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Nuclear Safety Bulletin
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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY
April 2018

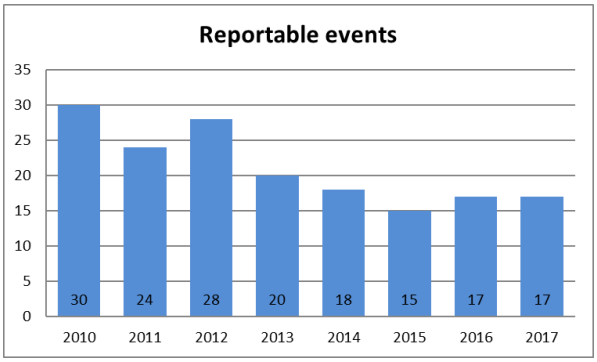
General

2017 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.

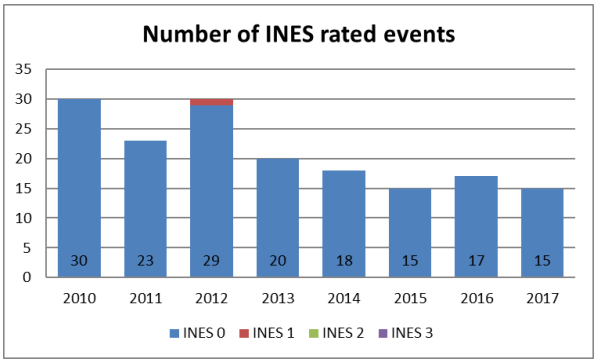
Below we give a short review on the 2017 safety performance assessment. The safety performance data are mainly taken from the quarterly reports of Paks NPP and the semi-annual reports of the other licensees.

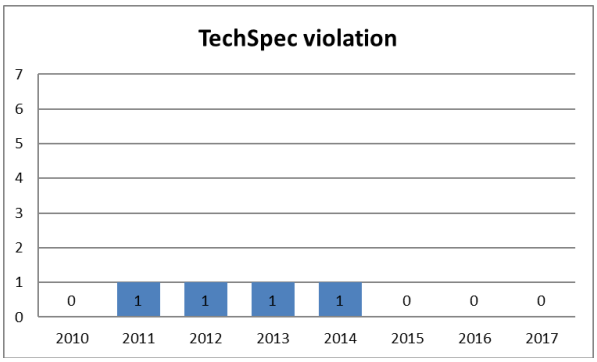
Paks Nuclear Power Plant



Seventeen reportable events occurred in 2017.

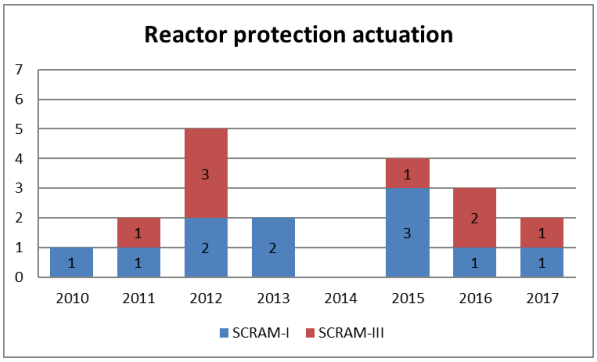
Out of the seventeen events reported by the NPP fifteen were of category „below scale" corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES). Two events were classified as "out of INES scale".

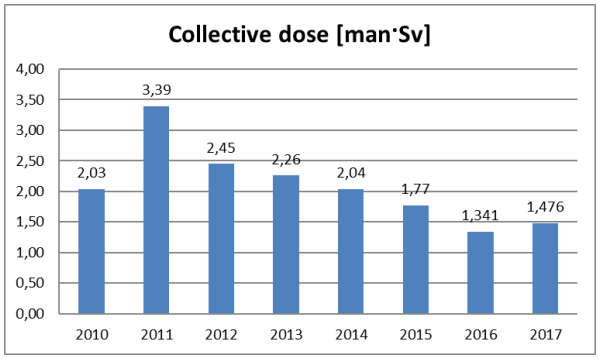




There was no event causing violation of technical operating specification since 2014.

Two automatic reactor protection actuation occurred in 2017. The SCRAM-I – non-real – event occurred under main outage. During the SCRAM-III event, automatic shutdown occurred on the fifth main circulation pump at Unit 2 due to a temperature measurement failure.



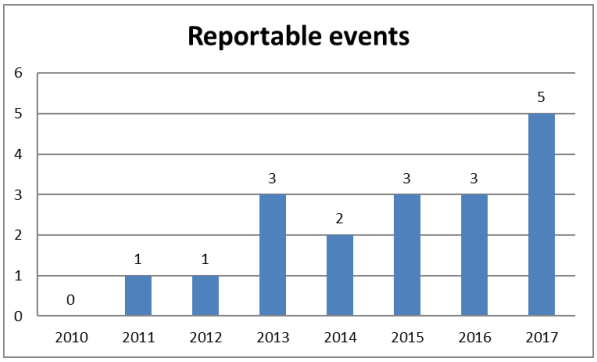


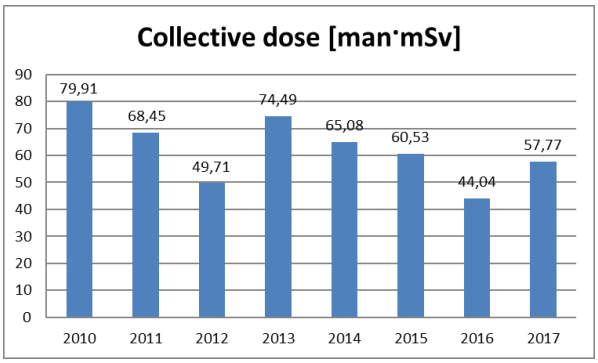
The collective radiation dose of employees is the 2nd lowest of the last twenty years.

