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Simple, Early Steps Toward Meeting Lower Phosphorus Effluent Limits

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Outline of Presentation

- Summary of Permit Timelines
- Phosphorus Optimization Planning
- Operation Evaluation Report (OER)
- Compliance Alternatives Planning
- Closing Thoughts



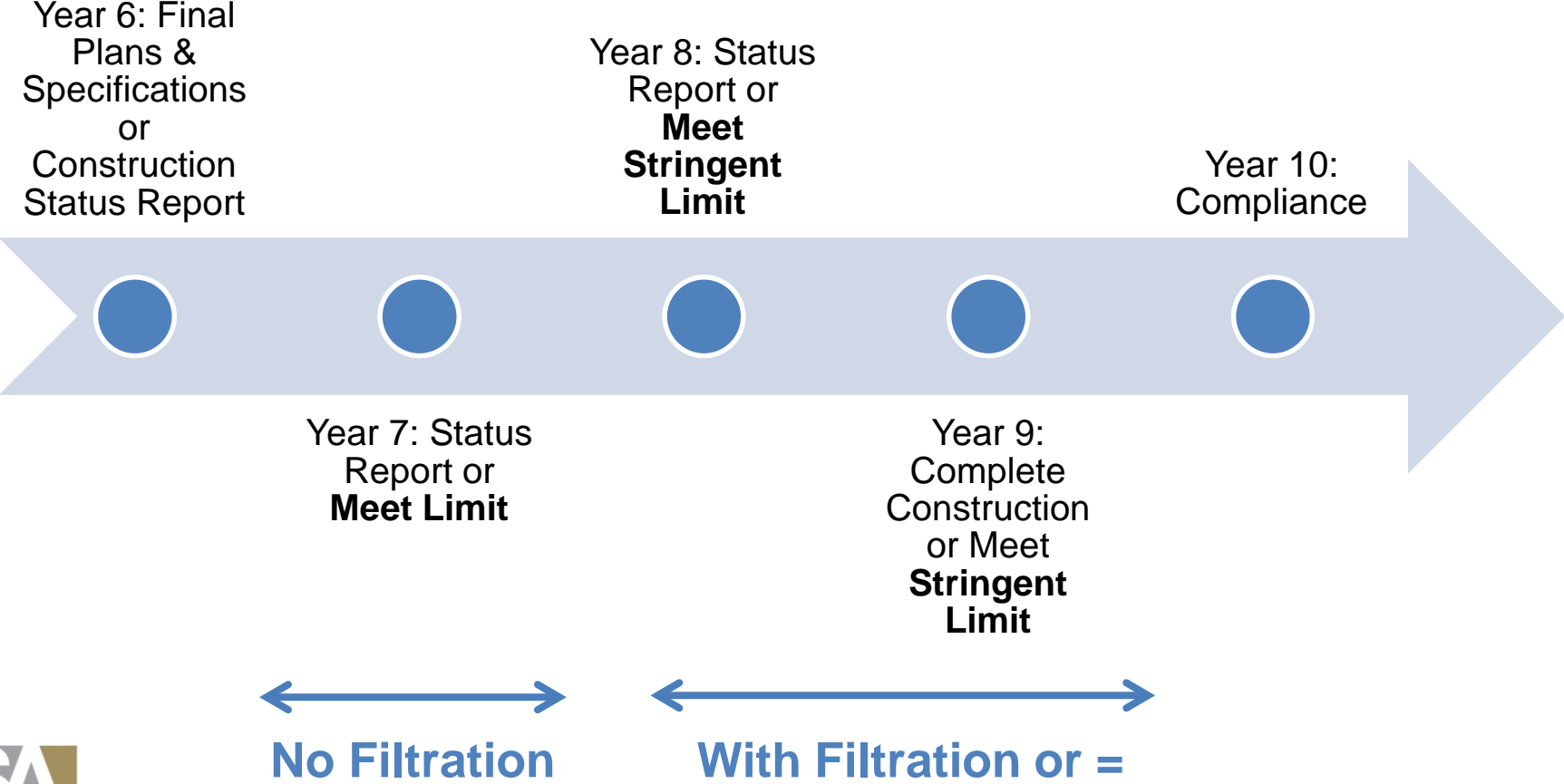
Permit Timelines




Recently Re-issued Wisconsin Permits – General Timeline for Stringent Limits First Permit

Required Action	Approximate Years After Permit Issued
Operational Evaluation Report	1
Study of Feasible Alternatives	1
Compliance Alternatives, Source Reduction, Improvements and Modification Status	2
Preliminary Compliance Alternatives Plan	3
Final Compliance Alternatives Plan	4
Progress Report on Plans and Specifications	5

Recently Reissued Wisconsin Permits – General Timeline for Stringent Limits





Permit Discharge Optimization Planning and Operation Evaluation Report (or ONR/POP)

WDNR Forms Provide Structure to P Optimization Plans

- Part 1 - Background Information
 - Description
 - Baseline Data
 - Identified P Contributors
- Part 2 – Optimization Action Plans
 - Self Identified Actions
- Part 3 – Approval

PHOSPHORUS OPTIMIZATION REPORT WORKSHEET

Facility Name: _____

WPDES Permit #: _____

PART 1—BACKGROUND INFORMATION

(A) Briefly describe wastewater treatment facility processes and operations and the means of treating phosphorus, including any chemicals used. Attach a flow schematic which shows the point(s) of chemical addition for TP control. Include both liquid and solids treatment trains.

