

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the Government of Germany, an IAEA Operational Safety Review Team (OSART) of international experts visited the site of Neckarwestheim Nuclear Power Plant and concentrated its review on unit one (unit I) from 8 October to 24 October 2007. Neckarwestheim NPP unit one is a part of the Neckarwestheim site which has two (2) units with a total capacity of 2240 MWe. The nuclear power plant (NPP) is part of the Energie Baden-Württemberg Kernkraft GmbH (EnKK) Group.

The site is located in the Southwest of Germany, in the federal state or “Land” Baden-Württemberg, in the local-authority districts of Neckarwestheim and Gemmrigheim, built on the shore of the Neckar river. The NPP is situated approximately 30 km north of the city of Stuttgart and 10 km south of Heilbronn.

Neckarwestheim units I and II, which generate 840 MWe and 1400 MWe respectively, have been in operation since June 1976 and January 1989. Both Neckarwestheim units generate electricity for the three-phase public grid and for the railway company Deutsche Bahn AG. The shareholders of the operating company EnKK are EnBW Kraftwerke AG (wholly-owned subsidiary of EnBW AG), ZEAG Energie AG, Deutsche Bahn AG and Kernkraftwerk Obrigheim GmbH. EnBW Kraftwerke AG is the principle shareholder and owns more than 98% of the plant.

The purpose of the mission was to review operating practices in the areas of management organization and administration; training and qualifications; operations; maintenance; technical support (engineering); operating experience; radiation protection; chemistry and emergency planning and preparedness. In addition, an exchange of technical experience and knowledge took place between the experts and their plant counterparts on how the common goal of excellence in operational safety could be further pursued.

The Neckarwestheim OSART mission was the 142nd in the OSART programme, which began in 1982.

The OSART team for Neckarwestheim was composed of experts from Belgium; Brazil; Canada; China; Czech Republic; France; Hungary, Romania; United Kingdom, and the USA, together with the IAEA staff members and one observer from Sweden. The collective nuclear power experience of the team was approximately 280 years including the observer.

Before visiting Neckarwestheim, the team studied information provided by the IAEA and the plant to familiarize themselves with the main features of the plant and operating performance, staff organization and responsibilities, and important programmes and procedures. During the mission, the team reviewed many of the plant’s programmes and procedures in depth, examined indicators of the plant’s performance, observed work in progress, and held in-depth discussions with plant personnel.

Throughout the review, the exchange of information between the OSART experts and plant personnel was very open, professional and productive. Emphasis was placed on assessing the effectiveness of operational safety rather than simply the content of programmes. The conclusions of the OSART team were based on Neckarwestheim's performance compared with IAEA Safety Standards.

OSART MAIN CONCLUSIONS

The OSART team concluded that the managers of Neckarwestheim are committed to improving the operational safety and reliability of their plant. This is clearly demonstrated by the fact that since the OSART preparatory meeting in November 2006, the plant has introduced or extended several programmes contributing to improved operational safety. During this process, the plant has extensively used the OSART methodology for self assessment and the IAEA Safety Standards to benchmark their existing practices. The management of Neckarwestheim also identified useful improvements taking into account lessons learned from a previous OSART mission at Philippsburg NPP, which took place in October 2004.

The team found good areas of performance, to share with the international nuclear community including the following:

- A visual display has been created for fuel loading and unloading in the computerized operation management system to support the shift crew when monitoring sub-criticality. The purpose of this function is to assure the communication between the refueling machine operators, shift crew and the responsible people of the reactor physics section during fuel handling. This system provides Control Room Operators with a better method of monitoring refueling status than is generally seen in other NPPs.
- In the past, at the beginning of the outage, filling up the reactor cavity sometimes caused an increase of aerosol concentration within the containment building. The corrective action taken by the plant was a temporary coverage of the reactor cavity with balloon silk. Any radioactivity underneath the cover is then extracted by a suction system equipped with aerosol and iodine filters. The benefits of this process are a decrease in ambient air activity concentrations and associated contamination of the operating rooms.
- The plant commissioned, in 2006, a Safety Management System (SMS) which is based on the ISO 9001 standard. With its implementation, the plant obtains a common structured description of the main plant processes, which are shown in comprehensive flowcharts describing how the process is working, the interfaces and who has which responsibilities. Process owners make sure that the process functions as expected, using performance indicators.
- Neckarwestheim NPP has a well structured and equipped I&C components workshop, where failed or obsolete electronic assemblies can be repaired or replaced. In cases where a component is no longer available, the necessary modification is performed and the relevant documentation updated. Neckarwestheim NPP is able to provide support to all other German nuclear power plants in the repair of I&C assemblies, or to modify equipment in line with the safety qualification.
- The plant uses all sources of internal operating experience for determining reliability data for plant-specific probabilistic safety analysis (PSA). The main benefit for the plant is the improvement of the statistical dependability of the reliability data by making use of the operational experience of similar plants and the own OE. With this the plant has a current and meaningful PSA and modifications as well as change of test frequencies can be assessed.

A number of proposals for improvements in operational safety were offered by the team. The most significant proposals include the following:

- The plant should further develop, clarify and reinforce its expectations in the industrial safety programme. Without a full and effective implementation of this programme, and without strict management expectations, the plant personnel is exposed to more industrial risk with potential injuries as a direct consequence.
- The plant should consider improving the preparedness to implement precautionary urgent protective actions on-site in the case of a radiological emergency beyond the requirements by German laws. Without the establishment of precautionary urgent protective actions, the risk of deterministic health effects for emergency support teams cannot be reduced even if the probability due to the design of the plant is very low.
- The plant should consider improving the current infrastructure in the field of emergency preparedness and response to be consistent with the IAEA safety standards and guides to assure a good support for the effectiveness of emergency response activities.
- The plant should consider full implementation of a comprehensive system to report, track and trend low level events in order to have the opportunity to identify precursors to more significant events.

The overall impression of the OSART team is that the plant showed many attributes associated with a strong safety culture. Neckarwestheim has had good performance results over the past years having the last scram in 2003 (four years before the start of the mission). The team observed evidence that plant attention to good material conditions, housekeeping and cleanliness is visible throughout the plant and this indicates a strong commitment by the plant management. The plant safety related structures, systems and components are well maintained and tested and this has resulted in superior equipment performance and plant availability. The OSART team, in its joint search for improvement, interacted with personnel who were open, honest, technically competent and qualified. The team noticed that special and adequate attention was paid to fire equipment and exercises. Good team work is well established at the plant.

A strong safety culture is evident in many ways; however the team found some areas where improvements are on-going and need to be sustained and fully implemented. For example the “plant management presence in the field” programme, during normal operation, could to be further promoted, allowing the plant managers to encourage, coach and reinforce safe practices and management expectations toward employees at Neckarwestheim.

Neckarwestheim NPP management expressed a determination to address the areas identified for improvement and indicated a willingness to accept a follow-up visit in about eighteen months. The regulatory body from the state level supports the plant decision.