REPORT

on the Implementation of Council Directive 2009/71/Euratom of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations

August 2014

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A. INTRODUCTION

A.1 Preparation, structure and content of the Report

Directive 2009/71/Euratom establishing a Community framework for the nuclear safety of nuclear installations (the 'Directive') was promulgated in the *Official Journal of the European Union* on 25 June 2009. In order to meet the obligation defined in Article 9(1) of the Directive, Member States are required to draft a report on the implementation of the individual articles of the Directive (the 'Report') and to submit it to the European Commission.

This Report was prepared by the Hungarian Atomic Energy Authority (the 'HAEA') in compliance with its responsibility set forth in Section 1(1)(f) of Government Decree No 112 of 4 July 2011 on the responsibilities of the Hungarian Atomic Energy Authority associated with its European Union and international obligations relating to nuclear energy, the designation of expert authorities participating in the regulatory proceedings of the HAEA, the amounts of fines that may be imposed and the scientific council assisting the work of the HAEA.

In accordance with the guideline prepared by the European Nuclear Regulators Group (ENSREG) applicable to the form and structure of the Report, this Report has two chapters.

Chapter A is the introduction to the Report, in which the Hungarian nuclear installations defined in Article 3 of the Directive are identified and briefly presented. In addition, it describes the general policy relating to the application of nuclear energy in Hungary as well as the main characteristics of the structure and content of the Report.

Chapter B presents, in the order of the articles of the Directive, the appearance of the obligations set forth in them in Hungarian legislation and their actual performance.

With regard to its content, the Report is based on the following documents:

- the Fifth National Report prepared under the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management;
- the Sixth National Report prepared within the Framework of the Convention on Nuclear Safety;

– the report for Parliament and the Government on the safety of the application of nuclear energy in Hungary in 2013;
– the Final Safety Report on Units 1 to 4 of the MVM Paks Nuclear Power Plant.

In addition to the items listed, the findings reached during the self-assessment carried out by the HAEA as preparations for the international peer review prescribed in Article 9(3) of the Directive (integrated official review carried out by the International Atomic Energy Agency) were also taken into consideration for the compilation of this Report.

A.2 Nuclear installations

The most important nuclear installations subject to the Directive are nuclear reactors using nuclear fuel (materials capable of self-sustaining nuclear chain reaction) and installations for the storage of spent fuel. The following nuclear installations operate in Hungary in 2014:

- Paks Nuclear Power Plant (MVM Paksi Atomerőmű Zrt. [MVM Nuclear Power Plant Ltd.]);
- Interim Spent Fuel Storage Facility (Radioaktív Hulladékokat Kezelő Közhasznú Nonprofit Korlátolt Felelősségű Társaság, Radioactive Waste Management Not-for-profit Limited Liability Company);
- Budapest Research Reactor (Centre for Energy Research of the Hungarian Academy of Sciences);
- Training Reactor (Nuclear Technology Institute of the Budapest University of Technology and Economics).

A.2.1 Paks Nuclear Power Plant

The Paks Nuclear Power Plant comprises four units (with a total capacity of 2 000 MWe), which entered into service between 1983 and 1987 and are in good technical condition. The approval of the 20-year service life extension of the units of the power plant is currently under way.

The current operating licences of the units have the following expiry dates:

– Paks Nuclear Power Plant, Unit 1: 31 December 2032 (its service life extension has been completed),

– Paks Nuclear Power Plant, Unit 2: 31 December 2014 (its service life extension is under way),

– Paks Nuclear Power Plant, Unit 3: 31 December 2016

– Paks Nuclear Power Plant, Unit 4: 31 December 2017

MVM Paksi Atomerőmű Zrt. is a State-owned business association. More than 99.9% of its shares are held by MVM Magyar Villamos Művek Zrt. [MVM Hungarian Electricity Ltd.] vested with authority by the State, the remainder by municipalities.

Main technical parameters of the reactor units of the Paks Nuclear Power Plant

Reactor type	Pressurized-water, water-cooled, water-moderated power reactor, type No: VVER-440/V-213
Thermal capacity of the reactor	1485 MW
Electrical capacity of a unit	500 MW
Number of primary circuits per unit	6
Total volume of primary circuit	237 m^3
Pressure in primary circuit	123 bar
Average temperature of primary coolant	284 ± 2°C
Height and diameter of reactor vessel	11.8 m and 4.27 m
Average enrichment of fuel	2.4%–4.2%
Fuel quantity per reactor	42 tonnes of uranium in 349 fuel cartridges
Number of turbo-machine groups per reactor	2
Rated pressure of secondary circuit main steam line	43.15 bar

MVM Paksi Atomerőmű Zrt. operates four VVER-440/V-213 pressurized-water units: the moderator of the reactors and the primary coolant are light water. The reactor has six cooling loops, and each one is connected to a steam generator. Each unit is supplied with a localisation tower, operating on the principle of bubble condensing, connected to hermetic compartments for handling any breakdowns caused by pipe ruptures. In these towers, trays filled with water containing boric acid are layered one above the other, completed with air traps. This system of hermetic compartments and localising towers makes up the containment for the reactors.

Each unit is installed with three active safety systems operated by diesel generators in the event of breakdown situations. These systems are supplemented by passive systems. Two wet steam turbines operate in each unit. According to the original plans, the rated thermal capacity was 1 375 MW/unit, and the rated electric capacity was 440 MW/unit. As a result of the capacity upgrading programme carried out between 2006 and 2009, the thermal capacity of each unit has increased to 1 485 MW, the electric power to 500 MW, in each unit.

The designers of the power plant chose a twin unit design. The turbine hall is common for the four units, and the reactor halls each shared by the two units enable the common use of high value maintenance equipment between the units. At the same time, with regard their main equipment and safety systems, the units are essentially independent of each other. One exception is the safety cooling water system, where the pressure line from the pumps to the expansion tank is shared by two units.

Taking advantage of a common site and the adjacent location of the units, the supply systems were designed to be shared by the whole power plant.

A.2.2 Interim Spent Fuel Storage Facility

The facility is responsible for the storage of spent fuel cartridges from the Paks Nuclear Power Plant for an interim period of 50 years. In order to store the spent fuel cartridges, a modular type dry facility operates next to the site of the Paks Nuclear Power Plant. In accordance with the regulations, the architectural and mechanical solutions guarantee the safety of the staff working in the facility and its vicinity under both normal operating and breakdown conditions. The site of the Interim Spent Fuel Storage Facility is located within a restricted zone of 3 km surrounding the Paks Nuclear Power Plant, and there is a restricted airspace of 7 000 feet (2 133 m) above the ground for aviation purposes.

The licence holder of the Interim Spent Fuel Storage Facility is Radioaktív Hulladékokat Kezelő Közhasznú Nonprofit Kft.

The first module comprising three chambers of the installation, which is able to provide storage for the cartridges for at least 50 years, and an accessory building were constructed by 1997. Afterwards, two modules, each comprising four chambers, were delivered in 2000 and 2003, then the construction of a phase comprising another five chambers was completed in 2007. After this, the installation was further expanded to the east. Chambers Nos 17 to 20 of the Interim Spent Fuel Storage Facility were completed in 2012. These chambers increased its storage capacity from 450 to 527 cartridges, thus, at present, the facility is suitable for accommodating a total of 9 308 cartridges. Simultaneously with the operation of the facility, its storage capacity is continuously expanded as required by MVM Paksi Atomerőmű Zrt. Taking into account the assumed service life of the nuclear power plant extended by 20 years and the quantity of spent fuel produced annually, the construction of a total of 36 chambers can be reckoned with.

The facility is an aboveground building in which the fuel cartridges are individually placed into vertical, thick-walled, hermetically closed steel tubes. The almost 2-metre thick reinforced concrete chamber around the storage tubes provide suitable shielding against radioactive radiation. Storage is carried out in dry conditions, and the residual heat generated is removed by a cooling system based on the natural draught effect of air. Thus, cooling is not expected to stop even as a result of an electrical fault or other technical failures. Filtered cooling air flows between the storage tubes, therefore, it cannot get into direct contact with the cartridges. A neutral gas environment (nitrogen) is provided in the storage tubes, the pressure of which is continuously monitored.

A structurally separate unit adjacent to the first storage module is the reception building. This part of the Interim Spent Fuel Storage Facility houses the equipment required for the container and cartridge handling operations preceding the placement of the cartridges in the storage tubes. The reception building also houses supply and process rooms, ventilation systems, and health care installations required for the operating personnel and monitoring equipment.

A.2.3 Budapest Research Reactor

The Budapest Research Reactor operated by the Centre for Energy Research of the Hungarian Academy of Sciences (previously known as the KFKI Atomic Energy Research Institute) was commissioned in 1959. After commissioning, two

significant refurbishments were carried out: during the first one, the capacity of the reactor was increased from 2 MW to 10 MW, then its general overhaul was carried out between 1986 and 1993.

In 2003, on the basis of the results of a nuclear safety review, the authority granted a licence for the continued operation of the installation and the performance of the activities stated in its Final Safety Report. At present, 14 large pieces of equipment operate around the reactor. The Instrument Centre of the Budapest Research Reactor is responsible for utilising the large equipment around the reactor for scientific purposes.

Technical data of the reactor:

- thermal tank-type reactor, the tank is made of aluminium alloy;
- coolant and moderator: light water (the reflector is beryllium);
- rated thermal capacity: 10 MW.

The reactor is dual-purpose equipment:

- firstly, it serves as a high-performance (high-flux) neutron source for basic and applied research. Material structure research required for the service life test of the reactor vessels of the nuclear power plant and neutron radiographic and activation analytical research are also carried out here. The cold neutron source commissioned in 2000 significantly increased the use of the reactor for scientific purposes.
- secondly, for the production of radioactive isotopes – primarily for medical and diagnostic purposes – through the irradiation of suitable target materials.

The operating cycles and the annual operating time were designed to be 40 days and 3800 hours, respectively. The equipment and systems originally dimensioned for 20 MW provide higher safety if operated at an output of 10 MW.

A.2.4 Training Reactor of the Nuclear Technology Institute of the Budapest University of Technology and Economics

The reactor operated by the Nuclear Technology Institute of the Budapest University of Technology and Economics has been serving education and research since 1971. The current operating licence of the Training Reactor is valid until 30 June 2017.

The Training Reactor is the first reactor to be designed and constructed only by Hungarian engineers. Its construction was made possible by R&D performed on

critical systems and the experience obtained during the operation and use of a research reactor with a capacity of 2 MW.

The reactor became critical for the first time on 20 May 1971. Its licence at the time permitted a thermal capacity of 10 kW. In line with increased demand and using domestic development results, the control system was modified in 1979, and the maximum capacity of the reactor was increased by one order of magnitude (i.e., to 100 kW) in the summer of 1980.

The training reactor has two purposes: education and scientific research in the fields of nuclear technology and power engineering. Due to this, efforts were made primarily to design multi-purpose reactor equipment. The completion of this task is ensured by the complex nature of the experimental equipment and laboratories associated with the reactor. Due to the universal nature of the education and research programme, the flexibility of the reactor is a fundamental requirement: quick-start and power changes several times a day are natural requirements. In addition, maximum safety was an essential criterion for both the first design and subsequent modifications, since:

– the reactor is located on campus, next to teaching buildings, in a densely populated area of Budapest;

– students with no practice are trained on the reactor and the experimental equipment connected to it.

Technical data of the reactor:

- pool-type reactor;
- coolant and moderator: light water (the reflector is water and graphite);
- fuel: EK-10 (made in Russia), enrichment is 10%;
- rated thermal capacity: 100 kW;
- In the active zone and the reflector, vertical irradiation channels allow the irradiation of the samples.

A.3 National Security Strategy

On the basis of the enumeration of values and interests and an analysis of the security environment, Government Resolution No 1035 of 21 February 2012 on the **National Security Strategy of Hungary** identifies the national goals, tasks and comprehensive governance instruments by which Hungary can enforce its national security interests in the international political and security system.

Pursuant to Section 34(b) of the Resolution:

‘We pay special attention to further increase and continuously monitor nuclear safety and security in Hungary and support international efforts, which strengthen its global framework.’

The fundamental safety goals and principles applicable to nuclear safety, **which comply with the IAEA Safety Principles, are set forth in Section 4/A** of Act CXVI of 1996 **(Atomic Energy Act).**

A.4 National Energy Policy

On 17 June 2008, Parliament passed a resolution on the energy policy for the period between 2008 and 2020. The resolution specifies the combined achievement of the security of supply, competitiveness and sustainability as primary long-term objectives; meeting the energy demand of the economy and the population safely, economically and by taking into account the environmental considerations; strengthening competition in the energy market; as well as facilitating the implementation of the Community objectives set in the European Union as the most important tasks.

The resolution, in its second part, requests the Government to take the necessary governmental steps for implementing the energy policy. Of the 20 tasks listed, two deal with the utilisation of nuclear energy. Accordingly, the Government:

- **‘shall commence the preparatory work for making a decision on new nuclear power plant capacities. In due course, the Government shall table, after thorough professional, environmental protection and public debate, its proposals on the need and conditions of the project and the type and establishment of the power plant before Parliament’;**
- ‘shall ensure the appropriate execution and implementation of programmes aimed at the final disposal of nuclear wastes and the provision of the necessary conditions’.

On 3 October 2011, the Hungarian Parliament adopted the **National Energy Strategy** setting directions for development and operation in the coming two decades, with an outlook to 2050. Under the strategy, in order to facilitate the achievement of its very long-term economic and environmental goals, **the State wishes to maintain the about 40 % share of nuclear energy in domestic electricity production in the long term.**

In order to achieve the above goals, on 14 January 2014, **the Government of Hungary and the Government of the Russian Federation entered into a**

Convention on cooperation in the area of the use of nuclear energy for peaceful purposes. This was promulgated in Act II of 2014.

It is stated in the Convention, among other things, that the parties cooperate in the maintenance and development of the capacity of the Paks power plant, including **the design, construction, commissioning and decommissioning of two new units, Units 5 and 6, with a VVER (water-cooled, water-moderated) reactor, with a minimum installed capacity of 1 000 MW for both units,** to replace the capacities of Units 1 to 4 to be shut down in the future.

A.4.1 MVM Paks II. Atomerőmű Fejlesztő Zártkörűen Működő Részvénytársaság (MVM Paks II Nuclear Power Plant Development Private Limited Company)

On 26 July 2012, the MVM Group established MVM Paks II. Atomerőmű Fejlesztő Zrt. [MVM Paks II Nuclear Power Plant Development Ltd.] for the preparation of the establishment of new nuclear power plant unit(s) at the Paks site. The purpose of the project company is to carry on and perform the most important tasks of the Lévai Project established after the resolution of Parliament, whereby the establishment of the new units can be achieved.

Until this goal is achieved, the most important initial tasks to be carried out under the project include setting a framework for future establishment, including setting the technical and commercial conditions. In addition, technical analyses need to be carried out on the environmental impacts and on the required system-level balancing and network development needs. Obtaining site, environmental, water and establishment licences as well as the assessment of regional economic and social impacts are also important additional elements of the project work.

First phase of site licence applications for the new units

MVM Paks II. Zrt. submitted an application for the approval of the site assessment and evaluation programme of the new unit(s) to the HAEA on 11 April 2014.

In assessing the submitted licence application (the ‘programme’), the HAEA examines the test and evaluation methods and theoretical considerations set forth in the programme from the point of view whether they are suitable and sufficient for determining the site parameters, assessing the suitability of the site and, through them, providing grounds for the site licence application.

The evaluation of the programme by the authority includes the following technical areas:

- geographical assessment and evaluation of the site,
- assessment and evaluation of human-caused hazards,
- earth sciences assessment and evaluation,
- geotechnical (e.g. earthquakes) and hydrogeological (subsurface waters) assessment and evaluation,
- hydrological (e.g. floods) assessment and evaluation,
- meteorological assessment and evaluation,
- establishment of data required for the evaluation of the transport of radioactive releases and the planning of accident response measures.

Licensing is under way in the summer of 2014. The HAEA held a public hearing on the matter in Paks on 5 May 2014. Government Decree No 112 of 4 July 2011 on the designation of expert authorities participating in the procedures of the Hungarian Atomic Energy Authority specifies the regional mining authority with jurisdiction for the area of the Hungarian Office for Mining and Geology (the 'MBFH') as participating expert authority in the site licensing procedure and, prior to it, the procedure aimed at site assessment and the approval of its evaluation programme. It issued its consent as expert authority on 14 July 2014.

In addition to assessing the application, the HAEA wishes to ascertain, as part of an inspection, too, the existence of the management system prescribed by law and the competence of the applicant to assume the licence holder's role. If the licence holder's answers given to the request of the supplementation of missing information, its submitted documents and the result of the inspection confirm the fulfilment of the nuclear safety requirements, the authority may make a decision on the application of the merits.

B. IMPLEMENTATION OF THE PROVISIONS OF THE DIRECTIVE BROKEN DOWN BY ARTICLE

B. 1 Legislative, regulatory and organisational framework (Article 4)

B.1.1 (Article 4(1))

Article 4 (1) Member States shall establish and maintain a national legislative, regulatory and organisational framework (hereinafter referred to as the 'national framework') for nuclear safety of nuclear installations that allocates responsibilities and provides for coordination between relevant state bodies. The national framework shall establish responsibilities for:

An important precondition of the safe application of nuclear energy is the operation of an efficient regulatory system. The fundamental objective of the supervision of the application of nuclear energy by the authority is to protect humans and the environment from the adverse effects of ionising radiation.

This fundamental safety objective applies to all installations and all activities performed with ionising radiation as well as to all phases of the service life of installations, nuclear or other radioactive materials, and equipment emitting ionising radiation but not containing any radioactive material.

The application of nuclear energy is regulated at the highest level in Hungary, in Acts. Act CXVI of 1996 on atomic energy (the 'Atomic Energy Act') declares that the direction and supervision of the safe application of nuclear energy are the responsibilities of the Government. According to the provisions of the Act, nuclear energy may be applied only in the manner defined by law and under continuous supervision by the authority, and safety takes precedence over any other consideration. The Atomic Energy Act established a modern, multilevel legislative and regulatory system, and the guidelines describing possible methods for implementing the Government decrees and ministerial decrees published as implementation and for meeting the requirements set forth in legislation conform to the international regulations and requirements for the safe and secure application of nuclear energy only for peaceful purposes. An important element of the Hungarian regulatory system is the legislation promulgating international conventions made with the participation of Hungary in order to enhance safety. The provisions of the Atomic Energy Act make it mandatory to regularly review and update the legislation and the safety requirements, taking into consideration state-of-the-art science and technology and international experiences.

The Hungarian Parliament passed the Atomic Energy Act in December 1996, which entered into force on 1 July 1997. This Act takes into consideration the experience gained by the authority and the operator during the construction and operation of the nuclear power plant as well as technical development and obligations arising from international conventions. The main criterion and cornerstone of this is reflected in the paragraph whereby '[i]n the application of nuclear energy, safety shall take precedence over all other aspects'. The drafters of the Atomic Energy Act also used the recommendations of the European Union, the International Atomic Energy Agency and the OECD Nuclear Energy Agency. The main characteristics of the Atomic Energy Act are as follows:

- it declares the overriding priority of safety;
- the direction and supervision of the safe application of nuclear energy are the responsibilities of the Government, and the Government provides for the performance of these tasks via the nuclear energy supervisory body (Hungarian Atomic Energy Authority [the 'HAEA']) and the ministers concerned;
- it determines the regulatory competence of the nuclear energy supervisory body and the Minister responsible for health care in the licensing procedures;
- it determines and distributes the competence and responsibilities of other administrative bodies participating in the application of nuclear energy;
- it declares the organisational and financial independence of the licensing and supervisory authorities;
- it establishes a general framework for the use of human resources, education, and R&D;
- it establishes the liability of the licence holder for any nuclear damage and establishes the extent of its liability for damages in accordance with the amended Vienna Convention;
- it allows the nuclear energy supervisory body to oblige the licence holder to pay a fine for infringing any legislation or safety regulation and for failing to comply with the specifications of standards obligatorily applicable on the basis of the orders of the authority or an individual regulatory licence issued on the basis of the foregoing;
- it prescribes the Government to designate a body responsible for the final disposal of radioactive wastes, the interim disposal of spent fuel assemblies, the closing of the nuclear fuel cycle and the decommissioning of nuclear installations, since solving these issues constitutes a national interest;

- it prescribes the establishment of a Central Nuclear Fund, the only purpose of which is to finance the final disposal of radioactive wastes, the interim disposal of spent fuel assemblies, the closing of the nuclear fuel cycle and the decommissioning of nuclear installations;
- it prescribes the obligation of providing physical protection, the fact that the user of nuclear energy is obliged to prevent unauthorised persons from gaining access to nuclear or other radioactive materials in its possession and installations and equipment overseen by it and used for the application of nuclear energy; and to prevent their release from oversight and their possible use for unauthorised purposes; and specifies that the licence holder has to provide for guarding the nuclear installations and radioactive waste repositories by armed security guards.

Two points that are more or less specific Hungarian features are included in the Atomic Energy Act:

- pursuant to the Atomic Energy Act, installations managing radioactive wastes (e.g. waste repositories) do not qualify as nuclear installations;
- on the basis of the amendment of the Atomic Energy Act and the related implementation decrees as of 1 July 2014 and in the case of radioactive waste repositories, the regulatory system of safety issues has been in line with that of nuclear installations; as part of this, the HAEA has become the main licensing and supervisory authority also in the case of such installations.

