

Appendix Q
EXPERT GROUP INFORMATION

IPPE and Serco have not participated in so many meetings but have been active in contributing reference values. Other participants not mentioned here have contributed to the discussion at meetings.

Meetings and some significant communication

The study was first proposed by Y. Naito already in 1995 but the Expert Group was prepared during the Working Party meeting in 1998, and was formally started after that. W. Weber (GRS) was the co-ordinator of the Expert Group and the chairman during most meetings.

1st Expert Group meeting, 15 September 1999

- Chaired by B. Gmal, in the absence of the expert group chairman W. Weber.
 - Some previously existing data were reported from Japan, France, Germany, Russia and USA.
 - ISO and ANS 8.15 standards development was discussed.
 - Best-estimate values were proposed by R.M. Westfall (ORNL). The group agreed but there was no common understanding on how to obtain those values.
 - J. Anno (IRSN) presented several French efforts in compiling criticality safety data. The importance of chemical and engineering data for criticality calculations was pointed out. Study of a fissile solution with a density gradient was proposed. A very useful compilation of density laws was included in a table. Another table demonstrated the limitations of the IRSN law used at the time (DILAPO, called Pre-Iso in this report).
- H. Okuno (JAERI) proposed simple geometry systems.
B. Gmal (GRS) reported on a recent revision of the German Criticality Handbook.
Further, new SCALE-4.3 and MCNP-4A critical values obtained by W. Weber were reported.
Y. Naito (NAIS) reported on a web site that had been started to support the collection of critical values.

Recommendations:

- Data to be collected by Y. Naito for introduction on the NAIS web page
- The data needed at first were values for basic systems of ²³³U, ²³⁵U, ²³⁹Pu metal and oxide water mixtures.
- If possible estimates of uncertainties of the values should be provided
- Preliminary deadline: 31st January 2000

September 7, 2000. E-mail from Y. Naito concerning the current status of the web site. Many important suggestions and conclusions were given. Some quotes follow below:

- Data not registered: UO₂+H₂O and UO₂F₂+H₂O without reflectors, systems with Pb reflection, fuel lattices, U-Pu systems, minor actinide (MA) data, ²³³U data. [This shows how very wide the scope still was].
- “We must establish the criterion to select the data which should be registered”. [The issue of

different qualities of the data was clearly pointed out at this time].

- “My idea is that we accept every data which are supplied by WG members if they think the data are the best of minimum critical data”.
- “We have not much information about MA critical data. In such a case, we must accept pure calculation results.”

2nd Expert Group meeting, 12 September 2000

- The final scope and objectives were defined.
- Recommended values will not be given to avoid difficulties in countries where licenses are based on minimum critical values.
- A limitation to two or three fissile systems was determined for an intermediate compilation. Various proposals were given but no specification was made. Report the intermediate compilation to the Working Party by end of February 2001.

4th WPNCS Meeting, September 15, 2000

- The Weber report to the WP expressed the opinion that only existing data were to be compiled, re-calculations were not intended. The aim was to present the range of values existing in different countries. [This is not what the scope and objectives state. It is not what some of the participants expected. See also new calculation results from ORNL, EMS, Serco, IRSN, IPPE]. Consensus on recommended values was not needed. This was agreed for the first part of the study. The web-site was slightly awkward. Exchange of Excel files was recommended.

3rd Expert Group meeting, 5 December 2001

- The chemical compounds were limited to UO₂, UNH, PuO₂ and PuNH during 2001.
- France, Sweden, UK and USA presented new contributions.
- J. Anno presented the new isopiestic method for nuclide densities in solutions.
- Preparations to create an Intermediate Compilation report were made. The idea was to let the contributors compile their methods and data. After that reviewers were supposed to evaluate differences in the results. The report was planned for the middle of 2002. [The function of the reviewers was not clear and this caused delays in the study]

Questionnaires in Microsoft Excel format were prepared by the coordinator W. Weber and distributed during 2002. Contributors were requested to fill in information on methods and input for the calculations. IRSN and some Serco information was distributed. EMS prepared all information, but it may never have been distributed.

4th Expert Group meeting, 10 September 2002

- There were now 570 entries on the NAIS web page, an increase by 140 from the previous meeting.
- A proposal for contents of a report was presented by W. Weber.
- There was considerable discussion on the criteria for evaluation and the quality of the data.
- Plans for completing the report were drawn.
- Y. Naito added a hand-written summary of conclusions and recommendations. Agreed to by D. Mennerdahl. The data are best-estimate values. It was not necessary to agree on recommended or standard values (at this time). It was also pointed out that the plutonium vector 71/17/11/1 had been added by the Expert Group. This was not clear to all participants until 2002.

- 6th meeting of the WPNCS, Paris, 12 September 2002
- The Expert Group members discussed an outline of the report which will assemble the minimum critical values collected so far. The document will also describe the methods used for the derivation of these data. The discrepancies between the compiled data will be assessed and an attempt will be made to explain the most important reason(s) for the discrepancies. [Comparing discrepancies between non-validated values would be essentially useless]
- On new programs of work: The Expert Group participants will mainly concentrate on the completion of the compilation report for the selected fissile media. **A year or two would be needed in order to finalise this effort.** After that, new media can be also studied.

