

# NUCLEAR POWER PLANT OPERATIONS

**April 25-26, 2017**

**Offices of Morgan, Lewis & Bockius LLP**

**1111 Pennsylvania Avenue, NW**

**Washington, DC**



EUCI is authorized by  
CPE to offer 12 credits  
for the course



EUCI is authorized by  
IACET to offer 1.0 CEUs  
for the course

# OVERVIEW

---

The nuclear power plant (NPP) operations course provides attendees with a clear understanding of how these powerful plants function and produce electricity. The course describes how plants are built, how a nuclear startup is conducted, and how the plant is taken from cold iron to 100-percent power. Plant staffing and full power operations will be addressed including boration/dilution, fuel rods, and electrical load. Functions of components of the balance-of-plant (outside of the nuclear island) will be described (turbines, generators, and cooling systems). The inherent stability and safety systems of nuclear plants will be covered in detail. Procedures for conducting a refueling outage and discussion of major outage tasks, including refueling, CEA changeouts, component rebuilds, and surveillance testing will be conducted. Participants will complete the course with full comprehension of and appreciation for the functions of the NPP and the production of electricity in the nuclear environment.

Topics include:

- The fission process, plant startups, and how reactors work
- How plants are staffed and what positions are required in a nuclear plant
- Thermal cycle, heat transfer, and the components of a nuclear plant
- How electricity is produced in a nuclear power plant
- The intricacies of plant safety systems
- What is required in managing refuel outages and how nuclear fuel reloads are accomplished

# LEARNING OUTCOMES

---

- Describe how fission is accomplished and the basics of how a nuclear reactor produces energy
- Explain the three loops in a nuclear plant
- Examine the staffing and personnel assignments required in a nuclear plant
- Discuss the thermal cycle and describe heat transfer and fluid flow
- Identify the major components of a nuclear power plant including generators, turbines, and cooling systems
- Discuss normal nuclear power plant operations and compare the variations in startup, steady-state operations, and shutdowns
- Examine nuclear power plant safety systems and the concepts of redundancy and defense-in-depth
- Describe the requirements associated with a refuel outage and nuclear fuel reload

# WHO SHOULD ATTEND

---

- All employees whose jobs require a working knowledge of nuclear power plant operations
- Personnel in the energy industry who are newly assigned to nuclear generation
- Contractors involved with nuclear plant operations, maintenance, and specific projects
- Employees who require a job-related understanding of the operations of nuclear power plants
- Public affairs and public relations personnel who need an understanding of nuclear energy
- Executives and managers who require training in nuclear power plant operations
- Engineers with responsibilities in nuclear power
- Suppliers and vendors involved in the procurement cycle for new and existing nuclear plants
- Attorneys and paralegals whose work is directly or indirectly involved with nuclear energy

# AGENDA

TUESDAY, APRIL 25, 2017

**7:30 – 8:00 am**      **Registration and Continental Breakfast**

**8:00 – 10:00 am**      **Course Introduction**

- Fission process
- Three loops explanation
  - Reactor coolant system (RCS)
  - Secondary plant
  - Heat rejection methods
- Plant staffing
- Technical specifications
  - Why they exist
  - Basic rules of use
- Procedures and their hierarchy

**10:00 – 10:15 am**      **Morning Break**

**10:15 am – 12:00 pm**      **Thermal Cycle**

- Basic heat transfer and fluid flow
  - Psat/Tsat
  - Latent heat
- Major systems within a nuclear plant
  - RCS
  - Steam generators
  - Main turbine
  - Main generator
  - Volume control
  - Cooling systems

**12:00 – 1:00 pm**      **Group Luncheon**

**1:00 – 2:45 pm**      **Normal Plant Operations**

- Plant startup
- Steady-state operations
- Plant shutdown

**2:45 – 3:00 pm**      **Afternoon Break**

**3:00 – 5:00 pm**      **Plant Safety Systems**

- Interrelationships
- Redundancy
- Accident conditions
  - High/low pressure injection
  - Containment spray
  - Recirculation actuations
  - Auxiliary feedwater
  - Emergency diesel generators
  - Ventilations systems

**5:00 pm**      **Day 1 Wrap-Up**



*“Great course with quality of content packed into a short time. Excellent take away reference! Highly recommend! Illustration pictures were great learning enforcement.”*

Technical Advisor, EPRI



*“Class information was easy to follow and understand. The instructor kept the class engaged and interesting.”*

Nuclear Program Manager, Duke Energy

# AGENDA

WEDNESDAY, APRIL 26, 2017

- 8:00 – 8:30 am**      **Continental Breakfast**
- 8:30 – 10:15 am**      **Refueling Outage**
- Cooldown/depressurization
  - Destack
  - Mode 6 and defueled
  - Offload
- 10:15 – 10:30 am**      **Morning Break**
- 10:30 – 11:45 am**      **Reload**
- Restack
  - RCS fill/vent
  - Heat-up
  - Mode changes
  - Major outage work/testing
- 11:45 am – 12:00 pm**      **Course Wrap-Up, Assessment, and Conclusion**



*“This course provided an excellent overview of nuclear power plant design, operation, and safety considerations.”*

President, EJCON Corp.



