

EXECUTIVE SUMMARY

At the invitation of Nuclear Power Operations Management Co., Ltd. (CNNO), a SALTO (Safety Aspects of Long Term Operation) mission was conducted at Unit 1 of the Qinshan Nuclear Power Plant in China from 6 to 15 June 2017, and subsequently a SALTO Follow-up mission was conducted from 7 to 10 May 2019. The plant is owned and operated by China National Nuclear Power Co., Ltd. (CNNP). Operation started in 1991. The unit will achieve its original design life time of 30 years of operation in 2021 and the plant owner intends to extend the unit's lifetime by 20 years.

MAIN MISSION CONDUCT AND RESULTS

The SALTO mission reviewed the status of plant activities for the long term operation (LTO) assessment of the plant against IAEA Safety Standards and international best practices. The IAEA review team consisted of two IAEA staff members (Team Leader and Deputy Team Leader), six external experts and four observers covering all areas of the standard scope of a SALTO mission.

The IAEA team reviewed the completed, in-progress and planned plant activities related to LTO, including activities involving ageing management (AM) of systems, structures and components (SSCs) important for safety and revalidation of time-limited ageing analyses (TLAAs). Through the review of available documents, presentations and discussions with counterparts and other members of the plant staff, the IAEA team observed that the plant has made significant progress in the field of ageing management and preparation for safe LTO. The LTO project addresses most of the topics as recommended by IAEA. Many activities are completely implemented and others are in progress.

The team found the plant staff to be professional, open and very receptive to suggestions for improvement. Walk-downs showed that the plant is in good condition. The IAEA team observed that plant management is committed to improving plant preparedness for LTO. In addition, the team noted good practices and performances in the following areas:

- Organizational structure to support preparation for safe LTO;
- Comprehensive implementation of leak rate testing of containment isolation valves; and
- Revalidation of time limited ageing analyses for mechanical components.

The team recognised that the plant approach to and preparatory work for safe LTO generally follows the IAEA Safety Standards and international good practices. However, the team identified several areas for further improvement. Fifteen issues were raised:

- The plant periodic safety review (PSR) is not comprehensive;
- Design basis documentation is not adequately managed to ensure its availability for the plant;
- The final safety analysis report (FSAR) has not been adequately updated for LTO;
- Active and short-lived passive components, which are not assessed for LTO as part of the operating license extension (OLE) project, are not consistently identified as included in other plant programmes relevant for LTO;
- Identified ageing related activities are not fully implemented in the current plant programmes and relevant results from plant programme activities are not always used in the ageing management programme;

- Trend monitoring of ageing management programme (AMP) results does not fully meet the needs for safe LTO;
- A periodic evaluation of plant programmes important to ageing management and LTO does not include evaluation of their effectiveness or feedback from operating experience and research and development (R&D);
- Ageing management programmes for mechanical components do not have in all cases adequate provisions to ensure effective ageing management during the LTO period;
- The plant has not established and implemented a comprehensive environmental qualification programme;
- The plant has not yet fully implemented its ageing management programmes for electrical and I&C components;
- Technological obsolescence of SSCs important to safety is not managed proactively throughout their service life;
- The ageing management review (AMR) for civil structures is not comprehensive;
- The ageing management programmes for civil structures and components do not meet the intent of an effective programme and have not been implemented;
- The TLAA for containment prestress loss is not adequate; and
- Systematic, coordinated and well-embedded competence and knowledge management is not developed and implemented to support the plant LTO.

A summary of the results was presented to plant management during the exit meeting held on 15 June 2017. The plant management expressed a determination to address the areas identified for improvement and indicated the intention to invite a ‘SALTO follow-up peer review mission’ for Unit 1 in May 2019 to review the progress in resolving the issues.

FOLLOW-UP MISSION CONDUCT AND RESULTS

The IAEA follow-up team consisted of one IAEA staff member (Team Leader), three external experts and two observers. The participating expert from the Netherlands was a member of the SALTO in June 2017 and two other experts from Argentina and the USA were also invited. Two observers from Sweden were contributing members of the follow-up team. This report is the report from the SALTO mission conducted in June 2017 supplemented with the sections ‘counterpart actions’ and ‘follow-up assessment by the IAEA review team’.

The IAEA follow-up team reviewed the progress in resolving each of the issues from the SALTO mission in June 2017 separately. The ‘counterpart actions’ provided in issue sheets were reviewed by the IAEA team prior to the follow-up mission and confirmed in the field during the visit. ‘Follow-up assessment by the IAEA Review Team’ was then added in light of the follow-up mission. The IAEA overall observation is given in each issue sheet’s section ‘Resolution Degree’. A ‘Status at follow-up SALTO mission’ is prepared by the IAEA team for each review area.

Based on the findings of the follow-up mission the team noted that the plant had made progress in solving most of the issues. Resolution of some issues requires further work by the plant. The resolution degree was determined by the team for each issue sheet separately, with the following results:

- 1 issue was assessed as insufficient progress to date;
- 9 issues were assessed as satisfactory progress to date;
- 5 issues were assessed as issue resolved.

Plant management expressed a determination to continue to address the remaining issues and prepare Qinshan Unit 1 for safe LTO.