RADIOACTIVE WASTE MANAGEMENT AND DECOMMISSIONING IN HUNGARY

REVISED TEMPLATE

1. NATIONAL FRAMEWORK FOR MANAGEMENT AND REGULATION OF RADIOACTIVE WASTE AND DECOMMISSIONING

1.1 National framework

1.1.1 Overview of national policy

On 1 June 1997 the Act CXVI of 1996 on Atomic Energy entered into force in Hungary, expressing the national policy in the application of atomic energy. It regulates among others the basic aspects of radioactive waste management and authorises the Government and the competent Ministers to issue executive orders specifying the most important requirements in this field.

The Act requires that a licence for the application of atomic energy shall be granted only if the safe interim storage or final disposal of the radioactive waste and spent fuel generated by the licensed activity can be assured in accordance with the most recent proven results of science, internationally accepted norms, as well as experience.

The Republic of Hungary was among the first to sign the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, established under the auspices of the International Atomic Energy Agency, on 29 September 1997, and ratified it on 2 June 1998. The Convention was promulgated in Act LXXVI of 2001. In order to fulfil the obligations of Article 32 of the Convention Hungary presents national reports to the review meetings and participates in the review processes.

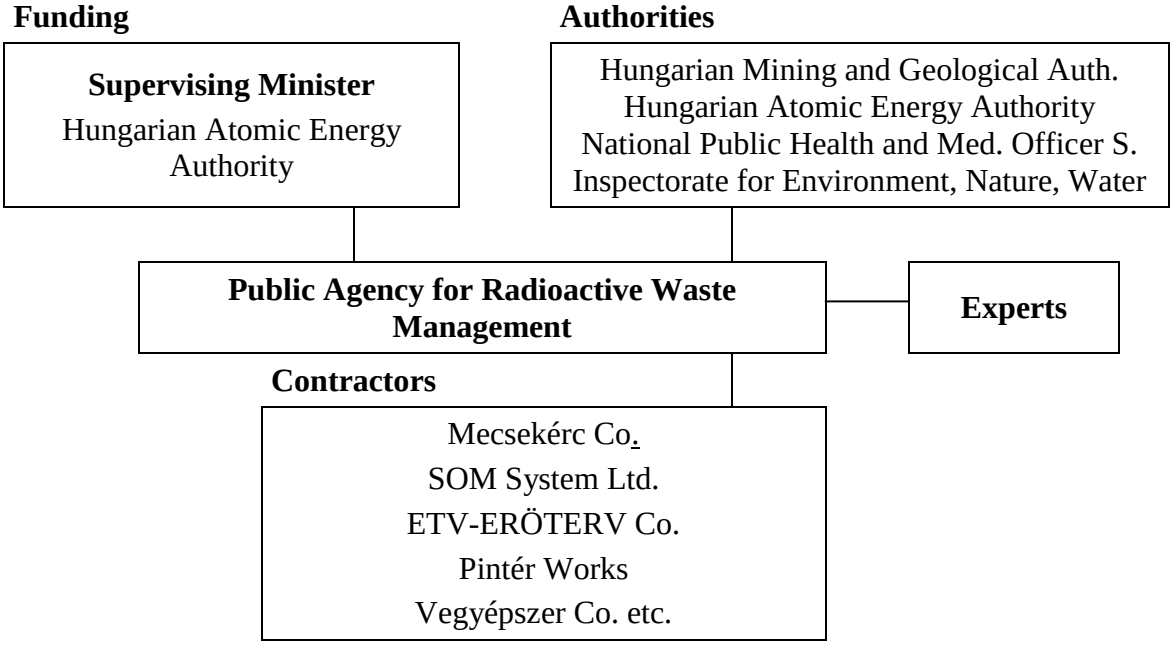
1.1.2 Overview of relevant institutions

As required by the Act on Atomic Energy and Governmental Decree 240/1997. (XII.18.) Korm.* the Central Nuclear Financial Fund (CNFF) was set up on 1 January 1998 in order to finance radioactive waste disposal, interim storage and disposal of spent fuel as well as decommissioning of nuclear facilities. As required by the Act, the Government authorised the Director General of the Hungarian Atomic Energy Authority (HAEA) to establish the Public Agency for the Radioactive Waste Management (PURAM), now in operation since 2 June 1998. The Minister supervising the HAEA has jurisdiction over the Fund, while HAEA is responsible for its administration.

