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Desalting and Water Purification Research Program

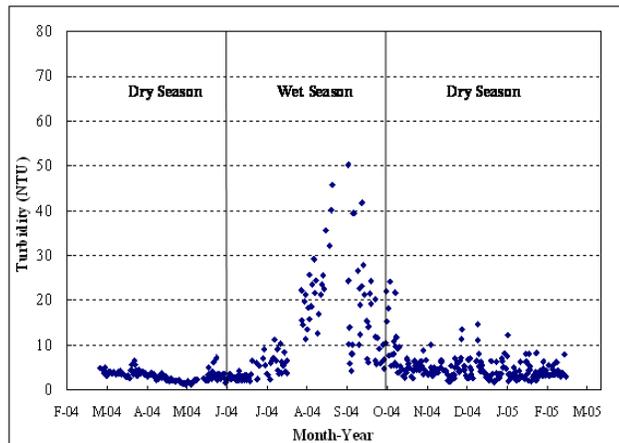
Pretreatment and Design Considerations for Large- Scale Seawater Facilities

DWPR Report #137, R. Reiss et al. & Tampa Bay Water

Objective:

For seawater desalination facilities using feedwater under the influence of surface runoff, evaluate:

- Pretreatment system alternatives – Mixed media filtration, Coagulation-sedimentation-filtration, and Microfiltration;
- Impact of seasonal and tidal variations on source water quality and process performance;
- Use of powerplant cooling water discharges versus background seawater at ambient temperatures.



Pilot testing and source water evaluation were carried out at the Anclote Power Generating Station (APGS) in Holiday, Florida, from December 2003 to February 2005.

Source water quality varied widely over the test period which encompassed three hurricane events. Of the pretreatment systems tested, only the MF system was capable of continually providing sufficient quality filtrate for the SWRO. The warmer power plant cooling water contributed to biological growth in the piping between the MF and RO systems. This problem was solved by adding UV irradiation after the MF system and daily shock chlorination of the transfer tanks and piping. A HEPA filtration system was also added to the transfer tank to keep out airborne microorganisms.

The SWRO was most sustainable when operated at a conservative flux of 8 gallons/sq.ft-day (gfd) rather than the higher 10 gfd. The RO and MF systems were cleaned every 30 days.

Capital cost for a 20 mgd system using MF-UV-SWRO was estimated at \$3.9/gal-day with O&M costs at \$1.34/kgal.

