Severe accident research in the core degradation area: An example of effective international cooperation between the European Union (EU) and the Commonwealth of Independent States (CIS) by the International Science and Technology Center

Abstract:
The paper has two following objectives: - To describe the organization of complex, international, experimental and analytical research of material processes under extreme conditions similar to those of severe accidents in nuclear reactors and, - To inform briefly about some of the results of these studies. The multilateral research program was supported and managed by the International Science and Technology Centre (ISTC). The ISTC was to support non-proliferation of sensitive knowledge and technologies in biological, chemical and nuclear domains by engaging scientists in peaceful research programmes with a broad international cooperation. The main forms of ISTC activity are Research projects and Supporting programs. In the Research projects informal contact expert groups (CEG) were set up by ISTC to improve coordination between adjacent projects and to encourage international collaboration: first of all by the European Commission. The CEG members - experts from the national institutes - evaluated and managed the projects’ scientific results from initial stage of proposal formulation until the final reporting. They were often involved directly in the project’s details by joining the Steering Committees of the project. The Contact Expert Group for Severe Accident & Management (CEG-SAM) is one of these groups. Five project groups from this area given as examples from the total of funded 30 projects during 10 years of activity to demonstrate this: 1) QUENCH-VVER from RIAR, Dimitrovgrad & IBRAE, Moscow, and PARAMETER projects (SF1 & SF4) from LUCH, Podolsk & IBRAE, Moscow, concerning a detailed study of bundle quenching from high temperature; 2) Reactor Core Degradation, a modelling project simulating the fuel rod degradation and loss of geometry from IBRAE, Moscow; 3) METCOR projects from NITI, St. Petersburg on the interaction of core melt with reactor vessel steel; 4) CORPHAD & PRECOS projects, NITI St. Petersburg undertook a systematic examination of refractory ceramics relevant to in-vessel and ex-vessel coria, particularly examining poorly characterised, limited data or experimentally difficult systems; and finally, 5) INVECOR project, NNE Kurchatov City, Kazakhstan, This is a large-scale (60 kg) facility to examine the vessel steel retention of corium during the decay heat.
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