As central national radioactive waste organization, the PURAM performs the tasks related to the final disposal of radioactive waste, as well as to the interim storage and final

* Korm. is the abbreviation of the Hungarian word Kormány, that means government in English.

disposal of spent fuel, and to the decommissioning of nuclear facilities. The scheme below illustrates the organisational chart of radioactive waste disposal in Hungary.



1.2 National, technical regulatory organisation(s)

1.2.1 Regulatory function

Key organisations with regulatory functions are the following:

The Minister of Health, through the National Public Health and Medical Officer Service (NPHMOS) performs the regulatory tasks with respect to radiation safety. NPHMOS is the responsible regulatory body for licensing and supervising siting, construction, commissioning, operation, modification and closure of radioactive waste disposal facilities.

HAEA is the nuclear safety regulatory body. Facilities for the interim storage or final direct disposal of spent fuel are – as defined by the Act on Atomic Energy – nuclear facilities and fall under the regulatory competence of the HAEA. The HAEA has also regulatory tasks in connection with radioactive waste collection, handling and treatment on the sites of nuclear facilities as well as in safeguards issues and in international transportation, packaging and recording of radioactive materials.

Under the Act on Atomic Energy, the Government provides for the execution of the high-profile governmental tasks described in this Act through the Hungarian Atomic Energy Authority (HAEA) and the Ministers concerned, whose work is co-ordinated by the Atomic Energy Co-ordination Council.

The Act on Atomic Energy authorises also the relevant Ministers to regulate various aspects of the application of atomic energy that fall into their scope of competence. In that undertaking they are supported by their appropriate organisations (see 1.2.2).

1.2.2 Organisation and resources

In radioactive waste management the licensing authority is the National Public Health and Medical Officer Service (on behalf of the Minister of Health). Based on a countrywide network, it is responsible for the inspection and enforcement, too. The authority is supported by the expert advice of the National Research Institute for Radiobiology and Radiation Hygiene.

In the licensing procedure further other public administration organisations participate as so-called special authorities, within their scope of authority and responsibility that are identified and delegated to them in separate legal regulations. In accordance with the Act on Atomic Energy the most important responsible Ministers are enforcing – through their organisations – the following aspects in the licensing procedures:

a. through the National Headquarters of the Police: physical protection, the public security and domestic order;
b. through the National Directorate General for Disaster Management: the fire protection and emergency preparedness;
c. through the Foodchain-Safety and Animal Health Directorate and the Plant Protection and Soil Conservation Directorate: food, plant and animal hygiene, as well as soil protection;
d. through the environmental protection, nature conservation and water inspectorates: environment protection, nature conservation and water quality protection;
e. through the Hungarian Office for Mining and Geology: geology, mining technology and mining safety;
f. through the building authority competent for the area: regional planning and building.

In accordance with Act CXVI of 1996 on Atomic Energy, the work of the HAEA is also supported by a Scientific Council having members of nationwide reputation. The Council's main function is to deal with major issues of principles as well as to consider those research areas and developments that are related to safety and prevention of accidents.

1.3 National implementing organisations

1.3.1 Scope of responsibility

As highlighted in 1.1.2, PURAM performs the tasks related to the final disposal of radioactive waste, as well as to the interim storage and final disposal of spent fuel, and to the decommissioning of nuclear facilities. It is responsible for the following activities:

