Joint Convention
Questions Posted To Hungary in 2018

Q.No	Country	Article	Ref. in National Report
*	Japan	Planned Activities	77

Question/ Comment	Please provide measures taken by HAEA, except for retrieving and conditioning of the waste packages, under the demonstration program for decreasing public dose. We are appreciate if you provide concrete practice such as design modification of repository.
Answer	Because the original licence did not deal with waste acceptance criteria –spent sealed radioactive sources (SSRS) and waste consisting of long-half life and alpha emitting radionuclides were also disposed of. The results of the safety assessments clearly indicate that the SSRS could result in high doses to individuals who intrude into the facility after the closure and they could also lead to high doses following any future disruption of the facility by natural processes. To enhance the safety of the repository several options had been analyzed, beside the conditioning of the waste packages. Finally the proper backfilling and the construction of very robust cup of the repository were choosen as priorities in the design. The backfilling material is selected. However the detailed design of the closure of the site will be elaborated later. The safety analyses showed that in case of reconditioning of waste packages there are no necessary for additional changes in the repostoiry design. In the first phase PURAM launched a demonstration program (DEMO) for retrieval and removal these radiation sources. The main aim of the achievement of the demonstration program was that each step of the recovery technologies could be appropriately tested before starting the full scale retrieval program. Concerning the high level activities of radiation sources and much elevated radiation fields the demonstration program had to be concerned from the radiation protection point of view in the performance. For the licence of DEMO the authority (that time: the Capital National Public Health and Medical Officer Service) stipulated a safety analyses proving the acceptable radiation situation for workers and public. The safety analyses contained the dose assessment for workers and public too. The authority prescribed also many radiological measures for decreasing public dose, so the retrieval works had to be performed under a double tent with a locking system (performing radiation control measurements), depression mode in the inner tent, ventilation system with HEPA filters. During the airborne release from DEMO workplace H-3 and C-14 were measured, and the changing of dose rate and contamination of workplace and filter was continually controlled. After the DEMO it’s stated that the public dose was very low: in the order of nSv.

Q.No	Country	Article	Ref. in National Report
*	Austria	General	Whole report

Question/ Comment	It would be useful to report with explicit reference to the Articles of the Joint Convention.
Answer	

Q.No	Country	Article	Ref. in National Report
*	Austria	General	Whole report

Question/ Comment: Good practice: Highligting of recommendations of the last JC Review Meeting at the beginning of the report including actual status of related actions

Answer:

Q.No	Country	Article	Ref. in National Report
*	Croatia	General	A, 1

Question/ Comment: According to the Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3), National Reports should include overview matrix.

Answer: The overview matrix will be included in the national presentation, uploaded as answer support document and also sent to the officers of our country group.

Q.No	Country	Article	Ref. in National Report
*	France	General	Section A - page 8-13

Question/ Comment: Hungary’s 6th National Report presents a detailed summary that responds to challenges and recommendations set out in the previous report. However, according to the guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3), the report from Hungary should include an overview matrix chart of spent fuel and Radioactive Waste Management to be used by the Rapporteur during the Country Group review.

Answer: The overview matrix will be included in the national presentation, uploaded as answer support document and also sent to the officers of our country group.

Q.No	Country	Article	Ref. in National Report
*	Japan	General	82

Question/ Comment: The environmental radiation monitoring system is composed of various component, but how is the reliability of data transmission of these networks guaranteed? For example, at the event of a power outage, is any backup measures taken against transmission system failure?

Answer: In the SFISF, the entire power supply is provided from the main power station's two 6kV main distributors. With an automatic switch, the power is also secured for a possible blockade, because the two 6kV main distributors are also capable of delivering complete power. In the event of failure of supply and backup power, some important systems (for example the Radiation Protection System and the Ventillation System of Fuel Handling Machine) operate on an uninterruptible power supply, and even after this, it is possible to put into service a gasoline powered low power auxiliary generator. In the case of data backup, the radiation protection and technology signals of SFISF Radiation Protection System (RPS) are continuously transmitted to the RPS SCADA system of Paks NPP with a

one-way, secure and uninterruptible power supply data system, and daily data tape backup from the entire IT server including the signals provided by the RPS system.

Q.No	Country	Article	Ref. in National Report
*	Japan	General	10

Question/ Comment: Regarding the integrated monitoring system, we understand review of regulatory requirements is included in it. Can you provide some examples of improvement process of regulatory requirements, in particular, improvement significantly contribute to safety.

Answer: Measurement programmes shall be established for controlling the radiation conditions of the site and monitoring the environment. Such monitoring, control and signalling systems, which are capable of providing data on the radiological conditions, shall be designed and installed. (2.2.7.1400. Annex 2 to Govt.decree 155/2014. (VI. 30.) Korm. Safety Code Volume 2 Design, construction, operation of the storage and disposal facility, closure and institutional control of the disposal facility).

Q.No	Country	Article	Ref. in National Report
*	Japan	General	11

Question/ Comment: Generally speaking, experience of Fukushima Daiichi nuclear disaster should be studied with diverse approach. It is mentioned that PURAM was requested to perform study and report had been submitted to HAEA. Is there any implication in the report, although official report is not yet completed? Please provide provisional observation if possible.

Answer: In December 2016, the assessment report was submitted to the HAEA and after the regulatory assessment process, the HAEA approved it in November 2017. The assessments reports were taken into account in the light of the experience of the Fukishima Daiichi accident: SFISF characteristics of the site review, all human initiated hazards, which are more frequent than 10-4 / year, fires, electric interferences, all natural disasters, which are more frequent than 10-5 / year (Earthquakes, extreme weather conditions, natural fires). The analysed scenarios: Loss of Ultimate Heat Sink, Earthquake, Extreme weather conditions, Snow cover, High temperature, Tornado, Fire in car park, Forest fire, Airplane crash, Electromagnetic interferences, Liquid radioactive waste leakages. 2 low risk weakness were pointed out, when electromagnetic interference can affect on I&C components. (Mobile phone usage close to opened electrical enclosures and welding transformers used by the maintenance work). The action plan is implemented already: Licensee modified Operational Limits and Conditions. Limited usage of mobile phones during maintenance, Only EMC certified welding machines allowed, Manipulating of fuel prohibited while welding carried out-Reviews and safety assessments post-Fukushima demonstrate that the SFISF are safe and do not pose any significant risk to the health and safety of people or to the environment.