(B) Baseline Year:

Month	Influent Avg. Flow (MGD)	Influent Avg. TP Concentration (mg/l)	Influent TP Mass (lb/day)	Effluent Avg. Flow (MGD)	Effluent Avg. TP Concentration (mg/l)	Effluent TP Mass (lb/day)
Jan						
Feb						
Mar						
Apr						
May						
Jun						
Jul						
Aug						
Sep						
Oct						
Nov						
Dec						
Avg						

Operation Evaluation Review Can Be a Useful Tool for Capital Improvements Planning

- Phosphorus data and facilities review:
 - Meet interim permit limit with minor operational changes?
 - Meet future (advisory) stringent limit with minor facility changes?
 - Other facility improvements needed?
- Communication tool
 - Budgeting
 - Support for rate increases
- Is future advisory phosphorus limit correct?
 - Stream monitoring

Optimization Step 1: Know Your Influent Sources

- Industrial customers
- Commercial and institutional customers
- Drinking water additives
- Perform monitoring



2. Who should we contact for additional information?
Name: _____
Telephone No.: _____

3. Product(s) manufactured or service(s) performed:

4. What is your average volume discharge to the sanitary sewer system in gallons per day? _____

5. Does your discharge to the sanitary sewer system include process wastewater other than normal sanitary wastewater from restrooms and employee facilities?
Yes () No ()
If yes, please provide the average and peak daily volumes of process wastewater discharged to the wastewater treatment facility. Include any discharge other than restroom and employee facility wastewater.

6. Does your product contain phosphorus (food industry, beverage industry, etc.)?
Yes () No ()

7. Do you use any substances containing phosphorus in either your production, cleanup, or cooling activities? These substances may be detergents, cleaning agents that contain phosphoric acid, cooling water additives containing phosphorus, etc.
Yes () No ()

8. If yes to 6 or 7 above, please provide a list of all substances containing phosphorus and the amount used per month. Also, please provide a copy of the Material Safety Data Sheet (MSDS) for each of the substances you use which contain phosphorus.

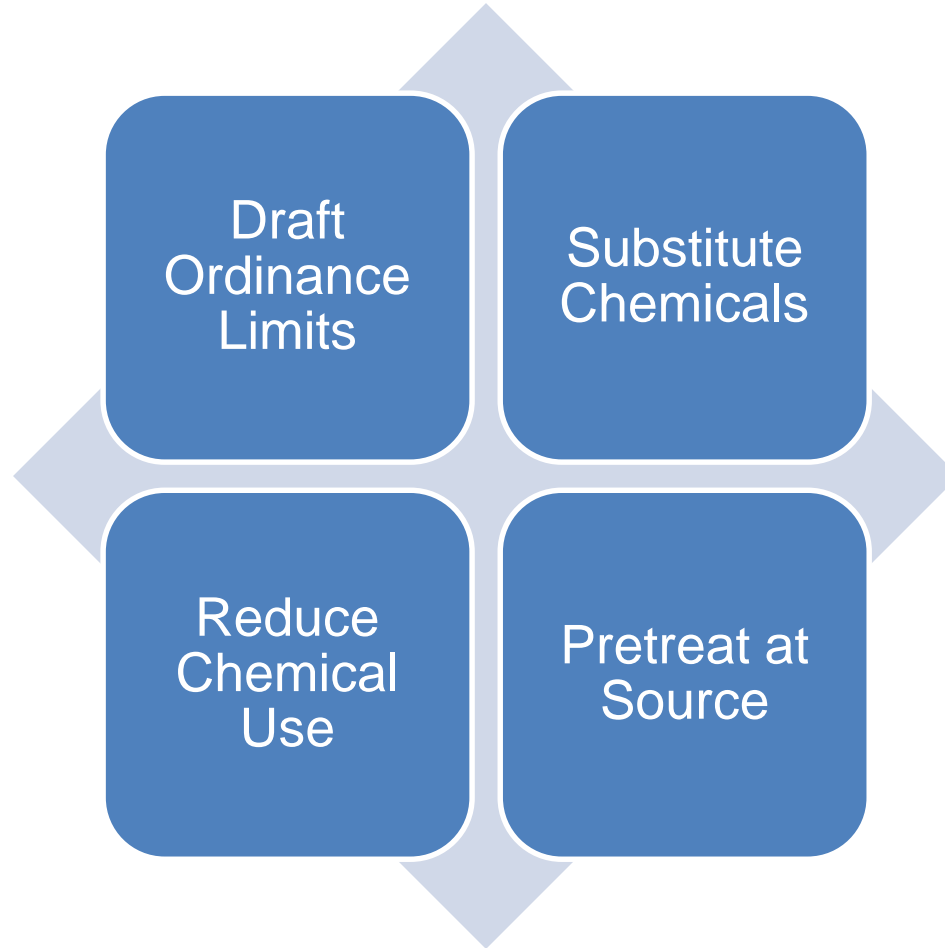
Survey Says...

