Working material

SALTO missions highlights 2005–2015

Long term operation safety practices in nuclear power plants

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FOREWORD

The IAEA Safety Aspects of Long Term Operation (SALTO) programme provides advice and assistance to Member States embarking on long term operation (LTO) in enhancing the safety of nuclear power plants (NPPs). Careful design and high quality of construction are prerequisites for a safe nuclear power plant. However, a plant's safety depends ultimately on the ability and conscientiousness of the operating personnel and on the plant programmes, processes and working methods. This applies also to all LTO related activities. A SALTO peer review service reviews a facility's LTO related activities and programmes against IAEA Safety Standards and proven good international practices.

SALTO peer reviews are available to all Member States with nuclear power plants considering long term operation. Many Member States have participated in the programme by hosting one or more SALTO missions or by making experts available to participate in missions. Preparedness for safe LTO can also be reviewed as a part of OSART missions when dedicated LTO module is included in the scope of OSART mission. Follow-up missions are a standard part of the SALTO programme and are conducted between 18 to 24 months following the SALTO mission.

This report initiates the practice of summarizing SALTO mission results so that all the aspects of SALTO missions are gathered in one publication. The format, content and scope is similar to the OSART Mission Highlights reports. The report also includes the results of LTO module reviews performed in the frame of OSART missions where applicable as well as follow-up missions. This report highlights the most significant findings while retaining as much of the vital background information as possible. This report is divided in three main Sections.

Chapter 1 summarizes the most significant observations made during the missions and follow-up missions between 2005 and mid-2015. Chapter 2 describes results of the pilot SALTO missions. Chapter 3 describes the main trends on issues and good practices that were identified in the period covered and the assessment of overall SALTO mission results.

Chapter 1, 2 and 3 of the report are intended for different levels of management in the operating and regulatory organizations respectively. Chapter 1 is primarily directed at the executive management level, Chapters 2 and 3 at middle managers and those involved in operational experience feedback. Individual findings varied considerably in scope and significance. However, the findings do reflect some common strengths and opportunities for improvement.

The contributions of all those who were involved in the drafting and review of this document are greatly appreciated. Particular acknowledgement goes to those provided by R. Havel (Czech Republic). The IAEA officer responsible for this publication was R. Krivanek of the Division of Nuclear Installation Safety.

BACKGROUND

Many of the challenges faced by those responsible for ensuring the safe operation of nuclear power plants are common throughout the world. The results of a SALTO peer review service are, therefore, of interest and possible application to many nuclear power plants and not solely to the plant in which they were originally identified. The primary objective of this report is to enable organizations that are operating or regulating nuclear power stations or providing technical support to them to benefit from experience gained in the course of missions conducted under the SALTO programme during the period 2005 – 2015 (March).

The IAEA started to develop guidance on the ageing management in the 1990s. Subsequently, a number of reports on the subject were published, providing general methodological guidance, as well as specific guidance for selected major nuclear power plant components and structures. In recent decades, the number of IAEA Member States giving high priority to continuing the operation of nuclear power plants beyond the time frame originally anticipated (typically 30–40 years) has steadily increased. Recognizing the need to assist its Member States in dealing with the unique challenges associated with long term operation (LTO), the IAEA conducted the Extrabudgetary Programme on Safety Aspects of Long Term Operation (SALTO) of Water Moderated Reactors in 2003–2006. During the programme implementation, it was recognized that a peer review service, using an approach based on the broad OSART service experience, would be useful to Member States. The approach was verified during several narrow scope engineering review missions, which were considered as pilot SALTO missions, and which included the earlier AMAT (Ageing Management Assessment Team) objectives. The approach was formalized in 2007 when a first full-scope SALTO peer review mission took place. SALTO peer reviews complement the OSART service, which in turn may include optional LTO module that is based on the SALTO peer review approach.

The SALTO peer review service is available to all Member States with nuclear power plants upon a request made to the IAEA. By mid-2015, altogether 22 SALTO peer review missions had been conducted at 13 nuclear power plants in 12 Member States (including 8 pilot SALTO missions). There had also been 6 follow-up missions to review the implementation of previous SALTO results. For 2 plants, LTO module was included in the OSART mission including the follow-up missions in this period.

SALTO teams consist of senior expert reviewers from NPPs, technical support organizations and regulatory authorities in the various disciplines relevant to the mission. During technical discussions between reviewers and plant staff, long term operation and ageing management programmes are examined in detail and their performance checked; strengths are identified and listed as good practices and weaknesses are listed as recommendations or suggestions. The criteria used by the teams as they formulate their conclusions are based on IAEA Safety Standards and the best prevailing international practices, and, therefore, may be more stringent than national requirements. SALTO reviews are not regulatory inspections, nor design reviews. Rather, SALTO reviews consider the effectiveness of long term operation programmes and of ageing management programmes, and are more oriented to programme, process and management issues than to hardware. The performance or outcome of the various programmes is given particular attention. SALTO teams neither assess the adequacy of plant design nor compare or rank the safety performance of different plants.

SALTO peer review service consists of the following elements:

- Workshop/seminar on IAEA safety standards and SALTO review method;
- Pre-SALTO mission (2 years or more before LTO, more than once if required);
- SALTO mission (less than 2 years before LTO);
- Follow-up SALTO mission (1.5-2 years after SALTO mission).

The plant's preparedness for LTO can also be reviewed as an optional module of an OSART mission. In that case the review is performed by 1 expert, which leads to less detailed review as compared to a SALTO peer review, and in some cases to a lack of specific expertise to address all technical areas described next.

In addition an expert mission that focuses on specific review areas related to LTO can be organized at request.

The review addresses the following areas:

A. Organization and functions, current licensing basis (CLB), configuration/modification management;
B. Scoping and screening and plant programmes relevant to LTO;
C. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for mechanical components;
D. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for electrical and I&C components;
E. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for civil structures;
F. Human resources, competence and knowledge management for LTO (optional area).

These areas are further divided into sub-areas defined in the SALTO Guidelines and used to structure this report in its Sections 1 and 2.

Further areas related to LTO, such as management, organization and administration, training and qualification, technical support, etc. may be optionally covered if requested.

The SALTO review is performed in line with the SALTO Guidelines, Service Series 26, published in 2014. The SALTO Guidelines are based on their first version (Service Series 17) which was developed in 2007 in parallel with the first SALTO peer reviews and which was revised in 2012/2013 to incorporate the experience obtained through SALTO peer reviews carried out earlier. The changes in the Guidelines are related both to improvement of the peer review approach as well as to the development of the plant's practices.

