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SALTO Peer Review Guidelines

2021 Edition

Guidelines for Peer Review of Safety Aspects of Long Term Operation of Nuclear Power Plants and Research Reactors

Vienna, June 2021

IAEA Services Series 26 (Rev. 1)

IAEA SAFETY STANDARDS AND RELATED PUBLICATIONS

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SALTO PEER REVIEW GUIDELINES

2021 EDITION

GUIDELINES FOR PEER REVIEW OF SAFETY ASPECTS OF LONG TERM OPERATION OF NUCLEAR POWER PLANTS AND RESEARCH REACTORS

INTERNATIONAL ATOMIC ENERGY AGENCY
VIENNA, 2021

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FOREWORD

The Safety Aspects of Long Term Operation (SALTO) peer review service, launched in 2005, was designed to assist operating organizations in adopting a proper approach to ageing management and preparation for safe long term operation of nuclear power plants. Several limited scope SALTO missions were performed in 2005–2007. The experience gained during those peer reviews served as the basis of the first edition of the SALTO Guidelines (IAEA Services Series No. 17), published in 2008. In 2014, the IAEA published the revised SALTO Peer Review Guidelines (IAEA Services Series No. 26), updated to include a new review area on human resources, competence and knowledge management for long term operation.

Between 2014 and 2020, the guidelines were used for an increasing number of SALTO missions, workshops and seminars for operating organizations of nuclear power plants and regulatory authorities. These SALTO workshops and seminars resulted in an enhanced understanding of IAEA safety standards and an increased number of requests for SALTO missions. The number of SALTO missions increased from 1–2 per year in the period 2007–2011 to 6–9 per year in the period 2016–2019. Although the IAEA's Integrated Safety Assessment of Research Reactors (INSARR) safety review service addresses ageing management activities at a general level, a more comprehensive review can be helpful, and SALTO missions to such installations are now also conducted.

This publication is a revision of the 2014 SALTO Peer Review Guidelines (IAEA Services Series No. 26). The IAEA officers responsible for this publication were R. Krivanek and A. Shokr of the Division of Nuclear Installation Safety.

EDITORIAL NOTE

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1. INTRODUCTION

1.1. BACKGROUND

International peer review is a useful tool for Member States to exchange experiences, learn from each other and apply good practices in different activities carried out throughout the lifetime of nuclear power plants (NPPs) and research reactors, including long term operation (LTO). The International Atomic Energy Agency (IAEA) supports Member States in enhancing the safety of NPPs and research reactors by providing a peer review service in many areas that affect safety.

This revision of the SALTO Guidelines supersedes the 2014 Edition of IAEA Services Series No. 26. It is based on experience of using the 2014 Edition and includes the following:

1. Changes in various IAEA Safety Standards Series publications;
2. New agreed definitions of recommendation, suggestion, self-identified issue, good practice and good performance and definitions from the IAEA Safety Glossary (2018 Edition);
3. Modification of the SALTO methodology for review of NPPs already operating in LTO period and NPPs in early phase of operation to ensure that ageing management is performed properly throughout the lifetime of NPPs;
4. Adaptation of the SALTO methodology for review of research reactors.

1.2. OBJECTIVE

The revised guidelines are primarily intended for members of an IAEA Safety Aspects of Long Term Operation (SALTO) peer review team. They provide a basic structure and common reference for peer reviews of ageing management and preparedness for safe LTO. They also provide useful information to the regulatory authorities, the operating organizations of NPPs and research reactors, and technical support organizations for carrying out their own self-assessments or comprehensive programme reviews and to the hosting organization preparing for a SALTO peer review mission.

These guidelines are intended to remain generic and applicable despite the differences between various NPPs and research reactors (their operating organizations are hereinafter referred to as ‘hosting organizations’). In this regard, it is important to note that the terminology of LTO used for research reactors is ‘continued operation’. This is mainly since research reactors do not have a standard service life and since the lifetime of these facilities is defined by their utilization programme. For the purpose of these guidelines, the terminology LTO will be adopted for both NPPs and research reactors. Safety aspects of LTO for research reactors should then be understood as programmes for continued safe operation for these facilities.

The publications referenced in these guidelines provide additional useful information for the SALTO team members and for the hosting organization.

A SALTO review focuses on the alignment with the IAEA Safety Standards in technical areas, managerial aspects of policy implementation, control and coordination of related activities, continuous review and improvement activities, document control and human resources.

1.3. SCOPE

For NPPs, the SALTO peer review is mainly focused on the fulfilment of safety requirements established in IAEA Safety Standards Series No. SSR-2/2 (Rev. 1), *Safety of Nuclear Power Plants: Commissioning and Operation* [1], and the associated recommendations provided in IAEA Safety Standards Series No. SSG-48, *Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants* [2]. A complete list of IAEA basis publications for NPPs is provided in Annex IX. The main focus of the review is devoted to the following areas:

- Management of physical ageing;
- Management of technological obsolescence;
- Programme for long term operation;
- Periodic safety review aspects related to ageing management and LTO justification[1];
- Records and reports;
- Human resources, competence and knowledge management for LTO.

For research reactors (including radioisotope production facilities and experimental devices), the SALTO peer review is mainly focused on the fulfilment of safety requirements established in IAEA Safety Standards Series No. SSR-3, *Safety of Research Reactors* [3], and the associated recommendations provided in IAEA Safety Standards Series No. SSG-10, *Ageing Management for Research Reactors* [4]. A complete list of IAEA basis publications for research reactors is provided in Annex X. The main focus of the review is devoted to the following areas:

- Management of physical ageing;
- Management of technological obsolescence;
- Periodic safety review or other equivalent safety evaluation process;
- Records and reports;
- Human resources, competence and knowledge management for continued safe operation.

The scope of the SALTO peer review does not address the following topics:

- Assessment or review of the design of NPPs and research reactors;
- Assessment of the environmental impact of LTO;
- Economic assessment and long term investment strategies.

1.4. STRUCTURE

Section 1 provides background of IAEA peer review services, objective of SALTO peer review guidelines, scope of the SALTO peer review and structure of the SALTO peer review guidelines.

Section 2 provides the SALTO peer review objectives, the description of SALTO peer review elements, and organizational aspects of the SALTO peer review missions.

Section 3 provides the description of review techniques and reporting of review results.

Section 4 provides the detailed scope of each review area and subarea for NPPs, relevant IAEA Safety Standards, expectations, evaluations and examples of documents for the review.

[1] Note: Detail assessment of the entire scope of the Periodic Safety Review of NPPs is addressed by the IAEA Technical Safety Review (TSR) Service Guidelines, IAEA Services Series 41 [5] and Technical Safety Review (TSR) Service Guidelines, Periodic Safety Review (PSR), IAEA Working Document [6].

Section 5 provides the detailed scope of each review area and subarea for research reactors, relevant IAEA Safety Standards, expectations, evaluations and examples of documents for the review.

Annexes I to X provide additional information and templates for mission preparations, conduct and reporting.

2. SALTO PEER REVIEW SERVICE

2.1. SALTO PEER REVIEW OBJECTIVES

The evaluation of programmes and performance is based on the IAEA Safety Standards (see Annex IX and X) and uses the combined expertise of the international review team. The review is neither a regulatory inspection nor an audit against national codes and standards. Rather, it is a technical exchange of experience and practices at the working level aimed at strengthening the programmes, procedures and practices implemented at the nuclear installation.

The key objectives of the peer review are to provide:

- The hosting organization with an opportunity to review its conformance with the IAEA Safety Standards by conducting a self-assessment and identify possible self-identified issues during the preparation phase prior to the mission;
- The hosting organization with an objective assessment of the status of ageing management and the preparedness for LTO with respect to the IAEA Safety Standards;
- The hosting organization with recommendations and suggestions for improvement in areas where performance does not meet the IAEA Safety Standards.

Additional benefits of the peer review service are to provide:

- Key staff of the hosting organization with an opportunity to discuss their practices with experts who have experience in the same field;
- The IAEA team members with an opportunity to broaden their experience and knowledge of their own field;
- All IAEA Member States with information regarding good practices identified in the course of SALTO reviews.

A SALTO peer review for ageing management and preparedness for safe LTO can be carried out at any time during the lifetime of an NPP or research reactor. The SALTO peer review service is beneficial for NPPs and research reactors:

1) **In the early phase of operation** — to support development and implementation of ageing management and other related activities in compliance with latest IAEA Safety Standards;

2) **During preparation for safe LTO** — to review ageing management and preparedness for safe LTO in compliance with latest IAEA Safety Standards;

3) **During operation in the LTO period** — to review ageing management and LTO related activities in compliance with latest IAEA Safety Standards.

Both the SALTO mission review areas and the depth of the review can be tailored to the NPP or research reactor operation phase as described in Section 2.2.

2.2. SALTO PEER REVIEW ELEMENTS

The SALTO peer review service offers the following elements:

- Workshop/seminar on IAEA Safety Standards and SALTO peer review methodology;
- Pre-SALTO mission;
- SALTO mission;

— SALTO follow-up mission;
— Expert mission based on SALTO guidelines;
— Support mission.

Further details are provided in Annex I.

2.2.1. Workshop/seminar on IAEA safety standards and SALTO peer review methodology

Workshops and seminars can be requested by hosting organizations and regulatory authorities at any time during the lifetime of an NPP or research reactor, prior to a Pre-SALTO/ SALTO mission but also between individual missions.

Workshops and seminars are hosted by the hosting organizations and regulatory authorities to learn about relevant IAEA Safety Standards, SALTO peer review methodology and to transfer experience and knowledge from other hosting organizations and regulatory authorities. Targeted workshops can be organized on any topic within the scope of a SALTO peer review service (see Sections 4 and 5). Workshops are frequently focused on methodology, development, implementation and review of scope setting, ageing management review (AMR), ageing management programmes (AMPs), time limited ageing analyses (TLAAs), obsolescence management, equipment qualification, periodic safety review (PSR), data collection and record keeping, human resources, and knowledge and competence management for LTO.

2.2.2. Pre-SALTO mission

A Pre-SALTO mission reviews ageing management and/or preparedness for safe LTO at an early stage of their preparation prior to the complete implementation of the ageing management and/or LTO activities.

A Pre-SALTO mission is a full scope mission comprising all review areas as defined in Section 4 for NPPs and Section 5 for research reactors. A team leader, a deputy team leader and six team members and a maximum of 4 observers take part in this mission.

A Pre-SALTO mission is followed by a next Pre-SALTO mission, a SALTO mission or a SALTO Follow-up mission within 18–24 months.

A Pre-SALTO mission can be conducted:

— **In the early phase of operation**

The mission reviews the status of ageing management and other related activities for consistency with the IAEA Safety Standards in early phase of operation. The appropriate time to invite a Pre-SALTO mission is when the ageing management strategy and concept are defined, organizational structure is defined, methodologies are developed (at least in draft) and pilot tasks are performed (e.g. parts of scope setting, AMR, development of AMPs, identification of TLAAs).

Multiple Pre-SALTO missions maybe be requested by a hosting organization. A Pre-SALTO mission is followed by a next Pre-SALTO mission or a SALTO follow-up mission within 18–24 months.

The scope of a Pre-SALTO mission in early phase of operation is based on the review areas as defined in Section 4 but the following items are not reviewed:

— A-4 – Programme for LTO;
— C-3 and E-3 – part Revalidation of TLAAs;
— D-3 – part Revalidation of equipment qualification (as a TLAA);
— In other areas, questions related to LTO preparations.

— **During preparation for safe LTO**

The mission reviews alignment of an installation's ageing management and preparedness for safe LTO with the IAEA Safety Standards in the early phase of preparations for LTO. A Pre-SALTO mission is performed well in advance of entering the LTO period to allow completion of necessary activities. The appropriate time to invite a Pre-SALTO mission is when the LTO strategy and concept are defined, the organizational structure is defined, methodologies are developed (at least in draft), and pilot tasks are performed (e.g. parts of scope setting, AMR, development of AMPs, identification and revalidation of TLAAs).

2.2.3. SALTO mission

A SALTO mission reviews ageing management and/or preparedness for safe LTO when the hosting organization is fully ready to demonstrate compliance with the IAEA Safety Standards.

A SALTO mission is followed by a SALTO Follow-up mission within 18–24 months.

A SALTO mission is a full scope mission, comprising all review areas as defined in Section 4 for NPPs and in Section 5 for research reactors, respectively. A team leader, a deputy team leader and six team members and a maximum of four observers take part in this mission.

A SALTO mission can be conducted:

— **During preparation for safe LTO**

The appropriate time to invite a SALTO mission is when the hosting organization is fully ready to demonstrate alignment of their ageing management and other activities for safe LTO with the IAEA Safety Standards and all activities are completely or almost completely implemented (e.g. scope setting, AMR, development of AMPs, revalidation of TLAAs).

— **During operation in LTO period**

The appropriate time to invite a SALTO mission is at ten-yearly intervals throughout the entire period of LTO. If a SALTO peer review service was not performed during preparation for LTO, a Pre-SALTO mission is performed prior to a SALTO mission.

2.2.4. SALTO follow-up mission

A SALTO follow-up mission is conducted to review the implementation of corrective actions to resolve recommendations and suggestions from a Pre-SALTO/ SALTO mission. The team leader, deputy team leader and typically one to three other team members of the original review team and a maximum of two observers take part in this mission. This number is dependent on the number of issues and self-identified issues reported during the original Pre-SALTO/ SALTO mission.

The follow-up mission takes place 18–24 months after the Pre-SALTO or SALTO mission.

In the case that a SALTO mission or a second Pre-SALTO mission is held within 24 months after the first Pre-SALTO mission, this mission may also function as a follow-up mission for

the first Pre-SALTO mission. Information about the progress in implementing corrective actions is used as a part of inputs provided to reviewers but the progress in implementing corrective actions is not separately documented in the Pre-SALTO/ SALTO mission report.

If a significant number of issues show insufficient progress, it will be proposed to the hosting organization that an invitation be issued for another follow-up mission one year from then. In addition, a support mission or workshop can be offered to the hosting organization.

2.2.5. Expert mission based on SALTO guidelines

In addition to the above-mentioned missions, the hosting organization can request an expert mission that focuses on specific review areas of a standard SALTO mission. One to five review areas (see Section 4 for NPPs and Section 5 for research reactors) can be requested by the hosting organization. The review process, methodology and reporting are in accordance with the SALTO guidelines. The size of the team is adjusted to the number of requested review areas.

2.2.6. Support mission

Support missions can be requested by the hosting organization to help with addressing recommendations and suggestions arising from a Pre-SALTO or SALTO mission. The scope of a support mission is agreed between the hosting organization and the IAEA and can include any topic within the scope of a standard SALTO mission. The usual SALTO peer review process, methodology and reporting can be used but it can be also adapted to the needs of the hosting organization. The team usually consists of a team leader and 2–3 experts.

2.3. ORGANIZATION OF THE SALTO PEER REVIEW

2.3.1. Initiation

A SALTO peer review service can be requested by the hosting organization, national nuclear safety regulatory authority or other relevant governmental body. A request for a SALTO peer review service is transmitted to the IAEA deputy director general, nuclear safety and security department, at least 12 months before the proposed date of the first mission.

2.3.2. Preparatory meeting

Upon receipt of a request for a SALTO peer review service, an IAEA technical officer is assigned to carry out the following:

- Establishment of liaison contacts with the hosting organization;
- Arrangement of a preparatory meeting with the hosting organization management and other staff involved;
- Recruitment of external experts for the IAEA team.

At the same time, the hosting organization nominates a contact person with whom the team leader may liaise.

A preparatory meeting is led by the IAEA technical officer at the hosting organization site approximately 6–12 months prior to the first mission. It provides the IAEA, management, counterparts and other organizations with adequate time for the mission preparation. The meeting covers discussions and agreement on:

- Exact scope of the review;
- Composition of the review team;
- Mission programme;
- Role of the regulator during the mission;
- Logistic support;
- Financial arrangements;
- Hosting organization preparatory activities;
- Hosting organization self-assessment;
- Preparation of the advance information package (AIP);
- Schedule of preparation milestones.

The IAEA technical officer prepares a draft of 'Terms of Reference' (also called 'Preparatory Meeting Report') document for the SALTO peer review process, which is reviewed, discussed and finalized with the hosting organization during the preparatory meeting. The Terms of Reference document includes the following items:

- Background and objectives;
- Scope of the SALTO peer review;
- Name of the IAEA team leader, host plant peer and host administrative correspondent;
- IAEA review team members and counterparts (if known at the time of the preparatory meeting);
- Steps of the SALTO peer review service;
- Dates of the first mission;
- Review basis and methodology;
- AIP format;
- Mission report format;
- Administrative and financial subjects and logistics;
- Public information and media interaction;
- Provisional mission schedule.

During the preparatory meeting, a detailed presentation of SALTO methodology is provided to the hosting organization staff. They familiarize themselves with the SALTO Guidelines and the IAEA Safety Standards related to ageing management and LTO that form the basis of the SALTO peer review. The preparatory meeting is designed to help the hosting organization conduct a self-assessment and prepare for the mission. The hosting organization will be offered the opportunity to send observers to other SALTO missions before its own mission, to gain practical experience on how a SALTO mission is prepared and conducted.

Following the preparatory meeting, the IAEA technical officer recruits international experts as reviewers and observers to the team. The IAEA nominates a team leader and a deputy team leader (both IAEA staff, one of which is typically the original IAEA technical officer).

2.3.3. Preparations by the hosting organization

The hosting organization management designates a host plant peer (HPP) and one counterpart for each review area with the following characteristics, roles and responsibilities:

- Good English language skills;
- Released from other plant duties for the duration of the mission;
- Good overall knowledge of the nuclear installation, review area and staff.

The host plant peer is to act as a liaison between the hosting organization and the IAEA team. During the mission, the HPP participates in the SALTO team meetings and advises the SALTO team members when information may not be complete or correct. The host plant peer cannot simultaneously act as a counterpart.

An important aspect of the hosting organization preparations for a SALTO mission is the conduct of a thorough self-assessment using the IAEA Safety Standards, SALTO Guidelines and working notes outlines (WNOs) as a basis. The results of the self-assessment may be included in the AIP in sufficient detail for the IAEA team members to understand any challenges which the hosting organization might be facing (see Annex V) and any gaps the hosting organization has identified. While the specific methodology used to conduct the self-assessment is left to the hosting organization, the results of the self-assessment should contain the following key components:

- For each review area, a description of how each individual expectation, as described in Sections 4 and 5, is met;
- Specific gaps where performance or programmes do not fully align with IAEA Safety Standards can be described as self-identified issues (in a standard issue template – see Annex VII, Sections 1, 2, 3.1 and 3.2).

2.3.4. Advance information package

The advance information package is prepared by the hosting organization and is used to convey relevant information to the SALTO team members for preparation for their review. The AIP contains administrative information (arrival logistics, accommodation, contact points and counterparts contact details, working places, site access requirements), general information (nuclear installation description, design information, external organizations) and information for each review area separately.

The advance information package for a SALTO follow-up mission is an updated AIP from the original mission with the issue sheets supplemented with hosting organization actions to resolve each issue (Section 3 of issue sheets – see Annex VII). Section 3 of every issue sheet provides information in a structured format: results of an issue analysis, defined corrective actions and the implementation status of corrective actions.

The compilation of information in the AIP is based on and utilizes existing documents such as procedures, task plans, and routinely prepared reports. Focus on the content with limited effort on editing is encouraged. The advance information package should be provided in English as this is the official SALTO working language.

To the extent possible, the format of the AIP should follow the suggested table of contents provided in Annex V. A typical AIP contains 15–20 pages of information for each review area and the whole AIP contains around 200 pages.

The standard approach is that the hosting organization sends the AIP in an electronic format to the IAEA at least 30 days before the review team arrives at the plant.

