Working Party on Nuclear Criticality Safety

7th Meeting of the Expert Group on Advanced Monte Carlo Techniques (EGAMCT)

SUMMARY RECORD

June 28, 2017
NEA Headquarters
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JT03434717
1. Introduction and Welcome
The Chair of the expert group, Eric Dumonteil of IRSN, France, opened the meeting and welcomed the participants. Thirty participants attended the meeting (see participants list in Appendix B).

This meeting was split in three main parts:

- A first part dedicated to general technical presentations and discussion.
- A second part dedicated to the report that is pending for the results of this Expert Group and the general presentation of results.
- A third part dedicated to the future activities of the EGAMCT and the subgroup proposal for cross-cutting work within WPNCS.

2. Approval of the Previous Summary Record and Review of Actions
The summary record of the 2016 meeting was approved without modifications. Actions from the previous meeting were reviewed. They relate to the submission and completion of the associated draft EG report, which is discussed under a specific agenda item.

3. Approval of the Agenda
The agenda (Appendix A) was approved with no modifications.

4. Technical Presentations

E. Dumonteil presented an overview of the neutron clustering problem (EGAMCT-2017/02, Neutron Clustering and Travelling Waves in Monte Carlo Criticality Calculations);

P. Smith presented the latest developments in MONK (EGAMCT-2017/08, MONK Status) and a review of his contributions to Phase I benchmark (EGAMCT-2017/01, UK undersampling calculations);

F. Brown presented a review of EGAMCT-2017/03 Investigations of Clustering in MCNP6 Criticality Calculations, and EGAMCT-2017/04 MCNP6: Verification for Nuclear Criticality Safety Calculations, It was highlighted that the criticality-safety community using MCNP should transfer to MCNP6 over the next few years.
D. Mennerdhal presented EGAMCT-2017/05, on the convergence in infinite rod extrapolation and length influence.

A. Zoia gave an in-depth presentation (EGAMCT-2017/06) on entropy and spatial correlations. He outlined power iteration with Monte Carlo, the different impacts of correlations in criticality simulations: entropy and convergence, spatial moments and correlations and relations to neutron clustering theory.

C. Perfetti gave an update (EGAMCT-2017/07) on continued investigation of metrics to detect undersampling biases. Several statistical metrics have been investigated for their potential to predict undersampling biases in the EGAMCT benchmark problems and have since been implemented within the CE TSUNAMI-3D framework of the SCALE 6.2 code package.

5. Status on the report

E. Dumonteil gave an overview of latest work done for the report, now entitled Calculating local tallies defined over loosely coupled systems with Monte Carlo criticality codes. It investigates undersampling, which occurs when the neutrons in one generation do not interact with all regions in the problem and result in generational eigenvalue estimates that have not incorporated information from all regions in the system, leading to inaccurate tally and tally variance estimates. E. Dumonteil committed to providing a final draft of the report to the group in December 2017.

6. Sub group structured proposed

During the 2017 meetings, within the context of the renewal of mandates that were coming to an end for all of the Expert Groups and the Working Party, the NEA (F. Michel-Sendis) made a proposal to transition to a subgroup system under the working party structure. A subgroup system allows greater flexibility to start the appropriate technical tasks with a short term (2 year) objective. This system has been used for many years under other NSC working parties such as the WPEC. This proposal was discussed and accepted by the EGCEA, EGUNF and EGUACSA expert groups who considered it to be appropriate for its future work. The Expert Group on Advanced Monte Carlo Techniques (EGAMCT) requested nevertheless an extension of its mandate pending the delivery of its final report and the definition of future activities. If no future activities are found, the EG would close down. A one year extension was decided and approved by written procedure after the meeting.

7. Any other business

The extension of the EGAMCT mandate will be done under the written procedure of the OECD NEA. If the EGAMCT mandate extension is approved, the next EGAMCT meeting will be held in conjunction with the WPNC meeting during the first week of July 2018. With no other business to discuss the meeting was adjourned.
8. List of Actions

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<th>#</th>
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<tr>
<td>1</td>
<td>Submit final version of EGAMCT report</td>
<td>E. Dumonteil</td>
<td>December 2017</td>
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<td>2</td>
<td>Submit EGAMCT Mandate for 1year extension approval through the written procedure.</td>
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<td>Asap after the meeting</td>
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APPENDIX A

ORGANISATION FOR ECONOMIC COOPERATION AND DEVELOPMENT
Nuclear Energy Agency
Nuclear Science Committee
Working Party on Nuclear Criticality Safety (WPNCS)
7th Meeting of the Expert Group on
Advanced Monte Carlo Techniques for Criticality Safety Assessment (EGAMCT)

Wednesday, 28 June 2017

AGENDA

Proposed Meeting Schedule:
9h30 – 17h00

1. Welcome
   F. Michel-Sendis & E. Dumonteil

2. Administrative
   Secretariat/All
   • Approval of the Agenda
   • Approval of Summary Record the Previous Meeting
   • Review of actions

3. Technical Presentations
   • MONK Status
     P. Smith
   • Recent developments on neutron clustering
     A. Zoia
   • MCNP Status & Clustering studies
     F. Brown
   • Stochastic modelling of bias on local tallies
     E. Dumonteil
   • Convergence in infinite rod + Extrapolation length influence
     D. Mennerdahl

4. Status of final report
   E. Dumonteil

5. Renewal of mandate of the EG
   All

6. Any other business
   • Date and place of the next meeting
## APPENDIX B

### LIST OF PARTICIPANTS

#### FRANCE

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<tr>
<th>Name</th>
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