The terms 'recommendation', 'suggestion' and 'good practice' are defined as follows in the framework of SALTO peer reviews (consistent with OSART reviews):

Recommendation

A recommendation is an advice on what improvements in safety aspects of LTO should be made in that activity or programme that has been evaluated. It is based on IAEA Safety Standards, Safety Reports, or proven, good international practices and addresses the root causes rather than the symptoms of the identified concern. It illustrates a proven method of striving for excellence, which reaches beyond minimum requirements. Recommendations are specific, realistic and designed to result in tangible improvements. Absence of recommendations can be interpreted as performance corresponding with proven international practices.

Suggestion

A suggestion is either an additional proposal in conjunction with a recommendation or may stand on its own following a discussion of the pertinent background. It is based on IAEA Safety Standards, Safety Reports, or proven, good international practices and addresses the root causes rather than the symptoms of the identified concern. It may indirectly contribute to improvements in safety aspects of LTO, but is primarily intended to make a good performance more effective, to indicate useful expansions to existing programmes and to point out possible superior alternatives to on-going work. In general, it is designed to stimulate the plant management and supporting staff to continue to consider ways and means for enhancing performance.

Note: if an item is not well based enough to meet the criteria of a '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 concept of 'encouragement' (e.g. The team encouraged the plant to…).

Good practice

A good practice is an outstanding and proven performance, programme, activity or equipment in use that contributes directly or indirectly to safe LTO and sustained good performance. A good practice is markedly superior to that observed elsewhere, not just the fulfillment of current requirements or expectations. It should be superior enough and have broad application to warrant bringing it to the attention of other nuclear power plants for their consideration in improving performance. A good practice has the following characteristics:

- it is novel;
- it has a proven benefit;
- it is replicable (it can be used at other plants);
- it does not contradict an issue.

The characteristics of a given 'good practice' (e.g. whether it is well implemented, or cost effective, or creative, or it has good results) should be explicitly stated in the description of the 'good practice'.

Note: An item may not meet all the criteria of a 'good practice', but still be worthy to note. In this case it may be referred to as a 'good performance', and may be documented in the text of the report. A good performance is a superior result that has been achieved or a good technique or programme that contributes directly or indirectly to safe LTO and that works well at the plant. However, it might not be appropriate to recommend its adoption by other nuclear power plants, because of financial considerations, differences in design or other reasons.

1. INTRODUCTION AND MAIN CONCLUSIONS

1.1 Summary

During the period 2005-mid 2015, 22 SALTO missions listed in TABLE I reviewed plants around the world. The SALTO missions No. 1 through 8 in TABLE I were pilot SALTO missions, typically narrow scope, serving also for development of SALTO peer review service methodology. These missions are evaluated separately in the Section 2 of this report, since the outcome of these missions is not consistent with the outcome of the subsequent standard missions. The same applies to mission No. 12, which was focused on particular technical aspect (risk based inspection). For 2 plants, safety aspects of LTO were reviewed in the frame of an OSART mission that included the LTO module, Table II.

TABLE I. PRE-SALTO AND SALTO MISSIONS

SALTO Mission No.	Plant	Mission type	Country	Year
1	Paks	Pre-SALTO *	Hungary	2005
2	Paks	Pre-SALTO *	Hungary	2006
3	Paks	Pre-SALTO *	Hungary	2006
4	Paks	Pre-SALTO *	Hungary	2007
5	Paks	Pre-SALTO *	Hungary	2008
6	Paks	Pre-SALTO *	Hungary	2008
7	Karachi	Pre-SALTO *	Pakistan	2007
8	South Ukraine	Pre-SALTO *	Ukraine	2007
9	Kori 1	SALTO	South Korea	2007
10	Dukovany	Pre-SALTO	Czech Republic	2008
11	Borssele	Pre-SALTO	Netherlands	2009
12	Koeberg	Pre-SALTO	South Africa	2011
13	Paks	SALTO	Hungary	2011
14	Borssele	SALTO	Netherlands	2012
15	Wolsong 1	SALTO	South Korea	2012
16	Tihange 1	Pre-SALTO	Belgium	2012
17	Armenian 2	Pre-SALTO	Armenia	2013
18	Angra 1	Pre-SALTO	Brazil	2013
19	Ringhals 1&2	Pre-SALTO	Sweden	2014
20	Dukovany	SALTO	Czech Republic	2014
21	Tihange 1	SALTO	Belgium	2015
22	Laguna Verde	Pre-SALTO	Mexico	2015

Note:
* Pilot SALTO missions serving also for development of SALTO peer review service methodology.

TABLE II. OSART MISSIONS INCLUDING THE LTO MODULE

OSART Mission No.	Plant	Country	Year
159	Bohunice	Slovakia	2010
170	Muhleberg	Switzerland	2012

The results of these missions, based on the findings collected (good practices, recommendations, and suggestions) are summarized in this report and provide series of snapshots of the status of plants activities to ensure safe LTO.

The IAEA evaluated the general trends and achievements derived from these SALTO missions (including OSART LTO module reviews) and these are presented in this report.

With respect to safe LTO, the number of recommendations and suggestions made during the SALTO missions correlates in principle with the level of compliance with the IAEA Safety Standards; the number of good practices indicates the level of implementation of the best international practices in the industry.

In most plants the level of preparation for the review, the openness of the counterpart teams and their readiness to co-operate impressed the SALTO peer review teams.

While the nuclear industry has made significant advances in safety, there is always room for further improvement: SALTO peer review teams have identified many safety aspects of LTO where improvements are still needed. At the same time, the assessment teams and plants reviewed have provided the IAEA with valuable feedback that allows continuous improvement of the IAEA services aimed at safe LTO.

Table III shows the number of issues and the number of good practices identified during selected pilot SALTO missions (mission No. 5 through 8). All these findings form the basis of the evaluation provided in Section 2 of this report.

TABLE III. PILOT SALTO FINDINGS OVERVIEW

	O&F, CLB, CM	S&S, PP	M	E, I&C	C	Total
Issues	3	15	10	3	13	44
Recommendations	3	22	23	4	17	69
Suggestions	4	6	1	1		12
Good Practices						
Missions	4	4	4	4	4	

Pilot SALTO missions No. 1-4 and 12 were narrow scope missions and the report format and contents does not allow summarizing the information in the way as shown in Table III.

The scope and focus of the pilot SALTO missions, as well as the format and contents of the documentation does not allow a direct comparison with the other SALTO missions.

Table IV shows the number of issues and the number of good practices identified during the 13 SALTO (No. 9-11 and 13-22) and 2 OSART missions. All these findings form the basis of the evaluation provided in Section 3 of this report.

