

# HYDROGENERATOR MAINTENANCE COURSE

*Portland, Oregon*



## AGENDA

*April 13-15, 2010*

*April 13, 2010*

### **Introduction and Stator Windings**

8:30am to 4:30pm

- Introduction
- Component overview
- Stator frames and cores
- Stator winding design and installation

*April 14, 2010*

### **Stator Windings and Core**

8:30am to 4:30pm

- Stator winding/core failure mechanisms, monitoring and testing
- Stator winding/core repair

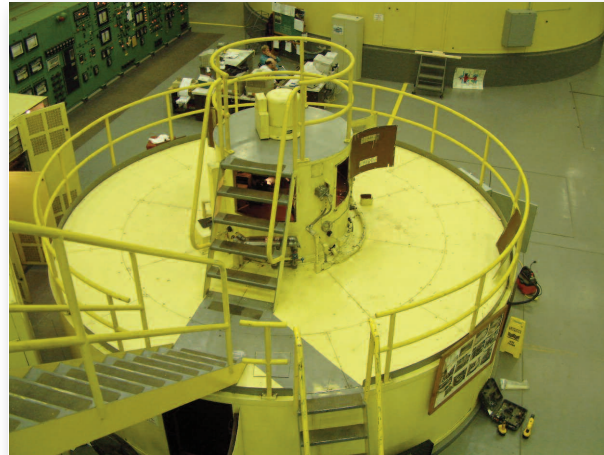
*April 15, 2010*

### **Stators and Rotors**

8:30am to 4:30pm

- Rotor design; rims, spiders, windings, brackets, bearing and cooling
- Rotor failure mechanisms, monitoring and testing
- General question period

*Please refer to the registration form on page 2*



Stator winding problems have been identified in over 40% of all hydraulic generators having modern thermoset windings. This coupled with less frequent but equally expensive rotor winding failures means that almost 50% of hydrogenerator failures are caused by deterioration of the rotor and stator windings. Preventing these failures involves a thorough understanding and appreciation of the design, function and interaction of all major component parts that make up a typical machine. Proper training and education on winding function, specification, testing, monitoring, maintenance and preparing effective repair specifications is the first step in prevention.

### **SEMINAR OBJECTIVES**

The course focuses on hydro-electric generators. Although much of the discussion relates to synchronous machines rated greater than 10MVA and 6.9kV the principles apply equally to generators of all sizes down to 4kV. Discussion will concentrate on stators (frames, windings and laminated cores), rotors (windings, rims and spiders), as well as brackets, bearings and cooling.

The course is presented from an end user perspective, rather than that of a machine designer.

### **WHO SHOULD ATTEND?**

This course is directed at engineering and maintenance personnel responsible for the purchase, installation, maintenance, testing and repair of hydrogenerators.



**Iris Power LP**

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# REGISTRATION FORM

To register for the seminar please fax this completed form with credit card information to 905-677-8498 or mail with a check payable to Iris Power LP, 3110 American Drive, Mississauga, Ontario, L4V 1T2. Please write "Iris Hydro Course" on the cheque to ensure that it is received by the appropriate department and include a completed registration form with payment.

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City and Province/State: \_\_\_\_\_

Postal/Zip Code: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

*please print email address clearly*

Payment made via: (check one box)

US Check    Canadian Check    P.O. # \_\_\_\_\_

Visa    Mastercard (non-Canadian accounts only)

Card #: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Card Holder Name: \_\_\_\_\_

Signature: \_\_\_\_\_

*We do not accept, AMEX, Discover or Diners Club cards at this time.*

## REGISTRATION

**Only 35 seats available, so register now.**

*Registration ends March 15, 2010.*

Registration includes breakfast, lunch and breaks daily. A complete set of notes is also included. **PRICE DOES NOT INCLUDE HOTEL ACCOMMODATIONS.** Confirmation will be issued upon receipt of payment.

### COST

\$1395.00 CDN

\$1395.00 USD

### LOCATION/VENUE

Portland, Oregon

### HOTEL RESERVATIONS

River Place Hotel:  
The Larkspur Collection  
1510 SW Harbor Way  
Portland, OR 97201  
800-227-1333

### CANCELLATION POLICY

Cancellation received prior to April 1, 2010 will result in a \$50.00 US/ \$75.00 CDN processing fee. Withdrawal received up to one week prior to the seminar will be subjected to a charge of \$150.00 US./ \$150.00 CDN. There will be no refunds a week prior to the seminar. Delegations substitution is permitted.

## COURSE INSTRUCTORS

**E**arl Goodeve has over 28 years of experience in the maintenance and testing of generator windings. Prior to joining Iris in 1993, Earl worked 25 years for Ontario Hydro the last 14 of which in the Hydraulic Stations Department, a central group responsible for the testing and maintenance of Ontario Hydro's 250 hydro units. He prepared stator and rotor rewind specifications, developed rehabilitation plans, and supervised the work. He was also responsible for retrofitting the PDA partial discharge analysis system to 160 hydrogenerators in a 3-year period, and providing test result interpretation services. Mr. Goodeve has supervised the installation of sensors on rotating machines in utilities and industrial plants throughout the world. He has co-authored over 10 technical papers, and served as Vice-Chair of the Rotating Machines Subsection of the Canadian Electrical Association. He is also a member of the IEEE working group developing technical standards for machine condition monitoring.

**V**icki Warren, Senior Field Services Engineer, Iris Power Engineering Inc. Ms. Warren is an Electrical Engineer with extensive experience in testing and maintenance of generator windings. Prior to joining Iris in 1996, she worked for the U.S. Army Corps of Engineers for 13 years. While with the Corps she was responsible for the testing and maintenance of hydrogenerator windings, switchgear, transformers, protection and control devices, development of SCADA software, and the installation of local area networks. At Iris, Ms. Warren has been involved in using partial discharge testing to evaluate the condition of insulation systems used in medium to high voltage rotating machines, switchgear and transformers. Additionally, Ms. Warren has worked extensively in the development and design of new products used for condition monitoring of insulation systems, both periodical and continual. Ms. Warren also actively participated in the development of multiple IEEE standards and guides, and was Chair of the IEEE 43 Working Group.