

REPORT
on
HUNGARIAN ATOMIC ENERGY AUTHORITY'S
ACTIVITIES IN 2010



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Published by Hungarian Atomic Energy Authority
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Printed in Hungary by Innova-Print Ltd.

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1. LEGAL BECKGROUND, TASKS AND STRUCTURE OF HAEA

In Hungary the use of atomic energy is governed by law (Act CXVI of 1996 on atomic energy, hereafter Atomic Act). In accordance with this Act, the control and supervision of the safety of applications is in the hand of the Government. The legal frame divides the basic regulatory tasks between the director-general of the Hungarian Atomic Energy Authority (HAEA) and the minister in charge of health. The HAEA is a public administration body acting in the field of peaceful applications of atomic energy with specified scope of tasks and authority, being independent from both organizational and financial points of view.

1.1 Legal background and its changes

The HAEA is a central public administration body acting under the control of the Government, it is supervised by a minister designated by the prime minister, but it cannot be instructed concerning its authority tasks. The minister, on behalf of the Government, supervises if the operation of the Authority is in harmony with laws. By virtue of Prime Minister's Resolution 5/2010. (XII. 23.) ME the minister of national development was the designated supervisor of the HAEA in 2010.

Other competent administrative bodies take part as special authorities in the HAEA's licensing procedures, and the regulations allow the involvement of professional experts (both institutes and individuals).

The quality management system of the HAEA, in the field of "Supervision of safe and peaceful applications of nuclear energy" meets the requirements of the international standard ISO 9001:2000. The certification of the HAEA's quality management system is valid until March, 2012.

A Scientific Council that is made up of maximum 12 nationally acknowledged individual experts supports the work of the HAEA. In 2010, at the request of the director general of HAEA, minister Dr. Tamás Fellegi relieved five former members and appointed five new ones. In the meeting in November 24, 2010 József Ronaky, director

general of HAEA thanked the conscientious professional work of professors György Vajda, György Bárdossy, György Köteles and Pál Tétényi. He also announced that István Hamvas, the general manager of Paks NPP requested his relieve of the activity of the Council. Ádám Kiss, the professor of Department of Nuclear Physics at the Roland Eötvös University was invited to chair the Council, while the new members are József Elter, head of department of Paks NPP, Zsolt Fülöp, director of MTA Institute of Nuclear Research, András Kovács, head of department of MTA Isotope Research Institute and Péter Trampus, manager of Trampus Consulting. The Scientific Council of the HAEA held three meetings in 2010: the main topic of the first, February meeting was the grounding of the new waste management programme, future of the Hungarian nuclear programme was discussed in the June meeting, while in November the Council, with its new members, was informed about the establishment of the Sustainable Nuclear Technology Platform.

The Atomic Act makes it obligatory to regularly review and update the laws and safety requirements by taking account of the latest results of science and technology as well as of the international experience. In 2010, the following important changes took place:

- ◆ Govt. decree 167/2010. (V. 11.) Korm. replaced the Govt. decree 248/1997. (XII. 20.) Korm. on the national nuclear emergency preparedness and response system. The decree was promulgated with consensus after one and a half year law making and coordination activity. The new decree takes into account the latest international recommendations and the experience gained during the recent period. It basically changed the structure of the nuclear emergency preparedness of Hungary;
- ◆ Ministerial decree 11/2010. (III. 4.) KHEM of minister of trade, communication and energy on the registration and regulatory control of radioactive materials and the required data provision serves the full harmonization with the Council Directive 2003/122/Euratom of December 22, 2003. The decree superseded the Ministerial decree 33/2004. (VI.28.) BM

of minister of internal affairs on the central and local accountancy for radioactive materials. The new decree reflects the experiences gained since the entering into force of the preceding decree, the legal framework of accountancy for radioactive wastes was established and the "D scale" internationally used for characterizing the dangerous quantities of radioactive material for emergency preparedness and physical protection purposes was introduced. The review of uniform local accountancy software required by the decree, the cost-free handing over of the software to the owners or holders and the publication of a guideline assisted the owners and holders to implement the prescriptions of the decree.

1.2 Tasks of HAEA

Licensing (at facility, system and component level) and inspection of nuclear safety of nuclear facilities, accountancy for and control of radioactive materials as well as licensing of related shipments and package designs, evaluation and coordination of research and development, fulfilment of regulatory tasks in the field of nuclear emergency preparedness, approval of emergency response plans of nuclear facilities, and the related international relations all belong under the competence of the HAEA. Implementation of the Treaty on the Non-Proliferation of Nuclear Weapons, fulfilment of duties originating from the safeguards agreement with the European Atomic Energy Community and the International Atomic Energy Agency, accountancy for and control of nuclear materials, and licensing of nuclear export and import are all the tasks of the HAEA.

1.3 Structure of HAEA

The HAEA is divided into three main organizational units: Nuclear Safety Directorate, General Nuclear Directorate, Organizational Units and Duties under the Direction of the Director General.

The departments of the Nuclear Safety Directorate and their tasks are as follows:

- ◆ *Department of Nuclear Power Plant (NPP) Supervision* performs licensing and inspection in nuclear safety related regulatory matters as specified by law. It also performs special authority tasks regarding the safety of the NPP;
- ◆ *Department of Nuclear Technology and Safety Assessment* performs licensing and inspection procedures with respect to the Spent Fuel Interim Storage Facility and the research reactors in nuclear safety related regulatory matters as specified by law. It performs special authority tasks in those cases pertaining to the scope of competence of other public administration bodies that concern the licensing of radioactive waste disposal facilities. It assesses the regular and event reports of nuclear facilities, and carries out the cause analysis of incidents and safety evaluation of the operators' activity;
- ◆ *Department of Technical Support* is responsible for analysis, training and emergency preparedness. In this scope it supports the implementation of regulatory tasks by probabilistic and deterministic safety analyses, coordinates the progress of technical development activities supporting the safe use of atomic energy. This department plans and organizes the training programmes of HAEA staff. Regulatory supervision of emergency preparedness of nuclear facilities, coordination of the activity of the Nuclear Emergency Response Organization of HAEA, participation in and development of the Hungarian Nuclear Emergency Response System and coordination of tasks imposed on HAEA derived from international agreements related to nuclear emergency preparedness also belong to the activity of this department.
- ◆ *Department of Strategy* is responsible for development, review and maintenance of laws, the Nuclear Safety Code and guidelines, operation of quality assurance system of HAEA, long term planning and preparations especially for regulation of new nuclear builds, law enforcement and for maintaining relations with the various co-operating authorities. The department also performs the special authority tasks in the safety area of the nuclear installations derived from regional and settlement planning activities and special authority tasks from the Espoo convention.

- ◆ *Section of Site Supervision* takes care of regulatory tasks related to the NPP that can be fulfilled at the site.

These departments operate under the direct control of the deputy director general heading the Nuclear Safety Directorate of the HAEA.

Other official duties of the HAEA are generally undertaken by another organizational unit of the Authority, the General Nuclear Directorate. The principal tasks of the four departments of the General Nuclear Directorate are:

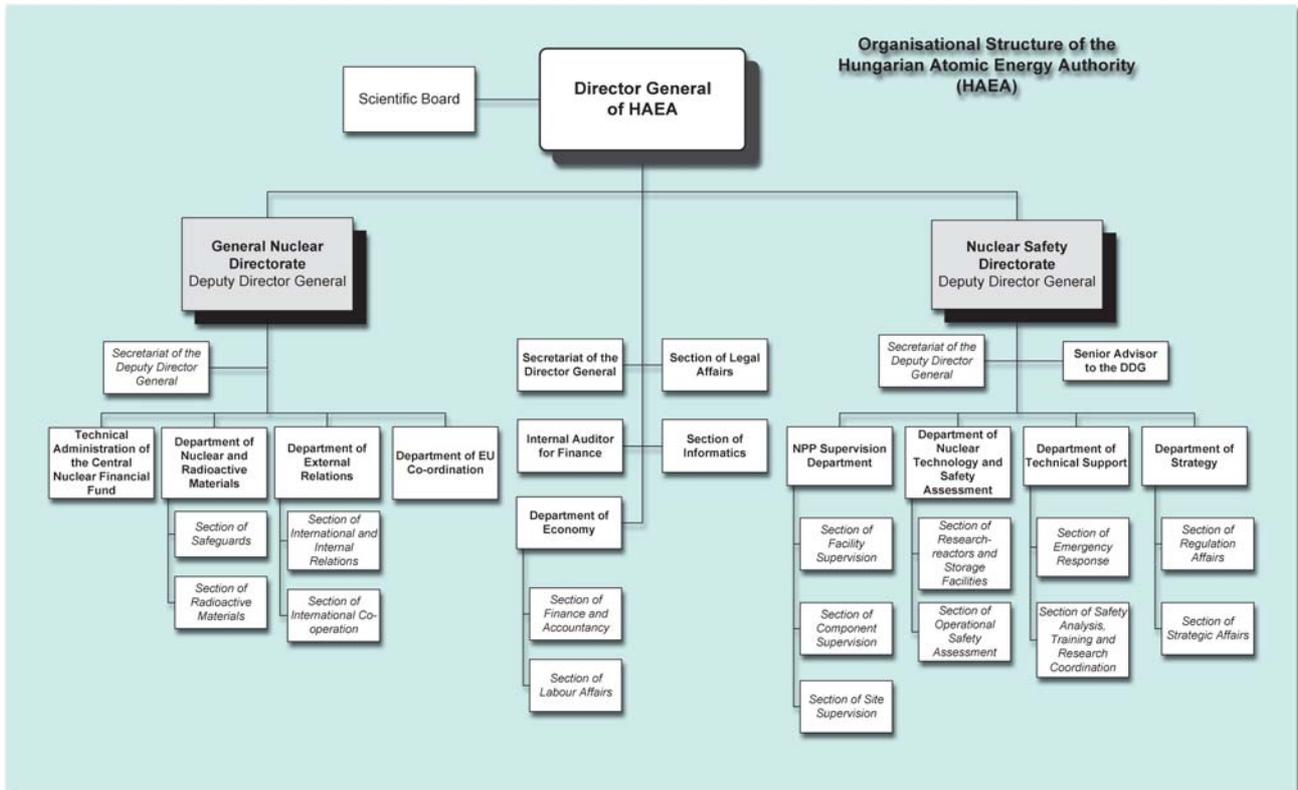
- ◆ *Department of Nuclear and Radioactive Materials* is responsible for the tasks imposed on Hungary by the Safeguards Agreement aimed at non-proliferation of nuclear weapons, for licensing of nuclear export and import, for the registration of radioactive materials, for licensing and/or approval of shipment of radioactive materials through national borders, and approval of shipments and package designs

of radioactive materials in the assigned cases;

