

LICENSING NOVEL ADVANCED REACTORS: ADDRESSING THE CHALLENGES

*Side Event during the 65th IAEA General Conference
21st September 2021*

Hybrid Event of In-Person and Virtual Meeting

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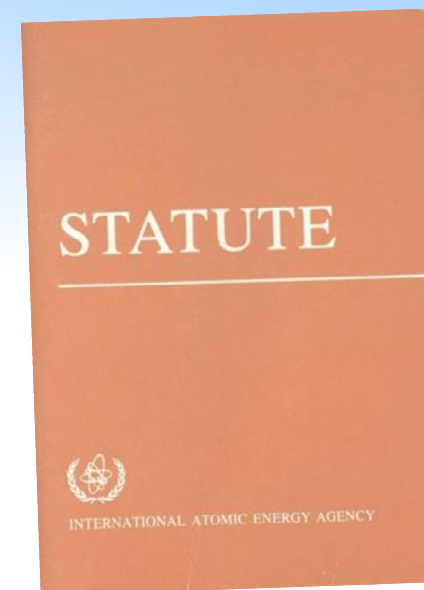
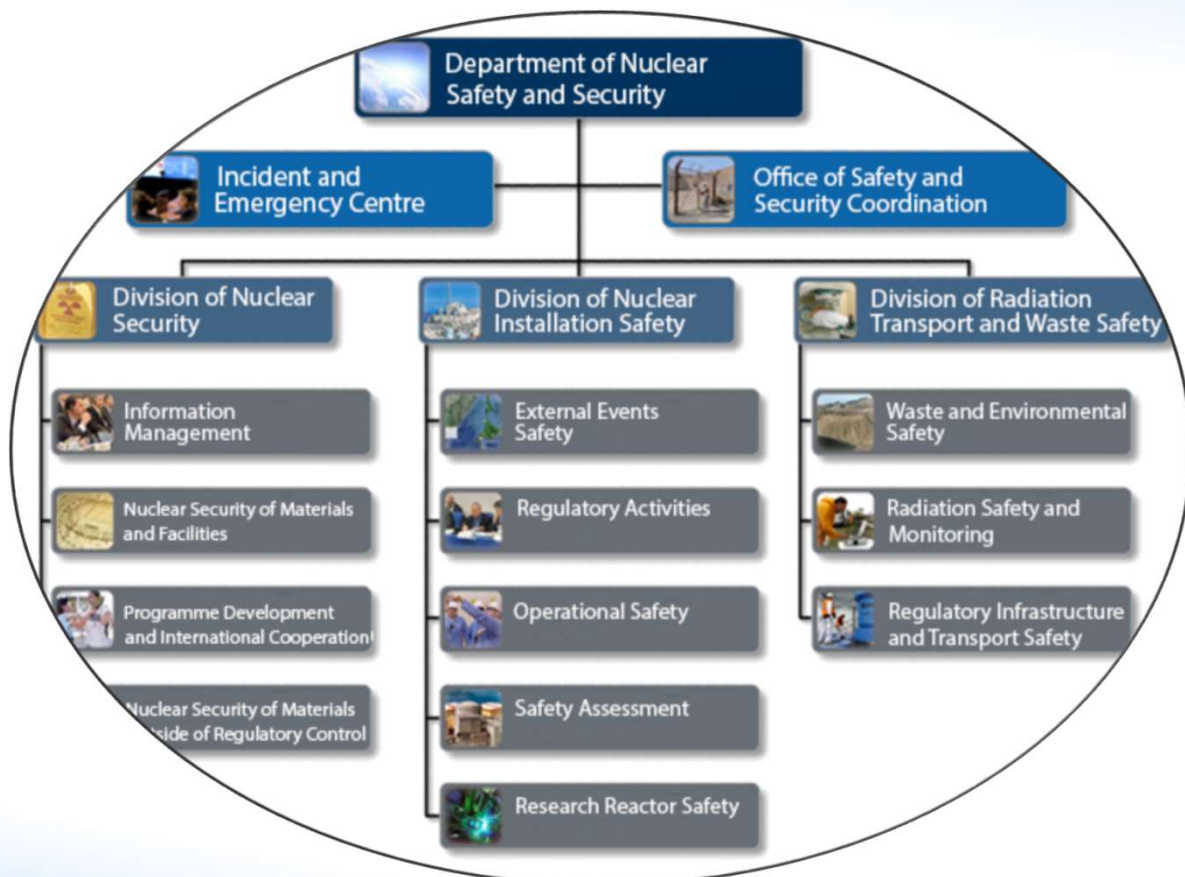
Director of Division of Nuclear Installation Safety (NSNI)
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1. Who are we and what do we do?



