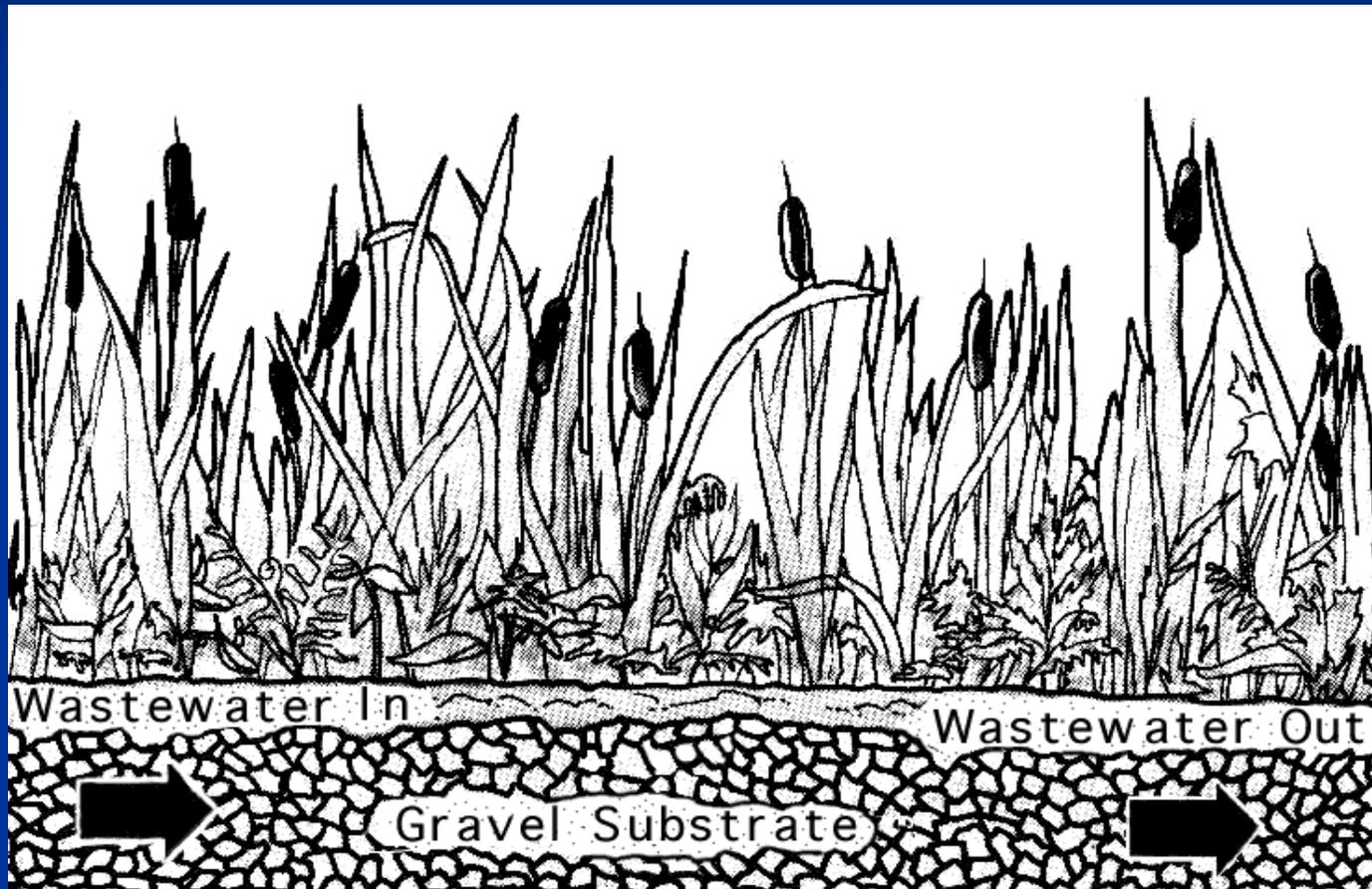
Constructed Wetlands

- Design Submitted
- Textbooks and Papers



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Constructed Wetlands



Constructed Wetlands



Wrap –up

- Discussed Facility Plan Requirements
- Ten States Standards
- MPCA Reliability Criteria
- Introduced the New Technologies in/coming to Minnesota



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