ICTP – The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

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WORKSHOP ON
ADVANCED NUCLEAR POWER PLANT SIMULATION
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29 October – 9 November 2001

(Miramare – Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics (ICTP, Trieste), in co-operation with the International Atomic Energy Agency (IAEA, Vienna), is organizing a Workshop on "Advanced Nuclear Power Plant Simulation" to be held from 29 October – 9 November 2001. The Workshop will be conducted by
Professor George BEREZNAI (Chulalongkorn University, Bangkok, Thailand) Dr. Wilson K. LAM (CTI Simulation International Corporation, USA/Canada) Dr. Serguei VIGOVSKY (Moscow Institute for Physics Engineering, Moscow, Russia) and Mr. Robert B. LYON (IAEA, Vienna, Austria).

In the second half of the 20th century, nuclear power evolved from the research and development environment to an industry that supplies 16% of the world's electricity. Global environmental change and the continuing increase in global energy supply required to provide increasing populations with an improving standard of living, make the contribution from nuclear energy even more important for the next century. For nuclear power to achieve its full potential and make its needed contribution, it must be safe, economical, reliable and sustainable. To achieve this, a wide spectrum of scientific and engineering personnel is required, with a broad understanding of the technology, as well as in-depth understanding of their respective specialities.

To contribute to the training of scientific and engineering personnel, the IAEA sponsors the development of educational simulators that operate on personal computers and which simulate responses of a number of water-cooled reactor types to operating and accident conditions. The simulators are designed to provide insight and understanding of the general design and operational characteristics of various power reactor systems. The purpose is to provide university professors and engineers involved in teaching topics in nuclear energy with tools to demonstrate reactor operational response characteristics. The tools are also supplied directly to students, junior engineers, and senior engineers and scientists interested in broadening their understanding of the topic. (Note that the simulators are not intended for plant-specific purposes such as design, safety analysis, licensing or operator training, and they are not designed to link with control system components).

This Workshop will include a combination of lectures and computer exercises on the use of a number of simulation packages: the CANDU Reactor Simulator, the Advanced Reactor Simulators, the VVER-1000 Reactor Simulator and the Classroom Advanced Reactor Demonstrators. Heavy water reactors, pressurized light water reactors and boiling light water reactors are included in these packages. By using the simulation software, in combination with the training material, participants will investigate and develop an understanding of the operational response characteristics of various reactor types. In addition to the use of the simulators, a model

development system that assembles integrated codes from a selection of
pre-programmed and tested sub-components will be used to provide
participants with illustration and practice in the development of such
reactor simulation codes. This will provide insight and understanding in
the construction and assumptions of the codes that model the design and
operational characteristics of the various power reactor systems.

LECTURES AND EXERCISES INCLUDE:

-        Introduction to mathematical modelling and physical laws;
-        Overview of dynamic simulation for power plant processes;
-        Numerical methods and other important model considerations;
-        Overview of simulation methodology and simple modelling exercises;
-        Basic nuclear plant system descriptions;
-        Principles of operation of the reactor systems, including
demonstration
         of the behaviour of the reactors in transient conditions and accident
         situations.

The Workshop is open to participants from all countries that are members of
the United Nations, UNESCO or IAEA. The main purpose of the ICTP is to
help research workers from developing countries through a programme of
training activities within a framework of international co-operation.
However, students and post-doctoral scientists from developed countries are
also welcome to attend. The participants must have completed several years
of study after a first university degree and must have an adequate
knowledge of English, the official language of the Workshop. Participants
should have a basic understanding of nuclear power plants, an interest in
modelling and computer simulation and some experience with computer
programming in solving sets of differential equations. A science of
engineering degree (e.g. in physics, mechanical, chemical or nuclear
engineering) or equivalent qualification is necessary. The Workshop will
be of particular interest to individuals involved in the training process.
Logistics limit the number of participants to 40.

As a rule, travel and subsistence expenses of the participants are borne by
the home institutions. However, limited funds are available for
participants from developing countries to be selected by the Organizers.
Such financial support is available only to those attending the entire
Workshop. Every effort should be made by candidates to secure support for
their fare (or at least partial fare) from their home country. There is no
registration fee for attending the Workshop. The closing date for
requesting participation is 30 JUNE 2001. The completed request for
participation form, to be found at the back of the Bulletin (also
obtainable via e-mail: smr1333@ictp.trieste.it, by typing on the subject
line: get bulletin, or via WWW server: http://www.ictp.trieste.it/),
should be sent to:

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