CONCEPT

# Industrial Wastewater Treatment in Oil, Gas and Petrochemical Plants

25 – 29 January 2027
London - Central London four-star



# Industrial Wastewater Treatment in Oil, Gas and Petrochemical Plants

**Ref:** 85_9238 **Date:** 25 – 29 January 2027 **Location:** London - Central London four-star **Fees:** 25300 SAR

## Introduction:

Industrial wastewater treatment in refineries, gas plants and petrochemical complexes fails quietly: an oil slug overloads the API separator, the DAF float carries over, biomass washes out and the final effluent breaches its permit before anyone traces the cause. This Core Concept course gives operators and engineers the working methods to characterise oily and chemical effluents, run separation, flotation, biological and polishing units to target, handle oily sludge and track effluent quality. Participants walk through realistic treatment trains and produce an Effluent Treatment Plant Performance and Troubleshooting Plan for their own site.

## Course Objectives:

- Characterise refinery, gas plant and petrochemical effluent streams by source, flow and key pollutants such as oil and grease, COD, sulphides, phenols and ammonia
- Operate API, CPI and flotation units to target oil removal by setting flows, skimming, chemical dosing and float removal correctly
- Control activated sludge and MBBR biological stages using food-to-microorganism ratio, sludge age, dissolved oxygen and nitrification checks
- Select tertiary polishing and water reuse options such as media filtration, activated carbon, membranes and ozonation against reuse quality targets
- Run effluent sampling, laboratory testing and permit reporting routines and track plant performance with defined KPIs
- Diagnose upsets across the treatment train and compile an Effluent Treatment Plant Performance and Troubleshooting Plan

## Target Audience:

- Operators and shift technicians who run oil-water separation, flotation and biological treatment units day to day
- Process and utilities engineers responsible for effluent treatment plant performance and upgrades
- Environmental engineers who manage discharge permits, effluent sampling and reporting
- Laboratory analysts who test process and final effluent samples and report quality trends
- Maintenance supervisors responsible for pumps, skimmers, blowers, dosing systems and sludge dewatering equipment
- Production supervisors whose units generate oily water, spent caustic or sour water streams

## Course Outline:

### Day 1: Effluent Sources, Characteristics and Plant Baseline

- Refinery and Petrochemical Wastewater Sources: Desalter Brine, Tank Drains, Cooling Tower Blowdown and Stormwater
- Produced Water Composition: Dispersed Oil, Dissolved Organics, Salinity and Solids
- Spent Caustic and Sour Water Stripper Bottoms: Sulphides, Phenols and Mercaptans
- Key Effluent Parameters: Oil and Grease, COD, BOD, TSS, Ammonia and pH
- Treatment Train Block Diagram and Mass Balance Baseline

### Day 2: Primary Oil-Water Separation and Flotation

- Equalisation and Diversion Tank Sizing for Load and Slug Control
- API Oil-Water Separator Design Basis per API Publication 421: Rise Rate and Surface Loading
- Corrugated and Parallel Plate Interceptor Operation and Plate Pack Fouling
- Dissolved Air and Induced Gas Flotation: Recycle Ratio, Bubble Generation and Float Removal
- Coagulant, Flocculant and Demulsifier Selection with Jar Testing

### Day 3: Biological Treatment Operation and Control

- Activated Sludge Process Control: F/M Ratio, Sludge Age and MLSS Targets
- Aeration Control with Dissolved Oxygen Setpoints and Blower Turndown
- Moving Bed Biofilm Reactor Media Fill, Mixing and Biofilm Health Checks
- Nitrification and Denitrification Control: Alkalinity, Temperature and Inhibition
- Secondary Clarifier Operation: Sludge Volume Index, Return and Wasting Rates

### Day 4: Advanced Treatment, Reuse, Sludge and Upset Control

- Tertiary Polishing: Multimedia Filters, Walnut Shell Filters and Granular Activated Carbon
- Membrane Treatment for Reuse: Ultrafiltration, Reverse Osmosis and Fouling Control
- Ozonation and Advanced Oxidation for Refractory COD and Phenols
- Oily Sludge Thickening, Centrifuge Dewatering and Oil Recovery
- Upset Diagnosis Matrix: Oil Carryover, Foaming, Bulking and Toxic Shock Loads

### Day 5: Treatment Train Walkthroughs and the Performance Plan

- Refinery Effluent Plant Walkthrough: Separator, Flotation and Aeration Basins
- Gas Plant Produced Water Walkthrough: Skim Tanks, Flotation Cells and Injection Filters
- Effluent Monitoring Audit: Sampling Points, Laboratory Records and Permit Exceedance Log
- Performance KPI Dashboard: Removal Efficiency, Chemical Use, Energy per Cubic Metre and Uptime
- Effluent Treatment Plant Performance and Troubleshooting Plan Drafting and Peer Review

## Skills You Will Gain:

- Effluent Stream Characterisation
- Oil-Water Separator Operation
- Flotation and Chemical Dosing Control
- Biological Process Control
- Tertiary Treatment Selection
- Oily Sludge Dewatering
- Effluent Sampling and Reporting
- Treatment Upset Diagnosis

## Why Attend This Course:

- Leave with an Effluent Treatment Plant Performance and Troubleshooting Plan built from walkthroughs of refinery and produced water treatment trains
- Reduce permit exceedances by recognising oil carryover, bulking and shock loads before they reach the final outfall
- Cut chemical and energy use per cubic metre by tuning dosing, recycle and aeration against measured results
- Compare practice with peers from refining, gas processing, petrochemicals and upstream production in other countries

## Conclusion:

Stable effluent quality depends on knowing each wastewater stream and running every unit in the treatment train to clear targets. The course moves from effluent sources and characteristics, through primary separation and flotation, to biological process control, then to tertiary polishing, reuse, oily sludge handling and upset diagnosis. The final day applies these methods in walkthroughs of refinery and produced water plants and turns the findings into a performance and troubleshooting plan that participants can apply on their own site.