



OVIVOTM
Bringing water to lifeSM

Water Specialists for the Power Sector
creating value in water through innovation, creativity and expertise

ovivowater.com

A New Global Force in Water

As society and the global economy demand more and more from water, there is a growing requirement for ever more specialist applications to manage clean water, to create specialist process waters, to treat wastewater, to extract energy from wastewater and to champion the reuse of water.

The 2010 merger of Eimco Water Technologies, Enviroquip, Aqua Engineering and Christ Water Technology plus many smaller specialist firms allows Ovivo to offer a unique combination of advanced solutions, probably the most significant application knowledge base in the world and some of the best brains in the business.

Ovivo aims to become the water partner of choice for clients in the public and private sectors and the leading source of water expertise for engineers and consultants across the globe.

For further information, visit
ovivowater.com



Ovivo - creating value in water through innovation, creativity and expertise in clean water, process water, wastewater treatment, waste-to-energy and water reuse markets across 5 continents.



Ovivo - bringing water to life



Our Role in your Industry

Ovivo is the world's leading supplier of high quality water treatment equipment, and we are therefore in a unique position to meet the demands of clients within the power sector.

Whether you need a proven water technology or a more innovative solution, we have the technical expertise and product range to meet all applicable environmental and regulatory requirements and provide you with safe, progressive and economical technologies and services.

The power sector requires a large amount of water as:

- Cooling water to condensers.
- Feedwater to boilers to produce the steam that drives the turbines to generate electricity.
- A scrubbing medium to remove air pollutants.

Current trends include:

- The ever more demanding environmental regulations for water discharge have resulted in increased interest in zero-liquid discharge systems.
- There is also a trend towards higher pressure boilers that use less - but higher purity - water.

The Benefits of choosing Ovivo:

Complete solutions

Many of our competitors tend to specialize in either pure water or cooling water technologies within the power industry. We are unique in that we operate across both areas and can therefore provide you with complete cost-effective solutions.

Simply water

Most of our competitors have interests across a wide variety of sectors, of which water is only one. We, on the other hand, are the first purely global water company - that means our focus is much greater on optimizing water and associated technologies and solutions.

Low running/lifecycle costs

We focus on water processes and technologies that offer the best value for our clients; sometimes these may have higher capital costs, but are more economical to run over the long-term and represent better value over their lifetime.

An environmental focus

We take our environmental responsibilities - and those of our clients - very seriously. Water is one of our most precious resources and, as a result, everything we do is focused on conserving it. But, as much as we care about water, we also care about the people and animals that depend upon it. Within the power industry, for example, protecting fish is an integral part of what we do (see over page).

Brilliant people

Ovivo are dedicated to operational excellence and will ensure a dedicated key account team of experienced project managers and installation and commissioning engineers. Clients will also enjoy dedicated aftermarket support and the collaboration of our specialist centers of excellence.



Creating Value



The ever more demanding standards of quality and reliability demanded by today's power industry can be exceeded by Ovivos' specialists in cooling water, condenser optimisation, feed water and wastewater treatment.



Expertise in the Power Industry

Pure Water Technologies and Processes

Pre-treatment

Raw water source quality can fluctuate greatly with the seasons, and so to cope with these fluctuations, you need a carefully designed and built pre-treatment system. We have decades' of experience in doing just this. But perhaps more importantly, we work closely with leading membrane suppliers to develop and optimize ultrafiltration systems that are fast becoming the world standard in modern, industrial plants. Types of pre-treatment we are experienced in include:

- Rapid flocculation with aluminum or iron salts.
- Lamella baffle plate clarifiers.
- Contact sludge lime soda softening.
- Pressurized or open multimedia filters.
- Sludge dewatering with plate, frame or belt presses.
- Ultrafiltration in dead-end or hybrid-flow modules.

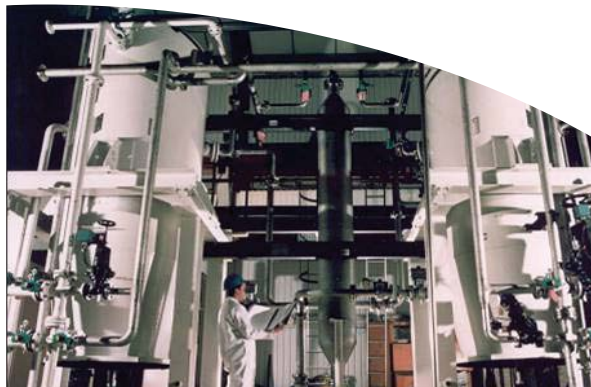


Demineralized Make-up

To optimize steam turbine efficiency, the steam purity and boilerfeed make-up water quality needs to be as high as possible; sodium and silica contamination, even for a short period, can lead to corrosion and turbine damage. We can provide an environmentally friendly, chemical-free solution for demineralization from small to large scale applications.

