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

Course Information Letter ---- CT307

GAS TURBINE CONTROLS FOR OPERATORS

CT307

The course discusses proper operation of a gas turbine from the perspective of the control room operators. (Auxiliary Operators, Shift Supervisors, and new Engineers can gain from this presentation as well.) To operate a machine safely and for the long-term, we need to have a good understanding of the basic theory, we need to know how different components might be placed at risk, we need to understand how the control system "thinks", we need to know how and when the protective systems should react, and we need to know the importance of proper operation of the auxiliary systems. With respect to the protective systems, we need to understand the symptoms of some of the common problems, what actions the operator should (or should not) take, what actions protective systems should take, and when. This course discusses all of this in a generic fashion (that is not necessary specific to any given machine). A good big-picture is required to become a "skilled operator" and this course takes us down that path.

A **topical outline** includes: Review of Gas Turbine Theory, Review of Gas Turbine Construction & Operating Principles, Auxiliary Systems, Start Up Sequencing, Speed Control, Temperature Control, NOx, Servo Valve Drive Systems, Overspeed / Over Temperature, Protective Circuits, Abnormal Conditions and Response.

COURSE DATES/LOCATION/FEE

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

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, Gas Turbine Controls for Operators, a $129 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$129).
2. A "Certificate of Completion" with 1.3 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

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

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 (cooling & sealing air, lube oil systems, fuel forwarding, control and hydraulic oil) describe the systems' purpose, normal operations, and abnormal conditions.
4. Given a gas turbine control system block diagram, sequence the turbine through a start up, load changes, shutdown, and emergency conditions.
5. Describe emergency condition response for the gas turbine.

COURSE OUTLINE

Day One

Review of Gas Turbine Theory

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

Auxiliary Systems, Schematic Piping Diagrams, Device Summary, Lube Oil and Hydraulic Supply, Trip Oil and Control Oil, Cooling and Sealing Air, Cooling Water

Day Two

Control Principles: Start Up Sequencing, Speed Control, Temperature Control, NOx, Servo Valve Drive Systems, Overspeed / Over Temperature, Protective Circuits

Abnormal Conditions and Response

FREQUENTLY ASKED QUESTIONS

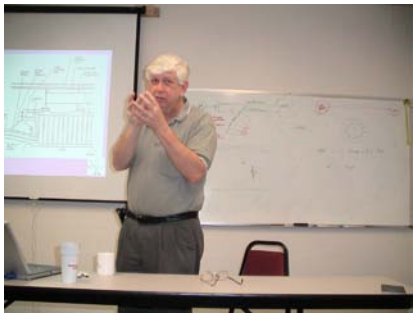
- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? Yes. $129 + 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.

RECENT SATISFIED CLIENTS:

Arizona Public Service, Associated Electric Cooperative, Avista Corporation, Calpine Corporation, Carolina Power & Light, Consolidated Edison, Consumers Energy, East Kentucky Power Cooperative, Entergy Operations, Florida Power & Light, GE Global O&M, Gordonsville Energy, Houston Lighting & Power, Industrial Risk Insurers, Korea Midland Power, MidAmerican Energy, Northern Indiana Public Service, Oklahoma Gas & Electric, Potomac Electric Power, Precision Engine Controls, PSEG, Public Service New Hampshire, Selkirk Cogen Partners, Stewart & Stevenson Operations, Texas Genco, UtiliCorp, West Plains Energy, Western Farmers Electric Cooperative

INSTRUCTOR (S):

DAN ANDERSON. Mr. Anderson is a HPC's Staff Boiler & Mechanical Systems Training Specialist. He started his career in the US Navy as a Boiler Technician in 1971. His Duty Stations included Steam Propulsion Plants of 400-, 600-, and 1200-PSI. His final duty station was at Great Lakes Naval Training Center as an instructor at the 1200-PSI training facility. In 1979, Dan was Honorably discharged from the Navy and started instructing at Propulsion Engineering Basics, at Great Lakes, IL, as a civilian instructor for the Navy. In 1990, Dan moved to Minnesota where he received a Chief A Operating Engineers License and went to work as Chief Boiler Engineer for the Green Giant Company. Then in 1994, Dan took a position as the Maintenance Manager for Minnesota Energy. Minnesota Energy is an ethanol producing plant and Dan was involved from construction thru start-up. In 1996, Dan went to work for Hutchinson Utilities Commission as an Operating Engineer. Dan's primary operations included a GE LM6000 combined cycle unit. Dan is EPA-QFO qualified. He resides in the Bradenton FL area.



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, ASTD and IEEE. He resides in Bradenton FL.

BOB JOHNDROW. Bob Johndrow hired into GE as a field engineer on the same day as HPC's founder, Harold Parker. That was 36-syears ago. Since that date, Bob Johndrow has been a GE Field Engineer specializing in many disciplines including Generator Maintenance and Testing. Bob completed GE's Generator Specialist Training Program early in his career. Since then he has been involved in the commissioning of several combined cycle plants where he was responsible for the turbine controls, auxiliaries, startup sequence and the generator. Bob earned a BS in Industrial Distribution from Clarkson University in Potsdam NY and also has GE Six Sigma Green Belt Certification. Bob accepted an early retirement package late 2003 and has worked as an independent as well as being associated with HPC Technical Services since then. He resides near Hartford CT.

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: _____ 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:_____