EUCI COURSE

COMBINED CYCLE POWER PLANT FUNDAMENTALS

October 7-8, 2019
EUCI Office Building Conference Center
Denver, CO

> ***"Great overview for someone with 1-2 years already at a plant. Components covered that I don't get to see very often."***
>
> Plant Engineer,
> Puget Sound Energy

RELATED EVENT:

HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS
October 9, 2019 | Denver, CO

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AUTHORIZED IACET PROVIDER

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

> ***"Great overview."***
>
> Survey Statistician,
> U.S. DOE/EIA

> ***"This was a great intro for new people in the industry."***
>
> O&M Tech, Hermiston Generating Company

AGENDA

MONDAY, OCTOBER 7, 2019

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

> ***"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.

> ***"I found the Combined Cycle Power Plant Fundamentals course informative, interesting, and practical."***
>
> Project Manager - Power, BHPB Iron Ore

AGENDA

MONDAY, OCTOBER 7, 2019 (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

> ***"Excellent balance between elementary and advanced topics."***
>
> Service Sales Engineer, Elliott

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

> ***"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

TUESDAY, OCTOBER 8, 2019

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

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

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

AGENDA

TUESDAY, OCTOBER 8, 2019 (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

EUCI Conference Center
4601 DTC Blvd., B-100
Denver, CO 80237

NEARBY HOTELS

Hyatt Regency Denver Tech Center
7800 E. Tufts Ave
Denver, CO 80237
Phone: 303-779-1234
0.3 miles away

Hilton Garden Inn Denver Tech Center
7675 E. Union Ave
Denver, CO 80237
Phone: 303-770-4200
0.6 miles away

Denver Marriott Tech Center
4900 S. Syracuse St
Denver, CO 80237
Phone: 303-779-1100
0.7 miles away

Hyatt Place Denver Tech Center
8300 E. Crescent Parkway
Greenwood Village, CO 80111
Phone: 888-492-8847
0.9 miles away

IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

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.**

To Register Click Here, or

Mail Directly To:
PMA Conference Management
PO Box 2303
Falls Church VA 22042
201 871 0474
Fax 253 663 7224
register@pmaconference.com

EVENT LOCATION

EUCI Conference Center
4601 DTC Blvd., B-100
Denver, CO 80237

See nearby hotels on page 6

PLEASE SELECT

○ **BOTH COMBINED CYCLE POWER PLANT FUNDAMENTALS** AND **HEAT RECOVERY STEAM GENERATOR (HRSG) FUNDAMENTALS COURSES**: OCTOBER 7-9, 2019: US $1995
EARLY BIRD on or before SEPTEMBER 20, 2019: US $1795

○ **COMBINED CYCLE POWER PLANT FUNDAMENTALS COURSE** ONLY: OCTOBER 7-8, 2019: US $1395
EARLY BIRD on or before SEPTEMBER 20, 2019: US $1195

ENERGIZE WEEKLY

Energize Weekly is EUCI's free weekly newsletter, delivered to your inbox every Wednesday. We provide you with the latest industry news as well as in-depth analysis from our own team of experts. Subscribers also receive free downloadable presentations from our past events.

○ **Sign me up for Energize Weekly**

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

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CREDIT CARD INFORMATION

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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 September 6, 2019 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 .
EUCI reserves the right to alter this program without prior notice.