



Hungarian Atomic Energy Authority

HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Bulletin

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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY

June 2020

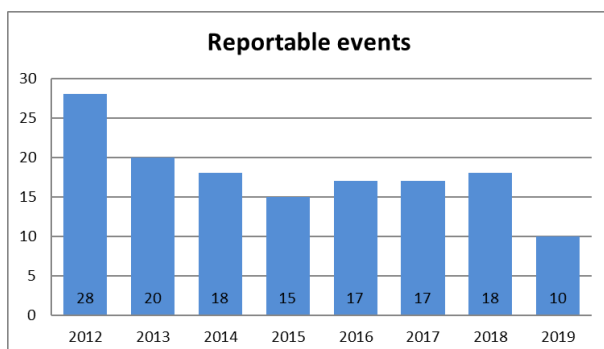
General

Annual safety performance assessment

The HAEA regularly evaluates the safety performance of operators of nuclear facilities. The main sources of data for the assessment are regular reports and event reports of the licensees, the protocols of regulatory inspections including regular and comprehensive inspections focusing on specific areas, and reactive inspections.

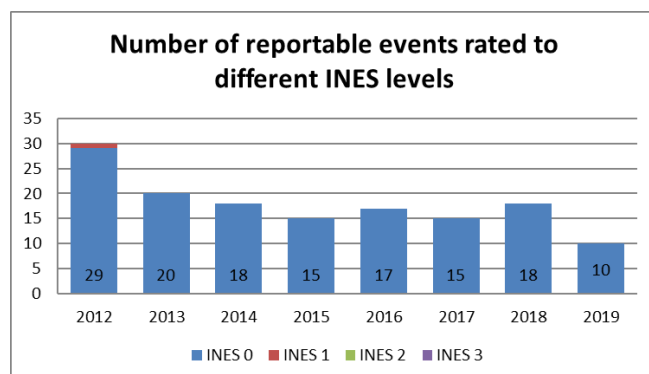
A brief extract of the annual safety performance assessment of 2019 is provided below. The safety performance data was taken from the quarterly reports of Paks NPP and the semi-annual reports of the other licensees.

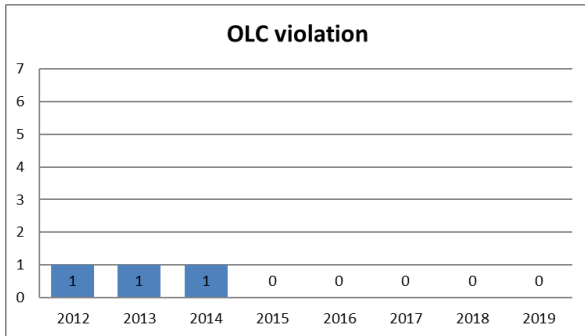
Paks Nuclear Power Plant



Ten reportable events occurred in 2019, less than in the previous year.

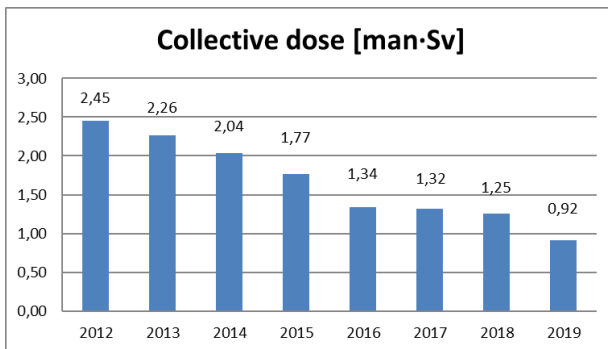
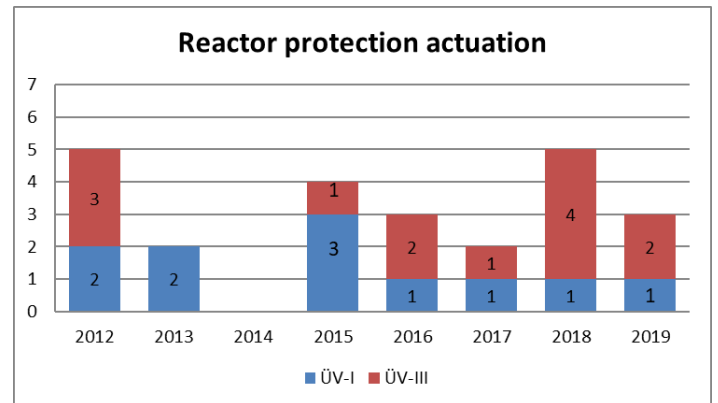
Ten events have been reported by the NPP altogether, all of them were „below scale” corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES).





