

Innovative Water Treatment Design for Turning Wastewater Treatment Effluent Into Boiler Makeup Water

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ABSTRACT

The Pinellas County Resource Recovery Facility (PCRRF) is a 3,150 tons per day mass burn facility located in Pinellas Park, Florida. Due to local water use restrictions and increasing costs for potable water supplies in central Florida, Pinellas County has continuously sought to reduce potable water usage at its facilities. The PCRRF's boiler makeup water system represented a prime target. Accordingly, a makeup water pre-treatment system using reclaimed water from a sewage treatment plant as its source, has been installed upstream of the existing reverse osmosis membrane and mixed bed polishing demineralizers. The pre-treatment system consists of a micro-filtration module, followed by a reverse osmosis module, which results in an overall configuration of micro-filtration, two stage reverse osmosis, and polishing demineralization. The system has been operational for approximately six months, and is producing excellent quality makeup water for the facility boilers. This paper will describe the pre-treatment process and its operational results to date.

BACKGROUND

The PCRRF is a mass burn waste-to-energy plant serving the densely populated Pinellas County peninsula and its one million residents. Each of the three boilers at the PCRRF is rated for a maximum steam output of 244,000 lbs/hour of 615 psia, 750°F steam. Boilers 1 and 2 were completed in 1983, and Unit 3 was added in 1986. Steam is used to produce electricity in two condensing turbine-generators, with the excess electricity sold to Progress Energy Florida. Total installed capacity is approximately 75 MWe, with approximately 57 MWe of committed capacity based on a rolling average capacity factor of 70%.

The facility has been retrofitted with state of the art air pollution control systems in order to comply with the State of Florida and US EPA Emissions Guidelines. The facility is also refurbishing boiler convention passes and other key plant equipment with its "Capital Replacement Project (CRP)"¹. As of this writing, the CRP is approximately three-fourths complete, with two boilers refitted, and all ancillary projects completed. The refitted units are performing as intended.

¹ Stasis, R.P., and Castro, D.J., "Pinellas County Resource Recovery Facility Capital Replacement Project", Proceeding from the 10th Annual North American Waste-to-Energy Conference, Philadelphia, PA, May 6-8, 2002 Published by the American Society of Mechanical Engineers.