HUNGARIAN ATOMIC ENERGY AUTHORITY
Nuclear Safety Bulletin
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RECENT DEVELOPMENTS IN NUCLEAR SAFETY IN HUNGARY
October 2017

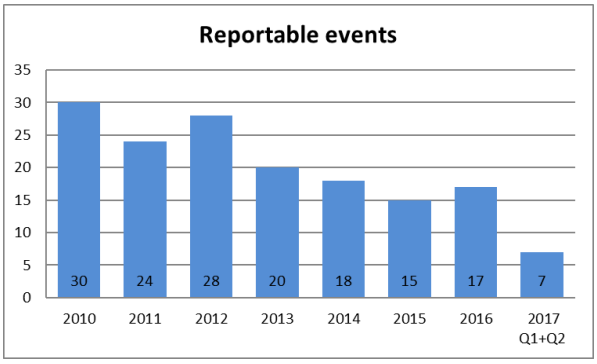
General

Semi-annual safety performance assessment, 2017

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

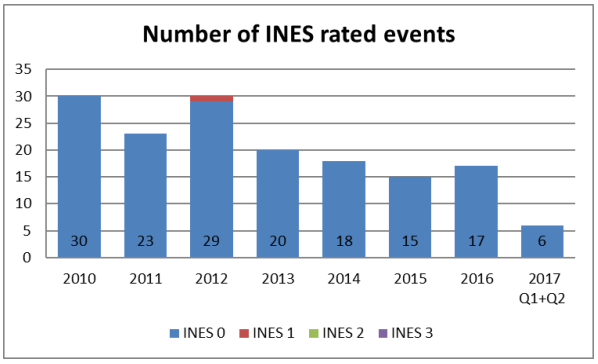
The safety performance data are taken from the 1st and 2nd quarterly reports of Paks NPP and the 1st semi-annual reports of the other licensees.

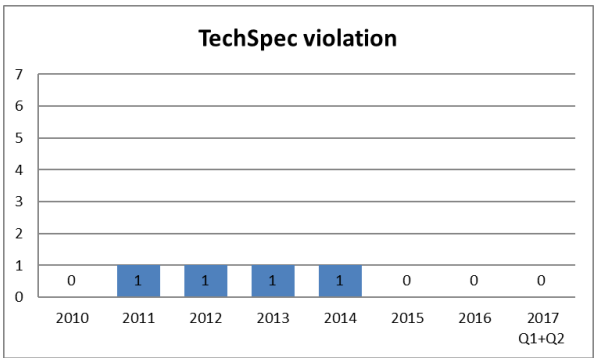
Paks Nuclear Power Plant



Seven reportable events occurred in the first half of 2017.

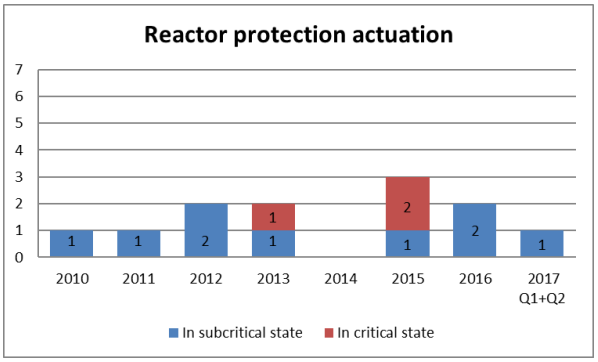
Out of the seven events reported by the NPP six were of category „below scale" corresponding to Level-0 on the seven-level International Nuclear Event Scale (INES). One event was out of INES scale.

