1st Annual Effective Utility Management Workshop

Rochester Water Reclamation Plant: Adjusting to a Changing World

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August 28th, 2019
ROCHESTER WATER RECLAMATION PLANT
Outline

• Overview of Rochester WRP
• Internal Structure Challenges
•Staffing Challenges
• Operation Challenges
• Regulatory Challenges
• Infrastructure Challenges
• Pretreatment/FOG Challenges
• Financing Challenges
• Public Perception Challenges
History

- 1926 - Original Treatment Plant
- 1952 - Trickling Filter Plant
- 1968 - Activated Sludge Plant
- 1980 - High Purity Oxygen Plant
- 1990 - Solids Handling Upgrade
- 2007 - ABC Plant Expansion
Facility Summary

- Rochester Water Reclamation Plant (WRP)
  - Treat 14 million gallons per day of wastewater
  - All City of Rochester
  - Produce 12 million gallons of biosolids per year
  - $590,000,000 facility
  - Operated 24/7 by 32 employees

- Collection System and WRP are one entity
  - $430,000,000 system
  - 11 Staff responsible for maintenance
  - 512 miles of sewer lines
  - 5 publically owned lift stations, 11 private lift stations
Regulatory Requirements

- NPDES Permit Requirements
  - CBOD: 15 mg/L (25 mg/L max week)
  - TSS: 30 mg/L (45 mg/L max week)
  - Ammonia:
    - Dec-Mar: 5 mg/L
    - Apr-May: 10 mg/L
    - Jun-Sept: 3 mg/L
    - Oct-Nov: 13 mg/L
  - Phosphorus: 1 mg/L (72.2 kg/d)
  - Fecal Coliform: 200 MPN/100mL
  - DO: >5 mg/L
  - pH: 6-9 S.U.
  - Mercury: 10 ng/L (17 ng/L max daily)
Internal Structure Challenge

- WRP

- Public Works

*Restructuring is happening now*
WRP Internal Structure Approach

• WRP
  • Pros:
    • More internal projects accomplished
    • More detailed oversight of respective disciplines
    • Better Supervision
    • Better Leader Communications
    • Better Planning
  • Cons:
    • Challenges with different managers/supervisors working in the same plant
    • Staff can get different messages (confusion)
• Public Works
  • Environmental Services = WRP, Collection and Storm Water
    • Moving to WRP
  • Aligned by work instead of function
    • Municipal Service vs Engineering
Staffing Challenges

• Started in 2013 (3 new management staff)

<table>
<thead>
<tr>
<th>Operations Staff</th>
<th>Average Age</th>
<th>Average Tenure</th>
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<tbody>
<tr>
<td>2013</td>
<td>49</td>
<td>24</td>
</tr>
<tr>
<td>2019</td>
<td>36</td>
<td>10</td>
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• Currently Hiring 23rd Operator (every 4-5 months)
• 24/7 Challenging Schedule
  • Becoming harder and harder to find operators to do shift work
  • Time more important than money
• Lots of competition for Good Operators
WRP Staffing Approaches

- Hiring for interpersonal versus technical skills
  - Interview Questions (Qualities in Someone Else, Random Act of Kindness)
  - Requires more training
  - Training program being re-evaluated

- Incorporate flex schedule

- Evaluated alternative shift schedules
  - Technology at the plant require staff to be present currently
  - Re-evaluate in the future

- Evaluate wages
  - Increase in wages may not be enough
Operation Challenges

- Complex Plant for our Size
  - 3 Sludges (significant different SRT’s)
  - Operation of Cryogenic Air Plant
  - 3 temperature loops
  - Hundreds of pieces of equipment
- Slug Loadings
- Filaments
- Toxicity Issues
- Power Outages
- Training
- Communications
- Data Management
WRP Operation Approach

- Communications
  - Daily E-mail, Weekly Operations Meetings

- Training
  - Needs Improvement
  - Planned Power Outages
  - SCADA
  - Training Videos – Access when you need it

- Technology/SCADA Changes
  - Automation of EQ Dewatering, Hot Water Loop, Solids transfer, etc

- Access to Data
  - Central Database
  - Access to all
  - Still in the works
WRP Operation Approach

- Process Board
  - Help Operators make decision
- Biology Monitoring
  - Process Changes for Filaments
- Process Optimization
  - Bypass primary effluent to 2\textsuperscript{nd} stage for floc growth
  - Minimal Mixing in anaerobic zone improves bio-P
  - Mixing off on digested holding
  - Sensitivity Analysis on GBT’s
  - Running at lower DO’s
- Emergency Operations Book
  - How to Respond to many slug loads/emergencies/incidents
Regulatory Challenges

• Permit Expired April 2015
• 2015 - MPCA Staff Came onsite to Discussion Phosphorous
• Further Discussions with MPCA indicated other reasonable potential pollutants of concern
  • Copper
  • Chlorides
  • Total Dissolved Solids
  • Specific Conductance
WRP Regulatory Approach

- Meetings, Meetings, and more Meetings
- Hired Consultant to evaluate MPCA Approach
- City and MPCA staff collaborated over data review and found evidence for a site specific conditions for Lake Zumbro
  - Site Specific Standard for Lake Zumbro (TP from <60 ppb to <75 ppb)
  - Considered Site Specific Standard for South Fork of Zumbro River but did not pursue after discussions with MPCA
- Understand Data Source/Quantity/Implications
  - WRP collects Zumbro River and Lake Data
WRP Regulatory Approach

