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Guidelines for Self-assessment of Research Reactor Safety

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GUIDELINES FOR SELF-ASSESSMENT OF RESEARCH REACTOR SAFETY

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GUIDELINES FOR SELF-ASSESSMENT OF RESEARCH REACTOR SAFETY

INTERNATIONAL ATOMIC ENERGY AGENCY
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FOREWORD

Self-assessment is an organization's internal process to review its current status, processes and performance against predefined criteria and thereby to provide key elements for the organization's continual development and improvement. Self-assessment helps the organization to think through what it is expected to do, how it is performing in relation to these expectations, and what it needs to do to improve performance, fulfil the expectations and achieve better compliance with the predefined criteria.

This publication provides guidelines for a research reactor operating organization to perform a self-assessment of the safety management and the safety of the facility and to identify gaps between the current situation and the IAEA safety requirements for research reactors. These guidelines also provide a methodology for Member States, regulatory bodies and operating organizations to perform a self-assessment of their application of the provisions of the Code of Conduct on the Safety of Research Reactors. This publication also addresses planning, implementation and follow-up of actions to enhance safety and strengthen application of the Code. The guidelines are applicable to all types of research reactor and critical and subcritical assemblies, at all stages in their lifetimes, and to States, regulatory bodies and operating organizations throughout all phases of research reactor programmes.

Research reactor operating organizations can use these guidelines at any time to support self-assessments conducted in accordance with the organization's integrated management system. These guidelines also serve as a tool for an organization to prepare to receive an IAEA Integrated Safety Assessment of Research Reactors (INSARR) mission. An important result of this is the opportunity for an operating organization to identify focus areas and make safety improvements in advance of an INSARR mission, thereby increasing the effectiveness of the mission and efficiency of the INSARR service. Other safety review services such as the Operational Safety Review Team (OSART) and the Integrated Regulatory Review Service (IRRS) have issued similar guidelines that have been proven to assist in the effective and consistent execution of missions.

This publication was developed based on input from a consultants meeting and an IAEA workshop held in 2014 and 2016, respectively. The IAEA wishes to thank the participants of the workshop, who provided valuable input to the guidelines, including experience and feedback from organizations that hosted INSARR missions. The IAEA also wishes to thank all contributors to this publication for their efforts and assistance. The IAEA officers responsible for this publication were A.M. Shokr and W.B. Kennedy of the Division of Nuclear Installation Safety.

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1. INTRODUCTION

1.1. BACKGROUND

The Integrated Safety Assessment of Research Reactors (INSARR) is an IAEA safety review service available to Member States with the objective of supporting them in ensuring and enhancing the safety of their research reactors. This service consists of performing a comprehensive peer review and an assessment of the safety of the respective research reactor. The reviews are based on IAEA safety standards and on the provisions of the Code of Conduct on the Safety of Research Reactors [1] (hereinafter referred to as the Code) following the guidance in IAEA Services Series No. 25, Guidelines for the Review of Research Reactor Safety: Revised Edition [2].

The INSARR missions and other limited scope safety review missions are conducted according to Ref. [2] which describes preparation, conduct, reporting and follow up of INSARR missions and provides guidelines for reviewing 21 areas related to research reactor safety. As mentioned in Ref. [2], the review guidelines were developed based on the IAEA safety requirements for research reactors and provide the details necessary for an INSARR mission team to conduct a comprehensive safety review of a research reactor facility and to assess the degree of conformance with the relevant IAEA safety standards.

To better assist the host organization to prepare for the INSARR mission, this publication presents self-assessment guidelines which are based on Ref. [2]. Feedback from IAEA safety review missions and the triennial international meetings on application of the Code indicated the need for this type of self-assessment guideline specifically directed at the host operating organization. If operating organizations invest the resources and effort needed to apply these self-assessment guidelines periodically in accordance with the integrated management system, they can improve safety and develop a common understanding of the safety issues and status among the staff of a given facility. Additionally, routine performance of self-assessments can also assist in forming a common approach and understanding among different facilities in the same country and internationally.

1.2. OBJECTIVES

The main objective of this publication is to provide guidelines for a research reactor operating organization to perform a self-assessment of the safety management and safety performance of its facility and help to identify gaps between the current situation and conformance with the requirements in IAEA Safety Standards Series No. SSR-3, Safety of Research Reactors [3]. Research reactor operating organizations can use these guidelines at any time to support self-assessments done in accordance with the organization's integrated management system. These guidelines also serve as a tool for an organization to prepare to receive an INSARR mission. An important result of this is the opportunity for an operating organization to identify focus areas and make safety improvements in advance of an INSARR mission, thereby increasing the effectiveness of the mission and efficiency of the INSARR service.

A second objective of the publication is to provide information and guidelines for Member States, regulatory bodies and operating organizations to perform self-assessment of their application of the provisions of the Code. This publication includes a mapping of the safety requirements in Ref. [3] (and other IAEA safety requirements) to the provisions of the Code

to assist States, regulatory bodies and operating organizations with developing actions plans to enhance application of the Code.

1.3. SCOPE

The scope of this publication covers the self-assessment of research reactor safety in 22 technical review areas and three main sections of the Code. The self-assessment methodology is based on IAEA Services Series 27, SARIS Guidelines [4], and adapted for application to research reactors. The structure of the technical areas covered by these self-assessment guidelines is aligned with Section 3 of Ref. [2], with the exception that these guidelines treat ageing management as a separate self-assessment area. This alignment promotes the use of these guidelines for effectively preparing for an INSARR mission and also facilitates use of Ref [2] by the operating organization as a tool to perform more detailed self-assessment in areas identified as needing improvements. This publication is not meant to limit the scope of self-assessment and operating organizations can develop their own guidelines to cover technical review areas particularly relevant to their specific facilities and activities.

This publication is applicable to all types of research reactors, critical assemblies and subcritical assemblies, at all stages in their lifetimes (consistent with the scope of Ref. [3]), and to States, regulatory bodies and operating organizations throughout all phases of national research reactor programmes. More information about the phases of a national research reactor programme and new research reactor project, including the development of regulatory and safety infrastructure, can be found in IAEA Nuclear Energy Series No. NP-T-5.1, Specific Considerations and Milestones for a Research Reactor Project [5].

Research reactors are used for a wide variety of purposes and applications such as research, training, radioisotope production, neutron beam physics, neutron radiography and materials testing. These purposes and applications call for many different design features, power levels and operational regimes. Some specific aspects of research reactors with power levels above several tens of megawatts or non-water-cooled research reactors may require additional assessments to those presented in this publication. In particular, the assessment guidelines in this publication do not cover all assessment areas that may be needed for high-powered research reactors, fast neutron research reactors or prototype power reactors and additional assessment criteria derived from the Operational Safety Assessment Review Team (OSART) review guidelines [6], which are applicable to nuclear power plants, may be useful. In all cases, a graded approach is used to determine the depth and scope of the self-assessment commensurate with the risk posed by the facility and activities. Guidance on use of a graded approach for research reactors is presented in IAEA Safety Standards Series No. SSG-22, Use of a Graded Approach in the Application of the Safety Requirements for Research Reactors [7].

1.4. STRUCTURE

Section 1 provides relevant introductory and background material. Section 2 gives an overview of self-assessment. Section 3 presents the self-assessment methodology, including preparing and conducting the self-assessment, analysing the results, and developing and implementing an action plan. Appendices I through XXII provide the 22 self-assessment modules covering the various areas related to research reactor safety. Appendices XXIII and XXIV are the guidelines and questionnaire, respectively, for self-assessment of application of the Code and are intended to be used together. Appendix XXV provides a mapping of the

provisions of the Code and the safety requirements in Ref. [3] and is meant to provide additional insight into the results of the self-assessment of the application of the Code.

2. OVERVIEW OF SELF-ASSESSMENT

2.1. OBJECTIVES OF SELF-ASSESSMENT

The main objectives of research reactor safety self-assessment are to provide the research reactor operating organization with a better understanding of the safety status of the facility and identify gaps in the implementation of safety requirements. As discussed in Section 1, above, it is also an important tool for preparation for an INSARR mission. In particular, self-assessment aims to:

- Assess the current safety status of the facility;
- Identify gaps between the current situation and conformance with national regulations and the requirements in Ref. [3];
- Identify appropriate actions to address the gaps and to enhance the safety of the facility consistent with the national regulations and relevant requirements of the IAEA safety standards.

Self-assessment may also contribute to the following enhancements in safety management:

- Verify that safety principles and safety requirements are appropriately applied;
- Increase awareness in the operating organization of safety-related elements that need to be considered and addressed;
- Identify policy and operational level issues that need to be addressed;
- Implement strategies for continuous improvement;
- Measure progress made since the previous self-assessment;
- Monitor compliance and/or conformance with the evolution of national legislation, requirements and recommendations on safety.

The objective of the self-assessment of application of the Code is to assist the State, regulatory bodies and operating organizations to identify areas needing improvements and formulate an action plan to strengthen application of the Code.

2.2. MOTIVATION FOR SELF-ASSESSMENT

A self-assessment requires time, effort and resources. In return, it provides benefits to the operating organization (or State or regulatory body, in the case of the Code), which may offset the devoted resources and time. Motivations may include the following:

- Improve understanding of the safety status of the facility and the safety issues needing attention;
- Strengthen the safety management of the operating organization and enhance the safety of the facility;
- Improve the confidence of external stakeholders, including the public and customers, in the operating organization's ability to safely operate, maintain and utilize the facility by communicating self-assessment results;
- Provide the operating organization with a means to identify its own strengths and weaknesses, which is often a strong motivator for improvement;

— Provide a basis for communication on how the organization is improving;
— Contribute to developing safety culture at all levels of the operating organization;
— Promote harmonization of organizational and operational processes and practices;
— Provide a mechanism for management to inform staff on safety strategy and objectives;
— Promote staff commitment to the operating organization and involvement in its processes and its performance;
— Contribute to the development of individual and collective competences for safety;
— Prepare for an INSARR mission by identifying focus areas and making safety improvements in advance of the mission, thereby increasing the effectiveness of the mission for both the IAEA and host organization and potentially reducing the extent of recommendations that need to be addressed afterwards.

An additional benefit of conducting a self-assessment is sharing experience among operating organizations within a State or with the international community. In this regard, widespread use of these self-assessment guidelines and sharing of the results by the international research reactor community will promote identification of common safety issues and implementation of effective improvements based on practical experience and lessons learned.

2.3. WHEN TO PERFORM SELF-ASSESSMENT

Self-assessment is recognized as a good practice at any stage in the lifetime of the facility. The initial self-assessment can be performed at any time that the operating organization is sufficiently developed and the preconditions given in Section 3.1 below are met. For an operating organization with an operating research reactor (or a research reactor in extended shutdown or decommissioning), the initial self-assessment can be scheduled and performed at an appropriate time consistent with the organization's integrated management system. For an operating organization involved in a project to establish a new research reactor, the self-assessment can be performed during any given phase in accordance with the progress of the project and with a scope that is tailored to the particular phase. As an example, the self-assessment could be performed as part of the transition from the construction phase to the commissioning phase with a limited scope covering the most relevant topics (such as commissioning, the safety analysis report, radiation protection and training and qualifications).

Subsequent self-assessments can be performed periodically, consistent with the integrated management system, and it is important to consider the benefits of harmonizing the performance of self-assessments with periodic safety reviews required by the regulatory body. Self-assessments could also be conducted to support specific activities with a major impact on safety or if the safety considerations change significantly, such as returning the facility to operation after extended shutdown or implementation of extensive reactor modifications.

A self-assessment using these guidelines would usually precede an INSARR mission as a part of the operating organization's preparations for receiving the mission, and could also be used to prepare for other IAEA peer review or safety advisory services for research reactors. This encourages operating organization to identify focus areas and make safety improvements in advance of an INSARR mission, an approach that is mandatory for organizations preparing to receive other IAEA services such as OSART and the Integrated Regulatory Review Service

(IRRS). The timing and scope of a self-assessment to prepare for an INSARR mission will be agreed between the IAEA and host organization during the planning of the mission.

