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

## NON PROLIFERATION THROUGH SCIENCE AND CO-OPERATION

**CONTACT EXPERT GROUP on**

**SEVERE ACCIDENT MANAGEMENT**

**(CEG-SAM)**

**MINUTES OF THE 8th MEETING**

**Federal State Unitary Enterprise**

**Scientific Research Institute Scientific Industrial Association “LUCH”, Podolsk, Russia**

**September 14-15, 2005**

**Kurchatov Institute of Atomic Energy (KIAE), Moscow, Russia**

**September 16, 2005**

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| Dissemination level: RE  PU: public  RE: restricted to EC and a group specified by the CEG-SAM members  CO: confidential, only for EC and CEG-SAM members |

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Revised minutes, December 5, 2005 CEG-SAM / M-08

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| Subject: 8th Meeting of the ISTC  “Contact Expert Group on Severe Accident Management” (CEG-SAM)  Place: FSUE SRI SIA „LUCH“, Podolsk and KIAE, Moscow, Russia  Date: September 14-16, 2005  Participants: 45 participants of 28 organizations from 8 countries:  Mr. H.J.Allelein GRS, Cologne  Mr. E.Altstadt FZR, Rossendorf  Mr. G.Azarian Framatome ANP SAS, Paris  Mr. D.Bottomley DG-JRC / ITU, Karlsruhe  Mrs. E.Brunet-Thibault EdF R&D, Clamart  Mr. B.Clement IRSN, Cadarache  Mr. G.Ducros CEA, Cadarache  Mr. Y.Dutheillet EdF R&D, Clamart  Mr. P.Hofmann Consultant, Karlsruhe (**secretary**)  Mr. Z.Hozer AEKI, Budapest  Mr. M.Hugon DG-RTD / J4, Brussels (**chairman**)  Mr. Ch.Journeau CEA/DTN, Cadarache  Mr. H.-D.Kim KAERI, Taejon, Korea  Mr. M.Krause AECL, Chalk River, Canada  Mr. A.Miassoedov FZK, Karlsruhe  Mr. M.Nie Framatome ANP GmbH, Erlangen  Mr. J.Stuckert FZK, Karlsruhe  Mr. W.Tromm FZK, Karlsruhe  Mr. S.Bechta RIT / NITI, Sosnovy Bor  Mr. V.Bezlepkin SPAEP, St.Petersburg  Mr. S. Bogatov RRC KI, Moscow  Mr. A. Borovoi RRC KI, Moscow  Mr. M. Budaev RRC KI, Moscow  Mr. V. Chesanov RIAR, FRD, Dimitrovgrad  Mr. V.Chudanov IBRAE, Moscow  Mr. A.Egorov RFNA, Minatom, Moscow  Mr. S.Gavrilov RRC KI, Moscow  Mr. A.Goryachev RIAR, FRD, Dimitrovgrad  Mr. E.Grishanin RFNC VNIIEF, Sarov  Mr. A.Kisselev IBRAE, DNS, Moscow  Mr. A. Kondrashenko RFNC VNIIEF, Sarov  Mr. I. Kungurtzev RIAR, Dimitrovgrad  Mr. Yu. Leontiev SPAEP, St.Petersburg  Mr. A. Lukianov IPPE, Obninsk  Mr. V. Mineev IVTAN-RAS, Moscow  Mr. V.Nalivaev LUCH, Podolsk  Mr. S. Orechov RRC KI, Moscow  Mr. A. Palagin IBRAE, Moscow  Mr. N.Parshin LUCH, SIA, Podolsk  Mr. E. Pazukhin RI RD, St.Petersburg  Mr. V.Semishkin Gidropress, Podolsk  Mr. Sheindlin JRC / ITU, Karlsruhe  Mr. V. Strizhov IBRAE, Moscow  Mr. L.Tocheny ISTC, Moscow (**co-chairman**)  Mr. Yu. Vassiliev NNC, Republic Kazakhstan  Mr. A. Vurim NNC, Republic Kazakhstan  Mr. V.Zhdanov NNC, Republiv Kazakhstan  Distribution list: Mr. A.Mitsos DG-RTD  (Shortened version Mr. Z. Stancic DG-RTD  of the minutes) Mr. A. Siegler DG-RTD / N  Mrs. B.Rhode DG-RTD / N.3  Mr. J.Sanders DG-RTD / N.3  Mr. P. Fernández Ruiz DG-RTD / J  Mr. M.Poireau DG-RTD / J.1  Mr. S. Webster DG-RTD / J.4  Mr. R.Schenkel DG-JRC  Mr. P. Frigola DG-JRC / 2  Intranet of Unit J.4  Mr. N. Jousten ISTC, Moscow  Mr. L.Tocheny ISTC, Moscow  EU CEG-SAM members  Contact person: Mr. M. Hugon Tel.: +32 2 296 5719 – DG-RTD / J.4 |

Agenda of the meeting see Annex 1, list of participants see Annex 2.

The 8th CEG-SAM Meeting was organized by the Federal State Unitary Enterprise Scientific Research Institute Scientific Industrial Association “LUCH” (FSUE SRI SIA) in Podolsk September 14-15, 2005 and by the Kurchatov Institute (RRC KI) in Moscow September 16, 2005.

The meeting is divided into restricted and extended sessions. The restricted sessions are to discuss internal matters and the status of current ISTC projects. For the first time a restricted European session took place without the Canadian and Korean participants. The extended sessions are dedicated to presentations of the progress of on-going ISTC projects and of new or revised ISTC proposals by Russian scientists.

The co-chairman L.Tocheny opened the meeting and welcomed the participants of the 8th meeting of the International Science and Technology Centre (ISTC) - members of the Contact Expert Group on Severe Accident Management (CEG-SAM) and Russian participants. He expressed his thanks to V.Nalivaev and I.Fedik, Director General of FSUE SRI SIA “LUCH”, to organize and host the meeting.

I.Fedik welcomed the participants of the 8th CEG-SAM meeting on behalf of “LUCH” and presented a short overview on the various activities of SRI SIA “LUCH”: developing and providing the nuclear industry with fuel elements and fuel assemblies for nuclear power plants and propulsion engines. In addition research is carried out in areas of development of materials for high-temperature application as well as reactor safety related problems as the behaviour of VVER fuel elements at high temperatures in the PARAMETER facility.

**Restricted session**

FSUE SRI SIA „LUCH“, Podolsk

**Topic #1:** Welcome and opening remarks

The chairman M.Hugon opened the first part of the restricted session and welcomed the participants of the 8th CEG-SAM meeting. He also expressed his thanks to FSUE SRI SIA “LUCH” on behalf of the CEG-SAM to host the meeting in Podolsk.