As regards radiation protection, the Atomic Energy Act distributes the regulatory tasks between several Ministers. The radiohygiene regulatory tasks fall within the competence of the Minister responsible for health care. The regulatory tasks relating to the technical aspects of radiation protection as well as the management and storage of spent fuel assemblies at nuclear installations fall within the competence of the nuclear energy supervisory body (HAEA). The protection of the environment and, within that, the regulation of emissions, is the competence of the Minister responsible for environmental protection. Issues relating to the radioactivity of the soil and the vegetation are assigned to the Minister responsible for land management.

The Government provides for the implementation of Government functions set forth in the Atomic Energy Act via the HAEA and the Ministers specified above. In fact, the Atomic Energy Act does not specify a ‘regulatory authority’, but authorises the Ministers to carry out regulation on behalf of the State.

With regard to the application of nuclear energy, the Atomic Energy Act specifies means and instruments. Such means and instruments are the

establishment of a statutory system, the definition of a safety supervisory system and spheres of responsibilities, the assignment of resources, the establishment of appropriate management systems and the identification of priorities.

In order to achieve the fundamental safety objective:

(a) the Government prepares efficient legal regulation and establishes and maintains an independent body or bodies overseeing the use of nuclear energy for peaceful purposes;

(b) both the bodies overseeing safety and the organisations performing activities entailing risks establish and maintain a management committed to the fundamental safety objective and an efficient management system;

(c) primary responsibility for safety lies with the person or organisation that is the licence holder of the installation or activity causing an increase in the risk arising from radiation;

(d) it is a general condition of the application of nuclear energy that the social advantages provided by it should be greater than the risks threatening the persons staying on the premises of the nuclear installation, the population, the environment and material assets;

(e) the user of nuclear energy provides reasonable protection to humans and the environment from radiation in accordance with Section 4(1);

(f) the user of nuclear energy optimises the highest level of safety that is reasonably attainable by meeting the safety requirements under Section 4(3)(c);

(g) the user of nuclear energy uses its best endeavours to ensure that the risk of injuring any person does not exceed the acceptable level;

(h) the user of nuclear energy is obliged to use its best endeavours to prevent nuclear or radiation accidents and to mitigate their consequences;

(i) the competent bodies and the user of nuclear energy prepare for the occurrence of incidents that infringe nuclear or radiation safety and are important from the point of view of safety and security, and for carrying out the required measures;

(j) the protective measures taken for mitigating risks remaining from previous radiation or radiation not regulated by the authority have to be warranted and proportional to the risks.

The statutory provisions divided the fundamental regulatory tasks relating to the application of nuclear energy between the Director—General of the HAEA and the Minister responsible for health care.

The HEAE is responsible for carrying out regulatory tasks relating to the safe application of nuclear energy, in particular, the safety and security of nuclear installations, the security of nuclear and other radioactive materials, and the prevention of the proliferation of nuclear and radiological weapons. The minister responsible for health care carries out, via the National Chief Medical Officer's Office of the National Public Health and Medical Officer Service, the regulatory tasks relating to radiation protection and the safety of radioactive materials and equipment containing them, equipment and installations emitting ionising radiation (the 'radioactive equipment and installations') as well as radioactive wastes and waste repositories.

The ministries concerned and central administrative bodies participate in carrying out the regulatory tasks under the Atomic Energy Act in accordance with their own technical areas: the Ministry of the Interior, the Ministry of Human Resources, the Ministry of Justice, the Ministry for National Development and the Ministry for Rural Development. The Authority of Defence Industry and Export Control operating within the Hungarian Trade Licensing Office issues export and import permits for nuclear and nuclear dual use products in consultation with the HAEA. The Ministry of Defence carries out the licensing and verification tasks relating to the safety and security of the application of nuclear energy within the national defence sector in the manner defined in a separate law.

The most important institutions in terms of the application of nuclear energy and their roles:

B.1.1-1 Hungarian Atomic Energy Authority

The HAEA is a government office. Its fundamental responsibilities and competence are specified in the Atomic Energy Act and Government Decree No 112 of 4 July 2011 on the responsibilities of the HAEA associated with its European Union and international obligations relating to nuclear energy, the designation of expert authorities participating in the regulatory proceedings of the Hungarian Atomic Energy Authority, the amounts of fines that may be imposed and the scientific council assisting the work of the Hungarian Atomic Energy Authority. The procedures of the HAEA are specified in Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and the related regulatory activities, Government Decree No 190 of 19 September 2011 on physical protection within the application of nuclear energy and the related licensing, reporting and verification system, and Decree No 7 of 6 March 2007 of the Minister of Justice and Law Enforcement on the rules for the registration and monitoring of nuclear materials.

The HAEA has had a certified quality management system since January 2013. Certification is valid for three years. In the period between certification and re-certification audits, an external organisation engaged by the HAEA carries out a supervisory audit every year in accordance with Hungarian standard MSZ EN ISO 9001:2009 (ISO 9001:2008). After three years of operation, the system is reviewed as part of re-certification audits.

The HAEA does not support and does not oppose to the application of nuclear energy. Pursuant to Section 17(1) of the Atomic Energy Act, its fundamental responsibility is to 'coordinate and carry out regulatory tasks relating to the safe application of nuclear energy, in particular, to the safety of nuclear materials and installations and to nuclear accident response, and information provision activities relating thereto'. Pursuant to Section 16(1) of the Atomic Energy Act, the HAEA 'shall keep a central register of radioactive materials, including nuclear materials separately'; Section 62(2) specifies the HAEA as the management agency of the Fund. The responsibilities of the HAEA (and the police) relating to nuclear security are specified in Section 30(2) of the Atomic Energy Act.

The competence of the HAEA extends, in addition to regulatory tasks, to the evaluation and coordination of R&D activities relating to the application of nuclear energy as well as to the financing of the technical support activities serving monitoring by the authority. Its responsibilities include the coordination of international cooperation relating to the application of nuclear energy, the preparation of intergovernmental conventions and the organisation of their implementation, and organisation of the cooperation with international organisations.

In accordance with the Atomic Energy Act, the work of the HAEA is also supported by the Scientific Council, the members of which are nationally recognised authorities in their fields. Taking into account advanced scientific results, the Scientific Council takes a position on the most important issues in principle and R&D issues relating to nuclear safety, the prevention of the proliferation of nuclear weapons, the technical issues of radiation protection and the prevention of nuclear accidents.

One of the most important international requirements for the safe application of nuclear energy is that the authority responsible for overseeing its application for peaceful purposes, safety and security should be independent of the interests of producers, owners and distributors as well as of the administrative bodies with interest and counter-interest in the application of nuclear energy. In Hungary, several provisions of the Atomic Energy Act and its implementation decrees guarantee that the international requirements for independence are met.

The HAEA is overseen by the Minister for National Development irrespective of his or her portfolio. The decisions of the HAEA may not be altered or annulled in any supervisory powers. The HAEA has the authorisations and powers required for the performance of its tasks. If warranted, the HAEA is entitled to impose fines and to withdraw or restrict licences.

As of 1 July 2014, the HAEA has also been overseeing radioactive waste repositories providing for the interim storage or final disposal of radioactive wastes (Government Decree No 155 of 30 June 2014).

B.1.1-2 National Chief Medical Officer's Office of the National Public Health and Medical Officer Service ('ÁNTSZ OTH')

The radiation protection (radiohygiene) authorities are responsible for issuing licences for ionising radiation sources, their use at workplaces and radioactive workplaces, and the comprehensive monitoring (supervision) of their safety. Pursuant to Government Decree No 323 of 27 December 2010 on the National Public Health and Medical Officer Service, the performance of public health administration tasks and the designation of pharmaceutical administration bodies, the regulatory tasks relating to workplace radiation protection and radiohygiene were carried in 2013 by radiohygiene subcentres belonging to the public health administration bodies of the metropolitan and county government offices. The professional direction of the subcentres is carried out by the ÁNTSZ OTH by involving the National 'Frédéric Joliot-Curie' Research Institute for Radiobiology and Radiohygiene ('OSSKI').

The OSSKI is engaged in professional and methodological, scientific research, training, in-service training, registration, coordination and expert activities providing grounds for the decision of the authorities in a number of areas, and the National Radiohygiene Emergency Service and the National Personal Dosimetry Service also operate under the umbrella of the OSSKI.

B.1.1-3 National Police Headquarters ('ORFK')

Pursuant to Section 31 of Government Decree No 190 of 19 September 2011 on physical protection and the related licensing, reporting and monitoring system within the application of nuclear energy issued pursuant to Section 67(q) and (r) of the Atomic Energy Act, the ORFK participates as an expert authority in the regulatory licensing procedure of the establishment, operation and modification of the physical protection system of nuclear installations, interim and final repositories of radioactive wastes, as well as nuclear materials, radioactive radiation sources and radioactive wastes.

B.1.1-4 National Directorate-General for Disaster Management of the Ministry of the Interior

The National Nuclear Accident Response System is integral with the general disaster management system established as the implementation of Act CXXVIII of 2011 on disaster management and the amendment of certain Acts related thereto. Its central direction is performed by the Disaster Management Coordination Inter-ministerial Committee (the 'KKB'). Pursuant to Section 22 of Act CXVI of 1996 on atomic energy, the Minister responsible for protection against disasters carries out the fire protection, civil defence and nuclear accident response tasks relating to the application of nuclear energy.

The operative working body of the KKB is the KKB National Emergency Management Centre, which consists of a general working group and protection Work Committees performing technical tasks. The Nuclear Protection Work Committee is operated by the central administration body responsible for protection against disasters, the National Directorate-General for Disaster Management of the Ministry of the Interior.

Pursuant to Section 5 of Government Decree No 112 of 4 July 2011 on the responsibilities of the Hungarian Atomic Energy Authority associated with its European Union and international obligations relating to nuclear energy, the designation of expert authorities participating in the regulatory proceedings of the Hungarian Atomic Energy Authority, the amounts of fines that may be imposed and the scientific council assisting the work of the Hungarian Atomic Energy Authority issued pursuant to Section 67(a) and (i) of the Atomic Energy Act, the BM OKF participates as an expert authority in certain regulatory licensing procedures in the special issues of the examination of compliance with fire and disaster management requirements for the establishment and design of nuclear installations; the disaster management and civil defence assessment of the Nuclear Accident Response Action Plan of nuclear installations; the prevention of emergencies, the elimination or mitigation of consequences; as well as the existence and provision of the personal and material conditions of efficient intervention.

The expert authorities participating in the regulatory proceedings of the HAEA are set forth in Annex 1 to Government Decree No 112 of 4 July 2011, and the expert authorities participating in its regulatory proceedings associated with radioactive waste repositories, in Annex 2 hereto.

Hungary is a party to a number of international conventions. Two of these must be pointed out from the point of view of the Directive, which Hungary has signed and ratified:

1. Act I of 1997 on the promulgation of the Convention on Nuclear Safety under the auspices of the International Atomic Energy Agency concluded in Vienna on 20 September 1994 (CNS);
2. Act LXXVI of 2001 on the promulgation of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (JC) under the auspices of the International Atomic Energy Agency.

In addition, the following legislation is worth mentioning:

1. Decree-Law No 12 of 1970 on the promulgation of the Treaty on the Non-Proliferation of Nuclear Weapons adopted on 12 June 1968 at Session XXII of the General Assembly of the United Nations;
2. Decree-Law No 28 of 1972 on the promulgation of the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof adopted on 7 December 1970 at Session XXV of the General Assembly of the United Nations;
3. Decree-Law No 8 of 1987 on the promulgation of the Convention on the Physical Protection of Nuclear Materials;
4. Act LXII of 2008 on the promulgation of the amendment, signed at a diplomatic conference organised by the International Atomic Energy Agency (IAEA) on 8 July 2005, of the Convention on the Physical Protection of Nuclear Materials adopted under the auspices of the IAEA in 1979 and promulgated in Decree-Law No 8 of 1987;
5. Act L of 1999 on the confirmation and promulgation by the Republic of Hungary of the Comprehensive Nuclear-Test-Ban Treaty adopted on 10 September 1996 by the General Assembly of the UN;

   Act LXXXII of 2006 on the promulgation of the safeguards agreement on the implementation of Article III(1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons and protocol and the protocol additional to the agreement;
6. Act XX of 2007 on the promulgation of the International Convention for the Suppression of Acts of Nuclear Terrorism;

7. Decree No 24 of 7 February 1990 of the Council of Ministers on the promulgation of the International Convention on Civil Liability for Nuclear Damage adopted in Vienna on 21 May 1963.

B. 1.2 (Article 4(1)(a))

(a) the adoption of national nuclear safety requirements. The determination on how they are adopted and through which instrument they are applied rests with the competence of the Member States.

The Atomic Energy Act prescribes at the level of principle that nuclear energy may be applied only in the manner specified by law and under supervision by the authorities, and the conditions of its application are set by the competent authorities by continuously taking into account the legislation and the results of science and technology.

The safety requirements for the application of nuclear energy at nuclear installations are set forth in the Nuclear Safety Code volumes issued as annexes to Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and related activities:

1. Nuclear Safety Regulatory Proceedings for Nuclear Installations;
2. Management Systems of Nuclear Installations;
3. Requirements for Nuclear Power Plant Design;
4. Operation of Nuclear Power Plants;
5. Design and Operation of Research Reactors;
6. Interim Storage of Spent Nuclear Fuel;
7. Assessment and Evaluation of Nuclear Installation Sites;
8. Decommissioning of Nuclear Installations;
9. Establishment Requirements for a New Nuclear Installation;
10. Definitions of Nuclear Safety Codes.

The codes authorise the Director-General of the HAEA to issue guidelines on the method of implementation of the requirements. Further detailed regulation of tasks arising from the implementation of legal requirements is provided by the sets of internal procedures prepared by the authority and the system of internal rules and instructions developed and operated at the licence holder.

These nuclear safety requirements have to be regularly reviewed and updated by taking into account scientific results and international experience (Section 5

of the Atomic Energy Act). This provision is supplemented by Government Decree No 118 of 2011 by expressly prescribing the review of the Nuclear Safety Codes by taking into account scientific results and domestic and international experience at least every five years and their updating, as required (Section 3(7)).

The Atomic Energy Act does not specify a 'regulatory authority', but authorises the Ministers to carry out regulation on behalf of the State; at the same time, it prescribes for the HAEA to monitor the enforcement of the legislation falling within its competence and, on the basis of the relevant findings, to initiate measures and to make proposals for the amendment or passage of legislation, as required, and to participate in the administrative consultation of the drafts of these proposals (Section 8(4) of the Atomic Energy Act).

The fundamentals of the legal system of Hungary are specified by the Fundamental Law of Hungary. The Fundamental Law represents the main pillars of legislation, because it identifies the bodies competent for legislation and defines the laws. The Legislation Act (Act CXXX of 2010), which lays down the fundamental requirements for, and process of, legislation, was passed for the implementation of Article T of the Fundamental Law. Additional sub-rules are set forth in the Rules of Procedure of Parliament (Resolution of Parliament No 10 of 24 February 2014), the Rules of Procedure of the Government (Government Resolution No 1144 of 7 July 2010), and public participation on the preparation of legislation is regulated by Act CXXXI of 2010.

Based on these, the following can be stated **in summary:**

The Nuclear Safety Requirements constitute an annex to Government Decree No 118 of 2010, thus they qualify as legislation together with the Atomic Energy Act. Pursuant to the Atomic Energy Act, if the HAEA is of the opinion that it is necessary to amend the Nuclear Safety Requirements or to possibly draft new requirements on par with the Atomic Energy Act, it will submit a relevant proposal to the Minister overseeing the HAEA. As a member of the Government, the Minister may submit a proposal to the Government. Prior to the relevant session of the Government, the proposal undergoes professional, administrative and public consultations in accordance with the Rules of Procedure of the Government and the Act on the above-mentioned public consultation. Depending on whether it is necessary to amend the Nuclear Safety Codes or to draft a new rule on par with the Atomic Energy Act, the Government, within its authority to pass decrees, either amends the Government decree or tables an Act amendment proposal before Parliament. The legislative procedure at Parliament takes place in accordance with the Rules of Procedure of Parliament.

However, there is not and may not be any difference between procedures aimed at establishing new rules or amending existing ones.

B.1.3 (Article 4(1)(b))

(b) the provision of a system of licensing and prohibition of operation of nuclear installations without a licence;

The basic principles of the licensing procedure of nuclear installations and the authorities taking part in licensing procedures are regulated by the Atomic Energy Act (Chapter III, Supervision by the authorities).

Government Decree No 118 of 2011 is based on this, which lays down additional statutory requirements for licensing and approval (Chapter III, Supervision by the authorities). The various licence types are specified in Volume 1 of the Nuclear Safety Code (Nuclear Safety Regulatory Proceedings for Nuclear Installations). The approval of the physical protection of nuclear power plants is regulated by Government Decree No 190 of 2011, which also falls within the competence of the HAEA pursuant to the Atomic Energy Act.

The commencement of activities for the preparation of the establishment of a new nuclear power plant or a new nuclear power plant unit(s) requires the consent in principle of Parliament, whereas the acquisition of the ownership of an operating nuclear power plant and the transfer of its use on any grounds requires the consent in principle of the Government.

Pursuant to the legislation in force, regulatory licences are required for all phases of the service life of the nuclear power plant (site selection, establishment, commissioning, operation and decommissioning). Furthermore, all modifications at the level of the installation or safety-related equipment may also be carried out only in possession of licenses. Within the licensing procedures, the considerations of the technical areas are enforced in the position statements of the expert authorities designated in legislation; taking them into consideration is mandatory for the authority.

When a new nuclear installation is established, the precondition for launching the licensing procedure is the existence of an environmental permit.

The licences issued by the HAEA are valid for definite periods; if the requirements are fulfilled, they may be extended at request. Pursuant to Act CXL of 2004, the decisions and orders of the HAEA may only be contested in court proceedings.

A Periodic Safety Review to be carried out every 10 years is a regular reassessment of the safety of nuclear installations under a comprehensive, pre-

decided programme. A decision on the further validity and conditions of the operating licence is made during the above review.

According to the new regulation promulgated in 2011 (an annex to Government Decree No 118 of 11 July 2011), the safety zone of the nuclear installation also have to be reviewed when the Periodic Safety Review is carried out. This provision ensures a review at least every 10 years even if there has been no external reason for it. The boundaries of the safety zone can be reviewed at any time from the point of view of external impacts on the nuclear installation, e.g. prior to the licensing of other industrial facilities in its vicinity.

A licence from the nuclear safety authority is required for the following activities relating to the nuclear installation (Section 17 of Government Decree No 118 of 2011):

(a) site assessment and evaluation (site assessment and evaluation licence);

(b) establishment of the characteristics and suitability of the site (site licence);

(c) establishment and expansion (establishment licence);

(d) commissioning (commissioning licence);

(e) operation and operation beyond its design lifetime (operating licence);

(f) modification (modification licence);

(g) final taking out of service (final shut-down licence);

(h) decommissioning (decommissioning licence);

(i) in the case of a nuclear power plant unit, re-start after its overhaul (start-up permit); and

(j) the construction, demolition and commencement of use of its structures and building components and the lifts of buildings.

(1a) During the establishment life cycle phase of nuclear installations, a nuclear safety licence is required for the:

(a) manufacture (manufacturing licence);

(b) procurement (procurement licence);

(c) installation (installation licence); and

(d) operation (operating licence)

of the nuclear system and system component.

(2) The nuclear safety authority approves the Nuclear Accident Response Action Plan on the first occasion as part of the commissioning licensing procedure, and its modification, as part of a modification licensing procedure.

(3) A licence from the nuclear safety authority is required for carrying out any modification of the nuclear installation or its system, system component, structure, building component, organisational structure, management system or document important for nuclear safety.

Pursuant to Government Decree No 190 of 2011, a regulatory licence is required for:

- the implementation of the physical protection system of the nuclear installation in accordance with the physical protection plan;
- the extension of the licence for the physical protection system of the nuclear installation;
- the transport of nuclear materials, radioactive radiation sources and radioactive wastes;
- and the modification of the approved physical protection system if the modification requires the modification of the physical protection system.

The application of nuclear energy is subject to a licence in Hungary (Section 33 of the Atomic Energy Act). The licence may be granted for a definite or indefinite period and subject to certain conditions. The licence granted for a definite period may be extended on application.

The licence ceases to be in force if:

(a) the period defined in it expires or the conditions set in the licence are not met;

(b) the supervisory body, the HAEA, may withdraw the licence or may limit the term of the licence of the nuclear equipment or nuclear installation within the permitted period stated in the licence if it has established a change in the safety conditions serving as a basis for granting the licence or the rate of risks.

The HAEA is obliged to regularly verify compliance with the provisions of the licence and the nuclear safety codes and the safety of the application of nuclear energy, and to take or initiate measures forthwith in order to eliminate any irregularities detected (Section 15 of the Atomic Energy Act). Pursuant to this provision and Section 9 of the Atomic Energy Act, the HAEA may conduct an enforcement procedure. In addition, a number of facts relating to the application of nuclear energy have been included in the Criminal Code. For the purposes of the implementation of the Directive, the most important ones are the ‘abuse of the operation of a nuclear installation’ (Section 264/A) and the ‘abuse of the application of nuclear energy’ (Section 264/B). This means that a person who operates a nuclear installation without or at variance with the licence defined by law or mislead the body or person entitled to decision-making

in order to obtain the licence defined by law for the use of nuclear energy commits a felony. If a criminal offence defined in the Criminal Code is carried out, the HAEA has no discretionary power and is bound by the obligation to file a criminal report. After this, the investigating authority decides on indictment and, in the case of indictment, the court decides, if necessary, on the measure to be taken (Criminal Proceedings Act).

