International Conference on Topical Issues in Nuclear Installation Safety:

Strengthening Safety of Evolutionary and Innovative Reactor Designs

Date 18-21 October 2022

PROGRAMME

Organized by the
International Atomic Energy Agency (IAEA)
IAEA Headquarters Vienna, Austria

In Cooperation with

European Commission Joint Research Centre (EC-JRC)

European Technical Safety Organisations Network (ETSON)

OECD Nuclear Energy Agency (OECD-NEA)

World Nuclear Association (WNA)

Scientific Programme Committee:

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Location of the Event:

International Atomic Energy Agency Vienna International Centre (VIC)

Building C, Boardroom D / CR1 / CR2 / CR7

Wagramer Strasse 5 A-1400 Vienna, Austria Tel.: (+43 1) 2600 21330

¹ Initially from UAE; from summer 2022 moved to USA with job post

² Initially from ONR; from summer 2022 moved to IAEA with job post

Working Language:	English	
Resolutions:	No resolutions may be submitted for consideration on any subject; no votes will be taken.	

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Participate in voting during sessions



Raise questions to speakers during session



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TIMETABLE

Tuesday, 18 October 2022

Time	Session No.	Session Title / Break	Venue
8:00–9:30		Registration of participants	C-Building – 4th Floor, in front of BR-D
9:30–10:30		Opening Session	BR-D
10:30–11:00		Coffee/Tea Break	
11:00–12:30		Plenary session #1: BR-D Panel discussion "Towards harmonization of safety approaches: regulatory and industry perspectives"	
12:30–14:00		Lunch Break	
14:00–15:30	1	Regulatory & Licensing	BR-D
	2	Design Safety Features	CR2
	3	Safety Demonstration	CR7
	4	Simulation & Modelling	CR1
15:30–16:00		Coffee/Tea Break	
16:00–18:00	5	International Collaboration & Harmonization	BR-D
	6	Design Safety Features	CR2
	7	Safety Demonstration	CR7
	8	Simulation & Modelling	CR1
18:00–20:00		Welcome Reception (Sponsored by Switzerland)	C-Building – 4th Floor, in front of BR-D

Wednesday, 19 October 2022

Time	Session No.	Session Title / Break Venue	
09:00–10:30		Plenary session #2:	BR-D
		Panel Discussion "Safety demonstrations for evolutionary and innovative reactors: Challenges and path forward"	
10:30–11:00		Coffee/Tea Break	
11:00–12:30	9	Regulatory & Licensing	BR-D
	10	Defence in Depth by Design	CR2
	11	Deterministic Safety Analysis	CR7
	12	Simulation & Modelling	CR1
12:30–14:00		Lunch Break	
14:00–15:30	13	Regulatory & Licensing	BR-D
	14	Transportable NPP Designs	CR2

Time	Session No.	Session Title / Break Venue	
	15	PSA & Risk-Informed Decision Making	CR7
	16	Simulation & Modelling	CR1
15:30–16:00		Coffee/Tea Break	_
16:00–18:00	17	Safety Approach BR-D	
	18	Design Safety Features	CR2
	19	PSA & Risk-Informed Decision Making	CR7
	20	Panel Discussion on Simulation & Modelling CR1	

Thursday, 20 October 2022

Time	Session No.	Session Title / Break	Venue
09:00–10:30		Plenary session #3: BR-D Panel discussion "SMR and microreactors: Design challenges and path forward"	
10:30–11:00		Coffee/Tea Break	_
11:00–12:30	21	Safety, Security and Safeguards Interfaces (3S)	BR-D
	22	Severe Accident Management	CR2
	23	PSA & Risk-Informed Decision Making	CR7
	24	Simulation & Modelling	CR1
12:30–14:00		Lunch Break	
14:00–15:30	25	Safety, Security and Safeguards Interfaces (3S)	BR-D
	26	Passive Systems	CR2
	27	PSA & Risk-Informed Decision Making	CR7
	28	Simulation & Modelling	CR1
15:30–16:00		Coffee/Tea Break	
16:00–18:00	29	Panel discussion on Safety, Security and Safeguards interfaces and challenges (3S)	BR-D
	30	Passive Systems	CR2
	31	PSA & Risk-Informed Decision Making	CR7
	32	Simulation & Modelling	CR1

Friday, 21 October 2022

Time	Session No.	Session Title / Break	Venue
09:00–10:30	33	External Hazards	CR2
	34	Multi-unit & Multi-module Risk Analysis	CR7
	35	Artificial Intelligence	CR1
10:30–11:00		Coffee/Tea Break	
11:00–12:00		Closing Session	BR-D

09:30-11:00 OPENING SESSION

BR-D (C-4th floor)

Time	Name	Designating Member State/Organization	Title
9:30–9:35	R. Grossi	Director General, IAEA	Welcoming address (pre-recorded video)
9:35–9:45	L. Evrard	Deputy Director General, Department of Nuclear Safety and Security, IAEA	Opening address from nuclear safety and security perspectives
	M. Chudakov	Deputy Director General, Department of Nuclear Energy, IAEA	Opening address from nuclear energy perspectives
9:45–9:55	R. Sardella	Conference President Switzerland, ENSI	Keynote address
9:55–10:30	S. Poghosyan	Conference Scientific Secretary (NS)	Overview of TIC2022 conference
	T. Jevremovic	Conference Scientific Secretary (NE)	
10:30–11:00	Coffee/Tea Break		

11:00-13:00

PLENARY SESSION #1: PANEL DISCUSSION "TOWARDS HARMONIZATION OF SAFETY APPROACHES: REGULATORY AND INDUSTRY

PERSPECTIVES"

Chairpersons: Kirsi Alm-Lytz, IAEA (SH-RAS)

