



HUNGARIAN ATOMIC ENERGY AUTHORITY Nuclear Safety Bulletin – for internal use

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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY October 2020

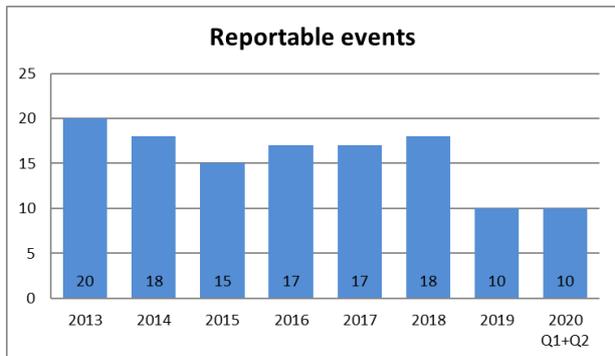
General

2020 semi-annual safety performance assessment of nuclear facilities

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.

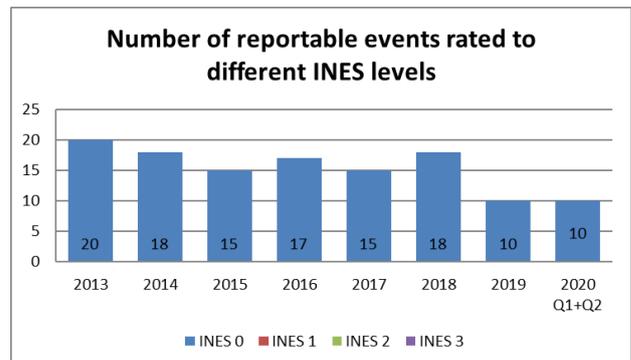
A brief extract is provided below from the semi-annual safety performance assessment. The safety performance data is taken from the first and second quarterly reports of Paks NPP and the first semi-annual reports of the other licensees.

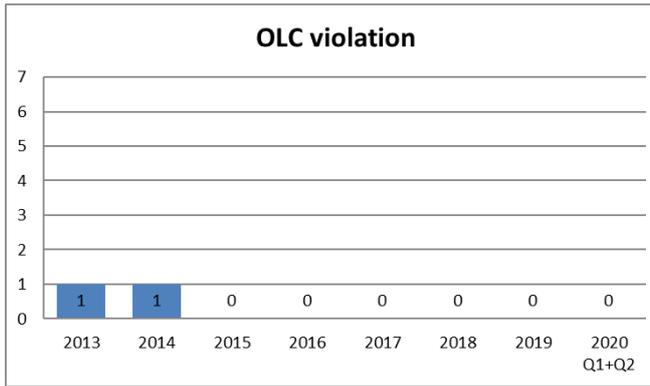
Paks Nuclear Power Plant



Ten reportable events occurred in the first half of 2020.

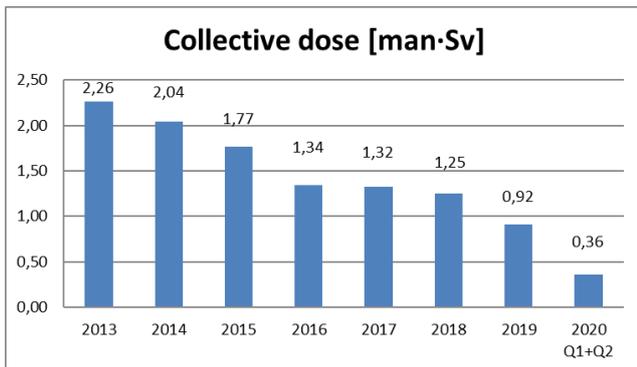
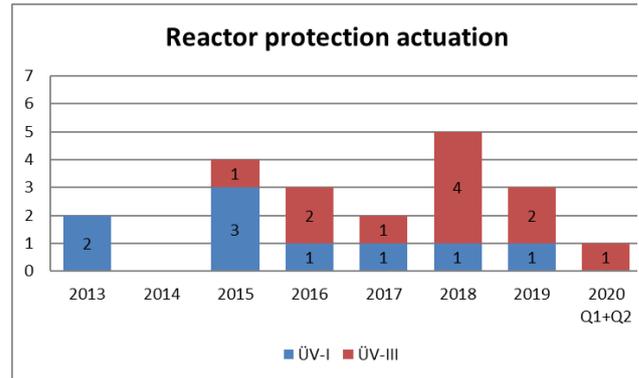
Ten events have been reported by the NPP altogether, all of them were of category „below scale” corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES).