Q.No	Country	Article	Ref. in National Report
*	Japan	General	-

Question/ Comment	In Organizational meeting 18-19 May 2017, Format of the overview matrix to be included in the National Report was agreed and attached to the meeting report(Annex X). Is there any difficulty to develop overview matrix?
Answer	The overview matrix will be included in the national presentation, uploaded as answer support document and also sent to the officers of our country group.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	General	Annex 8.1.1/ p. 115

Question/ Comment	Which type of cartridge is used in container C-30 for transport of spent fuel to SFIS?
Answer	The type of cartridge is used in container C-30 for transport of spent fuel to SFIS: T12/B-4. (mass: 2100 kg, height: 3460 mm, outer diameter: Ø1460 mm)

Q.No	Country	Article	Ref. in National Report
*	Slovakia	General	General

Question/ Comment	Are there any legal provisions for the treatment of foreign radioactive waste (particularly in case of incineration of RAW)? If any, more detailed information on these provisions would be welcome (e. g. limits and conditions for effluents, the methodology of declaring the activity and nuclide composition of the imported and re-exported RAW, chemical composition of RAW and of the final product, etc.).
Answer	The Hungarian legal framework does not differentiate between the domestic and foreign RW when it comes to their treatment: the same regulations are going to be applied to both of them. These regulations are currently under revision (and will be supplemented if necessary) in order to ensure compliance with WENRA’s safety reference levels for RW treatment and conditioning facilities and activities and the guidelines of IAEA’s recently published specific safety guides on predisposal RW management. The current regulations regarding RW management are quite general in nature, they do not feature any specific limits and conditions for any of the RW characteristics. These are to be specified for each RW management facility individually in their waste acceptance criteria, based on the safety analyses and assessments done by the licensees. The WACs are parts of the facilities’ safety reports, thus being a subject to authorization processes: it is first reviewed by the HAEA when the licensees apply for a construction licence and then a second time when they apply for an operating licence.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 8.2	81

Question/ Comment	Can you provide the technical basis of fuel cladding maximum temperature(410oC) during interim dry storage?

Answer The passive, natural draught-based cooling used at the Interim Spent Fuel Storage Facility is a reliable system. Based on the analysis, the maximum temperature of the cladding that shall not be exceeded either under normal or incidental circumstances were determined to be 410 degrees Celsius. The storage facility is permitted to receive only those fuel assemblies for which the safety assessment proved that they will not be overheated. The temperature analysis of the fuel assemblies for the entire handling sequence of the assemblies is based on conservative assumptions.
This limit was applied only in case of former generation of fuel assemblies. Those assemblies have fuel pins with an internal pressure less than 6 MPa. Based on the real creep analysis, it was proved that the effective creep strain remains under 1 % after 50 years of interim storage period, taking 6 MPa internal pressure and the maximum possible cladding temperature. This calculation results in a positive outcome even if we assume accidental cladding temperature during the whole storage period. The assumed accidental situation is the 95 % blockage at the air inlets of storage modules.
In the case of the new generation of fuel assemblies, the pressure under the clad is around 8,5 MPa. In such a case it is not allowed to assume more than 3 years with accidental temperature (after 3 years the calculated creep strain will be equal to 1 %). But the nuclear safety is ensured also in this case, because the estimated time for eliminating the blockage at air inlets is less than 24 hours.
The creep strain calculations are based on the methodology presented in the following document: IAEA-TECDOC-1385: WWER-440 fuel rod experiments under simulated dry storage conditions.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 9.6	61

Question/ Comment From the operational experience of SFISF, what kind of things can you said as advantage and disadvantage of SFISF.

Answer During the 20 years of operation of the SFIS Facility there were minimal emissions, the doses arising from the airborne releases (dominated by the crud and evaporated cask water during fuel drying and handling) and the liquid effluents. The exposure of the critical group of the population is calculated on the measured emission data and these calculations show negligible doses. The annual personal doses for the workers were low compared to the radiation protection limits. These doses depend on the extent of operation and maintenance activities and the numbers of the replaced contaminated aerosol filters.
During these years there were just few technical difficulties, for example failure of the inflatable seal in the fuel drying system, problem with fan belt in the ventilation system, blockage of the filter in the liquid waste system, failure of the seismic restraints of the fuel handling machine. According to the yearly reviews of the operational experiences some slight modifications were introduced.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 9.6	63

Question/ Comment Regarding SFISF, what kind of aging phenomena do you particulary concern during the storage period?

Answer	As far as the main mechanisms of ageing are considered, the following phenomena and issues are of high importance: irradiation, corrosion, fatigue, thermal ageing, creep, oxidation, wear, embrittlement, concrete degradation (carbonation, shrinkage, cracking and spalling).

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 10	Section G.2/ p. 64

Question/ Comment	Hungary is currently selecting a site for the future deep geological repository for the disposal of spent fuel (SF) and HLW in the Mecsek Mountains in the Boda Claystone Formation. In the event that this site will for some reason not be used for the construction of a deep geological repository (DGR), is there any substitute (alternative) location for DGR under consideration, for example in the Szecseny Schlier rock environment (formation) in northern Hungary?
Answer	In 2000-2002, a country-wide screening was performed, and the Boda Claystone Formation was ranked as the best potential host rock for the future deep geological repository in Hungary. Although site investigation in the Mecsek Mountains has revealed encouraging results till now, Hungary is planning to repeat the screening process in 2018-2019, considering new geological information accumulated during past decades and applying revised qualifying criteria. An alternative formation for further investigation may be selected based on the results of this process.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 11	68

Question/ Comment	In page 68 "Based on the experiences of the investigation of the incident on 2 December 2013, significant organizational, personnel changes and technical improvements have been made at the RWTDF. On 1 June 2014, the Independent Technical Safety Section, directly headed by the Managing Director was established to enforce PURAM’s safety policy. The quality and control of the professional work has increased, and safety oversight became more effective and the overall safety culture increased." found. After the accident, technical improvements seems to have been made, however, what kind of improvement is made ? Could you give us some concrete example ?
Answer	Measures were taken to establish the possibility and to enhance the efficiency of controlling and qualifying waste packages (checking compliance with WAC) already on the site of the waste producer. Also, waste conditioning procedures of most important larger waste producers were audited by PURAM. A segmented gamma scanner equipment was put into operation in the facility allowing non-destructive measurement of the content of waste packages. The air ventilation system of the facility was reconstructed.

Q.No	Country	Article	Ref. in National Report
*	United States of America	Article 11	Section H.3 pg. 69

Question/ Comment: In the site selection process for a radioactive waste repository, the survey referendum indicates considerable local government support. Please provide any lessons learned from this process which will be applied to the proposed siting of a spent fuel repository.

Answer: PURAM has offered active partnership to local municipalities since the very beginning of repository projects. The Hungarian legislation allows local municipalities around planned or existing facilities to establish so-called information and control associations which receive detailed information about site selection and operation. These associations have become important and effective institutions for involvement of locals on an everyday basis. (For instance, control groups were formed which are allowed to do independent checks in the facilities; associations issue newspapers and organize information days for their citizens.) According to the relevant government decree, the associations receive financial incentives from the Central Nuclear Financial Fund, which can be used not only for their main activities (sharing information to public and control siting and operation activities) but for developing their municipalities. Whenever possible, PURAM tries to hire employees who are local citizens.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 12	106

Question/ Comment: The information on remediation and long-term management of former uranium mine seems to be a valuable for CPs who face similar problem. Sharing such information meets a value of Joint Convention.

