Desalination Plant Operation and Maintenance Management

Course general description:

This Desalination Plant O&M management comprehensive training program is designed to equip chemical engineers with advanced knowledge and practical skills in managing modern desalination facilities. The course covers cutting-edge membrane technologies, critical operational parameters, environmental considerations, performance optimization, and asset management strategies.

Audience:

This course is designed for:

1. Chemical engineers
2. Plant managers and supervisors
3. Process engineers
4. Environmental engineers
5. Maintenance managers
6. Quality control specialists
7. Water treatment specialists

Course objectives:

Upon completion, participants will be able to:

1. Understand and apply advanced membrane technologies in desalination processes
2. Analyze and optimize process operation parameters and quality control measures
3. Implement effective brine management strategies and assess environmental impacts
4. Monitor and enhance plant performance through data-driven optimization techniques
5. Develop and execute comprehensive asset management plans for desalination facilities

Course duration:

5 days

Course location:

Dubai

Course contents:

Day 1: Advanced Membrane Technologies

1. Overview of desalination technologies, membrane types, and advancements in membrane material science.
2. Design principles of membrane systems, including module configurations and pre-treatment requirements.
3. Exploration of energy recovery devices to improve efficiency.
4. Workshop on membrane autopsy, fouling mechanisms, and cleaning techniques.
5. Case studies on membrane failure analysis.

Day 2: Process Operation Parameters and Quality Control

6. Key operational parameters for desalination (pressure, temperature, pH, flow, recovery rates) and control strategies.
7. Water quality monitoring: parameters, sampling, laboratory testing, and online systems.
8. Regulatory compliance requirements for water quality.
9. Workshop on water quality testing, troubleshooting, and quality assurance protocols.
10. Techniques for interpreting and reporting data.

Day 3: Brine Management and Environmental Impact

11. Characteristics and environmental impacts of brine discharge, including regulatory compliance.

12. Advanced technologies for brine management: ZLD, crystallization, evaporation ponds.
13. Opportunities for resource recovery from brine.
14. Environmental impact assessment and mitigation strategies.
15. Best practices for marine ecosystem protection and sustainable brine management.

Day 4: Performance Monitoring and Optimization

1. Identification of KPIs and techniques for data collection, trending, and efficiency analysis.
2. Energy and chemical consumption optimization through advanced control strategies.
3. Applications of digital twin technology in desalination plants.
4. Workshop on performance analysis, optimization case studies, and predictive maintenance.
5. Troubleshooting methods for performance improvement.

Day 5: Asset Management and Lifecycle Planning

1. Fundamentals of asset management, lifecycle cost analysis, and maintenance strategies (preventive, predictive, condition-based).
2. Management of utility plant systems (power generation, chemical storage, auxiliary systems).
3. Equipment reliability programs and spare parts management.
4. Introduction to asset management software, work order management, and budget control.
5. Final assessment and course wrap-up.

Methodology:

- 50% lectures & concepts
- 10% Videos
- 15% Case studies
- 15% Exercises
- 10% Discussions

Course code: (TPRS056)