Questions on the National Report of Hungary

ANSWERS

<table>
<tr><th>Chapter of Rep</th><th>Pg of Rep</th><th>Country</th><th>Question, Comment</th></tr>
<tr><td rowspan="4">GENERAL</td><td></td><td colspan="2">How is it determined that the requirements and regulations currently in place are effective in maintaining doses as low as reasonably achievable, social and economic factors taken into consideration, that the burden on future generations is minimized and that releases to the environment have no adverse short- or long-term effects?</td></tr>
<tr><td colspan="3">The dose and risk limits for the facilities are in conformity with the current international recommendations.

Regulatory control of radioactive discharges to the environment is in place. Dose constraints have been derived and implemented for the nuclear facilities (NPP, Interim Spent Fuel Storage Facility, research reactor, training reactor, ex-uranium mining milling site) and for the near surface repository. During these derivations optimisation was used.

Environmental Impact Assessment is required by law for new or to be modified nuclear facilities.
The safety of the facilities before and during the operation is regularly evaluated by conducting safety assessments.
Based on the results of the safety assessments corrective actions are initiated (e.g. near surface repository).
Safety enhancing programmes have been implemented (e.g. Interim Spent Fuel Storage Facility).

The operational experiences are regularly reported to the regulatory authority.

National projects (LLW/ILW repository siting, HLW repository siting, remediation of the U-mine, safety upgrading of he existing near surface repository) have been launched for all important areas of the radioactive waste management with an aim of minimising the burden of the future generations.

Our facilities and projects are regularly subject to international peer review.</td></tr>
<tr><td></td><td colspan="2">How do the results achieved, as a consequence of applying Hungary's requirements and regulations, compare with international standards or recommendations, and with neighbouring countries' requirements (e.g. Serbia and Romania), particularly when a natural resource such as water is shared?</td></tr>
<tr><td colspan="3">The Hungarian safety and radiation protection regulations are in compliance with those recommended by the ICRP and IAEA. Hungary is committed to certain international agreements concerning environmental impact assessment. As a candidate of the European Union, Hungary will comply with the Council Directive on assessment of the effects of certain public and private projects on the environment. There is no direct harmonisation with neighbouring countries' requirements.</td></tr>
</table>

	Are there joint emergency plans and emergency exercises with neighbouring countries, and are the permissible release limits under both normal and abnormal conditions developed jointly? For example, are the high tritium releases mentioned in Section F.4 acceptable to neighbouring countries (and are they air or water releases)?

Hungary has concluded bilateral agreements with the following neighbouring countries to inform each other in the early phase of a nuclear or radiological emergency, as well as to support each other if necessary: Austria, Croatia, Romania, Slovakia, Slovenia and Ukraine. List of these agreements can be found in Annex 4 of the Report.

There are joint emergency exercises with other countries, especially with Slovakia. Currently the emergency plans are elaborated by the countries individually, joint emergency plan does not exist. Release limits, action levels are determined by the country regulations on the basis of IAEA codes and guides.

The tritium releases mentioned by Canada are really close to the authorised limits (established in 1989, valid only for liquid releases and taking account the designed bases rather than radiological consequences). In the year 2002 the tritium releases for NPP Paks were:
Liquid releases: 21.9 TBq (13.7 TBq/GW_e y);
(authorised limit: 30 TBq/y)
Airborne releases: 6.31 TBq (3.96 TBq/GW_e y);
(no authorised limit)
These data are similar to the world average of PWRs reported by UNSCEAR.
No complaints from neighbouring countries have been received.

	To what extent are financial guarantees required for long-term storage of spent fuel and radioactive waste, and for how long are they required to cover costs such as regulatory monitoring and possible remedial actions (not necessarily accidents)?

According to Article 62 (1) of Act on Atomic Energy the performance of all tasks will be financed from the Central Nuclear Financial Fund (CNFF or fund) existing as separated state financial fund.

The systematic review of the mid and long term plans and of the cost estimations is justified by the need of having realistic coverage from the CNFF for the potential costs that will arise in the distance future. Thus it is possible to enforce the basic principle of having the generation using the nuclear power to pay for the costs arising in the future and related to this utilization without leaving unjustified burdens to the future generations.

The current detailed cost calculations are considering the projected tasks till 2108. Additional 300 years are assumed for monitoring.

	Please explain the public consultation process prior to making decisions related to waste disposal sites, and how the results of this process are factored into those decisions.

Environmental impact assessment for radioactive waste storage or repository and consultation of the public on site selection are linked together in Hungary. There are two acts which have both elements: Act CXVI of 1996 on Atomic Energy and Act LIII of 1995 on the General Rules of Environmental Protection.

According to the Section 13 of Act on Atomic Energy provisions set forth in special legislation shall apply with respect to public hearings on the use of atomic energy.

Section 68 of Act LIII stipulates that the impact assessment shall consist of a scoping (preparatory) and - in case it is necessary in accordance with the rules of the Act - a detailed assessment phase. The applicant shall present the findings of the phases of impact assessment in a preliminary environmental report and in a detailed environmental impact report.

There are two opportunities for public participation within the licensing procedure. The first opportunity presents itself when the developer submits an application to the competent authority. The application and the preliminary report have to be made accessible for public. Citizens and groups which may be affected by the project are entitled to comment on the preliminary environmental report. Comments can be submitted in written form.

Before making decision, the Environmental Authority (Inspectorate) takes into account the comments substantial from the viewpoint of consideration of impacts on environment.

The second stage for public input is given in form of public hearing when the detailed environmental impact assessment study have been performed. Act on the General Rules of Environmental Protection covers the general rules of these public hearings.

After a detailed environmental impact report has been submitted to it, the Inspectorate shall hold a public hearing.

The Inspectorate may invite the special authorities concerned in the matter, the affected parties and the affected local governments, the applicant, furthermore, the associations formed to represent environmental interests and other public organisations, if they announced their intent to participate and verified their capacity as party to the case.

Before making its decision, the Inspectorate studies the comments important in the matter from the aspect of evaluating the impact on the environment on their merits. In case there are several affected local governments, or if it is justified in view of the number of affected parties, separate public hearings may be held at several locations.

Please explain whether any non-radiological hazards (e.g. biological or chemical) associated with handling of spent fuel and radioactive waste have been identified and how they were dispositioned.

Hazards other than radiological are addressed in environmental impact assessment.

Environmental impact assessments for radioactive waste storage or a repository are regulated by two acts: Act CXVI of 1996 on Atomic Energy and Act LIII of 1995 on the General Rules of Environmental Protection.

Section 68 of Act LIII stipulates that the impact assessment shall consist of a scoping (preparatory) and - in case it is necessary in accordance with the rules of the Act - a detailed assessment phase. The applicant shall present the findings of the phases of impact assessment in a preliminary environmental report and in a detailed environmental impact report.

Could you present the QA requirements for operating and maintaining the spent fuel and radioactive waste data bases?

In the frame of the QA program the following steps are taken:

spent fuel management

- developing acceptance requirement of the spent fuel to the interim storage
- establishing of an ageing management programme

radioactive waste management

- developing environmental monitoring system
- transportation and waste acceptance requirements
- storage requirements
- safety analysis program.

There are no separate QA requirements for the spent fuel and radioactive waste data bases, the general rules of data base management apply. However, the programmes listed above pay special attention to the development of these data bases.

B		Much of the discussion in Section B.1 on resolution of spent fuel and high level waste issues, places reliance on the availability of a repository. While site suitability studies for a repository are underway, please clarify the remaining steps, and the expected timeframe before a repository might be available.
B.1.1	12	The report says that: "For future disposal of HLW preparations should be accelerated to construct a repository…". Does your national strategy include any target date for planning and construction of the repository?
B.1.2	13	'The discussion of disposition options for research reactor spent fuel includes one permanent solution (return to country of origin) and two temporary solutions. Ultimate disposition in the latter two cases, depends on future decisions regarding a HLW repository. What is the schedule for completing analyses and making this decision? Please describe the process.
G.2	53	When it is expected that the HLW will be in operation in Hungary?

Based on the current plan, as laid down in the 3rd Medium- and Long term Plan, in 2047 a HLW repository will be in operation in Hungary. The detailed schedule is as follows:

2004 – 2008

- R & D activities as laid down in the Policy.
- Sociological study.
- Completion of the concept design of the repository, cost analysis.
- Starting to develop the conceptual–level plan of the repository.
- Surface investigation of the Boda Claystone Formation area in order to establish a new underground research laboratory.
- Construction of the infrastructure necessary for the local investigations.
- Preparation of safety analysis.
- Analysing the requirements and costs of the storage of extended period and regional disposal.

- Completion of the location qualification investigation program, final allocation of the research laboratory. Preparation of the final report on the geological researches of the location qualification investigation program and its licensing by the regulatory authority.
- Compilation and approval of the strategy.
- Preparation of the quality assurance plans.

2009 – 2012:
- Beginning of construction of the research laboratory.
- Elaboration of the research/exploration plan.

2013 – 2032:
- Construction of the research laboratory.
- Accomplishment of the research/exploration program and preparation of the investment.
- Preparation of the quality assurance plans.

2033 – 2046:
- Construction of the repository for the high level radioactive wastes.

2047 – 2069:
- First phase of operation of the repository for the high level radioactive wastes.
- Transfer of the spent fuel assemblies stored in the Interim Spent Fuel Storage Facility to the repository.

2070 – 2094:
- Operation of the high level radioactive waste repository, waiting for transfer of the decommissioning wastes.

2093 – 2094:

Expansion of the capacity of the high level radioactive waste repository for receipt of the decommissioning wastes.

2095 – 2104:
- Second phase of operation of the repository for the high level radioactive wastes.
- Transfer and deposition to the repositories of the decommissioning wastes of Paks Nuclear Power Plant.

2105 – 2108:
- Closure of the repository for the high level radioactive wastes.

From 2108:

- Long term control.

B		In Sections B.2 (and H.3), the Radioactive Waste Treatment and Disposal facility at Püspökszilágy is said to have a remaining free capacity of only 70 cubic metres. The Hungarian Geological Survey has questioned the long term suitability of the site, and operations are being authorised by a series of temporary licences. It appears that the current situation could persist unresolved indefinitely. Please clarify the required remaining steps, as well as the timeframe, before decisions are made on site selection and construction of a new repository. Please also note that, while waste from Paks NPP is no longer sent to this repository, small scale isotope users apparently require up to 20 cubic metres of disposal space annually. Can Hungary also clarify the intent for continued use and licensing of Püspökszilágy until a new facility or acceptable safety analysis for the existing facility is available, and expound on the current (2003) remaining available capacity for small isotope users?

The Hungarian Geological Survey has questioned the long term suitability of the site of the Radioactive Waste Treatment and Disposal Facility mainly due to lack of some information. Since that time a comprehensive supplementary site characterisation programmme has been carried out which helped to clarify several concerns. The remaining issues are still further investigated. Moreover, the safety assessments conducted lately put the site suitability issue into perspective, and by now the basic intention is to set up a more robust hydrological model.

Schedule of the tasks (new LLW/ILW repository):

2004	Completion of the 2nd stage of the surface explorations, according to the arising needs (exploration program, tests, final report). - Beginning of the underground exploration, drifting. - Safety assessment. - Accomplishing the Preliminary Environmental Impact Study
2005-2007	Completion of the underground exploration. - Implementing the licensing process, acquisition the site utilization permit. - Starting of the mining works. - Construction of public works. - Accomplishing the construction designs. - Construction and mounting of the surface facilities. - Completion of the implementation. - Acquiring of the commissioning license. - Commissioning.
2008-2019	Operation of the facility (transfer of the operational wastes).
2020-2094	Decay period, condition maintenance.
2093-2094	Expansion of the facility.
2095-2104	Operation of the facility (transfer of the decommissioning wastes).
2105-2107	Closure of the facility.
from 2108	Long term control.

The new repository is planned to be used only for LLW/ILW of NPP origin (operational and decommissioning). The reason is that this was one of the prerequisites set by the local governments around the potential site.

Hence to keep the existing repository operational for additional several decades is of vital importance. The extension of the facility - due to its location – is not recommended, therefore regaining space within the existing vaults appears to be the most feasible.

It is important to note that two actions: regaining space for disposal of institutional radioactive waste in vaults, and retrieval of specific radioactive waste packages that are giving radiological concern are interconnected. Both types of operations would require the opening of the vaults that are already temporarily sealed and covered with a protective layer of bitumen, clay and grass. For obvious safety reasons, it would not be appropriate to open several times the vaults either to reduce the volumes of waste packages or to retrieve some specific items.

B.1.1	10	'The interim spent fuel storage facility for the Paks NPP is located 5 km from the NPP. It appears this facility should fall within the scope of the Joint Convention. Please explain why it does not.

The Interim Spent Fuel Storage Facility has been described in detail since the primary function of this facility is the interim storage of the spent fuel elements.

<table>
<tr><td>B.1.1</td><td>11</td><td>Does it mean that since 1998 the shipments of SF to Russia have been stopped only temporarily or permanently?</td></tr>
<tr><td>B.1.1</td><td>11</td><td>According to the Hungarian-Soviet Inter-Governmental Agreement it seems to be possible to send back the spent fuel from NPP Paks to Russia? Is this still a realistic option for the future or is direct disposal planned for spent fuel?</td></tr>
<tr><td colspan="3">Shipments of spent fuel from Paks NPP to Russia stopped temporarily in 1998. There is no decision yet on the back end of the fuel cycle. Direct disposal of spent fuel and reshipment to Russia are both among the investigated options.</td></tr>
<tr><td>B.2.1</td><td>13</td><td>'The current Radioactive Waste Treatment and Disposal Facility has no waste acceptance criteria (WAC) and has "accepted almost all kinds of radioactive wastes generated during the utilisation of nuclear technology and isotope applications." Please describe the type of WAC envisioned for the repository.</td></tr>
<tr><td>H.2</td><td>56-57</td><td>Have technical waste acceptance criteria (WAC) been defined for the storage of RAW and if so where have they been published and/or made available ?</td></tr>
<tr><td colspan="3">The original license did not specify any waste acceptance criteria (WAC).
Based on the results of the post closure safety assessment carried out in 2000 WAC were derived for disposal of the long lived components:

C-14 below 20 kBq/kg
Tc-99, U-234 and U-238 below 1 kBq/kg
Am-241 and Pu-239 below 0.7 kBq/kg
Ra-226 below 0.01 kBq/kg
U-235 below 0.05 kBq/kg
Th-232 below 0.025 kBq/kg

Site-specific waste acceptance criteria based on operational and post-closure safety considerations, will be developed. Justified and practical criteria would be needed both for future disposals and the redisposal of any retrieved waste.</td></tr>
<tr><td>B.2.1</td><td>14</td><td>'In the discussion of practices at the Radioactive Waste Treatment and Disposal Facility at Puspokszilagy it is stated that the Hungarian Geological Survey has questioned the long-term suitability of the site, with the result that only temporary licenses have been issued for the expanded part. In the past two years safety assessments have been made and investigations have been carried out to determine the measures necessary for future closure of the facility. Are the disposal trenches and wells at Puspokszilagy monitored? To what extent are there any indications of leakage and migration of radionuclides into the surrounding soil and groundwater? If, as indicated on page 57, the facility will be operational for another 40-50 years, will the wastes placed in the facility during that period of time be retrievable in the event it is shown to be necessary? Please discuss these site suitability issues.</td></tr>
</table>

a. The monitoring system comprises of:
- Hydrogeological system (e.g. water levels);
- Saturation of the engineered system;
- Radionuclide concentrations in groundwater and air;
- Other chemical and geochemical parameters;
- Chemical and physical evolution of the wastes;
- Physical state of the engineered barriers;
- Gas generation.

Background characterisation was performed during the construction phase in the environment of the facility by sampling soil, water, plants and animal products. Monitoring systems for the nearby environment were constructed as part of the extension, only (1993).

Monitoring programs are carried out since 1996 by pre-planned, systematic way (annual, semi-annual, quarterly or monthly measurements; continuos measurements).
Data collection includes
- Regular sampling of the aquifer;
- 7 boreholes for unsaturated samples;
- Installation of automatic sampling and measuring equipment (6 monitoring wells).

Locations and frequencies of sampling of radioactivity examinations of the environmental elements are summarised in a separate table (see Attachment 1).

b. "Background" measurements in 1993 show already an elevated value of tritium. A rise of groundwater level in many observation wells and a similar rise of the tritium concentration in dug well C was observed lately.
This release does not give rise to significant radiological concern.

The correct approach is to continue to monitor the situation and to retain the option of remedial action once the origin of the release is better understood.

c. It is important to note that two actions: regaining space for disposal of institutional radioactive waste in vaults, and retrieval of specific radioactive waste packages that are giving radiological concern are interconnected. Both types of operations would require the opening of the vaults that are already temporarily sealed. For obvious safety reasons, it would not be appropriate to open several times the vaults either to reduce the volumes of waste packages or to retrieve some specific items.

Site-specific waste acceptance criteria, based on operational and post-closure safety considerations will be developed. Justified and practical criteria would be needed both for future disposals and the redisposal of any retrieved waste.

Waste Acceptance Criteria will be derived on the basis of Operational and Post-closure Safety together with an effective plan for implementation.

Following the intervention, any further disposal is planned to be carried out in non-retrievable manner.

C.	13	Are there any NORM residues in Hungary?

With regard to the results of a surveying program of the Hungarian (TE)NORM situation some tailings ponds of coal fired power plants and of red mud arising from alumina factory have had slightly elevated radioactive concentration.

The coal fired power plants have piled up in the order of magnitude of 10 millions tons fly ash, bottom ash and slag in ponds located different places.

The radioactivity of U-238 series of these ponds is in the range of 200 to 2000 $Bqkg^{-1}$. The alumina factories have been produced about 60 millions tons red mud with the activity concentration of 200-400 $Bqkg^{-1}$. The other TENORM activities presently do not cause any concern regarding the radiation protection in Hungary.

D		According to Section D.2.3, between 1983 and 1996 the Paks NPP shipped low level waste to Püspökszilágy. Altogether 1580 cubic metres were disposed of, occupying 2500 cubic metres of the repository. Please clarify the above accounting of volumes, and if any steps are being taken to optimise use of the 2500 cubic metres of repository space. Were the additional 920 cubic metres taken up due to additional shielding requirements, inefficient package sizing, or some other cause?

1 drum of 200 l – due to the disposal arrangement – takes up 1.6 times more repository space. In other words 1 m^3 waste needs 1.6 m^3 disposal space. No steps were being taken to optimise use of the 2500 cubic metres of repository space. Paks NPP was required to build as much disposal capacity as was used by them. One of the possibilities currently being considered is to recover a part of these waste (not backfilled!) and by use of a supercompactor providing additional free space.