Unofficial meeting hosted by S. Mitake, Tokyo 16 October 2003

- W. Weber presented a summary of results and the spread of the results related to their age.
- There were long discussions on the benefits of determining best-estimate values.

7th WPNCS meeting in Tokyo, October 17, 2003

- Wolf Weber proposed the following time schedule for the assembly and publication of the final report:
 - November 2003 – January 2004: Assembly of the report.
 - February 2004 – March 2004: Peer-review
 - April 2004: Publication of the report
- The proposal was accepted.
- For the continuation of this activity beyond the publication of the aforementioned report, the Expert Group on Minimum Critical Values needs to submit to the WPNCS for approval of a detailed programme of work including the intended deliverables and corresponding time schedules.

5th Expert Group meeting, 31 August 2004

- Chaired by D. Mennerdahl. The expert group formally did not exist anymore. This was made very clear during the meeting. The primary purpose of the meeting was to arrange a documentation of the study in a report.
- The structure of a draft report, essentially from 2002, by W. Weber was discussed.
- A revised structure, added and revised results, as well as some extensions to the W. Weber draft report was presented by D. Mennerdahl.
- D. Mennerdahl was asked to prepare a final draft report for Christmas (2004). He accepted. This was later accepted by the Working Party (meeting on 3 September 2004).
- A list of issues [13] was prepared by D. Mennerdahl during and after the meeting on the morning of August 31. During the time between the meeting and the Working Party Meeting on September 3, very constructive responses were obtained from almost all participants that were asked, including some by email from absent Expert Group participants.
- JAERI presented the coming Data Collection 2 related to the Japanese Handbook. The validation will be significantly improved by the availability of the ICSBEP Handbook. In the previous validation, the experimental biases were not considered. The Moeken equation for low-enriched uranium gave considerable errors in the first Data Collection. The background of the very high minimum critical value for U(20)O₂ in the first Data Collection was given (the minimum was not properly searched). The incorrect value was given to the Expert Group and had not been corrected before this meeting.

Work on final draft after the 5th meeting

- A first version of a terminology appendix was distributed.
- Due to other commitments, the work on the final draft started seriously in mid-October 2004.
- The TSUNAMI sequences and modules in SCALE 5 were used to generate similarity indices for a number of benchmarks with the applications.
- The SMORES sequence in SCALE 5 was used to see the influence of non-uniform distributions.
- Thousands of calculations of reference values and benchmarks from the ICSBEP Handbook were calculated with MCNP5 and many cross-section libraries as well as with SCALE 5/XSDRNPM and SCALE 5/KENOVA and several cross-section libraries.
- IPPE supplied results for benchmarks and reference values.
- Results were documented in tables. Charts were generated.
- Several discrepancies were discovered and discussed with contributors.
- A comparison of methods used to determine nuclide densities was made and distributed to the contributors (not to all participants) in early March 2005.
- Extensive communication on nuclide density methods during first 3 weeks of March.
- March 26 (Easter). The last words on the final draft completed and it was distributed to a long list of participants and observers.
- April 1. IRSN informs about the withdrawal of preliminary results for UO_2 and PuO_2 .
- April 17. Appendix S; “The missing link” involving correlations through the neutron flux is added.
- May 4. IRSN contributes approved values for uranium and plutonium dioxides.
- Middle of May, Final draft report submitted to OECD/NEA for transfer to the OECD/NEA publishing system and to what the author believed was a peer-review.

9th WPNCS meeting in Knoxville, September 23, 2005.

- D. Mennerdahl presented the final report to the WPNCS.
- OECD/NEA at this time was already printing the report. The author had not seen the version after the transfer to the OECD/NEA system and was not aware of any peer review.
- It was made clear that the report is a first-iteration that can be followed up in later phases. Accurate propagation of uncertainties from measurements to reference values was outside the expectations of this first phase of the study. Without a proper study of the nuclide density issues it would not be a very useful effort. However, the subjective uncertainties given cover experimental as well as some human error uncertainties.
- The OECD/NEA and the WPNCS at the previous meeting in Prague in September 2004 had made it very clear that the Expert Group did not exist anymore. There was no chairman and no study. The procedure for completing a report was not clear.
- It was agreed that a further review of the report was motivated. A number of WPNCS participants agreed to review the report until November 30, 2005.

The OECD/NEA version of the report was made available in electronic form in early October, 2005.

- Comments were received from some WPNCS participants and from a few participants in the former Expert Group. No major problem or modification was suggested.
- The author did not start a proper review and update of the report until mid-January 2006. However, already in October it was found that math symbols in many cases did not survive the transfer from Microsoft Word to the OECD/NEA publishing system.

- There are many, many editorial corrections to be made. Some were existing in the original MS Word files, others were introduced during the transfer.
- The report has been updated with some references, considerations of comments and proposals as well as with some clarifications and recent events.
- The new final report will be sent to OECD/NEA about 6 February, 2006.
- It is essential that a further editorial review is carried out after the transfer to the OECD/NEA publishing system is complete.