Time	Name	Designating Member State/Organization	Title
11:00–11:10	R. Velshi	Canada/CNSC	The CNSC and the road to harmonization: a plan in action
11:10–11:20	S. Cadet-Mercier	France/ASN	EU initiatives in SMR licensing
11:20–11:30	M. Uesaka	Japan/JAEC	Harmonized power and non-power applications of next-generation advanced reactors
11:30–11:40	J. Ball	USA/GE-Hitachi	Design, licensing, and commercial progress
11:40–11:50	S. Bilbao y León	WNA	Supporting a new paradigm for reactor design licensing
11:50–13:00	Panel discussion and Q	%A	
13:00–14:00	Lunch Break		

BR-D (C-4th floor)

14:00-15:30 SESSION 1:

Regulatory & Licensing

BR-D (C-4th floor)

CR2 (C-2nd floor)

Chairpersons: Vesselina Ranguelova, OECD NEA

Miguel Santini, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20		G. Stoppa	WENRA	WENRA safety objectives for Gen 3 plants and their applicability to SMRs	
14:20–14:40	197	[∨] R. Awad	United Arab Emirates	Innovative regulatory approach for licensing a new nuclear power plant	
14:40–15:00	111	F. Llizastigui	Cuba	Developing competence of new regulators to tackle SMRs	
15:00–15:20	89	R. Vadi	Iran	A review of the requirements of the licensing procedure for the HTR-PM	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/Tea Break				

TUESDAY, 18 OCTOBER 2022

14:00-15:30 SESSION 2:

Design Safety Features

Chairpersons: Diego Lisbona, UK

Alexei Miassoedov, IAEA

Paper **Designating Member** Time Name Title of Paper No. State/Organization Development of the first Russian 14:00-14:20 26 VE. Vlasenko Russian Federation research molten salt reactor for technology trial of minor actinides burning 14:20-14:40 121 B. Hu China Research on heat pipe conduction device of containment dome 14:40-15:00 122 M. Alaleeli United Arab Material performance metrics for **Emirates** accident tolerant fuel cladding in pressurised water reactors 15:00-15:20 China 119 K. Wang Application of passive cold source system in nuclear power plant design 15:20-15:30 Session wrap-up by chairperson/Discussion 15:30-16:00 Coffee/Tea Break

14:00-15:30 **SESSION 3:**

Safety Demonstration

Chairpersons: David Holcomb, USA Martin Gajdos, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	30	[∨] W. Boyes	South Africa	A comprehensive thermo- hydraulic neutronic and safety analysis of a 100mwth pebble bed reactor core	
14:20–14:40	112	[∨] R. Youngblood	United States of America	Application of objectives-driven assurance cases to system development in an evolving acquisition model	
14:40–15:00	115	C. Wang	China	Internal flooding safety assessment of small reactor (ACP100) based on advanced 3D simulation software (CNIFA)	
15:00–15:20	196	^v D. Holcomb	United States of America	Steps towards efficiently demonstrating adequate MSR safety	
15:20–15:30	Session	Session wrap-up by chairperson/Discussion			
15:30–16:00	Coffee/Tea Break				

CR7 (C-7th floor)

14:00-15:30 SESSION 4:

Simulation & Modelling

CR1 (C-2nd floor)

Chairpersons: Ahmed Bentaib, France Nikoleta Morelova, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
14:00–14:20	104	[∨] W. Klein- Heßling	Germany	Regulatory perspectives on analytical codes and methods for advanced reactors
14:20–14:40	35	S. Gupta	Germany	IAEA simulation and experimental analyses network information system (SANIS) database: severe accidents experimental facilities, codes and education and training tools
14:40–15:00	56	S. Shevchenko	Russian Federation	The Russian approach to the regulatory review of computer programs used for multi-physics modelling and safety analysis of innovative nuclear installations
15:00–15:20	28	A. Bentaib	France	The OECD/NEA working group on the analysis and management of accidents (WGAMA): advances in codes and analyses to support safety demonstration of nuclear technology innovations
15:20–15:30	Session wrap-up by chairperson/Discussion			
15:30–16:00	Coffee/Tea Break			

16:00-18:00 SESSION 5:

International Collaboration &

Harmonization

Chairpersons: Brian Smith, USA

Kirsi Alm-Lytz, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
16:00–16:20		P. Calle- Vivies	IAEA, NSNI	NHSI update: regulatory track		
16:20–16:40		S. Monti	IAEA, NENP	NHSI update: industry track		
16:40–17:00	88	[∨] D. Williams	United States of America	U.S. and Canada cooperation on advanced reactor technologies - progress and challenges		
17:00–17:20	109	A. Carson	WNA	A new paradigm for reactor design licensing – collaboration the key		
17:20–18:00	Session wrap-up by chairperson/Discussion					
18:00-20:00	Welcome	Welcome Reception (Sponsored by Switzerland) – C building 4th floor coffee area				

BR-D (C-4th floor)

TUESDAY, 18 OCTOBER 2022

16:00–18:00 SESSION 6: CR2 (C-2nd floor)

Design Safety Features
Chairpersons: Mirela Nitoi, Romania

Mikhail Lankin, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper			
16:00-16:20	29	[∨] W. Boyes	South Africa	Advanced micro reactor (AMR)			
16:20–16:40	40	S. Flood	United Kingdom	U-Battery enhancing safety through innovative design			
16:40–17:00	131	J. Takeuchi	Japan	Conceptual design of Mitsubishi small modular reactor			
17:00–17:20	142	P. Calderoni	United States of America	The US DOE advanced sensor and instrumentation program			
17:00–17:20	84	[∨] J. Seymour	United States of America	Technology-inclusive human- system considerations for advanced reactors			
17:40–18:00	Session	Session wrap-up by chairperson/Discussion					
18:00–20:00	Welcome	e Reception (Spor	nsored by Switzerland) –	- C building 4th floor coffee area			
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16:00-18:00 **SESSION 7:**

