



**International Conference on
Innovative Technologies for
Nuclear Fuel Cycles
and Nuclear Power**

23–26 June 2003
Vienna, Austria

PROGRAMME

Organized by the



IAEA

International Atomic Energy Agency

In co-operation with the



Electric Utility Cost Group Inc.



International Science and Technology Center



World Energy Council



World Nuclear Association

Secretariat:

Scientific Secretaries: K. Fukuda, IAEA
V.M.R. Koorapaty, IAEA
J. Kupitz, IAEA
Conference Services: K. Morrison, IAEA

Conference Chairperson: R. O. Cirimello, Argentina

Location of the Conference:

International Atomic Energy Agency
Vienna International Centre (VIC)
Building C, 4th floor
IAEA Boardroom
Wagramer Strasse 5
A-1400 Vienna, Austria

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Working language: English

Resolutions: No resolutions may be submitted for consideration on any subject, no votes will be taken.

TIMETABLE

Sunday, 22 June 2003

16.00–18.00 Registration

Monday, 23 June 2003

08.00 Registration

09.30 Session 1

11.00 Coffee Break

11.30 Session 2

13.30 Lunch Break

15.00 Session 3

16.30 Coffee Break

17.00 Session 3 (cont'd)

19.00 Reception

Tuesday, 24 June 2003

09.00 Session 4

10.30 Coffee Break

11.00 Session 4 (cont'd)

12.30 Lunch Break

14.00 Session 5

15.30 Coffee Break

16.00 Session 5 (cont'd)

Wednesday, 25 June 2003

09.00 Session 6.1

10.30 Coffee Break

11.00 Session 6.1 (cont'd)

12.30 Lunch Break

14.00 Session 6.2

15.30 Coffee Break

16.00 Session 6.3

17.30 Session 6.4

Thursday, 26 June 2003

09.00	Session 7
10.30	Coffee Break
11.00	Session 7 (cont'd)
12.30	Summary by Conference Chairperson Closing Remarks

SUNDAY, 22 JUNE 2003

16:00 – 18:00 Registration

MONDAY, 23 JUNE 2003

08:00 Registration

09:30 – 11:00 SESSION 1:

**9:30 – 9:45 Opening Address:
M. ElBaradei, Director General, IAEA**

9:45 - 10:30 Panel on Conference Theme

**Chairperson:
L. Echávarri,
Director General, OECD/NEA**

**Panellists:
J. B. Ritch, Director General,
World Nuclear Association
S. J. Saunders, President,
Electric Utility Cost Group
L. Tocheny, Representative,
International Science and
Technology Center
E. P. Velikhov, President,
Kurchatov Institute,
Russian Federation**

**10:30 – 10:45 Perspective of a Developing Country with
an Expanding Nuclear Power Programme:
A. Kakodkar, Chairman, AEC, India**

**10:45 – 11:00 Innovative Nuclear Fuel Cycles for the Future:
Y. Fujiie, Chairman, AEC, Japan**

11:00 – 11:30 Coffee Break

**11:30 - 13:30 SESSION 2: NEEDS, PROSPECTS AND
CHALLENGES FOR INNOVATION**

**Chairpersons: L. Echávarri, OECD/NEA
 Y. Fujii, Japan**

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
KN61 11:30 - 11:55	J. Murray	World Energy Council	Energy Demands and the Nuclear Role
KN62 11:55 – 12:20	H. H. Rogner	IAEA	Nuclear Power in the 21st Century
KN63 12:20 - 12:45	W.C. Turkenburg	Netherlands	Environmental and Sustainability Aspects
KN64 12:45 -13:10	C. Cantrell	Electricity Utility Cost Group	Economic Requirements for Innovative Technologies
KN65 13:10 -13:30	V.M. Mourogov	IAEA	Innovation in Nuclear Technology and the Role of the IAEA
13:30 - 15:00	Lunch Break		
15:00 - 18:30	SESSION 3: EVOLUTION OF TECHNICAL, SOCIAL, ECONOMIC AND POLITICAL CONDITIONS		
Chairpersons:	A. Kakodkar, India S. J. Saunders, Electricity Utility Cost Group		
KN66 15:00-15:30	B. Barré	France	What do Societies expect of Innovative Nuclear Technologies?
KN67 15:30-16:00	J. Strosnider	USA	Technical Aspects of Innovative Nuclear Systems Including Reliability and Safety
KN68 16:00-16:30	A. M. Dmitriev	Russian Federation	Technical Aspects of Innovative Nuclear Systems Including Reliability and Safety
16:30 – 17:00	Coffee Break		

