

PAUL SCHERRER INSTITUT



**Paul Scherrer Institut (PSI)**



**United State Nuclear Regulatory Commission  
(US-NRC)**



**Sandia National Laboratory (SNL)**

**1. Meeting of the  
“European MELCOR User Group”  
Hosted by Paul Scherrer Institut  
Villigen Switzerland  
December 15-16, 2008**

***Preliminary Announcement and Call for Presentations***

Electronic submission of ¼ Page Abstract(s) and  
presentation(s) in power point or in pdf format

October 31, 2008

Deadline for Registration and Hotel Reservation

October 31, 2008

On-line information is available at  
[sacre.web.psi.ch/EMUG/first.european-meeting.html](http://sacre.web.psi.ch/EMUG/first.european-meeting.html)

## **1. ORGANISATION AND HOST**

About 15 European organizations, using MELCOR and/or having being involved in CSARP, expressed interest to exchange experience and expertise through organized annual meetings which will provide a forum to foster exchange of information among the participating organization regarding the use of MELCOR 1.8.6 and newer versions, to promote newcomers and to improve the feedback among the code users and the code developer. The 1<sup>st</sup> Meeting of the European MELCOR User Group is jointly organized by PSI, US-NRC/SNL. This first announcement is to inform you of this event and call for contributions to be submitted for presentation at the meeting.

This call is also available at [sacre.web.psi.ch/EMUG/first.european-meeting.html](http://sacre.web.psi.ch/EMUG/first.european-meeting.html)

## **2. BACKGROUND OF THE MEETING**

The MELCOR severe accident integral code is developed by Sandia National Laboratories (SNL) for the U.S. Nuclear Regulatory Commission (NRC) in the USA, and is provided to various European organizations by the through bilateral agreements under the 'Cooperative Severe Accident Research Program' "CSARP" between US-NRC and the European organizations. The code has been used for many reactor safety applications by these organizations. Some of these organizations also continuously assess the code with data available from mostly experimental European Severe Accident Research programs. A few organizations have also developed models for certain critical issues, which appear in local versions of MELCOR.

Recently the MELCOR code has been improved not only by incorporation of a better late phase melt pool behavior model but also it is completely rewritten using FORTRAN 95 and restructured. The new MELCOR version 2 and higher will replace the older versions 1.x in a foreseeable time frame; therefore, it may be that the version 1.8.5 which is currently in use by many organizations will possibly not be maintained by US-NRC any more.

The big improvement in the code modeling associated with late phase melt pool behavior, as well as large changes in the code and input model structures will definitely require large efforts to develop experience in application of MELCOR1.8.6 and MELCOR 2.x for plant safety assessments and assessment of new models using currently available separate-effect and integral test data. Further model development efforts in certain severe accident areas by some European organizations will eventually improve the predictive capability of the future versions of MELCOR further if such models are incorporated in the standard code version.

PSI has expressed its intention to establish a European MELCOR user group to several European organizations and received a good response. The main interests in establishing the user group are to foster experience and information exchanges among the European organizations through organized annual meetings and to establish a common needs on the further development and error correction for MELCOR.

This document presents a preliminary draft of aims and method of working of the proposed European MELCOR User Group. It is suggested that through e-mail communications the interested organizations provide their comments to optimise the proposed aims and the method of working. PSI will then prepare a second version which will then be subject to approval by the participating organizations in its first meeting to be organized by PSI in late 2008.

### **AIMS OF EUROPEAN MELCOR USER GROUP**

- To provide a forum for the presentation and discussion of the experience gained by:
  - MELCOR assessment using integral and separate-effect tests leading to presentation of performance of models and related issues including sensitivity to selected model parameters and model uncertainties,
  - Model development efforts,
  - Application of MELCOR for plant safety studies, including L2 PSA, which demonstrates

weaknesses and strengths of MELCOR models in reproducing the individual severe accident phenomena and interplay between them occurring in the nuclear and balance of plant systems and the effect of operator actions on the accident progression through user input as introduced in the code input models,

- Use of code with different compilers and operating systems.
- Prioritization of user error correction and model development needs, to be transmitted to the code developers and the NRC
- To minimize the efforts required to obtain an adequate knowledge of optimum use of the MELCOR, through sharing of experience,
- To support the gaining of MELCOR knowledge and experience, particularly concerning the younger and less experienced users.

## **METHOD OF WORKING**

1. Group meetings and all exchanges of information are essentially informal, and not related to any other international collaborative activities.
2. All exchanges are on a no-cost basis.
3. Any information acquired via the MELCOR User Group exchanges should not be published in the open literature without the permission of the originator and due acknowledgement.
4. Individual organizations may decide the extent to which they can make information available to the Group. (It is recognised that commercial considerations may need to be taken into account on occasions). Nevertheless all participants must be prepared to make some positive contributions to Group exchanges.
5. Any new organization participating in Group meetings must accept this agreed Method of Working; and be active in the field.
6. Any increased participation must be acceptable to all existing Group members.
7. Participating European organizations must be prepared to host Group Meetings in turn.

### **First year organization:**

PSI is the organizer for the first year. The organization for the next meeting will be discussed among participants and agreed to during the meeting.

