AMERICAN GLOBAL INSTITUTE
FOR PRIVATE TRAINING

# External Training Course

# High-Performance Water Treatment Practices in the Oil & Gas Sector

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**From 20 Oct. To 24 Oct. 2025**
**From 17 Nov. To 21 Nov. 2025**
**From 08 Dec. To 12 Dec. 2025**

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**The H Dubai Hotel, Dubai, UAE**


**Mr. Ghanem F. Al-Otaibi**
**GM & Institute Owner**
**Tel.: 00965 22248901** **Fax: 00965 22204999**
**Mob.: 00965 65548855** **Mob.: 00965 97273712**
**Email: admin@agi-kw.com** **Email: agi-kw@hotmail.com**
**W/SITE: WWW.AGI-KW.COM**

**American Global**
**Institute For Private Training**

Tel. 00965 - 22248901
Mob. 00965 - 65548855
Email admin@agi-kw.com
W/Site www.agi-kw.com

**External Training Course:**

# High-Performance Water Treatment Practices in the Oil & Gas Sector

**From 20 Oct. To 24 Oct. 2025** **Fees: 1750 KD**
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## Course Overview

This comprehensive five-day program delivers an in-depth and practical understanding of advanced water treatment technologies, operational excellence practices, and performance optimization strategies in the oil and gas industry. It is designed to equip participants with the expertise to manage produced water, injection water, desalination, and wastewater in both upstream and downstream operations. The course combines technical insights, engineering principles, and practical tools to ensure participants can design, operate, troubleshoot, and optimize treatment facilities for maximum efficiency, reliability, and environmental sustainability. Participants will gain hands-on exposure to:

- Advanced process control and automation in water treatment systems.
- Innovative membrane, separation, and reuse technologies.
- Cost reduction and performance benchmarking methods.
- Regulatory compliance and sustainable water management frameworks.

## Course Objectives

**Upon successful completion, participants will be able to:**

- Master the principles, stages, and technologies of industrial water treatment in oil & gas operations.
- Analyze performance indicators to evaluate efficiency, energy use, and treatment quality.
- Apply optimization techniques to enhance throughput, minimize losses, and increase plant reliability.
- Integrate chemical, physical, and biological treatment processes for optimal results.
- Develop preventive and predictive maintenance programs for treatment equipment.
- Implement advanced monitoring, SCADA, and digital twin solutions for real-time performance management.
- Ensure environmental compliance and minimize discharge impacts through sustainable practices.
- Identify innovation opportunities for water reuse, recycling, and zero-liquid discharge systems.

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**Mob.** 00965 - 65548855
**Email** admin@agi-kw.com
**W/Site** www.agi-kw.com

## Training Methodology

**The course employs an interactive, problem-solving approach supported by:**

- Expert-led presentations with advanced technical visuals.
- Case studies from leading global oil & gas treatment facilities.
- Practical workshops focused on design, operation, and optimization.
- Group assignments to encourage collaboration and real-world analysis.
- Simulation-based exercises on troubleshooting and fault analysis.
- Multimedia sessions using technical videos, plant models, and performance dashboards.
- Comprehensive course manuals and reference materials for continued learning.

## Organizational Impact

**By implementing the knowledge gained from this course, organizations will achieve:**

- Improved operational efficiency and reliability of treatment plants.
- Reduced downtime, maintenance costs, and chemical consumption.
- Enhanced compliance with environmental and sustainability standards.
- Optimized energy and resource utilization across water systems.
- Increased equipment lifespan and process stability.
- Stronger corporate image through sustainable and eco-friendly operations.
- Data-driven performance monitoring and optimization culture.

## Personal Impact

**Participants will gain the ability to:**

- Apply advanced technical knowledge to real-world water treatment challenges.
- Diagnose performance gaps and implement measurable improvements.
- Utilize modern process optimization and control technologies.
- Strengthen analytical, problem-solving, and decision-making skills.
- Enhance career prospects in oil & gas process management and environmental engineering.
- Contribute effectively to multidisciplinary operational excellence initiatives.

## Course Content & Outline

**Day 1 – Fundamentals of Water Treatment in Oil & Gas**

- Classification and characteristics of water in oil & gas operations.
- Water quality parameters and contamination types (oil, solids, chemicals).
- Overview of treatment stages: primary, secondary, and tertiary.
- Understanding produced water, injection water, and process water.
- Water balance management and integration into process systems.
- Key performance challenges: scaling, fouling, corrosion, and emulsions.
- Introduction to water treatment plant components and flow diagrams.

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**Day 2 – Treatment System Design & Process Optimization**

- Process design and sizing principles for treatment units.
- Equipment selection: separators, filters, clarifiers, and flotation systems.
- Chemical treatment design (demulsifiers, coagulants, inhibitors).
- Optimization of separation and clarification stages for maximum throughput.
- Process simulation tools for performance evaluation.
- Process control and instrumentation for treatment plants.
- Design case study: Produced water treatment optimization model.

**Day 3 – Advanced Technologies & Equipment**

- Membrane technologies: UF, NF, and RO in oilfield applications.
- Hybrid and modular treatment systems for flexibility and efficiency.
- Electrocoagulation, electro-oxidation, and advanced oxidation processes (AOPs).
- Desalination innovations and energy recovery systems.
- Smart automation, IoT, and AI for real-time monitoring and optimization.
- Nanotechnology and green chemistry in modern treatment solutions.
- Case study: Implementing advanced water reuse technology in refinery operations.

