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COURSE BROCHURE

Power Plant Water Chemistry and Steam Cycle Control Training Course

24 – 28 October 2027
Muscat

Power Plant Water Chemistry and Steam Cycle Control Training Course

Ref: 3268_124529 **Date:** 24 – 28 October 2027 **Location:** Muscat **Fees:** 6500 GBP

Power plant water chemistry and steam cycle control is a 1-week training course for plant chemists, laboratory technicians and boiler operations engineers, and it ends with a steam cycle chemistry control and dosing plan for their own unit. Units now cycle often and run longer between outages, so small chemistry excursions become tube failures and turbine deposits faster. Jupiter Prime Training presents power plant water chemistry as a daily operating discipline.

Why Power Plant Water Chemistry Matters Now

Three forces shape plant chemistry today. Generating units cycle more often to follow demand, which disturbs oxygen levels, pH and condensate quality during every start and shutdown. Experienced chemists are retiring, and their judgement about subtle analyser trends leaves with them. A plant that controls its cycle chemistry well avoids hydrogen damage, flow-accelerated corrosion and turbine blade deposits; a plant that handles it poorly faces forced outages and costly chemical cleaning. The course rests on accepted cycle chemistry guidance for all-volatile, oxygenated and phosphate treatment, described in general terms.

Who Gains Most from Power Plant Water Chemistry

- Staff who set and adjust feedwater and boiler water treatment limits
- Laboratory staff who collect samples and run analyses
- Operators who respond to chemistry alarms
- Engineers who run condensate polishers and dosing skids
- Specialists who track corrosion, deposits and tube failures

The greatest gain comes when a station sends its chemistry laboratory staff and boiler operations engineers together to agree one response to each excursion.

Power Plant Water Chemistry Capabilities

Participants leave able to read the steam and water cycle as one connected chemical system.

- Specify normal limits and action levels for cation conductivity, pH, dissolved oxygen and silica — shift chemists and control room operators
- Design sampling points, sample conditioning and analyser checks for representative results — laboratory supervisors
- Select all-volatile, oxygenated or phosphate treatment — station chemistry leads
- Assess condensate polisher and demineraliser performance from breakthrough and regeneration data — water treatment plant engineers
- Apply cooling water scaling, corrosion and biofouling controls to condenser circuits — maintenance and reliability engineers
- Build an excursion response that links chemistry readings to operating actions — shift managers and unit operators

Key Power Plant Water Chemistry Terms

- Cation conductivity — conductivity measured after a cation exchange column, revealing harmful anions such as chlorides.
- Flow-accelerated corrosion — dissolution of the protective oxide layer on carbon steel in flowing water.
- All-volatile treatment — a feedwater regime using ammonia or amines leaving no solid residues in the boiler.
- Condensate polishing — ion exchange filtration of returning condensate to remove salts and corrosion products.
- Carryover — transfer of boiler water droplets or volatile salts into steam.
- Hideout — temporary disappearance of dissolved salts from boiler water at high load, followed by their return when load falls.

Power Plant Water Chemistry Day by Day

Day 1: The Steam and Water Cycle as a Chemical System

- Cycle Mapping From Makeup Water to Hotwell — Where Contaminants Enter
- Boiler and Turbine Metallurgy Review — Which Treatment Regimes Suit Each Alloy
- Failure Mechanism Catalogue — Linking Tube Damage to Chemistry Causes
- Unit Cycling Profile — Chemistry Risk During Start-Up and Shutdown
- Key Parameter Set — Choosing What Each Shift Must Watch

Day 2: Sampling, Analysis and Instrument Trust

- Sample Point Design and Flow Rates — Obtaining Representative Steam Samples
- Sample Conditioning Panels — Cooling, Pressure Reduction and Filter Upkeep
- Online Analyser Verification — Grab Sample Comparison and Calibration Intervals
- Laboratory Methods for Silica, Iron and Sodium — Detection Limits
- Trend Charts and Data Validation — Separating Instrument Drift From Real Excursions

Day 3: Feedwater, Boiler Water and Steam Purity

- All-Volatile and Oxygenated Treatment Comparison — Regime Choice for Once-Through Units
- Phosphate and Caustic Treatment for Drum Boilers — Hideout Control
- Oxygen Scavenger and Amine Dosing Rates — Balancing Protection Against Decomposition
- Blowdown Control and Drum Carryover Checks — Steam Purity Limits
- Turbine Deposit Analysis — Tracing Silica and Sodium Back to Source

Day 4: Polishing, Makeup Plant and Cooling Circuits

- Demineraliser and Mixed Bed Operation — Regeneration Timing and Resin Health
- Condensate Polisher Breakthrough Signs — Bypass and Regeneration Decisions
- Condenser Leak Detection — Isolating a Seawater or Raw Water Ingress
- Cooling Tower Scaling Indices and Cycles of Concentration — Blowdown Setpoints
- Biofouling and Biocide Dosing Strategy — Condenser Performance and Discharge Limits

Day 5: Practising the Chemistry Control and Dosing Plan

- Action Level Table From Day 1 Parameters — Escalation for Each Reading
- Start-Up and Lay-Up Chemistry Procedures — Protecting Idle Boilers
- Excursion Simulation Using Day 2 Trend Data — Operator and Chemist Responses
- Chemical Cleaning Need Assessment — Deposit Weight Sampling and Timing
- Steam Cycle Chemistry Control and Dosing Plan — Completing the Unit Plan

Applying Power Plant Water Chemistry After the Course

- Lead a comparison of every online analyser against grab samples on one unit.
- Run a review of current action levels for cation conductivity, dissolved oxygen and sodium.

Power Plant Water Chemistry Questions FAQ

What is power plant water chemistry and why does it matter now?

Power plant water chemistry is the control of impurities and treatment chemicals across the steam and water cycle. It matters now because frequent load cycling and longer outage intervals give corrosion and deposits more chances to damage boilers and turbines.

Which roles gain most from power plant water chemistry training?

Plant chemists, laboratory technicians and boiler operations engineers gain most. Each sees how sampling and dosing decisions affect the others.

How does power plant water chemistry differ from a general industrial water treatment course?

It focuses on high-pressure steam cycles, where limits are far tighter than in process or building water systems.

What do you bring back from a power plant water chemistry course?

You bring back a chemistry control and dosing plan for your own unit. It sets action levels, sampling checks and treatment choices.

Power Plant Water Chemistry: The Way Forward

The steam cycle chemistry control and dosing plan first informs which action levels the control room adopts for each parameter. Chemists, laboratory staff and shift operators use it daily to respond to excursions in a consistent way. After its first use through a full start-up and shutdown, revisit the dosing rates and lay-up practice, since cycling behaviour often reveals gaps that steady operation hides.