Fairfield-Suisun Sewer District
1010 Chadbourne Road, Fairfield, California

I. Respondent:

Jordan Damerel – Director of Engineering

II. Presenters:

Jordan Damerel – Director of Engineering
Ben Carver – Operations Supervisor

III. Treatment Plant Characteristics:

- Advanced Secondary Wastewater Treatment
- 56 employees
- 14,000 customers served

IV. Innovation: High Speed Turbo Blowers – Engineering and Operational Considerations

A. Description

In late 2019, the Fairfield-Suisun Sewer District completed a $9M blower replacement project, which replaced one single-stage centrifugal blower with four high-speed turbo blowers. The District's Engineering, Operation, and Maintenance teams closely coordinated during planning, design, and startup to ensure a system that would meet all of the District's needs.

B. Type of Innovations

- Increased use of Information Technology
- Optimization of existing resources

C. Motivation for Innovations

The District's prior blower system was over 20 years old and lacked reliable redundancy. By implementing the Blower Replacement Project, the District was able to realize significant energy savings (~20%) for treatment plant aeration, reduced maintenance, and increased reliability and redundancy for the treatment plant's secondary treatment process.

D. Barriers/Challenges

The project was funded using a State Revolving Fund loan, including a portion of principal forgiveness from the SRF's Green Project Reserve. This method of financing caused the overall project to be delayed from its original schedule but resulted in significant cost savings to the District.

Because the treatment plant had to remain in operation during the project, the new aeration system needed to be started in phases. This led to an interim condition where the blowers had to be tested and tuned to run half of the plant, and then they had to be tested and tuned again as a complete system when the second half of the system was installed. The tuning was time consuming and performing it twice caused additional work for District Operations staff to learn how to operate the system.

E. Benefits

The reduction in energy costs and the increase in reliability and operational flexibility have been the largest benefits to date. Additionally, the reduced maintenance over the prior aging system, the improvement in data collection and feedback about the new blowers compared to the older technology, and the integration of blower system and aeration system programming into a single controller have resulted in improved operational efficiency.

F. Effect on Staff Training

The new blower systems are relatively simple, with far fewer parts than the prior blower system, but are more technologically advanced in terms of instrumentation and controls. As with any new technology, the rollout required a concerted effort to train staff on the new system, problems to keep an eye out for, troubleshooting, and maintenance tasks. District staff quickly developed new Standard Operating Procedures and Lock-Out/Tag-Out procedures to make sure tasks were performed consistently and safely.

G. Lessons Learned:

We learned that the pre-planning work we did to properly size the blowers was essential to make sure that the blowers operate at their highest efficiency most of the time. We also learned that the tuning and start-up of the blower system is the most time intensive part of the process, and having more required on-site time from the manufacturer's start-up team built into the contract would be beneficial to ensure the system is operating optimally.