B.1.4 (Article 4(1)(c))

(c) the provision of a system of nuclear safety supervision;

Nuclear energy may only be applied in the manner defined by law and under supervision by the authorities. The conditions of the safe application of nuclear energy are set by the competent authorities by continuously taking into consideration the legislation and the results of science and technology (Section 5(2) of the Atomic Energy Act).

The nuclear installation, the radioactive waste facility and the interim radioactive waste facility are under continuous supervision by the authorities. The continuous regulatory supervision activity of the nuclear energy supervisory body is carried out as follows:

(a) by licensing and approving decisions within individual procedures of the authorities;

(b) by the regular analysis and evaluation of the activities of the licence holder as well as the safety situation of the nuclear facility, the radioactive waste facility and the interim radioactive waste facility;

(c) by carrying out a continuous inspection programme (continuous presence of the authority at the sites of the nuclear power plant and the Interim Spent Fuel Storage Facility via its Branch Office);

(d) by conducting an enforcement procedure ensuring the practical enforcement of the statutory requirements and the orders of the authorities based on them (Section 9(2) of the Atomic Energy Act).

Chapter III of the Atomic Energy Act details the rules of the practical implementation of supervision by the authorities. It describes, among other things, the general procedures of licensing and inspections by the authorities, specifies the competence of the HAEA and other bodies concerned in the application of nuclear energy, the rate of the supervision fee payable by nuclear installations, and the requirements for technical experts acting in respect of the application of nuclear energy.

The operation of the licensing and the inspection system of the authorities have already been detailed in the previous section (Article 4(1)(b)). Article 5(3)(c) sets forth detailed rules for inspection and evaluation. A description of the enforcement activities is given under Article 5(3)(d) and the following section.

It is also stipulated in the Atomic Energy Act (Section 7(7)) that a scientific consulting body assists the work of the HAEA in order to ensure the provision of scientific grounds for Government, regulatory and nuclear accident response measures relating to the safe application of nuclear energy.

The HAEA finances the technical support activities serving inspection by the authorities from grants provided from the central State budget (Section 40(10) and Section 17(2)(23) of the Atomic Energy Act).

B.1.5 (Article 4(1)(d))

(d) enforcement actions, including suspension of operation and modification or revocation of a licence.

The general legal basis for the enforcement procedures relating to the application of nuclear energy is provided by Act CXL of 2004 on the general rules of public administrative procedures ('Act CXL of 2004'), Act CXVI of 1996 (Atomic Energy Act) and Act C of 2012 on the Criminal Code (the 'Criminal Code').

Pursuant to the Atomic Energy Act, one of the forms of implementation of the regulatory supervision activities of the HAEA as nuclear energy supervisory body is conducting enforcement procedures ensuring the practical enforcement of the statutory requirements and the orders of the authorities based on them.

The Atomic Energy Act also specifies the means and instruments that may be applied during the enforcement procedures:

- withdrawal of licences and limitation of the term of licences;
- withdrawal and amendment of modification licences (establishment of conditions);
- imposition of fines.

In addition, it also includes the possibility of withdrawing the licences of persons employed within the application of nuclear energy, which is enforceable by the police.

In respect of nuclear installations, the provisions of the Atomic Energy Act are supplemented with additional sub-rules. Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and the related regulatory activities details the enforcement procedures of the HAEA in

terms of the significance of the infringed regulations as regards safety. It describes the means of enforcement in accordance with the principle of gradual approach (Section 24):

1. written warning and corrective action to be carried by a deadline;
2. prescription of additional conditions;
3. restriction or stoppage of the activity or withdrawal of the licence; and
4. imposition of fines.

This Government Decree requires the licence holder to investigate the identified variations, to take the necessary measures and to prevent their repeated occurrence (Section 24).

The HAEA may also impose a fine, which is allowed, firstly, by the Atomic Energy Act and, secondly, Act CXL of 2004. The provisions of the Acts are supplemented by the rules of Government Decree No 112 of 4 July 2011 on the responsibilities of the HAEA, the minimum and maximum amounts that may be imposed, and what considerations the HAEA has to take into account when imposing the fine. The principle of gradual approach is applied at all levels of the regulation (Section 3).

For the establishment of the amount of the fine, attention has to be paid to all circumstances of the case, in particular, to ascertain:

(a) whether any unusual incident, nuclear emergency or nuclear damage has occurred;

(b) the weight of the infringement of the requirements and regulations;

(c) whether the rules have been breached repeatedly;

(d) whether any conduct causing the breach of rules or omission is imputable to a party;

(e) whether the party in breach of the rules or omitting its obligations has engaged in any damage-mitigating conduct facilitating the measures taken to eliminate the condition caused by such party.

The amount of the fine that may be imposed (Section 2) is minimum HUF 50 000 but maximum HUF 3 000 000; while minimum HUF 50 000 but maximum HUF 50 000 000 against the licence holder of the Nuclear Power Plant. It is minimum HUF 50 000 but maximum HUF 5 000 000 against the licence holders of other nuclear installations.

It is minimum HUF 50 000 but maximum HUF 5 000 000 against the licence holders of other nuclear installations for the breach of the obligation described

in the legislation providing for the application of safeguards under the Treaty on the Non-Proliferation of Nuclear Weapons.

The fine as an instrument of sanctioning may also be imposed independently and repeatedly, but may also be accompanied by other sanctions.

If a criminal offence defined in the Criminal Code is carried out, the HAEA has no discretionary power and is bound by the obligation to file a criminal report. After this, the investigating authority decides on indictment and, in the case of indictment, the court decides, if necessary, on the measure to be taken (Criminal Proceedings Act).

B.1.6 (Article 4(2))

(2) Member States shall ensure that the national framework is maintained and improved when appropriate, taking into account operating experience, insights gained from safety analyses for operating nuclear installations, development of technology and results of safety research, when available and relevant.

In the area of legislation, the Atomic Energy Act prescribes the regular updating of the nuclear safety requirements ('Section 5(1) The nuclear safety requirements for the application of nuclear energy shall be regularly reviewed and updated, taking into consideration scientific results and international experience.')

Pursuant to Section 3(7) of Government Decree No 118 of 2011: 'The Nuclear Safety Codes shall be reviewed at least every five years and shall be updated, as required, by taking into consideration scientific results and domestic and international experience. The guidelines shall be reviewed at the intervals specified by the nuclear safety authority or, on the recommendation of the licence holders, urgently.'

During the updating procedure conducted every five years, in addition to the Hungarian operating experience and research results, the current recommendations of the IAEA, the WENRA and the OCED NEA, the available experiences of the VVER Regulatory Forum and other countries as well as, urgently, the conclusions of the European stress test are also taken into consideration.

In its budget, the authority has a separate fund for financing research required for continuously monitoring the development of science and technology.

The licence holders of nuclear installations are obliged to submit regular (quarterly, annual, etc.) reports to the authority on the major events and operating experience of the reporting period (the annual report of the nuclear

power plant includes an operational campaign report, an ageing management report, a maintenance efficiency monitoring report, a radiation protection report, etc. separately).

In addition, the licence holder of every installation prepares a safety evaluation report at regular intervals.

Breakdowns and other unplanned incidents occurring during operation may also result in an obligation to make the regulatory requirements more stringent.

On the basis of the foregoing, the authority may impose special regulations, which may be included in the updating of the Nuclear Safety Code during the five-year reviews.

The Periodic Safety Review to be carried out every 10 years is another possibility for taking into account Hungarian and international operating experience and monitoring the development level of science and technology; its results are reported to the authority by the licence holders. In its decision, the authority approves the development (modification) needs found by the licence holder and, if necessary, imposes additional orders itself.

B.2 Competent regulatory authority (Article 5)

B.2.1 (Article 5(1))

Article 5 (1) Member States shall establish and maintain a competent regulatory authority in the field of nuclear safety of nuclear installations.

Pursuant to the Atomic Energy Act, the role of competent authority in Hungary for nuclear installations under Article 3 of the Directive is filled by the HAEA. The HAEA is an organizationally and financially independent administrative body operating under the direction of the Government, vested with independent responsibilities and regulatory powers in the area of the application of nuclear energy for peaceful purposes. The Minister appointed by the Prime Minister (as at the closing of the Report, the Minister heading the Ministry for National Development) is responsible for oversight of the HAEA, irrespective of his or her portfolio (Section 8 of the Atomic Energy Act).

The HAEA, as a government office, may not be instructed in its responsibilities defined by law (Act XLIII of 2010).

The competence of the HAEA includes the nuclear safety licensing (at installation, system and system-component level) and inspection of nuclear installations; the regulatory licensing and inspection of the establishment, operation and modification of nuclear installations, interim and final radioactive waste repositories, and the physical protection systems of nuclear materials, radioactive radiation sources and radioactive wastes; the registration and monitoring of radioactive radiation sources and wastes; the licensing of the transport and packaging of the latter; development of a position in the capacity of expert authority in nuclear export and import licensing procedures; evaluation and coordination of R&D relating to the safety of the application of nuclear energy; performance of tasks relating to nuclear accident response within the site and falling within its competence; approval of the accident response action plans of nuclear installations; and maintenance of international relations (Section 17(2) of the Atomic Energy Act).

The regulations allow the authority, in every case where it does not have the required expertise, to involve experts (institutions, companies or even private persons) in its work. In order to provide a scientific background for the work of the authority, the HAEA has entered into TSO agreements with several scientific institutes and expert companies. Such agreements lay down cooperation, among other things, with the Centre for Energy Research of the Hungarian

Academy of Sciences, the Nuclear Technology Institute of the Budapest University of Technology and Economics, the Nuclear Safety Research Institute and SOM System Kft. [SOM System LLC] (Section 17(3) of the Atomic Energy Act).

In accordance with the Atomic Energy Act, the work of the HAEA is also supported by the Scientific Council, the members of which are nationally recognised authorities in their fields. The Scientific Council assists the work of the HAEA in order to ensure the provision of scientific grounds for Government, regulatory and nuclear accident response measures relating to the safe application of nuclear energy (Section 8(7) of the Atomic Energy Act).

The work of the authority was reviewed by the International Atomic Energy Agency mission on two occasions.

The organisational units directed by the Deputy Director-General for Nuclear Safety were as follows (Organisational and Operational Rules of the HAEA):

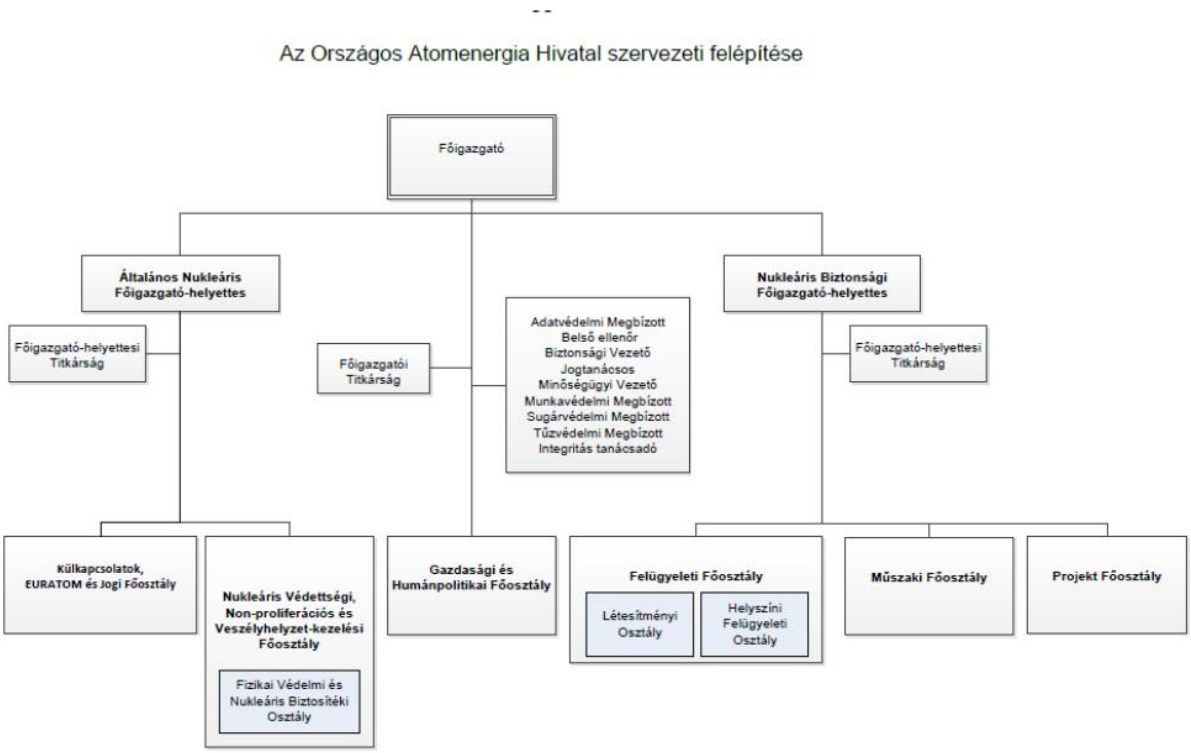
- Supervisory Division, which mainly performs licensing and inspection tasks defined by law in regulatory cases relating to the nuclear safety of nuclear installations and analyses the regular and incident reports of nuclear installations, and carries out investigations into the reasons for breakdown incidents and the safety evaluation of the activities of the operator; the On-site Supervision Department belonging to the Division provides for the performance of tasks relating to the nuclear power plant, which can be performed on site;
- The Technical Division, which supports the activities of the nuclear safety authority, directs the technical support activities for official oversight and the training system of the HAEA, and is responsible for strategic planning and self-assessment, the development of nuclear safety regulation and internal regulation;
- The Project Division is responsible for the preparation and coordination of projects and for making preparations for the supervision of the new nuclear power plant units by the authorities.

Other regulatory tasks of the HAEA, i.e. the tasks resulting from the safeguards agreement and the international convention on the physical protection of nuclear materials, licensing of nuclear exports and imports, the registration of radioactive materials, and maintenance of international relations, are essentially performed by the other organisational units of the authority directed by the Deputy Director-General for General Nuclear Issues.

The organisational units directed by the Deputy Director-General for General Nuclear Issues had the following high-priority tasks:

- performance of tasks relating to nuclear security and non-proliferation, the safety of transports, physical protection and the registration of radioactive materials, IT protection and nuclear emergency management (Nuclear Security, Non-proliferation and Emergency Management Division);
- representation of Hungary in the European Union, elaboration of positions for negotiations, performance and coordination of required legislation transposition tasks, including the analysis of radiation protection legislation as well as the organisation of foreign relations and the performance of professional and public information tasks (Foreign Relations, EURATOM and Legal Division).

Other competent administrative bodies take part in the authority's nuclear-safety licensing procedures as expert authorities, and the legislation also allows the involvement of professional experts (both institutions and individuals).



Az Országos Atomenergia Hivatal szervezeti felépítése	Organigram of the Hungarian Atomic Energy Authority
Főigazgató	Director-General
Általános Nukleáris Főigazgató-helyettes	Deputy Director-General for General Nuclear Issues
Főigazgató-helyettes Titkárság	Secretariat of the Deputy Director-General
Külkapcsolatok, EURATOM és Jogi Főosztály	Foreign Relations, EURATOM and Legal Division
Nukleáris Védettségi, Non-proliferációs és Veszélyhelyzet-kezelési Főosztály	Nuclear Security, Non-proliferation and Emergency Management Division
Fizikai Védelmi és Nukleáris Biztosítéki Osztály	Physical Protection and Nuclear Safeguards Department
Főigazgatói Titkárság	Secretariat of the Director-General
Adatvédelmi Megbízott Belső ellenőr	Data Protection Officer Internal Auditor

Biztonsági Vezető Jogtanácsos Minőségügyi Vezető Munkavédelmi Megbízott Sugárvédelmi Megbízott Tűzvédelmi Megbízott Integritás tanácsadó	Chief Security Officer Legal Advisor Quality Manager Industrial Safety Officer Radiation Protection Officer Fire Protection Officer Integrity Advisor
Gazdasági és Humánpolitikai Főosztály	Economic and Human Policy Division
Nukleáris Biztonsági Főigazgató-helyettes	Deputy Director-General for Nuclear Safety
Főigazgató-helyettesi Titkárság	Secretariat of the Deputy Director-General
Felügyeleti Főosztály	Supervisory Division
Létesítményi Osztály	Facilities Department
Helyszíni Felügyeleti Osztály	On-site Supervision Department
Műszaki Főosztály	Technical Division
Projekt Főosztály	Project Division

B.2.2 (Article 5(2))

Article 5

(2) Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion, or utilisation of nuclear energy, including electricity production, in order to ensure effective independence from undue influence in its regulatory decision making.

Even among its basic principles, the Atomic Energy Act lays down the responsibility of the Government to prepare effective legal regulation and to establish and maintain an independent body overseeing the use of nuclear energy for peaceful purposes against the fundamental safety objective, i.e. the protection of humans and the environment against the harmful effects of ionising radiation (Section 4/A of the Atomic Energy Act).

Regulatory functions mean licensing, inspection, enforcement and evaluation, and the tasks also include information provision and national/international coordination activities. The performance of the fundamental function requires it to be laid down in legislation that nuclear energy may only be applied as specified by legislation and subject to supervision by the authorities (Section 5(2) of the Atomic Energy Act).

The efficient performance of the functions and obligations requires the regulatory authority to have independence and institutional freedom in the organisational system of the Government. The HAEA is a government office (Act XLIII of 2010) and a central administrative agency established by an Act and operating under the direction of the Government (Section 8 of the Atomic Energy Act). The content elements of direction are foundation, transformation, dissolution and annual reporting obligation to the Government. Supervision over the HAEA is carried out by the Minister appointed by the Prime Minister, who makes legislation on issues falling within the responsibilities of the HAEA in his

or her above competence or makes proposals for passing Acts and Government decrees, in particular, on the basis of authorisation granted by an Act or Government decree, and represents the government office before the Government and Parliament. The content elements of supervision are the verification of legality, competence, efficiency and finances, the approval of the organisational and labour rules, while it may not be instructed in its responsibilities defined by law.

The HAEA is independent of any other body or organisation with interest in the application and development of nuclear energy (Section 5(3) of the Atomic Energy Act). The distinction between bodies and organisations includes both the organisational system of public and municipal administration and economic operators and non-governmental organisations. The HAEA is not responsible for the promotion of nuclear and other related technologies. Pursuant to the Atomic Energy Act, the fundamental responsibility of the HAEA is to coordinate and carry out regulatory tasks relating to the safe application of nuclear energy, in particular, the safety of nuclear materials and installations and nuclear accident response. The primary consideration of the HAEA is to enforce safety requirements. It has no interests in energy production or the security of energy supply; the Ministry for National Development and the Hungarian Energy and Public Utility Regulatory Authority (the 'MEKH') are responsible for performing these activities. It has no interests in industrial and technological developments and industrial production either. These ensure that decision-making is free from economic effects.

It is also important to note that regulatory cases affecting the nuclear safety of a nuclear installation, if there is a conflict of competences between the HAEA and another authority entitled to licensing or inspection, the nuclear energy supervisory body is entitled and obliged to act until the determination of such legal dispute (Government Decree No 118 of 2011).

Decisions on nuclear safety have to be made with due responsibility; a mistaken decision may have serious consequences. The Hungarian regulatory system has been established to allow the exclusion of the possibility of anyone influencing the decisions of the organisation responsible for nuclear safety or putting it under political or economic pressure. The nuclear laws in force and the institutional independence of the HAEA practically exclude the possibility of a conflict situation where one person can decide between favouring considerations suppressing nuclear safety (e.g., considerations of security of supply).

The decisions of the authority may not be altered or annulled in any supervisory powers (Section 8(1) of the Atomic Energy Act). The Director—General of the

HAEA exercises the employer's rights over the staff of the HAEA. The internal organisational structure of the regulatory authority has been established in proportion to the statutory competences and responsibilities associated with the activities relating to the installations and nuclear or other radioactive materials overseen by it (Section 17(2) of the Atomic Energy Act). Proportionality implies, firstly, the size of the regulatory authority following from its competence and responsibilities (headcount, infrastructure and financial resources) and, secondly, an organisation structure that corresponds to the competences and responsibilities.

The head of the HAEA is appointed and relieved by the Prime Minister on the recommendation of the Minister supervising it. The supervisory Minister submits his or her proposal to the Prime Minister via the Minister responsible for administrative quality policy and personnel policy. The Minister responsible for administrative quality policy and personnel policy may raise an objection within 15 days of receipt of the proposal, and may return the proposal to the Minister overseeing the government office or forwards it to the Prime Minister (Act XLIII of 2010).

The deputy head is appointed and relieved by the Minister overseeing the government office on the recommendation of the head of the HAEA. Simultaneously with making a recommendation to the Minister overseeing the government office, the head of the regulatory authority informs the administrative Secretary of State of the Ministry led by the Minister responsible for administrative quality policy and personnel policy about the person recommended to be the deputy head, who may raise an objection against the recommended person within 15 days of receipt of the information. A person objected to may not be appointed deputy head of the government office.

It is a further guarantee of institutional freedom that the Director-General of the HAEA exercises the employer's rights over the staff of the HAEA.

In accordance with the provisions of the Atomic Energy Act, the HAEA annually reports on its activities and submits its report on the safety of the application of nuclear energy in Hungary to the Government and Parliament, and informs the competent committee of Parliament (Act XLIII of 2010). The annual report is made public by the HAEA. In addition, the HAEA prepares an annual budget report every year, which is submitted by the supervisory Ministry to the Ministry for National Development and is discussed by Parliament under the General Appropriation Act.

