CONCLUSIONS AND RECOMMENDATIONS

There were 147 registered participants to the workshop to hear 5 invited talks, 3 talks on OECD-CSNI activity related to CFD, 44 technical papers, and to see 15 posters. This is about 50% increase with respect to the previous CFD4NRS held in Garching in 2006, and this confirms that there is a real need for such workshops. The objectives that 2/3 of the papers be concerned with two-phase issues and 1/3 dedicated to experimental techniques and CFD grade experimental data were reached. Many participants sent the message that the workshop was well organised. USA might be candidate to host a follow-up meeting, perhaps organized by US-NRC (confirmed by NRC a few days after the workshop). The suggestion received encouraging remarks from the audience during the discussion at the panel session. KAERI also proposed to host and organize a future workshop. A great majority of participants considered they would be interested in attending a follow-up workshop within two years.

Comments were made during the panel session on the content of XCFD4NRS. It was considered that some contributions were not directly related to the nuclear safety. Another comment suggested that such workshops should be a forum to discuss novel approaches but one must also keep in mind that the end users are people from the nuclear safety. There was a consensus on the need to keep a high quality of papers. It was also suggested to promote international benchmarks for CFD.

Both CFD4NRS and XCFD4NRS workshops proved to be very valuable means to assess the status of CFD code capabilities and validation, to exchange experiences on CFD code applications, and to monitor progress.

Offer was again made to publish selected papers from the workshop in a special issue of the Nuclear Engineering and Design (NED) Journal. It was also mentioned that the special issue devoted to CFD4NRS received a very high number of visits on the journal website and a lot of papers were downloaded. Session chairmen will make a selection of papers to be submitted to the NED Journal. It is anticipated that the special issue of NED dedicated to XCFD4NRS will appear early in 2009.

The following additional comments were made:

- Current capabilities of two-phase measurement techniques are still too limitative for CFD validation. Further efforts are required to develop more advanced techniques, such as X-ray PIV, and international cooperation is necessary to support the high cost of development.
- Most of CFD codes are commercial and do not offer a full transparency with access to sources, which may be a problem from a regulation point of view.
- Application of CFD to Nuclear Safety requires that code uncertainties are determined, as they are now for system codes.

The participants made the following recommendations:

- One should keep a close link between people developing experimental techniques and performing validation experiments, and people developing CFD models and codes.
- Best Practice Guidelines should still be promoted, which requires that they are further developed and made more specific to each application. For two-phase CFD the establishment of Guidelines on the choice of the physical models depending on the phenomena being investigated has to be considered as a long term activity.
- Experimental techniques should be further developed to provide CFD-grade data for validating CFD models, including estimates of measurement uncertainties.
- A new item should be added in the scope of the workshop: the development and application of uncertainty evaluation methods for CFD codes.