The liquid and gaseous radioactive releases into the environment were also very small, 0,245% and 0,082% of the regulatory limit, respectively.

Budapest Research Reactor

Five reportable events occurred in 2017. The events of the first half-year are related to the damage of welding seams and wrong position of fuel assemblies, and the events of the second half-year were in connection with momentary voltage sag on external electric supply, with incorrect start-up and with failures of external electricity network.

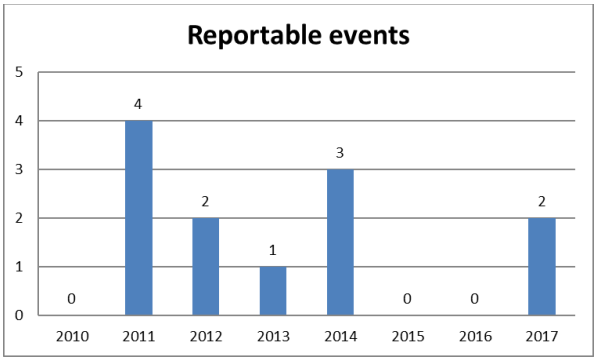


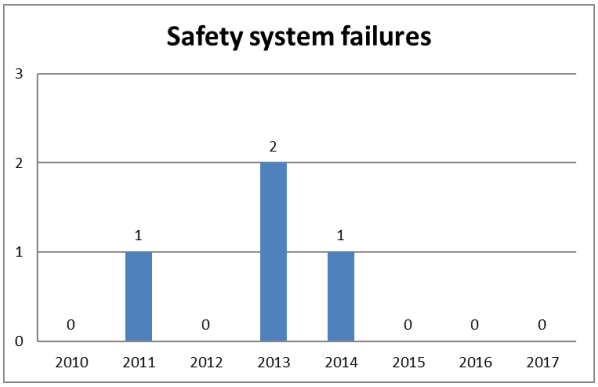


The employees' collective dose in 2017 is comparable to the previous year's values. The value of the collective dose refers to the doses of the December to November period.

Training Reactor of the Budapest University of Technology and Economics

Two reportable events occurred in 2017. Both events are related to valves.



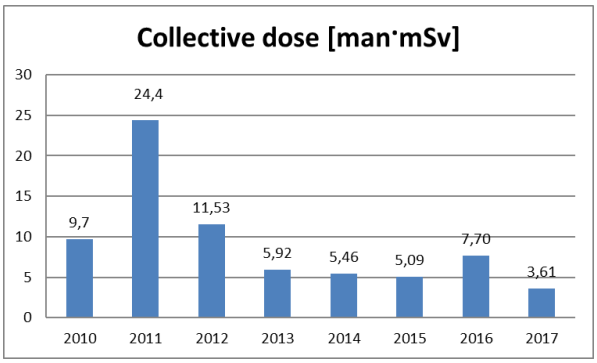


No safety system failure occurred since 2014.

Interim Spent Fuel Storage Facility

Based on the data of 2017 the collective dose of the employees is comparable to the previous years' values.

No reportable event occurred during the year in this facility.



Based on the comprehensive safety performance assessment it can be concluded that during 2017 the nuclear safety of the facilities supervised by the HAEA was, as in previous years, at an appropriate level. The facilities operated safely, did not endanger the environment, the population and the employees.

International cooperation

The HAEA hosted an international expert working group meeting

The OECD NEA's Multinational Design Evaluation Program (MDEP) established 11 years ago. The main objective of the project, currently involving 16 countries, is to strengthen the cooperation between participating countries, to develop professional relations and to compare national regulations, guides and standards and also to explore the possibilities for unifying them. Associated organizations in each country are currently performing the above activities in the design and issue-specific groups and so-called technical expert working groups in the MDEP. The VVER group is a prominent forum for the nuclear authorities of the countries involved in the construction of new Russian blocks. Hungary is also involved in the work of this group due to the Paks2 project.