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

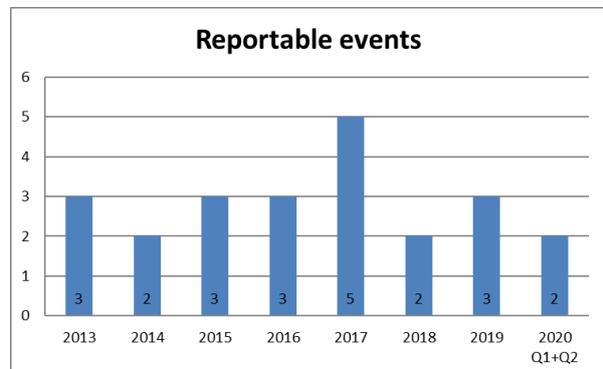
One automatic reactor protection actuation occurred in the first half of 2020. This SCRAM-III was caused by an excitation failure.



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

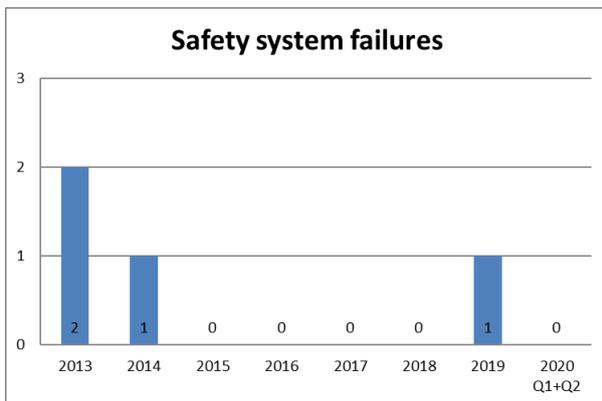
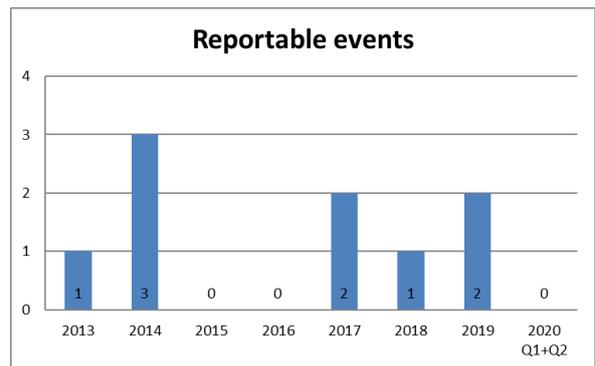
Budapest Research Reactor

Two reportable events occurred in the first half of 2020. One event was caused by a shut down due to a voltage drop, and the other one because of a shut down due to unavailability of two compressors.



Budapest University of Technology and Economics Training Reactor

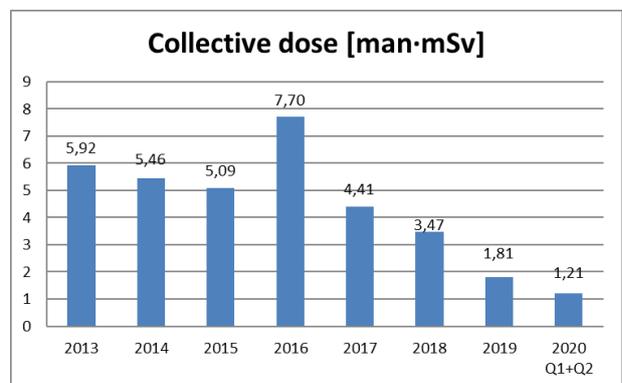
No reportable event occurred in the first half of 2020.



No safety system failure occurred in the first half of 2020.

