

A handwritten logo in blue ink. It consists of three parts: on the left, the letters 'ENS' with horizontal lines through them; in the middle, the letters 'RRFM' with diagonal lines through them; and on the right, the year '2004' with a long horizontal line extending from the end of the '4'.

## PROGRAMME

Organised by the  
European Nuclear Society (ENS)  
in co-operation with the  
International Atomic Energy Agency (IAEA)

8<sup>th</sup> International Topical Meeting  
**Research Reactor Fuel Management (RRFM)**

Forum Hotel, Munich, Germany  
March 21-24, 2004



## RRFM 2004 Programme

<b>SUNDAY 21 March 2004</b>		
14.00 – 17.00	Registration, Forum Hotel	
15.00	<b>Guided City Walking Tour</b> , meeting point: 'Fischbrunnen' at Marienplatz	
19.00	<b>Welcome Reception and Conference Dinner</b> , Forum Hotel	
<b>MONDAY 22 March 2004</b>		
07.30	Registration	
08.30 – 08.40	<b>Welcome Address</b>	Dr. Th. Goppel, Minister of the Bavarian State Ministry of Sciences, Research and the Arts
08.40 – 09.00	<b>Opening Address</b>	Prof. R. Schilling, Vice-President of the Technical University Munich
<b>Session 1</b>	<b>International Topics</b> Chair: K. Schreckenbach, Technical University München, Germany	
09.00 – 09.15	Nuclear Start-Up of FRM-II	K. Schreckenbach, Technical University Munich, München, Germany
09.15 – 09.40	Neutron Research and Applications at FRM-II	W. Petry, Technical University Munich, München, Germany
09.40 – 10.05	The Status of US Policy concerning Non-Proliferation, Conversion, Return of Foreign Spent Fuel to America and Russia	T. Dedik, Department of Energy, Washington D.C., USA
10.05 – 10.30	The Euratom Framework Programme and European Nuclear Research Infrastructures	H. Forsstrom, A. Zurita, DG Research J.4, European Commission, Brussels, Belgium
<b>10.30 – 11.00</b>	<b>Coffee Break</b>	
11.00 – 11.25	The Role of Research Reactors in Support of the Development of the Generation IV Nuclear Systems	M. K. Meyer, Argonne National Laboratory, Idaho Falls, ID, USA
11.25 – 11.50	Overview of the CEA R&D Programme on Generation IV Nuclear Energy Systems	F. Carré, P. Anzieu, Ph. Billot, Ph. Brossard, G-L. Fiorini, CEA/SACLAY, Gif sur Yvette, France
11.50 – 12.15	Safety Upgrading of PHENIX and Operation in the Frame of Generation IV Forum	J. Guidez, L. Martin, CEA/PHENIX Reactor, Bagnols-sur-Cèze, France
12.15 – 12.30	Discussion	
<b>12.30 – 13.30</b>	<b>Lunch</b>	