B.2.3 (Article 5(3))

Article 5 (3) Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework described in Article 4(1) with due priority to safety. This includes the powers and resources to:

It is an important precondition of the safe application of nuclear energy to operate a regulatory system that has, in order to enforce the regulatory system, the authorisation, expertise and funds required for the performance of the tasks, and is independent of the bodies with interest or counter-interest in the utilisation of nuclear energy. Pursuant to the provisions of the Atomic Energy Act, the direction and supervision of the safe application of nuclear energy are the responsibilities of the Government. The Government provides for the implementation of Government functions set forth in the Act via the HAEA and the ministers concerned (Section 6(1) and (2) of the Atomic Energy Act).

The competence, authorisation for performing its public responsibilities and resources of the HAEA are defined in an Act. The government office status of the HAEA (Section 8(1) of the Atomic Energy Act) provides, in principle, an appropriate competence and resources.

The HAEA is supervised by the Minister for National Development based on appointment by the Government. In fact, the Minister oversees the lawful operation of the HAEA via the organisational units of the Ministry. Due to this model, the HAEA is independent in making its professional decisions, but, for example, it may participate in legislation and decision-making on financial and human resources to a limited extent.

Supervisory fees account for the greatest part, about 90 %, of the revenues of the HAEA, which are paid by nuclear installations being established and operated, and which are deemed a public debt that may be collected as taxes (Section 19(1) of the Atomic Energy Act).

An administration service fee is payable for the site assessment and evaluation procedure, licensing procedure, site licensing procedure, establishment licensing procedure as well as licensing procedures relating to the transport, carriage and packaging of radioactive materials conducted by the HAEA (Section 18/A of the Atomic Energy Act), which also forms part of the revenues of the HAEA.

Statutory-level regulation supports the budgetary financing of technical support activities serving inspections by the authority (Section 4(10) of the Atomic

Energy Act). Despite the statutory regulation, the HAEA finances the costs of the technical support activities from its own revenue, the supervisory fees, because budgetary subsidy accounts for about 5 % of the costs of the technical support activities. The HAEA uses its revenues for performing its public responsibilities (covering its operation); an exception to this is the revenues of the HAEA from fines, which the HAEA is entitled to impose if warranted, which are due to the central State budget (Section 15 of the Atomic Energy Act).

It is important to note, however, that the Government may cut some of the resources, because the section specifying that only the operation of the HAEA may be financed from the supervisory fee has been removed from the Atomic Energy Act since 2009. The Government has been free to withdraw the supervisory fee proceeds since then. The obligation of the HAEA to make payments to the central State budget can be mentioned as an example of financial constraints, which is prescribed in Section 10 of the Act on the 2014 central budget of Hungary. In addition, it applies to restrictions on procurements by the HAEA, which, impairing the independence of the HAEA and making the performance of its tasks more difficult, amended Government Resolution No 1982 of 29 December 2013 on the procurement of equipment by bodies financed from the State budget within the budget headings controlled by the Government by Government Resolution No 1025 of 30 January 2014, and ordered the prohibition of the procurement of equipment.)

In the central State budget, the HAEA is a body financed from the State budget, which is vested with rights under the budget headings and the budget of which forms an independent budget title within the budget heading of the Ministry lead by the Minister supervising it. With regard to the HAEA, the body controlling the heading and its head are the HAEA and its Director-General, respectively, pursuant to Section 1(1)(a) of Government Decree No 368 of 31 December 2011 on the implementation of the State Budget Act.

The HAEA makes a budget proposal annually on the basis of the expenses required for performing the responsibilities specified in its Deed of Foundation and its expected revenues, and its budget is always for one year. If, during annual operation, it incurs unexpected expenses in connection with the regulatory activities, it is possible to apply for additional funds, but this has not occurred in the past years.

Among planned revenues and expenses, all revenues and expenses that are related to the public responsibilities performed; are regularly incurred on the basis of experience or are expected to occur on an ad hoc basis; are based on legislation or a private law obligation; or are related to the utilisation of

equipment have to be planned (Section 16(2) of Government Decree No 368 of 31 December 2011).

After the Act on the central State budget has been passed, the authority establishes its revenues and expenses by issuing a treasury budget (Section 28(2) of Act CXCV of 2011).

An elementary budget has to be prepared on the details of the economic content of the revenues and expenses of the authority, which is approved by the Director—General. The treasury budget and the elementary budget have to match at the level of the priority budget estimates. The budget estimates may be modified or reallocated only for the given budget year (one-off) or permanently beyond the budget year (permanent). The budgetary revenues may also be collected over and above the revenue estimates.

On the whole, the financial resources are, in principle, also available to the HAEA, but their use may be limited by the Government, which has in fact taken advantage of this opportunity in practice.

In respect of the human resources of the HAEA, the Government also plays a decisive role, since the current maximum headcount of the HAEA (80) is laid down in Government Resolution No 1166 of 4 August 2010. It is to be noted, however, that the headcount of the HAEA has been continuously decreasing in the past years notwithstanding that a procedure aimed at the establishment of two new nuclear power plant units has been launched, and the regulatory proceedings relating to the assessment and evaluation of the site of the nuclear installation are already under way. It is important to note that the headcount of the HAEA permitted in the Government resolution is insufficient for performing the current (e.g. an increasing number of regulatory tasks and international reporting obligations) regulatory activities and the ones expected in the near future in relation to the new nuclear power plant units.

In addition to new professional challenges, the performance of the tasks is made increasingly difficult by the exodus of the workforce with nuclear and radiation safety qualifications, required for the regulatory work, from the public sector. There are only a few qualified specialists in this technical area, and despite the attractive, challenging tasks, the higher income offered by engineering offices (also preparing for the new tasks), expert institutions, the nuclear industry and international organisations attract the specialists in a way that cannot be offset.

Typically, the authority can hire only young fresh university graduates, who leave the authority later in possession of the expertise obtained during introductory training to a high standard and from their experienced colleagues as a result of salary differences in the two sectors. Today, the total headcount in

the organisational units of the authority dealing with nuclear installations is only 40.

The headcount of the authority may also be decreased by the new regulations affecting public administration and cutting costs, according to which the status of retired staff discontinues and no new staff may be hired to replace them.

Even if a new nuclear power plant unit is established in Hungary, the HAEA has to fully perform regulatory supervision over the existing four power-generating units along with the other three installations, which represents an increasing workload due to the regulatory supervision of the ageing of the equipment of the installations and the equipment replacements, modernisation projects and ageing management procedures due as a result.

The licensing of one or two new nuclear power-generating units requires additional specialists. The HAEA has made an assessment of the expertise and manpower required, which it has forwarded to the government bodies concerned.

The employees of the HAEA as government officials employed as part of a public service relationship are governed by the provisions of Act CXCIX of 2011 on public service officers.

In order to ensure competence, the HAEA employs only inspectors holding a higher education degree; 95% of its staff consists of specialists holding a higher education degree, 42% of which hold two or three degrees, and 16% of them hold scientific degrees or university doctorates. 78 % of all employees have passed one or more state language proficiency examinations. The HAEA continuously trains its employees through internal and external courses, presentations and trainings. The appropriate legal basis for this is provided by Section 4(8) of the Atomic Energy Act, whereby the safe application of nuclear energy has to be facilitated by the training and in-service training of specialists.

In addition to the Atomic Energy Act, Section 80(1) of Act CXCIX of 2011 on public service officers also declares that government officials are entitled to promotion and are obliged to participate in training, in-service training or retraining, including administrative management training, prescribed centrally or by an administrative body (the 'in-service training').

Government Decree No 273 of 28 September 2012 on the in-service training of public service officers details the conditions of the training system and prescribes that the in-service training obligation of government officials and public servants may be met by public service in-service training and professional in-service training programmes and by participation in management trainings (Section 9(1)). The in-service training of government officials and public servants

is carried out in in-service training periods. The length of the in-service training periods is four years (Section 10(2).

In compliance with the foregoing, the HAEA is planning its training programme for a four-year period as of 2014. The system has a central (government/ministerial) registry. According to the new system, all employees are required to collect credits in various trainings every year and pre-planned for four years. This means that each employee has to compile a customised training programme every year and, accordingly, has to make a plan for four years in advance to collect the required credits by the end of the period.

B.2.4 (Article 5(3)(a))

Article 5 (3) Competencies (a) require the licence holder to comply with national nuclear safety requirements and the terms of the relevant licence;

Within its competence, the HAEA verifies compliance with the provisions of legislation and the performance of the provisions of enforceable decisions (Section 88 of Act CXL of 2004).

The HAEA ascertains, by licensing and carrying out inspections, by evaluating and analysing data submitted and available to, and collected by, it in connection with licensing and inspections, as well as by interpreting expert opinions and certificates that the application of nuclear energy; the technical condition of nuclear installations, their systems and system components; the operation of nuclear installations; and the implementation of modifications meet the requirements set on the basis of acceptable risk levels and the provisions of the regulatory licences (Section 9(1) of the Atomic Energy Act).

The nuclear installation, the radioactive waste facility and the interim radioactive waste facility are under continuous supervision by the authority. The continuous regulatory supervision activities of the HAEA are carried out, among other things, by conducting inspections during continuous and specific procedures, implementing a monitoring programme relating to modification, and conducting enforcement procedures ensuring the practical enforcement of the statutory requirements and the orders of the authorities based on them. (Section 9(2) of the Atomic Energy Act).

For the regulatory supervision of the nuclear installation, i.e. the evaluation and analysis of the activities of the licence holder, the HAEA conducts comprehensive, exploratory and ad hoc inspections for verifying the

implementation of the provisions of the decisions of the authority and legislation and carrying out its enforcement procedures. Through its verification activities, the HAEA examines the operation of the licence holders from a variety of aspects. The HAEA ensures the continuity of its inspection activity by on-site supervision maintained at the site of the nuclear installation and the operation of a duty schedule (Section 12(3) of the Atomic Energy Act), and is not subject to any time limit.

The competence of the HAEA relating to inspections is laid down in the Atomic Energy Act (Section 17(2) of the Atomic Energy Act). The Atomic Energy Act also declares that the HAEA is entitled, within its competence, to conduct inspections at any entity using nuclear energy (Section 17(4) of the Atomic Energy Act).

Section 22(1) of the implementation decree of the Atomic Energy Act, Government Decree No 118 of 2011, prescribes that in order to maintain nuclear safety, the HAEA regularly and systematically verifies at the least the following in all phases of the life cycle of nuclear installations in the manner specified in Volume 1 of the Nuclear Safety Code:

(a) the nuclear installations and their systems, system components and structures meet the requirements set in the licences and legislation;

(b) the design, site assessment and evaluation, establishment, commissioning, operation, modification and decommissioning of the nuclear installation meet the nuclear safety requirements, the terms and conditions serving as a basis for the regulatory licences as well as the provisions of the licences; and

(c) the management system of the licence holder meets the requirements set in this Decree.

However, this Government Decree also stipulates that verification or inspection by the HAEA does not exempt the licence holder from the obligation to carry out its own inspection activity.

In addition to inspections, pursuant to the Atomic Energy Act, one of the forms of implementation of the regulatory supervision activities of the HAEA as nuclear energy supervisory body is conducting enforcement procedures ensuring the practical enforcement of the statutory requirements and the orders of the authorities based on them. (The general legal basis for the enforcement procedures relating to the application of nuclear energy is provided by Act CXL of 2004 on public administrative procedures ['Act CXL of 2004'], Act CXVI of 1996 [Atomic Energy Act] and Act C of 2012 on the Criminal Code ['Criminal Code']).

The Atomic Energy Act also specifies the means and instruments that may be applied during the enforcement procedures, e.g. the withdrawal of the licence.

In respect of nuclear installations, the provisions of the Atomic Energy Act are supplemented with additional sub-rules. Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and the related regulatory activities details the means and instruments of enforcement procedures of the HAEA in terms of the significance of the infringed regulations as regards safety, and describes the means and instruments of enforcement in accordance with the principle of gradual approach (Section 24).

The HAEA may also impose a fine, which is allowed, firstly, by the Atomic Energy Act and, secondly, Act CXL of 2004. The provisions of the Acts are supplemented by the rules of Government Decree No 112 of 4 July 2011 on the responsibilities of the HAEA, the minimum and maximum amounts that may be imposed and what considerations the HAEA has to take into account when imposing the fine. The principle of gradual approach is applied at all levels of the regulation (Section 3).

It is minimum HUF 50 000 but maximum HUF 5 000 000 against the licence holders of nuclear installations for the breach of the obligation described in the legislation providing for the application of safeguards under the Treaty on the Non-Proliferation of Nuclear Weapons.

B.2.5 (Article 5(3)(b))

Article 5 (3) Competencies (b) require demonstration of this compliance, including the requirements under Article 6(2) to (5);

The obligations of the licence holder are laid down in the Atomic Energy Act, which are further detailed by the Nuclear Safety Codes constituting annexes to Government Decree No 118 of 2011 issued for the implementation of this Act.

The Atomic Energy Act (Section 10) lays down that the user of nuclear energy is responsible for the safe application of nuclear energy and compliance with the safety requirements. This is supplemented by a provision of Government Decree No 118 of 2011, which declares that responsibility for the safe operation of nuclear installations and compliance and ensuring compliance with the nuclear safety requirements lies with the licence holder throughout the life cycle of the nuclear installation (Section 4/A(c) and Section 5), and the acts or omissions of the HAEA do not, in any form and to any extent, exempt the licence holder from its liability for nuclear safety (Section 27 of Government Decree No 118 of 2011).

The Atomic Energy Act also prescribes that the licence holder is obliged, within its sphere of activities, to provide the technical and technological, material and personal conditions required for the safe application of nuclear energy and the maintenance and development of safety, and to continuously monitor the radiation conditions in accordance with the latest verified results of science and international requirements and experience. The licence holder is obliged, taking into consideration its operating experience and new knowledge relating to safety, to perform continuous activities to increase safety (Section 10 of the Atomic Energy Act). The demonstration of the fact that the licence holder meets all of its obligations arising from its liability and that it certifies that it has the resources and conditions required for maintaining nuclear safety in the long term are laid down in a decree (Section 27 of Government Decree No 118 of 2011).

The provisions of the Atomic Energy Act also includes that the user of nuclear energy is obliged to use its best endeavours to prevent nuclear and radiation accidents and to mitigate their consequences (Section 4/A(h) of the Atomic Energy Act).

In this respect, the Atomic Energy Act requires the user of nuclear energy to immediately take efficient measures if an unusual incident has occurred during its activities, and the level of the ionising radiation on the employees or the population or the extent of the radioactive contamination or the quantity of radioactive materials released into the environment exceeds or may exceed the values permitted by the authority.

Due to an incident having occurred at the nuclear installation or on the basis of a specific operating experience, the HAEA may also initiate measures if necessary (it may prescribe the implementation of measures in order to ensure nuclear safety and to protect life, physical safety, health, the environmental and property).

The Atomic Energy Act also allows the responsible head of the operating organisation on duty at a given point of time to order, as prescribed by law, the implementation of an operation, measure or modification deemed important by him or her even without the regulatory licence and approval required by law in order to prevent a breakdown or accident in the operating conditions posing an imminent threat of the occurrence of a breakdown or accident as well as, if a breakdown or accident does occur, to respond to it and to prevent its exacerbation (Section 42).

The user of nuclear energy is primarily responsible for eliminating unusual incidents, investigating into their reasons and taking the measures necessary for the prevention of their reoccurrence, but the HAEA oversees the activities of the

licence holder relating to unusual incidents, and the HAEA also examines incidents affecting safety.

It is the obligation of the user of nuclear energy to prevent the occurrence of nuclear emergencies, to avert or mitigate the consequences of an incident that has occurred and to restore the prescribed normal conditions; to this end, it:

(a) devises an accident response and action plan and has it approved by the competent authorities;

(b) creates the personal, material and organisational conditions of efficient accident response and ascertains their existence regularly, from time to time;

(c) provides conditions for the provision of external assistance required for accident response (nature, extent and method) in consultation with the competent authorities and organisations (Section 43).

In addition, Government Decree No 118 of 2011 prescribes that at the nuclear installation, the release of radioactive materials or radiation into the environment has to be prevented by applying defence in depth, and it has to be ensured that accidents resulting in a significant radiation damage as a result of failures or their combination can occur only with an appropriately low probability.

Pursuant to this legislation, defence in depth ensures the offsetting of possible human errors or technical failures, the maintenance of the efficiency of nested barriers as well as the protection of the population and the environment if the efficiency of barriers decreased.

Furthermore, in order to maintain defence in depth, the licence holder operates an efficient management system in accordance with the rules specified in Volume 2 of the Nuclear Safety Codes and its Management is firmly committed to nuclear safety and to maintaining a strong safety culture.

The licence holder has to comprehensively analyse and evaluate the nuclear safety of nuclear installations, the fulfilment of the nuclear safety requirements and the extent of risks prior to establishment and commissioning and, taking into consideration operating experience and new knowledge about safety, at regular intervals throughout the period of operation (as part of periodic safety reviews and reports), and has to publish their results on its website (Section 9(3) of the Atomic Energy Act).

The obligations of the licence holder are confirmed by Section 5 of Government Decree No 118 of 2011, with the proviso that it has to certify to the HAEA that the requirements set in the decree (the provisions of the Nuclear Safety Codes) are fully met.

Compliance with the safety requirements is certified by Safety Reports.

This piece of legislation prescribes the following about Safety Reports (Section 31):

(1) In order to ensure that nuclear energy is applied under public scrutiny, the licence holder prepares a report on its activities relating to the operation and safety of the nuclear installation and any incidents affecting safety, which may have occurred during operation, and submits it to the HAEA. Simultaneously with submitting a nuclear installation establishment licence application, the licence holder submits a Preliminary Safety Report to the nuclear safety authority, while simultaneously with submitting a commissioning licence application, it submits a Final Safety Report in accordance with the rules specified in Annexes 1, 3, 5 and 6.

(2) The reports submitted to the HAEA have to be prepared to a level of detail and depth that they allow the nuclear safety authority to assess and evaluate the activities of the operator and incidents affecting safety independently, on the merits.

(3) The licence holder updates the Final Safety Report of the nuclear installation annually, in accordance with changes in the nuclear installation.

(4) In the Preliminary and Final Safety Report, the information taken and to be taken into consideration for the design, establishment, commissioning, operation, modification and decommissioning of nuclear installations has to be summarised.

The HAEA conducts a Periodic Safety Review every 10 years at the nuclear installation to examine whether the nuclear installation operates in accordance with the basis of licensing, which it closes with a decision. In the first case, the decision has to be passed after 10 years from the date on which the operating licence became final and non-appealable. The licence holder is obliged to conduct its own audit at least one year prior to the deadline set for carrying out the audit of the HAEA, and taking its results as a basis, if necessary, to compile and implement a programme to take the safety-enhancing measures to eliminate or mitigate the risk factors found. The licence holder submits a Periodic Safety Report setting forth the results of its own audit, the factors affecting the safety of the nuclear installation and its programme of safety-enhancing measures to the nuclear safety authority not later than by the closing of the audit. The factors that determine the operating risks of the nuclear installation have to be shown it in comparison with the updated Final Safety Report as well as the Hungarian requirements in force and international good practice (Section 34).

Section 32 supplements the reporting obligation of the licence holder by providing that the licence holder of the nuclear installation prepares regular, incident and condition-related reports specified in Annex 1, and submits them to the HAEA.

B.2.6 (Article 5(3)(c))

Article 5 (3) Competencies (c) verify this compliance through regulatory assessments and inspections; and

The Atomic Energy Act prescribes that nuclear energy may be applied only in the manner defined by law, under the regular supervision and evaluation of the authorities (Section 9 of the Atomic Energy Act).

The HAEA is obliged to oversee the safety of the application of nuclear energy and compliance with all statutory regulations. Supervision is essentially carried out on the basis of the analysis and evaluation of documents submitted by the licence holders, in particular, submissions, regular and incident reports and information collected during inspections by the authorities. If it occurs during this that the safety risk caused by the nuclear installation or activity considerably exceeds the extent previously taken into account, the nuclear safety authority will initiate proceedings *ex officio* and, depending on the results of the regulatory proceedings, will impose orders ensuring the practical enforcement of the statutory requirements and the orders of the authorities. The HAEA makes its decision by comprehensively evaluating the facts available to it in detail, on the basis of the examination of compliance with the statutory requirements. During this, it examines the documents and data on the safety principles providing grounds for design, the quality of implementation, the actual principles of operation and practical operation of the completed nuclear installation, system and system component subject to the proceedings and on the operating activity, which are provided by the licence holder. In making its decisions, it enforces the considerations of the nuclear safety of the whole nuclear installation.

The section of the Atomic Energy Act regulating the competence of the HAEA guarantees the right to the HAEA to be able to conduct inspections at any user of nuclear energy, either with or without a prior notice.

During its regulatory supervision activity relating to nuclear installations, the HAEA conducts comprehensive, target, regular and ad hoc inspections. Pursuant to the Atomic Energy Act, the competence of the HAEA includes:

- nuclear safety inspection of nuclear installations;
- inspection of buildings and structures relating to nuclear installations and the inspection of the lifts of buildings by the authority;
- nuclear safety and technical radiation protection monitoring of activities relating to design, manufacture, assembly (installation), commissioning, operation, modification (repair), import, taking out of service and decommissioning of nuclear equipment;
- verification of the existence of the quality assurance system prescribed by law or having it verified by the institution designated by it.