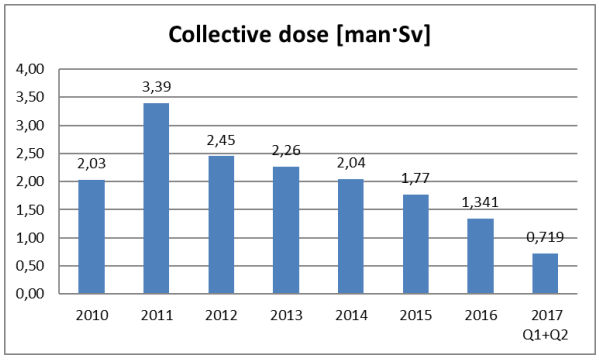




There was no event causing violation of technical specification during the examined period.

One automatic reactor protection actuation occurred in this period at Unit 2. During the event, automatic shutdown occurred on the fifth main circulation pump due to a temperature measurement failure.

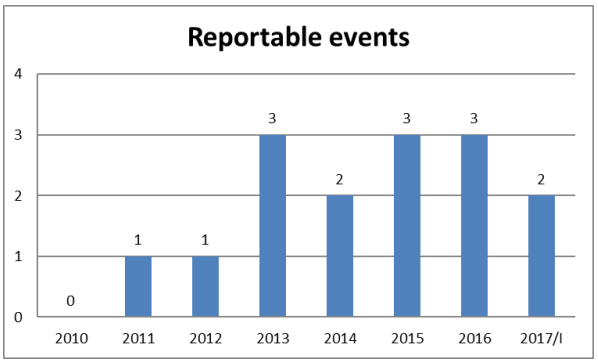


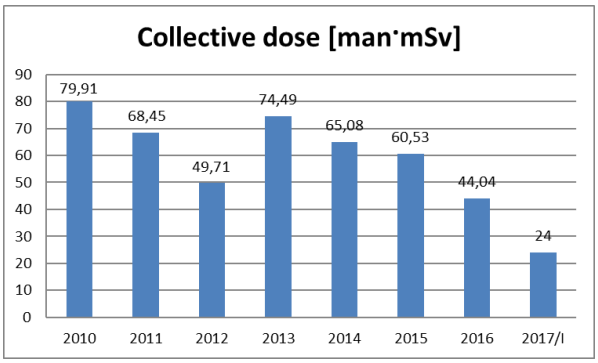


The collective radiation dose of employees has been gradually decreasing since 2011. As there is a regular time lag in the reporting of collective doses, the 1st and 2nd quarterly reports refer to the doses of the November to April period. The collective dose was below the planned value.

Budapest Research Reactor

Two reportable events occurred in the first half of 2017.

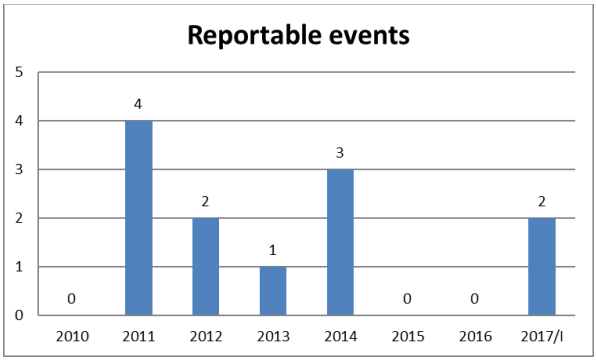


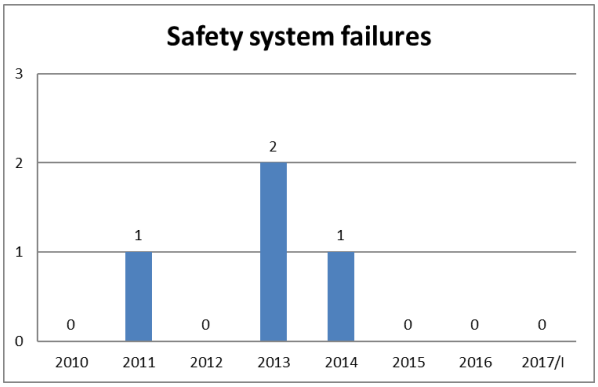


The expected collective dose for 2017 based on the half year's data is comparable to the previous year's values. This value refers to the doses of the December to May period.