2.3.5. Schedule

A typical Pre-SALTO/ SALTO mission programme is provided in Annex II and a SALTO follow-up mission programme in Annex III. In research reactors, both Pre-SALTO and SALTO missions are same and conducted as SALTO mission for review of ageing management. The typical duration shown can be adjusted in accordance with local conditions such as airport transfer times, local rules and the needs of the hosting organization.

A typical expert mission programme is provided in Annex IV. The duration of the mission can be adjusted in accordance with local conditions such as airport transfer times, local rules and the needs of the hosting organization but is typically 4–7 days.

A workshop, seminar or support mission programme is developed by the IAEA technical officer in cooperation with the hosting organization on a case by case basis. Typical duration is 3–4 days.

2.3.6. Team composition and responsibilities

The SALTO peer review is conducted by a team of international experts with experience applicable to the areas of the review. The typical team composition includes a majority of external experts (experienced experts from operating organizations, regulatory authorities or support organizations) and IAEA staff members (including the team leader and the deputy team leader).

Team members are selected by the IAEA to ensure that a variety of national approaches to ageing management and safe LTO are represented. Each reviewer typically covers one review area as described in Section 4 for NPPs and in Section 5 for research reactors, respectively. If requested by the hosting organization, two reviewers can be invited to review selected areas. Reviewers have typically broader knowledge beyond their assigned review area and good knowledge of the IAEA Safety Standards, which allows the team to discuss findings identified by individual reviewers and agree on main mission conclusions as a team.

Team leaders are responsible for scheduling, pre-mission briefing, team training, leading of daily meetings, conducting meetings with hosting organization management and regulatory authority, control of issue development, preparation of the draft mission report, issuing the final mission report, interface with public and media.

The reviewers are responsible for preparing for the mission by studying relevant information provided by the hosting organization in the AIP (but not limited to this), performing training, preparing detailed review schedule and identifying potential strengths and weaknesses. Team members are required to attend all parts of the training led by the team leader. This provides an opportunity for them to meet and resolve any questions not covered in these guidelines. A short meeting with the counterparts is also arranged prior to the mission.

During the mission, the experts conduct interviews and site walkdowns, develop daily reports and working notes for their review area based on templates provided, agree on findings and discuss issues and potential recommendations and suggestions with the counterpart, and draft their own part of the mission report. They also present main findings and conclusions for their review area at the exit meeting.

Up to four observers for Pre-SALTO and SALTO missions and up to two observers for SALTO follow-up and expert missions are invited by the IAEA to join the review team when agreed by the hosting organization. Observers are either IAEA staff members or external experts from operating organizations, regulatory authorities or technical support organizations. The purpose of inviting observers is to train them to become SALTO reviewers, share experience of hosting

a SALTO mission with future hosting organizations and share overall experience. The observers are full team members and play an active part in the preparation and conduct of the mission under the leadership of assigned reviewers and team leaders.

The team will not include a member from the host country, or experts who may have conflicts of interest.

The team members are also requested to provide feedback on the mission preparation and conduct and application of the IAEA Safety Standards (e.g. methodology, which parts of the IAEA Safety Standards need to be updated, what issues could not be referenced to the standards).

3. REVIEW METHODOLOGY

3.1. REVIEW TECHNIQUES

The SALTO team uses four steps to acquire the information needed to develop its recommendations, suggestions, evaluate self-identified issues and to prepare the SALTO mission report. These are:

- Review of written materials and databases;
- Interviews with hosting organization personnel;
- Direct observations of staff performance and structures, systems and components (SSCs) conditions;
- Discussion of evaluations and tentative conclusions within the team and with counterparts.

To be able to make informed assessments, reviewers are expected to cover each topic to the extent necessary, based on the questions contained in the WNOs for each specific review area. The WNOs are available at the IAEA SALTO website. Review findings should be described and supported by accurate facts to the degree required to make the significance of findings understandable. Formulation of recommendations and suggestions should be based on the identified gaps as compared to IAEA Safety Standards. Corrective actions to address self-identified issues should be consistent with IAEA Safety Standards. Similarly, good practices that are identified during the review should be documented for the benefit of other Member States and described in the SALTO report in sufficient detail as to be readily understood.

The use of review techniques mentioned above should be planned in advance for each day. Arrangements should be made with the counterpart regarding how to perform the discussions, interviews and observations.

Based upon the discussions and observations, the reviewer can, if necessary, modify his/her preliminary view. One or more iterations may be required for document review, discussions, interviews, and observations needed for an accurate understanding of the situation and capture clear facts to form a judgment.

3.1.1. Review of written materials and databases

Documents of general interest to the whole team are included in the AIP. In addition, during the review, each expert may decide to review additional documents used by the hosting organization.

The main information sources provided by the counterpart are as follows:

- AIP;
- National regulatory requirements related to ageing management and LTO;
- Ageing management and LTO policy and strategy documents;
- License renewal documentation;
- Implementation programme for LTO;
- PSR report and methodologies;
- Programme for modifications and replacements;
- Design basis documentation;
- Safety analysis report (SAR);

— Procedures and methodologies related to ageing management and LTO (such as scope setting, AMR);
— Documentation for SSCs (such as as-built drawings, technical specifications);
— Databases (such as system and equipment list, set point list);
— AMPs;
— TLAAs;
— Plant programmes relevant to ageing management and LTO (e.g. maintenance, in-service inspection, equipment qualification, surveillance, water chemistry);
— Plant level AMP;
— Plant life management programme;
— Operating experience feedback related to ageing management and LTO;
— Corrective action programme.

Examples of documents for the review for every area and subarea are provided in Section 4 and Section 5.

3.1.2. Interviews with hosting organization personnel

Interviews with hosting organization personnel are conducted by the IAEA team to:

— Understand the work processes, duties and responsibilities;
— Gather additional information not covered by any documentation or not available in English;
— Seek answers to questions arising from the documentation review;
— Assess hosting organization staff understanding of their duties and responsibilities;
— Assess hosting organization staff competence, awareness of and commitment to nuclear safety;
— Provide opportunity for all important information to be exchanged between reviewers and counterparts.

These interviews should be a ‘give and take’ discussion based on open questions and not an interrogation of the counterparts by the reviewers. If properly conducted, these discussions and interviews are the most important part of the SALTO mission.

3.1.3. Direct observation of staff performance in the field and SSCs conditions

Direct on-site observation of staff performance in the field and the physical condition of SSCs means the following:

— Implementation of programmes of the hosting organization:
  - Use of procedures and instructions;
  - Compliance with regular and specific reporting requirements;
  - Implementation of quality assurance and quality control programmes;
  - Collection, storage and retrieval of data;
  - Record keeping and trend monitoring;
  - Arrangements for monitoring of effectiveness of the programme and feedback;
  - Management monitoring and control;

— Physical conditions of in-scope SSCs through:
  - Walkdowns;
  - Inspection and diagnostics reports.

From these observations, the reviewer will form an opinion on:

— The management policy on and commitment to LTO;
— A systematic AMP;
— The commitment of the staff;
— Capability of the staff in terms of resources, technical knowledge and skills;
— Physical conditions of selected SSCs within the scope of LTO (effectiveness of AMPs).

Based upon the reviews of documentation, interviews and field observations, the reviewer can assess the overall performance.

3.1.4. Work with counterparts

The work with the counterpart involves the following activities:

— Entrance meeting;
— Daily planning;
— Daily review sessions;
— Debriefing;
— Discussion of tentative conclusions;
— Exit meeting.

Immediately after the entrance meeting, during the initial sessions, working teams are established in all review areas. The working teams consist of the IAEA reviewer, observer (if available), counterpart and other hosting organization staff. Each reviewer agrees, with the counterpart, an overall review schedule for the whole mission and a detailed review schedule for the next day. Review schedule for each day is then confirmed as a first activity of each day.

The reviewers plan their schedules such that a primary and an alternate objective are always established. To maintain review efficiency, review efforts can be directed to the day's alternate objective if unable to proceed with activities supporting the primary objective. After the review session, a detailed review schedule for the next day is agreed.

The counterpart is informed daily about reviewer's findings (facts). The reviewer and the counterpart should reach an agreement on each fact observed.

Based on facts identified during previous review steps, the reviewer develops tentative conclusions (e.g. preliminary recommendations, suggestions, good practices) which are to be discussed and clarified with the counterpart.

The main mission results are presented by reviewers to the counterparts, hosting organization management and staff and regulatory authority during at the exit meeting on the last day of the mission.

3.2. REPORTING RESULTS

3.2.1. Daily report

The IAEA review team has daily meetings in which the reviewers present their findings.

Primary information gathered by the reviewers during the review is documented in the form of daily reports (see template of daily report in Annex VI). One new daily report per review area is prepared each day (information from previous day is not repeated).

The daily reports do NOT contain description of the work performed by each reviewer. They contain only findings which can be either 'concerns/facts' (negative) or 'good ideas/performance' (positive) and are presented separately in the daily report. 'Other remarks' such as inputs or interfaces with other review areas, requests for other team members cooperation are also presented separately in the daily report. Concerns/facts are discussed and agreed between reviewer and counterpart prior to their presentation in the daily team meeting.

Daily team meetings create an opportunity for other team members to contribute their views, further strengthening the experience basis of the review team used for the evaluation. It is important that each reviewer comes to the meeting prepared to make a concise statement of his/her findings, this ensures enough time for the other review areas to be discussed at the same meeting.

The host plant peer attends the daily team meetings and their role is to listen, take notes and advise the team when information is incomplete or incorrect. The host plant peer also provides feedback to counterparts and requests them to provide relevant information to the team.

3.2.2. Working notes

Notes from reviewers' daily reports and other information recorded during the review is incorporated and consolidated into the review area specific working notes daily. SALTO WNOs, available on the IAEA website and provided to the reviewers by the IAEA team leaders, are used as a template. Each reviewer develops the working notes beginning with the records of the first day of the review and supplements it with new information every evening after the review sessions. Reviewers submit working notes to the team leader in the next morning for review. The team leader returns them to reviewers during the day with necessary comments and questions for clarification.

The working notes are the 'field notes' of the individual reviewers and are considered by the IAEA to be restricted documents. As such they are not released to the public. They are the basis for the development of issues, encouragements, good performances and good practices. Working notes contain:

- The reviewers' factual observations, with any necessary description and clear conclusions;
- References to reviewed documents, databases and performed interviews;
- References to the IAEA Safety Standards and other reference documents.

In writing the working notes, the following should be strived for:

- Language is clear, concise, objective and impersonal;
- Sentences are short, direct and aid understanding;
- Official names are used to designate organizational units, positions and systems;
- Abbreviations or acronyms are written in full on their first use;
- Personal or company names are not used.

The working notes are written in English, day-to-day from the first day of peer review, and modified and supplemented, as necessary, through the entire review part of the mission.

3.2.3. Issue sheets

The reviewer groups facts with the aim of defining fundamental overall problems. If agreed by the review team, the issue is further developed by the reviewer and documented on an issue sheet. Self-identified issues are considered by the relevant reviewer, supplemented as necessary in cooperation with counterparts and then processed the same way as normal issues. A template of the issue sheet is provided in Annex VII.

Terminology used in this section is defined in a 'Glossary' at the end of this publication. It explains terms such as issue, self-identified issue, facts, fundamental overall problem, safety consequence, recommendation, suggestion, encouragement, good practice, good performance.

Each issue sheet consists of the following sections:

(1) Issue identification – contains issue identifier, facility name, unit number, reviewed area, issue title and fundamental overall problem;
(2) Assessment of the status – provides date of the last day of the mission, a list of agreed facts, safety consequence, recommendation or suggestion, IAEA basis and documents reviewed.

For follow-up missions, information is added pertaining to sections:

(3) Hosting organization actions to resolve issue – provides date of counterpart report on actions (typically part of follow-up mission AIP), results of the issue analysis, corrective actions, status of corrective actions implementation;
(4) Follow-up assessment by the IAEA review team – provides date of the last day of the follow-up mission, a list of agreed facts, documents reviewed and resolution degree.

The purpose of Section 4 of the issue sheets is to reflect the discussions with the counterparts and other staff members, to record the facts, to record documents reviewed and decide on resolution degree at the time of the follow-up mission. The IAEA assessment of the progress with the resolution of SALTO issues and self-identified issues is made in accordance with the following definitions:

Issue resolved

All necessary actions have been taken to deal with the root causes of the recommendation rather than to address each individual fact identified by the team. A management review has been carried out to ensure that actions taken have eliminated the root cause. Actions have also been taken to check that it does not recur. Alternatively, the issue is no longer valid due to, for example, changes in the hosting organization.

Satisfactory progress to date

Actions have been taken, including root cause determination, which lead to a high level of confidence that the recommendation will be resolved within a reasonable timeframe, after the follow-up mission. These actions might include budget commitments, staffing, document preparation, increased or modified training, equipment purchases, etc. This category implies that the recommendation could not reasonably have been resolved prior to the follow-up visit, either due to its complexity or the need for long-term actions. This category also includes recommendations, which have been resolved using temporary or informal methods, or when resolution has only recently taken place and its effectiveness has not been fully assessed.

Insufficient progress to date

Actions taken or planned do not lead to the conclusion that the issue will be resolved within a reasonable timeframe. This category includes issues in response to which no action has been taken.

3.2.4. Pre-SALTO/ SALTO mission report

On completion of the review, the team members, under guidance from the team leader, prepare the respective parts of the Pre-SALTO/ SALTO mission report, based on the working notes. Every reviewer prepares his/her issue sheets, evaluates self-identified issues and prepares the evaluative part of the report (detailed conclusions for each review area). The day before completing the mission, the reviewers provide the team leader with the electronic file of their contributions to the draft report already discussed with the counterpart.

The draft mission report is provided to the hosting organization and regulatory authority at the exit meeting on the last day of the mission for review and editorial comments. The issues, particularly fundamental overall problems, recommendations and suggestions will not be changed after the exit meeting, but the hosting organization and regulatory authority may provide editorial comments on other parts of the report, e.g. accurate wording of facts, identification of documents reviewed.

The final mission report is completed and issued by the IAEA within two months of the end of the mission. The final mission report is submitted through official channels to the Member State, the relevant regulatory authority and the hosting organization. The IAEA restricts initial distribution to itself, members of the review team and the hosting Member State for 90 days after issuance of the final SALTO mission report. After this period, the mission report will be derestricted unless, within this 90 days period, the hosting organization or the Member State requests in writing to the IAEA that the report remains restricted. Further distribution is at the discretion of the Member State concerned.

The SALTO mission report contains the following information:

- Preamble;
- Foreword, describing the background of the IAEA SALTO peer review service;
- Executive summary;
- Introduction, providing objectives of the review, scope, description of the conduct of the mission and summary information on the nuclear installation;
- Main conclusions;
- Detailed conclusions for each review area separately;
- Summary of recommendations and suggestions;
- Definitions;
- References;
- Composition of the SALTO team;
- Issue sheets (including self-identified issues).

A standard table of contents is provided in Annex VIII.

The format of a Pre-SALTO mission report and an expert mission report is the same as that of a SALTO mission report.

Support mission results are documented as agreed with hosting organization. Parts of a SALTO mission report format can be also used.

3.2.5. SALTO Follow-up mission report

A SALTO follow-up mission report consists of the original Pre-SALTO or SALTO mission report (see Annex VIII) supplemented in some parts with the follow-up information. Approximately three months prior to the follow-up mission, the IAEA produces the relevant format of the draft SALTO follow-up mission report for the hosting organization to complete its responses (Section 3 'Hosting organization actions to resolve issue' of all issue sheets), i.e. the word document of the original report is amended by the following additions:

- At the end of the 'Executive summary' section, a new subsection entitled 'Follow-up mission conduct and results', which provides a summary of follow-up mission results;
- In Section 1.3 'Conduct of the mission', a brief description of a conduct of the follow-up mission;
- At the end of every review area in Section 3 'Detailed conclusions for review areas', new subsections entitled 'Status at SALTO follow-up mission', which provide an evaluation of the status of each issue and self-identified issues separately;
- In Section 7 'Composition of the SALTO team', the SALTO follow-up team and hosting organization team;
- In Appendix I 'Issue sheets', Section 3 'Hosting organization actions to resolve issue' and Section 4 'Follow-up assessment by the IAEA review team' of every issue sheet.

This document is sent to the hosting organization so that it may complete its responses. Once it has been sent back to the IAEA, it becomes the document used by the team during the follow-up mission. This document is also sent, one month in advance of the mission, to all follow-up SALTO team members.

A new issue sheet can be developed during the follow-up mission in exceptional cases if a serious deficiency comparing to the IAEA Safety Standards is observed by the IAEA team and time allows to properly develop the issue sheet. Such an issue sheet is supplemented to the follow-up mission report for further action by the hosting organization.

4. PRACTICAL GUIDANCE FOR CONDUCTING PEER REVIEW FOR NUCLEAR POWER PLANTS

This section provides detailed guidance to the review team for a SALTO mission at an NPP, focusing on areas relevant to ageing management and LTO. The scope of the review is divided into six review areas (A–F), and every area is divided into subareas (e.g. A-1 to A-7). Each subarea guidance comprises a list of IAEA reference publications including relevant paragraphs, citation of main IAEA expectations from IAEA Safety Standards, link to the relevant part of SALTO Working Notes Outlines for NPPs containing evaluations (questions for the review) and examples of documents for the review.

A - Organization of ageing management and LTO activities (Section 4.1):

- A-1 - Related regulatory requirements, codes and standards for ageing management and LTO and regulatory review;
- A-2 - Principles and approach to ageing management and LTO;
- A-3 - Organizational arrangements for ageing management and LTO;
- A-4 - Periodic safety review;
- A-5 - Programme for LTO;
- A-6 - Configuration/modification management and design basis documentation;
- A-7 - Safety analysis report.

B - Scope setting, plant programmes and corrective action programme (Section 4.2):

- B-1 - Methodology and criteria for scope setting of SSCs for ageing management and LTO;
- B-2 - Maintenance programme;
- B-3 - In-service inspection programme;
- B-4 - Surveillance programme;
- B-5 - Water chemistry programme;
- B-6 - Corrective action programme.

C - Ageing management of mechanical SSCs (Section 4.3):

- C-1 - AMR of mechanical SSCs;
- C-2 - AMPs of mechanical SSCs;
- C-3 - TLAAs of mechanical SSCs;
- C-4 - Verification of scope setting results for mechanical SSCs;
- C-5 - Data collection and record keeping for mechanical SSCs;
- C-6 - Documentation of ageing management and documentation in support of LTO for mechanical SSCs.

D - Ageing management of electrical and I&C SSCs (Section 4.4):

- D-1 - AMR of electrical and I&C SSCs;
- D-2 - AMPs of electrical and I&C SSCs;
- D-3 - Equipment qualification programme for all SSCs;
- D-4 - Technological obsolescence management for all SSCs;
- D-5 - Verification of scope setting results for electrical and I&C SSCs;

— D-6 - Data collection and record keeping for electrical and I&C SSCs;
— D-7 - Documentation of ageing management and documentation in support of LTO for electrical and I&C SSCs.

E - Ageing management of civil SSCs (Section 4.5):
— E-1 - AMR of civil SSCs;
— E-2 - AMPs of civil SSCs;
— E-3 - TLAAs of civil SSCs;
— E-4 - Verification of scope setting results for civil SSCs;
— E-5 - Data collection and record keeping for civil SSCs;
— E-6 - Documentation of ageing management and documentation in support of LTO for civil SSCs.

F - Human resources, competence and knowledge management for LTO (Section 4.6):
— F-1 - Human resources policy and strategy to support LTO;
— F-2 - Competence management for LTO and processes for recruitment, training and qualification of personnel involved in LTO activities;
— F-3 - Knowledge management and knowledge transfer for LTO.

