

# Aquatech

**CORPORATE PROFILE**



From Innovation Flows Leadership



# INNOVATING TO CREATE VALUE

for Industry, Infrastructure and the Environment

Aquatech is dedicated to bringing the most valuable solutions and providing the best customer experience in meeting water and environmental needs through our innovative technology solutions, products and services.

## INSIDE:

- Aquatech at a Glance
- Desalination
- Industrial Process Water
- Wastewater Treatment
- Recycle / Reuse
- Zero Liquid Discharge
- Integrated Water Services
- Leading Edge Technologies





# SOLVING THE WORLD'S WATER SCARCITY CHALLENGES

Aquatech at a Glance

Over  
**1,000**  
installations in  
**60** countries

Solely focused on water  
since its founding in 1981

Offices in North America, Europe,  
the Middle East, India, and China

*High percentage* of repeat business

More than  
**600**  
global  
employees

*State-of-the-art  
laboratory,  
piloting, and  
R&D capabilities*

## DEEP EXPERIENCE

The widest range  
of technology  
in the industry

Solutions  
for complex  
water problems

From concept to  
commissioning  
and beyond

Technologies	Key Markets	Services
<ul style="list-style-type: none"><li>• Industrial process water</li><li>• Biological wastewater treatment</li><li>• Wastewater recycle and reuse</li><li>• Zero Liquid Discharge (ZLD)</li><li>• Desalination</li></ul>	<ul style="list-style-type: none"><li>• Oil and gas</li><li>• Petrochemicals and refining</li><li>• Power</li><li>• Mining and metals</li><li>• Infrastructure</li></ul>	<ul style="list-style-type: none"><li>• Front end engineering and design</li><li>• Capital equipment</li><li>• EPC / design-build</li><li>• Integrated water services</li><li>• Industrial outsourcing</li></ul>

Our customers include some of the  
world's largest companies, as well as  
major municipal and infrastructure projects.



# DESALINATION

DESALINATION

From Intake to Outfall

## Technologies

- Seawater Reverse Osmosis (SWRO)
- Brackish Water Reverse Osmosis (BWRO)
- Multistage Flash (MSF)
- Multiple Effect Distillation (MED)
- Mechanical Vapor Compression (MVC)
- Brine recovery to reusable salt (zero waste)

Aquatech is one of the few companies in the world offering both membrane-based and thermal desalination technologies. We are committed to reducing our clients' energy and water footprints, creating the best customer experience in the process.

In addition to full-scale plants developed under Engineering, Procurement and Construction (EPC) and BOOT contracts, we offer customized, pre-engineered containerized solutions that provide a compact footprint and reduced installation time.

**AQUATECH  
INNOVATION** **LOWATT™ DESALINATION  
TECHNOLOGY**



## Increasing Reliability While Reducing Life Cycle Cost

Aquatech has developed LoWatt™ technology to focus on membrane desalination's two biggest pain points: biofouling and energy consumption. Our proprietary process couples cutting edge pretreatment, an innovative cleaning cycle, and decades of RO plant design to deliver:

- Increasing plant availability through fewer cleanings
- A proprietary osmotic cleaning cycle
- A reduction of power consumption up to 20%

*Multiple Effect Distillation (MED)  
at ARAMCO Refinery  
Rabigh, Saudi Arabia*



# INDUSTRIAL PROCESS WATER

INDUSTRIAL PROCESS WATER

Meeting Our Clients' Every Need

## Technologies

- Raw water treatment
  - Chemical feed
  - Clarification
  - Filtration
  - Sludge handling
- Ion exchange
  - UPCORE™ packed bed technology
- Evaporation and crystallization
  - Industrial concentration
- Membrane processes
  - Microfiltration
  - Ultrafiltration
  - Nanofiltration
  - Reverse osmosis
  - Fractional Electrodionization (FEDI®)

Our wide range of processes for custom engineered water treatment makes us one of few global companies capable of single point responsibility on a water treatment project.

For applications such as boiler feed water, process water, heating and cooling water, and process steam generation, Aquatech's customized and packaged treatment systems and products have created maximum flexibility and value for our blue chip clients around the world.

