INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the government of Japan, an IAEA Operational Safety Review Team (OSART) of international experts visited units 6 and 7 of the Kashiwazaki-Kariwa Nuclear Power Station from 29 June to 13 July 2015. 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; Radiation Protection including Post Accident Sampling; Emergency Planning and Preparedness and Severe 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.

Kashiwazaki-Kariwa nuclear power station is located almost at the centre of Niigata Prefecture between Kashiwazaki City and Kariwa Village on the coast of the Sea of Japan. The site covers an area of around 4.2 million square metres and is encircled by a hilly area of pine forest. Kashiwazaki city, to the south, has a population of approximately 92000 and Kariwa village, to the east, approximately 5000.

There are seven units on the site; all operated by the Tokyo Electric Power Company (Tepco), Units 1 to 5 are 1100 MWe BWR5 Reactors. Unit 1 has a Mark II containment vessel, units 2 to 5 have Mark II advanced containment vessels. Units 6 and 7 are 1356 MWe Advanced BWRs in ABWR containments. Units 1 to 5 were commissioned between 1985 and 1990, Unit 6 entered commercial operation in 1996 and Unit 7 in 1997. In total the site has an installed capacity of 8212 MWe, delivered to the grid system via two 500kV power lines with the possibility of upgrading one of these lines to 1000kV in the future. There are approximately 1100 Tepco personnel on the site and 4500 contractor personnel.

All seven units at the station have been shut down since March 2012. In the period since then the station has been implementing a significant programme of enhancements to the site, the installed plant and management programmes and procedures to enhance the robustness of defences against severe accidents.

The 2015 Kashiwazaki-Kariwa OSART mission was the 183rd in the programme, which began in 1982. The team was composed of experts from Canada, the Czech Republic, Finland, France, Slovakia, Sweden, the United Kingdom and the United States and the collective nuclear power experience of the team was approximately 350 years.

Before the OSART mission, the team studied information provided by the IAEA and the Kashiwazaki-Kariwa station to familiarize themselves with the main features and performance of the station, staff organization and responsibilities and important programmes and procedures. During the mission, the team reviewed many of the station's programmes and procedures in depth, examined indicators of plant performance, witnessed work in progress, the behaviours of workers and management, and held in-depth discussions with workers at the station. In addition the team observed the work done to address issues arising from the 2011 events at Fukushima-Daiichi

Throughout the review, the exchange of information between the OSART experts and Kashiwazaki-Kariwa 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 are based on the station's performance and programmes compared with the IAEA's 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 Kashiwazaki-Kariwa power station are committed to improving the operational safety and reliability of their station. The team found good areas of performance, including the following:

- Following the March 2011 accident at Fukushima Daiichi, Kashiwazaki-Kariwa has implemented comprehensive and robust defences against severe accidents, including additional tsunami and internal flood protection measures as well as enhanced installed and mobile back-up electrical power supplies, pumps and heat exchangers;
- The station carries out frequent drills in challenging scenarios to ensure the station personnel are well-prepared to deal with emergencies even under difficult environmental conditions;
- The station has established thorough control of all combustible materials and ignition sources to minimize fire risk.

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

- Systems to gather operating experience in the different management areas in the station should be integrated and the information collected should be used more proactively to detect and correct low level issues before they become significant, and enable the station to better exchange 'lessons-learned' with the rest of the nuclear industry;
- The existing severe accident management guidance should be enhanced to cover all plant conditions including potential events involving the spent fuel pools;
- The station's emergency plans covering all situations should be more fully integrated and documented in a way that is clear and easy to use.

Kashiwazaki-Kariwa station 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.