500 Tallevast Road • Suite 101
Sarasota, FL 34243 USA
Tel: 941-747-7733 • Fax: 941-746-5374
www.hpcnet.com

Course Information Letter ---- CT513

(GE) MK-I GAS TURBINE CONTROLS

CT513

Learn the operations, maintenance and troubleshooting techniques on this control system in a classroom environment as opposed to 2pm Friday afternoon when the demand is high and the unit won't start. Learn how to use all the OEM drawings that are provided with the machine, how to read the drawings, how to find information, how the various systems interact. Learn how the Mk-I electronic control signals are developed, and how they result in positioning of the fuel control valve(s). Learn how the control system responds to plant / system deviations to control load output. Learn why and how temperature control circuits function to provide protection of gas turbine components. Especially, the participant will learn outage preventive maintenance procedures that should be considered and how to troubleshoot problems.

Topical outline includes: Review of Gas Turbine Theory, Equipment Overview, Auxiliary Systems, Electric Fundamentals as they apply to Mk-I Gas Turbine Controls, Control Elementary Aids, Control Panel Arrangement, Test Equipment, Power Supplies, Control Principles, Control Sequences, Start-Up, Speed Control, Temperature Control, Servo Valve Drive Systems, Protection Systems, Calibration and Troubleshooting.

This course is intended for E/I Technicians, Engineers and Operators.

OBJECTIVES: Upon completion of the course the participant will be better able to maintain and troubleshoot the (GE) Mk-I Gas Turbine Control System, specifically the participant will be able to:

1. Demonstrate the ability to use the GE Mk-I drawings/schematics normally available on the job-site.
2. Describe the print and identification numbering system used throughout the turbine control system.
3. Demonstrate the ability to trace out the electrical signals throughout the control system.
4. Describe the basic theory used with summing devices.
5. Describe the hydraulic servomechanisms.
6. Given a normal change in operating conditions, describe the proper response of the control system and the response of the individual components.
7. Demonstrate adequate knowledge about using the appropriate calibration procedures.
8. Demonstrate adequate knowledge about applying troubleshooting sequences peculiar to this control system.
9. Demonstrate the ability to communicate control problems in a more effective manner.

COURSE DATES/LOCATION/FEE

For current dates / locations / prices, please see HPC's website, www.hpcnet.com.

COURSE OUTLINE

Monday

Gas Turbine Theory: Simple Cycle Gas Turbines, Performance Curves
Equipment Overview: Air Inlet Section, Compressor Section, Combustion Section, Turbine Section, Exhaust Section
Auxiliary Systems, Schematic Piping Diagrams, Device Summary, Lube Oil and Hydraulic Supply, Trip Oil and Control Oil, Cooling and Sealing Air, Cooling Water

Tuesday

Electric Fundamentals as they apply to Mk-I Gas Turbine Controls
Turbine Control Elementary Aids
Control Panel Arrangement
Test Equipment
Power Supplies
Control Principles

Wednesday

Control Sequences Using Elementaries
Start Up Control: System Description, Drawings
Speed Control: System Description, Drawings

Thursday

Temperature Control: System Description, Drawings
Servo Valve Drive Systems: System Description, Drawings
Overspeed / Over Temperature

Friday

Protective Circuits: System Description, Drawings
Calibration Procedures: Control Specifications, Start Up Control, Speed Control, Temperature Control, and Fuel Control Mechanisms
Troubleshooting: Routine Problems, Case Discussions

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? Yes. $195 + S&H.
- 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 Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, (GE) Mk-I Gas Turbine Controls, a $195 value, as written by Harold Parker. It is a valuable desktop reference in addition to being able to enhance the learning process. (This valuable text is available for purchase if you cannot attend – US$195).
2. A "Certificate of Completion" with 2.9 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

GAS TURBINE I&C CERTIFICATION:

There are two levels of certification (Both levels require this course):

1. Engineer
2. I&C Technician

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.hpcnet.com, for detail on this certification program.

INSTRUCTOR (S):

Harold Parker is the founder & President of H Parker & Company, Inc. Mr. Parker has worked in the "Power Generation" industry for 36 years, 14-years with GE as a Field Engineer, Start-Up Engineer, Technical Training Specialist and Manager. In 1983 Mr. Parker resigned from GE and started a training company, Schenectady Learning Systems, in Schenectady NY, which evolved into H Parker & Company, Inc. today. During this post-GE period, Mr. Parker was briefly employed as Manager Turbine-Generator Services with General Physics (2-years) and as a Field Engineer with Mechanical Dynamics & Analysis (2-years). Mr. Parker is the primary contributor to the development of the text used in this course presentation. Mr. Parker holds a BSME ('69 from Lawrence Institute of Technology), a MBA ('81 from the State University of New York @ Albany) and is a member of ASME, IEEE and ASTD.

Bill Lynn. Bill has 35+ years experience, almost all on gas turbine generators and the control systems. Bill "cut his teeth" on the Fuel Regulator Controls and the Mk-I system. Bill continued to develop experience on the Mk-II, -IV, -V, and the –VI systems. Installation, calibration, control checkout, application engineering, troubleshooting, and problem resolution are Bill's expertise. He worked for the GE international department, GE's Detroit District Office, and later the Gas Turbine Department. Bill accepted an early retirement about 4-years ago and has worked as an independent as well as with HPC Technical Services. Bill resides in the Fort Pierce FL area.

RECENT SATISFIED CLIENTS: (Not much of a call for Mk-I training anymore. HPC continues to offer this course on our schedule as a service to the industry, where it is required.)

HPC TECHNICAL SERVICES
500 Tallevast Road, Suite 101, Sarasota, FL 34243
Telephone: 941-747-7733 .... FAX: 941-746-5374
Website: www.hpcnet.com

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: _____

Student #2: _____

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

Student #3: _____

Enrolled by: _____ Date: _____

METHOD OF PAYMENT

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

HOW DID YOU LEARN OF THIS COURSE?

- ☐ Attended HPC courses before
- ☐ Received a fax
- ☐ Received an email
- ☐ Learned from a co-worker
- ☐ Internet search
- ☐ Other: _____