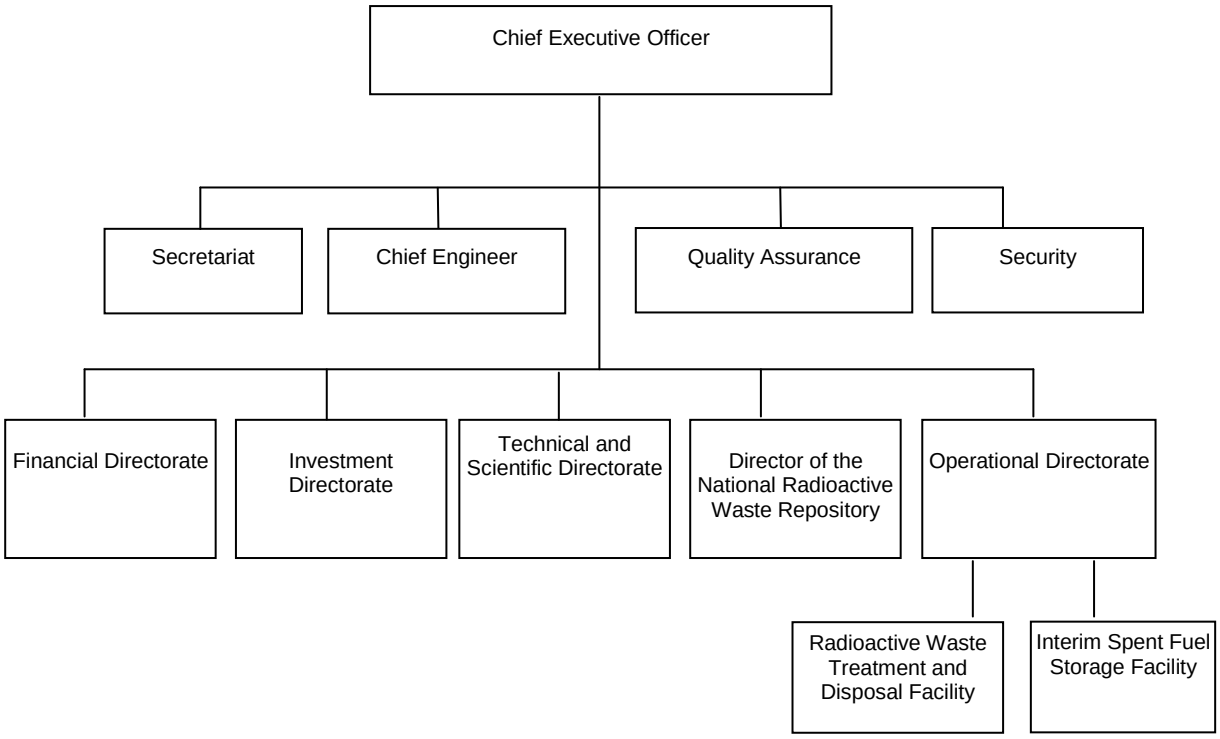
- elaboration of the medium- and long-term plans (strategies);
- cost estimates to identify the necessary payments into the Fund each year;

- preparation of technical and financial reports for the activities financed from the Fund;
- construction and operation of the National Radioactive Waste Disposal Facility (for LLW/ILW from Paks NPP);
- preparation for the establishment of a HLW disposal facility;
- construction (extension) and operation of the storage facility for interim storage of spent nuclear fuel, viz. the Interim Spent Fuel Storage Facility;
- preparatory work required for decommissioning of nuclear installations;
- operation the Radioactive Waste Treatment and Disposal Facility (for LLW/ILW from small scale waste producers);
- public relations and information.

The proposals of PURAM on the medium- and long-term plans, annual working programs and annual reports on the accomplished tasks are approved by the minister disposing over the Fund. In order to support the ministerial decisions the CNFF Special Committee was established that consists of the representatives of the concerned ministries and organizations.

1.3.2 Organisation and resources

Organizational scheme of the Public Agency for Radioactive Waste Management:



The financial resources for the operation of the Public Agency for Radioactive Waste Management are provided from the Central Nuclear Financial Fund established in accordance with the Act on Atomic Energy. The status and operational conditions of the Public Agency for Radioactive Waste Management as a public utility are defined by the relevant Acts on business organisations and on non-profit organisations.

The work of PURAM is supported by experts, who are well known scientists, many of them members of the Hungarian Academy of Sciences. They have been closely following the developments in radioactive waste management since the start of the projects in the nineties.