D		The total activity at Püspökszilágy by the end of 2002 is stated to be about 1060TBq. This is said to be a current best estimate based on data still to be verified. Are there past record keeping problems which make complete verification difficult? Please clarify the nature and sources of waste related to any record verification problems.

In the early days of the repository the inventory records were kept as hard copy only. In recent years these data have been transferred onto a computer database, copies of which are held at the repository and at another location (for the purpose of keeping records secure).

The inventory needed to be critically reviewed to determine if there were inconsistencies, to identify the key uncertainties and to check that everything was plausible.

In 2001, a comprehensive study was made with an aim of checking and improving the reliability of the inventory. Supplementary techniques (e.g. fuzzy logic) have been used to make the knowledge more complete on the radioactive content and composition of the wastes disposed of.
For a number of waste streams, data on the total activity was provided, together with a list of the three dominant radionuclides. The split of the total activity between the three radionuclides was not always available. The inventory of other less important radionuclides was also not stated. In order to deal with these uncertainties, it was assumed that each of the three identified radionuclides separately were present with an inventory equal to the total activity for the waste stream. This is a pessimistic assumption in terms of the inventory of these radionuclides.

Each consignment of waste arriving at Püspökszilágy is accompanied by a 'passport' that contains information about the waste and also includes the authorisations required for the waste to be transferred from the site of the waste producer. The information on the passport is checked prior to the waste being accepted at Püspökszilágy and then the data are transferred to the inventory database.

Records have been made and retained of every consignment of waste that has been received at Püspökszilágy. The data have been loaded into the program "Arcview". The program presents pictures of the distribution of various components of the inventory to be produced on a "compartment by compartment" basis.

The inventory database in its present working form contains most of the information that is necessary as input data for the safety assessment calculations.

D		Referring to Section D.2.4, at the end of 2002, there were 5100 cubic metres of liquid waste at PAKS NPP with a rate of generation of 250 cubic metres a year (after evaporation). Current tank capacity is said to be 91% full with an expectation that tanks will be full some time during 2005. Please clarify the intent regarding liquid waste management: are more tanks intended or is reliance being placed on the availability of additional liquid waste treatment technology currently undergoing commissioning to make existing capacity available for re-use? What is the expected timeframe for the completion of this technology? Has the Paks fuel cleaning incident resulted in any changes to plans for liquid waste management capacities or processes at Paks?

Before the fuel cleaning event occurred it was proved that remaining tank capacities and the Finnish volume reduction technology being under commissioning together provide possibility to keep balance between the generated and processed (volume reduced) liquid radioactive waste. We considered that there was no need to extend the liquid storage capacities, provided, the installation of the new (Finnish) volume reduction technology could be completed according to the schedule.

The basis of our expectation has been destroyed by the incident. Volume and isotope composition of radioactive wastes radically changed. Both alpha bearing isotopes and transuranic elements could be measured in the wastes. Moreover, at the moment, we do not exactly know the volume of radioactive waste to be processed. This additional liquid waste will be generated during handling the destroyed fuel elements in the recovery process and decontamination of the different effected systems and components of unit 2. We expect to have several thousands m^3 liquid radioactive waste to be processed and stored.

As one of the first steps decision has been made to implement new storage tanks with some 5000 m^3 additional storage capacity. Preparation works have already been started and we expect to have these capacities within one year. In parallel with this activity we have to modify the concept of waste management. The Finnish volume reduction technology (containing boron removal, ultrafiltration process as well as Co and Cs isotopes separation) has to be completed by new technologies for processing alpha contaminated wastes. The planned solidification technology (cement embedding) probably has to be modified. (Since there is no final disposal facility for wastes generated in nuclear power plant in Hungary the solidification has not been started yet due to the limited intermediate storage capacities on the site of Paks NPP.)

D.2.1	20	'Although the report implies a waste classification system consistent with the IAEA recommendations, there is no clear statement of the system nor a stated rationale for classification of waste. Please clarify your waste classification system and describe its development.
D		The system for classification of radioactive waste presented in this section seems to be not disposal-oriented as it is in the IAEA document "Classification of Radioactive Waste", Safety Series No. 11-G-1.1. Is such type of disposal-oriented classification intended to be introduced in Hungary?

In the meantime (after submitting the National Report) a new regulation has been promulgated which will enter into force in November 2003. This regulation – 47/2003 (VIII. 8.) ESZCSM Decree of the Minister of Health, Social and Family Affairs – deals with certain issues of interim storage and final disposal of radioactive wastes, and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity.

Appendix 2 of this regulation introduces a new classification of radioactive wastes.

General viewpoints of classification of the radioactive wastes:

That radioactive waste is qualified as low and intermediate level radioactive waste, in which the heat production during the disposal (and storage) could be neglected.

a) That low- and intermediate level radioactive waste is short-lived, in which the half-life of the radionuclides is 30 years or less, and it contains long-lived alpha emitter radionuclides only in limited concentration (this concentration is 4000 Bq/g in the case of one collecting packaging, and 400 Bq/g as average for the whole quantity of waste).
b) That low- and intermediate level radioactive waste is long-lived, in which the half-life of the radionuclides and/or the concentration of the alpha emitter radionuclides exceed the limits concerning short-lived radioactive waste.

That radioactive waste is high-level waste, the heat production of which shall be considered during design and operation of storage and disposal.

Within the above classification the authority can prescribe more detailed classification for the low, intermediate and high level radioactive wastes.

Classification viewpoints for low and intermediate level radioactive wastes:

1. The classification of the radioactive waste into low and intermediate level classes shall be performed based on the activity-concentration and exemption activity-concentration (EAC) of the radioisotope involved by it (Table 1).

Table 1

Radioactive waste class	Activity concentration (Bq/g)
Low level:	1 EAC – 10^3 EAC
Intermediate level:	> 10^3 EAC

2. If the radioactive waste contains a mixture of radioisotopes, then the classification shall be performed accordingly as follows (Table 2):

Table 2

Radioactive waste class	Activity concentration ratio
Low level	$\sum_i \frac{AC_i}{EAC_i} \le 10^3$
Intermediate level	$\sum_i \frac{AC_i}{EAC_i} > 10^3$

where AC_i is the activity-concentration of the i^{th} radioisotope existing in the radioactive waste, while the EAC_i is the exemption activity-concentration of the i^{th} radioisotopes.

<table>
<tr><td>D</td><td></td><td>The criterion for release of radioactive waste from regulatory control, 30 μSv annual individual dose, differs from the recommendations of ICRP and the requirements of the directive EC 96/29/EURATOM which is 10 μSv. Could you comment on this fact? Is change in this value planned in connection with the Hungarian accession to the EU?</td></tr>
<tr><td colspan="3">The Hungarian regulation defines the 30 μSv/y effective dose as the limit to be taken into account in a clearance procedure. The EU regulation 96/29/EURATOM refers to the 10 μSv/y as a limit to be taken into account in an exemption procedure, thus the two values are not comparable.</td></tr>
<tr><td>D</td><td></td><td>It is not clear how in practice the categorisation of radioactive waste in the NPP is carried out. Are the concentrations of individual radionuclides determined or only simple measurements of the surface dose-rate are carried out?</td></tr>
<tr><td colspan="3">The categorisation of radioactive wastes is managed according to the following criteria:
For high-level radioactive wastes only surface dose-rate measurement is performed. These wastes remain on plant site until the final decommissioning of the plant. Handling and categorisation will be performed during the decommissioning of the plant.
The low and medium level radioactive wastes are stored in drums (200 litre each). For these drums surface contamination and dose rate measurement is performed and, according to authority prescription 15 % of the drums undergo gamma spectrometric monitoring as well. For isotopes that are difficult to detect (H-3, C-14, transuranic elements etc.) additional checking is performed in order to determine the so called scaling factors. The inactive wastes to be released to the environment are checked using gamma spectrometric method after a preliminary selection based on dose rate measurement.</td></tr>
<tr><td>D</td><td></td><td>If the mentioned 60 m^3 of high level waste have been categorised by measurement of the surface dose-rate does it mean that the concentration of long lived radionuclides in that waste is likely to be limited to the level allowing, after a proper storage period, its near-surface disposal?</td></tr>
<tr><td colspan="3">High-level radioactive wastes, categorised by surface dose rate, will be stored on the site of Paks NPP up to the end of life time. These wastes are to be processed together with the high level wastes coming from dismantling work. During decommissioning, all high level wastes will be separated into two categories. Wastes having short-lived radionuclides will be transferred as soon as possible to LLW/ILW disposal facilities (planned to be constructed in some 200 m deep granite formation). Wastes containing long-lived nuclides are planned to be placed in deep geological (claystone) formation.</td></tr>
<tr><td>D</td><td></td><td>It seems that a list of nuclear facilities in the process of being decommissioned is missing. Which facilities are under decommissioning?</td></tr>
<tr><td colspan="3">There are no nuclear facilities in the process of being decommissioned in Hungary.</td></tr>
<tr><td>D.1.1</td><td>19</td><td>How long are the SF assemblies stored at reactor pools (ponds) in NPP Paks?</td></tr>
<tr><td colspan="3">The SF assemblies are stored for 5 years in the cooling ponds of NPP Paks.</td></tr>
</table>

<table>
<tr><td>D.1.1</td><td>19</td><td>'About 11,000 spent fuel assemblies will have been generated by 2017 and may remain in Hungary. Please explain why, as stated on page 10, the management of spent fuel at the three facilities is not subject to the Joint Convention. Is this statement subject to change depending on the ultimate assessment of disposition options? Will any of these spent fuel assemblies be sent back to Russia for reprocessing?</td></tr>
<tr><td colspan="3">In Article 2 (Definitions) the Joint Convention specifies the spent fuel management facilities: „any facilities or installation the primary purpose of which is spent fuel management”. The management of spent fuel in the facilities listed (Paks NPP, Budapest Research reactor and training reactor) is not the primary purpose. The Interim Spent Fuel Storage Facility has been described in detail since the primary function of this facility is the interim storage of the spent fuel elements.

The preferred option (reference scenario) recommended by PURAM in the 3rd Mid- and Long term Plan (approved by the minister in charge) is the domestic deep geological disposal, but several other options are also kept open and analysed. One of the options to be considered is to send the spent fuel assemblies back to Russia.</td></tr>
<tr><td>D.2.1</td><td>21</td><td>Decree 16/2000 stipulates that the dose limit for clearance is 30 microSv. Do you have predefined limits for unconditional clearance by means of activity concentrations or is clearance implemented on case by case bases?</td></tr>
<tr><td colspan="3">During the application for licence in the case of unconditional clearance, the licensee has to perform an assessment for various exposure pathways in order to demonstrate that its own predefined limits for the clearance process should not exceed the dose limit of 30 μSv/y.

The authority requires case by case studies with a strict and frequent review of these studies, and grants licence to unconditional clearance only for small amount of waste. The Ministerial Decree 16/2000 does not stipulate any predefined limits for unconditional clearance, only the dose limit of 30 μSv/y, nevertheless the licensee can derive other limits (activity concentration) from this dose limit on the basis of a verification study.</td></tr>
<tr><td>D.2.4</td><td>22</td><td>The capacity of the liquid radioactive waste storage tanks at Paks NPP is exhausted up to 91%. Taking into account the rate of generation of radioactive waste (evaporator concentrate and ion exchange resins), the tanks will be full within the next 2-4 years.

QUESTION: What technological equipment is foreseen to decrease the amount and volume of liquid waste?</td></tr>
<tr><td colspan="3">In an international tendering process a Finnish technology (IVO) was selected for reducing the volume of generated liquid radioactive wastes. This means that radionuclides are concentrated with high decontamination factor to small volume of waste, and inactive part of waste is released to the river Danube as part of the existing practice.

The technology consists of four subsystems: boron recovery system, caesium removal system, ultrafiltration system and a Co-60 removal technology.

• The boron recovery system recovers boron from the existing wastes. For crystallisation pH is adjusted under controlled conditions in the tank. With pressure filtration unit relatively dry and clean cake of boron is recovered. Separation of boron crystals is carried out using a highly efficient pressure filtration unit.

• The ultrafiltration system is used for removal of particulate material from liquids. The liquid is purified in this system and all the slurries are led to the collecting tank.</td></tr>
</table>

- Caesium nuclides 134 and 137 are removed using a purification system.
- The Co-60 radionuclides are removed by applying under-water plasma technique.
- The purified liquid goes to the control tank for release. Remaining sludges are to be embedded into concrete.

This technology is under commissioning at the moment.

D.2.4	22	It is expected that capacity of evaporator bottom storage farm at Paks NPP will be fully exhausted within 2-3 years. Is it the intention to come in time with commissioning of waste conditioning facility (e.g. cementation) or up-grading the capacity of this farm?

Several years ago Paks NPP purchased a MOWA type cementing equipment from NUKEM. Unfortunately, there is no final disposal facility in Hungary yet for radioactive wastes generated in nuclear power plant. Because of having limited capacities of intermediate waste storage on the site of Paks NPP, the solidification process will be started only after commissioning the final disposal facility for LLW/ILW.

We hoped that the remaining tank capacities and the Finnish volume reduction technology being under commissioning together provide possibility to keep balance between the generated and processed (volume reduced) liquid radioactive waste. We considered that there was no need to extend the liquid storage capacities, but the basis of our expectation has dramatically been destroyed by the fuel-cleaning incident. Volume and isotope composition of radioactive wastes radically changed. Both alpha bearing isotopes and transuranic elements could be measured in the wastes. Moreover, at the moment, we do not exactly know the volume of radioactive waste to be processed. This additional liquid waste will be generated during handling the destroyed fuel elements in the recovery process and decontamination of the different effected systems and components of unit 2. We expect to have several thousands m^3 liquid radioactive waste to be processed and stored.

As one of the first steps decision has been made to implement new storage tanks with some 5000 m^3 additional storage capacity. Preparation works have already been started and we expect to have these capacities within one year. In parallel with this activity we have to modify the concept of waste management. The Finnish volume reduction technology (containing boron removal, ultrafiltration process as well as Co and Cs isotopes separation) has to be completed by new technologies for processing alpha contaminated wastes. The planned solidification technology (cement embedding) probably has to be modified.

E.1	26	In Hungarian practice, are the LLW/ILW treatment and storage facilities at Paks NPP considered “nuclear facilities”? If these facilities are to be (re)built or upgraded, which entity would be the licensing authority?

In our legal practice the LLW/ILW treatment and storage facilities at NPP Paks are not standalone nuclear facilities.

In the case of upgrading/modification of RW treatment and storage facilities situated inside the NPP the licensing authority is HAEA NSD. But Act CXVI of 1996 on Atomic Energy allocates regulatory tasks to several co-authorities and in the licensing procedure initiated by application, the approval of special authorities shall be obtained and attached to the application by the applicant (Gov. Decree 108/1997).

E.1	26	It is noted from Section E.1 that Hungarian definitions do not classify Radioactive Waste Management facilities as nuclear facilities under HAEA regulatory responsibility, but under regulatory authority of the Ministry of Health, Social and Family Affairs (which also regulates Radiation Protection). It is also noted that the Ministry of Environment and Water establishes release limits and manages the Environmental Assessment process, and that regulation of Spent Fuel Management facilities falls under the responsibility of HAEA. Please confirm if this understanding is correct.
Your understanding of the Hungarian regulatory system (as described also in your question) is correct.		
E.1	26	Have you actually succeeded in clear and logical separation of the regulatory authority between HAEA and the Ministry of Health appointed Service, or would both be engaged on some occasions? It seems unclear in principle whether RW management facilities on an NPP site are fully under HAEA, and also should HAEA authority apply to transboundary movement of all RW.
E.1	26	'Section E describes issues defined by Act CXVI of 1996. Only facilities in which the amount of nuclear material used is above a certain limit are classified as nuclear facilities. This means that radioactive waste management facilities and repositories are not considered a nuclear facility. Please explain this distinction further and provide the limit that defines a nuclear facility? Please reconcile this with the Joint Convention "consideration of safety is required" definition.
E.2	29-32	Two Regulatory Bodies are reported with their main functions, with functional dependence of different Ministeries or organisations. Clarification is advisable about the effective independence of both regulatory authorities and their interfaces for performing complementary regulatory work. In particular, who suspends or revokes a licence, either in a spent fuel management facility or in a radioactive waste management facility? Who is responsible for the licensing of relevant personnel in such facilities?

The Hungarian regulatory system, as defined by Act CXVI of 1996 on Atomic Energy covers the whole area of the application of atomic energy and assures the priority of safety.

The regulatory authority is clearly defined in the relevant legal instruments both for HAEA and for the State Public Health and Medical Officer's Service (SPHAMOS). HAEA is the licensing authority in the case of nuclear facilities, including spent fuel management facilities. (By definition, a facility falls in this category, if it is using more then one effective kilogram nuclear material. The calculation of an effective kilogram nuclear material is defined by the IAEA INFCIRC/153 on the structure and content of agreements between the Agency and States required in connection with the treaty on the non-proliferation of nuclear weapons.) SPHAMOS is the licensing authority for non-nuclear facilities, radioactive waste management facilities and applications of radioactive material. There are cases where HAEA is the licensing authority and SPHAMOS is participating in the licensing procedure as special authority and vice versa. E.g. for the nuclear power plant HAEA is the licensing regulatory body, but SPHAMOS is participating in the procedure as special authority enforcing radiation safety requirements (among others in the field of radioactive waste management in the plant). The licence is revoked by the relevant licensing authority, either upon its decision or if the special authority, involved in the licensing procedure revokes its consent.