Interim Spent Fuel Storage Facility

The collective dose in the first half of 2020 is comparable to the previous year's values, and it shows a downward trend.



No reportable event occurred in the first half of 2020 in this facility.

Based on the comprehensive safety performance assessment it can be stated that during the first half of 2020 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 first half of 2020

The amendment of the Act CXVI of 1996 on Atomic Energy was necessary in order to clarify a concept and to create consistency with other laws. In order to ensure the transfer and management of customs secrets to the Hungarian Atomic Energy Authority (HAEA) as a nuclear energy supervisory body, the Act on Atomic Energy and the Act CLII of 2017 on the implementation of EU customs law was necessary to supplement.

Govt. Decree 36/2020 on amendment certain govt. decrees relating to the use of nuclear energy:

In order to perform the tasks of the authority efficiently related to the safe use of nuclear energy, in particular the physical protection of nuclear installations and radioactive waste repositories, Govt. Decree 190/2011 on physical protection and the related licensing, reporting and control system should be supplemented with new aspects.

The amendment of Govt. Decree 247/2011 on independent technical expert in the field of nuclear energy was intended to implement the clarification concerning the special field.

The modification of Govt. Decree 487/2015 on the protection against ionizing radiation and the corresponding licensing, reporting (notification) and inspection system was intended to amend the radiation protection training requirements in the light of experience of the authority, to review the provisions on the notification obligation covered by the decree, and to clarify the requirements for waste classification.

The amendment of Govt. Decree 489/2015 on monitoring radiation conditions relevant for public exposure of natural and artificial origin and on the scope of quantities obligatory to be measured was intended to be in line with the amended radiation protection regulations.

The amendment of Govt. Decree 490/2015 on the reports and interventions regarding missing, found or seized nuclear and other radioactive materials and other actions pertaining to radioactive materials following their report was intended to introduce the necessary amendments regarding the management of industrial, hazardous or mixed household waste due to the risk of the occurrence of high-activity radiation sources, and to establish compliance with the Act on the Code of General Administrative Procedure.

The amendment of Govt. Decree 184/2016 on the detailed rules of verification of skills and registration of civil engineering-technical experts, civil engineering designers, technical building inspectors and responsible construction supervisors of buildings and structures belonging under the effect of the act on atomic energy, and on the rules for data content of the registration was intended to implement amendments related to the promotion of electronic administration and justified on the basis of practical experience.

Govt. Decree 198/2020 on the amendment of the Govt. Decree 118/2011 on the nuclear safety requirements for nuclear facilities and the corresponding the HAEA regulatory activities:

The Section 12. (7) of the Act on Atomic Energy creates the possibility that certain structures, construction activities, as well as the so-called in the case of equipment with a long production time, the relevant construction permit procedure to be carried out by the nuclear energy supervisory body and the production permit procedure – as defined in the Govt. Decree 118/2011 – may be carried out simultaneously with the licensing procedure. The Govt. Decree 198/2020 lays down and clarifies detailed rules on the basis of this "authorization".

In connection with the requirements for new nuclear power plant units, the definition of the areas of involvement of independent experts in the context of design quality management systems was clarified and, as an administrative simplification, the amendment provides for the possibility to present information on the technical basis in the Preliminary Safety Report to be attached to the application for a licensing permit, thus, it is not necessary to attach it in a separate annex to the same application. The annex also contains a technical clarification of certain existing regulations.

The amendments to certain annexes of the Govt. Decree 118/2011 specify the text clarifications related to the radiation protection requirements, thus creating the unification of the annexes of the Govt. Decree 118/2011.

Covid-19 induced Emergency Management in the Nuclear Facilities

In accordance with the decision of the Hungarian Government, epidemiological measures have been introduced in the nuclear facilities. The aim of the actions are to decrease the spread of the infection, to minimize the health related risk of people working in the NPP beside keeping the high level of the nuclear safety.