“To establish or adopt, in consultation and, where appropriate, in collaboration with the competent organs of the United Nations and with the specialized agencies concerned, **standards of safety for protection of health and minimization of danger to life and property**, and to provide for the **application of these standards** to its own operation as well as to the operations making use of materials, services, equipment, facilities, and information made available by the Agency...”

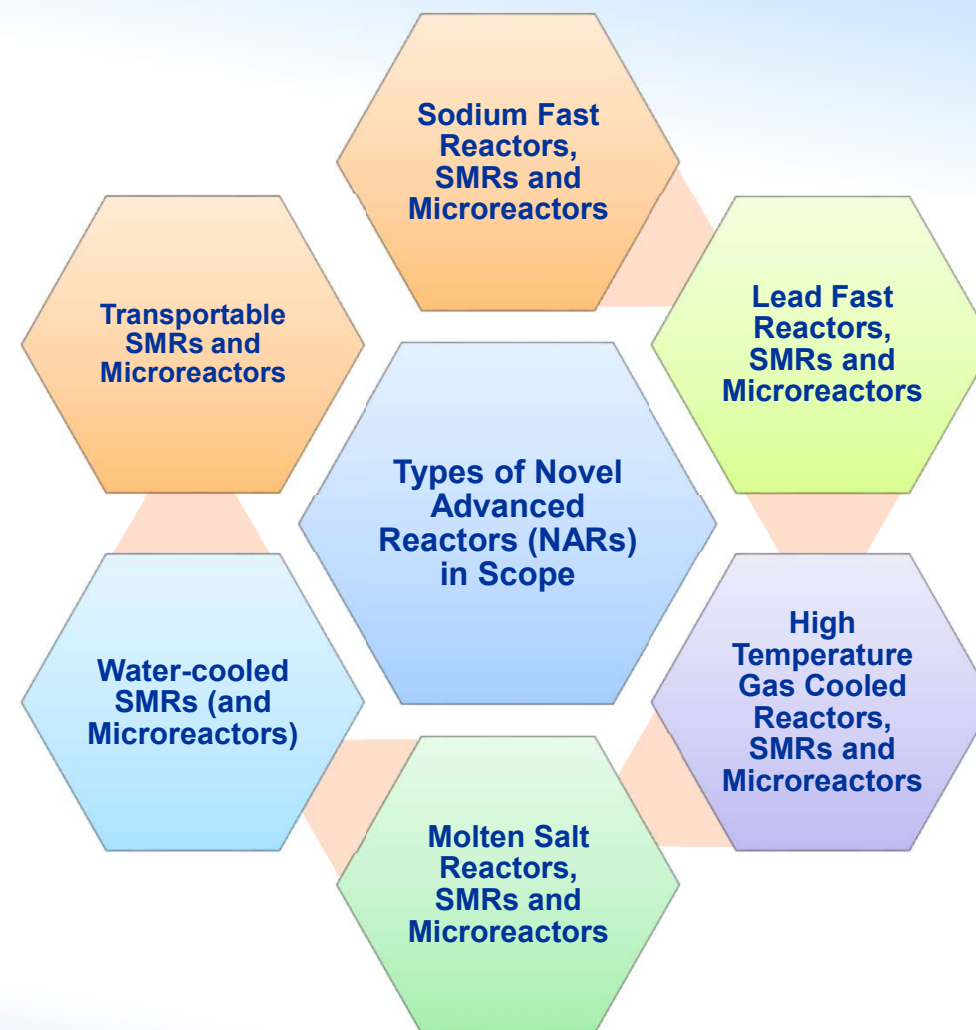
2. Why are we working on Novel Advanced Reactors?

