

## DESALINATION PLANTS IN THE EMIRATE OF ABU DHABI

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### 1. Introduction

The first desalination plant in Abu Dhabi Emirate was installed at Abu Dhabi Corniche in 1960, and was of Multi Stage Flash (MSF) type. Its capacity was only 12 500 gallons per day. The next distiller to be used in Abu Dhabi city was installed in 1968, with a capacity of about 25 000 gallons per day. In 1970 three MSF distillers each of 2 MIGD went into service and were installed at Abu Dhabi Power Station.

During the 1970s desalination systems grew in number, size and locations. New large plants were built at Abu Dhabi Power Station, and new stations were developed at Umm Al Nar, Taweelah, and Mirfa, all using large MSF distillers.

On some islands and in remote areas a large variety of smaller desalination plants have been installed over the last 25 years. These have used different systems, such as vapor compression plants with mechanical or thermocompressors; multiple effect and MSF distillers, and Reverse Osmosis (RO) systems. Plant sizes of up to 2 MIGD serve these areas. The number of smaller units in remote areas of Abu Dhabi Emirate is given in Table 1.

Location	Total capacity $M^3 d^{-1}$	No of units	Year of startup	Type of desalination plant
Das Island	500	4	1974	Vapor compression
Al Silla	250	2	1975	Vapor compression
Dalma Island	3500	7	1975/84	MSF
Al Futtsey	250	1	1976	MSF
Al Ruwais	500	2	1978	Vapor compression
Jabel Dhana	2000	1	1979	MSF
Jabel Dhana	2271	1	1980	MED
Al Dabiah	500	1	1982	MSF
Barge Rumith	2000	2	1982	MSF
Al Wagan	500	1	1985	MED - solar
Al Mirfa	1000	1	1987	MSF

Location	Total capacity M <sup>3</sup> d <sup>-1</sup>	No of units	Year of startup	Type of desalination plant
Al Mirfa	2000	1	1987	MSF
Al Silla	1000	1	1987	MSF
Al Dabiah	500	2	1987	MSF
Jabel Dhana	1000	1	1987	MSF
Jabel Dhana	2000	1	1987	MSF
Sir Baniyas	4000	1	1988	RO
Abu Al Abyad	4000	1	1989	RO
Dalma Island	8000	2	1989	RO
Al Wagan	3785	1	1990	RO
Al Mirfa	4000	1	1991	RO
Al Silla	1000	1	1991	RO
Al Rafique	1000	2	1991	RO
Jabel Dhana	8000	2	1991	RO
Al Silla	4000	1	1991	MED-TVC
Jabel Dhana	4000	1	1991	MED-TVC
Al Mirfa	8000	2	1991/92	MED-TVC
Al Silla	4000	1	1992	MSF
Al Murrawah	500	2	1992	MSF
Abu Dhabi (ADCO)	800	1	1993	RO
Umm Al Zamul	227	2	1994	RO
Bukeeisea	1000	1		RO
Jabeh Dhana	18 000	2	1996	MED-TVC
Dalma Island	4500	1	1996	MED-TVC
<b>TOTAL</b>	<b>98583</b>	<b>54</b>		

Table 1. Desalination Plant in Remote Areas of Abu Dhabi.

MSF	20 250
RO	35 812
VC	1250
MED-TVC	41 271
<b>Total</b>	<b>98 583</b>

Total installed capacity (M<sup>3</sup> d<sup>-1</sup>) of desalination plants in WED villages and islands.

## 2. Large MSF Desalination Plants in the Emirate of Abu Dhabi

### 2.1. Introduction

Over the past twenty-five years, the majority of desalination plants installed in the Arabian Gulf area have been Multi Stage Flash (MSF) type units. The unit plant ratings in the Emirate of Abu Dhabi have increased steadily from about 12 500 gal d<sup>-1</sup> in the 1960s to around 12.5 MIGD in the 1990s. The Water and Electricity Department (WED) of Abu Dhabi at present operates 33 large MSF desalination plants. The total design capacity of these plants is about 222 MIGD. The increase in the desalination

plant size has been achieved by improvements in various aspects of the plant design, material selection, and use of state-of-the-art technology.

To supply the Abu Dhabi Emirate with water at present and in the future requires continued expansion of the existing desalination capacities. This is being achieved through extension of the existing plants and/or construction of new plants. Extension of the existing Taweelah “A” and “B” plant is being done with the addition of about 73 MIGD plant capacity. About 50 MIGD capacity plants will be installed by Independent Water and Power Producer (IWPP) on Built Own and Operate (BOO) basis. With each increase in unit capacity, the Water and Electricity Department (WED), carefully studied the proposed design and compared it to past designs and operation to ensure that the large unit capacity plant would perform well.

A study has been undertaken to determine the potable water demand up to the year 2010 and to determine the future need for the desalination capacity based on the retirement of the present units and their deaerated capacity.

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#### **Bibliography and Suggestions for further study**

Author (1995) Development of desalination plant in the UAE.

El Nashar A M (1995) Overview of the design features, preferences and economics of the MSF plants operated by WED. IDA Proceedings.