OPERATIONS & WATER QUALITY COMMITTEE
SUMMARY MINUTES
March 12, 2019
4:15 p.m.

ATTENDANCE

Directors: Judy Huang (Chair), John Weed

Staff: Robert Shaver, Steve Peterson, Ed Stevenson, Robert Ells, Mike Wickham, Jake Reed, Cris Pena, Ben Egger

DISCUSSION TOPICS

1. Distribution System Leak Detection Methods: Steve Peterson, Manager of Operations and Maintenance, introduced the topic stating water purveyors are taking different approaches on how to proactively detect distribution system leaks and take better control of non-revenue water losses. Mr. Peterson pointed out that a couple of the District's Directors have previously inquired about the different leak detection methods in-use at the East Bay Municipal Utilities District and the San Jose Water Company. Robert Ells, Distribution and Maintenance Manager, described the four primary methods of detecting distribution system leaks that are in-use currently: 1) satellite (microwave technology), 2) flyover (thermal technology), 3) pressure and flow monitoring (Direct Metering Areas (DMA) by defined sectors of the distribution system coupled with SCADA communication), and acoustic monitoring (sound sensor technology). The four leak detection methods can be performed continuously (daily monitoring), intermittently (active surveys), or on a hybrid basis (daily monitoring coupled with active surveys). Continuous monitoring utilizes pressure and flow monitoring, and acoustic monitoring methods for detecting leaks, while intermittent monitoring typically consists of using satellites, flyovers, and active surveys. Hybrid approaches consist of using certain combinations of the four leak detection methods.

   Mr. Ells reviewed the pros and cons of each of the four leak detection methods. Intermittent satellite and flyover methods produce an abundance of data and each method requires significant field work to verify the accuracy of the data. While it's advantageous to proactively discover a small leak and schedule the repair work before it becomes a larger and more disruptive leak, the quality of the data currently available from satellite and flyover technologies yields false positives. Combining the costs of the satellite passes (or airplane/helicopter flyovers) with the necessary field verification work results in these methods being the most expensive and unreliable. Continuous pressure and flow monitoring methods using Advanced Metering Infrastructure (AMI) or sectionalizing the distribution system with isolated mains and flow meters is also potentially very expensive.

   Based on the information that staff was able to obtain in advance of the Committee meeting, acoustic monitoring is currently the most practical and utilized leak detection method by water purveyors. The acoustic monitoring method can be performed as part of an intermittent survey or can be installed on an appurtenance such as a fire hydrant for a fixed period of time to provide continuous monitoring. Mr. Ells explained the number of fire hydrants needed to support the acoustic monitoring devices depends primarily on hydrant spacing and pipeline

material. Once an acoustic device that has been incorporated onto a fire hydrant produces a positive signal indicating a potential leak, further field work is then performed using mobile acoustic equipment consisting of digital acoustic ground microphones, headphones and a digital signal correlator, to pinpoint the location of the leak. Additionally, Mr. Ells expressed an interest in piloting the use of the acoustic monitoring method using fire hydrants within a defined area of the distribution system.

Staff responded to the following questions from Directors Huang and Weed. Director Weed asked whether it makes sense to include the installation of leak monitoring technologies, e.g., pressure transducers, when replacing water mains. Director Huang asked what percentage of the District's non-revenue water could be monitored or detected through the utilization of one of the leak detection methods discussed. Staff responded to questions from the Directors.

2. Newark Desalination Facility Reverse Osmosis Membrane Replacement: Cris Pena, Environmental Engineer, provided an update on the current status of the replacement of the reverse osmosis (RO) membranes at the Newark Desalination Facility (NDF). Ms. Pena explained the membranes being replaced were DOW Filmtec XLE-440 membranes and that the existing membranes had reached the end of their useful life. The existing membranes had been in-use since construction was completed on the second phase of NDF in 2010. Bids to replace the membranes were received in September 2018 and in October; the Board awarded the membrane replacement project to C. Overaa & Company for $1.1 million. The new replacement RO membranes elements are Toray TMH20A-440C polyamide composite membranes manufactured by Toray Membrane USA, Inc. of San Diego, California.