He reminded briefly the tasks of the CEG-SAM in connection with the network of excellence (NoE) EC-SARNET, the critical review and discussion of the ISTC proposals that should be put on a ranking list.

For the first time Hee-Dong Kim from KAERI, who is foreign collaborator of the ISTC project #2936 (Reactor Core Melting), participated in the meeting and was welcomed by M.Hugon.

**Topic #2:** Adoption of the agenda

Additional presentations were proposed by D.Bottomley on “Further measurements in JRC-ITU of the sub-oxidised U-Zr-O system”, which would be of particular interest to the CORPHAD project, and by L.Tocheny on two new ISTC project proposals (see topic #22).

With these changes, the attached agenda (see Annex 1) was accepted.

**Topic #3:** Approval of the minutes of the previous 7th CEG-SAM meeting in Cologne, Germany, February 28-March 1, 2005

The secretary took into account the various comments on the draft minutes received by the group members in the revised minutes, dated April 24, 2005. The revised minutes were then approved without changes at the meeting in Podolsk.

**Topic #4:** Discussion of the “Specific action list” of the 7th CEG-SAM meeting in Cologne

Action 7/1: For all CEG-SAM members.

In the future, the collaborators should send the letter of support and/or advice by airmail to the Executive Director of ISTC Norbert Jousten with scanned copies by e-mail or by fax to the CEG-SAM chairmen M.Hugon (EC) and L.Tocheny (ISTC), the secretary and Mrs. Barbara Rhode (EC). *>Done for the last project proposals.*

Action 7/2: L.Tocheny will contact V.Zhdanov to prepare an official ISTC proposal on INVECOR to be decided at the next CEG-SAM meeting. Possible MCCI tests should be included. *> Done.*

Action 7/3: L.Tocheny should contact Yu.Zvonarev (RRC KI) to prepare a revised work plan on the proposal ASAC (Adaptation of SA ICARE/CATHARE and ASTEC codes to VVER). A small working group, lead by H.J Allelein, will define its interest and send it to L.Tocheny. > *No progress.*

Action 7/4: L.Tocheny will contact Russian organisations involved in safety-related research on RBMK (RRC KI, NIKIET) to stimulate them to propose an ISTC project. L.Tocheny proposed that the group should first define its interest to proceed in this matter. HJ Allelein stated he would make inquiries about this with the Berlin office of GRS. > *Contact with Russian organisations was established by L.Tocheny and he invited also some scientists to the meeting. The group should more clearly decide in which topics it is interested.*

Action 7/5: The electronic versions of available progress reports of ongoing ISTC projects should be send by the responsible EU collaborators to L.Tocheny and A.Miassoedov to include them in the ISTC CEG-SAM webpage. > *There are no new reports available for storage in the webpage. It was decided that in the future the Russian project manager should be responsible to send its reports to L.Tocheny and A.Miassoedov.*

Action 7/6: The recommendations of the CEG-SAM to the ISTC Governing Board for funding project proposals should be sent by the Secretary to the Chairman, who will forward them to B.Rhode, J. Sanders and L.Tocheny.

The recommendation for the proposal PARAMETER will be prepared by B.Adroguer and S.Marguet. > *Done on 10 March 2005.*

Action 7/7: The recommendations for EVAN will be prepared by H.J.Allelein and D.Bottomley and that for INVECOR by Ch. Journeaux and W.Tromm, once they have been officially registered at the ISTC Secretariat. > *Done for INVECOR at the beginning of April 2005*.

Action 7/8: M.Hugon will officially invite Zoltan Hozer, [Hozer@sunserv.kfki.hu](mailto:Hozer@sunserv.kfki.hu), (KFKI Atomic Energy Research Institute, AEKI, Hungary) to participate at the next CEG-SAM meeting in Podolsk and offer him membership of the group. *>Action completed. Z.Hozer was welcomed by the group and the chairmen encouraged him to act as collaborator in some of the projects.*

Action 7/9: L. Tocheny will contact VNIIEF, Sarov, concerning the follow-up of project proposal # 1974 on MCCI (see Action 6/2 of the 6th CEG-SAM meeting). *> Done. A paper on this subject will be presented by A.V.Kondrashenko (VNIIEF, Sarov ;); see topic #22.*

**Topic #5**: Status of ISTC proposals recommended for funding at the 7th CEG-SAM meeting: PARAMETER (#3194), INVECOR (#K-1265), EVAN (#3345)

L.Tocheny presented the status of the 3 ISTC projects.

PARAMETER project agreement: Leading organisation: “LUCH” (V.Nalivaev), commencement date: July 1, 2005, duration: 24 months, allocated funding: 300.752€, foreign collaborators: CEA, EdF, GRS, IRSN, JRC-ITU.

INVECOR project agreement under preparation: Leading organisation: IAE NNC RK, (V.Zhdanov) Kazakhstan, commencement date: still open, duration: 36 months, allocated funding: 644.628€, foreign collaborators: CEA, FZK, FZR, IRSN.

EVAN proposal, divided into two phases, under preparation: Leading organisation: SPAEP St.Petersburg (V.Bezlepkin), duration: phase one 12 months, phase two 24 months, requested funding: 350k€ / 450k€, foreign collaborators: CEA, GRS, IRSN, JRC-ITU, PSI, VTT.

An advice for EVAN will be prepared by H.-J.Allelein and D.Bottomley which will then be transmitted by the Chairman to B.Rhode, who will submit it to the ISTC Governing Board (GB) for decision in October 2005 *(Done on September 29, 2005).* Canada and/or Korea may also financially support the project

**Topic #6:** Status of the official ISTC CEG-SAM webpage

The password-protected website of the CEG-SAM group within the official ISTC webpage has been setup by Alex Miassoedov (FZK) in co-operation with Olga Myznikova (ISTC) and is now operational providing an access to the CEG-SAM related documents. The website can be accessed at <http://ceg-sam.istc.ru> (the login and password were sent to the group members by separate mail). The objective of the webpage is to serve as a file repository and to provide an easy access to all CEG-SAM related documents.

The comments of the group regarding slight improvements of the webpage were executed by A.Miassoedov. Project progress and final reports and a list of advices should be added in future. In addition, a regrouping of the documentation by project number and status should be done to put all documents related to the same ISTC project in the same file and to distinguish between proposals, running projects, completed projects and finally proposals not retained for funding. Further suggestions were to include the EC logo, to add a website global search feature, and for the various types of projects and proposals their number, title and acronym (action 8/12). It was further decided that each project co-ordinator should send their progress and final reports to L.Tocheny (ISTC) and A.Miassoedov (FZK) to be stored on the website.