15:00 - 18:30

**SESSION 3 (cont'd):
EVOLUTION OF TECHNICAL, SOCIAL,
ECONOMIC AND POLITICAL CONDITIONS**

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
KN69 17:00-17:30	Chang, In Soon	Korea, Rep. of	Environmental Effects Including all Stages of the Fuel Cycle
KN70 17:30-18:00	K. Samejima	Japan	Economic Conditions (competitiveness and innovative applications)
KN71 18:00-18:30	T. Rauf	IAEA	Political Factors (including Proliferation Resistance and Nuclear Security)
19:00	Reception		

TUESDAY, 24 JUNE 2003

09:00 – 12:30 **SESSION 4: PANEL ON CHALLENGES FOR
THE DEPLOYMENT OF INNOVATIVE
TECHNOLOGIES**

Chairpersons: R. O. Cirimello, Argentina
 J. B. Ritch, World Nuclear Association

Panellists:

A. C. de Oliveira Barroso	Brazil
D. Torgerson	Canada
Zhang Zouyi	China
S.B. Abdel-Hamid	Egypt
P. Bernard	France
R.K. Sinha	India
D. Nicholls	South Africa

10:30–11:00 **Coffee Break**

11:00–12:30 **SESSION 4 (cont'd)**

12:30-14:00 **Lunch Break**

14:00 - 18:30 **SESSION 5: INTERNATIONAL PROGRAMMES
ON INNOVATIVE NUCLEAR SYSTEMS**

Chairpersons: P. Bernard, France
 V. M. Mourogov, IAEA

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
72 14:00-14:50	S. Guindon	Canada	Status of work under Generation IV International Forum (GIF)
73 14:50 -15:15	M. Hugon	European Commission	Euratom Research on Future Systems in the Fifth and Sixth Framework Programmes
74 15:15 – 15:30	D. Hittner	France	Michelangelo Network (MICANET)
15:30 -16:00	Coffee Break		
75 16:00-16:30	J. Kupitz	IAEA	Background and Structure of the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)
76 16:30 – 17:00	F. Depisch	IAEA	Results Achieved within the International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)

14:00 - 18:30

**SESSION 5: (cont'd)
INTERNATIONAL PROGRAMMES
ON INNOVATIVE NUCLEAR SYSTEMS**

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
77 17:00-17:30	D. Nicholls	South Africa	Pebble Bed Modular Reactor Programme
78 17:30-18:00	A. Gagarinski	Russian Federation	USA - Russian Collaborative Program
79 18:00-18:30	L. Herrera	USA	Collaborative Programme of the International Nuclear Energy Research Institute, USA with France and the Republic of Korea

WEDNESDAY, 25 JUNE 2003

09:00 – 18:30 **SESSION 6: INNOVATIVE NUCLEAR SYSTEMS
AND RELATED R&D PROGRAMMES**

09:00 – 12:30 **Session 6.1 Innovative Reactor Systems**

Chairpersons: **P. E. Juhn, IAEA**
 D. Nicholls, South Africa

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
6	J.M. Hopwood	Canada	Innovative Reactor Technologies – Enabling Success
9	F. Carré	France	Overview of the CEA Program on High Temperature Gas Cooled Nuclear Energy Systems: The “Gas Technology Path”
17	T. Okubo	Japan	Innovative Concept of Reduced Moderation Water Reactor (RMWR) for Effective Fuel Utilization through Recycling
32	E. O. Adamov	Russian Federation	Nuclear Power Development on the Basis of New Nuclear Reactor and Fuel Cycle Concepts
40	D. R. Nicholls	South Africa	The Pebble Bed Modular Reactor – A Clean, Safe and Competitive Future Energy Option
10:30-11:00	Coffee break		
49	D. Delmastro	Argentina	CAREM Concept: A Cost Effective Innovative LWR for Small and Medium Utilities
53	B. D. Baptista	Brazil	The IRIS Reactor Design – An International Cooperative Project and the Brazilian Participation
10	P. Loriette	France	Nuclear Options for Industrialized and Developing Countries: Results of INOVACT Project.
18	K. Sato	Japan	State-of-the-Art of Second Phase Feasibility Study on Commercialized Fast Reactor Cycle System
33	N. Kodochigov	Russian Federation	The Gas Turbine – Modular Helium Reactor
12:30 – 14:00	Lunch break		

