

IAEA CRP on “Behaviour of Cementitious Materials in Multipurpose Packaging for Transportation, Long Term Storage and Disposal”.

First CRM, Moscow, 10-14.09.2007

Cementitious materials are used as a containment matrix for nuclear waste immobilization, as well as for engineered structures of nuclear waste storage and disposal facilities. The *CRP on Behaviour of Cementitious Materials* is investigating the behaviours and performance of cementitious materials during long term storage and disposal, and aims to understand the processes that may result in changing their physical and chemical properties. This programme was initiated by the IAEA Predisposal Unit of Waste Technology Section of the Division of Nuclear Fuel Cycle and Waste Technology in June 2006 and is led by the IAEA Project Officer Zoran Drace (Z.Drace@iaea.org) and Chief Scientific Investigator Michael Ojovan (M.Ojovan@sheffield.ac.uk). It is deemed that the exchange of information and research co-operation in resolving identical problems between different institutions in Member States will contribute towards improving waste management practices, its efficiency and general safety. The execution of the CRP will promote the exchange of advanced information on the ongoing research and development activities and facilitate access to the practical results of their application for conditioning or packaging of specific waste types. As a result of the project implementation a new knowledge and practical experience would be established and transferred to Member States to improve their radioactive waste management capacities, which is in line with the general rationale of the IAEA Subprogramme L.4 “Technologies for disposable radioactive waste”.

The *CRP on Behaviour of Cementitious Materials* gathered together researchers from 17 Member States which cover a large number of topics related to use of cementitious materials (See Table I).

Table I. Member states, research topics and representative researchers contributing to IAEA CRP on Cementitious Materials.

MS, Organisation	Research Topics	Researchers
Australia, ANSTO	Emerging and alternative cementitious systems based on geopolymers for low level and intermediate level radioactive waste immobilisation	D. Perera, P.G. McGlenn, K. Hart*
Belgium, SCK/CEN	Behaviour of cementitious materials in long term storage and disposal of radioactive waste	P. Van Iseghem*, W. Bastiaens
Brazil, IPEN	Assessment of the durability of cementitious materials in repository environment	R. Vicente
China, NUDT	The immobilisation of radioactively contaminated soil in cementitious materials	S. Bai*, S. Yang*
China, INET	Long term behaviours study of radioactive waste resin cementitious matrix for calcium sulfoaluminate cement system	J. Li*
Czech Republic, NRI	Development of waste matrices for immobilization of problematic wastes from Czech nuclear power plants	A. Vokal
France, CEA/Valrho	Behaviour of cementitious materials in long term storage and disposal	C. Cau Dit Coumes

India, BARC	Characterization, improvement and long term evaluation of cementitious waste products	D.S. Deshingkar
Korea, KHNP	Long term behaviour of cementitious materials in Korean repository environment	J.H. Yoon
Romania, NIPNE	Long term behaviour evaluation of cement conditioning matrices used for management of radioactive wastes at IFIN-HH	F. Dragolici
Russia, VNINM	Methods and production of cementitious materials for immobilisation into waste form. Specific of cementation process of some kinds of liquid radioactive waste of radiochemical plants.	L.P. Soukhanov
Russia, SIA RADON	Cementitious composite for immobilisation of radioactive waste into final waste form.	A.P. Varlakov
Serbia, VINCA INS	Behaviours of cementitious materials in long term storage and disposal	I. Plecac*, D.M. Kićević
Slovakia, AllDeco	Behaviour of aluminosilicate inorganic matrix SIAL [®] during and after solidification of radioactive sludge and radioactive spent resins and their mixtures	M. Breza
Slovenia, ARAO	Assessment and measurements of degradation processes in the engineered barriers of LILW repository	N. Zeleznik A. Sajna
Spain, ENRESA	Modelling water flow and transport in concrete vaults and containers due to thermal and capillary effects	M. Ordonez*
Sweden, SKB	Cement waste matrix evaluation and modelling of the long-term stability of cementitious waste matrices	B. Torstenfeld
Switzerland, PSI	Long-term mechanical stability and leaching behaviour of a solidified radioactive sludge	A. Wallisch
UK, University of Aberdeen	Long-term durability and performance of cementitious barriers	F. Glasser*
UK, ISL	Acoustic emission monitoring of cementitious wasteforms	M. Ojovan

*Did not attend the CRM in Moscow

The First Research Coordination Meeting on *Behaviour of Cementitious Materials* was organised in Moscow from 10 to 14.09.2007 with the purpose to identify objectives of individual projects and to justify R&D programme for the future work. The 1st RCM was hosted by the Moscow Scientific and Industrial Association “Radon”, the venue was at the Hotel “Svetlana” in northern part of Moscow city.



Participants of 1st RCM at the Hotel SVETLANA in Moscow.

The working programme included participants' presentations followed by extensive discussions on topics under interest.



Opening of 1st RCM by IAEA Unit Leader Z. Drace and Moscow SIA "Radon" General Director S. Dmitriev



L.P. Soukhanov from VNIINM, Russia presents his research programme.

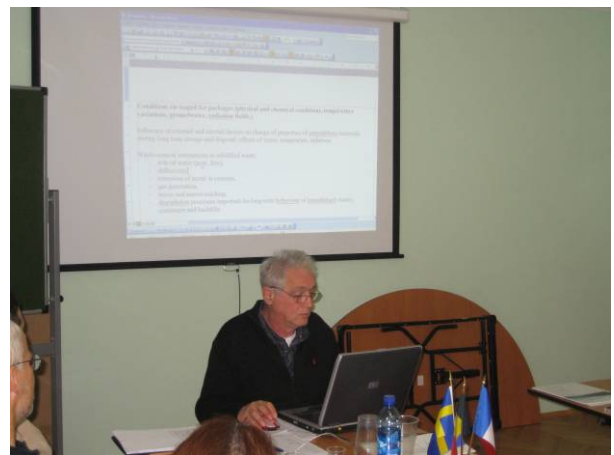
The hosting organisation Moscow SIA "Radon" organised on Thursday, 13 September a Technical visit to Moscow SIA "Radon" Radioactive Waste Processing Facilities near Sergiev Posad, Moscow Region. CRM attendees were allowed to see the main technological units including waste cementation facilities such as ash cementation unit, silt treatment unit, liquid and solid waste cementation unit. The cement testing laboratory was visited where routine cements tests are performed and highly penetrating cements were developed.

Slovenia								
Spain								
Sweden								
Switzerland								
UK FG								
UK ISL								

Six generic topics were identified within the CRP scope as a result of discussions from the eight initial suggested topics:

- 1-4. Cementitious materials for radioactive waste packaging and methods of production of cementitious waste forms (radioactive materials immobilisation, waste backfilling and containers).
- 2-3. Emerging and Alternative Cementitious Materials : from Physico-Chemistry to Waste Conditioning.
5. Conditions envisaged for packages and engineered barriers for different storage/disposal types.
6. Testing and monitoring techniques.
7. Waste acceptance criteria for waste packages, waste forms and backfills. Transport, long term storage and disposal requirements.
8. Modelling of long term behaviours of cementations materials used for long-term storage and disposal.

As a result of discussions it was agreed that the CRP Final report should consist of: (i) An introductory overview on CRP overall status and (ii) Individual detailed research reports. The work on introductory overview on CRP overall status started at the CRM so that a preliminary overview was prepared.



Working on CRP report and writing the overview on CRP overall status.

On the last day of CRM the working plan for CRP implementation was discussed. It was agreed that the Second CRM will be held in Romania and will be hosted by the National Institute for Physics and Nuclear Engineering "Horia Hulubei", Bucharest, Romania.