Safety Demonstration

CR7 (C-7th floor)

Veronique Rouyer, OECD Yaolei Zou, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
16:00–16:20	124	L. Ammirabile	European Commission	GIF integrated safety assessment methodology (ISAM) and guidance for its implementation for novel advanced reactors
16:20–16:40	52	[∨] S. Buchholz	Germany	Potential gaps in safety demonstration methods for LW-SMR identified in the ELSMOR project
16:40–17:00	73	Z. Hozer	OECD	Advances in knowledge, modelling and methods to support safety demonstration of conventional and advanced nuclear fuels in the OECD/NEA working group on fuel safety
17:00–18:00	Session	wrap-up by chairper	son/Discussion	
18:00–20:00	Welcome	e Reception (Sponso	ored by Switzerland) – C	building 4th floor coffee area

16:00-18:00 **SESSION 8:**

Simulation & Modelling

CR1 (C-2nd floor)

Ahmed Bentaib, France Nicole Virgili, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper			
16:00–16:20		N. Virgili	IAEA, NPTDS	New agency initiative on fission- fusion technology interfaces			
16:20–16:40	160	A. Lejosne	France	State of the art of IRSN's studies regarding fuel behaviour during LOCA			
16:40–17:00	171	^v M. Liu	United States of America	Development of a structural integrity model for the steam generator tubing of the SMART100 small modular reactor			
17:00–17:20	154	Q. Tran	Vietnam	Calculation of the neutron parameters for the accelerator- driven subcritical reactor using Pb and Pb-Bi mixtures as both target and coolant			
17:20–17:40	86	R. Henry	Germany	The finite element neutronics code FENNECS for the safety assessment of SMRs, micro reactors and other innovative concepts			
17:40–18:00	Session	Session wrap-up by chairperson/Discussion					
18:00–20:00	Welcome	Reception (Spor	nsored by Switzerland) –	- C building 4th floor coffee area			

9:00-10:30 PLENARY SESSION #2: PANEL DISCUSSION

"SAFETY DEMONSTRATIONS FOR

EVOLUTIONARY AND INNOVATIVE REACTORS:

CHALLENGES AND PATH FORWARD"

Chairpersons: Ana Gomez Cobo, IAEA (SH-SAS)

BR-D (C-4th floor)

Time	Name	Designating Member State/Organization	Title		
9:00–9:10	C. Viktorsson	UAE/FANR	Innovative Aspects for Safety Demonstration of an Evolutionary Design		
9:10–9:20	R. Taylor	USA/USNRC	Modernizing NRC's regulatory framework for safe deployment of advanced reactor technologies		
9:20–9:30	[∨] H. Perry	UK/Rolls-Royce SMR	Licensing of new reactors including novel features		
9:30–9:40	U. Stoll	Germany/ETSON	Safety demonstrations for evolutionary and innovative reactors: challenges and path forward from the TSO's perspective		
9:40–10:30 Panel discussion and Q&A					
10:30–11:00	Coffee/Tea Break				

11:00-12:30 **SESSION 9:**

Regulatory & Licensing

BR-D (C-4th floor)

Surik Bznuni, Armenia Miguel Santini, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
11:00–11:20	82	D. Fernández Lisbona	United Kingdom	Early assessment of innovative and advanced modular reactor (AMR) designs - regulatory process and insights from application to eight designs in the UK		
11:20–11:40	156	A. Julio Gonzalez	Argentina	A response to the regulatory safety challenges for new reactor technologies		
11:40–12:00	192	S. Bznuni	Armenia	Preliminary gap analysis of Armenian regulatory basis for the licensing of SMR type reactors		
12:00–12:20	194	T. Tabikh	Canada	Approach to small modular and advanced reactor regulatory readiness		
12:20–12:30	Session	Session wrap-up by chairperson/Discussion				
12:30–14:00	Lunch Bi	reak				

11:00-12:30 **SESSION 10:**

Defence in Depth by Design

CR2 (C-2nd floor)

Etienne Courtin, France Laura Videla, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper			
11:00–11:20	152	M. Gimenez	Argentina	CAREM 25: An integral methodological approach to coherently internalize defence in depth in the design process			
11:20–11:40	103	E. Courtin	France	Application of lines of defence (LoD) methodology for defence in depth implementation in the design of Gen4 reactors			
11:40–12:00	83	^v D. Plummer	United Kingdom	Regulatory perspective on the application of the defence-in-depth concept to innovative reactor technologies			
12:00–12:20	155	A. Liubarskiy	Russian Federation	Design measures aimed at eliminating cliff-edge effects as a necessary condition for effectiveness of plant defence-in depth			
12:20–12:30	Session	Session wrap-up by chairperson/Discussion					
12:30–14:00	Lunch Br	reak					

11:00-12:30 **SESSION 11:**

Deterministic Safety Analysis

CR7 (C-7th floor)

Josef Misak, Czech Republic Martin Gajdos, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper			
11:00–11:20	3	J. Misak	Czech Republic	Issues and needs in applications of deterministic safety analysis for demonstrating safety of nuclear power plants			
11:20–11:40	105	[∨] M. Polevoy	Russian Federation	Determination of temperature condition of absorbing elements for design basic conditions			
11:40–12:00	114	[∨] H. Yamano	Japan	Numerical analyses of design extension conditions for sodium- cooled fast reactor designed in Japan			
12:00–12:20	149	[∨] A. Samokhin	Russian Federation	Integrated design analyses of beyond-design-basis accidents at VVER-1200, including fuel severe damage			
12:20–12:30	Session	Session wrap-up by chairperson/Discussion					
12:30–14:00	Lunch Br	eak					

