

Expert Group on Uncertainty Analysis in Modelling

Chair:	Dr. Tomasz Kozlowski	(USA)
Members:	All NEA member countries	
Regular Observers (Non-Members):	European Commission <i>Under the NEA Statute</i>	
	Russian Federation	
Observer (International Organisation):	International Atomic Energy Agency (IAEA)	<i>By agreement</i>
Date of creation:	June 2010	
Duration:	June 2012	
Mandate:		

Agreed at the 22nd meeting of the Nuclear Science Committee in June 2011
[NEA/SEN/NSC(2011)3]

"Scope

Under the guidance of the Working Party on Scientific Issues of Reactor Systems (WPRS) the Expert Group will perform specific tasks associated with uncertainty analysis in modelling of coupled multi-physics analysis of present and future nuclear power systems. Reactor types considered include, but are not limited to the following:

- Present generation LWRs and HWRs with advanced and innovative fuels, evolutionary and innovative LWRs and HWRs
- High temperature gas reactors (HTRs)
- Fast spectrum systems and other novel systems including all six of the systems being developed under Gen IV.

Objectives

The Expert Group will provide advice to the WPRS and the nuclear community on the scientific development needs (data and methods, validation experiments, scenario studies) of sensitivity and uncertainty methodology for modelling of different reactor systems and scenarios.

The main activity will be focused on uncertainties in modelling LWR transients. In this context the objectives will be:

- To determine modelling uncertainties for reactor systems under steady-state and transient conditions, quantifying the impact of uncertainties for each type of calculation in the multi-physics analysis, i.e.:
 - Neutronics calculations
 - Thermal hydraulics modelling
 - Fuel behaviour

- For each of these types of calculation the major sources of uncertainty will be determined, arising from:
 - Data (e.g. nuclear data, geometry, materials)
 - Numerical methods
 - Physical models
- To develop and test methods for combining the above sources of uncertainty for each type of calculation so as to yield uncertainty assessment for the coupled multi-physics analyses
- To develop a benchmark framework which combines information from available integral facility and NPP experimental data with analytical and numerical benchmarking:
 - where available, experimental data will be used to test the individual types of calculation as well as coupled multi-physics simulations.

Deliverables

- Complete NUPEC PWR Sub-channel Bundle Tests Benchmarks (PSBT) – End 2011
- Complete KALININ-3 Coolant Transient Benchmark – End 2012
- Complete Phase I (core neutronics) of UAM Benchmark for BWR, PWR and VVER – End 2012
- Complete Phase II (core thermal-hydraulic) of UAM Benchmark for BWR, PWR and VVER – End 2012
- Release specifications for Phase III (coupled system thermal-hydraulics/core 3D kinetics) UAM Benchmark for BWR, PWR and VVER – mid 2012.
- Release specifications for Oskarsham-2 Reactor Stability Benchmark – mid 2012.

Meeting frequency

Once per year for full Experts Group, in connection with WPRS meeting. Annual workshop on Uncertainty Analysis in Modelling in Reactor Systems, in connection with the related benchmark activities.

Links to other groups

The Expert Group will work in co-ordination with the WPNCs Expert Group on Uncertainty Analysis for Criticality Safety Analyses and with the CSNI Group on Analysis and Management of Accidents (GAMA). The Expert Group will also work in co-operation with the IAEA HTR UAM CRP."