

How to Squeeze Every Drop Out of a Water Treatment Plant

Bill Persich, P.E.

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Presentation Summary

- Background
- Improvement Options
 - Plant Hydraulics
 - Flocculation Basin
 - Chemical Feed Systems
 - Instrumentation and Controls
 - Raw Water Reservoir
- Current Capital Projects

Background Conditions

- Ashland, OR – A Unique Community
- Ashland's Goals
 - Increase Plant Capacity
 - Make Plant Run Better
 - No Surprise - Minimize Costs!
 - Find “Low-Hanging Fruit”
- Existing Plant
 - Direct Filtration (Used to be Conventional)
 - Share Facilities with Hydropower Plant
 - Filter Capacity is 10 mgd
 - Actual Capacity is 7-8 mgd (Hydraulics Limited to Filters)
 - Facilities Date from 1920's

Plant Site is Challenging!

- Located in Canyon
- A River Runs Through It
- Prone to Flooding
- “Sensitive” Neighbors
- Tight Site
- “Scary” Gravel Assess Road







Remedy Hydraulic Bottlenecks

- Limited Hydraulic Grade Available
- Increase Capacity to Filters from 8 to 10 mgd
- Share Head with Hydropower Plant
- Developed Calibrated Hydraulic Model

Several Hydraulic Options Studied

- Raise Walls on Raw Water Flume
 - Little Room Available (3-4 inches?)
 - Impacts to Hydropower Plant Tailrace
- Increase Diameter of Raw Water Feed Pipe (24 to 36 inches)
 - Difficult to Construct
 - Short Pipe Gains Little Benefit
- Replace Existing Venturi with Mag Meter
 - Surprising Headloss Gains (10 inches @ 10 mgd)
 - Easy to Construct





Another Indirect Hydraulic Choke Point

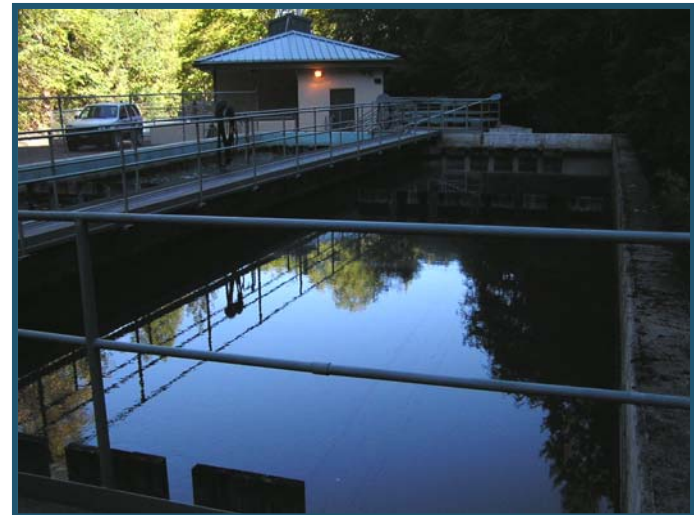
- Backwash and FTW Line is Limiting
 - Can't Simultaneously Backwash and FTW
 - Keeps Filters Idle Waiting Their Turn
- Existing Pipe is Damaged
- Replacement Pipe Recommended





Improve Flocculation

- Existing Flocculators Just a Big Empty Box
- Vertical Turbine Flocculators Recommended
 - Longer Filter Runs
 - Better Control of Water Quality
- Redirect Overflow to Wash Water Pond