- ◆ *Department of EU Co-ordination and Theoretical Radiation Protection* is to represent Hungary in the European Union, to develop the standpoints for discussions, to co-ordinate duties in connection with the law harmonization process including the analysis of regulations on radiation protection;
- ◆ *Department of External Relations* is responsible for maintaining external relations and for performing tasks relating to expert and public information;
- ◆ *Technical Administration of the Central Nuclear Financial Fund* handles the Central Nuclear Financial Fund.

These departments operate under the direct control of the deputy director general heading the General Nuclear Directorate of the HAEA.

The Section of Legal Affairs, Section of Informatics and Department of Economy are under the direct control of the director general.



2. HAEA'S LICENSEES

2.1 Nuclear facilities in Hungary

In Hungary the following nuclear facilities operated in 2010:

- ◆ Paks NPP;
- ◆ Training Reactor of Budapest University of Technology and Economics;
- ◆ Budapest Research Reactor;
- ◆ Spent Fuel Interim Storage Facility.

2.1.1 Paks NPP

Paks NPP consists of four units. The nominal electric output of the units is 500 MW. In 2010, the Paks NPP produced 15,761 GWh electricity, which stands for 42 % of the gross Hungarian electric power production.



2.1.2 Training reactor

The main task of the Training Reactor is the training and education of MSc and PhD students of the Budapest University of Technology and Economics and of other Hungarian high education institutes in the field of nuclear techniques (reactor physics, reactor techniques, nuclear engineering, radiochemistry, and nuclear measurement techniques), radiation and environmental protection and medical physics.

The design of the Training Reactor takes into account by far that it operates in a densely built-up area, and that during its operation students do perform measurements on its equipment, who, of course, do not have certified nuclear

expertise. The reactor was designed in such a way that even in the case of a most serious credible failure or human error, the occurrence of a nuclear accident or major release of radioactive material into the environment can be prevented.

There has not been any accident during the 40 years operation of the reactor. Based on the latest periodic safety review of the Training Reactor safety improvement actions and developments were ordered by the HAEA, out of which the reconstruction of the physical protection system was completed in 2010. The prototype of the new rod moving servo, as part of the modernization programme of the reactor protection system, is in the phase of testing. Preparation for reconstruction of nuclear measurement chains has started. The HAEA has been continuously supervising the implementation of modifications and development.

2.1.3 Budapest Research Reactor

The Budapest Research Reactor is one of the most significant research equipment in Hungary. The KFKI Atomic Energy Research Institute is responsible for the operation and safety thereof.

Special material structure research necessary for the lifetime evaluation of reactor pressure vessels of the Paks NPP together with neutron radiography and activation analysis research important for practical applications (e.g. cooling machine techniques, forensics) are carried out at the research reactor. The cold neutron source is of great importance for solid state physics research. The most important area of application of the research reactor is the production of radioactive isotopes for primarily medical (diagnostic) purposes.

The reactor is being set to low enriched fuel in a step by step manner, one-third of the fuel is already low enriched uranium. The last batch of highly enriched fuel elements will be removed from the core in November, 2012.

2.1.4 Spent Fuel Interim Storage Facility

The Spent Fuel Interim Storage Facility serves for the interim storage of spent fuel assemblies of

the Paks NPP. The spent fuel assemblies are stored one-by-one, in vertical tubes. The number of chambers may be extended. Each module stores 450 spent fuel assemblies.

The third phase of the construction of the storage facility began based on the valid construction license, in the course of which the facility will be extended by additional 4 modules. From section 1 of the third phase of the



Construction of SFISF (Phase III)

enlargement (starting with chamber 17) the arrangement of the storage tubes will be square instead of the earlier triangular layout, which will ensure the place for 527 storage tubes instead of 450. After the completion of the storage facility altogether 18,267 assemblies could be placed in the 37 chambers. Similarly to the former years, 480 assemblies were added to the inventory of the facility in 2010.

2.2 Owners and users of nuclear and other radioactive materials

The domestic regulation makes difference between the nuclear and other radioactive materials, thus it handles separately the nuclear materials applicable for fabrication of nuclear weapons. In Hungary, there are several hundreds

of companies that apply nuclear or other radioactive materials for peaceful purposes.

2.2.1 Owners, users and manufacturers of nuclear materials and equipment

As for safeguarding the implementation of the Treaty on the Non-Proliferation of Nuclear Weapons, the Republic of Hungary placed its nuclear activity under international control. In accordance with the stipulations of the Trilateral Safeguards Agreement signed between the Republic of Hungary, the European Atomic Energy Community (Euratom) and the International Atomic Energy Agency (IAEA), Hungary took responsibility to demonstrate that no nuclear material is diverted, within its territory, for preparation of nuclear weapons or other explosive devices.

Out of the licensees belonging under the force of the safeguards agreement the vast majority of nuclear material, of course, is possessed by the nuclear facilities. Beyond the nuclear facilities almost 40 other institutes, although in not too large amount, use nuclear material primarily for research and industrial purposes, but also for other services.

The unused nuclear materials of low amount are placed in the Radioactive Waste Treatment and Disposal Facility of Public Limited Company for Radioactive Waste Management.

There are 10 licensees authorized for export and import of nuclear and nuclear dual use materials and technologies.

2.2.2 Owners and holders of radioactive materials

The purpose and method of using radioactive materials is manifold, primarily the number of industrial radiography and medical sources is high. Among the licensees there are manufacturers, exporters and importers, shippers, users and the operator of the interim storage facility.

3. REGULATORY ACTIVITY

One of the most important areas of the HAEA's activities is the regulatory supervision of nuclear facilities, primarily of Paks NPP. The nuclear safety related regulatory role includes two groups of tasks. The Authority shall, on the one hand, fulfil the duty of being a regulator, i.e. it shall specify standards and requirements while, on the other hand, it shall enforce their fulfilment during the implementation of its supervisory role through carrying out the licensing, inspection and enforcement tasks.

3.1 Tasks of the nuclear safety authority

The HAEA proceeds in the following public administration matters related to nuclear facilities and equipment during fulfilment of nuclear safety regulatory tasks:

- ♦ nuclear safety inspection of nuclear facilities;
- ♦ nuclear safety licensing of installation, construction, extension, commissioning, operation, operation beyond design lifetime, modification, decommissioning and termination of nuclear facilities;
- ♦ approval of Periodic Safety Review Reports, inspection of implementation of actions derived from the report;
- ♦ inspection of implementation of the programme aimed at preparing for the extension of service lifetime of Paks Nuclear Power Plant;
- ♦ approval of regulatory licensing and inspection of structures connected to nuclear facilities and regulatory inspection of elevators;
- ♦ licensing and inspection of activities of nuclear equipment in relation to design, manufacture, installation, commissioning, operation, modification (repair), purchase, final shutdown and decommissioning;
- ♦ nuclear safety and technical radiation protection licensing and inspection;
- ♦ inspection of quality assurance system of the licensees and contractors prescribed in law, or having them inspected by a designated institute;
- ♦ licensing of nuclear emergency preparedness and response plans of nuclear facilities for the first case and after modifications;
- ♦ nuclear safety licensing necessary for restarting nuclear power plant units following main overhauls;
- ♦ licensing in principle of modification of operating nuclear facilities;
- ♦ licensing in principle of modification of systems, structures and components of operating nuclear facilities;
- ♦ approval of certain repair and implementation technologies, of description of measurement, calculation and technical analysis methods, and of employment in safety significant positions.

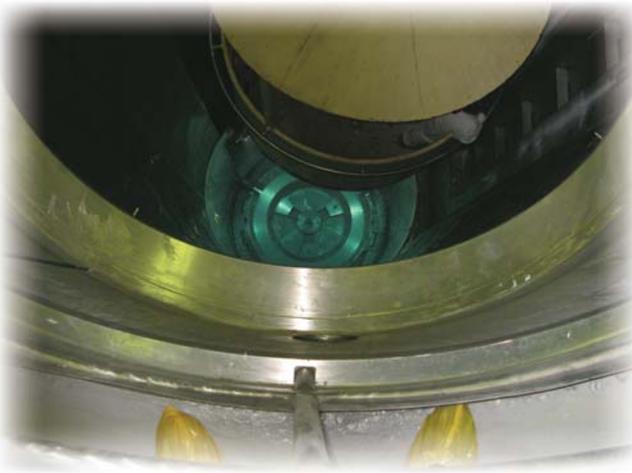
The HAEA takes the aspects of physical protection, fire protection and off-site emergency response into account during its regulatory activity.