Self-assessments of the application of the Code can be performed to support national and organizational planning cycles, including the setting of financial budgets and human resource levels. These self-assessments have also typically been done by Member States in preparation for the IAEA's triennial international meetings on application of the Code. In this respect, the results of self-assessments, when taken together over many Member States, have provided the IAEA with valuable data to inform its activities related to research reactor safety in order to focus on the technical areas with the greatest relevance.

3. METHODOLOGY

The self-assessment is intended to be performed periodically during the lifetime of the research reactor consistent with the integrated management system and prior to receiving an INSARR mission. The main inputs to the self-assessment are the facility safety documents, current status of the facility and the organization and the results of the previous self-assessment, if any, (in other words, the extent and impact of the implementation of the action plan arising from the last self-assessment).

3.1. SELF-ASSESSMENT MODEL

The model for the self-assessment of research reactor safety is based on a modular approach covering 22 areas related to research reactor safety. This model provides the research reactor operating organization with flexibility in the scope of the self-assessment, allowing the self-assessment to cover a single topic in support of a distinct activity or all topics as part of a comprehensive review of safety management by the organization and the safety status of the facility. The modular approach also makes meaningful self-assessment accessible to smaller research reactor operating organizations which may not have adequate staff or resources to perform a comprehensive self-assessment all at once. The self-assessment modules (Appendices I to XXII) cover the following safety areas (followed by their shorthand form):

1. Design (DES);
2. Safety analysis (SA);
3. Safety analysis report (SAR);
4. Construction (CON);
5. Commissioning (COM);
6. Siting and protection against external events (SIT);
7. Operational limits and conditions (OLC);
8. Safety culture (SCL);
9. Regulatory supervision (REG);
10. Safety committees (SC);
11. Operating organization and reactor management (RMG);
12. Training and qualifications (TRQ);
13. Conduct of operations (COP);
14. Maintenance and periodic testing (MPT);
15. Ageing management (AGM);
16. Modifications (MOD);
17. Utilization and experiments (EXP);
18. Management system (MS);

19. Radiation protection (ORP);
20. Radioactive waste management (RWM);
21. Emergency preparedness and response (EPR);
22. Decommissioning planning (DEC).

In addition to these modules, the operating organization can also develop modules to cover specific safety areas that may be of particular importance to their facility or activities.

The self-assessment modules consist of higher-level questions supported by an indicative list of points for consideration (which is not intended to be an exhaustive list covering all facilities and activities in the scope of this publication). This model aims at identifying the main gaps between the current situation and conformance with the requirements in SSR-3, which can then be further analysed using the detailed requirements in SSR-3, the guidance in the IAEA Safety Guides and Specific Safety Guides related to research reactors [7–18] and the review guidelines in Ref. [2]. This approach allows the operating organization to make an overarching self-assessment with fewer resources, and then to prioritize and focus resources on the areas needing most improvement. For these reasons, this model is well-suited for using self-assessment as a tool for preparing for an INSARR mission.

The model for the self-assessment of application of the Code consists of guidelines and a questionnaire to record the results (Appendices XXIII and XXIV). The questionnaire consists of tables covering three main parts of the Code: role of the State, role of the regulatory body and role of the operating organization. The tables include the individual provisions of the Code and allows for rating application of each provision on a scale from 0 (not applied) to 3 (fully applied). The model includes a mapping of the provisions of the Code and the IAEA safety requirements for research reactors (Appendix XXV), which is useful for better understanding the provisions of the Code and how to fully apply them. This approach allows an organization to have a high-level view of its strengths and weaknesses (through completing the self-assessment questionnaire in Appendix XXIV) and to develop a national or organizational action plan to strengthen application of the Code through implementation of the relevant requirements in the IAEA safety standards (using Appendix XXV to understand which safety requirements could be better applied).

3.2. PRECONDITIONS

The preconditions necessary for performing an effective self-assessment differ depending on its scope and depth. Similarly, the practical arrangements for doing so will vary between Member States and between the State, regulatory body and operating organization(s) in accordance with national laws, regulatory framework, regulations and organizational programmes and procedures. In general, it is beneficial to fulfil all of the conditions described below (or at least meet their intent) before beginning the self-assessment process.

3.2.1 Senior management commitment

Self-assessments will provide the greatest benefits when the State Officials (or senior management in the competent Ministry) or the senior management of the regulatory body or operating organization commits itself to:

— Provide strong leadership and allocate adequate resources for completion of the self-assessment project;

— Reinforce a learning and questioning attitude at all levels of the organization, from the staff to the senior managers themselves;
— Encourage those involved in performing the self-assessment to do so in a frank and honest manner, consistent with a strong safety culture;
— Consider self-assessment conclusions openly and transparently, consistent with a strong safety culture;
— Act on the results of the self-assessment to enhance safety and strengthen application of the Code.

3.2.2 Management system

The self-assessment process, including the five steps discussed in Section 3.3, works best when it is formally established, such as in the regulatory body's management system or the integrated management system of the operating organization. This helps to ensure that the entire self-assessment process will be followed through.

3.2.3 Staff involvement

The availability of competent and knowledgeable staff is crucial to performing the self-assessment and implementing the action plan in a timely manner. Self-assessment is an opportunity to develop and reinforce staff's questioning attitude, which is a fundamental aspect of a strong safety culture, and to foster a continuous improvement culture across the organization. Additionally, self-assessment provides an excellent opportunity to learn and transfer knowledge about the area under self-assessment. For these reasons, maximizing staff involvement in the process, including junior staff, can increase the benefits of self-assessments.

3.3. SELF-ASSESSMENT PROCESS

The self-assessment is a cyclic process consisting of five steps as shown in Figure 1, which is based on Ref. [4].

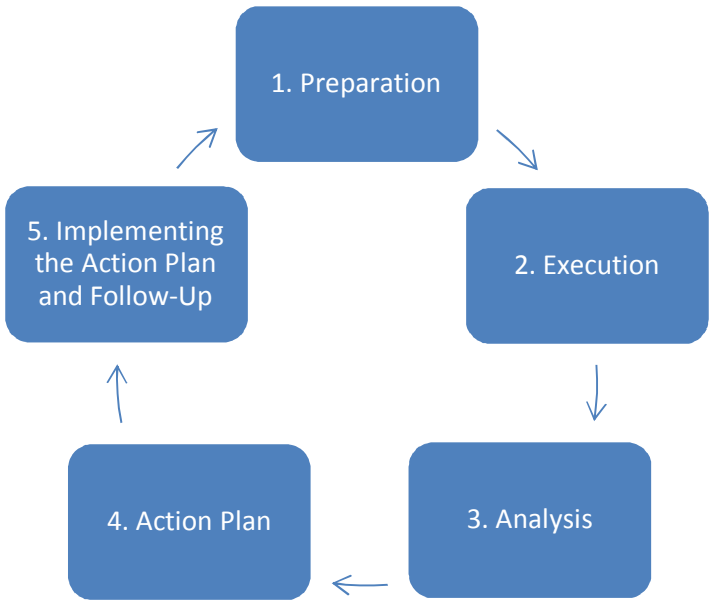

FIG. 1. Self-assessment process.

3.3.1 Preparation

During this phase, the self-assessment programme is planned and organized using a graded approach. This includes defining the scope, selecting the corresponding self-assessment modules (or provisions of the Code) and formalising a self-assessment implementation plan that is commensurate with the risk of the facility. The plan defines the self-assessment scope and the resources allocated to each step of the process, the milestones, time schedules and the responsible individuals. Competent staff who are knowledgeable about the facility carry out the self-assessment in cooperation with the management. Ideally, the self-assessment includes junior staff for training and knowledge transfer. For larger organizations with more complex facilities or activities, a self-assessment project management team may need to be established, headed by a project manager.

If the self-assessment is being conducted to prepare for an INSARR mission, the implementation plan can be established in consultation with the responsible IAEA officer. The timing of the INSARR mission within the self-assessment process can also be defined during this step, considering the specific purpose of the mission and the needs of the host organization. The INSARR mission could provide peer review of the results of the analysis step prior to establishing the action plan, or it could also be used to provide independent assessment of the implementation and follow-up of the action plan.

3.3.2 Execution

The objective of the execution phase is to provide responses to the questions in the self-assessment modules and ratings on application of the Code provisions in the self-assessment questionnaire, along with the relevant evidence. Evidence can be in the form of documentation or observations, such as observation of the physical status of systems, structures and components in the facility. In the case of documentary evidence, references are made at a level that provides for easy retrieval of the information supporting the specific conclusions of the self-assessment, which could be at the document, chapter or page level. In the case of self-assessment of application of the Code, documentation is the primary form of evidence.

3.3.3 Analysis of responses

The objective of the analysis phase is to formulate the overall conclusions of the self-assessment, investigate the gaps identified during the execution phase and to develop the recommendations for addressing the gaps. This includes identifying strengths and analyzing the identified gaps in more detail using national laws and regulations, the requirements of Ref. [3] and the provisions of the Code. National regulations, regulatory guides and the IAEA safety guides [7–18] can then be used to develop recommendations and strategies for safety improvements to address the gaps. It is advisable to consolidate and prioritize the recommendations of the self-assessment to the extent possible.

3.3.4 Action planning

Upon completion of the self-assessment analysis, senior management develops an action plan for implementation of the safety improvements or measures to strengthen application of the Code that were recommended by the analysis. The main inputs to the action plan are the results of the analysis, together with the evidence documented during the execution phase. An

effective action plan includes, at a minimum, the actions to be taken and their associated priorities, the persons in charge, the required resources and the associated deadlines.

3.3.5 Implementing the action plan and follow-up

Senior management is responsible for implementation of the action plan, although much of the work will be performed by other levels in the organization and potentially by external contractors or technical support personnel. The success of this phase relies on senior management's detailed and transparent communication with the organization's staff on the results, conclusions, the proposed action plan and the organization's commitment to safety improvements. In discharging its responsibility, senior management needs to ensure that adequate human and financial resources are available to complete the action plan in a timely manner and realize the full benefits of the self-assessment process.

This phase also includes follow-up on progress implementing the action plan, including indicators of how implementing the plan is enhancing the safety of the facility or strengthening application of the Code. A formal and structured process for follow-up of the implementation helps to ensure the entire action plan is implemented and that senior management can verify that the action plan is delivering the desired results and enables the formal closure of each action in the plan. A formal follow-up process also captures important information and experience for feedback to the preparation phase of the next cycle of self-assessment.