<table>
<tr><td colspan="3">The relevant regulations of the Minister of Health (see Annex 4 of the Hungarian National Report) contain the requirements of occupational radiation protection, the rules applicable for the employees within the whole scope of application of atomic energy. In case of nuclear facilities the relevant legal instruments contain further, special requirements and HAEA is enforcing them.
According to Governmental Decree 32/2002. (III. 1.) on the licensing of shipments of radioactive waste across the national border, the licensing authority in this issue is HAEA.</td></tr>
<tr><td>E.1.1</td><td>27</td><td>In Section E.1.1, it is noted that there are currently no safety codes or HAEA guides specific to spent fuel management facilities. Please elaborate on Hungary's experience with the application of NPP safety codes and guides to Spent Fuel Management facilities by analogy. What is the legal status of rules developed for NPPs which are applied by analogy to spent fuel management facilities?</td></tr>
<tr><td colspan="3">Formally there is no legal problem with the rules developed for NPP and applied for spent fuel facilities. Gov. Decree 108/1997 and its Annexes 1 to 5 shall apply to nuclear facilities, their buildings, structures, systems and equipment, and to the relevant activities and parties involved in such activities, including siting, construction, enlargement, commissioning, operation, modification, putting out of operation, and decommissioning. These codes prescribe the most important nuclear safety, radiation protection, waste safety and transport safety requirements which are valid for any nuclear facility. But HAEA has recognised the need of special code and safety guides for spent fuel facilities. The draft of the Annex 6 is in the final stage. This Code will be on the same level as the Gov. Decree.</td></tr>
<tr><td>E.1.1</td><td>27</td><td>Could Hungary indicate the planned schedule for entry into force the mentioned safety standard related to spent fuel and waste management? What is the associated elaboration and review process?</td></tr>
<tr><td colspan="3">The new Ministerial Decree 47/2003 (VIII. 8.) of the Minister of Health, Social and Family Affairs on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity will enter into force on 6 November 2003. The main change is that the competent authority will be the relevant Regional Institute of the State Public Health and Medical Officer's Service (SPHAMOS). The preparation for this task is going on.</td></tr>
<tr><td>E.1.2</td><td>27</td><td>Section E.1.2 and Section H indicate the general safety requirements of radioactive waste management are described in Section E. Please describe how each criterion under Article 11 is being implemented.</td></tr>
<tr><td>H.
E</td><td>55
27-28</td><td>In the report, at section H, it is indicated that the general safety requirements are described at section E. However, section E does not cover all the specific requirements of art. 11 of the Joint Convention. Could you give more details on the steps taken to fulfil the requirements of art. 11 (i)-(vii)?</td></tr>
<tr><td colspan="3">(i) Criticality is a main issue for spent nuclear fuel which is by definition no waste in Hungary. Criticality and heat removal has been thoroughly addressed prior to licensing of the Interim Spent Fuel Storage Facility. Whereas, criticality of the interim storage of PuBe sources and other nuclear material in the Radioactive Waste Treatment and Disposal Facility was analysed in the relevant safety report.
(ii) The largest radioactive waste generator by far is Paks NPP. Since starting operation Paks NPP has introduced various measures and has launched many programs with an aim to keep the generation of radioactive waste to the minimum practicable or reduce the volume prior to disposal. The planned new technologies will further reduce the volume of waste to be disposed of.</td></tr>
</table>

<table>
<tr><td colspan="3">(iii) The basic Hungarian regulations call for taking into account the interdependencies among the different steps in radioactive waste management. One of the measures is to develop waste acceptance criteria for the storage and disposal facilities.

(iv) The basic nuclear regulations are in place and are in full conformity with the international recommendations (IAEA, ICRP, EU).

(v) Regulation on Environmental Impact Assessment is in place and has been fully applied.

(vi - vii) Intervention to the existing near surface facility is going on in order to enhance safety and to avoid undue burdens on future generations. LLW/ILW repository project has well progressed and the HLW siting program will restart soon.</td></tr>
<tr><td>E.2</td><td>29-32</td><td>Please clarify the relationship envisaged between the regulatory body and the EC.</td></tr>
<tr><td colspan="3">Hungary is already an active observer in all the EU committees. After accession Hungary will become a full right member of the committees (Scientific and Technical Committee, Euratom Supply Agency etc.)

Representatives of the HAEA are participating as experts in the work of the Working Party on Atomic Questions, which is supporting the European Council in nuclear matters.</td></tr>
<tr><td>E.2</td><td>31</td><td>It is noted in Section E.2 that the Hungarian Atomic Energy Authority (HAEA) has concluded an agreement for the provision of technical expertise to support its activities with the Institute of Nuclear Techniques at the Budapest University of Technology and Economics. It is also noted that this University is a holder of a licence for a training reactor. Please clarify the degree of independence maintained between these professional experts used by HAEA for support activities and those responsible for licensed operation of the Training Reactor at the Budapest University of Technology and Economics.</td></tr>
<tr><td colspan="3">The agreement concluded with the Institute of Nuclear Techniques at Budapest University of Technology an Economics does not apply to the operation of the Training Reactor. The Institute is constituted of two units: the Department of Nuclear Techniques organises the educational tasks of the university, whereas the Training Reactor Laboratory operates the Nuclear Training Reactor, thus there is a possibility to select experts for technical support who are not involved in reactor operation.

Usually these experts are used in the evaluation of applications prepared by other facilities (e.g. review of safety assessment of modifications in Paks NPP, elaboration of nuclear safety guides for Periodic Safety Reviews, etc.). Although question/problem of independence is typical for small countries, proper level of independence can be assured by choosing the experts carefully. HAEA makes use the of knowledge of the experts of TSOs as listed on p.31 of the Report.</td></tr>
<tr><td>E.2.1</td><td>29</td><td>HAEA is the relevant authority regarding spent fuel management activities. In the case of a geological repository, which will be the role of HAEA, considering either the spent fuel being disposed directly or the corresponding HLW in case of reprocessing? And the role of the Minister of Health, Social and Family Affairs, as the other regulatory body and responsible for performing the licensing and controlling of siting, construction, commissioning, operation, modification and closure of a radioactive waste disposal facility?</td></tr>
</table>

The Hungarian regulatory system, as defined by Act CXVI of 1996 on Atomic Energy covers the whole area of the application of atomic energy and assures the priority of safety.

The regulatory authority is clearly defined in the relevant legal instruments both for HAEA and for the State Public Health and Medical Officer's Service (SPHAMOS). HAEA is the licensing authority in the case of nuclear facilities, including spent fuel management facilities. (By definition, a facility falls in this category, if it is using more then one effective kilogram nuclear material. The calculation of an effective kilogram nuclear material is defined by the IAEA INFCIRC/153. SPHAMOS is the licensing authority for non-nuclear facilities, radioactive waste management facilities and applications of radioactive material.

There is no decision yet, how to close the fuel cycle, it is foreseen to have a strategy by 2008. A facility for direct disposal of spent fuel would be a nuclear facility. The geological investigations are under the regulatory authority of the Hungarian Geological Survey.

E.3.1	32	Who is the authority issuing the permit (licence) for all operating periods of SF management facility?

Except the Environmental Protection Licence (issued by the special authority) HAEA NSD is the only authority issuing licences for the whole life of the SF storage facility. This process is regulated by Gov. Decree 108/1997 and co-authorities are involved in it.

E.3.1	32	It is noted in Section E.3.1 that the Director General of the Hungarian Atomic Energy Authority was authorised by Government Decree to establish the Public Agency for Radioactive Waste Management (PURAM). This Public Agency is responsible for final disposal of radioactive waste and for interim storage and final disposal of Spent Fuel. As such, the Public Agency is the responsible for the operation of the Interim Spent Fuel Store Facility at Paks and the Radioactive Waste Treatment and Disposal Facility at Püspökszilágy. Please explain the extent of independence between responsibilities for licensing, regulation and inspection of the Spent Fuel Management Facility and its day-to-day management and operation. To what extent is the regulatory body independent from the main licensee since both seem to be covered under the same Act, and both seem to draw from the same pool of expertise?
F		From Section F.2.2.2, it is noted that the HAEA, the regulatory authority for licensing nuclear facilities, is also responsible for the management of the funds established for the construction and operation of interim storage and disposal facilities. It is also noted from Table F.2.2.2-1 that the fund is very heavily dependent on the ability of the Paks NPP to make contributions. It is further noted that payments to these waste funds has to be approved by the Hungarian Energy Office, and is presumably therefore linked to both the price of energy and the financial situation of Paks NPP. Significant responsibilities in potentially conflicting areas seem to fall on HAEA, whose negative regulatory decisions regarding licensees would directly impact what would be significant contributions required from the central government budget to the waste management funds. It is further noted in section H.2 under the heading "refurbishment" that

<table>
<tr><td></td><td></td><td>past financial management of the Püspökszilágy facility led to the impaired physical condition of some operating systems and the obsolescence of equipment, requiring a significant upgrade and refurbishment of the facility. Please clarify how independence of decision making is maintained between those responsible for regulatory, licensing and inspection decisions, both regarding Paks NPP and the Spent fuel management facility and those responsible for the management of these funds and of those responsible for establishing the required contributions to those funds, both of Paks and others, including the central budget.</td></tr>
<tr><td colspan="3">The Council Report on Nuclear Safety in the context of Enlargement of the EU (June 2001) recommended – among others – to strengthen the independence of the nuclear safety regulatory body, and in particular addressed the arrangement that the head of PURAM reports to the Director General of the HAEA. There are now steps undertaken to transfer the founder’s right from HAEA to another governmental body.

HAEA is the licensing authority for the Interim Spent Fuel Storage Facility and the Paks NPP. Its licensing decisions, however, do not effect the obligation of the Paks NPP to make the payments into the Central Nuclear Financial Fund. HAEA is only managing the Fund, and its supervising minister – now the minister of internal affairs – is disposing over it only within the framework, set by Act on the annual central budget. The annual payments and expenditures are defined by Parliament. (Remark: the severe incident in the Paks NPP in April 2003 resulted in a long outage of Unit 2 and large remediation costs, but there are no changes in the payment obligation of the NPP.)</td></tr>
<tr><td>E.3.2</td><td>33</td><td>Several special authorities are named as participants in the licensing procedure for radioactive waste management facilities (Section E.3.2). Please elaborate on recent experience on co-operation and co-ordination among these special authorities and any impact this might have on the duration and complexity of the site review, selection and licensing process.</td></tr>
<tr><td colspan="3">The licensee has to collect all permits from special authorities involved in the licensing process. In practice, after a preliminary permission granted by the competent authority, the on behalf of the licensee performs this task on the basis of the preparatory documents. Thus the designer collects all requirements and approvals from special authorities (environment protection, water management, emergency preparedness etc.) and discusses any arising problems with these authorities. After getting all approvals from the involved special authorities, the licensee applies for licence to the competent authorities of the State Public Health and Medical Officer’s Service (SPHAMOS).</td></tr>
<tr><td>E.3.2</td><td>32-33</td><td>What are the responsibilities of the HAEA for siting, construction, commissioning, operation, modifications and closure of a radioactive waste disposal facility?</td></tr>
</table>

HAEA is missing from the list of special authorities on p.33 of the Report.

In August 2003 a new ministerial decree was published (47/2003 (VIII. 8.) ESZCSM Decree of the Minister of Health, Social and Family Affairs on certain issues of interim storage and final disposal of radioactive wastes, and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity).

Section 3 of this decree fixes the regulations as follows:

Concerning the interim waste storage facility and the final waste disposal facility a licence - issued by the Regional Institute of the State Public Health and Medical Officer's Service - is necessary for the

a) establishment (establishment licence),
b) operation (operating licence),
c) modification (modification licence),
d) termination (termination licence),
e) closure (closure licence) and
f) for the change-over to active or passive institutional control.

Appendix 3 designates the special authorities participating in the licensing processes. During the licensing processes according to this decree – if it affects issues belonging under its authority – the contributing special authorities are as follows:

a) the Inspectorate for Environment Protection with the territorial jurisdiction,
b) the Directorate for Water Affairs with the territorial jurisdiction,
c) the National Park Directorate with the territorial jurisdiction,
d) the building authority with the territorial jurisdiction,
e) the Hungarian Atomic Energy Authority,
f) the Ministry of Defence,
g) the County/Capital Animal Health and Food Control Station,
h) the County/Capital Plant- and Soil Conservation Survey,
i) the county (capital) transport inspectorates,
j) Hungarian Police Headquarters,
k) County Directorate for Emergency Management/Capital Directorate for Civil Defence and Capital Headquarters of Fire Service,
l) the office of the Hungarian Geological Survey with the territorial jurisdiction,
M) the Mining Bureau of Hungary.

E.4	34	Annual inspections of the waste storage facility are performed on a yearly basis. Are the results and measurements made available for the public?

The results of the inspection measurements are available for the public on any „open public day", in the visitor centres, in the annual reports, in different publications and on the web page of National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene (NRIRR).

E.4	33-34	What types of findings from inspection activities are occurred with high frequency on radioactive waste management facilities?

The main findings of the inspection of the Püspökszilágy RWTDF are the following:

- missing data in record keeping (activity concentration, composition),
- tritium occurring around/on the disposal area,
- usage of backfilling in the case of radwaste containing long lived radioisotopes,
- need of repair works,
- need for improvements of transport, measurement and monitoring equipment.

These inspection remarks can be found in the protocols.

<table>
<tr><td>E.5</td><td>34-35</td><td>Please provide us with a short description of stages of enforcement administrative process in case of non-compliance with Regulatory requirements.</td></tr>
<tr><td colspan="3">The competent authority of the State Public Health and Medical Officer’s Service (SPHAMOS) firstly calls attention of the licensee to the situation of the non-compliance with its prescription and gives a time for the correction. Secondly, if the call to attention has failed, the authority suspends temporarily the licence for a prescribed time. After all, the authority can withdraw the licence.</td></tr>
<tr><td>F</td><td></td><td>How is feedback of operating experience acted upon, and corrective measures evaluated? Please explain whether any specific safety issues have been identified as a result of the regulatory compliance program, and how they were dispositioned.</td></tr>
<tr><td colspan="3">Licensee is obliged to draw up and submit to the Authority reports on the activities related to the operation and safety of the nuclear facilities, as well as about events involving safety occurring during operation.

Licensee is obliged to report and investigate every event which have real or potential-degradation of the safety level or jeopardize the radiation exposure dose of the operational staff or the population and cause or may cause the radioactive release into the environment.

Regulators review all event reports and investigation reports especially the causes and the corrective actions of the event. In the periodical (quarterly, annual) reports Licensee evaluates and introduces the condition of the corrective action. Regulators can stipulate additional corrective actions.

Regulators, as a part of their daily routine inspection activity, supervise the process of operational experience feedback.

The assessment of operational experience feedback is a dominant part of the annual comprehensive regulatory review activity.</td></tr>
<tr><td>F</td><td></td><td>Please explain the reason why no mention is made, in Section F.6, of regulatory requirements pertaining to financial guarantees from the licensee to cover decommissioning costs.</td></tr>
<tr><td>F.6</td><td>47-48</td><td>How is it ensured that qualified staff and adequate financial resources are available for decommissioning?</td></tr>
<tr><td>F.6</td><td>47</td><td>Noting is written about the available financial resources.</td></tr>
<tr><td>F.6</td><td>47</td><td>How do you reserve the financial resources for decommissioning of nuclear facilities?</td></tr>
<tr><td colspan="3">The financial resources of decommissioning are dealt with in Section F.2.2.2. As described there, the Central Nuclear Financial Fund is a separate state fund pursuant to Act XXXVIII of 1992 on Public Finance, exclusively earmarked for financing the construction and operation of disposal facilities for the final disposal of radioactive waste, as well as for the interim storage and final disposal of spent fuel, and the decommissioning of nuclear facilities. The payments of Paks NPP into the Fund are defined so that the accumulated sum during its lifetime should cover all costs, including decommissioning and waste disposal. For nuclear installations financed from the central budget (research reactor and training reactor), the payments into the Fund are provided by the central budget, when they arise.</td></tr>
</table>

The nuclear safety authority prescribes to prepare plans for decommissioning well in advance, which are periodically reviewed. The licence for decommissioning will be based on a safety analysis and – among others - the demonstration of the availability of appropriate human resources. For the next decade the decommissioning of Paks NPP is not on the agenda, there is no need to maintain now a qualified staff for this purpose.

F.2.2.1	39-40	Could you present the organizational scheme and detail the responsibilities of the Public Agency for Radioactive Waste Management.

In accordance with Act on Atomic Energy, the Public Agency for Radioactive Waste Management (PURAM) was established in 1998. PURAM has been designated to carry out the multilevel tasks associated with disposal of radioactive waste, interim storage and final disposal of the spent fuel, as well as with the decommissioning of nuclear facilities.

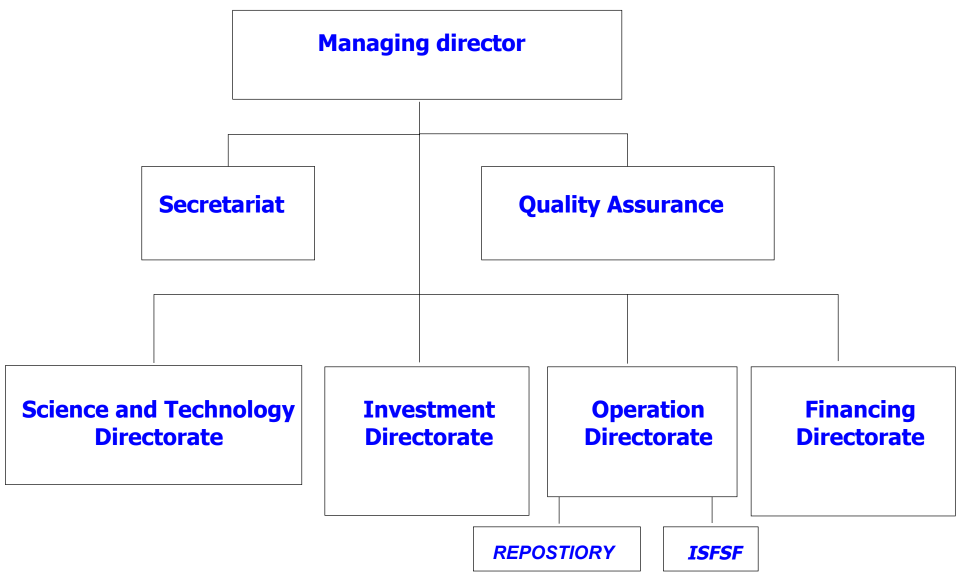
Main functions:

- Operation of the radioactive waste disposal facility
- Operation of the Interim Spent Fuel Storage Facility
- Investment, expansion of the Interim Spent Fuel Storage Facility
- Safety enhancement and upgrading of the near surface repository
- Siting a new LLW/ILW repository
- Closure of the fuel cycle
- Planning (e.g. decommissioning)
- Fee calculation
- Public relations
- International relations

PURAM is a fully state-owned, non-profit Agency established by the Director General of the Hungarian Atomic Energy Authority who acted on behalf of the Government. PURAM performs its activities on several levels:

PURAM's activities are conducted by a Managing Director appointed by the Director General of the Hungarian Atomic Energy Authority (HAEA). PURAM's management includes executives with various backgrounds and with a multidisciplinary experience. As of December 31, 2001 the Agency's staff was made up of 74 people, 5 in Budaörs Headquarter, 21 at Paks Headquarter and 48 at Püspökszilágy disposal site.

