



Course Information Letter ---- B411

BOILER MAINTENANCE & TROUBLESHOOTING B411

In this course we will learn the principal Boiler Performance Indicators and how those Performance Indicators can help us identify the causes of performance decline. We will learn ways to accurately measure boiler tube leakage. In addition we will learn how to establish and use a Boiler Tube Failure Analysis Program to maintain the boiler. We will learn about the ASME Pressure Vessel Code and its application to boiler tube repairs.

OBJECTIVES:

At the completion of this course the participant will be able to:

1. Describe circulation in a drum style boiler
2. Describe the basic thermodynamic process that occurs in the steam generator
3. Describe the principal performance indicators of boiler operation
4. Explain how those indicators can identify causes of deviation in boiler performance
5. Describe methods used to identify boiler tube leakage
6. Provide a basic description of basic boiler tube metallurgy
7. Describe the areas involved in a boiler inspection
8. Describe how to develop and use a boiler tube failure analysis program
9. Describe the ASME Pressure Vessel Code
10. Explain the ASME Pressure Vessel Code applicable to boiler tube repairs

COURSE OUTLINE

- I. Heat Transfer: Conduction, Convection, Radiation, Using the Heat Transfer Equation
- II. Steam Generators: Steam Generator Theory, Heat Transfer in the Boiler
- III. Component Design and Construction: Pressure Boundary Parts, Furnace and Waterwall, Superheaters, Reheaters, Economizer
- IV. Basic Metallurgy: Atom Structure of Iron, Physical Metallurgy of Steel, Microscopic Examination, Specific Affects of Alloying Elements, Heat-Treating Practices, Mechanical Working of Steel, Methods of Hot-Working, Mechanical Properties of Steel, High Temperature Properties of Steel, Some Factors Affecting Creep, Steels Used in Boiler Construction
- V. Inspection of the Boiler
- VI. Introduction to Boilers and How to Think out a Boiler Repair Project: How are Boilers Erected and How does the Erection Process Differ from the Repair Process, What are Some of the Common Boiler Repair Problems
- VII. Supplementary Information Concerning Detection, Causes, prevention and Repair of Failures in Fossil-Power Boilers: Hydrogen Damage, Caustic Gouging, Stress-Induced Corrosion, Long Term Overheating, Fireside Corrosion, transition Weld Failures, graphitization
- VIII. Boiler Tube Failure Modes and Possible repairs: Corrosion, Erosion, Superheater and Reheater Tubes, exfoliation of External High Temperature Surfaces, Exfoliation of Internal High Temperature Surfaces

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COURSE DATES/LOCATIONS/FEEES

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

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. A "Certificate of Completion" with 2.9 CEUs, authorized for issue by the International Associate of Continuing Education and Training.

INSTRUCTOR (S):

Hayes, Robert

Mr. Hayes instructs HPC's Balance-of-Plant O&M courses as well as our popular "Power Plant Blackout Preparedness" course. Mr. Hayes, prior to early retirement, held several positions during his long tenure at Illinois Power: (1) Results Engineer, Results Supervisor. Mr. Hayes had responsibilities, which included equipment performance testing, and rotating machinery vibration analysis and correction. (2) Supervisor Plant Operations. Mr. Hayes had responsibilities which included startup and checkout of new equipment, supervision of four operating shifts, and coal receiving and handling group. (3) Power Plant Operations Specialist. Mr. Hayes had responsibilities, which included frequent visits to all five fossil power stations, participation in control replacement projects, participation in development and implementation of clean air compliance plans, and served as an internal consultant for fossil power generation operations. He led several technical teams that identified and recommended protective system improvements to the large generating units. He conducted root cause analysis of several major equipment failures.

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HPC TECHNICAL SERVICES
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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 #: _____