

**EXTRABUDGETARY PROGRAMME
ON
SAFETY ASPECTS
OF LONG TERM OPERATION
OF WATER MODERATED REACTORS**

**MINUTES OF THE PROGRAMME'S THIRD
STEERING COMMITTEE MEETING**

25-28 April 2005

INTERNATIONAL ATOMIC ENERGY AGENCY

1. INTRODUCTION

The number of Member States giving high priority to extending the operation of nuclear power plants beyond their initial license is increasing. Decisions on long term operation (LTO) involve the consideration of a number of factors. While many of these decisions concern economic viability, all are grounded in the premise of maintaining plant safety. The IAEA recognized this new industry initiative; therefore, in the 1990's, it developed comprehensive generic guidance on how to manage the safety aspects of physical ageing. It was recognized, however, that internationally agreed-upon, comprehensive guidance was needed to assist regulators and operators in dealing with the unique challenges associated with the LTO issue.

In response, the IAEA initiated this Extrabudgetary Programme (Programme) on Safety aspects of long term operation of water moderated reactors (original title was Safety aspects of long term operation of pressurized water reactors). The Programme's objective is to establish recommendations on the scope and content of activities to ensure safe long term operation of water moderated reactors. The Programme should assist regulators and operators of water moderated reactors, and, in particular WWERs, in ensuring that the required safety level of their plants is maintained during long term operation, should provide generic tools to support the identification of safety criteria and practices at the national level applicable to LTO, and should provide a forum in which MS can freely exchange information.

The Programme activities are guided by the Programme Steering Committee (SC), follow the overall SC Programme Workplan and SC Terms of Reference, [1], and are implemented in 4 Working Groups (WG). The WGs focus on:

- general LTO framework (WG 1);
- mechanical components and materials (WG 2);
- electrical components and I&C (WG 3);
- structures and structural components (WG 4).

Further detailed information on the Programme could be found at: http://www-ns.iaea.org/nusafe/s_projects/salto_int.htm .

The purpose of the third Steering Committee Meeting, held at the IAEA Headquarters in Vienna, Austria, 25-27 April 2005, was to review the progress of the Programme. Specifically, the Steering Committee comments were requested on the work completed by the four Working Groups and guidance on the contents, and on the preparation of the Programme Final Report.

The Agenda for the Meeting is provided in Appendix I. Minor adjustments were made to the Agenda to accommodate presentation times. A co-ordination meeting of WG leaders/secretaries took place on 25 and 28 April 2005.

The Meeting was attended by nominated representatives of the participating Member States (MS), the European Commission and an observer from Japan, and WG leaders/secretaries. List of participants is provided in Appendix II.

2. MEETING SUMMARY

Mr. Ken Brockman, Director of the Division of Nuclear Installation Safety (NSNI) of the IAEA, opened the Meeting. In his opening comments Mr. Brockman complemented all the Member States for the quality of participants on the SC and on all of the WGs. He stated that the LTO related work is one of the key areas in the NSNI future activities. He stated that the Programme is now 2 years old and the global vision might be working. Mr. Brockman welcomed new participants from Netherlands and Canada as well as Japan as an observer and informed that future participation from China and Argentina is also expected. He also stated that he was pleased with the progress to date and urged continued diligence.

Mr. Aybars Guerpinar, Section Head of the Engineering Safety Section (ESS) of the IAEA, briefly described the IAEA LTO related priorities. He stated that there are six professional staff members currently working in LTO activities. These are also coordinated with other international organizations. The results of these activities may result in the preparation of probably three safety guides for use by the MS.

Mr. Radim Havel, the Programme Scientific Secretary, summarized the Programme activities that have taken place since the second Steering Committee Meeting in March 2004. Mr. Havel stated that this SC meeting is very important and several key issues must be addressed. With the Programme completion date only 19 months away, the SC must agree on the Programme Final Report table of contents and on a detailed action plan for scheduled implementation and completion of the Programme.

Regarding the status of the Programme, Mr. Havel stated that all WGs had the 2nd WG meetings and will have their 3rd meetings in May-June 2005. Based on the WGs comments, the Standard Review Process, IAEA-EBP-LTO-03 [2] has been revised and the QA Manual, IAEA-EBP-LTO-11 [3] and issued for use by the WG members. He also stated that almost all Country Information Reports (CIRs) have been completed. All the WGs are busy analyzing and drafting the review reports.

Mr. Havel also praised the excellent experts that are participating in the WGs. He also mentioned that the WG participants have a great deal of work to do over the next 19 months and urged the SC Members to provide support and coordination for the WG participants (from their MS). He also introduced Mr. Kazuhide Tomita from Japan, who is attending this meeting as an observer and will make a presentation during this meeting.

Mr. Frank Gillespie, the SC Chairman, welcomed the participants. In his opening remarks, he thanked Mr. Alex Duchac for coordinating the WG activities and reviewing the WG3 CIRs in a short period of time. Mr. Gillespie suggested that to the extent possible, format of information in Chapters 2, 3 and 4, should be similar. He further stated that he believes that there is a lot of useful information in the CIRs and the challenge to the WGs is to put all this information in format which could be easily used by the MS. Specific guidance or process should be provided for scoping of systems, structures, and components, and for using existing plant programs. Specific guidance should be included for the developing new programs to address potential aging effects. Mr. Gillespie summarized the questions and concerns raised during discussions.