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Common Sources of Phosphorus

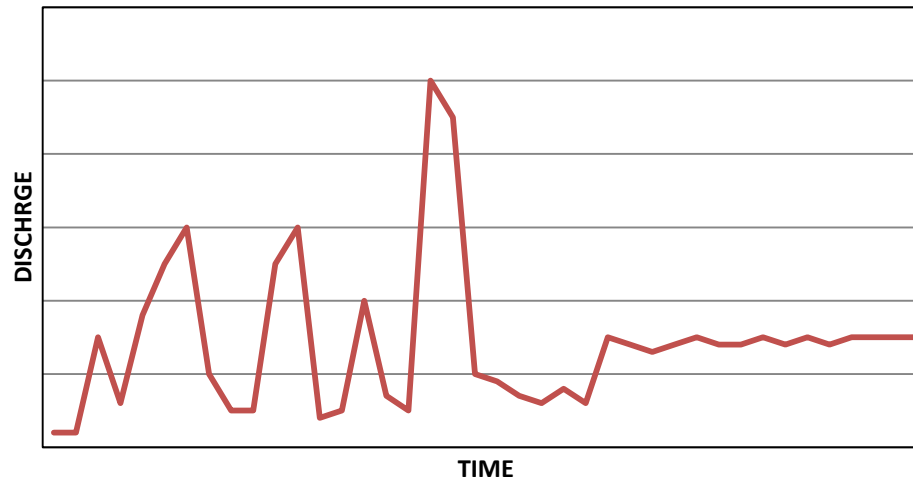
- pH adjustment chemical
- Cleaners and sanitizers
- Product and product additives – food, personal care products, metal finishing
- Economic or regulatory forces favoring certain chemicals

Optimization Step 2: Pollutant Minimization



Examples:

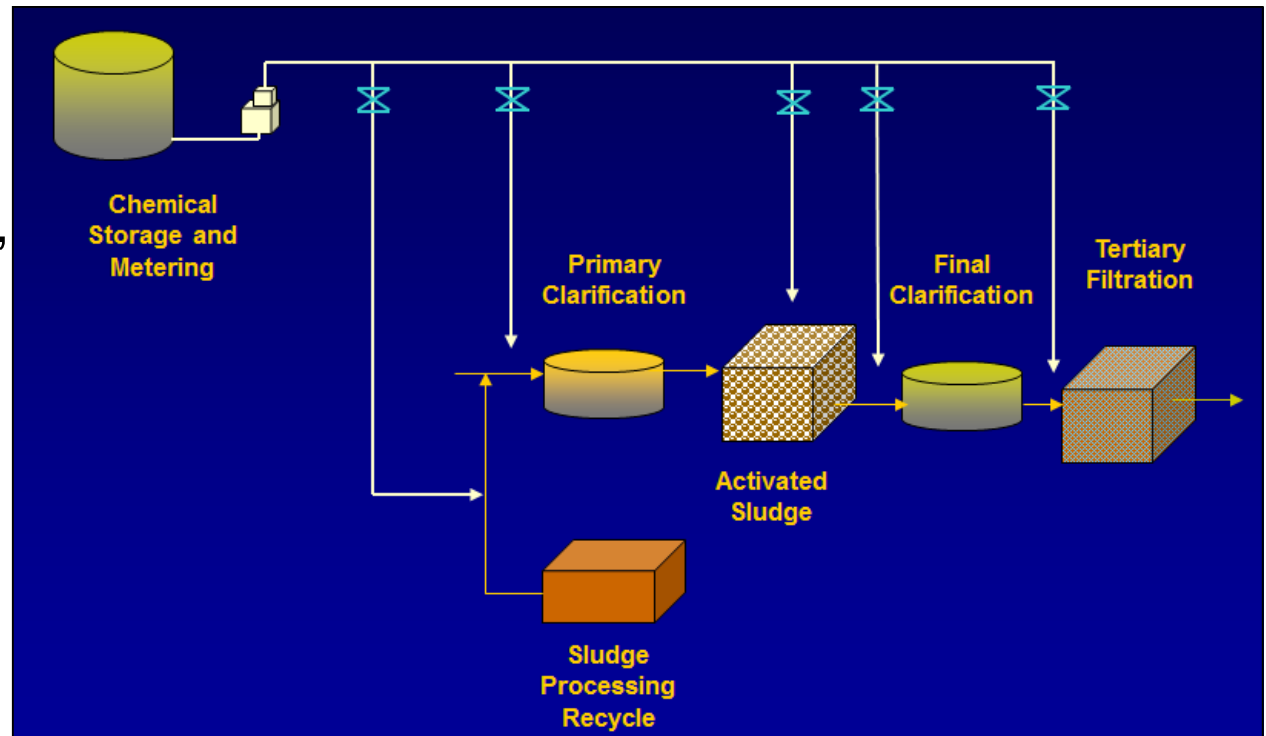
- Industrial discharge equalization (address BPR upset/poor performance)



