



Hungarian Atomic Energy Authority

## HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Bulletin

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# RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY

## October 2016

### General

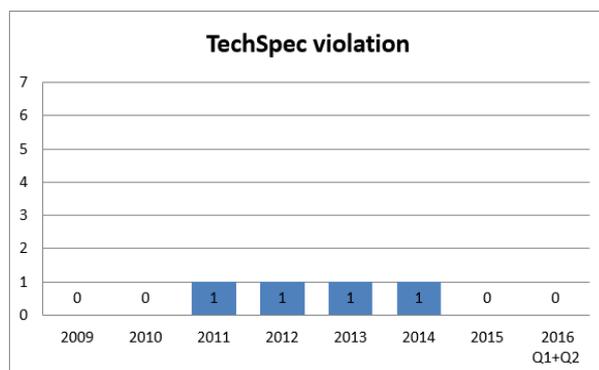
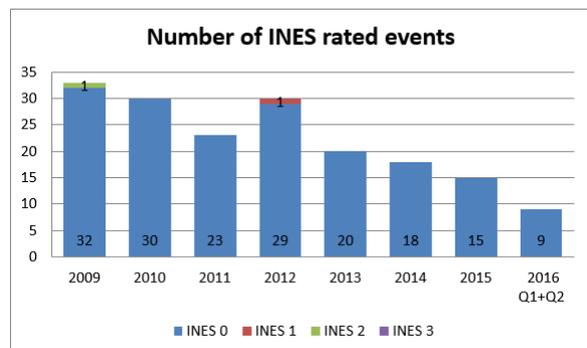
#### *Semi-annual safety performance assessment*

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 safety performance data are taken from the 1<sup>st</sup> and 2<sup>nd</sup> quarterly reports of Paks NPP and the 1<sup>st</sup> semi-annual reports of the other licensees.

#### *Paks Nuclear Power Plant*

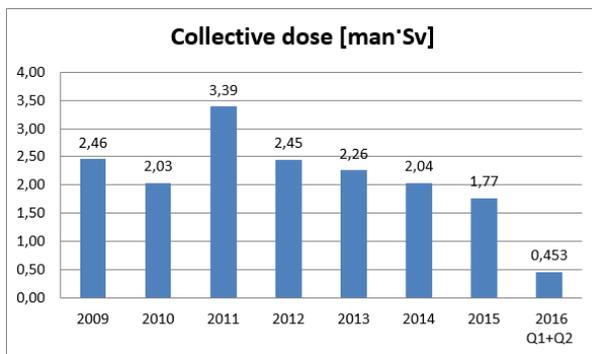
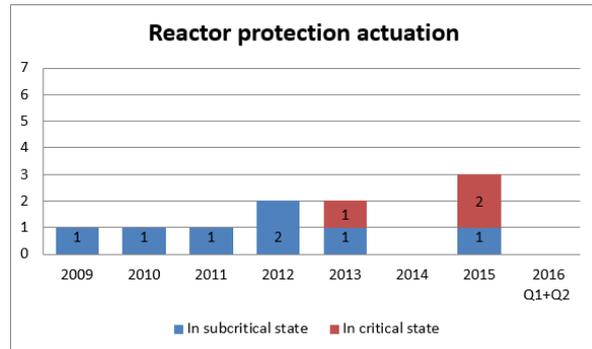
Nine events have been reported by the NPP altogether, all of them were of category “below scale” corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES).



There was no event causing violation of technical specification during the examined period.