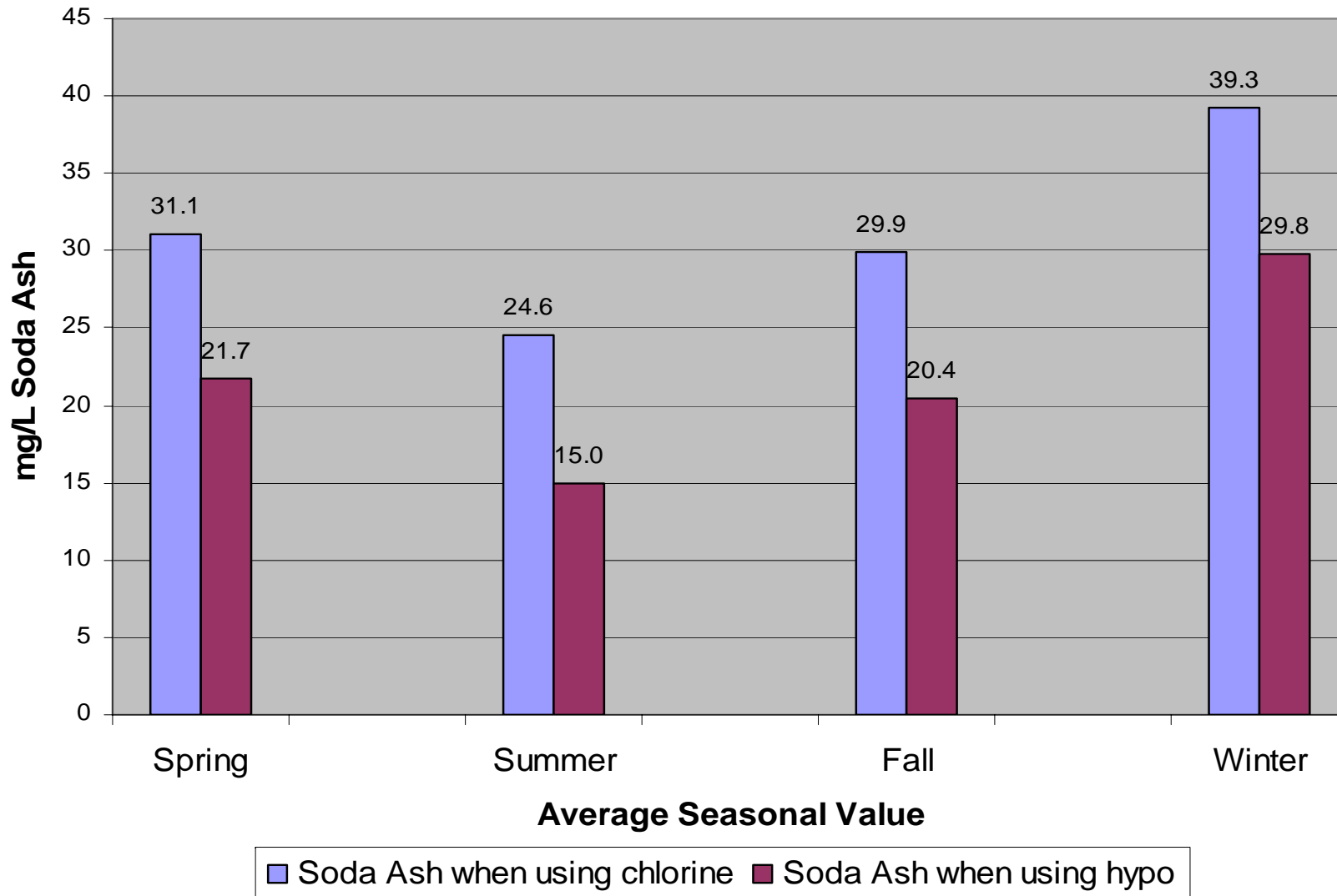


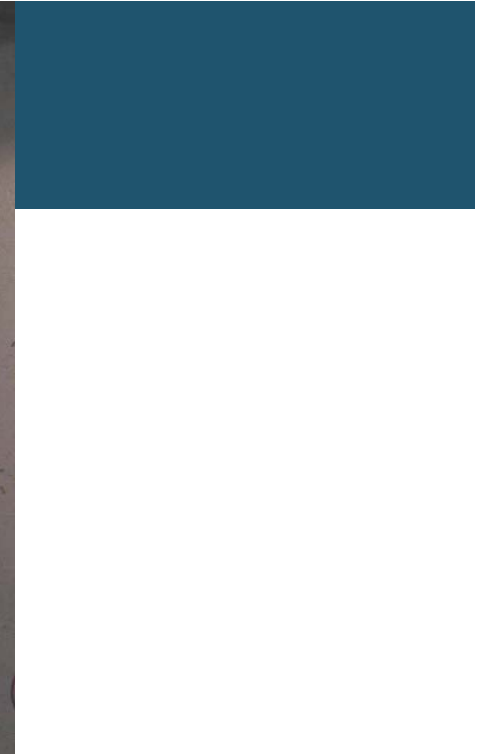
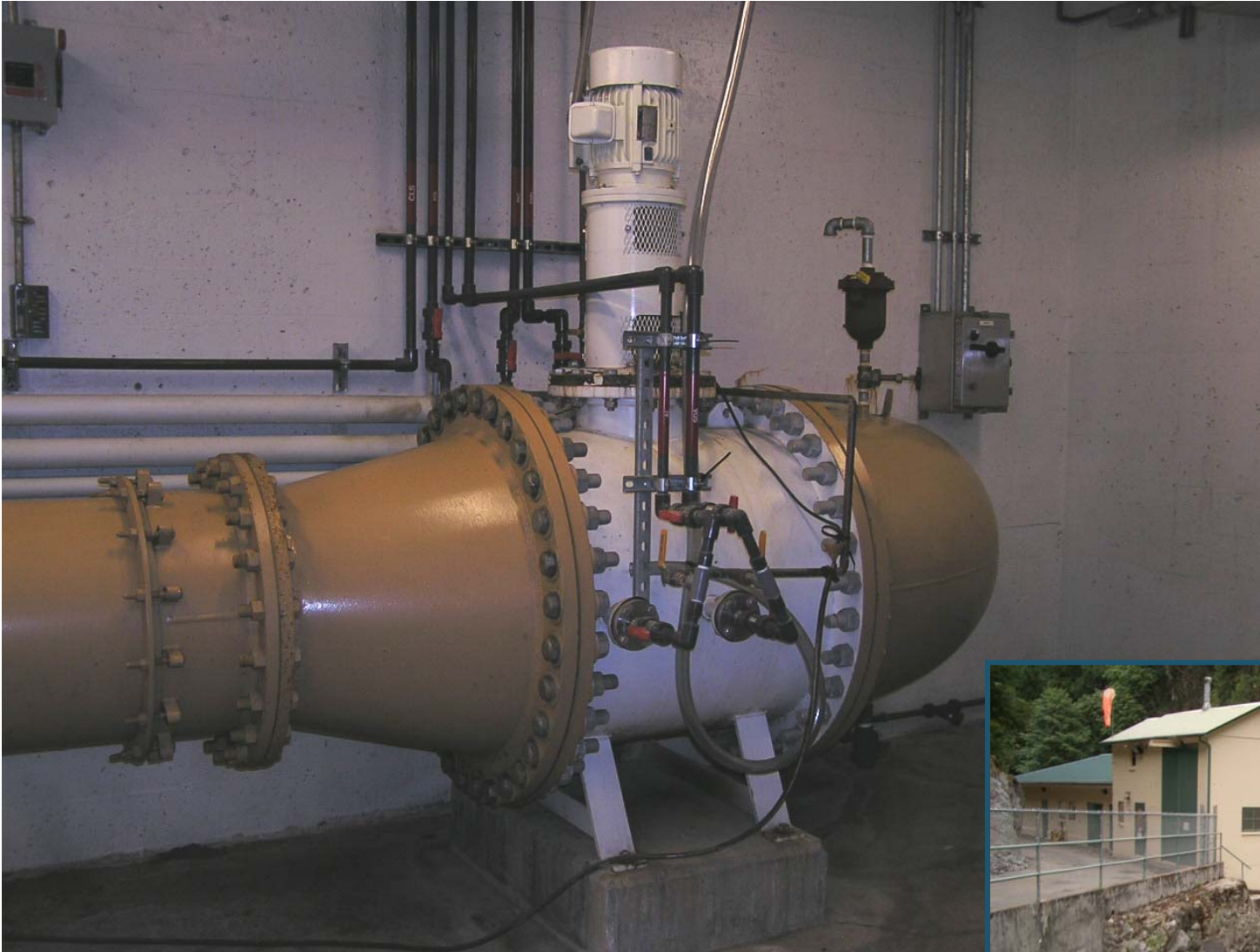
Update Chemical Feed Systems

- Upgrade Existing Soda Ash System
 - Increase Finished Water pH from 7.6 to 7.8
 - Add Second Solution Tank and Transfer Pump
- Relocate Chemicals Upstream
 - Chlorine
 - Potassium Permanganate
 - Soda Ash
- Convert Gas Chlorine System to Bulk Sodium Hypochlorite (also helps with higher pH)



Effects of Sodium Hypochlorite versus Chlorine on Calculated Values of Applied Soda Ash to Achieve a Finished Water pH of 7.8







Modernize Instrumentation and Controls

- Re-tune Raw Water Control Valve
 - Direct Level Control Now
 - 18-inch Dead Band-Shoot for 9 inches
 - Reduces Flow Capacity and Causes Overflows
 - Provide Cascade Loop with Plant Flow
- Re-program Backwash and FTW Cycle
 - FTW Filter “A” After Filter “B” Starts Backwashing
 - Re-program to Occur Earlier
 - Places Clean Filter in Service Sooner
 - Increase Filtration Productivity

Bold Look at Raw Water Reservoir

- *Anabaena* Blooms Cause T&O Problems
- Accumulating Sediments
- Options Considered
 - Dredge Sediments
 - Add Alum to Tie Up Phosphorous
 - Reroute Intake
 - Screen Algae
 - Mix Reservoir
- Rent-to-Own SolarBee Mixers to be Used



CIP Summary

Item	Capital Cost
Replace Venturi Meter	\$30,000
Replace Wash Water Line	\$200,000
Add Vertical Turbine Flocculators	\$200,000
Upgrade Soda Ash System	\$40,000
Relocate Chemical Feed Points	\$50,000
Switch to Sodium Hypochlorite	\$300,000
I&C Improvements	\$20,000
Total	\$840,000

30-Inch Wash Water Pipe Installation Above River



Gain Up to 3 mgd and Improve Plant Performance