09:00 – 18:30 **SESSION 6: (cont'd)**
INNOVATIVE NUCLEAR SYSTEMS
AND RELATED R&D PROGRAMMES

14:00 – 15:30 **Session 6.2 Innovative Fuel Cycles**

Chairpersons: **A. Bonne, IAEA**
 C. Ganguly, India

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
KN80	C. Ganguly	India	Innovative Nuclear Fuel Cycles Technologies to Meet Future Requirements of Economy, Safety, Environment and Waste, Proliferation Resistance and Cross-Cutting Issues
41	C. Degueldre	Switzerland	The Status of the Initiative for Inert Matrix Fuel
14	T. Koyama	Japan	Integrated Experiments to Demonstrate Innovative Reprocessing of Metal and Oxide Fuel by Means of Electrometallurgical Technology
20	M. S. Yang	Korea, Rep. of	The DUPIC Fuel Cycle – Recycle Without Reprocessing
48	P. C. Florido	Argentina	SIGMA: The First Intrinsic Proliferation Resistant Uranium Enrichment Technology
43	R. Bari	USA	Assessing the Proliferation Resistance of Innovative Nuclear Fuel Cycles

15:30 - 16:00 **Coffee break**

16:00 – 17:30 **Session 6.3 Other Topics**

Chairpersons: **L. Tocheny, International
Science and Technology Center**
 G. Torres-Oviedo, Chile

36	A. V. Zrodnikov	Russian Federation	SVBR-75/100 – Lead-Bismuth Cooled Small Power Modular Fast Reactor for Multi-Purpose Usage
44	J. Roglans-Ribas	USA	Technology Demonstration of Proliferation Resistance for an Advanced Fuel Cycle Facility
29	L. A. Bolshov	Russian Federation	Environmental Factors and the Role of Innovative Nuclear Technologies in Implementing the Strategy of Sustainable Development
12	R.K. Sinha	India	Road Map for a Future Indian Nuclear Energy System

16:00 – 17:30 **Session 6.3 (cont'd)**
Other Topics

<i>No. of Paper IAEA-CN-108/ Time</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
46	H. Wider	European Commission	Importance of Inherent Safety Features and Passive Prevention Measures in Innovative Reactors
47	A. Gagarinski	Russian Federation	Russia and Innovative Projects INPRO and Generation IV
17:30 – 18:30	Session 6.4	Poster Presentations	
	A. Bonne	IAEA	Summary of posters on fuel cycles
	J. Kupitz	IAEA	Summary of posters on nuclear power

THURSDAY, 26 JUNE 2003

09:00-12:30 SESSION 7: CONCLUDING PANEL

**Co-Chairpersons: R. Chidambaram, India
E. P. Velikhov, Russian Federation**

Panellists:

D. Torgerson	Canada
B. Wahlström	Finland
J. Bouchard	France
S. Saito	Japan
C.W. Cho	Korea, Rep. of
M. Lawrence	USA
A. Tsibulia	International Youth Nuclear Congress
V.M. Mourogov	IAEA

10:30 - 11:00 Coffee Break

11:00 - 12:30 Session 7 (cont'd)

