Wastewater Pasteurization Technology Pilot
Fact Sheet

Background

- The Ventura Water Reclamation Facility (VWRF) cleans between 7 to 9 million gallons of wastewater per day and is the sole treatment facility for the City of Ventura.
- The final step of the multi-step treatment process is disinfection of the water to kill any remaining bacteria/pathogens.
- The current treatment process adds chlorine for disinfection, and the chlorine is then neutralized chemically before the treated water is released to the detention ponds. The water travels through the ponds for about four days and is then released into the Santa Clara River Estuary.
- The authority to discharge water from the facility is regulated by the Los Angeles Water Quality Control Board. The permit issued by the Board outlines all the actions required to maintain the City's authorization to discharge.

Why?

- Ventura Water began evaluating alternatives to chlorine disinfection as an opportunity to discontinue handling hazardous chemicals and to improve the treatment processes to potentially support expansion of the water reuse program.

Partnership

- Research led to emerging technology using pasteurization (heat) to disinfect water, pioneered by the Pasteurization Technology Group (PTG). In addition to non-chemical disinfection, the system also uses energy efficiently and, based on the design, has the potential to generate renewable energy.
- PTG received California Title 22 approval for the technology in 2007 for water reuse but had not piloted the innovative technology on a larger scale.
- Ventura Water entered into an agreement with PTG to pilot a 500,000 gallon system and began testing at the VWRF in December 2011.

How It Works

- Pasteurization using heat with immediate cooling is a common process used today in hundreds of products to kill harmful organisms.
- The system uses natural gas combined with digester gas (a natural by-product of wastewater treatment) as fuel to drive a turbine (or turbines) to generate renewable electricity. The hot exhaust air from the turbine (energy that is typically wasted) is then passed through a series of heat exchangers that increase the temperature of the wastewater to a level that disinfects the

wastewater stream. Then the disinfected water is cooled to a safe level by transferring the heat to the incoming water – reusing the energy over and over.
- Unlike other wastewater disinfection approaches, this system does not require chemicals such as chlorine and sulfur dioxide, or costly electrical power and expensive ultraviolet lamps.

How It Saves Money

- In today's dollars, total electricity costs to power the VWRF are approximately $900,000 per year.
- Disinfection chemicals costs approximately $250,000 per year and there are significant risk management and staff costs associated with chemical handling and emergency preparedness.
- Because the natural gas-powered system utilizes waste heat and reuses energy in the process, early estimates show that the system may generate enough energy to power itself and the entire facility. It is estimated that it will cost 50% less to buy the needed quantity of natural gas vs. the current electricity bill.

Initial Testing Results

- Testing has been conducted and validated by an expert third party to build the record necessary to optimize the system requirements.
- Based on the earlier validation study, the State set an initial temperature target (180 degrees) at 10 seconds of contact time (time the water is at that temperature) as sufficient to kill harmful microorganisms.
- Initial results have been very positive for effective kill at lower temperatures, implying a potential for greater efficiency and sustainability.

Next Steps

- Additional testing will be conducted within the next few months to analyze the technology's performance with killing viruses not present in normal wastewater flow. Subsequently, a full performance analysis of all testing results will be reported to the State.
- System optimization, based on the specific elements of Ventura's water, will occur over the next 6 to 12 months to aid preliminary design parameters.
- As the largest installation of this technology, several design options will be considered during the following year – possibly taking advantage of more biogas and/or expanding co-generation opportunities. Final design and construction would follow.
- Ventura Water's capital improvement plan includes $9 million for the design and construction of a disinfection system and this cost is included in the recently approved rates.