BUTE Training Reactor

Two reportable events occurred in the first half of 2017.



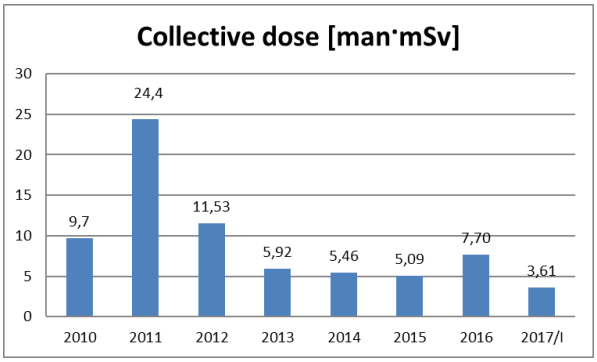


No safety system failure occurred in this period.

Interim Spent Fuel Storage Facility

The expected collective dose for 2017 based on the half year's data is comparable to the previous year's values.

Up to now, no reportable event occurred in this period in the ISFS facility.



As a summary, it can be concluded that during the first half of 2017 the nuclear facilities in Hungary operated in compliance with the limits and conditions specified in the operating and licensing documents.

International arrangements

Arrangement between the United States Nuclear Regulatory Commission (US NRC) and the Hungarian Atomic Energy Authority for the Exchange of Technical Information and Cooperation in Nuclear Safety

In the framework of a bilateral meeting on the margin of the 7th Review Meeting of the Convention on Nuclear Safety (CNS), the Director General of the Hungarian Atomic Energy Authority and the Chairman of the US NRC signed a new agreement for the next five years on the cooperation in nuclear safety.

The arrangement, with regard to the 27-year long cooperation, provides a framework for the future cooperation of the regulatory authorities. The authorities collaborate on the development of procedures regarding nuclear installations; the regulatory supervision of nuclear materials, radioactive waste and spent nuclear fuel; regulatory assessment of plans and measures of nuclear installations for safety and security improvement. The cooperation is realized through exchange of information on regulatory measures and experts in case of a nuclear emergency situation and also through implementation of joint projects.

Memoranda of Understanding signed on the margin of the 61st IAEA General Conference

Country Programme Framework - CPF

The document was signed by Mr Dazhu Yang, Deputy Director General, Head of the Department of Technical Cooperation of the International Atomic Energy Agency and Mr Gyula Fichtinger, Director General of the Hungarian Atomic Energy Authority in the framework of IAEA's Technical Cooperation Programme and contains Hungarian priority areas for the 2017-2022 period. The priority fields are: nuclear energy, management of radioactive waste and spent fuel, human health and nutrition, sustainability of nuclear institutions and knowledge management, nuclear security and emergency preparedness and response and application of nuclear techniques.

Memoranda of Understanding with the Polish and Moroccan authorities

The Hungarian Atomic Energy Authority newly signed an MoU with the National Atomic Energy Agency of the Republic of Poland concerning regulatory measures of new nuclear power plant designs (siting, construction, commissioning, operation and decommissioning of nuclear installations), radiation protection and physical protection, management of radioactive waste and spent fuel, radiological environmental monitoring and emergency preparedness and

response. The signatories exchange information in the above-mentioned topics and the cooperation might also be carried out in the form of visits and trainings provided for the other party.

The cooperation of the HAEA with the Moroccan Agency for Nuclear and Radiological Safety and Security covers the development of legislative basis in the field of nuclear and radiation safety, exchange of experience in licensing, oversight and control of activities, accounting for and control of nuclear materials and radioactive sources, as well as physical protection of nuclear installations. The agreement also concerns the regulatory assessment of operational indicators of nuclear power plants, plans and measures for safety improvement, emergency preparedness and response and the training of personnel of nuclear regulatory bodies. The cooperation is implemented in the form of exchange of information and documentation, visits of experts and scientific visits, organization of training courses, meetings and consultations and realization of joint projects.