11:00-12:30 **SESSION 12:**

Simulation & Modelling

CR1 (C-2nd floor)

Chairpersons: Fulvio Mascari, Italy Hadid Subki, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
11:00–11:20	69	D. Grabaskas	United States of America	Using calibrated water data for preliminary validation of the SRT code for advanced reactors		
11:20–11:40	106	R. Tanguy	WNA	Harmonizing mechanical codes & standards for innovative reactors		
11:40–12:00	132	F. Mascari	Italy	Status of the independent validation of trace code for SMR safety analyses		
12:00–12:20	8	[∨] M. Bedretdinov	Russian Federation	Thermal hydraulic codes validation for spent fuel pool conditions		
12:20–12:30	Session wrap-up by chairperson/Discussion					
12:30–14:00	Lunch Br	eak				

14:00-15:30 SESSION 13:

Regulatory & Licensing

BR-D (C-4th floor)

CR2 (C-2nd floor)

Chairpersons: Simon Coenen, Belgium

Volha Piotukh, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
14:00–14:20	42	N. Mughal	Pakistan	Regulatory experiences in licensing of advanced reactor technologies		
14:20–14:40	140	S. Coenen	Belgium	Belgian approach for licensing new innovative reactors		
14:40–15:00	163	P. Torano	Argentina	Argentine experience in the licensing of CAREM 25 prototype reactor		
15:00–15:20	125	B. Elsheikh	Egypt	Regulatory challenges and licensing efforts for innovative molten salt reactors		
15:20–15:30	Session wrap-up by chairperson/Discussion					
15:30–16:00	Coffee/T	ea Break				

WEDNESDAY, 19 OCTOBER 2022

14:00-15:30 SESSION 14:

Transportable NPP Designs

Chairpersons: Daria Doronkova, Russia

Mikhail Lankin, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
14:00–14:20		M. Lankin	IAEA, NSNI	IAEA activities on design safety and security considerations for the TNPP		
14:20–14:40	169	A. Bychkov	IAEA, INPRO	INPRO studies on transportable nuclear power plants and modules and key legal issues for their regulations		
14:40–15:00	100	B. Cirera	Denmark	Safety approaches for the CMSR power barge		
15:00–15:20	147	D. Doronkova	Russian Federation	Nuclear floating power unit: ensuring safety during transportation		
15:20–15:30	Session wrap-up by chairperson/Discussion					
15:30–16:00	Coffee/T	ea Break				

14:00-15:30

SESSION 15: PSA & RIDM CR7 (C-7th floor)

Chairpersons:

Jeffery Julius, USA Gaeul Choi, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper			
14:00–14:20	139	D. Grabaskas	United States of America	The ASME/ANS probabilistic risk assessment standard for advanced non-light water reactor nuclear power plants			
14:20–14:40	128	J. Julius	United States of America	Changes in PSA models to support the licensing of advanced non-light water reactors			
14:40–15:00	98	K. Ravichandran	Switzerland	Verification of SSC safety classification according to IAEA SSG-30 functional approach: benefits of DSA and PSA integration			
15:00–15:20	126	D. Henneke	United States of America	Natrium reactor SSC classification using the licensing modernization project (LMP) process			
15:20–15:30	Session	Session wrap-up by chairperson/Discussion					
15:30–16:00	Coffee/To	ea Break					

14:00-15:30 **SESSION 16:**

Simulation & Modelling

CR1 (C-2nd floor)

^v Plamen Petkov, Bulgaria Vladimir Kriventsev, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	59	[∨] T. Shibata	Japan	New test plan about safety features of HTGR by using HTTR in JAEA	
14:20–14:40	190	D. LaBrier	United States of America	Revival of a practical sodium safety culture through experiential training	
14:40–15:00	185	A. Farooq	Pakistan	Experimental investigation of iodine removal in a lab scale setup of filtered containment venting system	
15:00–15:20	75	[∨] P. Petkov	Bulgaria	Experimental investigation of liquid Tin surface property safety features for potential application as a coolant in direct contact liquid metal fast reactors (DCLMFR) heat removal	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/Te	ea Break			

16:00-18:00

SESSION 17:

Safety Approach

Chairpersons:

Debbie Francis, France Javier Yllera, IAEA BR-D (C-4th floor)

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
16:00–16:20	153	N. Mesmous	Canada	An innovative methodology for designing and regulating small and modular reactors	
16:20–16:40	76	D. Francis	France	NUWARD safety approach, implementing SMR specifics and preparing international deployment	
16:40–17:00	37	M. Nitoi	Romania	Towards innovative reactors licensing - ALFRED approach	
17:00–17:20	99	B. Cirera	Denmark	Toward developing a novel combined Licensing & Safety approach for advanced nuclear reactors based on the international maritime and nuclear safety framework. Case study of the CMSR Power Barge	
17:20–18:00	17:20–18:00 Session wrap-up by chairperson/Discussion				

16:00-18:00 **SESSION 18:**

Design Safety Features

CR2 (C-2nd floor)

Diego Lisbona, UK Simone Massara, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
16:00–16:20	60	S. Kubo	Japan	Safety design approaches for future SFRs in Japan
16:20–16:40	118	J. Zhu	China	Standard study of the technology and safety performance evaluation on emergency core cooling system strainer
16:40–17:00	107	[∨] M. Tarantino	European Commission	GIF LFR safety design criteria
17:00–17:20	127	S. Futagami	Japan	Development of safety design criteria and safety design guidelines for Generation IV sodium-cooled fast reactors
17:20–17:40	144	C. Stansbury	United States of America	An integrated design approach to address safety of the Westinghouse LFR: An innovative pool-type, liquid lead- cooled fast reactor
17:40–18:00	Session	wrap-up by chairp	erson/Discussion	