On the territory of MVM Paks NPP, a pandemic operative leadership group was established, which assessed the situation on a daily basis and informed the employees and the authority about the existing situation and the necessary measures. Pandemic Action Plan has been prepared, which defined the roles with the needed headcount for the safety operation, and measures have been taken to protect the health of the employee. The personal access is only available at one-way gates after body temperature control. Depending on the severity level of the pandemic emergency situation, different action levels were determined for the minimal headcount need. In the Pandemic Action Plan different levels of the measures were introduced meaning different numbers of staff and different hours of work in a shift. When the attendance number of employees in operative shift turn to uncertain the staff could be protected by restriction of leaving the NPP's site. Reaching the action level of the unit shut down, the leadership has to define the impacted unit for the power decrease and order the potential emergency case.

The departments not part of the operation shift, are working remotely, there site based activity can be requested in case it is needed. The existing pandemic measures include restriction on taking holidays (at management level), and new hygiene devices (masks) and measures to protect the employees.

Additional measures may be needed in parallel with the spread of the epidemic and worsening of the situation, like continuous PCR testing within the NPP, before entering the NPP, the operational shift must be screened, and back-up training with retired experts with appropriate operator exam and experience also provide adequate human resources (but the retired experts with relevant exam can be ordered for site work as stand-by also).

In connection with the increased epidemiological defence, the management of the Budapest University of Technology and Economics ordered measures for the whole university, in order to prevent the further spread of the coronavirus. In addition, on 16 March 2020 the Training Reactor was prepared for working days without on-call time. As part of this, the reactor zone was paralyzed by removing two fuel assemblies, so that the reactor would have been physically unable to reach the critical state. The physical protection of the Training Reactor (the building is protected by an armed security guard) and the necessary supervision were continuously provided during this period as well. After the summer maintenance, the Training Reactor will

return to normal operation, but health regulations to prevent the spread of the virus will still apply. No illness was reported among the reactor workers.

Measures to prevent the spread of the epidemic were also introduced at the Budapest Research Reactor belonging to the Eötvös Lóránd Research Network. To minimize the impact of the COVID-19 on the staff several hygienic measures have been implemented, only the essential staff has been permitted to work on location, the rest of employees have been instructed to work remotely and visitors haven't been allowed to enter the building. The Budapest Research Reactor's time schedule was modified from the 20th of March to the 11th of May. The BRR was in shutdown state, which was defined and regulated in the technical specification and documents of the reactor. According to the operational rules of this state, the supervision of the reactor and the safety related systems were going on remote access and weekly duty walk down. The operation of the research reactor after this period came back to the normal mode, in compliance with the introduced health regulations. According to our latest information there hasn't been any coronavirus infections among the reactor operational staff or other workers in the reactor building.

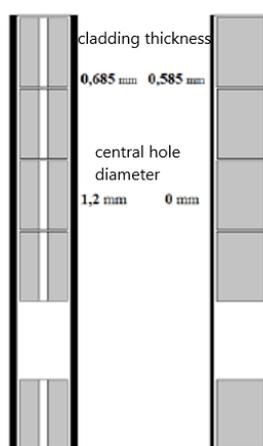
It is also crucial for the nuclear facilities that the Authority with staff for site supervision and inspection - also introduced serious pandemic actions. Accordingly, the Hungarian Atomic Energy Authority (HAEA) has set up a Defence Working Committee, which analyses and evaluates the pandemic situation continuously, assigns telework (remote working) to its staff, and provides all necessary protective equipments for those who carry out inspections that require personal presence in the nuclear facilities.

Although the protective actions were ordered by the Hungarian government reduce the possibility and number of contacts, it cannot isolate the employees completely. There is a need for disciplined and responsible compliance with restrictions also.