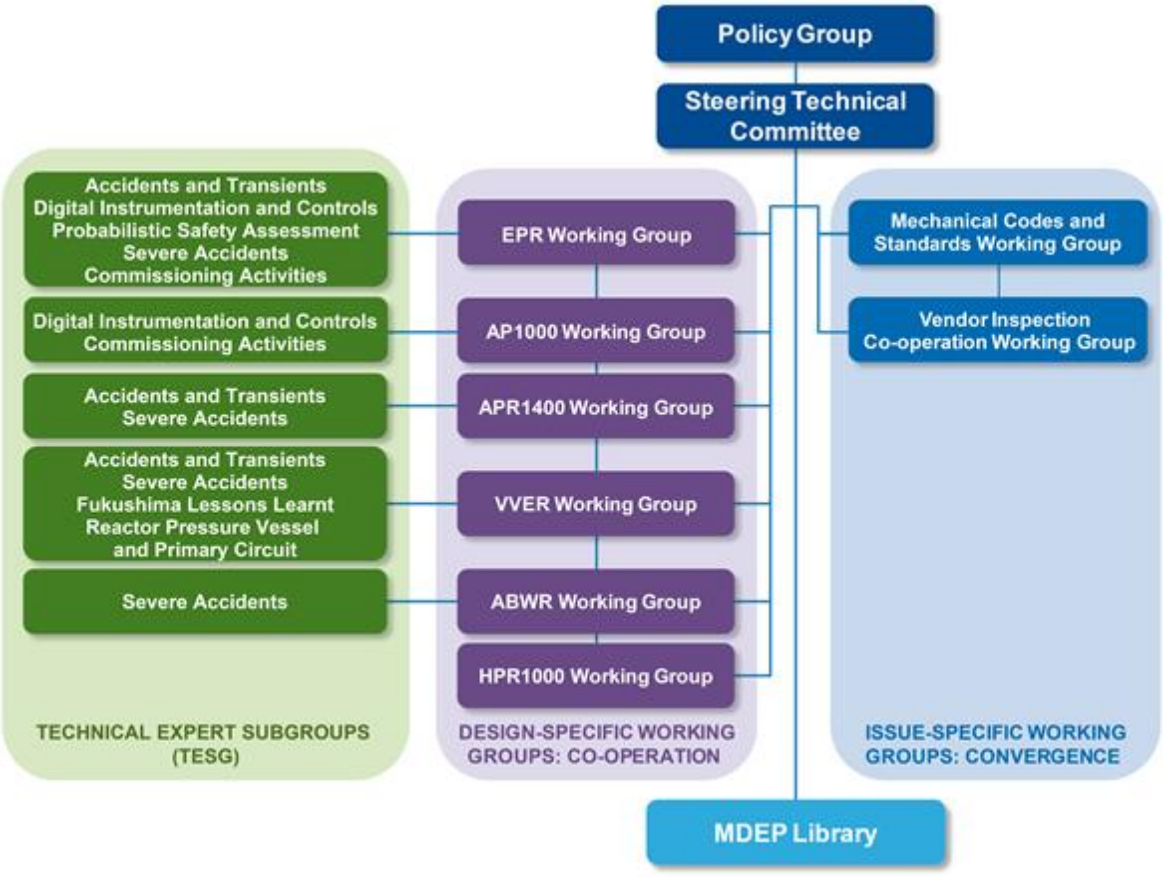


Figure 1 Organisational structure of MDEP

The VVER design-specific group currently contains 4 technical experts subgroups in each of the key areas of expertise that are particularly important for new installations. One of them is the "Reactor Pressure Vessel and Primary Circuit" technical expert subgroup, known as RPV&PC. Experts have been working together on the problematic questions of the primary circuit and reactor pressure vessel for more than 4 years and Hungary joined the work 3 years ago. The professional field of the technical experts subgroup addresses technical issues and problems related to the primary circuit and the main primary equipment from the regulatory side. During the course of work, the participating countries – Hungary, Finland, China, India, Turkey and Russia – exchange their experiences in the field of construction of VVER-type power plants and in other key issues, identifying the specific national regulatory features, and evolves the common position from a professional and also nuclear safety point of view. Examples of these key questions were the use of new steel raw materials, the overpressure protection of the primary circuit, the use of the "leak before break" concept or the requirements for cladding of the main equipment. In addition to negotiating regulatory requirements, it is also possible to discuss technical issues, which is a great help in understanding the technical side of the new constructions and a useful base for the licensing of the new Paks units.
The RPV&PC technical experts subgroup held the 9th meeting at the end of January 2018 so that the experts of the participating countries discuss important professional issues, arising from the point of view of the new Russian-designed units. During the 3-day discussion, the participants addressed several topics of concern, such as welding and material testing issues during the construction of new units, the possibility of applying new types of main equipment (steam generator, main coolant pump, etc.) or structural materials for the reactors to be built. The next meeting of the experts subgroup is planned to take place in May, where members will continue to share national practices and experiences, developing and negotiating new topics.

Visits of IAEA fellows

The HAEA is responsible for arranging fellowships in the framework of the fellowship programme supported by the IAEA for the training of experts coming from developing countries. Hungary receives approximately 25-30 fellows per year. During the year of 2017, significantly more, a total of 44 scientific visitors and fellows were received in Hungary from such countries as Bangladesh, Belarus, Croatia, Malawi, Malta, Morocco, Moldova, Nigeria, Pakistan, Romania, Saudi Arabia, Thailand, and Ukraine. The number of visitors increased particularly at the end of the year, when several scientific group visits took place. The interest has especially increased from Saudi Arabia.

The experts usually spent a couple of days, maximum a week at the HAEA. If they arrived for a longer time, they had the opportunity to visit nuclear installations or other partner institutes. Colleagues from the HAEA made presentations for them on regulatory questions of nuclear safety, research reactors, radioactive waste management, emergency preparedness and radiation protection.