The HAEA is obliged to evaluate the circumstances found during the inspections and the data obtained. The authorities operate a reporting system for ensuring the monitored application of nuclear energy and the evaluation of the activities of the licence holder. The reports are so detailed that they allow the independent review and analysis of activities and incidents that have occurred (Section 32 of Government Decree No 118 of 2011).

The sub-rules applicable to the evaluation and inspection obligation of the HAEA are set forth in Government Decree No 118 of 2011.

Such inspections may be exploratory or comprehensive inspections performed in order to continuously assess the safety of the nuclear power plant unit under a predefined programme or ad hoc inspections specifically relating to a particular incident or activity. Inspections by the authority are defined as observing an activity carried out on site and comparing it with the relevant documentation. The authority devises an annual inspection programme for planned inspections, and notifies those concerned of it in due time. The authority prepares an inspection plan for the individual inspections, and after the completion of comprehensive and exploratory inspections on site, it evaluates the findings of the inspections, providing grounds for the subsequent actions of the authority. Inspections and the evaluation of their findings may also be performed by outside experts or expert organisations as commissioned in writing by the authority.

In addition to the inspection activities of the authority, the expert authorities taking part in the licensing procedure also perform independent regulatory inspection tasks. Under cooperation agreements, in cases that concern different competences alike, the authorities may conduct joint inspections.

In the interest of the monitored application of nuclear energy and the evaluation of the activities of the licence holder, the reports made in the reporting system operated by the authority have a level of detail that they allow the independent assessment, review and evaluation of the activities of the

operator and the incidents that have occurred. The investigation of incidents affecting safety, which have occurred during operation, and the identification of their causes and the implementation of measures required for preventing their repeated occurrence are primarily the responsibilities of the licence holder. Any incident affecting nuclear safety is reported by the licence holder to the authority in accordance with the regulations in force. On the basis of the notification and the report prepared on the investigation carried out by the licence holder (or, depending on the weight of the incident, independently of the licence holder), the Authority analyses and evaluates the incident and initiates further actions if necessary.

The HAEA prepares a review and evaluation programme for the nuclear installation and activities reviewed. The regulatory review and evaluation extend to all phases of the life cycle of the nuclear installation. The regulatory review and evaluation of nuclear installations extend, in particular, to:

(a) development of operating parameters relating to the safety of operation;

(b) effect of management, organisational and administrative factors on safety;

(c) effects of changes and modifications;

(d) utilisation of the experience gained during the incidents and their investigation;

(e) questions affecting operation; and

(f) description of the activity aimed at increasing the level of nuclear safety.

The HAEA reviews and evaluates the analyses and other technical documents submitted by the licence holders and takes into consideration all relevant information available to it to ascertain that:

(a) the safety consequences of the activities performed at the nuclear installation are identified and the fulfilment of the safety requirements is demonstrated;

(b) the documentation submitted by the licence holder is accurate and sufficient to assess that the statutory and regulatory requirements are met; and

(c) the planned technical solutions are proven to be satisfactory or rated on the basis of already completed experiments, tests and practical experience gained during trial runs, thus they are suitable for attaining the required safety level (Section 25 of Government Decree No 118 of 2011).

During the evaluation, the HAEA carries out a comparison of the restrictions to be observed, the goals set and the actually achieved results on the basis of a

predefined system of indicators comprising measurable targets and criteria, allowing the display of trends in order to reduce the subjectivity of evaluation.

The authority uses of the evaluation results obtained from various sources for continuously evaluating the safety performance of licence holders. In order to widen the possibilities of assessment, the authority devised and applies a system of safety indicators relating to the Paks Nuclear Power Plant, the Interim Spent Fuel Storage Facility, the Training Reactor of the Budapest University of Technology and Economics and the Budapest Research Reactor. The safety indicators represent the totality of measurable parameters, which measure, among other things, the performance of the organisation and the human factor, too.

The safety indicators are specified essentially on the basis of the recommendations of the International Atomic Energy Agency. Accordingly, they can be divided into three main groups:

- indicators relating to the parameters of uniform operation;
- indicators relating to the safety parameters of operation; and
- indicators relating to parameters of commitment to safety.

The collected statistical set of indicators allows both comprehensive evaluation and the highlighting of various issues. At present, the authority prepares an evaluation annually of the safety performance of licence holders. It utilises the experience from the evaluation during the organisation of regulatory proceedings, e.g. during the preparation of annual inspection plans.

During the annual evaluation of the HAEA, the operational safety performance of the licence holders of nuclear installations [is established] on the basis of the results of the system of safety indicators. The purpose of the evaluation is to evaluate the activities and safety performance of the licence holders by the authority; using them, to monitor and analyse the safety parameters of operation; and to reveal possible safety problems in an early stage (Section 33 of Government Decree No 118 of 2011).

In addition to annual evaluation, the periodic re-evaluation of the nuclear safety of nuclear installations is performed at 10-year intervals according to a predefined comprehensive programme (taking into consideration the then-current international practice). This is the Periodic Safety Review, which is prescribed as obligatory by law. Under this programme, the authority decides on whether the operating licence may remain in force and, as required, prescribes safety-enhancing measures as a condition of continued operation (Section 34 of Government Decree No 118 of 2011).

B.2.7 (Article 5(3)(d))

Article 5 (3) Competencies (d) carry out regulatory enforcement actions, including suspending the operation of nuclear installation in accordance with conditions defined by the national framework referred to in Article 4(1).

The general legal basis for the enforcement procedures relating to the application of nuclear energy is provided by Act CXL of 2004 on public administrative procedures ('Act CXL of 2004'), Act CXVI of 1996 (Atomic Energy Act) and Act C of 2012 on the Criminal Code ('Criminal Code').

Pursuant to the Atomic Energy Act, one of the forms of implementation of the regulatory supervision activities of the HAEA as nuclear energy supervisory body is conducting enforcement procedures ensuring the practical enforcement of the statutory requirements and the orders of the authorities based on them.

The Atomic Energy Act also specifies the means and instruments that may be applied during the enforcement procedures:

- withdrawal of licences and limitation of the term of licences;
- withdrawal and amendment of modification licences (establishment of conditions);
- imposition of fines.

In addition, it also includes the possibility of withdrawing the licences of persons employed within the application of nuclear energy, which is enforceable by the police.

In respect of nuclear installations, the provisions of the Atomic Energy Act are supplemented with additional sub-rules. Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and the related regulatory activities details the enforcement procedures of the HAEA in terms of the significance of the infringed regulations as regards safety. It describes the means and instruments of enforcement in accordance with the principle of gradual approach (Section 24):

5. written warning and corrective action to be taken by a deadline;
6. prescription of additional conditions;
7. restriction or stoppage of the activity or withdrawal of the licence; and
8. imposition of fines.

This Government Decree requires the licence holder to investigate the identified variations, to take the necessary measures and to prevent their repeated occurrence (Section 24).

The HAEA may also impose a fine, which is allowed, firstly, by the Atomic Energy Act and, secondly, Act CXL of 2004. The provisions of the Acts are supplemented by the rules of Government Decree No 112 of 4 July 2011 on the responsibilities of the HAEA, the minimum and maximum amounts that may be imposed and what considerations the HAEA has to take into account when imposing the fine. The principle of gradual approach is applied at all levels of the regulation (Section 3).

For the establishment of the amount of the fine, attention has to be paid to all circumstances of the case, in particular, to ascertain:

(a) whether any unusual incident, nuclear emergency or nuclear damage has occurred;

(b) the weight of the infringement of the requirements and regulations;

(c) whether the rules have been breached repeatedly;

(d) whether any conduct causing the breach of rules or omission is imputable to a party;

(e) whether the party in breach of the rules or omitting its obligations has engaged in any damage-mitigating conduct facilitating the measures taken to eliminate the condition caused by such party.

It is minimum HUF 50 000 but maximum HUF 5 000 000 against the licence holders of nuclear installations for the breach of the obligation described in the legislation providing for the application of safeguards under the Treaty on the Non-Proliferation of Nuclear Weapons.

The fine as an instrument of sanctioning may also be imposed independently and repeatedly, but may also be accompanied by other sanctions.

If a criminal offence defined in the Criminal Code is carried out, the HAEA has no discretionary power and is bound by the obligation to file a criminal report. After this, the investigating authority decides on indictment and, in the case of indictment, the court decides, if necessary, on the measure to be taken (Criminal Proceedings Act).

In order to facilitate the fulfilment of the requirements set forth in the Nuclear Safety Codes, the HAEA issues guidelines, which it continuously reviews (Government Decree No 118 of 2011).

B.3 Licence holders (Article 6)

B.3.1 (Article 6(1))

Article 6 (1) Member States shall ensure that the prime responsibility for nuclear safety of a nuclear installation rests with the licence holder. This responsibility cannot be delegated.

The Atomic Energy Act **makes the licence holder primarily responsible** for the safe application of nuclear energy and the fulfilment of safety requirements.

The user of nuclear energy is responsible for the safe application of nuclear energy and compliance with the safety requirements (Section 10(1) of the Atomic Energy Act).

Responsibility for the safe operation of nuclear installations and compliance and ensuring compliance with the nuclear safety requirements lies with the licence holder throughout the life cycle of the nuclear installation (Section 5(1) of the Nuclear Safety Code).

Most important responsibilities of the licence holder:

- to establish the technical, technological, material and personal conditions for safe operation;
- to prevent the occurrence of an uncontrolled and unregulated nuclear chain reaction;
- to prevent the occurrence of any unacceptable damage to employees, the population, the environment or material assets, caused by ionising radiation or any other reason;
- to keep the radiation exposure of employees and the population to the lowest level reasonably attainable;
- to continuously monitor radiation conditions and provide the population with relevant information;
- to minimise the production of radioactive wastes;
- to continuously carry out activities to enhance safety and to finance the costs of related R&D activities;
- to regularly review and upgrade its own regulatory system serving to fulfil the safety requirements;
- to take into account the limits of human performance in the interest of safety;

- to fulfil the obligations of Hungary arising from international agreements made in the area of the application of nuclear energy for peaceful purposes;
- to ensure that the educational level, qualifications and health condition of employees meet the prescribed requirements;
- to engage suppliers that have a quality management system;
- to provide financial cover for amounts of liability for damages (insurance);
- to manage unusual incidents;
- to indemnify under a specific amount and within a time limit for damages arising as a result of the application of nuclear energy;
- to ensure the guarding of the installation by armed guards and to operate effective physical protection;
- to make regular payments to the Central Nuclear Fund to cover the costs of the final disposal of radioactive wastes, the interim storage and final disposal of spent fuel and, in the case of the nuclear power plant, the decommissioning of the installation.

B.3.2 (Article 6(2))

Article 6 (2) Member States shall ensure that the national framework in place requires licence holders, under the supervision of the competent regulatory authority, to regularly assess and verify, and continuously improve, as far as reasonably achievable, the nuclear safety of their nuclear installations in a systematic and verifiable manner.

The licence holder and the nuclear energy supervisory body have to comprehensively analyse and evaluate the nuclear safety of nuclear installations, the fulfilment of the nuclear safety requirements, the extent of risks prior to establishment and commissioning, and, taking into consideration the operating experience and new knowledge about safety, at regular intervals throughout the period of operation (as part of periodic safety reviews and reports), and have to publish their results on its website (Section 9(3) of the Atomic Energy Act).

The licence holder is obliged, within its sphere of activities, to provide the technical and technological, material and personal conditions required for the safe application of nuclear energy and the maintenance and development of

safety and to continuously monitor the radiation conditions in accordance with the latest verified results of science and international requirements and experience. The public has to be informed about the results of the monitoring of ambient radiation conditions regularly, at least on a monthly basis.

The licence holder is obliged, taking into consideration its operating experience and new knowledge relating to safety, to perform continuous activities to increase safety (Section 10 of the Atomic Energy Act).

In order to ensure that nuclear energy is applied under public scrutiny, the licence holder prepares a report on its activities relating to the operation and safety of the nuclear installation and any incidents affecting security, which may have occurred during operation, and submits it to the nuclear safety authority.

Simultaneously with submitting a nuclear installation establishment licence application, the licence holder submits a Preliminary Safety Report to the nuclear safety authority, while simultaneously with submitting a commissioning licence application, it submits a Final Safety Report.

The nuclear safety authority carries out the safety evaluation of nuclear installations on the basis of its licensing experience, inspection results, the reports of the licence holder and other information available to it.

The reports submitted to the nuclear safety authority have to be prepared to a level of detail and depth that they allow the nuclear safety authority to assess and evaluate the activities of the operator and incidents affecting safety independently, on the merits.

The licence holder updates the Final Safety Report of the nuclear installation annually, in accordance with changes in the nuclear installation.

In the Preliminary and Final Safety Report, the information taken and to be taken into consideration for the design, establishment, commissioning, operation, modification and decommissioning of nuclear installations has to be summarised.

The nuclear safety authority may prescribe, in a decision, the licence holder to prepare a safety evaluation report on the basis of any inspection, report or incident or in other justified cases. In preparing safety evaluation report, the licence holder ensures that the already completed analyses do not contain any contradictory statements or conclusions and that the data used are suitable for the given purpose (Section 31(1) to (6) of the Nuclear Safety Code).

B.3.2.1 Safety assessment

B.3.2.1-1 System of periodic and safety reports

According to regulations concerning the reporting obligations of the licence holder, two categories are to be distinguished:

Regular reports

- quarterly report: providing information to the authority about the development of the operating parameters, current issues of operation and factors affecting operation;
- annual report: based on quarterly reports, but due to more information being available over a longer periods, a more comprehensive description, evaluation and analysis;
- annual safety report: the licence holder has to update the final safety report in accordance with the changes relating to the nuclear safety of the installation;
- annual and quarterly reports on the monitoring of the effectiveness of maintenance: monitoring of the capacity of systems and system components fulfilling active functions and evaluation of their reliability and inoperability;
- report on the activity relating to the monitoring of the efficiency of maintenance;
- report on general overhaul and small repair activities: they include small repair activities affecting safety and general overhauls accompanied by the replacement of fuel assemblies;
- other communications for information purposes: providing the authority with up-to-date information.

Incident reports

- incidents under the obligation of immediate reporting are required to be notified of within two hours following their occurrence; the INES classification of all incidents subject to reporting has to be performed, and a proposal on this has to be submitted to the authority within 16 hours following the incident;
- incidents subject to reporting have to be submitted to the authority also in writing within 24 hours of their occurrence;
- an incident investigation report has to be submitted to the authority within *45 days* of the occurrence of the incident.

Procedures for the preparation and application of safety reports are prescribed by regulations at the level of an Act and a Government Decree. The regulatory proceedings associated with establishment are based on a **Preliminary Safety Report,** which is followed by a **Final Safety Report** necessary for the commencement of the operation of the nuclear installation.

The content requirements for the safety reports are based on the regulations of Reg. Guide 1.70 of the US NRC (United States Nuclear Regulatory Commission), taking into consideration the specific conditions in Hungary.

Final Safety Report

The Nuclear Safety Code prescribes that the Final Safety Report should be updated annually, so that the safety report can form an authentic and continuous basis for the assessment of the safety of the installation at all times. The Final Safety Report of the Paks Nuclear Power Plant deals with the various safety analyses in a separate chapter. The chapter has essentially two intended purposes. Firstly, the type of breakdowns in the elimination of which the given systems play a role is stated in the design basis of the safety systems described in other chapters of the Final Safety Report. The safety evaluation of this is carried out by making reference to the content of this chapter, and it can be shown in such a way that the systems constructed with the given design basis fulfil their functions. The other intended purpose of the chapter is to show that the safety evaluation of the whole power plant conforms to the provisions of the Nuclear Safety Code according to both the deterministic and the probability analyses.

The safety evaluation relates to:

- normal operation;
- design breakdowns;
- complex, beyond design basis breakdowns;
- assessments on the basis of incident-oriented operating instructions;
- analyses relating to Level 1 Probabilistic Safety Assessments (PSAs) performed on the basis of condition-oriented operating instructions;
- analyses relating to serious accident situations, essentially Level 2 Probabilistic Safety Assessments (PSAs).

Periodic Safety Report

The recommendations of the International Atomic Energy Agency relating to Periodic Safety Reviews (Periodic Safety Review of Operational Nuclear Power Plants, documents under Safety Series Nos 50-SG-O12 and NS-G-210) schedule

regular reviews about every 10 years, which provide a comprehensive picture of the safety of nuclear power plant units and, by virtue of their systematic approach, are suitable for identifying the necessary safety-enhancing measures and priorities. The authority performs a periodic nuclear safety review within ten years of the first day of the validity of the Operating Licence issued for the first time for the initial commencement of operation, and it repeats it every 10 years afterwards. In Hungary, the nuclear authority has issued a guideline for each Periodic Safety Review, which lays down the goals, principles of implementation, legal regulation, the technical background of the review and the governing documents.

The licence holders are obliged to perform their own internal review one year before the deadline set for the performance of the review and to submit a Periodic Safety Report on its results to the authority. As part of the review, the HAEA analyses and evaluates the technological and safety level of the operated nuclear installation on the basis of the report of the licence holder, and compares it with the state-of-the-art international technology and safety levels known at the given point of time. It assesses whether or not the risk arising from the difference can be tolerated during the next 10-year operating cycle and how the operation of the installation is related to the internationally accepted good practice. The HAEA closes the assessment with a decision, in which, if necessary, it may restrict further operation or may order the implementation of corrective action to enhance safety in order to reduce the above-mentioned risk. The safety review is conducted under regulated conditions; the authority reviews the corrective measures decided and authorises the modifications required for the implementation of the actions.

The authority passes a decision on the basis of the Periodic Safety Report of the licence holder and its own safety review, in which it lays down the conditions for future operation.

The first Periodic Safety Review of Units 1 and 2 of the Paks Nuclear Power Plant took place in 1995 and 1996. The Periodic Safety Review of Units 3 and 4 was performed in 1998 and1999 by the operator pursuant to the new Atomic Energy Act in force since 1997 and the related regulations.

The next Periodic Safety Review was conducted jointly for the four units at the same time. The authority approved the Periodic Safety Report on 15 December 2008, and ordered the implementation of 169 corrective measures in its approval decision. The authority follows the implementation of the corrective measures of the Periodic Safety Review, and used the experience gained for the evaluation of the service life extension programme of Unit 1.

B.3.2.1-2 Maintenance, test and monitoring programme of the licence holder

The licence holder has to devise:

(b) a preventive maintenance, test and monitoring programme to ensure that the systems and system components retain their parameters complying with the design requirements; and

(c) sets of procedures and operating and implementation instructions regulating the operation, maintenance, review and tests of the nuclear installation (Section 14(1) of Government Decree No 118 of 2011).

In order to oversee the individual processes, the licence holder has to operate, subject to Section 23, a comprehensive monitoring system differentiated from the point of view of nuclear safety, which covers all processes characteristic to the given life cycle phase and participating organisations (Section 30/A of Government Decree No 118 of 2011).

The licence holder prepares and implements a documented maintenance, test and monitoring programme for systems and system components important from the point of view of nuclear safety so that the systems and system components can be reliably operated and fulfil their planned function throughout the service life of the nuclear power plant unit (Volume 4, Section 4.6.1. 0100 of the Nuclear Safety Code).

In-service inspections and tests, materials testing

The proper technical condition of the systems and equipment of nuclear installations fulfilling safety functions has to be maintained. The proper technical condition and functional availability are demonstrated by in-service inspections and tests and ones performed in connection with general overhauls, as well as by the periodic materials testing of pressurised equipment and fittings. Detailed description of the in-service tests and inspections carried out at the Paks Nuclear Power Plant:

Types of in-service tests

The preparation, scheduling, performance, evaluation and documentation processes of tests and inspections to be performed regularly or in an ad hoc manner on the systems, sub-systems and equipment of the nuclear power plant are regulated by MVM Paksi Atomerőmű Zrt. in instructions.

According to the instructions, the processes and activities relating to tests are regulated in the following classification:

- in-service technological test: checking the main function of working and standby systems by assuming the lowest risk possible;

- unit shut-down technological test: checking the operability of equipment and systems involved in shut-down and obtaining information for maintenance works;
- general overhaul technological test: checking the operability and function of equipment and systems maintained during general overhauls;
- unit start-up technological test: full-scope check following general overhauls;
- unscheduled technological test: full-scope or partial check, which becomes necessary for other reasons, to verify operability.

Scheduling of in-service tests

In the first step, the tests are scheduled on an annual basis; an annual schedule is prepared by considering the cycle times of the tests. For the individual legs of multiple, redundant systems, tests are scheduled for different times. Specific dates and times of the performance of tests are decided at weekly planning meetings, in the knowledge of the operating condition of the unit and the permissible differences in cycle times. The tests set forth in the Technical Operation Rules are planned for a period from general overhaul to general overhaul. With respect to them, the allowed cycle time difference is ±4 days.

Evaluation of in-service tests

The records evaluating the tests are the basic documents for the certification of conformity. Evaluation is performed by the professional organisation responsible for the performance of the test. On the basis of the evaluation, the maintenance, refurbishment or quality management concepts and the cycle times may be modified.

The records of in-service technological tests have been kept by the power plant since 1992 and are processed in detail.

The in-service tests performed over the years have demonstrated the appropriate availability of the equipment, systems and means of protection. There has already been a precedent for taking supplementary measures due to an unsuccessful test, but the operational safety of the units has never been jeopardised, and no unit has ever been shut down out of schedule for this reason.

