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Course Information Letter ---- TG412

Steam Turbine Repairs

TG412

This two-day course takes the basics covered in TG201, TG301, and TG316 and provides in depth "Hands-On" turbine component repair training. If you are a hands-on person this is an excellent opportunity to gain from the hands-on experience. Hands-on activities is sure to generate questions you may not have considered before, it is sure to generate appreciation for those who commonly perform these repair activities. This course is only scheduled at our new Education/Lab facility in Bradenton, FL due to extensive uses of steam turbine components for practical exercises.

This course has been designed for steam turbine generator foremen, supervisors, engineers, and all other plant personnel who are involved in turbine repair decisions and have not had the opportunity to have been involved in or have actually performed repairs. A thorough understanding of turbine fundamentals and inspections is a prerequisite for this course. This basic knowledge may be obtained by "On-Job" experience or by completion of a turbine overhaul/inspection course.

Topical Outline includes: Diaphragm Area Checks, Diaphragm Drop Checks, Diaphragm Repairs, Steam Path Audit, Bucket/Blade Repair, Shell/Casing Repair, Bearing Repairs, Valve Component Repairs, and Packing/Seal/Fitting Repairs.

OBJECTIVES:

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

1. Describe the tasks involved in and the duration of diaphragm area checks.
2. Describe the tasks involved in and the duration of diaphragm drop checks.
3. Describe the tasks involved in and the duration of minor and major diaphragm repairs.
4. Describe the tasks involved in and the duration of steam path audits.
5. Describe the tasks involved in and the duration of bucket/blade repairs.
6. Describe the tasks involved in and the duration of bearing repairs.
7. Describe the tasks involved in and the duration of valve repairs.
8. Describe the tasks involved in and the duration of packing fitting and repairs.

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' instructor notes.
2. A "Certificate of Completion" with 1.3 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

Note: Immediately preceding this scheduled course, on Monday-Wednesday, is HPC's ***TG316 Steam Turbine Overhauls***.

COURSE OUTLINE

I. **Introduction**
   A. Lab Orientation/Safety
II. **Diaphragm Area Checks**
   1. Taking Data
   2. Calculating Areas
   3. Evaluating Data
   4. Corrections
III. **Diaphragm Drop Checks**
   A. Taking Data
   B. Evaluating Data
   C. Other Techniques
IV. **Diaphragm Repairs**
   A. Inspections
   B. Evaluations
      1. Minor
      2. Major
   C. Repairs
      1. Inco 182/82
      2. 410 Stainless
V. **Steam Path Audits**
   A. Operating Data
   B. Defect Effecting Performance
   C. Taking Data
      1. Seal Leakage
      2. Other Leakage
      3. Erosion
      4. Surface Finish
      5. Deposits
      6. Mechanical Damage
      7. Economic Evaluation
VI. **Bucket/Blade Repair**
   A. Cover/Shroud Band Removal
   B. Tenon Recontour
   C. Tenon Peening
   D. Cover/ Shroud Band Fitting
   E. Cover/Shroud Band Foxhole
   F. Tenon Welding
   G. Bucket Weld Repairs
   H. Erosion Shielding Replacement
   I. Tie Wire Repair
VII. **Casing/Shell Repairs**
   A. Defects
   B. Evaluations
   C. Repairs
VIII. **Bearing Repairs**
   A. Defects
   B. Evaluation
   C. Repairs
IX. **Valve Component Repairs**
   A. Casings
   B. Stems
   C. Disks
   D. Seats
X. **Packing/Seal Fitting/Repair**
   A. Casing/Diaphragm Bore Distortion
   B. Offset Seals
   C. Long Neck Seals
XI. **Course Conclusion / Examination**

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. Recognize the availability to deliver hands-on activity does depend upon your facility.
- 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.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary and it needs to priced on an individual need basis. You gain from the customization and price.
- Is HPC Technical Services' consultants available for "technical advise" during our upcoming outage? Yes. Call Harold Parker, hparker@hpcnet.com for a rate sheet.

STEAM TURBINE MAINTENANCE CERTIFICATION:

There are two levels of certification.

1) Mechanical Maintenance Technician – this course is required
2) Field Engineer – this course may be used for substitution for another course offering.

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):

Ray Militello. Mr. Militello has approximately 40-years experience maintaining steam turbine generator equipment. He has worked as a Field Representative for GE Installation & Service Department as well as a Turbine Repair Specialist for GE Apparatus Repair Division. Additionally, Mr. Militello was employed as a Supervisor - Maintenance and Maintenance Planning with Southern California Edison Company. Ray also worked as Manager, Maintenance Training Services with HPC Technical Services for 4-years before joining the Elliot Company as a service shop manager. For the last four years, Mr. Militello has been performing independent contractor work as a consultant, technical writer, and maintenance training instructor for the utility industry. Ray recently re-joined HPC's staff and is again bringing his excellent hands-on field experience into our classrooms for the benefit of all who attend.

Art Hinch, P.E. Mr. Hinch as worked in the Power Generation industry for 30+ years. During the 1974-1980 period, Mr. Hinch was employed by GE and was responsible for the installation of multiple large steam turbine generators (fossil and nuclear) and for multiple steam and gas turbine generator outages. To 1992 Mr. Hinch worked as an independent consultant in the south and southwestern regions. During this time frame he worked many turbine-generator outages on GE, Westinghouse, and Siemens units. In addition he worked the start up of a 1300-MW turbine generator unit. In 1992 Art signed on with Arkansas Nuclear One as a senior engineer in the turbine group where he worked primarily in the planning and implementing of turbine generator outages (GE and Westinghouse units). In 2003, Art accepted an early retirement package and has again functioned as an independent engineer, an associate of HPC Technical Services. In this capacity Art has worked multiple steam turbine generator outages on a variety of manufacturers as well as being primary instructor on a number of courses that HPC offers.

Douglas Lemmo, PE. Mr. Lemmo has 35 years experience in the power generation industry, 31 of them with GE. Within GE he was initially employed as a field engineer (1971-1976). Here he was responsible for the installation and startup of a number of large and medium steam turbine generators and the feed pump turbines. In addition to this installation work, Mr. Lemmo also performed maintenance service on a variety of nuclear, fossil and marine turbine units. After leaving the field, Mr. Lemmo taught in GE's Field Engineering Development Center. Here his specialty was steam turbine generators, installation, alignment and maintenance. After a couple years instructing, he accepted a position selling maintenance and repair services. In 1982, Mr. Lemmo was the Project Manager for a Waste-to-Energy site. Later projects included a modernization of a hydroelectric facility and the management of the installation of a few combined cycle sites. In 2002, Doug left GE and has been closely aligned with HPC as he has instructed many of our courses and provided site-engineering support on HPC contracts.

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 #: _____

HOW DID YOU HEAR OF THIS COURSE OFFERING

- ☐ Attended HPC courses before
- ☐ Received a fax
- ☐ Received an email
- ☐ Received an update mailing
- ☐ Internet search
- ☐ Other: _____