Answer:

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 12	Section H.2/ p. 67

Question/ Comment: Could you specify the corrective measures ordered by the HAEA based on the mentioned report submitted in June 2016?

Answer: The new governmental decree entered into force in 2014. This decree provided a period for the licensee for the fullfillment of its requirements. The exact value of the period and the scope of the program for the fulfillment is issued in a HAEA resolution. The measures in the HAEA resolution cover all the issues identified by the licensee and those identified by the HAEA. E.g. the licensee shall evaluate its safety policy, shall update the management system and the corresponding documentation, the management system shall be amended with requirements for the managers' self assesment, shall make a lifetime estimation for those SSCs where it is missing, shall create a database supporting the age management program, shall make a new fire hazard assessment.

Q.No	Country	Article	Ref. in National Report
*	France	Article 13	Section A - page 8

Question/ Comment: The Boda Claystone Formation (BCF), in the Western-Mecsek Mountain, is considered as the best formation to host deep disposal of high level waste and may also be used for disposal of spent nuclear fuel. Could Hungary specify if the geological research plan, rescheduled due to financial restraints and prepared by the Public Limited Company for Radioactive Waste Management (PURAM)

in 2012-2013 and running until 2018 (p. 65), will provide sufficient data for the generic qualification of the Boda formation and the safety assessment of the site (deep and surface)?
Could Hungary provide information on the future survey programme and site qualification, in particular underground?

Answer PURAM intends to continue the geological research at the Boda site to collects sufficient data for a preliminary safety assessment expected to be compiled in 2022. Based on the results of this evaluation, a smaller area will be selected for further surface investigation using boreholes and geophysics. Decision on the construction of an underground rock laboratory will be taken in 2030, and details of the underground investigation programme will be developed after that. So the internal milestones have been rescheduled, but the main milestone for starting the construction of the underground rock laboratory has been kept.

Q.No	Country	Article	Ref. in National Report
*	France	Article 13	Section H - page 66-67

Question/ Comment The RWTDF, located at Püspökszilágy, is a near-surface repository. The vaults and the wells are located above the water table in the unsatured zone within Quaternary clayey loess of 30 m thick (ANNEX 2, p. 83). As loess is know as being fragile under seismic events and hydrology, could Hungary specify, to ensure fulfilling safety functions, if the RWTDF was built taking into account the potential seismic impact (e.g., peak ground acceleration, site effects) and the evolution of hydrogeological context (groundwater levels variations)?

Answer The last post-closure safety assessment of the RWTDF site considered the effect of adverse surface evolution as an alternative scenario. This scenario relied exactly on the assumption described in the question: the long-term effects of loess instability, slope sliding. This scenario assumes that due to the damage of the vaults (caused by loess instability) the fluids infiltrating into the waste zone flow directly to the surface and the evolution of likely surface contamination is controlled by erosional processes. The scenario uses the following assumptions: 1) somewhere between 150 and 1000 years, the slope of the hill slides, 2) the protective surface layer (clay) of the facility gets damaged, 3) no hydraulic sealing anymore, therefore the flow rate through the waste zone gets intensified, 4) no unsaturated zone in the model, contaminants get to the surface.
Simulations indicate that this scenario results in the increase of max. dose twice as high as in the case of the normal scenario, but still below the dose constraints.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 13	Section H.3/ p. 71

Question/ Comment How many reinforced concrete containers presented in Figure H3-3 have already been disposed?

Answer Currently the first disposal chamber (K-1) is full, altogether 537 reinforced concrete containers (containing 4833 drums) have already been disposed of there.

Q.No	Country	Article	Ref. in National Report
*	Slovenia	Article 15	H, p. 66

Question/ Comment: How long will you provide an institutional surveillance for the radioactive waste disposal facilities?

Answer: The Decree 155/2014 (Safety requirements for facilities ensuring interim storage or final disposal of radioactive wastes and the corresponding authority activities) declares that the licensees, subsequent to the closure of the storage or disposal facility shall take care of active institutional control of the facility. Based on the licence for active institutional control, the licensee shall monitor the disposal facility and its environment, and shall take the necessary actions to ensure the safety of the storage or disposal facility.
The time validity of the licence for active institutional control shall be determined by the atomic energy oversight organization considering the features of the disposal facility and the planned date of transition to active institutional control. The validity of the active institutional control licence is at least 50 years. If the atomic energy oversight organization, based on the results of the periodic safety reviews, finds it necessary, the time validity of the active institutional control licence can be extended.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 15.1	67

Question/ Comment: Is the PSR periodically reviewed to ensure continuous improvement? Please provide concrete example of revised items in PSR in this review period?

Answer: During the periodic safety reviews of nuclear facilities, radioactive waste storage facilities and repositories, their compliance with the relevant safety requirements and the risks associated with them are to be fully assessed, analysed and evaluated on a regular basis, every ten years. During this process all relevant experiences gained from the operation of the facility or by other domestic or foreign applications of atomic energy, all new safety-related knowledge gained and international guidance published are to be considered.
The PSRs consist of two consecutive phases: First the licensees carry out a comprehensive assessment, analysis and evaluation of the safety of their facilities. The results of this work, the non-compliances identified and the programme of the corrective actions to be taken are then submitted to the HAEA in a report (PSRR). Upon the review of this report by the competent authorities – including the co-authorities responsible for mining, fire protection and disaster management – HAEA issues a resolution concluding the PSR, in which it prescribes corrective actions for the management of the safety-related non-compliances. The licensees are required to present the progression and results of these corrective actions (this requirement is prescribed in the resolutions concluding the PSRs). HAEA inspects and assesses the progression, results and effectiveness of these corrective actions and will take enforcement measures if any non-compliances are identified. So basically all safety-related non-compliances and their corrective actions are reviewed at least once during the subsequent review period.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 15.2	68

Question/ Comment: We understand that you took various measures for incident including providing education to RWTDF workers. Could you elaborate it for them?

Answer: Investigations performed after the incident showed that there was no satisfactory separation between the waste technology/work execution and the safety overview functions. New manager (leader) positions were established at the facility and now the key positions are the following: a) radiation protection officer, technology leader (newly established position), facility maintenance leader (newly established position) and operation safety leader (newly established position). In addition, a new department (independent from the operations) was established which is responsible for safety overview of all facilities of PURAM (among others RWTDF in Püspökszilágy). The procedures and fundamental documents of the quality management system linked with the operation and waste acceptance system was overviewed and modified. As far as the competence building and training is considered, the investigation concluded that there were rather few employees having higher (college/university) degree and - regarding waste manipulation activities - specific radiation competence was not at an appropriate level. To solve this problem, three new professionals with higher university degrees were hired for the technology leader, facility maintenance leader and dosimetrist positions. In addition, quite a large group of employees were further educated in the field of radiation protection and participated in a so-called comprehensive course on radiation protection organized by the HAEA according to the relevant government decree.

