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General Physics Corporation's Energy Services Group offers integrated power plant monitoring and training to increase overall performance.



Power Plant Performance Knowledge™ Series

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Advanced Performance Analysis and Troubleshooting for Power Plants

January 18 - 22, 2010 • Tampa, FL
June 14 - 18, 2010 • Buffalo/Niagara Falls, NY
September 27 - October 1, 2010 • Denver, CO

Fundamentals of Power Plant Performance for Utility Engineers

June 14 - 18, 2010 • Buffalo/Niagara Falls, NY
September 27 - October 1, 2010 • Denver, CO

Improving Combined Cycle Power Plant Performance

August 24 - 26 • Buffalo/Niagara Falls, NY

Heat Rate Awareness

June 15 - 17, 2010 • Buffalo/Niagara Falls, NY
September 28 - 30, 2010 • Denver, CO



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YOUR POWER PLANT EXPERTS

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Advanced Performance Analysis and Troubleshooting for Power Plants

Course Description

This 4½-day course is designed to teach attendees how to diagnose root causes of fossil and combined cycle power plant performance deficiencies. Over 25 different case studies are presented and solved, beginning with test data on specific components, followed by pertinent performance calculations, and ending with a “root cause” analysis of the problem. Diagnostic flowpaths, using “expert system” techniques, are provided for many of the case studies. The case studies are based on GP’s extensive experience in troubleshooting and testing all types of power plant equipment. Topics are optimally arranged to allow engineers from both plant types to pick and choose the equipment of most interest to them without any loss of continuity. Attendees have the option of attending the first 3½ days on the Rankine cycle plant, the last 3½ days on the combined cycle plant, or the full 4½-day program.

Prerequisites

Basic familiarity with equipment performance test methods and power plant thermodynamics.

Course Content

- Boilers and Air Heaters
- Feedwater Heaters
- HRSGs
- Steam Turbines
- Gas Turbines
- Pumps
- Condensers and Auxiliaries
- Combined Cycle

Course Objectives

At the end of this course, students should be able to:

- Recognize the principles of thermodynamics and heat transfer
- Identify where thermal losses occur
- Determine if problems are due to equipment or operational difficulties
- Act to effectively control heat rate
- Monitor improvements and continually reassess strategies for optimum performance

Who Should Attend

This course is for experienced power plant engineers and managers who are familiar with the ASME Performance Test Codes and knowledgeable in power plant components/systems.

Course Materials

The textbook *Advanced Performance Analysis*, diagnostic flowpaths, steam tables, and performance software are provided. Attendees are requested to bring a laptop computer with Microsoft® Excel™. Each attendee will receive a personal copy of the latest version of GPCALCS™ software.

Fundamentals of Power Plant Performance for Utility Engineers

Course Description

This 4½-day course is designed to teach attendees how to test and monitor coal-fired power plant equipment and improve unit heat rate. The course presents design and operating theories of power plant equipment. It also emphasizes efficiency and testing with full consideration given to the expectations and limits of component equipment. The laws of thermodynamics and the principles of heat transfer are reviewed and applied to equipment operation and efficiency. Actual test data is used to calculate turbine efficiency, condenser cleanliness, turbine cycle heat rate, turbine cycle heat rate corrections, boiler efficiency, and feedwater heater performance. The perspective of performance testing and monitoring is maintained throughout.

Prerequisites

Good working skills in algebra and graphical interpretation.

Course Content

- Overview of ASME Performance Test Codes
- Thermodynamics Review
- Overview of Boilers, Turbines, Feedwater Heaters, Condensers, Pumps, and Cooling Towers
- Test Instrumentation
- Data Evaluation

Course Objectives

At the end of this course, students should be able to:

- Recognize and use standard testing methods
- Determine the performance levels of major plant equipment
- Test performance accurately and interpret results
- Improve the efficiency of plant operations

Who Should Attend

This course is designed for engineers, engineering managers, and plant engineers.

Course Materials

The textbook *Fundamentals of Power Plant Performance* and steam tables are provided. Attendees are advised to bring a scientific calculator to class.

Improving Combined Cycle Power Plant Performance

Course Description

This 2½-day course is focused on improving the availability, reliability, capacity, and efficiency of the combined cycle power plant. It provides operators and engineers with an understanding of plant design for performance and the effect of operating parameters on plant efficiency and capacity. Attendees are taken through practical combined cycle thermodynamic principles. Emphasis is placed on the effect of design and operating conditions on plant performance. Performance of the combustion turbine, heat recovery steam generator, and steam turbine is determined using case studies.

