
Petrochemical Effluent Plant Performance Training Course for Operations Leaders

6 – 10 December 2026
Manama





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Programme Summary

Petrochemical effluent plant performance is the subject of this one-week training course for operations, environment and engineering leaders, ending in an effluent plant performance pack for one site. Refineries and petrochemical complexes release water that carries oil, sulphides, solvents and dissolved salts, and the plant that cleans it is often managed only when a limit is breached. The programme moves from stream sources to treatment train diagnosis, discharge risk, reuse and cost, applied to a site the participant selects. Mars Training Centre UK delivers this programme on petrochemical effluent plant performance to mixed-organisation cohorts.

The Business Case

Effluent plants sit at the end of every process unit, so each upset upstream arrives there as a load the plant was not sized for. When leaders cannot see where the train loses performance, they respond with chemicals, extra operating hours and discharge exceptions. Teams that share one stream register, one limit matrix and one improvement ranking can protect the licence to operate and spend treatment money where it matters.

- Discharge Exceedances: Fall as upstream upsets are linked to the stage that absorbs them.
- Treatment Cost: Falls as chemical, energy and sludge costs are tracked against each stage.
- Fresh Water Demand: Falls as treated water reuse options are tested against quality needs.

Principles and Evidence Base

- API 421 Design and Operation of Oil-Water Separators: Frames the separator review applied in Session 2.
- Best available techniques conclusions for refining: Provide the reference points used to compare the treatment train in Session 3.
- Mass balance and load analysis: Supports the flow and load balance sheet built in Session 1.
- Cost-benefit appraisal: Shapes the improvement ranking and investment case outline in Session 4.

Intended Participants

- Operations leaders who answer for the availability and output quality of the effluent plant.
- Environment managers who hold the discharge permit and report on monitoring results.
- Engineering leaders who approve changes to the treatment train and its controls.
- Planning and finance managers who set the water and treatment budget.

Typical functions include refineries, petrochemical complexes, gas processing sites and industrial estates with shared treatment.



Learning Outcomes

1. Participants will be able to construct a stream register that links every effluent source to its load on the plant.
2. Participants will be able to diagnose which stage of the treatment train is losing performance.
3. Participants will be able to evaluate discharge risk against permit limits and monitoring results.
4. Participants will be able to prioritise improvement options by cost, risk and benefit.
5. Participants will be able to justify a treated water reuse option to a technical committee.
6. Participants will be able to prepare a performance pack that supports a budget and permit discussion.

Programme Structure

Day 1: Petrochemical Effluent Plant Performance Foundations

Where does the effluent come from, and which streams drive the load on the plant?

- Effluent Source Inventory
- Stream Segregation Map
- Flow and Load Balance Sheet
- Oily Water and Sour Water Register
- Plant Performance Indicator Set

Day 2: Reading the Treatment Train

At which stage of the train is performance being lost?

- API 421 Oil-Water Separator Review
- Air Flotation Performance Check
- Equalisation Tank Assessment
- Biological Stage Health Review
- Polishing Stage Check

Day 3: Compliance and Discharge Risk

How close is each discharge point to its limit, and what follows an exceedance?

- Permit Limit Matrix
- Excursion Root Cause Analysis
- Monitoring Plan Review
- Best Available Techniques Comparison
- Upset Response Protocol



Day 4: Reuse, Cost and Improvement Design

Which improvements cut cost or enable reuse without raising discharge risk?

- Treated Water Reuse Options Table
- Chemical and Energy Cost Model
- Sludge Handling Cost Review
- Improvement Option Ranking
- Investment Case Outline

Day 5: Effluent Plant Performance Pack for One Site

Do the stream register, the train review and the limit matrix support the same improvement plan?

- Applying the Session 1 Oily Water and Sour Water Register
- Testing the Session 2 Biological Stage Health Review
- Checking the Session 3 Permit Limit Matrix
- Reviewing the Session 4 Improvement Option Ranking
- Completing the Effluent Plant Performance Pack

Methodology

The programme uses a data workshop method built on a shared case of a refinery and petrochemical site with a mixed effluent stream, a biological stage and a tight discharge limit. Participants build each artefact on the case, then on their own site, with written facilitator feedback after each session.

- Suggested activity: Tracing one upset from a process unit to the discharge point.
- Suggested activity: Ranking improvement options against cost and permit risk.
- Suggested activity: Presenting a reuse proposal to a mock technical committee.

Capstone Output

Each participant completes an effluent plant performance pack for one site. It holds a stream register, a treatment train review, a permit limit matrix, an improvement ranking and an investment case outline. The pack is used at work to open budget discussions, brief the environment team and plan the next permit review.

Frequently Asked Questions

Is petrochemical effluent plant performance training suitable for leaders who are not process engineers?

Yes. Petrochemical effluent plant performance is taught through cases and templates, assuming experience in operations, environment or engineering management but no detailed design background.



Which standards does petrochemical effluent plant performance training rest on?

Petrochemical effluent plant performance training rests on API 421 for oil-water separators, best available techniques conclusions for refining, and mass balance and cost-benefit methods.

How is the pack from petrochemical effluent plant performance training used at work?

You use the effluent plant performance pack to support budget requests, brief the environment team and prepare for the next permit review.

How does petrochemical effluent plant performance differ from general water treatment training?

Petrochemical effluent plant performance centres on oily, sour and solvent-bearing streams and discharge risk at refining sites, while general water treatment training covers drinking and municipal supply.