



Hungarian Atomic Energy Authority

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Guideline PP-2

Detailed requirement levels for the systems, structures and components of the deterrence physical protection function

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FOREWORD FROM THE DIRECTOR GENERAL

The Hungarian Atomic Energy Authority (hereinafter referred to as HAEA) is a central state administration organ (a so-called government office) having nation-wide competence in the field of peaceful use of atomic energy; it operates under the direction of the Government, it has independent tasks and scope of authority. The HAEA was established in 1990 by the Government of the Republic of Hungary with Govt. decree 104/1990. (XII. 15.) Korm. on the scope of tasks and competence of the Hungarian Atomic Energy Commission and the OAH.

The public service of the HAEA as defined in law is to perform and coordinate, independently of organizations having interest in the application of atomic energy, the regulatory tasks in relation to the peaceful and safe use of atomic energy, including the safety of nuclear facilities and materials, nuclear emergency response and nuclear security, and the corresponding public information activity, and to make proposal to develop and amend, and to offer an opinion on proposed legislations corresponding to the use of atomic energy.

The fundamental nuclear safety objective is to ensure the protection of individuals and groups of the population and of the environment against the hazards of ionising radiation. This is ensured with effective safety measures implemented and adequately maintained in the nuclear facility.

The radiation protection objective is to keep the radiation exposure of the operating personnel and the public all times below the prescribed limits and as low as reasonable achievable. This shall be ensured in the case of radiation exposures occurring during design basis accidents, and as far as reasonably possible during beyond design basis accidents and severe accidents.

The technical safety objective is to prevent or avoid the occurrence of accidents with high confidence, and the potential consequences occurring in the case of every postulated initiating event taken into account in the design of the nuclear facility shall remain within acceptable extent, and the probability of severe accidents shall be adequately low.

The HAEA determines the way how the regulations should be implemented in guidelines containing clear, unambiguous recommendations in agreement with the users of atomic energy. These guidelines are published and accessible to every members of the public. The guidelines regarding the implementation of nuclear safety, security and non-proliferation requirements for the use of atomic energy are published by the director general of the HAEA.

FOREWORD

The internationally accepted bases of physical protection are represented by the Law Order 8 of 1987 on the promulgation of the International Convention on the Physical Protection of Nuclear Materials, the Act LXII of 2008 on the promulgation of the Amendment to the Convention on Physical Protection of Nuclear Materials approved in the frame of the International Atomic Energy Agency and promulgated by Law-decree 8 of 1987 amended by a Diplomatic Conference organized by the IAEA signed on July 8, 2005, and the Act XX of 2007 on the promulgation of the International Convention for the Suppression of Acts of Nuclear Terrorism.

The realization of the stipulations undertaken by Hungary, at the highest level, is represented by the Act CXVI of 1996 (hereinafter referred to as Atomic Act), which includes the fundamental security principles and establishes the frame of the detailed physical protection regulations.

The Govt. decree 190/2011. (IX. 19.) Korm. published based on the authorization of the Act (hereinafter referred to as Government Decree) establishes the legal requirements for the physical protection of the use of atomic energy and for the connecting licensing, reporting and inspection system.

The HAEA is authorized to develop recommendations regarding the implementation of requirements established in laws, which are published in the form of guidelines and made accessible on the website of the HAEA.

For the fast and smooth conduct of licensing and inspection procedures connecting to the regulatory oversight activity, the Authority encourages the licensees to take into account the recommendations of the guidelines to the extent possible.

If methods different from those laid down in the regulatory guidelines are applied, then the Authority shall conduct an in-depth examination to determine if the applied method is correct, adequate and full scope, which may entail a longer regulatory procedure, involvement of external experts and extra costs.

The guidelines are revised regularly as specified by the HAEA or out of turn if initiated by a licensee.

The regulations listed are supplemented by the internal regulations of the licensees and other organizations contributing to the use of atomic energy (designers, manufacturers etc.), which shall be developed and maintained according to their quality management systems.

Before applying a given guideline, always make sure whether the newest, effective version is considered. The valid guidelines can be downloaded from the HAEA's website: <http://www.oah.hu>.

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1. INTRODCUTION

1.1. Scope and objective of the guideline

This guideline contains recommendations on how to meet the provisions of the Decree.

It provides detailed guidance and practical examples regarding the deterrence function of the physical protection system; thus it supports the licensees to comply with the prescribed criteria.

1.2. Relevant legislation and other documents

Legal background of nuclear security requirements are provided by the Atomic Act and the Decree and the following provisions:

- a) Handbook on the physical protection of nuclear materials and facilities, IAEA-TECDOC-1276, 2002

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2. TERMINOLOGY

In addition to the definitions in Section 2 of the Atomic Act and Section 2 of the Decree, this guideline uses the following definitions:

Unacceptable radiological consequence: a consequence of sabotage directed against a nuclear facility, nuclear material, a radioactive source or radioactive waste is unacceptable if it cause or might cause nuclear emergency. Furthermore, if the sabotage causes substantial exceedance of the dose limits for individuals or group of individuals in a short period or it is suitable to cause such extra radiation exposure.

