

## Terrorist threats of nuclear facilities

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*More than one year has passed since the terrible terrorist attacks against the United States. The tragic event fundamentally restructured our security policy approach and made requirements of countering terrorism a top priority of the 21st century.*

*In one year a lot of studies were published and the majority of them analyses primarily the beginnings of terrorism then focus on the interrelations of causes and consequences of the attacks against the WTC. In most of the cases the authors can only put their questions most of which have remained unanswered to date. Meanwhile, in a short while after the attacks the secret assessments of threat levels of potential targets and areas were also prepared.*

*One of the high priority fields is the issue of nuclear, biological, and chemical security, in short NBC-security. Here and now we focus on component N, that is the assessment techniques of nuclear security in short, without aiming at completeness. Our definite objective is to make non-expert readers understand – and present a concrete example as it is done in risk analysis – the real danger-level of nuclear facilities and especially the terrorist threat.*

*Our objective is not to give tips to terrorists but to provide them with deterring arguments and at the same time calm worried people.*

*In our communiqué we give an overview of international practice of nuclear antiterrorism and of preventive nuclear protection in Hungary.*

### Introduction

Let us begin with a brief “detour”. As experts – or, as some say, stubborn and wicked members of the nuclear lobby or even mafia – we are always sad to experience the widespread and general lack of information about nuclear technology. Certain time-servers exploiting this situation deliberately misuse this ignorance and as genuine soap-box speakers advertise false assertions trying to generate fear that is with deception or as they put it on “emotional grounds” do their best to turn the public against the utilization of nuclear energy.

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As opposed to their practice, in our opinion there is only one genuinely correct and acceptable method: to publish and disseminate real knowledge that helps the less informed people understand the key points, advantages, and risk factors of nuclear technology.

Let us begin with the most fundamental facts.

The proven fact and physical reality may seem unbelievable: even the cradle of mankind was embedded in radioactivity. It is no wonder since the Earth contained so called natural radioactive isotopes even in the time of its birth. These were, for example, carbon 14, which everybody breaths in and out nowadays too – though in tiny doses – or potassium 40, which is consumed together with salt.

Therefore radioactivity has been around since the very early times and mankind has been coexisting with it ever since although without knowing about it, as radioactivity was discovered only in the recent past. For that a certain Becquerel, an English physicist “is to blame” as he was the one who in 1896 discovered radioactivity. Nuclear physics developed at a rapid pace and in 1945 the first tragic experience of the “utilization” of nuclear energy came in Hiroshima and Nagasaki. That was another magnificent example of the human mind’s undisputable superiority in the series of victories over nature: the first beneficiary of high technology was, as usual, military ...

Until the peaceful utilization of nuclear energy, however, nearly two more decades would pass. That was the time when the first nuclear power plants were built. Today a significant part of the electric energy of the developed world comes from nuclear power plants, which provide a serious potential target for possible terrorist acts. And in the future this situation is about to deteriorate as after the forecasted exhaustion of fossil fuel in a few decades’ time no other mass energy source remains than nuclear energy.

Therefore, is a nuclear power plant – due to the colossal energy concentrated inside – a tempting target for terrorists? Will nuclear energy take mankind to its grave? Ad absurdum, will radioactivity escort the Earth from the cradle to its grave?

What are the chances of a successful terrorist attack against a nuclear power plant? Let us analyze the real chances and opportunities.

### **The security of nuclear power plants**

The peaceful utilization of nuclear energy began merely 50 years ago. Safety, security, protection of environment and population played an important role as early as during the planning and construction of the first generation of nuclear power plants. The “sensitive” character of nuclear technologies from the very early phases guaranteed that protection from unauthorized access was given a high priority every time. The Non-

proliferation Treaty aimed at the prevention of the proliferation of nuclear weapons and an international control system built for controlling the enforcement of the provisions of the Treaty played a decisive role in shaping the protection of nuclear materials and technologies. The protection of nuclear facilities and materials and its legal, institutional, and technical guarantees were established at high international standards.