APPENDIX I: DESIGN

Question DES 1.1	**Answer**	
Is the fundamental safety objective, to protect people and the environment from harmful effects of ionizing radiation, clearly adopted in the safety objectives and engineering design requirements for the facility? **Points for consideration** — Conformance of radiation doses and environmental impact with requirements of national authorities; — Conformance of radiation doses, generated radioactive waste and effluents with the principle of optimization of protection.	Yes	
	Partly	
	No	
References: SF-1 [19], SSR-3 Section 2 and Req. 8, 15 and 34		
Evidence	Analysis	

Question DES 1.2	**Answer**	
Is the reactor design conservative and based on defence-in-depth? **Points for consideration** — Use of conservative design margins; — Single failure criterion; — Redundancy, diversity and independence of means for ensuring the basic safety functions (shutdown, cooling and confinement); — Provisions of successive, verifiable physical barriers to the release of radioactive material; — Capability of the reactor protection system to automatically initiate required protective actions for all postulated initiating events; — Prevention of anticipated operational occurrences (equipment and/or procedures); — Design provisions to prevent and mitigate accidents, including design extension conditions; — Adequate testability and maintainability of structures, systems and components.	Yes	
	Partly	
	No	
References: SSR-3 Req. 7-10, 13, 16-29, 31 and 32		
Evidence	Analysis	

Question DES 1.3	**Answer**	
Are the specific design requirements and criteria clearly defined, reviewed, approved and implemented for the facility structures, systems and components important to safety? **Points for consideration** — Buildings and structures, including confinement or containment and associated ventilation; — Reactor core and associated features, including fuel, control rods and support structures; — Reactor protection system, reactivity control and shutdown systems; — Reactor cooling systems (normal and emergency); — Instrumentation and control systems; — Electrical power supplies (normal and emergency); — Fuel handling and storage; — Fire protection system; — Communication and alarm systems; — Experimental devices; — Radiation protection systems, including waste systems.	Yes	
	Partly	
	No	
References: SSR-3 Req. 42-66		

Evidence	Analysis

APPENDIX II: SAFETY ANALYSIS

<table>
<tr><td>Question SA 2.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the safety analysis complete and does it include proper analysis of the response of the reactor to the appropriate range of postulated initiating events?
Points for consideration
— List of postulated initiating events properly identified, analysed and covers all credible accidents that influence the safety of the reactor in the following categories:
• Loss of electrical power;
• Insertion of excess reactivity;
• Loss of flow;
• Loss of coolant;
• Erroneous handling or failure of equipment or components;
• Special internal events such as fire, explosion and flooding;
• External events such as earthquakes, weather emergencies, floods, fire and aircraft crashes, including credible combinations of events;
• Human errors.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 18 and 41 and Appendix I</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question SA 2.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Are the design basis accidents properly identified and analysed?</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 20</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question SA 2.3	**Answer**	
Does the safety analysis include consideration of safety of experimental devices and their effect on the reactor?	Yes	
	Partly	
	No	
References: SSR-3 Section 6		
Evidence	Analysis	

Question SA 2.4	**Answer**	
Is the safety analysis used as a basis for: — The design of items important to safety; — Establishing the operational limits and conditions; — Developing operating procedures; — Emergency preparedness and response; — Periodic testing and inspection programmes; — Record keeping practices; — Maintenance schedules; — Proposals for modifications — Ageing management programme; — Training and refresher training of operating personnel.	Yes	
	Partly	
	No	
References: SSR-3 Sections 3, 4, 6, 7, Req. 71, 74, 77 and 81		
Evidence	Analysis	

Question SA 2.5	**Answer**	
Is there a periodic safety review performed for the facility? **Points for consideration** — Validity of the safety analysis report and other documents in view of current regulatory requirements and the status of the facility; — Changes in site characteristics; — Changes in the utilization programme; — Cumulative effects of ageing and modifications; — Changes to procedures; — Use of feedback from operating experience; — Developments in the state-of-the-art in research reactor technology; — Compliance of structures, systems and components and software with the design requirements.	Yes	
	Partly	
	No	
References: SSR-3 Sections 4 and 7, Req. 5 and 86		
Evidence	Analysis	

Question SA 2.6	**Answer**	
Does the safety analysis include design extension conditions?	Yes	
	Partly	
	No	
References: SSR-3 Req. 22		
Evidence	Analysis	

Question SA 2.7	**Answer**	
Are the design limits specified for all relevant parameters for each operational state of the reactor and for accident conditions?	Yes	
	Partly	
	No	
References: SSR-3 Req. 21		
Evidence	Analysis	

APPENDIX III: SAFETY ANALYSIS REPORT

<table>
<tr><th>Question SAR 3.1</th><th colspan="2">Answer</th></tr>
<tr><td rowspan="3">Does the content of the safety analysis report follow the guidance in SSG-20?
Points for consideration
— Introduction and general description of the reactor;
— Safety objectives and engineering design requirements;
— Site characteristics;
— Buildings and structures;
— The reactor and its design;
— Cooling systems and connected systems;
— Engineered safety features;
— Instrumentation and control systems;
— Electric power;
— Auxiliary systems;
— Reactor utilization;
— Operational radiation safety;
— Conduct of operations;
— Environmental assessment;
— Commissioning;
— Safety analysis;
— Operational limits and conditions;
— Integrated management system;
— Decommissioning;
— Emergency preparedness and response.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 1 (See also the Appendix of SSG-20)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question SAR 3.2	**Answer**	
Does the introduction and general description of the facility include complete and up-to-date information? **Points for consideration** — Building and structures, including reactor building design features; — Drawings, tests, and inspections that are important to safety; — Reactor information, including core design, fuel element and absorber design and properties, operating characteristics, materials utilized in the core structure; — Auxiliary systems that are important to safety; — Historical review of upgrades and modifications; — Comparison with similar facilities; — Safety features; — Experimental programme; — Management organization; — Facility layout drawings.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 1 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.3	**Answer**	
Does the safety analysis report reflect the current status and configuration of the facility?	Yes	
	Partly	
	No	
References: SSR-3 Req. 1		
Evidence	Analysis	

Question SAR 3.4	**Answer**	
Does the safety analysis report present the safety principles and design criteria for the facility? **Points for consideration** — Overall safety objectives; — Safety principles important to design; — Design criteria applied to safety related systems; — Classification of structures, systems and components; — External events; — Codes and standards; — Design methods; — Qualification of structures, components and equipment; — Design for internal hazards (fire, flooding, etc.).	Yes Partly No	
References: SSR-3 Req. 1 (See also Chapter 2 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.5	**Answer**	
Does the safety analysis report fully describe the systems important to safety? **Points for consideration**: — Reactor coolant systems and connected systems including, as appropriate, the emergency core cooling, decay heat removal, the primary purification system, and the primary make-up system; — Engineered safety features including, as appropriate, redundancy, diversity, and the ability of associated equipment and materials to withstand accident conditions; — Instrumentation and control including, as appropriate, the power regulating system, the reactor protection system, alarm systems, interlocks, and the control room layout and ergonomic assessment; — Electric power including, as appropriate, normal alternating current power supply, uninterruptable direct current/alternating current power supply, cables and routing; — Means of containment or confinement, including methods and characteristics of normal and emergency ventilation; — Auxiliary systems including, as appropriate, fuel storage and handling, water systems, compressed air, air conditioning and fire protection.	Yes Partly No	
References: SSR-3 Req. 1 (See also Chapters 5-10 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.6	**Answer**	
Does the safety analysis report present a comprehensive description and analysis of reactor utilization? **Points for consideration** — Experimental facilities; — Irradiation facilities; — Methods of review and approval of new experimental devices and utilization activities; — List of materials forbidden in experiments.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 11 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.7	**Answer**	
Does the safety analysis report present operational radiological safety? **Points for consideration** — Radiation protection policy of the organization; — Radiation protection programme; — Quantitative accounting of sources of radiation at the facility; — Solid, liquid and gaseous waste; — Facility design for radiological safety, including environmental monitoring, access control and zoning, shielding, ventilation for radiological control, area and effluent radiation monitoring; — Handling and movement of radioactive materials; — Dose assessment for normal operation; — Equipment and instrumentation.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 12 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.8	**Answer**	
Does the safety analysis report present the conduct of operations? **Points for consideration** — Organizational structure, staff selection, training and qualification; — Review and audit functions; — Operating procedures; — Maintenance, testing, and inspection programmes; — Records and reports; — Fire protection procedures.	Yes	
	Partly	
	No	
References: SSR-3 Section 7 and Req. 1 (See also Chapter 13 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.9	**Answer**	
Does the safety analysis report present an environmental assessment that reflects the current conditions? **Points for consideration** — Analysis of gaseous and aqueous release for all operational states and accident conditions; — Effects of radionuclide uptake in plant and animal life; — Ultimate heat sink effects; — Disposal of spent fuel and radioactive waste.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 14 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.10	**Answer**	
Does the safety analysis report present the management system? **Points for consideration** — Provision for control of all activities associated with the facility to which quality assurance applies; — Quality assurance implementation — Management system procedures, including control of the safety analysis report.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 18 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.11	**Answer**	
Does the safety analysis report present decommissioning provisions? **Points for consideration** — Feasibility of decommissioning without undue risk to personnel, the public and the environment; — Evidence that considerations for decommissioning have been included in the design, construction and operational lifetime of the reactor.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 19 of the Appendix to SSG-20)		
Evidence	Analysis	

Question SAR 3.12	**Answer**	
Does the safety analysis report present emergency preparedness and response? **Points for consideration** — Approval by the appropriate authorities; — Established procedures; — Agreement with off-site emergency services for provision of assistance and support; — On-site emergency response actions for design basis accidents and design extension conditions; — Resources and communications in accident conditions; — Periodic drills and tests; — Review and updating of the on-site emergency plan.	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 (See also Chapter 20 of the Appendix to SSG-20)		
Evidence	Analysis	

APPENDIX IV: CONSTRUCTION

<table>
<tr><td>Question CON 4.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Does the construction of buildings, structures, and systems meet the design assumptions of the reactor safety analysis and follow appropriate management controls?
Points for consideration
— Project control and responsibilities during construction, including quality assurance provisions;
— Control of intentional and unintentional deviations during construction;
— Control of materials of construction, traceability, etc. at the appropriate quality classification;
— Proper control of the purchasing, delivery, receipt, handling, storage and installation of structures, systems and components important to safety;
— Qualification of suppliers and contractors;
— Conformance with construction and installation drawings and design specifications;
— Status of as-built drawings;
— Proper observance of construction hold points;
— Completeness of construction records.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 14 and 73</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question CON 4.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Does the construction of buildings, structures, and systems meet construction relevant codes and standards and good practices of local, national, and international organizations?</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 13 and 14</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question CON 4.3	**Answer**	
Has the construction of buildings, structures, and systems been reviewed and approved by the appropriate regulatory body?	Yes	
	Partly	
	No	
References: SSR-3 Req. 13		
Evidence	Analysis	

APPENDIX V: COMMISSIONING

<table>
<tr><td>Question COM 5.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is there (or in the case of existing facilities, was there) an established commissioning programme for the purpose of demonstrating that all safety objectives of the design have been achieved?
Points for consideration
— Adequacy of the organization that has been set up for the commissioning (groups involved, their staffing, responsibilities and training);
— Adequacy of the quality assurance programme for commissioning (for the management, performance and evaluation of commissioning activities);
— Adequacy of the tests (both on-site and off-site) and prerequisites included in each of the stages;
— Adequacy of procedures that have been prepared for each of the tests envisaged in the commissioning programme;
— Use of available information on relevant operating experience at other nuclear installations.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 73</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question COM 5.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Did the safety committee and the regulatory body review and approve the commissioning programme?</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 73</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question COM 5.3	**Answer**	
Does the commissioning programme adequately cover the experimental devices or are separate commissioning programmes developed for the experimental devices?	Yes	
	Partly	
	No	
References: SSR-3 Req. 36 and 73		
Evidence	Analysis	

Question COM 5.4	**Answer**	
Did the development of the commissioning programme involve cooperation between the operating organization, designers, manufacturers and constructors?	Yes	
	Partly	
	No	
References: SSR-3 Req. 73		
Evidence	Analysis	

Question COM 5.5	**Answer**	
Does the commissioning programme have provisions for dealing with verifications, reviews, audits, deviations and keeping of records and updating of the safety analysis report?	Yes	
	Partly	
	No	
References: SSR-3 Req. 73		
Evidence	Analysis	

Question COM 5.6	**Answer**	
Are the commissioning tests arranged in functional groups and in a logical sequence of stages including pre-operational tests, initial criticality, low power tests and nominal or other power tests?	Yes	
	Partly	
	No	
References: SSR-3 Req. 73		
Evidence	Analysis	

Question COM 5.7	**Answer**	
Do the commissioning tests include adequately documented acceptance criteria that confirm that all facility components and systems have been constructed in accordance with their design intent and that they meet the safety criteria?	Yes	
	Partly	
	No	
References: SSR-3 Req. 73		
Evidence	Analysis	

