Petten - Amsterdam, The Netherlands

June 28 – July 2, 2010

2010 RELAP5 USER

SEMINAR AND HANDS-ON TRAINING

To be held at

European Commission, Joint Research Center, Institute for Energy (EC-JRC-IE)

Petten. The Netherlands

http://www.grnspg.ing.unipi.it/3dsuncop/relap5

PROGRAMME OUTLINE

Objective of the Seminar/Training

The seminar-training is directed toward beginner and intermediate RELAP5 users with some thermal-hydraulic system code experience.

The seminar is subdivided into three parts. The first part provides with the features and limitations of Best-Estimate System Thermal-Hydraulic Codes and with the procedures for developing nodalizations. The second is devoted to the models and Input Structure of the RELAP5 Code. The third part consists of code hands-on training and it will focus on simple component modelling (for beginner users) and plant modelling (for intermediate users)

Organization

The Nuclear Research Group of San Piero a Grado (GRNSPG) of University of Pisa (UNIPI) and the Institute for Energy (IE) of Joint Research Center (JRC) of European Commission (EC) are **jointly** organizing a Seminar-Training directed toward beginner and intermediate users of RELAP5 Code.

The seminar-training will take place in **Petten,** close to Amsterdam (**The Netherlands**) from **June 28th** to **July 2nd, 2010** at the Institute for Energy (IE) of EC JRC. It will be held in the modern classrooms which are equipped with data projectors and networked PCs suitable for running advanced best estimate thermal-hydraulic codes (e.g. RELAP5).

The seminar is open to universities, vendors, national laboratories and regulatory bodies. A minimum of fifteen participants is required to organize the seminar. A maximum of 40 persons will be accepted.

Further information about participation and registration as well as useful practical information can be obtained from Alessandro Petruzzi at the following email address: a.petruzzi@ing.unipi.it. Special accommodation will be offered on a separate sheet. An internet website with the latest news will be available (after February 1st) at: **http://www.grnspg.ing.unipi.it/3dsuncop/relap5**

Expected Products

The Seminar will provide a transfer of experience and know-how from recognized experts in the respective fields. It will thus contribute to maintaining and increasing technical competence and to ensuring the sustainable development of nuclear technology. CDs containing all lectures will be distributed to the participants.

Lecturers and Code Instructors

W. Ambrosini	UNIPI, Italy
L. Ammirabile	JRC-IE, EC
A. Bucalossi	JRC-IE, EC
A. Kovtonyuk	GRNSPG, Italy
P. Pla	JRC-IE, EC
A. Petruzzi	GRNSPG, Italy

Organizing Committee

U. Von Estorff	JRC-IE, EC
B. Hirte	JRC-IE, EC
M. Kovtonyuk	GRNSPG, Italy

PROGRAMME OUTLINE

DAY 1 - Monday, 28 June 2010

Welcome and Objectives of the Seminar

9:00-9:15 **Registration**

9:15-9:30 **Welcome**
V. Ranguelova (JRC-IE), A. Petruzzi (GRNSPG)

9:30-10:00 **Lecture 0A:** Introduction to Seminar and Hands-on Training
A. Petruzzi (GRNSPG, Italy)

Session A **Best Estimate System Thermal-Hydraulic Codes: Features, Limitations and Procedures (1/3)**

10:00-11:00 **Lecture 1A:** Role and Features of System Codes in Nuclear Reactor Safety
A. Petruzzi (GRNSPG, Italy), A. Bucalossi (JRC-IE, EC)

11:00-11:30 **COFFEE BREAK**

11:30-12:30 **Lecture 2A:** Procedure for Developing Nodalizations (including Scaling Issues and User Effect) – *A. Petruzzi (GRNSPG, Italy)*

12:30-13:30 **LUNCH**

Session B **RELAP5 Code: Model and Input Structure (1/4)**

13:30-14:30 **Lecture 1B:** Physical Models in RELAP5 Code: The Hydrodynamic Model
W. Ambrosini (UNIPI, Italy)

14:30-15:30 **Lecture 2B:** RELAP5 Input Organization
A. Petruzzi (GRNSPG, Italy)

15:30-16:00 **COFFEE BREAK**

Session C **RELAP5 Hands-on Training (1/5)**
Instructors:
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE), P. Pla (JRC-IE), A. Bucalossi (JRC-IE)

16:00-16:30 **Exercise-1:** Input Preparation and Running Sample Problems

16:30-17:00 **Exercise-2:** Plotting Variables, Reading Output Files

PROGRAMME OUTLINE

DAY 2 - Tuesday, 29 June 2010

Session A — **Best Estimate System Thermal-Hydraulic Codes: Features, Limitations and Procedures (2/3)**

09:00-10:00 **Lecture 3A:** Procedure for Nodalization Qualification (at Steady State and On Transient Level) - *A. Petruzzi (GRNSPG, Italy)*

Session B — **RELAP5 Code: Model and Input Structure (2/4)**

10:00-11:00 **Lecture 3B:** Physical Models in RELAP5 Code: Closure Relationships and Other Models - *W. Ambrosini (UNIPI, Italy)*