**12:30-13:00 Summary by R. O. Cirimello,
Conference Chairperson**

Closing Remarks

POSTER PRESENTATIONS:**17.30 – 18.30 Wednesday, 25 June 2003**

<i>No. of Paper IAEA-CN-108/</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
1P	S.M.Gomez de Soler	Argentina	Nuclear Desalination: A Possible Solution to Latin American Region's Ongoing Water Scarcity
2P	A. Gevorgyan	Armenia	Prospective Opportunities for Using the Innovative Nuclear Systems in Armenian Energy Sector Long-Term Programme Development
3P	F. Sefidvash	Brazil	Fixed Bed Nuclear Reactor Concept
4P	D. Popov	Bulgaria	Innovative PWR Plant Design Concept with Low Primary Circuit Pressure
5P	R. B. Duffey	Canada	Producing Oil Sands Bitumen Using Steam from Nuclear Power
13P	A. N. Lasman	Indonesia	Core Design of the Indonesian Experimental Power Reactor
16P	K. Hiraiwa	Japan	Reduced Moderation BWR with Advanced Recycle Systems (BARS)
19P	M. Saito	Japan	Advanced Nuclear Energy Systems for Inherent Protected Plutonium Production
21P	R. Gazetov	Lithuania	New Generation Elastic Neutron Absorber Systems to Address Nuclear Reactor Efficiency and Safety Issues
24P	I. Dumitrache	Romania	Innovative Technologies for the Future of Nuclear Energy in Romania
25P	V. Poplavskiy	Russian Federation	Fabrication of Motor Fuel from Brown Coals by Hydrogenation with the Use of Nuclear Technologies
26P	L. Tocheny	Russian Federation	The International Science and Technology Center ISCT – Ten Year Experience in Supporting Innovative Nuclear and Other Programs Information Review
27P	A. M. Dmitriev	Russian Federation	Some Experimental Justifications of Construction of Nuclear Reactors with the Use of Solid Coolant
30P	E.F. Kryuchkov	Russian Federation	Enhancement of MOX-Fuel Inherent Proliferation-Resistance

POSTER PRESENTATIONS: (cont'd)

<i>No. of Paper IAEA-CN-108/</i>	<i>Name(s)</i>	<i>Designating Member State/Organization</i>	<i>Title of Paper</i>
34P	V. Poplavskiy	Russian Federation	BN-800 The Next Generation of Russian Sodium Reactors
35P	A.I. Kiryushin	Russian Federation	Generation Nuclear Reactor for Prospective Ships, Small Nuclear Power Stations and Power Desalination Complexes
38P	L. Litvinsky	Ukraine	Strategy of Nuclear Energy Development in Ukraine till 2030 and Further Outlook
39P	P. Darilek	Slovakia	VVER-440 as the First-Tier Reactor
42P	A. B. Bolme	Turkey	Requirements and Expectations from Innovative Nuclear Reactors: Turkey's Perspective
45P	Trinh Dinh Hai	Vietnam	Renovation of the Pneumatic Transfer System of the Dalat Nuclear Research Reactor
50P	Y. F. Chernelin	Russian Federation	Future of Large Scale Nuclear Power Development on the Basis of Holistic System of Nuclear Technologies
51P	S. A. Subotin	Russian Federation	System of Small Nuclear Power Stations with Industrial and Fuel Cycle Infrastructure
54P	I. A. El Shehawy	Egypt	Review of Egyptian Activities in Utilization of Nuclear Energy for Electricity Generation and Seawater Desalination
55P	S. Katanishi	Japan	Study on Reprocessing Method of High Temperature Gas-cooled Reactor Fuels
57P	J. A. Vergara	Chile	Innovative Nuclear Reactors and Fuel Cycles for High-Speed Cargo Vessels
58P	D. Feretic	Croatia	Analysis of future Nuclear Power Plants competitiveness by using stochastic methods
59P	V. Rachkov	Russian Federation	Russian Approach to Innovative Fuel Cycles

IAEA PUBLICATIONS RELATED TO THE SUBJECT OF THE CONFERENCE

Document Number	Title	Year
IAEA-TECDOC-936	Terms for describing new, advanced nuclearpower plants	1997
IAEA-TECDOC-940	Floating nuclear energy plants for seawater desalination	1997
IAEA-TECDOC-977	Integral design concepts of advanced water cooled reactors	1997
IAEA-TECDOC-985	Accelerator-driven systems: energy Generation and transmutation of nuclear waste (status report)	1997
IAEA-TC-903.3	Feasibility and motivation for hybrid Cconcepts for nuclear energy generation and transmutation	1998
IAEA-TECDOC-1015	Advances in fast reactor technology	1998
IAEA-TECDOC-1085	Hydrogen as an energy carrier and its production by nuclear power	1999
IAEA-TECDOC-1122	Fuel Cycle Option for LWRs and HWRs	1999
IAEA-TECDOC-1155	Thorium based fuel options for the generation of electricity: Developments In the 1990s	2000
IAEA-TECDOC-1172	Small Power and Head Generation Systems on the Basis of Propulsion and Innovative Reactor Technologies	2000
IAEA-TECDOC-1184	Status of non-electric nuclear heat applications: Technology and safety	2000
IAEA-TECDOC-1198	Current Status and Future Development of Modular High Temperature Gas Cooled Reactor Technology	2001