*“Fantastic – did not speak over our head, was able to relay info in comprehensive examples. My concerns that the class would exceed my comprehension level diminished right away.”*

Chief Estimator, Graycor



*“Very engaging and humorous. Knows his stuff and makes students feel comfortable.”*

Engineer, IRS Appeals Division

## INSTRUCTORS

---

### Burton A. Grabo Nuclear Industry Consultant

Mr. Grabo has more than 30 years of experience in the nuclear power industry and began his career as a lead instructor and senior mechanical trainer in the nuclear Navy. He began working in the commercial nuclear industry as a reactor operator and radiation protection worker with Arkansas Nuclear One. Burt has served in many capacities with the Palo Verde Nuclear Generating Station (PVNGS), including as Lead Senior Instructor and Section Leader for Nuclear Training, Nuclear Regulatory Affairs Section Leader, and Nuclear Assurance Operations Section Leader. He also created the maintenance intern program at PVNGS and served as the special project manager for the Nuclear Fuel Management department. During his career, Burt has held reactor and senior reactor operator licenses (including fuel handling) and has written numerous training curricula and presented lectures in nuclear power plant operations. Mr. Grabo holds a bachelor of arts degree from Ottawa University and completed nuclear engineering training at Memphis and Arizona State Universities.

## 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 1.0 CEUs for the course.**

## CPE CREDITS

---



EUCI is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its website: [www.learningmarket.org](http://www.learningmarket.org).

Upon successful completion of this event, program participants interested in receiving CPE credits will receive a certificate of completion. EUCI is authorized by CPE to offer 12 credits for the course.

There is no prerequisite for this course.

**Program Level:** Beginner

**Delivery Method:** Group-Live

**Advanced Preparation:** None

# REQUIREMENTS FOR SUCCESSFUL COMPLETION OF PROGRAM

---

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

## INSTRUCTIONAL METHODS

---

PowerPoint presentations and classroom discussions will be used in this course.

## PROCEEDINGS

---

The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.

## EVENT LOCATION

---

### **Offices of Morgan, Lewis & Bockius LLP**

1111 Pennsylvania Avenue, NW  
Washington, DC 20004  
202-739-3000

## NEARBY HOTELS

---

### **JW Marriott Hotel Pennsylvania Avenue**

1331 Pennsylvania Ave. NW,  
Washington, D.C.  
202-393-2000

### **InterContinental The Willard Washington DC Hotel**

1401 Pennsylvania Ave. NW,  
Washington, D.C.  
877-270-1390

### **W Hotel Washington DC**

515 15th St. NW,  
Washington, D.C.  
202-661-2400

### **Washington Marriott at Metro Center**

775 12th St. NW,  
Washington, D.C.  
202-737-2200

### **Grand Hyatt Washington**

1000 H St. NW,  
Washington, D.C.  
202-582-1234



Please make checks payable to: "PMA"

## EVENT LOCATION

**Offices of Morgan, Lewis & Bockius LLP**  
 1111 Pennsylvania Avenue, NW  
 Washington, DC 20004  
 202-739-3000

**View nearby hotels on page 6.**

## PLEASE REGISTER

**BOTH NUCLEAR POWER PLANT OPERATIONS AND NUCLEAR POWER REGULATION BASICS (NRC 101) COURSES**

APRIL 25-27, 2017: US \$2195,  
 Early bird on or before April 7, 2017: US \$1995

**NUCLEAR POWER PLANT OPERATIONS COURSE ONLY**

APRIL 25-26, 2017: US \$1395,  
 Early bird on or before April 7, 2017: US \$1195

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

Print Name

Job Title

Company

What name do you prefer on your name badge?

Address

City

State/Province

Zip/Postal Code

Country

Phone

Email

List any dietary or accessibility needs here

### CREDIT CARD INFORMATION

Name on Card

Account Number

Billing Address

Billing City

Billing State

Billing Zip Code/Postal Code

Exp. Date

Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

**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 March 24, 2017 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 (201) 871-0474.