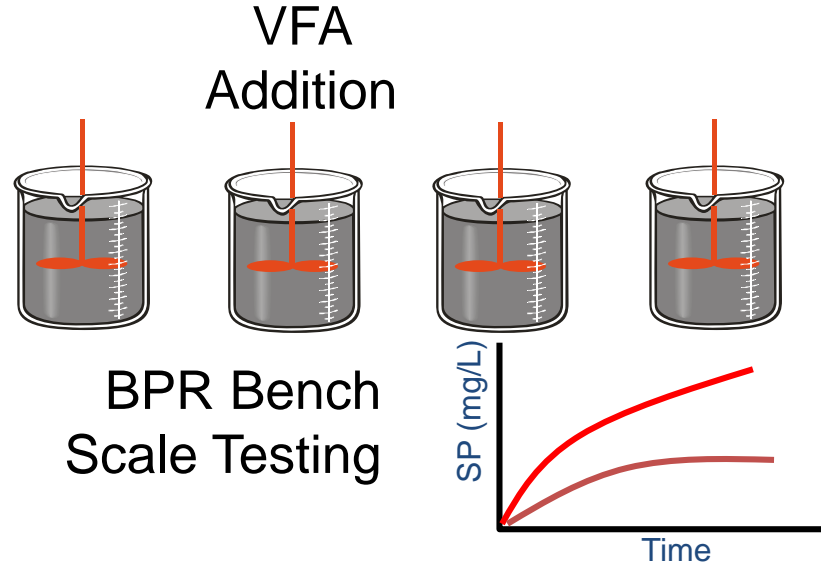
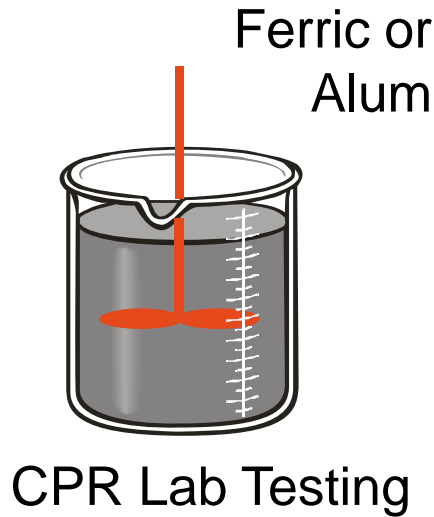
- Chemical substitution
 - pH adjustment
 - Sanitizers
 - Process cleaners

Optimization Step 3: Treatment Optimization at WWTP

- Explore BPR
- Additional chemical feed
- Multipoint chemical feed if available
- Optimize BPR through better monitoring, other simple methods