4.1. AREA A – ORGANIZATION OF AGEING MANAGEMENT AND LTO ACTIVITIES

A-1 - Related regulatory requirements, codes and standards for ageing management and LTO and regulatory review

References

SSR-2/2 (Rev. 1): Req. 1, 3.3, Req. 16, 4.53; SSG-48: 1.10, 3.2, 3.6, 3.18, 7.2, 7.8, 7.39–7.40

Expectations

SSR-2/2 (Rev. 1) - Requirement 1: Responsibilities of the operating organization [1]

> **"The operating organization shall have the prime responsibility for safety in the operation of a nuclear power plant."**
>
> "3.3 The operating organization shall establish liaison with the regulatory body and with relevant authorities to ensure a common understanding of, and to ensure compliance with, safety requirements and their interface with other requirements, such as those for security, protection of health or protection of the environment."

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

> **"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."**
>
> "4.53. The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and

components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime."

SSG-48 [2]

"3.2. Regulatory requirements for ageing management should be established and guidance should be developed to ensure that the operating organization of the nuclear power plant implements effective ageing management at each stage of the lifetime of the nuclear power plant."

"3.6. Ageing management activities should be overseen by the regulatory body throughout the lifetime of the nuclear power plant."

"7.2. Requirements for long term operation should be specified within the national regulatory framework. They should cover, as appropriate, interfaces with the requirements for periodic safety review."

"7.39. To ensure the safe long term operation of a nuclear power plant, the operating organization should demonstrate, and the regulatory body should oversee, that the safety of the nuclear power plant will be maintained throughout the period of long term operation in accordance with current safety standards and national regulatory requirements."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Requirements on LTO and LTO relevant aspects of plant activities;
- Requirements on plant programmes related to LTO;
- Requirements on equipment qualification;
- Requirements on ageing management;
- Requirements on license renewal (if existing);
- Requirements on PSR (if existing and relevant);
- Requirements on final SAR updating, and on design basis;
- Requirements on quality assurance;
- Requirements on configuration management;
- Requirements on control of the LTO evaluation process;
- LTO programme documentation.

A-2 - Principles and approach to ageing management and LTO

References

GSR Part 2: Req. 9, 4.26; SSR-2/2 (Rev. 1): Req. 1, 3.2a, 3.2b, Req. 16, 4.53–4.54; GS-G-3.1: 3.10–3.12, 5.10; SSG-25: 3.7, 3.10; SSG-48: 3.31, 5.1, 7.5–7.15

Expectations

GSR Part 2 - Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

"4.26 All individuals in the organization shall be trained in the relevant requirements of the management system. Such training shall be conducted to ensure that individuals are knowledgeable of the relevance and the importance of their activities and of how their activities contribute to ensuring safety in the achievement of the organization's goals."

SSR-2/2 (Rev. 1) - Requirement 1: Responsibilities of the operating organization [1]

"The operating organization shall have the prime responsibility for safety in the operation of a nuclear power plant."

"3.2. The management system, as an integrated set of interrelated or interacting components for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner, shall include the following activities:

(a) Policy making for all areas of safety, which includes:

— Setting management objectives;
— Establishing the policy for safety;
— Developing management and staff who value learning, have skills in creating, acquiring and transferring knowledge, and can adapt the organization on the basis of new knowledge and insights;
— Promoting a strong safety culture.

Strategies and management objectives shall be developed in accordance with the policy in order to put the policy into effect.

(b) Allocation of responsibilities with corresponding lines of authority and communication, for:

— Allocating resources;
— Providing human resources with the appropriate level of education and training and material resources;
— Retaining the necessary competences;
— Approving the contents of management programmes;
— Developing procedures and instructions, and having a strict policy of adherence to these procedures and instructions;
— Setting policies on fitness for duty;
— Establishing a programme to make the necessary changes to any of these functions on the basis of the performance in achieving objectives."

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.53. The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Definition of plant policy for LTO including the period of intended plant operation;
- Methodology for the implementation of LTO (e.g. licence renewal, intensified PSR);
- Plant level documentation for LTO;
- Plant level AMP;
- Internal procedures for development, updating and implementation of ageing management and LTO programme;
- LTO programme documentation;
- SAR and other licensing documentation.

A-3 - Organizational arrangements for ageing management and LTO

References

GSR Part 2: Req. 6, 4.11, Req. 9, 4.21–4.24; SSR-2/2 (Rev. 1): Req. 3, 3.8–3.9, Req. 4, 3.10–3.11; GS-G-3.1: 2.28–2.31, 2.61–2.62, 3.5, 4.1–4.2; SSG-48: 3.5, 3.31, 5.1–5.8, 6.9, 7.3–7.4; NS-G-2.4: 3.2–3.3, 3.18, 7.1–7.6, 7.7–7.10

Expectations

GSR Part 2 - Requirement 6: Integration of the management system [7]

"The management system shall integrate its elements, including safety, health, environmental, security, quality, human-and-organizational-factor, societal and economic elements, so that safety is not compromised."

"4.11. The organizational structures, processes, responsibilities, accountabilities, levels of authority and interfaces within the organization and with external organizations shall be clearly specified in the management system."

GSR Part 2 - Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

"4.21. Senior management shall make arrangements to ensure that the organization has in-house, or maintains access to, the full range of competences and the resources necessary to conduct its activities and to discharge its responsibilities for ensuring safety at each stage in the lifetime of the facility or activity, and during an emergency response."

"4.22. Senior management shall determine which competences and resources the organization has to retain or has to develop internally, and which competences and resources may be obtained externally, for ensuring safety."

"4.23. Senior management shall ensure that competence requirements for individuals at all levels are specified and shall ensure that training is conducted, or other actions are taken, to achieve and to sustain the required levels of competence. An evaluation shall be conducted of the effectiveness of the training and of the actions taken."

"4.24. Competences to be sustained in-house by the organization shall include: competences for leadership at all management levels; competences for fostering and sustaining a strong safety culture; and expertise to understand technical, human and organizational aspects relating to the facility or the activity in order to ensure safety."

"4.25. Senior management shall ensure that individuals at all levels, including managers and workers:

(a) Are competent to perform their assigned tasks and to work safely and effectively;

(b) Understand the standards that they are expected to apply in completing their tasks."

SSR-2/2 (Rev. 1) – Requirement 3: Structure and functions of the operating organization [1]

"The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented."

"3.8. Functional responsibilities, lines of authority, and lines of internal and external communication for the safe operation of a plant in all operational states and in accident conditions shall be clearly specified in writing. Authority for the safe operation of the plant may be delegated to the plant management. In this case, the necessary resources and support shall be provided."

"3.9. Documentation of the plant's organizational structure and of the arrangements for discharging responsibilities shall be made available to the plant staff and, if required, to the regulatory body. The structure of the operating organization shall be specified so that all roles that are critical for safe operation are specified and described. Proposed organizational changes to the structure and associated arrangements, which might be of importance to safety, shall be analysed in advance by the operating organization. Where so required by the State's regulations, proposals for such organizational changes shall be submitted to the regulatory body for approval."

SSR-2/2 (Rev. 1) – Requirement 4: Staffing of the operating organization [1]

"The operating organization shall be staffed with competent managers and sufficient qualified personnel for the safe operation of the plant."

"3.10. The operating organization shall be responsible for ensuring that the necessary knowledge, skills, attitudes and safety expertise are sustained at the plant, and that long term objectives for human resources policy are developed and are met."

"3.11. The organization, qualifications and number of operating personnel shall be adequate for the safe and reliable operation of the plant in all operational states and in accident conditions. Succession planning shall be an established practice for the operating personnel. The recruitment and selection policy of the operating organization shall be directed at retaining competent personnel to cover all aspects of safe operation. A long term staffing plan aligned to the long term objectives of the operating organization shall be developed in anticipation of the future needs of the operating organization for personnel and skills."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Organizational flowcharts and job descriptions;
- Plant procedures describing organizational structure in the plant;
- Plant level documentation for LTO;
- Plant level AMP;
- Internal procedures for development, updating and implementation of ageing management and LTO programme;
- LTO programme documentation.

A-4 - Periodic safety review

References

SSR-2/2 (Rev. 1): Req. 12, 4.44–4.47, Req. 14, 4.50, Req. 16, 4.53; SSG-25: 2.3–2.4, 2.9, 3.2, 3.4–3.5, 3.7–3.8, 3.10, 4.5, 4.19, 4.22, 4.25–4.27, 5.4, 6.1, 6.6–6.9; SSG-48: 4.6–4.8, 7.15, 7.37–7.38

Expectations

SSR-2/2 (Rev. 1) - Requirement 12: Periodic safety review [1]

"Systematic safety assessments of the plant, in accordance with the regulatory requirements, shall be performed by the operating organization throughout the plant's operating lifetime, with due account taken of operating experience and significant new safety related information from all relevant sources."

"4.44. Safety reviews such as periodic safety reviews or safety assessments under alternative arrangements shall be carried out throughout the lifetime of the plant, at regular

intervals and as frequently as necessary (typically no less frequently than once in ten years). Safety reviews shall address, in an appropriate manner: the consequences of the cumulative effects of plant ageing and plant modification; equipment requalification; operating experience, including national and international operating experience; current national and international standards; technical developments; organizational and management issues; and site related aspects. Safety reviews shall be aimed at ensuring a high level of safety throughout the operating lifetime of the plant."

"4.45. The operating organization shall report to the regulatory body as required, in a timely manner, the confirmed findings of the safety review that have implications for safety."

"4.46. The scope of the safety review shall include all safety related aspects of an operating plant. To complement deterministic safety assessment, probabilistic safety assessment (PSA) can be used for input to the safety review to provide insight into the contributions to safety of different safety related aspects of the plant."

"4.47. On the basis of the results of the systematic safety assessment, the operating organization shall implement any necessary corrective actions and reasonably practicable modifications for compliance with applicable standards with the aim of enhancing the safety of the plant by further reducing the likelihood and the potential consequences of accidents."

SSR-2/2 (Rev. 1) - Requirement 14: Ageing management [1]

"The operating organization shall ensure that an effective ageing management programme is implemented to ensure that required safety functions of systems, structures and components are fulfilled over the entire operating lifetime of the plant."

"4.50. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programme for periodic safety review. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.53. The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— PSR basis document including organizational arrangements, roles and responsibilities, human and financial resources, time schedule, regulatory authority involvement;
— Criteria and methodologies for evaluation of safety factors;
— Reports of safety factors evaluation results;
— Methodology for global assessment;
— Report of global assessment results;
— Integrated action plan.

A-5 - Programme for LTO

References

SSR-2/2 (Rev. 1): Req. 16, 4.54; SSG-48: 2.31, 3.31–3.32, 7.7–7.9, 7.16–7.19, 7.29, 7.41

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— LTO programme documentation including:
  - Planning of milestones for main activities such as development of methodologies, scope setting, AMR, review and update of AMPs and other plant programmes, identification and revalidation of TLAAs, developments of commitment plan, development of licence application and LTO justification documentation;
  - Planning of human and financial resources;

- Guidance for output documentation content and format;
- Plan of SAR update content;

— Programmes for modifications, reconstructions and replacements;
— List or database of corrective measures with supporting information originating from existing AMPs and plant programmes, including equipment qualification programme;
— Corrective measures defined as result of PSR or other safety reassessment.

A-6 - Configuration/modification management and design basis documentation

References

SSR-2/1 (Rev. 1): Req. 14, 5.3; SSR-2/2 (Rev. 1): Req. 10, 4.38, Req. 11, 4.39–4.43; SSG-48: 4.1–4.2, 4.13–4.15

Expectations

SSR-2/1 (Rev. 1) – Requirement 14: Design basis for items important to safety [8]

"The design basis for items important to safety shall specify the necessary capability, reliability and functionality for the relevant operational states, for accident conditions and for conditions arising from internal and external hazards, to meet the specific acceptance criteria over the lifetime of the nuclear power plant."

"5.3. The design basis for each item important to safety shall be systematically justified and documented. The documentation shall provide the necessary information for the operating organization to operate the plant safely."

SSR-2/2 (Rev. 1) – Requirement 10: Control of plant configuration [1]

"The operating organization shall establish and implement a system for plant configuration management to ensure consistency between design requirements, physical configuration and plant documentation."

"4.38. Controls on plant configuration shall ensure that changes to the plant and its safety related systems are properly identified, screened, designed, evaluated, implemented and recorded. Proper controls shall be implemented to handle changes in plant configuration that result: from maintenance work, testing, repair, operational limits and conditions, and plant refurbishment; and from modifications due to ageing of components, obsolescence of technology, operating experience, technical developments and results of safety research."

SSR-2/2 (Rev. 1) – Requirement 11: Management of modifications [1]

"The operating organization shall establish and implement a programme to manage modifications."

"4.39. A modification programme shall be established and implemented to ensure that all modifications are properly identified, specified, screened, designed, evaluated, authorized, implemented and recorded. Modification programmes shall cover: structures, systems and components; operational limits and conditions; procedures; documents; and the structure of the operating organization. Modifications shall be characterized on the basis of their safety significance. Modifications shall be subject to the approval of the regulatory body, in accordance with their safety significance, and in line with national arrangements."

"4.40. Modification control, in compliance with the requirements set out in SSR-2/1 [2], shall ensure the proper design, safety assessment and review, control, implementation and testing of all permanent and temporary modifications. Consequences of the modification for human tasks and performance shall be systematically analysed. For all plant modifications, human and organizational factors shall be adequately considered."

"4.41. Temporary modifications shall be limited in time and number to minimize the cumulative safety significance. Temporary modifications shall be clearly identified at their location and at any relevant control position. The operating organization shall establish a formal system for informing relevant personnel in good time of temporary modifications and of their consequences for the operation and safety of the plant."

"4.42. The plant management shall establish a system for modification control to ensure that plans, documents and computer programs are revised in accordance with modifications."

"4.43. Before commissioning a modified plant or putting the plant back into operation after modifications, personnel shall be trained, as appropriate, and all relevant documents necessary for plant operation shall be updated."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-6 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Database or records on permanent modifications;
- Database or records on set points;
- Modification control procedure;
- Quality assurance manual section on document control modification requirements;
- Configuration management manual or procedures and configuration management performance indicators;
- Modification control procedure;
- Methodology for design basis collecting, maintaining and reconstitution;
- Design basis documentation;
- Databases or documentation containing design basis information.

A-7 - Safety analysis report

References

SSR-2/2 (Rev. 1): 3.2e; GS-G-4.1: 4.1, 4.3–4.4; SSG-25: 3.9; SSG-48: 3.11, 4.1–4.5

Expectations

SSR-2/2 (Rev. 1) - Requirement 1: Responsibilities of the operating organization [1]

"The operating organization shall have the prime responsibility for safety in the operation of a nuclear power plant."

"3.2. The management system, as an integrated set of interrelated or interacting components

for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner, shall include the following activities:

e) Review activities, which include monitoring and assessing the performance of the operating functions and supporting functions on a regular basis. The purpose of monitoring is: to verify compliance with the objectives for safe operation of the plant; to reveal deviations, deficiencies and equipment failures; and to provide information for the purpose of taking timely corrective actions and making improvements. Reviewing functions shall also include review of the overall safety performance of the organization to assess the effectiveness of management for safety and to identify opportunities for improvement. In addition, a safety review of the plant shall be performed periodically, including design aspects, to ensure that the plant is operated in conformance with the approved design and safety analysis report, and to identify possible safety improvements."

SSG-48 [2]

"3.11. Ageing management should be addressed in the safety analysis report and other licensing documents. The description of ageing management in the safety analysis report should include general information on the following topics:

(a) The strategy for ageing management and prerequisites for its implementation;

(b) Identification of all SSCs that could be affected by ageing and are in the scope of the ageing management;

(c) Proposals for appropriate materials monitoring and sampling programmes in cases where it is found that ageing effects might occur that could affect the capability of SSCs to perform their intended functions throughout the lifetime of the plant;

(d) Ageing management for different types of in-scope SSCs (e.g. concrete structures, mechanical components and equipment, electrical equipment and cables, and instrumentation and control equipment and cables) and the means to monitor their degradation;

(e) Design inputs for equipment qualification (see paras 4.23–4.31) of the in-scope SSCs, including required equipment and equipment functions that need to be qualified for service conditions in normal operation and associated with postulated initiating events;

(f) General principles stating how the environment of an SSC is to be maintained within specified service conditions (e.g. by means of proper location of ventilation, insulation of hot SSCs, radiation shielding, damping of vibrations, avoiding submerged conditions, and proper selection of cable routes);

(g) Appropriate consideration of the analysis of feedback on operating experience with respect to ageing."

"4.5. The policy on ageing management and the justification for long term operation should be properly documented in the current licensing basis, in particular in documents such as the safety analysis report, reports of periodic safety reviews (if applicable) or other licensing basis documents."

Evaluations

SALTO Working Notes Outlines for NPPs, Section A-7 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- SAR sections with plant modifications;
- SAR sections with design basis information;
- SAR sections with ageing management and LTO justification information.

4.2. AREA B – SCOPE SETTING, PLANT PROGRAMMES AND CORRECTIVE ACTION PROGRAMME

B-1 - Methodology and criteria for scope setting of SSCs for ageing management and LTO

References

SSR-2/2 (Rev. 1): 4.54; SSG-48: 5.14–5.21, 7.20

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSG-48 [2]

"5.14. A systematic scope setting (also called 'scoping') process to identify SSCs subject to ageing management should be developed and implemented."

"7.20. Scope setting for long term operation should follow the approach set out in paras 5.14–5.21 and should account for differences in regulatory requirements, codes and standards."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Document for safety classification of SSCs (usually included in SAR);
- Plant policy document on the scope of LTO;
- Plant procedure providing method to identify the SSCs in scope of ageing management and LTO;
- Documentation on definition and identification of SSCs not important to safety within the scope of ageing management and LTO;
- Drawings which show boundaries of the scope (normally piping and instrumentation (P&I) diagrams with colour identifications);
- List or database of SSCs in and outside the scope of ageing management and LTO.

B-2 - Maintenance programme

References

SSR-2/2 (Rev. 1): Req. 16, 4.54, Req. 31, 8.1, 8.3–8.5, 8.15, 8.17; NS-G-2.6: 5.33–5.37, 7.6–7.8, 7.9, 8.1–8.4; SSG-48: 3.21, 3.25, 3.33, 3.35, 4.16–4.22, 7.26–7.27

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSR-2/2 (Rev. 1) - Requirement 31: Maintenance, testing, surveillance and inspection programmes [1]

"The operating organization shall ensure that effective programmes for maintenance, testing, surveillance and inspection are established and implemented."

"8.1. Maintenance, testing, surveillance and inspection programmes shall be established that include predictive, preventive and corrective maintenance activities. These maintenance activities shall be conducted to maintain availability during the service life of structures, systems and components by controlling degradation and preventing failures. In the event that failures do occur, maintenance activities shall be conducted to restore the

capability of failed structures, systems and components to function within acceptance criteria."

"8.3. The operating organization shall develop procedures for all maintenance, testing, surveillance and inspection tasks. These procedures shall be prepared, reviewed, modified when required, validated, approved and distributed in accordance with procedures established under the management system."

"8.4. Data on maintenance, testing, surveillance and inspection shall be recorded, stored and analysed for the purpose of confirming that the operating performance is in accordance with the design intent and with requirements for the reliability and availability of equipment."

"8.5. The frequency of maintenance, testing, surveillance and inspection of individual structures, systems and components shall be determined on the basis of:

(a) The importance to safety of the structures, systems and components, with insights from probabilistic safety assessment taken into account;

(b) Their reliability in, and availability for, operation;

(c) Their assessed potential for degradation in operation and their ageing characteristics;

(d) Operating experience;

(e) Recommendations of vendors."

"8.15. The operating organization shall establish suitable arrangements to procure, receive, control, store and issue materials (including supplies), spare parts and components."

"8.17. The operating organization shall ensure that storage conditions are adequate and that materials (including supplies), spare parts and components are available and are in proper condition for use."

SSG-48 [2]

"3.21. The operating organization should ensure that programmes and documentation relevant to the management of ageing (see Sections 4 and 5) and technological obsolescence (see Section 6) are implemented during the operation stage. Where necessary, new programmes and documentation should be developed or existing programmes and documentation should be reviewed and modified to ensure that they will be effective for managing ageing."