16:00-18:00

SESSION 19: PSA & RIDM CR7 (C-7th floor)

Chairpersons:

Irina Kuzmina, Russia Martin Gajdos, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
16:00–16:20	193	D. Henneke	United States of America	Risk-informed safety strategy and fault evaluation for the GE Hitachi BWRX-300 advanced reactor		
16:20–16:40	202	I. Kuzmina	Russian Federation	Insights on application of some probabilistic considerations for licensing of new nuclear power plants		
16:40–17:00	41	N. Harman	United Kingdom	Evolution in level 3 probabilistic safety assessment methodology for the UK-EPR		
17:00–17:20	164	[⋄] F. Llorenete	Argentina	Regulatory criteria proposal for the mission time of the sequences of the event trees of the L1 PSA for new nuclear power reactors		
17:20–18:00	Session	Session wrap-up by chairperson/Discussion				

16:00-18:00 SESSION 20:

Panel Discussion on Simulation &

Modelling

Chairpersons: Tatjana Jevremovic, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title
16:00–16:20	92	^v H. Sanchez- Mora	Mexico	BWR severe accident uncertainty and sensitivity analysis in the framework of the IAEA CRP I31033
16:20–16:40	146	N. Ryzhov	Russian Federation	Uncertainty and sensitivity analysis of severe accidents simulations at VVER in the framework of the IAEA CRP I31033
16:40–17:00	157	[∨] P. Hernan Ilardo	Argentina	Development of uncertainty and sensitivity approaches for the analysis of severe accidents in a small modular reactor
17:00–17:20	151	S. Petukhov	Canada	Uncertainty and sensitivity analysis of a CANDU 6 plant by means of severe accident codes in the framework of the IAEA CRP I31033: preliminary results
17:20–18:00	Session	wrap-up by chairp	person/Discussion	

CR1 (C-2nd floor)

9:00-10:30 PLENARY SESSION #3: PANEL DISCUSSION

"SMR AND MICROREACTORS: DESIGN CHALLENGES AND PATH FORWARD"

BR-D (C-4th floor)

Chairpersons: Aline des Cloizeaux (DIR-NENP, IAEA)

Time	Name	Designating Member State/Organization	Title		
9:00–9:10	M. Nichol	USA/NEI	U.S. design and safety advancements		
9:10–9:20	F. Dermarkar	Canada/AECL	SMRs: overcoming the design challenges		
9:20–9:30	S. Pedre	Argentina/CAREM	CAREM SMR status and challenges moving forward		
9:30–9:40	D. Francis	France/EDF	Nuclear safety and SMRs, safety in proportion		
9:40–10:30 Panel discussion and Q&A					
10:30–11:00	Coffee/Tea Break				

THURSDAY, 20 OCTOBER 2022

11:00-12:30 **SESSION 21:** BR-D (C-4th floor)

Safety, Security and Safeguards Interfaces

Chairpersons: ^v Duncan Barley, UK

Jeremy Whitlock, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
11:00–11:20		J. Whitlock	IAEA, SGCP	Safeguards by design for SMRs		
11:20–11:40	70	D. Kovacic	United States of America	Considering international safeguards during the design of advanced reactors and interfaces with safety and security		
11:40–12:00	81	[∨] D. Barley	United Kingdom	Safety, security and safeguards working together in the modernised generic design assessment		
12:00–12:20	184	A. Williams	United States of America	Lessons learned from exploring safety, security, and safeguards interfaces in advanced and small modular reactor technologies		
12:20–12:30	Session	Session wrap-up by chairperson/Discussion				

12:30-14:00 Lunch Break

THURSDAY, 20 OCTOBER 2022

11:00–12:30 SESSION 22: CR2 (C-2nd floor)

Severe Accident Management

Chairpersons: Ahmed Bentaib, France Alexei Miassoedov, IAEA

Paper **Designating Member** Time Name Title of Paper No. State/Organization Α. 11:00-11:20 IAEA, NENP SAMG-D toolkit Miassoedov 11:20-11:40 46 China The development and validation G. Dang of the accident prevention and mitigation strategy for the ACP100 modular small reactor 11:40-12:00 172 W. Wei Development and application of China a severe accident management guidelines verification and drilling platform at CNNP NUGENIA/TA2 recent 12:00-12:20 50 A. Bentaib France achievements in severe accidents research 12:20-12:30 Session wrap-up by chairperson/Discussion 12:30-14:00 Lunch Break

11:00-12:30 CR7 (C-7th floor) **SESSION 23:**

PSA & RIDM

Chairpersons: Elisabeth Duvillard, France Jorge Luis Hernandez, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper		
11:00–11:20	134	[∨] Y. Okano	Japan	ARKADIA-Safety, an overall risk assessment simulation tool for integrated risk-informed and performance-based decision making		
11:20–11:40	93	[∨] T. Sofu	United States of America	GIF framework for risk-informed approach for design and licensing of novel advanced reactors		
11:40–12:00	58	S. M. Hess	United States of America	Integrated RAMI for advanced nuclear power plants		
12:00–12:20	175	E. Duvillard	France	Incorporation of passive system functional reliability in probabilistic safety assessment		
12:20–12:30	Session	Session wrap-up by chairperson/Discussion				
12:30–14:00	Lunch Br	reak				

11:00-12:30 **SESSION 24:**

Simulation & Modelling

CR1 (C-2nd floor)