There hasn't been any events, which caused violation of technical specification, since 2014. On 24 October 2018, the NPP modified this document approved by the HAEA and started to use the Operational Limits and Conditions (OLC). There hasn't been any events, which caused violation of OLC, since then.

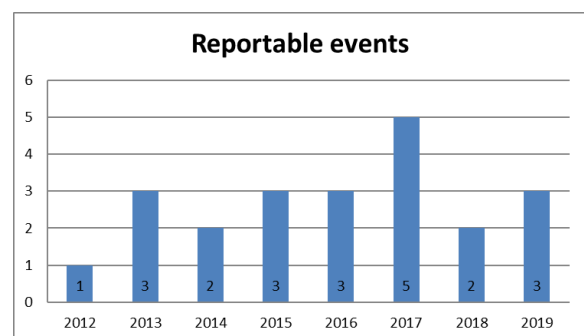
Three automatic reactor protection actuation occurred in 2019. A SCRAM-I actuation was caused by a switching test, and two SCRAM-III actuations in two separate events were caused by the low level of steam generators of Unit 1.



The collective radiation dose of employees has been declining since 2011.

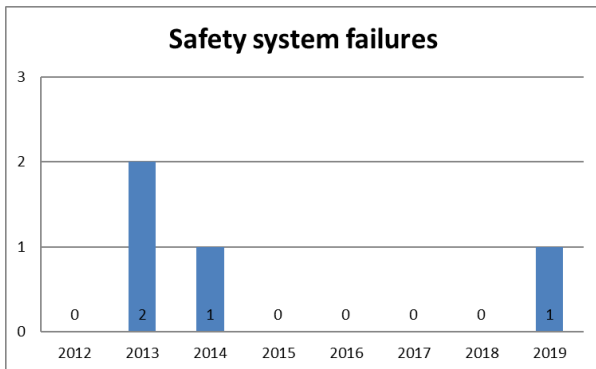
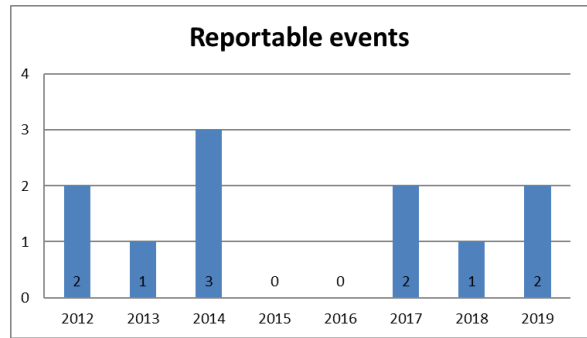
Budapest Research Reactor

Three reportable events occurred in 2019. The three events were consisted of an erroneous operator action, a low secondary circuit pressure and a failure of one of the reserve diesel generators.



