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|  | EUROPEAN COMMISSION  DIRECTORATE-GENERAL ‘RESEARCH’ | INTERNATIONAL  SCIENCE AND  TECHNOLOGY  CENTRE |  |

**CONTACT EXPERT GROUP on SEVERE ACCIDENT MANAGEMENT (CEG-SAM)**

*To:* R. Burmanjer (EC, DG-RTD / D.3) *Advice no.:* A-15

*Project code:* ISTC # 3690 *Date:* 20th September 2007

*Signatures:* P. Hofmann (Secretary)

*Linked meeting:* 12th CEG-SAM meeting, St. Petersburg, Russia, September 11-13 2007

*Attending members:* Allelein, Trambauer (GRS); Altstadt (FZD); Azarian, Fischer (AREVA); Bottomley (JRC/ITU); Cenerino, Clement (IRSN); Ducros, Journeau (CEA); Güntay (PSI); Herranz (CIEMAT); Hozer (AEKI); Krause (AECL); Lamy (EdF); Miassoedov, Stuckert, Tromm (FZK); Oriolo (UniPi)

*Copies:* CEG-SAM members; M. Hugon, J. Sanders (EC, DG-RTD / D.3), S. Webster (EC, DG-RTD / J.2), L.Tocheny (ISTC, Moscow)

\* Subject: - “Study of fuel assemblies under severe accident top quenching conditions in the PARAMETER-SF test series"

\* EU Collaborators: - CEA, EDF, FZK, GRS, IRSN, JRC-ITU, PSI, AEKI

\* Documents: Project proposal # 3690 “Fuel assemblies under severe accident conditions", LUCH, Podolsk; IBRAE, Moscow; GIDROPRESS, Podolsk.

\* Advice: - **EU funding recommended with high priority**

\* Justification: - This proposed project will last for 24 months for a total cost of 600,000 US$. This proposal extends the work of the PARAMETER-SF project (#3194) where two tests (SF1 & SF2) have been performed with top and combined quenching.

The project proposal comprises 3 main tasks:

* *Task 1*: post-test material analysis of Parameter-SF2 test performed in the frame of the 3194 project (top + bottom quenching).
* *Task 2*: Parameter-SF3: 18 heated and one central unheated fuel rods under the conditions of severe accident with top quenching at the assembly temperature of ~1600°C.
* *Task 3*: Parameter-SF4: 16 heated fuel rods and 3 passive fuel rods, located in the second row, with top quenching at ~1800°C.

The completion of task 1 will help interpret the SF-2 test and is necessary for a comprehensive understanding of this combined quenching experiment.

Task 2 (test SF3) is a repetition of the first test (SF1) with reduced maximum temperature to avoid extended blockage formation. The two tests (SF2 and SF3) allow better comparison between the efficiency of combined (top and bottom) quenching and top quenching only. Moreover, the SF3test is valuable both for model and computer code validation and to enlarge the data base for the hydrogen generation during core recovery which is still a risk-significant issue with large uncertainties.

Task 3 (test SF4) is devoted to study of the possible debris formation during core recovery. This issue has been ranked by the SARP with high priority in terms of risk significance and lack of knowledge as a precondition for modelling the debris bed formation in the core region and in the lower plenum and subsequently for the in-vessel melt retention as an AM measure. Nevertheless it is expected that the fresh fuel used in the test facility behaves differently compared to fuel with high burn-up.

Therefore a possible reorientation has been discussed: The facility is complementary to what can be achieved in the QUENCH set-up at FZK and CODEX facility at AEKI as it allows the use of fuel pellets in large bundles. Another issue confirmed as high priority by the SARP is air ingress scenarios. In the frame of SARNET, models are being developed separately for cladding and fuel oxidation, but a semi-integral experiment to assess the competitive oxidation of these two core elements is missing. An air ingress test could be performed with a focus on materials analysis (including U-O-Zr melt oxidation & possible UO3 volatilisation). Experience gained in performing QUENCH-10, CODEX-AIT-1 and AIT-2 experiments can be valuable and profitable exchange between European and Russian teams is expected.

\* Recommendation: - The project is worth funding considering the re-orientation of task 3.

\* Comments: - The project will have close links to the EU SARNET Network of Excellence (FP6) and to the German QUENCH programme. An air ingress test has also close links to FP release projects (VERCORS, VERONIKA).

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| Dissemination level : RE: restricted to EC, CEG-SAM members, ISTC and CIS beneficiaries |