

#### **4-10. Testing of System Designs for Unusual Applications**

For the desalination of well characterized waters with known SDI and composition, the RO performance can be projected with reliable accuracy by the computer program. However, testing is recommended to support the proper system design in special situations such as :

- Unknown feed water quality
- Waste waters
- Special permeate quality requirements
- Very high system recoveries
- Very large plants

First, a screening test is to select the right membrane and to obtain an idea about flux and rejection properties of this membrane in the special situations. Usually a small piece of flat sheet membrane is used for the screening test.

Second, using a 2540 size element, scale up data such as permeate flow and salt rejection as a function of feed pressure and system recovery are obtained. In subsequent batch mode test, leading the permeate into a separate containment and returning the concentrate to the feed tank, permeate flow and salt rejection are monitored until the permeate flow has declined to a very low value such as 0.09 gpm. From the batch tests, an indication of membrane stability and fouling effects can be revealed.

Third, a pilot test is run in the field in a continuous operation mode. The pilot plant has at least one 8040 size element, preferably an arrangement of elements similar to the arrangement in a large scale system. The permeate flow of the pilot plant should be at least 1 % of the large scale plant flow. The test should be run for more than 30 days. The objective is to confirm the system design and to optimize operating parameters as well as to minimize the risk involved in large scale plants.