

MEMORANDUM

To: Saqib Shirazi, P.E., Innovative Water Technologies, Texas Water Development Board (TWDB)

FROM: Lianfa Song, Texas Tech University

SUBJECT: Demonstration of High Recovery and Energy Efficient RO System for Small-Scale Brackish Water Desalination – February 2011

DATE: February 25, 2011

CONTRACT: 1004831107

Recent Project Activities:

1. Verification of accuracy has been performed on system measuring devices such as conductivity meters and probes, flowmeters and pressure transmitters.
2. Membrane fouling has been identified as a potential cause of the higher than expected operating pressures. The affected membranes have been replaced with new ones. In addition, we are testing brackish water membranes in the system this round of experiments. Operating pressures will be very closely monitored at three total dissolved solids (TDS) concentrations in order to identify potential problems.
3. Tests have been conducted to determine the effect of feed flowrate and recirculation to feed ratio on process energy requirements at three TDS concentrations: 1,000 ppm, 2,500 ppm and 5,000 ppm.

Issues Encountered:

1. The TDS concentration of holding tank effluent following the discharge cycle remains fairly high, indicating inefficient mixing and replacement of tank contents with feed water used in tank flushing.
2. Changing from normal mode to discharge mode (isolating the holding tank from the concentrate recycle circuit) causes rapid pressure increases during testing at 2,500 ppm and 5,000 ppm TDS. This forces the operator to initiate discharge before the system has reached the desired recovery during normal mode.

Items to be Addressed and Anticipated Project Activities:

1. Modifications to holding tank and the feasibility of these modifications will be studied in order to optimize flushing of contents during discharge cycle. In addition, changes to system design, such as the installation of another holding tank, will be considered in order to address the sharp pressure increases during discharge mode by maintaining a constant system volume.
2. Tests will continue at different feed flowrates and recirculation to feed ratios until a sufficiently wide range of parameters has been tested to determine the most energy-efficient operating conditions.