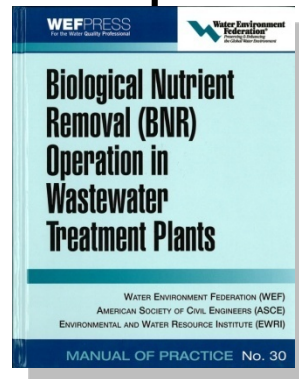


OER Process May Benefit from Collection of Additional Information – Bench Scale

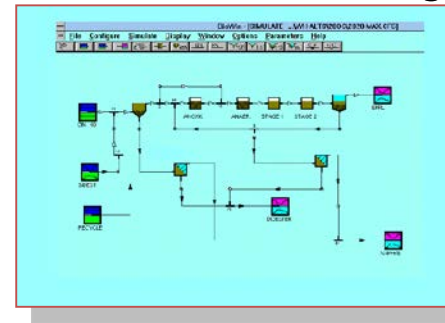


Additional WW
Characterization

Rd CBOD
VFA
NO₃-N



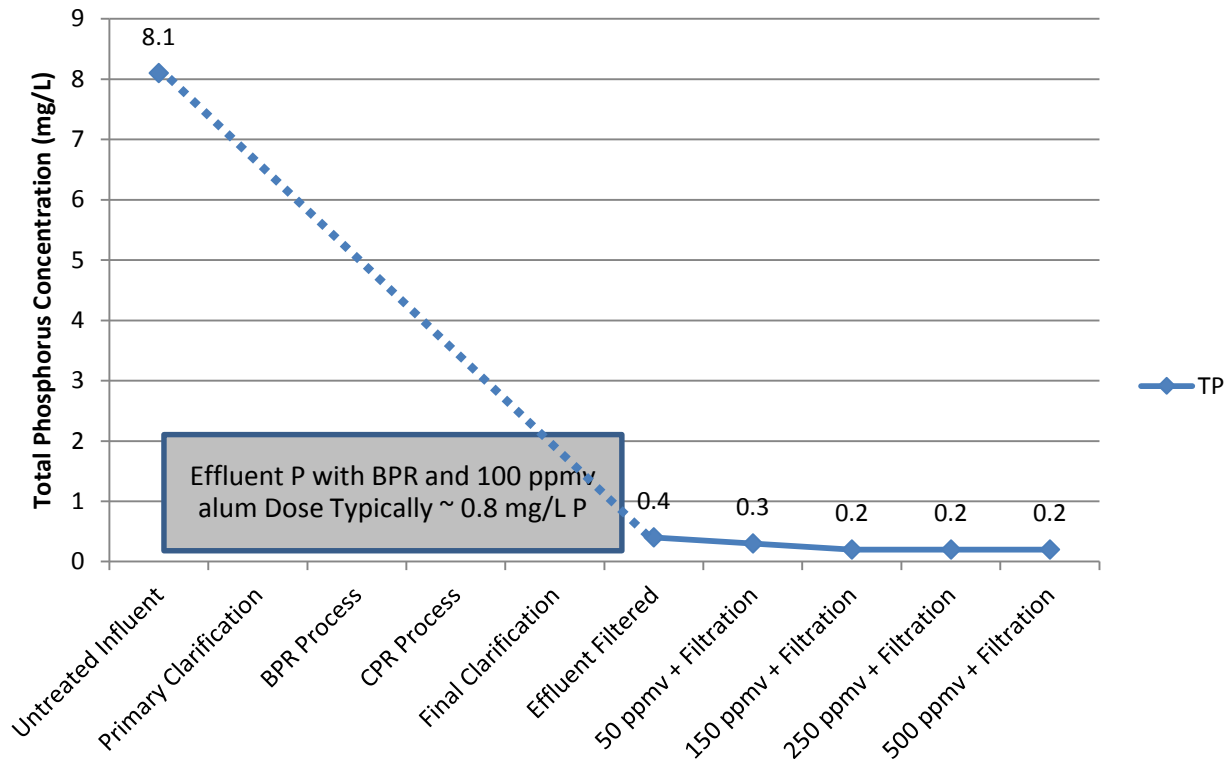
Process Modeling



Bench Scale Examples:

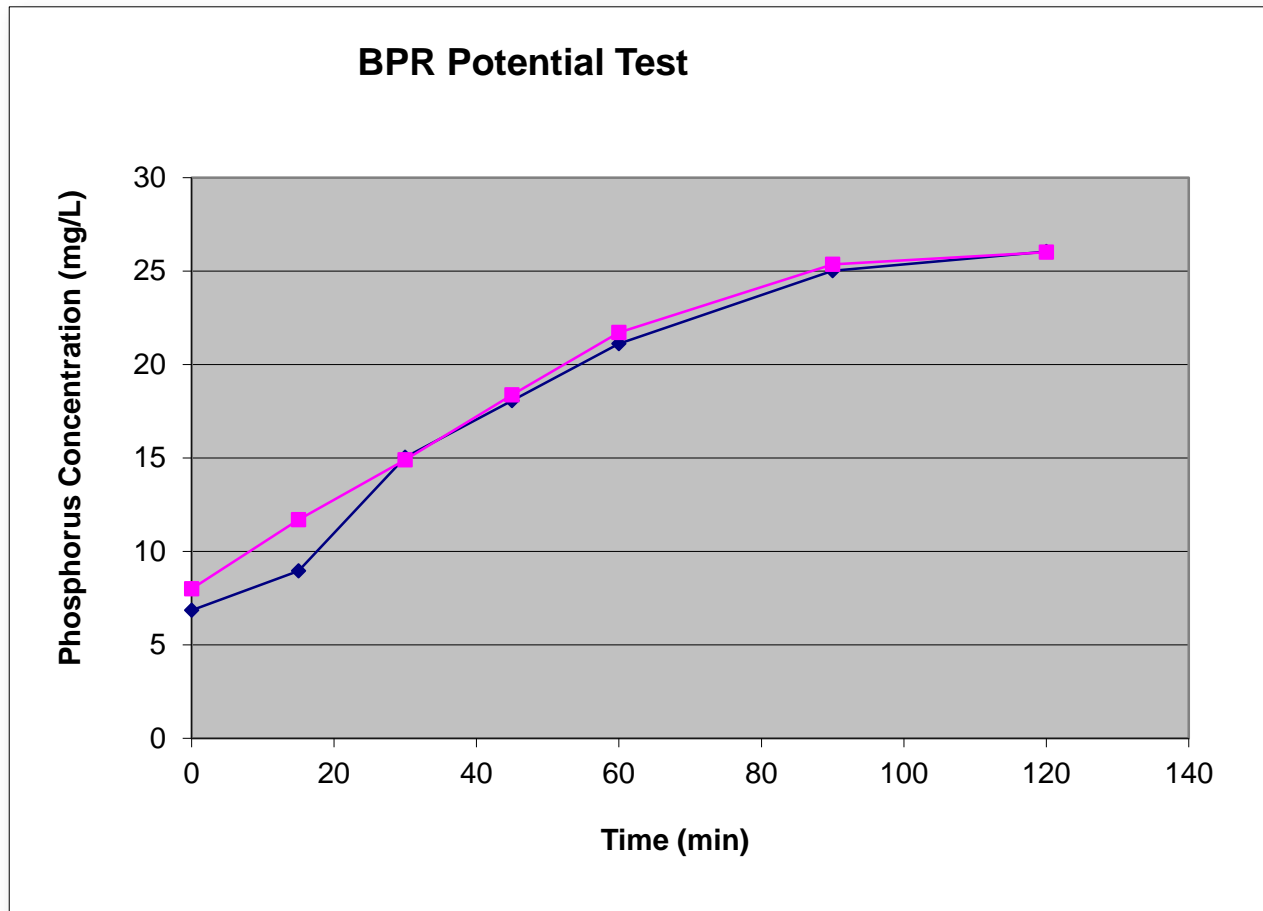
- Jar testing for optimum chemical addition
- Lowest P level achievable