### **Paks Nuclear Power Plant, continued**

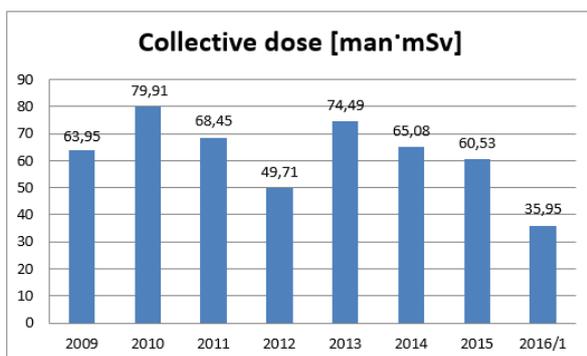
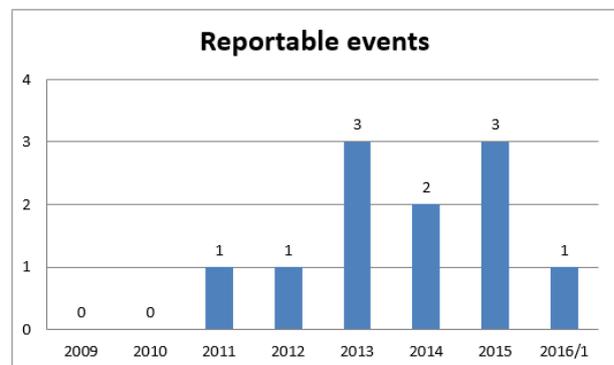
No reactor protection actuation occurred in this period.



As there is a regular time lag in the reporting of collective doses, the 1st and 2nd quarterly reports refer to the doses of the November to April period. The maintenance period in the Paks NPP reactors this year began on the 21<sup>st</sup> of May, so the effect of maintenance activities do not appear in the reported collective dose.

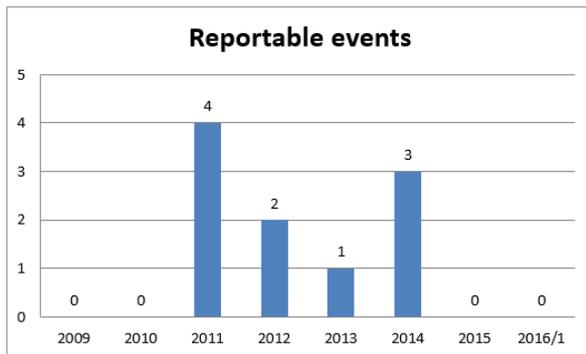
### **Budapest Research Reactor**

The one reportable event that occurred is the leakage of the main safety isolation valves, as a consequence of the gaskets' weak long-term radiation resistance. There is an article about the gasket renovation in our 2014-2 issue and we plan to summarize the lessons learned in our 2017-1 newsletter. The Budapest Research Reactor is in an extended outage state due to the problem.



The expected 2016 collective dose based on the half year's data is comparable to the previous year's values.

### ***BUTE Training Reactor***



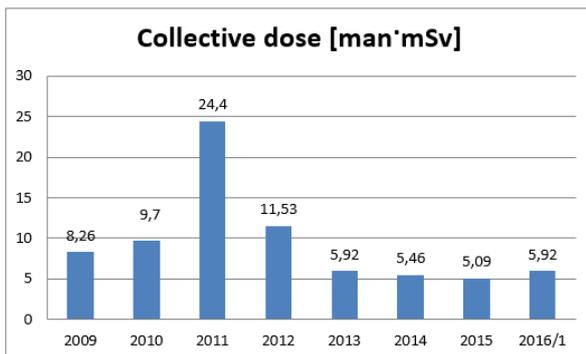
The Training Reactor and its building undergoes major reconstructions this year, the reactor is in an extended outage state since February 2016.

No reportable event occurred in the first half of this year.

No safety system failure occurred in this period.



### ***Interim Spent Fuel Storage Facility***



Due to the higher number of maintenance works involving higher doses the collective dose of this half-year is slightly above the previous full year values.

No reportable event occurred in this period in the ISFS facility.

As a summary, it can be stated that during the first half of 2016 the nuclear facilities in Hungary operated in compliance with the limits and conditions specified in the operating and licensing documents.