2. LEGAL FRAMEWORK

2.1 Primary Legislation and General Regulations

The most important laws, governmental decrees and ministerial decrees are the following:

a. Act CXVI of 1996 on Atomic Energy;

b. Governmental Decree 114/2003. (VII. 29.) Korm. on the Scope of Duty, Authority, and Jurisdiction of Imposing Penalty of the Hungarian Atomic Energy Authority, and on the Activities of the Atomic Energy Co-ordination Council;

c. Governmental Decree 240/1997. (XII. 18.) Korm., on establishment of the organisation designated for implementing radioactive waste disposal and spent fuel, as well as decommissioning of nuclear installations, and on the financial source performing these tasks;

d. Governmental Decree 89/2005. (V. 5.) Korm. on the nuclear safety requirements of nuclear facilities and the related regulatory activities;

e. Governmental Decree 124/1997. (VII. 18.) Korm., on radioactive materials as well as equipment generating ionising radiation, exempted from the scope of the Act CXVI of 1996 on Atomic Energy;

f. Decree of the Minister of Public Welfare 23/1997. (VII. 18.) NM defining the exemption levels (activity concentrations and activities) of radionuclides;

g. Decree of the Minister of Health 16/2000. (VI. 8.) EüM on the execution of certain provisions of the Act CXVI of 1996 on Atomic Energy;

h. Decree of the Minister of Health, Social and Family Affairs 47/2003. (VIII. 8.) EszCsM 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;

i. Decree of the Minister of Industry, Trade and Tourism 62/1997. (XI. 26.) IKIM on the geological and mining requirements for the siting and planning of nuclear facilities and radioactive waste disposal facilities;

j. Decree of the Minister of Justice 14/2005. (VII. 25.) IM on the operation and administration of the Central Nuclear Financial Fund.

General regulations – beyond those contained in the Act on Atomic Energy Act and its executive orders – are laid down in the Act LIII of 1995 on the General Rules of the Protection of the Environment, including the regulation of public hearings.

As prescribed by the Act CXVI of 1996 on Atomic Energy, the Parliament's prior approval (decision-in-principle) is required to initiate the establishment of a radioactive waste disposal facility.

2.2 Regulations concerning specific activities or facilities

2.2.1 Radioactive waste management

No regulation or specific guidance other than the above mentioned Decree of the Minister of Health, Social and Family Affairs 47/2003. (VIII. 8.) EszCsM have been issued on radioactive waste management yet. However the annexes of the Decree address certain specific, technical issues like the waste classification system, the requirements of siting, design and safety assessment of repositories. The general research aspects for geological site suitability of nuclear facilities and radioactive waste disposal facilities are specified in the Decree of the Minister of Industry, Trade and Tourism 62/1997. (XI. 26) IKIM. Technical guidance is also given to the radioactive waste generators, outlining the main requirements of waste acceptance.

2.2.2 Decommissioning

Governmental Decree 89/2005. (V. 5.) on the nuclear safety requirements of nuclear facilities and the related regulatory activities has special annexes which provide detailed codes regulating the safety and licensing of various nuclear facilities. These codes cover certain aspects of the radioactive waste and spent fuel management in nuclear facilities including their decommissioning. The Nuclear Safety Codes are the following:

Regulatory procedures for nuclear power plants;

Quality management of nuclear power plants;

Design requirements for nuclear power plants;

Safety requirements for the operation of nuclear power plants;

Nuclear safety code for research reactors;

Nuclear safety code for spent fuel interim storage facilities.

2.3. Guidance on implementation

2.3.1 Radioactive waste management

See 2.2.1

2.3.2 Decommissioning

Nuclear safety requirements related to nuclear facilities (including their decommissioning) are laid down in the Nuclear Safety Codes. The recommended methods on how to meet these requirements are given in legally not binding guides issued by the Director General of the HAEA. Some of these documents are related to the management of radioactive waste and spent fuel in nuclear facilities and to decommissioning.

3. WASTE MANAGEMENT STRATEGY AND CURRENT PRACTICE

3.1 Waste classification and quantities

General viewpoints of classification of radioactive wastes:

1. 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) 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 collecting packaging, and 400 Bq/g as average for the whole quantity of waste).
   b) 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 for short-lived radioactive waste.