3.2 Regulatory oversight of facilities

3.2.1 Inspection

The HAEA performed three integrated inspections during 2010 for Paks NPP in the area of utilization of operating experience from other plants and utilization of R&D results, response to nuclear emergencies and of maintenance. Beyond that the HAEA carried out nine targeted inspections, five out of which connected to the service life extension of unit 1, and one-one to the management and storage of radioactive wastes, record keeping of maintenance data, training, assessment and improvement measures of event investigations. The reconstruction of shaft No. 1 of unit 3, which was rescheduled from 2009, was inspected with priority.

Activities belonging to service life extension, which were to be performed during main overhauls, have been built in the annual inspection plan of the authority as individual inspection areas. Qualification conditions of cables, condition survey of steam generator and other technology tanks were such areas.



Reconstruction of shaft No. 1 of unit 3

On annual level, 249 individual regulatory inspections took place and documented by records, out of which 162 were field inspection in the distribution as follows: cyclic tests of safety equipment and systems (47), main overhauls of the units (47), documentation of technical safety review of pressure retaining systems (12). The responsible inspectors of the units performed 51 inspections with the objective to follow the operating conditions of the units and the general technical conditions in the facility. Neither prompt action nor intervention concerning the operation was necessary during the inspections.

The inspectors 377 times reviewed the compliance of preliminary safety evaluation of planned modifications and took part in 31 contractor audits and manufacturer acceptance tests. The HAEA participated in 57 regulatory authorization exams as for overseeing the training of the Paks NPP personnel. The documents of technical safety reviews of pressure retaining systems were inspected 55 times.

In the Spent Fuel Interim Storage Facility, it was a priority task for the HAEA in 2010 to inspect manufacturing of technology equipment required for the expansion of the facility. Several field inspections were carried out at the contractors, during which regulatory inspections of the manufacturing tests required by the quality plan, civil engineering structures and spent fuel storage tubes were performed.

Implementation and documentation of storage process of spent fuel assemblies were matters of targeted inspections in 2010. The HAEA also assessed during the inspections the measures

aimed at improving the level of safety that were decided in the frame of the Periodic Safety Review.

The authority performed site inspections to review the construction process of the new module commenced in the expansion phase 3, the operation of independent quality control, updating process of operational documentations and radiation protection measurement equipment.

It was another priority task in 2010 to supervise the conversion of the Budapest Research Reactor to low enriched fuel elements. The HAEA examined the experience gained during the operation of the first core constructed in the gradual conversion process in a field inspection and based on the evaluation of measurement results approved the continuation of the conversion programme.

Compliance of the ageing management and maintenance process of technology equipment, implementation and documentation of periodic maintenance of equipment and systems, and the structural inspection and pressure tests of pressure retaining components were all assessed by targeted inspections. The HAEA examined the fulfilment of the regulatory requirements in a manufacturing inspection of the new material testing irradiation probe to be installed in the reactor core. A failure was detected at one of the main gate valves as a result of the pressure test of the primary circuit. The repair of the valve was inspected by the authority.

Based on the Periodic Safety Review of the Training Reactor, the HAEA ordered safety improvement modifications and developments. Out of these the modernization of the physical protection system and the seismic-protection support of feedwater tanks were completed in 2010. Design of the new rod movement device to modernize the safety



Repair of the Research Reactor gate valve



Crane reconstruction in the reactor hall

protection system of the reactor was accomplished, and trial service of the prototype was inspected by the HAEA at the site of the manufacturer. Reconstruction of nuclear measuring chains is under preparation. The HAEA inspected the implementation of developments required after the Periodic Safety Review. The authority inspected the compliance with the operational limitations required for the commencement of the reconstruction works of the orbiting crane in the reactor hall and continuously supervised the implementation of specified modifications and developments.

3.2.2 Licensing procedures

In 2010, during its public administration procedures and oversight activity the HAEA issued 227 decisions, out of which 167 were resolutions and 60 were procedural orders. The 2.5 times more procedural orders are the result of the amendment to Act CXL of 2004 on the public administration procedures and services. 189 of the decisions were connected to the Paks NPP, 16 to the Spent Fuel Interim Storage Facility, 5 to the Budapest Research Reactor and 9 to the Training Reactor. The HAEA issued 8 procedural orders in its special authority role for the co-authorities.

Moreover, the HAEA is the authority concerning architectural aspects of nuclear facilities. In this task it performed 21 procedures in 2010 at the Paks NPP, out of which 14 were construction licenses, other 7 were permits for use with the involvement of special authorities. Issuance of permits for use was preceded by walk down inspections, which were participated by the authorities concerned and the professionals of the plant.

The decreasing tendency of the number of decisions issued for Paks NPP stopped. The increasing number of decisions was required by the time proportional implementation of the tasks connected to service life extension and the Periodic Safety Review, as well as to the delay of modification of management of primary to secondary circuit leak accidents (PRISE).

The most important building licenses were as follows:

- ◆ reconstruction of shaft No. 1 of unit 3,
- ◆ reconstruction of venting and air conditioning machines,
- ◆ replacement of fire barrier doors,
- ◆ renewal of roof insulation of the main service building.

The number of decisions concerning the Budapest Research Reactor, after accomplishment of the periodic safety review and realization of the related safety improvement actions practically did not change in 2010.

The number of decisions with respect to the Training Reactor slightly decreased in the process of the activities of the periodic safety review and the related safety improvement actions.

In the case of the Spent Fuel Interim Storage Facility, after licensing the operation of the first 16 chambers and accomplishment of the periodic safety review, a steady number of procedures can be observed. The licensing activities in relation to the investment and commissioning of the next modules and the first construction works of phase III were commenced.

There was no appeal submitted by the licensees against any regulatory decision issued in 2010.

3.2.3 Licensing of Emergency Response Plans

Every nuclear facility shall have Emergency Preparedness and Response Plan to manage emergency situations. The plan shall regulate all those activities that become due and necessary to be implemented after a potential accident taking place in relation to the nuclear technology in order to protect the workers, the public and the environment. In 2009, the Spent Fuel Interim

Storage Facility submitted its new Emergency Preparedness and Response Plan, which was reviewed and approved by the HAEA at the beginning of 2010. No change was initiated in the plans of other installations. The HAEA approved the nuclear emergency training and exercise plans of all of the four installations at the beginning of the year.

3.2.4 Activities related to the introduction of severe accident management at Paks NPP

The licensee carries out the implementation of technical modifications and development of severe accident management guidelines necessary to establish the possibility of severe accident management according to the agenda approved by the authority. In 2010, HAEA granted license in principle for the modification aiming at preserving the integrity of the reactor pressure vessel.

The licensee is to commence the implementation of the following severe accident management related technical modifications in 2011:

- ◆ provision of electrical supply during accidents;
- ◆ establishment of the severe accident measurement system;
- ◆ modifications related to provision of external cooling of the reactor pressure vessel;
- ◆ preparation and introduction of severe accident guidelines.

It is a precondition for service life extension of each unit to ensure the management of severe accidents as results of the above mentioned modifications.

3.2.5 Supervision of main overhauls in 2010

The main overhaul of nuclear power plant units includes planned maintenance and repair activities linked with regular refuelling. After completing the main overhaul, the operator shall submit license application to restart the unit.

The main overhauls of the Paks NPP units required altogether 146 days in 2010, which is 20% less than in the preceding years.

One of the most important events from the aspect of safety was the general overhaul of the reactor equipment of unit 4 that is due once every 4 year. During that, besides the actual periodic maintenance and review of the major components, also the inspections requiring complete removal of the core and the hydrostatic pressure test of the primary circuit were performed.

During the main overhauls of the units all the due and periodic maintenance and in-service inspections, technical safety reviews and leakage tests of the reactor equipment and the refuelling necessary for the upcoming campaigns were completed. All tasks were successfully performed within the planned schedule.

The PRISE modifications, except for the installation of the relief valve groups, were completed. The final implementation will be done by the installation of valves of other design.

During the main overhauls the regulatory inspections extended over the maintenance and main overhaul plans and their implementation, and over the maintenance effectiveness monitoring.

HAEA followed the main overhauls and start-ups of the units with on-scene witnessing, targeted, occasional and online inspections, and supervised them based on a separate inspection plan. These activities involved regular, random and daily verification of compliance with the milestones of nuclear safety (e.g. safety and protection system tests, leakage test, initial conditions of major steps) and general housekeeping. Results of the inspections above were processed and evaluated by HAEA.



PRISE leakage test

Sixty days following the completion of the main overhaul and start-up of the unit the licensee submitted its reports about the activities performed. The HAEA accepted the reports.

3.2.6 The most important repairs at Paks NPP

The HAEA granted permit for repair of several major equipment of the Paks NPP in 2010. Out of the repairs of safety classes 1 and 2 pressure retaining components, the trays of localization tower and the head of main gate valve should be highlighted. By using the experience of repairs of multiple failures the repair technologies, typically assembly and welding technologies were developed.

3.2.7 Review of Final Safety Analysis Report of Paks NPP

The Final Safety Analysis Report (FSAR) is the document that contains the current licensing basis, thus it has to be a living document. In order to provide for that the effective regulations require the licensee to annually update the Final Safety Analysis Report.

In line with the requirement in Article 19 of Govt. Decree 89/2005. (V. 5.) Korm. the Paks NPP updated the FSAR for units 1-4 and submitted to the HAEA. The updated FSAR reflects the state of December 31, 2009. The review and assessment of the documentation submitted was terminated in December, 2010.