- Several members expressed concerns regarding the amount of information in the CIRs. Focus should only be on LTO related information.
- Some members felt that with this large amount of information to be reviewed, there may not be enough time to complete the report as scheduled.

All SC members agreed that guidance should be provided to WG leaders/secretaries (L/S) to keep the focus on LTO related information and prepare a schedule for preparation of the final report.

Mr. Gillespie stated that the support and participation in the Working Groups was excellent and that the support and participation on the SC was outstanding. He urged all the members to continue this level of coordination and support.

2.1. NATIONAL PRESENTATIONS

Each MS participating in the SCM made a brief presentation, describing the status of its efforts with regard to the LTO and its continued support to this Programme.

Bulgaria

Since 2002 till August 2004 Bulgaria completely re-established its legislative basis by adopting a

new Nuclear Act and developing 20 new regulations in compliance with the EU legislation and IAEA requirements. The modernisation program of units 1 and 2 is completely finalized with the installation of the Severe Accident Management System, Filtered Venting System and the development of the Safety Accident Management Guidelines including units 3 to 6.

The modernization program of Units 5 and 6 is in its last phase (completed 68% till the end of 2004). The final completion is scheduled for the end of 2006 and will be reflected in a revision of units' SAR with an aim to ground the future long-term operation of these units.

The long-term energy development strategy of Bulgaria considers the nuclear option as a solution to meet the domestic needs of electricity supply and since April 2005 a governmental decision is taken for the recovery of the construction of Belene site.

Bulgaria is participating in the SALTO project in the SC, WG-1, 2 &4.

At national level, for the time being, there are no definite requirements programs and structures in the aspect of LTO.

The Bulgarian participants in the project highly estimate the competence and qualification of the WGs' leaders and staff involved in the project and have the following comments:

- CIRs were not revised on time and accordingly to the required contents
- Lists of reference documents is not supplied

Czech Republic

The description of the Czech national organization of SALTO project activities was provided with special emphasis on the CEZ company (NPPs owner) LTO management. The recommendations to the further project continuation were presented. The importance of the LTO issue for the Czech Republic was expressed.

Finland

In his presentation Mr. Koponen described the licensing situation in Finland. The operating licenses of the Loviisa units are valid to the end of 2007, and the licenses of the Olkiluoto units to the end of 2018. However, the licenses of the Olkiluoto units include a condition that a periodic safety review shall be carried out by 2008. Mr. Koponen further described the ageing and upgrading programmes at Finnish nuclear power plants. The principle of continuous improvement of safety is followed in Finland.

Hungary

In spite of the INES-3 severe incident happened on 10. April, 2003 the results of polls at this time do not show any loss of trust of the public concerning the safety performance level of Paks NPP. The Paks management has insisted in the decision for service life extension of the units and expressed their commitment to implement it as it was already announced previously. During the last year a number of policy makers of high rank and important bodies visited the plant and have supported in their statements the efforts made in this direction. There are no political parties in the Hungarian Parliament, which would not agree with the benefits of long term operation of the Paks units.

The Hungarian officials and experts have received significant assistance from the IAEA in coping with the consequences of the incident. Additionally, very important assistance was granted from the US NRC and the Russian GOSATOMNADZOR to the HAEA in its licensing process of restarting the unit Nr.2. as well as in QA inspection of the Russian consortium members, who were contracted for the recovering tasks of the tank containing the damaged fuel assemblies.

Concerning the preparatory actions of lifetime extension, the program developed by Paks has been continued. The outstanding importance of the subject of long term operation for Hungary is demonstrated by the fact that Hungary has initiated a separate TC Project with the IAEA (HUN/4/014) titled License Renewal of Paks NPP Operation that is under way from 2003.

Hungary appreciates the considerable effort made in the framework of the EBP SALTO by the IAEA and by all four Working Groups, in all of which there are Hungarian representatives. Considering the Work Plans of the Working Groups we are sure that the outcomes of this EBP will contribute to the success of our life time extension program.

Japan

Mr. K. Tomita, who attended the meeting as an observer, presented briefly the current status of plant life management (PLM) in Japan.

53 LWRs are operating and 7 units are aged over 30 years as of March 2005. 9 units have issued the PLM report so far.

Regarding the regulation related to PLM, in 1996 Ministry of International Trade and Industry (MITI, now METI) has presented the Basic Policy on Aged NPP asking technical evaluation for plants aged over 30 years assuming 60-year operation period and developing 10 year maintenance plan as PLM. In 2003 the PLM report as well as PSR report became mandatory.

In the PLM report, the licensee is requested to identify the SSCs to be evaluated first and phenomena caused by aging referring to the literature survey or operating experiences next. Considering these two things, the licensee is to conduct the technical evaluation and study the countermeasure for aging management. In the conclusion, a long term maintenance plan is presented.

Japan has been acting positively to renew and establish guidelines, codes and standards regarding PLM.