Budapest University of Technology and Economics Training Reactor

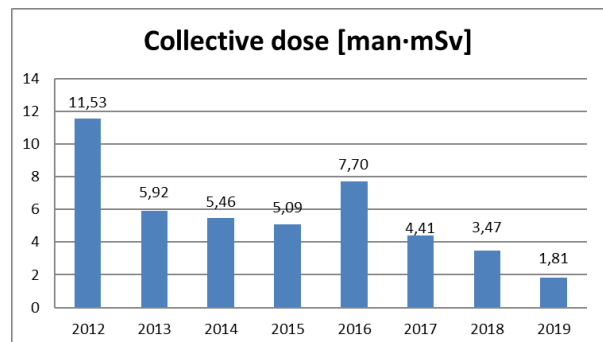
Two reportable events occurred in 2019. The first one was a malfunction of a logical unit and the other one was a dropping of one irradiator vessel during a pull-out.



One safety system failure occurred in 2019.

Interim Spent Fuel Storage Facility

The collective dose of employees in 2019 is comparable to the previous year's values, and it shows a downward trend. The reason for period's low value is the low volume of storage and maintenance works.



There was one reportable event, due to a malpractice in radiation protection.

Based on the comprehensive safety performance assessment it can be stated that during the first half of 2019 the nuclear safety of facilities inspected by the HAEA were at appropriate level, as in previous years. The facilities operated safely, did not endanger neither the environment, nor the population, nor the employees.

Legal changes of the second half of 2019

The Act on Atomic Energy year 1996. CXVI. was amended again by Act XXXIX of 2019 in the second half of 2019. The purpose of this amendment was to comply with the Act CL of 2016 on the General Administrative Procedures (CGAP) and to establish procedural issues not covered by CGAP where it is allowed by this Act. The provisions of the Act on Atomic Energy were supplemented with those relating to the designation of the administrative deadline of safety area of nuclear facilities.

The purpose of the amendment of the Governmental Decree 246/2011 on safety area of nuclear facilities and radioactive waste repositories was to make the real estate belonging to the safety area of nuclear facilities transferable to the licensee of another nuclear facility or radioactive waste repository, so that the objectives of the designation of the safety area can be fulfilled under the responsibility of the licensee.

An essential element of the duty of cooperation imposed on the owner and the licensee by the legislative amendment is the obligation to inform the licensee of all human activities carried out on his property. An assessment and, if necessary, analysis of activities affecting the safety of the licensee shall be carried out. The licensee shall have the right and obligation to provide information in the security area on the owner's property as to whether the activity carried out there is consistent with the information and assessments received and with the analysis. In case of divergence, the owner and the authority(ies) must be informed immediately. The authority shall have the right and control over the conditions and activities in the safety area and shall have the power to take actions in respect of the safety area.

Tasks of the HAEA regarding the safety zone for nuclear installations and radioactive waste storage facilities

Governmental Decree 246/2011 on safety area of nuclear facilities and radioactive waste repositories contains tasks for the HAEA. The most important task of these is to define requirements for when and how licensees need to be informed about activities in their safety zone and to assess their impact on safety, and, in what cases and in what manner the owners of the foreign property are required to inform the licensee of the activities on their property. These requirements are currently being defined in cooperation of co-authorities and licensees.

Another task is to carry out a review of the safety zone of the Paks NPP. The HAEA ex officio initiated administrative procedure to review the safety zone. In the framework of the

administrative procedure the NPP submitted a report and concluded that there was no need to change the safety zone. The HAEA and the Baranya County Government Department are investigated this report. Based on the results of this investigation, the HAEA designated a safety zone.

Emergency Preparedness: Regional Meeting for Better Coordination (2019)

The need for harmonisation of public protective actions near national borders in case of nuclear or radiological accident incurred several times in the past.

The Heads of the European Radiological Protection Competent Authorities (HERCA) and the Western European Nuclear Regulators Association (WENRA) prepared a document ('HERCA-WENRA Approach') which is an incentive approach that comprises the necessary mechanisms for countries to exchange adequate information and to achieve practical and operational solutions on a voluntary basis during an emergency, leading to a uniform way of dealing with any serious radiological emergency situation, regardless of national borders, hence allowing for coherent and coordinated protective actions.