Over 60 years' experience of boiler feed water systems, combined with special knowledge of ultrapure water systems make us an ideal partner for any kind of high-pressure boiler feed application:

- Ion exchange with Fluidized-bed, Amberpack and UPCORE.
- Electrodeionisation (EDI)
- Reverse osmosis, with permeate and staged concentrate.
- Mixed-bed deionizers with internal and external regeneration.
- Thermal, vacuum and membrane degasifying of boiler feedwater.



Condensate Polishing

Condensate polishing entails purifying the return steam condensate. This is essential for meeting the quality requirements of high pressure thermal cycles, and also minimizes the consumption of make-up water. Condensate polishing is applied in places where the condensate is the major portion of the boiler feedwater, or if the risk of contamination of return condensate is persistent.

Turbine condensate may be contaminated by corrosion products from the piping system or by leaching water from heat exchangers, which must be removed before being recycled to ensure the efficiency and long life of the turbine.

Especially for frequent stop-and-go and high flow rate fluctuations, our well-designed CPPs ensure short start-up times and high operational security. It frequently happens that not only turbine condensate but also external condensate must be treated simultaneously, and such special tasks require solid experience in design and manufacture of condensate polishing.

Our experience includes:

- Mixed-bed deionisation with internal or external regeneration.
- Automatic resin separation for highest resin purity employing the CONESEP® technology.

Amberpack and UPCORE are registered trademarks of Rohm and Hass Company and Dow Chemical Company, respectively.

Cooling Water Processes and Technologies



StopGate™ Technology

The StopGate design provides a water seal, allowing safe and easy inspection or maintenance of screening intakes or intake pumps. Ours are built to withstand design differentials for each application and they are welded from steel plate and rolled steel sections - and fitted with neoprene edge seals.

We normally design a single-piece StopGate design but can also supply gates in sections, with one section arranged to locate above the other so that it extends to the highest water level, thereby eliminating the necessity for a concrete wall apron.



Raking Machines

Raking machines provide a cost-efficient way of cleaning the bar screens that remove large debris from the intake water. Ours have a simple design and our engineers can customize for every site and application; they can also retrofit raking machines into existing installations.



Dual Flow Band Screens

The dual flow as well as the dual flow conversion band screens are less restrictive and more efficient than the thru-flow band screen; they combine maximum throughput with the highest debris capture ratios in the industry. In numerous applications throughout the world, our screens significantly reduce fouling of downstream pumps, condenser tubes, heat exchangers.

The superior performance of our screens is due to their design, which avoids the disadvantages of the conventional thru-flow traveling band screen and minimizes maintenance costs as well as plant down time.



Drum Screen Technology

Our double entry drum 'in to out flow' Screens are ideal for large volume, raw water intakes. They need little maintenance and effectively remove high loads of floating and suspended debris like jellyfish, thus protecting pumps, heat exchangers and other critical equipment.

These exceptionally reliable screens are in use in numerous nuclear power stations on critical duty and in some of the largest intakes in the world.

We have over 40 years' experience in mechanical water screening and filtration, and today we have a portfolio of over 700 successful installations worldwide. It is the combination of efficient design and long term experience that ensures reliable and economical performance on behalf of our clients.

Fish Protection

Our clients in the power industry abstract large volumes of water from rivers, lakes, reservoirs, seas and oceans. As these are home to many fish and other marine life, we offer a variety of technologies and processes to prevent entry into water intakes. We work closely with several environmental agencies to ensure that we safeguard the natural habitat and future of aquatic species and, far from adding cost, fish protection systems help save money by eliminating the costs involved in handling and disposal of fish kills - and in plant equipment maintenance and repair.



Passive Screens

These fish-friendly, reliable physical barriers keep marine life and debris separate from the volumes of water entering the intakes. The screens incorporate tiny slots through which water can pass, but larger aquatic life and debris cannot.

