



Hungarian Atomic Energy Authority

## HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Bulletin

H-1539 Budapest, P.O. Box 676,  
Tel: +36 1 436-9881, Fax: +36 1 436-9883, e-mail: [nsd@haea.gov.hu](mailto:nsd@haea.gov.hu)  
website: [www.haea.gov.hu](http://www.haea.gov.hu)

# RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY

## April 2017

### General

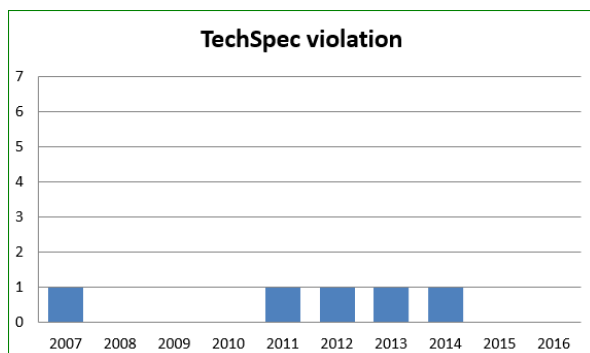
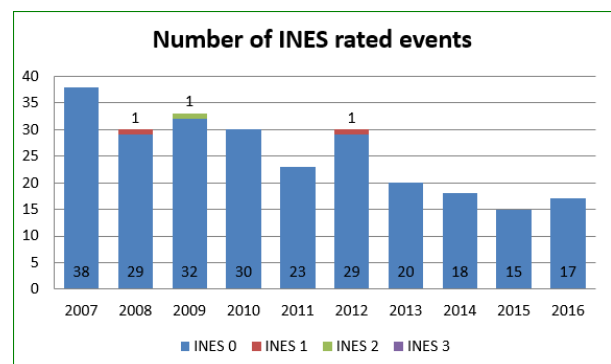
#### *2016 Safety Performance Assessment of nuclear facilities*

The HAEA regularly evaluates the safety performance of the operators of nuclear facilities. The main sources of data for the assessment are the regular reports and the event reports of the licensees, the protocols of regulatory inspections including the regular and comprehensive inspections focusing on specific areas, and the reactive inspections. The Hungarian nuclear facilities operated safely and there was no danger to the environment, public or to the employees.

Below a short preview can be observed from the forthcoming 2016 safety performance assessment.

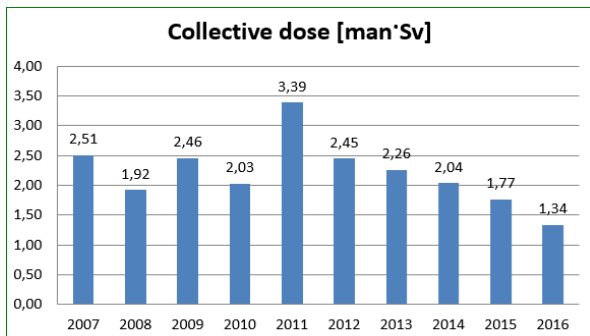
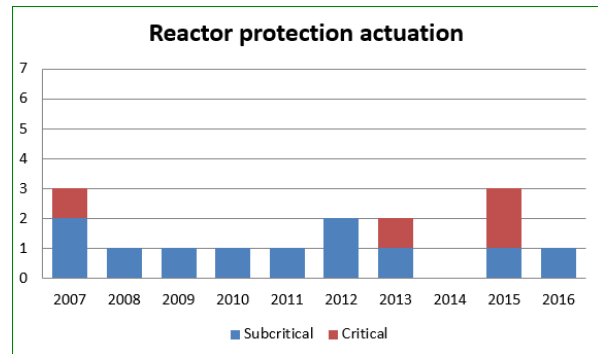
#### *Paks Nuclear Power Plant*

Paks NPP reported seventeen events. All of them were of category “below scale” corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES).



There was no technical specification violation since 2014. As a result of discussion with the NPP professionals, the classification of a 2014 event has been changed to violation of technical specification.