Based on the determinations of the review the HAEA ordered for the demonstration that further operation knowing the result of PRISE analysis (i.e. secondary pressure exceeds the pressure criteria for the analysis) does not mean any additional risk. The violation of criteria identified will be automatically eliminated by the PRISE modification (i.e. relief to the hermetic compartments will prevent the opening of safety valves). The modifications are intended to be carried out by the plant during the main overhauls in 2011.

The HAEA also ordered for the revision and modification of FSAR chapters related to the strength, lifetime and fatigue calculations performed according to ASME code, since Paks

NPP modified the respective chapters based on the unfinished and unaccepted documents and with a content contradictory to the purpose of the FSAR.

The update of the FSAR in 2011 needs to be carried out by considering the errors and deficiencies revealed and handed over as annex of the respective regulatory resolution.

3.2.8 Extending the service lifetime of Paks NPP

The manifold technical activity aimed at preparing for the extension of service lifetime covers the identification of ageing effects and ageing processes requiring ageing management, survey of condition of systems, structures and components, evaluation of current ageing management programmes, the necessary modifications and development of new programmes.

The authority reviewed and assessed the progress reports about the implementation of the programme developed to establish the preconditions of design life extension and long term operability. The obligations of the relevant regulatory resolution due in 2010 were complied with. In order to inspect certain tasks of the programme the HAEA compiled an inspection plan, the most important elements of which were performed. As an additional task the HAEA reviewed the programme prepared for the condition assessment of the system component, and sent the comments to Paks NPP.

The licensee shall submit the application for service life extension one year before the end of the design lifetime (in December, 2011 for unit 1), in which the results of the programme shall also be summarized.

3.2.9 Use of symptom based emergency operating procedures at Paks NPP

In the frame of an international contract, Paks NPP developed and introduced the symptom based emergency operation procedures some years before. The advantage of the new approach as compared to event based procedures is that the potential for human failures decreased, and thus the nuclear safety of the units was

enhanced. In line with the application experience of the procedures a new reversion was developed. Licensing and introduction of the new documents was completed in 2010. The former version was applicable only to manage situations launched at nominal power. By the end of 2010 those symptom based emergency operating procedures were developed, which are applicable for shutdown states and for the management of events of the spent fuel pool. Licensing started at the end of the year and the documents will be introduced in 2011.

3.2.10 New fuel type at Paks NPP

The Paks Nuclear Power Plant Ltd decided the introduction of a new fuel type to improve the efficiency fuel management. The new fuel contains gadolinium, which is worldwide applied to balance the effect of higher enrichment.

In accordance with the international practice, the introduction of new fuel started with the operation of test assemblies. Licensing of test assemblies took place in 2008 and 2009, a portion of the assemblies was inserted in unit 4 in 2009 and the evaluation of test results was completed. The trial operation of test control and safety assemblies to justify the applicability for control and safety functions was delayed to the beginning of 2010 due to fabrication failure of one of the assemblies. The first total refuelling with the new fuel type took place in 2010 on unit 4. The supplementary measurement programmes and the operating experience justified the results of analysis and tests described in the licensing procedure. The new fuel will be introduced in the following years for each unit and after some years of transition with mixed cores will be applied in general.

3.2.11 Removal of leaking assemblies from the reactor

In order to fundamentally analyze the environmental effects of the assembly containing the leaking fuel element, which is placed to the spent fuel pool of unit 4, several measurements were performed from September, 2009 to April, 2010 with the involvement of the experts of KFKI Atomic Energy Research Institute. The evaluation of the results determined the following:

- ◆ based on the examinations and if the radiation protection circumstances make it possible, the interim storage of the fuel assembly in the spent fuel pool for several years is allowable and recommended;
- ◆ the existence of leaking fuel is the concomitant of operation, its occurrence could be expected statistically;
- ◆ wet storage of more leaking assembly is manageable in the spent fuel pool. Storage of spent fuel in the Spent Fuel Interim Storage Facility after some years of cooling in the spent fuel pool is not allowed.

Taking the expert opinion and the measurement results into account the HAEA permitted the interim storage of the leaking assembly in the spent fuel pool, since it does not jeopardize nuclear safety, and by complying with the other effective requirements the unit can be operated safely.

3.2.12 Licensing activity in relation to PRISE modification in 2010

The adequate management of a PRISE accident sequence consists of several technological modifications and measures. Except for one technical modification these were implemented during the recent years. The complete implementation of the total set of measures was prescribed by the competent environmental protection authority in the environmental license for service life extension.

Several modification permits had to be issued in 2010. Purchase and installation license had to be issued for the adequate, seismic protected installation of the cabinets ensuring the electric supply. Modification of fabrication technology of gate valves required the modification of fabrication license. The operator decided about the application of new type valves for unit 4. Consequently, the modification license in principal had to be modified, its duration had to be extended and it was necessary to issue new fabrication licenses.

In order to complete the modification for each of the 4 units, further modification licenses are required, which will be due in 2011, and based on them the safety improvement measures can be accomplished by the defined deadline.

3.2.13 Replacement of medium of the viscose vibration dampers (GERB) in unit 3 and unit 4 of Paks NPP

The replacement of the medium applied in viscose vibration dampers installed for steam generators and main circulating pumps were implemented in 2007 for units 1-4. The vibration dampers ensure the integrity of the main circulation loop even in the case of an earthquake with a frequency of one per ten thousand years. Temperature measurement devices were also installed to the dampers during the replacement.

In the meantime the cooling efficiency of the hermetic compartments increased due to the reconstruction of the recirculation venting system. It resulted that the environmental temperature at the vibration dampers located near to the air inlet of the venting system decreased in comparison to the earlier values, and so the difference between the nominal and actual operating temperatures of the medium exceeded the required value (5 °C). In order to provide the optimal and operational function of the vibration dampers, the replacement of the viscose medium to one having lower nominal operating temperature was necessary.

At the request of Paks NPP the HAEA granted modification and purchase permits in 2010 for the replacement of vibration damper medium in unit 3 and unit 4.

3.2.14 Oversight of organizational and operational changes

Paks NPP initiated organizational changes in 2010. Some of the planned changes required regulatory approval, since their implementation directly or indirectly influenced the safe operation of the plant. The effect of organizational change proposals on safety was evaluated by the plant and found to be appropriate. The plant provided this information to HAEA in due time. The regulatory assessment of the application regarding organizational changes submitted to the authority at the end of 2010 will be finished in 2011.

3.2.15 Oversight of contractors' activity

In 2010, the Paks NPP reported about 84 qualification procedures, 24 out of which were without site audits. 31 of the reported site audits were witnessed by the authority (37% participation). In the process of designation for participation the main aspects were the relevance for safety of the activity to be qualified and the experience of the given contractor. Major deviations were not detected during the audits.

3.2.16 Fabrication of technology components for the extension of Spent Fuel Interim Storage Facility

In 2010 the fabrication of the 2,200 storage tubes started in the frame of extension of the Spent Fuel Interim Storage Facility by four new chambers. The mechanical strength of the storage tube against seismic effects and leaktightness ensuring the environmental compliance of storage is mostly guaranteed by the welds prepared by automatic welding machine. Before the beginning of mass production the HAEA strictly inspected the skills of the manufacturer personnel and the adequacy of the welding equipment. The compliance with the technology parameters specified for the welding was demonstrated by the full scope weld inspection after test manufacturing.

The steel structure section of the filling board ensuring exact positioning of storage tubes and at the same time the radiation protection shielding of the personnel is also under way. The HAEA



Inspection of manufacturing

performs regular complex inspections to assure the compliance with the requirements of the design documentation.

3.2.17 Extension of construction license of Spent Fuel Interim Storage Facility

In summer of 2010 the extension of the construction license of the facility became due. HAEA assessed the application of the operator Public Limited Company for Radioactive Waste Management based on the updated version of the Preliminary Safety Analysis Report and, by involving the special authorities concerned, decided about the extension of the construction license by 5 years as specified by law. The most important modification was the increase of fuel assemblies to be placed in the chamber modules, the possibility of which was adequately grounded by the safety analyses.

3.3 Safety assessment of nuclear facilities

HAEA continuously evaluates the safety performance of operators. The main areas of data collection supporting the assessment are: regular and event reports of the licensees, cyclic regulatory inspections, comprehensive regulatory inspections focusing on certain specific areas, reactive inspections and inspection of the training of operating personnel.

Investigations of events occurring at nuclear facilities mean an important part of the HAEA's analysis and assessment activity. The licensees shall report the safety significant events immediately, and submit a detailed written event report on the investigation within 30 days to the authority. The investigation of events supports the appropriate assessment of nuclear safety condition of the nuclear facilities, while feeding back the experiences gained during the analysis and assessment of events facilitates the enhancement of operational and overall safety level.

As a summary, the general evaluation of nuclear safety condition of nuclear facilities

showed appropriate results in 2010. The Paks NPP, the Budapest Research Reactor, the Training Reactor and the Spent Fuel Interim Storage Facility operated in accordance with the parameters specified in the operating and licensing documents.

In 2010, the authority recorded altogether 42 events at the Paks NPP. The NPP reported 32 events, while in case of 10 events the HAEA requested event investigation report. There was no reportable event taken place at the Spent Fuel Interim Storage Facility, the Budapest Research Reactor and the Training Reactor.

None of the events that took place in the Paks NPP in 2010 reached the INES-1 or higher classification on the seven-stage International Nuclear Event Scale used for the information of the public.

Deficiencies revealed during authority inspections did not jeopardize nuclear safety and the environmental releases nowhere exceeded the limit values.

