COMBINED CYCLE POWER PLANT FUNDAMENTALS

March 17-18, 2020
Western Energy Systems Conference Center
Anaheim, CA

“I highly recommend this course to get a good overview of all major components of a combined cycle power plant.”

Business Development Manager, ABB Inc.

RELATED EVENT:
HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS
March 19, 2020 | Anaheim, CA

EUCI is authorized by IACET to offer 1.1 CEUs for the course
OVERVIEW

Based on new challenges in the fossil fuel industry, combined cycle technology is a leading solution in improving efficiency and reducing emissions. Many organizations have considered or are considering the placement and development of new combined cycle plants. This course will explain how these plants operate and what the advantages are of moving into the combined cycle arena. The basics of the chemistry of heat and energy will be shown in order for participants to understand how plants function. All major components of the plant will be discussed and reviewed, including turbines, generators, and emission-control systems. Complete operation and maintenance of the combined cycle system will be discussed. Participants will complete the course with an understanding of how plants function efficiently, from the introduction of fuel into the plant to the generation and transmission of electricity.

LEARNING OUTCOMES

• The basic concepts of energy conversion, namely conversion of chemical energy to electricity
• The basic concepts of temperature, work, and heat in power plant operation
• The basic components of a combined cycle power plant and how they work together to produce energy
• The basics of fuel combustion and how fuels are prepared and combusted in a combustion turbine
• The basic components of a heat recovery steam generator and how they work together to produce steam energy
• The basic components of a steam turbine and how the turbine transforms steam energy from the heat recovery steam generator into mechanical energy
• The basic components of the electrical generator and how the generator transforms mechanical energy from the turbine into electrical energy
• The basic components of an electrical switchyard and how it works to transmit electrical energy into the electrical transmission and distribution systems outside of the power plant
• Operation and maintenance of a combined cycle plant

WHO SHOULD ATTEND

• New employees who work at or deal with combined cycle power plants
• Generation dispatchers who need a basic understanding of combined cycle power plant operation
• Regulators, communications staff, and others who need a basic understanding of combined cycle power plant operations
• Administrative or management support professionals who need a better understanding of combined cycle power plants to plan and implement projects
• Corporate accountants who desire a better understanding of combined cycle power plant operations and the factors that can affect operating costs
• Sales professionals who must understand combined cycle power plant operations to better serve customers

“Excellent fundamentals course.”
Staff Accountant, Hermiston Generating Co. LP

“Good crash course in combined cycle engineering for non-engineers.”
US Legal Counsel, Capital Power Corp.

REGISTER TODAY! CALL 303-770-8800 OR VISIT WWW.EUCI.COM
AGENDA

TUESDAY, MARCH 17, 2020

8:00 – 8:30 am   Registration and Continental Breakfast

8:30 am – 5:00 pm   Course Timing

12:00 – 1:00 pm   Group Luncheon

Power Plant Primer
- Power plant concepts
- Examples of power plants
- Basic energy concepts
- Heat and energy
- Work and heat in power plants

Chemistry
- First law of thermodynamics
- Input = output at steady state
- Natural gas combustion
- Stoichiometry
- Excess air
- Heating value

Combined Cycle Plant Equipment
- Basic plant equipment
- Combustion turbine
- HRSG
- Steam turbine
- Cycle efficiency
- Equipment arrangement

Gas Turbines
- Types
- How they work
- Applications
- Components
- Flow paths

Heat Recovery Steam Generator
- Description and functions of a heat recovery steam generator (HRSG)
- Types and configurations of HRSGs
- How an HRSG produces steam
- Components of an HRSG
- Design considerations
- Fabrication considerations

“Very knowledgeable. Answered any questions asked and was very detailed on responses.”
Control Room Operator, Public Works Commission

“I found the Combined Cycle Power Plant Fundamentals course informative, interesting, and practical.”
Project Manager - Power, BHPB Iron Ore
AGENDA

TUESDAY, MARCH 17, 2020 (CONTINUED)

Steam Turbines
- Impulse and reaction turbines
- Turbine classifications, designations, and arrangements
- Technology advances
- Overview of steam turbine components
- Steam flow control
- Rotors
- Casings
- Bearings
- Blades
- Seals

Emissions Control
- Gas turbine emission pollutants
- Emissions control technologies and applications
- Dry low NOx burners
- Water injection
- Steam injection
- Frame and aeroderivative engines

WEDNESDAY, MARCH 18, 2020

7:30 – 8:00 am  Continental Breakfast
8:00 am – 12:00 pm  Course Timing

Electrical Systems and Generators
- Example line diagrams
- VAR control
- Electrical equipment
- AC generators
- Switchgear
- Step-up transformers
- Emergency equipment

Balance of Plant Equipment
- Equipment in the cycle diagram
- Pumps
- Cooling systems
- Fuel supply
- Water supply
- Electrical supply
- Fire protection