Tests relating to general overhauls

During general overhauls, three test group processes are performed:

- before the unit is shut down, tests checking the systems necessary for shut-down and cooling are scheduled;
- during the general overhaul of the unit, upon completion of the maintenance of safety systems, their conformity is checked before the next safety system is handed over for maintenance;
- after the general overhaul of the unit, the systems necessary for the start-up and operation of the unit are thoroughly tested.

The tests are scheduled depending on the technological conditions. The sequence of tests and the conditions for establishing other operating conditions are regulated.

Of the listed groups, the one performed after the general overhaul of the unit contains the most tests. These are the following:

- operational and interlock tests of individual pieces of equipment;
- leak tightness and pressure test of systems;
- full operational test of the execution components of protection systems;
- strength pressure test of the main cooling circuit and steam generators corresponding to cycle times;
- integral leak tightness test of the hermetic compartment;
- reactor criticality experiments in order to verify the appropriateness of physical calculations;
- unit start-up tests performed at different power levels.

The scope of tests to be performed after weekend maintenance is decided in the knowledge of the interventions completed and the time elapsed, after special consideration.

The introduction of electronic testing instructions in connection with service life extension means a significant change in the system of tests. The essence of the method is that the testing process is supervised by the unit computer, thus information produced during the test is recorded, and the subjectivity arising during the measurement of fitting running times is eliminated. The application of the method is of considerable help also in the reference test of rotors. Data of the electronic testing instructions can be processed within its own system and are also uploaded to the central database where, as lifecycle data, can be subjected to further analysis. Data obtained from the system form the basis of the development of a condition-dependent maintenance strategy.

System of specifications for materials testing

At the Paks Nuclear Power Plant, the unified programme and system of criteria for periodic materials testing were devised simultaneously with the commissioning of the individual units, on the basis of Soviet specifications and standards, pre-commissioning tests and international experience, and with the involvement of domestic research institutes.

These specifications were approved by the National Energy and Energy Safety Engineering Inspectorate of that time, and any modification requires the permission of the authority at present, too. During the preparation for the service life extension of the units, these documents were revised by taking into consideration today's modern specifications. The documents are reviewed regularly, and the necessary changes are included into them.

Periodic materials tests

The scope of periodic inspections is defined by general materials testing programmes, which specify the test area, the test method, the scope and frequency of testing, reference to the relevant item of the compendium of criteria, technological conditions needed for the test, safety engineering requirements and the documentation procedures for each piece of equipment or equipment group. The full-scope periodic and non-destructive materials testing of primary and secondary circuit equipment involves the following units:

- reactor and its sealing units
- upper chamber
- reactor internals
- main circulating pipeline
- steam generators
- pressuriser
- hydro-accumulators
- primary circuit equipment and piping
- local sealing
- secondary circuit equipment and piping
- clamping structures
- fuel containers.

The test evaluation requirements are contained for all test methods and method types in the volume entitled 'Compendium of Criteria for Non-Destructive Materials Testing'.

Maintenance and inspections

The maintenance activities of the nuclear power plant aim at keeping or restoring the process equipment ensuring energy generation in a condition suitable for fulfilling their functions as well as avoiding, mitigating or eliminating the consequences of failures at reasonable expenditure. During maintenance activities, nuclear safety is the most important requirement. The central element of the maintenance system is a systematic approach, i.e. optimally carrying out preventive maintenance and condition-dependent maintenance. Certain system components are operated until failure, which is also part of the maintenance strategy.

General overhauls consist of the following activities:

- technical and safety engineering reviews carried out as part of the Periodic Inspection Programme;
- periodic and individual maintenance works;
- inspections prescribed by general materials testing programmes;
- works arising from the orders of the authorities;
- repair of failures occurring during operation as part of general overhauls;
- safety-enhancing measures, modifications and refurbishments.

Periodic maintenance performed on units in operation is accomplished on equipment with sufficient backup, which can be disconnected during normal operation of the given unit. This reduces the work to be done during overhauls.

Regular maintenance inspection tours serve as a means for assessing the condition of operating or standby equipment. Repair or maintenance of the equipment is scheduled on the basis of differences that may have been found.

Preparation has a key role in maintenance activities, which is the responsibility of the centralised technical organisation. Such a task is, among other things, the management of the activities of the preventive maintenance programme in the work management system as well as the compilation and updating of documentation describing the operation history of the equipment after the maintenance completed.

Procedures for carrying out maintenance

The regulation of the activities of maintenance as a main process is laid down in process instructions and implementation instructions under the production subsystem. These documents include:

- the systems and equipment concerned and their parts;

- the preparatory activities associated with maintenance;
- the activities to be performed;
- the documentation and evaluation of maintenance activities and the feedback of experience;
- the materials used directly and indirectly during the activities.

In connection with maintenance, quality supervision activities are performed in accordance with regulating documents of the main processes of inspection and industrial safety.

The system of specifications ensures that all activities relating to the construction, electrical, instrumentation and control, and mechanical maintenance of the nuclear power plant are carried out in satisfactory quality. Several kinds of supervisory methods and regulatory safeguards have been integrated with the system at MVM Paksi Atomerőmű Zrt.

Compliance with the quality requirements is monitored by maintenance inspections carried out during maintenance works, subsequent quality control and, where appropriate, inspection by HAEA staff.

The most important documents of maintenance works are work instructions, maintenance instructions and the quality control plan associated with them, technical decision-making sheets, as well as maintenance records, designs, technological descriptions and licences.

The set of procedures for the scheduling of major and minor overhauls includes documentation tasks and also identifies those responsible. The management body of overhaul scheduling is the Maintenance Work Committee. Its operation is regulated by conference procedures. The implementation of the general overhauls is determined jointly by a general overhaul authorisation plan, a general overhaul network plan and other instructions in force.

Separate instructions regulate the planning and implementation of scheduled preventive and periodic maintenance works. The lowest level of maintenance regulation consists of several hundred equipment-specific maintenance instructions.

The procedures for involving suppliers in maintenance activities are also regulated in detail. Suppliers are involved at the power plant by engaging them to carry out individual tasks under classical service contracts. The contract, the technical inspection of the activities carried out by the suppliers, the authorisation of the applied technology, the work instruction procedures, the transfer of the work site, and the inspection obligation of the managers responsible for the given technical areas collectively ensure supervised work.

B.3.2.2 Collection of the experiences of nuclear power plants

The licence holder devises and implements a systematic programme for the regular and continuous collection, screening, analysis and documentation of the operating data, experience and operational incidents of the nuclear installation in the commissioning, operation and decommissioning cycle of the nuclear installation. Operating experience and operational incidents reported by other operators and relevant to the installation also have to be taken into consideration.

The operating experience of the nuclear power plant and other operators has to be evaluated so that they identify all hidden failures or potential precursor incidents relating to nuclear safety and show any trend towards decreasing safety performance or the reduction of the safety reserves (Sections 4.14.1.0100 to 4.14.1.0200 of the Nuclear Safety Code).

B.3.2.2-1 Own operating experiences of the Paks Nuclear Power Plant

Data collection and processing have become separated as far as equipment and activities are concerned within the mechanical, instrumentation and control, and electrical fields. Consequently, monitoring and the use of data received differ in depth and complexity. The data collected by technical areas are handled in a joint database in the interest of uniform data collection and processing.

The analysis of reliability and availability indicators provides grounds for the replacement, modernisation and modification of equipment and components. The data are also used in safety analyses. The power plant has good indicators for its safety systems even by international comparison. In order to achieve the uniform collection of data of uniform strength within the organisational units of the power plant, a power plant-level regulation has been devised.

Safety-related incidents occurring at the power plant are always investigated with the involvement of competent specialists. Incidents are investigated at different levels at the power plant; the specific level is always determined by the severity of the incident that has occurred. Incidents also reported to the authority are investigated at the power plant level, while other incidents are investigated at the functions. Since 1992, incidents have also been classified according to the INES scale introduced by the International Atomic Energy Agency for external information purposes, and previous incidents have been classified retrospectively. Since 2000, the individual incidents have also been analysed by probabilistic means.

The results of the investigations and the corrective measures are comprehensively described. The measures are always assigned to responsible personnel and deadlines, thus they can be tracked. Not only single incidents, but also trends and changes in the reliability of safety systems over time are monitored. The trends found will lead, if necessary, to modifications or other technical or administrative interventions. The experience is used in education, during simulator training. The continuous and regular revision of operating instructions and the Technical Operation Rules shows the feedback of operating experience.

Once every quarter, the Operation Assessment Committee reviews the development of safety indicators, the experience from incident investigations, and the status of the implementation of the measures taken. The Operation Assessment Committee is a body operated by the Safety Directorate. It agrees the proposals prepared for decision-making. The Safety Director has decision-making power.

B.3.2.2-2 Utilisation of the experiences of other power plants

It is of essential interest to the Paks Nuclear Power Plant to learn and make use of operating and other experience from other installations and international information sources. MVM Paksi Atomerőmű Zrt. takes part in the work of important international nuclear organisations (International Atomic Energy Agency, OECD Nuclear Energy Agency). A more direct cooperation is by way of participating in the specific professional work as a member of groups comprising operators of nuclear power plants, e.g. the World Association of Nuclear Operators (WANO) and the Club of VVER-440 Operators. The closest cooperation may take place between partner nuclear power plants. This type of relations enables many kinds of mutually useful specific or long-term activities to be identified, including joint projects, exchange of experiences and data supply.

B.3.2.2-3 Utilisation of operating experience

The authority regularly checks the experience feedback processes, including the use of external and internal experiences and, in addition, separately investigates major incidents. The Nuclear Safety Code provides for the utilisation of operating data and experience. The licence holder informs the authority in reports about the implementation of the sections of the Nuclear Safety Code herein stated. The regular, performance criteria-based review of the feedback process of operating experience has to be carried out in a documented way

either under a self-assessment programme carried out by the licence holder or in an independent audit caused to be conducted by the licence holder.

The authority introduces and evaluates indicators, by which it can also evaluate, among other things, the feedback of experience. When incidents are analysed by the licence holder, it is obligatory to take into consideration the management of similar incidents; this is checked by the authority.

The authority performs a comparison of the restrictions to be observed, the goals set and the actually attained results during its review and evaluation programme on the basis of a predefined system of indicators comprising measurable targets and criteria. By doing so, it allows trends to be displayed in order to reduce the subjectivity of the evaluation (Section 26(3) of the Nuclear Safety Code).

B.3.3 (Article 6(3))

Article 6 (3) The assessments referred to in paragraph 2 shall include verification that measures are in place for prevention of accidents and mitigation of consequences of accidents, including verification of the physical barriers and licence holder's administrative procedures of protection that would have to fail before workers and the general public would be significantly affected by ionizing radiations.

The user of nuclear energy is obliged to use its best endeavours to **prevent nuclear or radiation accidents and to mitigate their consequences** (Section 4/A(h) of the Atomic Energy Act).

Section 17(2) of the Atomic Energy Act lays down, within the competence of the HAEA, nuclear safety licensing required for putting into effect the Nuclear Accident Response Action Plan of the nuclear installation on the first occasion and after its modification.

In order to prevent the occurrence of nuclear emergencies, to avert or mitigate the consequences of an incident that has occurred and to restore the prescribed, normal conditions, the user of nuclear energy is obliged to:

(a) devise an accident response and action plan and to have it approved by the competent authorities;

(b) create the personal, material and organisational conditions of efficient accident response and to ascertain their existence regularly, from time to time;

(c) provide conditions for the provision of external assistance required for accident response (their nature, extent and method) in consultation with the competent authorities and organisations (Section 43(2) of the Atomic Energy Act).

B.3.3.1 Defence in depth

At the nuclear installation, the release of radioactive materials or radiation into the environment has to be avoided by applying defence in depth, and it has to be ensured that accidents resulting in significant radiation damage as a result of failures or their combination can occur only with an appropriately low probability.

Defence in depth ensures that:

(a) possible human errors or technical failures are offset;

(b) the efficiency of nested barriers is maintained; and

(c) the population and the environment are protected if the efficiency of the barriers decreased.

Five levels of the defence in depth:

(a) prevention of deviations from normal operating conditions and malfunctions;

(b) detection of abnormal operating conditions and prevention of expected operational incidents from becoming design breakdowns;

(c) handling of design basis breakdowns as planned;

(d) stopping of beyond design basis breakdown and accident processes and mitigation of their consequences;

(e) in the case of a significant release of radioactive materials, mitigation of the radiological consequences.

Most important components of the defence-in-depth protection of nuclear installations:

(a) design solutions applying sufficient safety reserves (including the selection of an appropriate site, diversity and redundancy, as well as the application of time-tested, highly reliable technologies and materials), and establishment and operation to a high standard;

(b) application of regulatory, restrictive and protection systems and assessment and monitoring solutions as well as operation-regulating documents;

(c) safety systems, breakdown recovery instructions and trainings, which ensure the handling of design basis incidents;

(d) application of supplementary measures, means and instruments, and accident management guidelines as well as organisation of drills; and

(e) preparation for carrying out on-site and off-site accident response activities.

In order to maintain defence in depth, the licence holder operates an efficient management system in accordance with the rules specified in Annex 2 of the Nuclear Safety Codes, and its Management is firmly committed to nuclear safety and to maintaining a strong safety culture (Section 7(1) to (5) of Government Decree No 118 of 2011).

During design, multiple physical barriers have to be applied to prevent the uncontrolled release of radioactive materials into the environment. It has to be ensured with independent defence barriers that possible failures and abnormal operation can be detected, offset and managed.

The protection of the barriers has to be ensured. Design solutions have to be provided to ensure the fulfilment of the safety functions and safety criteria even if a level of protection is damaged (Section 3.2.1.1500-1600 of the Nuclear Safety Code).

B.3.3.2 Preparation for the occurrence of breakdowns, nuclear emergencies and accidents, activities performed to respond to them

The licence holder has to devise guidelines and instructions for measures required for handling expected operational incidents, design breakdowns, beyond design basis breakdowns and accidents (Section 14(1) of Government Decree No 118 of 2011).

Prior to the start of the commissioning of the nuclear installation, a Nuclear Accident Response Action Plan has to be devised for the site and the installation, and has to be continuously updated afterwards. The accident response measures have to be carried out in such a way that it should have more benefits than the damage it causes. The form, extent and duration of the measure to be introduced have to be optimised; when it is selected, efforts must be made to maximise the protection attainable by the measure.

In order to prepare for the prevention and response to unusual incidents and nuclear emergencies, the licence holder of the nuclear installation takes technical and organisational measures, prepares an accident response action plan, and establishes and trains an accident response organisation and keeps it

in a condition where it is able and ready to be deployed, even by engaging it in drills, in accordance with the provisions of the relevant legislation.

Emergency activities have to be planned at the site of the nuclear installation, during which preparations have to be made for all activities identified in the safety analyses and falling within the responsibility of the licence holder, which serve to respond to emergencies resulting in the release of radioactive materials and radiation exposure and to mitigate their consequences.

The head of the accident response organisation is the head of the nuclear installation or the representative of the head fully authorised to take measures (Sections 36 and 37 of Government Decree No 118 of 2011).

B.3.3.2-1 Hungarian Nuclear Accident Response System, accident response plans and programmes

Operation of the Hungarian Nuclear Accident Response System

The structure and tasks of the National Nuclear Accident Response System are provided for by Government Decree No 167 of 11 May 2010.

In normal periods, the organisations of the Hungarian Nuclear Accident Response System carry out preparatory tasks and drills. In addition to making preparations, certain organisations also perform permanent data collection, planning, information provision or cooperation tasks.

In a nuclear emergency, the Nuclear Accident Response Work Committee is responsible for the preparation of professional decisions.

Within the nuclear installation, its chief executive is responsible for carrying out nuclear accident response tasks; in the counties and the capital, the chairperson of the regionally competent County (Metropolitan) Defence Committee; and at the national level, the chairperson of the Disaster Management Coordination Inter-ministerial Committee is in charge of the same.

It is an important change at the regional level in the defence administration system that the chairperson of the County Defence Committee is a Government Commissioner, and his or her deputy is, in respect of disaster response, the head of the regional body of the professional disaster management body. The local defence committee is a body. The chairpersons of local defence committees are the mayors of cities of county rank, towns and districts in the capital, while their deputies are, in respect of disaster response, the persons designated by the heads of the regional bodies of the professional disaster management bodies.

In a nuclear emergency, the HEAE is responsible for evaluating the nuclear safety and radiation protection situation. This purpose is served by the Centre

for Emergency Response, Training and Analysis (CERTA) working within the organisation of the HAEA, the Nuclear Accident Information and Evaluation Centre working within the Emergency Centre of the National Directorate-General for Disaster Management, and the Information Centre of the National Environmental Radiation Monitoring System working within the Ministry of Health. The operation of the centres allows the analysis of nuclear emergencies that may arise, the quick identification of possible consequences and, based on them, the devising of proposals for precautionary decisions. Early alarm tasks based on the continuous monitoring of the radiation situation is performed by the National Directorate-General for Disaster Management. The Real-time On-line Decision Support System (RODOS) for nuclear accident response, developed with support from the European Union, operates there.

The Hungarian Atomic Energy Authority operates a High Level Working Group, involving the administrative bodies concerned, for the regular review of the National Nuclear Accident Response Action Plan (OBEIT).

Breakdown and accident management

According to the safety philosophy of the Paks Nuclear Power Plant, it applies instructions to all methods of operation in accordance with the principle of defence in depth: operating instructions for normal operation and for handling expected operational incidents, while breakdown instructions for handling design breakdowns. The breakdown recovery instructions applicable to design breakdowns are condition-oriented instructions or have to be a combination of condition-oriented and incident-oriented instructions. Instructions applicable to beyond design basis breakdowns may only be condition-oriented.

The serious accident management system is based on Level 1 and 2 Probabilistic Safety Assessments (PSAs). Serious accident processes and the sources that may result in an increase in releases or the radiation level have been identified in the assessments. Based on these, critical pieces of equipment are the spent fuel pool and the reactor operating at rated power and the shut-down, open reactor. The identification of the release categories and their probability values come from the analyses. Based on these, the types of accident processes that may develop and the cases in which serious accident management instructions are needed have been identified. Accident response is dimensioned for accident source terms and release conditions determined by Level 2 Probabilistic Safety Assessments.

Accident Response Organisation

The relevant parts of the Atomic Energy Act and the Nuclear Safety Code require, based on each other and supplementing each other with different

aspects, the user of nuclear energy to create the organisational conditions of efficient accident response. MVM Paksi Atomerőmű Zrt. operates an accident response organisation within its own organisation for carrying out the functions, activities and tasks arising from the requirements. The Accident Response Organisation is essentially responsible for:

- organising and maintaining the accident response preparedness of MVM Paksi Atomerőmű Zrt.;
- organising the civil defence tasks of MVM Paksi Atomerőmű Zrt.

MVM Paksi Atomerőmű Zrt. has devised a Comprehensive Emergency Management and Action Plan (the 'ÁVIT') for emergency management on the basis of operational and drill experiences, legislation and international recommendations. The ÁVIT includes sets of procedures and implementation instructions relating to the operation of the Accident Response Organisation (the 'BESZ').

The primary purpose of the conditions and restrictions set out in the Technical Operation Rules (the 'MÜSZ') is to ensure that if they are fulfilled, no circumstances that may give rise to accident situations develop, and its purpose is also, in part, to mitigate the consequences of accident situations that may have developed.

In the case of beyond design basis breakdown situations, which also lead to a serious accidental release in addition to damage to the zone (the 'accident situations'), the ÁVIT describes the organisational structure applicable to the situation. In order to carry out the risk control activity efficiently, the Paks Nuclear Power Plant has established and operates an Accident Response Organisation (BESZ), which is described in detail in the Final Safety Report. The BESZ is an organisation with a purpose to meet the requirements outlined for beyond design basis breakdowns and to be set during accidents, designed for the case of the occurrence of unusual incidents, which works according to a peculiar control and management method.

The BESZ is suitable for handling industrial or natural disasters and nuclear emergencies in peacetime, and for starting the performance of operational defence tasks and performing the most urgent rescue and remedial works in time of war. It also performs the civil defence tasks specified by the nature, staff size and activities of the nuclear power plant.

The BESZ is responsible for continuously providing information about unusual incidents that have occurred at the site to cooperating organisations, and the nature, composition, magnitude and duration of radioactive releases posing a hazard to both the environment and the population. The sphere of

responsibilities and risk control activities of the BESZ is limited to response tasks performed at the site of the nuclear power plant. In cases beyond its capabilities, the BESZ may request external forces of assistance. At the site, the BESZ organisation directs and coordinates the risk control activities of its own and external forces of assistance.

The head of the BESZ is the head of the nuclear installation or the representative of the head fully authorised to take measures (Section 37(3) of Government Decree No 118 of 11 July 2011).

The responsible head on duty at the given time of the operating organisation (engineer on duty) is entitled to announce an extraordinary operating condition, and after the announcement, he or she may order the execution of operations, measures and modifications deemed necessary by him or her even without the authorisation and approval of the nuclear safety authority.

When an extraordinary situation or an emergency develops, the engineer on duty, as a sole responsible executive, directs the emergency response activities on the basis of the ÁVIT until the arrival of the senior standby officer or the head of the BESZ overtakes this role from him or her.

B.3.3.2-3 Statutory background of radiation protection

The regulation of radiohygiene belongs to the Ministry responsible for health care, while the technical aspects of the radiation protection of nuclear installations and radioactive waste repositories, to the HAEA. The issue of releases and thus the protection of the environment belong to the Ministry responsible for environmental protection; the responsibilities relating to the radioactivity of the soil, vegetation and food belong to the Ministry responsible for agriculture in the period reviewed by the report.