Growing interest in these technologies in the fight against climate change

Novel Advanced Reactors can be very different from the current operating fleet, for example:

- ✓ different neutron spectrum
- ✓ different coolants and moderators
- ✓ simplified designs and passive means to maintain safety
- ✓ advances in engineering, materials, manufacturing
- ✓ serial factory, modular construction and standardization

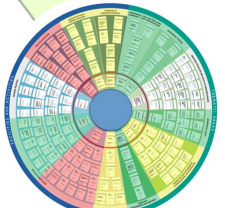
Are standards currently in use sufficient and relevant to ensure the safety of these innovative designs?



3. Our activities on Novel Advanced Reactors Safety



Novel Advanced Reactors Safety



Applicability of Safety Standards
(siting, design, construction, commissioning, operation, waste management, safety analysis, Emergency Preparedness, LMfS, Regulation)



Document development



Program to Address Applicability Review Findings

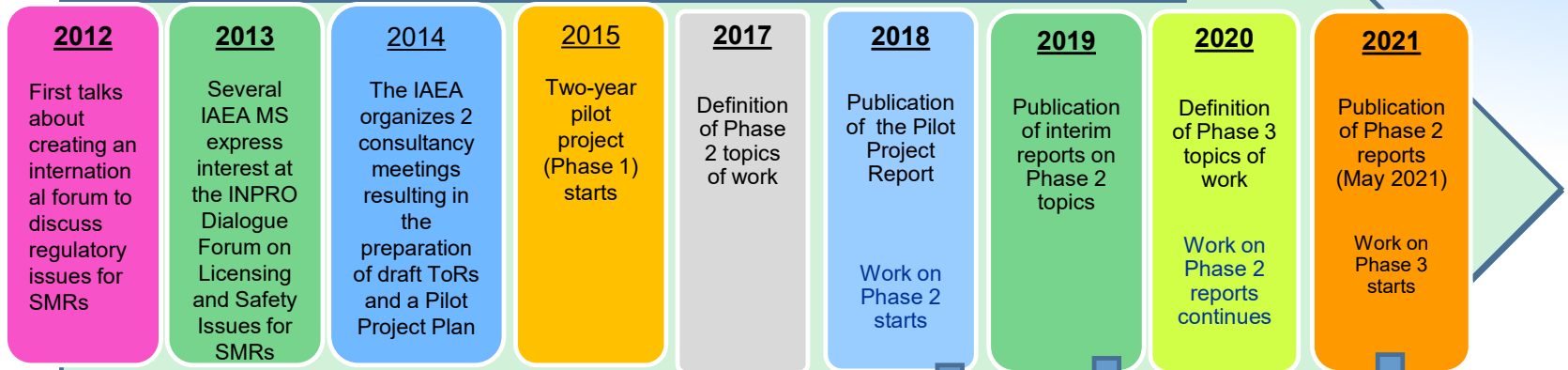
In close collaboration with:



International Nuclear Safety Group (INSAG)

Images source: SMR_Book_2020.pdf (iaea.org)

SMR Regulators Forum



Small Modular Reactor (SMR) Regulators' Forum



SMR Regulators Forum Phase 3

Licensing WG

- Mutual recognition of regulators' assessment/ Joint assessments/ Collaboration
- Identification of legal constraints

Design and Safety Assessment WG

- Security by design, interface with safety (Can, UK, USA, SA, Fin)
- Safeguards by design (may only include input presented by Safeguards Department)
- Containment/confinement