The CEG-SAM group thanked A.Miassoedov (FZK) and O.Myznikova (ISTC) once more for their time-consuming work.

**Topic #7**: Report by the secretariat; update of the list of collaborators

M.Hugon explained to M.Krause (Canada) and H.-D.Kim (Korea) that it was necessary to have a restricted European session to discuss European matters such as the interaction with EC-SARNET, the participation of non EU funding collaborators in progress meetings of ISTC projects funded by the EU and intellectual property rights.

**Restricted European session**

FSUE SRI SIA „LUCH“, Podolsk

**Topic #8**: Update on the information exchange and interaction between ISTC CEG-SAM and SARNET

The modalities of interaction between CEG-SAM and EC-SARNET are defined in the document entitled “Interaction between EC-SARNET and CEG SAM activities”, which was endorsed by the CEG-SAM at its 7th meeting in Cologne on February 28th - March 1st, 2005 and by the EC-SARNET Governing Board on 18 March 2005 in Paris.

At the last EC-SARNET meeting in Cologne in February 2005, E.Altstadt gave a presentation on the objectives and tasks of the CEG-SAM. At its next meeting, a presentation of ongoing ISTC projects should be given to enhance the planned interaction between EC-SARNET and CEG-SAM.

B.Clement will give a short presentation on EC-SARNET research priorities under topic #13, mainly to inform the Russian scientists.

As stated in the document entitled “Interaction between EC-SARNET and CEG SAM activities”, it was decided that P. Hofmann will send to J.M.Bonnet (CEA), responsible for core degradation and corium behaviour in EC-SARNET, the work plans of the PARAMETER and INVECOR proposals and to T.Haste (PSI), responsible for fission product behaviour in EC-SARNET, the work plan of the EVAN proposal (Action 8/5).

Finally, it was recalled that: 1) for each ISTC project one responsible group member should be nominated that will establish contact with the responsible topical coordinator of EC-SARNET in the considered research area, 2) the intellectual property rights have to be clarified, 3) the access to information on EC-SARNET projects for foreign collaborators such as Canada and Korea has to be defined.

**Topic #9**: Preliminary discussion/checking of individual ISTC project proposals

Comments on the proposal “Fuel assembly tests under severe accident conditions” (PARAMETER):

The project proposal and work plan were revised. An extension of the test matrix from two to three bundle tests was discussed. The decision was to perform two bundle tests in a first phase and possibly a third bundle test in a second phase. See also topic #18, the presentation of V.Nalivaev. A first project progress meeting will take place in connection with the QUENCH workshop in Karlsruhe, October 25-27, 2005.

Comments on the revised ISTC proposal on “Ex-vessel source term analysis” (EVAN):

The project proposal has two phases: Phase 1 lasting 1 year for construction and scoping tests and phase 2 lasting 2 years for test studies. See also topic #20, the presentation of Yu.Leontiev. The group strongly supports the execution of this project aimed at reviewing the scenarios and the parameters used to bound severe reactor accidents and then to examine selected areas of uncertainty. These are the fission product releases from the corium molten pool, the aerosol transport processes that can occur in the primary circuit and finally the iodine behaviour in the containment. It was decided to prepare an advice for the project proposal to be submitted to the ISTC GB meeting in October 2005 (action 8/7).

Three new ISTC project proposals will be presented under topic #21 and #22.

In this connection the group members expressed again their concern that most of the requested documents from ISTC regarding selected project proposals were not made available to them in sufficient time before the CEG-SAM meetings. A better organisation in this matter is highly desirable to establish a fruitful exchange of information and successful co-operation between ISTC and the CEG-SAM.

**Topic #10**: Participation of non EU funding collaborators in progress meetings of ISTC projects funded by the EU – Intellectual property rights

Some rules should be developed for the participation of non-European and non-funding organisations at CEG-SAM and project progress meetings. Of special concern are, in this connection, intellectual property rights (IPR). There exists an IPR agreement between Russia and funding parties for ISTC projects; this agreement does not concern individual organisations. Ch.Journeau proposed that regarding IPRs, a non-European organisation, which does not fund a project, cannot make use of the results within 3 years following their release.

The necessary rules should be established by the funding parties for the various ISTC projects and may be considered in the project agreements. The information on the progress of ongoing projects in the framework of the CEG-SAM meetings are limited and therefore no restrictions should be applied regarding the participation of non-funding and non-European CEG-SAM members.

The final conclusion of the European group members was that non-European members as Canada and Korea or non-funding parties can participate in the official CEG-SAM meetings but not in the specific progress meetings of ongoing ISTC projects as long as they are not collaborators. **Therefore, in the future, there will be no longer restricted European sessions!** As a result, the planned restricted European session on September 16, 2005, was cancelled.

# Extended session

FSUE SRI SIA „LUCH“, Podolsk

**Topic #11**: Welcome of the Russian colleagues; approval of the shortened minutes of the 7th CEG-SAM meeting in Cologne; adoption of the agenda

M.Hugon opened the extended session of the meeting and welcomed the Russian participants. The shortened minutes of the 6th CEG-SAM meeting, distributed to the Russian participants in April 2005, were accepted without any changes. The changes in the agenda, e.g. additional presentations were discussed and accepted.

M.Hugon informed the participants of the outcome of the discussion of topic #10 regarding the participation of non EU funding collaborators in progress meetings of ISTC projects funded by the EU. There are no restrictions concerning the participation of non-funding parties in CEG-SAM meetings but restrictions exist in the participation in specific project progress meetings.

**Topic #12:** Status of the information exchange and interaction between ISTC CEG-SAM and EC-SARNET

Concerning severe accident management (SAM), EC-SARNET activities are co-sponsored by the EC and most of ISTC projects (monitored by CEG-SAM) are financed by EC. Therefore, the interaction between EC-SARNET and CEG-SAM will bring mutual benefits and would further assure a critical mass of expertise for ISTC proposals addressing specific issues in the SAM area. Furthermore, a closer research co-operation with Russian organisations in the SAM area would and should be formalised (see topic #30). The information exchange should work in both directions.

It was decided by the CEG-SAM that ISTC proposals and information on ongoing projects should be transmitted to the EC-SARNET topical project coordinators of the concerned research field for additional expertise and feedback (topic #8 and action 8/5).

