



**Value and Results
from Collaboration**

**Webinar Series
on the Small Modular Reactor (SMR) Regulators' Forum
Phase 3 Reports**

Manufacturing, Construction, Commissioning and Operation (MCCO) Working Group

5 April 2024

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Q&A instructions



- The questions will be addressed after the presentations have been delivered. During the presentations, the participants are invited to post their questions in the chat.
- When posting a question in the chat, please kindly indicated the speaker you wish to address your question.
- After the presentations, the Moderator will start the Q&A session by selecting the questions to be addressed, from the chat first.
- Once all the questions from the chat have been answered, the Moderator will give the floor to the participants to ask questions directly by raising their virtual hand. This part of the session will proceed in the order in which the participants have raised their hands.
- When the Moderator gives the floor to a participant, the participant is kindly requested to turn on the video, identify herself/himself and indicate the speaker they are addressing, and then proceed by asking a clear and concise question. Please kindly mute your microphone while the speaker is providing their answer.
- The participants are encouraged to courteously react to one another's questions and/or remarks by using the chat. This will help the Moderator identify topics that interest the audience the most.
- Please keep in mind that the Moderator will set a time limit for each question to keep things on track and to maintain a good pace.

PLEASE KINDLY NOTE THAT THIS WEBINAR IS BEING RECORDED



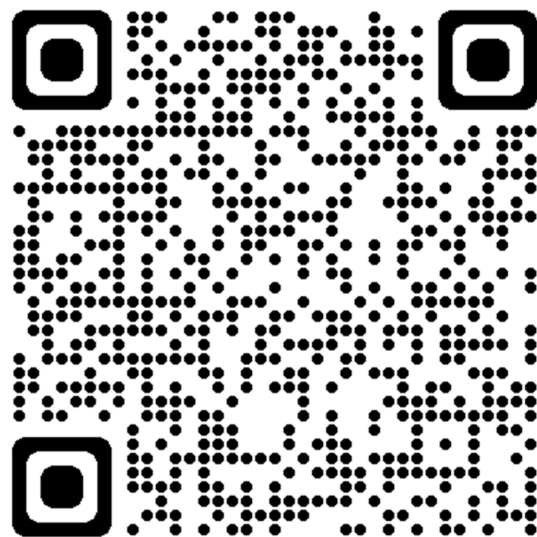
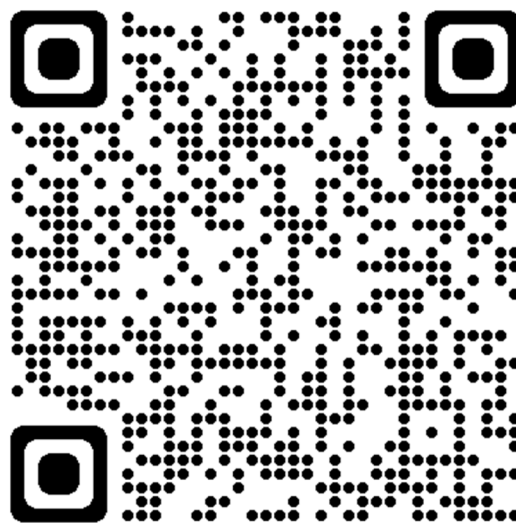
SMR Regulators' Forum Webinar Series



SMR REGULATORS' FORUM



**WG 3
MANUFACTURING,
CONSTRUCTION,
COMMISSIONING
AND OPERATION**


SMR REGULATORS' FORUM



**WG 2
DESIGN AND
SAFETY
ANALYSIS**

3 May 2024




SMR REGULATORS' FORUM



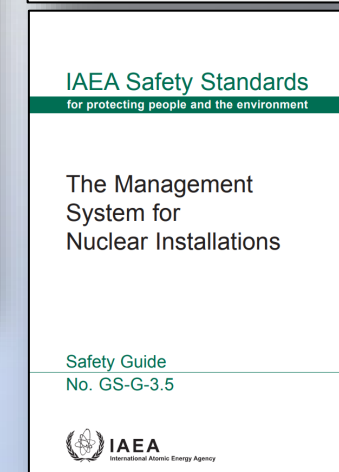
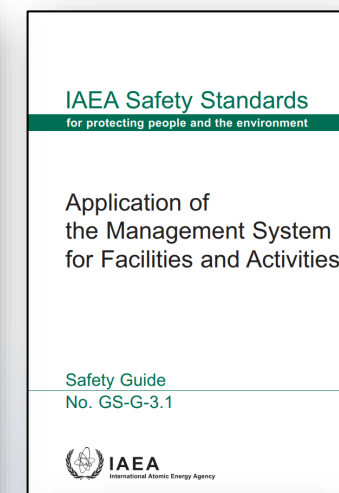
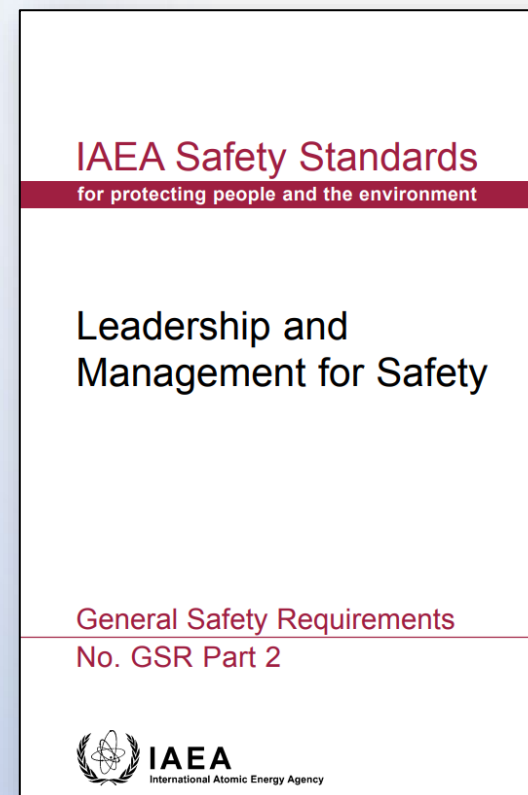
**WG 1
LICENSING
ISSUES**

18 June 2024



Introduction to the topic

- Current practice as stated in the IAEA Safety Standards:
 - ✓ The **licensee** is **responsible** for “protecting people and the environment from harmful effects of ionizing radiation is achieved” (GSR Part 2, Requirement 1).
 - ✓ The **licensee** maintains **oversight** of vendors, contractors and suppliers for “items, products and services that may influence safety” (GSR Part 2, Requirement 11).