Paks II. Project

The nuclear qualification process of the main contractor and the most important subcontractors of the new Paks nuclear power units is about to finish

According to the Hungarian legislation, the licensee of the nuclear power plant must confirm that the suppliers working on or in relation to the nuclear power plant are qualified and able to fulfil their tasks according to the nuclear safety requirements.

In line with that, the Hungarian state-owned MVM Paks II. Atomerőmű Fejlesztő Zrt., the project company, responsible for the construction of the 2x1200 MWe nuclear power plant with WWER (V491) type reactors, has almost finished the nuclear qualification audits of the main contractor, the Atomstroyexport Moscow, and its most important sub-contractors: Atomproyekt Sanktpeterburg as general designer of the power plant, OKB Gidropress as constructor of the reactor plant, Atomstroyexport Nizhny Novgorod as designer of the power plant, Kurchatovsky Institute as scientific adviser, and Orgenergostroy as designer of the construction erection base.

The scopes of audits cover the project management and design activities to be performed by the contractors during the first phase of the project finishing with obtaining the construction licence.

The HAEA has been supervising the audit processes that started on 18 April 2017 and will have been completed by the middle of October 2017. The Authority has been sharing its findings and recommendations with the licensee who considers them both in its decisions about the issuance of the nuclear qualification certificates and in the preparation for the upcoming audits.

Emergency Preparedness and Response

ConvEx-3 (2017)

The International Atomic Energy Agency (IAEA) along with 82 Member States and 10 international organizations concluded a two-day international emergency exercise between 21 and 22 June 2017 that tested responses to a simulated accident at the nuclear power plant in Hungary.

The accident scenario at Paks NPP simulated a significant release of radioactive materials into the atmosphere. This required States to address matters such as the prompt exchange of information, assessment of the situation, decisions on protective and other response actions including possible medical response, public communication, and the import/export of goods and border crossings.

"It is important to prepare for the worst, even while working to ensure it never happens," said Juan Carlos Lentijo, IAEA Deputy Director General and Head of the Department of Nuclear Safety and Security. "Through exercises like this, we can evaluate our readiness in case of a nuclear accident and identify good practices and areas for improvement."

Large-scale exercises of this kind are conducted every three to five years to test arrangements in place for fulfilling obligations under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. Based on a national exercise in a Member State, the Level 3 Convention Exercise (ConvEx-3) is the highest level of the IAEA and most complex emergency exercise. It is designed to identify emergency preparedness and response best practices as well as areas for improvement.

After the exercise, the participating organizations have prepared their organizational evaluation report, which should be submitted to the IAEA by the end of October 2017. The IAEA will compile feedback from participating Member States and international organizations into an evaluation report that will identify good practices and areas for further improvement in order to strengthen national and international preparedness to respond to nuclear and radiological emergencies of all kinds.

Regulatory activities

BME Training Reactor Periodic Safety Review

In September 2016, the BME Training Reactor submitted to the Authority the Periodic Safety Review Report and an application for a new operation license. The authority and the three competent authorities involved in the evaluation of the review (the Pécs District Office, acting within the Ministry of Environment and Nature Conservation of the Baranya County Office; the National Disaster Management Directorate of the Ministry of the Interior and the Buda District Disaster Management Agency of the Budapest Disaster Management Directorate) completed the review on 1 August 2017, with a number of obligations to further increase the level of nuclear safety.

In the assessment and authorization procedure, 20 inspectors of the HAEA participated in 7 workgroups. During the official review phase, several audits and negotiations were held between the licensee and the authority. The top management meeting with the Rector of the BME must be highlighted, where the main question was to arrange and organize the Training Reactor's status within the University's management system to ensure the priority of nuclear safety aspects at university level. Further important obligations were: the review of procedures for the examination programme of irradiated fuel assemblies, the preservation and improvement of the state of civil structures of the reactor building.

As a result of the Periodic Safety Review, the Hungarian Atomic Energy Authority has granted the operation license of the BME Training Reactor for another ten years.