11:00-11:30 **COFFEE BREAK**

11:30-12:30 **Lecture 4B:** General Structure of RELAP5 Input: Hydrodynamic Components
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE, EC)

12:30-13:30 **LUNCH**

Session C — **RELAP5 Hands-on Training (2/5)**
Instructors:
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE), P. Pla (JRC-IE), A. Bucalossi (JRC-IE)

13:30-15:30 **Exercise-3:** Valve Sizing

15:30-16:00 **COFFEE BREAK**

16:00-17:00 **Exercise-4:** Blowdown Problem: Input preparation

PROGRAMME OUTLINE

DAY 3 - Wednesday, 30 June 2010

Session A — **Best Estimate System Thermal-Hydraulic Codes: Features, Limitations and Procedures (3/3)**

09:00-10:00 **Lecture 4A:** Quantification of Accuracy of a Code Calculation
A. Petruzzi (GRNSPG, Italy)

Session B — **RELAP5 Code: Model and Input Structure (3/4)**

10:00-11:00 **Lecture 5B:** General Structure of RELAP5 Input: Heat Structures
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE, EC)

11:00-11:30 **COFFEE BREAK**

Session C — **RELAP5 Hands-on Training (3/5)**
Instructors:
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE), P. Pla (JRC-IE), A. Bucalossi (JRC-IE)

11:30-12:30 **Exercise-4:** Blowdown Problem: Input preparation (Cont'd)

12:30-13:30 **LUNCH**

13:30-14:30 **Exercise-4:** Blowdown Problem: Solution

14:30-15:30 **Exercise-5:** Steam Generator Modelling

15:30-16:00 **COFFEE BREAK**

16:00-17:00 **Exercise-5:** Steam Generator Modelling (Cont'd)

PROGRAMME OUTLINE

DAY 4 - Thursday, 1 July 2010

Session B — **RELAP5 Code: Model and Input Structure (4/4)**

09:00-10:00	**Lecture 6B:**	General Structure of RELAP5 Input: Control System *A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE, EC)*

Session C — **RELAP5 Hands-on Training (4/5)**

Instructors:
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE), P. Pla (JRC-IE), A. Bucalossi (JRC-IE)

10:00-11:00	**Exercise-5:**	Steam Generator Modelling (Cont'd)
11:00-11:30	**COFFEE BREAK**	
11:30-12:30	**Exercise-5:**	Steam Generator Modelling (Cont'd)
12:30-13:30	**LUNCH**	
13:30-15:30	**Exercise-6:**	Pressurizer Modelling
15:30-16:00	**COFFEE BREAK**	
16:00-17:00	**Exercise-6:**	Pressurizer Modelling

PROGRAMME OUTLINE

DAY 5 - Friday, 2 July 2010

Session C **RELAP5 Hands-on Training (5/5)**

Instructors:
A. Petruzzi (GRNSPG, Italy), L. Ammirabile (JRC-IE), P. Pla (JRC-IE), A. Bucalossi (JRC-IE)

09:00-11:00	**Exercise-7-Beginner:**	Boiling Channel Problem: Nodalization Development
09:00-11:00	**Exercise-7-Intermediate:**	LBLOCA Test: Nodalization Development
11:00-11:30	**COFFEE BREAK**	
11:30-12:30	**Exercise-7-Beginner:**	Boiling Channel Problem: Nodalization Development
11:30-12:30	**Exercise-7-Intermediate:**	LBLOCA Test: Nodalization Development
12:30-13:30	**LUNCH**	
13:30-16:30	**Exercise-7-Beginner:**	Boiling Channel Problem: Transient Analysis
13:30-16:30	**Exercise-7-Intermediate:**	LBLOCA Test: Transient Analysis
16:30-17:00	**RELEASE OF CERTIFICATES**	

2010 RELAP5 USER TRAINING

RELAP5 User Seminar and Hands-on Training

Institute for Energy (IE), Joint Research Center (JRC), Petten

June 28 – July 2, 2010

REGISTRATION FORM

To be returned by 3 May 2010

Last name: ..... First name: .....

Title:.....Organization:.....

Address:.....

City: ..... State: ..... Zip Code: ..... Country .....

Phone:..... Fax: ..... Email: .....

(Please type all information as you wish it to appear on your name badge)

On entering the Petten site, which is a secured area, you need to present your passport or identity card

Nationality: ..... Date of Birth: .....

Passport or ID Number:..... Date of Issue: ..... Expiry Date: .....

Private Address: ..... City: ..... Country: .....

I would like to use my personal computer ..... ☐

I need a personal computer ..... ☐

Registration Fees

Include the proceedings, lunches and coffee breaks:

28 June – 2 July 2010 – RELAP5 User Training ..... ☐ **€ 1500**

**** Bank charges to be added to registration fees***

Payment by 17 May 2010

☐ Information will be provided after May 3rd, 2010.

The Registration Form should be sent to:

Alessandro Petruzzi : **FAX #:** 0039 050 2210384 **email:** a.petruzzi@ing.unipi.it