GC 59 Senior Regulators' meeting
17 September 2015
IAEA Activities to Support Safe Long Term Operation of Nuclear Power Plants

G. Rzentkowski, Director
Division of Nuclear Installation Safety

Vienna, 16 September 2015

IAEA
International Atomic Energy Agency

Background: Current and Emerging Challenges

- Globalization of nuclear safety
  - Sustainable, broadly acceptable national strategies and policies
  - High safety standards based on consensus requirements
  - Harmonization and standardization
  - Regulatory effectiveness and transparency
- Maintaining and enhancing nuclear safety
  - New builds
  - Continued operation of ageing reactor fleet
  - Post-Fukushima safety improvements
- Public acceptance of nuclear power
  - Understanding of all aspects of nuclear energy
  - Risk tolerance

IAEA

Background: Long Term Operation

- Long Term Operation (LTO) of a nuclear power plant is operation beyond an established time frame defined by the licence term, the original plant design, relevant standards, or national regulations

- The comprehensive programme for LTO shall utilize the results of periodic safety review
  - Cumulative effects and implications of ageing (ageing mechanisms and ageing management programmes)
  - Safety modifications (repairs, replacements and upgrades)
  - Technical developments
  - Operating experience
  - Site characteristics

- The licensing documentation must remain valid through the entire period of LTO

IAEA

How is IAEA supporting safe LTO of NPPs?

Development of IAEA Safety Standards

- Requirements for commissioning and operation
- Guidance on Ageing Management and LTO

Capacity Building

- Fostering information exchange and establishing databases
  - International Generic Ageing Lessons Learned Programme (IGALL)
  - Ageing management and LTO workshops
  - Safety Aspect of Long Term Operation (SALTO) methodology and experience transfer workshops
  - coordinated research projects

Review Services

- Safety Aspect of Long Term Operation (SALTO)

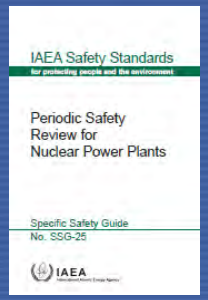
IAEA

IAEA Safety Standards

SSR-2/2: Commissioning and Operation

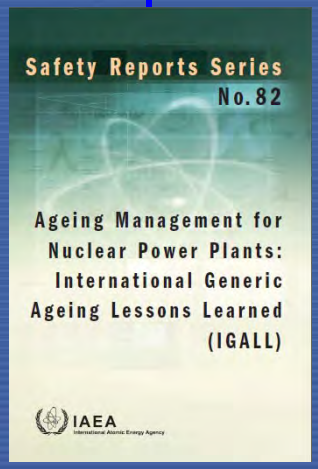
NS-G-2.12 Safety Guide on Ageing Management

(in revision)

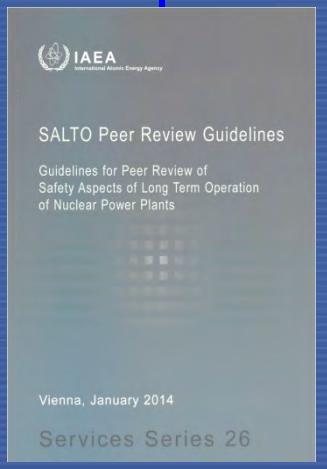


SSG-25 Safety Guide on PSR

SRS No 57 Safe LTO (2008)



SRS No 82 IGALL Report (April 2015)



SS No 26 SALTO Guidelines (Jan 2014)

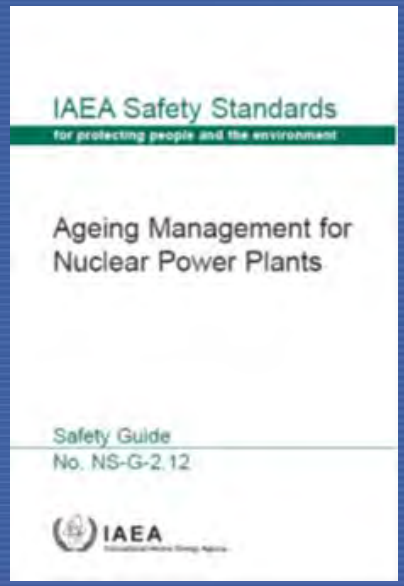
IAEA

IAEA Safety Guide on Ageing Management

"Ageing Management and development of a Programme for Long Term Operation of Nuclear Power Plants"

