

A photograph of two large, hyperboloid cooling towers of a nuclear power plant. The towers are illuminated from below, giving them a warm, orange-gold glow. Thick white steam or smoke rises from the top of each tower, merging into a large plume against a hazy, orange-tinted sky. The base of the towers is partially obscured by dark silhouettes of trees.

Water Solutions for the Power Industry



Resourcing the world

WATER TECHNOLOGIES

Water Solutions for the power industry

Veolia Water Technologies specialises in water and wastewater treatment solutions for various types of power stations: conventional power stations, fossil fuel or solar plants.

We can provide you with a tailor made water management system focusing on technical performance, compliance with process and environmental requirements and long-term cost effectiveness, in order to fulfil the most demanding reliability and quality requirements essential to the Power industry.

Our expertise and innovative technologies can help your company achieve the following objectives:

- Secure a water supply, which may be jeopardised because of water restrictions linked to the drought or excess water conditions
- Ensure the security and safety of the water process at the Power Stations
- Prevention of Legionella and management of health risks through our preventative solutions and complete treatment programmes to secure water treatment plants and cooling towers
- Implementing clean technologies and policies of continuous improvement and sustainable development to protect the environment



High OH&S Standards

We place the Occupational Health & Safety (OHS) of our customers, employees and third parties at our workplaces as our highest priority. We are certified to the following Standards by BSI Global:

- **BS OHSAS 18001: 2007** OHS Management Systems Standard
- **AS/NZS 4801: 2001** OHS Management Systems Standard
- **AS/NZS ISO 14001: 2004** Environmental Management Systems Standard
- **AS/NZS ISO 9001: 2008** Quality Management Systems Standard

Applications

Drinking Water Applications

- Set up or upgrade potable water systems, especially when the Power sites are in remote locations
- Provide a temporary or emergency supply of water, when there is a breakdown, emergency or planned maintenance needed

Wastewater Applications

- Treat wastewater & sludge to minimise waste, up to the point of Zero Liquid Discharge (ZLD)
- Treat wastewater for reuse or for discharge into sensitive environments.

Process Water Applications

- Reduce potable water consumption
- Produce purified demineralised water for boilers by removing dissolved solids from make up water
- Prevent build up of solids in cooling system equipment



Delivering solutions for all your water needs

Remove suspended solids, colloids, organics, iron and manganese from water (surface water, recycled waste stream...)	Produce high quality demineralised water to the boiler	Reduce the losses or damages caused by corrosion or deposits from condensate streams Reduce start-up times Minimise routine cleaning	Treat a side stream to increase the cycles of concentration by reducing suspended solids hardness, silica; Treat cooling tower blowdown to minimise waste or assist in a ZLD facility	Minimise wastewater sludge or concentrate it to a solid waste (dry cake)
RAW WATER PRE-TREATMENT	BOILER FEED MAKE-UP WATER	CONDENSATE TREATMENT	COOLING TOWER WATER	WASTEWATER TREATMENT
Actiflo® clarification Microfiltration Solids contact clarifier Pressure & gravity type filters Discfilters Hydrex® water chemicals	Continuous Electro Deionisation (CEDI) Conventional and packed-bed ion exchange Single and double-pass Reverse Osmosis Vacuum and forced draft degassifiers Hydrex® water chemicals	Mixed bed condensate polishers CERAMEM™ membranes for filtering hot condensate Separate beds condensate polishers Hydrex® water chemicals	Actiflo® clarification Reverse osmosis Solids contact clarifiers/softeners Microfiltration Pressure & gravity filters HPD evaporation/crystallisation (ZLD) OPUS™ I & II Hydrex® water chemicals	Actiflo® clarification Biological treatment (e.g.MBR) Sludge thickener Filter presses Lime soda softening HPD evaporation/crystallisation (ZLD) Reverse osmosis Metclean™ Hydrex® water chemicals

Our Technologies

Actiflo®



Compact, high performance water clarification system combining the advantages of microsand enhanced flocculation with fast lamella clarification, particularly suited for high turbidity water

Condensate Polishing



Conventional mixed bed polishing for hydrogen cycle operations

Tripol® condensate polishing for hydrogen and ammonia cycle operations

Reverse Osmosis



A membrane process used extensively for removing salts from seawater or brackish water and even dissolved contaminants from sewage

Available as a skid-mounted packaged plant or engineered solution

Evaporation & Crystallisation



A comprehensive range of evaporator, brine concentrator and salt crystalliser systems offering a complete produced and wastewater treatment solution, including volume minimisation, salt recovery and Zero Liquid Discharge (ZLD) options

Filtration



Can be used as a pre-treatment for reverse osmosis or as a standalone process for producing high quality water

Membrane filtration range including microfiltration, ultrafiltration and nanofiltration

Ion Exchange



A packaged or individually tailored solution ideally suited for ultra pure water for boiler feed

Key features: low operating costs, small footprint, efficient chemical usage

MetClean™



A process capable of removing heavy metals (arsenic, cadmium, lead, zinc, nickel, iron, manganese, arsenic, uranium, etc.) without sludge generation from different types of water, including industrial wastewater