Year	INES-1	INES-2	INES-3
1990	2	0	0
1991	5	0	0
1992	1	0	0
1993	2	0	0
1994	3	0	0
1995	2	1	0
1996	0	0	0
1997	1	1	0
1998	4	0	0
1999	3	0	0
2000	5	0	0
2001	3	0	0
2002	4	0	0
2003	3	0	1
2004	2	0	0
2005	1	0	0
2006	1	0	0
2007	0	0	0
2008	1	0	0
2009	0	1	0
2010	0	0	0

Table 1 INES classified events of the Paks Nuclear Power Plant between 1990 and 2009

3.4 Regulatory control of nuclear and other radioactive materials

3.4.1 Accounting for and control of nuclear materials

In 2010, according to the obligations undertaken in the international conventions, the HAEA fulfilled the task of operating nation-wide central accountancy system for nuclear materials, so it continuously accounted for any changes in the physical inventory of nuclear materials and provided data to the European Commission and to the International Atomic Energy Agency.

In 2010, the international inspectors spent 74 man-days in Hungary. The IAEA conducted 40, while the European Commission performed 34 site inspections, out of which 32 were joint IAEA/Euratom inspections.

The inspections took place at the Paks NPP (17), at the Spent Fuel Interim Storage Facility (11), at the Budapest Research Reactor (3) and once at the KFKI Central Isotope Storage Facility. Additional four inspections were conducted at those institutions, where only a small amount of nuclear material is in use or stored.

Two of the international inspections were conducted without 24h advance notification, one of them at Paks NPP and another at the Budapest Research Reactor. In the course of these inspections the international inspectors did not reveal any safeguards related problem or accountancy error.

Besides the national safeguards inspections conducted in parallel to the international inspections, the HAEA performed 13 independent national inspections in 2010; subsequent to the refuelling of the units of the Paks NPP, once at the Spent Fuel Interim Storage Facility and once at the Budapest Research Reactor and 5 more times at licensees possessing small quantity of nuclear materials. In connection to these independent inspections the HAEA inspectors performed environmental sampling 4 times.

In 2010, based on the national data provision, the European Commission, after consultation

with the HAEA, established the document of Special Safeguards Provisions for Installation I (i.e. Unit 1 and 2) and II (i.e. Unit 3 and 4) of the Paks NPP, which regulates the operational ledgers and accountancy to be maintained at the facility, the inspection rules, the cameras and instruments supporting the inspections and the rules for special reports.

In line with the Additional Protocol the international inspectors shall be supported in environmental sampling and entering wider scope of facilities. In order to verify the adequacy and completeness of data, and to reveal potential contradictions the IAEA deploys open source information (i.e. public media, scientific forums, publications) as well. In 2010, inspections under the Additional Protocol including environmental sampling were performed twice: once at the site of the Paks NPP and once at the KFKI.

The Additional Protocol related data provision and verification system was reviewed regarding the KFKI site in 2010. Accordingly, at the initiation of the HAEA and the Euratom the IAEA inspectors were provided with more extended information regarding the non-nuclear related buildings of the site, as well as extraordinary inspection was allowed to be conducted. As a result of the review the IAEA accepted the Hungarian request to exclude certain buildings from the scope of regular data provision and inspections as a reflection to the fact that neither buildings host nuclear fuel cycle related activity.

The HAEA issued a publication both in English and Hungarian on the "Nuclear non-proliferation activities in Hungary between 1999 and 2009", which provides an overview of the actions made and results reached in this field.

3.4.2 Support to the International Atomic Energy Agency's safeguards system

Hungary has been providing support to the safeguards system of the International Atomic Energy Agency since 1991. The purpose of this programme is to facilitate the development of the human resources of the IAEA and to contribute to the development of technical background necessary for the safeguards regime. The support programme is coordinated by the HAEA.

The tasks of the HAEA in 2010 cover the development of methods and tools for spent fuel verification and training of IAEA inspectors.

Moreover; in the frame of the programme providing support to the IAEA, the experts of HAEA and the Institute of Isotopes contributed to the joint programme, which assesses the potential nuclear weapon producing ability of a given country; i.e. those potential activities, during which the civilian nuclear materials and technologies can be diverted to military purposes. As a result of the project expected to be completed within several years such a methodology and software will be developed, which can facilitate the optimization of the verification activity of the IAEA.

At the request of the IAEA, the HAEA organized a training course for the nuclear experts of developing countries on the nuclear fuel cycle, non-proliferation related regulatory activities and on the safeguards related activities of nuclear facilities and other licensees.

3.4.3 Nuclear export and import licensing

According to international requirements, the preliminary license of HAEA shall be obtained to export or import nuclear materials. Beyond the nuclear materials and equipment, also the non-nuclear, nuclear dual use materials and technology that can be used in nuclear applications are subject to licensing.

In 2010, the HAEA issued 11 preliminary licenses (special authority permit) to import fresh fuel elements of nuclear reactors, measuring devices, NPP components, and standard material samples containing plutonium and uranium. In addition, the HAEA issued 12 preliminary licenses to export parts of nuclear power plant refuelling machine, their technical documentation, and neutron generators.

The HAEA inspected the realization of the licensed application of certain imported items; and pursuant to the international obligations it provided data to the International Atomic Energy Agency on the accomplished transfers.

The national nuclear export and import licensing system complied with the international directives

aiming at preventing the proliferation of the nuclear weapons.

3.4.4 International export control regime

The HAEA, together with the Ministry of Foreign Affairs, actively participates in the work of the international non-proliferation regimes, i.e. the Nuclear Suppliers' Group and the Zangger Committee.

The presidency of the Nuclear Suppliers Groups was given by Hungary in the period 2009-2010. Accordingly; the HAEA experts held presentations in consultative meetings with Israel, Pakistan, India and Serbia, and with Western-Balkan Countries (i.e. Albania, Bosnia-Herzegovina, the Former Yugoslav Republic of Macedonia, Montenegro).

Additionally; the HAEA provided expert opinion in several cases at the request of the Ministry of Foreign Affairs in order to support the Hungarian positions in European and international non-proliferation matters.

3.4.5 Registry and control of radioactive materials

An important stipulation of peaceful use of nuclear energy is the rigorous central registration for radioactive materials, which falls under the competence of the HAEA. According to the relevant directives of the Euratom and recommendations of the IAEA, the HAEA maintains a computerized system for registering radioactive materials (including wastes).

In accordance with the stipulations of the Ministerial decree 11/2010. (III.4.) KHEM a licensee shall keep such a local register, which provides up-to-date information on the actual inventory, type, activity, purpose of application, storage location and use of radioactive materials under its ownership. The local register shall be maintained by software provided to the licensees by the HAEA free of charge. Any changes in the inventory, in the use or application of radioactive materials, suspension of application, decay below exemption level, the total use up of materials or

their clearance from regulatory control shall be immediately recorded into the local register.

At the end of 2010 the central database of radioactive materials includes the data of 5534 sealed radioactive sources of 516 licensees. Regulatory certificates were provided for sealed sources by the HAEA in 674 cases during the year.

In 2010, the experts of HAEA conducted 150 on-site inspections in order to verify the compliance of local registers with the relevant legal prescriptions.

The inspection frequencies were specified in the frame of the risk-informed inspection regime considering the estimated probability and consequences of losing the regulatory control of radioactive sources. In harmony with the more rigorous requirements of the above referred decree, the scope of the registration system was extended to include radioactive wastes.

3.4.6 Licensing of transport and packaging of radioactive materials

Altogether 11 licensing procedures were conducted and the same number of licenses was granted during 2010 by the HAEA; in two cases the compliance with the formerly granted resolutions were verified in the frame of a comprehensive inspection.

The HAEA takes notes of the declarations of shipment of radioactive material between Hungary and other member states of the European Union according to the Council Regulation 1493/93/Euratom. In 2010, following the verification of these declarations based on the national source register, the HAEA granted licenses in 42 cases.

An assigned colleague of the HAEA participated in the work of the IAEA Transport Safety Committee, in the frame of which, the expert level preparation of the new version of IAEA safety requirements for the safe transport of radioactive materials was started.



4. OTHER TASKS

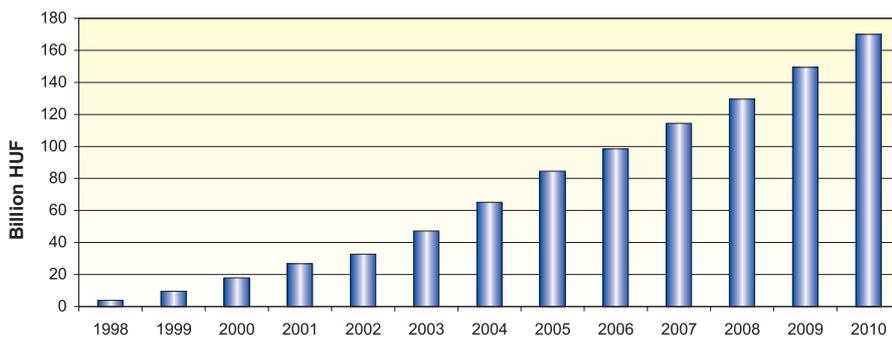
4.1 Technical administration of the Central Nuclear Financial Fund

4.1.1 Legal framework

As implementation of the Act on Atomic Energy a Central Nuclear Financial Fund (CNFF) operates from the payments of the users of atomic energy. Its objective is to finance the construction and operation of radioactive waste disposal facilities, and of spent nuclear fuel storage and disposal facilities, and to finance the decommissioning (dismantling) of nuclear facilities. The HAEA is the technical administrator of the CNFF, while the minister supervising the HAEA disposes over the Fund. In order to support the decisions of the minister disposing over the Fund, the CNFF Special Committee consisting of representatives of the concerned ministries and organizations was established.