• Make effort to understand methodology/science for limits
  • Reviewed reasonable potential data and had an interference with a lead test that caused a flag. Rochester reviewed data and found issue, proved to MPCA issue, and had bad data thrown out

• Tell the MPCA your challenges
  • Limits of Technology with HPO Plant
  • Financial Debt Services
  • Time Constraints

• Look for creative Solutions
  • Trading Credits (Point to Point, or Point to non-Point)
  • Integrated Planning
WRP Infrastructure Challenges

• Complex Plant with many assets
  • 32 acre site
  • 27 buildings
  • 50 basins
  • 270 pumps
  • 45 mixers
  • 28 blowers
  • & compressors
  • >500 motors

• HPO Plant nearly 40 years old
  • Cryogenic Air Plant Issues
WRP Infrastructure Approach

• Put on Hold Some Projects
• Evaluation of Existing Tankage / Equipment
• Perform a Facilities Plan
  • Consider Different Treatment Levels (Regulations)
• Goals:
  • Lower Energy
  • Clean Design
  • Decrease Maintenance
  • Innovative Process
  • Long Term Holistic Approach
• Modeling to be component
WRP Infrastructure Approach

- Facilities Plan Nearing Completion
  - Considered 19 different treatment alternatives
  - Considered Mainstream, Solids Handling, Side stream and Tertiary Treatments
  - Proceeding with conventional “AO” Process
  - 3 Phases
    - Phase 1 – Administration Upgrade / Chlorination Modifications
    - Phase 2 – Liquid Stream Upgrade
    - Phase 3 – Solids Handling Upgrade
Collection System
Infrastructure Challenges

- Growing community
- Tracking on paper
- New construction and maintenance under different management
- Outdated Master Plan
- Unplanned Destination Medical Center (DMC) projects
Collection System Infrastructure Approach

- Maintenance:
  - Jetting once every 2 years
  - Root control based TV
  - TV every 10 years
  - Repair simple structural problems ourselves
  - Annual lining and repair of prioritized manholes and sewer lines
Collection System Approach: Coordinating with other Utilities

- Streets projects – Mill & Overlay:
  - Sewers inspected and rated two years in advance
  - If serious problems the sewer will be addressed in conjunction
  - Manhole tops will be rebuilt and re-sealed against I&I

- All other utility projects:
  - Each utility maps top priority projects for 5 years
  - Maps are compared, and joint projects planned
Collection System Approach
Master Plan

- Planning for full build out and 25 year rain event
- Map and rank projects by Sewer Shed
- Rank by risk and needs
Collection System Approach
Flow Metering and Modeling

- Keep current and past picture
- Locate I and I
- Verification of modeling
- Model for planning and project selection
Pretreatment Challenges

Industry Challenges
- 5 Large Users (dairies, food processing)
- 6% of plant flow, 41% of BOD load and 22% of P load
- Lots of slug loading and exceedances

Fats Oil and Grease (FOG) Challenges
- High Restaurant to population ratio
- High Restaurant turnover
- Sewer lines clogs significant issue (monthly cleanout)
- Grease traps inconsistent use
- New ordinance
Industry Approach

- Set goals both internally and externally
- Current permits
- Use our Ordinances
  - No fines until this year since 1986
- Communications has become key
- Operators create chain of custody for spills

Total Non-pH Violations, including Monthly and TRC (2018 vs 2019)
FOG Approach

- Ordinance passed in 2015
- Environmental Specialist hired in 2017
- Inspections of FSE’s underway
- Mapping of problem areas
- Training and Public Education
- Many policy decision
- Currently FOG dumped at head of Plant
  - Threshold before building FOG receiving station
Finance Challenges

- Sewer Enterprise Fund
  - Used by Water Reclamation Plant and Collection System
  - ABC Plant Expansion Debt Services will be retired in 2026
  - Destination Medical Center
  - Historically bonded for projects

- Facility Plan Upgrades
  - Phase 1 - $10,000,000
  - Phase 2 - $62,000,000
  - Phase 3 - $15,000,000
WRP Finance Approach

- Sewer Enterprise Fund
  - Create Deputy Public Works Director of Environmental Services to oversee WRP and Collections System Works
  - Phased planning with more communications between engineering/WRP/Collection System

- Facility Plan Upgrades
  - Phase 1 - $10,000,000
  - Phase 2 - $62,000,000
    - Grants
    - State Loan Financing
  - Phase 3 - $15,000,000
    - State Loan Financing
Public Education Challenge

- Tours at the plant (500-1,000 people/yr)
- Prevent Odors
- Conferences
WRP Public Education Approach

- Educate Non WRP City Staff and Elected Officials
- WRP Start moving out into public
  - Thursdays on First
  - Safe City Nights
  - Touch-a-Truck
  - Earthfest Expo
  - Transportation Fair
- Local Media
  - Non flushables
  - TV spots on what we do
  - Ahead of major projects

- Others

The 3 P’s

Only Flush These!
QUESTIONS