"7.26. On the basis of the results of the ageing management review for long term operation, the existing plant programmes used for ageing management and existing ageing management programmes should be reviewed to ensure that they will remain effective in managing the effects identified for the planned period of long term operation. This review should identify programme modifications and/or new programmes necessary to ensure that the structures or components will be able to perform their intended functions for the planned period of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Procedures and reports on maintenance;
- Procedures and reports on reliability-centred maintenance, including Failure Mode and Effects Analysis and Criticality Safety Analysis;
- Report on PSR (if it exists);
- Documents on assessment of effectiveness of the maintenance programmes and evaluation against the nine attributes.

B-3 - In-service inspection programme

References

SSR-2/2 (Rev. 1): Req. 16, 4.54, Req. 31, 8.1, 8.3–8.5; NS-G-2.6: 5.33–5.37, 7.6–7.8, 7.9, 10.2–10.3, 10.4; SSG-48: 3.21, 3.24, 3.33, 3.35, 4.16–4.18, 4.32–4.36, 7.26–7.27

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSR-2/2 (Rev. 1) - Requirement 31: Maintenance, testing, surveillance and inspection programmes [1]

"The operating organization shall ensure that effective programmes for maintenance, testing, surveillance and inspection are established and implemented."

"8.1. Maintenance, testing, surveillance and inspection programmes shall be established that include predictive, preventive and corrective maintenance activities. These maintenance activities shall be conducted to maintain availability during the service life of structures, systems and components by controlling degradation and preventing failures. In the event that failures do occur, maintenance activities shall be conducted to restore the capability of failed structures, systems and components to function within acceptance criteria."

"8.3. The operating organization shall develop procedures for all maintenance, testing,

surveillance and inspection tasks. These procedures shall be prepared, reviewed, modified when required, validated, approved and distributed in accordance with procedures established under the management system."

"8.4. Data on maintenance, testing, surveillance and inspection shall be recorded, stored and analysed for the purpose of confirming that the operating performance is in accordance with the design intent and with requirements for the reliability and availability of equipment."

"8.5. The frequency of maintenance, testing, surveillance and inspection of individual structures, systems and components shall be determined on the basis of:

(a) The importance to safety of the structures, systems and components, with insights from probabilistic safety assessment taken into account;

(b) Their reliability in, and availability for, operation;

(c) Their assessed potential for degradation in operation and their ageing characteristics;

(d) Operating experience;

(e) Recommendations of vendors."

SSG-48 [2]

"3.21. The operating organization should ensure that programmes and documentation relevant to the management of ageing (see Sections 4 and 5) and technological obsolescence (see Section 6) are implemented during the operation stage. Where necessary, new programmes and documentation should be developed or existing programmes and documentation should be reviewed and modified to ensure that they will be effective for managing ageing."

"7.26. On the basis of the results of the ageing management review for long term operation, the existing plant programmes used for ageing management and existing ageing management programmes should be reviewed to ensure that they will remain effective in managing the effects identified for the planned period of long term operation. This review should identify programme modifications and/or new programmes necessary to ensure that the structures or components will be able to perform their intended functions for the planned period of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- In-service inspection (ISI) programme;
- AMPs connected to ISI;
- Report on PSR (if it exists).

B-4 - Surveillance programme

References

SSR-2/2 (Rev. 1): Req. 16, 4.54, Req. 31, 8.1, 8.3–8.5; NS-G-2.6: 5.33–5.37, 7.6–7.8, 7.9, 9.1–9.2, 9.19; SSG-48: 3.21, 3.33, 3.35, 4.16–4.18, 4.37–4.44, 7.26–7.27

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSR-2/2 (Rev. 1) - Requirement 31: Maintenance, testing, surveillance and inspection programmes [1]

"The operating organization shall ensure that effective programmes for maintenance, testing, surveillance and inspection are established and implemented."

"8.1. Maintenance, testing, surveillance and inspection programmes shall be established that include predictive, preventive and corrective maintenance activities. These maintenance activities shall be conducted to maintain availability during the service life of structures, systems and components by controlling degradation and preventing failures. In the event that failures do occur, maintenance activities shall be conducted to restore the capability of failed structures, systems and components to function within acceptance criteria."

"8.3. The operating organization shall develop procedures for all maintenance, testing, surveillance and inspection tasks. These procedures shall be prepared, reviewed, modified when required, validated, approved and distributed in accordance with procedures established under the management system."

"8.4. Data on maintenance, testing, surveillance and inspection shall be recorded, stored and analysed for the purpose of confirming that the operating performance is in accordance with the design intent and with requirements for the reliability and availability of equipment."

"8.5. The frequency of maintenance, testing, surveillance and inspection of individual structures, systems and components shall be determined on the basis of:

(a) The importance to safety of the structures, systems and components, with insights from probabilistic safety assessment taken into account;

(b) Their reliability in, and availability for, operation;

(c) Their assessed potential for degradation in operation and their ageing characteristics;

(d) Operating experience;

(e) Recommendations of vendors."

SSG-48 [2]

"3.21. The operating organization should ensure that programmes and documentation relevant to the management of ageing (see Sections 4 and 5) and technological obsolescence (see Section 6) are implemented during the operation stage. Where necessary, new programmes and documentation should be developed or existing programmes and documentation should be reviewed and modified to ensure that they will be effective for managing ageing."

"7.26. On the basis of the results of the ageing management review for long term operation, the existing plant programmes used for ageing management and existing ageing management programmes should be reviewed to ensure that they will remain effective in managing the effects identified for the planned period of long term operation. This review should identify programme modifications and/or new programmes necessary to ensure that the structures or components will be able to perform their intended functions for the planned period of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— Surveillance and monitoring programmes;
— AMPs connected to surveillance and monitoring;
— Report on PSR (if it exists).

B-5 - Water chemistry programme

References

SSR-2/2 (Rev. 1): Req. 16, 4.54, Req. 29, 7.13–7.17; SSG-13: 2.6, 2.9, 2.11, 2.21–2.23, 3.4, 4.4; SSG-48: 3.21–3.22, 3.33, 3.35, 4.16–4.18, 4.45–4.48, 7.26–7.27

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSR-2/2 (Rev. 1) - Requirement 29: Chemistry programme [1]

"The operating organization shall establish and implement a chemistry programme to provide the necessary support for chemistry and radiochemistry."

"7.13. The chemistry programme shall be developed prior to normal operation and shall be in place during the commissioning programme. The chemistry programme shall provide the necessary information and assistance for chemistry and radiochemistry for ensuring safe operation, long term integrity of structures, systems and components, and minimization of radiation levels."

"7.14. Chemistry surveillance shall be conducted at the plant to verify the effectiveness of chemistry control in plant systems and to verify that structures, systems and components important to safety are operated within the specified chemical limit values."

"7.15. The chemistry programme shall include chemistry monitoring and data acquisition systems. These systems, together with laboratory analyses, shall provide accurate measuring and recording of chemistry data and shall provide alarms for relevant chemistry parameters. Records shall be kept available and shall be easily retrievable."

"7.16. Laboratory monitoring shall involve the sampling and analysis of plant systems for specific chemical parameters, concentrations of dissolved and suspended impurities, and radionuclide concentrations."

"7.17. The use of chemicals in the plant, including chemicals brought in by contractors, shall be kept under close control. The appropriate control measures shall be put in place to ensure that the use of chemical substances and reagents does not adversely affect equipment or lead to its degradation."

SSG-48 [2]

"3.21. The operating organization should ensure that programmes and documentation relevant to the management of ageing (see Sections 4 and 5) and technological obsolescence (see Section 6) are implemented during the operation stage. Where necessary, new programmes and documentation should be developed or existing programmes and documentation should be reviewed and modified to ensure that they will be effective for managing ageing."

"7.26. On the basis of the results of the ageing management review for long term operation, the existing plant programmes used for ageing management and existing ageing management programmes should be reviewed to ensure that they will remain effective in

managing the effects identified for the planned period of long term operation. This review should identify programme modifications and/or new programmes necessary to ensure that the structures or components will be able to perform their intended functions for the planned period of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— The water chemistry programme at the plant;
— AMPs connected to water chemistry;
— Report on PSR (if it exists).

B-6 - Corrective action programme

References

GSR Part 2: Req. 13, 6.1–6.8, 4.20; SSR-2/2 (Rev. 1): Req. 1, 3.2e, 3.2f, Req. 9, 4.37; SSG-48: 4.49–4.53

Expectations

GSR Part 2 - Requirement 13: Measurement, assessment and improvement of the management system [7]

"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety."

"6.2. All processes shall be regularly evaluated for their effectiveness and for their ability to ensure safety."

"6.3. The causes of non-conformances of processes and the causes of safety related events that could give rise to radiation risks shall be evaluated and any consequences shall be managed and shall be mitigated. The corrective actions necessary for eliminating the causes of non-conformances, and for preventing the occurrence of, or mitigating the consequences of, similar safety related events, shall be determined, and corrective actions shall be taken in a timely manner. The status and effectiveness of all corrective actions and preventive actions taken shall be monitored and shall be reported to the management at an appropriate level in the organization."

"6.7. The management system shall include evaluation and timely use of the following:

(a) Lessons from experience gained and from events that have occurred, both within the organization and outside the organization, and lessons from identifying the causes of events;

(b) Technical advances and results of research and development;

(c) Lessons from identifying good practices."

"6.8. Organizations shall make arrangements to learn from successes and from strengths for their organizational development and continuous improvement."

SSR-2/2 (Rev. 1) - Requirement 1: Responsibilities of the operating organization [1]

"The operating organization shall have the prime responsibility for safety in the operation of a nuclear power plant."

"3.2. The management system, as an integrated set of interrelated or interacting components for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner, shall include the following activities:

e) Review activities, which include monitoring and assessing the performance of the operating functions and supporting functions on a regular basis. The purpose of monitoring is: to verify compliance with the objectives for safe operation of the plant; to reveal deviations, deficiencies and equipment failures; and to provide information for the purpose of taking timely corrective actions and making improvements. Reviewing functions shall also include review of the overall safety performance of the organization to assess the effectiveness of management for safety and to identify opportunities for improvement. In addition, a safety review of the plant shall be performed periodically, including design aspects, to ensure that the plant is operated in conformance with the approved design and safety analysis report, and to identify possible safety improvements."

SSR-2/2 (Rev. 1) - Requirement 9: Monitoring and review of safety performance [1]

"The operating organization shall establish a system for continuous monitoring and periodic review of the safety of the plant and of the performance of the operating organization."

"4.37. The appropriate corrective actions shall be determined and implemented as a result of the monitoring and review of safety performance. Progress in taking the corrective actions shall be monitored to ensure that actions are completed within the appropriate timescales. The completed corrective actions shall be reviewed to assess whether they have adequately addressed the issues identified in audits and reviews."

SSG-48 [2]

"4.49. A corrective action programme should be put in place to ensure that conditions adverse to quality, such as ageing related degradation, are identified and that corrective actions commensurate with the significance of the issue are specified and implemented."

Evaluations

SALTO Working Notes Outlines for NPPs, Section B-6 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— Corrective action programme with focus on ageing related deficiencies;
— Examples of ageing related actions.

4.3. AREA C – AGEING MANAGEMENT OF MECHANICAL SSCs

C-1 - AMR of mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 14, 4.50–4.51, Req. 16, 4.53–4.54; SSG-48: 3.3–3.4, 3.20, 3.26, 3.30, 3.32, 3.35, 3.40, 5.22–5.36, 7.21–7.24

Expectations

SSR-2/2 (Rev. 1) - Requirement 14: Ageing management [1]

"The operating organization shall ensure that an effective ageing management programme is implemented to ensure that required safety functions of systems, structures and components are fulfilled over the entire operating lifetime of the plant."

"4.50. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programme for periodic safety review. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

"4.51. Long term effects arising from operational and environmental conditions (i.e. temperature conditions, radiation conditions, corrosion effects or other degradations in the plant that may affect the long term reliability of plant equipment or structures) shall be evaluated and assessed as part of the ageing management programme. Account shall be taken in the programme of the safety relevance of structures, systems and components."

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.53. The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSG-48 [2]

"5.22. An ageing management review for in-scope SSCs should be performed to ensure and demonstrate that ageing will be effectively managed."

"7.21. The ageing management review for long term operation should follow the approach set out in paras 5.22–5.36, accounting for differences in regulatory requirements, codes and standards, knowledge and operating experience for the period of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- List or database of SSCs within the scope of ageing management and LTO;
- List of TLAAs;
- SAR;
- Design supporting documents;
- List of qualified equipment;
- SSCs test and inspection records;
- SSCs failure reports (including, where appropriate, root cause analysis);
- Operational history and records on load cycles;
- Statistical data of SSCs failures and failure rates;
- TLAA revalidation reports.

C-2 - AMPs of mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 14, 4.50–4.51; SSG-48: 3.33, 3.35, 3.37–3.39, 5.37–5.63, 7.26

Expectations

SSR-2/2 (Rev. 1) - Requirement 14: Ageing management [1]

"The operating organization shall ensure that an effective ageing management programme is implemented to ensure that required safety functions of systems, structures and components are fulfilled over the entire operating lifetime of the plant."

"4.50. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programme for periodic safety review. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

"4.51. Long term effects arising from operational and environmental conditions (i.e. temperature conditions, radiation conditions, corrosion effects or other degradations in the plant that may affect the long term reliability of plant equipment or structures) shall be evaluated and assessed as part of the ageing management programme. Account shall be taken in the programme of the safety relevance of structures, systems and components."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- AMPs and procedures for their implementation;
- Other plant programmes for managing the effects of ageing degradation;
- Report on PSR (if it exists);
- Past corrective actions resulting in enhancement of AMPs.

C-3 - TLAAs of mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 16, 4.54; SSG-48: 3.34, 5.64–5.69, 7.14, 7.18, 7.28

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSG-48 [2]

"3.34. For in-scope structures or components, the operating organization should identify all time limited ageing analyses and should demonstrate either that all these analyses will remain valid for the planned period of long term operation, or that the structures or

components will be replaced, or that further operation, maintenance or ageing management actions will be implemented."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Methodology for identification of TLAAs;
- List of TLAAs;
- Equipment qualification documentation;
- Design supporting documents (such as pressurized thermal shock analyses, fatigue calculations);
- TLAA revalidation reports;
- Report on PSR.

C-4 - Verification of scope setting results for mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 16, 4.54; SSG-48: 5.16–5.21

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSG-48 [2]

"5.16. The following SSCs should be included in the scope of ageing management:

(a) SSCs important to safety that are necessary to fulfil the fundamental safety functions:

— Control of reactivity;
— Removal of heat from the reactor and from the fuel store;
— Confinement of radioactive material, shielding against radiation and control of planned radioactive releases, and limitation of accidental radioactive releases.

(b) Other SSCs whose failure may prevent SSCs important to safety from fulfilling their intended functions. Examples of such potential failures are:

— Missile impact from rotating machines;
— Failures of lifting equipment;
— Flooding;
— High energy line break;
— Leakage of liquids (e.g. from piping or other pressure boundary components).

(c) Other SSCs that are credited in the safety analyses (deterministic and probabilistic) as performing the function of coping with certain types of event, consistent with national regulatory requirements, such as:

— SSCs needed to cope with internal events (e.g. internal fire and internal flooding);
— SSCs needed to cope with external hazards (e.g. extreme weather conditions, earthquakes, tsunamis, external flooding, tornados and external fire);
— SSCs needed to cope with specific regulated events (e.g. pressurized thermal shock, anticipated transient without scram and station blackout);
— SSCs needed to cope with design extension conditions or to mitigate the consequences of severe accidents."

"7.20. Scope setting for long term operation should follow the approach set out in paras 5.14–5.21 and should account for differences in regulatory requirements, codes and standards."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— Plant procedures on methodology of SSCs' scope setting;
— Plant procedure to identify SSCs not important to safety within the scope;
— List of SSCs' classification;
— List or database of SSCs within the scope of ageing management and LTO;
— Drawings which show boundaries of the scope (normally P&I diagrams with colour identifications).

C-5 - Data collection and record keeping for mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 15, 4.52; SSG-48: 3.13–3.15, 3.16–3.19, 3.23, 5.9–5.13

Expectations

SSR-2/2 (Rev. 1) - Requirement 15: Records and reports [1]

> **"The operating organization shall establish and maintain a system for the control of records and reports."**
>
> "4.52. The operating organization shall identify the types of record and report, as specified by the regulatory body, that are relevant for the safe operation of the plant. Records of operation, including maintenance and surveillance, shall be kept available from initial testing during the startup of each plant system important to safety, including relevant off-site tests. The records of operation shall be retained in proper archives for the periods required by the regulatory body. All records shall be kept readable, complete, identifiable and easily retrievable. Retention times for records and reports shall be commensurate with their level of importance for the purposes of operation and plant licensing and for future decommissioning."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Design basis documentation;
- Design supporting documents (such as pressurized thermal shock analyses, fatigue calculations);
- Technical specifications;
- Equipment qualification documentation;
- List or database of SSCs within the scope of ageing management and LTO;
- List of qualified equipment;
- Operational history and records on load cycles;
- SSCs failure reports (including, where appropriate, root cause analysis);
- Statistical data of SSCs failures and failure rates;
- SSCs test and inspection records.

C-6 - Documentation of ageing management and documentation in support of LTO for mechanical SSCs

References

SSR-2/2 (Rev. 1): Req. 16, 4.53; SSG-48: 5.70–5.74, 7.29–7.38

Expectations

SSR-2/2 (Rev. 1) - Requirement 16: Programme for long term operation [1]

> **"Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the long term safe operation of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations."**

"4.53. The justification for long term operation shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime."

SSG-48 [2]

"5.70. The assumptions, activities, evaluations, assessments and results of the evaluation of the plant programme for ageing management should be documented in accordance with national regulatory requirements as well as in accordance with IAEA safety standards. The documentation should be developed and retained in an auditable and retrievable form."

"7.29. The assumptions, activities, evaluations, assessments and results of the plant programme for long term operation should be documented by the operating organization in accordance with national regulatory requirements as well as in accordance with the IAEA safety standards. The documentation should be developed and retained in an auditable and retrievable form so that it provides a part of the technical basis for approval of long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section C-6 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Plant level AMP;
- SAR and other licensing documentation;
- Documentation of plant programmes for ageing management:
- Documentation of programme for LTO;
- Documentation of scope setting methodology and results;
- Documentation of AMR methodology and results;
- Documentation of AMPs;
- Documentation of ageing management implementation;
- Documentation of identification and revalidation of TLAAs for LTO;
- List or database of SSCs within the scope of ageing management and LTO;
- List of qualified equipment.

4.4. AREA D – AGEING MANAGEMENT OF ELECTRICAL AND I&C SSCs

D-1 - AMR of electrical and I&C SSCs

Use C-1.

D-2 - AMPs of electrical and I&C SSCs

Use C-2.

D-3 - Equipment qualification programme for all SSCs

References

SSR-2/1 (Rev. 1): Req. 30, 5.48–5.50; SSR-2/2 (Rev. 1): Req. 13, 4.48–4.49, Req. 16, 4.54; SSG-48: 3.12, 3.16–3.17, 3.21, 3.33–3.35, 4.16–4.18, 4.23–4.31, 5.67–5.69, 7.26–7.27, 7.28; NS-G-2.13: 2.21, 3.1, 3.9, 3.11, 3.20

Expectations

SSR-2/1 (Rev. 1) – Requirement 30: Qualification of items important to safety [8]

"A qualification programme for items important to safety shall be implemented to verify that items important to safety at a nuclear power plant are capable of performing their intended functions when necessary, and in the prevailing environmental conditions, throughout their design life, with due account taken of plant conditions during maintenance and testing."

"5.48. The environmental conditions considered in the qualification programme for items important to safety at a nuclear power plant shall include the variations in ambient environmental conditions that are anticipated in the design basis for the plant."