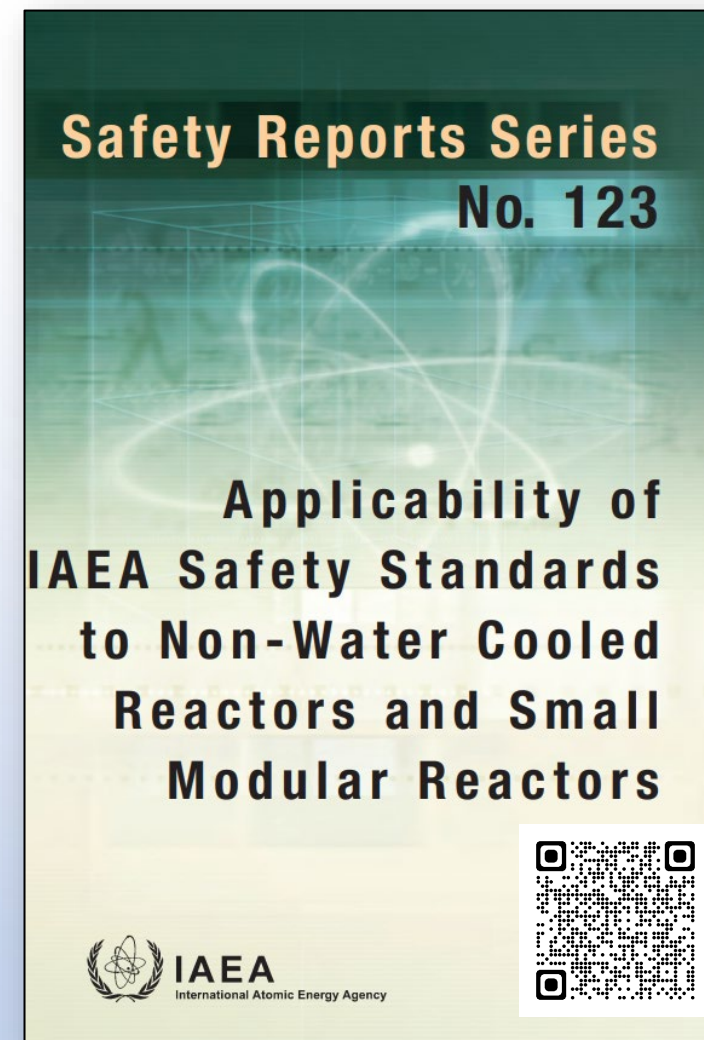
Introduction to the topic

SMR bring new approaches:

- Cases where the future owner and operator are not known
- Fleets of geographically dispersed SMRs that may not have a single owner/operator/licensee
- Complex supply chains

Who has the responsibility for safety?

How to demonstrate regulatory compliance, oversight and quality control of suppliers?



Introduction: SMR Regulators' Forum (SMR RF)

Mr Brian W. Smith, SMR RF Chairperson

Part 1. Regulatory Considerations in Pre-Licensing Engagement for Long-Lead Requests and Items (LLI)

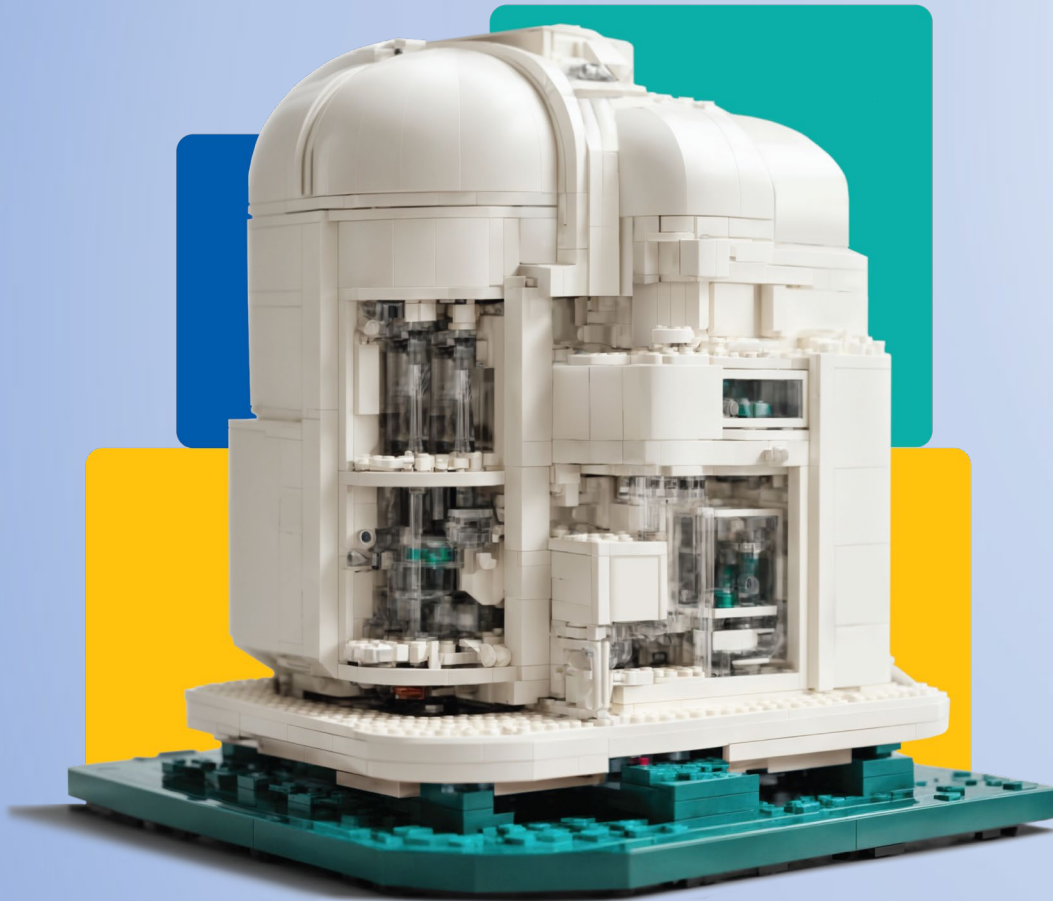
Ms Kerri Kavanagh, SMR RF MCCO WG Chair

Part 2. Conduct of Authorized Activities: Impact on Stakeholders' Organizational Capabilities (Designers, Vendors, Manufacturers, Supply Chains, Operators)

