MDEP
LW-SMMR/LB WG
Programme Plan 2024-2025

Related to: LW-SMMR/LB Working Group Activities

LW-SMMR/LB WG
Programme Plan for 2024 and 2025

Multi-National Design Evaluation Programme
LW-SMMR/LB Working Group (LW-SMMR/LBWG)

1. LW-SMMR/LBWG Goals

- Leverage national regulatory resources by sharing information and experience on the regulatory safety design reviews of the Land-Based Light-Water Small Medium and Modular Reactors (LW-SMMR/LB) with the purposes of enhancing the safety of the design and enabling regulators to make timely licensing decisions to ensure safe designs:
    1. Exchange experience on licensing process and design reviews, lessons learnt, and design-related construction, commissioning, and operating experience,
    2. Work to understand the differences in regulatory safety review approaches in each country to support potential use of other regulators safety design evaluations, where appropriate.
- Promote safety designs through cooperation (consideration should be given to promoting harmonisation of regulatory practices where there may be a safety benefit):
    3. Identify and understand key design differences including those originating from regulatory requirements and then documenting the reasons for differences in regulatory requirements,
    4. Document common positions on aspects of the review to enhance safety of designs,
    5. Coordinate communications on MDEP views and communicate common positions to vendor and operators regarding the basis of safety evaluations,
    6. Use experience gained in learning about similarities and differences in licensing frameworks to identify potential paths forward to harmonise licensing approaches and practices when there is a safety benefit.

2. Intermediate Objectives

7. Share information including evaluations among LW-SMMR/LBWG members to leverage resources and focus design reviews on safety issues including Fukushima-related issues and commissioning activities in regulatory areas that are significant for licensing decisions,
8. Encourage improvement of designs through design safety review cooperation when there is a clear safety benefit,
9. Enhance multilateral cooperation in licensing frameworks to harmonise licensing approaches and practices when there is a safety benefit,

10. Document the activities of the technical expert subgroups through technical reports and common positions.

3. 2024 -2025 MDEP LW-SMMR/LB WG Work Plan

- Communicate review results and timelines for sharing regulatory evaluations of the LW-SMMR/LB among all LW-SMMR/LB WG member countries,
- The following technical topics will be discussed in 2024 - 2025:
    1. Application of the first principle of Vienna Declaration.
    2. SMMR regulatory framework:
        i. consideration of the differences between the national SMMR safety requirements,
        ii. consideration of the expediency of establishing uniform universal requirements.
    3. New materials for LW-SMMR:
        i. development at the international level of guidelines for the introduction and verification of new materials for the SMMR,
        ii. discussion of approaches corresponding to the design solutions of the SMMR in terms of monitoring the metal of elements and welded joints during operation,
        iii. Development of the data bank for approved materials,
        iv. New fuel material (e.g. ATF).
    4. Safety assessment approaches for LW-SMMR:
        i. identification of postulated initiating events, and methodologies used for their identification,
        ii. source term for emergency planning,
        iii. establishment of emergency planning zones due to the specifics of the SMMR,
        iv. discussion to define criteria for safety assessment,
        v. Concepts of diversity, redundancy, physical separation, and functional independence applied in the design.
    5. Spent fuel management strategies (especially concerning final storage as waste or temporary storage as an asset for reprocessing):
        i. features of SNF discharge from the core,
        ii. SNF storage requirements (in liquid medium or dry storage),
        iii. restrictions on the amount of spent fuel and on the time of its storage on the site.
    6. Implementation of Probabilistic Safety Assessment (PSA) of LW-SMMR:
        i. requirements for the format and content of the probabilistic safety analysis report for the SMMR,

ii. Criteria of acceptability,
iii. Methodologies and requirements,
iv. Risk-informed approach:
    1. Risk-informed system configuration optimization.[1]
    2. Risk-informed equipment classification. [2]

