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Course Information Letter ---- TG509

(W) 300#/150# STEAM TURBINE CONTROLS TG509

The Westinghouse Mechanical Hydraulic Control System has proven to be a highly reliable and effective means of controlling steam turbine speed and load. It will provide years of trouble free operation if it is properly adjusted and maintained. If not maintained properly, it can be the leading cause of forced outages for the steam turbine. The reliability and availability of the control system can be a matter of skilled routine operations and maintenance activities. Efficient maintenance outages are often the result of thorough job planning and a complete understanding of the necessary skills and procedures. Furthermore, availability is often a function of the plant being able to get the unit "on-line" by resolving obstacles quickly. Increased availability and reliability can be attained through attendance at HPC's W Mechanical Hydraulic Steam Turbine Control Systems course.

Topical Outline includes: 300# Control System Overview, Function of Components, Turbine Valving, Protective Functions and the 150# Components, Valves and Protective Functions

OBJECTIVES: Upon successful completion of this course the participant should be able to:

1. Describe the purpose or function of the entire Hydraulic Control System and the features it must have to safely control turbine operation.
2. Name the major components/sub-systems.
3. Describe the purpose of each major component and /or sub-system.
4. Describe how each major component functions within the control system and/or sub-system.
5. Name and describe the kinds of tools, instructions, drawings, etc. that are required to maintain a particular system.
6. Describe the general methods and techniques for inspecting, testing, adjusting, and troubleshooting the hydraulic control systems.

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, (W) 300#/150# Steam Turbine Controls.
2. A "Certificate of Completion" with 1.3 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

STEAM TURBINE I&C MAINTENANCE 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.

COURSE OUTLINE

- I. **Introduction**
- II. **300# Control System Overview:** Throttle Valves, Throttle Valve Controller, Interceptor Valves, Reheat Stop Valves, Load Limit Valve, Throttle Pressure Regulator, Overspeed Trip Mechanism, Protective Devices, Overspeed Protection Controller
- III. **300# Control System Functions:** Control Block, Oil Impellers, Main Governor Transformer, Load Limit Valve, Governing Emergency Trip Valve, Auxiliary Governor, Dump Valve, Auxiliary governor Settings and Adjustments, Dump Valve Adjustment
- IV. **300# Control System Valves:**
 - a. Steam Chest
 - b. Governing Valve Servomotor: Adjustments, Governing Valve Servomotor Test Valve
 - c. Interceptor Valve: Steam Valve, Servomotor, Solenoid Operated Test Valve, Adjustments
 - d. Multiple Orifice and Check Valve
 - e. Reheat Stop and Trip Pilot Valve
 - f. Throttle Valve: Steam Valve, Servomotor, Adjustments
 - g. Throttle Valve Controller: Adjustment – Clutch, Limit of Shaft Travel, Pressure Switches
- V. **300# Control System Overspeed Trip Mechanism:** Overspeed Trip Mechanism, O/S Trip Mechanism Oil Pressure Check Valve, O/S Trip Valve Automatic Latch
- VI. **300# Control System Protective Functions:** Low Vacuum Trip, Low Bearing Oil Pressure, Thrust Bearing Trip, Solenoid Operated Trip, Throttle Pressure Regulator
- VII. **150# Control Systems:**
 - a. High Pressure Oil System, Control Oil System,
 - b. Turbine Valve Operating Mechanism: Throttle Valve, Reheat Stop Valve, Interceptor Valve, Governing Control Valve Servomotor
 - c. Trip Protection: Auto Stop Valve, Overspeed Trip Mechanism, Hand Trip Lever, Operating or Cylinder, Diaphragm (Sphero) Dump Valves
 - d. Governing (Speed and Load) Control: Speed Control vs. Load Control, Governor Impeller, Main Governor, Auxiliary Governor, Load Limit Valve, Throttle Pressure Regulator, Interceptor Valve Interlocking Relay, Auto Stop and Governing Control Valves, Emergency Trip Device

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? No, this course is too dependent upon print reading.
- 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 perform a functional checkout and calibration of your control system during the upcoming outage OR provide troubleshooting support should it be required? Yes we can. Call or contact Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

INSTRUCTOR/CONSULTANT(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's Westinghouse controls experience began to develop immediately after his resignation from GE. He had the opportunity to work on several systems, then co-taught this course with Mr. Art Richardson, until Mr. Richardson retired (for the 2nd time) in the late 1990s. 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 and ASTD.

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: _____
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?

- Familiar with HPC course offerings
- Received a fax
- Received an email
- Internet search
- Other: _____