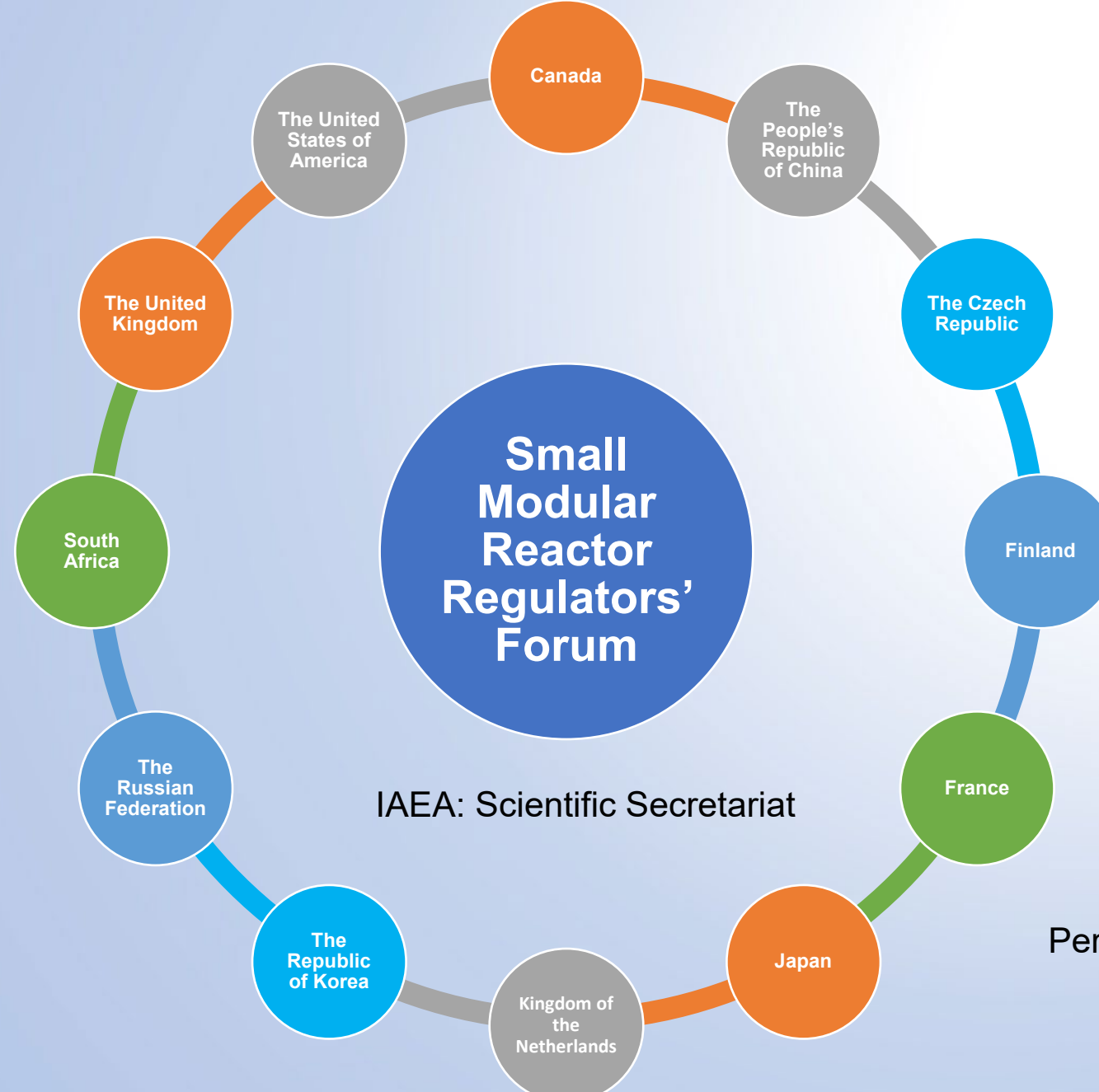
Ms Kerri Kavanagh, SMR RF MCCO WG Chair

Questions and Answers





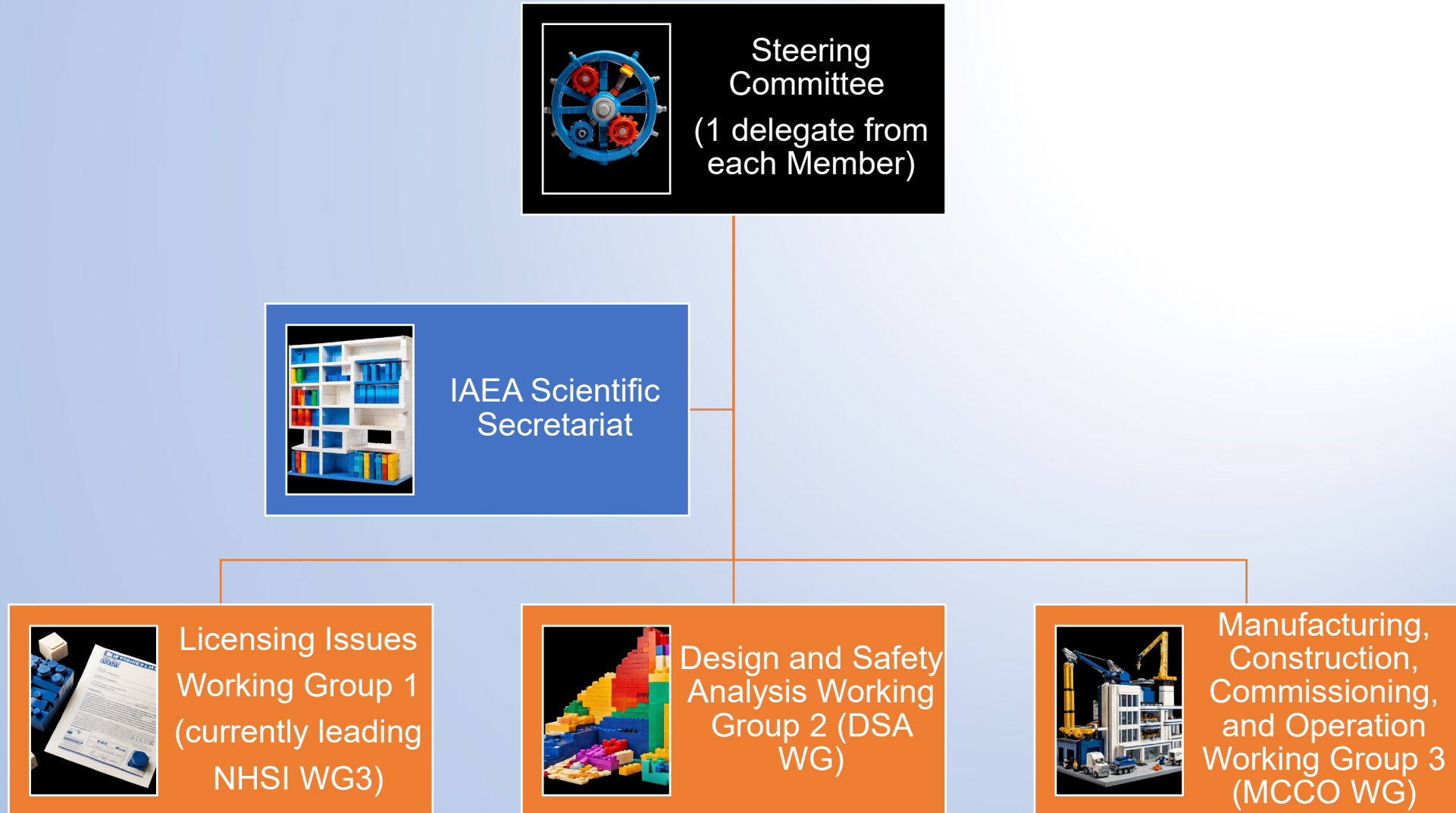
Introduction to the Small Modular Reactor Regulators' Forum (SMR RF)