TABLE IV. SALTO FINDINGS OVERVIEW

	O&F, CLB, CM	**S&S, PP**	**M**	**E, I&C**	**C**	**HR, KM**	**Total**
Issues	23	29	32	23	27	8	142
Recommendations	16	25	25	18	21	4	120
Suggestions	22	13	28	11	11	4	88
Good Practices	1	1	6	6	0	3	17
Missions	13+2	13+2	13+2	13+2	13+2	5	-

The main task of the assessment team formed by the IAEA was to evaluate and give a weight to the evaluation. To effectively transpose in wording the statistical results, the following approach consistent with the approach used by OSART was adopted:

- "In all plants" or "in all cases" is representative of frequency of issues in 14 times or more out of 15 plant reviews (more than 90% of the cases).
- "In many plants" or "frequently" is used for a number of issue items found in about 7 to 13 plants out of 15 plant reviews (from 45% to 90% of the cases).
- "In some plants" reflects that in 3 to 6 plants out of 15 plant reviews (from 15% to 45% of the cases).
- "In a few plants" means that the frequency of finding or the equivalent sort of issues appears in 2 or less plants of 15 plant reviews (up to 15% of the cases).

Note: The above categories are based on 13 SALTO missions and 2 LTO modules of OSART missions analyzed in section 3.

The tendencies, which were obtained from the assessment of issues and good practices of 15 peer review missions, are arranged to "Trends" for each review area.

1.2. Summary of trends classified by area

In this Section the summary of trends classified by area is provided for the missions 9-11 and 13-22, as well as for the 2 LTO modules reviewed in the frame of OSART missions, Tables I and II. The scope and focus of the pilot SALTO missions and of the mission No.12, as well as the format and contents of the resulting documentation does not facilitate meaningful summarization.

The area of "Human resources, competence and knowledge management for LTO" was reviewed only in 5 plants or reviews.

It should be also noted that the numbers provided for each trend observed in brackets provide a number of plants or reviews in which this trend was observed against the total number of plants or reviews. This numbers do not directly correspond to the numbers of findings provided in Section 3, since in some of the earlier missions there were more than 1 recommendation or suggestion provided for some issues and in some cases more than 1 issue per trend.

Organization and functions, current licensing basis, configuration/ modification management

- In some plants, there is an indication that LTO specific regulatory requirements are not available, or, are too general. In some plants, the LTO licensing is connected to a regular PSR, the missing LTO specific requirements are compensated for by the IAEA LTO and AM guidance or US NRC requirements. (3/15)

- In some plants, there is an indication that the decision on LTO has been adopted but the related organizational actions are not established/ implemented. (3/15)

- In some plants, the plant LTO policy is not clearly defined and established, leading to problems related to strategy, tasks, roles, responsibilities, organizational structure, familiarity of the staff, etc. (5/15)

- In some plants, the plant LTO implementation programme is established but the required actions to ensure its actual implementation are not in place. (5/15)

- In some plants, during early SALTO peer reviews (pre-SALTO), deficiencies were noted in connection with the status of the FSAR and other CLB documents, but were not observed more recently. (3/15)

- In some plants, deficiencies in the configuration/modification management including design basis documentation were identified indicating a gap between the LTO needs and actual status. (5/15)

Scoping and screening and plant programmes relevant to LTO

- In some plants, there is an indication that the scoping and screening methodology used does not address appropriately non-safety related items failure of which may impact on accomplishment of intended safety function, or results in an incomplete scope for LTO. (4/15)

- In some plants, there is an indication that the scoping and screening methodology used does not ensure that active components are addressed adequately. (3/15)

- In many plants, there is an indication that the existing plant programmes relevant for LTO are not evaluated at a proper time and with required scope to demonstrate their adequacy for safe LTO. (7/15)

Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for mechanical components

- In some plants, various deficiencies in area specific scoping and screening were observed. (4/15)

- In some plants, there is an indication that in the ageing management review the operating experience is not considered adequately. (4/15)

- In some plants, there is an indication that AMPs do not meet the 9 attributes of an effective AMP and were not revised as applicable. (5/15)

- In few plants, there is an indication that proactive obsolescence management programme is not yet fully implemented. (2/15)

- In few plants, there is an indication that codes and standards of different origin were applied selectively or inconsistently without prudent reconciliation. (2/15)

Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for electrical and I&C components

- In some plants, there is an indication that the actual environmental conditions are not monitored to ensure that aging analyses are based on conservative data, or there are no inspections and tests during the LTO period aiming at preserving cable system qualification and functionality. (4/15)

- In some plants, there is an indication that the EQ is incomplete or missing. (3/15)

- In some plants, there is an indication that the EQ is not revalidated for LTO. (4/15)

Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for civil structures

- In some plants, scoping and screening of civil structures was not performed thoroughly to facilitate ageing management for LTO. (3/15)

- In many plants, the ageing management review for civil structures was not implemented in a comprehensive way to facilitate ageing management for LTO. (7/15)

- In some plants, the AMP for civil structures does not meet the 9 attributes of an effective AMP and are not effective. (3/15)

– In some plants, the civil structures TLAA revalidation was not completed. (3/15)

Human resources, competence and knowledge management for LTO

– In some plants, the human resources strategy is not implemented consistently or is missing completely. (2/5)

– In some plants, the competence management and staffing is not adequate to support LTO programme implementation and safe LTO. (2/5)

– In some plants, the knowledge management is not adequate to support safe LTO. (2/5)

2. ASSESSMENT OF THE PILOT SALTO MISSIONS RESULTS

The pilot SALTO missions were conducted in the period 2005-2007. The purpose of these missions was, in addition to the assistance requested by the Member States concerned, also to verify and improve the approach proposed.

The pilot SALTO missions No. 1-4 and 12 were narrow scope missions, which addressed the following topics:

1. Peer Review of the HAEA Regulatory Requirements on the LTO for Paks NPP; 2005;
2. Peer review of the scoping/ screening process and preconditions of the License Renewal Programme of Paks Nuclear Power Plant; 2006;
3. Expert mission/workshop on time limited ageing analysis and equipment qualification for the license renewal programme of Paks nuclear power plant; 2006;
4. Review of methodology and criteria documents on deterministic pressurized thermal shock analysis and re-design of selected safe class 1-2 components; 2007;
12. Peer Review of Risk Informed In Service Inspection Programme for Koeberg NPP, Republic of South Africa; 2011.

The scope and focus of these missions, as well as the format and contents of the documentation does not allow a direct comparison with the other SALTO missions.

It should be noted that the co-operation with the counterpart during the pilot SALTO missions 1-8 provided very important insights to the IAEA to develop further the proposed SALTO peer review methodology.