They can be placed away from shore for better water quality, and away from high concentrations of debris and marine life; bursts of air remove debris from the screen surface. Advantages of passive screening include:

- Reliable water delivery.
- Low screen system costs.
- Simpler intake and pump station design.
- Low total projects costs.
- Low maintenance costs.



Fish Guidance

Behavioral barriers - or deterrent methods - exploit a fish's natural response to stimulus. Ours offer a range of stimuli that either deter fish from the area of a water intake or guide them into a bypass channel to a point downstream, which include:

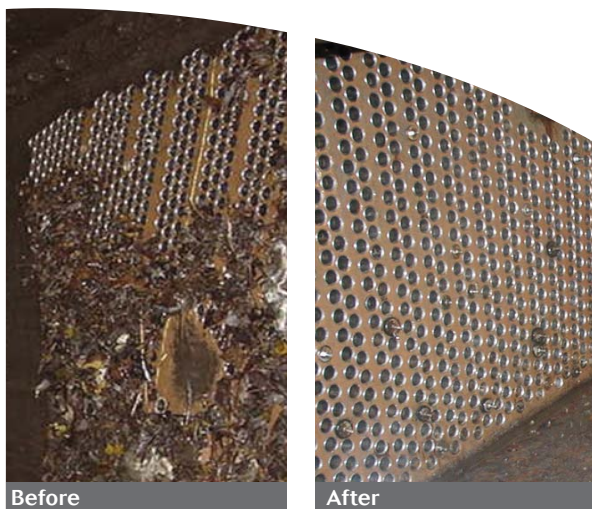
- Acoustic sound projector array for fish deterrent.
- Bio-acoustic fish fences for exclusion.
- Strobe lights.
- Bubble curtains.



Fish Recovery & Return (S.I.M.P.L.E.®)

Where fish do get into raw water intakes, survivability can be significantly increased with our fish handling band screens. Traveling fish buckets incorporated into the screen design provide a natural shelter for fish, then elevate them to the deck level where a series of gentle sprays sluice them into a return trough-system and back to their natural habitat away from the intake flow.

Condenser Optimization



Debris Filters

Debris build-up inside condenser tubes reduces a plant's performance and erodes the tubes themselves, causing them to fail. Our Automatic Self-Flushing Debris Filters' unique design fits within the cooling water line, so that the filter housing actually replaces a segment of the cooling water piping, thus eliminating the need for extra space or piping. It then removes coarse as well as fibrous debris, including plastic, clams, fish, tree roots, seaweed and pine cones.

Cleaning takes place via a rotor with several suction parts. Pressure drop is constantly monitored and, as soon as the pressure exceeds a pre-set value determined by debris accumulation, the suction rotor starts and the discharge valve opens. No further flushing devices or external pumps are needed.

In this way, the filter's unique design provides maximum debris removal at the lowest operating and maintenance costs.



Automatic Tube Cleaning Systems

Micro-fouling and scaling inside the condenser and heat exchanger tubes reduces the overall heat transfer rate and plant efficiency; corrosion deposits and surface pitting also contribute to tube failure.

Our online Automatic Tube Cleaning System (ATCS) is a permanent and highly effective solution to eliminate micro-fouling, scaling and any other surface deposits from the condenser tubes.

Here's what happens:

Elastomeric balls, slightly larger in diameter than the tube, are injected into the cooling water supply. The flow of the water forces them into each tube, where they travel its length, wiping away any deposits around the inside of the tube without adversely affecting the tube surface. A special strainer in the cooling water return pipe then collects the balls as they leave the tubes and re-injects them to continually circulate within a closed loop.



Mixel 432® Technology

Ovivo is an equipment partner for the Mixel 432® product. The Mixel 432® technology is a unique emulsion that does away with the need for chlorination and is environmentally friendly. Proven over 15 years to improve operational performance by acting as a deterrent to macro fouling, biofouling, corrosion inhibitor, scaling inhibitor and dispersant this biodegradable chemical offers increased efficiency and reduced costs.