4.1.2 Implementation of the work-plan 2010

The Act CXXX of 2009 on the budget for 2010 of the Republic of Hungary determined the receipts of the CNFF as 35.44 billion HUF (by the end of 2010 1 Euro=276 Huf). (The real receipts (35.65 billion HUF) were a bit more than specified, since the budget contribution ensuring the stability of the value of the fund was larger than as it was planned. The planned expenditure of the fund was 18.7 billion HUF in 2010, which was realized in the amount of 15.0 billion HUF. The difference between receipts and expenses provides coverage for long-term expenses; the balance of the fund increased by 20.64 billion



Increase of the balance of CNFF between 2000 and 2010

HUF in 2010. The balance of the fund's account at the Hungarian Treasury was 170.02 billion HUF at the end of 2010.

4.1.3 Most important tasks financed from CNFF



Technology hall of the National Radioactive Waste Repository

- ◆ Disposal of low and intermediate level wastes generated at the nuclear power plant at Bataapati National Radioactive Waste Repository

The transport of barrels including the radioactive waste of the Paks Nuclear Power Plant continued in 2010; 2400 barrels were stored in the repository at the end of the year.

The two declining basic shafts leading to the underground area of the repository and those shafts connecting them, and every surface object connecting to the basic shafts were accomplished in 2009.

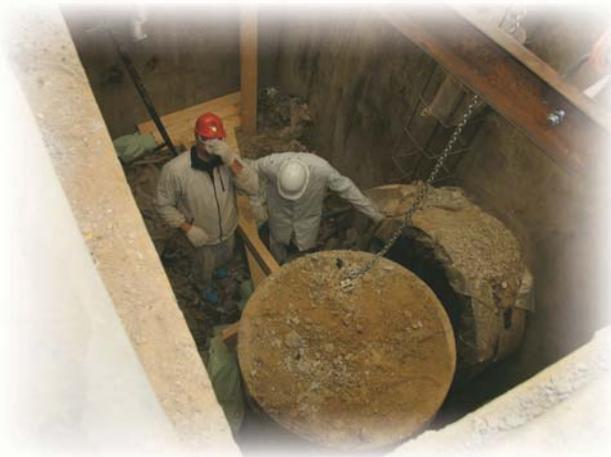
The construction plans of the first two storage chambers and the service technology systems were finalized by the middle of 2010. Consequently; the contract on the establishment of these first two chambers and the

construction of the technology systems was concluded in December 2010. The commissioning of the storage chambers in 2012 as latest is important for the Paks NPP Ltd; therefore the project budget for the next years shall be increased in comparison to as planned.

♦ *Operation and modernization of the Radioactive Waste Treatment and Disposal Facility operating at Püspökszilágy*

Following the re-opening of the storage pools certain (i.e. long lived high level) waste types are retrieved in the frame of a safety improvement programme being in progress at the Radioactive Waste Treatment and Disposal Facility. These wastes are stored temporarily in the service building modified for this purpose and in those pools that became empty in the frame of the programme until their final disposal in the deep geological repository. Consequently; the capacity created in the pools in such a way supports the disposal of institutional wastes (nonetheless the chambers became full by 2005). A demonstration project was launched in 2007. In the frame of that project four pools were re-opened, their waste content was fully taken out for selection, the long lived high activity isotopes were removed. Finally; after compression and conditioning the wastes were placed again in the pools or stored in the service building.

The safety analyses and assessments commenced on the basis of the experience and results obtained from the demonstration programme were completed. Accordingly; a



Removal of special waste packages



Placement of re-packaged wastes

proposal was elaborated with regard to further continuation of the safety improvement programme of the Radioactive Waste Treatment and Disposal Facility as well as to the safety improvement technology of the other 44 chambers of the site. The accomplishment of the tasks requires about 10 more years. The preparation for the replacement works regarding the large volume of waste is in progress in 2011.

♦ *Preparation for disposal of high level radioactive wastes and for decommissioning of nuclear facilities*

A clay-stone found in the area of the Mecsek mountain (aleurolit formation close to Boda) provides promising option for disposal of high level radioactive wastes; it seems to be applicable since it has good impermeability and thus it could well retain the radioactive isotopes. A research programme was established in 2003 for selecting the location of an underground laboratory, which justified that it is worth continuing the geological research in this area. The execution of the programme had slowed

down already in 2005, and it could not be realized according to the original schedule by the end of 2008 (i.e. the originally planned deadline) with the original content.

In 2009, the PURAM (i.e. the Public Limited Company for Radioactive Waste Management, the licensee of the repository), with the help of Hungarian and international experts, commenced the revision of the activities aiming at disposing the high activity long lived wastes and spent nuclear fuels, paying special attention to their scheduling and estimation of their expenses. The revision is also required by the service lifetime extension of the Paks Nuclear Power Plant.

A study supporting the new national programme for management and disposal of radioactive wastes and spent nuclear fuels to be elaborated in the next years was also accomplished. This study specified the future works and those assessments that are needed for substantiating the back-end strategy of the fuel cycle.

The first version of the document "Methodical suggestions and work plan for the site selection and sub-surface research programme in connection with high activity radioactive waste and spent fuel disposal facility" was elaborated, which includes various proposals regarding the works to be accomplished until the opening of the underground disposal facility.

The concept of further research works is developed with the consideration of the service life extension of the nuclear power plant, the closure of the fuel cycle, and within the latter one of the developments in connection with spent fuel management.

4.2 Emergency preparedness

The Hungarian Nuclear Emergency Response System is an integral part of the general disaster management system established by the Act LXXIV of 1999 on disaster management. The central body of the system is the Governmental Coordination Committee that, in the new government structure is chaired by the Minister

of the Interior; its members are the competent ministers. The director general of the HAEA as the chairperson of the technical body of the Governmental Coordination Committee (i.e. the Nuclear Emergency Response Working Committee) participates with discussion right in the meetings of the Governmental Coordination Committee. Similarly, the chairperson of the Nuclear Emergency Preparedness Technical Scientific Council, who is invited by the director general of the HAEA is another participant of these meetings.

The most important progress of the Hungarian Nuclear Emergency Response System in 2010 was the promulgation of a new governmental decree regulating the work of the system, which replaced the former 13 years old legislation. It is important to note that legal authorization was given to the High-level Working Group, which was invited and operated to elaborate the National Nuclear Emergency Response Plan.

4.2.1 International early notification system

Hungary is a party to the early notification convention established under the umbrella of the IAEA and the European Union's ECURIE early notification system. In order to maintain a direct cooperation, bilateral inter-governmental agreements have been concluded with Austria, Czech Republic, Croatia, Germany, Romania, Slovakia, Slovenia and Ukraine.

Beyond the cooperation in nuclear safety and radiation protection matters, general disaster management agreements under the competence of the Ministry for Local Governments have been concluded with certain neighbouring countries, which also have certain implications on nuclear emergency response tasks.

4.2.2 International assistance system

An international convention was created under the aegis of the IAEA on the assistance provided in the case of a nuclear accident or radiological emergency, in the frame of which the member states can request support to respond to the consequences from other member states through the International Atomic Energy Agency

if a nuclear or radiological emergency occurs on their territory or affects it.

As a part of the preparation for the implementation of the convention on assistance in the case of a nuclear or radiological emergency, the IAEA established an international assistance network (so-called RANET) and created a database that compiles the available assistance capabilities (e.g. detection and identification of contaminated areas, professional caretaking of contaminated injuries, on-site professional support) of the member states. The database includes data specified by the competent organizations on the assistance capabilities that could be provided by Hungary. The capabilities cover laboratories, measurement devices and expertise in the field of radiation protection and nuclear technology. Decision on providing the assistance is specified in a case-by-case manner. The database is regularly updated.

The representatives of the National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene and the HAEA are involved in the revision of the document regulating the RANET network. The new version of the document is expected to be published in the beginning of 2011.

4.2.3 The National Nuclear Emergency Response Plan

The High-level Working Group of the Governmental Coordination Committee continuously performed its activity in 2010. In the frame of the work the review of the National Emergency Response Plan was commenced. The review aims at adopting the new ministerial responsibilities derived from the reorganization of the government structure, and at reasonably reducing the size of the document based on the experience gained from the development and application of the Plan. The issuance of methodical guidance series in connection with the Plan was continued; two guidelines were published in 2010: the "Organized assistance in response" and the "Local management of a radiological emergency". The legal background of the High-level Working Group was strengthened in 2010 by the promulgation of the above mentioned new decree.

4.2.4 International tenders

The European Commission called a tender (i.e. RESPEC, Radiological Emergency Support Project for the European Commission) that was first won by the HAEA in 2006; as recognition of the well accomplished work the HAEA won the tender for the next three years as well (until 2013). The professional support to be provided in the case of a nuclear emergency includes the provision of technical data of nuclear facilities, the assessment of the situation developed, the estimation of the radiological release, recommendations on the implementation of food ban related protective measures, as well as the public administration.

The European Commission called another tender for the organization of professional trainings in the field of nuclear emergency response, which was also won by HAEA. One week courses shall be organized in three subsequent years for the experts of the EU member states. The first course was held in September 2010, which was attended by 24 professionals from 17 countries. According to the univocal opinion of the participants the course was a high quality, fruitful event that was conducted in good spirit. These two tenders show the internationally acknowledged high level of the Hungarian and HAEA emergency preparedness.

