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THE GROUNDWATER REPLENISHMENT SYSTEM

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ABSTRACT: In 1933 the Orange County Water District (OCWD) was formed in Fountain Valley, California to maintain the quality and quantity of Orange County's groundwater basin. Orange County's groundwater basin (the Basin) currently provides water for over 2.4 million residents of North and Central Orange County. The Basin's primary water supply is obtained from the Santa Ana River and recharged into the Basin. Supplemental sources are imported from the Colorado River and State Water Project via the Metropolitan Water District (MWD). To address the issue of seawater intrusion, in 1976 OCWD began recycling Orange County Sanitation District (OCSD) wastewater and injecting it along the Talbert Gap via a series of injection wells forming a hydraulic barrier. The facility known as Water Factory 21 (WF-21) was the first municipal scale reclamation plant to use membrane technology. Since early 1990s, it was evident that WF-21 was reaching the end of its useful life and increasing drought conditions drove the need for additional sources of water for groundwater replenishment. Drought conditions decreased available imported water supplies and base flows to the Santa Ana River. The Groundwater Replenishment System (GWRS) was developed as an indirect potable reuse project that produces 70 mgd, expandable to 130 mgd, for groundwater recharge and seawater intrusion protection. The heart of the GWRS is the 70 mgd Advanced Water Purification Facility (AWPF) treatment plant. The GWRS is the largest indirect potable reuse project in the United States and one of the largest in the world. It has been in operation since January 2008. The AWPF treats secondary effluent, currently discharged by OCSD into the ocean, using microfiltration (MF), reverse osmosis (RO), and advanced oxidation (UV with hydrogen peroxide). As an indirect potable reuse project the California Department of Public Health (CDPH) requires stringent product water quality and travel time requirements. The AWPF product water is equally distributed to the seawater intrusion barrier and recharge basins. Overall this presentation will attempt to present a discussion of key process operational parameters, water quality, operating costs, and the regulatory process involved in permitting a project of this kind in the state of California.

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