## **3. SCOPE, CONTENT AND OUTLINE OF THE MEETING**

The two days meeting is divided in three sections:

### **1. Section**

- MELCOR Input
  - Input deck conversion – conversion of MELCOR 1.8.5 input decks to MELCOR 1.8.6 and conversion of MELCOR 1.8.6 decks to MELCOR 2.0.
  - New input considerations – input file structure, obsolete features, new tabular records, new formula type CF, etc.
- Current MELCOR development thrust areas
  - Quality assurance
    - Code assessment work and regression testing
    - Code distribution and issue management
  - New MELCOR Models – discussion of new modeling and experience using new models
    - Point kinetics models
    - MELCOR-H2 Sulfur/Iodine cycle

- PBMR/PMR models
  - Molten pool models
  - Miscellaneous models
- Current code development
- Applications
  - MELCOR best practices
    - Default profiles – new feature to select sensitivity coefficient profile. Current best practice defaults and MELCOR 1.8.6 defaults are realized.
    - Time step control
    - Numerical aspects
  - Guidance for plant applications

## 2. Section:

About three half days will be devoted to presentations from all of the European organizations. For those who would like to present their experience in plant applications of the MELCOR 1.8.6 and MELCOR 2+, the organizers of the meeting should express their wish to see presentations not on specific aspects of the plant applications evaluating safety aspects of the plants in interest but the experience in use of the MELCOR models, input parameters, nodalization aspects which have certain bearing on the performance of the code as well as the quality of the code estimates.

Topics of interest:

- Group 1: Nodalization, input conversion, run time performance (time step control numerical stability, etc.)
- Group 2: Modeling features (early and late phase core degradation, corium pool formation, lower head behavior, fission product behavior, containment phenomena, etc), new modeling efforts
- Group 3: Model assessment, integral assessment, and lessons learnt (experience with MELCOR 1.8.5 is welcome, pointing out to the deficiencies/strengths of the models)
- Group 4: Plant application (run time performance, uncertainty analysis, link to PSA L2 and PSA L3 analyses, etc.)

Learning from others is a key to success and progress. Information obtained as a result of this meeting should give improved understanding in selection and use of code models and options and provide input to the code developers for further improvements.

## 3. Section

- Feed back from the participants: tour de table
- Organizational aspects: next meeting

For further details of the meeting can be obtained from:

Mr Salih Guentay  
 Deputy Head of LTH, Leader: Severe Accident Research Group  
 PSI  
 Telephone: +41 56 310 2677  
 E-mail: salih.guentay@psi.ch

## 4. PRACTICAL ARRANGEMENTS

### Participants:

The participation from the European countries is open to experts of the organizations actively using MELCOR or planning to use MELCOR. The success of the meeting is very much dependent on the active participation of those present, especially by presentations on their own experience with the code.

**Registration:**

All the participants should fill in the meeting participation and registration forms that are attached at the end of this document, including the titles of any proposed presentations, and send them by October 31, 2008 to:

Ms. Renate van Doesburg  
Secretary  
Laboratory for Thermal-hydraulics  
OVGA 420  
Telephone: +41 56 310 2685  
Telefax: +41 56 310 4481  
E-mail: [renate.vandoesburg@psi.ch](mailto:renate.vandoesburg@psi.ch)

Participants who would like to organize their accommodation themselves please indicate on the form. A block of rooms is reserved until November 1, 2008, after which there will be no guarantee of availability.

A registration fee will not be required. The participants bear the cost of travel and accommodation. A dinner on the evening of the first day and lunches on both days will be offered by PSI.

**Language:**

All presentations and discussions will be in English.

**Presentations and Abstracts:**

Presentations (in MS power point or Acrobat pdf format), along with abstract of not more than ¼ of an A4 page (in MS Word or pdf format), should be sent electronically not later than October 31, 2008 to Ms van Doesburg as indicated above.

The presentations will be loaded onto the web site indicated on the front cover and in the introduction, where they will be accessible to all those registered for the meeting. A CD containing the minutes and copies of all presentations and abstract will be circulated afterwards.

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**Registration Form**

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Surname (Family name)<sup>1</sup>:

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Given Name (s):

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Title or Function:

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Institution, Organization or  
Company (full address):

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Telephone No.:

---

Telefax No.:

---

E-mail address:

---

Title (s) of the presentation (s)

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**To be sent as soon as possible, and in any case before October 31, 2008, to**

Ms. Renate van Doesburg  
Secretary  
Laboratory for Thermal-hydraulics  
OVGA 420  
Telefon: +41 56 310 2685  
Telefax: +41 56 310 4481  
E-mail: [renate.vandoesburg@psi.ch](mailto:renate.vandoesburg@psi.ch)

<sup>1</sup> (Please indicate whether Prof., Dr., Mr., Mrs., Miss, Ms.)

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Hotel Reservation

Name
Affiliation
E-Mail Address
Phone Fax
Remarks

If you do not wish PSI to book a room in the hotel below please mark here:

- Reservations by PSI in: Hotel Terminus, Bahnhofplatz 1, 5200 Brugg, Switzerland
Phone ++41 56 441 18 21 Fax ++41 56 441 82 20
Cost: CHF 120.-- single room, with shower and toilet, breakfast included
Arrival Date Departure Date
Arrival Time ≈ Number of Persons Number of Rooms
Remarks

Please complete this form and fax or e-mail it not later than October 31, 2008 to
PSI, Thermal-hydraulics Laboratory
Attn. of Ms. R. van Doesburg, OVGA / 420
Fax +41 56 310 4481 / e-mail: Renate.vanDoesburg@psi.ch

