WHY AQUATECH.

TECHNOLOGIES
• Pretreatment
• Ion exchange
• Membrane processes
• Electrodeionization
• Wastewater recycle / reuse
• Desalination
• Zero Liquid Discharge (ZLD)
• Evaporative processes

KEY APPLICATIONS
• Heavy oil
• Oil sands
• Shale gas
• Refineries
• Integrated Coal Gasification Wastewater Treatment (IGCC)
• Coal / Gas to Liquid Wastewater Treatment (CTL) / (GTL)
• Spent caustic treatment

TOTAL WATER SOLUTIONS

OUR CAPABILITIES
With a proven track record of technology leadership and performance excellence in desalination, water reuse, wastewater treatment and zero liquid discharge, Aquatech supplies cutting edge, sustainable water purification systems and technologies to solve the world’s water scarcity challenges. No other company can offer turnkey EPC/design-build capabilities that provide design and engineering, modular field-proven products, project management, installation and start-up. We leverage these capabilities to develop standard and customized total water solutions that work together seamlessly worldwide to minimize life cycle costs and your environmental footprint.

But we don't stop with system supply and installation. Our Industrial Services Division offers water management support that ranges from spare parts supply and equipment leasing to maintenance, troubleshooting and plant upgrades. Need more hands-on support? Whether help is needed with daily plant operation, staffing, documentation or training, our customized build, own and operate (BOO) programs combine with operation and management (O&M) services to solve problems for individual customers.

OUR ADVANTAGES
Working with a company of our size and scope has many advantages. They include:

• Greater operational efficiency
• A global supply chain from a single source
• Customized solutions
• On-site service and support
World-Class Water Treatment, Reuse and Management. Worldwide.
Whether to meet regulations – address difficult-to-treat produced and process waters – or when scarcity of feed water demands stringent water recovery – our technology leadership and performance excellence provide you with total water solutions. With the broadest technology portfolio available for oil and gas, no one offers you more options than Aquatech.

INNOVATION ON THE MOVE

**MoSuite™ – Mobile Units for Shale Gas Flowback and Produced Water Treatment**
Consisting of specific process units (MoTreat®, MoMix®, MoPress®, and MoVap*), the MoSuite™ family of mobile water treatment units has been designed for on-site and satellite coal seam methane gas recovery water treatment. The various units work in tangent to optimize the water treatment process, yielding water that can be recycled and reused without the need for costly trucking to off-site treatment facilities.

**SmartMOD™ – Modularized Water Evaporation System**
SmartMOD™ is a produced water evaporation system that is fully modularized and self-contained, specifically designed to minimize construction and field labor requirements for in-situ thermal oil recovery processes like Steam Assisted Gravity Drainage (SAGD) and Cyclic Steam Stimulation (CSS). The technology has been proven in the Canadian Oil Sands processes to produce 6,800 m³ / day of distillate suitable for use as feed water for high-pressure drum boilers, achieving greater than 99% process availability.

NEEDED EXPERTISE ON A LOCAL LEVEL

**Proven Systems Experience**
For more than three decades, Aquatech has provided oil and gas companies with proven water and wastewater treatment systems worldwide.
- More than 1,700 installed systems worldwide
- 150 installations using evaporative processes, including recovery of produced water in steam flooding applications
- 28 ZLD projects in various power and process industries

**Global Reach**
With more than 600 employees and worldwide offices in key areas, Aquatech is there – no matter where you explore, drill or refine.
Advanced recovery technologies have drastically increased water use during oil and gas exploration. Recovering one barrel of oil or gas now requires approximately four barrels of water. Aquatech’s total water approach provides sustainable water solutions based on end usage applications – solutions that work to increase safety, reduce risk, improve economics, and are in sync with both community and regulatory requirements.

**UPSTREAM WATER TREATMENT TECHNOLOGIES**

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**Oil Sands – Produced Water Treatment**

*(Technologies: Warm Lime Softening (WLS), Anthracite Filter, Ion Exchange, Evaporation, Crystallization, Blowdown Management)*

Oil sands, or tar sands, are naturally occurring mixtures of bitumen (extremely heavy crude oil, sand and water). Estimates indicate that the oil sands contain 1.7 trillion barrels of bitumen, only 10% of which is recoverable with current technology. Most oil sand recovery is accomplished with in-situ thermal processes like Steam Assisted Gravity Drainage (SAGD) and Cyclic Steam Stimulation (CSS), where steam and chemicals are injected to liquefy the bitumen. The treatment and recycling of the produced water used in this process has a direct impact on the cost of oil production.
**UPSTREAM TECHNOLOGIES**

**PRODUCED WATER**

- Physical
- Chemical
- Precipitation
- Evaporation
- Aqua-EMBR

**Coal Seam Gas / Coal Bed Methane**  
(_Technologies: UF, Nanofiltration (NF), Reverse Osmosis (RO), Evaporation, Crystallization_)

Coal seams store both gas (commonly methane) and water, which holds the gas in place due to pressure from the weight of overlying rock. Once a well has been drilled into a coal seam, the well becomes the only conduit for gas and water to reach the surface.

