



The Abdus Salam
International Centre for Theoretical Physics



Course on
Natural Circulation Phenomena and Modelling
in Water-Cooled Nuclear Reactors

25 - 29 June 2007

Miramare -Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste), in cooperation with the International Atomic Energy Agency (IAEA, Vienna) is organizing a **Course on Natural Circulation Phenomena and Modelling in Water-Cooled Nuclear Reactors** to be held from 25 to 29 June 2007 in Trieste, Italy.

Nuclear power has proven its viability in many IAEA Member States. Water cooled nuclear power plants [light water reactors and heavy water reactors] represent 94% of the global nuclear power capacity, and advanced designs are being developed in several IAEA Member States to help meet future energy needs. Common goals for advanced designs are high reliability and competitive economics while meeting stringent safety requirements.

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

The objective of the Course is 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

Scientists and post-graduate students from all countries which are members of the United Nations, UNESCO or IAEA may attend the Course, provided they hold a science or engineering degree (e.g. in physics, mechanical, chemical or nuclear engineering) or equivalent qualification. A basic knowledge in thermo-hydraulics, fluid mechanics and heat transfer is required. The Training Course is intended for graduate engineers working in the nuclear field and post-graduate students wishing to become more informed and involved in natural circulation and its application in nuclear power plants. Logistics limit the number of participants to 25. Since ICTP activities are conducted in English, participants should have an adequate working knowledge of this language.

The main purpose of the Centre is to help researchers from developing countries through a programme of training activities within a framework of international cooperation; however, scientists from developed countries are also welcome to attend.

As a rule, travel and subsistence expenses of participants should be borne by their home institution. However, limited funds are available for some participants who are nationals of, and working in, a developing country, to be selected by the Organizers. Any support is available only for those attending the entire activity. There is no registration fee. The designation of a participant will be accepted only if forwarded by the official authority of an IAEA Member State. The application for financial support should be made at the time of designation of the participant.

The **Application Form** (available at: http://cfsagenda5.ictp.it/full_display.php?ida=a06203) should be filled in and sent to the competent official authority (Ministry of Foreign Affairs or National Atomic Energy Authority) for subsequent transmission to the IAEA's Secretariat, P.O. Box 100, Vienna International Centre, A-1400 Vienna, Austria, fax: +43-1-26007).

Closing date for receipt of the applications is **30 March 2007**.

Course on Natural Circulation Phenomena and Modelling in Water-Cooled Nuclear Reactor:

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In cooperation with

**International Atomic Energy Agency
(IAEA)**

DIRECTORS

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LOCAL ORGANIZER

Claudio TUNIZ (ICTP, Trieste)

DEADLINE

for requesting participation

30 March 2007