Today there are 438 nuclear power plants and 248 research reactors in the world. The protection of these and other facilities of the nuclear fuel cycle – spent fuel rod storage sites, major medical, industrial and research sources of radiation – from commando actions or terrorist acts is planned and structured on the basis of international proposals all over the world. In the past decade due to the disintegration of the Soviet Union, Balkan Wars and terrorist acts the protection was reinforced everywhere; serious efforts were made for preventing penetration to nuclear facilities and in the field of increasing the security of nuclear and radiological materials. The September 11 2001 terrorist attacks in America created a dramatically new situation. The immediate measures taken by the Hungarian administration and the competent authorities increased the readiness according to the emergency situation and provided actual information to the public.

The present study focuses on the international procedures generated by nuclear terrorist threat; on the legislative, preventive, and defence aspects of national preparedness; on threat-level to and preventive protection of a nuclear power plant as a potential target of terrorist attacks.

As it will be shown, in Hungary the probability of a terrorist attack is rather low while the legislative, institutional, and technological pre-conditions of protection are high by international standards and both the operators and the authorities are capable of protection against a – rather improbable – terrorist attack and of disaster relief.

### **Counter-terrorist measures (International practice)**

Regarding nuclear counter-terrorist measures international procedures are fundamentally based on the opinion and assessment of three organisations and the propositions and counteractions of these institutions can be considered as standard.

These organisations are as follows:

- The most important is the international Atom Energy Agency because as a UN organisation, specialised in peaceful utilization of nuclear energy it unites all concerned nations of the world.

- The Nuclear Regulatory Commission – NRC – of the United States because it is the nuclear authority of the target country of the September 11 terrorist attacks and is directly involved in countering the new threats.
- OECD-NEA, which is the body of nuclear experts of the most developed nations with thousands of work years of experience in running nuclear reactors.

The counter-terrorist measures are somewhat differently approached by these three institutes, however, their basic assessment is clearly identical with the following fundamental elements:<sup>1-6</sup>

- The Kamikaze attacks present a new quality, a higher level of threat towards civil world, in particular the nuclear industry and against it the current preparedness may not be appropriate.
- The entire structure of energetics utilizing nuclear energy and that of the related branches need a comprehensive review with special regard to the prevention and repelling opportunities of the new threat.
- The new-type threat must not trigger a negative development tendency that is the elimination of potential terrorist targets (sky scrapers, power stations, dams, bridges) but should generate the defeat of terrorism itself.
- In this issue a higher level international cooperation and collaboration is necessary.

*The policy of the International Atom Energy Agency (IAEA)*

On November 30th 2001 the Steering Committee of the IAEA discussed the report “Protection from Nuclear terrorism” submitted by the Director General of the Board, which outlined the following forms of threat:<sup>2,5,6</sup>

- theft of nuclear weapons;
- obtaining nuclear materials;
- obtaining radioactive materials;
- terrorist attacks against nuclear facilities;
- increase of preventive protection and accident-prevention.

The pre-conditions of efficient countermeasures according to the IAEA are as follows:

- Increasing the efficiency of international cooperation for which IAEA provides all support;
- In the member states:
  - review of the risk from nuclear energy;
  - a general re-evaluation of the potential threat areas, finding weak points;

- Taking measures on the basis of the new situation, of its re-assessment.
- Increase of the IAEA budget, by 10-15% at the beginning, in order to provide the more efficient activity of the agency.