IAEA-TECDOC-1203	Thermohydraulic Relationships for Advanced Water Cooled Reactors	2001
IAEA-TECDOC-1210	Safety related design and economic aspects of HTGR	2001
IAEA-TECDOC-1235	Safety aspects of nuclear plants coupled with seawater desalination units	2001
IAEA-TECDOC-1238	Gas turbine power conversion systems for modular HTGRs	2001
IAEA-TECDOC-1264	Reliability Assurance Programme Guidebook for Advanced Light Water Reactors	2001
AEN/NEA and IAEA 2002 Publication	Innovative Nuclear Reactor Development – Opportunities for International Co-operation	2002
IAEA-TECDOC-1245	Performance of Operating and Advanced LWR Design	2002
IAEA-TECDOC-1281	Natural circulation data and methods for advanced water cooled nuclear power plant designs	2002
IAEA-TECDOC-1288	Verification of Analysis Methods for Predicting the Behaviour of Seismically Isolated Nuclear Structures	2002
IAEA-TECDOC-1289	Comparative Assessment of Thermophysical and Thermohydraulic Characteristics of Lead, Lead-bismuth and Sodium Coolants	2002
IAEA-TECDOC-1290	Improving economics and safety of water-cooled reactors: Proven means and new approaches	2002
TRS-407	HWRs – status and projected development	2002
IAEA-TECDOC-1318	Harmonization and Validation of Fast Reactor Thermomechanical and Thermohydraulic Codes and Relations Using Experimental Data	2002

IAEA-TECDOC-1319	Thorium Fuel Utilization: Options and Trends (Proceeding of three IAEA Meetings held in 1997, 1998 and 1999)	2002
IAEA-TECDOC-1326	Design Concepts of nuclear desalination plants	2002
IAEA-TECDOC-1349	Potential of thorium-based fuel cycles to constrain plutonium and reduce the long-Lived waste toxicity	2003

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Governments of Member States and those organizations whose activities are relevant to the meeting subject matter are invited to designate participants for IAEA scientific conferences. In addition, the IAEA itself usually invites a very limited number of scientists as invited speakers and only participants designated or invited in this way are entitled to present papers and take part in the discussions.

Scientists interested in participating in any of the Agency's meetings should request information from the Government authorities of their own countries, in most cases their Ministry of Foreign Affairs or national atomic energy authority.

PUBLICATIONS

Proceedings

The extended synopses of all papers and posters presented together with a summary of the Conference will be published as an IAEA publication after the meeting. A copy will be sent to each participant present at the meeting as soon as possible after the Conference.

Other IAEA Publications

Order forms for IAEA publications are available at the Conference Desk. Publications may also be ordered from the Agency's sales agents in a large number of countries or ordered directly from the Publishing Section: International Atomic Energy Agency, P.O.Box 100, A-1400 Vienna, Austria.

SCIENTIFIC MEETINGS SCHEDULED BY THE IAEA

2003

International Conference on the Safety of Transport of Radioactive Material

7–11 July, Vienna, Austria

International Symposium on Seismic Evaluation of Existing Nuclear Facilities

25–29 August, Vienna, Austria

International Conference on National Infrastructures for Radiation Safety

1-5 September, Rabat, Morocco

Scientific Forum at the IAEA General Conference

16–17 September, Vienna, Austria

International Symposium on Applications of Gene-based Technologies for Improving Animal Production and Health in Developing Countries

6–10 October, Vienna, Austria

International Conference on the Protection of the Environment from the Effects

of Ionizing Radiation

6–10 October, Stockholm, Sweden

International Conference on Research Reactor (Utilization, Safety, Decommissioning, Fuel and Waste Management)

10–14 November, Santiago, Chile

2004

International Symposium on Nuclear Oncology

19-23 January, Porto Alegre, Brazil

International Conference on Topical Issues in Nuclear Safety

24-28 May, Vienna, Austria

Conference on Fifty Years of Nuclear Power, Where in the next Fifty Years?

28 June - 2 July, Moscow/Obninsk, Russian Federation

International Conference on Isotopes in Environmental Studies

30 August - 3 September, Monaco

Symposium on Quality Assurance for Analytical Methods in
Isotope Hydrology
4-8 October, Vienna, Austria?

20th IAEA Fusion Energy Conference
1-6 November, Vilamoura, Portugal

For information on forthcoming scientific meetings please consult
the IAEA WorldAtom website:
<http://www.iaea.org/worldatom/Meetings/>