Question COM 5.8	**Answer**	
Is there a comprehensive commissioning report presenting and assessing the results of commissioning, in particular, the action taken for unsatisfactory test results?	Yes	
	Partly	
	No	
References: SSR-3 Req. 73		
Evidence	Analysis	

Question COM 5.9	**Answer**	
Are the results of commissioning incorporated into the safety analysis report and reflected in the approved operational limits and conditions?	Yes	
	Partly	
	No	
References: SSR-3 Req. 1 and 71 (See also Chapters 2, 15 and 17 of the Appendix to SSG-20)		
Evidence	Analysis	

APPENDIX VI: SITING AND PROTECTION FROM EXTERNAL EVENTS

<table>
<tr><td>Question SIT 6.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Does the site evaluation include a comprehensive justification of the facility siting?
Points for consideration
— The effects of natural and human-induced external events;
— Characteristics of the site and its environment that could affect the transfer of released radioactive material to humans;
— Population density and distribution having relevance to the emergency arrangements and evaluation of risks to individuals and the population;
— Other collocated facilities;
— Capability for an ultimate heat sink at the site, as appropriate;
— On-Site and off-site emergency plans.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Section 5, Req. 5</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question SIT 6.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Are there provisions to review the site characteristics, to monitor any change, to confirm the continued suitability of the site from the safety point of view and to update the related documents?</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 5</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question SIT 6.3	**Answer**	
Do the site evaluation and safety analysis report provide a comprehensive review which takes into account all identified characteristics of the site and their impact from the safety point of view? **Points for consideration** — General site description; — Natural external events; — Geology, seismology, meteorology, hydrology, oceanography, etc.;	Yes	
— Nearby industrial and military facilities, including potential effects on the reactor site; — Routes, types and frequency of aircrafts, and other types of transport such as trains, trucks, and ships carrying potentially hazardous materials; — Population in the vicinity of the reactor; — Natural environment, land, and water usage; — Baseline radiological levels;	Partly	
— Buildings or natural features that could affect the dispersion of radioactive releases from the site; — Dispersion of radioactive materials (atmospheric and through aquifers, ground water, and surface water); — Aspects of the topography and road structure of the area around the site which could affect the movement of people in an emergency; — Mitigation measures required for postulated accidents.	No	
References: SSR-3 Section 5, Req. 1 and 5 (See also Chapter 3 of the Appendix to SSG-20)		
Evidence	Analysis	

APPENDIX VII: OPERATIONAL LIMITS AND CONDITIONS

Question OLC 7.1	**Answer**	
Is the set of operational limits and conditions developed and up to date reflecting the actual operational conditions of the facility? **Points for consideration** — Safety limits on important process variables and safety system settings for all operational states and accident conditions; — Limiting conditions for safe operation established and implemented to provide acceptable margins between normal operating values and safety system settings. — Surveillance requirements covering all structures, systems and components important to safety that prescribe the frequency and scope of tests.	Yes	
	Partly	
	No	
References: SSR-3 Req. 71		
Evidence	Analysis	

Question OLC 7.2	**Answer**	
Do the operational limits and conditions include administrative requirements? **Points for consideration:** — Organizational structure and responsibilities; — Staffing requirements; — Facility review and audit requirements; — Procedure requirements to ensure limits are not exceeded; — Review of operational events and violations of the operational limits and conditions; — Reports and records requirements.	Yes	
	Partly	
	No	
References: SSR-3 Req. 71		
Evidence	Analysis	

Question OLC 7.3	**Answer**	
Are the applicable operational limits and conditions reviewed and approved by the regulatory body?	Yes	
	Partly	
	No	
References: SSR-3 Req. 71		
Evidence	Analysis	

Question OLC 7.4	**Answer**	
Are the approved operational limits and conditions presented by clear statements of their objectives, applicability, specification and justification?	Yes	
	Partly	
	No	
References: SSR-3 Req. 71 (See also NS-G-4.4 for suggested format and content)		
Evidence	Analysis	

Question OLC 7.5	**Answer**	
Do the operational limits and conditions include requirements for actions to be taken if a safety limit, safety system setting or limiting condition for safe operation is not satisfied?	Yes	
	Partly	
	No	
References: SSR-3 Req. 71		
Evidence	Analysis	

Question OLC 7.6	**Answer**	
Is the compliance with all of the approved operational limits and conditions controlled by the operating organization?	Yes	
	Partly	
	No	
References: SSR-3 Req. 71		
Evidence	Analysis	

APPENDIX VIII: SAFETY CULTURE

<table>
<tr><td>Question SCL 8.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the organization’s safety policy promoted and the responsibilities understood by all personnel and managers?
Points for consideration
— Safety is a clearly recognized value;
— Leadership for safety is clear;
— Safety policy known by all staff members;
— Accountability for safety is clear;
— Safety expertise (as needed) available in the operating organization;
— Safety aspects of licence and operational limits and conditions known and understood by relevant staff;
— Awareness of safety consequences of malfunction of item(s);
— Understanding of the safety significance by the staff of their actions.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 3 and 67</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question SCL 8.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Are the means available to support the individuals to carry out the tasks safely?
Points for consideration
— Safety aspects clearly considered in decisions and action taken by senior management;
— Training and retraining programmes important to safety, including formal assessments;
— Sufficient resources for safety related activities;
— Periodic review of the training programmes important to safety;
— Up to date set of formally reviewed, approved and implemented procedures and instructions;
— A formal Safety Management Programme, including monitoring and evaluation of safety performance indicators.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Section 2, Req. 2 (See also aspects of Req. 58, 61, 70, 79, 89)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question SCL 8.3	**Answer**	
Do all personnel and managers exhibit a learning and questioning attitude? **Points for consideration** — Safety is learning driven; — Openness is encouraged at all levels in the organization; — Managers give staff opportunities to provide feedback; — Feedback by the staff is addressed by the management; — Procedures are in place for continuous improvement.	Yes	
	Partly	
	No	
References: SSR-3 Req. 2 and 4		
Evidence	Analysis	

Question SCL 8.4	**Answer**	
Is a safety culture encouragement and improvement programme defined and implemented? **Points for consideration** — Safety policy and safety objectives for the organization defined and communicated; — Expected behaviour defined and communicated; — Safety is integrated in all activities; — Working conditions and environment encourage safety culture; — Safety and safety culture subjects are part of regular meetings; — Safety culture development programme is established; — Safety culture awareness and safety performance by staff is evaluated and reported periodically; — Safety culture improvement actions are identified; — There is a formal process for recording safety issues and documenting the corrective actions.	Yes	
	Partly	
	No	
References: SSR-3 Req. 2, 3, 67 and 70		
Evidence	Analysis	

APPENDIX IX: REGULATORY SUPERVISION

<table>
<tr><td>Question REG 9.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the reactor subject to independent assessment and inspection that the facility is operated in compliance with regulatory and licence requirements?
Points for consideration
— Existence of an adequate legal framework and institutional bases for the regulatory body (e.g. laws, regulations);
— Established regulations and guidance upon which the regulatory activities are based;
— Oversight of reactor safety related activities by an appropriate regulatory or institutional body independent of the operating organization;
— Qualification and competency of the regulatory body staff and availability of outside consultants where and when necessary;
— Adequacy of resources provided to the regulatory body to fulfil its role and responsibility;
— Awareness and acceptance by the operating organization management of the prime responsibility for safety.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Section 3, Req. 2, 6 and 67</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question REG 9.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the relationship between the operating organization and the regulatory body based on mutual understanding, respect and confidence?</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Section 3, Req. 1</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question REG 9.3	**Answer**	
Is the operating organization informed and familiar with the regulatory approach and licensing process of the regulatory body?	Yes	
	Partly	
	No	
References: SSR-3 Section 3		
Evidence	Analysis	

Question REG 9.4	**Answer**	
Has the regulatory body free unimpeded access to all relevant documentation including safety analysis report, management arrangements, facility operating records, quality assurance records, and safety committee minutes and documents?	Yes	
	Partly	
	No	
References: SSR-3 Section 3		
Evidence	Analysis	

Question REG 9.5	**Answer**	
Does the regulatory body conduct inspections to ensure conformance with the operational limits and conditions and applicable regulations, codes and standards?	Yes	
	Partly	
	No	
References: SSR-3 Section 3		
Evidence	Analysis	

Question REG 9.6	**Answer**	
Does the regulatory body have free unimpeded access to all accessible parts of the facility, with due conformance to the access control rules and procedures of the facility?	Yes	
	Partly	
	No	
References: SSR-3 Section 3		
Evidence	Analysis	

Question REG 9.7	**Answer**	
Is there a clear and established process for communicating routine and non-routine radioactive discharges, operational occurrences, violations of operational limits and conditions and other regulatory requirements to the regulatory body, and follow-up on necessary corrective actions?	Yes	
	Partly	
	No	
References: SSR-3 Req. 2, 6 and 67		
Evidence	Analysis	

APPENDIX X: SAFETY COMMITTEE

<table>
<tr><td>Question SC 10.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is there an established safety committee or an equivalent advisory group to review safety aspects of the operation of the research reactor and its associated facilities?
Points for consideration
— Independence of the committee members with regard to the operating organization or reactor management;
— Adequacy of qualification of the committee members to cover sufficient safety areas;
— Established Terms of reference for the committee agreed on by the committee and the operating organization and approved by the regulatory body;
— Transparency of the advice of the committee to management of the facility and the regulatory body;
— Review of incidents and safety related events by the safety committee;
— Frequency and records of the committee meetings and follow-up actions.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 3 and 67</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question SC 10.2	**Answer**	
Does the committee advise on all aspects affecting the safety of the facility during design, construction, commissioning, operation, maintenance, testing, experiments, utilization, modification, extended shutdown and decommissioning? **Points for consideration** — Appointment of persons to posts which can have an impact on safety; — Training of persons who have an impact on safety; — Construction and installation of a new reactor facility; — Modifications to an existing reactor facility; — Experiments and research proposals that may affect the safety of the facility; — Examination, inspection, maintenance, testing and ageing management of safety related items; — Storage of fissile material and radioactive material; — Safety documentation, including the safety analysis report, operational limits and conditions and emergency plan before their submittal to the regulatory body for review and approval; — Peer review of the safety of the facility; — Quality assurance aspects of items and systems important to safety; — Radiation protection and radioactive waste management; — Adequacy of resources (personnel, funds) to ensure safe operation.	Yes	
	Partly	
	No	
References: SSR-3 Req. 6		
Evidence	Analysis	

Question SC 10.3	**Answer**	
Is there a procedure for the operating organization or reactor manager to refuse the advice of the committee?	Yes	
	Partly	
	No	
References: SSR-3 Paragraph 7.27		
Evidence	Analysis	

APPENDIX XI: OPERATING ORGANIZATION AND REACTOR MANAGEMENT

<table>
<tr><th>Question RMG 11.1</th><th colspan="2">Answer</th></tr>
<tr><td rowspan="3">Are the organizational structure and responsibilities of the operating organization adequately defined and implemented to ensure safe operation?
Points for consideration
— Management structure and lines of authorities;
— Clear and comprehensive safety policy;
— Responsibilities for safe operation clearly defined in a written delegation to the reactor manager;
— Reactor manager is given the necessary authority and resources to fulfil all responsibilities;
— Organizational structure is recognized and/or approved by the regulatory body;
— The radiation protection function is clearly defined and sufficiently independent from the reactor manager;
— Authorization of individuals to stop work for safety reasons;
— Staff responsibility for a safe working environment, including radiation protection, is clearly defined;
— Provisions for management of the interface between nuclear safety and security.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 68 and 90 (See also IAEA-TECDOC-1801 [20])</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