4.2.5 Emergency response drills and exercises

On July 8, 2010 the HAEA Emergency Response Organization was activated in the frame of the RESPEC contract as the advisory body of the European Commission in the ECURIE level 3 exercise organized by the European Commission. The exercise was successfully completed, the HAEA was able to fulfil its advisory tasks and establish communication with the international organizations within the required time limit. The experience gained from the evaluation is fed back by the HAEA to the national and international emergency preparedness activity.

The regular annual full scope exercise of the Paks NPP was held on December 1, 2010 with the participation of the central, departmental and



The Ecurie-Level-3 exercise

regional organizations of the Hungarian Nuclear Emergency Response System. The participating bodies exercised their tasks according to the National Nuclear Emergency Response Plan; primarily the activation of the organization following an alert and the development of decision support recommendations regarding public protection; the operation and application of the MARATHON Terra communication system was also verified. This was the first time when the Nuclear Emergency Response Working Committee was set up in its new location (i.e. in the CERTA Training Centre). The exercise provided a good opportunity to strengthen the cooperation between the Working Committee and the HAEA Nuclear Emergency Response Organization and to improve the mutual understanding of their tasks. The pre-defined major objectives were accomplished. The exercise was successful; its conclusions will be fed back to the National Nuclear Emergency Response System.

Besides the exercises mentioned, the HAEA regularly initiated internal communication and alert drills according to the task specified in the annual exercise and training plan approved by the Governmental Coordination Committee. HAEA successfully took part in the international communication tests launched by the IAEA, the European Commission and the neighbouring countries.

The exercise of the northern counties in the basis of a severe accident scenario of the Mohovce NPP was cancelled because of the flood related tasks of the county defence committees and of the structural changes originated from local government elections.

4.3 Support activities to the regulatory tasks of the HAEA

4.3.1 Technical support organizations

It is an international expectation in the field of nuclear safety related regulatory activities to involve the Technical Support Organizations (TSOs) to support the regulatory work. On the ground of regular technical support programmes of the recent years a network of technical support organizations (TSO network) was established. The most relevant institutes of the network are the KFKI Atomic Energy Research institute, the Institute of Nuclear Techniques of the Budapest University of Technology and Economics, the NUBIKI Nuclear Safety Research Institute and the SOM System Ltd. Cooperation agreements were concluded with the Institute of Nuclear Techniques and the SOM System Ltd in 2010. In the field of radiation health and radiation protection the HAEA is supported by the National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene; in the field of safeguards, registration of radioactive sources, safe packaging and transport of nuclear and other radioactive materials the HAEA is supported by the Hungarian Academy of Sciences Institute of Isotopes. The majority of the more extensive tasks supporting the HAEA regulatory activities were accomplished by the above mentioned institutes; in addition, providing fast expert support in case if sudden tasks rise. The HAEA professionals were satisfied with them; their activity significantly contributed the high quality



Dr. József Rónaky director general of the HAEA and Dr. Attila Aszódi director of the Institute of Nuclear Techniques sign the cooperation agreement

level of the regulatory actions, and accordingly the safe operation of the nuclear facilities.

4.3.2 Technical support activities

The topics directly supporting the nuclear safety, nuclear and other radioactive material related regulatory activities of the HAEA represented relevant weight in the activity of 2010, such as:

- ◆ severe accident phenomena,
- ◆ nuclear emergency preparedness,
- ◆ analysis of operating processes,
- ◆ safety analyses, background documents of guidelines connecting to various volumes of the Nuclear Safety Code,
- ◆ safeguards related environmental analyses,
- ◆ tasks supporting the prevention of illicit trafficking of nuclear material.

Similar to previous years, the reports are directly applicable in the regulatory work, in significant portion as results of comprehensive concept of long-lasting research projects. The results of 2010 were summarized and presented by the lead institutes in the frame of TSO seminars traditionally organized at the HAEA.

4.3.3 Establishment of the Hungarian Nuclear Knowledge Management Database

At the initiation of the director general of the HAEA, following thorough negotiations conducted in 2009, the representative of the leading Hungarian nuclear organizations established the Hungarian Nuclear Knowledge Management Database System on June 22, 2010 by signing a joint cooperation agreement at the headquarters of the HAEA. The main objective of the system is to collect and maintain the Hungarian made documents of the expertise accumulated during the application of atomic energy for the future generations. This continuously updated common database facilitates the sharing of knowledge and information within the nuclear community.



Signature of the Operation Rules for the Hungarian Nuclear Knowledge Management Database

The code of conduct developed by the editorial committee was signed on December 15, 2010, and thus the administrative conditions for the operation of knowledge management database were established besides the technical provisions. Consequently; the ordinary use of the "common electronic repository" of the Hungarian nuclear community started in 2010.

4.4 Special authority activity of the HAEA

At the request of the South-Danubian Inspectorate for Environment, Nature and Water the HAEA issued special authority opinions in 2010 in connection with:

- ◆ preliminary impact assessment of the recuperation power plant intended to be constructed on the site of the Paks NPP,
- ◆ impact assessment of the arrangement of the shallow at Baráka (between 1522.0 and 1521.5 rkm) in order to improve the navigability of the Danube,
- ◆ environmental impact assessment of the arrangement of the narrows at Paks (between (1530.5 and 1530.0 rkm) in order to improve the navigability of the Danube.

5. EXTERNAL RELATIONS

Today, peaceful application of nuclear energy can be realized only with involvement of international organizations, with their active partnership. Nevertheless, external relations are not restricted to foreign partners; the HAEA has good partnership with many Hungarian organizations as well.

5.1 International relations

Cooperation aiming at enhancement of safety and security belongs to the competence of many international organizations; whilst the bilateral agreements provide significant forums for the inevitable change of experience in this field. Among the organizations keeping contact with the HAEA the most important ones are the European Atomic Energy Community, the International Atomic Energy Agency, and the OECD Nuclear Energy Agency.

5.1.1 The International Atomic Energy Agency



The Hungarian experts undertake significant role in the work of the IAEA and its professional bodies. Four Hungarian experts participate in the committees making the preparation and commenting of safety regulations. Several Hungarian professionals play active role in cooperation programmes organized by the IAEA in the field of nuclear safety, safeguards and nuclear emergency preparedness.

Together with the IAEA, the HAEA and the domestic institutes organized 12 international events; they hosted 44 foreign fellowship students and scientific visitors. One Hungarian expert had the chance to take part in an IAEA fellowship abroad. The IAEA experts, at the request of the Republic of Hungary twice supported the domestic professional organizations with their opinion; 60 Hungarian professionals were invited by the IAEA in order to held presentations or participate in consultations.

In 2010 HAEA, together with other organizations, organized three international conferences; and at the request of the CTBTO and the EC it organized two training courses.

In 2010 the IAEA invited HAEA experts to participate in international expert review teams: in relation to safety and readiness review at the Serbian Vinča Research Institute, the review of the security and physical protection system in Cuba, in the review of the self-assessment and the performance of the national nuclear safety authorities in China, Ukraine and Iran.

The IAEA launched a project, initiated and financed by Norway, to facilitate the preparation of the nuclear safety inspectors of the Iranian nuclear authority responsible for the supervision of the safety of the Buser Nuclear Power Plant. The Authorities of the VVER operating countries were requested to participate in the preliminary preparation of the Iranian inspectors at the headquarters of the IAEA and to continue the training and knowledge sharing on their own territories by involving the trainees into the daily regulatory routine. Seven Iranian professionals were trained in 2010, who participated in a practical training on the regulatory supervision of the Paks Nuclear Power Plant both at the headquarters of the HAEA and at the Paks NPP.

The 54th general conference of the IAEA was held between September 20 and 24 in Vienna. Hungary was represented by the professionals of the HAEA and the Ministry of Foreign Affairs in the general conference; the Hungarian delegation was led by the director general of the HAEA.

5.1.2 OECD Nuclear Energy Agency

The Hungarian professional institutes, under the coordination of the HAEA, actively and fruitfully participate in the activities of the OECD NEA. The Director General of the HAEA is a member of its Board. Hungarian professionals are involved into the seven permanent committees organizing the professional activities as well as to the subordinate working groups. It is the acknowledgement of the HAEA's international prestige that the Director General of the HAEA is an elected member of the Bureau that is the core management within the Board.

5.1.3 Multilateral international instruments

Twelve multilateral interstate or intergovernmental treaties, conventions and agreements were concluded so far in the field of peaceful use of nuclear energy with the participation of Hungary. The tasks derived from the domestic execution of those instruments listed below are fulfilled by the HAEA.

The member states of the Nuclear Safety Convention, which is effective from 1996, undertook the responsibility for the maintenance and improvement of the international accepted level of nuclear safety and for preparing a national report every three years. The member states discuss the national reports on view conferences. The fifth Hungarian National Report was made in the frame of the convention, which was submitted to the International Atomic Energy Agency by the HAEA. The report, in both English and Hungarian can be accessed through the website of the HAEA.

5.1.4 Bilateral relations

Wide scope cooperation has developed with the nuclear safety authorities, nuclear power plants and research organizations of the neighbouring countries in the frame of regional programmes organized by the IAEA and the European Union. The HAEA maintains close professional connection with the partner authorities of those countries (Czech Republic, Finland, Slovakia, Russian Federation) operating VVER type

reactors. In the frame of the mutual information exchange agreements the HAEA cooperates with the authorities of the Czech Republic, Slovakia, United States of America, Russian Federation and Romania. Direct connection has developed with the Ministry of Environmental Protection of the Federal Republic of Germany in the frame of scientific-technical cooperation. The bilateral intergovernmental agreements concluded in the field of peaceful application of nuclear energy mean additional bilateral relations; the execution thereof is the duty of the HAEA.