“Excellent balance between elementary and advanced topics.”
Service Sales Engineer, Elliott

“This course gives you a good basis of what equipment is included in a combined cycle plant and how it works.”
B.D. Manager, Enerfab

“This was the class that I was looking for at my job. It provides a comprehensive overview for professionals like me.”
Environmental Specialist, SMUD

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AGENDA

WEDNESDAY, MARCH 18, 2020 (CONTINUED)

Water Treatment, Instrumentation, and Controls
- Water treatment systems
- Instrumentation
- Main control systems and interlocks

Maintenance
- Gas turbine maintenance
- Steam turbine maintenance
- Generator maintenance

Operations
- Gas turbine operations
- Steam turbine operations
- Generator operations

Review

“Good high level overview of subject matter.”
Sr. Performance Monitoring Analyst, Salt River Project

INSTRUCTOR

Carl R. Bozzuto
Honorary Member, The Council of Industrial Boiler Owners

Carl Bozzuto has over 50 years of experience in combustion and boiler operations and research. He began his career as a research engineer, senior project engineer, manager, and director for Combustion Engineering Inc. Carl was named Vice President of Process Technology for the company, where he was responsible for the development and commercialization of new boiler and power plant technologies, including advanced cycles, ultra-supercritical boilers, alternative working fluids, fluid bed boilers, plant integration, and other plant component technology. Serving recently as Vice President of Technology for the Power Environment Sector at Alstom Power Inc., he was responsible for the development and implementation of new technology for boiler and environmental products on a worldwide basis. Bozzuto holds 18 U.S. patents and membership in the American Institute of Chemical Engineers (AIChE), the Combustion Institute, the Source Evaluation Society, and the American Society of Mechanical Engineers (ASME). He has authored more than 30 published technical papers and was Editor-in-Chief of the textbook Clean Combustion Technologies, published by Alstom Power in 2009. Bozzuto has earned Bachelor of Science and Master of Science degrees in chemical engineering from the Massachusetts Institute of Technology and a Master of Science degree in management from the Hartford Graduate Center (RPI).

“Carl was a very experience teacher with lots of knowledge.”
Combined Cycle Technician, Tri-State G&T
INSTRUCTIONAL METHODS

This program will use PowerPoint Presentations, group discussions as well as active participation.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

EVENT LOCATION

Western Energy Systems Conference Center
499 Nibus Street, Suite A/B
Brea, CA 92821

- 15 minute drive from Anaheim
- 45 minute drive from Los Angeles
- 1 hour drive from Los Angeles International Airport
- 30 minute drive from Ontario International Airport

NEARBY HOTELS

<table>
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<tr>
<th>Hotel Name</th>
<th>Address</th>
<th>Phone</th>
<th>Distance</th>
</tr>
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<tbody>
<tr>
<td>Holiday Inn Express</td>
<td>2932 Nutwood Avenue, Fullerton, CA 92831</td>
<td>714-579-7400</td>
<td>1.7 miles away</td>
</tr>
<tr>
<td>Embassy Suites by Hilton Brea</td>
<td>North Orange County, 900 E Birch St, Brea, CA 92821</td>
<td>714-990-6000</td>
<td>1 mile away</td>
</tr>
<tr>
<td>Days Inn &amp; Suites by Wyndham Fullerton</td>
<td>333 E Imperial Hwy, Fullerton, CA 92835</td>
<td>714-459-5743</td>
<td>2.3 miles away</td>
</tr>
<tr>
<td>Chase Suite Hotel Brea</td>
<td>3100 E Imperial Hwy, Brea, CA 92821</td>
<td>714-579-3200</td>
<td>4.6 miles away</td>
</tr>
<tr>
<td>Travelodge by Wyndham Brea</td>
<td>805 S Brea Blvd, Brea, CA 92821</td>
<td>714-529-3078</td>
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EUCI is authorized by IACET to offer 1.1 CEUs for the course

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this course may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.
Registration Information

Mail Directly To:
EUCI
6400 S Fiddlers Green Cir., Suite 1620
Greenwood Village, CO 80111
OR, scan and email to: conferences@euci.com

WWW.EUCI.COM
p: 303-770-8800
f: 303-741-0849

Western Energy Systems Conference Center
499 Nibus Street, Suite A/B
Brea, CA 92821

See nearby hotels on page 6

Please Select

☐ BOTH COMBINED CYCLE POWER PLANT FUNDAMENTALS AND HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS COURSES: MARCH 17-19, 2020: US $2095
EARLY BIRD on or before FEBRUARY 28, 2020: US $1895

☐ COMBINED CYCLE POWER PLANT FUNDAMENTALS COURSE ONLY: MARCH 17-18, 2020: US $1395
EARLY BIRD on or before FEBRUARY 28, 2020: US $1195

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OR Enclosed is a check for $ to cover registrations.

Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before February 14, 2020 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 303-770-8800. EUCI reserves the right to alter this program without prior notice.