A five gallon per minute KLeeNwater ELG demonstration unit was installed at a major utility to determine the most cost effective treatment program to meet ELG limits for either treat and discharge or zero liquid discharge (ZLD) scenarios. The KLeeNwater system consists of micro filtration (I-MICRO), advanced RO (I-PRO) and a brackish water polishing RO (B-PRO) all housed in a Conex measuring 8' x 40'.

The water provided for the study was drawn from the FGD blowdown surge tank of a boiler burning eastern bituminous coal. The forced oxidation scrubber was designed to run with mid-high chloride levels (avg. 12,000ppm) which would typically provide a great challenge to standard reverse osmosis (RO) operation. In addition to meeting the new ELG regulations, this plant had additional limits on Boron levels imposed by local regulators.

The main goals of this project were:

1) Provide an average recovery of 80% or higher of the incoming water
2) Compare different pre-treatment scenarios to determine the best combination of chemicals needed to yield a low quantity of sludge at the most economical chemical cost
3) Determine if the brackish water RO could be used to eliminate the existing ion exchange system for Boron mitigation

The outcomes of the project were:

1) The 5 gpm pilot system met all project goals and confirmed results from the initial 2 gpm laboratory evaluation.
2) Recoveries of > 85% were realized using the optimum pre-treatment during the pilot test.
3) The Membrane Systems (I-MICRO, I-PRO, and B-PRO) performed consistently and predictably.
4) Solidification testing met regulatory requirements for leachability.
5) Permeate consistently met ELG and State regulations and was suitable for water re-use or discharge within the State and Federal Limits.