APPENDIX XII: TRAINING AND QUALIFICATION

Question TRQ 12.1	**Answer**	
Is a formally reviewed and approved training and qualification programme established and implemented? **Points for consideration** — Tasks and responsibilities to initiate and organize the training are defined and assigned; — Qualification requirements for the trainers and instructors are defined;	Yes	
— Requirements for initial training and qualification and retraining are defined for all safety related functions, including certifications for all phases of qualification with minimum levels for satisfactory completion; — Training records are available with a defined retention time following termination of employment; — Adequate resources are defined and available;	Partly	
— Documented training materials are established for all staff with safety related functions, including an organized curriculum with written and practical examinations, which at least includes reactor theory, radiation protection, operational limits and conditions, facility systems, operating procedures for operational states and abnormal conditions and the emergency plan — Measures for knowledge management are in place.	No	
References: SSR-3 Req. 70		
Evidence	Analysis	

Question TRQ 12.2	**Answer**	
Are requalification and retraining well defined and implemented? **Points for consideration**	Yes	
— Retraining and requalification are conducted regularly (one or two-year cycle for safety related aspects);	Partly	
— Curricula and applicable written and practical examinations are defined; — All safety related functions are included in the retraining programme.	No	
References: SSR-3 Req. 70		
Evidence	Analysis	

APPENDIX XIII: CONDUCT OF OPERATIONS

<table>
<tr><th>Question COP 13.1</th><th colspan="2">Answer</th></tr>
<tr><td rowspan="3">Are the basic measures that ensure safe operation available and fulfilled?
Points for consideration
— All operating procedures reflect safety as the highest priority and are developed, reviewed and revised according to the management system requirements and operational limits and conditions;
— Equipment important to safety is calibrated and operating properly;
— Safety systems settings and alarm settings are correct and adhered to;
— Lines of supervision and communication are clearly defined;
— Shift change-overs are formal, complete and documented;
— Conduct of operations conforms with the safety culture principles;
— The information concerning the design, construction, commissioning, and operation of the reactor facility, including site and environmental data, design specifications, details of material and equipment, as-built drawings, operating and maintenance manuals, and quality assurance documents are up to date, available and retrievable.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 74 (See also aspects of Req. 67, 71, 77, 78 and 84)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question COP 13.2	**Answer**	
Are written operating procedures available for all safety related operations, up to date, technically correct and properly used? **Points for consideration** — Start-up, operation, and shutdown of the reactor and operation of experimental devices; — Loading, unloading, and movement of fuel elements and assemblies, reflector assemblies, experimental devices, and other core components; — Routine maintenance; — Surveillance required by the operational limits and conditions; — Implementation of a radiation protection and control programme consistent with applicable regulations; — Authorization of operation and maintenance and conduct of irradiations and experiments that could affect reactor safety or insert reactivity in the core; — Operator response to abnormal events and accident conditions; — Procedures for on-site emergency response; — Radioactive waste management and effluent discharges; — Surveillance, as required, of the reactor and its auxiliary systems during reactor shutdown periods.	Yes	
	Partly	
	No	
References: SSR-3 Req. 74 (See also aspects of Req. 67, 71, 77, 78 and 84)		
Evidence	Analysis	

Question COP 13.3	**Answer**	
Are necessary safety related auxiliary provisions available? **Points for consideration** — Adequate equipment and facilities are provided for handling, storage, and disposal of spent fuel; — Packaging and transportation of fresh and irradiated fuel elements.	Yes	
	Partly	
	No	
References: SSR-3 Req. 58 and 78		
Evidence	Analysis	

Question COP 13.4	**Answer**	
Are all necessary systems and equipment important to safety in good condition? **Points for consideration** — All equipment is operating properly and protected from adverse environmental conditions; — Off-normal conditions and defective and out-of-service instrumentation are apparent to operators; — Lighting is adequate; — Instrumentation is unobstructed, clearly readable, and understandable to operators; — Housekeeping and cleanliness are satisfactory; — Programme to track and repair out-of-service equipment is available and up to date; — Changes in documentation of system and component status are documented.	Yes	
	Partly	
	No	
References: SSR-3 Req. 67 and 88		
Evidence	Analysis	

Question COP 13.5	Answer	
Are all necessary records and reports that are relevant to safety complete, available and easily retrievable? **Points for consideration** — Routine operating data including logbooks, reading sheets, checklists, and automatically recorded data; — Core management, fuel behaviour, and handling; — Performance evaluation of safety systems; — Current operational status and structures, systems and components out of service;	Yes	
— Written instructions for developing and implementation of temporary procedures or procedures that vary from existing procedures; — Maintenance, periodic testing, and inspection of items important to safety; — Safety categorization of experiments and modifications; — Location and transfer of radioactive sources and fissile materials; — Staff qualification and training; — In-service failures, safety related occurrences, and incidents; — Radiation exposure and medical records;	Partly	
— Radioactive waste storage and shipment; — Radioactive effluent releases; — Environmental monitoring results; — Relevant commissioning records; — Records relevant to decommissioning; — Communications with regulatory bodies; — Retention time is defined and records and reports are adequately stored.	No	
References: SSR-3 Req. 82		
Evidence	Analysis	

APPENDIX XIV: MAINTENANCE AND PERIODIC TESTING

Question MPT 14.1	**Answer**	
Is a formally reviewed and approved maintenance and periodic testing programme covering all safety-related systems and equipment implemented? **Points for consideration** — Activities, frequency, responsibilities and authorizations are clearly defined; — Compliance with the operational limits and conditions (and other requirements) is ensured; — The programme is based on the safety relevance, related safety analyses of the system and possible consequences in case of failure or deviations; — The programme is periodically reviewed and updated.	Yes	
	Partly	
	No	
References: SSR-3 Req. 31 and 77		
Evidence	Analysis	

Question MPT 14.2	**Answer**	
Are formally reviewed and approved maintenance and periodic testing procedures and instructions for items important to safety available? **Points for consideration** — Tasks, responsibilities and authorities, including the required qualification levels are clearly described; — Details and authorization are based on the safety significance and possible safety impact in case of failures or deviations; — Responsibilities and preconditions for the activities are clearly identified, including for removal and replacement of equipment, maintenance during operation and resumption of normal operations; — Necessary radiation protection and other necessary safety measures are described; — A work-permit system is in place.	Yes	
	Partly	
	No	
References: SSR-3 Req. 31 and 77		
Evidence	Analysis	

APPENDIX XV: AGEING MANAGEMENT

<table>
<tr><td>Question AGM 15.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is a formally reviewed and approved ageing management programme covering all safety-related systems and equipment implemented?
Points for consideration
— Screening of structures, systems and components for ageing management review;
— Identification and understanding of ageing degradation;
— Minimization of expected ageing degradation;
— Detection, monitoring and trending of ageing degradation;
— Mitigation of ageing degradation;
— Management of obsolescence;
— Continuous improvement of the ageing management programme;
— Record keeping.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 37 and 86 (See also SSG-10)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question AGM 15.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the ageing management programme appropriately interfaced with other technical areas?
Points for consideration
— Maintenance, periodic testing and inspection of items important to safety;
— Periodic safety review;
— Qualification of equipment important to safety;
— Design basis of the facility;
— Facility configuration management;
— Post-service surveillance and testing.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 37 and 86 (See also SSG-10)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

APPENDIX XVI: MODIFICATIONS

<table>
<tr><td>Question MOD 16.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is a formal procedure in place and integrated into the management system for controlling modifications relevant to safety (including modifications to safety documentation and procedures, organizational changes and temporary modifications)?
Points for consideration
— Modifications are subjected to appropriate safety analyses, design, construction, and commissioning procedures;
— The manner in which the design, installation and commissioning procedures will influence the original safety analysis and design requirements are considered;
— Users and specialists are involved in the safety review;
— Routes of review and approval, e.g. through the reactor safety committee and the regulatory body, are well defined, e.g. by the safety significance of the modification.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 4, 36 and 83</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question MOD 16.2	**Answer**	
Is the format and content of a modification proposal properly defined according to the safety significance of the modification? **Points for consideration** — A description of the proposed modification; — Justification for the modification such as ageing, back-fitting, and upgrading; — Internal organization, arrangements associated with the modification and specific responsibilities; — Design requirements and criteria where particular attention should be given to the testability and site environment changes; — A safety assessment that supports the modification; — Specifications of the design and manufacturing processes; — Installation procedures, including optimization to reduce radiation and other hazards; — Involvement of external organizations, including suppliers and contractors; — Commissioning process; — Testing and inspection of the completed modification; — Review of operational and emergency procedures; — Documentation updating; — Special requirements for training and operator certification; — Quality assurance requirements.	Yes Partly No	
References: SSR-3 Req. 4, 36 and 83 (See also SSG-24)		
Evidence	Analysis	

APPENDIX XVII: UTILIZATION AND EXPERIMENTS

Question EXP 17.1	**Answer**	
Is there an internal procedure established to review new experiments for their safety significance? **Points for consideration** — Formal licensing process or regulatory approval process for experiments with impacts on safety, as appropriate; — Review by the safety committee of each experiment or its modification judged to be of safety significance; — In all operational states, each experiment and associated equipment does not cause unacceptable consequences to the reactor, other experiments, site personnel, the public and the environment; — Radiation protection provisions for the experiments; — Considerations for decommissioning and disposal of radioactive waste generated by the experimental programme; — Availability to the operating personnel of information necessary for safe operation of experiments.	Yes Partly No	
References: SSR-3 Req. 4, 69, 72 and 83 (Section 7, specifically para. 7.26, 7.27, 7.46, 7.103)		
Evidence	Analysis	

Question EXP 17.2	**Answer**	
Are the experimental devices loaded into or directly connected to the reactor designed to current standards?	Yes Partly No	
References: SSR-3 Para. 7.106		
Evidence	Analysis	

Question EXP 17.3	**Answer**	
Are the use and handling of experimental devices by both facility personnel and external users controlled by written and approved procedures stating the responsibilities for those involved with experiments?	Yes	
	Partly	
	No	
References: SSR-3 Para. 7.105		
Evidence	Analysis	

Question EXP 17.4	**Answer**	
Is there an established procedure to ensure adequate communication and intervention between operators and experimenters?	Yes	
	Partly	
	No	
References: See SSG-24		
Evidence	Analysis	

APPENDIX XVIII: MANAGEMENT SYSTEM

<table>
<tr><td>Question MS 18.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is an integrated management system established at the level of the operating organization that includes specific requirements for safe operation and utilization of the facility?
Points for consideration
— It is aligned with the goals of the organization;
— All requirements (nuclear, environment, occupational health, security and economical) are considered together;
— It highlights safety as the highest priority;
— An individual is assigned to coordinate all the management system activities and directly report to the senior management;
— A graded approach is applied to ensure that the degree of resources, controls and attention is commensurate with the safety significance of a system, equipment or activity and the potential hazard in case of a failure or deviation.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 4, (See also SSR-3 Req. 90)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question MS 18.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the management system properly documented?
Points for consideration
— The policy statements of the organization;
— A description of the management system;
— A description of the structure of the organization;
— A description of the functional responsibilities, accountabilities, levels of authority and interactions of those managing, performing and assessing work;
— A description of the processes and supporting information that explain how work is to be prepared, reviewed, carried out, recorded, reported, assessed and improved.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 4, GSR Part 2 [21], Req. 8</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

<table>
<tr><td>Question MS 18.3</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Are the processes for the operating organization, including the procedures and instructions, clearly identified implemented and periodically assessed and improved?
Points for consideration
— Processes are clearly described;
— Processes and/or procedures are in place for:
• Operation of the reactor;
• Maintenance and modification of items important to safety;
• Reactor safety;
• Radiation protection;
• Occupational health;
• Environmental protection;
• Emergency preparedness and response;
• Management of the interface between nuclear safety and security;
• Selection and training of personnel;
• Self- and independent assessment;
• Management system review and improvement;
• Non-conformances and corrective and preventive actions;
• Control of documents and records of irradiations, waste, control of purchasing;
• Communication;
• Managing organizational change.
— Review period defined and all documents are reviewed in the set period;
— All staff are properly trained in the use of the management system necessary to fulfil their duties.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 4, (See also SSR-3 Req. 90, GSR Part 2 and IAEA-TECDOC-1801)</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

