Combined Cycle Generation Leadership Course: Start-Up, Cycling and Performance Testing

26 – 30 October 2026
Dubai - Marriott Hotel Al Jaddaf, Dubai

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Programme Summary

Combined cycle generation leadership is the subject of this one-week training course for plant managers, operations heads and performance leads, taught at managerial level and ending in a combined cycle unit review. Gas turbine, boiler and steam turbine decisions interact, yet start-up routines, cycling duty and test results are often judged one by one. The programme moves from the thermodynamic cycle to diagnosis, then to operating rules and performance testing, using prepared unit records from a utility plant and an industrial site. Mars Training Centre UK delivers this programme on combined cycle generation leadership to mixed-organisation cohorts.

The Business Case

Leaders who can read heat rate, judge start-up and cycling cost and challenge a performance test make better decisions on dispatch, maintenance and investment, and can tell a plant problem from a measurement problem before money is committed. The programme is tied to the measures below and tested on unit records that participants bring from their own plants and sites.

- Heat Rate: Improves when losses are located by component and corrected in the right order.
- Start-Up Cost and Delay: Falls when start sequences and holds are planned from recorded behaviour.
- Availability: Rises when cycling damage is anticipated and managed in outage planning.

Principles and Evidence Base

- Brayton and Rankine cycles: The thermodynamic cycles of the gas turbine and the steam plant, applied in Session 1 to locate where energy is lost.
- Heat-rate analysis: The practice of expressing fuel input per unit of output, applied in Sessions 2 and 3 to trace losses to components.
- ASME PTC 46: The test code for overall plant performance, applied in Sessions 4 and 5 to judge whether a performance test is sound.

Intended Participants

- Plant managers who answer for output, cost and availability of a combined cycle unit.
- Operations heads who set start-up, load and shutdown rules for shift teams.
- Performance leads who report heat rate and challenge test results.
- Generation planners who decide how units are dispatched.

Typical settings include public utilities, independent power producers, desalination and industrial energy sites.

Learning Outcomes

1. Participants will be able to diagnose heat-rate losses across the gas turbine, boiler and steam turbine.
2. Participants will be able to evaluate start-up sequences and holds against recorded unit behaviour.
3. Participants will be able to construct operating rules for load changes and cycling duty.
4. Participants will be able to appraise a performance test against its test code.
5. Participants will be able to prioritise corrective actions by output gain and risk.
6. Participants will be able to justify a unit review to a plant owner or board.

Programme Structure

Day 1: Combined Cycle Generation Leadership Foundations

How does energy flow through the gas turbine, boiler and steam turbine, and where is it lost?

- Brayton and Rankine Cycle Diagram
- Plant Energy Balance Sheet
- Heat Recovery Steam Generator Role Map
- Unit Loss Register
- Plant Operating Mode Chart

Day 2: Heat Rate and Efficiency Diagnosis

Which component accounts for the gap between design and actual heat rate?

- Heat-Rate Trend Review
- Compressor Fouling Indicator
- Boiler Pinch and Stack Loss Check
- Condenser Back-Pressure Effect Table
- Output Correction Curve Reading

Day 3: Start-Up and Cycling Decisions

How should start sequences, holds and cycling duty be set from recorded evidence?

- Start Curve Comparison
- Hot, Warm and Cold Start Rule Sheet
- Thermal Stress Limit Review
- Cycling Cost Estimate
- Load Ramp and Minimum Load Policy

Day 4: Performance Testing and Evidence

Is a performance test sound enough to support a commercial or technical decision?

- ASME PTC 46 Test Scope Reading
- Test Boundary and Instrument Plan
- Correction Factor Review
- Measurement Uncertainty Table
- Test Report Challenge List

Day 5: Combined Cycle Unit Review for One Plant

Do the findings join into a review that an owner can approve and act on?

- Applying the Session 2 Loss Ranking
- Testing the Session 3 Start Rules
- Checking the Session 4 Test Challenge List
- Sequencing Corrective Actions
- Completing the Combined Cycle Unit Review

Methodology

The programme is a data-led simulation built on prepared start curves, load records, heat-rate trends and a sample test report from a utility plant and an industrial site. Participants rank losses, set operating rules and challenge a test, then defend their findings to peers acting as an owner's technical panel.

- Suggested activity: Locating the cause of a slow heat-rate drift from trend data.
- Suggested activity: Comparing three recorded starts and proposing a revised hold.
- Suggested activity: Reviewing a sample performance test and listing its weaknesses.

Capstone Output

Each participant completes a combined cycle unit review. It holds a loss ranking, start-up and cycling rules, a test challenge list and a sequenced action plan. At work the review goes to the plant owner or board and guides the next outage scope.

Frequently Asked Questions

Is combined cycle generation leadership training suitable for managers who are not engineers?

Yes. Combined cycle generation leadership is taught through prepared records and templates. You need responsibility for a unit, its cost or its dispatch, but no design background.

Which standard does combined cycle generation leadership rest on in this training?

Combined cycle generation leadership here rests on ASME PTC 46 for overall plant performance, with the Brayton and Rankine cycles and heat-rate analysis as the technical base.

How is the review from combined cycle generation leadership training used at work?

You take the combined cycle unit review to your plant owner, use its operating rules for later starts and keep its test challenge list for the next performance test.

How does combined cycle generation leadership differ from a programme on gas turbine overhaul?

Combined cycle generation leadership concentrates on whole-unit performance, start-up and testing decisions, while a programme on gas turbine overhaul concentrates on component repair and rebuild.