

EXECUTIVE SUMMARY

At the invitation of the Government of Pakistan through Pakistan Atomic Energy Commission (PAEC) the IAEA conducted an expert mission on safe long term operation at Karachi Nuclear Power Plant (Karachi NPP) from 1 October to 5 October, 2018.

Karachi NPP is operated by the Pakistan Atomic Energy Commission (PAEC). It started commercial operation in 1972, the design lifetime expired in 2002. After completion of a set of safety upgrades the plant underwent a re-licensing process in 2003 and 2006. In 2014 and 2015 further safety upgrades were carried out and the second Periodic Safety Review (PSR-2) was also completed in the plant according to the regulatory requirements to extend the operation up to 30 September, 2018. Further safety improvements are being carried out in 2018 to further extend the service life as a minimum to 2020.

This Expert Mission was implemented as a part of IAEA TC Project PAK2007 'Strengthening and Enhancing Capabilities of Pakistan's National Institutions to Support a Safe, Reliable and Sustainable Nuclear Power Programme' focused on the status of activities for the Long Term Operation (LTO) assessment of the plant. The review team consisted of one IAEA staff member (Team Leader) and three external experts, covering scoping for LTO (as part of Area B) and the three technical areas of the standard scope of a SALTO mission: Ageing management review, review of ageing management programmes and revalidation of time limited ageing analyses for mechanical components (Area C), for electrical and I&C components (Area D) and for civil structures (Area E). The team reviewed the completed, in-progress and planned activities related to LTO in these areas.

Through the review of available documents, presentations and discussions with counterparts and other members of the plant staff, the IAEA team assessed progress in the field of ageing management and preparedness for safe long-term operation. The LTO project of the plant addresses several topics as recommended by the IAEA. Some activities are still in implementation and some are fully completed. Based upon the observations of this Expert Mission, the team found a progress in the field of ageing management and preparedness for safe long-term operation.

The team found the plant staff to be professional, open and receptive to suggestions for improvement. Walk-downs showed that the visited rooms of the plant are in a maintained condition. The mission team observed that the plant management is committed to improving plant preparedness for LTO.

In addition, the team found several good performances, including the following:

- On-site test facility for LOCA qualification of old Canadian General Electric (CGE) Moderator Pump motor,
- Steam generator in-service inspection program,
- Plant technical manual for ageing management programmes,
- Life cycle management programme for Reactor Feeder piping,
- Time limited ageing analysis of the containment.

The team found areas which should be improved to reach the level of international good practice. Nine issues were noted:

- The scoping methodology is incomplete and not fully implemented,
- The approach to identify and revalidate TLAAAs for SSCs is not comprehensive to support LTO,
- Ageing Management Programmes for mechanical components are not fully identified and implemented to ensure plant safety during LTO,
- Consistency and completeness of databases used for the assessment of the SSCs in LTO scope is not ensured,
- Technological obsolescence of SSCs important to safety is not managed proactively for LTO,
- A systematic cable ageing management programme is not implemented,
- The equipment qualification programme is not adequate,
- Ageing management review for SSCs has not been properly performed to support LTO,
- The ageing management programmes for civil structures and components are not complete.

During the review and development of the issues, the intended term of long term operation was not taken into account. The implementation of the issues should be duly prioritized by the plant with consideration given to the remaining operational life and subsequent decommissioning.

The Expert Mission was conducted based on the SALTO Peer Review Guidelines [21], however prior workshop/seminar on IAEA safety standards and SALTO review method or a Pre-SALTO mission were not conducted. An Ageing Management Assessment Team (AMAT) Mission was carried out at KANUPP in 2007, however the progress regarding the implementation of its recommendations and suggestions were not performed during this Expert Mission.

PAEC is encouraged to invite Pre-SALTO / SALTO mission(s) for its future NPPs for reviewing ageing management and other plant programmes relevant to LTO at an early stage of the preparation for LTO. PAEC is also encouraged to assign its personnel as SALTO ‘Observers’ to be trained for its subsequent SALTO missions.

A summary of the results was presented to the plant management during the exit meeting held on 5 October 2018. The plant management expressed a determination to address the areas identified for improvement, and indicated their intent to further cooperate with the IAEA. To address issues identified during the EM, a follow up activity in 2020 is planned to be invited by KANUPP preceded by a SALTO workshop in 2019.