Wastewater Treatment

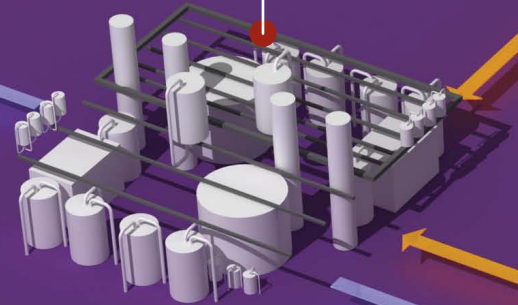
Wastewater is produced from a number of sources around a station, including: the deionization plant; surface water run off; flue gas desulfurisation and sanitary water. Ovivo has the technology and experience to recommend the best process to treat the most difficult of waters.

Mixel® is a registered trademark of MEXEL INDUSTRIES

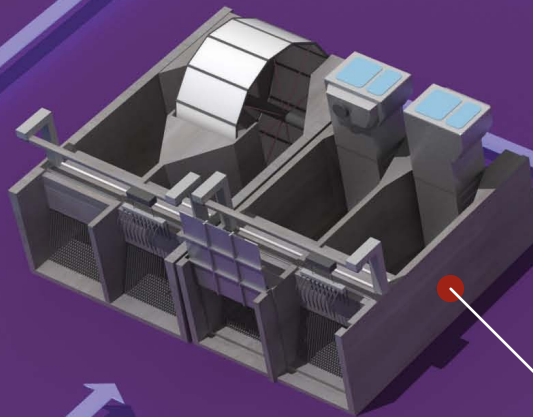
Our Power industry processes

Discover the ways we can help you with your wastewater challenges and help save you money

