



The Nuclear Harmonization and Standardization Initiative (NHSI)

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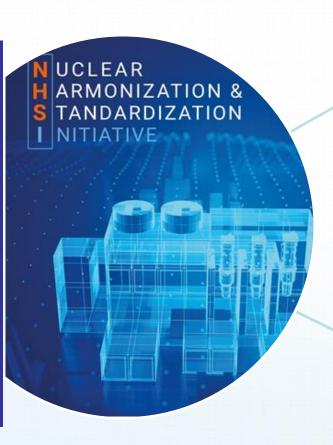


31st October 2023

NHSI Industry Track



Effective Global Deployment of Safe and Secure Advanced Nuclear Reactors



Harmonization of **Regulatory Approaches**Track

Harmonization

and

Standardization

of **Industrial**

Approaches

Track

• **WG1:** Framework for information sharing

• WG2: Towards harmonization - multinational pre-licensing review process

• WG3: Two processes increasing cooperation – building on current initiatives

Regulators

Governments

IAEA as facilitator

within and between the tracks

• Topic 1: Harmonization of high-level

• user requirements

• **Topic 2**: Common Approaches to

Codes and Standards

• **Topic 3:** Experimental Testing and Validation for Design and Safety Analysis Computer Codes

• **Topic 4:**Accelerating the implementation of nuclear infrastructure

for SMRs

Technology Holders

Operators and other end-users

International Organizations

and Associations

12



Topical Groups of the NHSI Industry Track



Harmonization of high-level user requirements

Common Approaches to Codes and Standards



Experimental Testing and Validation for Design and Safety Analysis

Computer Codes

Accelerating the implementation of nuclear infrastructure for SMRs



NHSI Industry Track Reach







Topic 1 Objective





Topic 1 - Harmonisation of high-level user requirements



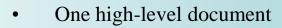
The IAEA is working with three utility organizations, which have existing user-requirements document, to draft a **technology-neutral high-level document** that will:

- be a reference when detailing technology specific requirements,
- help embarking and expanding countries structure their BIS,
- help regulatory bodies understand what future licensees expect.

Applications

Goals

Policies





• Technology-neutral

• Built on the contributions of utility organizations

Completed with input from non-traditional users

Technology specific criteria







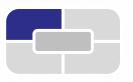
Will develop their own technology specific requirements (LWR, MSR, HTGR, FR, FNPP...)

Project specification

To be detailed by the user when preparing the BIS

Topic 1 Timeline







Definition of scope, alignement and planning



Harmonization of structure and drafting of the document

Phase 3

Consultation with the Industry and non-traditional users

Phase 4

Final draft and publication process

Fall 2022

Phase 1-Planning and Alignment

- Discussions with embarking countries
- Completion of users' survey
- Alignment with existing utility organizations

Phase 2 – Drafting

- Consultancy meetings with representatives from utility organizations
- Feedback in NHSI plenary meeting

Summer 2023

Phase 3 – Consultation

- TC workshop on GURC (China, 4-8 September 2023) Feedback from MS on the first draft

We are here!

- Consultancy meeting (Q4 2023)

Consultation of non-traditional users (oil companies)

Winter 2023-24

- Technical meeting (S1 2024)

 Presentation of the final draft
- Start of the publication process
- Preprint of the document (referred to by the utility organisations)
- Final publication

Phase 4 – Publishing



Topic 2 Objectives





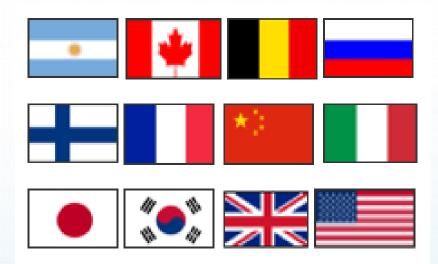
Topic 2 - Common Approaches on Codes and Standards



Mission & Vision with approaches on C&S:

- **Identify** similarities and differences
- Understand why they exist
- Share information on the findings
- Develop common approaches
- Harmonize where possible

25 companies from 12 Member States WNA as a strategic partner





Topic 2 Programme of Work





NHSI Topic 2 Scope

I. Codes & Standards

- A. QUALITY AND MANAGEMENT SYSTEM STANDARDS USED WIDELY IN THE MEMBER STATES (APPLICABLE TO SMRS)
- B. ENGINEERING STANDARDS FOR THE DESIGN AND CONSTRUCTION OF SMRS (WNA LEAD)
- C. EQUIPMENT QUALIFICATION STANDARDS FOR NUCLEAR (SMRS) FACILITIES
- D. C&S USED IN VARIOUS SMRS (AND THEIR PROJECTS)
- E. C&S FOR ADVANCE MANUFACTURING TO BE USED FOR SMRS (AND THEIR PROJECTS)