APPENDIX XIX: RADIATION PROTECTION

<table>
<tr><td>Question ORP 19.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is a formally reviewed and approved radiation protection programme established and implemented?
Points for consideration
— A clear policy on radiation safety is defined;
— The radiation protection organization is defined and adequate resources are available;
— The radiation protection organization operates sufficiently independent of reactor management.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 8, 34, 69 and 84 (See also GSR Part 3 [22])</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question ORP 19.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the radiation protection programme in compliance with the regulatory requirements?
Points for consideration
— Control of radiation doses to individuals present on the site including exposure limits and actions required if limits are exceeded;
— Control of the amounts of radioactive substances released to the environment from operation of the reactor, including release limits and actions required if limits are exceeded;
— Reference dose rates accounting for the characteristics of the reactor and its experimental facilities;
— Monitoring and records of internal and external personnel radiation exposures, including lifetime doses and action levels;
— Items to be included in and frequency of reports to the regulatory body.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 84</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question ORP 19.3	**Answer**	
Does the radiation protection programme, in addition to procedures and administrative requirements, provide the means to enable its implementation? **Points for consideration** — Sufficient and appropriate instrumentation and equipment for personnel monitoring and protection are available; — Workplace radiological monitoring and surveys (external radiation level and contamination monitoring) are adequately conducted; — Environmental radiological surveillance is performed; — Periodic calibration of all instruments and monitoring equipment; — Facilities, equipment, and instrumentation for contamination control and decontamination activities are in place; — Appropriate shipment and disposal of radioactive materials is ensured; — Records and reports of radioactive releases, including dose estimates up to the site boundary, are maintained; — Records of inventories of radiation sources are kept.	Yes Partly No	
References: SSR-3 Req. 84 (See also aspects of SSR-3 Req. 85)		
Evidence	Analysis	

Question ORP 19.4	**Answer**	
Are adequate operational radiation protection provisions implemented for all operational states and accident conditions? **Points for consideration** — Adequate radiation shielding, ventilation, filtration and decay systems; — Area radiation and airborne radioactivity monitoring instrumentation; — Adequately defined and implemented radiological zoning; — Appropriate access controls applied to areas with radiological hazards; — Reactor operation and facility modifications are planned, reviewed, supervised, and implemented from the perspective of avoiding unnecessary exposure to radiation; — Keeping exposure in conformance with the principle of optimization of protection, including a system of dose constraints for individuals where the dose targets are significantly below the regulatory limits.	Yes Partly No	
References: SSR-3 Req. 8, 34, 53 and 57 (See also GSR Part 3)		
Evidence	Analysis	

APPENDIX XX: RADIOACTIVE WASTE MANAGEMENT

Question RWM 20.1	**Answer**	
Is it ensured that the airborne and liquid effluent releases are within the national regulatory limits? **Points for consideration** — Procedures for control of effluent releases are in place and specify operations, radiation protection, and management responsibilities; — Installed sampling and monitoring equipment is appropriate for the effluents being monitored; — Radiological exposure to staff and the general public is kept in conformance with the principle of optimization of protection; — Releases control systems (e.g., filter efficiency, sampling, monitoring equipment) are well maintained, calibrated and operated; — Analytical procedures used to sample and evaluate effluent releases are reviewed periodically for accuracy and adequacy; — Treatment, conditioning, transportation, storage, and disposal of solid and liquid radioactive waste is being carried out in accordance with the requirements; — Ventilation is adequate in all relevant facility areas; — Production of solid and liquid radioactive waste is reported to the regulatory body, as required.	Yes Partly No	
References: SSR-3 Req. 59, 64 and 85		
Evidence	Analysis	

Question RWM 20.2	**Answer**	
Is the generation, handling, storage and release of radioactive waste and effluents consistent with the principle of optimization of protection? **Points for consideration** — Design features and operating procedures to control the generation of gaseous, liquid and solid radioactive waste in the reactor and experimental facilities; — Facilities, design features, equipment and procedures for handling and storage of waste; — Control and monitoring of effluent releases from the reactor and experimental facilities.	Yes Partly No	
References: GSR Part 3, SSR-3 Req. 9, 15, 59, 74 and 85		
Evidence	Analysis	

Question RWM 20.3	**Answer**	
Are the management system aspects for radioactive waste management adequate and implemented? **Points for consideration** — Procedures for handling, segregation, treatment, conditioning, transportation, storage, and disposal of solid and liquid radioactive waste are in place, adequate and correct; — Procedures for calibration of effluent monitoring instrumentation are in place, adequate and correct; — Records of radioactive waste are maintained; — Goals for minimizing generation of solid waste are established; — Records of effluent releases and environmental monitoring are maintained; — Up to date calibration and maintenance records of equipment are available.	Yes	
	Partly	
	No	
References: SSR-3 Req. 85		
Evidence	Analysis	

Question RWM 20.4	**Answer**	
Are the computational models and the data used by the models for solid and liquid waste monitoring still correct and is appropriate equipment used? **points for consideration** — Atmospheric dispersion data for radioactive airborne effluent releases not changed or affected by new construction or activities in the site vicinity; — Validity of the models used to evaluate the impact of surface and ground water contamination due to releases of radioactive material; — Number, type, sensitivity, location of instruments and interlocks, calibration and maintenance is adequate.	Yes	
	Partly	
	No	
References: GSR Part 3		
Evidence	Analysis	

Question RWM 20.5	**Answer**	
Do the personnel involved understand the aspects of the liquid and airborne effluent monitoring? **Points for consideration** — Understanding the proper use of sampling, filtering and monitoring equipment; — Understanding measurements taken during radiation counting of air and solid waste samples and surface contamination tests.	Yes	
	Partly	
	No	
References: GSR Part 3		
Evidence	Analysis	

APPENDIX XXI: EMERGENCY PREPAREDNESS AND RESPONSE

<table>
<tr><td>Question EPR 21.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Does the integrated management system provide for efficient on-site emergency arrangements and for effective coordination with off-site authorities?
Points for consideration
— Roles and responsibilities in emergency preparedness and response are clearly specified and assigned to various positions as part of the routine organizational structure and are documented in emergency plans and procedures;
— Processes are in place to assess hazards, to define goals to be achieved in emergency preparedness and response, to develop adequate arrangements to achieve these goals, and to boost leadership and individual commitment to emergency preparedness and response;
— Resources (human, technical, financial) are allocated for emergency preparedness and response;
— Coordination mechanism and effective relationships with off-site response organizations are established;
— Quality management programme is in place to ensure availability and reliability of all supplies, equipment, facilities, plans, procedures and other arrangements for emergency preparedness and response.</td><td>Yes

Partly

No</td><td></td></tr>
<tr><td colspan="3">References: GSR Part 7 [23], SSR-3 Req. 81</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question EPR 21.2	Answer	
Are arrangements for all functions that are essential for an effective emergency response on-site in place? **Points for consideration** — Appropriate management of operations on-site including for the transition from normal operations to operations under emergency conditions; — Prompt identification of emergency conditions and declaration of emergency class, activation of on-site emergency response and notification of off-site notification point(s) including provision of sufficient information for effective off-site emergency response; — Implementation of mitigatory actions on-site including provisions to obtain support from off-site emergency services;	Yes	
— Assessment of hazards and possible development of hazardous conditions initially and throughout the emergency to inform decisions of necessary emergency response actions on-site; — Implementation of necessary urgent protective actions to protect all persons present at the site in an emergency; — Availability of suitable, reliable and diverse means of communication for use in taking protective actions on the site and for communication with relevant off-site officials; — Effective communication with the public and ensuring consistent messages with relevant off-site response organizations; — Protection of emergency workers responding on the site and assessment of hazardous conditions in which emergency workers might have to perform response functions;	Partly	
— Provisions for manging an adequate number of individuals with contamination or of overexposed individuals including for first aid, dose estimation and medical transport; — Safe and effective management of radioactive waste in an emergency; — Termination of the emergency on the site and provision of relevant information in this regard to relevant off-site response organizations; — Document, protect and preserve, to the extent practicable, data and information important for an analysis of the emergency and the emergency response; — Analysis of the emergency and the emergency response in order to identify actions to be taken to avoid other emergencies and to improve emergency arrangements.	No	
References: GSR Part 7, SSR-3 Req. 81		

Evidence	Analysis

Question EPR 21.3	**Answer**	
Are the emergency plans and procedures based on the accidents analysed in the safety analysis report, as well as those additionally postulated for the purposes of emergency preparedness and response on the basis of the hazard assessment? **Points for consideration** — Results of analysis of design basis accidents and design extension conditions; — Results of any hazard assessment (including events of very low probability not considered in the design and nuclear security events) to inform the need for emergency arrangements and any lessons from operating experience and from past emergencies, including conventional emergencies. — On-site emergency plans and procedures are established that are commensurate with the results of the hazard assessment; — Periodically reviewed and updated hazard assessment, plans and procedures (including consideration of feedback from drills and exercises); — Coordination of on-site emergency plan and procedures with those of off-site response organizations; — Approval of on-site emergency plan and its relevant updates by the regulatory body.	Yes	
	Partly	
	No	
References: GSR Part 7, SSR-3 Req. 18, 19, 20, 22 and 81		
Evidence	Analysis	

Question EPR 21.4	**Answer**	
Are regular training, drills and exercises implemented to ensure that personnel relevant for emergency response are able to perform their assigned response functions effectively in an emergency? **Points for consideration** — Existence of a training programme that allows for relevant personnel staffing the emergency response organization to have requisite knowledge, skills and abilities to perform their assigned functions; — Existence of exercise programme that allows for emergency arrangements covering the range of functions to be fulfilled in an emergency response to be tested at suitable intervals and for necessary improvements to be identified; — Evaluation processes applied against pre-established objectives.	Yes	
	Partly	
	No	
References: GSR Part 7, SSR-3 Req. 81		
Evidence	Analysis	

Question EPR 21.5	**Answer**	
Are all other essential infrastructure elements in place to provide the capability for fulfilling the functions that are essential for effective emergency response? **Points for consideration** — Authorities for on-site emergency preparedness and response are clearly established; — The emergency response organization is clearly specified and staffed with sufficient personnel qualified and fit for their intended duties; — Coordination of preparedness and response between the operating organization and authorities at the local, regional and national levels, as appropriate; — Adequate logistical support and facilities are available to enable the on-site emergency response functions to be performed effectively.	Yes Partly No	
References: GSR Part 7, SSR-3 Req. 32, 55 and 81		
Evidence	Analysis	

APPENDIX XII: DECOMMISSIONING PLANNING

<table>
<tr><td>Question DEC 22.1</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is there an established, detailed decommissioning plan?
Points for consideration
— Provisions taken into account during the design, construction and operation of the reactor to facilitate decommissioning activities;
— Decommissioning organization and its assigned responsibilities;
— Awareness and readiness of the operating organization to deal with the technical and financial issues associated with the decommissioning process.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 33 and 89</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
<tr><td>Question DEC 22.2</td><td colspan="2">Answer</td></tr>
<tr><td rowspan="3">Is the decommissioning plan comprehensive?
Points for consideration
— Detailed set of decommissioning activities, tasks, and schedules;
— Facility radiological status;
— Radiation protection;
— Radioactive waste management;
— Accident analysis;
— Final radiation survey plan with criteria for release from regulatory control;
— Cost estimate of the decommissioning method selected and funding provisions;
— Quality assurance provisions in place during decommissioning.</td><td>Yes</td><td></td></tr>
<tr><td>Partly</td><td></td></tr>
<tr><td>No</td><td></td></tr>
<tr><td colspan="3">References: SSR-3 Req. 89</td></tr>
<tr><td><u>Evidence</u></td><td colspan="2"><u>Analysis</u></td></tr>
</table>

Question DEC 22.3	**Answer**	
Does the decommissioning plan evaluate various methods for decommissioning and include provisions for dismantling, handling, storage and disposal of decommissioned radioactive equipment?	Yes	
	Partly	
	No	
References: SSR-3 Req. 89		
Evidence	Analysis	

Question DEC 22.4	**Answer**	
Was the decommissioning plan reviewed and approved by the regulatory body?	Yes	
	Partly	
	No	
References: SSR-3 Req. 89		
Evidence	Analysis	

APPENDIX XXIII: CODE OF CONDUCT SELF-ASSESSMENT GUIDE

XXIII.1. OBJECTIVE

The objective of this self-assessment guide is to assist the State, regulatory bodies and operating organizations to complete the self-assessment questionnaire in Appendix XXIV (Tables 1, 2 and 3) and identify areas of satisfactory application of the Code [1] and areas needing improvements.