**Day 4 – Operational Performance & Troubleshooting**

- Identifying root causes of performance losses and operational upsets.
- Troubleshooting scaling, fouling, and corrosion issues.
- Maintenance planning: predictive vs. preventive approaches.
- Condition monitoring and reliability-centered maintenance (RCM).
- Process auditing and benchmarking for performance improvement.
- Equipment calibration, monitoring, and diagnostics.
- Hands-on workshop: Developing a troubleshooting and optimization checklist.

**Day 5 – Environmental Management & Future Trends**

- Environmental and discharge compliance requirements.
- Waste minimization, sludge handling, and recovery methods.
- Sustainable water management and circular economy principles.
- Zero Liquid Discharge (ZLD) and closed-loop systems.
- Energy efficiency and carbon reduction strategies.
- Emerging digital and green innovations in industrial water management.
- Strategic roadmap for future-ready water treatment operations.

## Course Agenda:

### (1st Day) Agenda

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|---|---|---|
| 9.00 | 11.30 | Discuss Course Major Points:<br>• Fundamentals of Water Treatment in Oil & Gas.<br>• Treatment System Design & Process Optimization.<br>• Advanced Technologies & Equipment.<br>• Operational Performance & Troubleshooting.<br>• Environmental Management & Future Trends. |
| 11.30 | 12.00 | Coffee Break |
| 12.00 | 14.00 | Fundamentals of Water Treatment in Oil & Gas:<br>• Classification and characteristics of water in oil & gas operations.<br>• Water quality parameters and contamination types (oil, solids, chemicals).<br>• Overview of treatment stages: primary, secondary, and tertiary.<br>• Understanding produced water, injection water, and process water.<br>• Water balance management and integration into process systems.<br>• Key performance challenges: scaling, fouling, corrosion, and emulsions.<br>• Introduction to water treatment plant components and flow diagrams. |
| 14.00 | 14.30 | Questions and Discussion |
| 14.30 | | Buffet Lunch |

### (2nd Day) Agenda

| | | |
|---|---|---|
| 9.00 | 11.30 | Treatment System Design & Process Optimization:<br>• Process design and sizing principles for treatment units.<br>• Equipment selection: separators, filters, clarifiers, and flotation systems.<br>• Chemical treatment design (demulsifiers, coagulants, inhibitors).<br>• Optimization of separation and clarification stages for maximum throughput. |
| 11.30 | 12.00 | Coffee Break |
| 12.00 | 14.00 | Treatment System Design & Process Optimization:<br>• Process simulation tools for performance evaluation.<br>• Process control and instrumentation for treatment plants.<br>• Design case study: Produced water treatment optimization model. |
| 14.00 | 14.30 | Questions and Discussion |
| 14.30 | | Buffet Lunch |

## (3rd Day) Agenda

| | | |
|---|---|---|
| 9.00 | 11.30 | Advanced Technologies & Equipment:<br>• Membrane technologies: UF, NF, and RO in oilfield applications.<br>• Hybrid and modular treatment systems for flexibility and efficiency.<br>• Electrocoagulation, electro-oxidation, and advanced oxidation processes (AOPs).<br>• Desalination innovations and energy recovery systems. |
| 11.30 | 12.00 | Coffee Break |
| 12.00 | 14.00 | Advanced Technologies & Equipment:<br>• Smart automation, IoT, and AI for real-time monitoring and optimization.<br>• Nanotechnology and green chemistry in modern treatment solutions.<br>• Case study: Implementing advanced water reuse technology in refinery operations. |
| 14.00 | 14.30 | Questions and Discussion |
| 14.30 | | Buffet Lunch |

## (4th Day) Agenda

| | | |
|---|---|---|
| 9.00 | 11.30 | Operational Performance & Troubleshooting:<br>• Identifying root causes of performance losses and operational upsets.<br>• Troubleshooting scaling, fouling, and corrosion issues.<br>• Maintenance planning: predictive vs. preventive approaches.<br>• Condition monitoring and reliability-centered maintenance (RCM). |
| 11.30 | 12.00 | Coffee Break |
| 12.00 | 14.00 | Operational Performance & Troubleshooting:<br>• Process auditing and benchmarking for performance improvement.<br>• Equipment calibration, monitoring, and diagnostics.<br>• Hands-on workshop: Developing a troubleshooting and optimization checklist. |
| 14.00 | 14.30 | Questions and Discussion |
| 14.30 | | Buffet Lunch |

## (5th Day) Agenda

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|---|---|---|
| 9.00 | 11.30 | Environmental Management & Future Trends:<br>• Environmental and discharge compliance requirements.<br>• Waste minimization, sludge handling, and recovery methods.<br>• Sustainable water management and circular economy principles.<br>• Zero Liquid Discharge (ZLD) and closed-loop systems. |
| 11.30 | 12.00 | Coffee Break |
| 12.00 | 14.00 | Environmental Management & Future Trends:<br>• Energy efficiency and carbon reduction strategies.<br>• Emerging digital and green innovations in industrial water management.<br>• Strategic roadmap for future-ready water treatment operations. |
| 14.00 | 14.30 | Questions, Discussion & Conclusion Training Course. |
| 14.30 | | Buffet Lunch |