Rev Area A – 1 expert
Rev Area B – 1 expert
Rev Area C-E – 3 experts - (C) mechanical, (D) electric and I&C and (E) civil SSCs
Rev Area F – 1 expert

3.1 Organisation and functions, current licensing basis, configuration/ modification management

3.1.1. Related regulatory requirements, codes and standards

Has a complete and consistent set of regulatory requirements, codes and standards related to ageing management and LTO been identified? [SSG-48; 3.2, 3.32, 7.2]

What are the regulatory requirements, codes and standards and are they consistent with the IAEA requirements and recommendations and are the gaps, if applicable, addressed by the plant in the LTO programme? [SSR-2/2; 4.53] [SSG-48; 3.2, 7.2, 7.6]

Does the principal approach and basic concept of the plant's LTO programme meet the intent of the applicable IAEA requirements and recommendations? [SSG-48; 2, 7.6, 7.11-7.15]

Are the ageing management and LTO activities overseen by the regulatory body throughout the lifetime of the nuclear power plant? [SSR-2/2; 4.53] [SSG-48; 3. 6, 7.39, 7.40]

3.1.2. Organizational structure for ageing management and LTO

Is the responsibility for ageing management well defined? [GSR Part 2; 4.3-4.5, 4.11, 4.23] [GS-G-3.1; 3.10, 3.11] [SSG-48; 3.5, 5.1] [SRS No. 15; 4.1]

Has the plant adopted a suitable organizational structure for preparation and implementation of the ageing management? [SSG-48; 3.5, 3.31, 5.1, 5.2]

Is the responsibility for LTO preparation well defined? [GSR Part 2; 4.3-4.5, 4.11, 4.23] [GS-G-3.1; 3.10, 3.11] [SSG-48; 3.31, 7.3, 7.4]

Has the plant adopted a suitable organizational structure for preparation and implementation of the LTO programme? [SSG-48; 3.31, 7.3]

Has the plant established a special LTO oriented project team or similar organizational arrangements dealing with such activities; has it defined responsibilities and duties as well as authorities within the organizational policy and quality assurance system (including control of contractors and TSOs)? [SSG-48; 7.3, 7.4]

Is the number of staff and their required qualifications for ageing management and LTO preparation adequate to the scope of work and duties? [GSR Part 2; 4.22-4.24] [GS-G-3.1, 4.1, 4.2] [SSG-48; 5.1, 5.7, 7.4, 7.10]

Do staff involved in ageing management and LTO activities have specific job descriptions/task responsibilities? [GSR Part 2; 4.23] [GS-G-3.1; 3.5] [GS-G-3.5] [SSG-48; 5.4, 5.6, 7.4]

Do plant managers have the appropriate resources to carry out their assigned responsibilities and accountabilities? [GSR Part 2; 4.21-4.27] [GS-G-3.4, 4.1, 4.2] [SSG-48; 5.1, 7.4]

Does this organizational structure have potential to manage the ageing management and LTO activities with long term perspective? [SSG-48; 5.2-5.7, 7.4]

Are the necessary quality assurance of processes related to ageing management and LTO addressed by the management system and organizational matters? [GSR Part 2; 2.2, Req.6] [GS-G-3.1, 3.10]

3.1.3 Plant policy for LTO

Does a clear policy exist in the area of long term operation and ageing management? [GSR Part 2; 4.2, Req.4] [SSR-2/2; Req.16] [GS-G-3.1; 3.10-3.12, 5.10] [SSG-48; 3.31, 5.1, 7.7]

Is the plant LTO policy consistent with related IAEA Safety Standards and does it meet their intent? [GSR Part 2; 4.2, Req.3] [SSG-48; 7.7-7.9]

Does the plant have plant level documentation covering LTO principles and concept? [SSG-48; 7.7-7.9]

Is the plant personnel familiar with the LTO policy and do they understand it? [GSR Part 2; 4.26] [SSG-48; 7.10]

3.1.4 LTO implementation programme

Does the plant have programme(s) or action plan for the resolution of issues identified during the review of AMPs, EQ and time limited ageing analyses? [SSG-48; 7.18] [SSR-2/2; 4.54]

Does the plant have a programme for major modifications, reconstructions and replacements? [SSG-48; 7.19]

Has an evaluation of the existing NPP programmes and documentation been performed? Are evaluation results used as a basis for developing the foundation for successful LTO and will they remain effective for the planned period of LTO. Will this evaluation determine if modifications and/or new programmes are necessary to ensure that SSCs are available and qualified to perform their intended function for the planned period of LTO? [SSG-48; 7.11-7.15, 7.16-7.18]

How has the plant applied the measures taken in connection to identified issues and how have these measures been incorporated into a relevant programme? Does the plant implementation programme for LTO cover activities such as modifications, major reconstructions and

scheduled replacements, and other plant commitments needed for assuring safety during LTO? [SSG-48; 7.19]

How and to what extent is the programme supported by safety analyses and if applicable by business evaluations, and how are plant activities coordinated in respect of an overall programme for LTO? [SSG-48; 3.11, 4.1-4.5, 7.5-7.6, 7.26-7.28]

Are relevant operating experience and research findings taken into account? [SSR-2/2;5.27-5.30, 5.32] [SSG-48; 2.7, 2.21, 2.31, 3.3, 3.11, 3.30, 3.35, 4.8, 5.8, 7.14, 7.16, 7.18]

Are recommendations and other suggestions arising from different types of reviews incorporated into plant activities? [SSR-2/2; 4.47] [SSG-25, 9.1-17] [SSG-48; 4.6]

Are the assumptions, activities, evaluations, assessments and results of the evaluation of the plant programme for ageing management and plant programme for long term operation properly documented? Is the documentation developed and retained in an auditable and retrievable form? [SSG-48; 5.70, 7.29]

Does the documentation include the following to demonstrate that ageing effects will be managed during the planned operating period:

- *A description of plant programmes and documentation relevant to ageing management;*
- *A list of commitments or plans for improvement or development of plant programmes and documentation relevant to ageing management. [SSG-48; 5.71, 7.31]*

3.1.5 Current safety analysis report and other licensing basis documents

PSR related questions

Does the PSR report or similar safety assessment provide comprehensive information on ageing management, equipment qualification and LTO (e.g. assumptions, activities, evaluations, assessments and results of the plant programme for ageing management, equipment qualification and LTO)? [SSR-2/2; 4.44, 4.50, 4.53] [SSG-48; 4.3, 4.6-4.8, 7.37] [SSG-25, 5.37-51]

If the PSR is used as a licensing tool, does it consider the entire planned period of long term operation and not just the ten years until the next PSR? [SSR-2/2; 4.44, 4.53] [SSG-48; 5.74, 7.38] [SSG-25, 3.7]

Does the scope of PSR review identify life limiting features of the plant in order to determine if there is a need to modify, refurbish or replace certain SSCs for the purpose of extending the operating lifetime of the nuclear power plant? [SSR-2/2; 4.44, 4.47, 4.53] [SSG-25; 3.2]

Is the scope of national and international standards and codes used as a PSR basis appropriate? [SSR-2/2; 4.44] [SSG-48; 4.5, 4.6, 4.10]

Does PSR include appropriate review of the following plant programmes and documentation, as these are of significant importance for safe long term operation? [SSR-2/2; 4.44, 4.50, 4.53] [SSG-25; 3.8]

— *Plant programmes to support the safety factors relating to plant design (SF1), the actual condition of SSCs important to safety (SF2), equipment qualification (SF3) and ageing (SF4);*
— *A management system that addresses quality management and configuration management (SF10);*
— *Time limited ageing analyses (SF5);*
— *Use of experience from other plants and research findings (SF9).*

Does PSR review safety factors (particularly SF 1: Plant design, SF 2: Actual condition of SSCs important to safety, SF 3: Equipment qualification, SF 4: Ageing) in sufficient detail to determine the feasibility of long term operation? [SSR-2/2; 4.44, 4.53] [SSG-25; 3.6]

Does PSR review identify trends of reported events and their possible connection with degradation of SSCs? [SSR-2/2; 4.44] [SSG-48; 2.7, 3.35, 4.8, 4.34-4.36, 5.28, 5.56, 7.40]

Are the results of the previous PSR examined in order to detect any long-term trends in deteriorating safety performance? [SSR-2/2; 4.44, 4.53] [SSG-25; 5.95]

Is long term operation properly justified by safety assessment, with consideration given to the life limiting processes and features of SSCs important to safety? [SSR-2/2; 4.53] [SSG-25; 3.1]

Does PSR global assessment provide justification for proposed long term operation in both the short term and long term? [SSR 2/2; 4.53] [SSG-25; 2.17, 4.21, 4.26-27, 6.6, 6.12, Appendix II.5] [SSG-48; 2.5, 2.30, 2.32]

Does operating organization appropriately report to the regulatory body about PSR conduct and results? [SSR-2/2; 4.45, 4.53]

Does PSR review determine reasonable and practicable modifications to be made in order to ensure that a high level of safety is maintained during long term operation? [SSR 2/2; 4.47, 4.54] [SSG-25; 3.6, 3.10, 5.12, 5.104, 5.128, 8.14]

Does the integrated implementation plan to be developed after the PSR contain the reasonable and practicable safety improvement? [SSG-25; 2.18, 8.23, 9.1]

FSAR related questions

Is the justification for plant safety during the planned period of LTO properly documented in FSAR (both ageing aspects and safety upgrades)? [SSR-2/2; 4.44, 4.54] [GS-G-4.1;3.160-3.164, 3.166, 3.167] [SSG-48; 4.1-4.3, 4.10]

Has the FSAR been updated to reflect the results of ageing management and LTO assessment activities (e.g., AMR, review of AMPs and plant programmes, revalidation of TLAAs)? [SSR-2/2; 4.54] [GS-G-4.1; 3.160-3.164, 3.166, 3.167] [SSG-25; 3.9] [SSG-48; 4.2, 4.4-4.5, 7.36]

Has the FSAR been updated and a proper safety justification provided when PSR review revealed discrepancies between the design documentation and the actual configuration, or that information on the design basis of SSCs important to safety is incomplete? [SSG-25; 4.14]

3.1.6 Configuration/modification management including design basis documentation (DBD)

Has the configuration management programme been established and implemented at the plant? [SSR-2/2; Req. 10, 4.38, 4.39] [NS-G-2.3; 4.13-18] [SSG-48; 4.9-4.10, 4.12]

Are plant activities effectively managed to verify that the plant physical configuration and operation conform to design requirements and to design documents all the time? [SSR-2/2; Req. 10, 4.38, 4.42] [NS-G-2.3; 4.15-16] [SSG-48; 4.9-4.10, 4.12]

Is the responsibility for plant modifications and set-points well defined? [SSR-2/2; Req. 10, 4.39, 4.40] [NS-G-2.3; 2.4, 3.1 -3.10]

Is the impact of the modification on plant safety properly assessed? [NS-G-2.3; 4.8-4.11]

Are the operational limits and conditions reassessed and revised, as necessary, following any safety related modifications at the plant or any changes to the safety analyses report, and also on the basis of accumulated experience and technological developments? [NS-G-2.3, 2.10, 3.2, 3.3, 3.30, 4.19-21]

Is QA involvement in place during the modification process to ensure that all updating of controlled drawings, documents and required training was completed before the actual operation of the modified system or equipment? [SSR-2/2; Req. 10, 4.42] [NS-G-2.3, 3.7, 4.14, 7.2, 9.1]

Does the QA programme deal with Configuration Management issues and in extent necessary for assurance of all plant modifications and design changes during the current operational period as well as period of LTO? [SSR-2/2; Req. 10, 4.39] [NS-G-2.3, 9.1]

