LAS VIRGENES, CALIFORNIA

CASE STUDY

UF/ RO

The Pure Water Demonstration Facility: An Immersive Pilot Facility Using H_2O Innovation Technologies

APPLICATION:
Demonstration facility

LOCATION:
California

TECHNOLOGY:
Ultrafiltration and Reverse Osmosis

COMMISSIONED:
2020

Las Virgenes demonstration facility

BACKGROUND

The Pure Water Demonstration Facility was built in 2020 in Las Virgenes, California, and serves as a testing ground for optimizing the processes to be used in the upcoming Advanced Water Purification Facility (AWPF) full-scale project.

The AWPF will treat tertiary effluent from the Tapia Water Reclamation Facility for indirect potable reuse. The facility will then convey the purified water to the Las Virgenes Reservoir, where it will be blended with treated water for two to six months before returning to the distribution network and being delivered to the customers' homes.

The demonstration facility also currently serves as a research center to educate communities, elected officials, academics, and water agencies about water reuse. This pilot also provides operators with hands-on experience about the new technologies, which allows staff to become familiar with them ahead of their use in the full-scale facility.

SOLUTION

In the Pure Water Demonstration Facility, the water is treated using ultrafiltration, reverse osmosis, and an ultraviolet advanced oxidation process. These systems all replicate the processes that will be included in the full-scale facility.

Ultrafiltration (UF)
A FiberFlex™ pilot was supplied, providing the best-in-class system to test three different membranes in parallel. The UF stage is used to remove suspended solids, organics, and pathogens, while also providing pretreatment for the downstream RO process. The system treats the water that comes directly from the Tapia Water Reclamation Facility with chlorine and ammonia addition for chloramination.

The three independent trains on the FiberFlex™ skid allow the facility to test membranes at different operating fluxes, recoveries, cleaning intervals, and backwash setpoints, independently of each other for maximum flexibility. Membrane integrity is also monitored independently for each of the three modules.

Reverse osmosis (RO)
The RO stage of the process is used to remove dissolved constituents but also serves as a pathogen barrier for bacteria, protozoa, and viruses.

Ultraviolet purification step

SOLUTION (continued)

Before entering the RO system, the water undergoes pH correction and antiscalant addition to prevent the undesirable formation of scaling on the membranes. The system is designed to run with two or three stages for maximum flexibility. An on-line total organic carbon (TOC) analyzer is used to measure the quality of the permeate produced.

Ultraviolet - Advanced Oxidation (UV-AOP)
During the third advanced purification step, the water is dosed with UV for disinfection and log removal. A chemical oxidant, such as chlorine or hydrogen peroxide, is added and reacts with the light to form very powerful and reactive oxidants, which break down any remaining chemicals or pollutants.

H_2O Innovation supplied the ultrafiltrattion (UF) and reverse osmosis (RO) treatment systems.

RESULTS

The Pure Water Demonstration Facility continues to operate with a high level of uptime and to produce the required amount of data. Yearly performance reports for the purification system are available on the Pure Water Project website.