Results of EC-SARNET's definition of priorities in terms of R&D needs will be periodically presented to the CEG-SAM members and Russian organisations. This list should be updated continuously within EC-SARNET.

**Topic #13:** EC-SARNET Research Priorities

B.Clement (IRSN) presented a short overview on the EC-SARNET research objectives as:

* the formation of close partnerships between the EU Member States,
* the formation of a network of excellence,
* the reversal of the fragmentation of European research in nuclear energy, and
* the resolution of still pending questions those are important for reactor safety.

Altogether 18 countries with 49 organisations work together in the EC-SARNET programme. All research activities are linked to national and international programmes aiming at a common interpretation and use of experimental results, and in a common development of models and a joint computation tool (ASTEC).

Different research priorities will be defined by the EC-SARNET working group SARP (Severe Accident Research Priorities) in the fields of early- and late-phase core degradation and vessel behaviour as well as ex-vessel corium recovery and fission product release and transport and its impact on the source term.

An interaction between CEG-SAM and SARNET should be therefore envisaged in 2006 to analyse more precisely the orientation to be given to ISTC projects to meet priority R&D needs. A link between the ISTC CEG-SAM webpage and SARNET will be helpful.

**Topic #14:** Progress report on the project # 1648.2 “Examination of VVER fuel behaviour under severe accident conditions, Quench state”

A.Goryachev from RIAR Dimitrovgrad presented the current status of the ISTC project which comprises three different tasks: a) study of spent fuel rod segments under reflood conditions to determine the hydrogen generation and fission product release; b) conduct of one integral quench experiment with 31 VVER fuel element simulators, and c) development of a quench model, which can be used in code systems to predict the VVER core behaviour during reflood conditions (“quench” stage).

After the installation of the single rod test facility in a hot cell at RIAR, first tests with pre-oxidized un-irradiated specimens have been conducted which have shown that the axial temperature distribution of the fuel rod specimens (about 100 °C) has to be improved. Some problems appeared during heat-up of the specimens to the desired test temperature as a result of uncontrolled fast oxidation. Additional effort is necessary to overcome these problems in the current test rig before first experiments with irradiated VVER fuel rod segments can be conducted. In the fuel rod segments no internal pressure is applied. Cs measurements are not planned. Fragmentation of the fuel rod segments will be avoided due to the limitation of the oxide layer thickness of about 100 microns.

Concerning the bundle quench experiment in the QUENCH facility the various components have been prepared by RIAR and are now ready for transportation to Karlsruhe by the end of September 2005. The VVER 1000 bundle quench test with 31 fuel rod simulators (18 electrically heated and 13 unheated fuel rods) will be conducted in the QUENCH facility at FZK, the currently planned date for the test is June 2006.

With respect to the modelling activities performed by IBRAE the requirements to the SVECHA code models (mainly concerning the material properties) were elaborated in order to be able to describe VVER reactor fuel element behaviour under severe accident conditions. The preliminary adaptation of the models for the time-dependent high temperature oxidation and mechanical behaviour of VVER cladding tubes was performed and a comparison of the results between “fresh” and “spent” fuel cladding tubes carried out. First results with the adapted models developed by IBRAE show a rather good agreement of calculated and experimental parameters. The model on the mechanical behaviour of the VVER cladding will be improved,

A first written report on the progress of the project will be delivered to the collaborators at the QUENCH Workshop and to ISTC in October 2005.

**Topic #15:** Progress report on the project # 2936 “Modelling of reactor core behaviour under severe accident conditions. Melt formation, relocation and evolution of molten pool”

A.Palagin from IBRAE presented briefly the work plan of the project #2936 that is divided in 8 tasks starting with modelling of melt formation and relocation up to a thermo-hydraulic model for the molten corium pool behaviour in the reactor pressure vessel including the crust formation. Tasks 1 and 6 have been completed.

In the framework of task 2 the modelling activities of the candling process of molten material mixtures outside and inside (cladding/pellet gap) of the cladding tubes for various types of downward flow and transient processes were performed. In addition work was conducted on the slug relocation model that describes the slow relocation of massive melts (“slug”) and its chemical interaction with fuel rods and steam (task 3). The model accounts for the heat effects of simultaneous dissolution and oxidation of massive melts.

The late stage material behaviour when the core is completely degraded and a molten pool is formed in the lower head of the reactor pressure vessel (RPV) is described by the three-dimensional CONV code (task 7). Theoretical analysis and CONV code validation were carried out: calculation of flows with variable densities, modification of the numerical algorithm and verification of the modified software on BALI experiments and preliminary LIVE calculations.

The models developed are now under adaptation for the SVECHA code.

**Topic #16:** Progress report on the project # 833.2 “Investigation of corium melt interaction with NPP reactor vessel steel” (METCOR-2)

The work carried out within the ISTC METCOR-2 project is aimed at studying physico-chemical phenomena taking place during the interaction of molten corium with reactor vessel steel in the case of in-vessel melt retention (IVR).

S.Bechta (RIT-NITI) described the progress of the project since the last CEG-SAM meeting in Cologne. The MC9 test on the interaction of a sub-oxidised corium melt (C30+steel) at about 2600°C with the steel of a RPV and its analysis has been completed. The results were presented at the last METCOR project progress meeting in St.Petersburg, July 12, 2005.

A preliminary test Pr1-MC10 has been performed for developing the procedure for corium melting in steam. Subsequently the test MC10 to study the corrosion of RPV steel interacting with C-100 corium in a steam atmosphere was conducted and a first analysis of the experimental results was carried out. The preliminary results show that the steel ablation rate in steam is about two times higher than in air. The conduct of the experiment MC-10 in steam compared to air results in some experimental difficulties regarding the temperature stability.

Within the current METCOR Project, the corium melt / vessel interaction can be substantially different in case of an oxidizing (steam) atmosphere in comparison to an inert atmosphere. The melt oxidation is accompanied by an additional heat release, the intensity of which depends on the process kinetics. This heat release causes melt heating and increased heat load on the vessel wall. If the metallic layer stays on the surface, its oxidation results in the formation of an oxide crust, which obstructs the heat transfer from the top surface, as a consequence, the impact of metallic melt on the vessel is enhanced by a focusing effect.

At the steering committee meeting the collaborators proposed an extension of the METCOR project for 3 years to clarify the important unresolved questions. A request was sent to N.Jousten, Executive Director of ISTC.