"5.49. The qualification programme for items important to safety shall include the consideration of ageing effects caused by environmental factors (such as conditions of vibration, irradiation, humidity or temperature) over the expected service life of the items important to safety. When the items important to safety are subject to natural external events and are required to perform a safety function during or following such an event, the qualification programme shall replicate as far as is practicable the conditions imposed on the items important to safety by the natural external event, either by test or analysis, or by a combination of both."

"5.50. Any environmental conditions that could reasonably be anticipated and that could arise in specific operational states, such as in periodic testing of the containment leak rate, shall be included in the qualification programme."

SSR-2/2 (Rev. 1) – Requirement 13: Equipment qualification [1]

"The operating organization shall ensure that a systematic assessment is carried out to provide reliable confirmation that safety related items are capable of the required performance for all operational states and for accident conditions."

"4.48. Appropriate concepts and the scope and process of equipment qualification shall be established, and effective and practicable methods shall be used to upgrade and preserve equipment qualification. A programme to establish, to confirm and to maintain required equipment qualification shall be launched from the initial phases of design, supply and installation of the equipment. The effectiveness of equipment qualification programmes shall be periodically reviewed."

"4.49. The scope and details of the equipment qualification process, in terms of the required inspection area(s), method(s) of non-destructive testing, possible defects inspected for and required effectiveness of inspection, shall be documented and submitted to the regulatory body for review and approval. Relevant national and international experience shall be taken into account in accordance with national regulations."

SSR-2/2 (Rev. 1) – Requirement 16: Programme for long term operation [1]

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

Evaluations

SALTO Working Notes Outlines for NPPs, Section D-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Design supporting documents;
- Equipment master list for equipment qualification;
- Equipment qualification files for qualified equipment;
- Programme for monitoring the environmental conditions;
- Programme for monitoring and maintaining the equipment conditions;
- Requalification programme;
- Scheduled equipment replacement programme;
- Report on PSR;
- SAR.

D-4 - Technological obsolescence management for all SSCs

References

SSR-2/2 (Rev. 1): Req. 10, 4.38, Req. 16, 4.54; SSG-48: 3.20–3.21, 3.27–3.28, 3.33, 6.1–6.12

Expectations

SSR-2/2 (Rev. 1) – Requirement 10: Control of plant configuration [1]

"The operating organization shall establish and implement a system for plant configuration management to ensure consistency between design requirements, physical configuration and plant documentation."

"4.38. Controls on plant configuration shall ensure that changes to the plant and its safety related systems are properly identified, screened, designed, evaluated, implemented and recorded. Proper controls shall be implemented to handle changes in plant configuration

that result: from maintenance work, testing, repair, operational limits and conditions, and plant refurbishment; and from modifications due to ageing of components, obsolescence of technology, operating experience, technical developments and results of safety research."

SSR-2/2 (Rev. 1) – Requirement 16: Programme for long term operation [1]

"4.54. The comprehensive programme for long term operation shall address:

(a) Preconditions (including the current licensing basis, safety upgrading and verification, and operational programmes);

(b) Setting the scope for all structures, systems and components important to safety;

(c) Categorization of structures, systems and components with regard to degradation and ageing processes;

(d) Revalidation of safety analyses made on the basis of time limited assumptions;

(e) Review of ageing management programmes in accordance with national regulations;

(f) The implementation programme for long term operation."

SSG-48 [2]

"3.20. A systematic approach should be applied to managing the ageing and obsolescence of SSCs to ensure that required intended functions are maintained at all times during the operation stage of the nuclear power plant."

"3.27. The availability of spare parts or replacement parts and the shelf life of spare parts or consumables should be continuously monitored and controlled (see paras 6.6 and 6.7)."

"3.28. Where spare parts or consumables could be vulnerable to degradation mechanisms owing to their storage environment (e.g. high or low temperatures, moisture, chemical attack and dust accumulation), measures should be taken to ensure that they are stored in an appropriately controlled environment."

"6.1. Technological obsolescence of the SSCs in the plant should be managed through a dedicated plant programme with foresight and anticipation and should be resolved before any associated decrease in reliability and availability occur."

Evaluations

SALTO Working Notes Outlines for NPPs, Section D-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Procedures for the management of technological obsolescence;
- Documentation to support SSC obsolescence and replacement;
- List of spare parts;
- Maintenance records;
- Long term investment programme for classified equipment and systems.

D-5 - Verification of scope setting results for electrical and I&C SSCs

Use C-4.

D-6 - Data collection and record keeping for electrical and I&C SSCs

Use C-5.

D-7 - Documentation of ageing management and documentation in support of LTO for electrical and I&C SSCs

Use C-6.

4.5. AREA E – AGEING MANAGEMENT OF CIVIL SSCs

E-1 - AMR of civil SSCs

Use C-1.

E-2 - AMPs of civil SSCs

Use C-2.

E-3 - TLAAs of civil SSCs

Use C-3.

E-4 - Verification of scope setting results for civil SSCs

Use C-4.

E-5 - Data collection and record keeping for civil SSCs

Use C-5.

E-6 - Documentation of ageing management and documentation in support of LTO for civil SSCs

Use C-6.

4.6. AREA F – HUMAN RESOURCES, COMPETENCE AND KNOWLEDGE MANAGEMENT FOR LTO

F-1 - Human resources policy and strategy to support LTO

References

GSR Part 2: Req. 7, 4.15, Req. 8, 4.16, Req. 9, 4.21–4.27, Req. 10, 4.29; SSR-2/2 (Rev. 1): Req. 4, 3.10–3.11; GS-G-3.1: 2.23, 2.31, 2.36, 2.53–2.54, 3.2, 3.11–3.12, 4.1–4.5, 4.6–4.12,

4.29, 5.11, 5.21, 5.59–5.60, 6.3, 6.32; NS-G-2.4: 2.3, 2.7, 2.11, 3.1, 3.2(5), 3.2(9), 3.4, 3.7, 3.15, 4.5–4.10, 5.10, 6.1–6.2, 6.11–6.15, 6.29–6.30; NS-G-2.8: 2.2, 4.1, 4.11, 4.44

Expectations

GSR Part 2 – Requirement 7: Application of the graded approach to the management system [7]

"The management system shall be developed and applied using a graded approach."

GSR Part 2 – Requirement 8: Documentation of the management system [7]

"The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use."

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

GSR Part 2 – Requirement 10: Management of processes and activities [7]

"Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety."

SSR-2/2 (Rev. 1) - Requirement 4: Staffing of the operating organization [1]

"The operating organization shall be staffed with competent managers and sufficient qualified personnel for the safe operation of the plant."

Evaluations

SALTO Working Notes Outlines for NPPs, Section F-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Human resource management procedures, guidelines and flowcharts;
- Plant procedures describing recruiting, succession planning and retirement;
- Human resource planning and staffing databases;
- Organizational flowcharts and job descriptions;
- Plant procedures describing organizational structure in the plant;
- Task and job descriptions related to LTO;
- Human resource statistics from past and plans for future (e.g. recruitment and retirement numbers);
- Check and verify whether the plant managers have the appropriate resources to carry out their assigned LTO responsibilities and accountabilities.

F-2 - Competence management for LTO and processes for recruitment, training and qualification of personnel involved in LTO activities

References

GSR Part 2: Req. 9, 4.21, 4.23–4.24, Req. 10, 4.28, Req. 13, 6.1–6.5, 6.7; SSR-2/2 (Rev. 1): Req. 2, 3.4–3.7, Req. 3, 3.8–3.9, Req. 4, 3.10–3.11, Req. 5, 4.1–4.3, Req. 7, 4.21–4.22; GS-G-3.1: 3.4, 4.6–4.9, 4.18, 4.20–4.21, 6.8, 6.16; GS-G-3.5: 3.30, 4.12, 6.23; NS-G-2.4: 2.14–2.15, 3.7; NS-G-2.8: 2.2, 2.4, 2.8, 2.12–2.14, 2.18, 3.1–3.2, 3.31, 4.1, 4.4, 4.10, 4.13–4.14, 4.15b, 4.31, 4.45, 5.6, 5.9, 5.24, 5.35, 5.37, 6.5, Appendix I; SSG-50: 2.18–2.19, 2.71

Expectations

GSR Part 2 – Requirement 9: Provision of resources [7]

> **"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."**

GSR Part 2 – Requirement 10: Management of processes and activities [7]

> **"Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety."**

GSR Part 2 – Requirement 13: Measurement, assessment and improvement of the management system [7]

> **"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety."**

SSR-2/2 (Rev. 1) – Requirement 2: Management system [1]

> **"The operating organization shall establish, implement, assess and continually improve an integrated management system."**

SSR-2/2 (Rev. 1) – Requirement 3: Structure and functions of the operating organization [1]

> **"The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented."**

SSR-2/2 (Rev. 1) – Requirement 4: Staffing of the operating organization [1]

> **"The operating organization shall be staffed with competent managers and sufficient qualified personnel for the safe operation of the plant."**

SSR-2/2 (Rev. 1) – Requirement 5: Safety policy [1]

> **"The operating organization shall establish and implement operational policies that give safety the highest priority."**

SSR-2/2 (Rev. 1) – Requirement 7: Qualification and training of personnel [1]

"The operating organization shall ensure that all activities that may affect safety are performed by suitably qualified and competent persons."

Evaluations

SALTO Working Notes Outlines for NPPs, Section F-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Competence management procedures and guidelines and flowcharts;
- Training records and/or databases;
- Training programme descriptions;
- Resources related to training;
- On-the-job training programmes and records;
- Trainee assessment records.

F-3 - Knowledge management and knowledge transfer for LTO

References

GSR Part 2: Req. 4, 4.3, Req. 8, 4.16–4.17, 4.20, Req. 9, 4.21–4.27, Req. 13, 6.1–6.2; SSR-2/1 (Rev. 1): 2.17; SSR-2/2 (Rev. 1): Req. 3, 3.8, Req. 7, 4.21, Req. 24, 5.28–5.32, 8.4; GS-G-3.1: 2.4–2.5, 2.28–2.31, 3.1, 3.11, 3.16, 4.1–4.2, 4.4, 4.6–4.7, 4.20, 5.6, 5.14; NS-G-2.3: 11.6; NS-G-2.4: 3.2–3.3, 3.18; NS-G-2.6: 2.16, 3.6, 3.10–3.11, 3.12, 6.1, 9.45, 10.45; NS-G-2.8: 4.48, 5.35–5.37; SSG-25: 5.7, 5.103–5.110, 8.13, 9.5; SSG-48: 2.7, 2.21, 2.26, 2.29, 2.31, 3.3–3.5, 3.10, 3.13–3.14, 3.16–3.18, 3.20, 3.30, 4.1–4.2, 4.8, 4.9–4.10, 4.13–4.14, 5.8, 6.1–6.3, 7.16, 7.18

Expectations

GSR Part 2 – Requirement 4: Goals, strategies, plans and objectives [7]

"Senior management shall establish goals, strategies, plans and objectives for the organization that are consistent with the organization's safety policy."

GSR Part 2 – Requirement 8: Documentation of the management system [7]

"The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use."

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

GSR Part 2 – Requirement 13: Measurement, assessment and improvement of the management system [7]

> **"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety."**

SSR-2/2 (Rev. 1) – Requirement 3: Structure and functions of the operating organization [1]

> **"The structure of the operating organization and the functions, roles and responsibilities of its personnel shall be established and documented."**

SSR-2/2 (Rev. 1) – Requirement 7: Qualification and training of personnel [1]

> **"The operating organization shall ensure that all activities that may affect safety are performed by suitably qualified and competent persons."**

SSR-2/2 (Rev. 1) – Requirement 24: Feedback of operating experience [1]

> **"The operating organization shall establish an operating experience programme to learn from events at the plant and events in the nuclear industry and other industries worldwide."**

Evaluations

SALTO Working Notes Outlines for NPPs, Section F-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Knowledge management policy and strategy;
- Descriptions of knowledge management process, procedures, guidelines and flowcharts;
- Description of the process for collecting and distributing operational experience;
- Documents related to knowledge-loss risk assessment;
- Report on PSR assessment on use of experience from other plants and research findings (if existing);
- Work processes, methodologies and procedures for life extension decision;
- Descriptions of information technology and information systems processes;
- Description of the process for managing records, reports and date related to maintenance, surveillance and inspections.

5. PRACTICAL GUIDANCE FOR CONDUCTING PEER REVIEW FOR RESEARCH REACTORS

This section provides detailed guidance to the review team for a SALTO peer review of research reactors, focusing on areas relevant to ageing management and continued operation. The scope of the review is divided into six review areas (A–F), and every area is divided into subareas (e.g. A-1 to A-7). Each subarea guidance comprises a list of IAEA reference publications including relevant paragraphs, citation of main IAEA expectations from IAEA Safety Standards, link to the relevant part of SALTO Working Notes Outlines for research reactors containing evaluations (questions for the review) and examples of documents for the review.

A - Organization of ageing management activities (Section 5.1):

- A-1 - Related regulatory requirements, codes and standards for ageing management and regulatory review;
- A-2 - Principles and approach to ageing management;
- A-3 - Organizational arrangements for ageing management;
- A-4 - Periodic safety review;
- A-5 - Programme for ageing management;
- A-6 - Configuration/modification management and design basis documentation;
- A-7 - Safety analysis report.

B - Scope setting, facility programmes and corrective action programme (Section 5.2):

- B-1 - Methodology and criteria for scope setting of SSCs for ageing management;
- B-2 - Maintenance programme;
- B-3 - In-service inspection programme;
- B-4 - Surveillance programme;
- B-5 - Equipment qualification programme;
- B-6 - Water chemistry programme;
- B-7 - Corrective action programme;

C - Ageing management of mechanical SSCs (Section 5.3):

- C-1 - AMR of mechanical SSCs;
- C-2 - AMPs of mechanical SSCs;
- C-3 - TLAAs of mechanical SSCs;
- C-4 - Verification of scope setting results for mechanical SSCs;
- C-5 - Data collection and record keeping for mechanical SSCs;
- C-6 - Documentation of ageing management for mechanical SSCs.

D - Ageing management of electrical and I&C SSCs (Section 5.4):

- D-1 - AMR of electrical and I&C SSCs;
- D-2 - AMPs of electrical and I&C SSCs;
- D-3 - TLAAs of electrical and I&C SSCs;
- D-4 - Technological obsolescence management for all SSCs;
- D-5 - Verification of scope setting results for electrical and I&C SSCs;
- D-6 - Data collection and record keeping for electrical and I&C SSCs;

— D-7 - Documentation of ageing management for electrical and I&C SSCs.

E - Ageing management of civil SSCs (Section 5.5):
— E-1 - AMR of civil SSCs;
— E-2 - AMPs of civil SSCs;
— E-3 - TLAAs of civil SSCs;
— E-4 - Verification of scope setting results for civil SSCs;
— E-5 - Data collection and record keeping for civil SSCs;
— E-6 - Documentation of ageing management for civil SSCs.

F - Human resources, competence and knowledge management for ageing management (Section 5.6):
— F-1 - Human resources policy and strategy to support ageing management;
— F-2 - Competence management for ageing management and processes for recruitment, training and qualification of personnel involved in ageing management activities;
— F-3 - Knowledge management and knowledge transfer for ageing management.

5.1. AREA A – ORGANIZATION OF AGEING MANAGEMENT ACTIVITIES

A-1 - Related regulatory requirements, codes and standards for ageing management and regulatory review

References

SSR-3: Req. 2, 4.3, Req. 86, 7.120; SSG-10: 2.8b, 4.1–4.2, 4.4, 7.13

Expectations

SSR-3 – Requirement 2: Responsibilities in the management for safety [3]

"4.3. The operating organization shall submit to the regulatory body in a timely manner any information that it has requested. The operating organization shall be responsible for making arrangements with vendors and suppliers to ensure the availability of any information that has been requested by the regulatory body. The operating organization shall also be responsible for informing the regulatory body of any additional new information on the research reactor and of any changes to information submitted previously. All information provided by the operating organization to the regulatory body shall be complete and accurate."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

"7.120. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programmes for in-service

inspections, periodic safety review and maintenance. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Requirements on ageing management and relevant aspects of facility activities;
- Requirements related to facility programmes on ageing management;
- Requirements on equipment qualification;
- Requirements on license renewal (if existing);
- Requirements on PSR (if existing);
- Requirements on SAR updating, and on design basis;
- Requirements on management system including quality assurance;
- Requirements on configuration management;
- Requirements on control of the ageing management evaluation process;
- AMP documentation.

A-2 - Principles and approach to ageing management

References

GSR Part 2: Req. 9, 4.26; SSR-3: Req. 67, 7.4, 7.7 (part), 7.9a, 7.9b, 7.9f, 7.9h, 7.9i, 7.9j, 7.9l, 7.9m, 7.9n, Req. 86, 7.120; GS-G-3.1: 3.10–3.12, 5.10; SSG-10: 2.5–2.8, 4.15, 7.12

Expectations

GSR Part 2 – Requirement 9: Provision of resources [7]

"4.26 All individuals in the organization shall be trained in the relevant requirements of the management system. Such training shall be conducted to ensure that individuals are knowledgeable of the relevance and the importance of their activities and of how their activities contribute to ensuring safety in the achievement of the organization's goals."

SSR-3 – Requirement 67: Responsibilities of the operating organization [3]

"The operating organization for a research reactor facility shall have the prime responsibility for safety in the operation of the facility."

"7.4. The operating organization shall establish, in accordance with the management system, the functions and responsibilities for the key positions in the organization for reactor operation."

"7.7. The operating organization shall prepare and issue specifications and procedures in

accordance with the classification of structures, systems and components and the management system."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

"7.120. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programmes for in-service inspections, periodic safety review and maintenance. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Definition of facility policy for ageing management including the period of intended facility operation;
- Methodology for the implementation of AMP;
- Facility level AMP;
- Internal procedures for development, updating and implementation of the AMP;
- AMP programme documentation;
- SAR and other licensing documentation.

A-3 - Organizational arrangements for ageing management

References

GSR Part 2: Req. 6, 4.11, Req. 9, 4.21–4.25; SSR-3: Req. 68, 7.10–7.12; SSR-3: Req. 69, 7.15; GS-G-3.1: 2.61–2.62, 3.5, 4.1–4.2; SSG-10: 2.5–2.7, 2.11, 2.17–2.19

Expectations

GSR Part 2 – Requirement 6: Integration of the management system [7]

"4.11. The organizational structures, processes, responsibilities, accountabilities, levels of authority and interfaces within the organization and with external organizations shall be clearly specified in the management system."

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

SSR-3 – Requirement 68: Structure and functions of the operating organization [3]

"The structure of the operating organization for a research reactor facility and the functions, roles and responsibilities of its personnel shall be established and documented."

SSR-3 – Requirement 69: Operating personnel [3]

"The operating organization for a research reactor facility shall assign direct responsibility and authority for the safe operation of the reactor to the reactor manager. The reactor manager shall have overall responsibility for all aspects of operation, training, maintenance, periodic testing, inspection, utilization and modification of the reactor. Discharge of this responsibility shall be the primary duty of the reactor manager."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Organizational flowcharts and job descriptions;
- Facility procedures describing organizational structure in the facility;
- Facility level AMP;
- Internal procedures for development, updating and implementation of the AMP.

A-4 - Periodic safety review

References

SSR-3: Req. 5 (part), 4.24–4.26; Req. 86, 7.120; SSG-10: 7.4–7.6; SRS-99

Expectations

SSR-3 – Requirement 5: Safety assessment [3]

"The safety assessment shall be continued throughout all the stages of the reactor's lifetime (in periodic safety reviews) and shall be conducted in accordance with the potential magnitude and nature of the hazards associated with the particular facility or activity."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an

effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

"7.121. On the basis of the results of the periodic safety review, the operating organization shall take any necessary corrective actions and shall consider making justified modifications to enhance safety (see also para. 7.120 on the interaction between ageing management and periodic safety reviews)."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- PSR basis document including organizational arrangements, roles and responsibilities, human and financial resources, time schedule, regulatory authority involvement;
- Criteria and methodologies for evaluation of safety factors;
- Reports of safety factors evaluation results;
- Methodology for global assessment;
- Report of global assessment results;
- Integrated action plan;
- If PSR is not conducted, any other equivalent safety review report;
- Event reports.