The Atomic Energy Act defines the statutory responsibilities of the users of nuclear energy and the authorities. The major regulations that are currently applied in the area of general radiation protection are as follows:

- Decree No 16 of 8 June 2000 of the Minister of Health on the implementation of certain provisions of the Atomic Energy Act lays down the basis of radiation protection following ICRP (International Commission on Radiological Protection) Recommendation 60 and the IAEA Safety Series-115 Recommendations. It contains commensurate regulation with the provisions of Directive 96/29/Euratom laying down general standards for the protection of the health of workers and the general public against the dangers arising from ionising radiation. The decree requires that a radiation protection service should be set up at all

installations applying nuclear energy. All users are obliged to prepare workplace radiation protection rules, which are approved by the National Public Health and Medical Officer Service. The annexes to the decree prescribe radiation exposure limits for the employees and the population, radiation safety principles for workplaces, procedures for radiation protection trainings, dosimetry checks, the treatment of radiation victims, the responsibilities of the radiation protection service, accident response and the special radiation protection regulations of nuclear power plants.

- Decree No 15 of 6 June 2001 of the Minister for the Environment derives the annual release limits based on the dose constraints determined by the National Chief Medical Officer's Office. Government Decree No 275 of 21 December 2002 on monitoring of the national radiation situation and radioactive material concentrations aims at transposing Recommendation 2000/473/Euratom of the European Commission into the Hungarian legal system. The recommendation, in which food is also included besides environmental components, prescribes the monitoring of radioactivity in the environment in order to estimate population exposure. The Government Decree has created a consolidated database and the organisation of the National Environmental Radiation Monitoring System with the following responsibilities:
  - collection of measurement results on dose rates of environmental radiation; radioactive isotopes in environmental components, food and building and raw materials; radon activity concentration; and the radioactive contamination of human bodies;
  - provision of information to the public about monitoring results;
  - cooperation in providing information to the European Commission;
  - publication of monitoring results in annual reports.

B.3.4 (Article 6(4))

Article 6 (4) Member States shall ensure that the national framework in place requires licence holders to establish and implement management systems which give due priority to nuclear safety and are regularly verified by the competent regulatory authority.

The Nuclear Safety Codes including nuclear safety requirements relating to the regulatory proceedings for the nuclear safety of nuclear installations, the

management systems of nuclear installations, and the performance and supervision of activities corresponding to the life cycle of nuclear installations are set forth in Annexes 1 to 10 (Section 3(1) of Government Decree No 118 of 2011).

In order to maintain defence in depth, the licence holder operates an efficient management system in accordance with the rules specified in Annex 2 and its Management is firmly committed to nuclear safety and to maintaining a strong safety culture (Section 7(5) of Government Decree No 118 of 2011).

Management systems of nuclear installations

The purpose of the relevant rules of the Nuclear Safety Code is to set requirements for the design, establishment, operation, evaluation and continuous development of a management system at the installation, which integrates safety, health care, environmental protection, physical protection, quality and economic elements in order for safety to be taken into consideration appropriately during every activity of the licence holder.

The principal goal of setting requirements for the management system is to take into consideration the impacts of the activities of the licence holder not in separate management systems, but by treating safety as an integral whole, thereby ensuring that nuclear safety is not damaged.

General requirements

The licence holder establishes, operates, evaluates and continuously develops a management system. This system has to conform to the objectives of the licence holder and has to support the achievement of these goals. The fundamental objective of the management system is to achieve and enhance safety by means of the following:

(a) consistent collection of all requirements for the operation of the licence holder;

(b) identification of the planned and systematic measures required for the fulfilment of these requirements with absolute certainty; and

(c) ensuring that the health, environmental protection, physical protection, quality and economic requirements are taken into consideration in accordance with the safety requirements by avoiding potential adverse impacts on safety.

Within the management system, safety has to prevail over all other requirements.

The management system has to identify and integrate the following requirements:

(a) statutory and regulatory requirements in force;

(b) all requirements declared by the parties concerned in connection with nuclear safety and approved by the licence holder; and

(c) international rules and standards adopted for application by the licence holder.

The licence holder has to certify the efficient fulfilment of the requirements of its own management system (Sections 2.1.1.0100 to 2.2.1.0400of the Nuclear Safety Code).

B.3.4.1 Description of the national management system

In the operation and development of management systems, nuclear safety is always the governing principle.

The design, manufacture, installation, assembly, commissioning, in-service inspections, testing, etc. of the given components are performed on the basis of the Nuclear Safety Codes and the associated guidelines. During the regulation of certain activities, the authority follows, in addition to the requirements of the Hungarian authority, the standards and guidelines of international organisations (e.g. IAEA) and countries with a leading role in the nuclear industry (e.g. USA). It is an important consideration that suppliers to the nuclear power plant may only be suppliers that hold a valid qualification for the relevant area.

The Atomic Energy Act prescribes that '[o]nly institutions, organisations and business organisations that have an **appropriate management system** may operate as part of activities relating to nuclear installations, systems and equipment'. Furthermore, the Atomic Energy Act requires that only individuals who meet the requirements set by the relevant detailed regulations in every respect, such as qualifications, personal and medical aptitude, etc. may be employed within the application of nuclear energy. The conformity of the management system needs to be examined and certified.

The management requirements for the operation of nuclear installations are set forth in Volume 2 of the Nuclear Safety Codes, which were set *on the basis of Code GS-R-3* of the International Atomic Energy Agency *and the WENRA reference levels and* by taking into consideration the specifications of *standard ISO 9001:2000.* The volume on quality management and the associated guidelines set the management requirements not only for the operator, but also its suppliers.

B.3.4.2 Role of the HAEA in the oversight of the management system

The Hungarian Atomic Energy Authority evaluates full compliance by MVM Paksi Atomerőmű Zrt. with the requirements set for the management system annually, as part of the Final Safety Report.

The authority performs comprehensive audits either as a system audit or a process audit. The audits are carried out in previously designated areas by internal auditors; the elimination of remarks recorded in the audit minutes is subject to reporting.

Planned inspections are performed on the basis of the annual inspection plan of the authority and according to the general overhaul decision on units under refuelling. Non-scheduled ad hoc inspections are performed in connection with incidents adversely affecting quality or upon individual designation by the authority.

The areas of the quality management system of the operator inspected by the authority are as follows:

- structure of the organisation,
- training and qualification of staff,
- internal regulatory documents of the licence holder,
- management of non-conformities,
- normal operation,
- maintenance and repairs,
- nuclear fuel management,
- selection of suppliers,
- design,
- acceptance at the manufacturers' premises,
- modifications.

The review of audits includes both management and independent audits. Inspections are carried out by the authority on the basis of written sets of procedures approved by the head of the authority and known to the licence holder.

The authority expects the licence holder to decide on corrective measures relating to the findings identified during the inspection of the authority. If no

measures are taken or they are inadequate, the authority orders the corrective measures in a specific decision.

B.3.5 (Article 6(5))

Article 6 (5) Member States shall ensure that the national framework in place requires licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to nuclear safety of a nuclear installation, laid down in paragraphs 1 to 4.

B.3.5.1 Obligations of the user of nuclear energy in respect of resources

The user of nuclear energy is responsible for the safe application of nuclear energy and compliance with the safety requirements.

The licence holder is obliged, within its sphere of activities, to provide the technical and technological, material and personal conditions for the safe application of nuclear energy and the maintenance and development of safety and to continuously monitor the radiation conditions in accordance with the latest verified results of science and international requirements and experience (Section 10 of the Atomic Energy Act).

The licence holder demonstrates as set out in this decree for the nuclear safety authority that it meets all of its obligations arising from its liability and certifies that it has the resources and conditions required for maintaining nuclear safety in the long term (Section 27(2) of Government Decree No 118 of 2011).

The Management also has to declare its commitment to the establishment, operation, evaluation and continuous development of the management system at all levels and has to provide appropriate resources for carrying out such activities.

Requirements for the provision of human resources

In the interest of safety, the possibilities and limits of human performance have to be taken into account throughout the service life of nuclear installations (Section 4(5) of the Atomic Energy Act).

Only individuals who have the educational level and qualifications defined by law and meet the conditions of employment prescribed by law and meet the prescribed health requirements may be employed within the application of nuclear energy (Section 11(1) of the Atomic Energy Act).

Persons who have committed the criminal offences listed item by item in Section 11(3) of the Atomic Energy Act, as adopted from the Criminal Code, may not be employed at nuclear installations and in positions relating to the regulatory inspection, design, construction, operation and modification of nuclear installations; the design, operation and maintenance of the physical protection system of nuclear installations; the maintenance of the nuclear system and system components; the use, storage, transport and transport escorting of nuclear radiation sources belonging to Categories I, II and III, closed radioactive radiation sources belonging to Hazard Categories 1, 2 and 3, and radioactive wastes belonging to Hazard Categories 1 and 2 defined by law; as well as the design, operation and maintenance of their physical protection systems. The employment of the employed persons in the positions referred to above requires a public security permit issued by the police under Section 11(5) of Act CXVI of 1996.

The required number and responsibilities of personnel on duty in the case of the various operating conditions have to be determined by taking into consideration that they should also be able to take the necessary measures during possible breakdowns.

The responsibilities for providing and managing resources, including human resources, are specified by the Nuclear Safety Code as follows:

- The senior management sets professional requirements for the employees at every level, and ensures, by providing training or taking other measures, that the required levels of knowledge and skills are attained and maintained, and evaluates the efficiency of the measures taken. The skills and expertise so attained have to be maintained continuously.

Further requirements for the personnel are as follows:

- Responsibilities, authorisations, subordination and superiority, and communications paths have to be clearly defined and documented for the employees.
- The organisational and operational rules of the licence holder have to include provisions for job descriptions. The rights, obligations, responsibilities, required competences and dependencies have to be specified accurately within the organisation of the licence holder from the individual to organisations of various sizes. The specification of the knowledge, skills and conditions required for filing the given position has to be mentioned in the job descriptions. The number and expertise of

the operating personnel required for safe operation have to be analysed systematically and in a way laid down in documents.

- The number and expertise of the operating personnel required and sufficient for safe operation and their suitability for work that is safe have to be certified in a regulated way and have to be presented in the Final Safety Report.
- The licence holder ensures the availability of operating personnel required and sufficient for safe operation. The licence holder has to have a long-term labour management plan for activities that are important from the point of view of nuclear safety. Human relations, primarily dependencies, and the effect of cooperation and communication have to be taken into consideration when the composition of the operating personnel is determined. The operating personnel have to meet the requirements for staff size, educational level, qualifications, skills, commitment to nuclear safety, health condition, physical and psychological aptitude, laid down in writing for the given task. These provisions have to ensure that the operating personnel are able to perform their tasks even in the case of design breakdowns, beyond design basis breakdowns and accidents. The fulfilment of the requirements has to be documented.
- The requirements for work and employees have to be identical irrespective of whether the work is performed by an employee of the licence holder or an employee of a supplier.

B.3.5.2 MVM Paksi Atomerőmű Zrt.

B.3.5.2-1 Financial resources of the licence holder

MVM Paksi Atomerőmű Zrt. entered into a power purchase agreement with MVM Partner Energiakereskedelmi Zrt. [MVM Partner Energy Trading Ltd.] for the sale of the electricity produced. The agreement provides for the sale of the energy produced by the generator to the trader until 2017.

B.3.5.2-2 Human resources of the licence holder

The Hungarian university system provides a wide range of professional knowledge during the training of mechanical, electrical and chemical engineers. At the Faculty of Mechanical Engineering of the Budapest University of Technology and Economics, students are trained in depth in power plants and nuclear power plants within subjects relating to energetics; in addition, there is a postgraduate course in nuclear engineering.

The headcount of MVM Paksi Atomerőmű Zrt. is 2533, of which 85 are employed in executive or managerial positions. The number of employees employed in operations is 854, the number of maintenance staff is 595, and the number of employees providing background support (security, technical, economic and HR activities) is 1084. 36 % of the employees of the power plant hold a higher education degree. At MVM Paksi Atomerőmű Zrt., 397 employees have passed a regulatory or advanced MVM Paksi Atomerőmű Zrt. authorisation examination.

The nuclear power plant's own specialist training system is described in detail in Section B.4.2.1 under 'B.4 Expertise and skills in nuclear safety (Article 7)'.

B.3.5.3 Radioaktív Hulladékokat Kezelő Kft. (Radioactive Waste Management Limited Company)

B.3.5.3-1 Financial resources of the licence holder

According to the relevant provision of the Atomic Energy Act, the Minister overseeing the Hungarian Atomic Energy Authority provides for the use of the Central Nuclear Financial Fund (Fund) operating since 1 January 1998. *As of 1 January 2014, the Ministry led by him or her has been responsible for the management of the Fund.* (Until 31 December 2013, the Hungarian Atomic Energy Authority managed the Fund.) The Fund is a segregated State fund, which is subject to the State Budget Act. Its primary goal is to finance the final disposal of radioactive wastes, the interim storage of spent fuel assemblies and *the closing of the nuclear fuel cycle*, and the tasks relating to the decommissioning of nuclear installations.

The institutions depositing wastes in the Radioactive Waste Treatment and Disposal Facility are bound by the obligation to make payments to the Fund as specified in the Annex to the Atomic Energy Act. For the nuclear installations financed from the central State budget (Budapest Research Reactor and Training Reactor), the central State budget covers the payments when such costs are incurred.

The amounts paid to the Fund have to be determined in such a way that it provides appropriate funds for financing the management of radioactive wastes and spent fuel assemblies and the decommissioning of nuclear installations. These funds cover the operating costs of the existing repositories and the subsidisation of municipal associations established for verification and information purposes.

B.3.5.3-2 Human resources of the licence holder

The Atomic Energy Act lays down that the body designated by the Government makes a proposal for the national policy and national programme for the management of radioactive wastes and spent fuel as well as for their review, furthermore, it provides for the performance of tasks associated with the final disposal of radioactive wastes, the interim storage of spent fuel, the closing of the nuclear fuel cycle and the decommissioning of the nuclear facility. Based on this, the Government has authorised the Director General of the Hungarian Atomic Energy Authority to establish an organisation for these activities. Radioaktív Hulladékokat Kezelő Közhasznú Nonprofit Kft. ('Radioaktív Hulladékokat Kezelő Kft.') so established performs the public tasks listed in the Atomic Energy Act, to be performed by the body designated by the Government, and, among other things, the non-profit activities under the Act on non-profit status as well as the tasks specified by the Government Decree on the designation, activities and funds of the body performing certain tasks relating to radioactive wastes and spent fuel as long-term responsibilities for such body.

The central office of Radioaktív Hulladékokat Kezelő Kft. is located in Budaörs, near Budapest. The directorates perform their management and administrative activities in Paks. The National Radioactive Waste Repository is located at Bátaapáti and the Radioactive Waste Treatment and Disposal Facility, in Püspökszilágy. A total of 207 persons work at the four sites, 88 of whom are armed security guards. The Interim Spent Fuel Storage Facility is operated and maintained by the personnel of the Paks Nuclear Power Plant under a contract, under the direction of Radioaktív Hulladékokat Kezelő Kft.

B.4 Expertise and skills in nuclear safety (Article 7)

Article 7 Member States shall ensure that the national framework in place requires arrangements for education and training to be made by all parties for their staff having responsibilities relating to the nuclear safety of nuclear installations in order to maintain and to further develop expertise and skills in nuclear safety.

The statutory background for the training requirements of the personnel of nuclear installations is provided by Act CXVI of 1996 on atomic energy (the 'Atomic Energy Act'), Government Decree No 118 of 11 July 2011 on the nuclear safety requirements for nuclear installations and the related regulatory activities ('Government Decree No 118 of 2011'), and Decree No 55 of 17 September 2012 of the Minister for National Development on special professional and in-service training of employees of nuclear installations and the sphere of specialists entitled to perform activities associated with the application of nuclear energy ('Decree No 55 of 2012').

B.4.1 General training requirements

The safe application of nuclear energy, including nuclear accident response, and the performance of related R&D tasks **have to be facilitated by** developing science and technology, the coordinated organisation of research work, the practical application of the results of domestic and international scientific research and the **training and in-service-training of specialists** (Section 4(8) of the Atomic Energy Act).

Those performing work on the basis of work organised within the application of nuclear energy or any other legal relationship participate in training and in-service training (the 'training') in accordance with the relevant legislation (Section 4(12) of the Atomic Energy Act).

Only persons who have the educational level and qualifications defined by law and meet the conditions of employment prescribed by law and meet the prescribed health requirements may be employed within the application of nuclear energy (Section 11(1) of the Atomic Energy Act).

It has to be ensured that the safety policy is known and understood by all employees and suppliers filling positions important from the point of view of safety in such a way that they can apply it appropriately during their activities (Section 8(2) of the Nuclear Safety Code).

The senior management of the licence holder is responsible for the availability of operating personnel holding an appropriate level of qualification and the required licences and for maintaining the qualification level of the operating personnel. The operating personnel have to be trained and qualified in such a way that they should be aware of the safety requirements and consequences of their activities (Section 8(5) of the Decree on the Nuclear Safety Code).

The senior management of the licence holder is fully responsible for ensuring that the required technical support is available in all areas relating to nuclear safety, provided either by its own employees or suppliers, throughout the existence of the nuclear installation (Section 12(2) of the Decree on the Nuclear Safety Code).

The operating personnel of the nuclear installation have to meet the requirements for headcount, educational level, qualifications, health condition and physical and psychological aptitude laid down in writing for the given task at all times (Section 12(3) of the Decree on the Nuclear Safety Code).

The licence holder has to have a comprehensive training policy (Section 13 of the Decree on the Nuclear Safety Code).

The licence holder ensures that only competent employees suitable for performing the activities and holding the required licences perform work at the nuclear installation (Section 29 of the Decree on the Nuclear Safety Code).

Decree No 55 of 17 September 2012 of the Minister for National Development has detailed provisions regarding the training and qualification requirements for the employees of all nuclear installations and special specifications for examinations in nuclear safety by the authority. Furthermore, it contains special requirements relating to the employees of the individual nuclear installation types and their training for the employees of the nuclear power plant and the research and training reactors as well as for the employees of the interim facility for spent fuel.

It contains the reporting obligations of the licence holder with respect to the aptitude and qualifications of the personnel. The licence holder of the nuclear installation is recommended to provide appropriately selected, qualified working staff who have the skills and experience specified in the job requirements for the safe, economical and reliable operation of the nuclear installation. To this end, it has to specify the jobs that are crucial and important for safety as well as the qualification and aptitude requirements for those filling such jobs. Decree No 55 of 2012 in force contains detailed rules for determining this.

In the case of **nuclear power plants,** the content requirements of the Preliminary and Final Safety Reports, while in the case of **research reactors and the interim facility,** those of the Final Safety Reports include the qualification requirements set for the operating personnel as well as the requirement of describing the procedures for trainings ensuring their fulfilment, the rules for their training programmes and experience feedback procedures. As part of this, the licence holder describes the training requirements for the operating personnel, compliance with the provisions of legislation, the training programmes ensuring the fulfilment of the training requirements, training procedures and experience feedback procedures in detail.

B.4.2 Licence holders

B.4.2.1 MVM Paksi Atomerőmű Zrt.

The power plant operates its own specialist training system, for which it also provides the financial, material and personal conditions. The specialist training system established at the Paks Nuclear Power Plant complies with the international requirements and the Hungarian legal rules. Following the **SAT (Systematic Approach to Training) methodology** preferred by the International Atomic Energy Agency, training is based on the analysis of job duties and systematically structured modular job-specific training programmes. Theoretical training is always followed by practical training. In addition to theoretical classroom training, the programmes also include practical training sessions held on the simulator, in the Maintenance Practice Centre or at the nuclear power plant. The training is completed by practical training in a real work environment. Each training phase ends with an examination; at the end of on-the-job training, the candidate obtains the right to work on his or her own at a company, advanced company or regulatory authorisation examination. The training does not come to an end upon obtaining a licence or authorisation for the job, but recurrent and refresher trainings and regular examinations are also carried out in addition to work. Periodic exams have to be passed every five years in the case of workers employed in positions subject to regulatory and advanced company licences, while it is every three years in the case of positions subject to company licences. The periodic renewal of medical and psychological aptitude is also a prerequisite.

The general procedures for the development and implementation of training programmes, the specification of positions and activities subject to obtaining special nuclear qualifications and the content elements of training programmes are described in the Nuclear Safety Code, the relevant Ministerial Decree

(Decree No 55 of 17 September 2012 of the Minister for National Development) and internal procedures.

The ***radiation protection training*** covers the widest range and the greatest number of employees. The education of those professionally engaged in radiation protection, the operating personnel, the maintenance staff and those engaged in technical support activities is performed separately. External employees engaged on a contractual basis also have to comply with the regulations on the fulfilment of the qualification and examination requirements.

MVM Paksi Atomerőmű Zrt. trains its specialists using its own resources and at its own training centres. All training infrastructure is available; the rooms of the training centres are well equipped. Teachers and instructors are competent and rated, in addition to being involved in education, they also carry out developments.

A full-scale unit simulator serving all four units has been in operation in the **Simulation Centre** since 1989. The simulator has been continuously developed, so it follows the modifications performed on the units. In addition to the training of control personnel, the simulator plays an important role in technological developments.

Put into operation with the support of the International Atomic Energy Agency in 1997, the **Maintenance Practice Centre** is unique in the world with its training workshops equipped with genuine primary circuit large equipment and mechanical equipment. Its special feature is that practice and training make use of full-scale inactive main primary equipment (reactor, steam generator, main circulating pump, etc.), equipment identical with the system components built in the process systems as well as training mock-ups.

