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# Thermal Unit Start-Up, Shutdown and Load Following Training Course

17 – 21 October 2027
Muscat

# Thermal Unit Start-Up, Shutdown and Load Following Training Course

**Ref:** 2627_99929 **Date:** 17 – 21 October 2027 **Location:** Muscat **Fees:** 6500 GBP

Thermal Unit Start-Up, Shutdown and Load Following is a 1-week training course for power plant operators and control room engineers who bring boilers and turbines on and off load, ending with a unit operating procedure review for their own station. Thermal units now cycle daily around variable renewable output, so every start, ramp and trip carries more thermal stress than older procedures assumed. Jupiter Prime Training delivers this course.

## Why Thermal Unit Start-Up, Shutdown and Load Following Matters Now

Three pressures reshape how thermal units are run. Growing solar and wind output pushes steam plant from steady base load into two-shifting and deep load reduction. System operators expect faster ramps and reliable response to dispatch instructions. Experienced shift staff are retiring. A station that runs starts and ramps well protects thick-walled components, keeps emissions inside permit limits and meets dispatch; one that does not suffers tube leaks, rotor stress, failed starts and lost availability. The course rests on manufacturer operating curves, protection interlock logic and written operating procedures.

## Who Gains Most from Thermal Unit Start-Up, Shutdown and Load Following

- Operators who run boiler firing, drum level and steam temperature control
- Control room engineers who authorise starts, shutdowns and changes to load set points
- Shift supervisors who coordinate field rounds, permissives and hold points
- Operations engineers who write and maintain unit operating procedures and checklists
- Instrument and control staff who maintain interlocks, trips and coordinated control loops

An operating shift gains most when its desk operators, supervisor and operations engineer attend together and agree one sequence.

## Thermal Unit Start-Up, Shutdown and Load Following Capabilities

Participants work from trend logs, operating curves and interlock diagrams to run each change of state within limits.

- Apply cold, warm and hot start curves to set firing and turbine run-up rates — the shift supervisor
- Assess boiler purge, light-off and drum level permissives before ignition — the desk operator
- Calculate allowable ramp rates from metal temperature differentials — the control room engineer
- Test coordinated boiler-turbine control response to dispatch changes — the instrument and control engineer
- Specify trip and runback actions for loss of major auxiliaries — the operations engineer
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Communicate procedure changes and hold points to field and desk staff — the operating shift

## Key Thermal Unit Start-Up, Shutdown and Load Following Terms

- Furnace purge — air flow through the boiler for a set time before ignition to clear unburnt fuel.
- Permissive — condition that must be satisfied before the control system allows the next operating step.
- Coordinated control — scheme that adjusts boiler firing and turbine valves together to follow load.
- Minimum stable generation — lowest load at which a unit runs steadily without support fuel.
- Runback — automatic fast load reduction when a major auxiliary trips.
- Metal temperature differential — difference between surface and inner temperature of thick components, limiting heating rates.

## Thermal Unit Start-Up, Shutdown and Load Following Day by Day

## Day 1: The Thermal Unit in a Changing Dispatch Pattern

- Steam Cycle and Major Auxiliaries — Where Operating Limits Come From
- Base Load, Two-Shifting and Load Cycling — Duty Profile Decisions
- Thermal Stress and Creep-Fatigue Damage — Effect on Component Life
- Manufacturer Operating Curves — Reading Limits for Pressure and Temperature
- Control Room Roles and Shift Handover Logs — Clear Accountability for Unit Changes

## Day 2: Boiler Control and Firing

- Furnace Purge and Burner Light-Off Sequence — Safe Ignition Permissives
- Drum Level Three-Element Control — Swell and Shrink During Start-Up
- Steam Temperature Control and Attemperation — Protecting Superheater Tubes
- Combustion Air and Draught Control — Stable Flame at Low Load
- Boiler Protection Trips — Flame Failure and Low Drum Level Response

## Day 3: Turbine Run-Up and Synchronising

- Turbine Warming and Rotor Stress Monitoring — Run-Up Rate Selection
- Cold, Warm and Hot Start Curves — Matching Steam to Metal Temperature
- Critical Speeds, Vibration and Eccentricity — Hold and Trip Decisions
- Generator Synchronising and Initial Loading — Breaker Closure Checks
- Turbine Protection Interlocks — Overspeed, Low Vacuum and Bearing Trips

## Day 4: Load Following and Controlled Shutdown

- Coordinated Boiler-Turbine Control Modes — Response to Dispatch Instructions
- Ramp Rate Limits and Minimum Stable Generation — Flexible Operation Boundaries
- Auxiliary Runback and Unit Trip Recovery — Fast Load Reduction Actions
- Planned Shutdown and Boiler Cool-Down — Preserving Thick-Walled Components
- Lay-Up and Preservation Practices — Corrosion Protection During Standby

## Day 5: Practising the Unit Operating Procedure Review

- Hot Start Simulation Case — Applying Boiler and Turbine Permissives
- Load Ramp and Runback Scenario — Applying Coordinated Control Limits
- Shutdown and Cool-Down Sequence Check — Applying Thermal Stress Limits
- Procedure Gap and Hold Point Identification — Operating Risk Ranking
- Completing the Unit Operating Procedure Review — Revision Proposal for Approval

## Applying Thermal Unit Start-Up, Shutdown and Load Following After the Course

- Compare recent warm start trends with the manufacturer start curve and record any rate exceedance
- Walk through the auxiliary runback logic with the instrument and control team

## Thermal Unit Start-Up, Shutdown and Load Following Questions FAQ

### What is thermal unit start-up, shutdown and load following, and why does it matter now?

It is the safe sequencing of boiler and turbine through starts, ramps and stops within their limits. It matters now because thermal units cycle far more often around renewable output.

### Which roles gain most from thermal unit start-up, shutdown and load following training?

Desk operators, control room engineers, shift supervisors and operations engineers gain most. You benefit if you run, authorise or write the steps that take a unit on and off load.

### How does thermal unit start-up, shutdown and load following differ from a control room upset response course?

It covers planned changes of state and their limits rather than reacting to abnormal process upsets.

### What will you bring back from thermal unit start-up, shutdown and load following training?

You bring back a reviewed unit operating procedure with gaps, hold points and revision proposals marked. It gives your shift a clear basis for safer starts and ramps.

## Thermal Unit Start-Up, Shutdown and Load Following: The Way Forward

The unit operating procedure review first informs which start-up and ramp steps need revised limits or extra hold points. Operations engineers, shift supervisors and desk operators use it to agree one sequence for every shift. After first use, revisit the review against recorded metal temperature trends so that limits match how the unit actually behaves.