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

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

Viewpoints of classification 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 contained in 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 more radioisotopes, then the classification shall be performed as follows (Table 2):

Table 2

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

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

Quantities of radioactive waste and spent fuel:

I. Yearly arising quantities

a) LILW from the NPP (4 units)	
– solid waste (compacted)	170 m^3
– liquid waste (unprocessed)	270 m^3
b) Spent fuel from the NPP (4 units) (average)	380 assemblies
c) other applications (non-NPP producers)	20-30 m^3

II. Total amount (assuming 30-year NPP operation life-time)

a) LILW from the NPP (solid and solidified operational waste*)	22 000 m^3
b) LILW from the NPP decommissioning	17 000 m^3.
c) HLW from the NPP decommissioning	410 m^3
c) Spent fuel from the NPP	11 100 assemblies

* The amount of solidified waste may be less pending on the success of the on-going project on the liquid waste treatment technology. (See 3.4.2)

3.2 Waste management strategy

Low and intermediate level waste from non-NPP producers:

In 1976, a radioactive waste treatment and disposal facility at Püspökszilágy was commissioned to condition and dispose of institutional LILW waste. The Radioactive Waste Treatment and Disposal Facility is a near-surface type repository with concrete trenches and disposal wells. In parallel with capacity freeing a safety enhancement programme has been in a good progress in the past few years. According to plans, the repository will be able to receive LILW and short-lived institutional waste for decades.

Low and intermediate level waste from Paks NPP:

The general concept, laid down in the late 1960s for the management of radioactive waste of VVER type NPPs, was to store on-site and postpone the decision on conditioning and disposal until the decommissioning stage. This concept was revised by the competent Hungarian organs in the 1980s and a site selection procedure started in 1983 with the aim at construction a LILW repository for the Paks NPP's needs. This procedure had to be interrupted in 1990 mainly due to the lack of public acceptance. In 1993 a new project was launched and its realisation is now in progress. In 2008 the surface part of a future LILW intermediate depth geological repository, the National Radioactive Waste Repository, started its operation (See 3.3).

Spent fuel:

The Paks NPP units, just as other East European VVERs, were supplied with fresh fuel by the Soviet Union. As part of the relevant agreement, the Soviet Union undertook to take back all spent fuel.

In 1992, however, Russia passed a legislation which prohibited the import of foreign spent fuel without sending back the high level waste and other products from the reprocessing which had been the practice between Hungary and Russia till that time. Since 1992 the reshipment required therefore lengthy, case by case negotiations. At the same time Ukraine became a transit state and a trilateral governmental agreement was concluded between Russia, Ukraine and Hungary to provide an appropriate legal framework for the shipments. With decreasing storage capacity in its spent fuel ponds and without certain future acceptance of spent fuel by Russia, the Paks NPP had to conclude a contract with GEC Alsthom Engineering Systems in 1992 for the construction of a modular vault dry storage (MVDS) system. In September 1997 the first fuel assemblies were received by the facility which – by now – has got 16 vaults (each for 450 assemblies) ready and further 4 vaults in construction.

As yet, there is no decision on the back-end of the fuel cycle, but – in order to be able to estimate the future costs of radioactive waste and spent fuel management, as well as to assure the necessary funding – some assumptions have been necessary to be made. For this funding purpose, the direct disposal of spent fuel assemblies was accepted as the reference scenario in Hungary.

High level waste

Due to the interim storage of the spent fuel there is no immediate need to establish a deep geological repository before the middle of the century. Also, the relatively small amount of NPP HLW can be stored on-site. However, as site selection process for such a deep geological repository requires a very long period of time, some preliminary exploratory works were done in a promising clay-stone formation (in Mecsek Hills, Hungary). Based on existing geological data – a country-wide screening took place later that confirmed the clay-stone formation serve a potential site for future more detailed investigations.