The HAEA cooperated with its following partner institutions to provide suitable programme for the fellows: National Directorate General for Disaster Management of the Ministry of the Interior, Institute of Nuclear Techniques of the Budapest University of Technology and Economics, Institute for Nuclear Research of the Hungarian Academy of Sciences, Center for Energy Research of the Hungarian Academy of Sciences, Research Centre for Astronomy and Earth Sciences of the Institute for Geological and Geochemical Research, Radioanalytical Reference Laboratory of the National Food Chain Safety Office, National Institute of Oncology, National Research Directorate for Radiobiology and Radiohygiene of the National Public Health Centre, MVM Paks NPP, Radanal Ltd., Public Limited Company for Radioactive Waste Management.

WENRA meeting

The Reactor Harmonization Working Group (RHWG) of WENRA (Western European Nuclear Regulators Association) held a meeting on 23-26 January 2018 at the Headquarters of the HAEA. More than 30 participants from 16 European countries attended the meeting, and representatives of Canada and Japan were also present.

During the meeting held, WENRA experts discussed current and possible future revisions (further development) of these reference levels, as well as other matters related to harmonization of nuclear safety in European NPPs. Inter alia – based on the suggestion of WENRA – out of the 2014 reference levels RHWG carries out a preliminary assessment regarding the implementation of reference level Design extension of Existing reactors (Issue F)

at the plants. In the case of the issue of external hazards (Issue TU), RHWG discussed the updated guidance documents and proposed still minor modifications to be carried out. In the case of the issue of internal hazards (Issue SV) RHWG accepted the prepared documents. The working group dealt with the future reference levels revision program but proposed further modifications in this connection.
The next meeting of RHWG will take place in Kyiv, Ukraine in June 2018 where the experts will continue to work on the above mentioned and other tasks.

The EU Topical Peer Review

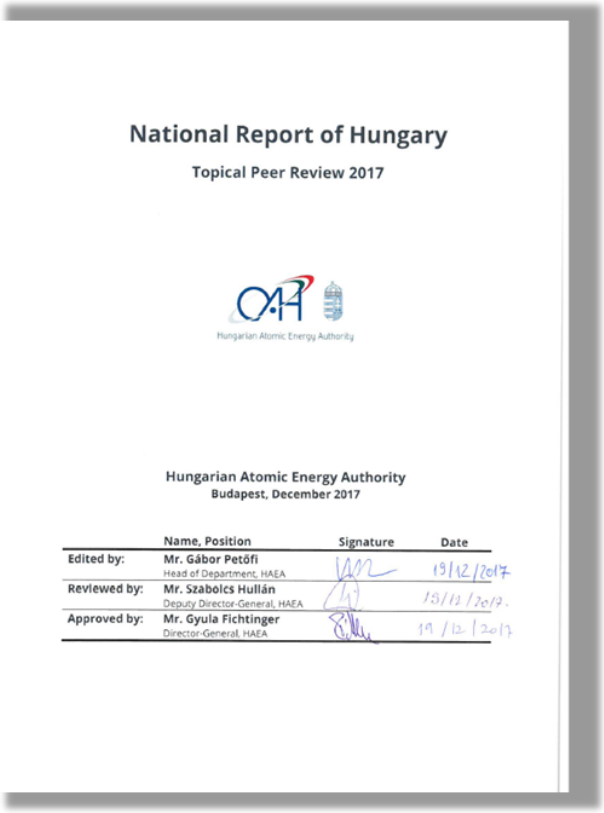
The EU Nuclear Safety Directive (2014/87/EURATOM (NSD)) requires the member states operating nuclear facilities to perform a Topical Peer Review every six years. According to the decision of the ENSREG, the nuclear safety advisory group of the European Commission consisting of the senior officials of the nuclear authorities of the member states, the topic of the 2017 topical peer review was ageing management. The review had to be performed for nuclear power plants in operation or holding an effective construction permit and for nuclear research reactors above 1 MW power. The purpose of the review in a particular area was to overview the national regulations, identify issues and good practices in the facilities, identify and share relevant operating experiences, carry out a review of the results on European level and to recognize the main common technical issues. A specification on the scope of the review and the content of national report was developed for the uniform documentation of the review results. As a first step, the member states had to prepare a National Assessment Report in the specified topic, which they had to publish in English, as well. The member states mutually review the reports of each other, to which also the public may make comments and put questions. The EU also invited experts to study the reports. The member states or the invited experts will present the results of the review in an international peer review workshop in the spring of 2018. They will summarize the results in a report after the workshop.

In Hungary, two facilities fell in the scope of the review: the Paks Nuclear Power Plant and the Budapest Research Reactor. Both facilities completed the self-assessment part of the review and they have sent their reports to the HAEA. The HAEA reviewed the reports, based on them and on its own assessments developed the National Assessment Report, which has been published both in Hungarian and English on its website.

The review results can be summarized as follows:

- Concerning ageing management of nuclear facilities the Hungarian regulations are in full compliance with the international recommendations.

- The HAEA follows the concept of continuous oversight also in this area; ageing management is embedded in the regulatory licensing, inspection and assessment activities.
- Ageing management activities in both facilities comply with the national regulations and so with the international requirements and good practices.
- The facilities are prepared to manage the anticipated ageing mechanisms and to identify and manage any unanticipated degradation.
- The facilities perform the activities to maintain the safe conditions of the plant equipment on a continuous basis.