In July 2019 the HAEA hosted a regional meeting with expert level participants from neighbouring countries as well as Germany and the Czech Republic to share information about their national nuclear emergency preparedness and response plan and public information practices.

The meeting in Budapest gave place to a number of presentations and discussions about the international requirements, the country specific national arrangements and the aspects and possible methods of cross-border coordination (including case studies, experiences in other, non-nuclear areas).

Participants welcomed the HAEA's initiative and proposed that this topic be discussed regularly in the future in order to develop closer cooperation.

Blackout and scram at Paks NPP Unit 4 – an event of interest

On the morning of October 31, 2019, during the execution of the electrical switching test performed at Unit 4, a differentiated protection operation occurred at a transformer due to an incorrect setting. The protection operation went well, however, due to a faulty operator intervention, a power failure occurred and then a Load Sequencing Program was started, which, however, the staff no longer detected. The electrical foreman sought to restore the voltage of

the relevant bus, however, prior to switching, did not take into account that the differential protection operation had changed the wiring pattern.

As a result of the operations, the power supply transformer failed for overcurrent protection, a Station Blackout (SBO) and an Operating Protection Signal (SCRAM) were generated on the block. The required programs started without any problem. The protection operations were in order and the crew performed properly during the malfunction and the stabilization of the block.

The Authority evaluated the investigation report and requested information on the outcome of the identified corrective actions. The licensee handed the requested information in and the authority found the corrective actions appropriate.

Paks Nuclear Power Plant

The status of the Periodic Safety Reviews' tasks

At Paks Nuclear Power Plant, the 10-yearly Periodic Safety Review (PSR) took place in 2017. The report was reviewed by the authority and in January 2019 a decision containing 73 regulations was issued. Two-third of the tasks have administrative nature, mainly due to changes in internal regulations, procedures and changes in legislation. The use of new scientific results in the field of probabilistic safety analysis will require many modifications and new assessments. Most of the technical modifications stems from the field of I&C, and component aging, obsolescence. In the field of architecture, the modifications originated from the aging management of the water intake plant and its associated structures provide the basis for several tasks, while in the field of physical protection, the task is to modify and modernize the four entrance gate of the power plant. The 73 regulations divided the tasks over the next 10 years, but the start of major, time-consuming measures of a larger volume is scheduled to the first half of the 10-year period.

Based on the status to date, the HAEA has accepted 27 tasks by March 2020, and the completion of 7 other tasks are currently under review. The completed tasks were mainly administrative measures. Additionally, it is important to note that 4 of the rescheduled National Action Plan tasks have already had a modification license, and the remaining one is ongoing process.

Issuance of the operating licence of the introduction of 15-month refuelling cycle at Paks NPP

On 25 July 2018, the Paks NPP submitted its Modification Assessment Report (MAR) of the introduction of 15-month refuelling cycle (so called C15) with the licence application to the HAEA

for the modification of the operating licence of the introduction of C15. The reason for submitting the application is that the introduction of C15 on the blocks of the NPP was submitted on 1 December 2005. The HAEA provided that, at the same time as the conversion assessment report (MAR) was submitted, it was necessary to initiate a change of the operating licence per block. The documentation the licensee submitted to support the licence application presents the general details of the C15, the preparation of the operation, its introduction, and demonstrates the safety of the operation of the units, taking into account practical experience as well. The MAR examined and evaluated seven campaigns and main outages. The HAEA also requested the submission of further documents during the procedure in order to clarify all facts, and obtained the competent environmental authority's position statement.

A public hearing was announced on several forums and then was held at the Municipality of Paks on 28 March 2019, in order to inform the public of the important details of the case, and where they had the opportunity to express their opinion and ask questions from the representatives of the licensee and the authorities involved. There were no questions and no one expressed any opinion during the event.

Based on the review of the MAR and of the documents submitted in the course of completing the deficiencies, and on the basis of the on-site inspections carried out by the authority, the HAEA found that there were no changes or deviations that would question the safe operation of the units, and the goals for the introduction of the extended time cycle are met. The authority involved in the procedure consented to the issuance of the permit. Based on the above, the HAEA evaluated the licence application and modified the operation license of the four units.