A-5 – Ageing management programme

References

SSR-3: Req. 37, 6.112–6.114; SSG-10: 4.1, 4.4, 4.15, 5.2, 5.23, 5.26–5.27, 5.31, 6.2, 6.4, 7.1, 7.12–7.13; SSG-24: 2.5

Expectations

SSR-3 – Requirement 37: Design for ageing management [3]

"The design life of items important to safety at a research reactor facility shall be determined. Appropriate margins shall be provided in the design to take due account of relevant mechanisms of ageing, such as neutron embrittlement and wear-out, and of the potential for age related degradation, to ensure the capability of items important to safety to perform their necessary safety functions in operational states and accident conditions in case of demand throughout their design life. The life cycles of the technology utilized and the possible obsolescence of the technology shall be considered."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an

effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— AMP documentation including:
  - Scope setting, AMR, review and update of AMPs and other facility programmes, identification and revalidation of TLAAs, developments of commitment plan;
  - Planning of human and financial resources;
  - Guidance for output documentation content and format;
  - Plan of SAR update content;
— Programmes for modifications, refurbishment and modernization;
— List or database of corrective measures with supporting information originating from existing AMPs and facility programmes, including equipment qualification programme;
— Corrective measures defined as result of PSR or other safety reassessment.

A-6 - Configuration/modification management and design basis documentation

References

SSR-3: Req. 4, 4.16, Req. 17, 6.33–6.34, 6.112, Req. 82, 7.94, Req. 83, 7.98–7.101, 7.103–7.104, 7.106, 7.107; SSG-10: 4.5–4.8, 4.17, 4.20, 4.23, 7.4, 7.11; SSG-24: 4.22, 4.31, 5.15, 7.5

Expectations

SSR-3 – Requirement 4: Integrated management system [3]

"The operating organization for a research reactor facility shall establish, implement, assess and continuously improve an integrated management system."

"4.16. The management system shall include provisions for the implementation of processes to ensure that the design, including subsequent changes, modifications or safety improvements, construction, commissioning, operation and utilization, and decommissioning of the reactor are performed in accordance with established codes, standards, specifications, procedures and administrative controls. Items and services important to safety shall be specified and controlled to ensure their proper use, maintenance and configuration."

SSR-3 – Requirement 17: Design basis for items important to safety [3]

"The design basis for items important to safety for a research reactor facility shall specify the necessary capability, reliability and functionality for the relevant

operational states, for accident conditions and for conditions arising from internal and external hazards, to meet the specific acceptance criteria over the lifetime of the research reactor."

SSR-3 – Requirement 82: Records and reports [3]

"The operating organization for a research reactor facility shall establish and maintain a system for the control of records and reports."

SSR-3 – Requirement 83: Utilization and modification of a research reactor [3]

"The operating organization for a research reactor facility shall establish and implement a programme to manage utilization and modifications of the reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-6 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Database or records on permanent modifications including those related to experimental facilities and utilization;
- Database or records on set points;
- Modification control procedure;
- Quality assurance manual section on document control modification requirements;
- Configuration management manual or procedures and configuration management performance indicators;
- Methodology for design basis collecting, maintaining and reconstitution;
- Design basis documentation;
- Databases or documentation containing design basis information.

A-7 - Safety analysis report

References

SSR-3: Req. 1, 3.6–3.9; SSG-10: 4.2, 5.31; SSG-20: 2.39, 3.2, 3.21, A 5.12, A 5.23, A 6.2, A 6.5, A 6.7, A 6.8, A 6.9, A 7.3, A 8.3, A 9.1, A 10.1, A 10.2

Expectations

SSR-3 – Requirement 1: Safety analysis report [3]

"A safety analysis report shall be prepared by the operating organization for a research reactor facility. The safety analysis report shall provide a justification of the site and the design and shall provide a basis for the safe operation of the research reactor. The safety analysis report shall be reviewed and assessed by the regulatory body before the research reactor project is authorized to progress to the next stage.

The safety analysis report shall be periodically updated over the research reactor's operating lifetime to reflect modifications made to the facility and on the basis of experience and in accordance with regulatory requirements."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section A-7 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— SAR sections with facility modifications;
— SAR sections with design basis information;
— SAR sections with ageing management and related programmes.

5.2. AREA B – SCOPE SETTING, PLANT PROGRAMMES AND CORRECTIVE ACTION PROGRAMME

B-1 – Methodology and criteria for scope setting and screening of SSCs for ageing management

References

SSR-3: Req. 86, 7.120; SSG-10: 5.4–5.8

Expectations

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

"7.120. The ageing management programme shall determine the consequences of ageing and the activities necessary to maintain the operability and reliability of structures, systems and components. The ageing management programme shall be coordinated with, and be consistent with, other relevant programmes, including the programmes for in-service inspections, periodic safety review and maintenance. A systematic approach shall be taken to provide for the development, implementation and continuous improvement of ageing management programmes."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Document for safety classification of SSCs (usually included in SAR);
- Facility policy document on the scope of ageing management;
- Facility procedure providing method to identify the SSCs in scope of ageing management;
- Documentation on definition and identification of SSCs not important to safety within the scope of ageing management;
- Drawings which show boundaries of the scope (normally P&I diagrams with colour identifications);
- List or database of SSCs in and outside the scope of ageing management.

B-2 – Maintenance programme

References

SSR-3: Req. 71, 7.22, 7.38–7.39; Req. 77, 7.68–7.69, 7.72–7.74; SSG-10 – 1.11, 3.8, 4.15e, 4.15m, 4.19, 4.20, 5.12a, 5.20, 5.23, 5.26, 5.31c, 5.32 (3), 7.2–7.3; NS-G-4.2: 2.8, 2.11–2.12, 2.19, 3.1, 3.6, 3.7–3.16, 5.6–5.7, 5.15–5.17, 5.26–5.27, 6.2, 6.4, 7.24, 8.6–8.7, 9.1c, 9.2–9.3, 9.8

Expectations

SSR-3 – Requirement 71: Operational limits and conditions [3]

> **"The operating organization for a research reactor facility shall ensure that the research reactor is operated in accordance with the operational limits and conditions."**

SSR-3 – Requirement 77: Maintenance, periodic testing and inspection [3]

> **"The operating organization for a research reactor facility shall ensure that effective programmes for maintenance, periodic testing and inspection are established and implemented."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Procedures and reports on maintenance;
- Maintenance schedules;
- Procedures and reports on maintenance programme review taking into account failure analysis;
- Report on PSR (if it exists);
- Documents on assessment of effectiveness of the maintenance programmes.

B-3 – In-service inspection programme

References

SSR-3: Req. 71, 7.22, 7.38–7.39; Req. 77, 7.68–7.70, 7.72–7.73, 7.75; SSG-10: 1.11, 2.8e, 2.8i, 2.13, 2.15, 2.17, 3.8, 4.2, 4.7, 4.12c, 4.25–4.26, 5.11, 5.14, 5.18, 5.29, 7.2–7.3, 7.12; NS-G-4.2: 2.29–2.30, 2.32–2.33, 3.4–3.5, 3.24–3.27, 5.1–5.3, 5.6, 5.11–5.12, 5.15–5.16, 5.18–5.20, 5.22, 5.25–5.28, 5.30, 6.3, 6.7, 6.9, 6.11b, 6.11d, 6.11e, 6.11g, 6.11h, 8.1, 8.5a, 8.6c, 8.7, 8.9–8.10, 8.14, 9.2, 12.1, 12.9

Expectations

SSR-3 – Requirement 71: Operational limits and conditions [3]

> **"The operating organization for a research reactor facility shall ensure that the research reactor is operated in accordance with the operational limits and conditions."**

SSR-3 – Requirement 77: Maintenance, periodic testing and inspection [3]

> **"The operating organization for a research reactor facility shall ensure that effective programmes for maintenance, periodic testing and inspection are established and implemented."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- In-service inspection (ISI) programme;
- AMPs connected to ISI;
- Report on PSR (if it exists).

B-4 – Surveillance programme

References

SSR-3: Req. 71, 7.33, 7.38–7.39, Req. 77, 7.68–7.69, 7.72–7.73, 7.75; SSG-10: – 2.13, 2.17, 3.8, 4.10e, 4.15e, 4.15l, 5.11, 5.21, 5.26, 7.2a, 7.2c, 7.2d, 7.3; NS-G-4.2: 1.9, 2.2, 2.7–2.9, 2.11, 2.15–2.16, 2.23–2.24, 2.29–2.32, 3.2–3.4, 3.5, 3.18–3.23, 5.3, 5.5, 5.6, 5.11, 5.15–5.16, 5.18–5.20, 5.22, 5.25–5.26, 6.1–6.3, 6.7, 6.8–6.9, 6.11, 8.1, 8.6b, 8.6c, 8.10, 9.2, 12.9, 12.10; SSG-37: 4.36–4.38, 6.14–6.15, 8.5, 8.62, 8.66, 8.70, 8.78

Expectations

SSR-3 – Requirement 71: Operational limits and conditions [3]

> **"The operating organization for a research reactor facility shall ensure that the research reactor is operated in accordance with the operational limits and conditions."**

SSR-3 – Requirement 77: Maintenance, periodic testing and inspection [3]

"The operating organization for a research reactor facility shall ensure that effective programmes for maintenance, periodic testing and inspection are established and implemented."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Surveillance and monitoring programmes including periodic testing;
- AMPs connected to surveillance and monitoring;
- Report on PSR (if it exists).

B-5 – Equipment qualification programme

References

SSR-3: Req. 24, 6.73, Req. 29, 6.82–6.84, Req. 86, 7.120; SSG-10: 4.10a, 7.8; SSG-37: 4.52–4.70; NS-G-4.2: 8.5k, 10.7; NS-G-2.13: 2.21, 3.1, 3.9, 3.11, 3.20

Expectations

SSR-3 – Requirement 24: Reliability of items important to safety [3]

"The reliability of items important to safety for a research reactor facility shall be commensurate with their safety significance."

SSR-3 – Requirement 29: Qualification of items important to safety [3]

"A qualification programme shall be implemented for a research reactor facility to verify that items important to safety are capable of performing their intended functions when necessary, and in the prevailing environmental conditions, throughout their design life, with due account taken of reactor conditions during maintenance and testing."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Design supporting documents;
- Equipment master list for equipment qualification;
- Equipment qualification files for qualified equipment;
- Programme for monitoring the environmental conditions;
- Programme for monitoring and maintaining the equipment conditions;
- Requalification programme;
- Scheduled equipment replacement programme;
- Report on PSR;
- SAR.

B-6 – Water chemistry programme

References

SSR-3: Req. 47, 6.162, Req. 86; SSG-10: 3.8, 3.14d, 3.15, 4.24c, 5.19, 5.24; NS-G-4.4: I.8a, I.8l

Expectations

SSR-3 – Requirement 47: Design of reactor coolant systems and related systems [3]

> **"The coolant systems for a research reactor shall be designed and constructed to provide adequate cooling to the reactor core."**
>
> "6.162. Provisions shall be made in the design to monitor and control the properties of the reactor coolant (e.g. the pH and conductivity of the water) and/or the moderator, and to remove radioactive substances, including activated corrosion products and fission products, from the coolant. Despite the fact that subcritical assemblies might not require cooling systems for heat removal, such provisions shall be applied to the fluids contained within such assemblies, to preserve fuel elements and structures, systems and components and to avoid radioactive releases."

SSR-3 – Requirement 86: Ageing management [3]

> **"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-6 (available on IAEA

website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— The water chemistry programme at the facility;
— AMPs connected to water chemistry;
— Report on PSR (if it exists).

B-7 – Corrective action programme

References

SSR-3: Req. 2, 4.1e, Req. 67, 7.9q, Req. 69, 7.19, Req. 88, 7.128; SSG-10: 2.17, 3.3, 5.13, 5.26, 6.2

Expectations

SSR-3 – Requirement 2: Responsibilities in the management for safety [3]

"4.1. In order to ensure rigour and thoroughness at all levels of the staff in the achievement and maintenance of safety, the operating organization:

(e) Shall review, monitor and audit all safety related matters on a regular basis, and shall take appropriate corrective actions where necessary;"

SSR-3 – Requirement 67: Responsibilities of the operating organization [3]

"7.9. It shall be the responsibility of the operating organization to ensure the following:

(q) Operating experience, including information on operating experience at similar research reactors, is carefully examined for any precursor signs of tendencies adverse to safety so that corrective actions can be taken before serious adverse conditions arise and recurrences can be prevented."

SSR-3 – Requirement 69: Operating personnel [3]

"7.19. The reactor manager shall periodically review the operation of the research reactor, including experiments, and shall take appropriate corrective actions in respect of any problems identified. The reactor manager shall seek the advice of the safety committee(s) or shall call upon advisors to review important safety issues arising in the commissioning, operation, maintenance, periodic testing and inspection, and modification of the reactor and experiments (see para. 7.26)."

SSR-3 – Requirement 88: Feedback of operating experience [3]

"7.128. Information on operating experience shall be examined by competent persons for any precursors to, or trends in, adverse conditions for safety so that any necessary corrective actions can be taken before serious conditions arise."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section B-7 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Corrective action programme with focus on ageing related deficiencies;
- Examples of ageing related actions;
- PSR (if existing).

5.3. AREA C – AGEING MANAGEMENT OF MECHANICAL SSCs

C-1 – AMR of mechanical SSCs

References

SSR-3: Req. 86, 7.120; SSG-10: 2.12, 2.17, 4.4, 4.18, 5.5, 5.13, 5.26–5.30, 6.4, 6.7, 7.12

Expectations

SSR-3 – Requirement 86: Ageing management [3]

> **"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- List or database of SSCs within the scope of ageing management;
- List of TLAAs;
- SAR;
- Design supporting documents;
- List of qualified equipment;
- SSCs test and inspection records;
- SSCs failure reports (including, where appropriate, root cause analysis);
- Operational history and records on load cycles;
- Statistical data of SSCs failures and failure rates;
- TLAA revalidation reports.

C-2 – AMPs of mechanical SSCs

References

SSR-3: Req. 86, 7.120; SSG-10: 1.10–1.11, 2.8, 2.9, 3.8, 3.14–3.16, 4.15–4.19, 4.20–4.23, 4.24–4.26, 4.27, 5.1–5.2, 5.9–5.11, 5.12, 5.14–5.22, 5.23, 5.25, 5.26–5.30, 6.4, 7.1, 7.2–7.3, 7.12–7.13

Expectations

SSR-3 – Requirement 86: Ageing management [3]

> **"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- AMPs and procedures for their implementation;
- Other facility programmes for managing the effects of ageing degradation;
- Report on PSR (if it exists);
- Past corrective actions resulting in enhancement of AMPs.

C-3 – TLAAs of mechanical SSCs

References

SSR-3: Req. 37, 6.112–6.113, Req. 86, 7.120; SSG-10: 4.10a, 4.10b, 5.15, 7.8; NS-G-4.2: 5.27

Expectations

SSR-3 – Requirement 37: Design for ageing management [3]

> **"The design life of items important to safety at a research reactor facility shall be determined. Appropriate margins shall be provided in the design to take due account of relevant mechanisms of ageing, such as neutron embrittlement and wear-out, and of the potential for age related degradation, to ensure the capability of items important to safety to perform their necessary safety functions in operational states and accident conditions in case of demand throughout their design life. The life cycles of the technology utilized and the possible obsolescence of the technology shall be considered."**

SSR-3 – Requirement 86: Ageing management [3]

> **"The operating organization for a research reactor facility shall ensure that an**

effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Methodology for identification of TLAAs;
- List of TLAAs;
- Equipment qualification documentation;
- Design supporting documents (such as pressurized thermal shock analyses, fatigue calculations);
- TLAA revalidation reports;
- Other licensing documents;
- Report on PSR.

C-4 – Verification of scope setting results for mechanical SSCs

References

SSR-3: Req. 86, 7.120; SSG-10: 5.2, 5.4–5.8

Expectations

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-4 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Facility procedures on methodology of SSCs' scope setting;
- Facility procedure to identify SSCs not important to safety within the scope;
- List of SSCs' classification;

— List or database of SSCs within the scope of ageing management;
— Drawings which show boundaries of the scope (normally P&I diagrams with colour identifications).

C-5 – Data collection and record keeping for mechanical SSCs

References

SSR-3: Req. 82, 7.94–7.97; SSG-10: 2.16, 4.12, 4.13–4.14, 4.15, 4.23, 5.31–5.32

Expectations

SSR-3 – Requirement 82: Records and reports [3]

> **"The operating organization for a research reactor facility shall establish and maintain a system for the control of records and reports."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-5 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

— Design basis documentation;
— Design supporting documents (such as pressurized thermal shock analyses, fatigue calculations);
— Technical specifications;
— Equipment qualification documentation;
— List or database of SSCs within the scope of ageing management;
— List of qualified equipment;
— Operational history and records on load cycles;
— SSCs failure reports (including, where appropriate, root cause analysis);
— Statistical data of SSCs failures and failure rates;
— SSCs test and inspection records.

C-6 – Documentation of ageing management for mechanical SSCs

References

SSR-3: Req. 86, 7.120; SSG-10: 2.5–2.7, 2.8i, 2.15, 4.2, 4.8–4.9, 4.23, 4.26, 5.6, 5.13, 6.4c, 6.7, 7.11

Expectations

SSR-3 – Requirement 86: Ageing management [3]

> **"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of**

items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section C-6 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Facility level AMP;
- SAR and other licensing documentation;
- Documentation of facility programmes for ageing management;
- Documentation of scope setting methodology and results;
- Documentation of AMR methodology and results;
- Documentation of AMPs;
- Documentation of ageing management implementation;
- Documentation of identification and revalidation of TLAAs for continued operation;
- List or database of SSCs within the scope of ageing management;
- List of qualified equipment.

5.4. AREA D – AGEING MANAGEMENT OF ELECTRICAL AND I&C SSCs

D-1 – AMR of electrical and I&C SSCs

Use C-1.

D-2 – AMPs of electrical and I&C SSCs

Use C-2.

D-3 – TLAAs of electrical and I&C SSCs

Use C-3.

D-4 – Technological obsolescence management for all SSCs

References

SSR-3: Req. 4, 4.16, Req. 37, 6.112; Req. 86, 7.129; SSG-10: 2.8d, 3.5a, 4.15h, 4.20, 4.26, 6.1–6.8, 7.11; SSG-37: 8.5, 9.1, 10.7; NS-G-4.2: 11.2

Expectations

SSR-3 – Requirement 4: Integrated management system [3]

"4.16 The management system shall include provisions for the implementation of processes

to ensure that the design, including subsequent changes, modifications or safety improvements, construction, commissioning, operation and utilization, and decommissioning of the reactor are performed in accordance with established codes, standards, specifications, procedures and administrative controls. Items and services important to safety shall be specified and controlled to ensure their proper use, maintenance and configuration."

SSR-3 – Requirement 37: Design for ageing management [3]

"The design life of items important to safety at a research reactor facility shall be determined. Appropriate margins shall be provided in the design to take due account of relevant mechanisms of ageing, such as neutron embrittlement and wear-out, and of the potential for age related degradation, to ensure the capability of items important to safety to perform their necessary safety functions in operational states and accident conditions in case of demand throughout their design life. The life cycles of the technology utilized and the possible obsolescence of the technology shall be considered."

SSR-3 – Requirement 86: Ageing management [3]

"The operating organization for a research reactor facility shall ensure that an effective ageing management programme is implemented to manage the ageing of items important to safety so that the required safety functions of structures, systems and components are fulfilled over the entire operating lifetime of the research reactor."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section D-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Procedures for the management of technological obsolescence;
- Documentation to support SSC obsolescence and replacement;
- List of spare parts;
- Maintenance records;
- Long term investment programme for classified equipment and systems.