**Topic #17:** Progress report on the project #1950.2 “Phase diagrams for multi-component systems containing corium and products of its interaction with NPP materials” (CORPHAD-2)

The CORPHAD-2 project focuses on experimental studies of phase diagrams of corium/NPP material mixtures to obtain information on liquidus and solidus temperatures, on temperature-concentration regions of miscibility gaps and on solubility limits. The reactor application of the results is based on the thermodynamic NUCLEA database optimisation. Improvements are expected regarding corium behaviour modelling.

S.Bechta (RIT-NITI) reported of the phase studies of the systems Zr-Fe-O, U-Zr-O and U-Fe-O. In the system Zr-Fe-O for the examined mixtures CORD33 and CORD39 a stratification into two liquids a “light” metallic and heavy “oxidic” melt was observed. In the U-Zr-O system for the composition CORD37 a miscibility gap under the formation of a metallic and oxidic liquid was determined. In the system U-Fe-O the mixture CORD36 resulted in a stratification of the melt into two liquids (metallic and oxidic) at about 2350°C. The results of the project are partially documented in internal progress reports and in different publications.

The current practice of severe accident scenario predictions and on severe accident management (SAM) is based on the integrated thermo-hydraulic and thermodynamic approach. The thermodynamic modeling of high-temperature systems containing the core and in-vessel structural materials is based on specialized programs and appropriate databases, e.g. GEMINI and NUCLEA. The software development and improvement requires extensive experimental studies, which, in particular, are aimed at studying the high temperature phase diagrams of corium.

At the steering committee meeting the collaborators also proposed an extension of the CORPHAD project for 3 years to clarify the open questions or the poorly-known systems that remain. A request was sent to N.Jousten, Executive Director of ISTC.

A key reason for continuing both projects immediately is that the practical experience has already been accumulated in surmounting the technical difficulties for such experiments. Moreover the advantages of continuing the investigation, while the expertise of the operating team and their initiatives are still fresh, are additional bonuses. Before a decision regarding the prolongation can be made, the available results should be reviewed critically.

**Topic #18:** Status of the ISTC project # 3194 on “Fuel assembly tests under severe accident conditions” (PARAMETER Facility). Presentation of the revised test matrix.

V.Nalivaev from FSUE SRI SIA “LUCH” presented the current status of the project PARAMETER that includes the conduct of two VVER-1000 bundle experiments under severe reactor accident conditions, similar to the experimental conditions of the QUENCH-06 experiment. In the first test the overheated bundle should be flooded from the top; in the second test the bundle will be flooded simultaneously from the bottom and from the top. The test parameters for the first bundle experiment (heat-up rate, steam flow rate, extent of pre-oxidation of the cladding, maximum cladding temperature before quenching, flooding rate) were described in detail. They were fixed on the basis of SVECHA code predictions by IBRAE.

The CEG-SAM requested a detailed description of the test rig to be able to conduct comparison calculations with their own code systems. A.Kisselev (IBRAE) should provide the necessary data set to interested organisations. The conduct of post-test calculations of the bundle experiments are not part of the ISTC project.

The first PARAMETER project progress (kick-off) meeting will take place in conjunction with the QUENCH Workshop in Karlsruhe, October 2005.

In the morning of September 15, 2005, the members of the CEG-SAM had the opportunity to visit the PARAMETER test facility in the Federal State Unitarian Enterprise “LUCH”. In the PARAMETER test facility experiments with 3.5m long electrically heated VVER and PWR fuel element simulators under design basis and severe accident conditions have been conducted. After the experiments extensive destructive post-test examinations of the damaged fuel elements are carried out. The various laboratories could be visited.

**Topic #19:** Status of the ISTC project # K-1265 “Study of the processes of corium-melt retention in the reactor pressure vessel” (INVECOR)

V.Zhdanov (NNC RK) described the objective of the in-vessel corium retention (INVECOR) experiments, e.g. the improvement of the safety assessment of LWR corium in-vessel retention (IVR) and the modelling of the thermal and physico-chemical processes of the prototypical corium pool and its retention in the water-cooled RPV lower head. The project is divided into 4 tasks. Task 1: Modernization of the available facilities and optimization of melting technology and simulation of decay heat, development of crucible surface protection technology including experiments on coating application for large-scale crucible tests. Task 2: Pre- and post-test calculations of the tests and development of a molten pool model. Task 3: Conduct of large-scale experiments with maintenance of the energy release into the molten pool. Task 4: Post-test analysis of the corium samples and the RPV steel.

Before performing the first test in the LAVA facility calibration tests are necessary to specify the heating mode, to assure the production of contamination-free corium and to specify the parameters for the decay heat simulation by a plasma-type heating device. In a first scoping test a corium pool should be obtained and kept for about 2 hours. A crucial point in the experiments is to keep the melt at high temperatures. Various methods and materials will be examined, mainly in the design and number of the heating electrodes inserted in the molten corium. An additional important task is the protective coating of the graphite crucible inner surface and the electrode nozzle outer surface to reduce the chemical contamination of the molten corium with these materials used in small-scale tests. Various coating methods and coating materials will be examined.

The test scenarios should be discussed with the collaborators of the project and considered in the work plan. The experience obtained in the framework of the METCOR and other international high temperature corium melt experiments should be evaluated and taken into account.

**Topic #20:** Status of the revised “Ex-vessel source term analysis” (EVAN) proposal #3345. Presentation of the work plan.

Yu.Leontiev (SPAEP) presented the status and work plan of the project proposal EVAN. The “Ex-vessel Source Term Analysis” (EVAN) ISTC proposal includes theoretical and experimental research of the processes affecting the late phase fission product release into the containment atmosphere. This stage is characterised by corium melt release from the reactor pressure vessel into the containment compartment. At this stage, the fission products are released from the core melt into the containment atmosphere.

The proposal is divided in four work packages consisting of altogether seven tasks which were described in detail: WP1) Analysis of severe accident scenarios; WP2) Experimental and theoretical investigations on fission product release from molten corium pool; WP3) Primary aerosol transport and deposition and WP4) The impact of containment parameters on the behaviour of iodine species. The proposed test matrixes for the different experiments were presented and discussed.

After the last expert group meeting on EVAN in Cologne in February 2005 and subsequent intensive consultations with the collaborators, a two-phase approach for the proposal was chosen: Phase 1 lasting 1 year for the construction and setup of the test equipment and the conduct of scoping tests (350k€) and Phase 2 lasting 2 years for complete test studies and evaluation of the results (450k€). An advice will be prepared by CEG-SAM in which the group strongly supports the execution Phase 1 of this proposal (see topic #32).