Evaluation of training activities

The training system is suitable for meeting the recruitment needs determined by the HR Management Department, by carrying out basic general power plant and job-specific professional trainings. Those working in jobs determining the safe operation of the power plant receive systematically structured basic and recurrent training. These job training programmes are based on an analysis that ensures the full identification of the competences required for the performance of the tasks. Training materials and examination questions required for training and examination are available for carrying out the training programmes; their updating and maintenance are provided for. Training is performed in part by full-time teachers and instructors holding licences valid in the given fields and in part by invited specialists of the power plant. In addition to their professional

skills, the teachers also have pedagogical competence, which they obtain in the training programme called ‘rated teachers for the nuclear power plant’.

The power plant has the appropriate infrastructure for carrying out both theoretical and practical training.

Efficiency is ensured by the continuous development of the methodology and tools of training. The training organisation is able to perform the training tasks of large modifications and developments performed during refurbishments and projects or unusual incidents, as it is demonstrated, e.g. by the refurbishment of the reactor protection system, training associated with incidents involving Unit 2 and the introduction of Condition-oriented Operating Instructions. As an indirect consequence of the introduction of the latter, the regulatory examination of the unit control personnel has been supplemented with practical examination on a simulator, thereby the personnel also demonstrate, in addition to their theoretical knowledge, their ability to perform safe operation and the successful breakdown recovery in practice.

The training organisation is responsible, in addition to professional training, for keeping the knowledge of the personnel up-to-date in the area of the current, relevant Acts, decrees, external regulations and recommendations and for teaching changes in internal regulation in both technical and administrative areas.

B.4.2.2 Interim Spent Fuel Storage Facility

The training regulation of RHK Kft. reflects the training regulation of MVM Paksi Atomerőmű Zrt., but it fundamentally differs from it at the level of detail. The regulation prescribes that positions affecting nuclear safety through activities or decisions may be filled only by persons who have an appropriate educational level and qualifications. This requirement is true for both the employees of RHK and subcontractors. Training is carried out on the basis of the training policy and rules, which are regularly reviewed in order to establish coherence with legislation. Internal and external (e.g. MVM PA Zrt.) resources are used for training. All training activities (participation, examinations and their results) are documented. The documents are kept for 30 years.

The qualification requirements set for the personnel of the facilities of Phase I and II of the Interim Spent Fuel Storage Facility are established in accordance with the legal rules in force.

In its training policy, the Management of the RHK Kft. declares its commitment to ensuring the qualifications and competence required for work in order to ensure the safe management of spent fuel cartridges and radioactive wastes.

The Management of the RHK Kft. considers it necessary to ensure that its own employees and the employees of the contractors have high level qualifications required for performing their tasks and provide for maintaining the qualification level and its improvement in accordance with legislation, the standards, and the company's own quality, environmental and safety policies.

At the Interim Spent Fuel Storage Facility, only qualified employees, who have the required special skills, expertise and commitment to nuclear safety as well as have the prescribed medical and psychological aptitude, may fill responsibilities important from the point of view of safety.

In addition to trainings based on its own resources, RHK Kft. also uses trainings based on external resources. RHK Kft. verifies the fulfilment of the training requirements at its subcontractors, and regularly reviews the existence of the conditions of internal and external trainings and the conformity of the training programme.

A training officer provides for the fulfilment of the training requirements of the installation and the registration of the training plans of the organisational units.

The power plant provides the trained and examined personnel required for the safe operation of the Interim Spent Fuel Storage Facility, who meet the requirements and the requirements set in Acts and decrees applicable to the personnel, under a contract between MVM Paksi Atomerőmű Zrt. and RHK Kft. The fulfilment of the requirements is overseen by RHK Kft.

The maintenance of knowledge and skills to a satisfactory level is ensured by **recurrent trainings**. It has two forms: pre-planned or ad hoc. According to the annual programme, the pre-planned ones are those that are described after a change in the legislation or internal regulations relating to the safety and operation of the Interim Spent Fuel Storage Facility. Another form of recurrent trainings is the description of incidents and experience relating to operation and maintenance. The time of, and officer responsible for, these trainings are determined by the Chief Operations Officer or the Plant Manager of the Interim Spent Fuel Storage Facility. The operating and maintenance subcontractor prepares and implements an annual training plan for recurrent trainings as laid down in the contract.

The detailed evaluation of the performance of the specifications of the Nuclear Safety Code relating to the operation of the Interim Spent Fuel Storage Facility, the safety-enhancing measures and the grounds for them are set forth in the documents of the 2007 Periodic Safety Review.

B.4.2.3 Training Reactor of the Nuclear Technology Institute of the Budapest University of Technology and Economics

The training requirements for the personnel are detailed in the internal rules of the Training Reactor. The requirements are updated by the periodic review of the rules. The specifications of the Nuclear Safety Code are taken into consideration for the compilation of the requirements.

Recurrent training, which includes the areas of operation, industrial safety, radiation protection, fire protection, quality assurance and the accident response action plan, is carried out every month. For the compilation and regular review of the training programme, changes in the internal and external regulations are taken into consideration and the external experience available is integrated into it.

The system of periodic training and examinations contributes to the reinforcement of the personal aspects of reactor safety and the maintenance of the level of knowledge of the operating personnel.

The training includes external (e.g. Nuclear Safety Code) and internal rules in the areas of operation, radiation protection, industrial safety, fire protection and quality assurance. Training also includes the accident response action plan. Drills are also held at the prescribed intervals.

Training on the structure of the reactors and reactor physics is also regular. The utilisation of external experience is ensured by seminars held at institutes as well as participation in conferences in Hungary and abroad.

During the trainings, the entire prescribed curriculum is reviewed in the period preceding the periodic examinations.

B.4.2.4 Budapest Research Reactor

Training is based on the document entitled ‘Training and Examination Rules for the Operating Personnel of the Budapest Research Reactor’, approved by the authority.

Recurrent training is carried out similarly to that of the Training Reactor, which also includes the areas of operation, industrial safety, radiation protection, fire protection, quality assurance and the accident response action plan, on a monthly basis. For the compilation and regular review of the training programme, changes in the internal and external regulations are taken into consideration and the external experience available is integrated into it.

There are regulations for a number of activities (physical start-up, decommissioning, etc.), which mention that the employee concerned should

have an appropriate educational level and qualifications, and relevant training should be held prior to the individual operations and, if possible, they have to be practised under inactive conditions, too.

Considering the magnitude of the task and the importance of coordinating the work of a high number of participants, the head of physical start-up held seminars in the period preceding the start-up of the reactor, with practical training sessions separately for those making extrapolations, using previous extrapolations, and separately a summary seminar on start-up for all participants.

In addition to the technical solutions, the operating personnel are selected with great circumspection, while they are prepared, periodically engaged in in-service training and examined in a regulated way.

B.4.3 Training of the authority (Hungarian Atomic Energy Authority)

The authority has devised and implements a systematic training plan in the interest of the training and in-service training of nuclear inspectors. The plan is based on individual training profiles and consists of three basic training types:

- introductory training
- recurrent training and
- in-service training.

Those employed by the authority may perform regulatory activities on their own (licensing, inspection and evaluation according to the general rules of public administration) only if they pass a nuclear safety or nuclear materials inspector's examination.

The Organisational and Operational Rules of the HAEA mentions it among the basic principles of performing work tasks that the development of the work of the authority is carried out by the continuous training and in-service training of the staff and the improvement of the organisation of the work.

The training system of the HAEA has adapted and applies the Systematic Approach to Training (SAT) recommended by the International Atomic Energy Agency. The set of training procedures specifies the responsibilities of all participants in training (executives, designers, training officer, HR officer, officers providing financing and administrative support, teachers within the organisation and training participants). The systematic training method is applied as follows:

(a) analysis of the development of the knowledge profile of the institution and training needs;

(b) planning of training goals and programmes for the long and short run;

(c) development (devising) of a training system;

(d) implementation of the decided training programmes; and

(e) evaluation of the implemented training programmes.

The professional composition and level of the knowledge required at the individual organisational units are determined by the competent heads of division, mainly by applying one of the modules of the Knowledge Profile Database regulated in the set of training procedures.

The personnel of the authority also have to acquaint themselves with the practice of the installations and other applications. Such training is done mostly at the nuclear power plant and in a form which fits into the training system of the nuclear power plant (at training courses), since the nuclear power plant is the principal licence holder. Furthermore, international courses and on-the-job training are also given a role in this process, which is integral with the form of training carried out within the above-mentioned organised framework.

Monitoring domestic and international operating and other experience is also an integral part of the trainings. Liaison with the authorities of other countries, cooperation within the framework of international organisations and groups (e.g. IAEA, WENRA, OECD NEA and VVER Regulatory Forum), including participation in events and carrying out visits abroad, as well as receiving experts for the purpose of exchanging experience and training in Hungary form part of such monitoring. The relevant activities include the participation of the experts of HAEA in international review missions and consulting projects, too.

Introductory training is based on demand. The Knowledge Profile Database of the HAEA includes the areas of expertise in which the HAEA needs staff with relevant knowledge. The knowledge levels of the staff appear in the database in a verified manner, by subject area, on a scale assigned to it. The database also allows the ranking of the importance of the given knowledge. These form the inputs of the customised training programme, which is given separately to every staff member and which is approved by the head of the given administrative unit. The training programme includes deadlines for performance and examination methods. The introductory training is closed by an inspector’s examination.

In the training system of the HAEA, maintaining and transferring knowledge also play an important role. It is assisted by various means, such as databases

operating on a computer basis and a process facilitating the transfer of the knowledge of experienced staff.

The training activities, including the training of the authority's own staff, also have to conform to the general training system of government officials specified in legislation. Thus, learning public administration skills and in-service training in technical areas form part of the introductory training.

B.5 Information to the public (Article 8)

Article 8

Information to the public

Member States shall ensure that information in relation to the regulation of nuclear safety is made available to the workers and the general public. This obligation includes ensuring that the competent regulatory authority informs the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.

The purpose of the information provision activities of the HAEA is to facilitate and ensure the accurate and quick provision of information to the public and accessibility to the data of public interest managed by it in matters falling within its responsibilities, in accordance with the relevant provisions of the Constitution, legislation and international conventions. It is in the essential interest of the HAEA to let its activities become known and recognised in the widest possible range, therefore, it aims at providing open, sincere, competent and non-technical information in time about its policy, goals, tasks, their implementation, its decisions and all events and incidents falling within its sphere of activities and competence, which are of public interest.

One of the pillars of the information provision activity of the HAEA is its **website.** The most important news affecting the organisation, excerpts from the decisions of the authority, announcements, legislation applicable to the authority, legal restrictions on the area of application of nuclear energy, guidelines and other rules, recommendations, the official announcements of the authority, such as invitations to, and minutes of, public hearings, are published on the website of the authority. In compliance with the transparency requirements and the Electronic Freedom of Information Act, the internal regulations applicable to the operation of the organisation and data on financial operations and organisational and personnel information are also available on the website.

Another important pillar of the information provision activity is **a report on the safety of the application of nuclear energy in Hungary, to be submitted to the Government and Parliament every year**, the preparation of which is the responsibility of the HAEA.

The HAEA holds press conferences on a regular basis. At the year-opening press conference, the heads of the authority report the achievements of the previous year and present the major tasks of the new year to journalists; furthermore, press staff are invited separately in connection with every important event or incident, as it was done, e.g. in connection with Fukushima. The authority issues a press release about every event or incident of public interest. (It has a currently valid agreement with the Hungarian News Agency, which maintains a National Press Service. Through it, the HAEA can directly forward its announcements to editorial offices and journalists, thereby covering the whole country.)

The authority regularly holds awareness-raising conferences entitled 'About Nuclear Energy – To Everyone' (e.g. about radiation, the operation and safety of nuclear power plants, radioactive wastes and the utilisation of nuclear energy in the 21st century), where the participants not only receive information, but can also ask questions directly from the lecturers.

Within the Association of Hungarian Journalists, journalists dealing with nuclear issues have established a separate group, with which the HAEA maintains active relations.

The authority holds an open day once a year, where interested visitors may acquaint themselves with its work.

The authority sometimes invites the mayors of the municipalities in the vicinity of the nuclear power plant, primarily the municipal leaders of the town of Paks, for informatory discussions and, if so requested, also engages non-governmental organisations.

The 2013 amendment of the Atomic Energy Act prescribes that the authority is obliged to hold public hearings in connection with all licensing procedures described in the Act. This also meets the transparency requirements, allowing the population to directly ask the authority and the licence applicants about the details of individual cases and to be able to tell their opinion and comments.

The authority replies to every inquiry received (in writing or by telephone).

The authority issues electronic newsletters, from which those interested (subscribers to the newsletters) can hear of major events affecting the authority.

B.5.1 Information Strategy

1. The awareness about, and recognition of, the activities of the independent authority must be strengthened among the public, members of Parliament and

the Government, and other authorities and organisations. It must be attained that the HAEA is considered authentic and the primary source in the assessment of issues relating to the safety of the application of nuclear energy in Hungary.

2. More progressive, forecasting and preparatory information must be used.

3. Cooperation with the information organisations of ministries and authorities operating in the area of application of nuclear energy and of nuclear installations must be strengthened.

4. Public participation, in accordance with legislation, in the decision-making processes must be facilitated.

5. Preference must be given to forms of information provision where dialogues, asking questions and directly answering the questions asked are possible.

6. Every effort must be made to ensure awareness about, and recognition of, the activities of the HAEA in Hungary and internationally.

7. Procedures and methods must be developed for the evaluation of the information provision activity.

8. Increasing attention must be paid to the provision of information to the population living in the vicinity of nuclear installations by organising public meetings and presentations and through the participation of the authority in local events.

9. The most important means of providing information to the public are the media and the website of the HAEA. Every effort must be made to publish more news about the activities and events of the HAEA on its website, which must determine attitude towards the whole organisation. An effort must also be made to inform the media regularly, actively and proactively.

10. Executive decisions on the information provision activity of the HAEA must be assisted by periodic communication analyses and ones performed as required.

11. Well-considered, proactive and target group-based communication must be facilitated by detailed planning.

12. Every effort must be made to distribute publications electronically and to reduce the quantity of printed materials.

B.5.2 Basic principles

Openness and transparency: Publication and making available information, data and professional publications relating to the activities of the HAEA as well as

legislation and guidelines applicable to the nuclear field, and answering inquiries about data of public interest in accordance with the relevant legislation.

Authenticity: The information provided should be accurate and professionally well-founded and should be based on verified facts and measured values, which, if necessary, must be compared with the data of other countries or with the domestic and international regulations and requirements.

Impartiality: The information provided must be impartial and independent of views opposing to and supporting nuclear energy. The information provision activity must also reflect that the authority is independent of the bodies, organisations and views with interest and counter-interest in the application of nuclear energy.

Non-technical nature: The information provided about the application of nuclear energy and nuclear safety must be to a high professional standard but non-technical, which can also be comprehended and understood by non-specialists.

Speed: Information must be provided without delay about incidents relating to the application of nuclear energy, which draws the attention of the public, taking into consideration the relevant international conventions.

Independence: The information provision activity of the HAEA is determined by the fact that the HAEA is a professionally independent organisation.

The HAEA has a picture of the whole range of news relating to nuclear energy by means of press monitoring results received on a daily basis. One of the high priority goals of its information provision activity is to ensure that the information presented is correct, and the authority represents a point of orientation for journalists. However, this does not mean that we continuously respond to news presented in the media.

B.5.3 Target groups

Media

Press organs, editorial offices, journalists, news agencies and journalist associations.

Public

The general public, representatives of municipalities and local residents around nuclear installations, teachers and students, non-governmental organisations and groups of special interest or advocacy groups (non-profit organisations, civil associations and professional organisations).

State and professional partners

Licence holders, technical, medical and health experts, ministries and government bodies, parliamentary committees and Members of Parliament, Office of the President of the Republic, Office of the Ombudsman, specialist institutions, universities and technical support institutions.

International partners

International organisations, foreign authorities, embassies and consulates in Hungary and Hungarian embassies and consulates abroad.

B.5.4 Means and channels of information provision

Media communication: press conferences, press releases, interviews, information materials, news, articles and publication of announcements (of public interest).

Online communication: website, community website (Facebook) and electronic newsletters.

Internal communication: memoranda of management audits, internal databases and documents of the quality system.

Provision of information to the public: by organising awareness-raising conferences, open days, roundtable talks, public hearings, response to direct inquiries, provision of information to the local population around nuclear installations, public meetings and presentations, and by participating in local events.

Publications: brochures, information and awareness-raising materials.

Multimedia materials: introductory films, awareness-raising materials, media kits, video materials and video interviews made at events.

Reports: report to Parliament, CNS Country Report, JOINT Convention Report and IAEA country profile.

Liaison: with partner authorities, nuclear installations and the press officers of other organisations, bilateral and multilateral domestic and international talks.

Participation in events: professional events, domestic and international events to present the activities and role of the authority, events and visits organised by the HAEA in Hungary for domestic and/or foreign participants.

Annex: List of legislation

I. Acts

Act CXVI of 1996	on atomic energy
Act I of 1997	on the promulgation of the Convention on Nuclear Safety adopted in Vienna on 20 September 1994 under the auspices of the International Atomic Energy Agency
Act LXXVI of 2001	on the promulgation of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management under the auspices of the International Atomic Energy Agency
Act CXL of 2004	on the general rules of public administrative procedures and services
Act LXXXII of 2006	on the promulgation of the safeguards agreement and protocol on the implementation of Article III(1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons, and on the Additional Protocol to the Agreement
Act XX of 2007	on the promulgation of the International Convention for the Suppression of Acts of Nuclear Terrorism
Act LXII of 2008	on the promulgation of the amendment to the Convention on the Physical Protection of Nuclear Materials, adopted by the International Atomic Energy Agency (IAEA) in 1979 and promulgated in Decree-Law No 8 of 1987, signed on 8 July 2005 at the diplomatic conference organised by the IAEA
Act XLIII of 2010	on central administrative bodies and on the legal status of members of Government and secretaries of State
Act CXXX of 2010	on legislation

Act CXXXI of 2010	on public participation in the preparation of legislation
Act CXXVIII of 2011	on disaster management and the amendment of certain corresponding acts
Fundamental Law of Hungary (25 April 2011)	Fundamental Law of Hungary
Act CXCV of 2011	on the State budget
Act CXCIX of 2011	on public service officers
Act C of 2012	on the Criminal Code

II. Government Decrees

Government Decree No 275 of 21 December 2002	on the monitoring of radiation levels and radioactive material concentrations in Hungary
Government Decree No 323 of 7 December 2010	on the National Public Health and Medical Officer Service, the performance of public health administration tasks, and on the designation of the pharmaceutical administration body
Government Decree No 112 of 4 July 2011	on the responsibilities of the Hungarian Atomic Energy Authority associated with its European Union and international obligations relating to nuclear energy, the designation of expert authorities participating in the regulatory proceedings of the Hungarian Atomic Energy Authority, the amounts of fines that may be imposed and the scientific council assisting the work of the Hungarian Atomic Energy Authority
Government Decree No 118 of 11 July 2011	on the nuclear safety requirements for nuclear facilities and the related regulatory activities
Government Decree No 190 of 19 September 2011	on physical protection relating to the application of nuclear energy and the relating system of licensing, reporting and inspection

Government Decree No 368 of 31 December 2011	on the implementation of the State Budget Act
Government Decree No 368 of 31 December 2011	on the implementation of the State Budget Act
Government Decree No 273 of 28 September 2012	on the in-service training of public service officers
Government Decree No 155 of 30 June 2014	on the safety requirements for facility installations providing for the interim storage or final disposal of radioactive wastes and the related regulatory activities

III. Ministerial decrees

Decree No 16 of 8 June 2000 of the Minister of Health	on the implementation of certain provisions of Act CXVI of 1996 on Atomic Energy
Decree No 15 of 6 June 2001 of the Minister for the Environment	on radioactive releases into the air and water during the application of nuclear energy and their monitoring
Decree No 7 of 6 March 2007 of the Minister of Justice and Law Enforcement	on the rules of registration and inspection of nuclear materials
Decree No 55 of 17 September 2012 of the Minister for National Development	on special professional training and in-service training of employees of nuclear installations, and the sphere of specialists entitled to perform activities associated with the application of nuclear energy

IV. Decree-Laws

Decree-Law No 12 of 1970	on the promulgation of the Treaty on the Non-Proliferation of Nuclear Weapons adopted on 12 June 1968 at Session XXII of the General Assembly of the United Nations
Decree-Law No 28 of 1972	on the promulgation of the Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Seabed and the Ocean Floor and in the Subsoil Thereof adopted on 7 December 1970 at Session XXV of the General Assembly of the United Nations
Decree-Law No 8 of 1987	on the promulgation of the Convention on the Physical Protection of Nuclear Materials
Decree No 24 of 7 February 1990 of the Council of Ministers	on the promulgation of the International Convention on Civil Liability for Nuclear Damage adopted in Vienna on 21 May 1963

V. Resolutions of Parliament and Government

Resolution of Parliament No 10 of 24 February 2014	Rules of Procedure of Parliament
Government Resolution No 1144 of 7 July 2010	Rules of Procedure of the Government
Government Resolution No 1025 of 30 January 2014	on the amendment of Government Resolution No 1982 of 29 December 2013 on the procurement of equipment by bodies financed from the State budget within the budget headings controlled by the Government
Government Resolution No 1035 of 21 February 2012	on the National Security Strategy of Hungary