



Water Reuse Case History

Empire Generating Power Plant/City of Albany Wastewater Reuse Project

Rensselaer, New York, USA

Municipality: City of Albany

Company: Besicorp Empire Development Company, LLC

Project Fast Facts

Flowrate: 4,800 gpm (1090 m3/hr)

Industry: Power

Use: Cooling and Process Water

Conveyance: 28-inch (71-cm) diameter pipeline

The Empire Generating Power Plant is a 535-megawatt power plant with a 635-megawatt peaking capacity. A natural gas-fired combined cycle power station located in Rensselaer, New York, it began operations in September 2010. The power station uses non-disinfected municipal secondary effluent as its only process water supply, allowing the facility to conserve fresh water consumption by as much as 4,800 gallons per minute during the summer high-demand period. The plant also further treats the water prior to its reuse. The project included tunneling underneath the Hudson River to convey municipal effluent from the City of Albany's wastewater plant to the new power plant.

With no applicable state regulations governing the use of secondary effluent for cooling towers, the project adopted California's Title 22 tertiary disinfected water quality requirements as an acceptably safe, state-of-the-art practice to control potential pathogen vectors from cooling tower drift. This resulted in the application of a combination of processes, including chloramination, coagulation, upflow sand filtration, hypochlorination, and chlorine contact.

In addition to supplying cooling tower water, the municipal secondary effluent is used as the makeup source for service water and demineralized water supplies. The service water is used for evaporative cooler supplies, demineralized water treatment, and miscellaneous process use. Service water is produced by intercepting the upflow sand filtered effluent and processing it through ultra-filtration followed by monochloramine addition. Using monochloramine as a disinfectant minimizes the formation of trihalomethane compounds (and therefore total organic carbon [TOC] compounds) that cannot be removed by the demineralized water treatment process.

The ultra-filtered service water is then forwarded to the reverse osmosis (RO) and mixed bed ion exchange units to produce demineralized water for a heat recovery steam generator. The TOC measured in the demineralized water is 27 to 48 parts per billion (ppb), less than half of the 100 ppb design limit. All water quality design parameters, including TOC limits, were confirmed in a full-scale validation performance test. The actual quality of demineralized water produced is 17+ meg-ohms, substantially higher than the 10 meg-ohm requirement.



The Empire Generating Power Plant is one of the cleanest and lowest noise producers of comparable plants in the U.S.

**Our motive is simple: to promote beneficial wastewater reuse around the world today.
Join us and help make matches happen. Because no water should be wasted.**