**Topic #21:** Study of fission product release and behaviour of VVER fuel with high burn-up under severe accident conditions

A.Goryachev (RIAR Dimitrovgrad) presented a new proposal VERONIKA (**V**VER **E**xperiments on **R**elease due to **O**ver-heating: **N**ormal**i**zation and **K**nowledge **A**ugmentation). In the frame of this proposal investigations on fission product release from high burn-up fuel annealed under oxidizing conditions are planned.

# The aim of the proposal is to obtain experimental data on release of FP from high burn-up VVER fuel, necessary to develop and validate computation codes, and to describe fuel behaviour and FP release under severe accident conditions. Realization of the project will help to solve the following tasks: Develop and validate the fission product release code on the basis of available PWR fuel data and newly obtained VVER fuel data and to compare the fission product release from high burn-up VVER and PWR fuel and correlate the differences in fuel characterization and operational parameters.

In the framework of the project the fission product release from high burn-up fuel of 60MWd/kgU in a steam, steam-hydrogen and hydrogen environment will be investigated in the temperature range between 1400 and 2300°C. In comparison to earlier similar tests it is planned to investigate the release of a wider range of fission product species including short lived isotopes that will be generated by additional irradiation of the fuel rod specimens before testing.

The duration of the planned project will be 5.5 years; the estimated cost will amount to 1100kUSD. It should be carried out in two phases (phase one: 3 years/660kUSD; phase two: 2.5 year/440kUSD) to provide the important feedback necessary for long-term projects. By this means, the experimental matrix may be corrected if necessary on the basis of the first phase's results and results of other related projects.

**Topic #22:** Other matters: New ideas and/or project proposals

It was planned to have presentations on three new ISTC proposals on 1) Large-scale corium melting experiments; 2) New emergency core cooling concept for VVER-1000 reactors; 3) Experiments in the IGR reactor (the presentation was shifted to topic #30). In addition, a presentation was foreseen on further measurements in JRC-ITU of the sub-oxidised U-Zr-O system, but it was cancelled due to lack of time.

A.Kondrashenko (RFNC-VNIIEF) presented the proposal on “Development of large-scale installation for heating and retention of 1000kg melts”. The project proposal describes the development of a large-scale installation for heating and retention of melts that simulate the reactor core melt with the following characteristics: melt volume from 100 to 150 liters (melt masses up to about 1000 kg), max. melt temperature 2500˚C; melt retention time 1-2 hours. The peculiarity of the Project is a new technology for the melt heating and retention developed by VNIIEF. Special pyrotechnic substances will be used to heat the melt and reach the melt parameters required. The corium melt will be maintained with such parameters for a long time by the use of thermal effects of metal (melt components) combustion in a flow of oxygen. A new sacrificial material will be used to immobilize fuel and decay products from the melt.

The accomplishment of this challenging task is divided into three phases, each of them corresponding to a separate ISTC project proposal:

Project #1: “Methods of mitigation of nuclear reactor severe accident consequences. Design of a laboratory installation for reactor core melts heating and retention. Development of computer models”. Project duration: 18 months; costs: 533 769$.

Project #2: “Methods of mitigation of nuclear reactor severe accident consequences. Design of a large-scale installation for reactor core melts heating and retention. Development of thermal models”. Project duration: 18 months; costs: 546 669$.

Project #3: “Methods of mitigation of nuclear reactor severe accident consequences. Experiments on a large-scale installation for reactor core melt heating and retention. Numerical simulation and explosive experiments”. Project duration: 18 months; costs: 475 736$.

First small-scale scoping experiments have been conducted to test the experimental procedure, heating methods, crucible materials as well as varying coatings, and temperature measurements. Their results were briefly described.

E.Grishanin presented the project proposal on “Development of an effective emergency core cooling system for VVER-type reactors”. During a large-break LOCA, the double-sided coolant outflow can result in a heat-up of the cladding temperatures up to 1200°C due to a delayed flooding of the reactor core by the emergency cooling system (ECCS). Although about 300t of water are available in the primary circuit, it would be currently not possible to cool-down the core earlier and faster. For this reason, the development of a new and more effective ECCS is considered that would guarantee that the cladding temperatures would not exceed 300°C during a large-break LOCA. The main ideas of the new ECCS design are protected by a Russian patent. The proposed work is the development of an effective new ECCS design for VVERs and PWRs by computing and experimental activities to demonstrate its effectiveness.

# Extended session (continued)

# KURCHATOV Institute, Moscow

**Topic #23:** Welcome at the Kurchatov Institute of Atomic Energy (KIAE)

V.Gnedenko, Director of the RSC Kurchatov Institute, welcomed the participants at the meeting and described briefly the various activities and tasks of the institute.

The meeting in Kurchatov Institute was dedicated to the CHESS project: its kick-off meeting was opened to the CEG-SAM members due to the interest of the subject. It was an exception to combine a kick-off or project progress meeting with an official CEG-SAM meeting. In the future, the two types of meetings will be separately conducted. Only the results and conclusions of the project progress meetings should be presented at the CEG-SAM meetings.

**Topic #24:** Current status of the ISTC project #2916 “Development of the model for nuclear fuel behaviour during active phase of the Chernobyl accident” (CHESS)

A.Borovoi (RRC KI) presented the current knowledge on the Chernobyl NPP Unit4 accident on April 26, 1986. As a result of the accident, shielding barriers and safety systems protecting the environment against radio nuclides contained in irradiated fuel were destroyed. The active phase of the accident, e.g. the time after the first explosion that destroyed the reactor, the release of radioactive fission products from the damaged reactor core lasted about 10 days. After this time the release of radioactive species was reduced by a factor of thousand and decreased continuously further. In the second phase of the accident, which lasted for some days, the interaction of the hot fuel with various materials resulted in the formation of a corium “lava”. More than 1000 tons of molten material relocated into the lower reactor premises.

The objective of the CHESS project is the development of a model in co-operation with IBRAE that is able to describe the second phase of the accident more accurately. A short review was given on the currently existing models (a more detailed description is given under topic #25). The early models were based on limited measurements and many decisions taken on their basis turned out to be far from optimal at a later time. The knowledge of the initial radionuclide composition of the fuel before the accident and their decay heat is of great importance. The available mechanical, chemical and heat data are not yet satisfactory. An additional important task is the description of the lava formation, its spreading and relocation in the destroyed reactor building and finally its solidification process.