The ways and techniques of fighting nuclear terrorism identified by the IAEA are as follows:<sup>2,5,6</sup>

- Increasing the efficiency of the Non-Proliferation Treaty,
  - Unifying the Treaty by “herding the outsiders into the shed”;
  - A disclosure of uncontrolled materials and activities, deploying increasingly developed technical methods and tools.
- Prevention of the theft of nuclear weapons:
  - Member states are responsible for reviewing their own security and structural preparedness and for taking the necessary steps of development,
  - The IAEA provides all support.
- Tightening the safeguarding and protection of nuclear materials (unfortunately, the level of physical protection of nuclear materials is different among states and its correction is the responsibility of the member states).
- The ways of IAEA assistance are as follows:
  - Urgent modernization (tightening!) of the Convention on the Physical Protection of Nuclear Materials and enlarge its effect in the first round;
  - Sending an IPPAS (advisory) mission to the particular countries to disclose threats towards nuclear activities;
  - Providing assistance with identifying the origins of stolen (and found) materials with involving the related fields (e.g. safeguard).
- In the field of prevention of obtaining radioactive sources:
  - Unfortunately, the level of secure safeguarding of radioactive sources is also different in the member states which causes an enormous number of “lost and found” radiation sources;
  - The international regulations worked out by the IAEA are at appropriate level but there is a lack of precise regulations on a tighter control by the authorities. The Agency will supplement it shortly.
- In repelling terrorist attacks against nuclear facilities:
  - The protection of nuclear facilities is appropriate primarily, thanks to their robust structures but their vulnerability differs among countries and types of facilities (power plant, enriching facility, reprocessing plant);

- The IAEA plans a review of regulations related to the physical protection of facilities (construction, operation) to enlarge its services in order to promote reviews and reassessments executed in particular countries.
- In relation to nuclear facilities it is important to repeat and highlight that the Agency will modernize (tighten!) of the Convention on the Physical Protection of Nuclear Materials and enlarge its effect in the first round;
- In the field of preventive protection and accident-prevention:
  - On the one hand the Agency intends to develop the speed, efficiency, reliability and quality of its Accident-Prevention Centre and on the other hand offers these services to the member states (assessment, evaluation, training and education).

In order to achieve the above mentioned objectives the IAEA wishes to increase its budget by 10–15% and to establish a separate financial foundation for protection from nuclear terrorism.

*The policy of the United States Nuclear Regulatory Commission (NRC)*

The United States' Nuclear Regulatory Commission immediately realized the potential threat towards nuclear facilities after the terrorist attacks and took immediate steps.

High-priority measures:

- The operators (licence-holders) were requested to provide the highest-level protection for the concerned facilities;
- Governmental and national security involvement in the information flow and assessment on a permanent basis;
- An overall review of security regulations was launched from the aspect of the new-type threat.

In November 2001 NRC President Dr Richard Meserve outlined the fundamental security policy objectives of the institution in the field of protection from nuclear terrorist threat triggered by the new situation.

Therefore, the fronts of preparation and protection include the following factors:

*Risk-reduction and risk-evasion*

In this context *risk-reduction* includes the review of all those activities that involve an internal risk in all elements of nuclear power generation and – depending on the outcomes of the review – a rational reduction of these internal risks. It is the rational reduction that is highlighted as the partial activities and the power generation as such have to be considered when analyzing profit and loss. Similarly to the IAEA ideas here

it is also emphasized that no retrocession – that is the closing down of terrorist targets – can be possible.

On the other hand, risk-evasion means a complete elimination of the threat, that is the activity involving a risk-level, regardless to its usefulness. Simultaneously with fighting terrorism society should be informed on the positive and negative elements of nuclear risk in a new approach and have these elements accepted.

*The role of the licence-holders and the government in protection against terrorism*

For the protection of nuclear facilities from terrorism the NRC – involving safeguard, protection, energetics and secret service experts – has previously developed and introduced the Design Basic Threat, which is mandatory for the operations. These complex and secret data contain the tasks of the licence-holders in connection with the protection and can also be an orientation for the authorities to assess the potential threat.

However, all this cannot be managed in an unaltered way after the September 11 2001 terrorist acts as Kamikaze terrorist acts go beyond the previous DBT level planned for “peace-time” and also go beyond the scope of the licence-holders. A protection from aircraft attacks cannot be the responsibility of a licence-holder thus the government should take over that responsibility and obligation.

In the light of the above facts the NRC regards the review of DBT as its responsibility, now with the involvement of military experts. The determination of the final value, however, will also be a political decision – thus exceeding the scope of NRC – that is a government responsibility.