ORGANIZATIONAL SCHEME OF THE PURAM



F.2.2.2	40	Hungary established a Nuclear Financial Fund in 1998. How much of the current liabilities for management of spent fuel and radioactive waste are covered at present?
By the end of the year 2002, the total sum accumulated in the Fund was 32,725 million HUF (about USD $1.5*10^8$). The total (life-time) costs to be financed from the Fund at present value (discounted) are 294,798 million HUF (about USD $1.4*10^9$)		
F.2.2.2	40	'Are the payments into the Fund for Paks Nuclear Power Plant expected to accumulate the full cost of decommissioning by the time the license is expired?
Yes		
F.2.2.2	41	Could you explain how is derived the yearly contribution for the Fund, and the degree of coverage that this contribution assures for decommissioning and radioactive waste and spent fuel management costs (including disposal)?
The calculations are performed in accordance with the calculation algorithms given in the "Rules of development of the long-term plans and relevant estimations in relation to activities to be financed from the Central Nuclear Financial Fund" approved on January 18, 2000 meeting of the Special Committee of the Hungarian Atomic Energy Commission. The method used is the 'net present value' $NPV = F_0 + \sum_{i=0}^{n-1} \frac{B_i}{(1+d)^i} - \sum_{i=0}^{m-1} \frac{K_i}{(1+d)^i}$ where: NPV: net present value F_0: accumulated money until the time of calculation B_i: fee to be paid in the year i K_i: cost of the programme in year i d: net rate of interest (currently 3%) n: operational lifetime of the NPP, cash in (in years) m: duration of the programme, cash out (in years) According to the calculations, in 2004 Paks Nuclear Power Plant Ltd. shall pay an amount of 23,930.6 million HUF to the Fund. That amounts, according to the production schedule provided by the PAKS NPP to 1.82 HUF/kWh.		
F.3	42	'Please elaborate on the steps taken to ensure QA programs for the safety of spent fuel management and radioactive waste management are established and implemented.

In the frame of the QA program the following steps are taken: *spent fuel management* — developing acceptance requirement of the spent fuel to the interim storage — establishing of an ageing management programme *radioactive waste management* — developing environmental monitoring system — transportation and waste acceptance requirements — storage requirements — safety analysis program		
F.3	42	What is the difference between the quality management system established by the Hungarian Atomic Energy Authority and the quality management system certified in accordance with ISO 9001:2000 for the Public Agency of Radioactive Waste Management?
Differences between the QM system of HAEA and that of PURAM: In the scope: HAEA Regulatory control of the peaceful and safe application of nuclear energy PURAM Management and disposal of LLW/ILW and HLW, spent fuel management, Preparation for decommissioning of nuclear facilities In connection with the suppliers chain in the applied quality management model: Supplier: HAEA: Licensees PURAM: Companies (contractual parties) Customer: HAEA: Society PURAM: Waste generator		
F.3	42	The Public Agency for Radioactive Waste Management introduced a quality management system that was officially certified in accordance with ISO 9001 :2000. Does The Public Agency for Radioactive Waste Management intend to compliment the Quality Management System by an Environment Management System according to the standard ISO 14001?
Yes. Preparations have been made. In this year PURAM is aiming at certifying Total Quality Management System including requirements of ISO 9001:2001 and ISO 14001:1996.		
F.4	42-43	Is there legislation that contains rulings on radiation protection and that is oriented to Euratom Directive 96/29/Euratom?

Ministerial Decrees 16/2000, 23/1997 and 47/2003 (see Annex 4 of the National Report) prescribe all aspects of radiation protection and these decrees are in concordance with the Directive 96/29/Euratom.		
F.4	42-43	What limits are applied for the operating staff and specifically for women of child-bearing age and for pregnant women? What specific radiation protection measures are taken for the facility staff (job preparation measures, classification into radiation protection zones, medical supervision)? How is it ensured that those responsible for radiation protection are sufficiently qualified?
Ministerial Decree of 16/2000 regulates basically the whole field of radiation protection and the main issues are the following: - dose limitation for different persons (workers, pupils, public), - categorisation of workers (A and B; a worker belonging to A has to wear an authorised film badge), - prohibition of work of pregnant women, nursing women and milky-nurse under radiation situation, - licence: granting, suspension, withdrawal, - categorisation of workplaces: free access, supervised and controlled area, - need for yearly medical supervision, - dose constraint for different activities, - protection provisions for the workers in the whole phase of the radiation activities, - establishment of health physics service on the workplace, - qualification and education (person involved in the use of atomic energy has to be qualified on 3 different levels: basic, advanced, comprehensive), - clearance process and declaration for inactive area, - radioisotope and waste handling on workplace, radiation monitoring, - emergency situation.		
F.4	42-43	How high is the permissible exposure for members of the public following releases of slightly radioactive materials?
According to Decree of the Minister of Environment Protection 15/2001. (VI. 6.) on the radioactive releases into the air and into the water in connection with the application of atomic energy, and on their control, all relevant radioisotopes have to be considered in the release (discharge) process of the given facility, so there are no „slightly" radioactive materials. The authorised dose constraints have to be applied for the derivation of the activity concentration of the different radioisotopes for limiting the releases into environment.		
F.5	43-47	How is the national emergency management system informed of the occurrence of an accident? Is there a distributed measuring system with automatic issuance of an early warning in Hungary or is the procedure dependent on information passed on by the licence holder?

The licensees shall immediately inform the regulatory body and other operational organisations on any event that might result in emergency.

In the framework of the National System for Nuclear Emergency Preparedness (created in 1989) a nation-wide environmental radiological monitoring system was established. This network includes several environmental monitoring stations operated by different organisations:

Ministry of Defence (36 stations), Paks NPP and Interim Spent Fuel Storage Facility (9), Ministry of Education (11, including 1 station at the site of Training Reactor), Hungarian Meteorological Service (26), KFKI Atomic Energy Research Institute (17). Outdoor exposure rates (in average of 10 min data) are collected and evaluated by an information centre. The warning level for outdoor exposure rate is 500 nSv/h.

The tasks of the network, sub-networks and data evaluating centres are regulated by Governmental Decree 248/1996 on the National Nuclear Emergency Response System and Governmental Decree 275/2002 on the monitoring of radiation levels and radioactivity concentrations in Hungary.

Beside the exposure rates, many monitoring stations are capable to provide meteorological and radiological data in more detailed form to support experts involved in decision making.

F.5.4	46	One managerial and one general exercise as well as four partial exercises are organised yearly in the Interim Spent Fuel Storage Facility. What is the nature and scope of the exercises?

Managerial exercise: Once a year, with the involvement of the organisational and management team. The enforcement branch (e.g. surveying team, first aid team, evacuating team, decontamination team, etc.) is not involved.

General exercise: Once a year, with the involvement of the entire organisational and control team, as well as of the enforcement branch.

Partial exercises: Four times a year, with an aim of exercising certain tasks such as evacuation, decontamination, etc. Only the responsible organisation is involved.

F.6	47	One page is devoted to this subject. Description that the decommissioning is mentioned in a written form in regulations is not given.

As it is mentioned in chapter E.2.1 of the Report (page 29) the scope of competencies of the Hungarian Atomic Energy Authority comprises licensing and supervision of nuclear facilities in each phase of their lifecycle. This competency also covers the decommissioning phase (the phases have been listed for the spent fuel management facilities in chapter E.3.1, page 32, although they are common for all nuclear facilities). The legal basis (requirements) of this licensing and supervisory activity for nuclear facilities is contained in the safety codes, issued as annexes to the Governmental Decree 108/1997. (VI. 25.) – see E.1.1 page 27. Code No.1 for NPPs, Code No.5 for research reactors and drafted Code No. 6 for spent fuel storage facilities establishes for the mentioned category of nuclear installations the licences required for final stop of operation and for decommissioning together with the prescription of general content of documentation to be submitted with the applications. Furthermore the codes require, that a preliminary decommissioning documentation shall be elaborated as a part of the Preliminary SAR, later as a part of the FSAR, and later regularly updated. 5 years before final cessation of operation a separate preliminary decommissioning plan and one year before commencing of decommissioning a detailed plan have to be submitted for information to the licensing authority. In each of the mentioned codes the chapter related to authority control contains listing of the topics to be controlled for each lifecycle phase,

<table>
<tr><td colspan="3">among others for the decommissioning phase. In Code No.3 for NPPs in Code No.5 for research reactors and drafted Code No. 6 for spent fuel storage facilities there are subchapters requiring to incorporate solutions for easy and safe decommissioning as early as at the design phase and also giving general requirements to the content of the preliminary decommissioning plan.</td></tr>
<tr><td>F.6</td><td>48</td><td>The record keeping is not described.</td></tr>
<tr><td colspan="3">Safety Codes No.4 (operational safety of NPPs) and No.5 (nuclear safety of research reactors) issued as annexes to the Governmental Decree 108/1997. (VI. 25.) – see E.1.1, page 27 – contain requirements on collection and utilisation of operational experience and a special part formulating prescriptions related to the operational documentation. It was realised a few years ago that these prescriptions are rather general, and establish only an overall framework for record keeping with aim of fostering decommissioning. In the process of the ongoing review of these codes and drafting of Code No. 6 (nuclear safety of the spent fuel storage facilities) more specific requirements are introduced to regulate record keeping for decommissioning especially.

0</td></tr>
<tr><td>F.6</td><td>48</td><td>What is the anticipated starting time of NPP Paks decommissioning?</td></tr>
<tr><td colspan="3">At present the NPP Paks and the HAEA NSD (the regulator) have a common project to elaborate all necessary conditions and prerequisites needed to implement lifetime extension (to extend the duration of the operational licenses) by 10 to 20 years of the units in case the relevant requirements of the regulator are met by the operator. Therefore now there are no established or anticipated starting dates of the decommissioning of the Paks units. The actual (10-year) licence of Unit 1 expires in 2008, the 30-years designed lifetime of some of the components expires in 2013.</td></tr>
<tr><td>F.6</td><td>47</td><td>'The Decommissioning section explains an "ongoing task of the Authority is the control of the radiation situation . . ." Please describe the Authority’s specific roles and responsibilities in this regard (e.g., are these activities limited to "inspection" activities?). Please describe the requirements for corrective measure to control unplanned releases of radioactive material.</td></tr>
<tr><td colspan="3">In the licensing document for decommissioning the case of unplanned release and abnormal situation has to be analysed, and the consequences are also to be demonstrated (e.g. additional exposure to the public). Moreover, the measures averting the serious consequences have to be elaborated for the different abnormal events.

Besides, during the decommissioning, the competent authority will perform regular control measurements in order to check the compliance with the licensed conditions and to avoid any abnormal situation or release.</td></tr>
<tr><td>G</td><td></td><td>Provide details related to the safety of other power and research reactor SF management facilities e.g. reactor pools (ponds) as requested by Articles 5, 8 and 9 of JC.</td></tr>
<tr><td>G</td><td></td><td>There is no reference to the SF management from the Research Reactor at Atomic Energy Research Institute and the Training Reactor of the Budapest Technical University in Hungary in section G of the report</td></tr>
<tr><td>G</td><td></td><td>What facilities for SF storage from the research reactors exist in Hungary?</td></tr>
</table>

G		Have safety assessments for the SF storage from the research reactor and the training reactor been performed?
G		What is the technology (type) for the SF storage from the research reactor and the training reactor?
G		What type of SF from the research reactor and the critical assembly are stored when the declaration was submitted and what inventories?
G		Are limits and conditions for safe operation of the facilities for storage SF from the research reactors and the critical assembly determined?

Spent fuel management facilities are those facilities – as defined by the Convention – the primary purpose of which is spent fuel management. There are no such facilities for the management of the spent fuel from the Budapest Research Reactor or from the training reactor at the Budapest University of Technology and Economics. Moreover, at present there is no spent fuel in the training reactor at all, it is operating with the first fuel loading.

The types and quantities of spent fuel of the research reactor are given in detail in section D.1.2 "Inventory and rate of generation of the spent fuel of non-nuclear power plant origin" of the National Report : 807 VVR-M2 and VVR-SM type (with an enrichment of 36%) fuel assemblies are stored on the site with 75 kg heavy metal content. From previous operations there are also 82 spent fuel assemblies of EK-10 type in the facility with a heavy metal content of 102.2 kg.

The spent fuel of the Budapest Research Reactor is stored under water in the storage pools of the reactor. The pools are parts of the reactor facility, consequently their safety is ensured by the safe operation of the reactor. The safety regulation of the research reactor includes prescriptions for the regular control of water level and water quality. The water quality control includes measurements of electric conductivity, pH and quantitative analysis of different ions. As a consequence of the safety considerations regarding spent fuel, the storage mode is being changed to semi-dry storage. Semi-dry means that the fuel is encapsulated into aluminium cans. During this procedure the fuel is dried, and then the cans are filled with inert gas. The cans are stored under water in the same pool, where they were stored before. The aim of the canning is to slow down the corrosion as much as only possible.

All nuclear facilities in Hungary have valid licenses. The licenses are based on safety reports. The safety reports include safety analysis of the spent fuel storage facilities.

In the pools storing spent fuel at the Budapest Research Reactor no active safety devices are present, consequently the safety has to be ensured by limiting the multiplication factor of the infinite structure (k-inf.). These limits correspond to the international practice. Operational limits are not introduced, as there is no operation in the usual sense. As conditions for the safe operation only the water quality can be considered in case of the wet storage. In case of the semi-dry storage the hermetic closure of the cans has to be ensured too. This can be controlled by regular checks of the weights of the cans.

G		Are the procedures described in Section G and the safety criteria as presented for the Interim Spent Fuel Storage Facility applied analogously for projected spent fuel management facilities?

At present there are no projected spent fuel management facilities, but the Hungarian legal regulations and regulatory requirements would apply to any future facilities as well.

G		How specifically the implementation of Art. 6, para.1, p. IV and Art. 6, para.2 is ensured?

<table>
<tr><td colspan="3">At present there are no proposed facilities for spent fuel management in Hungary. In the future, when planning a facility, we will follow the obligations, undertaken by joining the Convention.</td></tr>
<tr><td>G</td><td></td><td>Does your country envisage disposal of the SF from the research reactor and the training reactor?</td></tr>
<tr><td colspan="3">There is no decision yet on the solution of the disposal of spent fuel from the research reactor and the training reactor. The investigated options are discussed in the Hungarian National Report, in Chapter B.1.2 (p. 12-13).</td></tr>
<tr><td>G</td><td></td><td>What specific measures are undertaken for the implementation of Art. 5? What safety reviews of the existing facilities have been conducted or planned after the Convention's entry into force?</td></tr>
<tr><td colspan="3">Near surface repository:

Between 1999 and 2002 three safety analyses were completed: two were performed by Hungarian companies, while the other one was made by the AEA Technology of the UK in a project funded under the European Commission PHARE programme. Safety assessments attempted to answer the question whether the site would remain safe in the future, or corrective measures are needed, through which the required safety could be guaranteed.

Safety assessments performed recently on the repository revealed a need for corrective actions. Results of the Püspökszilágy facility are in the optimisation band, thus, as an actual task, options and extent of consequence-reducing measures are to be prepared. Partial or complete recovery of some long-lived sources that cause the problem is such a technological problem, which means proper designing, licensing, implementation of a waste-qualifying program.

Currently a new PHARE project is in progress aiming at deciding on the most appropriate and acceptable method of safety upgrading. The project – to be realised by the end of 2004 – should provide a consistent scheme for analysing the situation and for ensuring that all factors essential for successful implementation are addressed. The intervention logic should be sufficiently prepared.

Interim Spent Fuel Storage Facility:

The safety related information required for licensing of the Interim Spent Fuel Storage Facility (construction, putting operation, operation and termination) was presented in the Final Safety Case. Based on the operational experiences and the safety enhancing measures, the Final Safety Case is subject to revision in every year.</td></tr>
<tr><td>G</td><td></td><td>What is the current status of Interim Spent Fuel Storage Facility Paks enlargement for another 33 vaults? Document the process as requested by Article 6 of JC.</td></tr>
<tr><td>G.1</td><td>49</td><td>What are the appropriated steps to ensure that procedures for siting are established or that they will be established to fulfil this article? (This information is missing.)</td></tr>
</table>

Following the completion of the 11th module of the Interim Spent Fuel Storage Facility, a new licensing proceeding is needed for construction of further modules. By using this situation, the PURAM was going to review whether any costs could be saved by modifying the type of storage, having the safety of the storage maintained or even enhanced. In 2003 the licensing procedure relevant to the extension of the facility will start. The issue of potential change of the storage type was postponed by PURAM to the post-licensing period.

Schedule of the tasks:

2003 - 2007	Construction of vaults 12 – 16
2008 - 2011	Construction of vaults 17 – 20
2012 - 2017	Construction of vaults 21-25
2047 - 2069	Unloading of the filled vaults, transfer of the spent fuel to the high level radioactive waste repository.
2070 - 2088	Guarded supervision together with the nuclear power plant.
2089 - 2104	Decommissioning simultaneously with the nuclear power plant.

G		The report does not contain information on general safety, as required by art. 4 of the Joint Convention. Could you give details on the steps taken to fulfil the requirements of art. 4 (i)-(vii)?

<table>
<tr><td colspan="3">In chapter G.1 of the National Report it is rather comprehensively covered how requirements of Article 4 (i) – (vii) of the Convention are fulfilled in our Interim Spent Fuel Storage Facility (ISFSF). What concerns paragraph (i) assessment of criticality is described in detail on page 51, cooling method and criteria are stated on pages 49 and 52. The basic design characteristics of the ISFSF (page 49, 50), e.g. isolation, dry storage allow to minimise the generation of radioactive waste as required by paragraph (ii). Capacity of the site, modular construction, account of the specific characteristics of the spent fuel of NPP Paks with due conservatism for possible future development in burn up, heat generation etc. show that interdependencies among different steps in spent fuel management have been taken into account according to paragraph (iii). The safety criteria applied to ISFSF stated on page 51 are in full accordance with the internationally accepted principles, protective methods and also with the national regulatory limits based on ICRP documents fulfilling obligation under paragraph (iv). All real hazards [among others those, mentioned in paragraph (v)] associated with normal operation, anticipated operational occurrences and design basis accidents were assessed before licensing and the results were accepted by all competent authorities. As concerning paragraph (vi) the long term dry storage of spent fuel in nitrogen medium at low temperatures allows decrease both of heat generation and radioactivity content at the same time keeping mechanical and isolation properties of the assemblies. This way no rise of impacts on future generations can be predicted at all, and as a result of current practices present permitted values of any impact will not be reached in the future. In conclusion in connection with paragraph (vii) it can be stated, that the ISFSF will not impose undue burden on future generations.

As to the spent fuel management in other nuclear facilities (power plant units, research and training reactor) the requirements listed in Article 4. are incorporated in national legislation. Therefore design, operation of these facilities are in accordance with the requirements contained in the Convention, what is reflected in the respective safety assessments and SARs. For the 4 units of NPP Paks this question is covered in frame of the 2nd Hungarian National Report to the Convention of Nuclear Safety, what can be downloaded from the homepage of the HAEA (http://www.haea.gov.hu/english/national.html).