Total Phosphorus - Bench Scale Stress Test



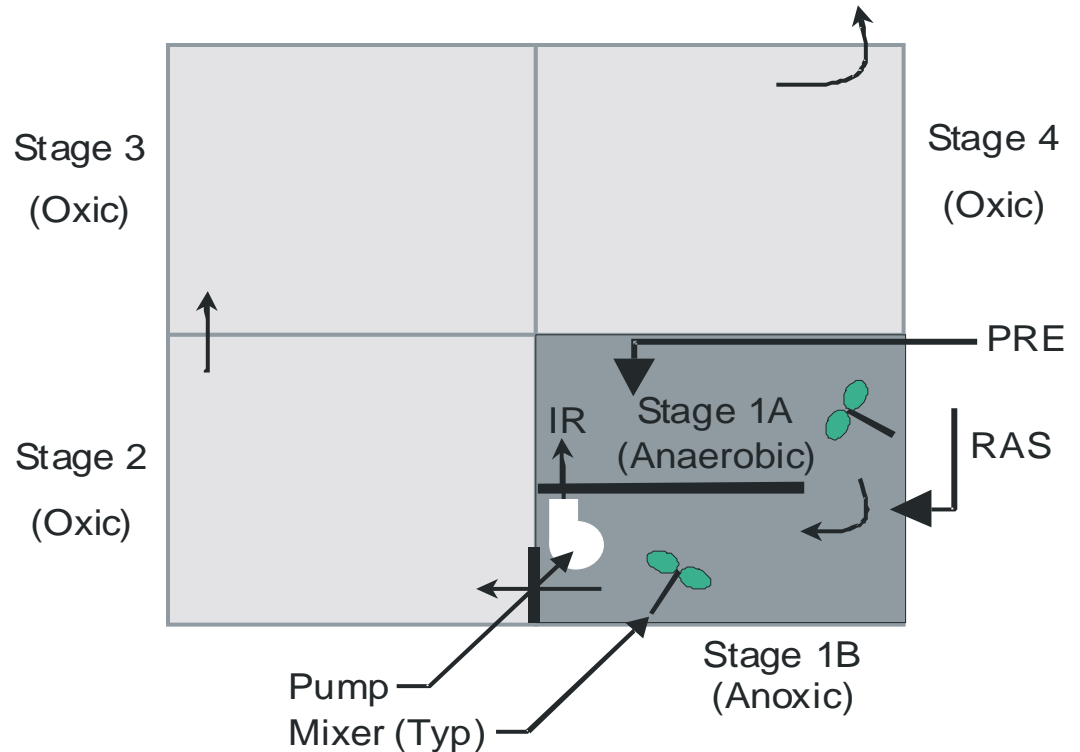
Bench Scale Examples:

- Jar testing for BPR potential



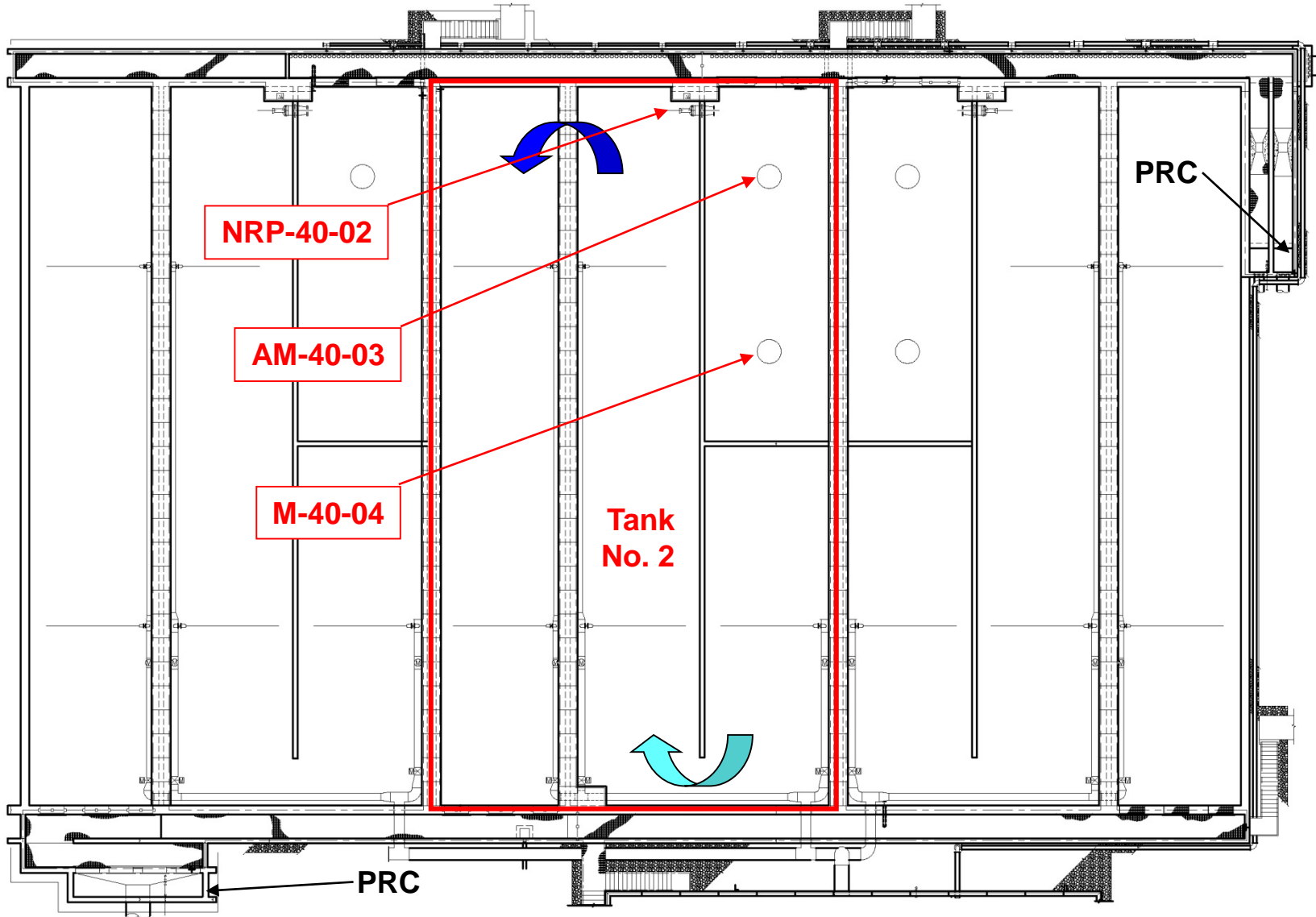
Pilot Scale Examples:

- Pilot BPR at CPR facility



Note: IR = Internal Recycle

Full Scale Example



Full Scale Example

- In-line phosphorus analyzer
- More efficient chemical dosing

ChemScan® mini oP

Ortho Phosphorus Analyzer

The new single parameter in-line analyzer family from ASA Analytics utilizes years of ChemScan® experience and proven technology to provide reliable and accurate analysis of water and waste water. This device has been designed from the ground up to reduce maintenance requirements, includes large ID sample tubing to minimize plugging and only needs quarterly reagent change out.

CAPABILITIES


- Automatic Analysis
- Continuous Output
- Multiple Data Communication Interface Option

BENEFITS


- High Reliability
- Low Capital Cost
- High Accuracy
- Low Operating Cost
- EPA Recognized Analysis Method

APPLICATIONS

- Potable Water



EPA AWARD RECIPIENT



ASA Analytics has been awarded an Environmental Business Achievement Award in recognition of the ChemScan mini oP analyzer. The merit award is in the category of Technology, Water/ Wastewater. [\(more\)](#)

FEATURES

- Automatic Analysis Utilizing ChemScan's Proven VMO Method
- Low Maintenance
- Automatic Zeroing and Cleaning
- Proven Sample Handling with Large I.D. Flow Paths
- Simple Field Adjustable Calibration
- Sample Blank to Eliminate Background Interference
- Automatic Cleaning

Video Demonstration

Video Installation

SUCCESS STORIES

An OER Provides Several Functions

- Optimizes P removal (through optimization plan)
- Sets the stage for compliance evaluation plan
- Optimizes WWTP for other changes (flows, loadings, etc.) if necessary
- Involves and educates dischargers

May also:

- Proactively address aging equipment or constrained site
- Basis for potential wastewater rate adjustments