**Topic #25:** Review and assessment of existing models of the second stage of the Chernobyl accident

This part was also presented by A.Borovoi. In the first model developed in 1986, the processes were explained by the effects of dropped materials (thousands of tons of lead and other materials from helicopters). It was refuted already in the course of the first year of systematic investigations inside the “shelter”. According to those investigations, the main assumption of the reactor vault filled with a thick layer of dropped materials (partially molten) turned out to be totally incorrect. The dropped materials could have produced even negative effects on the further stability of the destroyed reactor structure and the shelter at a later time.

In 1990 the “Flying-Reactor” model was developed by E.Purvis. The model is based on two hypotheses. The first hypothesis is, that as a result of a steam explosion the whole reactor core (fuel channels, graphite moderator) and reactor upper biological shielding were thrown out into the central hall (as a rocket) and have flown more than 14 meters above the floor. The second hypothesis is that in the central hall, a nuclear explosion occurred accompanied by a huge rise of temperature and evaporation of nuclear fuel. A.Borovoi considers that this model is not realistic and therefore useless for further considerations.

E.Pazukhin (RRC KI) developed another model that describes the main post-accident mechanical, chemical and heat processes in the destroyed reactor that comply with the factual data, observations, measurements and analyses of samples of fuel-containing and structural materials. The developed model describing the generation of about 1200 cubic meters of lava of composition did not include any considerable amounts of dropped materials. The logic of this model will be used in the subsequent investigations.

**Topic #26:** Half hour after the Chernobyl accident

E.Pazuchin (RRC KI) addressed in his presentation some source data necessary for the generation of a model of the Chernobyl accident phase 2 progression. Under the “second phase of the accident”, which began after the destruction of reactor Unit4 by explosion(s), a multiday process of nuclear fuel/constructional material interactions, corium generation and spreading occurred. By convention, the time of 30 minutes after the explosion was taken, and an attempt was made to reconstruct the data characteristic for that moment and necessary for further simulations. These data may be subdivided into the following three categories: mechanical data (data on geometry and materials), chemical data and heat data. To reconstruct the situation half an hour after the accident the knowledge on RBMK structure before the explosion and the results of the extensive investigations at the destroyed Unit 4 performed in the time from1986 through to 2004 are used. The appropriate data were presented and discussed. They will provide the necessary data for any further model development.

**Topic #27:** Applicability of some different computation models

A hydrodynamic approach was presented by V.Chudanov (IBRAE) for the chemical/thermal interaction of the corium lava with concrete structures. Different mathematical solutions of the problem were considered. Well known MCCI codes CORCON and WECHSL allow to consider a quasi stationary phase of concrete decomposition. To study and describe the molten core/concrete interactions, new 2D and 3D CFD mathematical models are developed to simulate a wide set of heat and mass transfer processes (gas generation, chemical reactions, dehydration of concrete, corium mixing and stratification, ).

**Topic #28:** The computation-analytical model for long-term corium behaviour

S.Bogatov (RRC KI) presented problems and activities on the release of radioactive species and air contamination inside and outside the Chernobyl Unit 4 premises as well as the long-time behaviour of the various materials: (i) analysis of available information of different forms of FCM (Fuel Containing Materials) transformation inside the shelter; (ii) quantitative assessments of long term corium transformation from viewpoint of possible radiological impact; (iii) how much time does one have before drastic measures for FCM withdrawal/isolation will be necessary? These various activities could provide a good basis for a future co-operation.

**Topic #29:** General discussion on CHESS

Several questions came up regarding the influence of graphite on the accident sequence. Did any graphite burning take place? A.Borovoi explained that graphite burning is hard to evaluate and does not have a strong impact on the chemical interactions. Nevertheless, the impact of graphite on the accident processes should be considered. It is well known, that already small amounts of C in the corium melt can have a strong influence on the liquidus and solidus temperatures. Samples of the destroyed reactor have been taken up to now and analysed to verify the conclusions of RRC KI. The activities are carried out in the framework of the Ukraine “Chernobyl Shelter Implementation Plan”, an international consortium.

For independent calculations by CEG-SAM group members, all available data of the initial conditions of the Chernobyl reactor Unit4 should be available.

**Topic #30**: Other topics

In-pile tests in the IGR research reactor: A short presentation was given on the possibilities to conduct transient in-pile tests in the IGR research reactor in the National Nuclear Centre of the Republic of Kazakhstan. The IGR has a long history and great experience in conducting in-pile tests; the results of some LOCA-, RIA- and SA-type experiments were described. A project proposal will be presented at the next CEG-SAM meeting.

Nuclear Safety Institute (NSI) of the Kurchatov Institute: D.Tsurikov, director of the NSI, and A.Asmolov, scientific director of NSI, gave overviews on the various activities of the NSI regarding fuel rod behaviour under design basis and severe accident conditions as well as core melt behaviour and RPV melt retention experiments (RASPLAV), performed in the framework of OECD/NEA agreements. There are still open questions on the fuel rod behaviour, even in the design basis accident area, but also under severe accident conditions.

The question was raised on how a close co-operation between NSI and CEG-SAM/EC-SARNET could be established. NSI (V.Asmolov) could possibly act as a coordinator or moderator for the Russian side. No final decision or recommendations were made.

**Topic #31:** Next CEG-SAM meetings

The 9th CEG-SAM meeting will take place in Paris/Clamart on March 7-9, 2006. EdF kindly offered to host and organise the meeting.

Yu.Vassiliev, General Director Deputy of the National Nuclear Centre of Kazakhstan Republic (NNC RK), proposed to host the 10th CEG-SAM meeting in Semipalatinsk in Kazakhstan in September 2006.

# Restricted session (continued)

# KURCHATOV Institute, Moscow

**Topic #32:** Detailed discussion of presented ISTC project proposals and preparation of CEG-SAM advices

After the presentation of the various ISTC project proposals by the Russian scientists, the restricted session of the meeting continued with detailed discussion on the presented project proposals to elaborate recommendations and priorities.

EVAN: After interactions with Yu.Leontiev (SPEAP), the proposal EVAN (ISTC #3345) was modified several times following the recommendations of the CEG-SAM. The initially extensive program was reduced to an appropriate level. The project will be performed in two phases, the total costs will be 800k€; details are given in topic #20. The collaborators will be CEA, GRS, IRSN, JRC-ITU, PSI and VTT. An advice for the project proposal EVAN will be prepared by H.J.Allelein and D.Bottomley. The advice will be sent to M.Hugon, who will forward it to the ISTC bureau in Brussels for presentation at the next ISTC Governing Board meeting in October 2005 for funding decision (action 8/7).

