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| **SCIENCE & TECHNOLOGY CENTER IN UKRAINE** | EUROPEAN COMMISSIONDIRECTORATE-GENERAL ‘RESEARCH’ |  |  |

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

*To:* R. Burmanjer (EC, DG-RTD / D.3) *Advice no.:* A -14

*Project code:* STCU # 4207 *Date:* 24th May 2007

*Signatures:* P.Hofmann (Secretary)

*Linked meeting:*  11th CEG-SAM meeting, Dresden, Germany, March 7-9, 2007.

*Attending members:* Altstadt, Willschütz (FZD); Azarian, Nie (AREVA); Bottomley (JRC/ITU); Cenerino, Clement (IRSN); Ducros, Journeau (CEA); Dutheillet (EdF); Güntay (PSI); Herranz (CIEMAT); Koch (RUB); Miassoedov, Stuckert, W. Tromm (FZK); Krause (AECL); Trambauer (GRS)

*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: - “Long-term prognosis of behaviour of the fuel dust in Chernobyl Shelter"

\* EU Collaborators: - ITU & CEA; probably IRSN & other organisations

\* Documents: -STCU project proposal #4207;”Long-Term prognosis of behaviour of the fuel dust in Chernobyl Shelter”, (Version March 2007). Leading Institutions: Ukrainian Institute of Agricultural Radiology, Kiyv; Institute of Safety Problems of Nuclear Power Plants, Chernobyl

\* Advice: - **EU funding recommended with Priority 1**

\* Justification: - This project proposal will last for 30 months for a total cost of 300,000 US$. This proposal examines the long-term reactions and stability of the irradiated fuel particles in the Chernobyl shelter. It will run in parallel with the ISTC project (#3702 –CHESS-2) which will look at the long term stability of the larger pieces of fuel–containing material (FCM) or lava.

The first task is to review the formation mechanisms of the Chernobyl hot particles (HP) and their classification by physical-chemical characteristics. The «Hot particles» database will be modernized and updated. Then the characteristics and behaviour of radioactive aerosols (RA) and water in Shelter will be examined (eg. rate of formation, composition, dispersal mechanisms). Then further experiments of the fuel particle (FP) destruction rate and its dependence on the matrix characteristics (oxidation state) and media properties will be performed. At this point a model for the FP transformation in the Shelter can be established.

This model will then be combined with the model for fuel-containing material (FCM) degradation from the ISTC project #3702 of KI, Moscow. The combined model will be used to estimate the long-term radioactive dust formation from all sources and to predict the activity distribution in the Shelter. This is essential for any future activity within the Shelter: eg. its disassembly and replacement, fuel/FCM removal and its transformation into an ecologically safe system. This is expected to last for up to 70-100 years.

The projects will have joint meetings and full information exchange and have a final programme of modelling and production of a combined model for the long term prediction of the stability of all forms of fuel (pieces & FCM).

The parallel running of the projects will optimise their progress and combine their expertise as well as maximising the databases for the model.

This project is of truly international nature and is an essential investment for any undertaking at the Shelter (Shelter Implementation Plan) and will grow more important with time. It is a unique database for EU countries to assess long-term stability of corium & concrete interaction products.

\* Comments: - This project will evaluate a vast data bank on irradiated fuel particles in Chernobyl Shelter. Along with the parallel ISTC project #3702, it will produce a combined model that will be invaluable to the EU as well as Russia, Ukraine and Eastern Europe.

- The project will also have links to the SARNET programme where the analyses will be of great interest to the Corium topic. Furthermore analyses of the long-term weathering will have great relevance to spent fuel studies.

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