In the Budapest Research Reactor spent fuel is stored in the near reactor pool in densified rack, from where it is transported to an interim store at the site. This store is a water filled vessel deepened into the ground. Within it earlier the fuel was stored in water filled hermetic canisters, but nowadays their canning is going on into new gas filled dry cans. The analyses show that all the requirements of Article 4. are met this way

In the training reactor there is no spent fuel this time, as is written on page 20. Design and analyses reflected in SAR allow to manage the possible amount of spent fuel from future operation in full accordance with the requirements of Article 4.</td></tr>
<tr><td>G

B</td><td>49-53

10</td><td>The report does not contain information on review of safety of existing facilities as required by art. 5, probably because at p. 10 of the report it is stated that the spent fuel management at the nuclear facilities site does not fall within the scope of the convention. However, according to art.1 (ii) of the Joint Convention, one of the objectives is to ensure that during all stages of spent fuel management there are effective defences against potential hazards. According to art. 1 (iii) of the Joint Convention, another objective is to prevent accidents with radiological consequences and to mitigate their consequences should they occur during any stage of spent fuel management. Could you give details on review of safety at reactors site, especially taking into account the recent Paks event?</td></tr>
</table>

Review of safety of the Interim Spent Fuel Storage Facility (ISFSF) was not performed as a separate activity for two reasons. One of them is, that this facility is of modular type, therefore for granting of operating licence of a new module an updated FSAR of the complete existing facility has to be submitted for review to the competent authorities. (Last time in September of this year an extended operational licence was issued – additionally valid for the 8^{th} vault, the first one within the 3^{rd} module.) The other reason is that the licensee of the ISFSF have been changed. originally the owner of the NPP Paks was the licence holder and the facility was operated as a part of the NPP by the NPP Paks shareholding company. Later as a consequence of Act CXVI of 1996. on atomic energy the PURAM was formed and became the operator of the ISFSF. Therefore step by step all the site, construction and operation licences were transferred to PURAM. Along the regulatory review and approval of the licence extension and licence transfer applications the required safety review was accomplished. A complex periodic safety review (PSR) is due first in 2008 according to the legal requirements.

In case of NPP Paks PSR was accomplished separately for units 1-2 and 3-4 and reported in the National Reports of Hungary under Convention on Nuclear Safety. These reports were made public and as the latest can be downloaded from the web site of HAEA (see answer to Question Romania 4).

A PSR is ongoing for the Budapest Research Reactor, it is due to be finished in November of this year, which among others covers all spent fuel management related issues.

As it was stated earlier, actually there is no spent fuel management in the training reactor.

Safety of spent fuel management at reactor sites is covered above. Details of the serious incident which occurred at unit No.2 of Paks NPP happened at an operation outside of the design bases. One of the main conclusions up to now is, that review and analysis processes both at the operator and the regulator need improvement, as this situation was not revealed in advance. With respect to this incident Hungary follows policy of openness. Although neither the Convention on Early Notification, nor the bilateral agreements would have required, Hungary using all available channels informed the international community and the neighbouring countries. At different international meetings Hungarian participants made special presentations on the course of events, on radiological and other consequences (among others in the beginning of May in Bucharest on the Training Course on Decommissioning of Research Reactors organised by CNCAN and US DOE). HAEA and other organisations increased their communication with the open media. Hungary invited a special IAEA expert mission to asses the results of the domestic investigations. Report of this mission can be downloaded in original from the web-site of the HAEA. On the other hand in our understanding detailed discussion of most aspects of this event is outside of the scope of the Joint Convention, and therefore also of the Review Conference as in the cleaning procedure generally, and in the incident itself there was not involved spent fuel as it is defined in the Article 2. n) of the Joint Convention, as the intention was to further use the cleaned fuel in the reactors.

G.1	49-51	The description of current operating licence scope and safety assessments (Section G.1) would not seem to allow the storage of used fuel assemblies damaged in the Paks fuel cleaning incident of 10^{th} April 2003. Please elaborate on any plans and difficulties related to the interim storage of spent fuel and liquid wastes resulting from the Paks fuel cleaning incident.

<table>
<tr><td colspan="3">In the scope covered by the current operating licence and the safety assessments of the Interim Spent Fuel Storage Facility there is no possibility to store the fuel damaged in the severe fuel cleaning incident of the 10th April 2003. But an interim storage of the damaged fuel (although not so severely damaged) was foreseen by design of the reactor units itself in the near reactor spent fuel ponds. Of course there is a need to hermetically encapsulate them in suitable canisters. The original design included a kind of canisters, and certain amount of those was delivered to the plant before its commissioning, but those were intended to be used for fuel not much changed in geometry and dimensions. The commercial contract concluded with a holding of Russian contractors to eliminate the consequences of the incident includes the design, safety assessment, licensing and fabrication of the suitable canisters. A basic element of the elimination process will be the transfer of debris, parts of fuel assemblies and only slightly damaged assemblies into these canisters. In some cases possibly the original canisters could also be used. The further fate of these canisters can be decided at a later stage, in principle they can stay in the pond as long as the unit will be finally stopped for decommissioning. The incidental waste both liquid and solid (e.g. the cleaning tank itself) have to be managed specially. It requires increasing of interim storage capacity of the NPP of all kinds of radwaste. Conceptual design of a new liquid waste storage tank farm have been already submitted to the licensing authority to get licence in principle. The assessment of the application is underway. Use of some newer technologies in comparison of those already existing in NPP Paks, based on ion-exchange and other filters with highly ion selective properties have been in planning stage. The separation of different waste streams resulting from the incident itself and of the elimination operations (and of course from the conventional operational radwastes) is required by the regulator and is foreseen by the operating organisation. As a consequence of the incident in the affected areas all scaling factors used have to be adjusted to the new isotope content.</td></tr>
<tr><td>G.1</td><td>49</td><td>Are there financial resources for a repository for SF from Paks?</td></tr>
<tr><td colspan="3">Yes, the calculations defining the payments into the Central Nuclear Financial Fund take into consideration the cost of the disposal of the spent fuel from Paks NPP.</td></tr>
<tr><td>G.1</td><td>49-50</td><td>“...4. Passive cooling. The cooling of the spent fuel assemblies is provided by a self-regulating passive cooling system, by a natural draft-induced airflow around the fuel storage tubes. The outside cooling air and the storage gas within the storage tube cannot intercommunicate...

6. Isolation. The isolation of the spent fuel assemblies (from the environment) is provided by the fuel storage tubes and the gas supply system during storage...”

Question 1. What is the maximum temperature of the fuel rod cladding and how is it monitored?</td></tr>
<tr><td colspan="3">Cladding: 410 ^{O}C (earlier: 350 ^{O}C)
Concrete: 100 ^{O}C
Storage tube: 300 ^{O}C

During storage the temperature of the fuel rod cladding is not monitored.</td></tr>
<tr><td>G.1</td><td>49-50</td><td>Question 2. How is each tube of the storage sealed, how is the tightness monitored and what is the operational term of the seals? (see Bulgaria 10)</td></tr>
</table>

<table>
<tr><td colspan="3">Lifetime, until effective sealing is ensured of the storing tube O-rings, is expected to be longer than 25 years. In service the effectiveness of the sealing is checked by the monitoring system of the gas supply. Should gas from the nitrogen supply system of any of the vaults escape due to corrosion or other reasons, alarm will go out. The threshold for giving alarm is 1.75 l/min gas leakage.
Measurements by use of He-leak tests are carried out when filling the tubes with fuel assemblies as well as when leakage is observed.

In the case of the filled vaults, every 5-year the sealing of 4 closure plugs selected randomly are removed and investigated by destructive material testing.</td></tr>
<tr><td>G.1</td><td>52</td><td>Is it possible to store damaged SF in Interim Spent Fuel Storage Facility Paks storage facility including assemblies damaged during the April 2003 fuel cleaning incident? If yes, provide an overview of storage conditions.</td></tr>
<tr><td colspan="3">At present it is not allowed to store damaged spent fuel in the Interim Spent Fuel Storage Facility.</td></tr>
<tr><td>G.1</td><td>52</td><td>The environmental licence for the ISFSF was issued by the Lower Danube Valley Environmental Authority. Which is the role of the other regulatory bodies (HAEA and the State Public Health and Medical Officer's Service) in the environmental licence?</td></tr>
<tr><td colspan="3">The environmental licence is the first licence to be acquired in the licensing procedure. There are special authorities participating in the procedure, e.g. HAEA for nuclear safety, the State Public Health and Medical Officer’s Service for hygienic matters.</td></tr>
<tr><td>G.1</td><td>52</td><td>How is compliance ensured with Joint Convention Article 9 iv) concerning engineering and technical support in operation of a spent fuel storage facility?</td></tr>
<tr><td colspan="3">Based on the operational experiences safety enhancing measures are regularly implemented.

A comprehensive programme has been launched to follow with attention the ageing of the facility components.</td></tr>
<tr><td>G.1</td><td>52</td><td>How is compliance ensured with Joint Convention Article 9 vi) concerning collection, analysis and incorporation of operating experience?</td></tr>
<tr><td colspan="3">The safety related information required for licensing of the Interim Spent Fuel Storage Facility (construction, putting operation, operation and termination) was presented in the Final Safety Case. Based on the operational experiences and the safety enhancing measures, the Final Safety Case is subject to revision in every year.

The operational limits of the Interim Spent Fuel Storage Facility were approved by the licensing authority. The reports prepared in relation to the operation and the safety of the Interim Spent Fuel Storage Facility shall be submitted quarterly and annually to the authority.

The Environmental Permit of the Interim Spent Fuel Storage Facility was issued by the Environmental Authority. The Environmental Permit specifies the limit values for the airborne and liquid discharges from the Interim Spent Fuel Storage Facility. The results of the discharge and environment monitoring activities shall be reported to the authority on a monthly basis.</td></tr>
<tr><td>G.2</td><td>53</td><td>Would the option of an international or regional repository (in Hungary or elsewhere) be considered during the yet-to-begin development of a national policy and strategy (given that the PURAM Waste Agency is a member of ARIUS)?</td></tr>
</table>

At present there is no decision on the back end of the fuel cycle. Several options are investigated, one of them is the international or regional repository. Decision on the strategy is expected to be taken in 2008.		
G.2	53	No decision has yet been taken on the back-end of the spent fuel cycle. When the strategy for disposal of spent fuel will be defined?
Based on the current plan, as laid down in the 3rd Medium- and Long term Plan, by 2008 the strategy will have been approved. 2004 Beginning the R & D activities as laid down in the Policy. 2005 Completion of the R & D activities. 2008 Compilation and approval of the strategy.		
G.2 H.2		Are there any safety requirements/considerations for the retrievability of waste and spent fuel from the disposal facility?
According to Appendix 6 of 47/2003. (VIII. 8.) ESZCSM, Decree of the Minister of Health, Social and Family Affairs, establishment and design aspects of the final disposal facility include the following: “The technology of the waste disposal shall be designed in such a way that the waste remains retrievable under the operating time, if the retrieving is proved to be necessary by further operating experience, or it is requested by the regulatory procedure.”		
G H.2 H.3	49-53/ 56-60	Prior to constructing a spent fuel / radioactive waste management facility, is a check of its environmental impact made with public participation? What parameters are examined, apart from airborne and liquid discharges?
Environmental impact assessment for radioactive waste storage or repository and consultation of the public on site selection are linked together in Hungary. There are two acts which have both elements: Act CXVI of 1996 on Atomic Energy and Act LIII of 1995 on the General Rules of Environmental Protection. According to the Section 13 of Act on Atomic Energy provisions set forth in special legislation shall apply with respect to public hearings on the use of atomic energy. Section 68 of Act LIII stipulates that the impact assessment shall consist of a scoping (preparatory) and - in case it is necessary in accordance with the rules of the Act - a detailed assessment phase. The applicant shall present the findings of the phases of impact assessment in a preliminary environmental report and in a detailed environmental impact report. There are two opportunities for public participation within the licensing procedure. The first opportunity presents itself when the developer submits an application to the competent authority. The application and the preliminary report have to be made accessible for public. Citizens and groups which may be affected by the project are entitled to comment on the preliminary environmental report. Comments can be submitted in written form. Before making decision, the Environmental Authority (Inspectorate) takes into account the comments substantial from the viewpoint of consideration of impacts on environment.		

The second stage for public input is given in form of public hearing when the detailed environmental impact assessment study have been performed. Act on the General Rules of Environmental Protection covers the general rules of these public hearings.

After a detailed environmental impact report has been submitted to it, the Inspectorate shall hold a public hearing unless the activity falls under military secrecy. The Environmental Authority (Inspectorate) informs the affected local government about the environmental impacts of a secret military activity.

The Inspectorate may invite the special authorities concerned in the matter, the affected parties and the affected local governments, the applicant, furthermore, the associations formed to represent environmental interests and other public organisations, if they announced their intent to participate and verified their capacity as party to the case.

Before making its decision, the Inspectorate shall study the comments important in the matter from the aspect of evaluating the impact on the environment. In case there are several affected local governments, or if it is justified in view of the number of affected parties, the public hearing may be held at several locations.

In an environmental impact assessment for long term storage and disposal of radioactive waste the following items are normally considered:

- Social impacts
- Land use considerations
- Technical considerations
- Transport issues
- Radiological impact
- Non-radiological impact
- Economic impact

The legislation on environmental impact assessment requires the consideration of the following:

- population
- soil
- water
- air
- archaeological heritage
- landscape
- inter-relationship between above factors
- material assets
- climatic factors
- fauna
- flora
- architectural heritage

other considerations: dimension and classification of impact area
transboundary effects
alternative options

G. H.2 H.3	49-53/ 56-60	What are the legal bases for licensing spent fuel / radioactive waste management facilities? On which regulations, codes, standards and guidelines are the safety and environmental assessments of such facilities based?
G. H.2 H.3	49-53/ 56-60	What are the licensing procedures and what documents with which contents have to be submitted? Who checks submitted documents and compliance with licensing conditions? How was the Interim Spent Fuel Storage Facility licensed? How was the Radioactive Waste Treatment and Disposal Facility licensed? Is a supplementary licence granted for repair and refurbishment under legislation now in force and in line with international safety standards?
E	25-35	How is the structure of the regulatory framework and the regulations beyond the act (hierarchy/contents/listing)?

Radioactive waste management

The main regulations concerning the licensing of radwaste management facility and their safety assessments from the radiation protection point of view are the following:

- Decree of the Minister of Health 16/2000. (VI. 8.) on the execution of certain provisions of Act CXVI of 1996 on Atomic Energy associated with radiation protection,
- Decree of the Minister of Health, Social and Family Affairs 47/2003. (VIII. 8.) on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity,
- Decree of the Minister of Public Welfare 23/1997. (VII. 18.) on the exemption levels activity-concentrations and activities) of radionuclides,
- the Hungarian Standard MSZ 14344/1-1989: Radioactive wastes. Terminology and categorisation,
- the Hungarian Standard MSZ 14344/2-1989: Radioactive wastes. Management.
- Decree of the Minister of Environment Protection 15/2001. (VI. 6.) on the radioactive releases into the air and into the water in connection with the application of atomic energy, and on their control.

In the authority system of the State Public Health and Medical Officer's Service (SPHAMOS), at first instance, the Regional Institutes of the SPHAMOS perform the grant of licence, record keeping of licences, protocols and inspection of licensee's workplaces.

At second instance, the Office of the Chief Medical Officer is dealing with the affair of appeal of licensee after a negative answer of the SPHAMOS Institute at first instance, as well as grants the licence for the nation-wide transport of radioisotopes and for the production and trade of radioisotopes.

Regarding radiation protection, the main regulations can be found in Annex 4 of the National Report, except one, the very new regulation: Decree of the Minister of Health, Social and Family Affairs 47/2003. (VIII. 8.) on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity which replaces Annex 11 of the old Decree of the Minister of Health and Social Affairs 7/1988. (VII. 20.).

The National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene (NRIRR) is a technical support institute to both the Office of the Chief Medical Officer and the Regional Institutes of the SPHAMOS and, moreover registers all licences granted to the user of atomic energy (including the operators of spent fuel and radwaste management).

In the preparation phase of the National Report parts related to radioactive waste management the old Ministerial Decree 7/1988 had been in force. According to this decree, the Office of the Chief Medical Officer was the licensing authority for the Radioactive Waste Treatment and Disposal Facility (RWTDF). It participated also in the licensing procedure of the Interim Spent Fuel Storage Facility (ISFSF) as a special authority.

The National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene (NRIRR) was involved in both licensing procedures as a technical support institute in order to make an expert study. During the licensing procedure, detailed documents were required for the sake of the evaluation of the aspects of radiation protection, emergency and safety assessment.

In the case of the Püspökszilágy Radioactive Waste Treatment and Disposal Facility the licensee (or rather the designer on behalf of the licensee) applies for the approvals and discusses on the requirements with the special authority involved in the licensing process. After getting all approvals, the licensee applies for the licence to the SPHAMOS. According to the new Ministerial Decree 47/2003 (VIII. 8.) of the Minister of Health, Social and Family Affairs on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity, the competent authority is the Regional Institute of the SPHAMOS, it means that the commissioning licence after refurbishment of RWTDF will be granted by the Capital Institute of the SPHAMOS.

It is stated that all new regulations (standards) are in accordance with the international regulations (EU) and recommendations (ICRP, IAEA).

Spent fuel management

Legal bases for licensing of spent fuel management facilities are described in section E.1. The general framework is established by Act CXVI on Atomic Energy relevant provisions of which are outlined there. More specific questions are contained in the governmental and ministerial decrees. Nuclear safety questions are covered by Governmental Decree 108/1997. (VI. 25.). Its annexes Nos. 1-4, are safety codes that are mandatory regulations and are used on the basis of analogy for the licensing of the Interim Spent Fuel Storage Facility. The analogy is practically identity in the case of code No. 2 related Quality Assurance, as it is a very slightly modified translation of the IAEA Safety Code 50-C-Q, which states, that is applicable also for nuclear facilities other than NPPs. The code No.1 outlines in detail for what, when and what kind of license is required for NPPs, this set of procedures can be easily adapted for spent fuel management facilities. Here are also given the requirements on documentation, which have to be submitted with the applications. Design requirements of code No.3. for the NPPs shall be treated differently. General requirements, including those related to safety analysis can be used fully for methodology etc., while requirements to such specific questions as containment systems shall be practically dropped. The general scheme of treating radiation protection licensing issues are the same as in case of NPPs and are governed basically by Ministerial Decree 16/2000 (VI: 8.) of minister of health. The situation is analogous for environmental protection issues. The detailed environmental assessment requirements are governed by Governmental Decree 20/2001. (II. 14.) specifying provisions of Act LIII of 1995 on Environmental Protection. This decree which incorporates procedures for fulfilment obligations from Espoo Convention, makes mandatory the detailed environmental assessment for spent fuel management facilities not only before the construction phase, but also before their decommissioning. Public involvement requirements and its basic procedures are defined by the Act itself. This way a separate environmental licence, based on the detailed assessment is the prerequisite of the nuclear safety licences. Radiation protection authorities are involved in both licensing procedures to obtain their consent, and moreover they issue a specific licence fore the structure and basic procedures of the health physic organisational unit of the operational organisation. Specific nuclear safety guidelines will be elaborated and issued for the spent fuel storage facilities only after entering into force of their mandatory legal basis, the drafted safety code No.6. mentioned on page 27. of the National Report.

