Agenda

- Charlotte Water Overview
- Focus on Rehabilitation/O&M
- Getting Started
- ROSG Benefits
- Successes
- Lessons Learned
- Moving Forward
Charlotte Water Overview

History

• 1881-Charlotte Water Company established

• 1972-Charlotte-Mecklenburg Utility Department (CMUD) became division of the City of Charlotte

• 2015-CMUD completed rebranding process to become Charlotte Water
Charlotte Water Overview

*Infrastructure*

- Serve >883,000 customers
- 5 large WWTP’s and 2 package plants (Avg. Daily Flow 88+ MGD)
- Operate 3 WTP’s (Avg. Daily Flow 100+ MGD)
- 80 wastewater lift stations
- >4,200 miles of water distribution mains and >4,200 miles of wastewater collection pipelines
Charlotte Water Overview

Community Investment Plan

- Total 5-year CIP budget of $944 M
- Water $309 M
- Wastewater $635 M
- Water Rehab and Upgrade $24 M
- Wastewater Rehab and Upgrade $41M
Charlotte Water Overview

*Maintaining Aging Treatment Plants*

- Current larger plants are 38 to 90 years old
- 18,000 + pieces of equipment
- 118 diesel driven generators and pumps
- Harsh environment, precision equipment
- Major effort to maintain reliability
Focusing on Rehabilitation/O&M

**Before Establishment of ROSG**

- Two main options for all Rehab and Maintenance Projects (Wastewater)
  1. Add smaller Rehab/Maintenance Projects to larger CIP Projects
  2. Plant Engineer, ORC, and Maintenance Staff execute project

- Neither option optimal for an entire program
Focusing on Rehabilitation/O&M

Another Option

- ROSG Established in 2012 with 2 teams
  - Senior PM
  - PM
  - Inspector

- Mission:
  - Work closely with EMD/O&M Staff
  - Provide safe, reliable treatment facilities
Getting Started

• Review existing EMD list of projects with ROSG/O&M staff

• Prioritize Projects
  – Safety
  – Regulatory compliance
  – Reliability/Redundancy
  – Coordination/Timing with other larger Projects

The secret of getting ahead is getting started.
Getting Started – Adding Resources

- Procured nine Engineering Consultants
  - Water/Wastewater Treatment
  - Lift Stations
  - Small distribution/collection lines

- “On-Call” Engineering Consultant Contracts
  - Design/CA
  - Planning/Evaluation
  - PER’s/Tech Memo’s
  - Business case development

- Typically issue a new RFQ every 2 to 3 years
Getting Started – Adding Resources

- Each ROSG PM manages several Engineering Consultant contracts
- PM schedules scoping meeting with stakeholders
- PM and consultant negotiate fee and execute task order
- ROSG Typically complete 15+ projects/year ($10K - $6M)
Staying on Track

- Quarterly/Bi-annual meetings with ROSG/O&M Staff
- Separate meeting for each treatment facility
  - Review and update comprehensive project lists
  - Discuss schedules
  - Select project approach
  - Prioritize projects
  - Manage staff resources
Rehabilitation and Operations Support Group Benefits

- O&M staff are able to focus on their core responsibilities
- Root cause of issues and most effective/economical solutions
- Smaller projects tend to allow for flexibility and more efficient approach
- Funding request process more streamlined and successful
- ROSG PM’s semi-dedicated to a particular plant but also share info/lessons learned, benefiting future projects
**Successes – McAlpine Aeration System**

- McAlpine aeration diffuser membranes experienced premature failure in February 2016

- Emergency situation requiring immediate response

- ROSG/EMD/Procurement worked closely
  - Waiver of competitive bid process
  - Negotiated cost with manufacturer and contractor
Successes – McAlpine Aeration System

• 16,000 membranes replaced between April and June

• Avoided any wastewater process issues

• Key benefits of ROSG/EMD working together
  – Quickly discern root cause
  – Efficiently navigated unique procurement process
  – Significantly reduced time to resolve the issue.
Successes – McAlpine Digester Mixers

• McAlpine has 1 top mounted, dual impeller digester mixer on each of the 8 digesters

• 4 mixers began failing within 3 to 6 months of each other

• Decommissioned and dewatered one digester to investigate. Found failed impeller blade.

• Multiple procurements required to determine cause of failure

• Multiple procurements of repair parts while finalizing failure investigation
Successes – McAlpine Digester Mixers

- **Procurement Palooza**
  - Rigging contractor to remove impeller blades
  - Non-destructive testing to determine extent of damage
  - Metallurgist to determine cause of failure
  - Equipment vendor provided a revised design and replacement parts
  - General Contractor to make repairs/install equipment

- **Key benefits of ROSG/EMD working together**
  - Methodical approach likely provided best solution
  - Finite element analysis resulted in modification of impeller blade connection to shaft, preventing future issue
Successes – Mallard Blower Facility

- Blowers began surging
- Only 3 of 5 blowers available/operating at reduced capacity
- Impacting aeration system performance during warm weather
- Retrofit existing blowers
- Increased size of main air header
- Miscellaneous piping and valve modifications
Successes – Mallard Blower Facility

- Key benefits of ROSG/EMD working together
  - Original strategy was to replace 5 blowers
  - Input from stakeholders, careful analysis of entire system, resulted in relatively minor repairs
  - Able to meet short term demands for 7-10 years
Lessons Learned

- Grouping smaller projects may increase interest
- Tailor projects to provide right balance of risk and reward
- Different procurement process/License Requirements
- Procurement efficiency

The PAST is where you learned the lesson.
The FUTURE is where you apply the lesson.

Don't GIVE UP in the middle!
Moving Forward

- Evaluation of Facilities
  - Rehabilitation Plan
  - Schedules

- Regular Cleaning/Maintenance Schedules
  - Digesters
  - Aeration Basins
  - Clarifiers

- On-Call Contractors

- Standardizing Front End Documents
Questions?