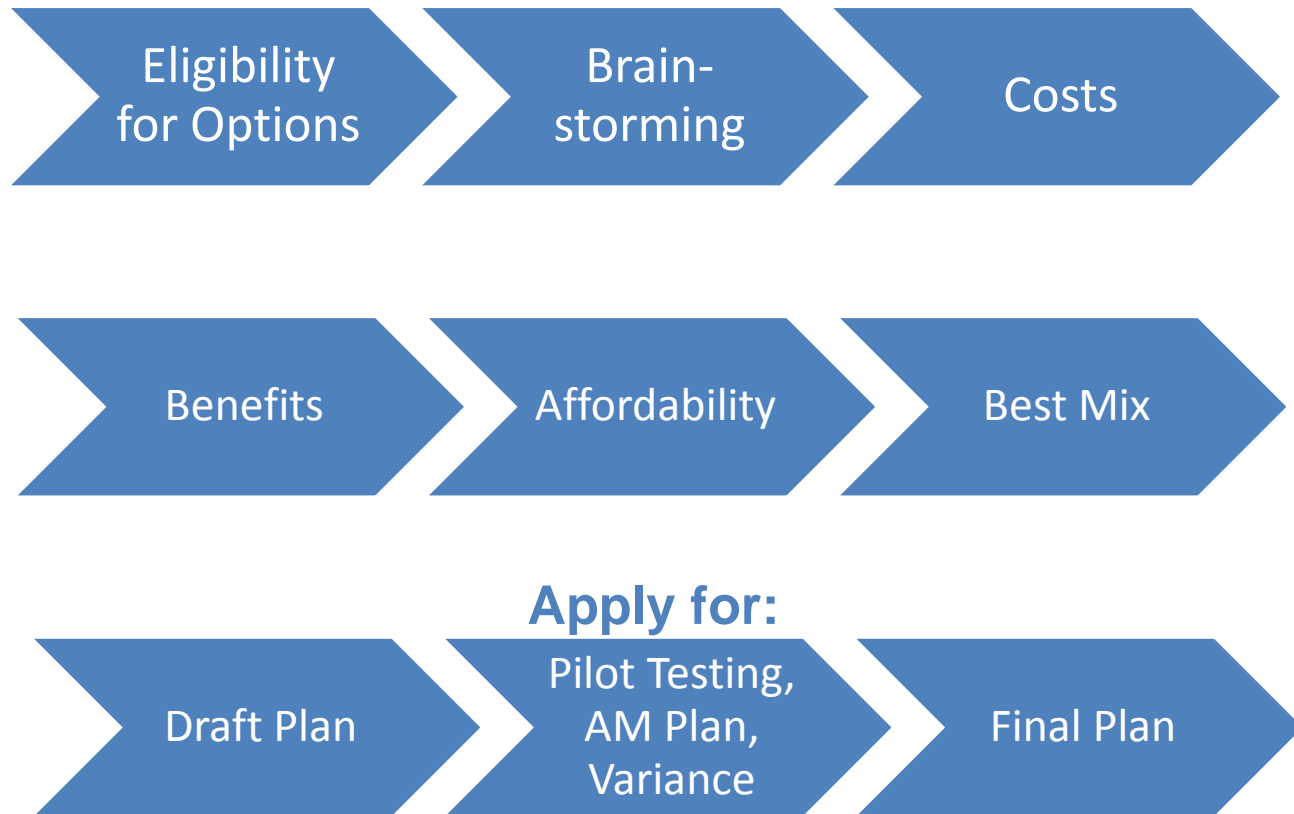


Compliance Alternatives Planning

Facilities Planning Provides Opportunity to Evaluate All Options and Combinations



Compliance Alternatives Plan Should be Executed in Phases

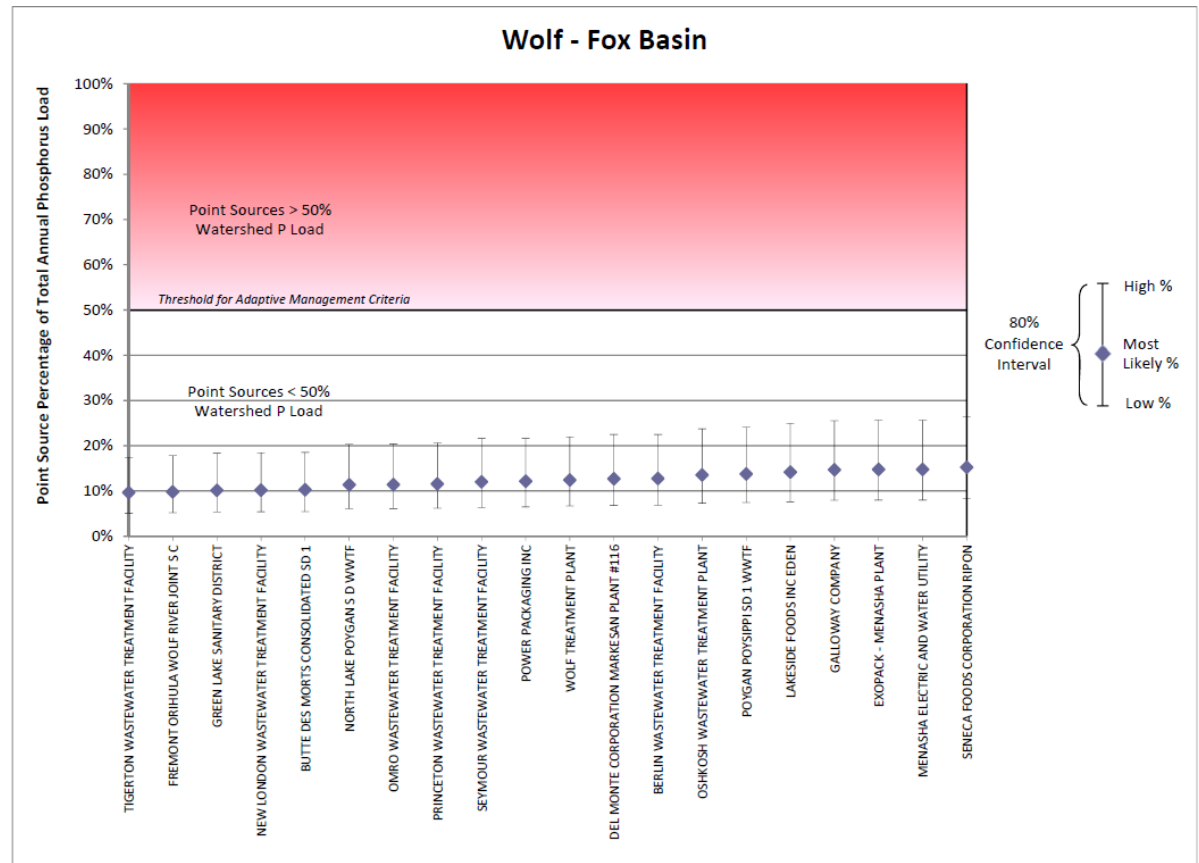


Determine Eligibility for Various Options

- Variance or Site Specific Standard?
- Watershed Adaptive Management?
- Water Quality

Trading?

*WDNR's PRESTO
or similar tools



When Should Stream Monitoring Be Conducted?

- During OER phase (as soon as practical)
- When upstream conditions include..
 - Higher stream flows
 - Lower phosphorus concentrations expected
 - Little or no existing data
- When downstream conditions include...
 - Limited aquatic life (LAL)/ephemeral stream/wetlands
 - Where WQC Changes
 - Little or no existing data
- Other considerations
 - Variance or site-specific standard
 - Watershed Adaptive Management option



Closing Thoughts

Additional Considerations

- Use early required documents such as OER as a tools for:
 - Cost optimization
 - Creative review of options
 - Thorough planning
 - Effective communication
- Phosphorus compliance schedules are long
- Various compliance options exist
- Treatment technologies evolving; future costs may be lower
- Consider other upcoming regulations





Questions



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