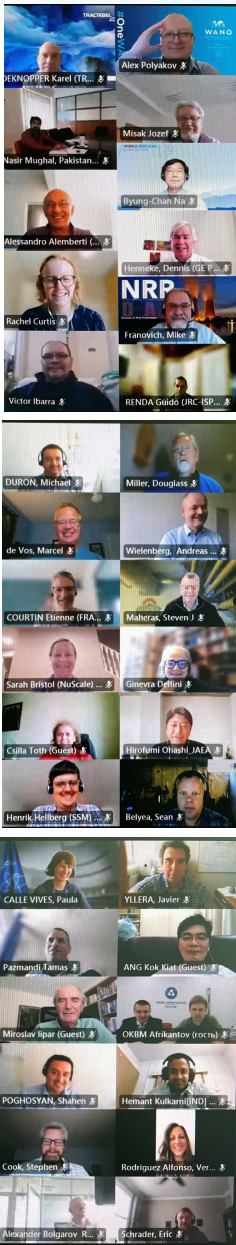
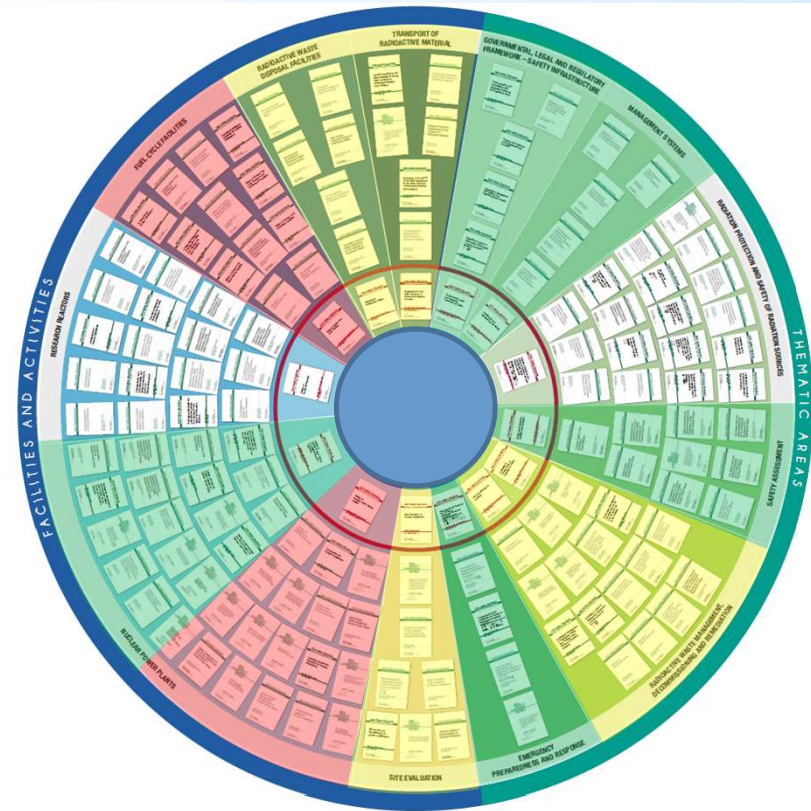
Maintenance, Construction, Commissioning and Operation WG

- Regulatory oversight of long lead SSC procurement
- Organizational stakeholders' capabilities (Designers, Vendors, Manufacturers, Supply chains, Operators)



Safety Standards Applicability Review

- The IAEA has completed the review of applicability of Safety Standards to Novel Advanced Reactors throughout lifecycle
- Working with more than 150 experts from 30 countries and 40 organizations
- Safety Standards generally applicable, some areas of non-applicability (technology specific) and areas for which further guidance will be beneficial
- The review will be captured in a Safety Report



4. Development of future program of work on Novel Advanced Reactors Safety

- A future prioritized program of work to address:
 - Areas for further work and areas of non-applicability in the Safety Standards
 - Recommendations from SMR Regulators' Forum
- In close collaboration with the safety standards committees and commission and *the SMR Safety Strategic Group*
- Reflecting Member States' needs and priorities

We will present areas under consideration as part of the panel discussion and hear examples of issues regulators are facing in the licensing of new technologies, and how the IAEA can help

Panel Discussion

Moderated by Ms Paula Calle Vives

Chair of the SMR Safety Working Group

Mr Ramzi Jammal

Executive Vice-President and Chief Regulatory Operations Officer,
Canadian Nuclear Safety Commission

Canada

Mr Jinkun Wu

Deputy Director of Division of Reactor, Nuclear Safety Regulation
Department II, National Nuclear Safety Administration, MEE

People's Republic of China

Ms Irina Sokolova

Head of International Relations Department, Rostechnadzor

Russian Federation

Mr Alun Griffiths

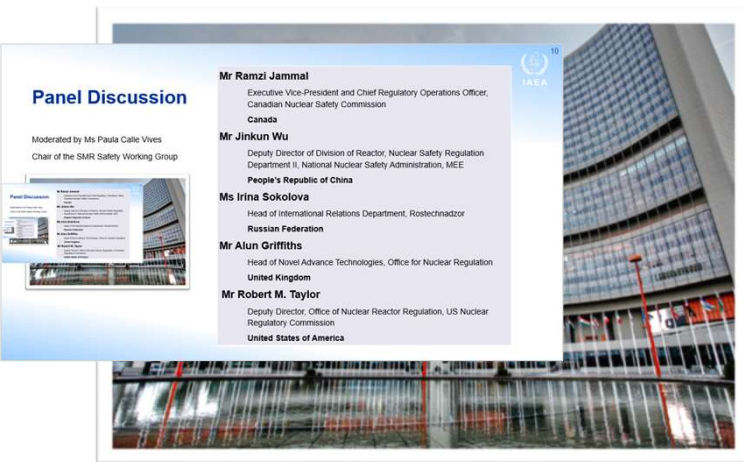
Head of Novel Advance Technologies, Office for Nuclear Regulation