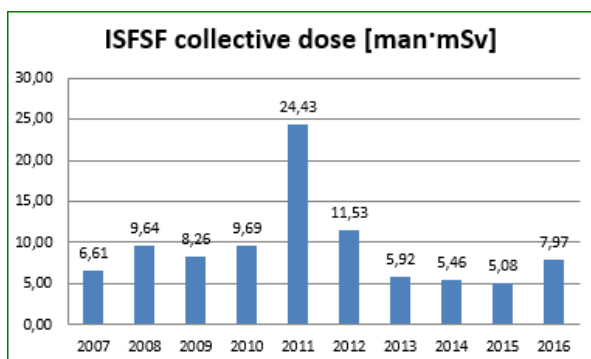
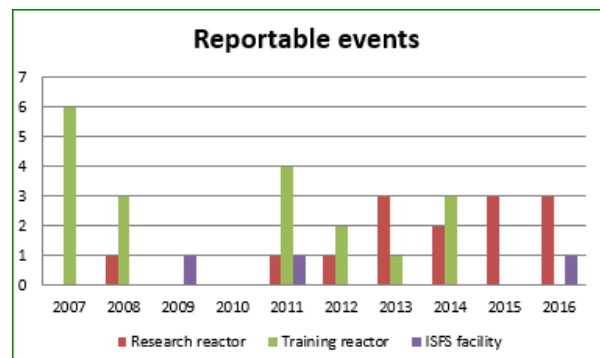
One reactor protection actuation happened in 2016. It occurred in subcritical state of the reactor, during testing the effectiveness of the reactor protection system. Incorrect setting of the testing conditions caused the event.



The collective radiation dose of employees has been gradually decreasing since 2011. The value of 2016 is the lowest of the last twenty years. The liquid and gaseous radioactive releases into the environment were also very small, 0.26% and 0.06% of the regulatory limit, respectively.

### Other Nuclear Facilities

Three reportable events occurred in 2016 at the Budapest Research Reactor, none in the Training Reactor of the Budapest University of Technology and Economics and one in the Interim Spent Fuel Storage Facility. The Training Reactor was out of operation from March, and the Research Reactor from June for refurbishment and troubleshooting, respectively, for the rest of the year.



Following the peak of 2011 caused by maintenance activities, the collective doses of the Interim Spent Fuel Storage Facility have been gradually decreasing. It became somewhat higher again in 2016. Maintenance works in the first half-year caused the majority of the 2016 year's collective dose.

The general evaluation of nuclear safety conditions of nuclear facilities has concluded acceptable and stable safety performance results in 2016.

## International arrangements

### *Cooperation agreement with Ukraine and the Republic of Belarus*



On 26 September 2016, the Hungarian Atomic Energy Authority (HAEA) and the State Nuclear Regulatory Inspectorate of Ukraine signed an agreement on cooperation in Vienna on the margins of the 60th General Conference of the International Atomic Energy Agency (IAEA) in the field of nuclear and radiation safety. The agreement serves as a framework for the parties for further bilateral cooperation regarding

development of legislative basis in the field of nuclear and radiation safety; exchange of experience in numerous fields; regulatory assessment of operational indicators of nuclear power plants, plans and measures for safety improvement; emergency preparedness and response; and training of personnel of nuclear regulatory bodies. The cooperation shall be implemented in the form of exchange of information and documentation, visits of scientific and expert visits, organization of training courses, workshops, seminars, meetings and consultations as well as implementation of joint projects.

After a one-year preparation period, also during the 60th General Conference of the IAEA, the HAEA and the Ministry for Emergency Situations of the Republic of Belarus signed a memorandum of understanding on cooperation in the field of safety of peaceful use of nuclear energy. The parties agreed that they strengthen their cooperation in the area of exchange of information related to the legislative basis of the regulatory activities;



new directions in quality management of regulatory activities; development of regulations and regulatory guides, exchange of good practices in various fields; methods for safety assessment of nuclear facilities at all stages of their life cycle and actions taken by the regulatory body in the case of an emergency at a nuclear facility. The cooperation takes place in the form of exchange of information, exchange of personnel and implementation of joint projects.

To realize the reinforcement of the cooperation, delegates of the HAEA and the Gosatomnadzor (GAN) held a three-day long meeting to exchange experience in Minsk at the end of February on the subject of regulatory supervision of new nuclear power plant projects.

