

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the government of Switzerland, an IAEA Operational Safety Review Team (OSART) of international experts visited Mühleberg Nuclear Power Plant from 8 to 25 October 2012. The purpose of the mission was to review operating practices in the areas of Management organization and administration; Training and qualification; Operations; Maintenance; Technical support; Operating experience feedback, Radiation protection; Chemistry, Emergency planning and preparedness, Severe accident management and Long term operation. 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 Mühleberg OSART mission was the 170 in the programme, which began in 1982. The team was composed of experts from Belgium, Czech Republic, Finland, Germany, Hungary, Slovakia, Sweden, UK and USA together with the IAEA staff members and an observer from Finland. The collective nuclear power experience of the team was approximately 340 years.

Mühleberg nuclear power plant (KKM) is a single unit General Electric (GE) boiling water reactor plant with Mark 1 containment. Its licensed thermal power output is 1097 MW. The two turbine generator sets produce an electrical net output of 373 MW. Commercial operation started on 6 November 1972. The plant is situated on the left bank of the river Aare and forms part of the community of Mühleberg in the Canton of Berne. The plant is located about 14 km west of the city of Berne. The plant employs approximately 330 permanent staff.

The plant (KKM) is owned and operated by the utility BKW FMB Energie AG (BKW), Berne. BKW is the owner of eight hydropower stations and is part-owner of 18 other non-nuclear power generation installations. The total energy generated annually by BKW amounts to more than 8500 GWh, with KKM's share amounting to 2700 GWh.

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

- A comprehensive strategy to manage the core shroud cracking issue and allow long term operation includes chemical treatment of the reactor water, improved ultrasonic inspection tooling, analytical modelling, and the future optimization of the tie-rod design;
- Preserving and transferring knowledge has been implemented at the plant so that running the plant safely, reliably, efficiently and with care for the environment is achieved;
- Fast and thorough response to recent significant external operating experience events, including important plant modifications and communication;
- Support for industry efforts to improve fuel design and monitoring practices; resulting in good fuel performance and fewer fuel assemblies discharged from the reactor.

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

- The plant should provide all reasonable protection for the persons on the site in an emergency with radioactive release to avoid any unjustified health risks;
- The plant should embrace and promote the operating experience program and methods throughout the plant, to ensure corrective actions are timely and OE is used throughout the plant in day-to-day activities;
- The plant should reinforce its work control and risk assessment system with the use of radiation work permits to ensure adequate, written radiological work controls are provided consistently at all times;
- The utility should consider improving its means for an independent nuclear oversight with a continuous review of safety performance at the nuclear power plant.

Mühleberg 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.