Q.No	Country	Article	Ref. in National Report
*	France	Article 17	Section A - page 9

Question/ Comment: An important environmental remediation programme was accomplished for the closed uranium mine in the Mecsek Hills and post-remediation tasks are to be performed for the long-term.
Could Hungary specify the long-term plan of monitoring and radiological protection of the population concerning the radon concentration in the remediated area and in the surrounding region ?

Answer: The closed uranium mine and remediated residues area have a long term operational monitoring program (overviewed by 5 years) for 30 years including radon concentration monitoring on site and in the vicinity of the affected area. The radiation protection of the population concerning radon radiation burden is basically solved, and the changes of radon levels could be tracked on the remediated area. At present, in the frame of the National Radon Action Plan radon surveillance is to be prepared for the whole Hungarian area including the Mecsek Hills (uranium mining area) for long term, and this plan will also provide a control of the elevated radon level territories.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 18	Section E.2.1/ p. 38-39

Question/ Comment: Do you consider public hearings you organize as an effective tool for public communication in the licensing process?

Answer To involve public into the regulatory decision making processes is an international recommendation that has a tight bond with transparency and openness. Public hearing is not only a communication tool, but for HAEA this is the main tool for public involvement. We believe that this direct, face to face communication is the best way of informing people from first hand, build trust and answer questions, understand their fears and concerns, receive their opinions. From this point of view, there is no other tool like this.

In Hungary by law HAEA has to hold public hearings for every licensee level licensing procedure, so it is not a case by case decision, or based on the effectiveness of this tool. Legislation ensures that public involvement will happen in those cases.

When the topic is less controversial and the Regulatory Body is well trusted, it might hapen that fewer people appears at a public hearing, however it does not mean that this tool would be less effective.

Q.No	Country	Article	Ref. in National Report
*	United States of America	Article 19	Section E.1 pg. 36

Question/ Comment Please clarify which organization is responsible for preparing the environmental assessment report for constructing a new spent fuel storage or a radioactive waste repository. What is the role of the public in the review and comment process? For example, do interested parties have the opportunity to provide written or verbal input and participate in public hearings?

Answer According to the Act on atomic energy PURAM is responsible for both interim storage of spent fuels (provided the storage takes place in a site different from that of NPP or research reactor) and disposal of radioactive wastes. So, PURAM is responsible for performing environmental impact assessment and preparing the environmental assessment report if the storage facilities are not on site of the waste/SF producer. In this regard, a good example for the whole process is the one conducted in Bátaapáti (see Chapter H.3, pp. 69). Considerations of environment protection issues relevant to spent fuel and radioactive waste management are given in Act on Environmental Protection. (This Act applies to projects that may have significant environmental impacts.) Construction of a new, spent fuel storage or a radioactive waste repository always requires an environmental licensing procedure which is based on an environmental impact assessment and where a wide range of interested parties can take part. The Act also calls for public hearings in local and neighbouring municipalities and of other interested groups. There is an opportunity to provide written and verbal input into the process. These issues are within the competence of the minister responsible for environmental protection. Hungary is also committed to the international agreements concerning environmental impact assessment. As a member of the European Union, Hungary also complies with the relevant Council Directive.

Q.No	Country	Article	Ref. in National Report
*	Belarus	Article 20	Section E

Question/ Could you, please, clarify the following:
Comment 1. In what way is the graded approach reflected in the distribution of the regulator's resources in various spheres of regulatory activity?
2. Please explain the strategy to compensate for loss of qualified personnel in the regulator. What are the measures taken by the regulatory body in this respect? Are there relevant documents developed for this purpose?
3. How is the problem of retaining newly recruited specialists in the regulator resolved?
4. What are the main internal procedures and methods used to verify professional competence of the regulator's specialists?

Answer 1. Continuous monitoring of the competence and the capacity of the employees is a very important device of the management of human resources. Human resources are always changing, developing and transforming. Organizations have to try to keep up with this process in order to be able to perform their task efficiently.
The HAEA monitors its human resources continually and often implements internal transfer of human resources, keeping in mind the professional competence and experience to be utilized at the highest level.
2. The Authority seeks to develop conscious management of human resources, in the framework of which it prepares the foreseeable loss of workforce (particulary retired colleagues). We are trying to keep the knowledge of senior colleagues through a so-called mentor program. The elderly, more experienced colleagues and the young newcomers are working together in order to transfer professional knowledge and experience.
The process of internal regulation of this mentor program is being developed. It will include a detailed procedure and a strategic plan of the HAEA to keep human resources and knowledge base at a high level. 3. The newly recruited professionals have the opportunity to develop their knowledge at our organization. We offer a very special, exceptional opportunity to acquire knowledge in the field of nuclear energy.
The Hungarian Atomic Energy Authority is a special, unique organization within the sphere of public administration. Compared to most organizations of public administration, employees of the HAEA receive a higher salary based on the Act CXVI of 1996 on Atomic Energy (Atomic Act).
In addition, the leadership tries to maintain an efficient policy of financial management in order to be able to offer competitive benefits for the employees. 4. The activity of employees is verified throughout the year and evaluated by their leaders every six months. This system of benchmarking includes many aspects related to the individual competencies and the quality of task supplying. On the one hand, the benchmark system helps the leaders to monitor the activity of their employees. On the other hand, this system could motivate the collegaues to improve themselves and do their job more efficiently.
This system is regulated in laws, which contain the detailed procedure of benchmarking, the requirements and the deadlines of the measures to be taken.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 20	Section E.2.1/p. 38

Question/ Comment: How many inspections are carried out by HAEA per year in SFIS and what are their objectives?

Answer: The number of inspections depend on the type of the licensee's activities in the SFISF and on the regulatory experience. Generally, in every 3 years HAEA performs a comprehensive inspection and annually 5 to 15 ad hoc or revealing inspections. A comprehensive inspection is performed on pre-specified areas of the licensee's activity by the nuclear safety authority. The cyclic system for comprehensive inspection systematically covers all topics in a 10 year period (the time interval between the 2 PSR's). The purpose of the inspection is to examine the operation and interaction of the entire processes.

Q.No	Country	Article	Ref. in National Report
*	United States of America	Article 20	Section E.2.1 pg. 39

Question/ Comment: The U.S. commends Hungary on its impressive outreach program and for transparency including an annual press conference with media, holding a semi-annual conference on nuclear energy with special attention to improve experience for students, and issuing an annual publication on the safe use of nuclear energy in Hungary.

Answer:

Q.No	Country	Article	Ref. in National Report
*	Austria	Article 22	11

Question/ Comment: The NR mentiones the human resource policies of HAEA regarding units 5 and 6 of Paks NPP includes significant increase of HAEA staff, which was intended to be effective already in 2017.
Is the HR development plan met according to the schedule presendet in the report (40 additional positions in 2017)?
What is the actual status of the long term Spent Fuel Management Strategy for the new units at Paks NPP?