The following summarizes the trends and tendencies identified in the findings for the missions 5-8. This information is, however, not directly comparable to the information provided in Section 3 since the approach used during the missions as well as the format and contents of the mission reports is substantially different. Also, human resources, competence and knowledge management for LTO were not addressed at all during these missions and therefore are not dealt with in this Section.

2.1. Organization and functions, current licensing basis (CLB), configuration/ modification management

TABLE V. SUMMARY OF FINDINGS (AREA A)

Title		Rec.	Sug.	GP	Total
1.1	Related regulatory requirements, codes and standards				0
1.2	Organizational structure for LTO				0
1.3	Plant policy for LTO		2		2
1.4	LTO implementation programme	2	1		3
1.5	Current SAR and other CLB documents				0
1.6	Configuration/ modification management including design basis documentation	1	1		2
Total		3	4		7

2.1.1. Related regulatory requirements, codes and standards

No findings.

2.1.2. Organizational structure for LTO

No findings.

2.1.3. Plant policy for LTO

Findings: 2 suggestions

The issue is related to the plant policy documentation that should address a complete and consistent overall approach to LTO.

2.1.4. LTO implementation programme

Findings: 2 recommendations, 1 suggestion

The issue is related to the plant approach to ageing management and LTO that was not in compliance with international practices.

2.1.5. Current safety analyses report and other current licensing basis documents;

No findings.

2.1.6. Configuration/modification management including design basis documentation (DBD).

Findings: 1 recommendation, 1 suggestion

The issue is related to the lack of design basis data and information needed for ageing management and LTO.

2.2. Scoping and screening and plant programmes relevant to LTO

TABLE VI. SUMMARY OF FINDINGS (AREA B)

Title		Rec.	Sug.	GP	Total
2.1	Methodology and criteria for scoping and screening of SSCs for LTO	5	3		8
2.2	Plant programmes relevant to LTO	17	3		20
Total		22	6		28

2.2.1. Methodology and criteria for scoping and screening of SSCs for LTO

Findings: 5 recommendations, 3 suggestions

Trend: In some plants the scoping and screening methodology is not adequate to ensure that all SSCs required are addressed by the AM.

Examples show that:
- The scoping/screening process is not in compliance with good international practices.
- The scoping/screening process is not clearly described.
- The scoping/screening process leads to omission of some subsystems from the scope of AM.

2.2.2. Plant programmes relevant to LTO (Maintenance, equipment qualification (EQ), in-service inspection (ISI), Surveillance and monitoring, Monitoring of chemical regimes etc.)

Findings: 17 recommendations, 3 suggestions

The issues identified are related to the implementation of the maintenance rule and its various aspects, security of related database systems, approach to EQ, review and self-assessment of AM activities, equipment replacement strategy, and introduction of modern maintenance approaches instead of corrective maintenance.

2.3. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for mechanical components

TABLE VII. SUMMARY OF FINDINGS (AREA C)

Title		Rec.	Sug.	GP	Total
3.1	Area-specific scoping and screening				
3.2	Ageing management review	11			11
3.3	Review of ageing management programmes	11	1		12
3.4	Obsolescence management programme	1			1
3.5	Existing TLAAs				
3.6	Revalidation of TLAAs				
3.7	Data collection and record keeping				
Total		23	1		24

2.3.1. Area-specific scoping and screening of SSCs for LTO

No findings.

2.3.2. Ageing management review

Findings: 11 recommendations

The issues identified address various detailed aspects of the AMR as well as its compliance with good international practices.

2.3.3. Review of ageing management programmes

Findings: 11 recommendations, 1 suggestion

The issues identified address various detailed aspects of the AMPs, such as scope of information, inspection plans, use of operating experience, as well as NDT qualification.

2.3.4. Obsolescence management programme

No findings.

2.3.5. Existing time limited ageing analyses

Findings: 1 recommendation

The issue identified deals with requirements connected with the use of ASME Code instead of original Codes and Standards used in the design of the plant.

2.3.6. Revalidation of time limited ageing analyses

No findings.

2.3.7. Data collection and record keeping

No findings.

2.4. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for electrical and I&C components

TABLE VIII. SUMMARY OF FINDINGS (AREA D)

Title		Rec.	Sug.	GP	Total
5.1	Area-specific scoping and screening				
5.2	Ageing management review				
5.3	Review of ageing management programmes	2	1		3
5.4	Obsolescence management programme				
5.5	Existing TLAAs	2			2
5.6	Revalidation of TLAAs				
5.7	Data collection and record keeping				
Total		4	1		5

2.4.1. Area-specific scoping and screening of SSCs for LTO

No findings.

2.4.2. Ageing management review

No findings.

2.4.3. Review of ageing management programmes

Findings: 2 recommendations, 1 suggestion

The issues identified are related to inadequate monitoring of temperature of electrical and I&C equipment.

2.4.4. Obsolescence management programme

No findings.

2.4.5. Existing time limited ageing analyses

Findings: 2 recommendations

The issue identified is related to the missing auditable EQ documentation.

2.4.6. Revalidation of time limited ageing analyses (including EQ)

No findings.

2.4.7. Data collection and record keeping

No findings.

2.5. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for civil structures

TABLE IX. SUMMARY OF FINDINGS (AREA E)

Title		Rec.	Sug.	GP	Total
5.1	Area-specific scoping and screening	1			1
5.2	Ageing management review	3			3
5.3	Review of ageing management programmes	9			9
5.4	Obsolescence management programme				
5.5	Existing TLAAs	4			4
5.6	Revalidation of TLAAs				
5.7	Data collection and record keeping				
Total		17			17

2.5.1. Area-specific scoping and screening of SSCs for LTO

Findings: 1 recommendation

The issue identified is related to the scoping and screening approach that leads to an incomplete list of structures and structural components.

2.5.2. Ageing management review

Findings: 3 recommendations

The issues identified are related to completeness and adequacy of the AMR tables and use of an approach that identifies and addresses commodity groups where feasible.

2.5.3. Review of ageing management programmes

Findings: 9 recommendations

The issues identified deal with the AMPs not meeting the 9 attributes of an effective AMP, missing AMPs, and implementation of AMPs.

2.5.4. Obsolescence management programme

No findings.

2.5.5. Existing time limited ageing analyses

Findings: 4 recommendations

The issues identified are related to the identification of existing TLAA that was not performed and/or related information is missing.

2.5.6. Revalidation of time limited ageing analyses

No findings.

2.5.7. Data collection and record keeping

No findings.

3. ASSESSMENT OF THE SALTO MISSIONS RESULTS AREA BY AREA

The following summarizes the trends and tendencies identified in the findings for the missions 9-11 and 13-22, as well as for the 2 LTO modules reviewed in the frame of OSART missions, Tables I and II.

