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Gas Facility Boilers and Heaters: Two-Week O&M Course

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Gas Facility Boilers and Heaters: Two-Week O&M Course

Gas Facility Boilers and Heaters: Two-Week O&M Course is a two-week course for operators, technicians and engineers who run and service steam generators and resistance heating units in gas plants. The second week adds time for hands-on servicing plans, performance tracking, instrument and power checks and emergency drills. You build a Thermal Plant Care Plan for your site. Mercury Training Center runs this two-week edition.

About This Course

Thermal units in gas plants often run until something trips, because servicing is reactive, efficiency is not tracked and alarms are reset without a cause. To follow the course you should already run, inspect or service thermal units on site. You practice with startup sequences, inspection records, running data and fault scenarios.

Who It Is For

- People who run steam generators and process heaters shift by shift
- People who plan and carry out servicing on thermal units
- People who look after power supply, elements and wiring of resistance heaters
- People who maintain instruments, control loops and trip systems
- People who oversee safety and thermal performance of plant utilities

This course is not for readers who need only a one-week overview of the same units, who are better served by a shorter course, or for designers who size new thermal plant, who are better served by a design engineering course.

Competencies You Will Build

- Safe startup and shutdown: runs firing and heating sequences with every pre-check and isolation in place.
- Combustion and efficiency control: keeps excess air, stack temperature and fuel use within target.
- Inspection and condition tracking: spots corrosion, scaling, leaks and element wear early and records them.
- Instrument and trip checking: verifies readings, alarms and interlocks before trusting them.
- Structured fault finding: traces flame failures, overpressure and abnormal current to a cause.
- Criticality-based servicing: plans work and spares by the risk each one carries.

What You Will Be Able to Do

By the end of the course you will be able to:

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- From a written startup procedure, check each step and add missing pre-firing checks.
- Given a week of running data, calculate combustion efficiency and spot falling performance.
- Using an inspection checklist, record the condition of tubes, burners and elements and rank defects.
- From current, voltage and temperature readings, decide whether a heater element is failing.
- Given an alarm and trip list, test interlock logic and flag instruments due for calibration.
- Using criticality ratings, build a servicing schedule and spares list for your units.

Course Content

Day 1: Heating Duties in Gas Plants

- Role of Thermal Systems in Gas Processing and Transmission
- Heat Generation and Transfer Principles
- Steam Generator Applications in Gas Processing
- Resistance Heating Applications on Site
- Direct Versus Indirect Heating and Performance Factors

Day 2: Steam Generator Construction

- Furnace, Burners, Tubes, Drums and Heat-Transfer Surfaces
- Fuel Combustion and Useful Thermal Energy
- Water Circulation and Steam Raising
- Pressure and Temperature Relationships
- Safety Valves, Protective Devices and Reliability Factors

Day 3: Running the Steam Generator

- Startup Sequence and Pre-Firing Checks
- Burner Ignition and Flame Monitoring
- Pressure, Temperature and Water Level Watch
- Fuel Supply Pressure and Flow Requirements
- Shutdown, Isolation and Abnormal Condition Response

Day 4: Inspecting and Servicing Steam Generators

- Preventive Servicing Schedules
- Burner and Combustion Part Inspection
- Tube, Heat-Transfer Surface and Water-Side Cleanliness Checks
- Valves, Pumps, Seals and Mechanical Connections
- Corrosion, Scaling, Leakage and Overheating Signs in Condition Records

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Day 5: Efficiency and Performance Tracking

- Efficiency Indicators and Fuel-to-Output Relationships
- Combustion Efficiency and Excess-Air Control
- Heat-Transfer Losses and Stack Temperature
- Detecting Declining Thermal Performance
- Trend Analysis of Running Data for Improvement

Day 6: Resistance Heating Fundamentals

- Main Parts and Resistance Heating Principles
- Heating Elements and Terminal Connections
- Temperature Control and Power Regulation
- Enclosure and Protection Requirements
- Load, Running Conditions and Reliability Factors

Day 7: Running and Servicing Resistance Heaters

- Startup Procedure and Normal Control Settings
- Monitoring Temperature, Current, Voltage and Power
- Element Inspection for Damage or Deterioration
- Insulation and Grounding Checks
- Preventive Servicing Routine for Heating Units

Day 8: Instrumentation and Protection

- Temperature, Pressure, Flow and Level Measurement
- Control Loops for Thermal Stability
- Alarms, Trips and Protective Interlocks
- Burner Management and Heater Protection Systems
- Calibration, Functional Testing and Faulty Readings

Day 9: Troubleshooting and Emergency Response

- Flame Failure and Unstable Combustion
- High Pressure and Overheating Response
- Element Failure and Abnormal Current
- Structured Troubleshooting Method
- Emergency Shutdown, Safe Isolation and Fuel and High-Temperature Hazards

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Day 10: Reliability Practice and Your Care Plan

- Exercise: Criticality Ranking and Condition-Based Servicing Plan
- Exercise: Recurring Failure Review From Servicing Records
- Exercise: Spare-Parts Plan for Critical Thermal Units
- Exercise: Emergency Shutdown Drill on a Flame Failure Scenario
- Completing Your Thermal Plant Care Plan

Case Studies and Exercises

The following are suggested activities.

- Case study: A gas processing plant's steam generator trips on flame failure during startup; you decide the cause and the corrected sequence.
- Case study: A compressor station's fuel gas heater shows rising current and falling outlet temperature; you decide whether to replace elements now.
- Exercise: A power utility's auxiliary boiler burns more fuel each month; you produce an efficiency analysis and corrective actions.
- Exercise: A petrochemical site needs a servicing plan for several thermal units; you produce a criticality ranking and schedule.

What You Take Back

The Thermal Plant Care Plan is a working document you build across the two weeks for the thermal units at your own site. In your first month back, use it to correct startup checklists, begin efficiency tracking and schedule the first condition-based servicing on the highest-risk item.

- Startup, shutdown and isolation checklists
- An efficiency and condition tracking sheet
- An instrument, alarm and trip test list
- A criticality-based servicing schedule and spares list

Quick Answers FAQ

What should I know before a gas facility boilers and heaters course?

You should already run, inspect or service thermal units in a gas plant or utility and read basic process and wiring diagrams. No design background is required.

How does a two-week boilers and heaters course differ from a one-week course?

The two-week course gives separate days to steam generator inspection, efficiency tracking, resistance heater servicing, instrumentation and emergency drills, with a final day of practice. The one-week course covers the same subjects in less depth.

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Why does stack temperature matter for boiler efficiency?

Stack temperature shows how much heat leaves with the flue gas. A rising value at the same load usually means fouled heat-transfer surfaces or too much excess air, both of which raise fuel use.

What do I take back from a gas facility boilers and heaters course?

You take back the Thermal Plant Care Plan, built for your own units. It holds startup and isolation checklists, a tracking sheet, a trip test list and a servicing schedule with spares.

For Your Manager

After the course, the team member will be able to run thermal units safely, track efficiency, inspect and service steam generators and resistance heaters, check trips and instruments and lead first response to faults. They return with a Thermal Plant Care Plan for the site's units, first used to correct checklists and start condition-based servicing.

training@mercury-training.com
www.mercury-training.com