Answer: 1. Yes. the HR development plan has been met according to the presented schedule. However, it should be noted that during implementation the lack of enough skilled human resources causes problems. 2. After their use in the reactor, spent fuel elements are stored in the fuel pool situated close to the reactor, depending on the process technology, for a period of maximum 10 years, and subsequently this is followed by an interim storage period. Spent fuel elements originating from the new units will be placed in a new interim storage site which is to be established for this purpose. Their final deposit will be implemented pursuant to the national policy and programme determined on the basis of the Decision of the Parliament No 21/2015. (V.4.).

Q.No	Country	Article	Ref. in National Report
*	Croatia	Article 22	F, 49

Question/ Comment: HAEA doubled the number of personnel (164 members) to be able to perform the regulatory tasks taken over from the health authorities (amendment of the Act on Atomic Energy, 1 January 2016). Could you explain how training and education of new personnel was performed in short time frame?

Answer HAEA has a special training system which is mandatory for government officers and contains extensive education on nuclear safety and security knowledge. For the new radiation protection inspectors, HAEA organized a 3-month complementary comprehensive training program in the field of radiological protection, including the following themes: legal issues (licensing and inspection according to the new Govt. degree), practical skills (dosimetry in radiation hazardous workplaces, measurement techniques, radiation shilding calculations, etc.), application of atomic energy in medical and industrial workplaces and transport of radioactive materials. At the end of the training, each person passed a complex examination in front of a committee.

Q.No	Country	Article	Ref. in National Report
*	Croatia	Article 22	F, 51

Question/ Comment What is the average percentage of the funds given annually from the Fund to support the local communities, public information and involvement?

Answer In line with the Act CXVI. of 1996 on Atomic Energy, the Public Limited Company for Radioactive Waste Management, the body designated by the Government shall provide information to the population of the settlement or settlements hosting the storage or disposal facility and of the adjacent settlements; and of the settlements concerned by the permitted research drills in the frame of the site selection activity serving for the establishment of a storage or disposal facility, on a regular basis through the associations of municipal governments for control and information (hereinafter referred to as association). The associations may receive financial support from the Central Nuclear Financial Fund (hereinafter referred to as Fund) in connection with an existing or proposed storage facility.

The Act on Hungary’s Central Budget determines the amount of the financial support of the association.
In accordance with the Act C of 2017 on Hungary’s Central Budget for the year of 2018 this amount is 1 231.6 million HUF (3956.87 EUR). This amount accounts for 10.13 % of the total expenditure of the Fund (12 157.9 million HUF, 39060.74 EUR). Since 2014 this amount is essentially unchanged.

Q.No	Country	Article	Ref. in National Report
*	United States of America	Article 22	Section F.5.6 pg. 58

Question/ Comment Hungary seems to be very active in working with international partners in the area of emergency preparedness. Please describe the role of surrounding countries in this planning, and how Hungary envisions interacting with its neighboring countries in the event of an emergency.

Answer Hungary concluded bilateral agreements with Austria, the Czech Republic, Croatia, Germany, Romania, Slovakia, Slovenia, Ukraine and Serbia to mutually notify each other of nuclear or radiological emergencies in the early phase of such situations and assist each other should such a request be received. The bilateral cooperation provides a good opportunity to share experiences, to organize joint exercises and to elaborate the framework of joint activities.

The arrengements of the Hungarian Nuclear Emergency Response System are detailed in the Hungarian Nuclear Emergency Response Plan. The plan includes neighbouring nuclear facilities as emergency preparedness category (EPC) V, it contains the basic design parameters of these facilities.

The regional harmonisation of public protective actions during an emergency is not yet established.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 25	General

Question/ Comment: IAEA Safety Standards GSR Part 3 and GSR Part 7 expects that government authorities develop a protection strategy to protect people and environment in case of nuclear and radiological emergencies. Is this protection strategy implemented in your legislation and practice? If yes, could Hungary shortly describe how this is applied for RAW related installations (e. g. graded approach, etc.)?

Answer: The arrangements of the Hungarian Nuclear Emergency Response System are detailed in the Hungarian Nuclear Emergency Response Plan. The current 3.0 version of the plan was approved in February 2018. This version is in compliance with European Union Basic Safety Standards (Council Directive 2013/59/EURATOM laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation), therefore it contains the framework of the protection strategy.

In this strategy the reference level for emergency occupational exposure depends on the emergency preparedness category (EPC) of the facility. For the effective dose of adults and for the equivalent dose of the fetus it is 100 mSv for EPC I and II, in the areas of precautionary and urgent protective action zones during the first 7 days, and 20 mSv in any other case. As for RAW facilities, in Hungary, the Interim Spent Fuel Pool Facility is EPC II and the other radioactive waste repositories are in EPC III.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 25	F5, p. 56

Question/ Comment: What Emergency Plans are available at the site of the spent nuclear fuel and radioactive waste handling facility? Outside the site? Who, in which manner, and how often reviews the plans?

Answer: At the sites of all facilities the Nuclear Emergency Response Plans are available. The nuclear emergency preparedness activities at the site are specified by the Nuclear Emergency Response Plan. In the facilities the manager is responsible for the coordination and implementation of emergency response tasks. Outside the facility sites the coordination of execution of nuclear emergency response tasks falls under the responsibility of national, regional and local branches of the official disaster management organizations. In case of an emergency the County Defence Committees have the responsibility for the coordination of the emergency response process.

Q.No	Country	Article	Ref. in National Report
*	France	Article 26	Section B - page 21

Question/ Comment: The temporary waste repository of Solymar, closed at the beginning of the 1980's, was cleaned. The waste (LLW) was transferred for disposal to the Radioactive Waste Treatment and Disposal Facility (RWTDF) and restrictions are in place for the utilization of the Solymar site. Could Hungary specify the applied policies in terms of remediation of polluted soils and potential return to public use? More particularly for Solymar site, is it planned to be completely remediated?

Answer: As the site proved to be inadequate (impermeable properties of the soil, disadvantageous hydrogeology, etc.), the Hungarian Atomic Energy Commission decided on establishing a new radioactive waste disposal facility for institutional wastes close to the main production centre (Budapest). In December 1976, the new disposal facility was commissioned at the village of Püspökszilágy. In 1980 the Solymár site was cleaned up and closed by transferring all waste to the new facility. Six steel tubes containing the sealed sources were filled by liquid concrete . The tubes then were raised and placed into a transfer tube. These 'conditioned' tubes were placed to one of the vaults in the new repository. The wastes in damaged bags were packed into drums. The wastes in corroded drums were repacked to new drums or polyethylene bags before disposal in the new repository. A few cubic meters of liquid waste were processed before disposal. During the clean up process at Solymár site firstly, all radioactively contaminated parts (soil, debris) were disposed of at the Püspökszilágy Radioactive Waste Treatment and Disposal Facility. Then the upper layer of 10-15 cm of soil was removed and a new cover layer was placed on it. The site has been subject to environmental monitoring since that time. The site was declared usable by the regulator, but with some restrictions. The border of this site has to be marked and the use of the area of Solymár site is to be restricted, which means that the deep building construction (more than 1 m of depth) is prohibited on this area. Now this area is used by a shopping centre (park and parking area). The reason, why Solymár facility was not released for full unrestricted use, is because a little contamination was found on the surface and bottom of a few storage wells during decommissioning. Though, all contamination was removed and transported to the Püspökszilágy facility, the authority prescribed precaution measures to be maintained. Reflecting the site owner's investment poject plans affecting the former temporary waste repository of Solymár, the Hungarian Atomic Energy Athority provided a guidance to the site owner in 2017, regarding how to fullfill the land use restrictions ordered by the former radiation safety authority issuing the clean-up license in 1980. The precautionary actions (control measurements of soil activity concentration) are to be executed if the soil is disturbed more than 3 m depth. However, the investment project suggestion is to increase the thickness of the top layer of soil and to create a parking area there.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 26	Section F.6/p. 60