Chairpersons:
*Sebastian Buchholz, Germany Simone Massara, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
11:00–11:20	45	[∨] E. Soldatov	Russian Federation	System of design codes for the computational modelling of the lead-cooled fast reactors	
11:20–11:40	51	[∨] S. Buchholz	Germany	Recent improvements of ATHLET models for passive safety features of LW-SMR	
11:40–12:00	27	[∨] P. Lien	United States of America	TRACE confirmatory analysis model development and validation in NuScale design	
12:00–12:20	159	M. Martin	United Kingdom	Enhanced safety of current and future nuclear plant using integrated mechanistic models and data-centric assessment of risk	
12:20–12:30	Session wrap-up by chairperson/Discussion				
12:30–14:00	Lunch Bi	reak			

14:00-15:30 SESSION 25:

SESSION 25: BR-D (C-4th floor) Safety, Security and Safeguards Interfaces

(3S)

Chairpersons: Luca Ammirabile, E.C

Heather Loony, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	173	C. Scherer	IAEA, INPRO	Using INPRO methodology for a holistic sustainability assessment in Safety, Safeguards and Security (3S)	
14:20–14:40	123	L. Ammirabile	European Commission	Application of the objective provision tree tool for the safety-security interface assessment	
14:40–15:00	25	[∨] I. Garcia	United States of America	Impact of cyber security features on digital instrumentation and Control Systems Important to Safety at Nuclear Power Plants – Evaluation Framework	
15:00–15:20	24	[∨] I. Garcia	United States of America	U.S.A. Regulatory efforts for cybersecurity of small modular reactors/advanced reactors	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/T	ea Break			

14:00-15:30 **SESSION 26:**

Passive Systems

CR2 (C-2nd floor)

Chukwudi Azih, Canada Mikhail Lankin, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	54	[∨] A. Samokhin	Russian Federation	Evaluation of the innovative steam generators passive heat removal system efficiency for VVER-1200 power units in beyond design basis accidents conditions	
14:20–14:40	133	P. Vácha	Czech Republic	Innovative passive safety features of the HeFASTo reactor concept	
14:40–15:00	199	Y. Yuan	China	An experimental program for ACP100 passive containment air cooling system	
15:00–15:20	189	C. Azih	Canada	Development of experimental and modelling capabilities and tools at Canadian Nuclear Laboratories for investigations on inherent and passive safety designs of advanced reactor concepts	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/T	ea Break			

14:00–15:30 SESSION 27: CR7 (C-7th floor)

PSA & RIDM

Chairpersons: Luke Lebel, Canada

Jorge Luis Hernandez, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	36	N. Xue	China	Application of Probabilistic method in the EPZ determination of SMR	
14:20–14:40	94	[∨] S. Vasavada	United States of America	Insights for risk-informed approaches to sizing emergency planning zones	
14:40–15:00	162	L. Lebel	Canada	Challenges in defining emergency planning zones for small modular reactors and advanced reactors: review of Canadian practices and research at Canadian nuclear laboratories	
15:00–15:20	135	E. Schrader	United States of America	An alternative emergency preparedness regulatory framework for small modular reactors and other new technologies	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/T	ea Break		·	

14:00-15:30 **SESSION 28:**

Simulation & Modelling

Chairpersons: Victor Sanchez Espinoza, Germany Eve-Lyne Pelletier, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
14:00–14:20	161	C.Herer	France	Natural circulation HERO-2 experiment simulations in the EU funded PASTEL project	
14:20–14:40	91	^v S. Lu	United States of America	Long term effects and numerical simulation of radiolytic gas, non- condensable gas and boron transport for small modular light water reactors	
14:40–15:00	188	[∨] K. Podila	Canada	Development of multiphysics modelling capabilities for small modular reactors in Canada	
15:00–15:20	39	V. Espinoza	Germany	Status of the H2020 McSAFER project-experimental and analytical investigations for the safety evaluation of watercooled SMRs	
15:20–15:30	Session wrap-up by chairperson/Discussion				
15:30–16:00	Coffee/Tea Break				

CR1 (C-2nd floor)

16:00-18:00 SESSION 29:

Discussion Session on Safety, Security and Safeguards (3S) interfaces and

challenges

Chairpersons: Shahen Poghosyan, IAEA

Jeremy Whitlock, IAEA

Time	Name	Designating Member State/Organization	Title
16:00–16:10	S. Poghosyan	IAEA, NSNI	3S interfaces and challenges for SMRs and other innovative reactors
16:10–16:20	C. Viktorsson	UAE/FANR	3S integration in UAE nuclear regulation
16:20–16:30	R. Jammal	Canada/CNSC	The CNSC and the 3S – a full cycle regulator
16:30–16:40	A. lyengar	USA/DOE	Perspectives on 3S for Advanced Reactors
16:40–16:50	H. Looney	IAEA, NSNS	3S interfaces: security perspective
16:50–17:00	J. Whitlock	IAEA, SGCP	3S interfaces: safeguards perspective
17:00–18:00	Panel discussion		

BR-D (C-4th floor)

16:00-18:00 SESSIG

SESSION 30: Passive Systems CR2 (C-2nd floor)

Chairpersons:

Finis Southworth, USA Mikhail Lankin, IAEA

Paper **Designating Member** Time Name Title of Paper No. State/Organization 16:00-16:20 F. Southworth United States of 57 The effect of intermittent passive America heat removal on HTGR conduction cooldown performance 16:20-16:40 O. Tiurikov Russian Federation Experimental and computational 148 research of the containment passive emergency pressure decrease system in the floating NPP with reactor KLT-40S and universal nuclear-powered icebreaker with reactor RITM-16:40-17:00 186 [∨] F. Mezio Argentina Uncertainty assessment of a CAREM 25 passive safety system: lifecycle management study case 17:00-17:20 Thermal hydraulic analysis of a 129 M. Ilyas Pakistan novel concept for a passive containment cooling system 17:20-17:40 N. Sungur **MSCFP** Assessment of VVER-1200 (V-491) core cooling reliability during the operation of passive heat removal system via steam generator 17:40-18:00 Session wrap-up by chairperson/Discussion