**AQUATECH  
INNOVATION**

**STEAMFLOOD ENHANCED  
OIL RECOVERY TECHNOLOGY**



### **Integrated Oilfield Water Management at One of the World's Largest Enhanced Oil Recovery (EOR) Facilities**

Oilfields produce more water than oil. Fields utilizing the Steamflood process need to recover produced water as feed for boilers. Aquatech merged old and new technology to provide a complete and optimized solution to OXY at one of their most important Middle East developments.

- 390,000 barrels of water per day de-oiling and ion exchange
- 300,000 barrels of water per day Mechanical Vapor Compression (MVC)
- One integrated oilfield water management solution

*Mechanical Vapor Compression (MVC)  
recycling produced water at EOR Oilfield  
Mukhaizna, Oman*



# WASTEWATER TREATMENT

## WASTEWATER TREATMENT

Harnessing a Valuable Resource

### Technologies and Processes

- Clarification / filtration
- Physical / chemical treatment
- Advanced Oxidation (AO)
- Wet Air Oxidation (WAO)
- Heavy metals removal
- Oil / water separation
- Aerobic biological treatment
  - Activated sludge process
  - Integrated Fixed Film Activated Sludge (IFAS)
  - Moving Bed Bioreactor (MBBR)
  - Sequential Batch Reactor (SBR)
  - AquaEMBR™ Enhanced Membrane Bioreactor (MBR)
- Anaerobic biological treatment
  - Upflow Anaerobic Sludge Blanket Reactor (UASB)
  - High rate anaerobic reactor
  - Anaerobic membrane bioreactor

Wastewater is the ultimate untapped resource. Aquatech's approach is to see wastewater as an opportunity, not a burden.

Today's technology developments allow us to realize this vision. Whether it's ensuring that industries meet stringent discharge compliance or recovering energy from municipal sewage, Aquatech will seek to maximize wastewater's true hidden value.

**AQUATECH**  
**INNOVATION** **BIOCORE™**  
**TECHNOLOGY**



### An Advanced Biological Process that Provides Results While Also Reducing CAPEX and OPEX

Our BioCORE™ Fluidized Bed Bioreactor technology utilizes a specially designed media, which due to its unique shape and extremely high active surface area, has been proven to achieve water quality compliance in challenging industrial wastewater applications. The process has significant cost benefits and can be easily used to retrofit existing non-compliant facilities.

- Reduces media volume by 40% – 80%
- Reduces power consumption by up to 20%
- Reduces footprint by 25% – 75%

*Biological  
Wastewater Treatment  
Mumbai International Airport, India*



# RECYCLE / REUSE

RECYCLE / REUSE

Extending Water's Life Cycle

## Technologies

- Ultrafiltration plus Reverse Osmosis (UFRO)
- High Efficiency Reverse Osmosis (HERO™)
- Membrane distillation
- Forward osmosis
- Evaporation and crystallization

Aquatech is a leader and pioneer in wastewater reuse, having completed some of the first large-scale projects in both industrial and municipal reuse.

We possess this deep experience and expertise having tackled a variety of applications with an in-depth toolbox of technologies.

## Applications

- Cooling tower blowdown
- Municipal sewage
- Microelectronics waste
- Frac flowback
- Produced water boiler blowdown
- SAGD and conventional produced water
- Refinery and petrochemical effluent

**AQUATECH  
INNOVATION**

**HIGH EFFICIENCY  
REVERSE OSMOSIS (HERO™)  
TECHNOLOGY**



### HERO™ Effectively Handles Difficult-to-Treat Waters

Aquatech has pioneered the application of HERO™ technology on wastewater. Our experience is unmatched with over 60 installations around the world on applications such as refinery waste, cooling tower blowdown, and treated sewage, to name a few.