The final review of the National Action Plan at the end of 2019

The Paks NPP dealt with the status and scheduling of the remaining tasks in the frame of the Periodic Safety Review (PSR). Taking into account the calculated additional risk during the annual regulatory inspection, the HAEA decided on new deadlines, which are included as a separate condition in the PSR decision. The HAEA reviewed the Action Plan again in 2019. The purpose was to describe the status of the actions in December 2019. Therefore Annex V of the plan describing the status of the actions was updated. As a summary, out of the 51 tasks, 46 have been implemented and 5 have been rescheduled due to delay in the implementation. The new deadlines were determined by the PSR closure decision of HAEA. Tasks 1.28 and 1.29 were merged in the PSR decision.

The HAEA pays extended attention concerning the 5 tasks in delay. The HAEA rescheduled these tasks in its decree on Periodic Safety Assessment. In most cases the time demands and

rules of public procurement procedures, the changing legislation and modification of the technical specifications have primarily a major role in the delay.

The National Action Plan can be downloaded [HERE](#).

International verification of discharge and environmental monitoring activities at Paks NPP

Verification of the discharge and environmental monitoring activities of MVM Paks NPP Ltd. was carried out between 2-5 April 2019 in Hungary by experts of Nuclear Energy Directorate of Directorate-General for Energy of the European Commission.

During their visit, the surveillance activities of the competent authorities for environmental protection, food chain safety, public health and for nuclear energy supervision were also examined.

The verification was carried out on the base of the Euratom Treaty Article 35, accordingly to which the Committee have right of access to control facilities necessary for the permanent control of the level of radioactivity in the atmosphere, water and soil and for controlling compliance with the basic standards, and it may examine their operation and efficiency. The European Commission takes similar verifications in 3 to 4 member states per year.

The draft report on the results of the verification was sent to the HAEA in March 2020. The review of the draft report by the Hungarian organizations involved into the verification programme is required by the end of March 2020.

Paks II project

Regulatory licensing and supervision activity of the HAEA related to the new unit construction project

In 2019, the HAEA performed twelve occasional and a comprehensive inspections at the Paks II Nuclear Power Plant Ltd. in order to check – among others – the engineering survey activities, oversight of construction erection base structures, the suppliers' qualification procedures and the licensee's human resource development efforts.

Also in 2019, the Paks II NPP Ltd. performed 22 supplier qualification audits, which included 7 on-site audits. The HAEA participated in six on-site audits (5 in Russia, 1 in Hungary) as an observer. Furthermore, Paks II NPP Ltd. performed 7 on-site supplier supervisory audits, where the HAEA also participated on six of them as an observer.

In the past year, the HAEA issued a further construction permit for so-called construction erection base structure (in this case, a canteen). The construction of the above-mentioned and two office buildings have commenced in 2019.



Progress of the buildings of the construction erection base

Physical Protection

National training about the Force on Force exercises in Hungary

The International Atomic Energy Agency in cooperation with the US Department of Energy, the MVM Paks Nuclear Power Plant Ltd. and the HAEA organised a national workshop in Paks, Hungary, between 8-11th October, about the organisation and execution of the performance-based nuclear security exercises, called Force on Force (simulating engagements).



Participants of the exercise

Experts were delegated to the event by the HAEA, the National Police Headquarters, the Counter Terrorism Centre and by the Hungarian nuclear facilities.

The IAEA's instructors presented the rules and techniques on how to plan, execute and evaluate a Force on Force exercise. They also informed the participants about methods and relevant technological solutions to simulate and evaluate combat between the member of the response forces and the adversaries. After that, the participants got acquainted to the primer technological and operational solutions and equipment.

The training included practical elements, smaller groups had to work out an exercise scenario involving an adversary attack against a hypothetical nuclear power plant and then prepare a controller event log for that specific scenario. At the end of the sessions, the groups presented the solutions they had developed and then analysed that with the instructors.