Paks Nuclear Power Plant

Licensing of SLIM type test fuel assemblies

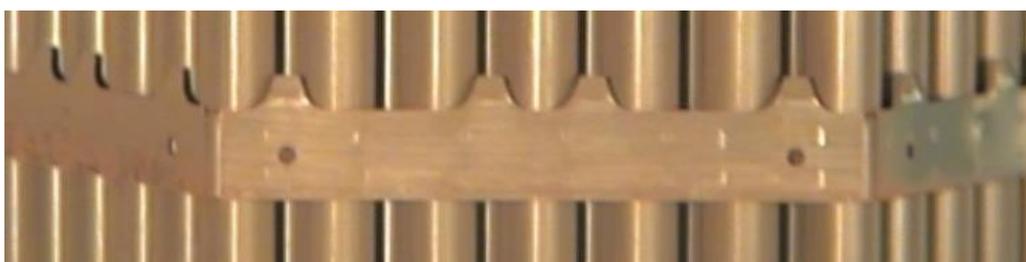
Paks Nuclear Power Plant intends to introduce a new water-uranium ratio optimized so-called 'SLIM fuel'. This new fuel type has thinner cladding and pellets without central holes (except for rods containing burnable absorber, which still have central hole), and the spacer grids are equipped with mixing vanes in order to enhance the mixing of the coolant. This new concept allows for more economical fuel usage as the lack of the central hole increases the amount of uranium in the fuel rod and the thinner cladding results in bigger utilization of fissile materials. Therefore less fresh fuel will be necessary per fuel cycle and thus the number of spent fuel assemblies will be reduced.



Changes in fuel rod

The licensing of the SLIM fuel will proceed in two stages. In Paks Nuclear Power Plant, when new fuel type was introduced, in each case an introductory test program was used during which a small number of Lead Test Assemblies were placed in one of the reactors.

This is also how SLIM fuel is introduced. Paks Nuclear Power Plant has requested a license for the use of 18 SLIM fuel assemblies in the 35th fuel cycle of unit 3, which is scheduled to start in early December, 2020. The HAEA issued the license under resolution number HA7191.



Spacer grids with mixing vanes

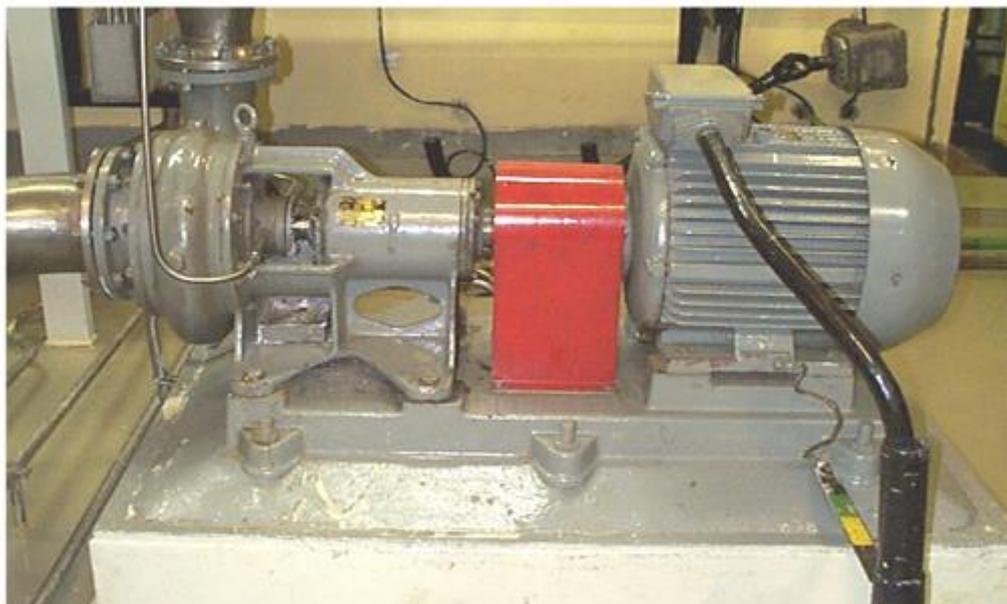
Paks Nuclear Power Plant evaluates the experiences from the test program. In case of a positive operating experience, the second stage of licensing can take place, during which the Paks Nuclear Power Plant submits a license application for the general use of SLIM fuel assemblies. This license application is expected to be submitted (by Paks Nuclear Power Plant to the HAEA) in 2022, after the successful completion of the test program.

In order to transport these new fuel types the competent authority of the Russian Federation 'ROSATOM' issued a supplement for the existing package design approval. According to the valid Hungarian legislation and the international agreements concerning carriage of dangerous goods the HAEA issued a Hungarian Endorsement, which makes the shipment of this new type legally possible to the Paks NPP.