- Eliminates biofouling
- Maximizes recovery to beyond 95%
- Makes zero discharge affordable

*Zero Liquid Discharge  
at Petrochemical Facility  
Tamil Nadu, India*



# ZERO LIQUID DISCHARGE

ZERO LIQUID DISCHARGE

Ensuring Compliance • Protecting the Environment

## Technologies

- Falling Film Brine Concentrators
- Forced Circulation Crystallizer
- Horizontal Spray Film Evaporator
- Hybrid systems with membrane pre-concentrators
- High Efficiency Evaporation (HEVAP™)
- SmartMOD® modular evaporation

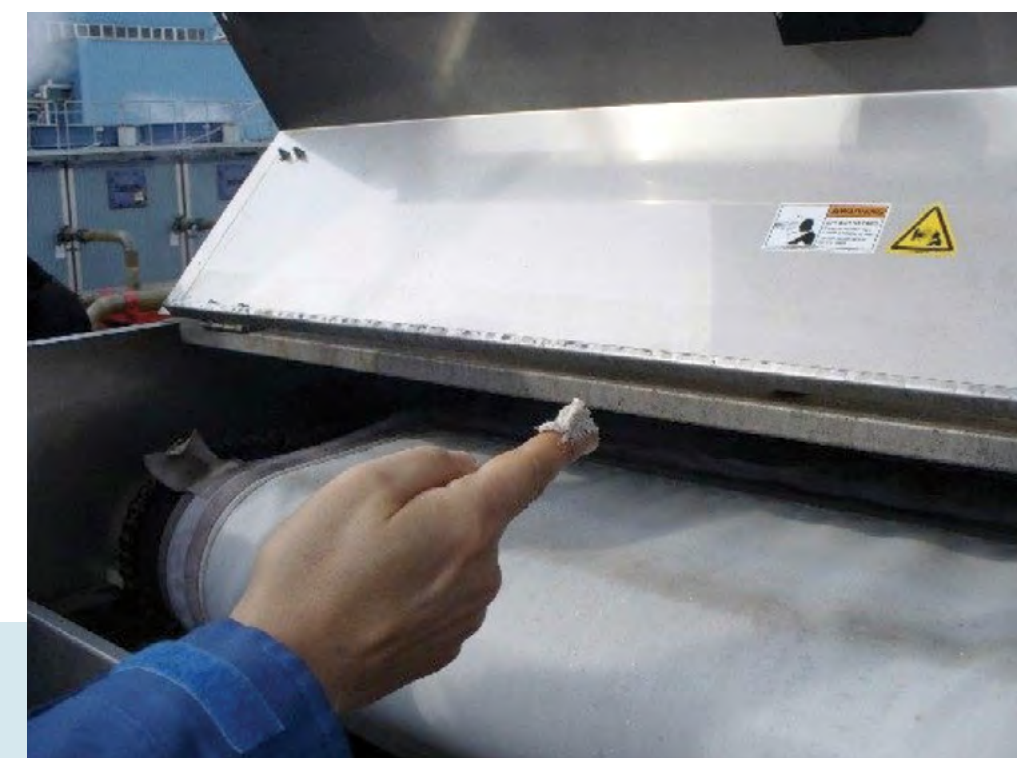
Our unparalleled depth of experience in ZLD encompasses more than 160 ZLD installations, including stand-alone thermal / evaporative processes, membrane processes, or hybrid systems, which we pioneered. Hybrid ZLD systems result in greater value, ease of operation and reduced operating costs.

## ZLD Applications

- Cooling tower blowdown
- Flue Gas Desulphurization (FGD) wastewater treatment
- Enhanced Oil Recovery (EOR) produced water
- Coal to Chemicals (CTX) waste
- Gas to Liquids (GTL) waste
- Integrated Gasification Combined Cycle (IGCC) plants

**AQUATECH  
INNOVATION**

**HEVAP™ HIGH EFFICIENCY  
EVAPORATION**



## Aquatech's Experience Leads to Increasing Reliability in ZLD Systems

Reliability is key for ZLD operations. Aquatech's deep experience in designing ZLD plants has led to the development of our patented HEVAP™ technology, which allows evaporators to be more efficient, with less downtime and longer runs in between evaporator cleanings.