- Potential topic for future consideration include:
    1. SMR recycling and decommissioning:
        i. The process of decommissioning the SMMR, including the process of reprocessing and handling spent fuel,
        ii. Waste Classification and Recycling Strategies,
        iii. Regulatory Control of Radioactivity in Recycled Consumer Goods,
        iv. Decommissioning and Long-Term Safety Management.
    2. In-service inspection methods for integrated SMR systems.
- Following additional discussions on the topics above, LW-SMMR/LB technical expert subgroups (TESG) can be established.
- These TESGs should perform the following:
    1. The technical expert subgroups should provide a work plan including description and scope of issues to be addressed to the LW-SMMR/LBWG and report on the status at every LW-SMMR/LBWG meeting,
    2. Meet regularly to exchange information on relevant aspects of the design review status,
    3. Share relevant evaluations when they become available,
    4. Produce technical expert subgroup technical reports on subjects that the subgroup deems important to safety to identify and document similarities and differences among designs, regulatory safety review approaches and resulting evaluations,
    5. Produce MDEP common positions, especially on important safety evaluation findings,
    6. Post evaluations, positions, reports, etc. in the MDEP library.
- Follow the construction and commissioning progress of LW-SMMR:
    7. Share significant design changes, if any, in construction and commissioning,

[1] For the design of LW-SMMR, identify weak links in the design. Evaluate the advantages and disadvantages of the system design scheme from a risk perspective. Apply the risk-informed concept to achieve balance and optimization of system design. Realize simplified system design without reducing safety.

[2] Based on traditional deterministic equipment analysis, through PSA analysis of the contribution of each equipment in the LW-SMMR system to risk, evaluate the safety-related importance of equipment. Realize more refined classification of LW-SMMR equipment to improve safety and economy.

8. Provide feedback on construction and commissioning experience.

- When necessary, plan and conduct technical site visits.
- Provide recommendations, when appropriate, to the MB for considering possible items as topics to address generically.

4. Planning outputs of the LW-SMMR/LB WG during 2024 - 2025

- Commence the development of the following technical reports (TR) and Common Positions (CP)
    1. Common position on Vienna Declaration
    2. SMMR regulatory framework:
        1) Comparison table of the differences between the national SMMR safety requirements,
        2) Potentially CP on the national SMMR safety requirements,
    3. New materials for LW-SMMR:
        1) TRs or/and CPs on material selection,
        2) TRs or/and CPs on commendable requirements for Reports on Certification Tests,
        3) Finding the common approach to the development of the databank for approved materials.
    4. Safety assessment approaches for LW-SMMR:
        1) TR and/or CP on Emergency Planning Zones (EPZ) for LW-SMMRs,
        2) TR and/or CP on Criteria for Safety Assessment of LW-SMMRs, including the selection of DBA,
        3) TR and/or CP on Emergency Preparedness and Response for LW-SMMRs.
    5. Spent fuel management strategies (especially concerning final storage as waste or temporary storage as an asset for reprocessing):
        1) TR and/or CP on Spent Nuclear Fuel Discharge Features for LW-SMMRs,
        2) TR and/or CP on Spent Nuclear Fuel Storage Requirements for LW-SMMRs,
        3) TR and/or CP on Restrictions for On-Site Spent Nuclear Fuel Storage at LW-SMMRs,
        4) TR and/or CP on Spent Nuclear Fuel Management Strategies for LW-SMMRs (on land and on platform).
    6. Implementation of Probabilistic Safety Assessment (PSA) of LW-SMMR:
        1) TR and/or CP on criteria of Acceptability for PSA for LW-SMMR,
        2) TR and/or CP on PSA Methodologies and Requirements for LW-SMMRs,
        3) TR and/or CP on the Risk-informed system configuration optimization for LW-SMMRs,
        4) TR and/or CP on the Risk-informed equipment classification,
        5) TR and/or CP on Data Sources for PSA of LW-SMMRs,

6) Finding the common approach to the development of a data-bank with the help of the states-vendors of LWR-SMMR to fulfill the lack of information and proving the comprehensive probabilistic safety assessment.

- Workshop in 2025 on one of the topics.
- Contribute to the MDEP 2025 Annual Report,
- Share lessons learnt from design reviews and design issues faced during LW-SMMR/LB safety review and construction,
- Recommendations and inputs to other MDEP working groups regarding potential generic issues and harmonisation opportunities (coordination with CNRA/WGNT, GIF/RSWG, CSNI/EG SMR, HTGRWG, as appropriate).

5. Key Stakeholders with whom the LW-SMMR/LB WG members will interact

- Other MDEP regulators as needed (care shall be taken NOT to share proprietary or sensitive info inappropriately)
- Non-MDEP regulators, as appropriate
- WNA/CORDEL
- CNRA/WGNT
- CSNI/EG SMR
- LW-SMMR/LB Utilities/Licensees/Operators
- Other Groups, as appropriate, to further MDEP goals (IAEA, TSO, etc)