A prerequisite for the introduction of the new fuel type is the amendment of the Spent Fuel Interim Storage Facility operating licence, which is currently in progress.

Unit 4 spent fuel pool coolant circuit pump commissioning with an incorrect circuit breaker

On June 6, 2020, the Unit 4 spent fuel pool coolant circuit pump start test failed. During the inspection, the specialists did not find any error, so they prepared the setting of the relevant circuit breaker. The pump was switched to the maintenance supply from which the starting could already be performed. They noticed that the coolant circuit pump circuit breaker of the spent fuel pool had been replaced with another pump circuit breaker. The circuit breakers were replaced, then both pumps were tested with their own circuit breakers and they worked properly.



Coolant circuit pump of the spent fuel pool

The direct cause of the event was that the night shift staff failed to identify the circuit breaker during the commissioning of the spent fuel pool coolant circuit pump. As a result, the pump was commissioned with the circuit breaker of the primer circuit heat removal pump accidentally. The root cause of the event was that the effectiveness of self- and co-control by operational staff was inadequate. To avoid similar events, a program has been developed, taking into account domestic and international experience, which strengthens the safety culture and encourages staff to comply with the necessary error prevention rules (self- and co-inspection)

Cooling of the spent fuel pool was adequately provided. There was no parameter degradation that compromised nuclear safety.

Because of the event the first coolant circuit of the spent fuel pool was inoperable for 42 minutes. The temperature of the water in the spent fuel pool and the cooling of the spent fuel were adequate throughout, within the prescribed operating parameters.

The impact of the event on nuclear safety was not significant. The authority evaluated the investigation report. The licensee took appropriate corrective actions for the detected deviations.

Paks II project

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

In the first half of 2020, the HAEA performed five ad-hoc inspections – with the necessary COVID-19 protection measures – at the Paks II Nuclear Power Plant Ltd. in order to check – among others – the engineering survey activities, and the implementation of the construction support base structures.

Paks II Nuclear Power Plant Ltd. has submitted the construction license application to the Authority on 30th of June 2020; and official licensing procedure has started on 1st of July 2020. The HAEA has 12 months (with the possibility for additional 3 months extension if needed) for the evaluation of the application.

Prior to submission of the construction license application, the HAEA has already prepared a project plan for the evaluation processes, in order to deal with the 75 000 pages of documentation. Indicating the complexity of the evaluation process, the Authority involves half of its employees and established fifteen evaluation groups.

The HAEA will involve co-authorities, as well as national and international experts in the assessment of the construction license application as well as other related license applications. Besides this, the Authority has also contracted the IAEA for a “Technical Safety Review: Design Safety” mission with, the expected start by the end of 2020.

During the construction license evaluation procedure, the HAEA will manage a further circa hundred other licensing procedures in connection with to the new NPP construction (e.g. manufacturing permits).

International Cooperation

Hungary - Member of the IAEA Board of Governors since September 2019

Hungary has been member of the International Atomic Energy Agency's Board of Governors since September 2019. During the one-year period of our membership, Hungarian delegates have taken part in five regular meetings of the Board. Unfortunately, due to the COVID-19 pandemic, the HAEA could not always send its representatives to the Board of Governors' meetings in this period, but we have closely cooperated with the Ministry for Innovation and Technology and the Ministry of Foreign Affairs and Trade in preparing the statements made by Hungary at the Board meetings on several important issues, delivered by the representatives of the Permanent Mission of Hungary in Vienna.

Hungary, during this one-year period has made statements at the IAEA Board of Governors on various topics. We have mentioned our strong commitment to nuclear safety, security and safeguards on several occasions. Among other issues, our delegation usually emphasizes 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 at the Board meetings. We have also delivered several statements on nuclear verification in Iran, calling upon this country to fully cooperate with the IAEA.

Talking about nuclear technology, the Board has been informed by our representatives that Hungary, in line with its National Energy Strategy 2030, is strongly committed to nuclear energy innovation. We are planning to launch several research and development initiatives with respect to the continued operation of the existing national nuclear electricity generation capacity and the construction of new nuclear units. With regard to nuclear technology, our delegation underlined the importance of regional cooperation facilitated by the various technical cooperation projects and informed the Board about the new Hungarian national project for the 2020-2021 cycle, which aims to contribute to enhancing patient care in diagnostic radiology and the implementation of which is ongoing.