Objective

- Provide comprehensive guidance on recommended ways of fulfillment of **SSR-2/2**
  - Requirement 14: Ageing management
  - Requirement 16: Programme for long term operation
- Assure consistency of terminology
- Update obsolete sections
  - Incorporate current state-of-the-art of industry practices
  - R&D results



Timeline

- Draft submitted to Member States for comments — August 2015
- Deadline for Member States for comments — November 2015
- Draft approved by Member States (all steps) — October 2016
- Target publication date — March 2017

IAEA

IGALL Programme: Objective and Approach

Objective

- Publish state-of-the-art report on a systematic approach to ageing management (as described in the Safety Guide NS-G-2.12)
  - Guidance on recommendable Ageing Management Programmes (AMPs)
  - Basis for implementation of AMPs for NPPs with diverse technologies: PWR, BWR, WWER, CANDU, PHWR
  - periodic updates (at least every 5 years)

Approach

Degradation mechanisms + ageing effects

Catalogue of generic AMPs and TLAAs

- **Collecting of „proven" Ageing Management Programmes (AMP) and typical Time Limited Ageing Analysis (TLAA)**
- **Discussing and creating generic AMPs and TLAAs in Working Groups**
- **Identification of recommended AMPs and TLAAs for safety structures and components in Ageing Management Review tables**

OPERATORS

REGULATORS

DESIGNERS

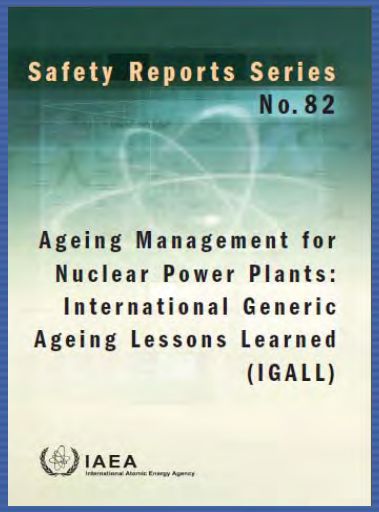
NEWCOMERS (capacity building)

IAEA

IGALL Phase 1 (2010-2013): Deliverables

IGALL Safety Report

- Guidance on recommendable AMPs and typical TLAAs
- Published in April 2015

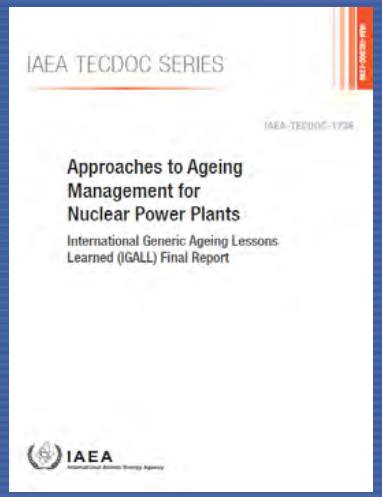


IGALL database

- IGALL database on IAEA web sites contains:
- 76 AMPs
- 27 TLAAs
- More than 2000 consolidated line items in AMR tables (totally more 7000 line items collected from Member States)

IGALL TECDOC

- Supplements IGALL Safety Report
- Published in April 2014



IAEA

IGALL Phase 2 (2014-2015): Deliverables

Support Member States (MS) in IGALL implementation

- Workshops
- Expert missions for NPPs and regulators

Enhance the completeness of IGALL

- CANDU mechanical components
- WWER mechanical components
- Active I&C and electrical components
- Management of technological obsolescence

Proposals for IGALL development and improvement (Phase 3)

- IGALL Phase 2 will be concluded by Steering Committee and Technical Meeting in November 2015
- IGALL Phase 3 scheduled for 2016-2017

IAEA

SALTO Peer Review Service: Objective

- Review of alignment with IAEA Standards
- Recommendations and suggestions for full implementation of IAEA Standards
- Opportunity to share experience and practices with international experts
- Advice on licensing processes and procedures
- Openness and transparency
  - Public awareness and acceptance

IAEA

SALTO Peer Review: Scope

A. Organisation and functions, current licensing basis, configuration/ modification management
B. Scoping and screening and plant programmes relevant to LTO;
C. Ageing management review, review of AMPs and related TLAAs for mechanical components
D. Ageing management review, review of AMPs and related TLAAs for electrical and I&C components
E. Ageing management review, review of AMPs and related TLAAs for civil structures
F. Human resources, competence and knowledge management for LTO