Question/ Comment: In section F.6 it is stated that "The new regulation determines the main steps of withdrawal of the facility from nuclear safety authority oversight following the termination of the decommissioning process." Does this new regulation also include a restricted release of the site from nuclear safety authority control, with any restrictions on the future use of the remaining structures? If yes, could you briefly describe the mechanism to ensure compliance with the restrictions and which organization will ensure that the restrictions are maintained and enforceable?

Answer Yes, the new regulation contains generally that the nuclear safety supervision of the nuclear facility and its site may be terminated by a release licensed for unlimited usage, or by a release licensed for usage with limitations. If the licensee requests the release of the nuclear facility and its site to be licensed for usage with limitations, then the licensee shall develop and submit its proposal related to the limitations, furthermore the draft of institutional monitoring system ensuring the observance thereof.
The regulation does not contain more detailed requirements in Hungary because the achievement of this phase of decommissioning is not expected in the near future. The surveillance of other authorities will not come to the end after the release from nuclear safety surveillance. These authorities are e.g. environmental and water supply authorities.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 26	Section F.6/p. 60

Question/ Comment Regarding the 20-year service life extension of the Paks NPP units and subsequent update of decommissioning plan, could you describe how this extension is affecting the creation of financial resources for the Central Nuclear Financial Fund for decommissioning of the Paks NPP?

Answer In accordance with Article 63, Paragraph (1) of Act CXVI. of 1996 on Atomic Energy, nuclear power plants are required to cover the costs of the emplacement of radioactive waste without the intention of retrieval and the temporary storage of spent fuel - including the decommissioning of storage facilities - and the back-end of the nuclear fuel cycle, the costs of decommissioning of the nuclear power plant, and the support provided to associations of municipal governments for control and information by making contributions to the Central Nuclear Financial Fund.

The Public Limited Company for Radioactive Waste Management, the body designated by the Government, shall provide for carrying out the back-end of the nuclear fuel cycle, as well as the decommissioning of a nuclear installation. Every year, the PURAM prepares the medium and long-term plans for the activities to be financed from the Central Nuclear Financial Fund including the recommendations for payment obligations. This plan determines the payment obligation of the Paks NPP taking into account a 50-year operational life (which includes a 20-year lifetime-extension). This ensures that the required financial resources will be available in due time.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 26	F 6.2.2, p.70

Question/ Comment Were recommendations of the joint NEA-EC-IAEA publication “International Structure for Decommissioning Costing (ISDC) of Nuclear Installation” [1]7088, 3 Feb. 2012, taken into account during the review of the Paks NPP Decommissioning Plan in 2016? If so, then how has the Paks NPP decommissioning cost changed as compared to earlier calculations?

Answer Yes, the recommendations of of the joint NEA-EC-IAEA publication “International Structure for Decommissioning Costing (ISDC) of Nuclear Installation” ¹7088, 3 Feb. 2012, were taken into account during the review of the Paks NPP Decommissioning Plan in 2016.
The decomissioning cost in present value has increased compared to earlier calculations, but there were several reasons for increasing in cost (bottom-up estimating method based on site specific data, increase in the scope of work, modification in the radioactive waste management concept).

Q.No	Country	Article	Ref. in National Report
*	Belarus	Article 28	Section J

Question/ Comment Does the country have a practice of life extension of sealed radionuclide sources after the end of their assigned lifespan?

Answer The rules for the use of sealed radioactive sources are determined by government decree 487/2015.(XII.30.)Korm. The responsible authority for life period extension of sealed sources is the Hungarian Atomic Energy Authority, that licenses the extension of the service period of the sealed radioactive source. The license application shall include the safety analysis of usage of the radioactive source and the integrity examination record that is not older than one year.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 28	J, p.75

Question/ Comment Based on what measurements and for what purposes is the Pu content evaluated in PuBe sources? The source activity is known already.

Answer The measurements are based on calorimetry, neutron coincidence counting, neutron and gamma spectrometry. The purpose of the evaluation of the Pu content was to specify real Pu content of the sources for the nuclear material accountancy. After the measurements, as it turned out, the real content was less than the given content.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 28	J, p.75

Question/ Comment It is stated that disused SRS should be disposed of in Püspökszilágy disposal facility? It this also applicable to disused SRS that contain long-lived radionuclides?

Answer No, it is not applicable for spent radioactive sources containing long-lived radionuclides. These items are only temporarily stored in certain purpose-designed wells of the facility (see p. 84, An 2.1.2 Handling and Storage). As soon as a deep geological repository (DGR) becomes available in the future (in 2064, according to the national programme), these spent radioactive sources will be transported to the DGR for final disposal.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 28	J, p.75

Question/ Comment: How do regulatory authority identify sources that have not been used for a longer period of time? What are the criteria for considering the SRS as disused?

Answer: In the electronic registration system, it is possible for the licensees to select the source-specific technical feature (for example: calibration, storage etc.). In the registry program, there is a "storage" tag for long time unused radioactive sources. Classification depends on the licensees. If the source feature has any changes, the licensees must report it in the registry system. Storage means that the source is still in the local and central electronic registry system, “storage” is only a tag in the electronic registry system. These radioactive sources are still under regulatory control. The Workplace Radiation Protection document contains requirements for sealed radioactive sources, for example: how often to do direct or indirect integrity tests etc.

Q.No	Country	Article	Ref. in National Report
*	United States of America	Article 28	Section J pg. 75

Question/ Comment: The report discusses an electronic registry system. Please clarify whether the licensees currently using sources have direct access to the registry system or whether access is limited to staff from the regulatory body.

Answer: The electronic registry system is divided into two parts. There are local registries in which the licensees have to keep track of every source and there is a central registry system, in which all of the registries of the licensees are kept track of. The central registry system is accesible only to the authorized staff from the regulatory body (HAEA), while the local registries are maintaned, managed and operated by the licensees. The program used for the central registry system is called "RADON". The name of the local registry program is "RADIUM". The „RADIUM” program and the updates are available on the webpage of the HAEA (Hungarian part), and this computerized registration program is free for the licensees and owners of radioactive sources.

Q.No	Country	Article	Ref. in National Report
*	Australia	Article 32	pages 24, 84-85

Question/ Comment: What is the policy for management of LLW and ILW wastes containing nuclear material? Are they processed at the Radioactive Waste Treatment and Disposal Facility in a way that allows for safeguards requirements to be terminated, or will they be disposed of as safeguarded wastes at a later date alongside HLW?