## Legal and Regulatory Framework

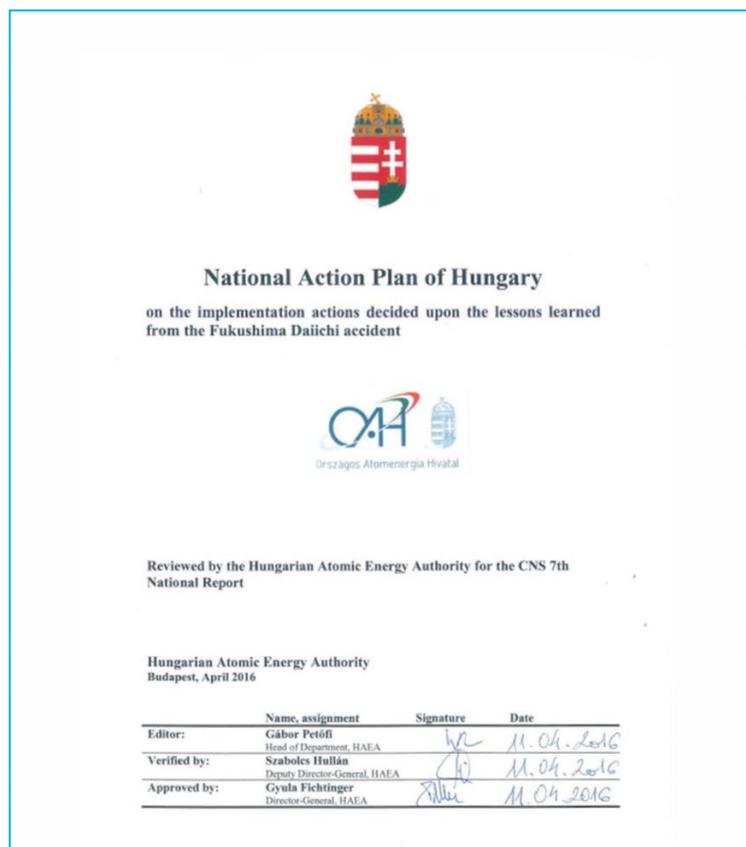
### *National action plan reviewed*

Following the Fukushima accident in 2011, Hungary also performed the stress tests in relation to Paks Nuclear Power Plant to review its resistance against extreme hazards. The improvement actions decided upon the results were compiled to a National Action Plan that was published on the HAEA website. The EU initiated the review of the progress in the actions in 2013 and 2015 and concluded that they show a good development, moreover, good practices were identified among the solutions and offered them to the attention of other member state. In 2016, as part of the national report prepared for the triennial international review conference of the Convention on Nuclear Safety, the Hungarian Atomic Energy Authority reviewed the National Action Plan again with a reference date of 2015 December.

According to the results 28 out of the 51 tasks were completed and closed, while regarding more the completion is still under the HAEA assessment. Beyond the bulk of the remaining tasks, the progress in which is time proportional, there are 4 tasks showing some delay. In the case of these the HAEA requested a risk assessment of the delay from Paks NPP.

The safety margins of Paks Nuclear Power Plant are further strengthened by the incorporation of the experience from the Fukushima accident, while its capabilities of managing extreme situations of very low probability evolves, too.

The reviewed action plan can be downloaded from [here](#).



## **Paks Nuclear Power Plant**

### ***Licensing of safety and control rods' reconstruction at Paks NPP***

#### ***Background***

The instrumentation and controlling (I&C) of the Safety and Control Rod System (SCRS) at the Paks NPP units is becoming old and obsolete. The maintenance was difficult to carry out and some items did not have replacement parts. After having several minor instabilities of the SCRS and some reportable events occurred, the Paks NPP decided to reconstruct the SCRS I&C.

#### ***Tendering***

According to EU prescriptions, a public procurement was initiated. Škoda and its subcontractor ZAT from the Czech Republic won the reconstruction tender. The hardware design phase began in 2014.

#### ***Licensing***

The licensing documentation submitted for approval expanded to approximately 5100 pages with the included drawings. It contained review results of the independent experts regarding operation, I&C, civil engineering and ergonomics. A working group of 9 inspectors was established in the HAEA to provide the assessment of the related I&C, civil engineering and operation supporting documents to reach the final regulatory decision.

The HAEA initiated a consultation with the representatives of the Licensee on the observed minor problems, training, scheduling issues and the conditions to build in into the decision. The reconstruction requires much time therefore it can be implemented only during main overhauls. That means one reconstruction should be completed each year during the next 4 years. In the licensing phase an inspection was conducted in the relevant premises (see Picture 1-2), where the fire barriers and wall penetrations (see Picture 3) were inspected. No deficiency was identified.