Where the facts or findings of the SALTO missions address a common problem, the trend is complemented by several examples of observation, a discussion on the weight of these findings and possible remedial actions.

3.1. Organization and functions, current licensing basis, configuration/modification management

TABLE X. SUMMARY OF FINDINGS (AREA A)

Title		Rec.	Sug.	GP	Total
1.1	Related regulatory requirements, codes and standards	1	2		3
1.2	Organizational structure for LTO	3	3		6
1.3	Plant policy for LTO	3	3		6
1.4	LTO implementation programme	1	4	1	6
1.5	Current SAR and other CLB documents	3	3		6
1.6	Configuration/ modification management including design basis documentation	5	7		12
Total		16	22	1	39

3.1.1. Related regulatory requirements, codes and standards

Findings: 1 recommendation, 2 suggestions

Trend: In some plants there is an indication that LTO specific regulatory requirements are not available, or, are too general. In some plants, the LTO licensing is connected to a regular PSR, the missing LTO specific requirements are compensated for by the IAEA LTO and AM guidance or US NRC requirements.

IAEA Basis: SSR-2/2, 4.53; NS-G-2.12, 3.2; SRS No. 57, 2.1

Examples show that:
- There is no complete and consistent set of requirements related to LTO.

It should be noted that the objective of the SALTO peer review is to review the plant's own LTO work; therefore this trend is not fully supported by the recommendations and suggestions made, since the regulatory framework is owned by the regulator.

The lack of LTO related requirements likely contribute to a number of issues identified in areas A and B directly and other areas indirectly. Therefore it is essential that LTO specific

regulatory requirements are established in Member States that intend to pursue LTO as a matter of urgency.

3.1.2. Organizational structure for LTO

Findings: 3 recommendations, 3 suggestions

Trend: In some plants there is an indication that the decision on LTO has been adopted but the related organizational actions are not established/ implemented.

IAEA Basis: SSR-2/2, 3.2; NS-G-2.12, 3.16, 4.2-8

Examples show that:
- There is a lack of organizational structures, staffing dispositions and management system documents related to LTO.
- It is not clear which part of the project will be performed by the plant, which will be done by contractors, and how the necessary knowledge will be transferred to the plant.
- The roles and responsibilities, organization and interfaces concerning the preparation and implementation of the LTO project are not appropriately defined.

This area is directly linked to the next sub-section on plant policy for LTO, where additional examples are relevant as well.

3.1.3. Plant policy for LTO

Findings: 3 recommendations, 3 suggestions

Trend: In some plants the plant LTO policy is not clearly defined and established, leading to problems related to strategy, tasks, roles, responsibilities, organizational structure, familiarity of the staff, etc., see e.g. also sub-section 3.1.2, 3.1.4, 3.1.5.

IAEA Basis: SSR-2/2, 3.2; NS-G-2.12, 4.2

Examples show that:
- Not all relevant utility and plant staff are familiar with the LTO project, develop ownership of the LTO project and support its implementation.
- The lack of sufficient emphasis is endangering timely implementation of the LTO programme.
- The LTO target duration is not appropriately identified or is limited to the 10 years licensing period (this is also connected to the use of PSR based approach on LTO).

This aspect could have a broad overall impact on the LTO programme and its implementation.

3.1.4. LTO implementation programme

Findings: 1 recommendation, 4 suggestions, 1 good practice

Trend: In some plants the plant LTO implementation programme is established but the required actions to ensure its actual implementation are not in place.

IAEA Basis: SSR-2/2, Requirements 14 and 16; NS-G-2.12, 4.35-38

Examples show that:
- The activities related to LTO are not completely owned by the day to day organization.
- Lack of programme for sustainable management of ageing during LTO period.
- AMPs are not fully implemented and the responsibilities are not clearly defined in plant processes.
- Organizational arrangements for improvement of ageing management at the plant after LR are not in place.
- Programs, documents and procedures to ensure consistent management for LTO are not complete close to entering LTO.
- The plans to transfer the outcomes and outputs from the LTO project (programmes, results of analysis, activities, updating documentation) are not adequate or missing.

Measures to ensure implementation of LTO project results, commitments, documents updates, and activities need to be in place to ensure plant safety during LTO.

The good practice is related to the use of developed risk matrix also for prioritizing safety issues. This enables the plant to optimally allocate resources and use available resources efficiently in resolving safety issues.

3.1.5. Current safety analyses report and other current licensing basis documents

Findings: 3 recommendations, 3 suggestions

Trend: In some plants, during early SALTO peer reviews (pre-SALTO), deficiencies were noted in connection with the status of the FSAR and other CLB documents, but were not observed more recently.

IAEA Basis: SSR-2/2, 3.2; SRS No.57, 7

Examples show that:
- Consideration should be given by the plant to generate an UFSAR updates and commitments list.
- The plant should review, and if necessary, revalidate the plant transients and their occurrence.
- The PSR is not consistent with the latest IAEA Safety Guide on PSR.

3.1.6. Configuration/modification management including design basis documentation

Findings: 5 recommendations, 7 suggestions

Trend: In some plants deficiencies in the configuration/modification management including design basis documentation were identified indicating a gap between the LTO needs and actual status.

IAEA Basis: SSR-2/2, Requirement 10, 11; SRS No.57, 3.2

Examples show that:
- The data are stored in different databases that may lead to the incompleteness and inconsistency of data.
- An integral, structured configuration management function is missing even though most of the elements exist on individual bases, there is a lack of overall management procedures to support the generation and maintaining of knowledge.
- The modification process does not ensure that plant programmes such as ageing management are updated to ensure safe operation of the plant.
- There is no process to formally document acceptance of documents developed by external contractors therefore the role of such documents within the plant design basis is not clear.
- Design basis documentation is available in principle but not readily accessible.

Systematic attention to conformance among actual plant configuration, related information and design requirements is essential to ensuring safety during LTO.

3.2. Scoping and screening, plant programmes relevant to LTO

TABLE XI. SUMMARY OF FINDINGS (AREA B)

Title		Rec.	Sug.	GP	Total
2.1	Methodology and criteria for scoping and screening of SSCs for LTO	11	5		16
2.2	Plant programmes relevant to LTO	14	8	1	23
Total		25	13	1	39

3.2.1. Methodology and criteria for scoping and screening of SSCs for LTO

Findings: 11 recommendations, 5suggestions

Trend: In some plants there is an indication that the scoping and screening methodology used does not address appropriately non-safety related items failure of which may impact on accomplishment of intended safety function, or results in an incomplete scope for LTO.

IAEA Basis: SSR-2/2, 4.54; SRS No.57, 4

Examples show that:
- It is not clear if the scoping analysis covered non-safety related SSCs.
- The plant methodology is based on safety classification (i.e. only safety related SSCs are in scope).