Russia

The presentation provides information on the life time of Russian NPP units. According to the data provided, 7 units out of total 31 have been operating for more than 30 years. As a result of implementation of LTO programmes additional 15 years of operation were justified for each of the abovementioned 7 units with total electric capacity of 2738 MW. The presentation also provides information on the regulatory basis of LTO. In 2004 four Safety Guides were developed and put into force at Russian NPPs within the frame of the IAEA project RUS/9/003 – these guides specify the procedure for elaboration of documents for LTO. The section of the Report “Management of WWER equipment life” covers the following topics:

- Methodology for management of equipment life;
- Regulatory basis for equipment life management;
- Mitigation of ageing effects;
- Existing and future research activities related to LTO;
- Improvement of equipment condition monitoring using Residual Life Monitoring System (SAKOR);

The following proposals should be considered at the SC Meeting:

- focusing on the LTO-specific goals in the reports;
- establishing feedback with CIRs to optimize the information collected;
- extension of time for preparation of final working group reports.

Slovak Republic

Country Information Reports have been submitted from WG 1, WG 2, WG 4, while WG 3 CIR is still under elaboration. By the repealing provisions of new Atomic Act No. 451/2004 coll., which is in force since December 1st 2004, all existing decrees have been canceled. New decrees are elaborated and at present they are under review and approval process. The provisions in the area of ageing and ageing management are more precisely defined as in old decrees. The Research and Development Project 'Ageing Management and Optimisation of Operation of WWER 440 NPPs' is under way and it is planned to be completed by the end of 2005. Under way is also a gradual reconstruction of Bohunice V2 NPP (Unit 3&4) with the aim of safety enhancement and both, the life time extension and the power uprating.

Sweden

From January 2005 two new regulations are in power in Sweden. The first one, replacing the current regulations the second is a completely new regulation concerning design and construction of NPP's reactors. At the same time an intensive activity is going on dealing with application to increase the power output from three reactors. Taking into account the current situation and the nearest future in the field of Nuclear Power in Sweden the Long Term Operation is a very important issue to deal with. For Safe Long Term Operation, continuous upgrading and Modernization is important. If this is done correctly, "Life Time Extension" is not a specific Safety Issue although it may be a relevant Licensing Issue. SALTO programme did achieve some good progress. The ongoing activities are reflecting the fact that it is extremely important to stress on the LTO Safety Aspects as the main motivation to this programme and the main issue to be in focus of the programme activities.

Sweden will continue support EBP SALTO, however for better efficiency and assurance of timely finishing of the programme the participants should better coordinate the activities at the national level and control fulfilling of the commitments.

Ukraine

From 2004 preparation of the Ukrainian NPPs to LTO is conducted in compliance with the adopted national programmes. The main regulation with regard to the procedure of preparation, justification and assurance of safe operation of NPP units beyond the design life time.

Utility "Energoatom" is intensively developing methodological documentation for inspection of main process equipment, critical components subject to ageing management. In this respect inspection of Unit 1 of Rovno NPP has started.

Ukrainian delegation is of opinion that the main concern in terms of the project is elaboration of scoping criteria for SSC for inclusion to LTO procedure in order to minimize the list of LTO-related SSCs for working groups 2, 3 and 4.

USA

The license renewal program in USA has made substantial progress based on this experience gained in reviewing several license renewal applications. The NRC has issued 30 renewal licenses and an additional 18 are currently under review. Based on lessons learned and in consultation with the industry and public, the NRC has revised several guidance documents. These draft documents were released for public comment. Over the next few months, the NRC plans to conduct public meetings and workshops to address public comments and finalize these documents. These include: Draft Standard Review Plan, Rev. 1, Draft Generic Aging Lessons Learned (GALL) Report, Rev. 1, Draft Regulatory Guide, DG-1140, License Renewal Inspection Manual, Draft Bases Document for Revisions to GALL, Rev. 1, and SRP, Rev. 1. These revised documents are currently scheduled for issuance in September 2005. In addition, Nuclear Energy Institute has also revised its guidance document Draft NEI 95-10, Industry Guidelines for Implementing the Requirements of 10 CFR Part 54-The License Renewal Rule, Rev. 5.

The USA continues to strongly support this IAEA effort to bring together in one organized and structured program, the optimum approached to managing and monitoring the effects of plant aging.

2.2. WORKING GROUPS' PRESENTATIONS

Each of the Working Groups provided a brief overview of their activities thus far and their plans for future activities. The major activities for the four WGs were completion of review of country information reports (CIRs) using the Standard Review Process (IAEA-EBP-LTO-03). The handouts of the presentations are provided in Appendix III. of this report.

Working Group 1 - PT Kuo (WG-1 leader)

Mr. Kuo briefly reviewed the activities for Working Group 1, which is focused on the General LTO Framework. The group's second meeting was held 23-27 August 2004 in Stockholm and Oskarshamn and the minutes are provided in IAEA-EBP-LTO-12 [4]. Mr. Kuo informed that the CIRs have been received from the participating Member States (MS). To facilitate and provide consistency in reviewing these CIRs, the WG-1 members were divided into four sub-groups with responsibility to review specific sections of all CIRs. The reviews were conducted in accordance with the revised Standard Review Process (IAEA-EBP-LTO-03). Mr. Kuo provided summary results of these reviews and also stated that due to time constraints, these summary results have not been coordinated with/among other WG-1 members. These results were summarized in seven sections.