Warning sign: a tool visually indicating a sign and/or text regarding the boundary of a certain area, room or zone, rules of limitations, requirements and the code of conduct, as well as regarding bans and hazards.

Authority: the HAEA and the National Police Headquarters.

Fence: a structure spatially separating and providing boundary the site from public areas and from neighbouring real assets (Govt. decree 253/1997. (XII. 20.) Korm. on the national requirements for the development of settlements and for construction). With other words; fence is a line made of plants or a structure indicating the boundaries of the real asset.

Artificial barrier: such a structure located on the road towards a gate, which is able to prevent the forced break-through of a gate by a vehicle, or prevent or delay the intrusion by providing physical barrier between fences.

Protection fence: a reinforced, fully closed structure providing perimeter for the area and inner zones of the protected facility, which limits unauthorized access/regress to and from the protected area and zone; it includes check points (gate) of the access and regress control of personals and vehicles.

3. RECOMMENDATIONS OF THE GUIDELINE

3.1. General considerations

The deterrence physical protection functions aim at preventing the intention to commit unauthorized removal of nuclear or other radioactive materials and sabotage against nuclear facilities or materials at the time when such intention is evolved (in the planning phase of the adversary act), but latest when the illegal action is commenced.

The deterrence is effective, if the potential adversaries consider the given physical protection system as a hard target that can be defeated only with great efforts, and thus they give up their intention. An important aim of deterrence is to make the potential adversary recognize the negative effects of its act and thus to prevent its intention to commit the action.

The deterrence physical protection function cannot be easily measured, thus it should not be used as the only element of physical protection. The fact that a given physical protection system has never been challenged does not necessarily mean that the deterrence function works effectively.

The deterrence physical protection function should be realized by the obligants with such measures, protection forces, tools and procedures, which provide indication and information on the following:

- a) the given facility or material is specially protected against unauthorized removal,
- b) the adversary action may induce countermeasures even at the commencement of the act,
- c) the successful completion of the adversary act is doubtful.

Basically, the deterrence physical protection function needs the application of tools and measures that belong to the first line of defence, however it should be enforced in the second and other subsequent physical protection zones that are established according to the defence in depth principle.

3.2. Realization of deterrence

The Govt. decree requires that:

Section 8

The physical protection shall ensure that the:

- a) *deterrence,*

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- b) detection,*
- c) delay, and*
- d) response*

functions cooperate effectively according to the requirement of Annex 2 and 3.

Section 9

(1) Deterrence shall be implemented such a way that it enforces the adversary of the unauthorized removal or sabotage to give up the preparation for of execution of the intended act.

(2) Deterrence shall be implemented by the appropriate combination of the following items as specified in Annex 3 and 4:

- a) warning signs, notices,*
- b) sound and light signals,*
- c) well visible artificial obstacles,*
- d) awareness training, and*
- e) accountancy verification.*

The realization of the deterrence physical protection function is supported by the application of signs and indications providing clear presentation of hazards, limitations and the nature of protection. These tools have no role in the realization of other functions of the physical protection system, thus they can be exclusively used to perform the deterrence physical protection function.

Additionally, well visible artificial barriers (i.e. security fences, physical barriers and limitations), the appropriate application of internal administrative rules, as well as the establishment of a nuclear security culture greatly support the realization of the required level of deterrence.

The technical guidance regarding artificial barriers is provided in Guideline PP-4 "Detailed requirements for the systems, structures and components of the delay physical protection function".

This guideline provides guidance regarding these components only with regard to their role in the realization of the deterrence physical protection function.

3.2.1. Warning signs

The visual warning tools indicate signs and/or texts regarding the perimeter of a certain area, room or zone, rules of limitations, requirements and the code of conduct to be complied with, as well as regarding bans and hazards. They should be placed primarily at the main gate, at access points, in inner area, at zone

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boundaries and at the doors of protected rooms. They perform banning, directing and warning function. It is important that these signs should be unambiguous; they should provide clear and concise messages with the combination of presentation of images at proper viewing distance.

Their recommended realization at the main gate and access points should include:

- a) the name of the facility,
- b) warning on access rules,
- c) warning on forbidden tools and activities,
- d) warning on access rights,
- e) warning on obligations to be followed by those entering the area (e.g. opening of bags)
- f) the indication of a metal detector gate,
- g) the indication of a package checking equipment,
- h) warning on radiation hazard,
- i) the indication of an area under video surveillance,
- j) the indication of an area protected by physical protection system,
- k) warning on hazards and conditions of entering the area.

