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www.ProfessorTurbine.com

FRAME 9EA & 9FA GAS TURBINE OPERATIONS AND ALARM RESPONSE

(CT329)

This course is intended to have a positive impact upon gas turbine operator decision-making. The course specifically targets Control Room Operators, wannabe CRO, and Shift Supervisors. Engineers will benefit as well. Normal operations are discussed to include startup, on-line operations, and shutdown. Alarm conditions are discussed with the following items in mind: implications of the alarm occurrence (why/how is the unit at risk), probable causes, and actions to be taken.

There are significant differences between the 9EA and 9FA as well as significant similarities. Each topic will be discussed starting with an overview of the component / system. Where there are significant differences then both the 9EA and 9FA will be discussed.

When this course is taught on-site the emphasis will be on that unit located at that site.

COURSE DATES/LOCATION/FEE

See www.TurbineGeneratorTraining.com for detail on the course dates / locations / and registration fees.

HPC's **3-4-2 policy** applies: Sign up 3 for the same course/date and pay for only 2!

For those participants who "**Training Savings Program**" members, your account balance will be reduced by 60% of the quoted open-enrollment price (yes that is 40% off for paying for volume in advance).

HPC Technical Services reserves the right to cancel any course/seminar within 10-working days of the scheduled date. Fees are 100% refunded or credited to another Seminar (clients' choice) if HPC should cancel any Seminar. HPC is not responsible for non-refundable airline tickets or other travel expenses under any circumstance.

OBJECTIVES

Upon completion of this course, the participant will be able to:

1. Describe the relationship of the various turbine components and how they may be at risk during operations.
2. Describe the different fuel systems used in gas turbine operations.
3. For each of the gas turbine auxiliary systems describe the systems' purpose, function of major components making up the system, normal operations, and abnormal conditions.
    a. Inlet and Exhaust Air
    b. Cooling and Sealing Air
    c. Lube Oil System
    d. Hydraulics
    e. Trip System
    f. Fuel Gas
    g. Liquid Fuel
    h. Fire Protection
    i. Water Wash
    j. Cooling Water
    k. Starting Means
4. Given a gas turbine control system block diagram, sequence the turbine through start-up preparation, a start up, load changes, normal shutdown, and emergency conditions.
5. Demonstrate the ability to navigate the operating screens to sufficiently to trace an alarm drop.
6. Given an alarm, describe how the unit may be at risk.
7. Given an alarm, describe what are the most proper actions to take (short- and long-term).

COURSE OUTLINE

Day One

Review of Gas Turbine Theory
Review of the 9EA & 9FA Gas Turbine Construction & Operating Principles: Air Inlet Guide Vane & Casing, Compressor Stator, Compressor Rotor, Combustion Section, Turbine Stator, Turbine Rotor, Exhaust Section, Bearings

Day Two

Auxiliary Systems (incl. purpose, P&IDs, Device Summary, start-up, normal operation, alarms & alarm response): Inlet and Exhaust Air, Cooling and Sealing Air, Lube Oil System, Hydraulics, Trip System, Fuel Gas

Day Three

Auxiliary Systems cont'd: Liquid Fuel, Starting Means, Fire Protection, Water Wash, Cooling Water
Preparation for Start Up
Start Up Sequencing: Overview, Functional Logic, Alarms and Response

Day Four

Speed Control: Overview, Functional Logic, Alarms and Response
Temperature Control: Overview, Functional Logic, Alarms and Response, Combustion Monitor
NOx: Overview, Functional Logic, Alarms and Response

Day Five

Control Valve Positioning: Servo Mechanisms, Gas Control Valve, Liquid Control Valve, Fuel Splitter, and DLN Splitter; Functional Logic, Alarms and Response
Protective Systems: L4, Overspeed Trip, Emergency Overspeed Trip, Overtemperature Trip, Vibration, 20FG/20FL
Certification Examination for those who are interested.

WHAT YOU WILL RECEIVE

1. 1 copy of HPC Technical Services' textbook, Frame 9EA & 9FA Gas Turbine Operations and Alarm Response, as written by Harold Parker with technical review by Sal Paloucci. It is a valuable desktop reference in addition to being able to enhance the learning process.
2. A Certificate of Completion with 31 PDH.

GAS TURBINE OPERATOR CERTIFICATION

Those who attend this course are automatically qualified to take HPC Technical Services' Certification Examination. This examination is offered at no additional expense to the participant. An 80% passing grade is required. The examination length will not exceed 2-hours. Those who complete this examination will receive a revised "certificate of completion" that recognizes this accomplishment along with two-copies of a "To Whom It May Concern" letter that states their accomplishment. (Two copies are provided, one for the participants' employer and one for the participants' personal file.)

Consult HPC's website, www.TurbineGeneratorTraining.com, for detail on this certification program.

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? Can the course be customized? YES, call or email Stephen Parker, Stephen@TurbineGeneratorTraining.com for a price quotation.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (office). You gain from the customization and price.
- Can HPC Technical Services provide "Technical Assistance" in conducting functional checkouts or troubleshooting problems? Yes we can. Call or contact Stephen Parker, Stephen@TurbineGeneratorTraining.com for our rate sheets and any further information required.

RELATED COURSES OF INTEREST

- (GE) Frame 9 Gas Turbine Generator Maintenance class (CT525)
- Mk-V (-VI or -VIe) for Gas Turbine Operators (CT316, CT324, or CT324e)
- Utility Generator O&M course (G401).
- Gas Turbine Controls, CT516 for Mk-V, CT524 for Mk-VI, and CT524e for Mk-VIe.

INSTRUCTORS

All HPC instructors are educated 'experts' on the subjects they teach, with years of relevant hands-on experience (typically 20+ years), and have proven instructional skills. Brief resumes can be looked up on HPC's website, www.TurbineGeneratorTraining.com.

HPC TECHNICAL SERVICES
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REGISTRATION FORM

Company: _____

Plant: _____

Address:_____

City/State/Zip: _____

Telephone:_____ FAX:_____

Course Number/Title: _____

Course Dates: _____/_____/_____ Thru _____/_____/_____

Course Location: _____ Course Fee:_____

PLEASE ENROLL THE FOLLOWING INDIVIDUAL (s) LISTED BELOW:

Student #1:_____Email: _____

Student #2: _____ Email: _____

☐ **Taking advantage of HPC's 3-4-2 Policy: Send 3, Pay for 2 when paying in advance.**

Student #3: _____ Email: _____

ENROLLED BY: _____Email: _____

Date: _____

METHOD OF PAYMENT

☐ Check to Follow: _____
☐ Check Enclosed #: _____
☐ MC/Visa/AMEX #: _____
Expiration Date: _____ CV Code: _____
Purchase Order #: _____

How did you find out about this course initially?

- o Website search
- o Fax advertisement
- o Magazine advertisement
- o Familiar with HPC
- o HPC mailing
- o Other:_____