Perth seawater desalination plant, Australia

**Totally Integrated Automation performs positively at Australia’s first seawater desalination plant, the largest seawater reverse osmosis plant powered entirely by renewable energy, and wins PACE Zenith Award for Automation**

**The requirements**
Perth, the capital of the state of Western Australia, is particularly affected by droughts that have not only endangered the drinking water supply, but have also led to severe economic losses. To cure this problem, the Water Corporation of Western Australia decided to build a seawater desalination plant using reverse osmosis technology for better energy efficiency and a more compact footprint compared to a conventional thermal desalination plant. The undertaking was awarded to a joint venture between Suez Degrémont S.A. and Multiplex Engineering Pty as a private operating agency project. The contract includes a 25-year term of operation and maintenance, with extremely high requirements for performance, availability, and profitability, in particular in the area of process automation and energy efficiency. In addition, this largest project of its kind in the southern hemisphere had to be completed in just 18 months.

**The solution**
With a capacity of 45,000,000,000 liters per year, Kwinana Beach supplies some 20 percent of Perth’s water requirements. Because of their success in many other desalination projects, SIMATIC PCS 7 and PROFIBUS were chosen for the plant’s process control system. The server, all controllers, and the PROFIBUS connection to the field instrumentation were designed with complete redundancy. Facility management is significantly simplified through the use of a SIMATIC PCS 7 Web Server that allows operating personnel to remotely access all facility data. In terms of energy efficiency, several SINAMICS G150 frequency converters reduce power consumption by up to 50 percent compared to unregulated electrical drives, while ensuring that delivery volumes always meet the actual demand. For better motor management, SIMOCODE pro is applied in the Motor Control Centers (MCC).

**The benefits**
The automation system is based on the principles of Totally Integrated Automation (TIA) and meets all requirements of the operating agency. Programming, maintenance, and exchange of components even during operation are easy and efficient, thanks to a common profile for all instrumentation and electronic devices. In line with TIA philosophy,
comprehensive diagnostic information allows for predictive maintenance, which significantly reduces costs. SIMATIC PCS 7 allows access to all internal parameters from a single point, which also simplifies commissioning. Operations and maintenance staff added a PCS 7 Web Server to extend their coverage. The server gives them the tools to access plant data from off-site, in a secure environment. Besides providing plant parameters for optimization or reporting purposes, this aids plant maintenance, especially outside normal working hours. The performance and reliable future-orientation of the system have even impressed independent experts: PACE, Australia’s leading magazine for process control technology, honored Perth-Kwinana with its Zenith Award for the best automation project of 2007.

**End customer**
Water Corporation of Western Australia

**System integrator**
Joint Venture of Degrémont SA and Multiplex Engineering Pty.

### System brief
- Project duration: 18 months
- Capacity: 140,000 m³/d (30.8 MIGD) design; prepared for 250,000 m³/d (55 MIGD)
- Reverse osmosis process
- Energy usage: approx. 4.6 kWh/m³

### Scope of supply
- Distributed control system SIMATIC PCS 7 with SIMATIC PCS 7 Web Server
- Four redundant SIMATIC S7-400H Controllers
- Client/server system with complete hard- and software redundancy, including fully redundant Ethernet- and Profibus networks with fiber optic cables
- 300 PROFIBUS PA devices
- SINAMICS G150 frequency converters
- SIMOCODE pro motor management system

### Benefits at a glance
- Maximum reliability of freshwater supply thanks to fully redundant system design
- Efficient engineering for high cost effectiveness during construction, for example, centralized configuration of all actuators and sensors
- Reduced operating costs through predictive maintenance and energy-efficient electrical drives means correspondingly low water costs per household
- Complete scalability, an open system architecture, and long-term availability of spare parts ensure the investment over the long-term and enable future plant expansion