Does the plant quality assurance plan specifically dealing with configuration management to such extent, which guarantees necessary input for LTO analyses? [NS-G-2.3, 9.1]

Is there a design authority? [NS-G-2.3; 3.19] [SSG-48; 4.11]

Does the plant have access to design basis documentation which contains design basis requirements and supporting design information? [SSR-2/1; 5.3] [SSG-48; 4.13]

Is the design basis information and its changes included in the safety analysis report or separate design basis documentation? [SSR-2/1; 5.3] [SSG-48; 4.14]

Are alternative arrangements in place, which compensate for the lack of complete design basis documentation at the plant, e.g. the programme of reconstitution of design basis? [SSR-2/1; 5.3] [SSG-48; 4.15]

3.2. Scope setting and plant programmes relevant to ageing management and LTO

3.2.1. Methodology and criteria for scope setting of SSCs for ageing management and LTO

Does the plant have a clear policy on the scope of ageing management and LTO and a systematic process which includes:

- *Relation to safety classification system;*
- *Criteria for scoping including boundary conditions; and*
- *Identification of all plant's SSCs (such as a master equipment list)?*

[SSR-2/2; 4.54] [SSG-48; 5.14, 5.15]

Are the criteria for SSCs scope setting of ageing management and LTO consistent with IAEA Safety Standards? [SSR-2/2; 4.54] [SSG-48, 5.16, 5.17]

What methodology has been used for identifying SCs within the scope of LTO, especially for identifying SCs not important to safety within the scope? [SSR-2/2; 4.54] [SSG-48; 5.16-5.19]

Were dedicated plant walk-downs used to check the completeness of the list of SSCs whose failure may prevent SSCs important to safety from performing their intended functions? [SSR-2/2; 4.54] [SSG-48; 5.19]

Is a distinction between SSCs within the scope and those out of the scope clear? Are boundaries between SSC within the scope and SSC out of the scope clearly defined? [SSG-48; 5.18, 5.21]

Does the plant have a clear division of SCs which include interfaces between areas of mechanical, electrical, I&C components and civil structures (e.g., motor-operated valves, cable trays, penetrations, liners, supports)? [SSG-48; 5.18- 5.21]

Have SCs commodities groups (group of components/ structures which have similar functions, similar materials or are in similar environment) been defined and if so, how? [SSG-48; 5.20]

Are the scoping method and results (SSCs in scope and out of scope) properly documented, and is the relevant data accessible (indicating e.g. information sources, intended function, safety class, scoping criteria applied)? [SSR-2/2; 4.52] [SSG-48; 5.21, 5.70, 7.18, 7.29-7.30, 7.33]

Are the results of the scoping processes documented in a manner that complies with the requirements of the quality assurance programme? [SSG-48; 5.70, 7.29-7.30]

Does the plant use risk based information (e.g. PSA) to extend the scope for LTO? (PSA results should not be used to exclude SCs from the scope of LTO.) [SSG-48; 5.16]

3.2.2. Plant programmes relevant to LTO

Maintenance

Are experienced and potentional ageing effects taken into account in preventive and predictive maintenance programmes for in-scope SCs to determine a suitable maintenance method, e.g. overhaul maintenance and condition based maintenance, and an interval of the maintenance? [NS-G-2.6, 2.8-2.9]

Does the plant have a systematic approach to maintenance such as reliability centered maintenance, condition based maintenance and risk informed methods? [NS-G-2.6, 2.5-2.6, 8.2-4] [SSG-48; 4.17]

Are preventive and predictive maintenance programmes periodically evaluated based on new regulatory requirements, suppliers' recommendations, past maintenance history and feedback from related operational experience and research results and findings? [NS-G-2.6, 2.7, 2.8, 2.10, 6.11-14] [SSG-48; 3.3, 3.30, 3.35, 4.18]

Are the results of the scoping setting and ageing management review adequately reflected into the existing preventive and predictive maintenance programmes? [SSR-2/2; 4.54] [NS-G-2.6, 2.9, 8.1] [SSG-48; 4.20-4.22]

Does the plant have a process to evaluate existing preventive and predictive maintenance programmes used to manage ageing of in-scope SCs against the nine attributes? [SSG-48; 4.17, 4.21, 4.22]

Is it clearly defined for each in-scope SC what maintenance programmes (e.g. preventive, predictive and corrective) are applied, which ageing effects they manage, what maintenance/inspection methods are used, maintenance frequency, tasks, records and storage? [NS-G-2.6, 2.5-2.6, 8.1, 8.4] [SSG-48; 4.19, 4.20]

Does the evaluation of the maintenance results also include trend analysis? [SSG-48; 4.17]

Do maintenance programmes also address obsolescence of SSCs including the intended period of LTO? [SSG-48; 6.3]

Does the plant have a process and database that support the evaluation of effectiveness of maintenance programmes in detecting and characterizing ageing effects? Can you provide technical references to support findings and conclusions? [NS-G-2.6; 5.19, 5.33- 36, 9.16, 9.22] [SSG-48; 4.17, 4.21, 4.22, 5.54]

Equipment qualification *(typically reviewed by reviewer D)*

Has the plant developed, implemented and maintained comprehensive equipment qualification programme? [SSR-2/2; 4.48-49] [SSG-48; 4.23-31]

Is there equipment qualification master list containing mechanical, electrical and I&C components in place? Does it include cables, connectors and penetrations? Is this list updated regularly? [SSR-2/2; 4.49] [SSG-48; 4.29]

Is equipment qualification status preserved and updated through surveillance, maintenance, modifications and replacement, environment and equipment condition monitoring and configuration management? Are adequate interfaces with related programmes in place? [SSG-48; 3.35, 4.18, 4.27, 4.30] [SRS No. 3; 5.3]

As regards seismic qualification, does the plant use appropriate seismic motions based on the latest knowledge, operational experience and research findings? Are possible ageing effects taken into account for seismic qualification? [NS-G-2.13; 4.1-4.8]