II. Oversight & Acceptance

- A. A USE OF STANDARD, PROVEN SERIALLY MANUFACTURED INDUSTRIAL GRADE ITEMS
- B. NON-NUCLEAR CODES, STANDARDS, LAW AND REGULATIONS RELEVANT TO SMR DEPLOYMENT
- C. OVERSIGHT ACTIVITIES REQUIRED BY CODES, STANDARDS, LAW AND REGULATIONS

Deliverables:

Publication(s), white paper(s), information 8 **sharing platform for the IAEA Member States**

Topic 2 - Way Forward





Topic 2 - Common Approaches on Codes and Standards





- Kick-off (1-2 Dec 2022) Virtual
- Scoping and beginning to plan
- Ad-hoc planning meetings on need basis
- **First Working Meeting** ("February 2023" CM -date based on Doodle poll) Virtual
- Workshop (12-14 April 2023), IAEA/Vienna, Hybrid
- 18 May, NHSI Ind Track call
- NHSI plenary, 27 June 2023
- 10-11 July CM 2023, Hybrid
- 14-15 Sept CM 2023, Hybrid 2024 (TBD) Spin-offs
 Technical Meeting, 11-15 We are here!
 December 2023 (nominations) Meetings on need basis f

- CM Spring 2024
- CM Summer 2024
- CM Autumn 2024 (TBD), Virtual
- Final TG2 meeting, end of

Meetings on need basis for different Topic 2 activities

- **Platform Operation**
- Spin-off Coordinated Projects (TBD)
- Recurring meetings (TBD)
- What else (TBD)

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Technical Meeting on the Harmonization and Use of Industrial Codes and Standards for Small Modular Reactors in December 2023 WHY SERIALLY MANUFACTURED INDUSTRIAL PRODUCTS ARE CRUCIAL FOR RELIABLE DEPLOYMENT OF SMALL MODULAR **REACTORS**



Topic 3 Objectives





Topic 3 - Experimental Testing and Validation for Design and Safety Analysis Computer Codes - Global cooperation mechanism for experiments and code validation for SMRs, between experimental facilities, technology holders, International Oganizations and TSOs.

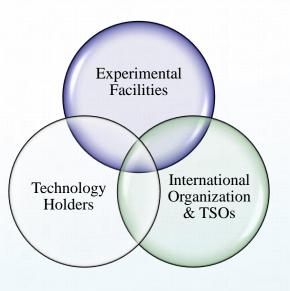


Mission & Vision:

- Reduce costs and increase schedule certainty for experiments and code validation for SMRs.
- Provide greater reach and enhanced utilization of existing experimental facilities.
- Share information on experimental programs, and identify potentials for resource sharing.
- Establish best practices & common approaches in testing and code validation.

Programme of work:

- Setup the NEXSHARE (Network for Experiments Sharing) Network.
- Populate a database of experimental facilities for SMRs.
- Organizing a first Workshop (potential bi-annual event).
- Providing opportunity for sharing between Network members and early engagement with TSOs.
- Publications: Network brochure, experimental facilities for SMRs, and others based on the Network's needs.





Topic 3 Timeline





Note: sharing information on experiment and code validation does not necessarily mean sharing data, but identifying what is available, what work is being conducted, what are the gaps and what facilities are currently available. Agreeable conditions for sharing (data or resource) are to be established between interested parties.

Phase 1 Planning and Alignment Phase 2 Define Collaborations Phase 3 Implement Activities We are We are We are We here! Winter 2024 Winter 2024

Phase 1– Planning and Alignment

- Kick-off
- CM (7-9 Dec 2022)
- Gather inputs and needs
- Define the workplan

Phase 2 – Define Collaborations

- Network Terms of Reference
- Network Specifications
- CM (22-23 March 2022)
- Monthly progress meetings
- Mapping & Engagement of participating organizations
- CM (11-14 July 2023)

Phase 3 – Implement Activities

- Monthly progress meetings
- CM (5-7 Dec 2022)
- Ongoing engagement of participating organizations
- Launch the Network (Q2 2024)
- Issue publication(s) (Q2 2024)
- Workshop (18-21 June 2024)

Phase 4 – Long-Term Collaboration

 Mechanisms for long-term maintenance, update, etc





Topic 4 Objectives





Topic 4 - Acceleration of nuclear infrastructure implementation for SMRs

The focus is to bring together technology holders, owner/operators, International Organizations and other industry stakeholders to consider possible innovative approaches to support accelerated infrastructure implementation.

