CITY OF REDLANDS, CALIFORNIA

Recycled Water Treatment Facility

HIGHLIGHTS

- Pre-negotiated contract for membranes and related equipment.
- Largest wastewater MBR in California at the time of design.
- Able to recoup some of the cost of treatment through sale of effluent.
- Able to offset the use of scarce groundwater in the underlying basin.
- Able to beneficially dispose of effluent as an alternative to the current (potentially limited) percolation of effluent.

The City of Redlands retained Carollo, assisted by another consultant, to upgrade its existing treatment facility to provide recycled water for use as cooling water by a local power generator. The upgraded facility will remove total inorganic nitrogen from 9.5 mgd to a level of less than 10 mg/L to meet Basin Plan requirements. It will also treat 6 mgd of the total flow to meet California Title 22 requirements for low turbidity, disinfected effluent suitable for use in cooling towers and crop irrigation.

The initial phase of the project included an evaluation of treatment processes capable of producing effluent of the required quality and assistance with power company negotiations regarding effluent quality. Selected processes included new technology using immersed MF membranes in a membrane bioreactor, followed by disinfection with sodium hypochlorite. This arrangement allows Redlands to install reverse osmosis downstream of the MBR and upstream of the chlorination point to meet future total dissolved solids (TDS) discharge requirements if needed.

Carollo's responsibilities also included both preliminary and final design of modifications to the existing activated sludge treatment basins to increase the plant capacity and allow a portion of the basins to be operated at a higher mixed liquor concentration (8,000 mg/L) in association with the membranes. Carollo designed a separate membrane tank and a chemical storage/feed system for the MBR system.

In addition to upgrades/additions to provide nitrogen removal and tertiary effluent, the project involved upgrade, rehabilitation, or replacement of most of the major elements of the plant (some up to 40 years old) to reduce O&M requirements and restore reliability. These included the plant's electrical, control, and pumping systems.

The Redlands Recycled Water Facility employs new technology using immersed MF membranes in a MBR followed by disinfection with sodium hypochlorite.