*A balance between security and openness*

Maintaining the trust of the population is a top priority for the NRC and a necessary element of this is openness on the decisions of the Commission. The NRC website is the most significant tool in this field. After the September 11 2001 attacks the NRC had to close down the site – for a while at least – and began to filter the information, running the most sensitive data on closed network.

The balance between openness and security must be given a second thought and a fundamental requirement is that from now on information must not present a security threat. The President of the NRC assured both the government and the licence-holders that – beyond his authority role – took up the role of the mediator too in this multilayered common thinking process.

One of the manifestations of this large scale common thinking is the study published in December 2001 by the Nuclear Energy Institute:<sup>7</sup>

The 24-page study gives a detailed answer to the proposal of high-ranking Congressmen, suggesting that the guarding and protection forces of nuclear facilities should be placed under government supervision. With regard to all the significant viewpoints the response was clearly negative: the proposed measure is rather unreasonable, as it would weaken and impede the preventive and protective capabilities of the well-prepared local forces.

*The policy of the OECD-NEA*

At the OECD-NEA experts' meeting in December 2001 there was a clear-cut standpoint on nuclear terrorism both in basic principles and in approaches:

- Preventive measures against external influences are the most important;
- The resistance capability of the containment against external impacts, including crashes of aircraft of various types (in this aspect as a “by-product” an extremely informative report was compiled on the resistance capabilities of containment of nuclear power plants in the member states and the restricted airspaces over and around nuclear power plants);
- The DBT must be reviewed and managed as a secret document and the necessary measures should be identified and taken on this basis;
- The structure and system of accident-prevention must be re-assessed.

In summary it can be stated that – although there is no panacea for nuclear terrorism, which can be applied by anyone and anytime – the Hungarian participation in international cooperation is an imperative. Although the above-mentioned institutions are slowly seeking ways and means from these sources a lot of useful information, guidance, and lessons can be learned.

**On Hungary's general terrorist threat in brief**

The assessment of the country's terrorist threat here should be limited only to the extent necessary for the evaluation of the nuclear security. The brief overview of Hungary's well-known and received terrorist threat assessment will be followed by a concrete analysis of the most typical Hungarian example of a nuclear facility, the Paks nuclear power plant.

*The general terrorist threat of Hungary*

It is a well-known and generally accepted fact that terrorist threat towards a country is determined by the following factors:



1. Does the country fit the enemy image of a terrorist organisation?
2. Does a particular terrorist organisation have operation capabilities in country?
3. What is the preparedness-level of the country?

As for the first factor, after the change of regime in Hungary – because of the transition of Russian Jews immigrating to Israel – the country got into the focus of the attention of certain Middle East terrorist organisations. An evidence for this is the bus-bombing at Ferihegy, which indicated the presence of the second factor.

In the past decade the terrorist threat of the country gradually decreased – particularly after Hungary’s NATO accession. This situation has not changed since the September 11 terrorist acts or the escalation of the Palestinian-Israeli conflict. It is generally accepted that Hungary nowadays is not a primary target country for international terrorist organisations thus the terrorist threat to the country is determined by the threat-level towards the neighbouring states, the European Union, and NATO.<sup>8</sup>

When analyzing terrorist threat a relatively new phenomenon the nearly worldwide antiglobalization movement should not be forgotten either. It has followers in Hungary too but on the basis of current information it can be claimed that there is no real danger of a violent action against the nuclear power plant.

#### *Characteristic types of terrorist acts*

##### *External attack*

Some actions of terrorist organisations can be classified as “external attacks” coming from abroad or from the peripheries of society and are aimed at a country or at the political, economic, ethnic, religious, or military representatives of that state. Their objective is intimidation, coercion, and grabbing the attention of the media. The tool of execution is usually explosive material, sometimes firearms. The victims are taken randomly who happen to be present on the scene of attack, randomly chosen persons, or symbolic objects. The attack against objects have always had some symbolic message as it was proven by the September 11 terrorist acts. Today nuclear facilities still do not have such a symbolic significance which relatively reduces the probability of an external terrorist attack.