CORPHAD-2 + METCOR-2: The Steering Committees of both projects recommended an extension of the ongoing work. The project METCOR-2 will be terminated in May 2006, the project CORPHAD-2 in November 2006. The technical reasons and justifications for the prolongation were summarized in two letters to N.Jousten (ISTC) signed by the collaborators who form the Steering Committees. A prolongation of 3 years is requested for the CORPHAD and METCOR projects, the estimated costs being 670k€ and 430k€, respectively.

Strong reasons for continuing the projects immediately are that the practical experience has already been accumulated in surmounting the technical difficulties. An additional advantage for continuing the investigation is that the expertise of the operating teams is existing today. Any decision by the CEG-SAM on the further support of the projects will be postponed to the next meeting. L.Tocheny mentioned that for the decision the final results of the projects have to be available and very good arguments are needed for the prolongation. Links to EU research should be shown. Nevertheless, a proposal for the prolongation of the earlier project METCOR-2 should be prepared before the next CEG-SAM meeting (action 8/9).

For the remaining presented proposals (VERONIKA, large-scale corium melting experiments, IGR), additional information and work programmes are needed to formulate specific recommendations by the CEG-SAM. **In this connection the group requested to L.Tocheny that in the future for each proposal a one page summary should be provided at least 2 weeks before the meeting otherwise it will not be accepted for presentation.** According to L.Tocheny a possibility to improve the proposals and to prepare detailed papers would be to grant some money to the responsible organisation.

For VERONIKA a detailed project description is already available that should be distributed to the group members after official acceptance and registration of the proposal by ISTC (action 8/8).

Concerning the large-scale melting experiments, presented by A.Kondrashenko (RFNC-VNIIEF), some concern regarding the test conduct and the expected results was expressed. The group should therefore formulate some recommendations which will be sent to A.Kondrashenko after agreement by the CEG-SAM; Ch.Journeau will prepare the paper and circulate it (action 8/6).

Again the group expressed its interest in RMBK related projects. L.Tocheny contacted responsible organisations, but, due to the different RMBK research areas the CEG-SAM should define first its interest. The conclusion of the CEG-SAM was to obtain information on experimental activities (action 8/4).

**Topic #33:** Strategy for the future of CEG-SAM

A discussion took place how the interaction between CEG-SAM and EC-SARNET should be organized. All requests from EC-SARNET should be sent via M.Hugon to L.Tocheny. L.Tocheny will send them to V.Asmolov (NSI) who will act as coordinator of the Russian organisations (see topic #30). The group expressed its opinion that no new procedures should be established; only the existing ones should be optimized. The proposed procedure should work in both directions. The question was raised how the non-European members of CEG-SAM will be involved in the exchange process. A proposal will be prepared by M.Krause and presented at the next meeting (action 8/10).

**Topic #34**: Other issues

The question was discussed if the various presentations at the meetings could be incorporated in the webpage. A.Miassoedov, responsible for the ISTC/CEG-SAM webpage, considers this request as difficult. No positive decision was made.

L.Tocheny requested the CEG-SAM to provide him a very short summary on the scientific outcome of the ongoing ISTC projects. He will incorporate the statements in a general official report to ISTC regarding the success and progress of the CEG-SAM. D.Bottomley will prepare such a one page summary (action 8/11).

Since the chairman had to leave before the end of the meeting the co-chairman L.Tocheny closed the meeting. He thanked once more “LUCH” and the Kurchatov Institute for hosting the meetings and for all their related efforts and he thanked the participants for their efficient work and contributions and wished them a safe journey back home.

**M.Hugon** (chairman) **P.Hofmann** (secretary)

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**Annexes:**

1. Revised final agenda of the 8th CEG-SAM meeting
2. List of participants at the CEG-SAM and CHESS kick-off meetings
3. ISTC projects recommended by the CEG-SAM (updated 10-2005)
4. Specific action list (see below)

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Annex #4:

**Specific Action List**: 8th CEG-SAM meeting

Action 8/1: **General procedure for “Letters of Support”**

The collaborators should send the letter of support and/or advice by airmail to the Executive Director of ISTC, Norbert Jousten, with scanned copies by e-mail or by fax to the CEG-SAM chairmen M.Hugon (EC) and L.Tocheny (ISTC), the secretary P.Hofmann and Mrs. Barbara Rhode (EC)

Action 8/2: L.Tocheny will contact all Russian coordinators (project manager) of ongoing ISTC projects to send their project progress and final reports to him. L.Tocheny will then send these reports to A.Miassoedov (FZK) who will include them in the ISTC CEG-SAM webpage.

Action 8/3: L.Tocheny should contact Yu.Zvonarev (RRC KI) to prepare a revised work plan on the project proposal on ASAC (Adaptation of SA ICARE/CATHARE and ASTEC codes to VVER).

Action 8/4: L.Tocheny will invite Russian organisations involved in safety-related research on RBMK (RRC KI, NIKIET) to propose an ISTC project. L.Tocheny proposed that the CEG-SAM should first define its interest to proceed in this matter*. The CEG-SAM expressed its interest in RMBK safety related experimental activities.*

Action 8/5: ISTC proposals and work plans of ongoing projects should be sent to the EC-SARNET topical coordinators (topic #8). It was decided that P.Hofmann should send the available project descriptions of INVECOR and PARAMETER to J.M.Bonnet (responsible for core degradation and corium behaviour) and that of EVAN to T.Haste (responsible for fission product behaviour).

Action 8/6: Ch.Journeau will prepare some remarks and recommendations on the project proposal of A.Kondrashenko (RFNC-VNIIEF) “Development of large-scale installation for heating and retention of 1000kg melts” and distribute to the group members for comments. *Done on September 22, 2005.*

Action 8/7: D.Bottomley and H.-J.Allelein will prepare an advice for the project proposal EVAN and send it to M.Hugon *(Done on September 29, 2005).*

Action 8/8: L.Tocheny should send the detailed description of the project proposal VERONIKA (topic #21) to P.Hofmann for distribution to the group members.

Action 8/9: A proposal for the prolongation of the project METCOR-2 should be prepared by the Steering Committee members before the next CEG-SAM meeting. A similar letter for the CORPHAD-2 project prolongation should be prepared later.

Action 8/10: M.Krause will prepare a paper how non-European countries like Canada and Korea could be incorporated in the CEG-SAM/SARNET information exchange.

Action 8/11: L.Tocheny requested the CEG-SAM to provide him a very short summary on the scientific outcome of all ongoing ISTC projects. D.Bottomley will prepare the summary.

Action 8/12: A. Miassoedov will reorganise the CEG-SAM website by project, so that all reports pertaining to a project are put in the same file. The file should contain the number, title and acronym of the project.

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