- Develop a TECDOC that will:
 - Provide a forward-looking view on how some infrastructure issues addressed in the Milestones Approach could be graded in time or resources.
 - Discuss earlier industry engagement needed to enable accelerated deployment of SMRs and Microreactors.
 - Identify obstacles to these new approaches.
- Inform the next update to the Milestones Approach document in the 2027/2028 timeframe.



Topic 4 Timeline





Phase 1

Planning and Alignment

Phase 2

Align structure and drafting of the document

Phase 3

Meetings with Member States, Industry and other stakeholders

Phase 4

Final draft and publication process

Winter 2022

- 1st CM Meeting (8-10 November 2022) on Legal Frameworks for SMRs and MRs
- Kick-off Meeting (20 December 2022) Virtual meeting to Share Information on Infrastructure Development, discuss role and input to TECDOC, and Scope possible early engagement support to Member States

Summer 2023

- 2nd CM Meeting (3-5 May 2023) Hybrid on Deployment models for SMRs and Microreactors with Vendors
- 3rd CM Meeting (1-3 August 2023) Hybrid on Deployment models for SMRs and Microreactors with Owners/Operators
- Develop Initial Draft input of **TECDOC**
- Internal meeting on consolidate and review draft of TECDOC content (18-20 September 2023)

- Follow- her up Discuss. up Discussion Meeting (Q4) Virtual meeting with NHSI Participants to provide status update
- End O4 Virtual with NHSI Participants - Status Update - To be determined
- O1 2024, Technical Meeting, Hybrid meeting to collect Member States and experts feedback on the draft TECDOC

Winter 2024

Hybrid meeting on Regulatory framework & Capacity Building

Q2/Q3 2024 - Meeting in

Submit final draft in Q3/Q4 2024

Final draft circulated for internal review

Start of the publication process Preprint of the document (referred to by the utility organisations) Final publication

**Additional meetings for the TECDOC will be based on results and recommends from the CMs held



Elements of the TECDOC







Drivers that Support SMRs and Microreactors Deployment



Features and Implications of SMRs, Transportables (MRs), and FNPP



Readiness of Technology Recipients Countries (TRC)



Innovations and challenges in existing and future Deployment Models Accelerators



Enabling Tools for Acceleration



Timeline and Expected Outcomes



2022

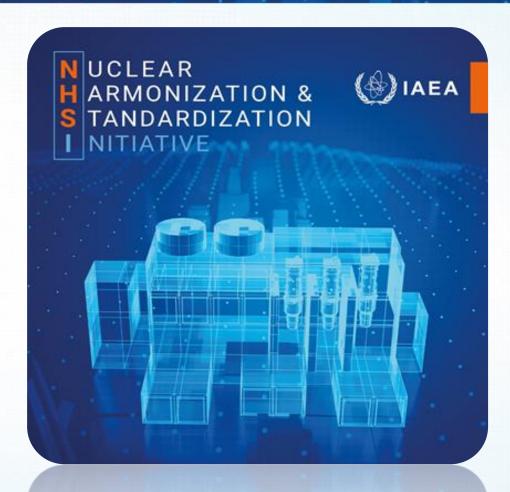
- Work plans and outline of publications for each working and topical group
- Key inputs, experience available, cooperation with ongoing projects
- Start development of publications
- Define interface between tracks

2023

- WG/TG meetings and continue developing publications
- NHSI Plenary June 2023
- Targeted interface meetings between tracks

2024

- Completion of draft publications
- NHSI Plenary June 2024
- Interface meetings between Industry and Regulatory Track
- Recommendations for future work



The success of this Initiative will require clear commitment and support from Governments, regulatory bodies and industry



Save the dates





First IAEA International Conference on Small Modular Reactors and their Applications

Save the dates: 21-25 Oct 2024





Visit our <u>Portal</u> for up-to-date information on IAEA SMR related events and <u>its NHSI pages</u>

https://smr.iaea.org





Thank you!