Licensing procedures for the ISFSF are as follows: first is obtaining the (nuclear safety) site licence, it is based on a documentation, that shows that the principal design characteristics of the facility may enable fulfilment of all valid legal requirements at the planned site. For this the preliminary environmental assessment have to be accomplished and adopted by environmental authorities as a basis for the detailed phase. Next the environmental licence have to be obtained from the competent environmental authority based on the detailed assessment and the compulsory public hearing procedure. Then application for the construction licence may be submitted, based on the Preliminary SAR. Construction licence will be issued in parallel with the building licence, as in case of nuclear installations the nuclear safety authority is also a specific building authority. In these processes all concerned specific authorities shall be involved (local, environmental, fire protection, physical protection, radiation protection etc.). In certain cases also a special water usage licence may be necessary from the competent authority. For safety classified equipment nuclear safety licenses are necessary for manufacturing (or import from abroad) and assembling. On the basis of the nearly finished FSAR the nuclear safety commissioning licence shall be obtained, which also allows a limited time (half year) test operation. After finishing the commissioning process and introducing the necessary amendments into the FSAR it is required to apply for and issue the operating licence provided all requirements have been met. Submitted documents and compliance with licensing conditions are checked by the nuclear safety authority, the Nuclear Safety Directorate (NSD) of the HAEA. They shall involve all the concerned (defined in legal rules acts,. decrees) other authorities and may involve any experts or expert organisations as they deem necessary.

On the basis of the previous Act I. of 1980 on Atomic energy (ceased force 1st June of 1997) and the related old decrees the site licence of ISFS valid for 33 vaults was issued by Nuclear Safety Inspectorate of HAEA (the predecessor of NSD) in November of 1994. The construction licence was issued on the same basis in February of 1995 by the Hungarian Atomic Energy Commission for 3 modules incorporating 11 vaults. The commissioning licence was issued by this Commission in February of 1997 for the 3 vaults of the first module. After entering into force of the new legislation the operating licence for this 3 vaults was issued already by the HAEA NSD in August of 1998. Holder of all these licences was the owner of the NPP Paks, with operating organisation of the NPP itself. The latest in this line is the operating licence for the 8th vault, issued in September of this year. Additionally step by step the earlier licenses keeping their validity were also transferred to the new licensee: the site licence in August of 2003, the construction licence of module 3 (vaults 8-11) in September of 2003. Some minor modifications of the licence conditions were also introduced several time (e.g. concerning a temporary rise of allowed rate of transport of spent fuel into the ISFSF, different formulation of the allowed maximum fuel sheath temperatures). The content of the required documentation is given in the safety codes, as mentioned above.

G. H.2 H.3	49-53/ 56-60	During the operating lifetime of a spent fuel / radioactive waste management facility, could modifications for compliance with the state of the art and science be required?
G./ H.2/ H.3	49-53/ 56-60	Which organisation or governmental agency monitors compliance with the safety conditions foreseen in the submitted licensing documents during and after construction of a spent fuel / radioactive waste management facility (who is the regulatory body)?

Radioactive waste management

According to the new Ministerial Decree 47/2003 (VIII. 8.) of the Minister of Health, Social and Family Affairs on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity, the licence of commissioning of the final radwaste disposal facility could be granted for maximum 10 years, and the licence requires a periodical review of the disposal system, so there is a possibility to let perform any modification based on the new results of science.

According to the radioactive waste management facility and the new Ministerial Decree 47/2003 (VIII. 8.) of the Minister of Health, Social and Family Affairs on certain issues of interim storage and final disposal of radioactive wastes and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity, the competent authority for inspection of safety conditions is the competent Regional Institute of the SPHAMOS.

The regulatory body is the Minister of Health, Social and Family Affairs, but the licensing and inspection tasks are carried out by the SPHAMOS on behalf of the Minister.

Spent fuel management

During the operational lifetime of each nuclear facility, thus also case of the spent fuel management facilities (e.g. ISFSF) a comprehensive periodic safety review (PSR) have to be accomplished. One of the several aims of this review is to compare the governing documents of the facility (including the legal requirements contained in acts, decrees, etc.) by the advanced international practice, what is understood as a legally more solid definition of the validated and practicable „State of the art and science" terminus. This phase of the PSR is concluding with the report on review to be submitted to the nuclear safety authority. Compulsory part of this submission is to state the revealed deficiencies and make a proposal on the plan of corrective actions. HAEA NSD assesses this report, may make additional review of documents, or even physical situation at the site, and on the basis of the report and own assessment takes a decision on the possibility of further operation in general and prescribes the required corrective actions with their deadline. Differences between the operational practice and/or domestic requirements and the advanced international experience can serve as basis of requiring enhancements/corrective actions by the regulator, would not those be proposed by the licensee.

The HAEA NSD as the competent nuclear safety authority of first instance monitors the compliance with the safety conditions foreseen in the submitted licensing documents during and after the construction of a spent fuel management facility. The regulatory body by the definition of the IAEA, is a more complex entity, including the territorial organ of the State Public Health and Medical Officer's Service in charge for the personal radiation protection of the workers and the public, the territorial Environmental Protection Inspectorate monitoring environmental discharges, organs of police monitoring compliance with physical protection and security issues etc.

G. H.2 H.3	49-53/ 56-60	To what extent is decommissioning considered during licensing of a spent fuel / radioactive waste management facility?

There are rather general design requirements in the Nuclear Safety Code No. 3, aiming at ensuring technically easy decommissioning and limit as much as possible the waste generation at this phase together with introducing the ALARA principle. Therefore on the basis of a very preliminary decommissioning plan a separate chapter on this phase of the lifecycle of the facility has to be included into the Preliminary as well as in the Final SAR. As it was stated in answer given to Question Germany 6, these SARs constitute the basis for granting the construction and later the commissioning/operating licences. After entering into force of the new codes this chapter of the FSAR shall also be required to be regularly updated.

H	55	What legal, technical or organisational steps are taken to: ensure that the generation of radioactive waste is kept to the minimum practicable; ensure that interdependencies among the different steps in radioactive waste management are taken into account; provide for effective protection of individuals, society and the environment which has due regard to internationally endorsed criteria and standards; manage radioactive waste to minimise the biological, chemical and other hazards that may be associated with radioactive waste management; avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation; manage radioactive waste in such a way to avoid imposing undue burdens on future generations ?

The dose and risk limits for the facilities are in conformity with the current international recommendations.

Regulatory control of radioactive discharges to the environment is in place. Dose constraints have been derived and implemented for the nuclear facilities (NPP, Interim Spent Fuel Storage Facility, research reactor, training reactor, ex-uranium mining milling site) and for the near surface repository. Environmental Impact Assessment is required by law for new or to be modified nuclear facilities. The safety of the facilities before and during the operation is regularly evaluated by conducting safety assessments.

Based on the results of the safety assessments corrective actions are initiated if necessary.

Safety enhancing programmes have been implemented (e.g. Interim Spent Fuel Storage Facility). The operational experiences are regularly reported to the authority.

Intervention to the existing near surface facility is going on in order to enhance safety and to avoid undue burdens on future generations.

National projects (LLW/ILW repository siting, HLW repository siting, remediation of the U-mine, safety upgrading) have been launched for all important areas of the radioactive waste management with an aim of minimising the burden of the future generations.

Our facilities and projects are regularly subject to international peer review.

Technical and organisational steps (for the near surface repository):
In undertaking the safety assessment, we have drawn on some of the latest guidance given in ICRP publication 81. The guidance is particularly relevant to the treatment of human intrusion and disruptive events. Some of the guidance is highly relevant for the Püspökszilágy Radioactive Waste Treatment and Disposal Facility:

- Exposures from a solid waste disposal facility are treated as potential exposures, as their magnitude depends on future processes and conditions that have probabilities associated with them.
- For next generations at least the same level of protection from the action of disposing of radioactive waste should be ensured as it is given to the current generation.
- Protection of future generations should be achieved by applying current quantitative dose and risk criteria to estimate future doses or risks in appropriately defined critical groups.
- Optimisation is the central approach to evaluating the radiological acceptability of a waste disposal system.
- Resilience of the repository to such events should be evaluated.
- Where human intrusion could lead to doses to those living around the site exceeding the current intervention criteria, reasonable efforts should be made at the repository development stage to reduce the likelihood of human intrusion or to limit its consequences.
- Below 10 mSv per year intervention is not always likely to be justifiable, but above 100 mSv per year intervention should be considered almost always justified.
- Similar considerations apply in situations where the thresholds for deterministic effects in relevant organs are exceeded.

It is noted that the guidance on optimisation and human intrusion is particularly relevant to the Püspökszilágy Radioactive Waste Treatment and Disposal Facility.

H.	55	With reference to Sections H.2 and K.2, please clarify the timeframe for consideration, decision making, retrieval and removal from the Radioactive Waste Treatment and Disposal Facility of the types of waste for which the site is currently considered unsuitable (long lived high activity sources). Do sufficiently accurate records exist of the current status and location of these sources to allow safe retrieval to be planned? Does the nature of issues for which the site is now considered unsuitable justify the projected continued use timeframe by the Public Agency (PURAM) of 40-50 years? Are the special wells (boreholes) in the pit in the basement of the centralised interim storage building (final paragraph of H.2 under the heading refurbishment) being developed with considerations of retrievability of the radioactive sealed sources to be deposited there? What types of sources are to be placed in these boreholes and what types would not be placed in these boreholes? Please also explain the assumptions used in the models mentioned in Section H.2.

a) From the results of the safety analysis accomplished it could be stated that present operation and environmental safety up to the end of passive institutional control of the facility at Püspökszilágy is properly guaranteed. The facility as a whole is suitable for safe disposal of low and intermediate level short-lived wastes. Beyond the passive institutional control, mostly because of the significant amount of long lived components yet disposed of (^{14}C, ^{226}Ra, ^{232}Th, $^{234, 235, 238}$U, ^{239}Pu and ^{241}Am); as well as because of the high activity ^{137}Cs sealed sources, inadvertent human intrusion – or any other scenario resulting in surfacing of waste after deterioration of concrete barriers – could result in exceeding both dose constraint and dose limit.

Key recommendations relating to the future management of the site are:

- certain long-lived and high activity spent sources should be removed from the facility;
- the repository cap should be carefully designed;
- the scope for long-term settlement within the vaults should be minimised and at an appropriate time, the vaults should be completely backfilled;
- steps should be made to minimise the chances of future human disturbance by recording information about the facility and by an extensive period of administrative control over the site.

The results of the safety assessments clearly indicate that the spent sealed radioactive sources could result in high doses to individuals who intrude into the facility and they could also lead to high doses following any future disruption of the facility by natural processes.

There are existing international recommendations (ICRP, IAEA) covering such situations, i.e. criteria to be applied and action to be taken in the case of exposure resulting from past practices. These recommendations call for obligatory intervention above 100 mSv/a and an optimised intervention where doses of between 10 and 100 mSv/a are observed. The basis for optimisation is the real dose associated with intervention activities vs. reduction of the potential dose in the future. Such an optimisation has never been performed in Hungary.

Safety assessments performed recently on the repository showed a need for corrective actions. A PHARE preliminary assessment indicated long-term doses of around 100 mSv/a in case of inadvertent human intrusion and a credible hazard of larger-scale aerial contamination at 500 – 800 years after closure owing to presence of large ^{137}Cs sources. A national assessment estimates human intrusion doses around 35 mSv/a and recognises an additional hazard associated with ^{226}Ra, ^{137}Cs and ^{232}Th-sources.

The presence of certain large sources (e.g. ^{137}Cs) in the vaults also gives cause for concern. These sources are intimately mixed with other wastes. Given the serious radiological consequences that would arise from handling the sources, it is believed that their disposal in the near surface environment is inappropriate. It should be emphasised that the probability of such exposure over any short time period is very small.

b) Records have been made and retained of every consignment of waste that has been received at Püspökszilágy. The data have been loaded into the programme "Arcview". The program presents pictures of the distribution of various components of the inventory to be produced on a "compartment by compartment" basis.

The inventory database in its present working form contains most of the information that is necessary as input data for planning of retrieval.

c) The feasibility study being currently undertaken is believed to give justification for the projected continued use of the repository following the intervention and safety upgrading of the facility. The supplementary site investigations carried out in the last 3-4 years have answered most of the concerns based on which the Hungarian Geological Survey had previously questioned the suitability of the site.

d) The conversion of the existing treatment building into a centralised interim store for institutional radioactive waste which are not meant for near surface disposal is a part of the current upgrading and development activities at the repository site. The treatment building was designed in the 1970's to treat and condition raw radioactive waste from isotope applications but remained unused.

The special wells (boreholes) in the pit in the basement of the centralised interim storage building are to be used for storage of spent sealed radiation sources is not suitable for near surface disposal. The new storage building will be fully operational in early 2005.

e) Storage and disposal methods of spent sealed radiation sources in the past and at present in the Radioactive Waste Treatment and Disposal Facility are shown in the attached table (Annex1).

f) Two evolution scenarios have been treated in the Püspökszilágy safety performance. The first assessment of the normal scenario reflected the understanding and knowledge of the site at the time being. The assumption is that the cap failure will occur 2000 years after the closure of the repository and the assessment is based on conservative assumptions and on available specific and generic data.

An alternative evolution scenario has been analysed in order to investigate the effect of the following parameters:
I) the behaviour of the system in the case of a shorter lifetime of the cap (500 years);
ii) lower sorption coefficients for the geosphere;
iii)specific data for biosphere modelling.

Separate results of the contribution of each disposal unit are available

Additionally two human intrusion scenarios have been analysed:
i) residence farming;
ii)road construction.

In addition, the scenario of "finding a sealed source" (^{226}Ra source having 2 GBq activity) has also been investigated in connection with the two analysed human intrusion scenarios.

The residence farming scenario supposes that after the institutional control houses will be built on the site but no removal of the waste form is considered. The road construction scenario takes into account approximately by a half of the total inventory arising from excavation (10 to 12 m deep) for road construction purposes.

Deterministic approach has been used in treating the human intrusion scenarios. Results of the residential farming scenario are too conservative. Neither the 2000 years structural stability, nor the cemented and backfilled waste forms have been taken into account. The assumed erosion rate (1 mm/a) is 3-5 times higher than the results of specific studies. Road construction and excavation into the waste were characterised as single events. The affected waste volume is probably 30% of the total volume. Results are given as function of time of intrusion and are below the dose constraint. Residential farming and „real intrusion" scenarios are accompanied with a case when someone is finding a source containing long-lived nuclide (Radium in precious metal case, or plutonium in stainless steel casing). The results of the safety assessment are summarised in the attached table (Annex2).		
H.	55	'Radioactive waste from the Solymar site was removed and the site was cleaned up and closed between 1979 and 1980. Where was the waste subsequently stored after removal from the site? Please describe the criteria used to allow limited site use.
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 has been commissioned at the village of Püspökszilágy. In 1980 the Solymár site was cleaned up and closed by transferring all waste to the new facility. Criteria for limited site use: The residual activity for the site permitted by the regulatory body was 37 MBq (1 mCi) ^{90}Sr equivalent. The actual residual activity was estimated around 10 % of the value set by the regulator. The site has been subject of environmental monitoring since that time (24 years by now).		
H	55	Is the remediation of the closed uranium mine considered to involve wastes included in the scope of the Convention?
The waste rock piles, the heap leaching piles and the tailing ponds are not considered to be radioactive wastes falling under the scope of the Convention.		
H	55	If uranium mining were to resume in future, would the wastes be considered to be within the scope of the Convention?
According to the present Hungarian regulation, the waste rock piles, the heap leaching piles and the tailing ponds are not considered to be radioactive waste.		
H		From a technical perspective, are there wastes which are potentially acid generating and/or which will produce leachates with elevated heavy metal concentrations? If so, how are these regulated and managed?
Sulphide content of the wastes is low (~0.2 %), while concentration of the acid consuming components (carbonates in mine wastes and heap leaching wastes, hydroxide in mill tailings) is much higher (in CO_2-equivalent ~3 %). Therefore the leachates from wastes have pH $\geq$ 7. Nevertheless in the leachates the uranium concentration is above the discharge limit (2 mg/l), therefore leachates are collected and treated for removal of uranium using an anion exchange process.		

H	55	Could Hungary provide clarifications on the restricted use of the "declassified interim disposal facility" of Solymar?

The use of the area of Solymár site is restricted, this means that deep building construction has been prohibited on this area.

H	55	'The discussion of existing facilities and past practices for radioactive waste management on page 55 and Annex 7 includes few details on the cleanup of the Solymar site, remediation of the mining plots, decontamination of the tailings ponds, methods used to stabilize the heap leaching piles, etc. Please provide more information on the specific activities and techniques used to remediate these areas. For example, what methods were used to stabilize the mill tailings and prevent leaching of radionuclides into the groundwater?

<u>Mecsek</u>

<u>Mining plots:</u>

Mining cavities have been cleaned from the organic-contaminated (first of all diesel fuel) rocks which than were treated on the surface for decomposing of the contaminants. All equipment, ore cars etc. contaminated with or containing organics were also removed. After removal of the equipment the bulkheads construction has started in the immediate (15-20 m) vicinity of the shafts on each working level. Then shafts were backfilled mainly with mine waste rocks. Debris from demolition of buildings on mine yards was also placed into the shafts.

The heads of shafts were closed with steal concrete plate having an opening (1mx1m) for refilling if needed.
Debris from the blasted mine tower was placed on waste rock pile N3.

<u>Heap leaching:</u>

Remediation of heap leaching sites has started with washing the piles with mine water. Then the obtained washing water was treated for removing of uranium. The washed residues were relocated to the waste rock pile N3, which is a common collecting area for different wastes (excluding mill tailings).