## RRFM 2004 Programme

<b>Session 2</b>	<b>Fuel Development, Qualification, Fabrication and Licensing</b>	
	Chair: A. Ballagny, CEA/Saclay, France; J-P. Durand, CERCA, France	
13.30 – 13.50	U-Mo Dispersion Fuel Results and Status of Qualification and Licensing Programs	P. Lemoine*, J. L. Snelgrove**, N. Arkhangelsky <sup>†</sup> , L. Alvarez <sup>††</sup> , *CEA/Saclay, France, **Argonne National Laboratory, Argonne, IL, USA, <sup>†</sup> Ministry for Atomic Energy, Moscow, Russian Federation, <sup>††</sup> Comisión Nacional de Energía Atómica, Buenos Aires, Argentina,
13.50 – 14.10	Update on U-Mo Monolithic and Dispersion Fuel Development	C. R. Clark*, S. L. Hayes*, M. K. Meyer*, G.L. Hofman**, J.L. Snelgrove**, *Argonne National Laboratory, Idaho Falls, ID, ** Argonne National Laboratory, Argonne, IL, USA
14.10 – 14.30	Status as of March 2004 of the French U-Mo Group Development Program	J-M. Hamy*, P. Lemoine**, F. Huet***, B. Guigon***, C. Jarousse <sup>†</sup> , J-L. Emin <sup>††</sup> , *Framatome-ANP, **CEA/Saclay, ***CEA/Cadarache, <sup>†</sup> CERCA, Romans, <sup>††</sup> COGEMA, Vélizy, France
14.30 – 14.50	2004 Status of the CNEA Qualification Programs for the Fabrication of High Density Fuels for Research Reactors	L. Alvarez, N. Boero, P. Echenique, G. Ruggirello, Comisión Nacional de Energía Atómica, Buenos Aires, Argentina
14.50 – 15.10	Recent Observations at the Postirradiation Examination of Low-Enriched U-Mo Miniplates Irradiated to High Burnup	G. L. Hofman*, Y. S. Kim*, M. R. Finlay*, J. L. Snelgrove*, S. L. Hayes**, M. K. Meyer**, C. R. Clark**, F. Huet <sup>†</sup> , *Argonne National Laboratory, Argonne, IL, USA, **Argonne National Laboratory, Idaho Falls, ID, USA, <sup>†</sup> Commissariat à l'Énergie Atomique/Cadarache, Saint-Paul-lez-Durance, France
15.10 – 15.20	Discussion	
<b>15.20 – 16.00</b>	<b>Coffee Break</b>	
	<b>Poster Viewing, Poster Session 1: Fuel Development, Qualification, Fabrication and Licensing</b>	
	Results of Computational Study of Stressed-Strained State Kinetics in a Research Reactor Fuel Element with (U-9%Mo)-Al Dispersive Fuel Irradiated in the IVV-2M Reactor	V. V. Popov*, M. Y. Khmelevsky*, V. G. Aden**, E. F. Kartashov**, V. A. Lukichev**, *SSC RF-IPPE, Obninsk, **FSUE RDIPE, Moscow, Russian Federation
	Thermo-mechanical Modelling of U-Mo Fuels with MAIA	V. Marelle*, F. Huet*, P. Lemoine**, *CEA/Cadarache, France, **CEA/Saclay, France
	Microstructure of U <sub>3</sub> Si <sub>2</sub> Fuel Plates Submitted to a High Heat Flux	S. Van den Berghe*, A. Leenaers*, E. Koonen*, P. Jacquet*, L. Sannen*, C. Jarousse**, B. Guigon <sup>†</sup> , A. Ballagny <sup>†</sup> , *SCK•CEN, Mol, Belgium, **CERCA, Romans, France, <sup>†</sup> CEA/Cadarache, France