There was very fruitful discussions among participants regarding clear definitions and boundaries of LTO, scoping of SSCs, QA programs, maintenance activities and their relationships to management of aging of systems, structures and components (SSCs), EQ programs, design basis for the plants and updates of Final Safety Analysis Reports (FSAR), and Time-Limited Aging Analysis (TLAA) in relationship to LTO activities. Modernization of plant SSCs and use of existing plant programs as part of aging management for LTO was also discussed.

Working Group 2 - T. Taylor (WG-2 secretary)

Mr. Taylor reviewed briefly the activities for Working Group 2, which is focused on Mechanical Components and Materials. The group's second meeting was held in Vienna, 16-18 November 2004 and the minutes are provided in IAEA-EBP-LTO-13 [5]. Mr. Taylor informed that the CIRs have been received from participating MS and as followed by WG-1, the review work has been divided among WG-2 members. Preliminary results of CIRs review indicate that all participating MS did not follow the agreed upon data collection process. It may be necessary to go back to some participating MS to provide additional information. During this presentation, discussions among Steering Committee members continued regarding definitions of LTO, existing maintenance practices, scoping of SSCs for inclusion for further evaluations for LTO period.

Working Group 3 - A. Duchac (WG-3 acting leader)

Mr. Duchac briefly reviews the activities of WG-3, which is focused on Electrical Components and Instrumentation and Controls (E&IC). The second meeting was held in Kiev on 24-26 May 2004 [6]. Mr. Duchac informed that a total of 6 CIRs have been received and due to late submission of some CIRs, only a partial review has been completed. This review indicates that there is a great variation of licensing practices among participating countries, and there is no clear definition or consensus of LTO among participating MS. The scoping and inclusions of E&IC components varies greatly as indicated in the CIRs, not only among MS, but also among different nuclear reactor types. The level of information provided in the CIRs are quite varied and it may be necessary to request MS to provide additional information in specific areas. EQ and aging management of power and instruments and controls cables appears to be a standard practice in several MS. General discussion among SC members continued in areas common to the work of WGs 2, 3 & 4.

Working Group 4 - T. Katona (WG-4 leader)

Mr. Katona briefly reviewed the activities of WG-4, which is focused on structures and structural components. The second meeting of the WG-4 was held on January 17-19, 2005 in Vienna, Austria [7]. MS participants presented the results of their CIR. Similar to other WGs, the review of CIRs was divided in 3 sub-groups. Each was assigned specific CIR sections to review based on revised Standard Review Process (IAEA-EBP-LTO-03). This review is not completely finished, but partial review indicates that most of the CIRs contain sufficient information to proceed to the next phase. Specific information may need to be requested from some MS in order to have a user friendly final report. Mr. Katona further indicated that these reports showed similar confusion on definitions of LTO, scoping of SSCs for LTO, use of existing programs and maintenance programs for LTO period, and review of TLAAs applicable to LTO. Mr. Katona also noted that guidance needs to be provided on acceptability of aging management programs.

Next meeting of WG-4 is scheduled for May 17-19, 2005 in Vienna, Austria. At this meeting, specific directions will be given to the WG members in preparation of the final report.

2.3. DISCUSSION AND ACTION ITEMS

Following the four WG presentations there was a general discussion regarding the information provided by the WGs. Specific topics of discussion:

- i.* Pre-conditions for LTO - discussion among participants concluded that it is clear what should be included under pre-conditions for an operating power plant to start a LTO project. Examples could be availability for current licensing basis and updated FSAR. WG-1 was assigned the lead responsibility for this task.
- ii.* Scoping criteria for LTO - based on WG1 - 4 presentations, the SC concluded the definitions of scoping and the criteria as applied to LTO should be clearly defined. WG-1 was assigned this task. WG 2 - 4 were asked to prepare a scoping process diagram for use in scoping of SSCs for LTO. WG2 - 4 L/S presented a proposed process diagram for the SC comments which is included in Appendix IV. of this report.
- iii.* Attributes for an acceptable aging management program - based on discussions following WG1 - 4 presentations, the SC tasked WG-1 to prepare a list of attributes for an acceptable aging management program. MS then could use these attributes to compare existing plants programs and maintenance practices which could be used during LTO.
- iv.* Common table for aging management review - as part of preparation of the final report, WG2 - 4 L/S agreed to propose a table format containing material, environment, aging effect/ mechanism information which could be quite useful for aging management review. A proposed table was provided to the SC for comments and is included in Appendix V. of this report.

Definition of LTO - based on WG 1 - 4 presentations, the SC tasked WGs 2 - 4 to propose a clear definition of LTO for inclusion in WG-1 report (review the existing definition).
- v.* WGs Final Reports outlines - based on WG 1 - 4 presentations and discussions, the SC tasked WG 2 - 4 to finalize the outlines including tables, and ensure that they are uniform and consistent.
- vi.* Based on the presentation by WG 1 - 4 L/S and further discussions, the SC directed WGs 1 - 4 L/S to ensure that the WGs Final Reports focus only on LTO specific issues. Information related to normal operations which some CIRs may contain, should be excluded.
- vii.* Based on the presentations by WG 1 - 4 L/S and further discussions, the SC directed WG 1 - 4 L/S that if a specific CIR is missing some information and this information is needed for the final report, it should be requested on a country specific basis only. No general revisions to any CIR should be requested.
- viii.* At the request of the Programme Scientific Secretary, the SC Chairman introduced an item for SC discussion, whether the CIR prepared by the participating MS could be de-restricted. After discussions, the SC decided that CIRs will remain restricted because they may be incomplete and not truly represent a complete picture of country practice. Any requests will be referred to the respective country expert.
- ix.* Based on discussions, the SC agreed that the recommendations made by the WGs in the Programme Final Report and as commented and approved by the SC, the Agency

could use the information in part, or as a whole, as appropriate in a Safety Guide or other Agency documents. The table of contents of the Programme Final Report is provided in Appendix VI. of this report.