D-5 – Verification of scope setting results for electrical and I&C SSCs

Use C-4.

D-6 – Data collection and record keeping for electrical and I&C SSCs

Use C-5.

D-7 – Documentation of ageing management and documentation in support of continued operation for electrical and I&C SSCs

Use C-6.

5.5. AREA E – AGEING MANAGEMENT OF CIVIL SSCs

E-1 - AMR of civil SSCs

Use C-1.

E-2 - AMPs of civil SSCs

Use C-2.

E-3 - TLAAs of civil SSCs

Use C-3.

E-4 - Verification of scope setting results for civil SSCs

Use C-4.

E-5 - Data collection and record keeping for civil SSCs

Use C-5.

E-6 - Documentation of ageing management for civil SSCs

Use C-6.

5.6. AREA F – HUMAN RESOURCES, COMPETENCE AND KNOWLEDGE MANAGEMENT FOR CONTINUED OPERATION

F-1 - Human resources policy and strategy to support ageing management

References

GSR Part 2: Req. 7, 4.15, Req. 8, 4.16, Req. 9, 4.21–4.27, Req. 10, 4.29; SSR-3: Req. 68, 7.10–7.12, Req. 69, 7.13–7.15; GS-G-3.1: 2.23, 2.31, 2.36, 2.53–2.54, 3.2, 3.11–3.12, 4.1–4.5, 4.6–4.12, 4.29, 5.11, 5.21, 5.59–5.60, 6.3, 6.32; NS-G-4.5: 2.4–2.5, 2.8, 2.11, 2.13, 2.15, 2.17–2.18, 2.21, 2.29b, 2.29g, 2.31, 2.34, 2.37, 2.42, 2.45, 2.50, 2.59, 2.65d, 2.69, 2.91, 3.2, 3.5, 3.7, 3.18–3.20, 4.1, 6.1–6.4

Expectations

GSR Part 2 – Requirement 7: Application of the graded approach to the management system [7]

"The management system shall be developed and applied using a graded approach."

GSR Part 2 – Requirement 8: Documentation of the management system [7]

"The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use."

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

GSR Part 2 – Requirement 10: Management of processes and activities [7]

"Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety."

SSR-3 – Requirement 68: Structure and functions of the operating organization [3]

"The structure of the operating organization for a research reactor facility and the functions, roles and responsibilities of its personnel shall be established and documented."

SSR-3 – Requirement 69: Operating personnel [3]

"The operating organization for a research reactor facility shall assign direct responsibility and authority for the safe operation of the reactor to the reactor manager. The reactor manager shall have overall responsibility for all aspects of operation, training, maintenance, periodic testing, inspection, utilization and modification of the reactor. Discharge of this responsibility shall be the primary duty of the reactor manager."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section F-1 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Human resource management procedures, guidelines and flowcharts;
- Facility procedures describing recruiting, succession planning and retirement;
- Human resource planning and staffing databases;
- Organizational flowcharts and job descriptions;
- Facility procedures describing organizational structure in the plant;
- Task and job descriptions related to ageing management;
- Human resource statistics from past and plans for future (e.g. recruitment and retirement numbers);

— Check and verify whether the facility managers have the appropriate resources to carry out their assigned ageing management responsibilities and accountabilities.

F-2 - Competence management for ageing management and processes for recruitment, training and qualification of personnel involved in ageing management activities

References

GSR Part 2: Req. 9, 4.21, 4.23–4.24, Req. 10, 4.28, Req. 13, 6.1–6.5, 6.7; SSR-3: Req. 3, 4.4–4.6, Req. 4, 4.8, 4.10, 4.15a, 4.15b, Req. 68, 7.10–7.12, Req. 69, 7.13–7.15, Req. 70, 7.28–7.31; GS-G-3.1: 3.4, 4.6–4.9, 4.18, 4.20–4.21, 6.8, 6.16; GS-G-3.5: 3.30, 4.12, 6.23; NS-G-4.5: 2.16–2.19, 2.34, 2.53, 2.70, 3.7–3.10, 3.14, 3.18–3.21, 4.1, 4.3, 4.7, 4.11–4.12, 4.15, 4.33–4.36, 4.38, 5.7, 6.1–6.4; SSG-50: 2.18–2.19, 2.71

Expectations

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

GSR Part 2 – Requirement 10: Management of processes and activities [7]

"Processes and activities shall be developed and shall be effectively managed to achieve the organization's goals without compromising safety.

GSR Part 2 – Requirement 13: Measurement, assessment and improvement of the management system [7]

"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety."

SSR-3 – Requirement 4: Integrated management system [3]

"The operating organization for a research reactor facility shall establish, implement, assess and continuously improve an integrated management system."

SSR-3 – Requirement 68: Structure and functions of the operating organization [3]

"The structure of the operating organization for a research reactor facility and the functions, roles and responsibilities of its personnel shall be established and documented."

SSR-3 – Requirement 69: Operating personnel [3]

"The operating organization for a research reactor facility shall assign direct responsibility and authority for the safe operation of the reactor to the reactor manager. The reactor manager shall have overall responsibility for all aspects of operation, training, maintenance, periodic testing, inspection, utilization and

modification of the reactor. Discharge of this responsibility shall be the primary duty of the reactor manager."

SSR-3 – Requirement 70: Training, retraining and qualification of personnel [3]

"The operating organization for a research reactor facility shall ensure that safety related functions are performed by suitably qualified, competent and fit-for-duty personnel."

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section F-2 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Competence management procedures and guidelines and flowcharts;
- Training records and/or databases;
- Training programme descriptions;
- Resources related to training;
- On-the-job training programmes and records;
- Trainee assessment records.

F-3 - Knowledge management and knowledge transfer for ageing management

References

GSR Part 2: Req. 4, 4.3, Req. 8, 4.16–4.17, 4.20, Req. 9, 4.21–4.27; SSR-3: Req. 68, 7.12, Req. 88, 7.126–7.129; GS-G-3.1: 2.4–2.5, 3.1, 3.11, 3.16, 4.1–4.2, 4.4, 4.6–4.7, 5.6, 5.14; SSG-10: 2.16, 4.2, 4.12c, 5.15, 5.31–5.33, 7.11

Expectations

GSR Part 2 – Requirement 4: Goals, strategies, plans and objectives [7]

"Senior management shall establish goals, strategies, plans and objectives for the organization that are consistent with the organization's safety policy."

GSR Part 2 – Requirement 8: Documentation of the management system [7]

"The management system shall be documented. The documentation of the management system shall be controlled, usable, readable, clearly identified and readily available at the point of use."

GSR Part 2 – Requirement 9: Provision of resources [7]

"Senior management shall determine the competences and resources necessary to carry out the activities of the organization safely and shall provide them."

GSR Part 2 – Requirement 13: Measurement, assessment and improvement of the management system [7]

> **"The effectiveness of the management system shall be measured, assessed and improved to enhance safety performance, including minimizing the occurrence of problems relating to safety."**

SSR-3 – Requirement 68: Structure and functions of the operating organization [3]

> **"The structure of the operating organization for a research reactor facility and the functions, roles and responsibilities of its personnel shall be established and documented."**

SSR-3 – Requirement 88: Feedback of operating experience [3]

> **"The operating organization for a research reactor facility shall establish a programme to learn from events at the reactor facility and events in other research reactors and from the nuclear industry."**

Evaluations

SALTO Working Notes Outlines for Research Reactors, Section F-3 (available on IAEA website https://www.iaea.org/services/review-missions/safety-aspects-of-long-term-operation-salto)

Examples of documents for the review

- Knowledge management policy and strategy;
- Descriptions of knowledge management process, procedures, guidelines and flowcharts;
- Description of the process for collecting and distributing operational experience;
- Documents related to knowledge-loss risk assessment;
- Report on PSR assessment on use of experience from other facilities and research findings (if existing);
- Work processes, methodologies and procedures for life extension decision;
- Descriptions of information technology and information systems processes;
- Description of the process for managing records, reports and data related to maintenance, surveillance and inspections.

REFERENCES

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Commissioning and Operation, IAEA Safety Standards Series No. SSR-2/2 (Rev. 1), IAEA, Vienna (2016).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants, IAEA Safety Standards Series No. SSG-48, IAEA, Vienna (2018).

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Research Reactors, IAEA Safety Standards Series No. SSR-3, IAEA, Vienna (2016).

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Research Reactors, IAEA Safety Standards Series No. SSG-10, IAEA, Vienna (2010).

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Technical Safety Review (TSR) Service Guidelines, IAEA Services Series No. 41, IAEA, Vienna (2019).

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Technical Safety Review (TSR) Service Guidelines, Periodic Safety Review (PSR), IAEA Working Document, IAEA, Vienna (2020).

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety, IAEA Safety Standards Series No. GSR Part 2, IAEA, Vienna (2016).

[8] INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Design, IAEA Safety Standards Series No. SSR-2/1 (Rev. 1), IAEA, Vienna (2016).

ANNEX I - SALTO PEER REVIEW ELEMENTS

Typical SALTO peer review steps for NPPs in the early phase of operation

1. **Workshop/seminar** on IAEA Safety Standards and SALTO peer review methodology (one or several workshops/seminars, anytime during the SALTO peer review service)
2. **Preparatory meeting** (to prepare every Pre-SALTO mission, 6–12 months before the mission)
3. **Pre-SALTO mission** (one as a minimum but multiple Pre-SALTO missions can be performed)
4. **Follow-up SALTO mission** (18–24 months after the last Pre-SALTO mission)
5. **Expert mission** based on SALTO guidelines (if requested, one or several missions, anytime during the SALTO peer review service)
6. **Support mission** (if requested, one or several missions, anytime during the SALTO peer review service)

Typical SALTO peer review steps for NPPs during preparation for safe LTO

1. **Workshop/seminar** on IAEA Safety Standards and SALTO peer review methodology (one or several workshops/seminars, anytime during the SALTO peer review service)
2. **Preparatory meeting** (to prepare every Pre-SALTO mission, 6–12 months before the mission)
3. **Pre-SALTO mission** (one as a minimum but two or three Pre-SALTO missions can be performed)
4. **Preparatory meeting** (to prepare SALTO mission, 6–12 months before the mission)
5. **SALTO mission** (18–24 months after the Pre-SALTO mission, typically less than 2 years before entering LTO)
6. **Follow-up SALTO mission** (18–24 months after the SALTO mission)
7. **Expert mission** based on SALTO guidelines (if requested, one or several missions, anytime during the SALTO peer review service)
8. **Support mission** (if requested, one or several missions, anytime during the SALTO peer review service)

Typical SALTO peer review steps for NPPs in LTO period and for research reactors

1. **Workshop/seminar** on IAEA Safety Standards and SALTO peer review methodology (if requested, one or several workshops/seminars, anytime during the SALTO peer review service)
2. **Preparatory meeting** (to prepare SALTO mission, 6–12 months before the mission)
3. **SALTO mission** (typically every 10 years during the entire period of LTO)
4. **Follow-up SALTO mission** (18–24 months after the SALTO mission)
5. **Expert mission** based on SALTO guidelines (if requested, one or several missions, anytime during the SALTO peer review service)
6. **Support mission** (if requested, one or several missions, anytime during the SALTO peer review service)

Typical duration of SALTO peer review service elements

- Workshop/seminar: 3–4 days
- Preparatory meeting: 1–2 days
- Pre-SALTO mission: 9 days
- SALTO mission: 9 days
- SALTO follow-up mission: 4 days
- Expert mission based on SALTO guidelines: 4–7 days
- Support mission: 3–4 days

ANNEX II - TYPICAL Pre-SALTO/ SALTO MISSION PROGRAMME

[Plant] Pre-SALTO/SALTO MISSION PROGRAMME ([DD Month – DD Month, YYYY])

Day 0 Monday	**PM**	Arrival of team members to the closest international airport before 14:00 14:30 Transportation from the airport to the hotel organized by counterpart 18:00 IAEA team briefing at the hotel, preparatory activities, pre-meeting with counterparts
Day 1 Tuesday	**AM**	07:30 Departure from the hotel 08:00 – 09:00 Entrance procedure at the plant 09:00 – 12:30 **IAEA team training**
	PM	14:00 – 15:30 **Entrance meeting** Opening of the mission – HPP – 5 minutes NPP expectations – plant manager – 5 minutes Regulatory authority expectations – 5 minutes Objective and schedule – TL – 10 minutes Introduction of participants – both sides – 5 minutes Methodology of review – TL – 30 minutes LTO activities – HPP – 30 minutes 16:00 – 18:00 **Initial sessions in review areas** – general presentations of counterparts, planning with counterparts 18:00 Departure to the hotel
Day 2 Wednesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Parallel sessions in review areas – interview and discussion 11:00 – 11:30 Information meeting of PM and TL
	PM	13:00 – 16:00 Parallel sessions in review areas – interview and discussion 16:00 – 16:30 Debrief with counterpart 16:30 – 16:55 Preparation for team meeting 17:00 – 17:50 Team Meeting with HPP 18:00 Departure to the hotel
Day 3 Thursday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Parallel sessions in review areas – interview and discussion 11:00 – 11:30 Information meeting of PM and TL
	PM	13:00 – 16:00 Parallel sessions in review areas – interview and discussion 16:00 – 16:30 Debrief with counterpart 16:30 – 16:55 Preparation for team meeting 17:00 – 17:50 Team Meeting with HPP 18:00 Departure to the hotel
Day 4 Friday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Parallel sessions in review areas – interview and discussion 11:00 – 11:30 Information meeting of PM and TL
	PM	13:00 – 16:00 Parallel sessions in review areas – interview and discussion

		16:00 – 16:30 Debrief with counterpart 16:30 – 16:55 Preparation for team meeting 17:00 – 17:50 Team Meeting with HPP 18:00 Departure to the hotel 20:00 Team training in the hotel – development of issues and good practices
Day 5 Saturday		Free day
Day 6 Sunday	**AM**	08:00 – 11:00 Team meeting in the hotel – discussion of potential issues and good practices 11:00 – 12:00 Team training in the hotel – development of evaluative section of report
	PM	13:00 – 18:00 Drafting of Working Notes, issues, good practices and evaluative section of report – bilateral discussions with TL
Day 7 Monday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Parallel sessions in review areas – interview and discussion 11:00 – 11:30 Information meeting of PM and TL
		13:00 – 16:00 Parallel sessions in review areas – interview and discussion 16:00 – 16:30 Debrief with counterpart 16:30 – 16:55 Preparation for team meeting 17:00 – 17:50 Team Meeting with HPP 18:00 Departure to the hotel
Day 8 Tuesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Parallel sessions in review areas – interview and discussion 10:30 – 11:00 Information meeting of PM and TL
	PM	13:00 – 13:30 Debrief with counterpart 13:30 – 15:00 Preparing draft issues and evaluative part of report 15:00 – 16:30 Cross-checking of other areas issues 16:30 – 16:55 Preparation for team meeting 14:00 – 17:00 Send issues to the IAEA for 'cold body review' 17:00 – 17:50 Team Meeting with HPP 18:00 Departure to the hotel 20:00 Team training in the hotel - exit speeches Consultation with TL and DTL in the hotel – development of issues, good practices and evaluative section of report
Day 9 Wednesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 Team meeting with HPP – issues, good practices and evaluative section of report presentation, discussion and agreement by team - counterparts review the issues, good practices and evaluative section of report simultaneously 11:00 Receive response from IAEA 'cold body review'
	PM	13:00 – 15:00 Discussion of issues, good practices and evaluative part of report with counterparts 13:30 – Press release to IAEA for comments 13:45 – 14:30 Information meeting of PM and TL 14:30 – 15:15 TL Debriefing with regulatory authority

		15:00 – 16:00 Revision of the draft issues based on counterpart's comments 16:00 – 17:00 Agree the issues, good practices and evaluative section of report with counterparts 17:00 Deadline for any changes in draft report 17:00 – 18:00 Preparation of exit meeting speeches 18:00 Departure to the hotel 19:00 Official farewell dinner with counterparts
Day 10 Thursday	**AM**	08:30 Departure from the hotel 09:00 – 09:45 Rehearsal of exit meeting speeches, 'cleaning' of offices 10:00 – 11:00 **Exit meeting** (including plant management) Opening by the HPP Description of Mission scope – DTL – 4 minutes Detail findings (each reviewer) – 6 * 5 (30) minutes Observers remarks and lesson learned – 4 * 2 (8) minutes Main finding and conclusions – TL – 5 minutes Regulatory authority speech – 5 minutes HPP's remark (comparison against initial expectations) – 5 minutes Speech by a plant manager – 5 minutes Closing by the plant manager
	PM	12:00 Transportation of the team to the airport organized by counterpart Departure of team members from the airport after 17:00

Plant walkdown will be organized as optional for reviewers based on their requests. For research reactors, the programme is prepared on a case by case basis, depending on the size of the research reactor and the needs of the host organization.

ANNEX III - TYPICAL SALTO FOLLOW-UP MISSION PROGRAMME

[Plant] SALTO FOLLOW-UP MISSION PROGRAMME ([DD Month – DD Month, YYYY])

Day 0, Monday	**PM**	Arrival of team members to the closest international airport before 14:00 14:30 Transportation from the airport to the hotel organized by counterpart 18:00 IAEA team briefing at the hotel, preparatory activities, pre-meeting with counterparts
Day 1, Tuesday	**AM**	07:30 Departure from the hotel 08:00 – 09:00 Plant access formalities 09:00 – 10:00 **IAEA team training** 10:30 – 12:00 **Entrance meeting** Opening of the mission – HPP NPP expectations – plant manager Regulatory authority speech Objective and schedule – TL Introduction of participants – both sides Methodology of review and IAEA LTO activities – TL LTO activities – HPP
	PM	13:00 – 17:00 **Parallel sessions** – reviewers and counterparts 17:00 – 17:15 Debrief with counterpart and preparation for Team meeting 17:15 – 18:00 **Team Meeting** with HPP 18:00 Departure to the hotel
Day 2, Wednesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 **Parallel sessions** – reviewers and counterparts
	PM	12:00 – 13:00 Lunch at the plant 13:00 – 17:00 **Parallel sessions** – reviewers and counterparts 16:00 – 16:30 TL: Information meeting with PM 17:00 – 17:15 Debrief with counterpart and preparation for team meeting 17:15 – 18:00 **Team Meeting** with HPP 18:00 Departure to the hotel
Day 3, Thursday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 **Parallel sessions** – reviewers and counterparts
	PM	12:00 – 13:00 Lunch at the plant 13:00 – 14:30 **Updating of issue sheets** 14:15 – 15:00 TL: Information meeting with PM 14:30 – 15:30 **Agree the updated issues with counterparts** 15:00 – 15:45 TL: debriefing with regulatory authority 15:45 – 16:00 Press release for NPP comments 15:30 – 18:00 **Finalization of draft report, send press release to IAEA** 18:00 Departure to the hotel 19:00 Official farewell dinner with counterparts

Day 4, Friday	**AM**	07:30 Departure from the hotel 08:00 – 09:00 Finalization of draft report and preparation of exit meeting speeches 09:00 Deadline for any changes in draft report 09:30 – 10:00 **Rehearsal of exit meeting speeches** 10:30 – 11:30 **Exit meeting** (including plant management) Opening by the HPP Description of mission scope and detail findings – DTL – 5 minutes Detail findings (each reviewer): 3 * 5 (15) minutes Observers remarks and lesson learned: 2 * 3 (6) minutes Main finding and conclusions – TL – 5 minutes HPP's remark (comparison against initial expectation): 5 minutes Regulatory authority speech: 5 minutes Plant manager's speech: 5 minutes Closing by the plant manager
	PM	12:00 Transportation of the team to the airport organized by counterpart Departure of team members from the airport after 17:00

Plant walkdown will be organized as optional for reviewers based on their requests. For research reactors, the programme is prepared on a case by case basis, depending on the size of the research reactor and the needs of the host organization.

