EXECUTIVE SUMMARY

This report describes the results of the OSART mission conducted at Fangjiashan Nuclear Power Plant, China from 7 to 24 January 2019.

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 eleven areas: Leadership and Management for Safety; Training and Qualification; Operations; Maintenance; Technical Support; Operating Experience Feedback; Radiation Protection; Chemistry; Emergency Preparedness and Response; Accident Management and Human-Technology-Organization interaction.

The mission was coordinated by an IAEA Team Leader and Deputy Team Leader and the team was composed of experts from Belgium, Brazil, France, Germany, Norway, Russian Federation, Slovakia, Slovenia, South Africa, Sweden, UK, USA, two IAEA staff members and one observer from Russian Federation. The collective nuclear power experience of the team was approximately 365 years.

The team identified 22 issues, resulting in 11 recommendations and 11 suggestions; 4 good practices were also identified.

Several areas of good practice were noted, in particular:

- The Computer network-based expert system that integrates monitoring, assessment and forecasting functions for severe accident management.
- The '3D Environment' for electrician skills training.
- The voice message announcement system used to avoid people entering the wrong building.

The most significant issues identified were:

- Safety expectations are not always set high enough, clearly communicated or reinforced through the operating organization.
- The operating organization does not always create an environment that ensures the reporting of deficiencies.
- Some radiation work practices and arrangements at the plant do not fully ensure adequate control of contamination and that doses are ALARA.

Fangjiashan 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 China, an IAEA Operational Safety Review Team (OSART) of international experts visited Fangjiashan Nuclear Power Plant from 7 to 24 January 2019. 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, Accident Management, Emergency Preparedness and Response and Human-Technology-Organization interaction. 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 Fangjiashan Nuclear Power Plant is located at Jiaxing, Zhejiang province, China. The plant is owned by Qinshan Nuclear Power Co., Ltd (QNPC) and operated by CNNP Nuclear Power Operations Management Co., Ltd (CNNO). The Fangjiashan plant consists of two units with Pressurized Water Reactor (PWR) with reference output of 1089 MWe gross. The type of the unit is known as Improved Chinese PWR CPR-1000. Fangjiashan is a Generation II+ pressurized water reactor, based on the design of French 900 MWe (three loops design). It has been designed for a 40-year service life. The Fangjiashan employs approximately 700 staff (altogether in CNNO there are 4000 employees).

The Fangjiashan OSART mission was the 205th in the programme, which began in 1982. The team was composed of experts from Belgium, Brazil, France, Germany, Norway, Russian Federation, Slovakia, Slovenia, South Africa, Sweden, UK, USA, two IAEA staff members and one observer from the Russian Federation. The collective nuclear power experience of the team was approximately 365 years.

Before visiting the plant, the team studied information provided by the IAEA and the Fangjiashan 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 Fangjiashan NPP are committed to improving the operational safety and reliability of their plant. The team found good areas of practice, including the following:

- The Computer network-based expert system that integrates monitoring, assessment and forecasting functions for severe accident management.
- The '3D Environment' for electrician skills training.
- The voice message announcement system used to avoid people entering the wrong building.

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

- Safety expectations are not always set high enough, clearly communicated or reinforced through the operating organization.
- The operating organization does not always create an environment that ensures the reporting of deficiencies.
- Some radiation work practices and arrangements at the plant do not fully ensure adequate control of contamination and that doses are ALARA.

Fangjiashan 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.