On the closing day, participants evaluated the workshop: they agreed that they could use the presented methods in future exercises, even for non-Force on Force ones. The HAEA's goal is to execute the first performance-based nuclear security exercise at the Paks Nuclear Power Plant in the coming years, so the Force on Force training can be a great opportunity in the professional implementation of the execution.

Budapest Research Reactor

Main regulatory oversight activities at the Budapest Research Reactor in the second half of 2019

Comprehensive inspection

According to the regulatory oversight strategy of the HAEA, concerning the research reactor between two Periodic Safety Review, the sub-areas of each of the designated major safety areas (safety management, quality assurance, technical condition, operation, safety analyses) should be reviewed by means of comprehensive inspections at least every three years. At the Budapest Research Reactor (BRR), the three-day inspection took place in December 2019. The inspection was carried out by 14 nuclear safety inspector in eight working groups. The inspection method was preliminary notified on-scene inspection containing document reviews and interviews.

It can be stated that the on-site phase of the comprehensive inspection did not reveal any nuclear safety problem which would have required immediate regulatory action. The regulatory evaluation report of the inspection have been drawn, the most serious shortcoming of the facility is due to a reason beyond the Centre for Energy Research, the licensee's remit: there is no strategic decision on the future of the research reactor. The operation licence of BRR is valid until 2023. Until the final decision, parallel preparation for the possible next life cycle states is required to maintain the level of nuclear safety. The inspection revealed resource problems and further differences in the management system. As regards the condition of the facility is in a suitable condition in for its age, but the preservation or maintenance of the condition will require measures in the near future. According to the evaluation report of the HAEA an action plan will have been developed by 31 May 2020. By the licensee, specifying the remedial measures necessary to address the discrepancies identified and assessing by the authority.

Preparation for the fresh fuel shipment to the Budapest Research Reactor

In 2020 BRR is going to supply fresh fuels to replenish inventories depleted due to operation. In cooperation with licensee, the HAEA also have been started the preparation to his tasks in the regulatory oversight of the process. The last fuel deliveries were in 2009 and in 2013. The VVR M2 LEU fuel assemblies were imported from Russia, made at TVEL Company's Novosibirsk plant. The first meeting between OAH and BRR on the current shipment took place at a regular senior management meeting in the autumn. The HAEA determined the detailed task plan and milestones. One special inspection was carried out to assess the licensee's preparation process by the regulatory body. The HAEA also inspected the licensee's site inspection at the TVEL Novosibirsk plant.

The licensee submitted an application to the HAEA on 20 November 2019 to obtain endorsement for the transport container package design. The official decision was issued on 27 February 2020.

International Cooperation

TPR National Action Plan

Hungary has developed the National Action Plan of the 1st Topical Peer review on 'Ageing management of nuclear power plants and research reactors' to fulfil of the measures. In accordance with the Nuclear Safety Directive of the European Union, a Topical Peer Review (TPR) should be carried out every six years in every Member State operating nuclear installations. The first TPR, started in 2017, covered the ageing management of operating nuclear power plants and nuclear research reactors with a power equal to 1 MWth or more. The European Nuclear Safety Regulators Group (ENSREG) TPR report was published in autumn 2018 and it summarizes the results of the international peer review of the national reports drawn up based on a guide of the Western European Nuclear Regulators Association (WENRA). According to the report, the continuous development and evaluation of aging management programs and tools based on international experience is important. In addition to reviewing the implementation of general aging management programs, the practical implementation of aging management has also been studied in four areas. In all topics, areas have been found where European countries face common challenges and for certain countries have been identified, where specific areas need to be improved.

