

EXECUTIVE SUMMARY

Upon the invitation of the Korea Ministry of Science and Technology (MOST), a safe long term operation (SALTO) peer review mission was provided on the continuous operation (CO) programme/activities of Kori Nuclear Power Plant Unit 1 (hereinafter Kori Unit 1).

Kori Unit 1 was the first nuclear power plant (NPP) in Korea. It is located on the south-eastern portion of the Korean Peninsula. The unit is a two-loop Pressurized Water Reactor (PWR) designed by Westinghouse. According to the final safety analysis report (FSAR), the stated design life is 30 years. It had an initial criticality in June 1977 and started commercial operation in April 1978.

The MOST and its technical support organization, Korea Institute of Nuclear Safety (KINS), adopted periodic safety review (PSR) in 2000 as an effective measure to ensure the safety of NPPs. Ageing management was one of the most important among the eleven factors. In 2003 the safety review by KINS was completed for the first PSR of Kori Unit 1 and it was concluded that Kori Unit 1 was maintaining a high level of safety and the ageing phenomena were managed in an appropriate manner.

Subsequently, a new rule for operation beyond design life was initiated and it was intended this issue be addressed under the framework of PSR. The CO regulation was established as an extension of PSR, in that two requirements were added to the PSR: one requiring the implementation of an ageing management programme including time-limited ageing analysis and the other requiring an assessment of the radiological impacts on the environment. The legislation of the CO was completed in 2005, including supplements of the Atomic Energy Acts, Enforcement Decree, Enforcement Regulation, and safety review guidelines. The utility, Korea Hydro and Nuclear Power Company (KHNP), submitted to KINS through the MOST in 2006, an application for approval for the CO of Kori Unit 1 beyond its design life (30 years).

As this is the first application based on the PSR enhanced for continued operation in Korea, an independent peer review by an international organization will assist in establishing the credibility and in assuring the approaches and methodologies are consistent with internationally accepted practices. Based on this background, the MOST requested the IAEA perform a peer review service as an independent review.

The mission reviewed activities performed by the plant related to ageing management and safe LTO. The IAEA team was composed of one IAEA staff member (T. Inagaki) and six international experts: Mr. Kenneth Chang (USA), Mr. Ervin Liszka (Sweden), Mr. Alan Cox (USA), Mr. Toshio Yamamoto (Japan), Mr. Antonio Moreno Gonzalez (Spain) and Mr. Karl-Heinz Lehmann (Germany).

The IAEA team confirmed that comprehensive and systematically prepared regulatory requirements were available, which referenced the well established regulatory scheme in other Member States. The plant established a specific division which is dedicated to conducting activities related to the continuous operation. The IAEA team observed that the plant and the TSOs have been performing extensive engineering work to accomplish the CO programme objectives. Sound engineering approaches and capability are behind the work. Component replacement/refurbishment programmes and safety enhancement programmes are being implemented.

In addition, the team noticed good practices and good performance in various areas, such as:

- CO commitment list and tracking/review process;

- Categorization of the systems for scoping and screening;
- A complete computerized system that contains the inspections and actions history;
- EQ management system;
- Removal of surface rust and repainting of outdoor tanks, and;
- Control of the occupational exposure of KHNP staff and contractors.

Taking into account the above mentioned points, the team recognized that the plant approaches for the continued operation are in line with international practices.

The team identified a few technical areas which could be improved and raised five issues in the areas of 1) piping and component fatigue analyses and monitoring, 2) scoping and screening of non-safety SSCs, 3) inspection sampling for One-Time Inspection Programme, 4) additional replacement items for proper implementation of TLAA, and 5) water table level determination for design and long term operation. Three recommendations and four suggestions were provided.

The summary conclusion of the review was presented to the Kori NPP plant management during the exit meeting held on 2 August 2007 and also reported to the director general of the MOST on 3 August 2007.

This report includes the detailed recommendations issued by the Team.