

EXECUTIVE SUMMARY

Upon the invitation of ESKOM, a peer review mission on safe long term operation (Pre-SALTO) was conducted to review programmes/activities of the Koeberg Nuclear Power Plant (further referred to as “the plant”).

Koeberg Nuclear Power Plant is the only NPP in South Africa and is owned and operated by ESKOM. The nuclear steam supply system supplier is FRAMATOME, now AREVA. Each unit is equipped with a reactor operating with enriched uranium (U-235) as fuel and light water as moderator and coolant, this type of reactor is known as a PWR.

The initial license to operate the plant was issued by the National Nuclear Regulator (NNR) and the plant was commissioned in 1984 (unit 1) and 1985 (unit 2). The first Periodic Safety Review (PSR) was carried out in 1998. The regulatory requirements for operation beyond 40 years have not yet been established. The initial design assumed an operating life of 40 years. However, Eskom is in the process of confirming and demonstrating that the plant can be safely operated to over 60 years. In 2010, the Eskom board approved a business case demonstrating that it is economically viable to operate the plant up to 60 years. This approval initiated the funding of the replacement of some of the large equipment that would otherwise limit the operational life of the plant. It was decided that the engineering process to validate the safety of the plant will be performed according to the IAEA Safety Report Series No. 57 “Safe Long Operation of Nuclear Power Plants”. In this regard, ESKOM, together with the National Nuclear Regulator (NNR) and the Department of Energy (DOE) asked the IAEA to perform SALTO reviews to confirm the progress of the work.

This Pre-SALTO mission reviewed the status of the plant activities for a safe long term operation (LTO) assessment. A preparatory meeting was held in November 2014. The scope of the Pre-SALTO mission was agreed on and defined in the Terms of Reference (ToR) issued in November 2014. The TOR also outlined a review team comprising two IAEA staff members, six external experts and four observers covering all disciplines required to be reviewed in Pre-SALTO.

The mission reviewed completed, in-progress and planned plant activities related to LTO, including activities involving the ageing management of systems, structures and components (SSCs) important to safety and revalidation of time limited ageing analyses (TLAAs).

Through the review of available documents, including the Advance Information Package and other plant documents, presentations and discussions with counterparts and other members of the plant staff, the IAEA team concluded that the plant has worked extensively in the field of long-term operation and ageing management. The LTO project is covering many topics as recommended by IAEA and other topics are addressed by relevant plant processes. Based upon the observations of this Pre-SALTO review, the team finds good progress in preparation for the long-term operation of the plant. The team has found the plant staff professional, open and very receptive to suggestions for improvement. Walk-downs showed that the power plant is in a good condition.

The Pre-SALTO team concluded that plant management is committed to improving plant preparedness for LTO. In addition, the team noticed the following good practice:

- Authorization of design engineers.

Taking into account the above mentioned points, the team recognised that the plant approach and preparatory work for safe LTO generally follows the IAEA Safety Standards and international practices.

However, the team identified some fundamental areas for further improvement. Fifteen issues were raised:

- A clear plant policy and project organization for the LTO project is not in place;
- Accessibility, completeness and archive system for design basis documentation and as-built documentation is not appropriate to serve for an expected 30 additional years of operation;
- Detailed processes and procedures have not been implemented to define the LTO scoping;
- The process to identify all potential degradation mechanisms and ageing effects of structures and components in LTO scope has not been defined;
- The interface among plant programmes and ageing management is not well defined;
- There is no fully established proactive obsolescence management programme in place;
- Equipment conditions data for safety related mechanical, electrical and I&C components is not completely transferred into LTO databases and consistency among different databases is not systematically verified;
- The established EQ programme does not support LTO since the programme does not include all necessary elements;
- TLAA revalidations have not been completed for the period of LTO;
- Cable ageing management programme is not fully implemented for medium-voltage cables and manuals are not completed for low-voltage cables and I&C cables;
- Plant activities in ageing management of chloride induced degradation of civil structures do not cover all civil structures in the scope for LTO and their effectiveness is not reviewed and demonstrated;
- Not all degradation mechanisms and ageing effects of civil structures in LTO scope are thoroughly addressed and recorded;
- Some equipment anchorages have not been considered in the ageing management of the plant for LTO;
- A competence and knowledge based workforce plan for LTO has not been developed;
- Cooperation with external (worldwide) organizations to obtain needed competence and to incorporate knowledge for LTO is insufficient.

A summary of the review was presented to plant management during the exit meeting held on 25 November 2015. The plant management expressed a determination to address the areas identified for improvement, and indicated the intention to invite a second “Pre-SALTO peer review mission” in April 2018 to continue in the review of the plant preparation for LTO.

Appendix III of this report includes the team’s detailed recommendations and suggestions arising from this mission.