*Picture 1: Safety and control rod cabinets (1)*



*Picture 2: Safety and control rod cabinets (2)*



*Picture 3: Fire barrier wall penetration*

### ***HAEA decision***

The HAEA issued the decision and approved the reconstruction. The licence is valid until 30.06.2020. The HAEA made several binding conditions, among others: 1. The Modification Review Report to be submitted before the put in operation shall assess the training of operational and maintenance personnel. 2. Some part of the concurrent Reactor Protection System modifications relevant for SCRS reconstruction must be implemented during the same main overhaul as the licensed modification. 3. The HAEA must be informed on each factory acceptance test (FAT) 30 days in advance. 4. Additional documentation on the gateway (GW) computer of SCRS must be submitted in order to fully justify that the GW is repercussion free.

### ***Present status***

The reconstruction is to start on Unit 2 starting in October, 2016 during the main overhaul, the implementation plans are currently being elaborated.

## **An Event of Interest**

### ***Diesel generator inoperable during testing due to failure of starting air reducer***

On the 5<sup>th</sup> of May, 2016, during a startup test of a unit 2 diesel generator, the starting air pressure was observed to rise slightly above the maximum allowable value. The diesel



*Surface defect on the reducer's closure element*

generator was taken out of service for maintenance thus unit 2 entered a TechSpec limiting condition. The inspection revealed non-compliant operation of the starting air reducer, so a decision was taken to replace it. The diesel test was repeated and it confirmed that the replacement was completed successfully.

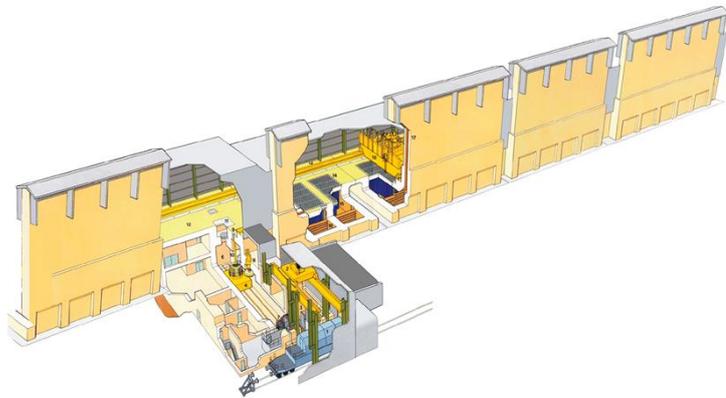
The event was caused by surface defect of the reducer's closure element.

The event was rated on the INES scale as level 0.

## Interim Spent Fuel Storage Facility

### *Modification of construction license of the Interim Spent Fuel Storage Facility*

Installation and commissioning of new vaults of Interim Spent Fuel Storage Facility (ISPS) is going on in a modular way as spent fuel is generated at Paks NPP. The HAEA issued construction license for building a total of 33 vaults. Currently the ISPS operates with 20 vaults, which can provide