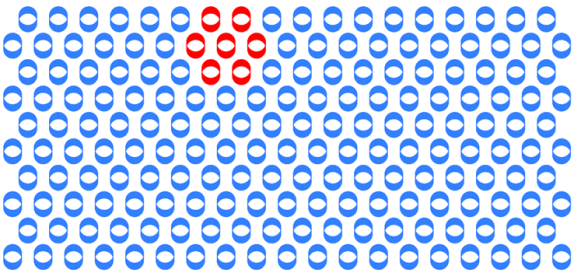
Modification of construction licence of the Interim Spent Fuel Storage Facility

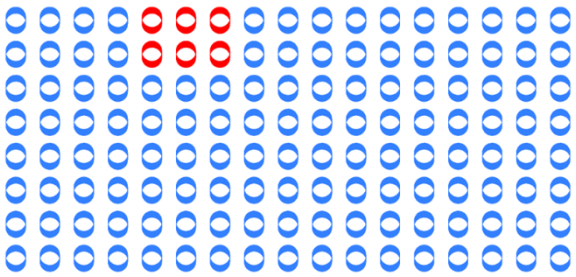
In May 2016, the HAEA issued the decision of the modification of construction licence for the 25-33 vaults of the Interim Spent Fuel Storage Facility (ISFS). The licence is valid until 15 December 2033. The HAEA stipulated several binding conditions, among others: the licensee shall develop internal procedure and technology to the safe handling of fuel assemblies degraded during storage. The regulatory procedure started by the application of Public Agency for Radioactive Waste Management (PURAM) in February 2016. The supporting documentation included the revised and updated version of the Preliminary Safety Analysis Report and an updated version of the Final Safety Analysis Report for the whole facility. The HAEA reviewed the licence application with the contribution of the designated co-authorities: the Baranya County Government Office Department of Environmental Protection and Nature and the National Directorate General for Disaster Management. According to the Act on Atomic Energy a public hearing should be held for all facility level licensing. In the corresponding public

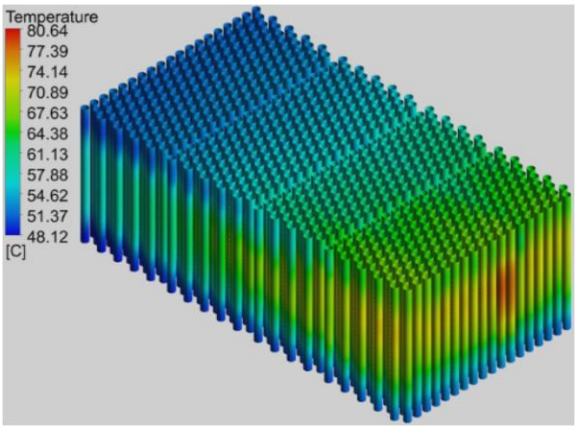
hearing on the 5 October 2016 the public interest was very low; there were no questions or comments. The modification of construction licences increased the existing storage capacity maintaining the same safety level.

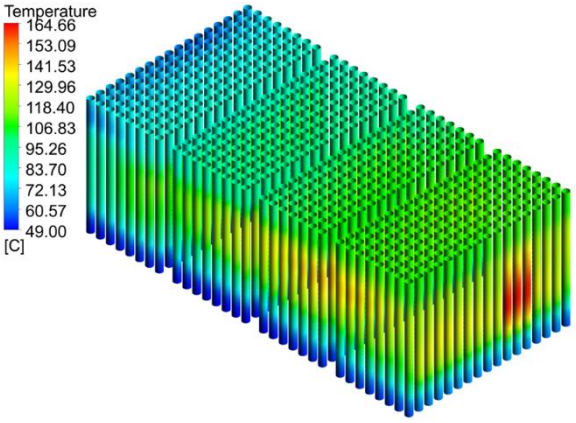
The improvement of storage efficiency of the future 25-33 vaults are based on a new concept. The spent fuel had rested for more than 20 years have lower residual heat output compared to the spent fuel freshly delivered from the nuclear power plant. This heat difference will enable the licensee to increase the number of storage tubes in the same overall geometry. In the future the long stored fuel assemblies are planned to be relocated from the oldest vaults (1-15) to these increased capacity vaults (25-33) and the fuel assemblies freshly delivered from the NPP will be loaded to the so vacated locations. The expanded storage capacity will be sufficient for the spent fuel generated at the NPP also considering its service life extension.