National Report of Hungary

Topical Peer Review 2017

Hungarian Atomic Energy Authority

Hungarian Atomic Energy Authority
Budapest, December 2017

	Name, Position	Signature	Date
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Reviewed by:	Mr. Szabolcs Hullán Deputy Director-General, HAEA		19/12/2017.
Approved by:	Mr. Gyula Fichtinger Director-General, HAEA		19/12/2017

Figure 1 over page of the National Report of Hungary

An Event of Interest

Foreign bodies in the sprinkler system – Event Investigation

In nuclear power plants, one active safety system is the sprinkler system. Its main role is to reduce the pressure of the containment by steam condensation.

During the Periodic Safety Review, function and performance tests were carried out at the Paks NPP and as part of it, the design survey, a camera test of the sprinkler system's individual sections was performed. Several foreign bodies (including metal chips, welding rods) were found in the pipelines of the sprinkler system on Unit 1. The investigation procedure launched by the licensee revealed that the foreign bodies had got into the pipe sections during the establishment, the prevention of which was not taken due account of during the pipeline construction. On the basis of the gained experience the sprinkler system of the other Units has also been examined.

According to the investigation, the presence of foreign bodies did not the interfere with the performance of the safety function, so the emission limits would not have been violated, for this reason the impact of the event on security was not significant. The HAEA carried out an on-site inspection, which clarified that the analyses performed and connected to the event were unit-independent and conservative, and the sprinkler system was able to perform its safety function despite the presence of foreign bodies. As a conclusion of the event investigation, the HAEA requested that the lessons learnt of the event should be summarized and the experiences for all four NPP units be submitted to the authority.

Figure 1 Foreign bodies in the pipes of the sprinkler system

Emergency Preparedness and Response

Changes in the HNERP

The HAEA operates the High Level Working Group (HLWG) that has the legislative responsibility to prepare, regularly revise and update the Hungarian Nuclear Emergency Response Plan (HNERP) and its guides.

The previous version, 2.3 of the HNERP was published in 2015. Following the current revision, the HLWG prepared its new 3.0 version and in February 2018 the Chairman of the Interministerial Committee for Disaster Management Coordination (the Minister of Interior) approved the submitted Plan.

The revision was conducted along the recommendations and suggestions of the Hungarian Emergency Preparedness Review (EPREV) mission. The main aspect of the revision of the HNERP was the implementation of the IAEA's new relevant publication, the GSR Part 7 (Preparedness and Response for a Nuclear or Radiological Emergency).

The revision of the HNERP is a two-step process. In the first step the most important aspect was the compliance to the new EU regulation (EU BSS - Council Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation) the modifications concerning the HNERP were implemented. According to this regulation the new version of the HNERP stipulates the radiation protection reference levels, generic criteria and derived action levels and it provides the frame for the protection strategy – in line with the revised Govt. Decree 487/2015. With these modifications the plan is in line with certain requirements of the GSR Part 7 of the IAEA.

Further aspects of the revision were: improving the table of critical tasks, determination of the main responsible organisations; amendment of the abnormal events and the related tasks by the nuclear security events; clarification of the process of termination of an emergency and updating the National Public Information Plan according to the modified Govt. Decree 165/2003.

In the second step of the revision, the HLWG has additionally to revise the HNERP to be fully in line with the GSR Part 7. According to the plans, this new version 3.1 of the HNERP will be issued in 2019.

Budapest Research Reactor

The experiences of the regulatory event investigation of fuel assemblies' welding insufficiency and fuel assembly misplacement at Budapest Research Reactor

In the spring of 2017, the reload operations of the active core of the Budapest Research Reactor were carried out. Inspection before placing the fresh fuel assemblies showed that the welding seams for securing the foot part of two fuel assemblies were damaged. The damaged fuel assemblies were restored to the storage barrel and replacement fuel assemblies were used.

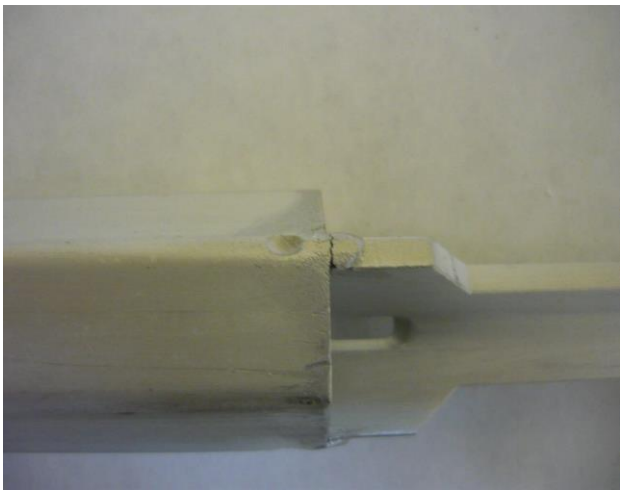

Figure 1 The ruptured welding of the fuel assembly number 01H40209

During the visual check of the number and position of the fuel assemblies it was established determined that three fuel assemblies were not in charted core position.

The investigation found that the staff was mistaken when moving the fuel assemblies during loading due to the poor underwater visibility conditions in the core.