3.3 Waste management issues at national level

Low and intermediate level waste

- Radioactive Waste Treatment and Disposal Facility

In the past years, a considerable work has been concentrated on demonstrating the safe operation of the facility and on determining the measures necessary for its future closure. In the on-going safety enhancement programme certain reconstruction and upgrading activities have been done and safety assessments were carried out. This programme has been realised in a step-wise fashion. First a so called demonstration program was accomplished to test the recovery technology and collect the necessary information and experience. Long-lived waste and sources were removed from four vaults to be stored in the technology building, pending re-disposal in a HLW repository, the recovered short-lived waste was –as possible – compacted thus free capacity was created in the vaults.

Based on the results of the already accomplished demonstration programme, safety assessments will be prepared and the safety enhancement programme will be revised and (if necessary) modified. The next phase will continue with opening the vaults in rows I.-II. of the repository and the whole programme will be completed by 2015.

- National Radioactive Waste Repository

The site selection project (already mentioned in 3.2.) identified a potentially suitable site at Bátaapáti, in a granitic host rock for a repository in mined cavities, 200-250 m below surface.

In 2001 a long-term research project and a research plan was elaborated and approved. There was a final report prepared on the performed geological investigations at the end of 2003, the main statements of which were the following: „The Bátaapáti site complies with all the requirements set forth in the relevant regulation (the Decree of the Minister of Industry, Trade and Tourism 62/1997. (XI. 26) IKIM.), and thus, from geological point of view it is suitable for final disposal of low and interim level radioactive wastes." The competent geological authority, the South-Transdanubian Regional Office of the Hungarian Geological Service, accepted this report by means of a resolution.

In 2004 a research program for 2004-2007 was launched to select the exact location of the facility in the host rock and to collect the data necessary for the licensing and construction of the facility.

From the beginning the research work was supported by the population of Bátaapáti and its vicinity. 75 percent of the inhabitants of Bátaapáti took part in a local referendum held on July 10, 2005, and accepted the construction of the repository with a majority more than 90 percent. This decision was supported by the local governments of the surrounding settlements, too.

According to Section 7 (2) of the Act on Atomic Energy, in order to launch preparatory work aiming at the construction of a radioactive waste repository, a prior approval in principle of the Parliament is necessary. The research programme for the final disposal of low and intermediate level radioactive waste in the area of Bátaapáti reached in 2005 such a level of preparedness that requesting the approval of the Parliament became possible. The approval in principle of the Parliament, of November 21, 2005, certified that construction of the facility for final disposal of radioactive waste serves the interest of the society in large.

Based on the environmental impact assessment the environmental licence was issued which – after an appeal – entered into force in October 2007. On the basis of the pre-construction safety assessment the authority issued the construction licence for the surface parts (technology and central buildings) and also for the future underground disposal chambers in May 2008. The operation licence for the surface part entered into force in October 2008. With this first phase operation licence it became possible to transport waste from the Paks NPP to the new technology building for buffer (predisposal) storage. The first packages (200 l drums with solid LILW) arrived at the end of 2008. At present, tunnelling activities are in progress aiming at the construction of the underground disposal chambers. By 2011, after completing the second phase in the operation licensing procedure, two disposal chambers are planned to be put into operation. Later further chambers will be necessary to dispose of the total (approximately 40000 m^3) LILW waste arising from the 30 year operation of the NPP and its future decommissioning.

High level waste

The exploratory works (already mentioned in 3.2.) were executed in a clay-stone formation (the Permian Boda Claystone Formation) which was accessible from Hungary's

former (then operating) uranium mine in a depth of 1100 m. The uranium mine had to be closed because it got depleted, so the Government took the decision that the clay-stone should have be explored as far as possible before the closure of the mine. A research programme was carried out which confirmed the preliminary suitability of the formation in 1998. In 2003, after the closure of the mine a new research programme was launched to select a site for an underground research laboratory in the clay-stone.

In the past few years, the project has been slowed down due to budgetary constraints and because the priority was given to the LILW disposal programme in Bátaapáti. Since 2008 only the monitoring activities could be maintained. Besides the elaboration of a future decision on the fuel cycle back-end, the whole HLW programme needs to be reconsidered.