##### *Sabotage*

In accordance with the Hungarian Penal Code sabotage includes the derangement of the operation of a public works (Art. 260) or one of its gravest consequences; causing public danger (Art. 259) This has not been characteristic for terrorism and these types of acts are fairly improbable in the case of nuclear power plants fall into the category of

“hard” ones thanks to their tight security. Nuclear transportations are also classified as “hard” targets thus a terrorist attack against them is also highly improbable.

*Individual actions*

Most terrorist acts are pre-planned therefore individual terrorist acts executed on individual decision are rather rare. Terrorist acts are not triggered by personal motivations. This is especially true in the case of nuclear facilities as only authorized personnel can enter them or one who is familiar with the circumstances, the operation of the facility, and the impacts of a potential nuclear contamination. Naturally, anything can go wrong but the probability is rather low here.

**A brief Hungarian overview of preventive nuclear protection**

*Legislative background*

The shaping of a new nuclear security and regulation system was launched on 1st July 1997 with the entering into force of Act CXVI of 1996 on the Nuclear Energy – Atomic Act. The new system takes into consideration the international recommendations and requirements of IAEA relating to the safety of utilization of nuclear energy, regularly reviewed and developed by the Agency.

The fundamental function of the AA is to protect the health and security of the population and of the environment. In accordance with its basic principle nuclear energy can be utilized only in accordance with laws and regulations whose enforcement is regularly controlled by the authorities and “during the utilization of nuclear energy safety is a top priority over any other factors”.

*Regulation and management*

The managing and supervision of the guidance of safe managing of the utilization of nuclear energy is the scope of the government in accordance with the AA. The National Atomic Energy Commission – a government advisory body – and NAE Agency were established on the provisions of the AA. Latter is a central administrative authority with independent function and scope of a government-controlled authority in the field of nuclear safety and security.

The AA provides structural and financial independence for the NAEA as the supreme nuclear safety and security authority from owners’, or service providers’ business interests and also from state administration authorities interested or counter-

interested in the utilization of nuclear energy – in accordance with international expectations.

On the basis of the AA nearly all executive law was created – these are government or ministerial decrees – therefore the governmental responsibility for the utilization of nuclear energy is guaranteed at a very high level.

#### *Licensing and control*

In the framework of the administrative structure supervising the safe utilization of nuclear energy it is the NAEA that bears the responsibility for tasks related to the security of nuclear facilities and non-proliferation of nuclear weapons. Under the AA the NAEA has the right to conduct checks at any of the utilisers of nuclear energy. For promoting nuclear security the NAEA regularly checks the observance of the provisions of law and regulations, the system of quality assurance of the nuclear facilities, the conditions on which the licensing is based, the execution of measures ordered by the Agency.

In enforcing the rules and regulations related to the physical protection of nuclear facilities and to that of radioactive and nuclear materials the police as a state administration organ plays an important role with its right to control and issue permission. Here and now, however, it will not be analyzed in depth.

#### *The functions of the utiliser of nuclear energy*

In accordance with the AA the utiliser of nuclear energy is responsible for the safe utilization, and during these activities the utiliser must provide and ensure all the technological, financial, and personnel conditions necessary for maintaining and developing safety level. The licence holder must work out, run, and further develop a system of quality assurance for the entire life span of the facility. It is also the licence holder's responsibility to take technological-organizational measures for the prevention of an emergency situation or a nuclear accident and also to prepare a plan and organisation for assessing, limiting, and defusing an existing nuclear emergency situation. It is also the licence holder's responsibility to submit regular and individual reports prescribed by Nuclear Safety Regulations, also to check the enforcement of these regulations.

#### *The physical protection of nuclear facilities, nuclear and radioactive materials*

The purpose of physical protection is to create the secure guarding and protection of nuclear facilities, radioactive and nuclear materials and to prevent these facilities or materials from getting out of safe control, to prevent unauthorized persons from getting

access to them. The tasks related to the protection and safeguarding of Hungarian nuclear facilities, to the transportation of nuclear materials are properly regulated by the AA and by the Decree of the Ministry of the Interior 47/1997 (VIII:26) on The Police Tasks Related to the Utilization of Nuclear Energy.