Is all environmentally qualified equipment included in the scope for LTO? [SSR-2/2; 4.48] [SSG-48; 5.16]

Are the results of the scope setting, ageing management review, and TLAA revalidations for LTO adequately used to update equipment qualification programmes? [SSR-2/2; 4.48] [SSG-48; 4.23, 4.28, 4.29] [SRS No. 3; 3.3.2, 4.1]

Has the plant evaluated the existing equipment qualification programmes for LTO for consistency with the nine attributes? [SSR-2/1; 5.49] [SSR-2/2; 4.48, 4.54] [SSG-48; 4.17]

If the equipment qualification programme was designed according to earlier standards, is the re-qualification programme for in-scope SCs in place, focused on ensuring that the equipment can perform its function under current design basis condition? [SSG-48; 4.28, 4.30]

Has it been demonstrated that environmental qualification will remain valid over the expected period of LTO? Have corrective measures been developed and implemented? Does the demonstration support the technical justification that ageing effects will be managed effectively? [SSR-2/1; 5.49] [SSR-2/2; 4.25, 4.48]

Can you provide the qualification results on safety related mechanical, electric and I&C equipment located inside containment? Do these results specify whether the equipment has been qualified to perform its safety functions in environmental conditions equivalent to design basis accident conditions for the planned period of LTO? [SSG-48; 4.25, 4.26, 4.28]

Is timely replacement of equipment that cannot be qualified for the planned period of LTO adequately considered? Has a specific programme for replacement of mechanical, electrical and I&C equipment with qualified or stated lifetimes less than the planned LTO period been developed and implemented? [SSR-2/1; 5.49] [SSG-48; 4.25, 4.26, 4.28, 4.50, 5.25(6)]

Has the availability of qualified manufacturers and products needed for plant modifications for LTO been considered? [SSG-48; 6.7] [SRS No. 3; 5.3.2]

Is equipment qualification documentation available and retrievable for the whole period of LTO? [SSG-48; 4.29] [SRS No. 3; 2.7]

In-service inspection

Does the plant have a process to ensure that ageing mechanisms identified from operating experience and research findings are taken into account in the existing ISI programmes for SCs important to safety to determine a suitable ISI method? [NS-G-2.6, 10.5-10.10] [SSG-48; 3.3, 3.30, 4.50, 4.52, 4.53, 5.8]

Are ISI programmes periodically evaluated based on past ISI results, operating experience, new knowledge and research findings? [SSG-48; 3.3, 3.30, 3.35, 4.17, 4.50, 4.52, 4.53, 5.8]

Are results of the scope setting, ageing management review, and TLAA revalidations for LTO adequately reflected in the existing ISI programmes? [SSR-2/2; 4.54] [NS-G-2.6; 2.13] [SSG-48, 4.32]

Has the plant evaluated the existing ISI programmes for LTO for consistency with the nine attributes? [SSR-2/2; 4.54] [SSG-48; 4.17]

Are ISI results correctly documented (e.g. in a properly maintained database)? Can you provide the technical bases to support the justification for LTO? [NS-G-2.6, 7.6-7.8, 10.45-10.47] [SSG-48; 4.34, 4.36]

Does the ISI programme for SSCs in the scope of LTO clearly identify the inspection method, the links with ageing management programmes, the frequency, tasks, records and storage? [SSG-48; 4.32] [NS-G-2.6; 4.5, 4.21, 6.12]

If ISI results indicate notable degradation, are similar locations appropriately determined? Are SSCs in redundant subsystems inspected independently to detect possible differences in their ageing behavior? [SSG-48; 4.35]

Has the ISI programme been reviewed and evaluated for effectiveness in detecting and characterizing the degradation mechanisms for SSCs within the scope of LTO? Does evaluation provide a technical basis to justify that the ageing phenomena will be detected in a timely manner with the proposed inspection? [SSG-48; 4.33] [NS-G-2.6, 2.13, 10.1-2, 4]

Have the methodology, equipment, and personnel, which are part of the ISI process, been qualified according to national standards, regulatory requirements, and IAEA recommendations [7] where applicable? [NS-G-2.6, 10.24-34]

If the plant is using risk informed ISI, can you provide the related justification? Has the effectiveness of risk informed ISI been evaluated, considering limited operational experience of risk informed ISI programmes, and the limitations of the underlying probabilistic analyses of risk informed ISI? [SSG-48; 3.3, 3.30, 4.33]

Surveillance and monitoring

Are results of the scope setting, ageing management review, and TLAA revalidations for LTO adequately reflected in the existing surveillance and monitoring programmes? [SSR-2/2; 4.54] [NS-G-2.6; 9.1-9.9]

Has the plant evaluated the existing surveillance and monitoring programmes for LTO for consistency with the nine attributes? [SSR-2/2; 4.54] [SSG-48; 4.17]

Do the programmes confirm the provisions for safe operation that were considered in the design, assessed in construction/commissioning and verified in operation? [NS-G-2.6; 2.12] [SSG-48; 4.38]

Do the surveillance and monitoring programmes remain effective for assessing the service life of SSCs and supporting safe LTO? [NS-G-2.6;7.6-8] [SSG-48; 3.35, 4.39-4.41

Do plant surveillance and monitoring programmes consider feedback on operating experience and research results and findings? [SSG-48; 3.3, 3.30, 4.8, 4.50, 4.52, 4.53, 5.8] [NS-G-2.6; 2.7, 6.11-14]

Has the plant implemented supplementary LTO related surveillance programmes, such as reactor pressure vessel supplementary surveillance programme, controlled ageing management programmes for cables, surveillance programme of concrete etc.? [NS-G-2.6; 9.9] [SSG-48; 4.42-4.44]

Monitoring of chemical regimes

Are results of the scope setting, ageing management review, and TLAA revalidations for LTO adequately reflected in the existing chemistry program? [SSR-2/2; 4.54, 7.13-7.17]