The investigation found that damage to the welding seams for securing the foot part of the two fuel assemblies did not compromise the leaktightness of the fuel assembly, and the damaged fuel assemblies were not loaded into the core, so the event did not directly jeopardize the safe operation of the reactor. The HAEA provided for the supplement of the relevant procedures in a decision (rules on self-checking and co-control, teaching of the rules on handling and moving fuel assemblies, documentation and visual inspection of the movement of fresh fuel assemblies, control of the position and identification number).

The damage of the seams happened presumably due to a manufacturing defect. During the event of the fuel assembly misplacement, the faulty configuration of the core had been revealed according to the specifications before the operation of the core started, i.e. the event had no impact on the nuclear safety.

Regulatory activity

The evaluation of the Paks Nuclear Power Plant's Periodic Safety Report (PSR) has begun

The implementation of the Periodic Safety Review of Nuclear Facilities is provided for by the Act CXVI of 1996 on Atomic Energy. In the framework of the review the licensee should completely analyse and evaluate the technical status of the power plant periodically, taking into account the operational experience and new knowledge on safety.

Government Decree No. 118/2011. (VII.11.) on nuclear safety requirements of nuclear facilities and on related activities provides for the way of PSR implementation and the official guidance No. A1.39 provides assistance concerning the content of the PSR.

The licensee is required to carry out its own review, and based on the results of this, if necessary, to compile and implement safety-enhancing measures to eliminate and mitigate the identified risk factors.

Based on the licensee's Periodic Safety Report and the establishments of the Authority's review of the PSR, the authority may revoke or give a time limit of the operating license if it has determined a change in circumstances or an increase in risk.

On 14 December 2017, the MVM Paks Nuclear Power Plant submitted the safety report to the HAEA, which is the foundation document for the next 10 years of safe operation.

The PSR received is assessed by professional working groups in terms of its impact on nuclear safety. They are responsible for the special features of the blocks, the revision of the state of systems, systems elements and structures, affecting nuclear safety, the processing and assessment of indicators and analysis. Collecting and weighting the identified security issues, rating the safety impact of the differences and deficiencies found in the PSR and formulating the necessary corrective measures constitute also a part of the assessment.

Six months are available for the Authority to evaluate the security report that can be extended once by 90 days.

Comprehensive inspection exercise in Hungary under Safeguards Support Programme

Hungary has already provided support to the International Atomic Energy Agency (IAEA) for more than 25 years to prevent the proliferation of nuclear weapons and to enhance the peaceful use of nuclear energy. The Department of Supervision of Radiation Sources at the Hungarian Atomic Energy Authority administers the Hungarian safeguards support program. The role of the Hungarian facilities and research centres is essential in the implementation of the program.

Since the beginning of our support program the Hungarian nuclear facilities and organisations possessing nuclear material have provided venues for the practical training of the IAEA safeguards inspectors. Based on our expertise and venues we offer contributions to various training options of the IAEA, such as:

- The goal of the *Additional Protocol Complementary Access* training simulating inspection is to confirm that in relation to the IAEA there is no undeclared activity performed in Hungary in association with the nuclear fuel cycle. In the framework of the training, the experienced inspectors of the IAEA conduct different on-site inspections at several sites.
- The *Comprehensive Inspection Exercise* aims at simulating nuclear material inspections under the Comprehensive Safeguards Agreement to be performed by newly recruited inspectors of the IAEA at a nuclear power plant.
- In the frame of *Traineeship Program*, the IAEA provides a biannual training for nuclear professionals from developing countries. During the nine-month program the trainees will be aware of facilities in the different stages of the nuclear fuel cycle, their safeguards systems and measurement techniques.

On 5-9 February 2018 the IAEA organized a comprehensive inspection exercise at the Paks Nuclear Power Plant with the aim of practical training and examination of the newly recruited inspectors of the IAEA. During the one-week training the IAEA inspectors were provided with an

overview of the technical features of the Paks NPP, its radiation protection regulations, as well as the nuclear material accountancy and control system. During the simulation of the classic safeguards inspections, the inspectors performed inventory verifications of nuclear materials, checked, maintained and installed IAEA surveillance (cameras and camera systems) and containment (metal- optical- and electronic seals) systems. The course ended with a practical examination of the eight inspectors.

The Staff of the HAEA and the Nuclear Safety Department of Paks NPP participated actively in the successful implementation of the exercise for which the IAEA expressed its gratitude.

Radioactive Waste Repositories

Situation of Expansion of Spent Fuel Interim Storage Facility (SFISF) in 2017

The extension of the Spent Fuel Interim Storage Facility (SFISF) is going on modular way in, considering the Paks Nuclear Power Plant's needs. The first three-vault module which is capable of storing the spent fuel at least for a period of 50 years and the reception building of the facility were ready by 1997. This was followed by the handover of a four-vault module in 2000 and of another one in 2003. The extension in westward direction was finished in 2007 with five vaults. After that the facility expanded eastwards, and in 2012, vaults 17-20 of the SFISF were completed. The capacity of these vaults was increased from 450 to 527 assemblies, thus the total storage capacity of the facility is 9308 spent fuel assemblies.

