

## Summary of **SilentAlarm**<sup>™</sup> Plant References

*(Partial List)*

The following is a partial list of membrane plant installations worldwide where the innovative **SilentAlarm**<sup>™</sup> **SMART** membrane system fouling and performance monitoring and optimization technology and software systems, developed exclusively by Eng. Mohamad Amin Saad, have been used or installed, including plants for which the membrane system's performance and fouling history have been evaluated or monitored (*either on-site or in-house*) using actual historical plant operating data & membrane system design parameters:

1. Al Fujairah Seawater RO Plant – F1 (190,000 m<sup>3</sup>/d double-pass capacity with Hydranautics spiral-wound membranes), ADWEA (Abu Dhabi Water & Electricity Authority), Fujairah, UAE, 2006-2016.
2. Al Fujairah Seawater RO Plant – F2 (136,500 m<sup>3</sup>/d double-pass capacity with DAF+ DMGF pretreatment schemes), Veolia for ADWEA (Abu Dhabi Water & Electricity Authority), Fujairah, UAE, 2006-2016.
3. Major IWP SWRO Plant (300,000 m<sup>3</sup>/d double-pass capacity with DMGF pretreatment schemes), Private client. 2018-2019.
4. DESAL G Seawater RO Plant (25,000 m<sup>3</sup>/d double-pass capacity with DMGF pretreatment), DEWA (Dubai Water & Electricity Authority), Jebel Ali, UAE, 2016.
5. Al Hamriyah Seawater RO Plant (90.900 m<sup>3</sup>/d double-pass capacity with DAF+ UF pretreatment schemes), SEWA (Sharjah Water & Electricity Authority), Fujairah, UAE, 2015.
6. Al-Taweelah SWRO Pilot Plant (2.7 m<sup>3</sup>/hr double-pass capacity with DMF and UF pretreatment schemes), ONDEO Degrémont (Suez) for ADWEA (Abu Dhabi Water & Electricity Authority), Fujairah, UAE, 2004-2015.
7. Floating Barges IWP SWRO Desalination Plant (2X25,000 m<sup>3</sup>/day double-pass capacity with UF pretreatment), ACWA Power/NOMAC, Saudi Arabia, 2010- 2012.
8. SWRO Plant (12,000 m<sup>3</sup>/d single-pass capacity with Hydranautics spiral membranes), ABB Global Water Initiative-ISI, 2012.
9. Brackish RO Plant 500 (Upgraded 17,500 m<sup>3</sup>/d capacity with Hydranautics and Toray spiral membranes), Abqaiq, Saudi Aramco, Saudi Arabia, 2012.
10. Shuqaiq IWPP SWRO Plant (212,000 m<sup>3</sup>/day double-pass capacity with Toray membranes), ACWA Power/NOMAC, Shuqaiq, Saudi Arabia, 2011.
11. Shuaiba III Expansion IWPP SWRO Plant (150,000 m<sup>3</sup>/day double-pass capacity with Toray membranes), ACWA Power/NOMAC, Shuaiba, Saudi Arabia, 2009.
12. Seawater RO Plant (50,400 m<sup>3</sup>/d capacity with Toyobo hollow-fine fiber membranes), MARAFIQ, Yanbu, Saudi Aramco, Saudi Arabia, 2008.