- x. The SC also agreed that all draft WGs Final Reports shall be submitted to Mr. R. Havel by December 5, 2005.
- xi. The next Steering Committee Meeting is tentatively scheduled for the week of January 23, 2006.
- xii. Based on the discussion during the SC meeting, the WG leaders and secretaries revised the schedule for the remaining Programme time until its completion, Appendix VII.

2.4. IAEA LTO Related Activities

IAEA staff members from both NE and NS Departments provided a brief overview of IAEA activities related to LTO of nuclear power plants. The handouts of these presentations are included in Appendix VIII. of this report. Mr. Kang and Mr. Havel also briefly reported on the efforts initiated to improve the co-ordination of the Agency activities.

Plant Life Management Activities, New CRPs – Mr. K-S. Kang

Mr. Kang briefly summarized the IAEA PLIM related activities during the period from 2003-2004 and the forthcoming activities/events for 2005-2007.

I&C Modernization, On-line Condition Monitoring – Mr. O. Glockler

Mr. Glockler briefly described the IAEA Instrumentation & Control (I&C) activities. These included aging and life management, I&C modernizations projects, impact of power uprate & license renewal, performance monitoring of I&C systems, maintenance and repair procedures, and instrumentation for normal and accidental conditions. Mr. Glockler also provided information on technical meetings proposed for 2005.

Risk Informed IS1, Maintenance Optimization – Mr. H. Cheng

Mr. Cheng briefly described the new aspects of maintenance including maintenance optimization, aging and computer based system QC & maintenance. Mr. Cheng also summarized the various related activities and publications and future activities planned for 2006-2009.

NPP personnel training for excellence of performance – Mr. A. Kazenkov

Mr. Kazenkov briefly described the ongoing activities related to effective training to achieve excellence in human performance. Performance is considered a function of knowledge, skills, attitudes, opportunity, effort and motivation. Mr. Kazenkov also provided a listing of recent publications & developments and planned activities for 2006-2007.

Computer model for economic assessment of NPP life extension – M. Condu

Mr. Condu briefly described two current activities. (1) Computer model for the economic assessment of PLEX, and (2) Development of an international NPP capital cost database. First one will be available to use by the MS.

SKALTO database, Aging management activities – Mr. T. Inagaki

Mr. Inagaki briefly described the IAEA activities related to aging management and knowledge sharing. Mr. Inagaki summarized the IAEA guidance documents available to the MS on aging

management and the activity related to the development of a framework for sharing knowledge on aging management and long term operation.

Periodic safety review, configuration management, and design basis documentation in relation to LTO – Ms. C. Toth

Ms. Toth briefly described the various IAEA activities in these areas including revisions to PSR to take into account the updating process of FSARs. Ms. Toth also summarized activities related to DBD & configuration management. There is a meeting scheduled for September 2005 to finalize the safety report or “Application of Configuration Management in Nuclear Power Plants.”

Lessons learned from recent review of LTO programs – Mr. P. Contri

Mr. Contri briefly described the feedback from recent IAEA services in the LTO area. These included IAEA projects in Lithuania, Pakistan, Ukraine, Armenia, Netherlands, and Hungary. Mr. Contri summarized how these MS are addressing issues related to PSR, LTO, human resources, program to manage aging of components, legal requirements, regulatory control and preconditions for LTO. Mr. Contri also provided a listing of IAEA safety documents applicable to AMP during LTO.

Defense in depth methodology- Mr. J. Hoehn

Mr. Hoehn briefly described the basic safety concept of defense in depth (DiD) for nuclear installations. Mr. Hoehn stated that the role of DiD is to meet the objectives as stated in INSAG-12, 1999 by providing a systematic and logical framework for the principles. Mr. Hoehn summarized an approach for assessment of DiD for nuclear power plants under long term operation.

REFERENCES

- [1] Minutes of the Programme's 1st Steering Committee Meeting, IAEA-EBP-LTO-01, Vienna, 2003 (internal EBP report).
- [2] Standard review process, Revision 1, IAEA-EBP-LTO-03 Vienna, 2004 (internal EBP report).
- [3] Programme QA Manual for Document Handling, IAEA-EBP-LTO-11, Vienna, October 2004 (internal EBP report).
- [4] Minutes of the Programme's Working Group 1 Second Meeting, IAEA-EBP-LTO-12, Stockholm and Oskarshamn, Sweden, 23-27 Aug, 2004 (internal EBP report).
- [5] Minutes of the Programme's Working Group 2 Second Meeting, IAEA-EBP-LTO-13, Vienna 16-18 November 2004 (internal EBP report).
- [6] Minutes of the Programme's Working Group 3 Second Meeting, IAEA-EBP-LTO-10, Kiev, Ukraine, 25-27 May 2004 (internal EBP report).
- [7] Minutes of the Programme's Working Group 4 Second Meeting, IAEA-EBP-LTO-14, Vienna 17-19 January 2005 (internal EBP report).