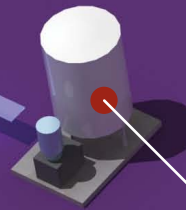
Wastewater Treatment Plant



Water Intake Systems

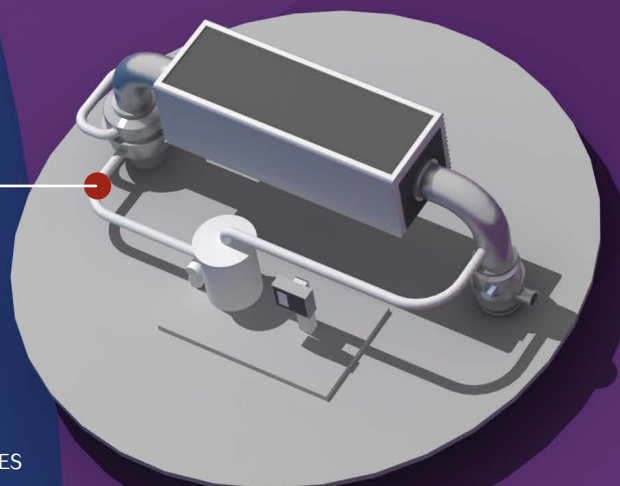


Mixel 432® Dosing

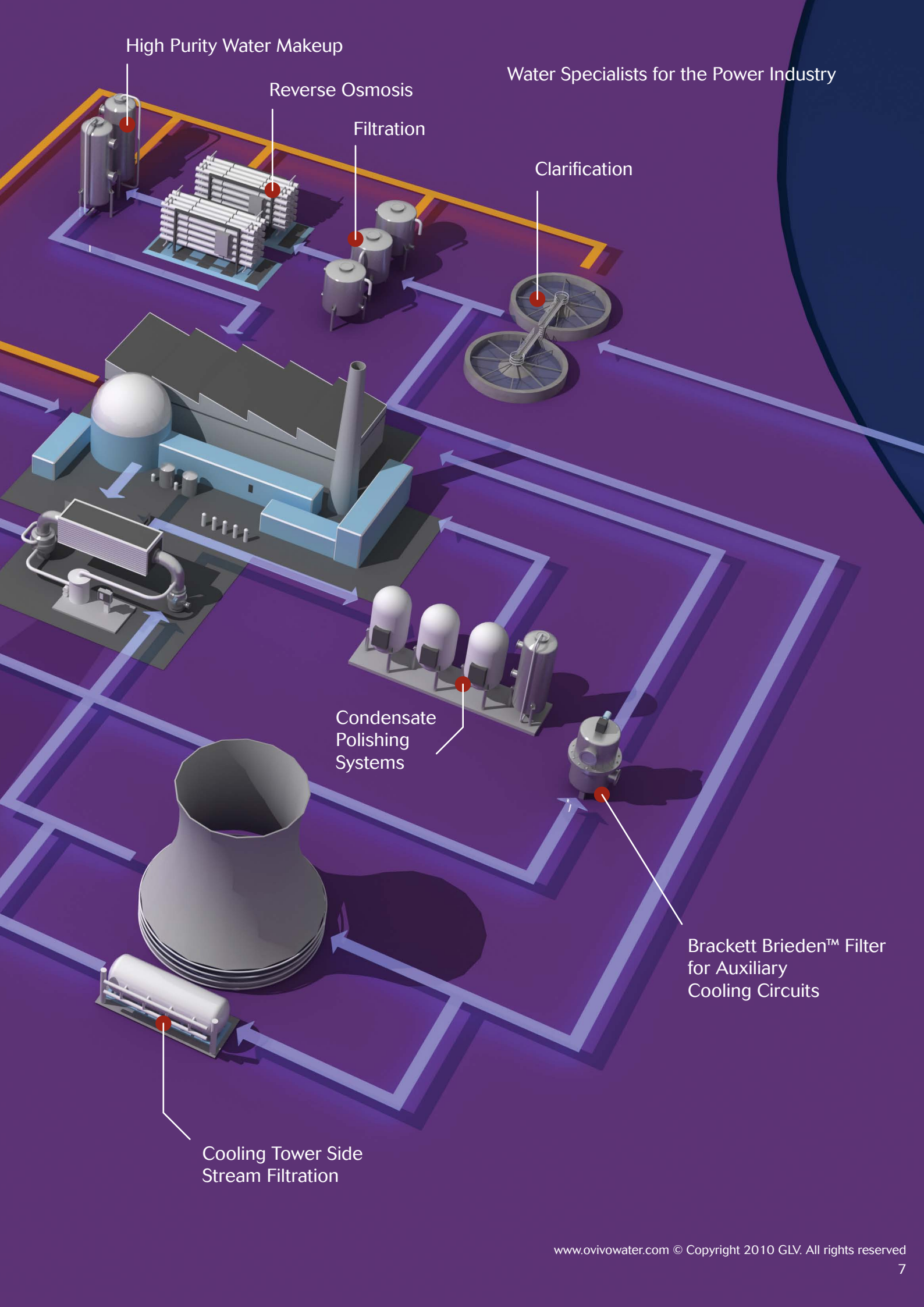


Condenser Optimization Systems:

- Debris filtration
- Condenser on line tube cleaning system



Mixel® is a registered trademark of MEXEL INDUSTRIES



High Purity Water Makeup

Reverse Osmosis

Filtration

Water Specialists for the Power Industry

Clarification

Condensate
Polishing
Systems

Brackett Brieden™ Filter
for Auxiliary
Cooling Circuits

Cooling Tower Side
Stream Filtration

Case Study Treatment of Flue-Gas-Washing-Water in Power Plants Mellach, Austria

Brief

Austrian Thermal Power (ATP), a subsidiary of Verbund, is one of the largest producers of power and district heat in Austria. Its coal-fired power plant at Mellach, near Graz in Austria, began operation in 1986.

Against a backdrop of rising oil and gas prices, the economic argument for keeping its plant in service was strong as coal is

a comparatively cheaper fuel. Following changes to Austrian regulations for the discharge of wastewater from thermal power plants, ATP wished to adapt its ageing flue gas washing water plant at Mellach to meet these new industry standards. Ovivo's flue gas washing water solution gave ATP's Mellach plant an extended lease of productive life.

Solution

Flue gas washing water is continually recycled within a washing tower. This circulation results in wastewater blown down for treatment that bears a high concentration of soot, the organic residues of combustion, sulphurous acid, sulphuric acid and many heavy metals such as lead, cadmium, arsenic and mercury. All such environmental poisons must be reduced

How we created value

- Efficiency: treating and recycling 156m³ wastewater per day.
- Effectiveness: achieved all guaranteed values from inception.
- Reliability: operation has been uninterrupted since start-up.



below relevant maximum values before any wastewater can be discharged to a sewer or into receiving water.

The plant includes several steps during which heavy metals are precipitated from flue gas washing water partly as metal hydroxides and metal sulphides. The precipitated sludge is separated and dewatered by a plate-and-frame press. A new circular sedimentation tank improves reduction of heavy metals.

