EXECUTIVE SUMMARY

This report describes the results of the OSART mission conducted for Tihange Nuclear Power Plant Unit 3, Belgium from 17 April to 4 May 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 ten areas: Leadership and Management for Safety; Training and Qualification; Operations; Maintenance; Technical Support; Operating Experience Feedback; Radiation Protection; Chemistry; Emergency Preparedness & Response and Accident Management.

The mission was coordinated by an IAEA Team Leader and Deputy Team Leader and the team was composed of experts from Bulgaria, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Arab Emirates, United Kingdom, three IAEA staff members and one observer from United Arab Emirates. The collective nuclear power experience of the team was 358 years.

The team identified 14 issues, five of them are recommendations, and nine of them are suggestions. Four good practices were also identified.

Several areas of good practices were noted:

- The plant had developed an integrated tool to support fire hazard analyses which included assessments for the fire resistance of fire separation barriers, calculations for fire propagation in multi-compartment configurations and an algorithm for taking fire extinguishing systems into account in the calculation of fire growth and propagation.
- The plant integrated permanent design modifications into a structured project management system, ensuring that the plant's resources and requirements were all aligned and followed a graded approach based on safety and complexity.
- If a severe accident occurred which resulted in a core melt, the plant had designed and installed equipment for the stabilization of the reactor core to prevent further degradation of the core. Furthermore, the plant had strategies and procedures in place for the use of this equipment.

The most significant issues identified were:

- The plant should enhance the design, operating parameters and operational capability of the full scope simulator to sufficiently replicate the unit 3 main control room (MCR), ensuring operators can train the practical skills required for the safe operation of the plant.
- The plant should enhance its processes, procedures and practices for managing temporary modifications to limit their number and duration in order avoid an additional burden for maintenance and operations and to minimize their cumulative safety significance.
- The plant should improve the work management system in order to improve work preparation, scheduling adherence and minimize backlogs.

Tihange management expressed their commitment to address the issues identified and invited a follow up visit in about eighteen months to review the progress.

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the government of Belgium, an IAEA Operational Safety Review Team (OSART) of international experts visited Tihange Nuclear Power Plant Unit 3 from 17 April to 4 May 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; Emergency Preparedness & Response and Accident Management.

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 Tihange Unit 3 Nuclear Power Plant is one of three units with a total site capacity of 2985 MWe located on the shore of the Meuse River, approximately 25km South-west of Liege city in central Belgium. The plant is owned by Engie Electrabel and operated by Engie Electrabel. Unit 3 is of Westinghouse 1038MWe PWR type and it went into commercial operation in September 1985. The Tihange site employed approximately 1000 staff across all three units.

The Tihange OSART mission was the 218th in the programme, which began in 1982. The team was composed of experts from Bulgaria, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Arab Emirates, United Kingdom, three IAEA staff members and one observer from United Arab Emirates. The collective nuclear power experience of the team was 358 years.

Before visiting the plant, the team studied information provided by the IAEA and the Tihange 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 good international practices.

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 Tihange 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 had developed an integrated tool to support fire hazard analyses which included assessments for the fire resistance of fire separation barriers, calculations for fire propagation in multi-compartment configurations and an algorithm for taking fire extinguishing systems into account in the calculation of fire growth and propagation.
- The plant integrated permanent design modifications into a structured project management system, ensuring that the plant's resources and requirements were all aligned and followed a graded approach based on safety and complexity.
- If a severe accident occurred which resulted in a core melt, the plant had designed and installed equipment for the stabilization of the reactor core to prevent further degradation of the core.

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 design, operating parameters and operational capability of the full scope simulator to sufficiently replicate the Unit 3 main control room (MCR), ensuring operators can train the practical skills required for the safe operation of the plant.
- The plant should enhance its processes, procedures and practices for managing temporary modifications to limit their number and duration in order avoid an additional burden for maintenance and operations and to minimize their cumulative safety significance.
- The plant should improve the work management system in order to improve work preparation, scheduling adherence, and minimize backlogs.

Tihange management expressed their commitment to address the issues identified and invited a follow up visit in about eighteen months to review the progress.