On inner areas, especially at the doors of protected rooms the warning signs should include indications on:

- a) access rights,
- b) hazards and conditions of entering the room,
- c) indication of an area protected by fire alarm system.

The following warning signs are recommended to be applied according to the various levels of physical protection:

1. Warning signs

At physical protection level A and B, depending on the actual circumstances, the following signs shall be applied:

- a) name of the facility,*
- b) warning on vehicle entrance rules,*
- c) warning on unpermitted tools and activities,*

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- d) *warning on entrance rights,*
- e) *requirements for the obligations of entering persons, especially for bag searching,*
- f) *indication of metal detector gate,*
- g) *indication of package checking device,*
- h) *warning on radiation hazard,*
- i) *indication of video surveillance area,*
- j) *indication of physical protection covered area, and*
- k) *warning of entrance hazards, indication of entrance conditions.*

At physical protection level C and D, depending on the actual circumstances, the following signs shall be applied:

- a) *name of the facility,*
- b) *warning on vehicle entrance rules,*
- c) *warning on unpermitted tools and activities,*
- d) *warning on radiation hazard, and*
- e) *warning of entrance hazards, indication of entrance conditions.*

3.2.2. *Artificial barriers*

The main types of artificial barriers are as follows:

Fences

A certain part of fences applied in the physical protection system shows the boundary of the protected area. It is important for the viewpoint of deterrence that the construction of the fence should clearly indicate the potential limitations, difficulties of a potential penetration; additionally it should indicate that the penetration will induce countermeasures. It is an important warning that the unauthorized entrance to the area entails violation of the law.

The fences should be constructed in compliance with the requirements of Govt. decree 253/1997. (XII. 20.) Korm. on national development of settlements and construction.

Traffic direction and limitation structures

Such tools (e.g. on the road leading to the main gate), which are able to prevent the aggressive break-through of the gate by a vehicle or (e.g. providing physical barrier between fences) able to prevent and delay access to the inner area. Their presence is well visible, thus they significantly participate in the realization of deterrence.

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A slowing down section (so called slalom road) should be established in front of the main entrance. This should significantly slow down the vehicles in order to prevent the aggressive (kamikaze) penetration and to facilitate the visual or instrumental inspection of the vehicle.

The traffic direction and limitation structures placed in front of the main gate and along with fences should prevent the aggressive penetration of a vehicle loaded with explosive materials to the site of the facility, and they should slow down the running of the adversaries.

The traffic direction structures may be mobile or fix.

Mobile structures are: road blocks or mobile fences.

The road blocks are able to stop vehicles immediately; they should be practical solutions to lock the road rapidly and to protect important buildings. If the vehicle drives to the structure, then its tyres will be damaged immediately and becomes incapable of going further. The road blocks are solid structures, which can be made of galvanized steel plates with stainless steel elements. The road blocks are stored and transported in a metal box, which can be easily loaded even to the trunk of a personal vehicle.

Their installation is very rapid and easy. A road block has two parts, which are connected by a short chain. The extendable length may change for easy tailoring according to conditions of a specific situation; it is typically between 3 and 5 m. Its use is recommended where the entrance of the protected area or the protected object is farther from the location of installation, since the vehicle to be stopped will move several meters beyond the point where the tyres were hit and damaged and it will drift in an uncontrolled manner.

Fix structures are: structures installed on the road that can be elevated from the road manually or by using remote control, and barriers made of concrete blocks. The rising and sinking road blocks can provide elevated level of physical protection against aggressive and unauthorized access and regress of vehicles by causing damage to their tyres, shafts and suspensions. The vehicle will be arrested immediately at the location of installation.

Barriers

A barrier has legal, administrative, entrance banning or allowing, movement direction governing functions, and thus supports the controlled access and regress to and from the protected facility. Barriers should be applied on the road leading to the main gate and between physical protection zones or fences, where their primary task is not to prevent the penetration to the protected area.

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3.2.3. *Accountancy verification*

The accountancy verification plays an important role in deterrence; primarily in preventing the unauthorized removal of nuclear and other radioactive materials, since if the existence and inventory of nuclear and radioactive materials are regularly verified, then the action will be revealed within a short period of time. The unauthorized removal of materials by an insider is usually realized during a long period of time by subsequent thefts of small portions of materials, thus the regular accountancy verification is the most effective deterrence method in such a case.

The requirements for accountancy verification are:

4. Accountancy and control requirements

8. At physical protection level A, the physical inventory of nuclear materials shall be verified in a documented manner at least once a week.

9. At physical protection level B, the physical inventory of nuclear and other radioactive materials shall be verified in a documented manner at least once every two weeks.

10. At physical protection level C, the physical inventory of nuclear and other radioactive materials shall be verified in a documented manner at least once every three months.

11. At physical protection level D, the physical inventory of nuclear and other radioactive materials shall be verified in a documented manner at least once every six months.