   Currently, the RO membrane elements for three of the four RO trains have been successfully replaced and tested. However, there will be a delay in completing the fourth RO train because an insufficient number of satisfactory membrane elements have been received by Overaa. Each RO train consists of 441 8-inch diameter elements and each element undergoes a factory quality control test and is then hermetically sealed to prevent contamination. However, 20 of the elements delivered displayed contamination on the membrane surface and were rejected by the District. Overaa estimates it will take Toray Membrane USA, four to six weeks to deliver new membrane elements which will push the final completion date until sometime in May 2019. In the meantime, the fourth RO train has been tested and placed into service utilizing 60 of the 63 RO vessels. Each RO vessel contains seven RO membrane elements. Because NDF has been placed back in-service producing between 7 and 7.5 MGD with four trains online and the work performed by Overaa has been satisfactory, the District considers the project substantially complete even though the fourth train will need to be taken off-line while the last remaining membrane elements are installed.

   In response to Director Huang's question on whether the new RO membranes are as efficient as the replaced membranes, Ms. Pena explained the computer performance projections submitted by Toray were similar to the performance projections of the Dow Filmtec membranes. However, when comparing the initial performance measures between the two membranes, the Toray membranes have a slightly higher normalized specific flux rate (greater passage of permeate water per square foot of membrane at a constant pressure) and

produce permeate water with a lower conductivity (corresponding to a higher level of salt rejection). Ms. Pena explained the enhanced performance of the Toray membranes is definitely influenced by the fact the level of total dissolved solids (TDS) in the raw brackish water supplying NDF has significantly diminished since NDF first came online in October 2003. Currently, the average conductivity of the groundwater supplying NDF is approximately 1500 µS/cm which corresponds to about 900 mg/L TDS.

In response to Director Weed's question on whether the replacement of RO membranes could be staggered by replacing membranes of RO trains individually over multiple years, Steve Peterson, Manager of Operations and Maintenance, explained that all four RO trains operate from a common manifold and it is desirable to have similar performance efficiencies from each RO train. Because the passage of raw water through the RO membranes will seek the path of least resistance, NDF performance is enhanced when the four RO trains are performing similarly.

3. Security Assessment of District Facilities and Protocols: Jake Reed, Emergency Response and Security Officer, discussed the need for consulting services to perform a security assessment of District Facilities and to review District security protocols. As background for the Committee, Mr. Reed described some of the multiple legacy security systems that have been established overtime to meet specific security needs. Examples include the District's use of the AECO fire system at Headquarters and Bay Alarm for video surveillance at certain District facilities. The scope of consulting services will include performing evaluations and recommendations of each security system on whether to remove or to retain and make improvements to the various systems, and will include the development of a master plan on the approach for modernizing and consolidating the various systems to improve how the security systems are operated and maintained. Additionally, the consulting services will include an assessment of the physical security needs and current security conditions at District facilities, and address the District's reporting and certification requirements associated with the 2018 American Water Infrastructure Act (AWIA).

   Mr. Reed explained AWIA was signed into federal law by President Trump in October 2018 and requires Community Water Systems (CWS) serving more than 3,300 people to perform a risk and resilience assessment (RRA) of both natural hazards and malevolent acts, including physical security and cyber-security threats to an agency's water system. Each CWS will be required to submit to the US Environmental Protection Agency (EPA) certification of assessment compliance not later than March 31, 2020 for systems serving a population of 100,000 or more. Additionally, each CWS will be required to submit an emergency response plan to the EPA not later than six months after completing the RRA (September 30, 2020). The EPA is required to provide baseline information on malevolent acts of relevance to CWS not later than August 1, 2019.

   Mr. Reed discussed how the District plans on leveraging the security and hazard mitigation planning work already performed for incorporation into a document that will meet AWIA certification requirements. Examples of work already performed include the 2014 Cyber Vulnerability Assessment, 2016 Multi-Jurisdictional Hazard Mitigation Plan with Newark

and Union City, development of the District's Business Continuity Plan, and the District's pilot dispatch program in Operations. Other RRA work needed for compliance with AWIA would be included in the security assessment scope of services.

Staff responded to questions from Directors Huang and Weed. Director Weed asked staff to identify how technology can be leveraged to the extent practical as part of the security assessment. Because time is of the essence, both Directors were conceptually supportive of proceeding with a request for proposals (RFP) for consultant services before the EPA provides baseline information on malevolent acts of relevance to CWS on or before August 1, 2019. Director Huang stated that staff may want to consider phasing the scope of services to help expedite the work of the consultant.

4. Public Comments: There were no public comments received.

RECOMMENDATIONS

Topics discussed by the Committee were informational only and no recommendations were made.