**APPENDIX I.
AGENDA
3rd Steering Committee Meeting**

Monday, 25 April 2005		
13:30	Opening	Mr.K.Brockman
	IAEA LTO related priorities	Mr.A.Guerpinar
	EBP status and meeting objective	Mr.R.Havel
13:50	Chairman's address	Mr.F.Gillespie
	Countries' statements (summary of national activities re. LTO, comments to EBP status, recommendations)	
14:00	Bulgaria	Ms.R.Tranteeva
14:15	Czech Republic	Mr.P.Krs
14:30	Finland	Mr.H.Koponen
14:45	Hungary	Mr.L.Voross
15:00	Japan	Mr.K.Tomita
15:15	Russia	Mr.N.M.Sorokin
15:30	<i>Coffee break</i>	
16:00	Slovak Republic	Ms.M.Ziakova
16:15	Sweden	Mr.L-G.Larsson
16:30	Ukraine	Mr.O.Semenov
16:45	UK	Mr.B.West
17:00	USA	Mr.R.Reister
17:15	EC	Mr.M.Bieth
17:30	Discussion	all
18:00	<i>Adjourn</i>	
Tuesday, 26 April 2005		
	WGs status and outlook (status of CIR collection, preliminary review results and recommendations, proposed format and contents of the WG final report and Programme final report)	
9:00	WG 1	Mr.P-T.Kuo
9:45	WG 2	Mr.T.Taylor
10:30	<i>Coffee break</i>	
11:00	WG 3	Mr.A.Duchac
11:45	WG 4	Mr.T.Katona
12:30	<i>Lunch break</i>	
	IAEA LTO related activities	
	NE	
14:00	Plant life management activities, new CRPs	Mr. K-S.Kang
14:20	I&C Modernization, On-line condition monitoring	Mr. O.Glockler
14:35	Risk Informed ISI, Maintenance Optimisation	Mr. H.Cheng
14:50	NPP personnel training for excellence of performance	Mr. A.Kazennov
15:05	Computer model for the economic assessment of NPP life extension	Mr. M.Condu
15:20	Discussion	
15:30	<i>Coffee break</i>	
	NS	
16:00	SKALTO database, Ageing management activities	Mr. T.Inagaki
16:20	Periodic safety review, Configuration management, and Design basis documentation in relation to LTO	Ms.C.Toth
16:35	Lesson learnt from recent reviews of LTO programmes	Mr.P.Contri
16:50	Defence in depth methodology	Mr.J.Hoehn
17:05	Priorities	Mr.R.Havel

17:15	Discussion	all
17:30	<i>Adjourn</i>	
18:30	<i>Reception</i>	
Wednesday, 27 April 2005		
	SC comments/recommendation/guidance	
9:00	Preparation of the Programme Final Report (TOC, level of detail, etc.)	all
	WG outcome integration in the Programme Final Report	all
10:30	<i>Coffee break</i>	all
11:00	Guidance to the WGs leaders/secretaries	all
12:30	<i>Lunch break</i>	all
14:00	Programme schedule	all
15:00	Recommendations to the IAEA	all
15:30	<i>Coffee break</i>	all
16:00	Other issues	all
17:00	Closing remarks	all
17:30	<i>Adjourn</i>	all

WG leaders/secretaries co-ordination meeting*

Monday, 25 April 2005		
9:30	Status of work	
	Recommendations and proposal on future actions	
	Consistent reporting to the SC	
12:00	<i>Adjourn / Lunch break</i>	
Thursday, 28 April 2005		
9:00	Action items from the SC	
	Finalization of the review reports	
	Preparation of the Final WG reports	
	Preparation of the Programme Final Report	
	Future activities (co-ordination needs, cross-cutting topics, etc.)	
15:00	<i>Adjourn</i>	

