

EXECUTIVE SUMMARY

This report describes the results of the OSART mission conducted for Krsko Nuclear Power Plant in Slovenia from 15 May to 1 June 2017.

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 thirteen 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; Human, technology and organization interaction; Long term operation 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 Armenia, Belgium, Bulgaria, Canada, the Czech Republic, Hungary, The Netherlands, Russian Federation, Spain, Sweden, Ukraine, United States of America and the IAEA staff members. The collective nuclear power experience of the team was approximately 350 years.

The team identified 20 issues, resulting in 4 recommendations, and 16 suggestions. 3 good practices were also identified.

Several areas of good performance were noted:

- The plant has implemented a tool allowing personnel to take a virtual panoramic tour using photos of technological areas. Multiple panoramic snapshots were taken inside the plant. The tool is available for all workers with access to a plant computer. Resulting in reduced radiation dose and improved the plant work planning;
- The plant, together with a vendor using state of the art 3-D printing technology, has reverse-engineered and produced an impeller to replace an obsolete item on a Fire Protection Pump;
- The plant has established a practice that assists in raising awareness of the plant staff on insights from the plant-specific Probabilistic Safety Assessment (PSA).

The most significant recommendations include:

- The plant should improve the programme for managers to reinforce their expectations of plant personnel behaviour and practices;
- The plant should enhance training programme for all personnel performing tasks important to safety, including emergency duties;
- The plant should improve the prioritization, implementation and monitoring of safety related activities to ensure their timely completion.

Krsko NPP 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 Slovenia, an IAEA Operational Safety Review Team (OSART) of international experts visited Krško Nuclear Power Plant from 15 May to 1 June 2017. 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 and response, Accident management, Human, technology and organization interactions, Long term operation 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 Krško Nuclear Power Plant is the only nuclear power plant in Slovenia. It is located on the north bank of the Sava River approximately 2 km southeast of the town of Krško in the east-southeast part of the Republic of Slovenia. The plant is equipped with a Westinghouse pressurized-water reactor with thermal power of 1994 MW and the net electrical output of the plant is 696 MWe. The Krško NPP was built jointly by the Republic of Slovenia and the Republic of Croatia. The supplier of the nuclear installation was the U.S. Westinghouse Electric Corporation. The plant became a nuclear facility in May 1981 when the initial core was loaded. First criticality was achieved in September 1981 and on 2 October 1981 the generator was synchronized for the first time to the grid. On 1 January 1983 commercial operation of the plant began. The plant is connected to the 400 kV transmission system to cover the needs of consumers of Slovenia and Croatia.

The Krško OSART mission was the 194th in the programme, which began in 1982. The team was composed of experts from Armenia, Belgium, Bulgaria, Canada, the Czech Republic, Hungary, The Netherlands, Russian Federation, Spain, Sweden, Ukraine, the United States of America and the IAEA staff members. The collective nuclear power experience of the team was approximately 350 years.

Before visiting the plant, the team studied information provided by the IAEA and the Krško Nuclear Power 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 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 Krsko NPP are committed to improving the operational safety and reliability of their plant. Several areas of good performance were noted:

- The plant has implemented panoramic tour using photos of technological areas. Multiple panoramic snapshots were made inside plant technological areas. The tool is available for all workers with access to a plant computer, resulting in reducing radiation doses and improving the plant work planning;
- The plant together with a vendor using state of the art 3-D printing technology has reverse-engineered and produced an impeller to replace an obsolete item on a Fire Protection Pump;
- The plant has established a practices that assist in raising an awareness of the plant staff on insights from the plant-specific Probabilistic Safety Assessment (PSA).

The most significant recommendations include:

- The plant should improve the programme for managers to reinforce their expectations of plant personnel behaviour and practices;
- The plant should enhance training programme for all personnel performing tasks important to safety, including emergency duties;
- The plant should improve the prioritization, implementation and monitoring of safety related activities to ensure their timely completion.

Krsko 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.