*Special techniques of guarding and protecting nuclear materials and facilities*

On the basis of the provisions of the AA the utiliser of nuclear energy must employ armed guard for the armed protection of nuclear facilities. The armed guard is under the official and administrative supervision of the competent county (or Budapest) police HQ.

On the basis of the AA and the relating MoI Decree the police issues a licence on activities connected to nuclear facilities. When issuing the licence the authorities should *check if the proper physical protection can be realized with special attention to:*

- securing personal and property protection, the order of storage and utilization in order to prevent unauthorized persons' access;
- the technical systems of the protection and safeguarding of nuclear facilities and the adjacent buildings, that of the radioactive waste dumps, and the personnel conditions. The facility must be equipped with technical security systems which prevent unauthorized access;
- the conditions and records of storage in order to provide the clear-cut identification of personal responsibility. The police prescribe the methods of keeping the records and the security measures to be taken during utilization;
- the order of entry and exit from the nuclear facilities, and radioactive waste dumps.

*Special personnel conditions of utilizing nuclear energy*

In accordance with the AA in utilization nuclear energy the rules are very strict: the employees must have proper professional education detailed in special law, meet other requirements detailed in other regulations and must be fit to fulfill medical requirements. The utilizer of nuclear energy is allowed to employ only persons who are prepared and qualified for this job and must also work out, organize, and run freshman and qualification courses.

The special conditions of employment are regulated by a MoI Decree which – as a part of the physical protection – practically declares a ban on the employment of persons with a criminal record, presenting a threat to public security. The employment in any field is possible only with police permission. It can be stated that legislation creates rather strict public security conditions for employees of nuclear facilities.

The health conditions are detailed in the differentiated prescriptions of the related laws, ranging from the simplest medical checkup to a certificate of psychological fitness – required in certain positions.

#### *Securing transportation*

The police issues permission for the transportation of new and spent nuclear fuel and in the case of radioactive materials – upon reaching a certain danger-level – determines the route of transportation (detailed in the so called escort licence). Providing the physical protection during the transportation of nuclear materials is a police responsibility. Direct safeguarding is executed by armed guards while the security of transportation is provided on the basis of a previously elaborated and classified plan. As the experience and the effective law indicate the proper protection level during the transportation of nuclear materials is ensured.

#### *Sanctioning unlawful acts*

Sanctioning unlawful acts make up an important part of the preventive protection. Act IV of 1978 on the Penal Code identifies three different categories of criminal acts in this field: abuse of radioactive material (Art. 264); abuse of operating a nuclear facility (Art. 264/A); and abuse of the utilization of nuclear energy (Art. 264/B). These are criminal acts that are penalized in accordance with international practice. There are two articles sanctioning crimes committed with radioactive materials: Article 270/A Para. (2) on threat to the public with radioactive material, and Article 281/A Para. (2) on the unlawful dumping of waste presenting a threat to the environment.

#### *Protection from the smuggling of nuclear and other radioactive materials*

The tools of struggle against the smuggling, use, transportation, “dissemination” – that is illegal trafficking – of nuclear or radioactive materials can be divided into three categories: prevention, detection, and response measures.

Prevention is the most important direct protection technique. The most efficient tools of prevention of illegal trafficking in radioactive and nuclear materials are the legal background and technological infrastructure of the particular country, the appropriate measures aimed at the physical protection, security of radiation sources, import/export permission and control. In Hungary the legislative environment and records are appropriate. Maintaining them, however, requires permanent attention.

For detecting illegal trafficking an efficient method is the control of borders with the use of dosimeters. This technique allows a discrete examination of cross-border traffic of persons, trucks, and freight trains. The rapid speed of the checks is paramount. The

control points should be set up at locations where the probability of detecting an illegal load of radioactive materials is the highest. These locations are customs areas of border crossing stations and around nuclear and radiological facilities.