- Permanent Observers:
- European Commission
 - OECD NEA
 - WNA-CORDEL

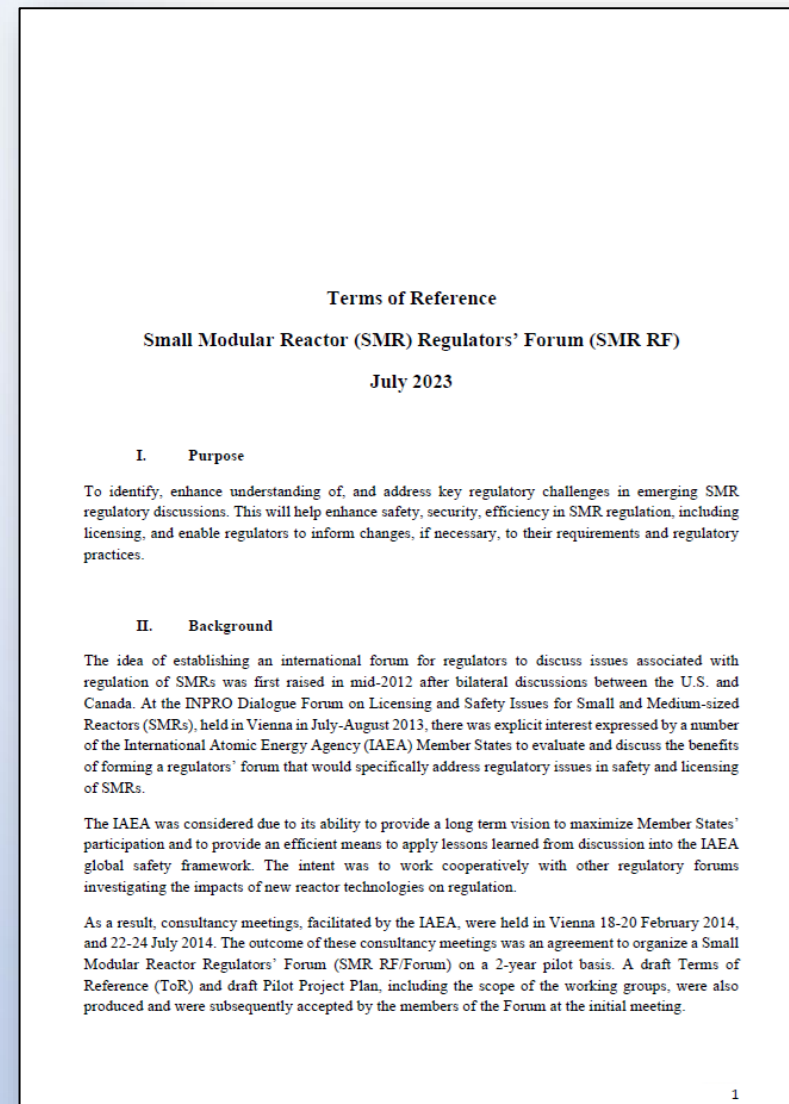


Organizational Structure



Membership requirements

- Membership is open to all IAEA Member States able to contribute in a meaningful manner to the work of the three of its Working Groups.
- The work being conducted is generally of a complex nuclear safety nature with a focus on SMRs that requires experience in:
 - ✓ multidisciplinary technical assessment across various areas of nuclear safety;
 - ✓ application of defence-in-depth in design and safety analysis;
 - ✓ use of risk-informed methodologies in regulatory decision making.
- Membership presupposes a commitment to devote adequate resources, with appropriate experience and knowledge base, to ensure that the Forum's purpose and objectives can be fully achieved.



Objectives and Outcomes

- Share regulatory experience among the Members to:
 - ✓ facilitate efficient, robust, and thorough regulatory decisions;
 - ✓ encourage enhanced nuclear safety and security;
 - ✓ facilitate international cooperation among regulators performing SMR-related assessments.



Generation and sharing of information that regulators can use to enhance their regulatory frameworks and activities



Description of regulatory challenges and discussions on paths forward



Common position statements on regulatory (policy and technical) issues



Suggestions for revisions to, or drafting of, the IAEA publications, especially the IAEA Safety Standards regarding SMRs



Suggestions for high level issues to be raised before international codes and standards organizations

Areas of Technical Work

Pilot Phase (2015 – 2017)

- Graded Approach
- Defence-in-Depth
- Emergency Planning Zone Size

Phase 2 (2018 – 2020)

- **Licensing Issues:** Key Regulatory Interventions, First of a Kind vs Nth of a Kind, and Licensing multiple module/unit facilities
- **Design and Safety Analysis (DSA):** multiple-unit/module, passive and inherent safety features, beyond design basis aspects
- **Manufacturing, Construction, Commissioning, Operation (MCCO):** manufacturability, supply chain and commissioning, collection and use of experience, conduct of maintenance, co-activities/combined activities on a multiple unit SMR



Areas of Technical Work

Phase 3 (2021 – 2023)

- **Licensing Issues:** mutual recognition of regulators' assessments/Joint assessments/Collaboration
- **DSA:** (a) safety, security and safeguards from a regulatory perspective and (b) Containment/confinement
- **MCCO:** (a) Regulatory considerations in pre-licensing engagement for long-lead requests and items and (b) Conduct of authorised activities: Impact on stakeholders' organisational capabilities

Phase 4 (2024 – 2026)