In the fall. 2019 ENSREG approved its own Action Plan, which will assist in assuring that the conclusions from the TPR are taken into account in improving nuclear safety across European nuclear facilities. It will also assist, through further peer reviews, in ensuring that the recommendations and suggestions from the TPR are addressed by national regulators and ENSREG in a consistent manner. The action plan contains actions for the EU level challenges and also identifies the importance of the improvement on the next TPR process based on the lessons learned from the first TPR.

The Hungarian National Action Plan was submitted in 30 September 2019 by the ENSREG. The National Action Plan set out actions of improvement in connection with four areas of the country. According to the first action, the HAEA will have reviewed the domestic nuclear safety regulations by 15 December 2021 to ensure that during long construction periods or extended shutdown of NPPs, relevant ageing mechanisms are identified and appropriate measures are implemented to control any incipient ageing or other effects. To fulfil the second action, the HAEA will give more recommendation and explanation to an appropriate and sufficient number

of samples for the new building of the NPP by 15 December 2020. The Paks NPP is reviewing its aging management program of inaccessible cables in the relation of used degradation detecting techniques. Also the existing, component specific ageing management programs for concealed pipework penetrations through concrete structures will be reviewed and upgrade will be conducted.

Hungary should implement the National Action Plan by 2022, and send a report on its implementation to ENSREG.

More than 300 students participated in the „About atomic energy to everyone” Conference in Szeged

The HAEA, in cooperation with the TIT Studio Association and supported by the University of Szeged, hosted an event on "Atomic Energy for Everyone" on 21 November 2019 in Szeged, attended by more than three hundred students.



International Cooperation

On 28-29 October 2019, the HAEA hosted the annual Hungarian-Austrian bilateral meeting, which was attended by several experts. During the meeting, both parties informed each other about the main changes, results and developments of the past year and the challenges ahead. The main topics of the meeting were the changes in the legal framework, the recent developments at Paks NPP, the status of the Paks II project, emergency preparedness, radiation protection, radioactive waste management, the results of the EU topical peer review in Hungary about the ageing management of nuclear facilities, and the IRRS Missions in both countries.

On 20-21 January the delegation of the Finnish Radiation and Nuclear Safety Authority (STUK) visited the HAEA. Hungarian and Finnish experts have met for the eighth time to share their licensing and supervisory experiences.

The delegation of the Bulgarian Nuclear Regulatory Agency (BNRA), led by the President, Dr. Latchesar Kostov, paid a visit to Hungary from 27-29 January 2020. At the beginning of March, the delegation of the Turkish Nuclear Regulatory Authority (NDK), led by the President, Mr. Dr. Zafer Demircan, also visited HAEA.

Consultation in the HAEA about the IAEA Technical Cooperation Programme, IAEA Board of Governors Meeting in Vienna

On 4 February 2020 Carmina Jimenez, expert of the International Atomic Energy Agency (IAEA), came to Hungary for a one-day visit to discuss national and regional projects supported by the IAEA Technical Cooperation Programme. An important topic of the discussion was the priorities and budget options of the Hungarian national project starting in the 2020-2021 cycle. Participants also talked about the most effective application of the criteria set by the IAEA and the requirements to be met in the next project cycle, 2022-2023.



The regular meeting of the Board of Governors of the International Atomic Energy Agency – with the participation of Hungary as member of the Board since last September – was held in Vienna from 9 to 13 March 2020. Highlights of the meeting included the Nuclear Safety Review, the Nuclear Technology Review of 2020, and Iran among other topics. Hungary made statements on nuclear safety and nuclear technology as well as on nuclear verification in Iran. We mentioned our strong commitment to nuclear safety and that the Hungarian legal and regulatory framework is regularly updated in line with developments in the IAEA safety standards. Our delegation emphasized the importance of peer review missions, the ageing management of nuclear power plants and research reactors, human resources development, nuclear knowledge

management and capacity building in nuclear safety in order to ensure the sustainability of nuclear programmes.

