

process, and biomembranes both living and synthetic. It is quite possible that the ultimate desalting process may come from the biological field.

Considerable emphasis will be placed on developing a theory and better understanding of the new pressure dialysis process. Synthesis of better mosaic membranes and support systems for this new process will be emphasized.

Applied research will concentrate on development of new membranes; high flux, high salt rejection, new compositions, sheet, tubular, tubules, and hollow fiber configuration, porous supports for composite membranes, new designs for membrane processes, new means of fabrication, and in-situ removal of membranes from a plant.

We anticipate that during the five additional years of the full-scale program, we will undertake the construction of several types of prototype plants which are required since there is no single optimum process for the variety of feed waters, site characteristics and product water quality with which we must contend. At this time distillation is most economical for sea water, while membrane processes are more economical for lower salinity waters. We will report to the President and the Congress on our plans for constructing prototype plants.

During this current fiscal year, construction will begin on a distillation module of up to 3 MGD capacity to provide the technological base for plants of 200 MGD. As soon as we obtain sufficient data from the module, we plan to expand it to a prototype plant of 12-15 MGD. We are also considering a 30 to 50 MGD seawater conversion prototype plant, as well as an 8 MGD plant.

In our reverse osmosis program we are also considering three prototype plants. Two of these would be of 1-3 MGD capacity. One would be operated on high hardness ground brackish water and the second would desalt surface brackish water contaminated by industrial effluents, agricultural run off, or sewage effluent. The third plant, of 3-5 MGD capacity, will be designed to convert 95% of brackish feed to product water, as compared to the present 50%-60%. Special emphasis will be given to minimize the effects of brine disposal in all of these plants.

Two test beds will explore the potential of reverse osmosis for sea water conversion.

Supporting research and development projects include high pressure pumps of new designs and materials of construction that permit high efficiency and low maintenance, and suitable feed water pretreatment methods for contaminants removal to extend membrane life.

Distillation and membrane development will be supported by pilot plant tests to determine the performance, service life and design integrity of new membranes, membrane supports, and new plant designs.

Other processes are being evaluated as well as pretreatment methods, brine disposal, and by-product recovery.

As many of you will recall, the desalting program had as one of its original objectives that of desalting seawater to provide fresh water for agriculture. This still remains an ultimate goal but by far the most difficult to achieve.

Studies carried out for OSW by the Bureau of Reclamation during the past several years show that high quality water together with innovative irrigation techniques can be utilized for the production of high value crops and increased yields in areas now dependent on mildly saline natural supplies. Substantive economic benefits have been shown even though desalted water costs are more than the prices charged for irrigation water. As a follow-up on this concept, the Bureau of Reclamation, with cooperation by OSW, is proposing an experimental program to further develop such application and obtain definitive data on benefits to be obtained.

OSW is participating in the Department Task Force in assisting the Bureau of Reclamation in a study of the potential development of both water and power of the geothermal resources of the Imperial Valley Region. OSW's interest is in evaluating the potential of desalting existing geothermal brines and in developing processes to recover fresh water economically. This study is a facet of the Department's Western U.S. Water Study.

Our estimated cost for the proposed new program is \$240 million. This amount would continue our research and development for an additional five years from FY 1973 through FY 1977 with an additional three-year period for completing these activities and one year for preparing a final report.

We urge the committee to adopt the proposed legislation and provide the tools to enable us to proceed toward the goals of this vital program.