EXECUTIVE SUMMARY

This report describes the results of the OSART mission conducted for Borssele Nuclear Power Plant (NPP), the Netherlands from 23 January to 9 February 2023.

The purpose of an OSART mission is to review the operational safety performance of a nuclear power plant against the IAEA safety standards, make recommendations and suggestions for further improvement and identify good practices that can be shared with NPPs around the world.

This OSART mission reviewed 11 areas: Leadership and Management; Training and Qualification; Operations; Maintenance; Technical Support; Operating Experience Feedback; Radiation Protection; Chemistry; Emergency Preparedness & Response; Accident Management, and Use of PSA for Plant Operational Safety Improvements.

The mission was coordinated by an IAEA Team Leader and Deputy Team Leader and the team was composed of experts from Czech Republic, France, Japan, Hungary, Slovakia, Spain, Sweden, Switzerland, United Arab Emirates, the United Kingdom and observers from Belgium and Mexico. The collective nuclear power experience of the team was 424 years.

The team identified 11 issues, three of them are recommendations, and eight of them are suggestions. Six good practices were also identified.

Several areas of good practice were noted:

- The plant has developed an easily applicable mechanism matrix to visualize ageing management activities in order to ensure effective ageing management of all systems structures and components in scope of its plant-level ageing management programme.
- The plant has developed a unique risk-informed application that categorizes the proposed areas of improvement identified in the Periodic Safety Review (PSR), according to deterministic and probabilistic risk benefits in order to concentrate efforts in areas most beneficial to safety.
- The plant implemented a passive Reactor Coolant Pump (RCP) seal isolation valve to reduce the risk of RCP seal failure and subsequent primary coolant loss in situations when the Emergency Core Cooling System (ECCS) is not available.

The most significant issues identified were:

- The plant should enhance the arrangements for the administration and control of operator aids to prevent the use of non-authorized operating documentation and other non-authorized material.
- The plant should strengthen the radiation protection practices for contamination control, dose planning and the control of radioactive sources to ensure that the requirements of the radiation protection programme are fully met.
- The plant should consider enhancing its worker implementation of chemical control practices to ensure appropriate identification, labelling, storage and safe handling with chemicals as well as accurate results of chemical analyses.

Borssele NPP management expressed a determination to address the areas identified for improvement and indicated a willingness to accept a follow up visit in about 18 to 20 months.

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the government of the Netherlands, an IAEA Operational Safety Review Team (OSART) of international experts visited Borssele Nuclear Power Plant from 23 January to 9 February 2023. The purpose of the mission was to review operating practices in the areas of Leadership and Management for Safety, Training and Qualification, Operations, Maintenance, Technical Support, Operating Experience Feedback, Radiation Protection, Chemistry, Radiation Protection, Chemistry, Emergency Preparedness and Response, Accident Management and Use of PSA for Plant Operational Safety Improvements. 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 Borssele NPP is located in the Sloe area in the municipality of Borssele, on the estuary of the Schelde River. The plant is owned and operated by the 'Elektriciteits Produktiemaatschappij Zuid-Nederland' (Electricity Production Company South-Netherlands) (EPZ). With its one 482 MWe pressurized water reactor, every year Borssele accounts for 3.1% of country's electricity production. In 2021, the plant generated 3.6 TWh. Borssele nuclear reactor was commissioned in 1973. The Borssele NPP employs approximately 400 persons: 350 employees and 50 employees from permanent subcontractors.
The Borssele OSART mission was the 216th in the programme, which began in 1982. The team was composed of experts from Czech Republic, France, Japan, Hungary, Slovakia, Spain, Sweden, Switzerland, United Arab Emirates, the United Kingdom and two IAEA staff members and observers from Belgium and Mexico. The collective nuclear power experience of the team was 424 years.

Before visiting the plant, the team studied information provided by the IAEA and the Borssele plant to familiarize themselves with the plant's main features 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 the plant's performance compared with the IAEA Safety Standards.

The following report is produced to summarize the findings in the review scope, according to the OSART Guidelines document. The text reflects only those areas where the team considers that a Recommendation, a Suggestion, an Encouragement, a Good Practice or a Good Performance is appropriate. In all other areas of the review scope, where the review did not reveal further safety conclusions at the time of the review, no text is included. This is reflected in the report by the omission of some paragraph numbers where no text is required.

MAIN CONCLUSIONS

The OSART team concluded that the managers of the Borssele NPP are committed to improving the operational safety and reliability of their plant. The team found areas of good practice, including the following:

- The plant has developed an easily applicable mechanism matrix to visualize ageing management activities in order to ensure effective ageing management of all systems structures and components in scope of its plant level ageing management programme.
- The plant has developed a unique risk-informed application that categorizes the proposed areas of improvement, identified in the Periodic Safety Review (PSR), according to deterministic and probabilistic risk benefits in order to concentrate efforts in areas most beneficial to safety.
- The plant implemented a passive Reactor Coolant Pump (RCP) seals isolation valve to reduce the risk of RCP seal failure and subsequent primary coolant loss in situations when the Emergency Core Cooling System (ECCS) is not available.

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

- The plant should enhance the arrangements for the administration and control of operator aids to prevent the use of non-authorized operating documentation and other non-authorized material.
- The plant should strengthen the radiation protection practices for contamination control, dose planning and the control of radioactive sources to ensure that the requirements of the radiation protection programme are fully met.
- The plant should consider enhancing its worker implementation of chemical control practices to ensure appropriate identification, labelling, storage and safe handling with chemicals as well as accurate results of chemical analyses.

Borssele NPP management expressed a determination to address the areas identified for improvement and indicated a willingness to accept a follow up visit in about 18 to 20 months.