OPUS™ I & II



A process suitable for desalination of feed water with high concentrations in silica, organics, hardness, boron and particulates; Combines a proprietary high rate chemical softening process, Multiflo™, with filtration, ion exchange and reverse osmosis to generate high quality water with a low waste volume

Hydrex®



Complete range of specialty water treatment chemicals for boiler & cooling water systems including Legionella control, Reverse Osmosis antiscalants, biocides, cleaners, inhibitors, dispersants and polymers

Case Studies

Vales Point Power Station for Delta Electricity, NSW

Design, build, commissioning, testing and a multi-year Service & Maintenance agreement of a microfiltration & reverse osmosis plant and refurbishment of an aging Anhydrous Ammonia plant to a safer aqueous system

- Capacity: 1.2 ML/day (upgradeable to 1.8 ML/day)
- Process: microfiltration, reverse osmosis and Hydrex® Specialty Water Chemicals
- Application: Treat effluent from sewage treatment plant for use in the demineralisation plant feed water & reuse as irrigation at Mannering park

Tarong Power Station Microfiltration & RO Plants for Tarong Energy, QLD

Design, supply, delivery, installation, test and commissioning of two water treatment plants at Tarong Power Station

- Capacity: 2 ML/day & 250 KL/day (1,400 MW - power station)
- Process: microfiltration and reverse osmosis to provide up to 2 Megalitres/day of treated water
- Application: treat water to produce feedwater; the microfiltration plant provides 250 kilolitres/day of reliable and safe drinking water on site environment

Huntly Power Station Condensate Polishing Plant for Genesis Energy, NZ

Design, supply, construct and install a new Condensate Polishing Plant

- Capacity: 360 m³/h
- Process: Tripol® condensate polishing system with 3 regenerator vessels to remove impurities from condensate steam from the power station's steam turbine
- Application: provide high quality water for the high pressure boiler



Bayswater Water Treatment Plants for Macquarie Generation, NSW

Design, build and operation of four water treatment plants

- Capacity: 120 ML/day
- Process: lime softening, reverse osmosis, 8 Actiflo® clarification units, ion exchange, filtration, HPD concentrator and crystalliser
- Application: reduce the salinity of Lake Liddell through an increased salt removal capacity to provide cooling water whilst maintaining Bayswater as a Zero Liquid Discharge power station

Water Solutions for

1 PRE-TREATMENT

- Ground water, surface water, grey water
- Seawater desalination

- Screening
- Flocculation, sedimentation
- Settling, clarification
- Combined clarification + filtration
- Membrane technologies
- Softening
- Electro-chlorination
- Desalination

2 BOILER FEED WATER

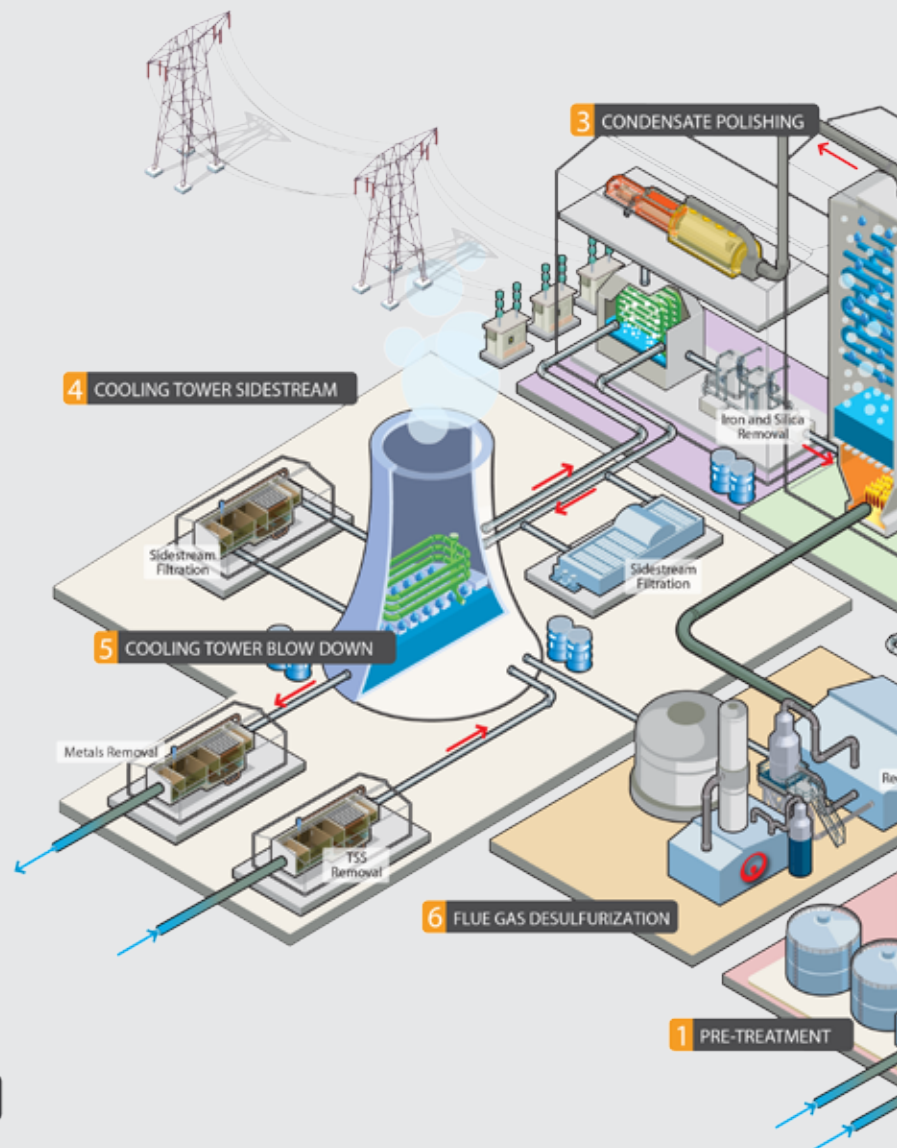
- Reduction of impurities
- Water demineralization