- No mechanical cleaning required
- Higher recoveries
- More availability than a conventional evaporator – up to 100%

*ZLD converts liquid waste into disposable dry solids to maximize water reuse and achieve environmental compliance.*

*Southern Company Services  
IGCC Power Plant  
Mississippi, U.S.A.*



# INTEGRATED WATER SERVICES

INTEGRATED WATER SERVICES

Services that Deliver Quantifiable Value

## Products and Services

- Operation and maintenance
- Troubleshooting
- Remote monitoring
- Performance audits
- Upgrades and retrofits
- High performance specialty chemicals
- WATERTRAK™ pre-engineered products
- AQUAOUTREACH™ industrial outsourcing
  - Performance-based O&M
  - Water by the gallon (BOOM)

As a single source provider for our industrial clients, we offer integrated water solutions that focus on reducing cost through managing long-term reliability and consistency of operation.

## Accountability and Predictability

Our AQUAOUTREACH™ industrial outsourcing services have been designed to offer our clients complete security in plant operations through a performance-oriented approach. This methodology has been particularly successful for managing high tech processes like desalination, water reuse, and Zero Liquid Discharge projects.

**AQUATECH  
INNOVATION**

**SERVICES FOR  
THE UNCONVENTIONAL  
GAS INDUSTRY**



## Good for the Industry, Good for the Environment

The growth in shale oil and gas exploration has created a great opportunity for our economy. With it has come a serious but manageable environmental challenge to effectively handle fracking flowback and produced water. Aquatech has addressed this challenge with a complete solution. Our MoSuite™ lineup of mobile equipment allows for water treatment and reuse at the wellpad. Our investment in multiple central facilities where producers can send their wastewater for processing and Zero Liquid Discharge exhibits how Aquatech has addressed this challenge with a complete, 360-degree solution.

**Reliable, Sustainable, Adaptable**

*Our portfolio of “one-stop” products, services, and chemicals allows our clients to focus on their core business.*



# FROM INNOVATION FLOWS LEADERSHIP



LEADING EDGE TECHNOLOGIES

Delivering Value Through Technology

## New Innovations

- Salt recovery of desalination brine
- BioCORE™ technology
- HEVAP™ High Efficiency Evaporation
- LoWatt™ desalination process
- MoSuite™ products and services for the unconventional gas industry
- SmartMOD® modular evaporation for produced water in oil and gas exploration
- Recycle / reuse and Zero Liquid Discharge for difficult-to-treat wastewaters
  - Flue Gas Desulphurization (FGD)
  - Cooling Tower Blowdown (CTBD)
  - Refinery and petrochemical effluent
  - Steam Assisted Gravity Drainage (SAGD) boiler blowdown
  - Microelectronics waste
- QUA® advanced membrane products
  - Q-SEP® ultrafiltration
  - FEDI® Fractional Electrodeionization
  - CeraQ™ ceramic membranes
  - EnviQ™ membrane bioreactors



Aquatech prides itself on its ability to take on new applications and develop cost-effective and reliable solutions for them. We do this by teaming with our clients to understand their key issues, followed by a significant amount of laboratory work and pilot testing. Our innovations include new, patented, cutting edge products and processes, as well as simple, yet groundbreaking, new business models.

Mobile evaporation for unconventional gas drilling sites

**AQUATECH  
INNOVATION** SmartMOD®



## Understanding and Addressing our Clients' Unmet Needs

The Alberta Oil Sands region is an exciting area for O&G exploration. Due to the use of steam to maximize the recovery of oil, there is a significant need to recycle water through evaporation. Such recycling plants are large and complex. Furthermore, the remote locations and weather involved demand exorbitant installation costs. Aquatech developed SmartMOD™ to address these challenges. It is a completely modular system that maximizes the pre-assembly of the plant while also reducing civil foundation loads. In addition, the client receives a system with more operational flexibility.

- Increased redundancy
- Complete modularity
- Reduced total installed cost by up to 30%



PILOTING AND  
APPLIED TESTING



*"Aquatech's unique spread of experience is unmatched by any other water treatment specialist. Where other companies suggest a particular technology because it's the one they know, Aquatech customers know they will always get the most appropriate solution for their need."*

- Global Water Intelligence



**Aquatech International Corporation**  
One Four Coins Drive  
Canonsburg, Pennsylvania 15317 U.S.A.  
+1-724-746-5300  
aic@aquatech.com