The cases disclosed in Hungary to date induced efforts for enhancing the coherence of the response measures including the fine-tuning of legislative regulation, enlarging technological resources, and a wider international cooperation.

*The official and international control over nuclear materials*

The Non-proliferation Treaty came into force in 1970. In it the countries possessing nuclear weapons took responsibility for not passing on nuclear weapons to another country and countries not possessing nuclear weapons agreed on not producing such weapons. Some of these states also agreed on placing the entire nuclear activity on their territories, nuclear materials and facilities under the control of the International Atom Energy Agency. In accordance with this Treaty these states made a so called guarantee agreement on the control of enforcement of the Treaty. Hungary ratified the Treaty in 1972 (Law 9. of 1972). Some countries – e.g. India, Pakistan, or Israel – allowed the IAEA control over imported material and technology only.

The fulfillment of the guarantee agreement requires the signatory states to keep a record on the nuclear materials (uranium, plutonium, thorium) on their territories checked by the authorities, to assist to their international checks and participate in disclosing losses, unauthorized use, or theft. The records and their originality are checked by both the National Atom Energy Agency and the International Atom Energy Agency.

The frequency of checks/measuring is set on the basis of detecting the withdrawal of a sufficient quantity of nuclear materials – significant quantity – from peaceful utilization before the production of a nuclear weapon becomes possible.

The disclosure of nuclear programs kept in secret in Iraq and North Korea highlighted the necessity of the augmentation of security system. Therefore in 1997 under the aegis of the IAEA a complementary protocol was made to the security agreement, which allows the disclosure of hidden nuclear activity through the tightening of control system. The complementary protocol was pronounced in Hungary in Act XC on 19th October 1999.

The guarantee system of the IAEA is supplemented by the nuclear export/import control system which Hungary joined in 1985. Thanks to legislative regulation, regular official and international control in Hungary the safeguard standards are high therefore since the introduction of this system (1972) there has been no nuclear material lost or stolen.

*The Hungarian system of nuclear accident-prevention*

The Hungarian system of nuclear accident-prevention is responsible for preventing nuclear and radiological threat to the territory of Hungary, for the preparation to eliminating the consequences of a nuclear accident, or for the elimination/reduction of nuclear emergency. The system is divided into two significantly different parts: accident-prevention inside and outside the facility. For the first the management of the facility bears the responsibility while the latter one is organized into a nation-wide hierarchic structure. At national level it is the Governmental Coordination Committee that is responsible for preparation for nuclear accident-prevention. This is the committee that guides the preparation to and prevention of all types of nuclear accidents. The National Disaster Relief General Directorate and National Atom Energy Agency play an outstanding role in both the protection and preparation phases. During preparation these two agencies are responsible for the organization of training and exercising, the review of national plans, while during protection for the securing of technological, scientific and logistical background of decision-making.

The maintaining of contacts between Hungarian nuclear accident prevention and the IAEA is guaranteed by the rapid-information agreement. Hungary has made this agreement with nearly all of its neighbours and signed treaties of mutual assistance too. The Hungarian accession to the EU rapid-information system will be ratified in the near future.

The structure and practice of Hungarian nuclear accident prevention is in accord with generally approved international recommendations, primarily with the special publications of the IAEA, the OECD-NEA and the EU. Hungary is an active participant in all cooperation in the field of nuclear accident-prevention launched by the mentioned organisations and the lessons learned are incorporated into the Hungarian system.

**Summary**

Analyzing the current state of nuclear protection in Hungary and comparing it with the international standards it can be claimed that the Hungarian nuclear facilities have a solid multi-level system of preparedness, approved by the authorities, relating to nuclear security, physical protection, and accident-prevention.

This preparedness – taking into consideration the low probability of terrorist attacks against Hungarian nuclear facilities – counterbalances the possible weaknesses. These shortfalls can be identified by analyzing the technical details of the preparedness and this work has already been in progress.

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