IAEA

SALTO Peer Review: Steps

Phase 0:

Workshop/seminar - IAEA safety standards and SALTO methodology (optional)

Phase 1:

Pre-SALTO Mission - NPP in preparation for LTO (one or more Pre-SALTO missions 2-10 years before entering LTO)

Phase 2:

SALTO Mission - NPP ready for LTO

(less than 2 years before entering LTO)

Phase 3:

Follow-up SALTO Mission

(app. 2 years after SALTO mission)

IAEA

SALTO Peer Review: Methodology

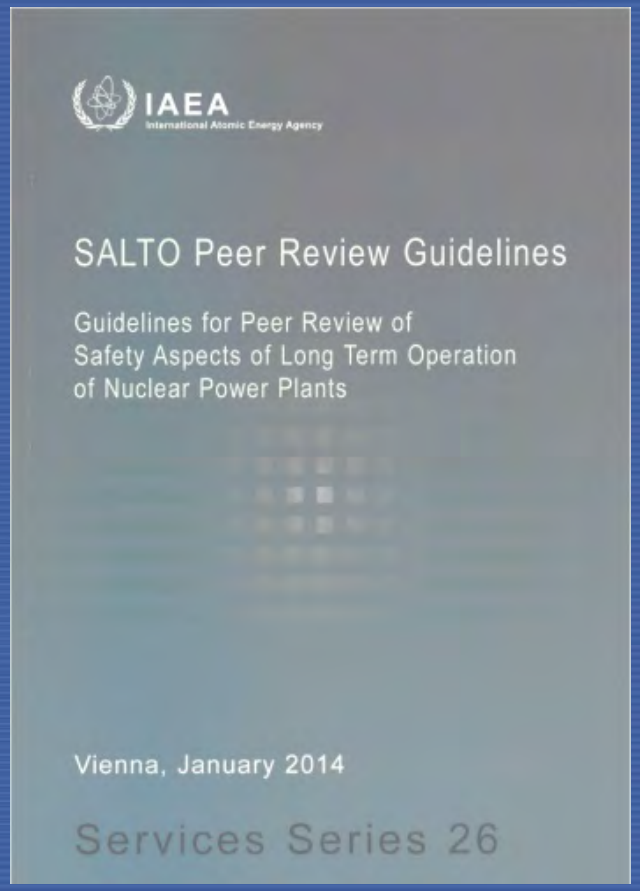
The SALTO peer review team uses four steps to acquire the information needed to develop their recommendations, as set out in the expert's technical notes:

1. Review of written material (Advance Information Package and NPP documents and procedures)
2. Discussions with counterparts
3. Direct observation of SSC status, environment
4. Discussion of evaluations/tentative conclusions