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13. Brackish RO Plant (160,000 m<sup>3</sup>/d capacity with Hydranautics spiral membranes), Saudi Aramco, Saudi Arabia, 2008.
14. Abqaiq Brackish RO Plant (9,000 m<sup>3</sup>/d capacity with Toray spiral membranes), Abqaiq, Saudi Aramco, Saudi Arabia, 2007.
15. Al Jubail Seawater RO Plant (91,000 m<sup>3</sup>/d capacity with Dupont hollow fiber, and Toray & Toyobo spiral membranes), SWCC (Saline Water Conversion Corporation), Jubail, Saudi Arabia, 2007.
16. Penneshaw Seawater RO Plant (300 m<sup>3</sup>/day capacity with Koch spiral membranes), South Australia Water Corp., Adelaide, Australia, 2005.
17. E.I. Dupont's *Permasep*<sup>®</sup> Products RO plants in the Middle East/Arabian Gulf and US Research facilities, 1998 – Testimonial letter, issued by DuPont's *Permasep*<sup>®</sup> Products following the conclusion of the 9-month evaluation and testing in the Arabian Gulf and US Research Facilities, agreed with our conclusion that **MASAR**<sup>®</sup> is "an excellent to monitor plant performance and capable of providing an early warning if membrane fouling is occurring", and recommending its use of the **MASAR**<sup>®</sup> software technology at RO plants employing DuPont membranes (copy of letter is available on *masar.com*).
18. Gabes Brackish RO Plant (22,500 m<sup>3</sup>/day capacity with Toray spiral-wound membranes), SONEDE, Tunisia, 2003-2004.
19. Pembroke Seawater RO Plant (54,000 m<sup>3</sup>/d capacity with Dupont hollow fiber membranes), MDS (Malta Desalination Services), Malta, 2003.
20. Industrial Wastewater RO Plant (30,000 m<sup>3</sup>/d capacity with Dow Filmtec spiral membranes), SUT Sakra Pte., Singapore, 2003.
21. Ras Abu Jarjur High-brackish 3-stage RO Plant (52,500 m<sup>3</sup>/d capacity with Dupont's hollow fine fiber membranes), Bahrain, 1998-2002.
22. Port Hueneme Demonstration Recycling Facility, brackish RO and Nanofiltration Trains (5,700 m<sup>3</sup>/d capacity with Dow Filmtec' spiral membranes), California, USA., 1999-2000. See paper entitled "*Real-time Membrane Fouling Monitoring – A Case History*", presented at and published by the World of Water™ Conference, Las Vegas, Nevada, USA, December 10-12, 2001. Also excerpted in Industrial WaterWorld™ Journal, Case Studies, PennWell, January 2002.
23. Clifton Brackish Nanofiltration Plant (9,000 m<sup>3</sup>/d capacity with Osmonics' spiral membranes), Colorado, USA, 2001.
24. Brackish RO Plant – 4 Arrays (264 gpm capacity with Koch Fluid Systems' spiral membranes), USA, 2001.
25. Burrton Brackish Pilot RO Plant (6 gpm capacity with Koch Fluid Systems' spiral membranes), Colorado, USA, 2001.
26. Sajaa Brackish RO Plant (5,700 m<sup>3</sup>/d capacity with Dow Filmtec' spiral membranes), Sharjah, UAE, 2000-2001.

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27. Orange County Water District Brackish RO Pilot Plant (300 gpm capacity with Koch Fluid Systems' spiral membranes), Municipal facility, Southern California, USA., 2000.
28. Motorola's Ultrapure Water Double-Pass RO Plant (350 gpm capacity with Dow Filmtec' spiral membranes), Chandler, Arizona, USA, 2000.
29. Brackish Microfiltration Pilot Plant – Unit 3 (250 gpm capacity with US Filter's Memcor hollow fine fiber membranes), Texas, USA, 2000.
30. Brackish Microfiltration Pilot Plant (25 gpm capacity with US Filter's Memtec hollow fine fiber membranes), Texas, USA, 2000.
31. West Basin Water District Brackish RO Plant (42,600 m<sup>3</sup>/d capacity with Hydranautics' spiral membranes), Municipal facility, Southern California, USA., 1999- 2000.
32. New Port News Brackish RO Plant (21,600 m<sup>3</sup>/d capacity with Hydranautics' spiral membranes), Virginia, USA, 1999.
33. Ghar Lapsi Seawater RO Plant (34,000 m<sup>3</sup>/d capacity with Dupont's hollow fine fiber membranes MDS (Malta Desalination Services), Malta, 1999.
34. Riyadh Water & Sewage Authority's 6 Riyadh Region Brackish RO Plants: Salboukh, Manfouha I & II, Shemaisi, Malaz (160,000 m<sup>3</sup>/d design capacity with Dupont's hollow-fine fiber membranes) and Buwaib (46,800 m<sup>3</sup>/d design capacity with Osmonics' spiral membranes) – 1998.  
**MASAR**<sup>®</sup> was effectively specified by RWSD as the only system proven to perform *"special calculations to measure the Fouling Index as a function of plant's operating conditions and elapsed time"*  
- Al Shumaisi RO Plant's Refurbishment Contract, Technical Specifications, General Conditions (page 63).
35. Ad-Dur Seawater RO Plant (45,000 m<sup>3</sup>/d capacity with Dupont's hollow fine fiber membranes), Bahrain, 1998.

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