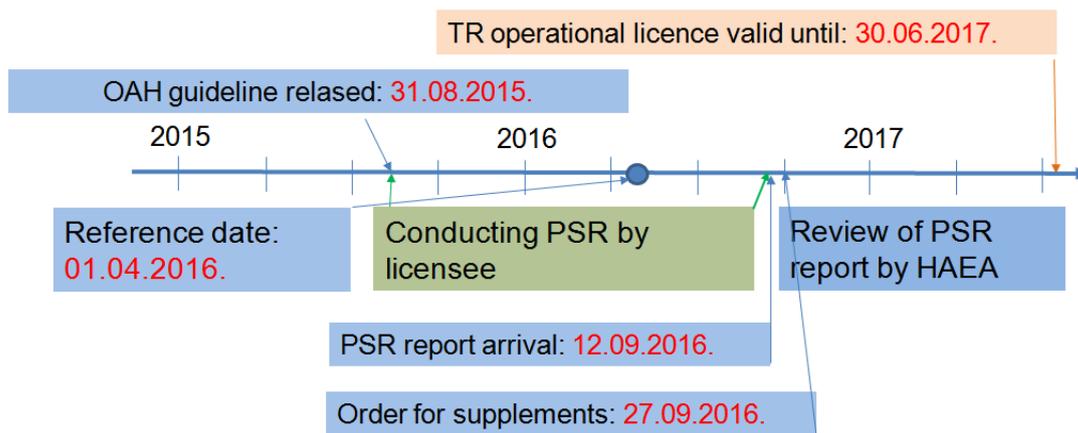


storage capacity for 9308 spent fuel assemblies. The extension continued with the construction of four more vaults. The new 21-24 vaults will be commissioned in 2017. The operator Public Limited Company for Radioactive Waste Management (PURAM) examined the possibility of increasing the existing storage capacity at the same safety level. The improvement of storage efficiency of the future 25-33 vaults are based on a new concept. The spent fuel had rested for more than 20 years have lower residual heat output compared with the spent fuel freshly delivered from the nuclear power plant. This heat difference will enable the licensee to increase the number of storage tubes in the same overall geometry. In the future the long stored fuel assemblies are planned to be relocated from the oldest vaults (1-15) to this increased capacity vaults (25-33) and the fuel assemblies freshly delivered from the NPP will be loaded to the so vacated locations. According to the legislation a procedure to modify the license has to be conducted. The Baranya County Government Office Department of Environmental Protection and Nature on the 7th of December 2015 granted the modified environmental operating license. In February 2016, the PURAM submitted the license application to modify the construction license of ISFS for the 25-33 vaults. The supporting documentation includes the revised and updated version of the Preliminary Safety Analysis Report and an updated version of the Final Safety Analysis Report. The HAEA reviews the licence application with the contribution of the designated relevant co-authorities. On the corresponding public hearing on the 5th of October, 2016 the public interest was very low; without any questions or comments. Considering the consent of the special authorities and the results of the review the issuance of the construction license is anticipated at the end of the year. The expanded storage capacity will be sufficient for the spent fuel generated at Paks NPP considering its service life extension.

## BUTE Training Reactor

### *Periodic Safety Review of the BUTE Training Reactor*

According to the Act CXVI of 1996 on atomic energy, the Licensee and the nuclear safety regulator shall carry out a full scope review and assessment of the nuclear safety of the nuclear installations in regular intervals, covering the status of fulfilment of nuclear safety requirements, the level of risks, taking into account the operational experience and the new knowledge related to nuclear safety. The Periodic Safety Review of the Training Reactor of the Budapest University of Technology and Economics shall be carried out in ten years intervals and so it takes place in 2016. The scope of the review is defined in the Nuclear Safety Code which is conform to the IAEA recommendations. Besides the nuclear safety authority, a number of co-authorities take part in the process, including the territorially competent professional municipal fire departments, the National Directorate General for Disaster Management and the Baranya County Government Office Department of Environmental Protection and Nature.



*Timeline of the PSR*

The current operation licence of the Training Reactor is valid until the 30<sup>th</sup> of June 2017, based on the assessment of the periodic safety review results the HAEA may grant the operation license for an additional 10-year cycle. For supporting the review and assessment procedure the HAEA released the Guideline 1.51 "Guideline to the implementation of Periodic Safety Assessment of the Training Reactor". The guideline specifies the time points, the legal requirements, the standards, the volumes of the report and the quality assurance requirements. The PSR was submitted in September 2016 and the HAEA has nine months for the evaluation. The authority started the evaluation process and for the first step issued the order of supplements for the missing information. According to the HAEA work plan for the authority review process 20 inspectors in 7 working group will take part in the proceedings.