16:00-18:00 CR7 (C-7th floor) **SESSION 31:** PSA & RIDM

Chairpersons: Dennis Henneke, USA Martin Gajdos, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
16:00–16:20	97	K. Ravichandran	Switzeland	Synergizing deterministic and probabilistic safety analyses - a holistic approach to safety at Leibstadt NPP, Switzerland
16:20–16:40	85	B. Sayed Muhammad Wassem	Pakistan	Application of the level-1 PSA model in various regulatory processes and challenges faced during their execution
16:40–17:00	110	^v A. Gilbertson	United States of America	U.S. Nuclear Regulatory Commission guidance on the acceptability of probabilistic risk assessment used in regulatory decision making for non-light- water reactors
17:00–17:20	168	G. Petkov	Bulgaria	Contextual integrated risk- informed decision-making
17:20–18:00	Session wrap-up by chairperson/Discussion			

16:00-18:00 **SESSION 32:**

Simulation & Modelling

CR1 (C-2nd floor)

^v Yury Shmelkov, Russia Lara Peguero, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
16:00–16:20	67	[∨] Y. Shmelkov	Russian Federation	Practical application of sensitivity and uncertainty analyses in the analysis of radiological consequences for BDBA at modern NPPs with VVER
16:20–16:40	137	[∨] P. Kanin	Russian Federation	Practical application of uncertainty and sensitivity analysis methodologies for the analysis of severe accidents in VVER reactors
16:40–17:00	95	K. Ahn	Republic of Korea	Uncertainty and sensitivity Analysis of the PWR and SMR by means of severe accident codes in the framework of the IAEA CRP I31033
17:00–17:20	33	A. Aboshosha	Egypt	Computer aided design and simulation of professional hybrid electrical energy backup system for nuclear facilities
17:20–17:40		V. Skliarenko	MSCFP	Chinese supercritical water reactor CSR-1000: Safety features and exploration of hydraulic resistance coefficient correlations
17:40–18:00	Session wrap-up by chairperson/Discussion			

FRIDAY, 21 OCTOBER 2022

9:00-10:30 SESSION 33:

External Hazards

Chairpersons: Abdallah Amri, France

Paolo Contri, IAEA

CR2 (C-2nd floor)

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
9:00–9:20		L. Micewski	IAEA, NSNI	External hazards related issues in SMR siting and design	
9:20–9:40	64	A. Amri	France	Main lessons learned from the Clearinghouse topical operational experience report (TOER) on external hazards and their possible use for the design of new reactors	
9:40–10:00	78	K. Deknopper	Belgium	External hazard challenges for evolutionary and innovative reactor designs	
10:00–10:20	181	D. Grabaskas	United States of America	The regulatory treatment of low frequency external events as part of a risk-informed performance-based approach	
10:20–10:30	Session	Session wrap-up by chairperson/Discussion			
10:30–11:00	Coffee/Tea Break				
10:00–10:20	181 Session	D. Grabaskas wrap-up by chairp	United States of America	of new reactors External hazard challenge evolutionary and innovativ reactor designs The regulatory treatment of frequency external events part of a risk-informed	

FRIDAY, 21 OCTOBER 2022

9:00–10:30 SESSION 34: CR7 (C-7th floor)

Multi-unit & Multi-module Risk Analysis

Chairpersons: Dennis Henneke, USA Yaolei Zou, IAEA

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper	
9:00–9:20		S. Poghosyan	IAEA, NSNI	IAEA methodology on multi-unit probabilistic safety assessment	
9:20–9:40	145	D. Henneke	United States of America	Multi-module probabilistic safety assessment (PSA) for the PRISM sodium-cooled fast reactor	
9:40–10:00	66	[∨] A. Qavi	Pakistan	Probabilistic safety assessment of multi-unit site of nuclear power plant	
10:00–10:30	Session wrap-up by chairperson/Discussion				
10:30–11:00	Coffee/Tea Break				

FRIDAY, 21 OCTOBER 2022

9:00-10:30 **SESSION 35:**

Artificial Intelligence

BR-D (C-4th floor)

Jorge Luis Hernandez, IAEA Alina Contantin, IAEA Chairpersons:

Time	Paper No.	Name	Designating Member State/Organization	Title of Paper
9:00–9:20		T. Jevremovic Y. Kim	IAEA, NPTDS IAEA, NSNI	IAEA activities on artificial intelligence (joint presentation by IAEA NE and IAEA NS)
9:20–9:40	63	A. Lye	United Kingdom	Probabilistic AI for prediction of material properties in nuclear reactors
9:40–10:00	170	G. Ma	China	The design and application of the intelligent accident analysis system for the nuclear power plant
10:00–10:20	176	S. Meschini	Italy	Machine learning applications for nuclear safety: An overview
10:20–10:30	Session wrap-up by chairperson/Discussion			
10:30–11:00	Coffee/Tea Break			

FRIDAY, 21 OCTOBER 2022

09:30-11:00 CLOSING SESSION

BR-D (C-4th floor)

Time	Name	Designating Member State/Organization	Title	
11:00–11:30	S. Poghosyan	Conference Scientific Secretary (NS)	Summary remarks on plenaries and panel	
	T. Jevremovic	Conference Scientific Secretary (NE)	discussions	
11:30–11:50	R. Sardella	Conference President Switzerland, ENSI	TIC2022 summary remarks, main outcomes and conclusions	
11:55–11:59	A. Bradford	IAEA, DIR-NSNI	Closing remarks	
	A. des Cloizeaux	IAEA, DIR-NENP		
12:00 Adjourn				

E-Session (posters)