## RRFM 2004 Programme

	In-Pile Tests and Post-Reactor Examinations of Fuel Elements with Uranium-Molybdenum Fuel of Reduced Enrichment	V. A. Loukichev*, V. G. Aden*, Ye. F. Kartashev*, O. A. Golosov**, V. B. Semerikov**, M. S. L'outikova**, A. A. Dyakov**, A. V. Meleshko**, V. M. Chernyshov+, A. A. Yenin**, *RDIPE, **IRM, +TVEL, ++NZHK, Moscow, Russian Federation
	Technical Project for Reconstruction of the Research Reactor IRT - Sofia	T. Apostolov <sup>1</sup> , V. Anastassov <sup>1</sup> , D. Drenski <sup>1</sup> , S. Belousov <sup>1</sup> , S. Kadalev <sup>1</sup> , E. Anastasova <sup>1</sup> , E. Moskov <sup>1</sup> , V. Kirilov <sup>2</sup> , M. Popov <sup>2</sup> , J. Zdebor <sup>3</sup> , V. Valenta <sup>3</sup> , V. Sousec <sup>3</sup> , J. Kysela <sup>4</sup> , S. Flibor <sup>4</sup> , M. Gaube <sup>5</sup> , M. Debauche <sup>5</sup> , P. Gubel <sup>6</sup> , A. Ivanov <sup>7</sup> , <sup>1</sup> Institute for Nuclear Research, Sofia, Bulgaria, <sup>2</sup> Atomenergoproject, Sofia, Bulgaria, <sup>3</sup> SKODA, Plzen, Czech Republic, <sup>4</sup> Nuclear Research Institute, Rez, Czech Republic, <sup>5</sup> BELGATOM, Brussels, Belgium, <sup>6</sup> SCK-CEN, Mol, Belgium, <sup>7</sup> EQE, Sofia, Bulgaria
	Development of IRT-Type Fuel Assembly with Pin-Type Fuel Element for LEU Conversion of WWR-SM Research Reactor in Uzbekistan	A. Vatulin*, A. Morozov*, V. Suprun*, I. Dobrikova*, V. Mishunin*, G. Kulakov*, A. Alexandrov**, A. Yenin**, A. Tkachev**, *A. A. Bochvar, Moscow, **NCCP, Novosibirsk, Russian Federation
16.00 – 16.20	<b>Discussion Poster Session 1</b> Chair: G. Damm, Research Centre Jülich, Germany	
<b>Session 2</b>	<b>Fuel Development, Qualification, Fabrication and Licensing, continued</b> Chair: A. Ballagny, CEA, J-P. Durand, CERCA, France	
16.20 – 16.40	Post-irradiation Examination of Uranium-7wt%Molybdenum Atomised Dispersion Fuel	A. Leenaers*, S. Van den Berghe*, E. Koonen*, L. Sannen*, M. Verwerft* C. Jarousse**, F. Huet#, M. Troabas+, M. Boyard**, S. Guillot**, *SCK-CEN, Mol, Belgium, **CERCA, Romans, France, #CEA Cadarache, France, +SRMJ, l'Etang la Ville, France, **TECHNICATOME, Aix-en-Provence, France
16.40 – 17.00	Fabrication and Characteristics of U-Mo Foils for a Monolithic Fuel by Cooling-Roll Casting Method	K. H. Kim, D. B. Lee, S. J. Oh, C. K. Kim, D. S. Sohn, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea
17.00 – 17.20	Activities for the HANARO Fuel Production at KAERI	C. K. Kim, K. H. Kim, J. M. Park, Y. S. Lee, D. B. Lee, S. J. Oh, H. D. Park, D. S. Sohn, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea
17.20 – 17.30	Discussion	
17.30	<b>Close of Day One</b>	

## RRFM 2004 Programme

<b>TUESDAY 23 March 2004</b>		
<b>Session 2</b>	<b>Fuel Development, Qualification, Fabrication and Licensing, continued</b> Chair: A. Ballagny, CEA, J-P. Durand, CERCA, France	
08.00 – 08.20	Success Story of FRM-II Fuel Element Manufacturing	G. Harbonnier, P. Colomb, JP. Durand, B. Duban, Y. Lavastre CERCA, Les Bérauds, Romans-sur-Isère, France
08.20 – 08.40	CERCA Mo-99 Annular Cans Target Manufacturing Development	C. Jarousse*, P. Colomb*, M. Febvre*, N. Morcos**, P. Anderson**, *CERCA, Romans-sur-Isère, France, **ANSTO, Menai NSW, Australia
08.40 – 09.00	Firming Up the Supply of Enriched Uranium for Research Reactors of the World: A Core U.S. National Nuclear Security Administration Mission	D. R. Tousley*, M. E. Hassler**, E. M. Parker**, *Department of Energy, National Nuclear Security Administration, Washington D.C., **Y-12 National Security Complex, Oak Ridge, TN, USA
09.00 – 09.10	Discussion	
<b>Session 3</b>	<b>Reactor Operation, Fuel Safety, Core Conversion</b> Chair: H. M. Verkooijen, Interfaculty Reactor Institute, Delft, The Netherlands	
09.10 – 09.30	Conversion of the FRM-II	K. Böning, W. Petry, A. Röhrmoser, Chr. Morkel, Technical University Munich, München, Germany
09.30 – 09.50	The New Australian Replacement Research Reactor: Construction Progress and Utilisation	T. Irwin, D. Vittorio, Australian Nuclear Science and Technology Organisation (ANSTO), Menai NSW, Australia
09.50 – 10.10	ILL High Flux Reactor: Improvements and Specific Experimentation	H. Guyon, Ch. Vettier, N. Kernavanois, G. McIntyre Institut Max von Laue - Paul Langevin (ILL) , Grenoble, France
10.10 – 10.20	Discussion	
10.20 – 10.50	<b>Coffee Break</b> <b>Poster Viewing, Poster Session 2: Reactor Operation, Fuel Safety, Core Conversion, Spent Fuel Management, Back-end Options, Transportation</b>	
	Irradiation of Two U-Mo Fuel Plates in BR2	V. Kuzminov, E. Koonen, SCK-CEN, Mol, Belgium
	Preliminary Study on the Utilisation of U-Mo Fuel for the RSG-GAS Reactor	T. M Sembiring, I. Kuntoro, T. Taryo, National Nuclear Energy Agency , Serpong, Tangerang, Indonesia
	Criticality Safety Assessment on the RSG-GAS Fresh Fuel Storage for Anticipating the Next Core Conversion Program	T. M Sembiring, Zuhair, National Nuclear Energy Agency, Serpong, Tangerang, Indonesia
	MCNP Calculation of Substitution Experiments at RB Critical Assembly	M. Pesic, Vinča Institute of Nuclear Sciences, Belgrade, Serbia and Montenegro