- The methodology and criteria for scoping non-safety class components indicates that non-conservative criteria were used for assessment of potential impact on electrical component safety functions.
- The methodology for scoping and screening is not well defined and part of the safety related SCs are scoped out incorrectly.

The plants should give adequate attention to the scoping and screening methodology, its appropriate and timely application, as well as the completeness of the outcome. Without a well-defined and justified scope it cannot be demonstrated that the ageing management of all safety relevant structures and components is adequate for LTO.

Trend: In some plants there is an indication that the scoping and screening methodology used does not ensure that active components are addressed adequately.

IAEA Basis: SSR-2/2, 4.54; SRS No.57, 4

Examples show that:
- The active components were intended to be addressed in the frame of the PSR but no specific additional requirements on PSR to address them were developed.
- There is a lack of comprehensive evaluation of active mechanical components.
- Different scoping methods for passive and active components may lead to omission of some items form the scope of LTO.

The combination of different approaches and methods for scoping and screening of passive and active components may lead to inadequate evaluation or omission of some items from the LTO scope.

Other issue is related to incomplete scoping of SSCs for LTO and deficiencies of related documentation. This impact subsequently the ageing management review.

3.2.2. Plant programmes relevant to LTO (maintenance, equipment qualification, in-service inspection, surveillance and monitoring, monitoring of chemical regimes etc.)

Findings: 14 recommendations, 8 suggestions, 1 good practice

Trend: In many plants there is an indication that the existing plant programmes relevant for LTO are not evaluated at a proper time and with required scope to demonstrate their adequacy for safe LTO.

IAEA Basis: SSR-2/2, 4.54; NS-G-2.12, 2.5, 2.6, 4.33; SRS No.57, 3.3, 5.3

Examples show that:
- Current arrangement of databases to support maintenance activities does not have an integrated structure.
- The methodology to assess active components for LTO has not been finalized and implemented by the plant.
- The interfaces of different programmes that manage ageing of SSCs in the scope of LTO are not well defined.
- The evaluation of the effectiveness of the programmes is not adequate.

- There is an insufficient involvement of maintenance, EQ, chemistry, ISI, surveillance and monitoring in ageing management.
- There is a lack of co-ordination with all plant's departments or projects and the LTO project.
- Existing plant programmes relevant for LTO are not adequately enhanced for LTO.

The good practice identified is related to the use of the plant's Maintenance Training Centre for LTO related inspection activities.

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

TABLE XII. SUMMARY OF FINDINGS (AREA C)

Title		Rec.	Sug.	GP	Total
3.1	Area-specific scoping and screening	3	1		4
3.2	Ageing management review	4	5	2	11
3.3	Review of ageing management programmes	5	9	3	17
3.4	Obsolescence management programme		2		2
3.5	Existing TLAAs	1			1
3.6	Revalidation of TLAAs	12	10	1	23
3.7	Data collection and record keeping		1		1
Total		25	28	6	59

3.3.1. Area-specific scoping and screening of SSCs for LTO

Findings: 3 recommendations, 1 suggestion

Trend: In some plants various deficiencies in area specific scoping and screening were observed.

IAEA Basis: SSR-2/2, 4.54; SRS No.57, 4

Examples show that:
- There is no project document which describes procedure on how to identify SSCs and their LTO boundary drawing.
- Scoping of non-safety related mechanical and civil SCs whose failure could affect the function of safety-related components, has not been performed using a documented and verifiable methodology to identify spatial interactions.
- The LTO approach, including scoping and screening, is not consistent for all mechanical components.

Other issue is related to data collection and record keeping to support scoping and screening.

3.3.2. Ageing management review

Findings: 4 recommendations, 5 suggestions, 2 good practices

Trend: In some plants there is an indication that in the ageing management review the operating experience is not considered adequately.

IAEA Basis: SSR-2/2, Requirement 24; NS-G-2.12, 2.5, 2.12, 3.16, 4.33; SRS No.57, 5.1-3

Examples show that:
- Some ageing mechanisms/effects are not considered even though they caused degradation at other plants, such as localized thinning due to cavitation, vibration fatigue.
- The time span of operating experience and the range of references used are not sufficiently comprehensive for AMR.
- Operating experience from the whole operational history of the plant was not considered for LTO.

Other issues are related to clear definition of the AMR in plant documentation, timely initiation and completion of the work, and condition assessment.

The good practices are related to the establishment of a database supporting AMR and thorough approach to the RPV assessment.

3.3.3. Review of ageing management programmes

Findings: 5 recommendations, 9 suggestions, 3 good practices

Trend: In some plants there is an indication that AMPs do not meet the 9 attributes of an effective AMP and were not revised as applicable.

IAEA Basis: SSR-2/2, 4.50, 4.54; NS-G-2.12, 4.33, 6.2; SRS No.57, 5.3-4

Examples show that:
- Pilot AMPs do not address all generic IAEA AMP attributes.
- The existing plant documentation does not fully cover all attributes of effective AMP.
- AMPs do not address all generic IAEA AMP attributes.

Trend: In some plants there is an indication that some specific plant items are missing from the scope of AMPs.

IAEA Basis: SSR-2/2, 4.50, 4.54; NS-G-2.12, 4.32, 6.2; SRS No.57, 5.3-4

Examples show that:
- Inspection sample for one-time inspection programme does not include the pressurizer spray head.
- Subcomponents of reactor assembly are excluded from inspection programme in the plant.

Other issues are related to ageing mechanisms/effects not addressed by AMPs, updated documentation of AMPs, AMP requirements are not implemented in the plant procedures,

clear definition of the AMR in plant documentation, timely initiation and completion of the work, and condition assessment.

The good practices are related to the implementation of a management system for ISI, implementation of advanced AMPs, as well as to the developing a comprehensive system to manage aging of RVI.

3.3.4. Obsolescence management programme

Findings: 2 suggestions

Trend: In few plants there is an indication that proactive obsolescence management programme is not yet fully implemented.

NS-G-2.12, 5.1-4

Examples show that:
- There is no fully implemented proactive obsolescence management programme in place.
- The proactive part of the obsolescence programme is not in place yet.

3.3.5. Existing time limited ageing analyses

Findings: 1 recommendation

Trend: None

In 1 plant the work regarding the existing TLAAs was not initiated at all.

3.3.6. Revalidation of time limited ageing analyses

Findings: 12 recommendations, 10 suggestions, 1 good practice

Trend: In few plants there is an indication that codes and standards of different origin were mixed together or one used instead of the other without prudent reconciliation.