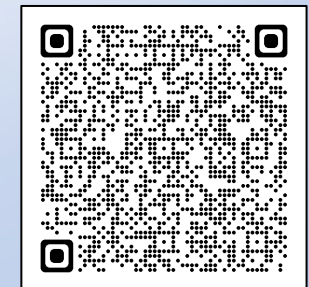
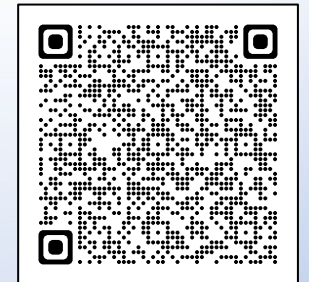
- **Licensing Issues:** collaborative reviews and leveraging other regulators' reviews (NHSI WG3)
- **DSA:** (a) mechanistic source term and (b) continuation of 3S topics
- **MCCO:** (a) manufacturing and deployment in the absence of a Licensee, (b) construction oversight, (c) organizational capability of a new Licensee (no prior nuclear experience)



SMR RF Manufacturing, Construction, Commissioning, and Operation Working Group (MCCO WG)



- MCCO WG addresses issues related to **manufacturing, construction, commissioning and operation** of SMRs
- MCCO Phase 3 Reports:
 - **Regulatory Considerations in Long Lead Items** – implications of SMRs and advanced reactors on long lead item (services and goods) engagement with regulators prior to the licensing process for a specific facility.
 - **Capabilities of the supply chain when supporting Licensees** – implications of new ownership models, new and more internationally dispersed suppliers joining the industry.



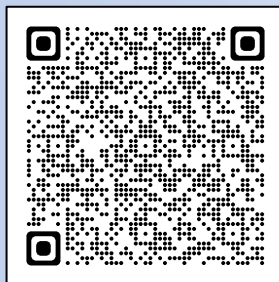


**Working Group on Manufacturing, Construction,
Commissioning and Operation**

Phase 3 Report

**Regulatory Considerations in Pre-
Licensing Engagement for Long-
Lead Item Requests**

December 2023



Part 1. Regulatory Considerations in Pre-Licensing Engagement for Long-Lead Requests and Items (LLI)



Initial considerations on LLIs



Differences in the meaning of LLI for SMRs with respect to large nuclear power plants



SMRs and regulatory challenges for LLIs



Considering how different regulators regulate long-lead procurement, especially if Licensee is not known



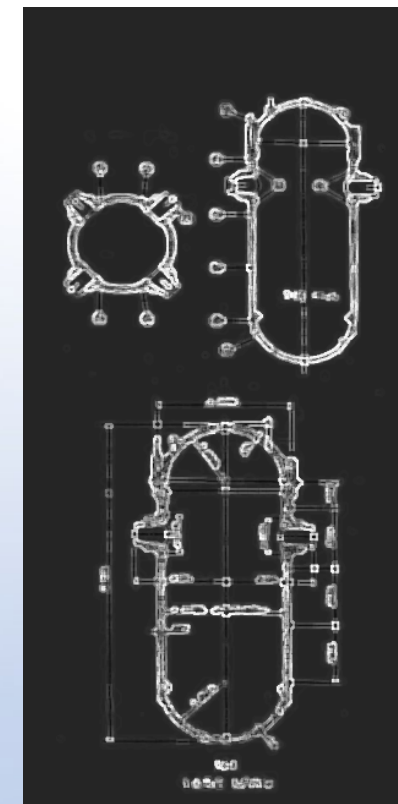
What does 'off the shelf' manufacturing business model for SMRs mean for regulators?

LLIs – what are they?

In general: equipment, products, systems and, in some cases, programmes and technical information, with a lead time for procurement *that is outside the licensing process* for the new build project for which the LLI is intended.

Further:

- *licensing* decision concerning construction **has not been made yet** (which includes assessment of sufficiency of the NPP design);
- items likely have a degree of importance to safety in the construction and operation of a facility;
- **long lead times**, which necessitate their procurement early enough to align with the overall existing facility or new build project.

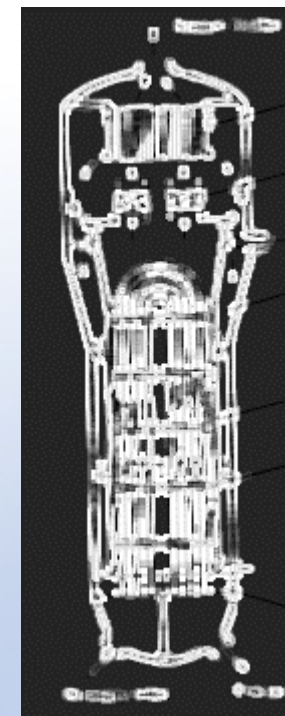


LLIs – what are they (cont'd)?

BUT: The definition of LLIs and the regulatory processes for addressing them will vary from country to country according to each Member State's regulatory framework.

In some cases, countries have addressed certain LLI supply chain applicants through direct regulation using manufacturing licenses or certification of suppliers.

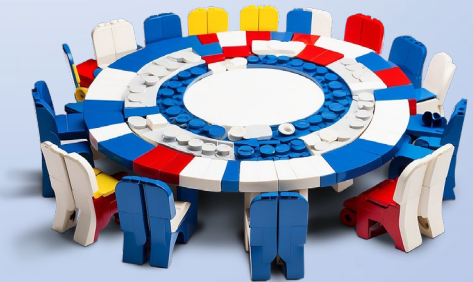
Although the regulatory approaches may differ, regulators should understand the necessity for some safety significant components to be procured in advance to align with new build programs.



Why does a future Licensee (or vendor) seek LLI feedback from a regulatory body?

Seeking to:

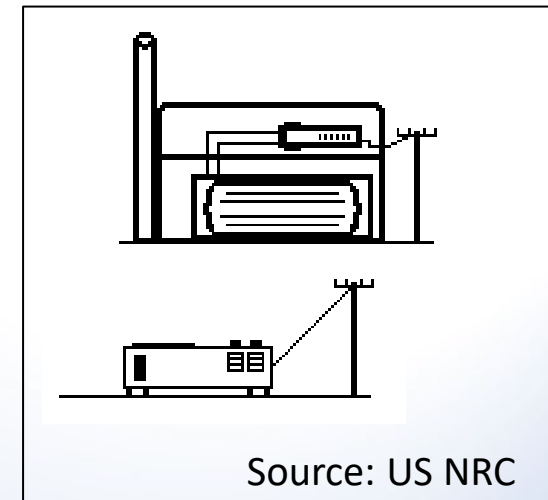
- gain sufficient confidence that the LLI will not present undue barriers in the licensing/authorization process for the new build project;
- receive feedback on areas, such as use of codes and standards, and other types of evidence and the path to reconciliation of the LLI by the Licensee with the facility safety case to demonstrate it meets requirements.