During the relocation the residues were treated with lime (~ 1.5 kg lime/t) for retardation of uranium dissolving from the freshly relocated residues. Lime was added practically in the form of a horizontal reactive barrier. This method proved to be effective for decreasing of uranium in the seepage.

<u>Mill tailings:</u>

Stabilisation of tailings was carried out in the frame of remediation of the tailings ponds. Some important stages of the remediation were as follows:

- Removing of free water from the ponds
- Dewatering of the very weak part of tailings ponds using geomaterials (geogrid and geotextile) and interim loading cover with constructing two horizontal drainage lines (1050 m) in the tailings
- Reconturing and relocation of some part of tailings for decreasing the dam slope

Covering the tailings with multi-layer covering system (total thickness 1.5-1.6 m) which comprises clay layer.

The multi-layer covering decreases the radon flux from the tailings pond much bellow 0.74 $Bq/m^2.s$ and the seepage rate to app. 30-40 mm/a.

Additionally the contaminated ground water is removed from the vicinity of tailings ponds (pump and treat system was built for removing and treating up to 0.75 million m^3/a of contaminated water).

Uranium concentration in the groundwater in the immediate vicinity of the tailings ponds is on the level of 10-40 microgram/l.

Solymár 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 has been placed on it.		
H.1	55	Where is the waste, removed from Solymár, located at present? How is it conditioned and packed?
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 has been 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.		
H.2	56	You point out that "the spent sealed sources could impose high doses to individuals who intrude into the facility". Does this mean, that human intrusions are taken into account in your safety analyses?
Human Intrusion scenarios which were taken into account: • Borehole drilling – examination of core by geotechnical workers – main exposure pathways - external exposure and inhalation of dust • Site excavation – exposure of workers involved in construction activities – main exposure pathways - external exposure and inhalation • Site occupation – Use of land for crops after contamination by an intrusion – main exposure pathways - ingestion of plants and external The safety assessment indicated long-term doses of around 100 mSv/a in case of inadvertent human intrusion and a credible hazard of larger-scale aerial contamination at 500 - 800 years after closure, owing to the presence of large ^{137}Cs sources. The new iteration estimates human intrusion doses around 35 mSv/a and recognises an additional hazard, associated with ^{226}Ra, ^{137}Cs and ^{232}Th-sources. The presence of certain large sources (e.g. ^{137}Cs) in the vaults gives cause for concern. These are intimately mixed with other wastes. Given the serious radiological consequences that would arise from handling the sources, it is believed that their disposal in the near surface environment is inappropriate. We fully respect the recommendation from ICRP Publication 81.		
H.2	56	Which safety concept for the treatment facility is performed? Is there an interim storage?

To convert the existing treatment building into a centralised interim store for institutional radioactive waste which are not meant for near surface disposal is a part of the current upgrading and development activities at the repository site. The treatment building was designed in the seventies to treat and condition raw radioactive waste from isotope applications but remained unused. The special wells (boreholes) in the pit in the basement of the centralised interim storage building are to be used for storage of spent sealed radioactive sources not suitable for near surface disposal. Temporary (buffer) storage for about 1000 drums of 200 litre each will also be provided in the storage building. The new storage building will be fully operational in early 2005.		
H.2	57	Could Hungary provide the estimated quantities of waste to be retrieved and disposed of in a new disposal facility?
Since the free capacity of the repository is running short PURAM is considering a plan in which additional wastes might be disposed in the vaults either using the free voids within the vaults or after removing and re-treating some of the wastes. This would create additional disposal capacity. On the basis of the safety assessment undertaken, it is believed that the disposal of additional waste might be possible without impacting adversely on performance. However, given the high consequences calculated for certain scenarios, we consider that it would be unwise to dispose of significant additional inventories of certain radionuclides without demonstrating that there is significant conservatism in the current assessment. There may be a scope for special waste treatment or packing measures that might mitigate the effects of additional disposals of certain key radionuclides. A focused study is planned to be undertaken based on an understanding of the inventory of additional arisings that might be disposed of. It is important to note that two actions: regaining space for disposal of institutional radioactive waste in vaults, and retrieval of specific radioactive waste packages that are giving radiological concern are interconnected. Both types of operations would require the opening of the vaults that have temporarily been sealed and covered with a protective layer of bitumen, clay and grass. For obvious safety reasons, it would not be appropriate to open several times the vaults either to reduce the volumes of waste packages or to retrieve some specific items. An EU PHARE project is currently underway with an aim of deciding on the most appropriate and acceptable method of safety upgrading. This project – to be realised in 2003–2004 – should provide a consistent scheme for analysing the situation and for ensuring that all factors essential for successful implementation are addressed. The intervention logic should be sufficiently prepared. Based on the main conclusions of the feasibility study to be prepared decision will be made on the number of vaults to be opened and the quantity of the waste to be retrieved. Due to the rather large number of parameters involved, an optimised intervention programme should be established on the basis of a system study. Serco Assurance (UK) will provide leading technical coverage of all of the required technical issues.		
H.2	58	Could Hungary provide information on the current schedule for the mentioned upgrade of the storage building?
The conversion of the existing treatment building into a centralised interim store for institutional radioactive waste which are not meant for near surface disposal is a part of the current upgrading and development activities at the repository site. The treatment building was designed in the seventies to treat and condition raw radioactive waste from isotope applications but remained unused. The special wells (boreholes) in the pit in the basement of the centralised interim storage building are to be used for storage of spent sealed radiation sources is not suitable for near surface disposal. The new storage building will be fully operational in early 2005.		
H.2	56-57	Is the disposal facility designed to deal only with nuclear wastes or will it accept the wastes from medicine, industry etc. as well?

<table>
<tr><td colspan="3">The radioactive waste disposal facility at Püspökszilágy is currently the only site for disposal of radioactive waste in Hungary. The near surface facility was commissioned in 1976, and wastes from all research, medical and industrial applications have been sent there for treatment and disposal.

In 1983 the site was licensed to dispose of low level solid radioactive wastes from the Paks NPP until the expected opening of the power station′s own disposal facility. Unlike other waste producers, the power plant was charged for this service and was compelled to build as much new disposal capacity as it will have occupied. The shipments from the nuclear power plant continued until 1996. The planned new repository, for which site selection and site confirmation has been going on since 1993, will only accommodate LLW/ILW of nuclear power plant origin.

According to PURAM's plan, the repository will be operational for an additional 40–50 years, by receiving the radioactive waste from the small-scale producers of the country. By the end of this period, a deep geologic repository is supposed to be available to receive those long-lived wastes temporary stored in Püspökszilágy facility, which are not amenable for disposal in near surface repository. Bearing this approach in mind, firstly measures are to be taken to provide additional disposal capacity within the site.</td></tr>
<tr><td>H.2</td><td>56-57</td><td>Could you describe the time period for which the regulatory body issued a licence for a repository operation?

Is this time period fixed or is it bound to any regulatory conditions as periodical safety assessment?</td></tr>
<tr><td colspan="3">According to Decree 47/2003. (VIII. 8.) ESZCSM of the Minister of Health, Social and Family Affairs, Section 12:

Operating licence for final waste disposal facility could be issued for determined duration, for 10 years at most, which – in case of meeting the operating conditions – can be extended on request repeatedly for 5 years at most.

The licensee shall summarise the results of the safety evaluation in a safety report.

Section 10:

The safety report can be partial or full scale.
a) Full scale safety report shall be prepared for the substantiation of the establishment, operating and closure license applications, also considering the result of the periodic safety reviews.
b) Partial safety report shall be prepared for the modification of certain – safety related – components of the facility, or for the modification of the licensed activity, for commencing the regulatory inspection and for finishing the active regulatory inspection.</td></tr>
<tr><td>H.2,

I.</td><td>56-57,

61</td><td>Considering the importance of international co-operation in RAW management through bilateral and multilateral mechanisms, as stated in the Convention Preamble ix), which legislative restrictions, if any, govern the acceptance of foreign RAW for processing and/or storage?</td></tr>
<tr><td colspan="3">According to Governmental Decree 32/2002. (III. 1.) on the licensing of shipments of radioactive waste across the national borders, import of radioactive waste requires a licence that can be granted only if the technical, legal or administrative resources to the safe management of the waste are assured.</td></tr>
<tr><td>H.2</td><td>56-57</td><td>What are the plans for dealing with the spent sealed sources currently stored in the Radioactive Waste treatment and Disposal Facility?</td></tr>
</table>

Further safety assessments and feasibility studies are currently being undertaken in order to ascertain the inventory of the long-lived sources that should be recovered from the disposal vaults and wells.

Having identified the key issues in the safety assessments, further work can be undertaken to resolve these issues, leading eventually to a position in which full assurance of the post-closure safety of the repository can be provided. It is emphasised that this further work is likely to involve changes in the characteristics of the facility, updating of plans for its closure and enhancements of the methods used to evaluate its post-closure radiological impact.

PURAM has currently been planning a programme of intervention activities. This programme is funded by the Central Nuclear Financial Fund. However, the nature of the retrieval operations to be performed, the equipment needed, the selection of the most relevant waste packages to be retrieved, the sequential operations to be carried out are still unknown. Due to the rather large number of parameters involved, an optimised intervention programme should be established on the basis of a system study. Serco Assurance will provide leading technical coverage of all of the required technical issues.

The decisions reached concerning the favoured waste management option will be of interest to a number of stakeholders. Implementation will involve the commitment of substantial sums of money. It is therefore important that the decision is well argued and justified. This will be ensured by application of a formal multi-attribute analysis approach.

Beside conducting an assessment to identify the preferred waste management options, an optioning approach will be used to identify the details of how to implement the preferred option. The view on implementation will be used as the basis for defining an equipment list and a timeline for the preferred options.

The outcome of the feasibility work will provide a view as to the best option for the management of each category of waste currently disposed at the Püspökszilágy site (neglecting the spent sources in wells B and D which will be dealt within a separate project).

The recommendations as to the most effective options will be accompanied by a set of arguments and justifications that explain why the specific option is preferred. These will have been debated and discussed at decision meetings, which are part of a formal assessment process. This will provide a good basis for discussion with interested stakeholders.

The overall outcome will be a plan that provides for improvement of the long-term safety of the facility, while at the same time allowing for more effective use of the available disposal volume.
See Annex (1)

H.2	56-58	Which are the requirements on measures to limit possible radiological impact on individuals, society and the environment during design and construction of waste management facilities?

Appendix 4 of the 47/2003. (VIII. 8.) ESZCSM Decree of the Minister of Health, Social and Family Affairs specifies the requirements for final disposal:

- The design basis shall be determined during the licensing of the installation or modification of the facility.
- At the determination of the initiating events in the risk analysis, the events and event-combinations featuring less than 10^{-7} event/year probability could be ignored.

In case of conditions postulating the expected behaviour of the disposal system, after closure, the radiation exposure of the individuals of the control group of the population due to the effects of the disposed waste shall not exceed the effective dose of 100 µSv/year.

- Such external – human or natural originating – events or event-combinations affecting the disposal system during its lifetime, which are beyond the optimised design basis, shall be evaluated with the application of the risk criteria. As a result of these, the resultant risk of the events entailing overexposure of any individual of the population shall not exceed the value of 10^{-5} event/year.

H.2	56-58	Which are the conceptual plans and technical provisions taken into account at the design stage for the decommissioning of radioactive waste management facilities?

In Hungary currently the only „radioactive waste management facility" is the near surface repository with the central interim storage building at the site. At the time of licensing of this facility, considering of its decommissioning was not a requirement. For the nuclear facilities the Hungarian Nuclear Safety Codes explicitly call for that due consideration should be given to the decommissioning aspects. In the case of the Interim Spent Fuel Storage Facility the aspects of decommissioning were taken into account during the planning stage and when performing safety assessment. A decommissioning plan was also prepared.

H.2 H.3	56-60	Is there a licensing procedure in place governing radioactive waste management facilities to be built in the future? Under such a licensing procedure will safety assessments be similar to those for the radioactive waste treatment and disposal facility now conducted as a precondition for granting a permanent licence?

Appendix 4 of the 47/2003. (VIII. 8.) ESZCSM decree of the Minister of Health, Social and Family Affairs specifies the requirements for final disposal:

For granting the licence for the establishment, the existence of other licences (environment protection, water usage, building) determined by the particular law is necessary.

With the licence application for the establishment the pre-establishment safety report - the recommendation for the waste acceptance requirements and the justification that the safety related systems, structures and components meet the radiation protection and radiation safety requirements - shall be submitted.

Operating licence for a final waste disposal facility could be issued for determined duration, for 10 years at most, which, in case of meeting the operating conditions, can be extended on request repeatedly for 5 years at most.

Attached to the operating license application the followings shall be submitted:
a) that part of the pre-operational safety report, which shall be prepared before the beginning of operation,
b) the emergency action plan determined by the particular law,
c) the plans for the waste acceptance and disposal requirement system,
d) the records of the successful operating tests, and
e) the plans for the technological instructions.

In the operating licence the followings shall be indicated:
f) the licensed lifetime of the final disposal facility,
g) the maximal waste quantity and activity that can be disposed in the facility,
h) the storage conditions, the method and frequency of supervision to be performed by the operator,
i) the frequency and method of periodical review for the disposal system considered in the safety analysis, and the safety analysis necessary for performing review, and
J) the reporting and recording obligations.

H.3	58-60	The involvement of the general public and of the Contracting Parties in the vicinity of such a facility is not described. Are the described procedures established in the regulatory framework for a future siting?

Environmental impact assessment for radioactive waste repository and consultation of the public on site selection are linked together in Hungary. There are two acts which have both elements: Act CXVI of 1996 on Atomic Energy and Act LIII of 1995 on the General Rules of Environmental Protection.

According to the Section 13 of Act on Atomic Energy provisions set forth in special legislation shall apply with respect to public hearings on the use of atomic energy.

Section 68 of Act LIII stipulates that the impact assessment shall consist of a scoping (preparatory) and - in case it is necessary in accordance with the rules of the Act - a detailed assessment phase. The applicant shall present the findings of the phases of impact assessment in a preliminary environmental report and in a detailed environmental impact report.

Two opportunities occurs for public participation within the licensing procedure.

The first opportunity presents itself when the developer submits an application to the competent authority. The application and the preliminary report have to be made accessible for public. Citizens and groups which may be affected by the project are entitled to comment on the preliminary environmental report. Comments can be submitted in written form.

Before making decision, the Inspectorate takes into account the comments substantial from the point of view of consideration of impacts on environment.

The second stage for public input occurs in form of public hearing when the detailed environmental impact assessment study have been performed. Act on the General Rules of Environmental Protection covers the general rules of the public hearings.

After a detailed environmental impact report has been submitted to it, the Inspectorate shall hold a public hearing unless the activity falls under military secrecy. The Environmental Authority (Inspectorate) informs the affected local government about the environmental impacts of a secret military activity.

The Inspectorate may invite the special authorities concerned in the matter, the affected parties and the affected local governments, the applicant, furthermore, the associations formed to represent environmental interests and other public organisations, if they announced their intent to participate and verified their capacity as party to the case.

Before making its decision, the Inspectorate study the comments important in the matter from the aspect of evaluating the impact on the environment on their merits. In case there are several affected local governments, or if it is justified in view of the number of affected parties, the public hearing may be held at several locations. According to Act CXVI of 1996 on Atomic Energy 10 par.(4):

In order to regularly provide information to the population of the communities in the vicinity of the facilities, the licensee of a nuclear power plant as well as that of a radioactive waste disposal facility shall promote the establishment of a public control and information association and can grant assistance to its activities.

H.3	58	'The report concludes the Republic of Hungary fulfils the obligations specified in Articles 11-17 of the Convention. No information is provided in section H on the institutional measures after closure of either the existing Radioactive Waste Treatment and Disposal Facility nor the proposed LLW/ILW disposal facility. Will the provisions in Article 17 be addressed as part of the proposed steps to minimize future human disturbance by recording information about the facility and by an appropriately extensive period of administrative control over the site? Please elaborate
K.2	65	'Operational and environmental safety up to the end of the passive institutional control of the Radioactive Waste Treatment and Disposal Facility at Püspökszilágy is appropriately guaranteed. What institutional measures per Article 17 are being employed or shall be employed?

According to the new regulation – 47/2003 (VIII. 8.) ESZCSM Decree of the Minister of Health, Social and Family Affairs – on certain issues of interim storage and final disposal of radioactive wastes, and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity:

For the closure licence application of the final waste disposal facility, closure plan (including the decontamination plan for the site of the disposal facility), safety report and plan for changeover to active institutional control shall be submitted.

The closure plan of the disposal facility shall ensure that during the active institutional control the maintenance and supervision demands are minimal.

During the closure phase care shall be taken of the demolition or of other utilisation possibilities of the buildings serving for the acceptance, qualification, treatment, packaging and for the on-site interim storage of the wastes, and of the decontamination of the site from industrial and radioactive wastes and of the environment-friendly recultivation of the site according to the rehabilitation plans of the landscape.

The handing over of the closed facility and site to regulatory inspection shall be performed only with licensed activity plan and with its approved detailed substantiating safety report.

Following the closure, particular license shall be obtained for the changeover to active institutional control, and after its completion another licence shall be obtained for the commencement of the passive institutional control.

For granting the licence of the active institutional control, safety report considering the whole operation (waste quantity, modifications) shall be prepared. The licence shall contain the active institutional control requirements and the length of the control period.

The active institutional control period lasts at least 50 years, the extension of which can be decided by the authority based on the results of the periodical safety reviews.

The task of the active institutional control period is the control and monitoring of the environmental conditions and processes and of the measurable concentration of radioactive isotopes in the natural elements.

In the case of surface storage facilities of the repository, the maintenance of the manageable components of the disposal system and the limitation for the utilisation of the site for other purposes could be taken into account.

If at any period of the active institutional control an unplanned release of radioactive materials to the environment or its possibility is observed, in justified case the regulator orders action to restore or improve the environmental safety.

<table>
<tr><td colspan="3">In the licence relating to the passive institutional control, the length of the inspection period and the necessary requirements shall be prescribed.

The 47/2003. (VIII. 8.) ESZCSM Decree of the Minister of Health, Social and Family Affairs regulates the application of the passive institutional control tools in the license relating to the institutional control, and determines the period for which this inspection it to be maintained.