United Kingdom

Mr Robert M. Taylor

Deputy Director, Office of Nuclear Reactor Regulation, US Nuclear
Regulatory Commission

United States of America



Proposals under consideration for further work on NAR Safety (1/3)

IAEA Safety Standards

for protecting people and the environment

IAEA Safety Standards

for protecting people and the environment

- Small adaptations to ensure technology neutrality, enlarge scope of Safety Standards and address general NAR issues
- New Safety Guide on demonstration of safety of FOAK (NAR design, construction, and manufacturing)

Proposals under consideration for further work on NAR Safety (2/3)

Safety Reports Series

IAEA TECDOC SERIES

Practical application of key existing requirements/ recommendations to **NARs:**

- Design Approach
- Safety Analysis
- Severe Accident and Accident Management
- Operation and Commissioning
- Effective international cooperation in the regulation and design assessment

Regulatory Design Assessment

Proposals under consideration for further work on NAR Safety (3/3)

IAEA TECDOC SERIES



Webinars

Training

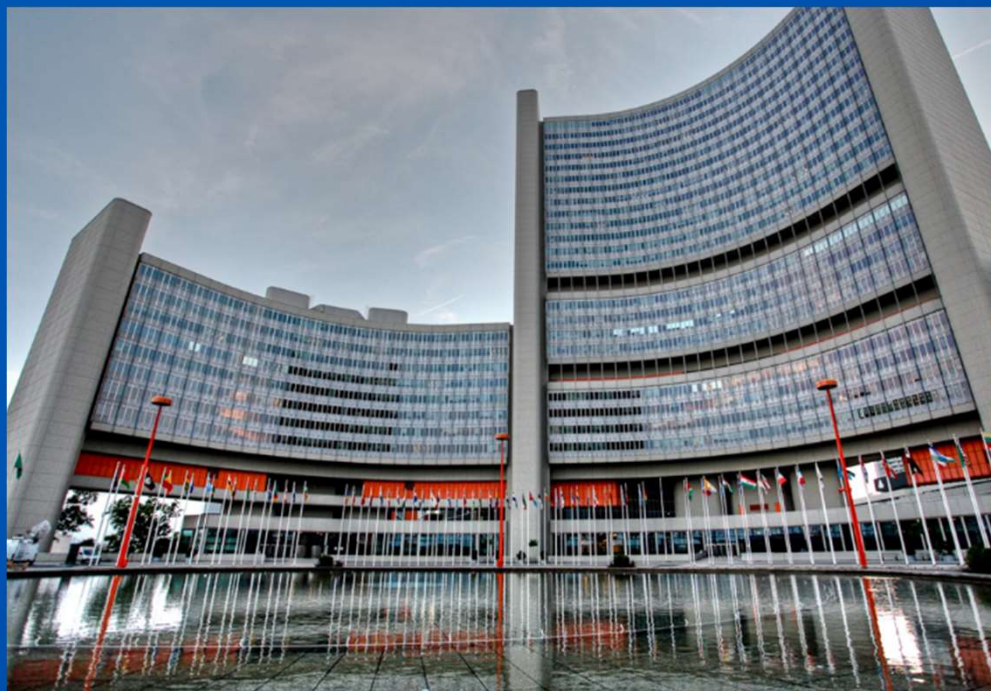
Technical Meetings

TIC
October 2022

Technical Safety Review
Conceptual Designs
**Proposal to work with
regulatory team**

Repository of **Knowledge** -
Technology Specific (*may provide
basis for future requirements/
recommendations*):

- Safety analysis and basis for design for non-water cooled reactors
- Chemistry of coolants and materials
- Operating experience, tests, experiments
- Novel Wastes
- Design and regulation of transportable SMRs



Thank you!
Questions?