Screen No.	Paper No.	Authors	Designating Member State/Organization	Title of Paper
1	53	A. Shapovalov	Russian Federation	Results of a quantitative comparison of different nuclear fuel cycles by their safety
2	71	C. Wang	China	The consideration of the independence of DID and its application in HPR1000 design
3	101	A. Izhutov	Russian Federation	Advanced program for irradiation testing of fuel and materials to justify safety of evolutional and innovative designs for nuclear reactors
4	167	P. Gyan	Ghana	Multi agent systems application concept for enhancing reactor safety and operations in an innovative SMR
5	178	E. Miralles- Dolz	United Kingdom	Reliability-based optimisation with total Monte Carlo
6	180	E. Roumili	France	Easing the nuclear safety demonstration integrated into projects using MBSE and artificial intelligence
7	183	I. Syilmi Qaira	Indonesia	Remote imaging of the iot integrated smartphone display for analysis of leaks in reactor pipes and vessels as an initial command for complete automatic shutdown mode in the small modular reactor plant
8	187	E. Torres	Canada	Advanced computer vision machine learning for automatic microstructural analysis

IAEA PUBLICATIONS RELATED TO THE SUBJECT OF THE EVENT

STI/PUB/1978, IAEA Safety Standards Series No. SSG-69, Publ 2021 Equipment Qualification for Nuclear Installations I IAEA

STI/PUB/1949, IAEA Safety Standards Series No. SSG-67, Publ 2021 Seismic Design for Nuclear Installations | IAEA

STI/PUB/1968, <u>IAEA Safety Standards Series</u> No. SSG-68, Publ 2021 Design of Nuclear Installations Against External Events Excluding Earthquakes | IAEA

STI/PUB/1893, Safety Reports Series No. 103, Publ 2020
Methodologies for Seismic Safety Evaluation of Existing Nuclear Installations | IAEA

STI/PUB/1991, IAEA Safety Standards Series No. SSG-77, Publ 2022
Protection Against Internal and External Hazards in the Operation of Nuclear Power Plants | IAEA

STI/PUB/2024, IAEA Safety Standards Series No. SSG-73, Publ 2022 Core Management and Fuel Handling for Nuclear Power Plants | IAEA

STI/PUB/1950, IAEA Safety Standards Series No. SSG-9 (Rev. 1), Publ 2022 Seismic Hazards in Site Evaluation for Nuclear Installations | IAEA

STI/PUB/1968, IAEA Safety Standards Series No. SSG-68, Publ 2022
Design of Nuclear Installations Against External Events Excluding Earthquakes | IAEA

STI/PUB/1947, IAEA Safety Standards Series No. SSG-64, Publ 2021
Protection against Internal Hazards in the Design of Nuclear Power Plants | IAEA

IAEA TECDOC Series No. 1988. Publ 2021

<u>Technical Insights from Benchmarking Different Methods for Predicting Pipe Failure Rates in Water Cooled Reactors | IAEA</u>

IAEA TECDOC Series No. 1994, Publ 2022

Numerical Benchmarks for Multiphysics Simulation of Pressurized Heavy Water Reactor Transients LIAEA

IAEA TECDOC Series No. 1971, Publ 2021

Thermal Performance Monitoring and Optimization in Nuclear Power Plants: Experience and Lessons Learned | IAEA

IAEA TECDOC Series No. 1966. Publ 2021

INPRO Collaborative Project: Proliferation Resistance and Safeguardability Assessment Tools (PROSA) | IAEA

IAEA TECDOC Series No. 1983, Publ 2021 Risk Aggregation for Nuclear Installations | IAEA

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Application of a Graded Approach in Regulating Nuclear Installations | IAEA

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Occupational Radiation Protection During the Decommissioning of Nuclear Installations | IAEA

IAEA TECDOC Series No. 1940. Publ 2021

Integrated Safety Assessment of Nuclear Installations by the Regulatory Body | IAEA

Safety Reports Series No. 123, Publ 2022 [IAEA Preprint]

Safety Report on Applicability of Safety Standards to Non-Water-Cooled Reactors and Small Modular Reactors

Safety Reports Series No. 110, Publ 2021 [IAEA Preprint]

Multi-unit Probabilistic Safety Assessment

IAEA TECDOC Series No. 2010, Publ 2022

Approach and Methodology for the Development of Regulatory Safety Requirements for the Design of Advanced Nuclear Power Reactors: Case Study on Small Modular Reactors

IAEA TECDOC Series No. 2003, Publ 2022

Lessons Learned in Regulating Small Modular Reactors

IAEA TECDOC Series No. 1982, Publ 2021

<u>Current Approaches to the Analysis of Design Extension Conditions with Core Melting for New Nuclear Power Plants</u>

IAEA TECDOC Series No. 1937, Publ 2020

Probabilistic Safety Assessment for Seismic Events

IAEA TECDOC Series No. 1936, Publ 2020

Applicability of Design Safety Requirements to Small Modular Reactor Technologies Intended for Near Term Deployment

Nuclear Energy Series No. NR-T-1.10 (Rev. 1) <u>Nuclear reactor technology assessment for near term deployment (iaea.org)</u>

Nuclear Energy Series No. NR-T-1.20 21-00180E PUB1932 Body 25 03 2022-Print-PDF.indd (iaea.org)

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13-16 December, Vienna, Austria

2023

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International Symposium on Isotope Hydrology (CN-320) 3-7 July. Vienna. Austria

Second International Conference on Climate Change and the Role of Nuclear Power (CN-315) **9-13 October, Vienna, Austria**

29th IAEA Fusion Energy Conference (CN-316) **16-21 October, London, United Kingdom**

International Conference on Waste and Environmental Safety: Integrated Approach to Strengthening Sustainable Development (CN-318)

6-10 November, Vienna, Austria

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27-30 November, Dead Sea, Jordan

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