DeNOx catalysts are used at fossil fuel-burning facilities to reduce nitrogen oxide (NOx) emissions. As these catalysts age an increasing amount of ammonium is detected in the flue gas washing water, which is dealt with by an ammonia desorption and absorption plant. New chemical dosing stations, a precoat cartridge filtration unit, and a final neutralisation stage complete the wastewater treatment process. An automatic sampling unit takes measurements for audit by the regulatory authorities.

Outcome

The plant has a net wastewater production of 156m³ per day. Ovivo's treatment processes clean and recycle this volume as rinsing and dilution water for chemicals in order to improve the overall water balance. The new plant was started up in December 2003.



Case Study Cooling Water Intakes

Ling Ao Nuclear Power Station, China

Brief

After the successful execution and operation of Ling Ao Phase 1 which included our high capacity drum screen technology, we have also been awarded Ling Ao Phase 2.

Solution

Ovivo supplies equipment for the world's largest cooling water intakes for thermal and nuclear power generation, including Ling Ao Nuclear Power Station in China.

Scope of equipment supply includes: barscreens, stopgates, cable hauled raking mechanisms,

double entry drum screens, washwater system and controls. All equipment has been seismically qualified and components for which nuclear safety was relevant complied with the demanding standards of the French RCC-M and RCC-E Design and Construction Rules of PWR Nuclear Islands.



Our experience, commitment and technology has resulted in us becoming one of the major global suppliers of screening plants for power applications.