Prerequisites

Basic understanding of power plant thermodynamics.

Course Content

- Thermodynamics Review
- Introduction to Combined Cycle Power Generation
- Gas Turbines
- HRSGs
- Steam Turbines
- Combined Cycle Operation and Maintenance Considerations

Course Objectives

At the end of this course, students should be able to:

- Recognize the principles of thermodynamics relating to the combined cycle
- Describe Brayton cycle and Rankine cycle performance parameters
- Determine the performance levels of major plant equipment
- Determine if performance problems are due to equipment or operational issues
- Act to effectively optimize combined cycle plant performance

Who Should Attend

This course is designed for control room operators, shift supervisors, plant engineers, and plant management personnel.

Course Materials

The textbook *Combined Cycle Power Plant Performance*, steam tables, and a calculator are provided.

Heat Rate Awareness

Course Description

This 2½-day course provides attendees with heat rate concepts, controllable and non-controllable losses, and the effects of component performance on operating costs for a coal-fired power plant. The focus will be on developing a detailed understanding of the heat rate effects of operating practices, unit optimization, and environmental compliance.

Prerequisites

Basic understanding of coal-fired power plant operations.

Course Content

- Power Plant Thermodynamics Review
- Calculating the Cost of Heat Rate Deviations
- Controllable Losses
- Boiler
- Turbine
- Condenser
- Feedwater Heaters
- Ancillary Equipment
- Optimization Tools
- Cycle Isolation
- Instrumentation Effects on Heat Rate
- How Does My Job Relate to Heat Rate

Course Objectives

At the end of this course, students should be able to:

- Discuss the details of heat rate concepts
- Explain controllable and non-controllable losses
- Explain the effects of component performance on operating costs
- Discuss how heat rate affects operating practices, unit optimization, and environmental compliance

Who Should Attend

This course is designed for operators, supervisors, engineers, and managers who are not directly involved in the daily operation of the plant.

Course Materials

The textbook *Heat Rate Awareness*, steam tables, and a calculator are provided.

*This course incorporates material created under the sponsorship of EPRI, the Electric Power Research Institute.

Reserve your space today!

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Registration Form

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25 Northpointe Parkway
Suite 100
Amherst, NY 14228-2213

All of our courses offer a 10% multi-registrant discount to organizations registering three or more persons for the same class at the same time. Call 716.799.1080 or 800.803.6737 for information on multi-course discounts.

- Fee includes textbook, other course materials, continental breakfasts, lunches, and daily beverage breaks.
- Cancellations received more than 15 working days prior to the start of the course are entitled to a full refund.
- Cancellations within 11-14 working days prior to the start of the course are subject to a 20% service charge.
- Those persons who have not canceled ten working days prior to the start of the course and "no shows" are subject to the full fee. Substitutions may be made at any time.

Please register me for:

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Course Fees

Advanced Performance Analysis and Troubleshooting for Power Plants

3½-Day Combined or Rankine Cycle Plants	\$1,750
4½-Day Combined and Rankine Cycle Plants	\$1,950

Fundamentals of Power Plant Performance for Utility Engineers

\$1,500

Improving Combined Cycle Power Plant Performance

\$1,050

Heat Rate Awareness

\$1,050*

*Discounts available to members of EPRI target 71.005 heat rate and cost optimization.

Travel & Lodging

Participants are responsible for making their own travel and hotel arrangements. A block of rooms is set aside in a local hotel for our students. Be sure to mention GP to receive the special rate. Maps and hotel information will be mailed to you with your registration confirmation.

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Cancellations: Applicants may cancel up to 15 working days before the first course day for a full refund. Cancellations received within 11-14 working days prior to the start of the course are subject to a 20% service charge. Those persons who have not canceled ten working days prior to the start of the course and "no shows" are subject to the entire fee. Substitutions may be made at any time.



General Physics Corporation
25 Northpointe Parkway • Suite 100
Amherst, NY 14228

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Instructors

GP instructors have served as plant managers, operation superintendents, performance engineers, and shift supervisors at power plants. Our instructors bring hands-on experience to the classroom. They understand the problems that you may encounter and the environment you work in. To learn more about GP's instructors, visit our website at: <http://fossilfuelcourses.gpworldwide.com/instr.aspx>