During the expansion of the facility by new vaults 21-24 there was no change concerning the existing technical solutions applied on vaults 17-20. In 2017 the construction work of vaults 21-24 were completed and the operator, the Public Limited Company for Radioactive Waste Management (PURAM) applied for the commissioning licence and occupancy permit based on the safety documentation prescribed by the Nuclear Safety Codes. According to the Hungarian legislation the competent authorities responsible for supervising environmental protection, physical protection and fire protection were involved in the licensing process. The public hearing related to the licensing process was held on 14 September 2017 in the main room of the city hall in Paks. The HAEA judged the submitted documents with the involvement of competent authorities and issued the licence to carry out the commissioning.

The commissioning started with the loading of a spent fuel assembly in March 2018. The HAEA inspects the commissioning works. In 2018 the PURAM will submit an application for the operational licence with the documentation containing the experiences of the commissioning phase and the HAEA will review the application with the participation of the involved co-authorities.

In February 2016, the PURAM submitted a “modification of the construction permit concerning vaults 25-33 of the SFISF” application. The licensee examined in addition to the extension of the storage facility if the further increase of the storage capacity of the SFISF may be increased concerning vaults 25-33, while ensuring the same level of safety and increasing the efficiency of storing. When designing the new concept, spent fuel that had been stored in the facility for over 20 years were taken into account instead of the three-year cooled ones, which due to the longer cooling period had a relatively smaller decay heat output. This allows an additional capacity increase inside the module, i.e. storing 703 storage tubes in the same geometry. Spent fuel assemblies that have been cooled for over 20 years in vaults 1-15 would be moved to vaults 25-33 with increased storage capacity.

The architectural parameters of the vaults of increased capacity do not change, only the placement of storage tubes will be constructed in a denser configuration. Through the planned storage capacity increase, the SFISF will have enough storage capacity in 33 vaults to ensure the interim storage of spent fuel of the Paks NPP until the end of its lifetime, including the 20-year lifetime extension. Based on this construction permit the PURAM has applied for a construction permit for the next four (No. 25-28) vaults and after the assessment of the underlying documentation, the HAEA approved the application and issued the construction permit.

Safety reassessment of nuclear facilities shall take place every 10 years. The PURAM carried out the first PSR, mandated by the Act on Atomic Energy, in 2007. In order to support the further operation of the SFISF the licensee submitted the respective Periodic Safety Report to the HAEA by 30 November 2017. The regulatory assessment of the report is going on.

In 2013, the HAEA issued a resolution for the PURAM, requiring it to review and process the experiences gained from the Fukushima accident and produce an assessment report thereof. Similarly to the Targeted Safety Reassessment carried out at the Paks NPP, the PURAM also concluded the safety reassessment of the SFISF. Over the past two years, the review of the site characteristics has been carried out for possible extreme parameters, as well as the examination of the impact of these extreme values on the safety barriers, and the analysis of the protection of the SFISF against external threats. It should be assessed concerning the risk factors if the design basis of the storage has been established appropriately and what margins it has beyond its design basis. The results of the tests carried out demonstrate that the SFISF has margins beyond its original design basis that ensure compliance with the post-Fukushima requirements.

The challenges of the next years concerning SFISF will be the works related to the construction and commissioning of vaults 25-28.

Planned facility contains 8 modules (1 module = 3 to 5 vaults)

- 5 operating modules (vaults No. 1-20)
- 1 module constructed, under commissioning (vaults No. 21-24)
- construction permit for 1 module (vaults No. 25-28)
- 1 additional module planned (vaults No. 28-33)

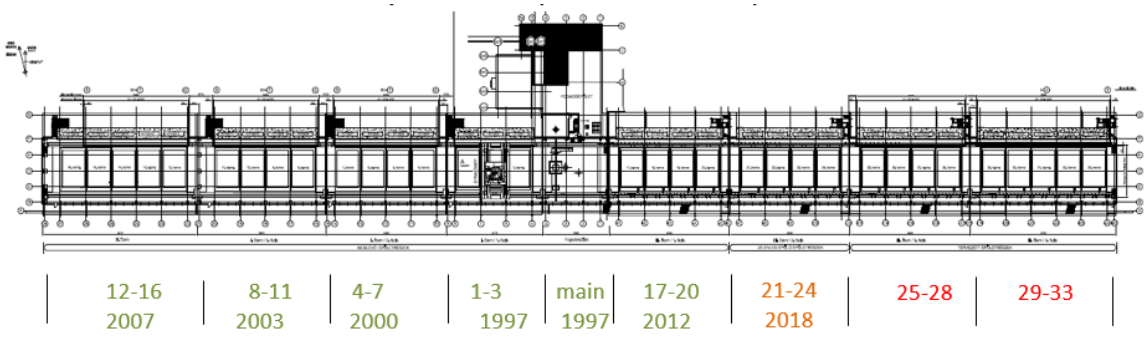

Figure 1 State of SFISF in January 2018

The first periodic safety review of the RWTDF is concluded

In December 2017, the periodic safety review (PSR) carried out by the Public Limited Company for Radioactive Waste Management (PURAM) – the licensee of the Radioactive Waste Treatment and Disposal Facility (RWTDF) – was concluded with the HAEA's resolution.

According to regulations becoming effective in 2015, the compliance of radioactive waste storage facilities and repositories with the relevant safety requirements and the risks associated with them are to be fully assessed, analysed and evaluated on a regular basis, just like in the case of the nuclear facilities. The review takes place every ten years, taking into consideration all relevant experiences gained during the operation of the facility or other domestic or foreign applications of atomic energy, new safety-related knowledge gained and international guidance published during the elapsed period.