IAEA

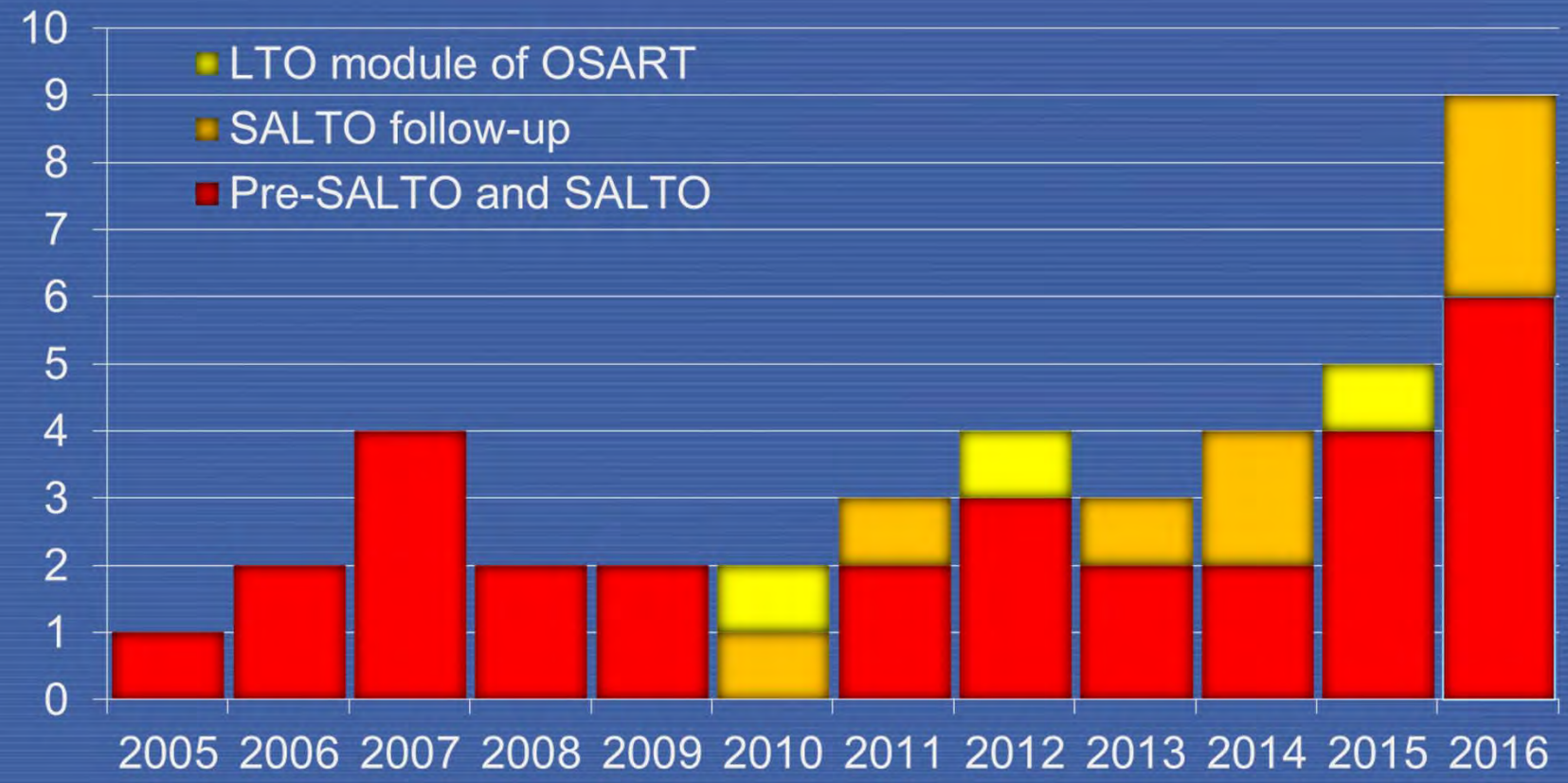
SALTO Peer Review: Guidelines

- Developed for SALTO peer review team members
- Guidance to a host organization in preparation for a peer review mission
- Description of standard review areas
  - New area “Human resources, competence and knowledge management for LTO”
- Published in January 2014



IAEA

SALTO Peer Review: Missions 2005 - 2016



IAEA

SALTO Peer Review: Results

Technical Meeting on "Results of SALTO peer review missions" will be held on 14-16 June 2016 in Vienna

- Missions results will be analysed and insights will be used to improve SALTO service
  - 24 Pre-SALTO and SALTO missions
  - 6 SALTO follow-up missions
  - 3 LTO modules of OSART missions

- Missions overview and results

  http://www-ns.iaea.org/actionplan/missions.asp

- Other related information

  http://www-ns.iaea.org/tech-areas/operational-safety

IAEA

Summary

What has been accomplished

1)A draft Safety Guide on “Ageing Management and development of a Programme for LTO” developed

2)IGALL Programme established as a network for development of common internationally agreed AMPs and TLAAs

3)SALTO Peer Review Service established as an efficient tool to asses consistency with IAEA Safety Standards in LTO preparations

Continued support of MS

1)Provide comments and support to allow for its timely publication

2)Encourage regulators and operators to contribute to IGALL Phase 3

3)Encourage NPPs to invite SALTO Peer Review missions to review consistency with IAEA Safety Standards

IAEA

Conclusions

IAEA made a significant effort in supporting MS in establishing a framework for the safety of LTO of power reactors

- 15 Member States requested the SALTO mission and are implementing IAEA Safety Standards
- 26 Member States participate in the IGALL programme

Scope of the LTO programme varies between MS, however it is generally consistent with IAEA Safety Standards advising to

- Perform safety assessment with due consideration of ageing
- Utilize results of periodic safety review
- Assure validity of (updated) licensing basis
- Review adequacy of the arrangements to maintain plant safety
- Implement improvements to resolve the safety issues identified

Further development of the LTO programme depends strongly on continued support of MS

- Cooperation of regulators and NPP operators

IAEA

Thank you for your attention!

IAEA