

## INTRODUCTION AND MAIN CONCLUSIONS

### INTRODUCTION

At the request of the Government of the Belgium, an IAEA Operational Safety Review Team (OSART) of international experts visited the site of Tihange Nuclear Power Plant and concentrated its review on the unit 1 from 7 May to 23 May 2007. Tihange NPP unit one is a part of the Tihange site which hosts all together 3 units with total capacity of 2985 MW. The Tihange NPP is part of SUEZ Group and belongs to Electrabel Company. Tihange Nuclear Power unit 1 is owned at 50% by Electrabel (EBL) and Electricity de France (EDF). The site is located on the shore of the Meuse River, approximately 30 km South-West from Liege city.

Tihange NPP operates three units Tihange 1 to 3, respectively 962 MWe, 1008 MWe, and 1015 MWe, in operation since 1975, 1983 and 1985. Unit 1 had its steam generators; reactor vessel head; control rod system; and process instrumentation system replaced. Tihange 1 is modeled on the Beaver Valley Plant in the United States. A cooling tower was added to unit 1 in 1990.

The purpose of the mission was to review operating practices in the areas of management organization and administration; training and qualifications; operations; maintenance; technical support (engineering); operating experience feedback; 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 Tihange OSART mission was the 141<sup>st</sup> in the programme, which began in 1982.

The team for Tihange unit 1 OSART was composed of experts from Brazil, Bulgaria, Canada, China, France, Germany, Romania, Russia, Slovakia, together with the IAEA staff members and three observers from Russia, Germany and the IAEA. The collective nuclear power experience of the team was approximately 344 years including the observers.

Before visiting Tihange unit 1, the team studied information provided by the IAEA and the Tihange 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 Tihange's performance compared with IAEA Safety Standards and good international practices.

## MAIN CONCLUSIONS

The OSART team concluded that the managers of Tihange unit 1 are committed to improving the operational safety and reliability of their plant. This is clearly demonstrated by the fact that since the OSART preparatory meeting and seminar in February 2006 Tihange plant has introduced or extended several programmes contributing to improved operational safety. During this process Tihange plant has used extensively the OSART methodology for self assessment and the IAEA Safety Standards to benchmark their existing practices and to identify useful improvements.

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

- The plant has developed an ambitious programme for reducing fire hazards in improving fire fighting capability, staff behaviour, training, fire fighting equipment and facilities;
- The plant has equipped all exits of its radiological controlled area with sensitive exit gate monitors “IPM9” that are equipped with beta and gamma detectors;
- The plant has designed and installed seismically qualified fixed structures on which blankets of lead shielding can be quickly installed and dismantled for high dose rate worksites in places where workers carry out systematic maintenance;
- A document management database was created to meet deadline requirements for essential reports (e.g. ASME), for increased precision and completeness of the issued documents, for improving operating experience (OPEX), work records and to plan future work;
- Several tools were developed to increase the behaviour of employees in charge of responding an emergency situation at the plant (specific colour-stickers for cars, blue flash light to direct rescue teams and reflex form for each key position in the emergency plan);
- The plant has set up an organization for the reception of personnel and families for managing a long accident period, in the “reception and fall-back center” in Les Awirs (Centre d’accueil et de repli des Awirs - CARA).

The team found also some areas where improvement should be done such as:

- The work authorization process and its coordination are not fully established and not always followed;
- Events are not always analyzed in a timely manner and formal root cause analysis methodology is not always used;
- The application of the human performance tools does not always meet management expectations;
- Procedures for temporary modifications, personnel operational aids and tagging are not always adhered to in a rigorous manner;
- The plant operations managers and personnel did not develop and implement a sufficiently demanding programme for resolving minor deficiencies in the field, such as labeling, cleanliness, unmanaged storage and small leakages;
- Plant workers, in some cases, do not rigorously follow the plant requirements necessary to prevent their contamination and/or spread of contamination.

Tihange unit 1 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.