The PURAM carried out a comprehensive assessment, analysis and evaluation of the RWTDF's safety in the first phase of the PSR. The results of this work, the non-compliances identified and the programme of the corrective actions to be taken were submitted to the HAEA in a report. Upon the review of this report by the competent authorities – including the competent authorities responsible for mining, fire protection and disaster management – the HAEA issued the resolution concluding the PSR, in which it prescribed corrective actions for the management of the safety-related non-compliances.

The operation license of the National Radioactive Waste Disposal Facility

The HAEA has taken over the responsibility of regulatory oversight of the repositories since 1 July 2014, the legal framework for which is laid down in the safety requirements for facilities ensuring interim storage or final disposal of radioactive wastes and the corresponding authority activities of the Government Decree 155/2014.

The National Radioactive Waste Disposal Facility (NRWDF) is situated in Bátaapáti, where the disposal of low and intermediate level radioactive wastes of Paks nuclear power plant takes place. Radioactive waste is delivered to the site in 200 l drums, and the final packaging is made on site. The final waste package is a reinforced concrete container with nine drums containing waste, where the space between the barrels is filled with inactive cement.

The Public Limited Company for Radioactive Waste Management (PURAM) submitted the operation license application on 25 April 2017. The safety analysis report substantiating the operation procedure, the operational limits and conditions, the emergency operating procedures and the emergency preparedness and response plan had been prepared in compliance with the legal requirements. These documents were annexed to the operating license application. According to the law and the administrative requirements, the duration of the operation licensing

procedure is six months. This period does not include certain procedural steps, such as the duration of the process of the involved competent authorities

The Baranya County Government Office took part in the licensing procedure of the HAEA as a competent environmental and mining authority. In accordance with the applicable legislation, the HAEA, as part of the procedure, held a public hearing in the great hall of the community centre in Bátaapáti on 8 June 2017. During the review and evaluation of the application and its supporting documents, the HAEA requested additional information and documents for the completion of the application in June 2017. By the end of July 2017, the PURAM fully submitted the additions required by the HAEA. The operation license of the NRWDF was issued in September 2017, where all the competent authority opinions and legal requirements were taken into account.

It is important to note that the operating license extends the current operation of the facility and the newly installed I-K2 chamber. For the I-K2 chamber the PURAM introduces a new waste disposal technology. In the new technology, the final waste package is, the so-called compact waste package (CPW), made in the nuclear power plant. A metal container will be filled with 4 drums containing solid radioactive waste, and the space between the drums will be filled with radioactive cement. The final placement of CPW delivered to the NRHT is disposed in the reinforced concrete pool in the I-K2 chamber. The pool is closed step by step, in parallel with the filling. After the complete closing of concrete pool, additional drums will be placed on the top of it. Using the new technology, space utilization has been optimized.

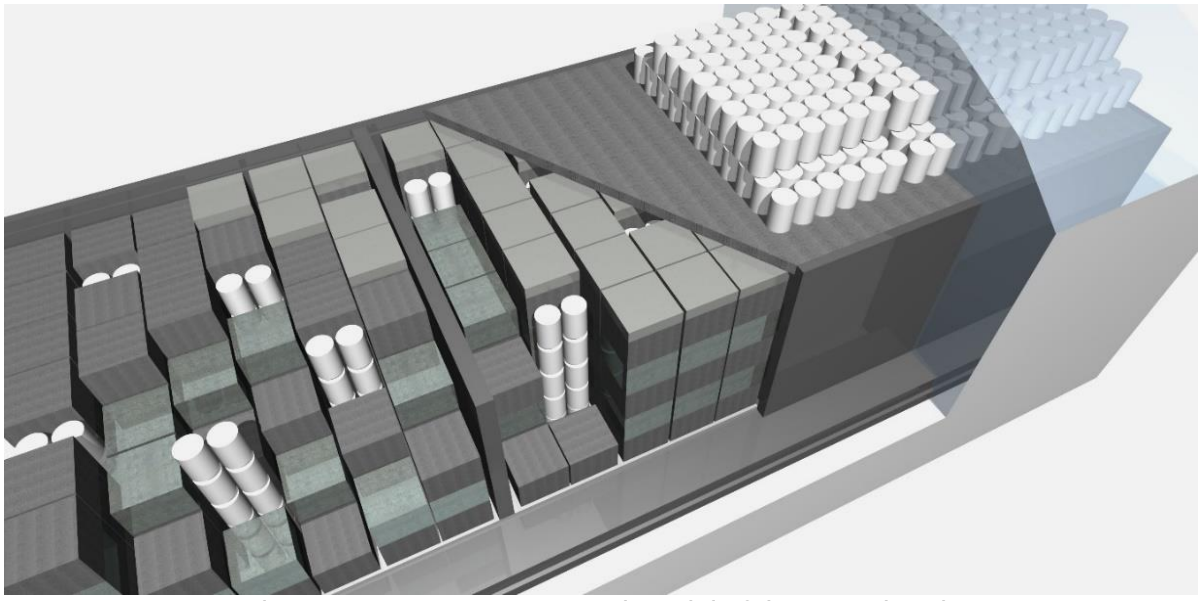

Figure 1 Computer generated model of the I-K2 chamber