Has the plant evaluated the existing chemistry programme for LTO for consistency with the nine attributes? [SSR-2/2; 4.54] [SSG-48; 4.17]

Does the chemistry programme consider feedback on operating experience and research results and findings? [SSG-13; 7.9] [SSG-48; 3.3, 3.30, 4.8, 4.50, 4.52, 4.53, 5.8]

Has the plant chemistry programme been reviewed with respect to LTO and modified if applicable? [SSG-48; 3.22, 3.35, 4.47]

Are chemistry staff aware of implications of chemistry parameters on known aspects which could adversely impact safety during LTO (such as corrosion, erosion, inter-granular stress corrosion cracking, primary water stress corrosion cracking, etc. of SCs within the scope of LTO)? [SSG-13; 3.4, 4.4, 4.47] [SSG-48; 4.48]

Are new findings and conclusions coming from e.g. surveillance and ageing management being considered in updating plant chemistry programme and are the appropriate interfaces established? [SSG-48; 4.17, 4.45, 4.46]

Are chemistry practices in compliance with technical specifications and consistent with international good practices? Do they appropriately take into account the materials concept? [SSG-13; 3.4] [SSG-48; 3.22, 4.17, 4.45, 4.46]

Does the chemistry programme include diagnostic parameters that provide useful information for determining and preventing the cause of unexpected ageing? [SSG-13; 6.7-6.23] [SSG-48; 3.22, 4.45, 4.47]

Corrective action programme

Is there a corrective action programme 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? [SSG-48; 3.25, 4.49]

Does the corrective action programme document occurrences of identified ageing related degradation (conditions adverse to quality) and the methods used address the degradation, such as evaluation and acceptance, evaluation and monitoring, repair, or replacement? Is such information be taken into account as plant specific operating experience? [SSG-48; 3.3, 3.25, 3.30, 4.50]

Does the corrective action programme document the modifications to ageing management programmes, system configuration or plant operations that are made to manage the occurrence or the severity of the ageing effect? [SSG-48; 4.51]

Is the corrective action programme and the associated plant specific operating experience routinely reviewed by individuals responsible for the relevant ageing management programme to determine whether ageing management programmes need to be enhanced? [SSG-48; 3.3, 3.30, 3.35, 4.52]

Are the modifications of the existing ageing management programmes specified and implemented, or new ageing management programmes developed, if it is determined as needed through the evaluation of the corrective action programme and the associated plant specific operating experience? [SSG-48; 3.25, 3.30, 4.53]

3.3. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses

3.3.1. Data collection and record keeping

Are efficient data collection and record-keeping systems in place so that trend analyses can readily be performed to predict SSC performance? [SSG-48; 3.23, 5.9-5.11]

Do the data collection and record-keeping systems provide all information for AMR? [SSG-48; 3.23, 5.9-5.11]

Is design documentation, including documentation from suppliers, made available? [SSG-48; 5.9-5.12]

3.3.2. Area specific scoping and screening of SSCs for LTO

Is a master list of plant SCs available? Which items are in scope for LTO and out of scope for LTO? [SSG-48; 5.15, 5.18]

Is the scope of SCs for LTO complete and documented? Does it fulfil scope setting criteria? [SSR-2/2; 4.54] [SSG-48; 5.14-5.17, 5.21, 5.70, 7.18, 7.20, 7.29, 7.30, 7.33]

Are SCs to prevent/ mitigate design extension conditions within the scope of LTO? [SSR-2/1 R.1; Req.20, 5.27, 5.29(c)] [SSG-48, 5.16]

If scope setting data is distributed into more than one database, how is data consistency assured? [SSG-48; 5.14-5.15, 5.21, 7.29-7.30, 7.33]

Are other SCs failure of which may impact on accomplishment of safety functions included in the scope? [SSG-48; 5.16]

Have SCs commodity groups (group of components/structures which have similar functions, similar materials and are in similar environment) been defined and if so, how? [SSG-48; 5.20]

3.3.3. Ageing management review

Identification of programmes to manage ageing of in-scope structures or components

Are SCs within the scope of LTO subjected to appropriate programmes such as AMPs, revalidation of time limited ageing analyses or existing plant programmes? [SSR-2/2; 4.54] [SSG-48, 5.22-5.23, 5.25-5.26, 7.18, 7.20-7.21]

Have appropriate ageing management reviews and condition assessments been performed for all SCs in scope? [SSR-2/2; 4.53, 4.54] [SSG-48, 3.24, 5.22-5.23, 5.25-5.26, 7.11, 7.18, 7.22, 7.24-25]

Are all the important input design data such as design description, design basis including loads and other parameters necessary for evaluation of safety available or accessible for the plant? [SSG-48; 5.26]

Identification of ageing effects and degradation mechanisms

Is information on maintenance history starting with time of commissioning and basic data from fabrication of components including material properties and service conditions kept and managed in a proper way? [SSG-48; 5.28, 7.23]

Does the review and assessment of the operating and maintenance history for the structure or component form part of the analyses accounting for such parameters as operational transients, past failures, or unusual conditions that affected the performance or condition of the structure or component? Is an examination of repairs, modifications or replacements relevant to ageing considerations included in the analysis of the SCs? [SSG-48; 3.26, 5.28-5.29]

Is operational data collected with a focus on transients, events and generic operating experience? Does it also include information such as power uprating, modification and replacement, surveillance and any trend curves that are important for the overall assessment? [SSG-48; 3.3, 3.30, 4.8, 5.28-5.29, 7.22-7.23]

Does a procedure exist for the structure, component or commodity grouping to assess degradation effects into the detail? [SSG-48; 5.23, 5.30, 7.32]

Does plant ageing management contain identification of possible ageing effects/ mechanisms, critical locations/ parts, material, environment and ageing management programmes addressing these subjects for SCs in a scope of LTO? [SSG-48; 3.24, 5.27-5.29]

