



**HEU**  
Harbin Engineering University



**IAEA**  
International Atomic Energy Agency

# Course on Natural Circulation Phenomena and Passive Safety Systems in Advanced Water Cooled Reactors

**11 – 15 July 2011**

**(Harbin Engineering University – Harbin, P.R.China)**

The College of Nuclear Science and Technology (CNST) of Harbin Engineering University (HEU), Harbin, China, in co-operation with the International Atomic Energy Agency (IAEA), Vienna, Austria, is organizing a Course on Natural Circulation Phenomena and Passive Safety Systems in Advanced Water Cooled Reactors, to be held at Harbin, P.R.China, from **11 to 15 July 2011**.

Passive safety systems based on natural circulation are key to the heat removal from core or containment in many evolutionary and innovative water-cooled reactor designs. Some designs also utilize natural circulation to remove core heat during normal operation.

The objectives of the Course are to provide participants with instruction on:

- ◆ natural circulation during reactor start-up and operation, methods of analyses and governing equations, passive system initiation and operation, flow stability, scaling laws for experiments;
- ◆ phenomena that influence natural circulation (e.g. behaviour in large pools of liquid, effects of non-condensable gasses on condensation heat transfer; condensation on containment structures, behaviour of containment emergency systems, thermo-fluid dynamics and pressure drops in various configurations, steam-liquid interaction, gravity driven cooling, liquid temperature stratification, behaviour of emergency heat exchangers and isolation condensers, stratification and mixing of boron);
- ◆ experimental databases for these phenomena;
- ◆ methodology for determining the reliability of passive systems that utilize natural circulation.

#### **Participation:**

- ◆ Scientists, engineers and post-graduate students from all countries which are members of the IAEA may attend the Course subject to approval by the Course Director.
- ◆ A basic knowledge in thermo-hydraulics, fluid mechanics and heat transfer is required.
- ◆ A science or engineering degree (e.g. in physics, mechanical, chemical or nuclear engineering) or equivalent qualification is necessary.
- ◆ Logistics limit the number of participants to 30.
- ◆ The Course will be conducted in English, participants should have an adequate working knowledge of English.
- ◆ Travel and subsistence expenses of the participants should be borne by the home institution.
- ◆ Course registration fee is 200 US\$.

#### **Request for Participation:**

- ◆ The application form can be accessed at the activity website <http://gongxue.cn/hexueyuan/ShowArticle.asp?ArticleID=80284>.
- ◆ Closing date for receipt of the applications is 31 March 2011.

#### **Activity Secretariat:**

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#### **INSTRUCTORS:**

- Prof. J. Reyes,  
(Oregon State University, USA)
- Prof. F. D'Auria,  
(University of Pisa, Italy)
- Dr. N. Aksan,  
(Formerly PSI, Switzerland)
- Prof. Y.A. Hassan,  
(Texas A&M University, USA)
- Dr. D. Saha,  
(BARC, India)
- Dr. J.C. Ferreri,  
(NRA, Argentina)

**DEADLINE FOR  
REQUESTING PARTICIPATION:  
31 March 2011**