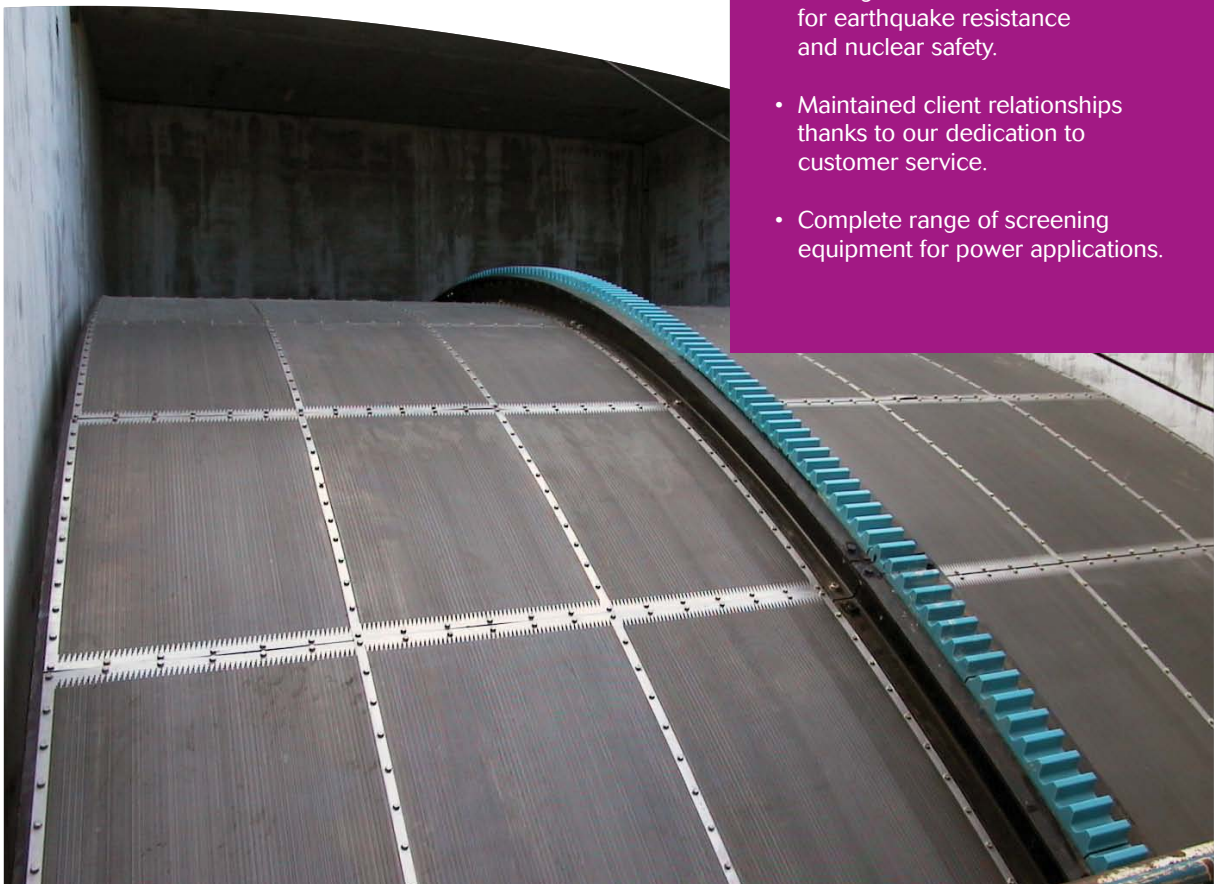
Outcome

Our effective screening systems for cooling water intakes at nuclear power stations met with client satisfaction, as can be seen from our engagement for Ling Ao Phase 2.



How we created value

- Met rigorous standards for earthquake resistance and nuclear safety.
- Maintained client relationships thanks to our dedication to customer service.
- Complete range of screening equipment for power applications.



Prolonging the efficient life of your assets

Customer Services

Recognising the importance of customers' needs for efficient and fully reliable equipment, whether it is a small packaged plant or a major turn-key installation, we support all customers with a comprehensive portfolio of After Sales service packages ranging from the supply of spare parts through to full operation and maintenance contracts. Our dedicated Customer Service team has a proven service track record in the Power sector serving several hundred power industry customers throughout the world.

Erection, Commissioning and Training

For all equipment and systems supplied, Ovivo can provide fully qualified technicians to undertake plant erection, commissioning, supervision and operator training. Both classroom and on-site training packages are tailored to individual customers needs to ensure that all aspects of Health and Safety legislation are adhered to as a minimum.

Maintenance

Provision of on site supervision and/or site operatives to cover the complete range of maintenance disciplines are available to suit required needs. Multi-skilled staff are equipped for both planned maintenance and intervention work.

Service & Inspection Visits

Both Standard and Validated service / inspection visits, complete with inspection reporting, are available from our trained service engineers to ensure planned maintenance and to reduce the chance of unexpected / premature failure.

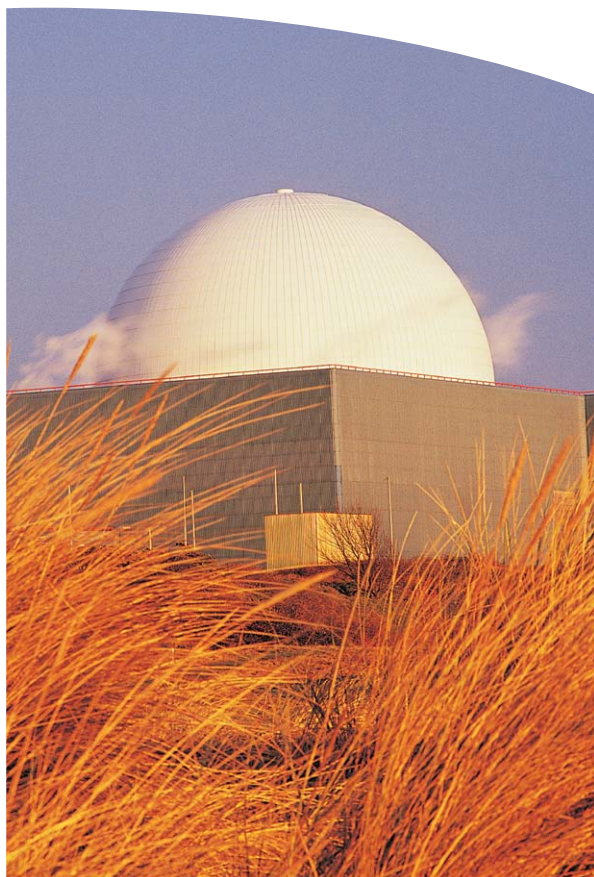
Upgrades, Overhaul & Performance Upgrades

Whether driven by legislation, environmental conditions or new technologies, upgrades, improvements and overhauls are offered to maintain your equipment to the level performance expected and that is compliant and include:

- Mechanical plant overhaul and refurbishment.
- Plant optimisation and trouble shooting.
- Control and instrumentation enhancements including system automation.
- New technologies.

Spare parts

- OEM Parts will ensure reduced downtime and reliable plant operation.