Preparatory works of the JC, CNS and Euratom reports

The Seventh Review Meeting of the Contracting Parties to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention) is being held at the Headquarter of IAEA in Vienna, Austria from 24 May 2021. The Contracting Parties of the Joint Convention hold a review meeting every three years to report about their national radioactive waste management practices and about changes since the last meeting. Before the review meeting, member states prepare a national report submitted to the Joint Convention Secretariat of the IAEA. After submission of national reports, contracting parties can ask questions and make written comments, while latest developments in the field of radioactive waste management are presented during the review meeting. In the framework of the seventh review process, national reports must have been submitted by 27 October 2020. The preparation of the report is going to be coordinated by the HAEA. Several external partners provide data for the finalisation of the report. An Extraordinary Meeting was convened to be held in May 2020 to discuss possible ways to improve procedural mechanisms of the Joint Convention, which would have been immediately followed by the Organizational Meeting of the Contracting Parties in preparation for the Seventh Review Meeting. Due to the evolving COVID-19 situation, both events have been postponed to a later date still to be determined.

Every three years, Contracting Parties to the Convention on Nuclear Safety (CNS) hold a review meeting during which their representatives report of their national nuclear safety practices and the changes occurred since the last meeting. Due to the COVID-19 situation, the 8th Review Meeting, planned to be held between 23 March and 3 April 2020, was postponed by consensus between Contracting Parties of the CNS. However, Contracting Parties, including Hungary, submitted their national reports to the CNS Secretariat prior to the Review Meeting. Based on the reports, questions were also submitted as well as answers during the review process. Hungary answered all the 118 questions addressed to us and made our answers available to the other Contracting Parties. As part of our preparations for the review meeting, the Hungarian presentation has already been compiled, and will be updated as necessary before the new date.

Council Directive 2014/87/EURATOM on amending Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations requires member states to submit a national report for the first time by July 2014, and then by July 2020 to the European Commission on the implementation of the Directive. The 2nd national report will focus on the implementation of the articles of the Directive with an emphasis on the significant developments that have occurred over the past 6 years, such as the completion of the Paks NPP's lifetime

extension programme, the introduction of the 15 month fuel cycle, the findings and results of the European Commission's Topical Peer Review as well as the major national legislative changes. The Directive was amended in 2014, which placed a larger focus on regulatory independence and public communication, which were not touched upon in the first report.

The employer enjoys greater freedom in defining certain conditions, of which to be highlighted the possibility of introducing flexible working hours is also emphasized, and it also has a greater role in determining the terms and conditions of employment.

Spent Fuel Interim Storage Facility

Regulatory procedure regarding the modification of the operating licence of the SFISF for the storage of new types of spent fuel assemblies

On 8 November 2019 the Public Limited Company for Radioactive Waste Management (PURAM), as the licensee of the Spent Fuel Interim Storage Facility (SFISF) – the facility designated for the storage of the Paks Nuclear Power Plant's spent fuel – submitted its application to the HAEA regarding the modification of the operating licence of the facility, upon which a regulatory procedure started. PURAM presented two reasons for submitting the application. To improve its fuel management, Paks NPP is planning to introduce two new types of spent fuel assemblies with optimized water-uranium ratio. Following the utilization of these new assemblies at the NPP their interim storage would take place at the SFISF, which requires the modification of the SFISF's operating licence. Regarding one of the spent fuel assembly types that can currently be stored at the SFISF the modification of certain operational limits and conditions – which are supporting the operating licence currently in effect – are necessary.

As appendices to the application PURAM submitted the followings: the supporting document, the modified chapters of the Final Safety Report and the Emergency Response Plan, the modified Operating Limits and Conditions and other documents. With this documentation the licensee intends to verify that the new types of fuel assemblies can be safely stored in the SFISF and that it is safe to implement the said modifications of the operational limits and conditions. The submitted documents are currently being reviewed and evaluated by the HAEA.

As part of the regulatory procedure, a public hearing will be held at an appropriate time, where the public will be informed of the important details of the case, where they can express their opinions, and where the representatives of the licensee and the authorities involved will answer any questions arising.