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

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

*To:* R. Burmanjer (EC, DG-RTD / D.3) *Advice no.:* A -21

*Project code:* STCU # 4758 *Date:* 25th Sept. 2009

*Signatures:* P.Hofmann (Secretary)

*Linked meeting:*  16th CEG-SAM meeting, Moscow, September 7-11th, 2009.

*Attending members:* Azarian, Fargette (AREVA); Bottomley (JRC/ITU); Clement (IRSN); Nicolas, Journeau (CEA); Lamy (EdF); Güntay (PSI); Herranz (CIEMAT); Oriolo (Uni.Pisa); Stuckert, (FZK); Krause (AECL);

*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: - Natural and calculation-experimental research of processes of fuel melt interaction with construction materials for severe radiation accidents on nuclear power plants.

\* EU Collaborators: - GRS, FZK, ITU, CEA, AECL

\* Documents: - STCU Proposal #4758 Natural and calculation-experimental research of processes of fuel melt interaction with construction materials for severe radiation accidents on nuclear power plants. Leading Institution: Institute for NPP safety problems, Ukraine’s National Academy of Sciences

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

\* Justification: - This project proposal will last for 30 months for a total cost of 199,080 US $. This project will be carried out by the Institute for NPP safety problems of UNAS, Ukraine, Chernobyl who have a wide range of experienced personnel and all the necessary licences to carry out this work in the Shelter. The proposal will extend & improve the measurements made in the Shelter boreholes of temperature, neutron and -dose rate as well as water & air sample analysis. This will complement the activities being carried out under the STCU #4207 'Long-term prognosis of behaviour of the fuel dust in Chernobyl Shelter'.

The principal objective of this project will be to specifically examine the melted fuel-containing materials (FCM) hidden beneath the poured concrete layers that have potentially up to 50wt% U content and so could potentially attain re-criticality under certain conditions of water content (e.g. during soil drainage or drying following variations in rainfall or if improved roofing is placed over the Shelter). Determination of their location is the necessary first step before they can be neutralized and finally removed as is eventually foreseen.

The project will start with an assessment of the existing data-base collected under previous work and determination of missing data. Then the key boreholes will be re-equipped and refurbished to extend the data collection. This data will be then be assessed and used as input for models to estimate the location & condition of these nuclear-hazardous FCM. Particularly important estimates will be the maximum U content, its distribution as well as its composition . This improved and updated chemical, physical and meteorological data will be important in the models to assess the FCM's future condition and degradation with time as well as determining the potential measures that can be undertaken to prevent further reactivity incidents & indicate what removal techniques are possible (given the local dose rates, the form & solubility of the hazardous clusters).

Comments: This is a project of national importance for the Ukraine and will provide essential data for the long-term aim of remediating the Shelter site. This work should be done on a rigorous scientific basis as it will provide qualified physico-chemical data for the evaluation of the nuclear-hazardous clusters & all buried FCM material.

This data will be of great interest to both Russian & Western European researchers in severe accidents. Links with the SARNET2-corium programme and CEA-Plinius project are proposed as these will be of mutual benefit. In addition this databank can be of considerable use for estimating fuel and corium degradation under short & medium term storage conditions.

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