ANNEX IV - TYPICAL EXPERT MISSION PROGRAMME

[Plant] EXPERT MISSION PROGRAMME ([DD Month – DD Month, YYYY])

Day 1, Sunday	**AM**	Arrival of team members to the closest international airport before 14:00 14:30 Transportation from the airport to the hotel organized by counterpart 18:00 IAEA team briefing at the hotel, preparatory activities, pre-meeting with counterparts
Day 2, Monday	**AM**	07:30 Departure from the hotel 08:00 – 08:30 Plant access formalities 08:30 – 10:15 **IAEA team training** 10:30 – 11:45 **Entrance meeting** Opening of the mission – HPP NPP expectations – plant manager Regulatory authority expectations Objective and schedule – TL Introduction of participants – both sides Methodology of review – TL LTO activities – HPP
	PM	13:00 – 16:45 **Parallel sessions in review areas** – interview and discussion 16:45 – 17:00 Debrief with counterpart 17:00 – 17:15 Preparation for Team meeting 17:15 – 17:45 Team Meeting with HPP 18:00 Departure to the hotel
Day 3, Tuesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 **Parallel sessions in review areas** – interview and discussion
	PM	13:00 – 16:45 **Parallel sessions in review areas** – interview and discussion 15:30 – 16:00 Information meeting of PM and TL 16:45 – 17:00 Debrief with counterpart 17:00 – 17:15 Preparation for Team meeting 17:15 – 17:45 Team Meeting with HPP 18:00 Departure to the hotel
Day 4, Wednesday	**AM**	07:30 Departure from the hotel 08:00 – 12:00 **Parallel sessions in review areas** – interview and discussion
	PM	13:00 – 16:45 **Parallel sessions in review areas** – interview and discussion 15:30 – 16:00 Information meeting of PM and TL 16:45 – 17:00 Debrief with counterpart 17:00 – 17:15 Preparation for Team meeting 17:15 – 17:45 Team Meeting with HPP 18:00 Departure to the hotel
Day 5, Thursday	**AM**	07:15 Departure from the hotel 08:00 – 12:00 **Parallel sessions in review areas** – interview and discussion

	PM	13:00 – 16:00 Development of issues and evaluative section of report 13:30 – 14:00 Information meeting of PM and TL 16:00 – 17:00 Debrief with counterpart 14:00 – 17:00 Review of issues and evaluative section of report by TL 17:00 – 18:00 Team Meeting with HPP – Team meeting with HPP – issues and evaluative section of report presentation, agreement by team 18:00 – Departure to the hotel 19:00 – Official farewell dinner with counterparts
Day 6, Friday	**AM**	07:30 Departure from the hotel 08:00 – 09:00 Finalization of the inputs for the draft report (reviewers) 09:00 Deadline for any changes in the draft report 09:00 – 09:30 Preparation of exit meeting speeches (reviewers) 09:00 – 09:30 Finalization of the draft report (TL) 09:30 – 10:15 Rehearsal of exit meeting speeches 10:30 – 11:30 **Exit meeting** (including plant management) Opening by the HPP Description of Mission scope – TL – 3 minutes Detail findings (each reviewer) – 4 * 5 (20) minutes Main finding and conclusions – TL – 5 minutes HPP's remark (comparison against initial expectation) – 5 minutes Regulatory authority speech – 5 minutes Speech by a plant manager – 5 minutes Closing by the plant manager
	PM	12:30 Transportation of the team to the airport organized by counterpart Departure of team members from the airport after 17:00

Plant walkdown will be organized as optional for reviewers based on their requests. For research reactors, the programme is prepared on a case by case basis, depending on the size of the research reactor and the needs of the host organization.

ANNEX V - STRUCTURE AND CONTENTS OF ADVANCE INFORMATION PACKAGE

I. ADMINISTRATIVE INFORMATION

1. Arrival logistics (airport, hotel, plant)
2. Transportation airport-hotel, hotel-plant
3. Hotel accommodation information (name, telephone number, website address, availability of internet)
4. Contact points at the plant and list of the counterparts (names, e-mail addresses, phone numbers)
5. Site accommodation (site access control, controlled area access, meeting rooms, SALTO offices, administrative/interpretation support, office machines and lunch arrangements)
6. Summary of site specific radiological, industrial and fire safety rules, and emergency response provisions

II. GENERAL INFORMATION

1. Description of the NPP/research reactor
   - Overall site, plant description and which units are to be reviewed
   - Brief operating history of the plant
   - Outline of the operating license
   - Current organizational charts of the utility/plant
   - Arrangement of major plant structures and buildings (layout schematics)
   - List of abbreviations and acronyms used in the plant
   - Plant colour coding system identification and labelling system
2. Design information
   - Major process and safety systems
   - Key design parameters
   - Unique safety features
3. External organizations

   Brief description of main functions, structure and interaction of external organizations with the NPP/research reactor:

   - Utility headquarters
   - Industry organizations
   - Regulatory authorities
   - Main suppliers and subcontractors
   - Contractors supporting plant maintenance

III. INFORMATION FOR AREA REVIEWERS' PREPARATION

A – Organization of ageing management and LTO activities

A-1 - Related regulatory requirements, codes and standards for ageing management and LTO and regulatory review

A-2 - Principles and approach to ageing management and LTO

A-3 - Organizational arrangements for ageing management and LTO

A-4 - Periodic safety review

A-5 - Programme for LTO

A-6 - Configuration/modification management and design basis documentation

A-7 - Safety analysis report

B – Scope setting, plant programmes and corrective action programme

B-1 - Methodology and criteria for scope setting of SSCs for ageing management and LTO

B-2 - Maintenance programme

B-3 - In-service inspection programme

B-4 - Surveillance programme

B-5 - Water chemistry programme

B-6 - Corrective action programme

C – Ageing management of mechanical SSCs

C-1 - AMR of mechanical SSCs

C-2 - AMPs of mechanical SSCs

C-3 - TLAAs of mechanical SSCs

C-4 - Verification of scope setting results for mechanical SSCs

C-5 - Data collection and record keeping for mechanical SSCs

C-6 - Documentation of ageing management and documentation in support of LTO for mechanical SSCs

D – Ageing management of electrical and I&C SSCs

D-1 - AMR of electrical and I&C SSCs

D-2 - AMPs of electrical and I&C SSCs

D-3 - Equipment qualification programme for all SSCs

D-4 - Technological obsolescence management for all SSCs

D-5 - Verification of scope setting results for electrical and I&C SSCs

D-6 - Data collection and record keeping for electrical and I&C SSCs

D-7 - Documentation of ageing management and documentation in support of LTO for electrical and I&C SSCs

E – Ageing management of civil SSCs

E-1 - AMR of civil SSCs

E-2 - AMPs of civil SSCs

E-3 - TLAAs of civil SSCs

E-4 - Verification of scope setting results for civil SSCs

E-5 - Data collection and record keeping for civil SSCs

E-6 - Documentation of ageing management and documentation in support of LTO for civil SSCs

F – Human resources, competence and knowledge management for LTO

F-1 - Human resources policy and strategy to support LTO

F-2 - Competence management for LTO and processes for recruitment, training and qualification of personnel involved in LTO activities

F-3 - Knowledge management and knowledge transfer for LTO

IV. SELF-ASSESSMENT RESULTS

- For each review area, a description of how each individual expectation, as described in Sections 4 and 5, is met. This information is typically presented on 3 to 4 pages;
- Specific gaps where performance or programmes do not fully meet the IAEA Safety Standards can be described as self-identified issues (in a standard issue template – see Annex VII). Sections 1, 2, 3.1 and 3.2 of the template are filled in. Section 3.2 of the template contains also budget commitments, staffing, document preparation, increased or modified training, equipment purchases, etc.

ANNEX VI - DAILY REPORT TEMPLATE

[PLANT] SALTO [YEAR]

Daily Team Meeting – Review Status

Reviewer:	
Review Area:	
Date:	
Discussed with counterpart	**Yes / No**
Concerns/ facts:	
Good Ideas / Performance:	
Other Remarks (interfaces)	
Reminder: <u>Before the daily meeting</u>, provide daily report to the team leader.	

ANNEX VII - ISSUE SHEET TEMPLATE

1. ISSUE IDENTIFICATION	**Issue Number: A-1**
NPP: [NPP name]	**Unit:** [unit number]
Reviewed Area:	
1.1 – ISSUE TITLE:	
1.2 – FUNDAMENTAL OVERALL PROBLEM:	
2. ASSESSMENT OF THE STATUS	**Date:** D1/M1/ YYY1
2.1 – FACTS: **F1)** **F2)** **F3)** **F4)**	
2.2 – SAFETY CONSEQUENCE:	
2.3 – RECOMMENDATION/SUGGESTION: **R)** The plant should…. **S)** The plant should consider …	
2.4 – IAEA BASIS:	
2.5 – DOCUMENTS REVIEWED: – Format: ID, Rev. XX (where appropriate), Title, Date (at least year);	
3. HOSTING ORGANIZATION ACTIONS TO RESOLVE ISSUE	**Date:** D2/M2/ YYY2
3.1 – RESULTS OF THE ISSUE ANALYSIS: n.a.	
3.2 – CORRECTIVE ACTIONS: n.a.	

3.3 – STATUS OF CORRECTIVE ACTIONS IMPLEMENTATION: n.a.		
4. FOLLOW-UP ASSESSMENT BY THE IAEA REVIEW TEAM		**Date:** D3/M3/ YYY3
4.1 – FACTS: **F1)** n.a.		
4.2 – DOCUMENTS REVIEWED: n.a.		
4.3 – RESOLUTION DEGREE:		
1.	**Insufficient progress to date**	n.a.
2.	**Satisfactory progress to date**	n.a.
3.	**Issue resolved**	n.a.

n.a.: not applicable for the present mission.

ANNEX VIII - STRUCTURE AND CONTENTS OF THE MISSION REPORT

PREAMBLE
FOREWORD
EXECUTIVE SUMMARY

1. INTRODUCTION
1.1. Objectives
1.2. Scope
1.3. Conduct of the mission
1.4. Summary information on the plant
1.4.1 General information
1.4.2. Regulatory framework for LTO
1.4.3. Plant's LTO policy
2. MAIN CONCLUSIONS
3. DETAILED CONCLUSIONS FOR REVIEW AREAS
3.1. Organization of ageing management and LTO activities
3.2. Scope setting, plant programmes and corrective action programme
3.3. Ageing management of mechanical SSCs
3.4. Ageing management of electrical and I&C SSCs
3.5. Ageing management of civil SSCs
3.6. Human resources, competence and knowledge management for LTO
4. SUMMARY OF RECOMMENDATIONS AND SUGGESTIONS
5. DEFINITONS
6. REFERENCES
7. COMPOSITION OF THE SALTO TEAM
APPENDIX I: ISSUE SHEETS (INCLUDING SELF-IDENTIFIED ISSUES)

ANNEX IX - IAEA BASIS PUBLICATIONS FOR SALTO PEER REVIEW OF NUCLEAR POWER PLANTS

1) INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety, IAEA Safety Standards Series No. GSR Part 2, IAEA, Vienna (2016).

2) INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Design, IAEA Safety Standards Series No. SSR-2/1 (Rev. 1), IAEA, Vienna (2016).

3) INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Nuclear Power Plants: Commissioning and Operation, IAEA Safety Standards Series No. SSR-2/2 (Rev. 1), IAEA, Vienna (2016).

4) INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna (2006).

5) INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for Nuclear Installations, IAEA Safety Standards Series No. GS-G-3.5, IAEA, Vienna (2009).

6) INTERNATIONAL ATOMIC ENERGY AGENCY, Format and Content of the Safety Analysis Report for Nuclear Power Plants, IAEA Safety Standards Series No. GS-G-4.1, IAEA, Vienna (2004).

7) INTERNATIONAL ATOMIC ENERGY AGENCY, Modifications to Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.3, IAEA, Vienna (2001).

8) INTERNATIONAL ATOMIC ENERGY AGENCY, The Operating Organization for Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.4, IAEA, Vienna (2001).

9) INTERNATIONAL ATOMIC ENERGY AGENCY, Maintenance, Surveillance and In-service Inspection of Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.6, IAEA, Vienna (2002).

10) INTERNATIONAL ATOMIC ENERGY AGENCY, Recruitment, Qualification and Training of Personnel for Nuclear Power Plants, IAEA Safety Standards Series No. NS-G-2.8, IAEA, Vienna (2002).

11) INTERNATIONAL ATOMIC ENERGY AGENCY, Operating Experience Feedback for Nuclear Installations, IAEA Safety Standards Series No. SSG-50, IAEA, Vienna (2018).

12) INTERNATIONAL ATOMIC ENERGY AGENCY, Evaluation of Seismic Safety for Existing Nuclear Installations, IAEA Safety Standards Series No. NS-G-2.13, IAEA, Vienna (2009).

13) INTERNATIONAL ATOMIC ENERGY AGENCY, Chemistry Programme for Water Cooled Nuclear Power Plants, IAEA Safety Standards Series No. SSG-13, IAEA Vienna (2011).

14) INTERNATIONAL ATOMIC ENERGY AGENCY, Periodic Safety Review for Nuclear Power Plants, IAEA Safety Standards Series No. SSG-25, IAEA, Vienna (2013).

15) INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants, IAEA Safety Standards Series No. SSG-48, IAEA, Vienna (2018).

ANNEX X - IAEA BASIS PUBLICATIONS FOR SALTO PEER REVIEW OF RESEARCH REACTORS

1) INTERNATIONAL ATOMIC ENERGY AGENCY, Leadership and Management for Safety, IAEA Safety Standards Series No. GSR Part 2, IAEA, Vienna (2016).

2) INTERNATIONAL ATOMIC ENERGY AGENCY, Safety of Research Reactors, IAEA Safety Standards Series No. SSR-3, IAEA, Vienna (2016).

3) INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna (2006).

4) INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for Nuclear Installations, IAEA Safety Standards Series No. GS-G-3.5, IAEA, Vienna (2009).

5) INTERNATIONAL ATOMIC ENERGY AGENCY, Operating Experience Feedback for Nuclear Installations, IAEA Safety Standards Series No. SSG-50, IAEA, Vienna (2018).

6) INTERNATIONAL ATOMIC ENERGY AGENCY, Evaluation of Seismic Safety for Existing Nuclear Installations, IAEA Safety Standards Series No. NS-G-2.13, IAEA, Vienna (2009).

7) INTERNATIONAL ATOMIC ENERGY AGENCY, Maintenance, Periodic Testing and Inspection of Research Reactors, IAEA Safety Standards Series No. NS-G-4.2, IAEA, Vienna (2006).

8) INTERNATIONAL ATOMIC ENERGY AGENCY, Operational Limits and Conditions and Operating Procedures for Research Reactors, IAEA Safety Standards Series No. NS-G-4.4, IAEA, Vienna (2008).

9) INTERNATIONAL ATOMIC ENERGY AGENCY, The Operating Organization and the Recruitment, Training and Qualification of Personnel for Research Reactors, IAEA Safety Standards Series No. NS-G-4.5, IAEA, Vienna (2008).

10) INTERNATIONAL ATOMIC ENERGY AGENCY, Ageing Management for Research Reactors, IAEA Safety Standards Series No. SSG-10, IAEA, Vienna (2010).

11) Safety Assessment for Research Reactors and Preparation of the Safety Analysis Report, IAEA Safety Standards Series No. SSG-20, IAEA, Vienna (2012).

12) Safety in the Utilization and Modification of Research Reactors, IAEA Safety Standards Series No. SSG-24, IAEA, Vienna (2012).

13) Instrumentation and Control Systems and Software Important to Safety for Research Reactors, IAEA Safety Standards Series No. SSG-37, IAEA, Vienna (2015).

14) Periodic Safety Review for Research Reactors, Safety Reports Series No. 99, IAEA, Vienna (in publication).

LIST OF ABBREVIATIONS

AIP	advance information package
AMP	ageing management programme
AMR	ageing management review
DTL	deputy team leader
HPP	host plant peer
INSARR	Integrated Safety Assessment of Research Reactors
I&C	instrumentation and control
ISI	in-service inspection
LTO	long term operation
NPP	nuclear power plant
OSART	Operational Safety Review Team
P&I	piping and instrumentation
PM	plant manager
PSR	periodic safety review
SALTO	Safety Aspects of Long Term Operation
SAR	safety analysis report
SSCs	structures, systems and components
TL	team leader
TLAAs	time limited ageing analyses
WNOs	working notes outlines

GLOSSARY

encouragement. If an item does not have sufficient safety significance to meet the criteria of a 'recommendation' or 'suggestion', but the expert or the team feels that mentioning it is still desirable, the given topic may be described in the text of the report using the phrase 'encouragement' (e.g. the team encouraged the plant/research reactor to…).

facts. A fact is something that is known to have happened or to exist, especially something for which proof exists, or about which there is information. A fact is evidence of a deficiency in programmes or performance. Based on the grouping of facts of similar nature, each reviewer develops an issue stated as a fundamental overall problem which can have a safety consequence.

fundamental overall problem. A fundamental overall problem is a generic deficiency in programmes or performance which is supported by multiple, agreed facts, stated in terms that are consistent with the facts, agreed by the team and which can lead to a safety consequence.

good practice. A good practice is an outstanding and proven programme, activity or equipment in use that contributes directly or indirectly to operational safety and sustained good performance. A good practice is markedly superior to that observed elsewhere, not just the fulfilment of current requirements or expectations. It should be superior enough and have broad enough application to be brought to the attention of other operating organizations and be worthy of their consideration in the general drive for excellence. A good practice is novel; has a proven benefit; is replicable (it can be used at other nuclear installations); and does not contradict an issue. Normally, good practices are brought to the attention of the team on the initiative of the plant. An item may not meet all the criteria of a 'good practice', but still be worthy to take note of. In this case it may be referred as a 'good performance' and documented in the text of the report.

good performance. A good performance is a superior objective that has been achieved or a good technique or programme that contributes directly or indirectly to operational safety and sustained good performance, that works well at the nuclear installation. However, it might not be necessary to recommend its adoption by other nuclear installation, because of financial considerations, differences in design or other reasons.

issue. An issue is an identified problem or an area of improvement, which has been identified based on the IAEA Safety Standards (see Annex IX and X). It is documented in the mission report in a format of and issue sheet (see Annex VII). An issue has a safety consequence that justifies the review team making a recommendation or suggestion.

peer review service. An examination or review of commercial, professional or academic efficiency, competence, etc., by experts in the relevant field. An IAEA peer review service is a process designed to facilitate the review of the degree of conformance of selected regulatory and technical elements of the national infrastructure for nuclear safety, with the IAEA Safety Standards. The review is conducted by a team of experts and coordinated by IAEA staff.

recommendation. A recommendation is advice on what improvements in operational safety should be made in the activity or programme that has been evaluated. It is based on inadequate conformance with the IAEA Safety Standards and addresses the general concern rather than the symptoms of the identified concern. Recommendations are specific, realistic and designed to result in tangible improvements.

safety consequence. A safety consequence is an adverse effect on safety that could result from deficient programmes or poor performance.

self-identified issue. A self-identified issue is documented by the SALTO team in recognition of hosting organization actions taken to address inadequate conformance with the IAEA Safety Standards identified in the self-assessment made by the hosting organization prior to the mission and reported to the SALTO team. Credit is given for the fact that actions have been taken, including root cause determination, which lead to a high level of confidence that the issue will be resolved within a reasonable timeframe. These actions should include budget commitments, staffing, document preparation, increased or modified training, equipment purchases, etc. It is documented in the mission report in a format of an issue sheet (see Annex VII).

suggestion. A suggestion is advice on an opportunity for safety improvement not directly related to inadequate conformance with the IAEA Safety Standards. It is primarily intended to make performance more effective, to indicate useful expansions to existing programmes and to point out possible superior alternatives to ongoing work.

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