Installation and commissioning of new vaults of ISFS is going on in a modular way, parallel to generation of spent fuel at the NPP. Currently the ISFS operates with 20 chambers, providing a storage space for 9308 spent fuel assemblies. The new 21-24 chambers will be commissioned in 2018.









expanded storage (703 vault/module)

original storage (527 vault/module)

Registration of the professionals by the Hungarian Atomic Energy Authority

Currently, only the professionals registered at the HAEA are authorized to perform activities in connection with the civil structures used for atomic energy applications, according to paragraph 18/D of the Act on Atomic Energy (CXVI. of 1996).

The governmental decree 184/2016 (VII. 13.) came into force on 1 August in 2016 about the rules regarding the data content of the registration of civil engineering-technical experts, civil engineering designers, technical building inspectors and construction supervisors in connection with the structures used for atomic energy applications. According to this decree the HAEA has had a professional registration list since 1 August, 2016, in which 252 professional licences of 142 people are recorded. This list contains the professional's name, notification address, the exact beginning and end date of the registration and the validity time. It also includes the registration number (generated by the HAEA), the appellation, the letter codes of the professional area, the number of the decision, and also the case number.

As the HAEA does not have a statutory authorization for handling the professionals' personal data, this list is accessible only for the licensees (with the agreement of the professionals) through a protected server. This quasi „public" registration list contains the name and notification address of the professionals, the registration number with the appellation and letter codes of the professional area. Besides it includes the exact beginning and end date of the registration.

More information about the registration can be found on our homepage:

http://www.oah.hu/web/v3/OAHPortal.nsf/web?openagent&menu=06&submenu=6_1_1

Radioactive Waste Repositories

The operation license of the Radioactive Waste Treatment and Disposal Facility

The HAEA has taken over the responsibility of regulatory oversight of the repositories 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 (VI.30.).

The Radioactive Waste Treatment and Disposal Facility (RWTDF) can be found in Püspökszilágy, where the reception and disposal of low and intermediate level radioactive wastes of institutional origin take place. The RWTDF is responsible for providing its services over the entire area of the country. The fundamental functions of the RWTDF are the separation, compression and packing of the waste received, and the disposal of waste and the long-term interim storage of conditioned radioactive waste that cannot be disposed of in the repository.

In accordance with the applicable regulations, the PURAM submitted the operation license application for RWTDF on 30 June 2016. 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 of regulatory procedures and administrative services, 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 time needed to clarify facts and data contained in the application, and the time required to complete the application by answering specific questions of the regulator. The Baranya County Government Office and Pest County Government Office took part in the environmental and mining issues in the licensing procedure of HAEA, as a competent authority. The Office of the Chief Medical Officer of the National Public Health and Medical Officer Service, in its capacity as former supervisory authority, had given professional stance as domestic legal aid in the procedure. In accordance with the applicable legislation, the HAEA, as part of the procedure, held a public hearing in the Hall of the Mayor's Office in Kisnémedi on 8 November 2016. During the review and evaluation of the application and its supporting documents, HAEA requested additional information and documents as the completion of the application in December 2016. By the end of February 2017, the PURAM fully submitted the additions required by the HAEA. The operation licensing procedure was extended by 90 days

