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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 -17

*Project code:* ISTC # 3609 *Date:* 29th October 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: - “Flow pulsation at reactor vessel external cooling (EXPULS)”

\* EU Collaborators: - FORTUM

\* non-EU Collaborators: - KAERI

\* Documents: - ISTC project proposal #3609; “Experimental investigation of flow pulsation effects on burnout in RPV external cooling system”, Leading Institution: NITI, Sosnovy Bor

\* Advice: - **EU funding recommended after revision, high priority**

\* Justification: - This project proposal will last for 2 years for a total cost of 184,000 USD. This budget is appropriate. The group supports the execution of this project aimed at providing additional information of ex-vessel coolability. The dry-out of the outer RPV is numerically and experimentally investigated with emphasis of the influence of flow pulsations on the critical heat flux. The critical heat flux is one of the key parameters for the heat that can be removed from the molten corium pool. The outcome will substantially reduce the uncertainties in the evaluation of in-vessel retention (IVR) scenarios.

- In-vessel retention strategy has been introduced in Finland for the Loviisa NPP with VVER-440 units. The development of IVR solutions for the handling of severe accident scenarios in VVER-440 reactors is under development in some other European countries (e.g. Hungary and Slovakia). Since the project will address the heat removal from the lower head of a flooded reactor the results of experiments can provide important information for the establishment and validation of the design of external cooling of these low power reactors.

\* Recommendations: - The effect of critical heat flux development is largely influenced by the geometrical arrangements of the test facility. It should be specified:

* whether the applied experimental setup will simulate a given reactor type,
* or the execution of test series will make possible drawing general conclusions (e.g. using dimensionless parameters).

- The frequency of flowrate oscillation (or the period of dry phase on the external surface of the lower plenum model) should be compared to the heat removal process from the molten corium through the vessel wall. Such data can be derived from the results of OECD RASPLAV and MASCA projects.

- After confirmation of the project by ISTC the work plan should be agreed with the SARNET partners. It is especially recommended to ask Prof. Nam Dinh (KTH) for his comments.

- The contribution of KAERI should be specified.

\* Comments: -This project will bring additional data on critical heat flux needed to evaluate the IVR possibilities during a core melt down accident and therefore can improve the capabilities of ASTEC.

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