

EXECUTIVE SUMMARY

Upon the invitation of the Inspectorate of the Ministry of Economic Affairs, Agriculture and Innovation (EL&I), a peer review mission on safe long term operation (SALTO) was provided to review programmes/activities of the Borssele nuclear power plant (further referred as “the plant”).

The plant (in Dutch: Kernenergie Centrale Borssele or KCB) is located on the estuary of the Schelde River in the south of the Netherlands. The plant lies just behind a sea dyke in the industrial area Vlissingen-Oost. The plant is located near the village of Borssele in the Borsele municipality. The plant is owned and operated by N.V. Elektriciteits-Produktiemaatschappij Zuid-Nederland (EPZ), which has received its plant operating license, on the basis of the Nuclear Energy Law from the Ministry of VROM and other Ministries in The Hague.

The plant was designed and built by Kraftwerk Union (KWU) and is owned by NV EPZ.

The plant has been in operation since October 1973. Its main nuclear components were assumed to have a 40 year operating life in the original design. In 1997 a comprehensive modernization project was performed at the plant in which also some design modifications were implemented. Components impacted by this project were shown to have safety margins warranting operation until at least the end of 2013 (that is, consistent with the original design life of the rest of the plant).

In 2003, the plant finalized its second 10-year periodic safety review (PSR). The evaluation process was started by the licensee and regulator defining and agreeing to the scope of the evaluation. The first phase of that evaluation resulted in a list of specific items to be addressed in the evaluation, and since that time almost all of these items have been completed.

In October 2013, the plant will reach the original design lifetime of 40 years. The current license of the plant is unlimited in time. Every ten years NV EPZ has to perform a PSR. An agreement between the stakeholders of the power plant and the Dutch government was signed which allows the plant to extend its operation until 2034 subject to a number of conditions.

The plant is required to perform an LTO assessment to demonstrate the safety of the plant for 60 years of operation. This SALTO mission is in support of and has reviewed details related to this LTO assessment. The scope of the SALTO mission was agreed to and defined in Terms of Reference issued in July 2009. Preparatory meetings were held in July 2011 and March 2012. Further details were specified in Preparatory Meeting Minutes. According to these the review team was organized, and is constituted of four IAEA staff members and four external experts covering all disciplines involved in the ToR and Preparatory Meeting Minutes.

The mission reviewed the planned, started and performed plant activities related to LTO and ageing management of systems, structures and components (SSCs) important to safety within the framework of a full-scope SALTO Peer Review. Upon request of the Dutch regulator, the scope was extended with the Management, Organization and Administration (MOA) OSART module. Moreover, the progress in the areas in the issue sheets of the limited-scope IAEA Mission of 2009 was reviewed.

The IAEA team found that plans are being prepared and extensive engineering work has been done to review ageing degradation mechanisms, and to review/implement ageing management programmes with the goal of justifying safe continued operation beyond October 2013 with an operational life time horizon of 60 years. In addition, the team noticed good practices and good performance in areas as follows:

Good Practice

- Use of risk matrix

Good performance

- Evaluation of training effectiveness;
- Use of colour coding in the Periodic Safety Review - 10EVA13;
- TLAAs revalidation;
- Chemistry programme;
- Component chain;
- Civil structure integration into equipment database.

Taking into account the above mentioned points, the team recognized that the plant approach and preparatory work for safe long term operation generally follows international practices.

The team identified areas which are to be improved upon or have room for further improvement. Fifteen issues were raised including:

- Human performance improvement;
- Corrective actions for issues identified in evaluation of Safety Factors 10 and 12;
- Lack of guidance document, in respect of the regulator licensing conditions rules (NVR-rules), related to ageing management and to some degree also for LTO;
- Lack of organizational structures, staffing dispositions and management system documents properly suited for managing LTO including ageing management;
- Practices surrounding parts substitutions and modifications require improvement;
- Practices surrounding acceptance of vendor engineering documentation;
- Assessment of active components for LTO;
- Scoping and screening for LTO;
- Implementation issues in applying the attributes of an effective ageing management programme;
- Ageing management catalogue of ageing mechanisms for mechanical components should include cavitation;
- Plant programmes for ageing management are not documented in a systematic way;
- Establish final documentation of revalidation analyses;
- Ageing analyses not always proved to be conservative;
- Discrepancies within civil ageing management review and degradation mechanism project catalogue;
- Lack of centralized oversight of system/component programmes.

The status of issues from the limited scope SALTO Mission in 2009 was also assessed by the team with the following resolution degree:

- 1 issue - no progress in the resolution of the issue, or unsatisfactory resolution;
- 2 issues – the issue was identified by the Counterpart and work has started to resolve it;
- 3 issues – the implemented actions meet partially the intent of recommendations of previous IAEA review;
- 4 issues - the intent of recommendations of previous IAEA review is fully met. Issue closed.

A summary of the review was presented to the plant management and the Ministry of EL&I representatives during an exit meeting held on 11 May 2012.

FOLLOW-UP MISSION

A follow-up mission was organized during 4–7 February 2014 and the team consisted of one IAEA staff member, three external experts and two observers. Participating experts from the Czech Republic, Sweden and Spain were members of the original SALTO team in 2012. Observers from Sweden and the Czech Republic were also members of the follow-up team. The SALTO follow-up report is the original report from the main SALTO mission supplemented with the “counterpart actions” and “follow-up assessment by the IAEA review team”. The “counterpart actions” provided in issue sheets` section 4 are reviewed by the follow-up IAEA review team prior to the follow-up mission and confirmed in the field during the visit. “Follow-up Assessment by the IAEA Review Team” is then added in light of the follow-up mission into issue sheets` section 5. The IAEA conclusion is produced in issue sheets` section “Resolution Degree”. “Status at follow-up SALTO mission” is prepared by the IAEA team for each review area. This resulting document is therefore an overall report of both the original mission and the follow-up mission.

During the original full-scope SALTO peer review mission in 2012, fifteen issues were defined in six reviewed areas. The follow-up team reviewed the progress in issues solving separately for each of those issues and also separately for each recommendation and suggestion contained in issue sheets (except of issues from area “Management, Organization and Administration OSART Module” which will be reviewed by the planned OSART mission in September 2014). Progress in solving of A3 and C1 issues of “A Limited-scope SALTO Peer Review Mission (2009)” was also evaluated.

The team has concluded that the plant performed a significant work to solve those issues but a resolution of majority of issues must be still finalized. The resolution degree was determined by the team for each issue sheet separately with results as follows:

- 1 issue - insufficient progress to date;
- 10 issues - satisfactory progress to date;
- 4 issues - issue resolved.

The detailed evaluation of plant actions is provided in Appendix IV of this report in a section 5 of each individual issue sheet of issues from 2012 (resp. in Appendix III, section 7 of issues A3 and C1 from 2009). Additional evaluation is provided for each review area in a “Status at follow-up SALTO mission” subsection of each review area (resp. in a “Status at follow-up SALTO mission” subsection of general conclusion section for issues A3 and C1 from 2009).