

6 June 2022



Ms Anna Bradford
Director of Division of Nuclear Installation Safety
Department of Nuclear Safety and Security
International Atomic Energy Agency

Dear Ms Anna Bradford:

In the 2022 spring meeting of the Small Modular Reactor Regulators' Forum (the Forum), you provided a presentation on the initiative recently launched by the IAEA's Director General called the Nuclear Harmonization and Standardization Initiative (NHSI). As discussed in your presentation, this initiative has a goal of harmonizing and standardizing regulatory and industrial approaches in support of the effective global deployment of safe and secure advanced nuclear reactors. This goal has a strong interface with the objectives of the Forum, as the Forum's main purpose is to bring together national regulators to identify, enhance understanding of and address key regulatory challenges that may emerge in future SMR regulatory decisions. In recognition of the past and ongoing efforts of the Forum in this area, you asked the Forum to provide input so that it could inform the further development of the NHSI. The Forum is pleased to support your request.

The Forum sees the great potential for enhanced international harmonization to reduce regulatory burden and increase the efficiency of regulatory reviews in the long term, while maintaining the highest standard on safety, safeguards and security. In addition, the Forum sees shorter term opportunities for collaboration, such as joint technical reviews and the sharing of information by regulators, that will contribute to the long-term objectives of the NHSI.

There are important issues that need to be considered early in the development of a pragmatic programme of work. First, each regulator is limited in the changes they can make in their own country. Each country has its own legal system and is responsible for setting regulatory expectations. Each country is also responsible for ensuring nuclear safety in their own country. This leads to legal and regulatory differences from one country to another that make some collaborative activities more difficult to achieve. This is especially true when multiple countries collaborate on common designs. Second, there is overhead when working with other countries on international projects and in particular joint technical reviews. It takes time to learn how to work with one another. The time and resources needed may be greater if there are more than two countries involved. Third, the ability of sharing regulatory and design information among regulators, which is needed for enhancing cooperation, may be hampered by commercial issues, export control license(s) constraints, and other domestic and international legal restrictions. Finally, the Forum notes that it is important to ensure that the activities in the programme of work must avoid leading to competitive advantages of certain design developers.

The Forum was initiated in 2015 and has completed two phases of activities. During this time, the Forum successfully demonstrated the ability of regulators to collaborate, work to address key regulatory challenges, and reach common positions, thereby enhancing safety, security, and efficiency in SMR regulation. In these first two phases, the Forum has addressed harmonization issues in several of its published reports. These reports addressed topics such as: (1) Graded Approach, (2) First of a Kind vs Nth of a Kind, (3) Key Regulatory Interventions During a Small Modular Reactor Lifecycle, (4) Licensing of New Build Projects with Multiple Module/Unit Facilities, (5) Manufacturability, Supply Chain Management, and Commissioning, (6) Conduct of Maintenance, and (7) Conduct of Co-Activities and Combined Activities on a Multi-Unit SMR Facility Site. The reports addressing these topics, as well as several others, can be found on our website at <https://www.iaea.org/topics/small-modular-reactors/smr-regulators-forum>.

In phase 3, the Forum is developing important work to contribute to the harmonization of regulatory approaches that is available to inform and provide input to the NHSI initiative. For example, the Forum is developing a report with current experiences, common positions, and recommendations on how to achieve enhanced international regulatory cooperation on SMRs. This work explores different options for international collaboration including sharing of information and inspection processes among regulators, regulators performing joint technical reviews, as well as the adoption of new designs by embarking countries and preparing for regulatory harmonization. The report also aims to establish lessons learned and good practices in this area. For example, important experiences can be gathered from bilateral or multilateral cooperative agreements between countries. These have tended to start out smaller in scope as regulators learn to work with each other. Momentum for these activities is building as regulators and proponents alike realize the benefits of ongoing collaboration. Other relevant experiences are related to regulatory groups such as the Multinational Design Evaluation Programme (MDEP) which aimed to establish common positions in the reviews of specific reactor designs (e.g., AP1000, APR1400, EPRs, etc.). Due to legal and proprietary limitations on the amount of information that can generally be shared among regulators, the differences in timing of the regulatory reviews, regulatory expectations, and the high-level nature of the discussions in these regulatory groups, the common positions had limited impact on the outcome of the regulatory reviews and harmonization among countries. Lessons learned from these activities can be utilized in the harmonization efforts moving forward.

Other topics that are being addressed by the Forum in Phase 3 include organizational capabilities, legal challenges for SMR deployment, the consideration of long lead time items, authorized activities and capabilities, and safety, security, and safeguards by design.

The NHSI work to achieve the long-term goal of harmonization provides an excellent opportunity to establish collaborative activities that can deliver useful outcomes in the short and medium term. The Forum suggest the following examples of concrete activities and outcomes:

- Regulatory sharing of information and inspection processes: efficient information exchange on regulatory processes and knowledge needed for the regulatory assessment of a SMR would be beneficial for regulators.

- International joint technical reviews: an assessment process could be developed for regulators of different member states to work together in the safety evaluation of specific SMR designs or specific technical topics. The international review outcome could then be the basis for the final regulatory decision in each member state, so a harmonized outcome is achieved. Furthermore, many countries' regulatory process does not include pre-licensing engagement and hence this is a stage for which joint technical reviews will be beneficial and easier to establish. Any process developed should allow for joint technical reviews of regulators from different countries working as a single team.
- Mutual recognition and acceptance of regulatory reviews: development of an approach to achieve acceptance of other regulator's reviews could be possible on specialized areas and may be beneficial for both experienced regulators and embarking countries.
- Preparing the ground for regulatory harmonization: recognising the differences in the requirements among member states and agreeing on the bases for the common requirements is a pre-requisite for harmonization. This pre-step can be achieved during international joint technical reviews and would help the participant member states to identify areas where national and international requirements are different.

The Forum recommends, as an essential first step to contribute to the above activities, to develop and implement a joint technical review process for conceptual designs against safety principles and requirements. IAEA high level safety requirements, for example, could be used as review criteria or as a benchmark for member states' regulations for generic advanced reactor designs. In some areas, additional common positions may be needed to deal with new features of SMRs. Any common position can then inform changes in the standards and possibly in member states' regulations/guidance. An important benefit from this first step is to gather lessons learned on multilateral collaboration to help define a joint technical review process that can be used to reach joint international regulatory positions.

As the IAEA further develops the plan to implement this initiative, we ask that you consider how the Forum can provide independent expert advice. We believe that the prior, current, and future work of the Forum can contribute significantly to this initiative. As discussed earlier, we are currently in phase 3 of our efforts and plan to start identifying new topics to address in phase 4 early next year. We will select the topics during our April 2023 meeting. While we would typically plan to address similar topics and produce reports in phase 4, we are willing to consider taking on new types of activities. We would welcome coordination with you on evaluating these topics. The products of the Forum could be endorsed and can help inform the NHTS's outcomes.

We look forward to coordinating with the IAEA on this important initiative and working towards achieving the goal.

Sincerely,

Brian W. Smith
Chairperson, SMR Regulators'
Forum Steering Committee

Matthew Bamber
Vice-Chairperson, SMR Regulators'
Forum Steering Committee