The design of the storage facility (including the geographical co-ordinates of the site) and the records of the stored waste shall not be discarded.</td></tr>
<tr><td></td><td></td><td>What restrictions/conditions, including financial guarantees, are in place relative to the export and re-entry of sealed sources, especially to and from countries which do not have any programs in nuclear power and/or research, or to and from countries which do not have a nuclear regulatory body and/or rules and regulations governing the use and shipping of radioactive material?</td></tr>
<tr><td>I</td><td>61</td><td>How does the regulatory authority evaluate whether the receiving country has sufficient administrative and technical capabilities and regulatory structure for SF management (e. g. criteria or documents to be submitted)?</td></tr>
<tr><td>J</td><td>63</td><td>'Section J describes the willingness of Hungarian sealed source manufacturers to take back radioactive sources produced. Section J also states the Hungarian legislative system does not prevent manufacturers from fulfilling such obligations. What institutional control provisions are placed on manufacturers, licensees, and government entities for disposal? What source types, if any, are excluded from these obligations?</td></tr>
<tr><td colspan="3">The regulatory authority issues licences for all types of practices involving radioactive materials (included sealed sources), including the export and import of radioactive material. The regulation makes it to the responsibility of the shipper to examine that the receiver fulfils all requirements (holds a valid licence etc.) before the actual transfer takes place. Individual shipments are not subject to licensing on a case by case basis. Therefore the regulatory authority at present does not evaluate the receiver country's regulatory structure, technical capabilities, etc., with the exception of shipments of radioactive waste across the national borders.

There are no legislative restrictions preventing Hungarian companies from taking back exported sources to Hungary. However, such commitments are to be reported to the central registry of radioactive sources.

The regulation obliges all licensees to transfer all spent, disused or unneeded radioactive sources to the Public Agency for Radioactive Waste Management for disposal, or long term storage if a disposal option does not exists (as in the case of long-lived or alpha bearing isotopes, or nuclear materials under safeguards).</td></tr>
<tr><td>I.</td><td>61</td><td>What procedure and method for the regulatory inspection are conducted to confirm the safety of packages of radioactive wastes or spent fuels for transboundary movement?</td></tr>
<tr><td colspan="3">We promulgated (and follow the provisions of) the following mode specific international agreements: ICAO TI, ADR, RID and IMDG Code, which – for the radioactive materials – are based on the provisions of the IAEA’s TS-R-1. As a consequence, the first step is the authorisation of the package design and the transport. The on site inspection (surface dose rate, surface contamination, closure etc.) of the package is performed at the facility, prior to the transport.</td></tr>
</table>

<table>
<tr><td>I.</td><td>61</td><td>Does the prohibition on shipments of waste to parties to the Cotonou agreement relate to all parties (EU and ACP parties), or just to the ACP parties to that agreement?</td></tr>
<tr><td colspan="3">Annex 3 of Governmental Decree 32/2002. (III. 1.) on the licensing of shipments of radioactive waste across the national borders lists explicitly those countries – from among the parties to the Cotonou agreement – where the prohibition of shipments of waste applies. The prohibition does not apply to EU Member States.</td></tr>
<tr><td>J.</td><td>63</td><td>Do you have information about orphan sources in your country?</td></tr>
<tr><td colspan="3">By the nature of “orphan” sources, information on them becomes available only after they have been found, located, detected. Several such events happened in the recent years, all were reported to the IAEA’s Illicit Trafficking Database. The system of central and local registries of radioactive materials enables the regulatory authorities to verify physical inventories and reveal the loss of a source. No such case of lost sources have been reported in recent years.</td></tr>
<tr><td>J.</td><td>63</td><td>Are there any radiation monitors for example at points of entry into or out of the Country to detect orphan sources?</td></tr>
<tr><td colspan="3">We have deployed portal monitors (detecting both gamma- and neutron radiation) at our road and rail border crossing points (on the entry side). In addition, the customs officers are equipped with portable survey meters as well.</td></tr>
<tr><td>J.</td><td>63</td><td>Do you have control monitors to detect orphan sources before they may reach a foundry and be melted?</td></tr>
<tr><td colspan="3">Although this is not required formally by regulation, some of the major steel producers do have radiation monitors installed at their facilities to detect radioactive sources and contamination in scrap metal shipments.</td></tr>
<tr><td>J.</td><td>63</td><td>All radioactive sources are recorded in a central registry,…Could you please describe in general your registry and which type of data does it include? What are the criteria for sources to be included in to it?</td></tr>
<tr><td colspan="3">The criterion for including radioactive material in the licensing and registration system is based on the internationally accepted exemption levels (activity and specific activity). NORM is included only on individual regulatory authority decisions. The central registry records basic technical characteristics (nuclide, activity, date, physical form, use, etc.), ownership and licence information.</td></tr>
<tr><td>J.</td><td>63</td><td>'Section J describes procedures and practices for registering and tracking sources throughout their service life through disposal. What efforts have been made to include "legacy" sources or the sources that predate "modern" tracking systems?</td></tr>
<tr><td colspan="3">The central registry of radioactive materials was started together with the first applications of artificial radioactive material in Hungary in the early ‘60-s. Consequently, “legacy” sources predating the “modern” tracking systems are mostly Ra-226 sources used in early radiotherapy and a few cases of larger samples or NORM (e.g. natural U), and similar. These sources have been already collected and shipped to a central storage. Therefore no steps were needed (and taken) to formally introduce these “legacy” sources into the current – operational – regulatory system of licensing and registering (tracking).</td></tr>
</table>

J.	63	For disused source disposal, the fees have been set “sufficiently low so that the lack of financial resources on the side of users should not be an obstacle to safe disposal”. The statement implies that the Government probably pays for the bulk of the disposal costs; how was the users portion calculated?

The fees to be paid by the waste producers is laid down in Decree 14/2000 (V.2.) of the Minister of Economy.

The disposal costs of the various waste forms:

Solid or solidified waste: 165 000 HUF/m^3 (about 220 HUF =USD 1)

spent sealed sources:

activity less than 1 MBq: 1600 HUF/ piece
1MBq<A< 100 MBq: 3200 HUF/ piece
100 MBq<A< 1 GBq: 8500 HUF/ piece
1 GBq<A< 10 GBq: 12 700 HUF/ piece
10 GBq<A< 40 GBq: 16 000 HUF/ piece
40 GBq<A< 500 GBq: 30 000 HUF/ piece
500 GBq<A< 75 TBq: 80 500 HUF/ piece

note: in the case of the spent sealed sources, based on the half life of the nuclide, the unit price should be multiplied by a factor as follows:

$t_{1/2} < 1$ year	0.5
1 year $< t_{1/2} <$ 35 years	1.0
$t_{1/2} > 35$ years	3.0

J.	63	Are there some categorisations of waste produced outside the nuclear industry, especially from the point of view of disposal options? Is it a possibility to disposed of the disused sealed sources in near surface repository, which are the technical limitation for their disposal?

General viewpoints of classification of the radioactive wastes:

- That radioactive waste is qualified as low and intermediate level radioactive waste in which the heat production during the disposal (and storage) could be neglected.
- That radioactive waste is high-level waste, the heat production of which shall be considered during design and operation of storage and disposal.
- Within the above classification the authority can prescribe more detailed classification for the low, intermediate and high level radioactive wastes.

Disused sealed sources can be disposed in near surface repository if they meet the waste acceptance criteria.

For Püspökszilágy repository site-specific waste acceptance criteria based on operational and post-closure safety considerations need to be developed. Justified and practical criteria would be needed both for future disposals and the re-disposal of any retrieved waste.

There is a possibility of appropriate interim criteria that might be improved as the safety case develops.

K.	66	One of the recommended measures to upgrade safety of the radioactive waste repository Püspökszilágy is retrieval of certain high-active and long-lived sealed sources from the facility. Do assessment of practicability of these activity and implementation programmes exist? Has a comparative assessment of the potential risk to the workers carrying out these operations versus the long-term risk associated with the human intrusion scenario been done?

To determine the intervention option, suitable for safety improvement of the Püspökszilágy repository, guides will be given by a Feasibility Study to be prepared in frame of a PHARE program of the European Union.

The aim of the feasibility study is to make a decision on acceptable retrieval methods of these wastes and also to prepare a detailed working plan and proposals on the necessary auxiliary equipment and services, using which the operator of the site will be able to perform the retrieval procedure in a way that the personal carrying out the works should receive as low as possible dose. The study should determine not only the retrieval method of the wastes mentioned above, but also the need of further treatment, conditioning and the way of storage and/or final disposal of the retrieved waste.

A key aspect of our approach is the use of a formal multi-attribute approach to evaluating the options and recording the advantages and disadvantages. A proper structure for the evaluation is important because the decisions reached will be of interest to a number of stakeholders and implementation will involve the commitment of substantial sums of money.

The proposed methodology has the objective of identifying the important criteria that distinguish between different management options and providing a framework for a view on the preferred option, taking account of a range of radiological, safety, environmental and cost implications. In applying the methodology, emphasis is placed on using the methodology to acquire an overall understanding of the arguments and to audit those arguments.

The basic principles for intervention as set by the ICRP include:

- The intervention should do more good than harm.
- The form, scale and duration of the intervention should be optimised.
- Dose limits do not apply.

Annex 1	69	The vault-type of spent fuel storage facility is employed for the interim storage of VVER-400 spent fuel. What are design specifications of the vault regarding to decay heat and cooling time of fuel?

In the vault-type facility spent fuel assemblies of VVER-400 type can be stored.

Design specifications:
- min. 3-year cooling time after discharge from the reactor
- the highest initial enrichment: 3.6%
- average burnup: 42 GWday/tU
- highest burnup: 50 GWday/tU
- 478 W/assembly remanent heat power in case of average burnup
- 717 W/assembly remanent heat power in case of highest burnup
- hermetic (intact) assemblies

Limiting factors:
- Cladding: 410 ^{O}C (earlier: 350 ^{O}C)
- Concrete: 100 ^{O}C
- Storage tube: 300 ^{O}C

<table>
<tr><td>Annex 1.1.3</td><td>69</td><td>Referring to Annex Section An 1.1.3 "Storage modules," is the nitrogen used for inerting the spent fuel storage tubes at a pressure above or below atmospheric pressure?</td></tr>
<tr><td colspan="3">According to the operational regulation the nitrogen pressure should be kept in the range of 80-310 mbar above the atmospheric pressure.</td></tr>
<tr><td>Annex 2.3</td><td>74-75</td><td>Referring to Annex Section An 2.3 "Record keeping," record keeping appears now to be completely computerised. Please elaborate on Hungary's experience with ensuring long term availability of such records given the relatively frequent obsolescence of data storage media types and related recording and reading devices? What contingency plans exist to prevent loss of records information?</td></tr>
<tr><td colspan="3">The central registry of radioactive materials has been completely computerised since the middle of the ’70-s. Since then, three major changes of the hardware platform, and four major changes of the software platform happened. All transitions were smooth and without any data loss. So far, a dedicated and responsible staff proved to be sufficient to adequately address the data migration issue, even without sophisticated formal contingency plans and procedures.</td></tr>
<tr><td>Annex 2.5</td><td>75-76</td><td>Did you set the long term dose limit for the members of population related to the disposal site after institutional control?</td></tr>
<tr><td colspan="3">According to the new regulation, ESZCSM Decree of the Minister of Health, Social and Family Affairs 47/2003 (VIII. 8.) on certain issues of interim storage and final disposal of radioactive wastes, and on certain radiohygiene issues of naturally occurring radioactive materials concentrating during industrial activity, after closure, the radiation exposure of the individuals of the control group of the population due to the effects of the disposed waste shall not exceed the effective dose of 100 μSv/year.</td></tr>
<tr><td>Annex 2.5</td><td>75-76</td><td>How did you solved the problem with intrusion scenarios at disposal site after institutional control?</td></tr>
</table>

From the results of the safety analysis accomplished it could be stated that present operation and environmental safety up to the end of passive institutional control of the facility at Püspökszilágy is properly guaranteed. The facility as a whole is suitable for safe disposal of low and intermediate level short-lived wastes. Beyond the passive institutional control, mostly because of the significant amount of long lived components yet disposed of (^{14}C, ^{226}Ra, ^{232}Th, $^{234, 235, 238}$U, ^{239}Pu and ^{241}Am); as well as because of the high activity ^{137}Cs sealed sources, inadvertent human intrusion, or any other scenario resulting in surfacing of waste after deterioration of concrete barriers, could result in exceeding both dose constraint and dose limit.

Key recommendations relating to the future management of the site are:

- certain long-lived and high activity spent sources should be removed from the facility;
- the repository cap should be carefully designed;
- the scope for long-term settlement within the vaults should be minimised and at an appropriate time, the vaults should be completely backfilled;
- steps should be made to minimise the chances of future human disturbance by recording information about the facility and by an extensive period of administrative control over the site.

To determine the intervention option, suitable for safety improvement of the Püspökszilágy repository, guides will be given by a Feasibility Study to be prepared in frame of a PHARE program of the European Union.

The aim of the feasibility study is to make a decision on acceptable retrieval methods of these wastes and also to prepare a detailed working plan and proposals on the necessary auxiliary equipment and services, using which the operator of the site will be able to perform the retrieval procedure in a way that the personal carrying out the works should receive as low as possible dose. The study should determine not only the retrieval method of the wastes mentioned above, but also the need of further treatment, conditioning and the way of storage and/or final disposal of the retrieved waste

Annex 2.5	75-76	What kind of international recommendations did you took into account in order to take the decision about dose limits during and after institutional control of disposal facility?

Regarding the radwaste disposal facility, the EU, ICRP, IAEA and OECD recommendations were taken into account in setting the 100 μSv/y limit for the radiation burden of the members of the reference group of the public.

Annex 7.2.2	94	Are there provisions for monitoring of the content of individual radionuclides in surface and underground water during monitoring of closed uranium facilities? If yes, what exactly radionuclides are monitored?

At present only uranium and radium is monitored regularly in surface and underground waters. Naturally, the main components (Ca, Mg, Na, K, SO_4, HCO_3, Cl, etc.) of the samples of monitoring network are also determined regularly. Some samples are analysed for trace elements (As, Cd, Se, Zn, Cu, Li, B, etc.), too.

Annex1 to the answer on Question 27 of Canada
Annex1 to the answer on Question 5 of Austria

Storage and disposal methods of SRS in the past and at present in the Radioactive Waste Treatment and Disposal Facility (RWTDF)

Type of SRS	Past practice		Present and future practice		Corrective actions
Short half-life (< 5 years), high activity sources	• Disposal in shallow boreholes with EB (well 'B')	A	• Disposal in shallow boreholes with EB (well 'B')	A	No
Short half-life (< 5 years), low activity sources	• Disposal in shallow vaults with EB (vault 'A')	A	• Disposal in shallow vaults with EB (vault 'A')	A	No
high activity ^{137}Cs sources	• Disposal in shallow vaults with EB	N	• Storage in shallow boreholes with EB	A	**Yes**
Long half-life, low activity sources (e. g. smoke detectors)	• Disposal in shallow vaults with EB (vault 'A')	A	• Disposal in shallow vaults with EB (vault 'A')[a]		No
Long half-life, greater activity sources	• Storage in shallow boreholes with EB (well 'D') • Disposal in shallow boreholes with EB (well 'D') • Disposal in shallow vaults with EB (vault 'A')	A N* N*	• Storage in shallow boreholes with EB (well 'D') • Storage in boreholes in the Central Interim Store	A A	No **Recovery and disposal elsewhere** **Recovery and disposal elsewhere**
^{238}Pu and ^{239}Pu sources (incl. ^{238}Pu–Be)	• interim storage (not in the RWTDF) • Disposal in shallow vaults with EB (vault 'A')	A N	• interim storage (not in the RWTDF) • in the Central Interim Store	A	No under investigations
^{226}Ra source (in medical use)	• interim storage (not in the RWTDF)	A	• storage in the Central Interim Store, pending final disposal in geological repository	A	No

EB – engineered barriers
A – acceptable according to the current safety requirements
N – not acceptable based on the results of the safety assessment
N* – not acceptable for certain SRS
a – limited overall activity (based on the waste acceptance criteria)

Annex2 to the answer on Question 27 of Canada

Results of the safety assessment of the Radioactive Waste Treatment and Disposal Facility

Scenario	Adults			Children		
	Time [years]	Total dose [mSv y^{-1}]	Main components	Time [years]	Total dose [mSv y^{-1}]	Main components
NES	5000	0.053	^{14}C, ^{99}Tc, ^{232}Th, ^{234}U	5000	0.08	^{14}C, ^{99}Tc, ^{232}Tc, ^{234}U
AES	600	0.13	^{14}C, ^{99}Tc, ^{226}Ra	600	0.18	^{14}C, ^{99}Tc, ^{226}Ra, ^{232}Th
Residence Farming	300	50.1	^{232}Th, ^{226}Ra			

NES – normal evolution scenario
AES – alternative evolution scenario

Intrusion scenario	Time [years]	Total dose [mSv]
Road construction	500	0.010
	1000	0.073
	1500	0.063
	2000	0.033

Results of the safety assessment for the scenario of finding a ^{226}Ra (2.4 GBq) source 2000 years after closure of the repository

action	Time	dose/dose rate
Finding, cleaning	10 min	0.45 mSv
Transportation (taking home)	1 h	0.45 mSv
Exhibition (at home)	200 hr/yr	23 mSv/yr

Annex 1 to the answer on Question 15 of USA

Locations and frequencies of sampling of radioactivity examinations of the environmental elements on the site of the Radioactive Waste Treatment and Disposal Facility

SAMPLING LOCATION	water	sediment	soil	flora	fish	aerosol	fall-out
monitoring station at site						daily	weekly
monitoring station at the farming company						daily	weekly
Püspökszilágy area I.			12/year	2/year			
Püspökszilágy area II.			12/year	2/year			
Püspökszilágy area III.			12/year	2/year			
Sampling location at the farming company			12/year	2/year			
Precipitation collector canals			2/year				
Around the newly built vaults (4 points)			2/year				
Precipitation collecting pool	occasionally						
Observation well "55"	2/year						
Observation well "A"	2/year						
Observation well "B"	2/year						
Observation well "C"	2/year						
Observation well "V"	2/year						
Other observation wells	occasionally						
River Galga at Aszód	1/year	1/year		1/year			
River Galga upstream from influx	1/year	1/year		1/year			
River Galga downstream from influx		1/year		1/year			
Fishpond	6/year	6/year		2/year	6/year		
Inside the fence (4 points at the vaults)			1/year				
Covered vaults left side			1/year	1/year			
Covered vaults right side			1/year	1/year			
Némedi stream bridge	2/year	2/year		2/year			
Némedi stream graveyard	2/year	2/year		2/year			
Némedi stream, at Váckisújfalu	1/year	1/year		1/year			
Szilágyi stream	2/year	2/year		2/year			
Szilágyi stream, influx	2/year	2/year		2/year			
Agriculture field outside the fence I. right			1/year				
Agriculture field outside the fence I. left			1/year				
Potable water	occasionally						