XXIII.2. GUIDELINES

The following subsections provide guidelines for assessing the level of application of the Code in three main areas: role of the State, role of the regulatory body and role of the operating organization. The level of application of each provision of the Code should be assessed on a scale from 0 (the Code is not applied) to 3 (the Code is fully applied) using the detailed explanations for each level given below. Additional insight into the relationship between the Code and the safety requirements for research reactors can be found in Appendix XXV, which may be useful for performing the self-assessment and planning actions to strengthen application of the Code.

XXIII.2.1. Self-Assessment of Role of the State

Paragraph 9: Legal and regulatory framework

Level 3: A comprehensive, fully structured legal and regulatory framework is in place, which implements the recommendations of sub-paragraphs 9(a) through 9(d);
Level 2: A partial framework is in place, with work under way to implement recommendations not now included;
Level 1: A partial framework is in place, with no change anticipated;
Level 0: No framework is in place.

Paragraph 10: Establishment, functioning and independence of the Regulatory Body

Level 3: The Regulatory Body is established and functioning (capable of carrying out the regulatory functions), and is independent of the reactor operator, owner, or designer;
Level 2: The Regulatory Body is established and functioning in the same organization as the operator, or owner, but with independent authority and resources;
Level 1: The Regulatory Body is established and functioning in the same organization as the operator, or owner, and without independent authority or resources;
Level 0: The Regulatory Body is either not established, or not functioning.

Paragraph 11: Authority and resources of the Regulatory Body

Level 3: The Regulatory Body has adequate legal authority and resources to carry out its regulatory functions;
Level 2: The Regulatory Body has authority and/or resources that are inadequate to carry out some regulatory functions;
Level 1: The Regulatory Body has inadequate authority and/or resources to carry out most regulatory functions;
Level 0: There is no established or functioning Regulatory Body.

Paragraph 12: Involvement of the public and other bodies in the regulatory process, if deemed necessary

Level 3: There are clearly defined mechanisms for the involvement of the public and other bodies in all appropriate regulatory processes;
Level 2: There are clearly defined mechanisms for the involvement of the public and other bodies in most of the appropriate regulatory processes are established;
Level 1: Mechanisms for the involvement of the public and other bodies in the appropriate regulatory processes exist, but are not clearly defined;
Level 0: There are no mechanisms for the involvement of the public or other bodies in the regulatory process.

Paragraph 13 (part): Financing system and resources for safe operation and/or for safe extended shutdown state

Level 3: An adequate financing system is in place and sufficient resources are available;
Level 2: A financing system is in place but resources are limited;
Level 1: A financing system is in place, but resources are clearly inadequate;
Level 0: No financing system is in place.

Paragraph 13 (part): Financing system for decommissioning

Level 3: An adequate financing system is in place and it is clear that sufficient resources are or will be available for decommissioning;
Level 2: A financing system is in place, but additional action is needed to ensure that sufficient resources will be available for decommissioning;
Level 1: A financing system is in place in principle, but additional action is needed to implement the system and identify a source of funding;
Level 0: No financing system is in place.

Paragraph 14: Governmental emergency response system

Level 3: Fully structured emergency plans are available and exercised;
Level 2: Fully structured emergency plans are available but are not exercised, or plans are available and exercised only for the research reactor site;
Level 1: The emergency response system is incomplete, but some plans exist;
Level 0: There is no system for governmental emergency response.

Paragraph 15: Legal and infrastructure arrangements for decommissioning

Level 3: Complete arrangements are in place;
Level 2: Partial decommissioning arrangements exist and further arrangements are under development;
Level 1: Partial decommissioning arrangements exist and there is little or no work underway to develop further arrangements;
Level 0: No arrangements exist.

Paragraph 16 (part): Safety review of operating research reactors

Level 3: Arrangements are in place for regular review of the safety of operating research reactors, for making reasonably practical improvements or for shutdown and decommissioning if necessary.
Level 2: Arrangements are in place for regular review of the safety of operating research reactors, but there are no provisions for making improvements or for shutdown and decommissioning;
Level 1: Arrangements are in place for review of the safety of research reactors, but such reviews are not regular in time;
Level 0: There are no arrangements for regular review of the safety of operating research reactors.

Paragraphs 16 (part)/17: Extended shutdown safety, if applicable

Level 3: Full arrangements (including an effective operating organization and preservation program) for safety of a research reactor in extended shutdown are in place;
Level 2: Partial arrangements for reactor management and preservation, including maintenance and surveillance of systems are in place;
Level 1: Incomplete arrangements for management of the reactor are in place, with only minimal maintenance and surveillance being done;
Level 0: No effective operating organization or preservation programme exists.

Paragraph 18: Information for neighbouring States, if applicable

Level 3: Comprehensive and timely arrangements including lines of communication with neighbouring States are in place;
Level 2: Partial internal arrangements are in place, but there is no clearly defined line of communication with neighbouring States;
Level 1: Incomplete arrangements, requiring significant additional work, are in place;
Level 0: No arrangements are in place.

XXIII.2.2. Self-Assessment of Role of the Regulatory Body

Paragraph 19a: Process of issuing authorizations

Level 3: Comprehensive, fully structured processes are in place;
Level 2: Many parts of the processes are in place, but some are lacking;
Level 1: A few parts of the processes are in place, but many are lacking;
Level 0: No process for issuing authorizations is in place.

Paragraph 19b: Regulatory inspections and assessments

Level 3: Comprehensive inspections and assessments are conducted regularly;
Level 2: Partial inspections and assessments are conducted regularly or comprehensive inspections are conducted infrequently;
Level 1: Inspections and assessments of any scope are conducted rarely;
Level 0: No inspections or assessments are conducted.

Paragraph 19c: Enforcement of regulations and authorizations

Level 3: Prompt and effective enforcement actions are taken as necessary, including suspension, modification or revocation of an authorization;
Level 2: Enforcement actions are taken as necessary, not including suspension, modification or revocation of an authorization;
Level 1: Enforcement actions are rarely taken, even if there is an apparent need;
Level 0: No enforcement actions are taken.

Paragraph 19d: Review and assessment of safety submissions throughout the lifetime of the reactor

Level 3: The regulatory body has full capability and reviews and assesses all safety submissions from the operating organization, including the safety analysis report and the results of periodic safety reviews;
Level 2: The regulatory body has limited capability in some areas and reviews and assesses most safety submissions, including the safety analysis report and the results of periodic safety reviews;
Level 1: The regulatory body has limited capability in most areas and reviews and assesses some safety submissions;
Level 0: Safety submissions are generally not reviewed or assessed.

Paragraph 19e: Availability of regulatory requirements and decisions, as appropriate

Level 3: All regulatory requirements and decisions and their basis are made available, as appropriate.
Level 2: All regulatory requirements and most decisions and their basis are made available, as appropriate.
Level 3: Some regulatory requirements and decisions and their basis are made available, as appropriate.
Level 4: Regulatory requirements and decisions and their basis are not made available.

Paragraph 20a: Requirement for management of safety

Level 3: A regulatory requirement for clear arrangements for management of safety, reflecting safety as the highest priority and encouraging development of a strong safety culture is in place;
Level 2: A regulatory requirement for clear arrangements for management of safety is in place, but stronger provisions reflecting safety as the highest priority and for development of a strong safety culture are needed;
Level 1: A regulatory requirement for clear arrangements for management of safety is in place, but it does not reflect safety as the highest priority and/or encourage development of a strong safety culture;
Level 0: No regulatory requirement for management of safety is in place.

The following four self-assessment levels are to be used for the requirements specified in each of Paragraphs 20b and 20c.

Level 3: The operating organization is required to prepare and maintain the safety analysis report up-to-date, obtain authorizations and conduct periodic safety reviews;
Level 2: The operating organization is required to prepare a safety analysis report and update it as required to obtain authorizations, and conduct periodic safety reviews;
Level 1: The operating organization is required to prepare an safety analysis report and update it as required to obtain authorizations, but periodic safety reviews are not required;
Level 0: There is no requirement to prepare an safety analysis report, or to maintain the safety analysis report up to date.

The following four self-assessment levels are to be used for the requirements specified in each of Paragraphs 20d through 20u.

Level 3: The requirements/criteria are in place as recommended by the provisions in the Code;
Level 2: The requirements/criteria are partially in place and work is underway with satisfactory progress towards fully applying the provisions in the Code;
Level 1: Only limited requirements/criteria are in place and/or there is little or no work underway to fully apply the provisions in the Code;
Level 0: There are no requirements/criteria in place.

XXIII.2.3. Self-Assessment of Role of the Operating Organization

The following four self-assessment levels are to be used for the recommendations specified in each of Paragraphs 21 through to 35.

Level 3: The recommendations in the Code are fully implemented;
Level 2: The recommendations in the Code are partially implemented and work is underway with satisfactory progress towards complete implementation;
Level 1: There is a low level of implementation, there are significant difficulties or limitations, and/or there is little or no work underway to complete implementation of the recommendations in the Code;
Level 0: The recommendations are not implemented; there is little or no progress towards implementation.

APPENDIX XXIV: CODE OF CONDUCT SELF-ASSESSMENT QUESTIONNAIRE

Tables 1, 2 and 3 provide forms for recording the self-assessment of application of the provisions of the Code related to role of the State, role of the regulatory body and role of the operating organization, respectively. The forms should be completed following the Self-Assessment Guide in Appendix XXIII and consulting the full text of the Code [1].