Key Differences for SMR LLIs

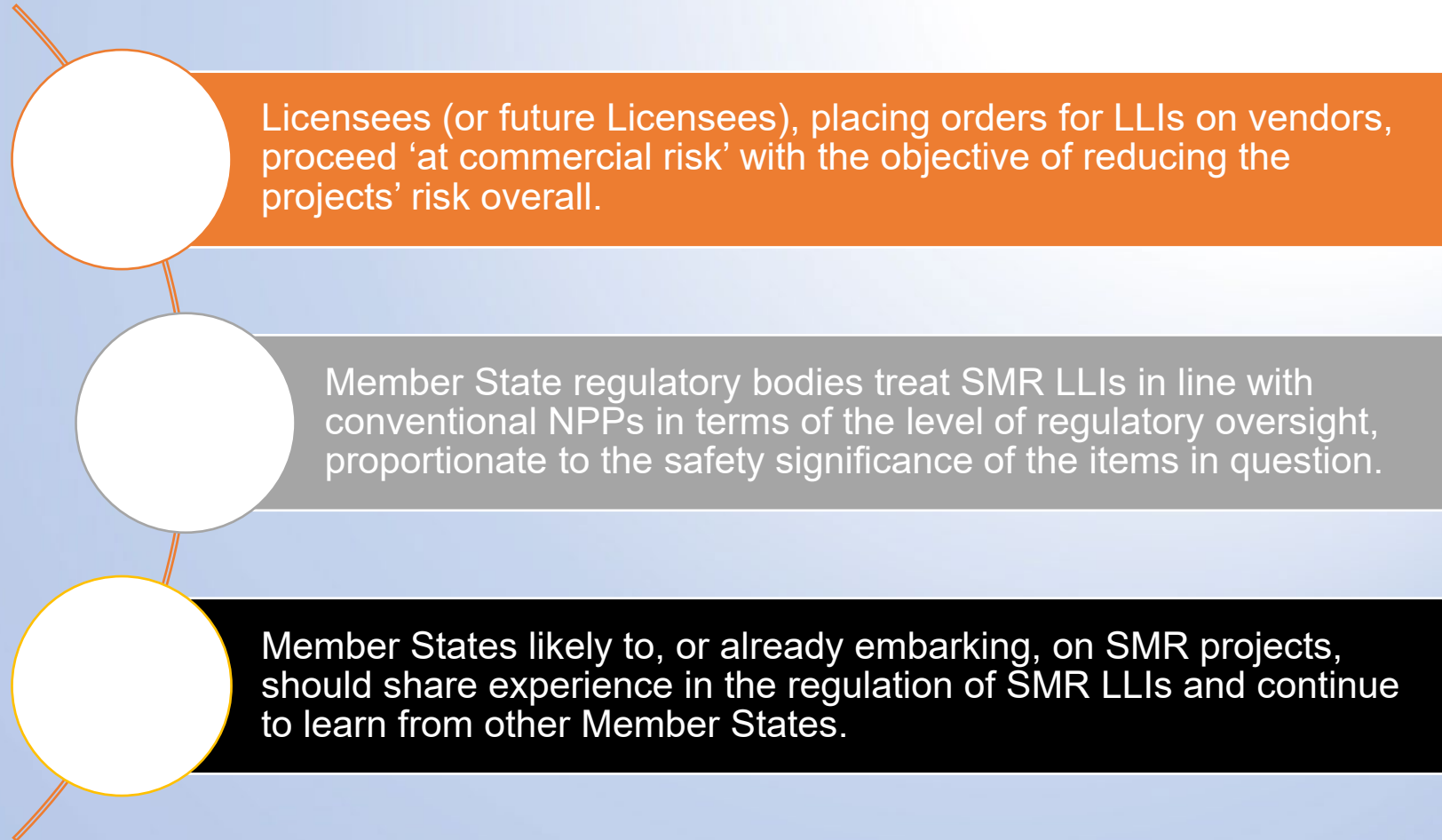
MCCO WG identified key differences for LLIs for SMRs compared to the traditional NPPs (not all inclusive):

- LLIs are likely to be procured by vendors and not Licensees.
 - ✓ Future licensee does not have ability to provide oversight of manufacture of their LLIs.
- Whole safety system modules may be manufactured as LLIs. In some instances, the entire SMR plant may be delivered as a single package.
- Some SMRs using advanced manufacturing will require LLIs that are not covered by existing codes.
- Supply chain for novel technology may not be familiar with regulations.



Regulatory Considerations in Pre-Licensing Engagement for LLIs

Key common positions



Regulatory Considerations in Pre-Licensing Engagement for LLIs

Considerations of 'Off-the-Shelf' Manufacturing and Fleet-wide Manufacturing

The concept of 'off-the-shelf' manufacturing and 'fleet-wide' manufacturing for LLIs are not considered to be one and the same.

Phase 2 MCCO report discusses manufacturing and provides common positions related to the manufacturing of components (see Section 1.2).

'Fleet-wide' manufacturing (first-of-a-kind to nth-of-kind SMR) – manufacturing a fleet of one design – can reduce the times for manufacturing and assessments resulting in items on a 'shelf'.





IAEA

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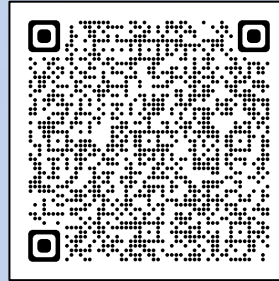


Working Group on Manufacturing, Construction,
Commissioning and Operation

Phase 3 Report

**Conduct of Authorised Activities
Impact on Stakeholders'
Organisational Capabilities
(Designers, Vendors, Manufacturers,
Supply Chains, Operators)**

December 2023



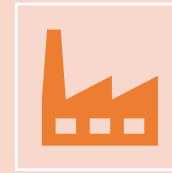
Part 2. Conduct of Authorized Activities: Impact on Stakeholders' Organizational Capabilities (Designers, Vendors, Manufacturers, Supply Chains, Operators)



How SMRs impact Licensee's ability to perform its authorized activities?



