Closing Remarks and Action Plan
PBMR Related Benchmarks and Experimental Facilities

- **Proteus Pebble Bed Critical Facility Experiments**

- **ASTRA Critical Facility**

- **HTR-10 Reactor in Beijing**
  - Y. Xu, 'The HTR-10 project and its further development,' Proceedings of HTR2002, Petten, The Netherlands, April 2002
  - International Handbook of Evaluated Reactor Physics Benchmark Experiments

- **Reactors and Facilities Operated in Germany, such as the AVR**

- **Code-to-Code Comparisons in IAEA CRP-5 (Evaluation of HTGR Performance)**

- **VSOP and MCNP Comparisons for PBMR**
Future benchmarks

- Burnup benchmark proposal
- ASTRA analysis (IAEA / CRP5 definition available)
- Pebble Box (IAEA / CRP5 definition available)
- Gen-IV plans (limit duplication)
- AVR (In European program; DLOFC simulated test, Melt-wires)
- ?
ACTION LIST: PBMRT5.0

• PBMRT5 meeting summary with all presentations to be published (also CD) Target October 2008
  – Official summary, All presentations, All submitted spreadsheets, All comparison spreadsheets
  – Action list with final deadlines and plans
• Discussions between current submissions to clarify differences
  – Axial offset – Tinte
  – Kernel models ?
    • Differences in Fission Power (Case 6)
    • Kernel model vs no kernel model
    • Differences between temperatures although powers are similar
  – Steady State submissions / updates / converged results (Action F Reitsma)
    • Old results removed (as applicable)

• All outstanding questionnaires to be submitted by 15 October 2008
  – Updated PARCS-Agree ? (PARCS-Direkt received 2007)
  – CITATION – PBMR for SS Exercise 1
  – DORT-Thermix (could not locate)
  – Many Others? Please send again: (email sent by James Han in July)
ACTION LIST: PBMRT5.0

• Finalised comparative spreadsheet and statistical analysis (send to PSU, finalised by end October 2008)
  – Updated spreadsheets placed on web

• Draft Benchmark report sent to participants (mid / end November)
  – Comments submitted by end December 2008

• Final report at OECD end January 2009
• Published report, March / April 2009
  – Presentations and other data on CD

• Special Journal issue to be published in 2009 (KI feedback)
Conclusions & Future work

• Benchmark definition is final and no changes will be made
• Successful workshops well attended with very stimulating discussions
• Wide variety of codes and methods are applied
• Decision to publish only one report (and not a separate specification)

• Next and final workshop now completed

• Major deadlines
  – Finalisation of results and all submissions (30 October)
    • Questionnaires
    • Code descriptions
  – Drafted report will be sent to all for comment (November 2008)
    • 2-3 weeks for comments
  – Published report (March / April 2009)

• A special Journal issue containing all the detailed submissions of the OECD PBMR 400MW Transient Benchmark Exercise will be pursued in 2009 (as a final detailed summary of all the related work)
Value added by the benchmark

- Countless fruitful discussions and opportunity to learn
- The OECD PBMR 400MW Code to code Benchmark added a lot of value
  - Will form part of PBMR’s V&V work supporting the license application
  - Part of all other Code verification
  - At least five PhD related to this work completed or in progress
  - Increased confidence in the tools used to calculate pebble bed reactors
- Was the catalyst for new code developments
  - Handful of couplings made between neutronic and thermal fluid codes
  - New applications of existing codes
  - Cross section generation and representation lessons learned
- Value of reverse engineering done at PBMR emphasized
THANK YOU

• All participants
• Support from all organizations, sending participants
• Organizing committee
  – Kostadin Ivanov – support to chairman and comparisons
  – James Han – Student at PSU - Comparisons
  – Enrico Sartori – organizing meeting and support
• OECD / NEA / NSC
• PBMR releasing information to be used in benchmark

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