Are the measures taken to ensure that spare parts are stored in an appropriately controlled environment to avoid degradation mechanisms owing to their storage environment (e.g. high or low temperatures, moisture, chemical attack, dust accumulation)? [SSG-48; 3.28]

Have materials, environment and stressors that are associated with each structure, component, or commodity grouping in the process of identification of ageing degradation effects been properly considered? [SSG-48; 5.27-5.29]

Have operating experience and research findings and results been adequately considered? [SSG-48; 3.3, 3.30, 4.8, 5.8, 5.28]

Can you provide selected examples demonstrating consistency with IGALL AMR tables? [SSG-48; 5.24] [SRS No. 82]

Identification of the appropriate programme for ageing management

Were appropriate methods to detect, monitor, prevent and mitigate ageing effects and degradation mechanisms specified for each structure or component? [SSG-48; 5.30]

Are existing and proposed plant programmes that support LTO consistent with the IAEA recommendations including the nine attributes? [SSG-48; 3.33, 5.31-5.32, 5.38-5.41, 5.43-5.49, 7.18, 7.26-7.27]

Reporting on the ageing management review

Is the methodology used to carry out the ageing management review documented and justified? [SSG-48; 7.32]

Has it been demonstrated that the effects of ageing will continue to be identified and managed such that the intended function of the SC will be maintained throughout the planned period of LTO? [SSG-48; 5.22, 5.26, 5.30, 5.33, 7.13-7.15]

Does the plant develop and maintain in an auditable and retrievable form all information and documentation necessary for an effective management of ageing effects? [SSG-48; 5.70, 7.29-7.30]

Is the following information available in the documents demonstrating management of ageing effects?

- *Clear identification of the ageing effects requiring management;*
- *Understanding of ageing, monitoring of ageing and prevention and mitigation of ageing effects;*
- *Identification of the specific programmes or activities that will manage the effects of ageing for each structure, component, or commodity grouping listed;*
- *Description of how the programmes and activities will manage the effects of ageing;*
- *Description of application of results of the ageing management review in plant operation, maintenance and design;*

- *List of substantiating references and source documents;*
- *Discussion of any assumptions or special conditions used in applying or interpreting the source documents; and*
- *Description of existing and new programmes for LTO.*

[SSG-48; 5.33-5.35, 5.39-40, 7.29-7.31, 7.34-7.35]

3.3.4. Ageing management programmes

Can you provide specific examples of existing and new AMPs to demonstrate consistency with IGALL AMPs with respect to meeting the intent of IGALL AMPs? [SSG-48; 3.33, 5.36, 5.42, 5.50] [SRS No. 82]

Are AMPs consistent with the IAEA recommendations including the nine attributes? [SSG-48; 3.33, 5.38, 5.46]

If the AMP involves inspection by sampling from a specific population of structures or components, does it describe and justify the methods used for selecting the samples to be inspected and the sample size? [SSR-2/2; 4.50] [SSG-48; 5.41]

Development of ageing management programmes

Is the development of the AMPs based on the results of the ageing management review? [SSR-2/2; 4.50] [SSG-48; 5.45]

Are existing and new AMPs specific to ageing effects and degradation mechanisms or specific to structures and components? [SSR-2/2; 4.50] [SSG-48; 5.43, 5.44]

Are specific actions relating to the detection, monitoring and prevention or mitigation of ageing effects properly specified within each AMP (e.g. maintenance, equipment qualification, in-service inspection, testing and surveillance, as well as for controlling operating conditions)? [SSR-2/2; 4.50] [SSG-48; 5.44]

Information on the current status of in-scope structures or components should be collected for subsequent review of the effectiveness of the ageing management programmes.

Are performance indicators representing the effectiveness of the AMPs developed along with the development of the AMPs? [SSR-2/2; 4.50] [SSG-48; 5.49, 5.56]

Are IGALL AMPs used as guidance for the development of AMPs? [SSR-2/2; 4.50] [SSG-48; 5.50]

Implementation of ageing management programmes

Are AMPs implemented in a timely manner with appropriate data to ensure that the intended functions of structures or components continue to be met? [SSR-2/2; 4.50] [SSG-48; 5.51, 5.53]

Are detailed implementation procedures that describe preventive and mitigatory actions, monitoring or inspection and assessment actions, acceptance criteria and corrective actions established and shared among the different units of the nuclear power plant (e.g. the operations, maintenance and engineering units) that are responsible for implementing ageing management programmes? [SSR-2/2; 4.50] [SSG-48; 5.52]

Review and improvement of ageing management programmes

Does the plant conclude, after reviewing the existing plant programmes and/or ageing management programmes, that the management of ageing effects is not adequate in some cases? If so, does the plant modify the existing programme or develop a new programme for the purpose of LTO? [SSR-2/2; 4.54] [SSG-48; 3.33, 5.37, 5.54-5.63]

Are AMPs coordinated, implemented and periodically reviewed for improvements? [SSR-2/2; 4.50] [SSG-48; 5.37, 5.39]

Are operation, inspection/monitoring and maintenance programmes well-coordinated by AMPs? [SSR-2/2; 4.50] [SSG-48; 2.9-2.10, 5.37, 5.39, 5.41, 5.43]

Is the effectiveness of AMPs periodically evaluated in the light of current knowledge and feedback from the programme and the performance indicators? [SSR-2/2; 4.50] [SSG-48; 3.35, 5.54, 5.56]

How are AMPs incorporated into the management system of the operating organization? [SSR-2/2; 4.50] [SSG-48; 5.55]

Are data and information newly acquired through the implementation of AMPs shared among responsible units and other internal or external organizations involved in ageing management? Are these data connected with the existing plant databases, such as the master equipment and component list? [SSR-2/2; 4.50] [SSG-48; 5.57]