At the latest meeting in September, Hungary thanked the IAEA for its great effort to assist its Member States (Hungary included) in their fight against Covid-19. It was also pointed out that during the pandemic nuclear safety remains a priority for Hungary, with relevance to the implementation of the new nuclear units as well.

Hungary receives IAEA support to fight COVID-19

In March 2020, the International Atomic Energy Agency offered member states its support to send gratis equipment to enable them to use a nuclear-derived technique to rapidly detect the coronavirus that causes COVID-19. The technique is known as real time reverse transcription–polymerase chain reaction (real time RT-PCR). This is the most sensitive technique for detecting viruses currently available. A number of countries, including Hungary, requested the support of the IAEA, and in June, the National Public Health Center in Budapest received the shipment.

Cancelled events and official trips, different working methods due to the COVID-19 pandemic

The external relations of the last six months have been determined by the fact that the staff of the Hungarian Atomic Energy Authority performed their duties remotely from mid-March to the middle of June. At the same time, employees of the HAEA were not allowed to travel abroad on an official trip, which is expected to remain so until the end of the year. Since March, it has not been possible to hold major events, and the reception of foreign guests and delegations has also been suspended. Meetings of various international working groups and bodies took place on online platforms. From the beginning of September until January 4, 2021, the HAEA will be working with remote access again.

Based on the temporary legislation adopted in the epidemic situation, it was possible for the HAEA to hold a public hearing in an unusual, electronic way, without personal participation. Among the pending regulatory procedures, it was organized related to the application of the Public Limited Company for Radioactive Waste Management. The amendment of the operating license of the Spent Fuel Interim Storage Facility was the subject of the electronic public hearing. The public and the interested parties could ask their questions and express their views from 8 to 12 June.

Radioactive Waste Repositories

Modification process for the monitoring programme of the RWTDF

On 18 November 2019 the Public Limited Company for Radioactive Waste Management (PURAM), as the licensee of the Radioactive Waste Treatment and Disposal Facility (RWTDF) – the facility designated for the storage and final disposal of the institutional radioactive waste in Hungary – submitted its application to the HAEA about the modification for the monitoring programme as a 2nd category modification, upon which a regulatory process started. The PURAM was obligated to submit the application by the previously issued operating licence.

As appendices to the application the PURAM submitted the followings: the supporting documentation for the modification, the modified regulations of emission and environmental control and other documents. The HAEA reviewed the submitted documents and required the PURAM to submit additional documents and to clarify certain technical details in the form of procedural decision. The PURAM submitted the additional documents and clarified the technical details as included in procedural decision. The HAEA forwarded all the documents to the Government Office of Baranya County (BAMKH), involving it to the process as the competent authority in the environmental and nature protection.

The BAMKH issued the approval of the regulations of emission and environmental control of the RWTDF under certain condition while the HAEA approved the monitoring program under some conditions, one of them was parallel with the condition of the BAMKH. Following previous consultations this process was the first successful step of the harmonized cooperation between the two authorities.

Management of pandemic at PURAM facilities

After the request of the HAEA, at March 2020, PURAM submitted its plan to operate safely its facilities during the pandemic. It is an internal instruction called *Preparation for pandemic and tasks during an occurred pandemic*. For supporting, a detailed task matrix also completed to ensure the following of the ordered measures. These two documents were weekly – every two weeks during the summer – updated by PURAM. The measures are determined and supervised by the Pandemic Leading Group. They acquired plenty of facemasks, hand sanitizer etc. They also made the list of jobs essential to the safe operations at all three facilities (SFISF, NRWR, RWTDF). For the other employees, PURAM gave the opportunity for home office. The situation is regularly evaluated, and there are further measures as necessary. There were some alterations requested by the HAEA in the internal instruction. The HAEA has not become aware of any important problem related to the pandemic, so these measures proved to be viable to assure the safe operations of facilities of PURAM in this situation.