## Radioactive Waste Repositories

### *The new regulation of the radioactive waste repositories in the mirror of the WENRA's safety reference levels of radioactive waste disposal*

#### **Elaboration of the new legislation**

After the amendment to the Act on Atomic Energy in 2013, the HAEA was designated to take over the task of regulatory oversight of the radioactive waste repositories from the Medical Officer Services. In 2013, initiated and led by the HAEA, the elaboration of a new executive order on the radioactive repositories started where special focus was given to take into account all the WENRA safety reference levels and other relevant international standards and to elaborate a more detailed system of requirements and regulatory processes than earlier in a similar manner as those are in the Nuclear Safety Codes for nuclear facilities.

The new decree came into force in the middle of 2014 on the safety requirements of interim storage and final disposal facilities of radioactive waste and the related regulatory activities-

Two annexes of the Decree provide detailed regulation on

1. Management systems and
2. Design, construction, operation, closure, institutional control of repositories.

Till now six regulatory guides have also been issued

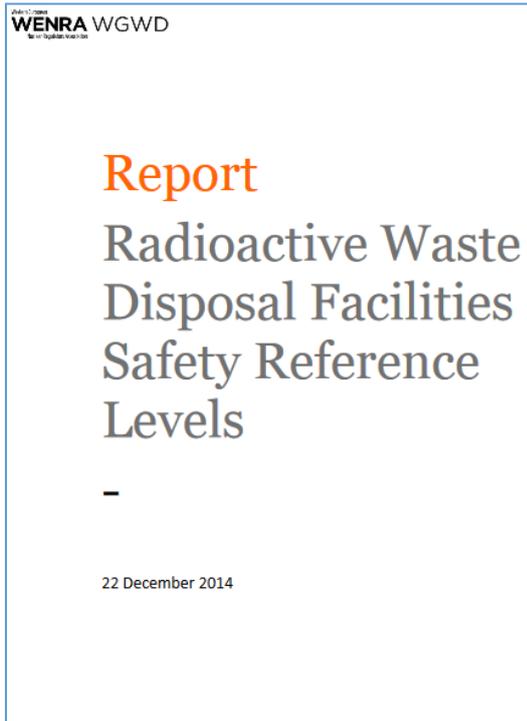
1. Regulatory inspection of the repositories;
2. Regular reports of the repositories;
3. Event reports of the repositories;
4. Measurements of the safety culture and the utilization of the result;
5. Periodic safety review of the Radioactive Waste Treatment and Disposal Facility;
6. Management systems of the repositories.

#### **WENRA Working Group on Waste and Decommissioning**

The WENRA Working Group on Waste and Decommissioning (WGWD), in order to develop a harmonized approach to selected nuclear safety and radiation protection issues and their regulation, has developed common safety reference levels (SRLs) in the fields of radioactive waste and spent fuel management facilities in order to benchmark the national practices.

108 SRLs with altogether 180 requirements were developed in the following topics:

- safety management;
- disposal facility development;
- waste acceptance;
- safety verification.



Similarly as in every WENRA member state, a self-assessment was carried out by the HAEA to check how these reference levels are included in the national regulatory requirements. In the second step of this benchmarking the self-assessment were reviewed by other designated countries. While the waste storage SRLs have not been assessed yet, because the relevant decree came into force later than these activities had been carried out in the WENRA, regarding the disposal SRLs Hungary was one of the first countries who presented its own self-assessment.

The preliminary result of the benchmarking was very good for Hungary, because only 3 SRLs were

marked where difference existed (C) and should be addressed for harmonization, but in the other 98 cases the SRLs are covered explicitly by national regulatory system (A). (There were further 7 cases where the Hungarian legislation was relevant, and only the English translation of it was incomplete (A?).)

The total result of the benchmarking exercise of the Hungarian self-assessment concerning the disposal SRLs summarized in the following table:

Classification	A	A?	B	C
Number of the SRLs	98	7	0	3

The established set of SRLs for the processing of radioactive waste and spent fuel is to be benchmarked from the next year on WENRA WGWD meetings.

### ***Present activities in the HAEA***

The HAEA has started to elaborate an amendment of the Decree with the following aims:

- to add two additional annexes
  - about the design requirements for repositories
  - about the specific requirements for site survey and assessment of repositories
- to take into account the initial experiences with the use of the regulations and the missing WENRA SRLs (marked C)
- to integrate the requirements of very low level radioactive wastes (VLLW).