IAEA Basis: SSR-2/2, 4.54; SRS No.57, 2.2, 6

Examples show that:
- Only the use of a single design Code provides the intended safety margin built into the Code; mixing e.g. FSU Codes and ASME Code may lead to unacceptable outcomes.
- Mixing different pressure vessel & piping codes and standards in the stress analysis.

Other issues are related to a number of specific narrow focus comments regarding the TLAAs, late TLAAs revalidation, development of an FSAR update and commitments list, and use of non-conservative assumptions on the number of the transient cycles (design, not the actual one).

The good practice is related to the continuous update of the fatigue analysis in one plant.

3.3.7. Data collection and record keeping

Findings: 1 suggestion

Trend: None

The 1 issue identified deals with a lack of a database for a component specific AMP.

3.4. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for electrical and I&C components

TABLE XIII. SUMMARY OF FINDINGS (AREA D)

Title		Rec.	Sug.	GP	Total
4.1	Area-specific scoping and screening				
4.2	Ageing management review	4	2		6
4.3	Review of ageing management programmes	7	5	3	15
4.4	Obsolescence management programme			1	1
4.5	Existing TLAAs	3	1		4
4.6	Revalidation of TLAAs	4	1		5
4.7	Data collection and record keeping		2	2	4
Total		18	11	6	35

3.4.1. Area-specific scoping and screening of SSCs for LTO

No findings.

3.4.2. Ageing management review

Findings: 4 recommendations, 2 suggestions

Trend: None

The issues identified are related to equipment or parts susceptible to ageing that have a qualified lifetime much shorter than 40 years, use of limited source of information on operating experience and obsolescence management, inadequate seismic anchoring of electrical and I&C equipment as well as other equipment, and to incomplete identification of degradation mechanisms.

3.4.3. Review of ageing management programmes

Findings: 7 recommendations, 5 suggestions, 3 good practices

Trend: In some plants there is an indication that the actual environmental conditions are not monitored to ensure that aging analyses are based on conservative data, or there are no inspections and tests during the LTO period aiming at preserving cable system qualification and functionality

IAEA Basis: SSR-2/2, 4.48; NS-G-2.12, 7.5; SRS No.3, 5.3

Examples show that:
- The ageing analyses of cables may not be conservative since the temperatures used may be too low. The routing of the cables is not completely known, this makes it difficult to monitor the environment to be used in the analyses.
- The qualified life does not take into account the current operating parameters, diagnostic results, ambient and accident conditions.
- There is no temperature monitoring programme in place at the plant to identify hot spots.
- There are no planned periodic and documented condition visual inspections and tests during the LTO period

AMPs to support EQ should be developed and implemented.

3.4.4. Obsolescence management programme

Findings: 1 good practice

Trend: None

The good practice is related to the technological obsolescence management, which is considered a basic part of ageing management.

3.4.5. Existing time limited ageing analyses

Findings: 3 recommendations, 1 suggestion

Trend: In some plants there is an indication that the EQ is incomplete or missing.

IAEA Basis: SSR-2/2, Requirement 13; NS-G-2.12, 7.2-7

Examples show that:
- Some replacement items which need TLAA are missing from the present Master list, TLAA list and related documents.
- Information in the Qualification Protocol of Component is not clear and complete enough for its purposes.
- The plant has not developed and implemented a comprehensive EQ programme.
- Existing practices in maintaining some electrical and I&C equipment do not assure its qualification and functionality during the period of LTO.

3.4.6. Revalidation of time limited ageing analyses (including EQ)

Findings: 4 recommendations, 1 suggestion

Trend: In some plants there is an indication that the EQ is not revalidated for LTO.

IAEA Basis: SSR-2/2, Requirement 13; NS-G-2.12, 7.3-6; SRS No.57, 3.3

Examples show that:
- The qualified life for the LTO period is not analyzed or revalidated for all required components, the revalidation is not a part of the LTO programme.
- There is a lack of EQ revalidation for the plant's cable system (cables, trays, connections).
- EQ of originally installed safety cables of class 1E is not completely revalidated for LTO.
- The validity of equipment qualification is limited to design life and is not appropriate for LTO.

Other issue is related to the user-friendliness of documentation of TLAA revalidation.

3.4.7. Data collection and record keeping

Findings: 2 suggestions, 2 good practices

Trend: None

The issues are related to the inconsistency of the data contained in the databases and to the incompleteness of the EQ database (Q-list).

The good practices are related to the databases of I&C reliability results, and to the easy access to important parameters for cable status assessment.

3.5. Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for civil structures

TABLE IX. SUMMARY OF FINDINGS (AREA E)

Title		Rec.	Sug.	GP	Total
5.1	Area-specific scoping and screening	3			3
5.2	Ageing management review	5	9		14
5.3	Review of ageing management programmes	9	1		10
5.4	Obsolescence management programme				
5.5	Existing TLAAs				
5.6	Revalidation of TLAAs	4	1		5
5.7	Data collection and record keeping				
Total		21	11		32

3.5.1. Area-specific scoping and screening of SSCs for LTO

Findings: 3 recommendations

Trend: In some plants, scoping and screening of civil structures was not performed thoroughly to facilitate ageing management for LTO.

IAEA Basis: SSR-2/2, 4.54; SRS No.57, 2.2, 4

Examples show that:
- Civil structures have not been defined at the component level or as commodity groups.
- There are several lists of SCs relevant for LTO which are not consistent.

The other issues is related to the lack of actions in this area, where ageing management programme was not established yet.

3.5.2. Ageing management review

Findings: 5 recommendations, 9 suggestions

Trend: In many plants, the ageing management review for civil structures was not implemented in a comprehensive way to facilitate ageing management for LTO.

IAEA Basis: SSR-2/2, 4.54; NS-G-2.12, 2.3, 3.1, 3.5, 4.10-11, 4.22, 4.26, 4.28, SRS No.57, 5

Examples show that:
- There are discrepancies within civil ageing management review and degradation mechanism project catalogue.
- The need for external painting of the reactor containment building was not evaluated.
- There are no inspection procedures and ageing management programmes for concrete structures.
- The process for incorporating external operating experience consideration for LTO is not effective.
- The plant has not demonstrated that the unit 2 spent fuel pool can maintain its structural integrity during LTO.
- Loss of concrete durability due to leaching Calcium Hydroxide has not been appropriately addressed.
- The AMR tables do not cover evaluation for all known ageing effects and do not designate the most stringent AMP for managing the ageing effects.

The ageing management review for civil structures should receive more attention.

The other issue is related to a lack of oversight to ensure completeness of ageing management.

3.5.3. Review of ageing management programmes

Findings: 9 recommendations, 1 suggestion

Trend: In some plants, the AMP for civil structures does not meet the 9 attributes of an effective AMP and are not effective.

