EXECUTIVE SUMMARY

At the invitation of the Belgian Nuclear Regulatory Body (FANC), a SALTO (Safety Aspects of Long Term Operation) mission was conducted at units 1 and 2 of the Doel Nuclear Power Plant in Belgium from 14 to 23 February 2017, and subsequently a SALTO Follow-up mission was conducted from 25 to 28 June 2019. The plant is owned and operated by ENGIE Electrabel, part of ENGIE (formerly GDF Suez). Operation of unit 1 started on 15 February 1975 and unit 2 on 1 December 1975, respectively. The units achieved 40 years of operation in 2015 and the plant owner intends to extend the units' lifetimes by 10 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 four IAEA staff members (team leader, deputy team leader, reviewer F and an observer), five external experts and three 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 the ageing management (AM) of systems, structures and components (SSCs) important to 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 long-term operation. The LTO project addresses most of the topics as recommended by IAEA and other topics are being addressed by relevant plant processes. Many activities are complete, others are still 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 a good condition. The IAEA team observed that plant management is committed to improving plant preparedness for LTO. In addition, the team noted the following good practices and performances:

- Integrated risk management for LTO both on programme and individual project level creating strong risk awareness and real-time monitoring of risks;
- A comprehensive, well-defined scoping methodology for LTO evaluation; and
- Retention incentives introduced to reduce the loss of experienced personnel and retain important knowledge.

The team recognised that the plant approach to and preparatory work for safe LTO follows the IAEA Safety Standards and international practices.

However, the team identified several areas for further improvement. Thirteen issues were raised:

- Organization of ageing management for LTO period is not fully implemented;
- Final Safety Analysis Report (FSAR) is not fully updated regarding ageing management for LTO period;
- Ageing management process for LTO period is not fully implemented;
- With the density of upcoming projects in the LTO outages, the current plant project arrangements might not always ensure timely and comprehensive integration of project-related activities into the line organizations;
- The scope of SSCs for ageing management during the LTO period is incomplete;

- The continuous feedback loop for information relevant to ageing management for the LTO period is not fully implemented;
- The evaluation and documentation of mechanical components for LTO is not fully complete;
- There are several stand-alone databases for SCs used in the LTO programme that are inconsistent and incomplete;
- The plant equipment qualification (EQ) of some safety related cables is not finalized;
- Ageing management review of qualified electrical and I&C components is not fully complete for LTO scope;
- The plant has not completed a comprehensive ageing management review for civil SCs for the LTO period;
- The plant has not completed the review and update of the ageing management programmes for civil structures and components for the LTO period; and
- The plant has not finalized the process of identifying and enhancing the knowledge and competences related to ageing management for LTO period.

A summary of the review was presented to plant management during the exit meeting held on 23 February 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 units 1 and 2 in June 2019 to review the progress in the resolution of issues.

FOLLOW-UP MISSION CONDUCT AND RESULTS

The IAEA follow-up team consisted of two IAEA staff members (team leader and deputy team leader), three external experts and two observers. The three participating experts from the Czech Republic, Switzerland and Canada were members of the SALTO team in February 2017. Observers from South Africa and Sweden were also actively contributing members of the follow-up team. This document is the report from the February 2017 SALTO mission supplemented with the 'counterpart actions' and 'follow-up assessment by the IAEA review team'.

The IAEA follow-up team reviewed the progress in solving each of the issues from the 2017 SALTO mission separately. The 'counterpart actions' provided in the 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 as a result of the follow-up mission. The IAEA overall observation is given in issue sheets section 'Resolution Degree'. A summary on 'Status at follow-up SALTO mission' is also 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 progressed 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;
- 8 issues were assessed as satisfactory progress to date;
- 4 issues were assessed as issue resolved.

The plant management expressed a determination to continue to address the remaining issues and prepare Doel NPP units 1 and 2 for safe LTO.