Is an in-depth review of ageing management performed periodically (e.g. as part of PSR or as part of the safety review for LTO)? [SSR-2/2; 4.50] [SSG-48; 3.35, 5.61, 5.62]

Documentation of ageing management

How are assumptions, activities, evaluations, assessments and results of the evaluation of the plant programme for ageing management documented? [SSR-2/2; 4.50] [SSG-48; 5.70, 5.71]

Does the documentation also include demonstration that ageing effects will be managed during the planned operating period, a list of plant commitments and an update of the safety analysis report? [SSR-2/2; 4.50] [SSG-48; 5.71, 5.72]

3.3.5. Obsolescence management programme

Has a dedicated plant programme to manage technological obsolescence consistent with the IAEA recommendations been developed and implemented? [SSG-48; 3.20, 6.1, 6.3, 6.6-6.8]

Has the technological obsolescence programme been reviewed for consistency with the 9 attributes? [SSG-48; 6.5]

Have the appropriate technological obsolescence management reviews and assessments been performed for all SCs important to safety? [SSG-48; 3.20, 3.27, 6.2]

Has it been demonstrated that the effects of obsolescence will be continuously identified and managed such that the intended function of SCs will be maintained throughout the planned period of LTO? [SSG-48; 3.20, 6.7-6.8]

Does the plant review the efficiency of the existing technological obsolescence programmes on a regular basis? [SSG-48; 6.11]

Are operating experience, results of research and development, and the information provided in SRS No. 82 [16] systematically considered in the reviews of the technological obsolescence programme? [SSG-48; 3.3, 3.30, 6.10]

Is a system in place for the management of technological obsolescence of SSCs such as I&C equipment and systems, sensors, medium voltage cables, uninterruptable emergency power supply (UPS)? [SSG-48; 3.27, 6.1]

3.3.6. Existing time limited ageing analyses

Are the existing time limited ageing analyses (e.g. from FSAR) properly documented in the current safety analyses report or other licensing basis documents? Do they clearly and adequately describe the current licensing basis or the current design basis requirements for plant operation? [SSG-48; 5.64-5.68, 7.5, 7.11, 7.14, 7.28]

Has the plant established a list of existing time limited ageing analyses? [SSG-48; 3.34, 5.64, 7.18]

Which methods and information sources were used to identify the TLAAs? [SSG-48; 5.64, 7.18]

Has the plant identified missing time limited ageing analyses? [SSG-48; 3.34, 5.65, 7.18]

Has the plant launched time limited ageing analyses reconstitutions if needed? [SSG-48; 5.65, 7.18]

Are typical time limited ageing analyses part of the safety analyses such as: [SSG-48; 2.23, 5.64-5.68]

- *Irradiation embrittlement of the reactor pressure vessel;*
- *Thermal and mechanical fatigue;*
- *Thermal ageing;*
- *Loss of preload;*
- *Loss of material.*

Are plant TLAAs consistent with IGALL TLAAs and do they meet their intent? [SSG-48; 5.65] [SRS No. 82]

3.3.7. Revalidation of time limited ageing analyses

What methods and criteria are used for revalidation of time limited ageing analyses? [SSG-48; 5.67-68]

Do the reviewed time limited ageing analyses justify safe operation for LTO? [SSR-2/2; 4.54] [SSG-48; 5.69, 7.18, 7.28]

Has the qualification of SCs covered by the EQ programme been satisfactorily established and maintained for LTO? [SSR-2/2; 4.54] [SSG-48; 5.69]

Has an evaluation been done to demonstrate that the safety analyses meet one of the following criteria:

- *The analysis remains valid for the intended period of LTO;*
- *The analysis has been projected to the end of the intended period of LTO;*
- *The effects of ageing on the intended function(s) of the structure or component will be adequately managed for the intended period of LTO. [SSG-48; 3.34, 5.67, 7.14, 7.17-7.18, 7.28]*

What corrective or compensatory measures are taken, if the analyses cannot be revalidated? [SSG-48; 3.34, 5.68, 7.18-7.19]

Are the implications of revalidation considered in the plant operational limits and conditions? [SSG-48; 5.70-5.72, 7.18]

Is the revalidation of time limited ageing analyses documented in an update to the FSAR? [SSG-48; 5.70-5.72, 7.18, 7.36]

Operational limits and conditions

Have the stressors given in the design specifications or Current Licensing Basis been used for assessment of SCs and their supports? [SSG-48; 2.7, 2.9, 2.10, 2.11, 3.9, 3.21

Check if data from surveillance programmes and diagnostic systems were applied in the analyses? [SSG-48; 3.23]

Were limits established in the design specifications or current licensing bases used?

Documentation of revalidation

Does the plant develop and maintain in an auditable and retrievable form all information and documentation necessary for revalidation of time limited ageing analyses? [SSG-48; 7.29-7.31, 7.36]

3.4. Human resources, competence and knowledge management for LTO

3.4.1. Human resources policy and strategy to support LTO

Do the plant human resources policy and strategy reflect LTO requirements? [GSR Part 2; 4.16] [GS-G-3.1; 2.54] [NS-G-2.4; 5.10; 6.11]

Do management manuals and job descriptions determine roles, responsibilities and delegations of authority for all managers in key positions related to LTO? [GSR Part 2; 4.16] [GS-G-3.1; 2.53; 2.54;] [NS-G-2.4; 2.11, 3.4]

Is good coordination maintained among different plant groups, among the site organizations and contractors involved in LTO? [NS-G-2.4; 3.2(5) (9), 4.5-4.10] [GSR Part 2; 4.29] [GS-G-3.1; 2.31, 6.3]

Are staffing and resources sufficient to accomplish the tasks assigned? [NS-G-2.4; 2.3, 3.1, 3.7, 3.15, 4.8, 5.10, 6.1, 6.2 6.11-6.15, 6.29, 6.30] [SSR-2/2; 3.10-3.11] [GSR Part 2; 4.21-4.27] [GS-G-3.1; 2.23, 2.36, 3.2, 3.11-3.12, 4.1-4.12]