IAEA Basis: SSR-2/2, 4.50, 4.54; NS-G-2.12, 4.33, 6.2; SRS No.57, 5.3-4

Examples show that:
- The ageing management programme for civil structures should be reviewed to ensure its consistency with the 9 attributes and thereby its effectiveness.
- Relevant data from existing plant activities are not provided to and used in the ageing management programmes for LTO.
- The containment tendons pre-stress and corrosion monitoring should be calibrated and validated.
- Tendon surveillance programme has not demonstrated that the containment pre-stressing tendons can maintain their design function during LTO.
- Ageing management of containment suppression pool and associated components is not effective.

The other issues are related to missing AMPs (that need to be developed), and AMPs that were identified as important but were not implemented yet (such as containment visual inspections).

3.5.4. Obsolescence management programme

No findings.

3.5.5. Existing time limited ageing analyses

No findings.

3.5.6. Revalidation of time limited ageing analyses

Findings: 4 recommendations, 1 suggestion

Trend: In some plants, the civil structures TLAA revalidation was not completed.

IAEA Basis: SSR-2/2, 4.54; NS-G-2.12, 6.3; SRS No.57, 6

Examples show that:
- The analysis for some civil structures has been done without adequate consideration of degradation of the structure, aged properties of material and appropriate loading effects of external hazards derived using current information.
- The plant has not demonstrated that assessment of the grouted containment tendons operability is valid for the period of LTO.

– Fire protection of cables and masonry partitions qualification has not been revalidated in the LTO process.

3.5.7. Data collection and record keeping

No findings.

3.6. Human resources, competence and knowledge management for LTO

TABLE XV. SUMMARY OF FINDINGS (AREA F)

Title		Rec.	Sug.	GP	Total
6.1	Human resources policy and strategy to support LTO	2		1	3
6.2	Competence management for LTO and recruitment, training, and qualification processes for personnel involved in LTO activities	2	1		3
6.3	Knowledge management and knowledge transfer for LTO		3	2	5
Total		4	4	3	11

3.6.1. Human resources policy and strategy to support LTO

Findings: 2 recommendations, 1 good practice

Trend: In few plants, the human resources strategy is not implemented consistently or is missing completely.

IAEA Basis: SSR-2/2, Requirement 1-3; GS-R-3, 4.1, 4.4; GS-G-3.1, 4.1; NS-G-2.4, 3.7, 6.11-12, 6.14; NS-G-2.12, 4.4, 4.6

Examples show that:
– There is a lack of adequate long term staffing plan for the LTO programme.
– Various human resource, competence and knowledge management processes and procedures for LTO are not consistently implemented.

The good practice is related to the use of a comprehensive and well implemented approach to the management of critical suppliers.

3.6.2. Competence management for LTO and recruitment, training, and qualification processes for personnel involved in LTO activities

Findings: 2 recommendations, 1 suggestion

Trend: In few plants, the competence management and staffing is not adequate to support LTO programme implementation and safe LTO.

IAEA Basis: SSR-2/2, Requirement 1-3; GS-R-3, 4.2-4; GS-G-3.1, 4.4, 4.20; GS-G-3.5, 4.10, 4.13; NS-G-2.4, 4.5, 4.7-8

Examples show that:
- A systematic approach for competence and knowledge management is not implemented to support the plant LTO.
- Staffing plans for the long term operation of the plant are not adequate.

3.6.3. Knowledge management and knowledge transfer for LTO

Findings: 3 suggestions, 2 good practices

Trend: In few plants, the knowledge management is not adequate to support safe LTO.

IAEA Basis: SSR-2/2, 3.10; GS-R-3, 4.2; GS-G-3.1, 3.12, 4.2, 4.4; GS-G-3.5, 4.10-13; NS-G-2.4, 4.8

Examples show that:
- Coordination between key LTO functions and partners does not ensure that all relevant documents, data and knowledge are being systematically reviewed, archived and shared
- Knowledge management processes are not fully integrated into the line organization and knowledge management is not implemented for LTO.

The good practices are related to the collaboration between the plant and manufacturers to transfer related knowledge, and to the specialists` programme, that addresses the need for specialist skills in certain areas in order to be able to handle strategically important challenges such as an ageing plant, new requirements from the regulatory authorities.

3.7. SALTO and OSART LTO module follow-up

SALTO follow-up missions as well as OSART follow-up missions are integral part of the services, and take place approximately 1.5-2 years after the main missions. In the period 2005-mid 2015 there were 6 follow-up missions to review the implementation of previous SALTO results. For 2 plants, LTO module was included in the OSART mission including the follow-up missions in this period.

TABLE XVI. SALTO FOLLOW-UP MISSIONS

SALTO Mission No.	Plant	Country	Year
9	Kori 1	South Korea	2010
10	Dukovany	Czech Republic	2011
11	Borssele	Netherlands	2012
13	Paks	Hungary	2013
14	Borssele	Netherlands	2014
15	Wolsong 1	South Korea	2014

TABLE XVII. OSART FOLLOW-UP MISSIONS WITH LTO MODULE

OSART Mission No.	Plant	Country	Year
159	Bohunice	Slovakia	2012
170	Muhleberg	Switzerland	2014

The following are the results of the follow-up missions regarding the resolution of the findings (total 77 issues):

TABLE XVIII. RESOLUTION OF ISSUES

Status of issues	No.	%
Resolved	37	48.1%
Satisfactory progress	35	45.5%
Insufficient progress	4	5.2%

The results of the follow-up missions demonstrate the effectiveness of the SALTO service and in particular the commitment of the plants to implement improvements identified by SALTO teams.

3.8 ASSESSMENT OF OVERALL SALTO MISSIONS RESULTS

TABLE XIX. FINDINGS OVERVIEW

	O&F, CLB, CM	**S&S, PP**	**M**	**E, I&C**	**C**	**HR, KM**
Issues	23	29	32	23	27	8
Recommendations	16	25	25	18	25	11
Suggestions	22	13	28	10	11	4
Good Practices	1	1	6	6	0	3
Missions	13+2	13+2	13+2	13+2	13+2	5

The Table XII shows the number of findings in each standard review area. Two trends are shown in the Table:

a) the number of issues across the areas is approximately uniform with the exception of mechanical components (area C) where significantly higher number of recommendations and suggestions occurred; the lower number of issues in the area F (HM, KM) is due to the smaller number of missions that reviewed this area;
b) as compared with the OSART missions, the number of good practices identified is much smaller in SALTO missions so far.

It is difficult to derive any further conclusions on a more detailed level since the SALTO methodology was evolving in parallel with the implementation of the earlier missions and the findings scope, content and format does not allow easy comparison.