3.4 Research and Development

3.4.1 Research infrastructure

As regulated in the Act on Atomic Energy, technical support serving the regulatory control of the safe use of atomic energy shall be funded from the central budget.

In order to support its activities, the nuclear safety regulatory authority, the HAEA has concluded agreements with several scientific institutions. Such agreements establish its co-operation with the KFKI Atomic Energy Research Institute, the Institute of Nuclear Techniques at the Budapest University of Technology and Economics, the Department of Physical Chemistry at the Veszprém University, the NUBIKI Nuclear Safety Research Institute Ltd. (former Electrical Power Research Institute Ltd.) and the Institute of Isotopes of the Hungarian Academy of Sciences.

In special cases, the tasks of the licensing authority of radioactive waste disposal facilities, the regional radiological centres of the National Public Health and Medical Officer Service are supported by the National Research Institute for Radiobiology and Radiohygiene.

The R&D plans discussed below are financed partly by the Paks NPP Ltd., partly from the Central Nuclear Financial Fund.

3.4.2 Contents of R&D plans

Low and intermediate level waste treatment

A liquid waste treatment technology is under development in Paks NPP. The aim is to remove cobalt, boron and cesium from evaporator concentrates. The possibility of application of other volume reducing technologies (incineration, supercompacting) has also been studied.

Low and intermediate level waste disposal

Most R&D performed so far in Hungary on LILW disposal has served the identification of a suitable site for either a near surface or a mined cavity type repository, including site investigations, laboratory analysis of borehole samples, determination of rock characteristics (sorption, water permeability, isotope migration rates, etc.) and performance

assessment. Other important fields of R&D have included waste characterisation, waste acceptance criteria and facility design.

At present the LILW repository in Bátaapáti is already in construction phase and the results of the site investigations are now being finalised and documented.

High level waste

Based on preliminary assessments (see 3.3.) the Permian Boda clay-stone formation in the Mecsek Hill area is considered suitable for high level waste disposal. To evaluate the suitability of this formation as a location for a waste repository, systematic investigations are carried out to explore the clay-stone.

3.5 Financing of Radioactive Waste Management

3.5.1 Framework and responsibilities

The Act CXVI of 1996 on Atomic Energy requires that the licensee, or in the case of budgetary organisations, the central budget shall be liable to cover the costs of the final disposal of radioactive waste, as well as the interim storage and final disposal of spent fuel, and of the decommissioning of a nuclear facility. The Act established the Central Nuclear Financial Fund to realise this goal. The relevant rules of the Act are the following:

1. The Central Nuclear Financial Fund (hereinafter the 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 (demolishing) of nuclear facilities.
The member of the Government exercising supervision over the HAEA shall dispose over the Fund. The manager of the Fund is the HAEA.

2. The licensees are obliged to cover the costs of the final disposal of radioactive waste, as well as of the interim storage and final disposal of spent fuel, and of the decommissioning (demolishing) of nuclear facilities by contributing to the Fund.
In the case of nuclear facilities, the amount of payment shall be determined in a way that it fully covers all the costs arising as a result of the final disposal of radioactive waste and of the interim storage and final disposal of spent fuel generated during the total operating period of the facility and at the time of decommissioning, as well as all the costs related to the decommissioning of the nuclear facility.
The amount of payments is determined by the law on the annual budget on the basis of the cost estimate prepared by PURAM, the organisation identified pursuant to Section 40 of the Act CXVI. of 1996 on Atomic Energy. It is taking into consideration all the liabilities and it is reviewed by the HAEA and - in relation to a nuclear power plant - by the Hungarian Energy Office.
The payments made by the licensees may be accounted for within the category of other costs. In the case of a nuclear power plant, these should be taken into account when determining the price of electric energy.

3. The provisions on the separate state financial funds of Act XXXVIII of 1992 on Public Finance shall be applied to the financial management of the Fund, with the deviations included in this Act.

In order to ensure that the Fund maintains its value, it shall receive subsidies from the central budget in a sum calculated on the average assets of the Fund in the previous year using the average of the central bank base rate in the previous year.
This sum shall be made available to the Fund by January 31 each year.
The assets of the Fund shall be kept separated in a state treasury account.

