

INTRODUCTION AND MAIN CONCLUSIONS

INTRODUCTION

At the request of the government of the Kingdom of Belgium, an IAEA Operational Safety Review Team (OSART) of international experts visited Doel Nuclear Power Plant from 8 to 25 March 2010. 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, Radiation protection; Chemistry and Emergency planning and preparedness. 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 Doel OSART mission was the 157th in the programme, which began in 1982. The team was composed of experts from France, China, United Kingdom, United States of America, Switzerland, Sweden, Canada, Finland, and Hungary together with the IAEA staff members and observers from Czech Republic and Russia. The collective nuclear power experience of the team was approximately 378 years.

The Doel nuclear power plant is located in the Port of Antwerp, on the Schelde river, a few kilometers from the border between Belgium and the Netherlands. The plant is owned principally by Electrabel which belongs to the GDF SUEZ Group. The plant has 961 Electrabel employees and about 350 permanent contractor staff on site.

The plant operates units 1 and 2 with 433 MWe net power each and units 3 and 4 with 1006 and 1040 MWe net power respectively. According to the request of the Federal Agency for Nuclear Control (FANC) units 1 and 2 were the main scope of the OSART review. Doel 1 and 2 are twin units with two loop PWR reactors; they share various common safety systems and a common control room. The Architect Engineer for Doel 1 and 2 were Tractionel (now Tractebel) Engineering and Electrabel using a Westinghouse licence. Doel 1 and 2 started commercial operation in 1975. A common bunker with emergency systems was constructed in 1990. Steam generators were replaced on Doel 2 in 2004 and on Doel 1 in 2009.

Before visiting the plant, the team studied information provided by the IAEA on OSART methodology and by the Doel 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 team were based on the plant's performance compared with the requirements of IAEA Safety Standards and good international practices.

The following report is produced to summarise the findings in the review scope, according to the OSART Guidelines document. The text reflects only those areas where the team considers that either 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 team concluded that the management of Doel NPP are committed to the principle of continuous improvement in the operational safety and reliability of their plant.

The team found good areas of performance, including the following:

- Self assessment exercises are conducted at all levels, including workshop level, as well as at different process levels;
- Competency grades are used to measure safety culture and reduce errors due to human behavior;
- The defense-in-depth principle as a strategy for nuclear safety is integrated into all training courses and programs;
- A training and assessment program is performed to improve contractors' competency in Nuclear Safety Culture during outages;
- An intensive training program is used for maintenance work planners, leading to a formal accreditation;
- The fuel department has compiled a pocket size book that is easy to use and provides a short and easy to read description of tools, equipment and installations used for handling of fuel and core components.

A number of areas for improvements in operational safety were identified by the team. The most significant of them include the following:

- Analyses for some events are not being performed to the required depth and rigor described in the plant programs, and are not being completed in a timely fashion;
- Outside of working hours, there is no one required to be present at the site who has the responsibility or the authority to classify an emergency or to notify off-site authorities;
- Not all industrial safety related hazards and risks to workers' safety and health are identified and eliminated on an ongoing basis;
- The plant uses Probabilistic Safety Analyses to a limited extent for assessments and risk evaluations;
- Procedural guidance is not currently in place to ensure the control room environment remains habitable by operators with respect to oxygen content following an accident;
- There are weaknesses in the maintenance backlog management tool and the methodology for ensuring timely completion of maintenance works.

Doel NPP management expressed a determination to address the areas identified for improvement and indicated a willingness to invite a follow up visit some time in the beginning of 2012.