Chemical Phosphorus Removal: A Case Study

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Phase 2 Wastewater Treatment Facilities Improvements

- Expanded N. WWTF from 3.5 to 7.5 MGD
- Eliminate S. WWTF
- Received new effluent phosphorus limit of 1.0 mg/l
Selection of Chemical Phosphorus Removal

- Existing site & hydraulic conditions
- Existing tank layout
- Reliability
Components of Chemical Phosphorus Removal System

- Chemical Feed Building
- Chemical Storage Tank & Chemical
- Chemical Feed Pumps
- Safety Equipment
- Controls
- Piping to addition locations
Chemical Feed Building & Tank

- Building protects equipment
- Building is secondary containment for storage tank
- Storage tank capacity: 12,500 gallons (14 days)
- Truck fill connection
Chemical Feed Pumps & Controls

- Located above secondary containment area
- Diaphragm Pumps
- Utilize NPW as a carrier
- Can adjust stroke length and speed
- Pumping rate is paced with the influent flow meter
Safety Equipment

- Potable water feed w/ backflow preventer
- Hot water heater
- Tempered Water Blending System
- Emergency Shower and Eyewash
• Multiple chemical addition locations allow operators to optimize chemical addition
Selection of Chemical

- Less corrosive & easier to handle than Ferric Chloride
- Required less chemical and storage
- Does not interfere with UV
- Jar Tests w/ Alum & Polyaluminum chloride
- Selected Aluminum Sulfate (Alum)
Process Testing & Start-Up

- Influent varies but effluent is relatively constant
Automated Chemical Feed through SCADA

- Calibrate pumps to determine pumping rate
- Determine scaling factor based on P needed to remove and Alum properties
- Pace pumping rate with influent flow meter
- Staff commitment
Chemical Procurement & Costs

- Village procures the supply and delivery of Alum
- Competitive bidding saves the Village money
- Prevents increase of pricing for contract term
- Average Annual Chemical Cost = $70,000
Chemical P Removal Results

- Can consistently meet effluent limit
- Allow operators to minimize the chemical usage

![Graph showing chemical P removal results](image)
Questions?

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Thank you

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