## RRFM 2004 Programme

	Testing of Spectrometric and Television Equipments of the Test Rig for Inspection of Spent Fuel Assemblies of Research Reactors in Conditions Similar to Real	V. Maklakov, G. I. Gadjiev, A. F. Grachev, A. S. Ladzin, Yu.V. Chechetkin, Scientific Centre of the Russian Federation Research Institute of Atomic Reactors, Dimitrovgrad, Russian Federation
	A Study on the Extension of the Cycle Length and Change of the Fuel Reloading Pattern for HANARO	C. S. Lee, S. J. Park, H. Kim, HANARO Centre Korea Atomic Energy Research Institute, Daejeon, Republic of Korea
	Spent Fuel Handling during the REBUS Burn-up Credit Experiments	F. Vermeersch, P. Baeten, F. Joppen, SCK-CEN, Mol, Belgium
	New Design Study of the Moderator Chamber of the FRG-1 Cold Neutron Source for the Increase of Cold Neutron Flux	W. Bernnat*, W. Feltes**, Knop*, P. Schreiner*, *IKE, University of Stuttgart, **Framatome-ANP, Erlangen, +GKSS, Geesthacht, Germany
	U-Mo Spent Fuel Reprocessing: First Experimental Results on Unirradiated Fuels	A. Juvenelle, M. H. Garrido, A. Vaudano, J. P. Dancausse, CEA/VALRHO-Marcoule, Bagnol sur Cèze, France
	Cleaning Methods for RA Reactor Spent Fuel Storage Tubes Decontamination	V. G. Aden*, S. Yu Bulkin*, V. F. Muraviyov**, A. F. Mordukhai**, N. M. Sorokin**, V. A. Parabin**, *RDIPE, Moscow, **NIKIMT, Moscow, Russian Federation
	Spent Fuel Management of the Finnish TRIGA Reactor	S. E. J. Salmenhaara, VTT, Espoo, Finland
	Logistics of the Research Reactor Fuel Cycle: Area Solutions	J-L Falgoux*, F. Obadia**, L. Halle+, P. Naigeon+, P. Auziere**, *CERCA, Paris, **CERCA, Romans, +COGEMA LOGISTICS, Saint Quentin en Yvelines, **COGEMA, Vélizy, France
	Shipping Test of Fuel Assemblies in LVR-15 Reactor	L. Viererbl, V. Broz, M. Marek, A. Voljanskij, Nuclear Research Institute Rez, Czech Republic
10.50 – 11.20	<b>Discussion Poster Session 2</b> Chair: H. Müller, RWE Nukem, Alzenau, Germany	
<b>Session 3</b>	<b>Reactor Operation, Fuel Safety, Core Conversion, continued</b> Chair: H. M. Verkooijen, Interfaculty Reactor Institute, Delft, The Netherlands	
11.20 – 11.40	Core Safety Increase and the MIR Reactor Operation Life Prolongation	A. I. Ijoutov, A. F. Grachev, V. V. Kalygin, A. E. Novoselov, M. N. Svyatkin, State Scientific Centre of the Russia Research Institute of Atomic Reactors, Dimitrovgrad, Russian Federation
11.40 – 12.00	Current Status of U-Mo Conversion Program in JRR-3	T. Kusunoki, Y. Murayama, S. Wada, M. Nishi, T. Kato, F. Sakurai, Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan
12.00 – 12.20	The use of Cadmium Wires as Burnable Poison: A First Feasibility Study for the BR2 Reactor	A. Beeckmans de West-Meerbeeck, SCK-CEN, Mol, Belgium
12.20 – 12.30	Discussion	
<b>12.30 – 13.30</b>	<b>Lunch</b>	