* in this meeting only WG leaders/secretaries will take part

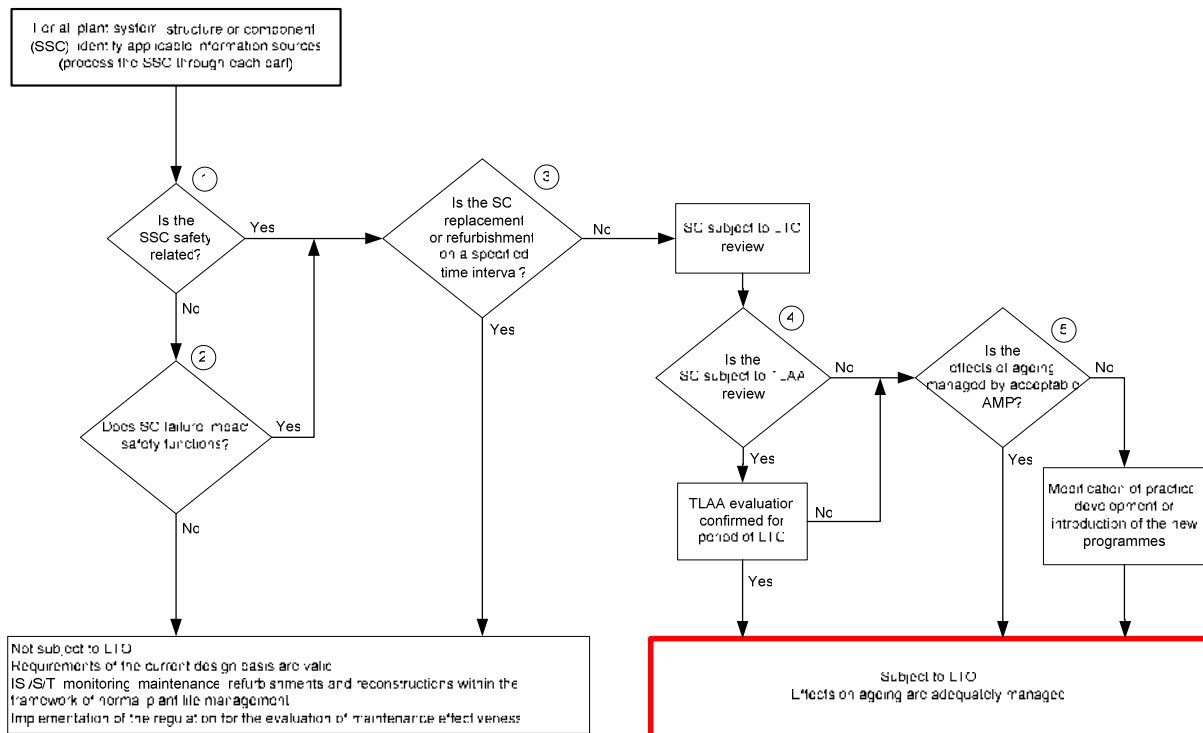
**APPENDIX II.
LIST OF PARTICIPANTS**

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**APPENDIX III.
WG LEADERS'/SECRETARIES' PRESENTATIONS**

APPENDIX IV. SCOPING PROCESS



1. Safety-related SSC

SSCs that perform the following functions:

1. To ensure integrity of reactor coolant pressure boundary,
2. To ensure the capability to shut down the reactor and maintain it in a safe shutdown condition, and
3. To ensure offsite radioactive exposures less than, or comparable to, limits specified in the regulations of individual MS by preventive or mitigate measures.

2. Non Safety SSCs whose Failure Impacts Safety Function

The function of a safety system, structure or component may be compromised by failure of a non-safety related structure or component. One example is the failure of fire protection piping that leads to electric failure of an electrical panel that controls the current to a motor operated valve performing a safety engineered function, where the fire protection piping is a non-safety related component and the electrical panel is a safety component. The selection criterion includes but not limited to SSCs which perform a function to satisfy the requirements for the following:

- Anticipated transient without scram (ATWS)
- Station blackout (SBO)
- Pressurized Thermal Shock (PTS)
- Environmental Qualification (EQ)
- Fire Protection (FP)

3. Is the SC on a replacement Schedule or Refurbishment Schedule

For SSCs are replaced based on a qualified life or specified time period; it is not necessary to include the SSCs in an aging management review or subject the SSCs to an Aging Management Program.

4. Time Limited Aging Analysis (TLAAs)

Time Limited Aging Analysis (TLAAs) are plant calculations and analyses that consider the effects of aging, involve time-limited assumptions defined by the current operating term, for example, 40 years; and involve conclusions or provide the basis for conclusions related to the capability of a system, structure, or component to perform its intended function(s).

5. Acceptable Ageing Management Programs

An acceptable ageing management program should contain the following attributes:

1. A defined program scope,

2. Identification of preventive actions or parameters to be monitored or inspected,
3. Detection of ageing degradation /effects,
4. Monitoring and trending including frequency and methodologies,
5. Pre-established acceptance criteria,
6. Corrective actions if a component fail to meet the acceptance criteria,
7. Confirmation that required actions have been taken,
8. Administrative controls that document the program's implementation and actions taken, and
9. Operating experience feedback.

**APPENDIX V.
AGEING MANAGEMENT REVIEW**

(Example, to be completed)

Commodity Group/ Component	Safety Function	Materials	Stressors	Degradation Mechanism / Material Effects	Monitoring, Testing, Trending	Safety Strategy
Power cables (low, mid and high voltage)	Provide signals and power to ECC systems	EPR - ethylene propylene rubber XLPE – cross-linked polyethylene	Moisture with high voltage	Embrittlement, water tree formation/ drop in insulation resistance	Visual inspection, partial discharge test, megger testing, water level monitoring	Eliminate long term water immersion (water pump out)
			COPPER	Temperature	Chemical reaction / embrittlement, insulation resistance drop	Temperature monitoring, megger checks, visual inspection
			Radiation	Polymer cross-linking / insulation resistance drop	Radiation level monitoring, megger testing, partial discharge	Equipment Qualification (EQ): manage by replacement
Piping, fittings, pumps, and valves in emergency core cooling system	Accident mitigation	Stainless steel	Moisture, temperature, acidic fluids, radiation	Crevice and pitting corrosion, thermal cycles / loss of material due to general corrosion, acid attack,	Visual inspection, performance testing, ultrasonic measurement one-time inspection	Water chemistry control, environmental control

