

## Sun-powered desalination plant

The Abhu Dhabi solar desalination plant in the United Arab Emirates was designed as a demonstration unit for evaluating the technical and economic feasibility of obtaining potable water from sea water. Commissioned in 1984, the plant is designed to yield an average of 85 m<sup>3</sup>/day of fresh water using sea water with a salinity of 55,000 ppm. It consists of three sub-systems: the solar collector field, heat accumulator and evaporator.

Thermal energy for the multiple effect stack-type (MES) evaporator, having a rated capacity of 120 m<sup>3</sup>/day, is supplied by an array of evacuated tube, flat plate collectors with a total absorber area of 1,862 m<sup>2</sup>. A thermally stratified heat accumulator, with a capacity of 300 m<sup>3</sup>, ensures that the evaporator can function 24 h a day. Electricity required by the different pumps is supplied by the main grid. The plant's monthly efficiency is in the range of 43-55 per cent, the lower values measured during winter and higher values in summer. Results show that the performance of the evaporator was maintained at its normal values.

Based on the operating performance over a period of 16 years, it has been concluded that:

- ▷ The performance of the collector field and evaporator sub-systems have not suffered in performance decline to any appreciable degree;
- ▷ The total cost of water ranges from about US\$7/m<sup>3</sup> to US\$10/m<sup>3</sup>, with the contribution of capital amortization representing about 85 per cent of the total cost and only 15 per cent contributed by operation and maintenance expenses;
- ▷ No problems were encountered with any of the tube bundles; and
- ▷ Distillate conductivity has been in the range of 10-20 m<sup>2</sup>/cm.

*Contact: Mr. Ali M. El-Nashar,*

*Desalination Laboratory Research Centre, Abhu Dhabi Water & Electricity Authority,*

*P.O. Box 41375, Abu Dhabi, United Arab Emirates. E-mail:*

*elnashar@emirates.net.ac.*

*Website: <http://www.re-focus.net>*