A long-term plan (lasting up to the decommissioning of the various nuclear facilities), a medium-term plan (for five years), and an annual work schedule on the use of the Fund are being prepared by PURAM. The medium- and long-term plans are to be reviewed annually and revised as required. The medium- and long-term plans and the annual work schedule are to be approved by the Minister supervising the Hungarian Atomic Energy Authority.

The payments into the Fund are defined in accordance with these plans. The rate of payments into the Fund shall be specified in such a way as to provide appropriate sources for all costs of radioactive waste and spent fuel management and the decommissioning of nuclear facilities. These sources also provide coverage for public control and information activities as well as for the operational expenses of the existing facilities.

The proposal for the annual payments into the Fund by Paks Nuclear Power Plant Ltd. is submitted by the Minister supervising the Hungarian Atomic Energy Authority, in the course of the preparation of the Act on the Central Budget.

The institutes disposing of radioactive waste in the Radioactive Waste Treatment and Disposal Facility are also liable to contribute to the Fund in accordance with the official price list contained in a ministerial order. For nuclear installations financed from the central budget (research reactor and training reactor), the sources required to cover the payment into the Fund are provided by the central budget, when they arise.

3.5.2 Status of financing schemes

The above described financing schemes are in force in Hungary. The Act on the central budget of the Republic of Hungary contains year by year the budget of the Central Nuclear Financial Fund with the obligatory payments of Paks NPP Ltd. into the Fund. In December 2008 the assets of the Fund amounted to 129,5 billion HUF, for the long term costs of radioactive waste disposal, spent fuel management and decommissioning.

4. DECOMMISSIONING STRATEGY AND CURRENT PRACTICE

4.1 Decommissioning strategy

Decommissioning is not an urgent issue for the Hungarian nuclear facilities. Though the design lifetime of the nuclear power units at Paks NPP was 30 years, a lifetime extension project is now in progress. Nevertheless, the safety regulations require a preliminary decommissioning plan already during the operation of the facility, and for the purposes of funding, a cost estimate must be prepared too. To this end, a study was ordered from the Slovakian company, DECOM who has investigated and compared various decommissioning strategies for the nuclear power plant. The preferred option was to defer dismantling and site clearance for 70 years and to maintain the plant in a state of “supervised closure” in the

interim. This option is the basis of the decommissioning cost calculations. The third revision of the plan was carried out in 2008.

4.2 Status of decommissioning projects

In Hungary there are no ongoing decommissioning projects.

4.3 Decommissioning issues at national level

As mentioned in 4.1, decommissioning is not a current issue for the Hungarian nuclear facilities. Nevertheless this question has been covered in regulations, as the final phase of the life-cycle of the installations. As for all other phases, it requires a nuclear safety licence. For decommissioning, a multi-step licensing procedure is established, where the first step is to obtain the authorities' consent to terminate operation. A further requirement is a valid environmental protection licence based on environmental impact assessment and public hearing. As in all phases of the life-cycle of a facility, radiation protection authorities are involved in these licensing processes, and they license separately the appropriate radiation protection programme and radiation protection organisation. During the dismantling, decontamination and other steps, an ongoing task of the authority will be the control of the radiation situation within the facility and around it, and the monitoring of personal doses as well as the discharges and the radiation in the environment. Emergency plans have to be updated with new or likely scenarios and any necessary organisational changes required must be adjusted accordingly.

The decommissioning plan shall be regularly revised in accordance with the regulations in force; and the results of the revision are to be submitted to the Hungarian Atomic Energy Authority. Based on the acquired experience a more detailed regulation might be necessary before the elaboration of the finalised decommissioning plan.

4.4 Research and development

Currently the R&D activity in this field is very limited, it comprises only the establishment of a decommissioning database for the nuclear power plant.

4.5 Financing

see 3.5

ACRONYMS AND ABBREVIATIONS

HAEA	Hungarian Atomic Energy Authority
NPHMOS	National Public Health and Medical Officer Service
PURAM	Public Agency for Radioactive Waste Management
CNFF	Central Nuclear Financial Fund