In order to improve effectiveness, instead of bilateral meetings, the Czech, Slovakian, Slovenian and Hungarian nuclear safety authorities regularly discuss the actual issues of common interest in quadrilateral meetings already for seven years. The due quadrilateral meeting of the safety authorities were held in Balatonfüred on June 14-15, 2010.

The bilateral meeting between Austria and Hungary in the field of nuclear safety and radiation protection was organized in Hernstein (Austria) on November 22-23, 2010.

5.1.5 Other regulatory relations

The HAEA is an active member of the Western European Nuclear Regulators' Association (WENRA), and the Forum uniting nuclear authorities of countries operating VVER type nuclear power plants (VVER Regulators Forum). The HAEA is a member of the Regulatory Assistance Management Group (RAMG) coordinating those PHARE projects that support the preparation of central and eastern European countries in the field of nuclear safety, and it is a founding member of the organization of Countries with Small Nuclear Programme, the establishment of which was initiated by the Swiss nuclear authority (i.e. Network of Regulators of Countries with Small Nuclear Programmes - NERS).

In 2010 two WENRA meetings were organized: in Helsinki on March 25-26 and in Bratislava on November 9-10. The most important WENRA result of 2010 is the establishment of the safety objectives for newbuild nuclear units, which document was prepared by its Reactor Safety Working Group. The essence of this document

was summarized in a WENRA statement that can be read in Hungarian on the HAEA webpage.

The association of the regulatory bodies of countries operating VVER type nuclear reactors (i.e. the VVER Forum) discusses the regulatory related issues in various working groups. The representatives of the VVER countries, at the invitation of the HAEA, met in Balatonfüred on June 16-17, 2010. Many presentations were held on the nuclear power plant related experience by the representatives of Bulgaria, Czech Republic, Finland, India, Iran, China, Hungary, Russia, Armenia, Slovakia, Ukraine, as well as of the International Atomic Energy Agency and the German GRS Institute. The Working Groups discussing special topics gave summaries about their recent activities.

5.2 Tasks from the Euratom Treaty

Hungary, as a member state of the European Union is a member of the European Atomic Energy Community. The (primarily professional and coordination) tasks serving for the implementation of the Euratom Treaty is fulfilled by the HAEA. The effective cooperation in the frame of the Euratom was flawless also in 2010. It is supported that those mechanisms and procedures had been developed in the recent years that ensure the successful presentation of the Hungarian interests.

5.2.1 Preparation for the EU Presidency in 2011



The presidency staff of the HAEA will lead the Working Party on Atomic Questions (WPAQ). The

operative programme of the Hungarian Presidency was discussed several times between the Presidency Troika (i.e. Spain, Belgium and Hungary) and the European Commission as well as the General Secretariat of the Council. The preparation of the presidency diary with the dates of the planned meetings and the potential topics to be discussed was finished by the end of November.

In the frame of the obligatory trainings in relation to the preparation for the EU presidency the staff

members passed the foreign language trainings; they regularly visited the professional presentation and seminars held in connection with the fulfilment of presidency tasks.

5.2.2 Participation in Euratom working groups and expert committees

Committee working to the Council of the European Union

The most important decision support working group in the nuclear field is the Working Party on Atomic Questions; it discussed several topics in 2010 and supported the acceptance, inter alia, of the following documents:

- ◆ Council conclusions on the safety of medical isotope production in the European Union;
- ◆ Council resolution on the issuance of the guidelines to the Commission regarding the discussion on the cooperation agreement to be established in the field of peaceful use of atomic energy between the European Atomic Energy Commission and the government of the South African Republic;
- ◆ Council decision on the discussion of the cooperation agreement to be established in the field of peaceful use of atomic energy between the European Atomic Energy Community and the government of Australia;
- ◆ Euratom report to the 5th review conference of the Convention on Nuclear Safety (CNS).

At the request of the Commission the council working groups started the discussion on the guideline on safe management of radioactive wastes and spent fuels in November.

Committees to the European Commission

- ◆ ENSREG – European Nuclear Safety Regulators' Group supports the development of a common position in the field of nuclear safety and management of spent nuclear fuels and radioactive waste management, and facilitates the harmonization, coordination and cooperation

between national nuclear authorities. Hungary is represented in the group by the director general and one of his deputies.

- ◆ INSC – Instrument for Nuclear Safety Cooperation supports the development of a high level nuclear safety and radiation protection in third countries, and the application of fruitful and efficient safeguards systems. One expert of the HAEA participates in the work of INSC.

In the frame of the INSC the European Commission initiated a project to support the Egyptian authority regarding the site selection project of a new nuclear power plant. The EC established a consortium with the participation of the HAEA. The HAEA experts participated in the review of the fundamental conditions for emergency planning, the quality management system connecting to the site selection, and in consultations on the relevant documentation

Additionally, the HAEA experts participates in the work of Expert Groups established based on the

- ◆ Article 31 basic safety standards;
- ◆ Articles 35-36 environmental radiation control and monitoring system;
- ◆ Article 37 radioactive waste disposal of the Euratom Treaty.

The HAEA delegates a member to the Advisory Committee of the Euratom Supply Agency.

5.2.3 Participation in the European Coordination Interdepartmental Committee

The European Coordination Interdepartmental Committee (ECIC) was established for coordination of the governmental activity in connection with the European Union. A deputy

director general of the HAEA participated in the work of the Committee. In nuclear area the elaboration and harmonization of discussion standpoints is performed by the expert group on "Atomic questions" that is led by a head of department of the HAEA.

In 2010 the Interdepartmental Committee discussed and approved the discussion standpoints elaborated by the participation of the HAEA in those topics that are discussed by the Working Group on Atomic Questions. In the nuclear field the HAEA performed the tasks in connection with the preliminary opinioning of the technical legislations prior to their promulgation.

During the year, and especially in its second half, the reorganized ECIC prepared intensively for the fulfilment of the EU presidency related tasks. The timeline of meetings and seminars was decided, as well as the priorities, which were then harmonized with the Commission and the General Secretary of the Council.

5.2.4 Participation in the Euratom 7th research and development frame programme

The total amount allocated for the implementation of the 2007-2011 7th research frame programme is 2,751 million EUR. The distribution of this amount among the various research fields is as follows:

Research in the field of fusion energy	1,947 million euro
Fission and radiation protection	287 million euro
Nuclear activities of the Joint Research Centre	517 million euro

The National Contact Point of the frame programme in the field of fission and radiation protection, and the Joint Research Centre is a department head of the HAEA.

6. PUBLIC INFORMATION

The HAEA maintained regular relation with the representatives of the media also in 2010. Three Newsletters were published and the leading officials of the HAEA gave numerous interviews to journalists. The majority of the interviews were in connection to the Hungarian position on nuclear energy, new units to be constructed at the site of the Paks Nuclear Power Plant and international nuclear-related events. In order to inform the professional public, the HAEA published a report on its 2010 activity.

The Hungarian Atomic Energy Authority continuously strives for providing as comprehensive as possible information to the professional community and the public on issues related to the safety of nuclear applications. Since October 2009 the HAEA has regularly published the decisions of the nuclear safety regulator, indicating their date of issuance, concise subject and effect. The list of decisions can be found on the HAEA website (www.haea.gov.hu).

This was the second time when the Hungarian Association of Nuclear Journalists, in cooperation with the HAEA, organized the Nuclear Journalist

Academy. The Academy provides two year training in order to support the journalists in their objective and professional communication regarding the peaceful use of atomic energy. In 2010 the journalists got thorough information on the activities of the HAEA, and they visited the National "Frédéric Joliot-Curie" Research Institute for Radiobiology and Radiohygiene, the Paks Nuclear Power Plant, the Bábaapáti National Radioactive Waste Repository, the National Oncology Institute, the Mohovce Nuclear Power Plant and the MAVIR Hungarian Transmission System Operator Company.

Primary and secondary school teachers of natural science subjects visited the HAEA in February 24, 2010, where they heard a presentation on the activities of the HAEA and visited the CERTA Crisis Centre.

The HAEA, together with the TIT Studio Association, the Károly Eszterházy College and the ATOMKI, organized a public information conference on "About atomic energy to everyone" in Eger on May 20, and in Debrecen on November 17. Around 600 persons attended the conferences.



Visit of media representatives in the National Oncology Institute



Open house at the HAEA

In the frame of the days of cultural heritage, the HAEA had an open house for the sixth time in 2010. The public was invited to the office building and could obtain information on the various activities of the HAEA in the frame of presentations, exhibitions. About 180 people used the opportunity to visit the modern decision support centre of the Hungarian emergency preparedness, the Centre for Emergency Response and Training Centre (CERTA), where the emergency operation of the centre could be followed through a simulated nuclear accident.

It was concluded in the frame of the statistical analysis of the websites of ministries and background institutes that the HAEA complied most the legal requirements for public information among the background and supervised institutes in 2010.

The HAEA requested the TNS public opinion polling company to conduct an assessment how

known and recognized the activities of the HAEA are. Three fourth of the asked persons are aware of the fundamental task of the HAEA; two thirds of the public think that the HAEA reliably supervises the operation of the nuclear power plant and other nuclear facilities; the HAEA regulatory activities were evaluated as 4.07 on a five grade scale based on the relevant answers.

In order to inform the international public, the HAEA prepared English summaries on the latest results of nuclear safety in Hungary in May and November 2010. The papers provide up-to-date information on the changes of energy policy, legal and regulatory framework, latest results of the nuclear safety of Paks Nuclear Power Plant (i.e. its extension with new unit(s), service lifetime extension, power uprating, etc.), and on significant events with regard to nuclear installations and nuclear emergency preparedness. These documents can be downloaded from the HAEA website.