APPENDIX VI. PROGRAMME FINAL REPORT TOC

- i **Executive Summary**
- ii **Introduction**

1. General Regulatory Framework for Long Term Operation

- 1.1. Laws and regulations relevant to LTO
- 1.2. Current design basis requirements including design codes and standards used.
 - 1.2.1. General - Design codes and standards used structures and components
 - 1.2.1.1. Criteria for Scope of SSCs Relevant to LTO
 - 1.2.1.2. Criteria for Acceptable Aging Management Program
 - 1.2.2. Maintenance Practices
 - 1.2.3. Environmental qualification (EQ) for electrical and mechanical equipment
 - 1.2.4. Quality assurance (QA) practices
 - 1.2.5. Final Safety Analysis Report (FSAR) update
 - 1.2.6. In-service inspection (ISI) program
 - 1.2.7. Time limited ageing analysis (TLAA)
- 1.3. Past upgrading of design basis requirements performed, including PSRs
- 1.4. Considerations given to, or activities planned or taken for, LTO
- 1.5. Existing programs that are directly related to LTO
- 1.6. Available research results and operating experiences that are directly related to LTO
- 1.7. List of reference documents from which the information were collected

2. Materials and Mechanical Components

- 2.1. Operational Approaches Applicable to Long Term Operation
 - 2.1 Normal Operational Practice/Programs Applicable to Ageing Management
 - 2.1.1 In-service Inspection Practices for passive Components
 - 2.1.1.1 Augmented inspection programs that address issues such as erosion/corrosion,
 - 2.1.1.2 Augmented inspection of steam generator tubing or
 - 2.1.1.3 Augmented inspection for specific degradation mechanisms such as Intergranular stress corrosion cracking
 - 2.1.2 Maintenance Codes or Practices for Active Components
 - 2.1.3 Equipment Qualification Practices
 - 2.1.4 Component function tests,
 - 2.1.5 Applied diagnostic systems,
 - 2.1.6 Surveillance specimen programmes (irradiation damage, corrosion loops),
 - 2.1.7 Nondestructive material properties tests (hardness measurement etc.),
 - 2.1.8 Destructive tests and material research carried out during NPP operation,
 - 2.1.9 Special loading measurement systems (temperature, deformation etc.) combined with damage calculation (e.g. on-line and off-line fatigue monitoring)
 - 2.1.10 Chemical regimes monitoring
 - 2.2 Plant-specific safety analyses which may have been based on an explicitly assumed plant life or operating period
 - 2.3 Compilation of a list of reference documents from which the above information was collected

3.0 Electrical and Instrumentation & Control Components

- 3.1 Applicable laws specific to E and I&C for long term operation
 - 3.1.1 Requirements applicable to long term operation
 - 3.1.1.1 The process used in developing the scope of systems, structures and components (SSCs) that are within the long

- term operation (LTO) review
 - 3.1.1.2 Configuration control practices used to control design basis
 - 3.1.1.3 Aging management programmes
 - 3.1.1.3.1 Research/ process providing basis for applicable aging effects on E and I&C intended function(s) focused by component
 - 3.1.1.3.2 Ageing mitigation measures applied in NPP
 - 3.1.2 Operational approaches applicable to long term operation
 - 3.1.2.1 Normal operational practices/programmes applicable to aging management
 - 3.1.3 I&C testing and monitoring practices for components
 - 3.1.3.1 Maintenance standards or practices for active components
 - 3.1.3.2 Equipment qualification practices
 - 3.1.3.3 Component functional tests
 - 3.1.3.4 Applied diagnostic systems and prognostic systems
 - 3.1.3.5 Surveillance specimen programmes
 - 3.1.3.6 Nondestructive material properties tests
 - 3.1.3.7 Destructive tests and material research carried out during NPP operation
 - 3.1.3.8 Special loading (stressor) measurement systems (temperature, deformation etc.) combined with damage calculation (e.g. on-line and off-line fatigue monitoring)
 - 3.1.3.9 Chemical and environmental monitoring
- 3.2 Plant specific safety analyses which are based on an explicitly assumed plant life or operating period
- 3.3 Compilation of a list of reference documents from which the above information was collected

4. Structures and Structural Components

- 4.1 Regulatory requirements applicable to LTO
 - 4.1.1 Criteria for selection of items in the scope of Structures and Structural Components in the LTO program
 - 4.2 Ageing management programs - organizational, management issues and interfaces with other plant processes
- 4.2 Operational approaches applicable to LTO
 - 4.2.1 Reference degradation mechanisms
 - Mechanisms which are life limiting and particularly important for the LTO, their effects and location
 - 4.2.2 Monitoring, surveillance and inspections in-service inspections and periodical test practices (integrity, leak tightness, etc.)
 - 4.2.3 Maintenance practice ageing mitigation measures and repair technology
 - 4.2.4 Assessment techniques for existing structures - Trend analysis and evaluation of safety margin. Practices used to control design basis.
- 4.3 Compilation of a list of reference documents from which the above information was collected

**APPENDIX VII.
REVISED PROGRAMME SCHEDULE**

**APPENDIX VIII.
IAEA PRESENTATIONS**