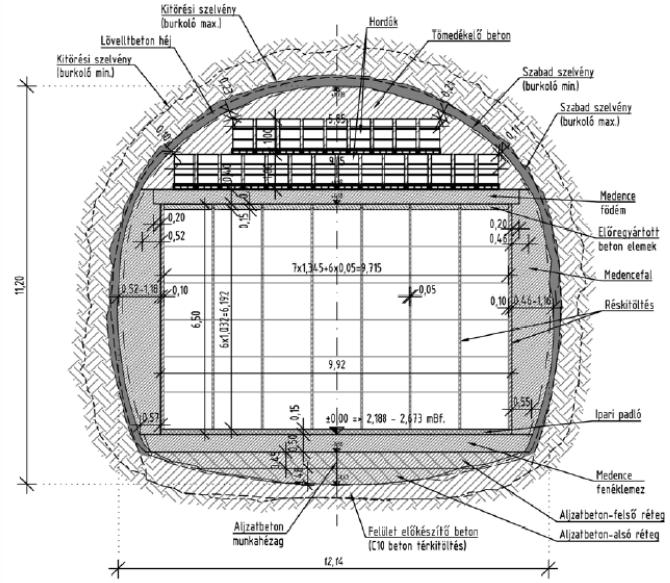
in April 2017. The operation license of the RWTDF was issued in August 2017, where all the competent authority opinions, domestic legal aid and legal requirements were taken into account.

The decision on operation license of RWTDF was published as a public notice, which had been available on the Notice board of the Mayor's Offices in Kisnémedi and Püspökszilágy, as well as on the website of the HAEA.

Construction License of the Reinforced Concrete Vault in the National Radioactive Waste Repository I-K3 Disposal Chamber

The HAEA has granted the construction license of the reinforced concrete vault in the National Radioactive Waste Repository (NRWR) I-K3 disposal chamber for the application of Public Limited Company for Radioactive Waste Management (PURAM).

The HAEA commenced the licensing procedure on 24 April 2017. As part of the licensing procedure the Government Offices of the Baranya County Mining Department and Tolna County Disaster Management Directorates, Szekszárd Branch Office have been involved as competent authorities. In their statements, the competent authorities granted their contribution to the construction license.

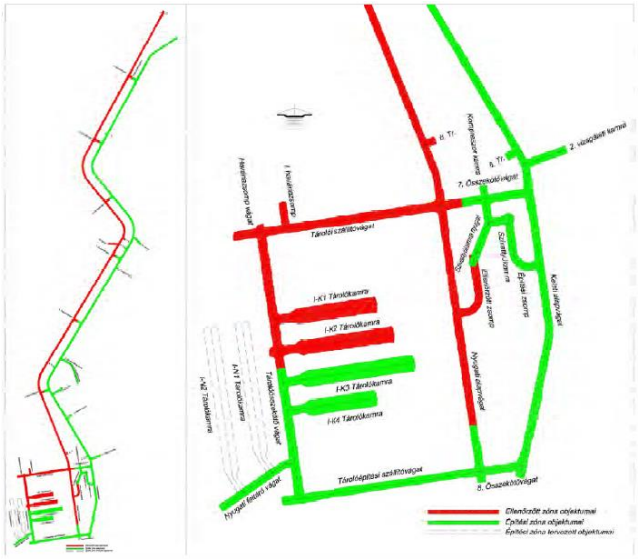


Formation of the reinforced concrete vault in I-K3 disposal chamber

During the procedure, the HAEA payed special attention to design requirements resulting from the disposal of radioactive waste, and the utilization of the recent experiences.

The reinforced concrete vault in the underground disposal area is designed to store the compact waste packages. As a technical barrier, the reinforced concrete vault has to fulfil special impermeability requirements, which are ensured by following the Austrian “Weiße Wanne” directive.

There are four chambers located next to each other, of which the I-K3 is the longest one. At present, the storage to the I-K1 chamber completed. The construction of the previous chamber, the I-K2 will probably be finished in the last quarter of this year. The I-K2 and I-K3 have similar concrete vault formation, therefore the experiences can be utilized during the construction works which are expected to commence in the first half-year of 2018.



The underground disposal area