Consideration of updating the definition of authorized activities to include manufacture of safety-sensitive nuclear components by regulators and IAEA



Licensee needs to be resourced and capable of establishing adequate oversight of the supply chain



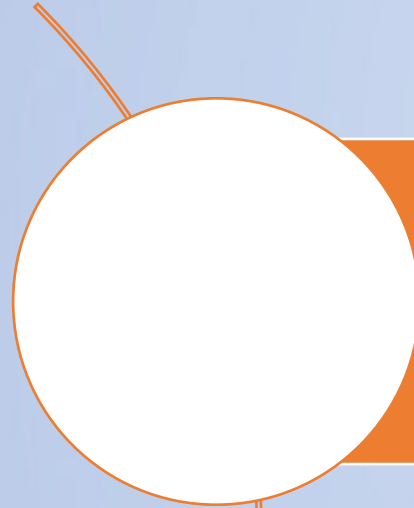
Differences in the SMR business model and its effect on Licensee's ability to conduct authorized activities, i.e., understanding of the design and oversight of procurement process to ensure nuclear safety



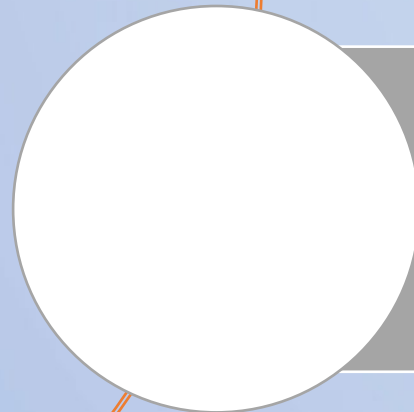
The Licensee will always be accountable for safety and the authorized activity

Key common positions

The size and capability of the Licensee



There is no minimum size of a Licensee, as long as they are able to carry out activities that they are authorized and required to do.

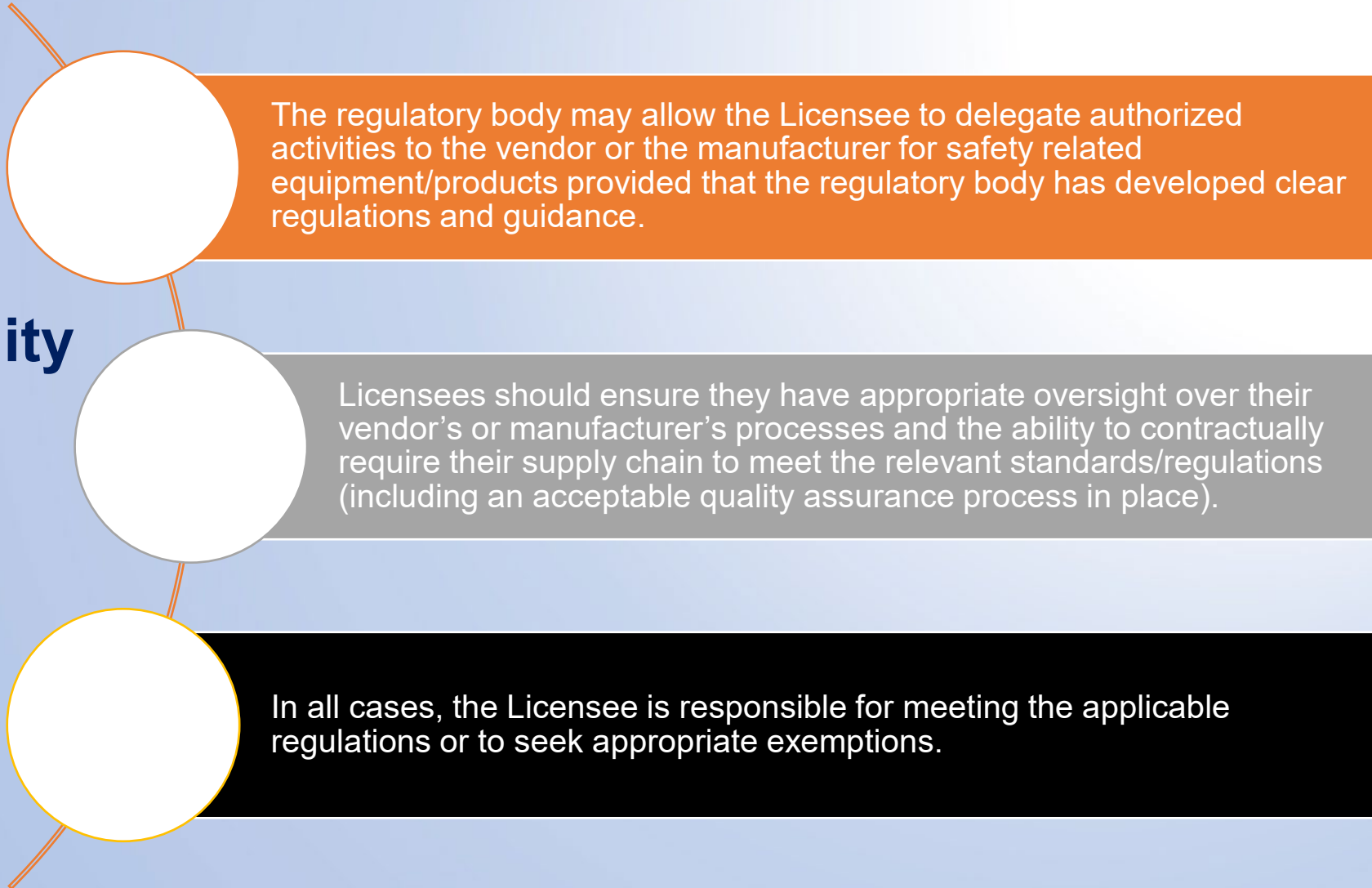


Regulators should consider how their regulatory requirements with regards to 'intelligent customer' capabilities may be met for small Licensee organizations.