- Filtration
- Reverse osmosis
- Demineralization
- Continuous Electro-Deionization
- Combined pre-treatment
- Mixed bed ion exchange
- Water Treatment Chemicals

3 CONDENSATE POLISHING

- Remove impurities from condensate steam
- Iron and silica removal

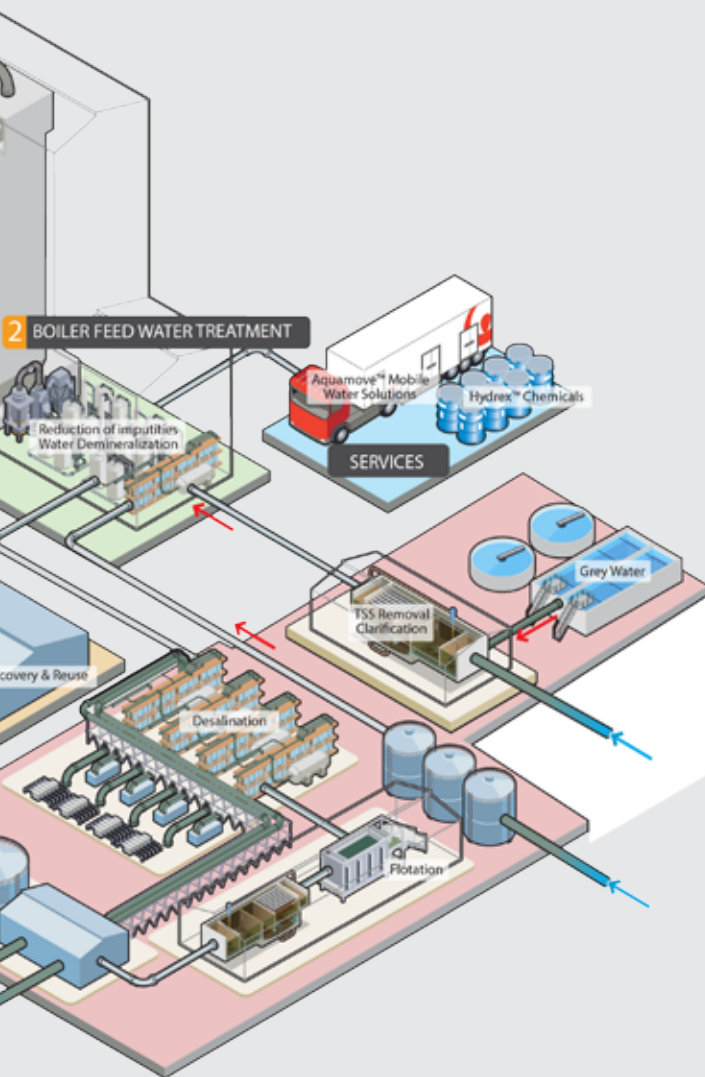
- Resin regeneration
- Candle filters
- Pre-coated filters
- Filtration
- Mixed bed ion exchange
- Deaerating feedwater heaters
- Separate beds condensate polishers



REUSE AND RECYCLING

- Environmental impact
- Water footprint
- Metals removal

the Power Industry



2 BOILER FEED WATER TREATMENT

Reduction of impurities
Water Demineralization

Recovery & Reuse

SERVICES

- ▶ Mobile water solutions
- ▶ Green Chemicals: Hydrex™
- ▶ Outsourcing

4 COOLING TOWER SIDESTREAM

- ▶ Reduce scaling and deposition
- ▶ Minimize microbial activity
- ▶ Increase concentration cycles

- Water treatment chemicals
- Side stream filtration
- Full stream filtration
- Electro-chlorination
- Turbine inlet cooling

5 COOLING TOWER BLOW DOWN

- ▶ Minimise water
- ▶ Zinc and chromates removal
- ▶ Carbonate removal

- Clarification (Actiflo®)
- Filtration (media filtration media membrane)
- Zero Liquid Discharge

6 FLUE GAS DESULFURIZATION

- ▶ Metals removal
- ▶ Particle matters and Gypsum desaturation
- ▶ Environmental impact

- CoLD™
- Evaporation
- Crystallization
- OPUS™