During the consultation the HAEA experts shared their experience on the supervision of operating nuclear power plants with the GAN experts, who, in turn, shared their supervision experience regarding the Astravets Nuclear Power Plant construction project with their Hungarian counterparts. The Astravets units use the same Russian designed AES-2006 reactor technology as the one proposed for the Paks new build project.

The meeting included a site visit to the Astravets Nuclear Power Plant construction site, where the HAEA experts received detailed information on GAN's on-site supervision practices.

Topics for further bilateral meetings have also been discussed.

## **Regulatory activities**

### ***Comprehensive inspection in the Paks NPP***

According to the annual oversight program of the HAEA the technical condition and operation of Paks NPP were reviewed in the framework of a comprehensive inspection in the second half of 2016.

During the inspection, the authority paid special attention to assess the technical condition of the facility, including equipment qualification, qualified status, monitor the implementation of periodic tests, ageing management and maintenance issues.

The HAEA assessed the status of the technical modifications for maintaining and increasing the nuclear safety security, the characteristics of safe operation and utilization of operating experience. The operating experience from other NPPs and the utilization of R & D results were assessed as well.

The inspection of the NPP's radiation protection covered monitoring of internal radiation exposure, the radiation protection related instrumentation qualifications, maintenance of protective equipment, monitoring and dose planning and the control of radiation hazardous activities.

During the audit, the authorities identified 19 findings, the NPP shall prepare an action plan for their elimination and the implementation schedule of the defined tasks shall be sent for approval to the HAEA.

### ***On-power Maintenance of Paks NPP Units***

From the beginning of operation of the Paks NPP it was not allowed during power operation to take out of operation or stand-by state any components belonging to safety systems to carry out their planned maintenance. The only necessary exception was (for a 120-hour long strictly

limited duration) a certain section of each of the three trains of the essential service water system serving both of the twin-units. According to the Operational Limits and Conditions (further: OLCs) the maintenance of these sections was allowed when one of the twin-units was shut down for refuelling, while the other twin-unit was operating on power.

The operating organization began to study this issue taking into account the international practice (among others operation of similar units in the Czech Republic) using a risk monitor based on probabilistic safety analysis (PSA). The studies departed from the fact that taking out of service for maintenance makes the given train of the essential service water system unable to serve the respective bunch of other safety systems (e.g. high- and low pressure ECCS, containment sprinkler system). The preliminary PSA calculations showed that taking out of service one train at one time during on-power operation for 30 days altogether (for the three trains for the two twin-units) results in less cumulative annual risk than that resulting from a shorter maintenance period during the refuelling outage, characterised with an open containment.

Paks NPP submitted a license application for the related modification. A supporting documentation attached to the application was prepared taking into account the draft IAEA guidance "Integrated Risk Informed Decision making". The licensee demonstrated that introduction of the on-power maintenance practically will not change the outcome of the deterministic safety analyses and that the PSA calculations show a decrease of the cumulative annual risk.

During review and assessment of the submitted documents the HAEA focused its efforts on fulfilment of the single failure criterion, the acceptability of the PSA calculations results, adequacy and completeness of the amendments to the OLCs and the Final Safety Analysis Report, the correctness of the list of components determined as suitable for on-power maintenance, finally on the completeness of internal NPP documents identified as requiring modification.

As the result of the procedure the HAEA issued the modification license with several conditions to introduce on-power maintenance in the beginning of March 2017; the on-power maintenance of the units will commence for the first time in mid-June of 2017. To check fulfilment of the license conditions the HAEA will perform dedicated inspections before and during execution of the on-power maintenance.

## Paks II. Project

### *Site licensing of the new NPP units*

On 27 October 2016, Paks II. Nuclear Power Plant Development Ltd. has submitted the site license application for two VVER-1200 units at Paks. In the license application, the licensee shall demonstrate that the site characteristics that would exclude the possibility of construction do not exist, describe the



implementation of the licensed site survey and assessment programme and determine the site-related design data. The complex final report describing the results of the site survey and assessment programme shall be attached to the application.

The HAEA by granting the site license accepts the justification of lack of such site characteristics that would exclude the possibility of the construction, furthermore the suitability of the site survey, assessment of data determined based on the site survey and the site-related design data derived from the assessment and altogether the suitability of the site.