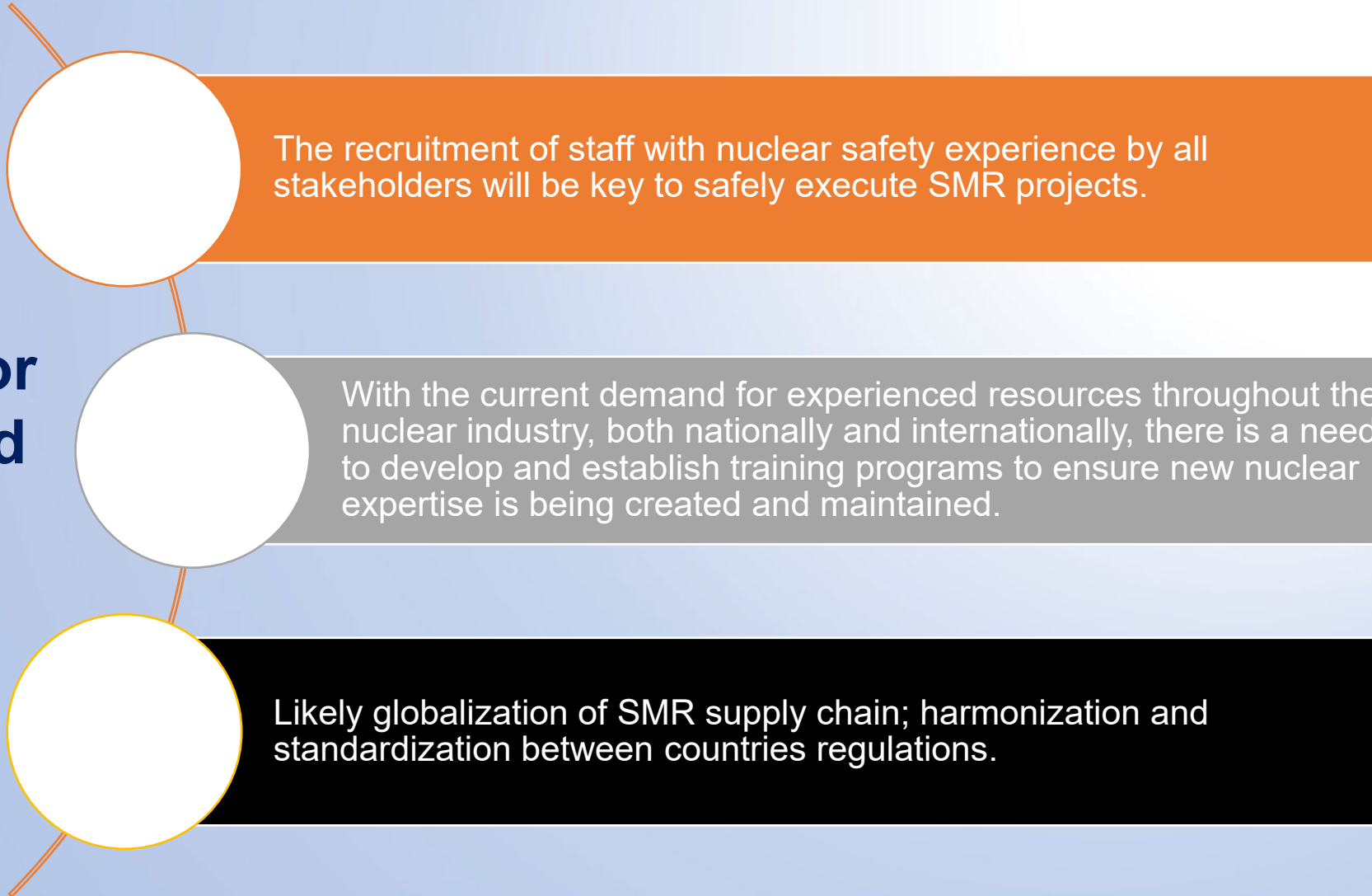
Key common positions

The responsibility of the Licensee



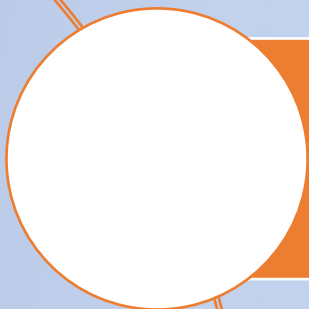
Key common positions

The need for experienced resources

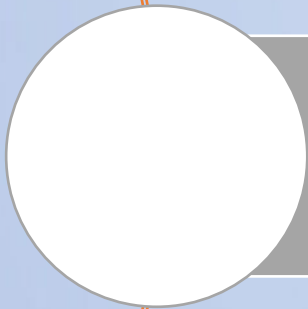


Key common positions

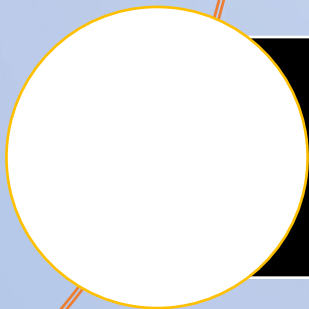
Licensee will likely be a smaller organization for an SMR, more reliant on supply chain organizations and contractors



Key definitions in regulatory frameworks and the IAEA guidance may need to be revised to include manufacture in the scope of Authorized Activities in order to support SMR construction.



Regulators should consider how their regulatory requirements with regards to intelligent customer capabilities may be met for a small Licensee organization.



Size of the Licensee's organization is not a consideration for whether the regulatory requirements need to be met. In all cases, the Licensee is responsible for meeting the applicable regulations or to seek appropriate exemption.



Next Steps

The SMR RF MCCO WG is currently considering:



Manufacturing and
deployment in the
absence of a Licensee



Construction oversight

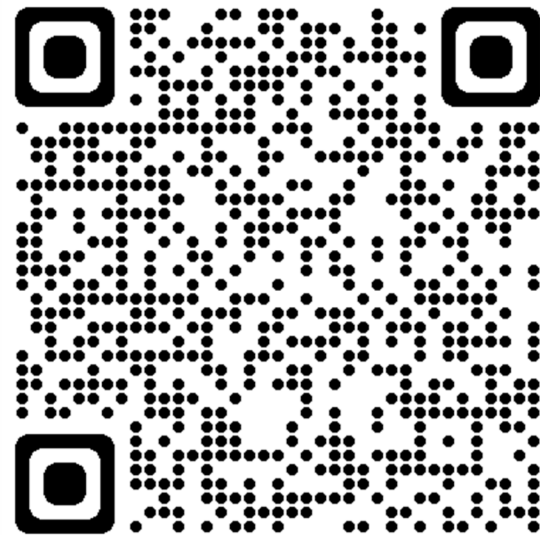
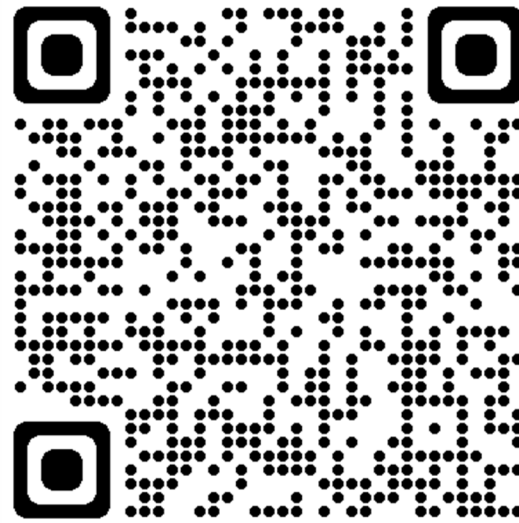


Organizational capability
of a new Licensee (no
prior nuclear experience)

Questions and Answers



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WG 2
DESIGN AND SAFETY ANALYSIS

3 May 2024



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WG 1
LICENSING ISSUES

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