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Plant Profile

Santa Paula Water Recycling Facility

Location: Santa Paula, Calif.
Startup date: June 2010 (anticipated)
Service population: 30,000 (current), 50,000 (capacity)
Number of employees: 3–4 (anticipated)
Design flow: 4.2 mgd (15,900 m^3/d)
Average daily flow: 3.4 mgd (12,870 m^3/d)
Peak flow: 7.2 mgd (27,300 m^3/d)

The new Santa Paula (Calif.) Water Recycling Facility is scheduled to open in about 6 months. The 4.2-mgd (15,900-m^3/d) membrane bioreactor facility will replace the city's 1939 trickling filter wastewater treatment plant. It is estimated that the energy-efficient innovations used in the new facility will reduce the energy costs for wastewater treatment in its original design by as much as 15%.

The new facility will be the first of its kind to be built under *California Government Code* Sec. 5956, which enables public–private partnership by using private investment to solve public infrastructure needs. The City of Santa Paula signed a contract with Santa Paula Water LLC — a private company owned by Alinda Capital Partners LLC (New York) and PERC Water Corp. (Costa Mesa, Calif.) — for the company to design, build, operate, and finance the Santa Paula Water Recycling Facility.

Engineering of the new facility commenced May 6, 2008, and groundbreaking for construction occurred July 7, 2008. The facility is expected to be completed and operating by June 2010.

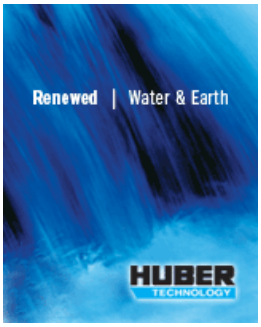
Energy Efficiency

The facility will include various energy-efficient features that, working together, will reach the 15% reduction from the original facility design. Highlights of the energy-efficient features include an innovative lighting design, an energy-efficient membrane-scouring and aeration system, and a "smart" control system.

An innovative lighting system will far exceed energy saving measures dictated by California's Title 24 energy- efficiency requirements. The system uses a combination of natural lighting, LED lamps, mercury-vapor exterior lights, electronic ballasts for fluorescent lamps, light sensors, and automatic dimming devices to reduce the amount of energy needed.

An energy-efficient membrane-scouring and aeration system makes the most of the energy used. Because membrane scouring and aeration account for nearly half of the facility's power consumption, project planners chose to employ the most energy-efficient air-production and usage systems on the market. Most noticeable are the facility's turbine blowers, which are used throughout the facility's various process areas. The blowers' precision technology enables operators to control, monitor, and specifically adjust the airflow for aeration over a wide range of operations. Additionally, the facility's ultraviolet (UV) disinfection system uses amalgam lamps — the most energy-efficient way to generate UV light on a large scale.

Finally, the facility's smart controlling system has the ability to gather, display, track, and store live data generated by the facility. In an effort to optimize energy consumption, this specialized supervisory control and data acquisition (SCADA) system is designed to update operators consistently on the exact status and measurements of all of the facility's processes, such as airflow, water flow, and tank capacity. The SCADA system also is equipped to notify operators of abnormal conditions via telephone,



text message, or video messaging directly to the operator's smart phone.

Process Flow

As wastewater enters the new facility, a lift station will feed it into two parallel headworks screening trains. Each train consists of a coarse screen followed by a grit vortex and 2-mm fine screen. The flow then is distributed into three parallel biological trains, each consisting of an anoxic and an aerobic tank. Mixed liquor suspended solids (MLSS) are recycled from the aerobic tanks back to the anoxic tanks at a rate of 3 to 5 times the incoming flow. From the aerobic tanks, membrane feed pumps send the MLSS to six parallel membrane bioreactor trains. Each train contains four hollow-fiber membrane modules.

Following membrane filtration, the effluent enters the UV disinfection channel, where 10 modules, each with 36 low-pressure, high-output amalgam UV lamps, disinfect the water. The modules vary their power output according to effluent flow and UV transmittance. After disinfection, the treated effluent is discharged to percolation ponds. In the near future, the treated effluent will be used for irrigation purposes.

The waste activated sludge from the membrane tanks is sent to belt gravity thickeners and from there is discharged into aerobic digesters. The digesters treat the solids to meet Class B biosolids requirements. Following digestion, the biosolids will be dewatered using a screw press and transported to the Ventura (Calif.) Regional Sanitation District for further treatment and land application.

Early Award

Even though the facility isn't open yet, it already has won an award. PERC Water Corp. and Alinda Capital Partners received the *Global Water Intelligence* magazine 2008 Water Deal of the Year Award of Distinction for the facility. The award recognizes deals that have made the biggest contribution to the advancement of public–private partnerships in the international water sector in 2008. *Global Water Intelligence* stated the City of Santa Paula's use of private-sector funding demonstrates a "bold new direction in the financing of U.S. water infrastructure" and described the deal as a "ground-breaking transaction which can be emulated across the United States."

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