## RRFM 2004 Programme

<b>Session 4</b>	<b>Spent Fuel Management, Back-end Options, Transportation</b> Chair: Ph. Auziere, COGEMA, Vélizy, France	
13.30 – 13.50	Back-end of the Research Reactor Nuclear Fuel Cycle: International Status and Perspective	P. Adelfang, I. G. Ritchie, International Atomic Energy Agency, Division of Nuclear Fuel Cycle and Waste Technology, Vienna, Austria
13.50 – 14.10	Spent U-Mo Fuel Acceptance for Treatment at the La Hague Plant	Ph. Auziere, COGEMA, Vélizy, France
14.10 – 14.30	Decommissioning the Material Test Reactor Fuel Cycle	Ph. Cartwright, F. I. Cheme, UKAEA, Dounreay, Great Britain
14.30 – 14.50	The Fuel Situation at Research Reactors in Austria	H. Böck*, M. Villa*, F. Meyer**, W. Ninaus <sup>†</sup> , H. Rabitsch <sup>†</sup> , E. Schachinger <sup>†</sup> , *Atominstitut of the Austrian Universities, Vienna, **Nuclear Engineering Seibersdorf, <sup>†</sup> University of Technology, Graz, Austria
14.50 – 15.00	Discussion	
<b>15.00 – 15.30</b>	<b>Coffee Break</b>	
15.30 – 15.50	Storage of Fuels Elements Coming from Dutch Research Reactors and Laboratories	C. Kalverboer*, H. Kastelein*, B. Tigoulet**, S. Petitjean**, *COVRA, Vlissingen, The Netherlands, ** SGN, St Quentin en Yvelines, France
15.50 – 16.10	Successfully Shipping Fresh Fuel from Romania to Russia: The Experience	C. Toma*, M. Ciocanescu*, L. Biro**, A. Smirnov <sup>†</sup> , J. Thomas <sup>††</sup> , *Institute for Nuclear Research, Arges, Romania, **National Authority of Control, Bucharest, Romania, <sup>†</sup> SOSNY, Dimitrovgrad, Russian Federation, <sup>††</sup> WSRC/DOE, Washington D.C., USA
16.10 – 16.30	United States Foreign Research Reactor Spent Nuclear Fuel Acceptance Program: Current Progress and Future Challenges	A. W. Thrower, C. E. Messick Sr, J. R. Wade, Department of Energy, Washington D.C., USA
16.30 – 16.50	Global Cleanout Project	J. Edlow*, G. Gruber**, *Edlow International Company, Washington, D.C., USA, **RWE NUKEM, Alzenau, Germany
16.50 – 17.00	Discussion	
17.00	<b>Summary of RRFM 2004 and Closing Remarks</b> , Pol Gubel, Conference Chairman	
<b>WEDNESDAY 24 March 2004</b>		
<b>Post Conference Technical Visit: FRM-II</b>		
08.30 – 11.00	<b>Group A:</b> 08.00 – 11.15; <b>Group B:</b> 09.30 – 12.45; <b>Group C:</b> 11.15 – 14.15	