Answer: There is no explicit or specific policy besides the general safety and safeguards principles and measures. However, throughout the national policy and the national programme it is assumed that no processing of this sort of waste is or will be applied. Waste items containing nuclear material subject to safeguards are currently stored in a purpose-built unit in the technology building and will be transported into and finally disposed of in a domestic DGR together with other long-lived waste items unsuitable for safe disposal in

Püspökszilágy and HLW/SF from the Paks NPP. The safeguards issues linked to final disposal will have to be addressed there. According to our reference scenario of the national programme, such a DGR will be available in 2064.

Q.No	Country	Article	Ref. in National Report
*	Belarus	Article 32	Section D 2.4

Question/ Comment: The national report states that there is currently no need for immediate processing of ion-exchange resins produced at the Paks NPP. It is assumed that the total amount of radioactive waste in the form of ion-exchange resins until the end of the 50-year working lifespan of the NPP will total 459 m3.
What methods of processing and conditioning of ion-exchange resins are considered for their subsequent adjusting to the disposal acceptance criteria?

Answer: According to the current concept the ion-exchange resins are planned to be conditioned by a cementation technology, which is under commissioning in Paks NPP also for the evaporator concentrates, sludges and other liquid waste streams. During the development of the composition of the cement matrix for the ion-exchange resins the waste acceptance criteria of the Bátaapáti National Radioactive Waste Repository were taken into account. However, it is important to mention that the ion-exchange resins at Paks NPP are planned to be conditioned just after the final shutdown of the units (2037-2041) during the transient period, so there is a lot of time to optimize the finally applied conditioning technology, taking into account the developments in that field.

Q.No	Country	Article	Ref. in National Report
*	Bulgaria	Article 32	B, Annex 1.5, Annex 8.1.2

Question/ Comment: What computer code is used for assessment of the dose exposure of the population from the operation of the nuclear facilities in Hungary (Paks NPP, SFISF) and is it based on the methodology of the European Commmission CREAM (code PCCREAM-08)?

Answer: A special (custom-developed) computer software (TREX) is used for assessment of the dose exposure of the population from the operation of the NPP. The TREX software is based on the Lagrange model, not on the code PC-CREAM.
SFISF: The dose assessment of the reference group regarding the routine discharges from the ISFS is based on the IAEA SRS No. 19. methodology. The SRS 19 methodology uses the Gaussian plume model for atmospheric releases. The methodology includes a food chain model as well, based on the concept of concentration factors. PURAM plans to purchase PCCREAM-08 in 2018 to revise previous assessments and to conduct new ones with it in the future.

Q.No	Country	Article	Ref. in National Report
*	Bulgaria	Article 32	B, Annex 1.5, Annex 8.1.2

Question/ Comment: Is the assessment of conservative maximum individual effective dose of the population based on all the pathways of intake, including migration of radioactivity in underground waters?

Answer The dose assessment of the reference group regarding the routine discharges from the ISFS is based on the IAEA SRS No. 19. methodology. The SRS 19 methodology uses the Gaussian plume model for atmospheric releases. The methodology includes a food chain model as well, based on the concept of concentration factors. PURAM plans to purchase PCCREAM-08 in 2018 to revise previous assessments and to conduct new ones with it in the future.

Q.No	Country	Article	Ref. in National Report
*	Bulgaria	Article 32	B, Annex 1.5, Annex 8.1.2

Question/ Comment Is the contribution of tritium and C-14 taken into account in dose assessment from the gaseous discharges?

Answer The dose assessment of the population is based on the measurement data performed by operator(s) and different authorities under the Joint Environmental Radiation Monitoring System. The radation exposures of the public is calculated from all pathways (intake, ingestion, immersion, skin dose, ...) of airborne release and water discharge. The dose assessment of migration of radioactivity in underground water is determined for only tritium that can be found under the NPP. The combined impact of radiation burden for public arising from Paks1 & 2 NPPs and the Spent Fuel Interim Storage Facility has been calculated in the Environmental Impact Study of the future Paks2 NPP (http://www.kormany.hu/hu/foldmuvelesugyi-miniszterium/hirek/nemzetkozi-kornyezetvedelmi-hatasvizsgalati-eljarasok Paksi Atomeromu bovítés / EIA procedure of PAKS NUCLEAR POWER PLANT II project (Paks NPP II project) 02 Paks2 NPP EIA Report EN/Paks2_NPP_EIA_Report_20_EnviroRadio_EN)

Q.No	Country	Article	Ref. in National Report
*	Bulgaria	Article 32	B, Annex 1.5, Annex 8.1.2

Question/ Comment Whether the given in Annex 1.5 dose for the critical group of the population 3 nSv/year is only for the emissions from the Facility for storage of spent fuel – SFISF?

Answer Yes, the effective dose 3 nSv/year given in Annex 1.5 stems only from the emissions of the SISF showing that the measured values of the airborne and liquid discharges of the SFIS Facility were very low, far below the limits.

Q.No	Country	Article	Ref. in National Report
*	Croatia	Article 32	B, 17

Question/ Comment Is there any program established for general public and local community involvement and information transfer regarding the siting of deep geological repository for SNF? What does it include?

Answer The Act CXVI of 1996 on Atomic Energy established the legal background for the establishment of information and control associations of the local governments around the Spent Fuel Interim Storage Facility or the radioactive waste repositories, as well as in the region of site investigations for a repository. As far as the siting of the deep geological repository for SNF is concerned the West-Mecsek Social Information, Control and Settlement Development Association (NYMTIT) was established in 1996. The

information transfer is mainly performed with the involvement of the association. The means of involving and informing the local people include local forums, printed brochures and newsletters, video newsletters, operating websites, etc. You can find more information on the website of PURAM: http://www.rhk.hu/en/about-us/public-relations/. There is an opportunity for the local residents (clients) to be involved in the decision making process through public hearings in licensing procedures (e.g.: environmental protection licensing, site inevestigation licensing).

Q.No	Country	Article	Ref. in National Report
*	Germany	Article 32	p. 18, Section B1; p. 64, Section G2

Question/ Comment: Stakeholder involvement in the site selection process for a geological repository:
How have stakeholders been involved in the site selection process for the geological repository for HLW and SF?

Answer: The Act CXVI of 1996 on Atomic Energy established the legal background for the establishment of information and control associations of the local governments around the Spent Fuel Interim Storage Facility or the radioactive waste repositories, as well as in the region of site investigations for a repository. As far as the siting of deep geological repository for SNF is concerned, the West-Mecsek Social Information, Control and Settlement Development Association (NYMTIT) was established in 1996. The information transfer is mainly performed with the involvement of the association. The means of involving and informing the local people include local forums, printed brochures and newsletters, video newsletters, operating websites, etc. You can find more information on the website of PURAM: http://www.rhk.hu/en/about-us/public-relations/. There is an opportunity for the local residents (clients) to be involved in the decision making process through public hearings in licensing procedures (e.g.: environmental protection licensing, site inevestigation licensing).