TABLE 1. SELF-ASSESSMENT OF APPLICATION OF THE CODE, ROLE OF THE STATE

Code provisions	Summary description (for details refer to the Self-Assessment Guide and the Code)	Self-Assessment 0	1	2	3
9	Legal and regulatory framework	☐	☐	☐	☐
10	Establishment, functioning and independence of the regulatory body	☐	☐	☐	☐
11	Authority and resources of the regulatory body	☐	☐	☐	☐
12	Involvement of the public and other bodies in the regulatory process, if deemed necessary	☐	☐	☐	☐
13 (part)	Financing system and resources for safe operation and/or for safe extended shutdown state	☐	☐	☐	☐
13 (part)	Financing system for decommissioning	☐	☐	☐	☐
14	Governmental emergency response system	☐	☐	☐	☐
15	Legal and infrastructure arrangements for decommissioning	☐	☐	☐	☐
16 (part)	Safety review of operating research reactors	☐	☐	☐	☐
16 (part) / 17	Extended shutdown safety, if applicable	☐	☐	☐	☐
18	Information for neighbouring States, if applicable	☐	☐	☐	☐

TABLE 2. SELF-ASSESSMENT OF APPLICATION OF THE CODE, ROLE OF THE REGULATORY BODY

Code provisions	Summary description (for details refer to the Self-Assessment Guide and the Code)	Self-Assessment 0	1	2	3
19a	Process of issuing authorizations	☐	☐	☐	☐
19b	Regulatory inspections and assessments	☐	☐	☐	☐
19c	Enforcement of regulations and authorizations	☐	☐	☐	☐
19d	Review and assessment of safety submissions during the lifetime of the reactor	☐	☐	☐	☐
19e	Availability of regulatory requirements and decisions, as appropriate	☐	☐	☐	☐
20a	Requirement for management of safety	☐	☐	☐	☐
20b	Requirement to prepare and maintain a safety analysis report and obtain an authorization	☐	☐	☐	☐
20c	Requirements to undertake periodic safety reviews and make proposals for upgrading and refurbishment as necessary	☐	☐	☐	☐
20d	Requirement for financial and human resources to support safe operation	☐	☐	☐	☐
20e	Requirement for personnel training	☐	☐	☐	☐
20f	Requirement for quality assurance program	☐	☐	☐	☐
20g	Requirement to take human factors into account	☐	☐	☐	☐
20h,i	Requirements for radiation protection	☐	☐	☐	☐
20j	Criteria for emergency preparedness	☐	☐	☐	☐
20k	Criteria for siting research reactors	☐	☐	☐	☐
20l,m,n	Requirements for design, construction and commissioning	☐	☐	☐	☐
20o,p,q,r,s	Requirement for operation, maintenance, modification and utilization	☐	☐	☐	☐
20t	Criteria for safety in extended shutdown	☐	☐	☐	☐
20u	Criteria for release from regulatory control of decommissioned research reactors	☐	☐	☐	☐

TABLE 3. SELF-ASSESSMENT OF APPLICATION OF THE CODE, ROLE OF THE OPERATING ORGANIZATION

Code provisions	Summary description (for details refer to the Self-Assessment Guide and the Code)	Self-Assessment 0	1	2	3
21	Management of safety	☐	☐	☐	☐
22	Assessment and verification of safety	☐	☐	☐	☐
23	Financial resources	☐	☐	☐	☐
24	Qualified human resources	☐	☐	☐	☐
25	Quality assurance programmes	☐	☐	☐	☐
26	Human factors	☐	☐	☐	☐
27/28	Radiation protection	☐	☐	☐	☐
29	Emergency preparedness	☐	☐	☐	☐
30	Siting	☐	☐	☐	☐
31	Design, construction and commissioning	☐	☐	☐	☐
32	Operation, maintenance, modification and utilization	☐	☐	☐	☐
33	Extended shutdown	☐	☐	☐	☐
34/35	Decommissioning	☐	☐	☐	☐

APPENDIX XXV: MAPPING OF SAFETY REQUIREMENTS IN SSR-3 TO THE PROVISIONS OF THE CODE

Tables 4 and 5 provide mapping of the safety requirements and paragraphs of SSR-3 to the provisions of the Code [1]. Table 4 covers the role of the regulatory body, and Table 5 covers the role of the operating organization. Note that additional IAEA safety standards may also be applicable to the provisions of the Code, such as IAEA Safety Standards Series No. GSR Part 1 Governmental, Legal and Regulatory Framework for Safety [24], and others.

TABLE 4. CODE PROVISIONS ON THE ROLE OF THE REGULATORY BODY AND RELATED SAFETY REQUIREMENTS AND PARAGRAPHS IN SSR-3

Provision No.	Summary description of the Code provision	Related requirements (Req.) and paragraphs (para.) of SSR-3
19. (a)	Process of issuing authorizations	Para. 3.4, 3.5 Req. 1, para. 3.6, 3.11
19. (b)	Regulatory inspections and assessments	Req. 1, para. 3.13, 3.14
19. (c)	Enforcement of regulations and authorizations	Req. 1, para. 3.13, 3.15
19. (d)	Review and assessment of safety submissions during the lifetime of the reactor	Req. 1, para. 3.10–3.12
19. (e)	Availability of regulatory requirements and decisions, as appropriate	Req. 1, para. 3.13
20. (a)	Requirement for management of safety	Req. 1, para. 3.16
20. (b)	Requirement to prepare and maintain an SAR and obtain an authorization	Req. 1
20. (c)	Requirements to undertake periodic safety reviews and make proposals for upgrading and refurbishment	Req. 1
20. (d)	Requirement for financial and human resources to support safe operation	Req. 4, para. 4.15 Req. 67, para. 7.9(j and n)
20. (e)	Requirement for personnel training	Req. 2, para. 4.1(c) Req. 4, para. 4.15(b) Req. 67, para. 7.9(h, i) Req. 69, para. 7.15 Req. 70, para. 7.29–7.31 Req. 81, para. 7.91 Req. 83, para. 7.99(d)
20. (f)	Requirement for quality assurance program	Req. 4 Req. 67, para. 7.9(m)
20. (g)	Requirement to take human factors into account	Req. 4, para. 4.10 Req. 9, para. 6.9 Req. 15, para. 6.27(b) Req. 35 Req. 41, para. 6.122(d) Req. 68, para. 7.12
20. (h)	Radiation protection of the public and workers	Req. 8 Req. 34 Req. 57 Req. 69, para. 7.23 Req. 84
20. (i)	Radiation protection of the environment	Req. 84, para. 7.109, 7.113 Req. 85, para. 7.117
20. (j)	Criteria for intervention in emergencies and requirements for emergency plans	Req. 32 Req. 55 Req. 67, para. 7.9(g)

Provision No.	Summary description of the Code provision	Related requirements (Req.) and paragraphs (para.) of SSR-3
20. (k)	Criteria for siting research reactors	Para. 5.1–5.12
20. (l)	Requirements for design	Para. 2.10–2.14 Req. 7 Req. 10 Req. 25–28
20. (m)	Requirements for construction	Req. 14
20. (n)	Requirements for commissioning	Req. 30 Req. 73
20. (o)	Requirements for operational limits and conditions	Req. 21 Req. 71
20. (p)	Requirements for reporting events significant to safety	Req. 67, para. 7.9(f) Req. 71, para. 7.42, 7.43 Req. 77, para. 7.76
20. (q)	Requirements for modifications	Req. 36 Req. 72, para. 7.46 Req. 83 Req. 71, para. 7.40
20. (r)	Requirements for access to the research reactor by the regulatory body	Para. 3.3, 3.13, 3.14 Req. 31, para. 6.88
20. (s)	Requirements for management of radioactive waste	Req. 15 Req. 59 Req. 85
20. (t)	Criteria for research reactors in extended shutdown	Req. 87
20. (u)	Criteria for release from regulatory control of decommissioned research reactors	Req. 33 Req. 89

TABLE 5. CODE PROVISIONS ON THE ROLE OF THE OPERATING ORGANIZATION AND RELATED SAFETY REQUIREMENTS AND PARAGRAPHS IN SSR-3

Provision No.	Summary description of the Code provision	Related requirements (Req.) and paragraphs of SSR-3
21	Management of safety	Req. 2, para. 4.1(a, b and f) Req. 3 Req. 4, para. 4.7–4.15 Req. 67, para. 7.1–7.5, 7.9(a, i, m and n) Req. 68, para. 7.10, 7.12 Req. 69, para. 7.13
22. (a)	Assessment of safety	Req. 1, para. 3.6–3.9, 3.12 Req. 2, para. 4.2 Req. 4, para. 4.20 Req. 5 Req. 37, para. 6.113 Req. 41 Req. 67, para. 7.9(a, d and q) Req. 83, para. 7.99(a and b) Req. 86, para. 7.121, 7.122 Req. 88

Provision No.	Summary description of the Code provision	Related requirements (Req.) and paragraphs of SSR-3
22. (b)	Verification of safety	Req. 1, para. 3.12 Req. 2, para. 4.1(e) Req. 5, para. 4.25, 4.26 Req. 67, para. 7.9(o) Req. 71 Req. 77, para. 7.68, 7.70, 7.72 Req. 86
23	Financial resources	Req. 4, para. 4.15 Req. 67, para. 7.9(j and n)
24	Human resources	Req. 2, para. 4.1(c) Req. 4, para. 4.15 Req. 67, para. 7.9(h, i) Req. 68, para. 7.12 Req. 69, para. 7.14, 7.15, 7.20 Req. 70 Req. 81, para. 7.91 Req. 83, para. 7.99(d)
25	Quality assurance programme	Req. 4 Req. 67, para. 7.9(m)
26	Human factors	Req. 4, para. 4.10 Req. 9, para. 6.9 Req. 15, para. 6.27(b) Req. 35 Req. 41, para. 6.122(d)
27	Radiation protection of workers and the public	Req. 8 Req. 34 Req. 57 Req. 69, para. 7.23 Req. 83, para. 7.102 Req. 84
28	Radiation protection of the environment	Req. 84, para. 7.109, 7.113 Req. 85, para. 7.117
29	Emergency preparedness	Req. 32 Req. 55 Req. 67, para. 7.9(g) Req. 81
30	Siting	Paras. 5.1–5.12
31. (a)	Defence-in-depth in design and construction	Para. 2.10–2.14 Req. 7 Req. 10 Req. 25–28 Req. 41, para. 6.120
31. (b)	Design for reliable and manageable operation, considering human factors and the man-machine interface	Req. 24 Req. 28 Req. 35 Req. 36 Req. 49 Req. 50 Req. 51 Req. 53 Req. 56

Provision No.	Summary description of the Code provision	Related requirements (Req.) and paragraphs of SSR-3
31. (c)	Construction in accordance with the approved design	Req. 14, para. 6.26 Req. 67, para. 7.9(c) Req. 73, para. 7.48
31. (d)	Use of proven technologies	Req. 13 Req. 14, para. 6.25
31. (e)	Commissioning programme	Req. 67, para. 7.6, 7.9(e) Req. 73
32. (a)	Operational limits and conditions	Req. 71
32. (b)	Use of approved procedures for conduct of operation, utilization, modification, maintenance, inspection and testing activities	Req. 67, para. 7.9(o) Req. 71, para. 7.38, 7.39 Req. 72, para. 7.45, 7.46 Req. 74 Req. 77, para. 7.69, 7.70 Req. 83, para. 7.101, 7.103–7.106
32. (c)	Procedures for responding to anticipated operational occurrences and accidents	Req. 71, para. 7.41–7.43 Req. 74, para. 7.58(g)
32. (d)	Availability of technical support	Req. 4, para. 4.14, 4.15 Req. 69, para. 7.24, 7.25 Req. 88, para. 7.129
32. (e)	Report and follow up on events significant to safety	Req. 67, para. 7.9(f) Req. 77, para. 7.76 Req. 88, para. 7.127
32. (f)	Modifications	Req. 4, para. 4.16 Req. 6, para. 4.27(d) Req. 41, para. 6.119(d) Req. 69, para. 7.26 Req. 71, para. 7.40 Req. 74, para. 7.58(k) Req. 83
32. (g)	Assessment of modifications proposed to perform experiments	Req. 72, para. 7.46 Req. 83
32. (h)	Safety committee	Req. 6 Req. 67, para. 7.4, 7.9(b) Req. 69, para.7.26, 7.27
32. (i)	Safety assessment and approval of utilization projects having safety significance	Req. 4, para. 4.18 Req. 83, para. 7.99(a), 7.100, 7.101
32. (j)	Management and minimization of radioactive waste	Req. 15 Req. 34, para. 6.101 Req. 59 Req. 67, para. 7.9(p) Req. 74, para. 7.58(i) Req. 83, para. 7.99(c) Req. 85
32. (k)	Document management	Req. 78, para. 7.84 Req. 82 Req. 83, para. 7.99(b and e) Req. 89, para. 8.3
33	Extended shutdown	Req. 87
34, 35	Consideration of ultimate decommissioning during the entire life of the facility and decommissioning planning	Req. 15 Req. 33 Req. 89, para. 8.1, 8.3

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