As a part of the licensing procedure the HAEA held a public hearing at Paks. The public hearing is meant to provide information to stakeholders about the subject and process of the licensing procedure, moreover to provide an opportunity to express their opinion and ask their questions. Besides the public, among the almost 150 participants, the representatives of NGO's and political organizations also participated the event.

The assessment of the application was completed and the license was granted on 30 March 2017. In the site license several conditions were prescribed, for example development and implementation of a monitoring program for the specified site characteristics, content and schedule of regular reports, requirements to be fulfilled in the construction license application. To check fulfilment of the license conditions the HAEA will perform dedicated inspections.



## Radioactive Waste Repositories

### *RWTDF applied for a comprehensive license*



The use of atomic energy in Hungary covers a wide spectrum, inevitably generating various forms of radioactive waste. It is our common interest to treat, store and dispose of those types of waste safely and responsibly. To face the issues the Radioactive Waste Treatment and Disposal Facility (RWTDF) was built nearby Püspökszilágy and Kisémedi with a

capacity of 5040 m<sup>3</sup>, now operated by Public Limited Company for Radioactive Waste Management (PURAM). The construction completed in 1976, in addition, the first waste package was transported there in 1977. PURAM is responsible – among others – for accepting, transporting, sorting and conditioning of non-NPP originated radioactive waste produced in Hungary. Regarding the appearance of the facility - concerning radiation protection regulations -, the controlled zone is fully detached by a fence. The building for technology, containing a room for sorting waste together with a press for compaction and cementation machine for liquid materials, along with reinforced concrete vaults and non-corrosive steel tube serve the proper storage and disposal of radioactive waste. In the 2000's PURAM prepared safety assessments demonstrating the safe operation of the site, however, after institutional control phase, there were possible scenarios initiating considerable radiation dose to the public. A new project has therefore been established for the enhancement of safety and to carry out refurbishment on the site, which consisted of retrieving and sorting waste followed by conditioning along with repackaging. The process reduced the volume of waste, thus based on a new safety assessment, the facility applied for a license to continue the program. The RWTDF still holds distinct licenses for managing, storing and disposal of waste as well as a license for modification for performing the abovementioned program enhancing safety. In order to clarify and simplify the situation the PURAM applied for a comprehensive license based on the newly prepared safety analysis report substantiating the operation.

The use of nuclear energy is permitted evidently only under control by authorities. The authorisation process regarding safety belongs to the HAEA that is responsible for the enforcement of relevant requirements connected to safety, security and non-proliferation. Due to the amendment of the atomic law in 2013, the HAEA became the competent authority for siting, building, operating, modifying and closing a radioactive waste storage or disposal

facility. In 2014, PURAM conducted a process to verify compliance with requirements for safety and stated that the facility does not bear any of the documents as follows: overall safety report about all the activities, a document containing limitations and controls as well as a manual for emergency operating procedures. Meanwhile, the submission of the abovementioned documents took place as a part of the licensing proceeding.

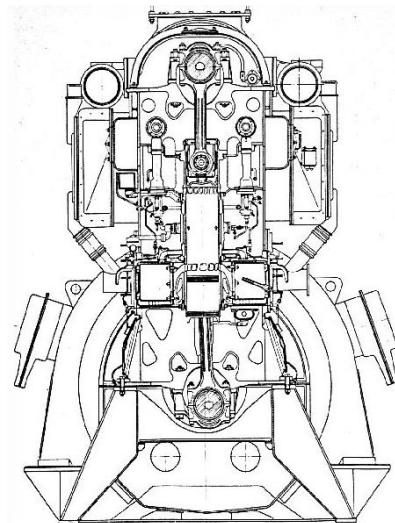
The HAEA commenced the procedure on 30 June 2016 to check the fulfilment of the design and operational safety requirements. Considering environmental and mining issues the Government Offices of Baranya and Pest County, respectively, have been involved as cooperating authorities. According to the atomic law of Hungary, a public hearing was held as a part of the licensing procedure. Following the public hearing, before making the decision the HAEA consider the submitted questions, viewpoints and proposals arisen in the public hearing as well as the position statements of the cooperating authorities.