## Emergency Preparedness and Response

### *International review of nuclear emergency preparedness in Hungary*



In 2014 the Disaster Management Interministerial Coordination Committee decided to request the International Atomic Energy Agency to conduct an Emergency Preparedness Review Service (EPREV) mission in Hungary. EPREV missions are one of the reviews offered by the IAEA to strengthen nuclear safety in Member States. EPREV missions focus on the level of preparedness for nuclear or radiological or emergencies in Member States.

The tasks associated with the two-week mission were coordinated by the Hungarian Atomic Energy Authority in close cooperation with the National Directorate General for Disaster Management, Ministry of the Interior (NDG DM). The initiation phase and preparation for the EPREV Mission were carried out according the corresponding guidelines of IAEA.

As part of the preparatory phase of the Mission a pre mission meeting was held in June 2015 and the national self-assessment process was carried out after that, based on the IAEA safety requirements for Preparedness and Response for a Nuclear or Radiological Emergency. As a result all Hungarian legislative and technical documents relevant for nuclear or radiological emergency preparedness and response were uploaded to IAEA EPRIMS database to be available for the EPREV team members. Since the General Safety Requirements No. GSR Part 7 of the IAEA superseded the safety requirements No. GS-R-2 in November 2015, Hungary became the first country where the emergency preparedness

was reviewed by the new IAEA safety requirements. and the review therefore implied additional challenges to the organizations and experts involved into the review process.

The team consisting of IAEA Secretariat and nine international experts concluded the 12-day mission. Chris Dijkens, Director, International Enforcement Cooperation at the Ministry of Infrastructure and the Environment of the Netherlands, led the review team, which included experts from Canada, France, Lithuania, the Netherlands, Portugal and the IAEA.

The official opening meeting was held at the NDG DM in Budapest on June 13, 2016. During the two-week EPREV mission the experts reviewed the respective Hungarian legislation, visited all the nuclear facilities and radioactive waste repositories as well as some institutions using radioactive sources in the country.



Based on the self-assessment report and other background documents that were made available for the team, interviews were carried out with representatives of organisations who play a key role in the emergency preparedness and response system. All results were then compared with the current international safety standards on emergency preparedness and response and further analysed by the team.

At the end of the mission, the experts prepared a report on the results of the review, in which in addition to recommendations and suggestions aiming at improving the national system, good practices were also identified to disseminate the Hungarian knowledge and experience on the international level.

"Hungary is generally well-prepared for any nuclear or radiological emergency. We commend the support and dedication of the authorities to nuclear and radiological emergency preparedness and response," said Dijkens. "The self-assessment completed by Hungary in preparation for the review was thorough and objective, and our team was met with openness and transparency by all organizations involved."

The EPREV team identified several strengths during the mission, including:

- Hungarian authorities are proactive in aligning their EPR programme with newly published IAEA Safety Requirements on Preparedness and Response for a Nuclear or Radiological Emergency;
- A national High-Level Working Group in the Disaster Management Inter-Ministerial Coordination Committee has been established to ensure EPR arrangements are up-to-date;
- The country actively participates in international emergency exercises and uses available peer reviews to strengthen its EPR programme.

The review team also highlighted areas where further progress is needed, including:

- Continuation of work towards harmonizing existing EPR arrangements with the latest IAEA safety requirements;
- More training of medical staff on diagnosing clinical symptoms of radiation exposure;
- Succession planning to help ensure sustainable availability of qualified EPR staff;
- Translation of more public information materials into other languages as required;
- Improving arrangements to protect workers that may be involved in emergency situations.

The Government of Hungary is expected to adopt an action plan to implement the mission's recommendations and suggestions.

The Hungarian Atomic Energy Authority and the National Directorate General for Disaster Management, Ministry of the Interior (NDG DM) were assigned to prepare the action plan and to coordinate its execution. The draft of the action plan has been prepared and by the beginning of December 2016, the action plan will be submitted to the Disaster Management Interministerial Coordination Committee for approval. The deadline for the execution of the action plan is planned by the end of 2017.

