



## Course Information Letter ---- OP433

### ABC'S OF THE ELECTRICAL GRID OP433

This course offers an insight to how electricity is safely and reliably transmitted from the power plant to your neighborhood. This course offers a meaningful introduction to power transmission, operational issues, safety considerations and reliability concerns. Lawyers, consultants, public officials, media representatives, and any interested party will benefit from a well rounded overview of these industry basics. Those that work in or around the power generation industry, but away from the transmission & distribution side, will gain a needed understanding of the technology.

From the power plant we entertain the identification and purpose of the step-up transformer, transmission lines, step-down transformers, and local distribution. In addition we discuss reliability issues. Why are there black-outs, what are their causes, what kind of protection is there, how well does it work, and what is new on the horizon.

#### WHO SHOULD ATTEND:

- Employees new to the electric power industry or with limited industry experience.
- Regulators, commission staff (state and federal), attorneys, ISOs/RTOs, industry vendors and others that need a basic understanding of the "grid".
- Federal, state and local government officials who need to understand the 'hows' and 'whys' of power transmission.
- Local and national media personnel who need who manage communications on power transmission.
- Plant administrative and support personnel looking to augment their understanding of their industry.
- School teachers and staff (of all levels), so they can better explain these fundamentals to their students.

#### OBJECTIVES: Upon completion of this course the participant will be able to:

1. Describe how the electrical grid is divided across North America.
2. Describe why transmission lines are at such high voltages.
3. Describe the different types of power that is transmitted and why it is necessary.
4. List the major components that make up the electrical grid.
5. Describe the function of those major components correctly listed above.
6. List the types of faults that typically occur on a transmission line.
7. Describe what protective actions are taken during these fault conditions.
8. Describe considerations for future needs, including the meeting of regulatory requirements.

#### COURSE DATES/LOCATION/FEE

For current dates / locations / prices, please see HPC's website, [www.hpcnet.com](http://www.hpcnet.com).

#### COURSE OUTLINE

##### Day One

Introduction  
Purpose of Electric Grid  
Types of Electrical Power

##### Day Two

Overall Design Considerations  
Safety Issues  
System Risk and Reliability

# ABC's of the Electrical Grid – OP433

www.hpcnet.com

## Major Components

- Circuit Breakers
- Step Up Transformers
- Transmission Line
- Switchyard
- Distribution

## Competitive Market

Challenges for the Immediate Future

## 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](mailto:stparker@hpcnet.com) for a price quotation.
- 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, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (office). You gain from the customization and price.

## WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' instructor notes.
2. A "Certificate of Completion" with 1.0 CEU, authorized for issue by the International Associate of Continuing Education/Training.

## INSTRUCTOR (S):

**Robert Hayes** Mr. Hayes instructs HPC's Balance-of-Plant O&M courses as well as our popular "Power Plant Blackout Preparedness" course. Mr. Hayes, prior to early retirement, held several positions during his long tenure at Illinois Power: (1) Results Engineer, Results Supervisor. Mr. Hayes had responsibilities, which included equipment performance testing, and rotating machinery vibration analysis and correction. (2) Supervisor Plant Operations. Mr. Hayes had responsibilities which included startup and checkout of new equipment, supervision of four operating shifts, and coal receiving and handling group. (3) Power Plant Operations Specialist. Mr. Hayes had responsibilities, which included frequent visits to all five fossil power stations, participation in control replacement projects, participation in development and implementation of clean air compliance plans, and served as an internal consultant for fossil power generation operations. He led several technical teams that identified and recommended protective system improvements to the large generating units. He conducted root cause analysis of several major equipment failures.

**Leonard Fox** Mr. Fox has approximately 20 years experience working in the electrical field. In his earlier career he worked for several manufacturers of power transformers where he was involved in the installation, checkout and troubleshooting of said transformers. Later in his career he became involved in the inspection of property to ensure safety and code requirements have been met. Over the past few years, Mr. Fox has started to teach some of HPC's electrical maintenance courses.

**Tom Reichle** Mr. Reichle has a total of more than 30 years training and electrical experience. Nineteen (19) years developing and conducting courses, writing texts and outlines for AVO International Training Services. Another twelve (12) years in the US Army Nuclear, gas turbine and diesel power plants operation and maintenance including electrical, mechanical and I&C. Mr. Reichle, using his 30 years of experience, has provided customized services to clients in order to meet their individual needs. He provides training, guidance and technical expertise in the areas of circuit breakers, transformers, sub-station equipment and cable maintenance.

**HPC TECHNICAL SERVICES**  
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Website: [www.hpcnet.com](http://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 LEARN OF THIS COURSE**

- Attended other HPC courses.
- Internet Search
- Received a fax.
- Received an email.
- Other: \_\_\_\_\_