Is the staffing policy directed to retaining a pool of experienced and knowledgeable staff? [GSR Part 2; 4.21-4.27] [GS-G-3.1; 4.1; 4.2; 4.6; 4.7 5.60] [NS-G-2.4; 2.7]

Are long-term staffing policy objectives for human resources established and maintained? [NS-G-2.8; 2.2, 4.4] [GS-G-3.1; 4.29, 5.11, 4.7] [NS-G-2.4; 6.11; 6.12; 6.14]

Have specific competence requirements for LTO related positions been identified and are these used in the recruitment/selection process for these positions? [NS-G-2.8; 2.12 – 2.14] [GS-G-3.1; 4.6, 4.7] [NS-G-2.4; 2.14, 2.15]

Is long-term succession planning established and implemented? [NS-G-2.8; 4.1, 4.11] [GS-G-3.1; 4.2-4.3, 4.29]

Do plant managers have the appropriate resources to carry out their assigned LTO responsibilities and accountabilities? [GSR Part 2; 4.15, 4.21-4.25] [GS-G-3.1; 4.1-4.2, 4.6-4.7, 5.21, 5.59, 6.32]

3.4.2. Competence management for LTO and recruitment and training/ qualification processes for personnel involved in LTO activities

Does the plant have a process to ensure competent human resources for LTO including external support? [SSR-2/2; 3.4-3.7] [NS-G-2.8; 2.18, 3.1, 3.2, Appendix I] [GS-G-3.1; 4.18, 4.20, 4.21]

Does the plant have an adequate process for assessing and meeting the organizational competency requirements to support LTO? [GSR Part 2; 4.21, 4.23, 4.24, 4.28, 6.1-6.5] [GS-G-3.1; 4.8; 4.9] [NS-G-2.8; 2.2; 2.4; 2.12; 4.4]

Have all key technical competences for LTO activities been identified and do all involved staff meet these requirements? [SSR-2/2; 3.8-3.11] [NS-G-2.8; 4.13; 4.14]

Do personnel assigned to LTO duties that can affect safety have a sufficient understanding of the plant and its safety features? [NS-G-2.8; 3.2; 4.1]

Does plant management have the necessary management skills, experience and knowledge needed to manage safe LTO? [SSR-2/2; 4.1-4.3] [NS-G-2.8; 3.31]

Is the opportunity given to managers and plant personnel to learn from external peer organizations and their lessons learned? [GSR Part 2; 6.7] [GS-G-3.1; 6.8, 6.16] [GS-G-3.5; 3.30, 4.12, 6.23] [NS-G-2.11; 2.5, 3.9, 7.6]

Does the plant have an appropriate plant recruitment policy for LTO? [NS-G-2.8; 2.12 – 2.14] [GS-G-3.1; 4.6, 4.7] [NS-G-2.4; 2.14, 2.15, 3.7]

Does the policy and role of plant management support training needs and allocate sufficient resources? [NS-G-2.8; 4.10, 4.31, 6.5] [GS-G-3.1; 3.4]

Is personnel involved in LTO activities well trained through on-job-training and other appropriate processes? [NS-G-2.8; 2.8, 4.15(b), 4.45, 5.6, 5.9, 5.24]

3.4.3. Knowledge management and knowledge transfer for LTO

Does an appropriate KM policy exist? [GSR Part 2; 4.3, 4.27] [GS-G-3.1 2.4, 2.5, 4.1, 4.2, 4.4, 5.6]

Are KM principles and practices embedded in the integrated management system? [GSR Part 2; 4.21-4.22, 4.26, 4.27] [GS-G-3.1 2.4, 2.5, 3.1, 3.11, 4.1, 4.2, 5.6]

Is KM a part of the operating organization's long term strategy? [GS-G-3.1 4.6, 4.7] [SSR-2/2 3.10, 3.11]

Is there clear ownership of KM processes and issues? [GSR Part 2; 4.23, 4.25-4.26] [GS-G-3.1 5.14]

Are KM principles and practices embedded in the organization? [GSR Part 2; 4.22, 4.24] [SSG-48; 3.20]

Has the plant embedded KM principles and practices in its process for collecting and using operating experience feedback? [SSR-2/2 5.28, 5.29, 5.30, 5.31, 5.32] [SSG-48, 2.7, 2.21, 3.3, 3.30, 5.8, 7.16, 7.18] [SSG-25, 5.7, 5.103-110, 8.13, 9.5] [SSG-48; 4.8]

Has the plant implemented adequate processes for learning from the LTO experiences of other plants? [SSR-2/2 5.28, 5.29, 5.30, 5.31, 5.32] [SSG-25, 5.103-110] [SSG-48, 2.31, 7.16, 7.18]

Does the plant have a process for knowledge-loss risk assessment and mitigation for suppliers, TSOs and outside service providers? [SSR-2/1 2.17] [NS-G-2.6 3.10, 3.11, 3.12] [SSG-48; 2.26, 2.29, 6.1-6.3]

Does the plant have established adequate processes for transferring knowledge, information and data to/from the vendor, critical equipment/component suppliers, outsourced services and TSOs? [SSR-2/1; 2.17] [NS-G-2.6; 2.16, 3.6, 3.10, 3.11, 3.12] [SSG-48; 3.4-3.5, 3.10, 3.13-3.14, 3.16-3.18]

Do IT/IS processes support managing information and records and their availability? [GS-G-3.1, 4.2] [SSR-2/2 8.4] [NS-G-2.6; 6.1, 9.45, 10.45]

Does the plant retain records of traceability, rationale and assumptions of why and how operational, maintenance and design changes (corporate memory) have been made? [GS-G-3.1; 3.16] [GSR Part 2; 4.16-4.17, 4.20][SSG-48; 4.1-4.2, 4.9-4.10, 4.13-4.14] [NS-G-2.3, 11.6]

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