Creating Value

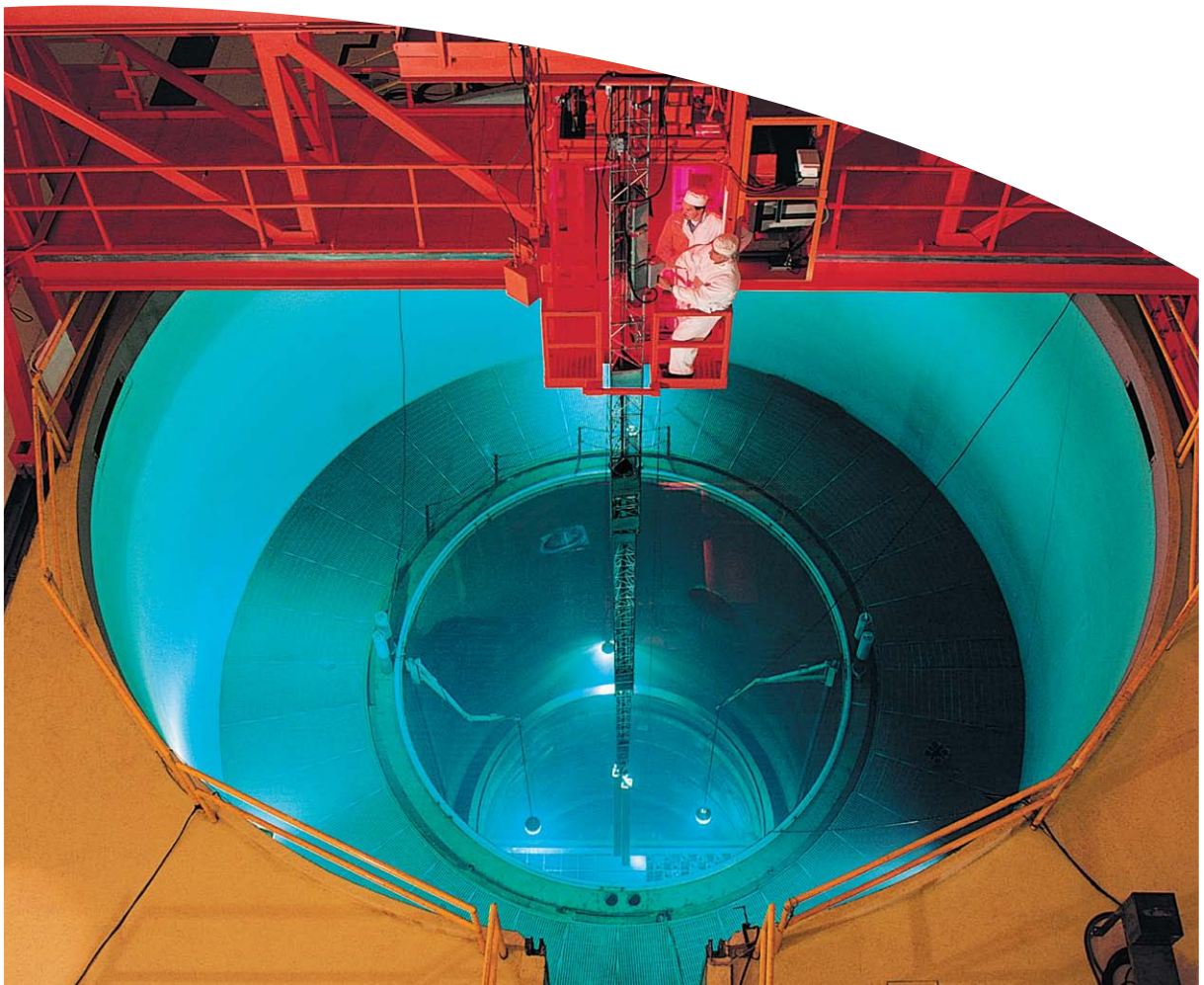


Prolonging the life of a power station's assets by ensuring water treatment for cooling, boiler feed, condensate polishing and condenser optimization that delivers effective and efficient performance is key to Ovivo's success.



Applications and Solutions

Industry	Solution	Application
Power	Cooling Water & Pre-Treatment	Decarbonization
		Clarification
		Filtration
	Process Water Treatment	De-ionization (Demineralization)
		Condensate Polishing
		Condenser Optimization
	Wastewater Treatment	Chemical Physical Wastewater Treatment
	Water Intake Solutions	Condenser Optimization
		Cooling Water & Pumping Stations



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