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 32	Section D.1.1/ p. 27

Question/ Comment: What is the maximum limit of burn up level of fuel in Paks, and approximately how many assemblies are taken from core during 15-months fuel cycle?

Answer: The maximum limit of burn up level of fuel assembly in Paks < 58 000 MWday/tU; During 15-months fuel cycle 102 assemblies are taken from core in normal conditions.

Q.No	Country	Article	Ref. in National Report
*	Slovakia	Article 32	Section D.2.4/ p. 31-32

Question/ Comment: Which methods of radioactive waste minimisation during NPP operation do you consider the most efficient?

Answer: The most efficient waste minimisation actions during operation were the following:
- increasing the volume reduction factor of liquid waste evaporation,

- using high quality ion exchange resins (long service life),
- implementing a liquid radioactive waste treatment technology (volume reduction of evaporator concentrate).

The introduction of a 15-month operating cycle has a significant environmental effect, since the lower volume of fuel replacement and maintenance works results in a lower rate of solid and liquid waste production. The volume of low- and medium-radiation waste created during periodic outage works (disassembled insulation, obsolete parts, binders, supplementary materials, seals, etc.) also decreased by an average of 10%.

After the introduction of longer cycles, the quantity of spent and fresh fuel assemblies also changes. The annual use of 84 pcs changes to 102 with the 15-month cycle, which means a 12-piece per unit, i.e. almost 3% decrease for a 5-year period (84x5 vs. 102x4).

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	A, 8

Question/ Comment: It is reported that there are plans to increase storage capacity for SNF storage in SFISF during 2019-2036. Please clarify if there has been any construction extension of the SFISF to permit the abovementioned increase of the storage capacity of the initial SFISF design, or is it a new design? If these are new designs, please describe the approval procedure for new scopes of SNF to be stored and related environmental impacts.

Answer: Since the Report was made, there is a newly approved plan. A few years ago, in parallel with the extension, we started an investigation program for increasing the capacity of the current storage system. We have implementation licence for 33 vaults. The aim was to keep this licensed number, but it became clear that a new vault with extra large storage capacity is necessary. We had to redesign the charge face, as a result, the new vault houses 703 fuel storage tubes. The first step in the complex licensing procedure was to modify the Environmental Protection License. The submitted Environmental Study was approved by the competent Authority. Then we compiled the implementation licensing documentation. Based on the Preliminary Safety Analysis Report of the Interim Spent Fuel Storage Facility the implementation licence was issued by HAEA. According to the new plans for the extension of the facility, the construction of the first 4 extra large capacity vaults will be started in 2019 and the construction of the last 5 vaults will be started in 2026. The total capacity of the storage will be 17743 spent fuel assemblies. With this total capacity the Facility will be capable to store all spent fuels resulting from the extended service life of Paks NPP.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	B 1.1, p.19

Question/ Comment: It was mentioned that the SFISF was designed for 50-year storage of SNF. Does Hungary have any decisions and solutions (political and technical) for further SNF handling after the storage period is expired?

Answer: According to the reference scenario for the back-end of the fuel cycle set out in Hungary’s national programme on spent fuel and radioactive waste management (adopted by the Government in August 2016), the spent fuel will be directly disposed after an interim

storage period in a deep geological repository to be established in Hungary. The repository will be commissioned in 2064 according to the current plans.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	B 1.2, p.20

Question/ Comment: In view of the Fukushima accident, are there any provisions for safety improvement in the National Action Plan, specifically, any concept solutions regarding handling of significant amounts of radioactive water arising during management of a beyond-design basis accident with severe core damage?

Answer: Section 6.1.3.3. of the National Report of Hungary on the Targeted Safety Re-assessment of Paks Nuclear Power Plant determined that the plant is not fully prepared to manage liquid radioactive wastes generated in large quantities during a severe accident. The following action was therefore decided: procedures shall be developed for the management of liquid radioactive wastes during severe accidents. The risk, potential routes and possible monitoring tools and methods of liquid form release of radioactive materials shall be examined and the measures necessary, and possible to respond to in such a situation, shall be specified. The examinations have been completed. A separate procedure is being prepared. The task was completed by deadline (15.12.2015). The licensee submitted the proof of completion for authority acceptance at the end of 2015 and the completion of the task was approved by the HAEA in September 2016.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	B 2.1, p.20

Question/ Comment: What is the technology used at Paks NPP for reprocessing of used filtering materials (incineration, immobilization in the geopolymer or cement matrix etc.)?

Answer: The used air filters are compacted. Filters generated by the operation of liquid waste treatment technology are planned to be conditioned by a cementation technology, which is under commissioning in Paks NPP.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	B.2.1., p.21

Question/ Comment: What are the major activities implemented and planned at Paks NPP aimed at minimization of liquid radioactive waste?

Answer: Implemented major activities are the following:
- liquid radioactive waste treatment technology for volume reduction of evaporator concentrates,
- prevent the draining of heat exchagers secondary side cooling water and sludge into the receiving system of radiactive drainages,
- ultrafiltration unit for cleaning technical boric acid solutions.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	B.2.1, p.21

Question/ Comment: Paks NPP has commissioned deep purification facilities for liquid radioactive waste (LRW). Have you managed to attain the LRW purity values equal to such permitting release from the regulatory control?

Answer: Treated liquid radioactive waste is discharged into river Danube on normal releasing route, together with condensate resulting from liquid waste evaporation. The activity content of discharged LRW is below the regulatory limit. Discharge data for Paks NPP given in Annex 8 (Table An8.1.2. -1) showing that the values of liquid discharges were below the limits.

Q.No	Country	Article	Ref. in National Report
*	Ukraine	Article 32	D.2.1, p.29

Question/ Comment: RW classification. Is it taken into account RW classification into low and intermediate level waste when selecting approach to their disposal? If yes, how?

Answer: No, the low and intermediate level radioactive waste selection depends on the source of the waste. The National Radioactive Waste Repository (NRWR)in Bátaapáti is in operation for the final disposal of low-and intermediate-level wastes of nuclear plant origin, and the Radioactive Waste Treatment and Disposal Facitity (RWTDF) at Püspökszilágy is for the disposal of institutional radioactive waste.

Q.No	Country	Article	Ref. in National Report
*	Japan	Article 32.1.1	19

Question/ Comment: Can you provide the reasons other than stated in the report why "modular vault dry storage" system was adopted in Hungary and other type of storage system was not adopted?

Answer: The SFISF was constructed and put into operation by the NPP in the 1990's. The wet storage option was discarded by the NPP and the priority was given to dry storage solutions. The available storage cask options available that time were able to provide higher cladding temperatures comparing to the MVDS and - on the other hand - the economic studies indicated no significant difference between the associated costs. Consequently, the final choice for MVDS was motivated by the more favourable cladding temperature parameters of MVDS systems.