



International Approaches to Long Term Operation and License Renewal

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Topics

- License Renewal and Subsequent License Renewal
- IAEA Approach
 - Safety Reviews
 - Aging Management
 - Long Term Operation
- Conclusions from IRRS Mission to US NRC
- U.S. support of IAEA activities on LTO



License Renewal and Long Term Operation

- License renewal – the process in Part 54 of Title 10 of the U.S. Code of Federal Regulations (10 CFR Part 54) to renew the license of nuclear power plants
- IAEA characterizes Long Term Operation (LTO) as “operation beyond an established time frame set forth by, . . . , licence term, design, standards, licence and/or regulations”



License Renewal and Subsequent LR

- A limited scope review
- Focuses on managing the effects of aging of long-lived, passive structures and components important to plant safety
- Active structures and components are covered by Maintenance Rule (10 CFR 50.65)
- Other aspects of original license are not reconsidered

License renewal – plant operation to 60 years
 Subsequent license renewal – plant operation to 80 years



License Renewal Safety Principles

- The ongoing regulatory process is adequate to ensure the safety of currently operating plants
- The same plant operating rules apply during the renewal term (plant CLB to be maintained)
 - Requires additional actions for aging management of passive, long-lived plant structures and components for license renewal



Regulatory Process Essential Elements

- Resident inspectors and Regional inspections
- Performance assessments of inspection findings
- Daily assessment of events
- Safety issue resolutions (generic and plant specific)
- Materials aging & degradation issues important to safety addressed by
 - Rule changes
 - Generic communications
 - Orders
 - Voluntary actions



IAEA Approach

- **Safety Review**
 - Periodic Safety Review for Nuclear Power Plants (Safety Guide)
 - Guidelines for IAEA Operational Safety Review Teams (OSART)
- **Aging Management**
 - Ageing Management for Nuclear Power Plants (Safety Standard)
 - International Generic Ageing Lessons Learned (IGALL) (Safety Report)
 - Approaches to Ageing Management in Member States (TECDOC)
- **Long Term Operation**
 - Safe Long Term Operation of Nuclear Power Plants (Safety Report)
 - Guidelines for Peer Review of Safety Aspects of Long Term Operation of Nuclear Power Plants (SALTO)



Description of Periodic Safety Review

- “an overall view of actual plant safety . . . and to determine reasonable and practical modifications to ensure or improve safety”
- “. . . to ensure that a high level of safety is maintained during continued operation”



PSR Safety Factors

- The plant condition
- Safety analyses
- Performance and feedback of experience
- Management
- Environment (radiological effects)



Purpose of Integrated Regulatory Review Service Mission to US NRC

- to conduct a review of the . . . nuclear regulatory framework and regulatory activities as applied to operation of nuclear power plants to review its regulatory effectiveness and to exchange information and experience in the areas covered by IRRS. The review was carried out by comparison against IAEA safety standards as the international benchmark for safety.



Relevant Conclusions from IRRS Mission

Good Practices

- GP5: Licensing process is very transparent
- GP11: A robust operational experience feedback programme
- GP12: Collects and documents aging management lessons learned and shares with international nuclear community

Suggestion

- S9: Confirmed NRC proposal to incorporate lessons learned from PSRs in other countries



IAEA International Generic Ageing Lessons Learned (IGALL) Program Description

- Guidance on recommendable or “proven” ageing management programmes.
- For nuclear power plants with diverse water reactor technologies
- Addresses add in-scope components, including active
- Update IGALL Report periodically (at least each 5 years)
- Fundamental document to support ageing management Safety Guide

Web - <http://gnssn.iaea.org/NSNI/PoS/IGALL/SitePages/Home.aspx>



IGALL Status

- **Phase 1** (2010-13) developed initial report, including AMRs, AMPs, TLAAs based on US NRC GALL report
- **Phase 2** (2014-15) expanded for CANDU and WWER, technological obsolescence, and active components
- **Phase 3** (2016-17) objectives
 - Prepare IGALL Safety Report, version 2018
 - Update IGALL database and enhance its completeness
 - Support Member States in use of IGALL



Objectives of SALTO Peer Review

- An objective assessment of preparedness for LTO compared to international nuclear safety standards;
- Recommendations and suggestions for areas of improvement
- Discussions of key plant staff and external experts
- Identify good practices for Member States



SALTO Review Areas

- A: Organization and functions, CLB, configuration/modification management
- B: Scoping and screening and plant programmes relevant to LTO
- C: AMR, AMPs, and TLAAs for mechanical components
- D: AMR, AMPs, and TLAAs for electrical and I&C components
- E: AMR, AMPs, and TLAAs for TLAAs for civil structures
- F: Human resources, competence and knowledge management for LTO (optional area)



NRC Support to IAEA Activities

- NRC has been and will continue to be active participants in the IGALL Program
 - Steering Committee
 - Working Groups
- NRC will continue to support SALTO missions and related workshops
- Important for knowledge sharing of U.S. experience and counterparts experiences



Summary

- Use of license renewal approach necessitates implementation of other essential elements of the United States regulatory process
- Scope of IGALL program exceeds that of license renewal
- International sharing of operational findings is an important part of maintaining informed aging management world wide
- Support to international programs (IGALL and SALTO) is an essential part of knowledge sharing and dissemination of best practices



Acronyms & Initialisms

<ul style="list-style-type: none"> • ADAMS – Agencywide Documents Access and Management System • AMRs – aging management review (line items) • AMPs – aging management programs • CANDU – CANada Deuterium Uranium reactor • CFR – Code of Federal Regulations • CLB – current licensing basis • GALL – (NRC) Generic Aging Lessons Learned Report (NUREG-1801) • IAEA – International Atomic Energy Agency • IGALL – International Generic Ageing Lessons Learned 	<ul style="list-style-type: none"> • IRRS – Integrated Regulatory Review Service • LR – license renewal • LTO – long term operation • OSART – Operational Safety Review Team • PSR – periodic safety review • SALTO – Safety Aspects of Long Term Operation • SLR – subsequent license renewal • SSCs – systems, structures and components • TLAAs – time-limited aging analyses • WWER – Water-Water Energetic Reactor
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 **RIC** 2016 

Related IAEA Documents

- "Periodic Safety Review for Nuclear Power Plants," Specific Safety Guide No. SSG-25 (2013)
- "OSART guidelines, 2005 Edition, Reference report for IAEA Operational Safety Review Teams (OSARTs)," Services Series No. 12, SVS-12 (2005)
- "Ageing Management for Nuclear Power Plants, IAEA Safety Standards," Safety Guide No. NSG2.12 (2009) [Under revision to address LTO considerations, see IAEA DS-485]
- "Ageing Management for Nuclear Power Plants: International Generic Ageing Lessons Learned (IGALL)," Safety Reports Series No. 82, SRS-82 (2015)
- "Approaches to Ageing Management in Member States: International Generic Ageing Lessons Learned (IGALL) Final Report," IAEA-TECDOC-1736 (2014)
- "Safe Long Term Operation of Nuclear Power Plants," Safety Reports Series No. 57, SRS-57 (2008)
- "SALTO Peer Review Guidelines, Guidelines for Peer Review of Safety Aspects of Long Term Operation of Nuclear Power Plants," Services Series No. 26, SVS-26 (2014)
- "Integrated Regulatory Review Service (IRRS) Guidelines for the Preparation and Conduct of IRRS Missions," Services Series No. 23 (2013)