Coal seam gas (CSG) water contains anywhere from 100 to 10,000 mg/L of total dissolved solids and a high bicarbonate content, making it unsuitable for many uses without treatment. Aquatech has developed sustainable water treatment processes for CSG water that both protect the environment and add value to local communities. By using a combination of filtration, reverse osmosis, evaporation and crystallization, we produce ultra clean water for recycling, reuse or disposal. We carefully manage the brine produced from the desalinated water, storing it in containment ponds or tanks at the CSG fields.

**Shale Gas**  
(_Technologies: MoSuite™ for pretreatment; Evaporation and Crystallization, both mobile and fixed_)

Managing produced water from shale gas wells is challenging, but Aquatech offers both mobile and fixed solutions that get the job done right. Our wide range of treatment technologies are adaptable, customizable, multi-tier and capable of handling wide variations in water chemistry.

Aquatech solutions ensure a consistent water composition. This enables consistent hydro fracturing and minimal down-hole scaling. Whether you choose to handle produced water through well injection, local discharge, or fracture reuse, our water treatment solutions enable greater utilization, thereby reducing the number of trucks required for off-site disposal. What’s more, they provide a positive environmental impact, with less noise and dust, fewer carbon emissions and reduced road damage.

**Enhanced Oil Recovery for Heavy Oil**  
(_Technologies: WLS, Anthracite Filter, Ion Exchange, Evaporation, Crystallization_)

In a Steamflood Enhanced Oil Recovery (EOR) process, steam is injected in the wells, lowering the viscosity of heavy oil suitable for extraction through the production wells. The fluid from the wells is a mixture of oil, water and gas and goes through a separation system to separate the three. The separated produced water is heavily contaminated with dissolved solids and hydrocarbons.

Our depth and breadth of technologies offers a wealth of integrated solutions for the treatment of EOR produced water, generating a purified product that can be reused for the production and injection of steam. Our turnkey approach to treatment includes coordinating the logistics of wastewater removal off-site and any sludge disposal.
Process Water for Refineries
(Technologies: API Separator, Corrugated Plate Interceptor (CPI), Tilted Plate Interceptor (TPI), Free Water Knockout Drum (FWKO), Induced Air Flotation (IAF), Induced Gas Flotation (IGF) / Desalination)

Downstream refineries and petrochemical plants have demanding environmental management challenges. Significant quantities of water – primarily for processing and cooling – are needed to produce fuel. Refineries use approximately 1 to 2.5 gallons of water for every gallon of fuel produced. Aquatech’s efficient process water treatment and water recycling technologies offer tremendous water-saving opportunities for these companies.

Recycling / Advanced Recycling / Reuse
(Technologies: HERO™ and ZLD)

Today, the quality of industrial effluent is deteriorating, water costs are escalating rapidly and the supply of potable water is limited, which makes high quality reuse water increasingly attractive. Aquatech’s advanced recycling and reuse techniques provide a recovery rate of greater than 90% on challenging wastewater applications.
Offering conventional as well as custom treatments make Aquatech a one-stop solution for industrial water and wastewater treatment.

**Refinery Wastewater Treatment**  
*(Technologies: Biological, Chemical, Mechanical Treatment)*  
With rising crude oil prices and the depleting quality of crude, the level of refinery wastewater pollutants has reached a new high. Aquatech’s more advanced water treatment / recovery methods and robust processes work well under a variety of conditions and handle constantly changing flow rates.

**Integrated Coal Gasification Wastewater Treatment (IGCC)**  
*(Technologies: HERO™ and ZLD)*  
The wastewater stream generated through gasification processes produces effluent containing high levels of dissolved solids and other impurities such as sulphide, chloride, ammonia and cyanide. This highly polluted effluent requires the application of an advanced water treatment prior to discharge in order to meet mandated regulations. Aquatech offers a solution that recycles the maximum amount of water integrated with our Zero Liquid Discharge technology to preserve the environmental integrity of the adjacent fresh water resources.

**Coal / Gas to Liquid Wastewater Treatment (CTL / GTL)**  
*(Technologies: HERO™ and ZLD)*  
Wastewater in CTL / GTL plants comes from domestic wastewater, storm water runoff, coal, slag storage, facility effluent, cooling blowdown, industrial processes and reverse osmosis brine. These effluents typically contain salts, minerals, sulfides, chlorides, ammonia, oil and grease, and cyanides, requiring advanced and complex treatment. To meet strict environmental discharge guidelines and provide effective treatment with the lowest possible life cycle costs, Aquatech offers integrated, site-specific RO and hybrid ZLD solutions.

**Spent Caustic Treatment**  
*(Technologies: Humid Oxidation with Peroxide (OHP))*  
Spent caustic streams consist of very high chemical oxygen demand (COD) levels as well as hazardous sulfides, mercaptans, sodium salts and more. Traditionally, various disposal techniques were adopted for spent caustics such as deepwell injection, incineration, wet air oxidation or transport and dispose. Aquatech’s spent caustic treatment system offers the best alternative to conventional disposal practices and is an environmentally friendly solution.