## An Event of Interest

### ***Simultaneous inoperability of two out of three safety systems due to fuel pump failure of a diesel generator***

During outage of Paks NPP Unit 2, the 'Y' safety system of unit 2 was out of service due to planned maintenance. On 30 October 2016 the test of the 'X' safety system was completed successfully, and the test of 'W' safety system started according to the outage schedule. During the 'W' test, insufficient fuel pressure signal was generated at the 'W' diesel generator. The diesel generator was shut down at the scene and normal power supply to the 6 kV bus was restored. The diesel generator fuel pump coupling failure was revealed and immediately repaired. The event was rated on the INES scale as level 0.





## **Emergency Preparedness and Response**

### ***Transport Security Exercise in cooperation with the National Police Headquarters***

On 8 February 2017 in the territory of Pest county, the HAEA in cooperation with the National Police Headquarters (NPH) conducted a transport security exercise to test the response time of the police forces in case of a security event.

In the frame of the International Physical Protection Advisory Service (IPPAS mission) in 2013, experts delegated by the IAEA examined the Hungarian implementation of international nuclear security recommendations. Based on the evaluation, the experts suggested that a transport security exercise (e.g. car theft) shall be conducted while the reaction time of the police response forces can be measured.

The HAEA and the NPH decided to conduct an exercise as realistic as possible, so the emergency announcement of the security related event was received through the national emergency number (112). The response forces were not informed previously to assure the credibility of their activity.

To carry out the exercise, a transport company was invited to participate and asked to grant a driver, who is experienced enough and a vehicle, which is provided with all the required licenses and equipment. By the built-in GPS tracking system, the movement of the car could be observed by the participants during the whole exercise.

The short scenario was the following: during a radioactive material transport a driver stopped to make a phone call, and an unknown person suddenly came to the car and violently (but without using a gun) pull the driver out from the vehicle. The driver while trying to protect himself, activated the built-in panic button, but could not preclude the theft of the car. The unknown person drove away with the vehicle (including the radioactive material). The physical protection officer received a short message on his cell phone sent by the built-in alarm system, and immediately tried to reach the driver. When he could not get in touch with the driver, called the national emergency number (112) and announced the car theft. The observers started to measure the response time at this point of the exercise.

When the police response forces arrived on the site where the “theft” car parked, the timing was finished. All the participants and observers considered the exercise successful, because the response forces arrived in the time frame given by the legal regulation. The exercise yielded useful experience not only for the participants but also for the observers, so the HAEA decided to conduct more transport security exercises with alternate scenarios in the future.

The NPH and the HAEA compiled a summary report and it will be presented at the IPPAS follow up mission in June, 2017 when the fulfilment of the recommendation and suggestions of IPPAS mission will be examined.



### ***RESPEC support***

The European Commission (EC), Directorate-General for Energy, Directorate for Nuclear Energy, Safety and ITER have signed a contract with the Hungarian Atomic Energy Authority (HAEA) to provide additional support resources to the EC's unit Radiation Protection (ENER D.3) in case of a radiological emergency or emergency hazard situations. The Radiological Emergency Support Project for the European Commission (RESPEC) started on 1 April 2016. The duration of the contract is 36 months.

The task of the contracted organisation is to provide assessment support and professional assistance to the bodies of the EC – especially to the Radiation Protection Unit – during a radiological or nuclear accident affecting the territory of the European Union. For this purpose the HAEA shall support the EC with nuclear and radiological analyses, elaboration of proposals on protective actions and verifying the content of the press releases that are prepared to inform the media by the EC.

In the period of this tender, it is a new task to organise the annual ECURIE (European Community Urgent Radiological Information Exchange) exercise. The ECURIE exercise is a nuclear emergency response exercise for testing and examining the ECURIE system.

The host country of the 2017 exercise was Hungary and the scenario took place at Paks NPP. All ECURIE Member States (31 countries) participated in this exercise which was held on March 28, 2017 and lasted 12 hours. The HAEA Emergency Response Organisation analysed and reported successfully the nuclear and radiological situation based on the exercise scenario to the ECURIE Member States via the ECURIE system and fulfilled the RESPEC support for the EC.

With this exercise the HAEA has closed the first successful year (1 April 2016 - 31 March 2017) of the actual RESPEC project.

