

CONCLUSIONS AND RECOMMENDATIONS

There were 98 registered participants to the workshop to hear 5 invited talks and 39 technical papers. This is perhaps a good measure of the level of general interest in the workshop. The messages coming back to the organisers from the participants were that the workshop was well organised and that the subject material well chosen. As there was only a 60% success rate for the extended abstracts sent in to the organisers for acceptance, the quality of the papers was high, and the focus of them on the central issue strong.

The case for future workshops in the series was discussed openly during the final panel session. It was pointed out that 2/3 of the papers accepted for CFD4NRS were concerned with single-phase calculations and experiments, while 1/3 were dedicated to multi-phase issues. The ratio probably reflects the degree of maturity of CFD in the respective areas, but nonetheless suggests a growing acknowledgement of the role of multi-phase CFD in nuclear NRS issues.

Following on from this observation, CEA proposed a follow-up meeting, perhaps hosted by CEA Grenoble, in which the ratio of single-phase to two-phase papers would be inverted, and would expand the area of advanced instrumentation needed for providing local data needed to validate the models currently being proposed for multi-phase CFD. The suggestion received encouraging remarks from the audience. It was also generally agreed that the frequency of future workshops should be 2-3 years, allowing sufficient time for the technology to advance, and minimise the chance of overlap with the material presented at CFD4NRS.

The Organising and Scientific Committees had discussed at an early stage whether the editor of an appropriate archival journal should be approached in regard to offering publication of selected papers from the workshop in a special issue of the journal. On balance, it was considered that it would be too great a risk to an editor for a first-of-a-kind conference with an untried format. It therefore came as a bonus that Professor Yassin Hassan, co-editor of Nuclear Engineering and Design, and a participant at CFD4NRS, would make just this suggestion. The offer has been followed up, and about 25 authors of technical papers and 3 invited speakers have expressed interest in this proposal. Again, the offer reflects the high quality of the presented material, and the general level of interest in what the workshop aimed to achieve. It is anticipated that the special issue of NED dedicated to CFD4NRS will appear early in 2007.

Clear recommendations to come out of the workshop for the continuing use of CFD methods in NRS issues are listed below.

- Best Practice Guidelines should be followed as far as practical to ensure that CFD simulation results are free of numerical errors, and that the physical models employed are well validated against data appropriate to the flow regimes and physical phenomena being investigated.
- Experimental data used for code validation should include estimates of measurement uncertainties, and should include detailed information concerning initial and boundary conditions.
- Experimenters involved in producing data for validating CFD models and/or applications should collaborate actively with CFD practitioners in advance of setting up their instrumentation. This interface is vital in ensuring that the information needed to set up the CFD simulation will actually be available, the selection of “target variables” (i.e. the most significant measurements against which to compare code predictions) is optimal, and the frequency of data acquisition is appropriate to the time-scale(s) of significant fluid-dynamic/heat-transfer/phase-exchange events.
- This workshop proved to be a very valuable means to assess the status of CFD code validation and application. Specialised workshops of this type should be organised at suitable time intervals also in the future, in order to maintain continuity, monitor progress, and exchange experiences on CFD code validation and applications.