



Hungarian Atomic Energy Authority

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Guideline PP-5

**Determination of physical protection
zones**

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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 nationwide 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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Designation of physical protection areas

1. INTRODUCTION

1.1 Scope and objective

The guideline contains recommendations on how to comply with the regulations established in the Decree.

It provides detailed guidance on the arrangement of physical protection zones.

1.2 Corresponding laws and regulations

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

- a) Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5), IAEA Nuclear Security Series No. 13, IAEA, 2011.

2 DEFINITIONS

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.

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3 RECOMMENDATIONS OF THE GUIDELINE**3.1 Legal requirements**

The Decree provides that:

*14. §**Arrangement of Physical protection zones*

(1) Following the concept of protection-in-depth, physical protection zone or zones shall be developed within the area established for the physical protection of the nuclear facility, interim store and final repository of radioactive waste, nuclear material, radioactive source and for radioactive waste.

(2) The physical protection zones are as follows:

- a) limited access area;*
- b) protected area;*
- c) vital area; and*
- d) inner area.*

(3) Protected area shall be designated inside the limited access area; vital area shall be designated inside the protected area; while inner area shall be designated inside vital area.

(4) The physical protection areas shall conform to the physical protection levels determined in Section 7 as specified in paragraphs (5)–(8).

(5) As minimum, level D protection shall be ensured within limited access area. Nuclear material, radioactive source, radioactive waste requiring level D physical protection shall be located within limited access area.

(6) As minimum, level C protection shall be ensured within protected area. Nuclear material, radioactive source, radioactive waste that requires level C physical protection and such systems, structures and components, which are significant to radiological consequences and so require level C protection, shall be located within protected area.

(7) As minimum, level B protection shall be ensured within vital area. Nuclear material, radioactive source, radioactive waste that requires level C physical protection and such systems, structures and components, which are significant from

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the point of view of radiological consequences and so require level C protection, shall be located within vital area.

(8) Level A protection shall be ensured within inner area. Nuclear material requiring level A physical protection shall be located within inner area.

(9) Movement between two physical protection zones shall be possible only via access points in a controlled manner.

7. §**Required physical protection levels**

(1) During the use, storage and transport of nuclear materials, radioactive sources, and processing, storage and transport of radioactive wastes four levels of physical protection shall be developed according to sections (2)–(5) by ensuring:

- a) on physical protection level A: prevention of sabotage and unauthorized removal,*
- b) on physical protection level B: reducing the opportunity of sabotage and unauthorized removal,*
- c) on physical protection level C: reducing the opportunity of unauthorized removal, and*
- d) on physical protection level D: application of basic protection measures (i.e. prudent management).*

(2) Level A physical protection shall be ensured in the case of use, storage and transport of Category I nuclear material.

(3) Level B physical protection shall be ensured in the case of:

- a) use, storage and transport of Category II nuclear material,*
- b) use, storage and transport Category 1 radioactive source,*
- c) processing, storage and transport of Category 1 radioactive waste, and*
- d) transport of Category III nuclear material.*

(4) Level C physical protection shall be ensured in the case of:

- a) use, storage of Category III nuclear material,*
- b) use, storage and transport of Category 2 and 3 radioactive source, except for the use of sealed radioactive sources in portable devices outside the testing laboratory, and*
- c) processing, storage and transport of Category 2 and 3 radioactive waste.*

(5) Level D physical protection shall be ensured in the case of:

- a) use, storage and transport of Category 4–5 radioactive source except for the use of sealed radioactive sources in portable devices outside the testing laboratory,*

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- b) use, storage and transport of non-categorized nuclear materials, and
- c) processing, storage and transport of Category 4 radioactive waste.

(6) Concerning systems, structures and components significant to radiological consequences the level of physical protection shall be identical to that of the used or stored nuclear material and radioactive source, or processed, disposed radioactive waste, determined according to Sections (1)–(5).

(7) Concerning the physical protection during processing and transport of the radioactive source that was re-qualified to radioactive waste the requirements of the protection level of the radioactive source shall apply.

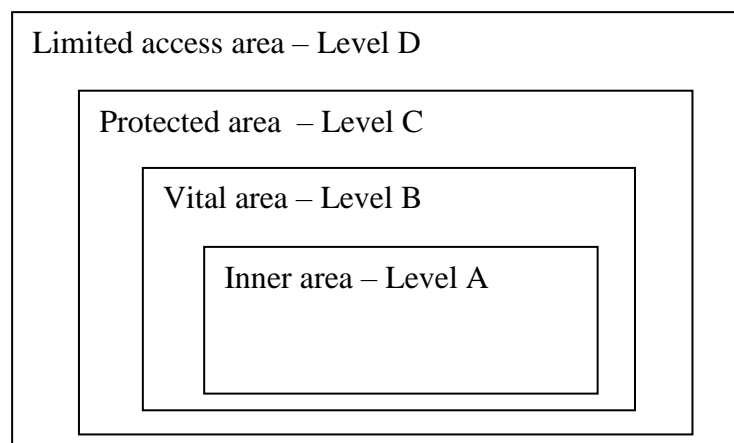
3.2 General considerations

Use or storage of nuclear or other radioactive materials or operation of a nuclear facility can be pursued within an area controlled from physical protection point of view. The area, where the physical protection system of the nuclear or other radioactive material or the nuclear facility is designed and operated is regarded as controlled area.

The structure of the physical protection system should be based on physical protection zones and the zones shall be compliant with the physical protection levels determined in Section 7 of the Decree.

The physical protection zones are as follows:

- limited access area
- protected area
- vital area
- inner area



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The protected area shall be designated inside the limited access area; vital area shall be designated inside the protected area; while the inner area shall be designated inside the vital area. Both the protected area and the vital area, where the use and store of nuclear and other radioactive materials or the operation of systems and components important to safety of nuclear facilities take place, are encompassed by a physical barrier/physical barriers.

In those cases, when sabotage against systems and components might entail unacceptable radiological consequences, then Physical protection level A, B, C or D should be appropriately selected, designed and maintained as required by the used, stored or transported nuclear or other radioactive materials.

The protected area should provide at least level C physical protection. Nuclear materials, radiation sources, radioactive wastes requiring level C physical protection should be placed within the protected area, as well as those systems and components requiring level C physical protection, sabotage against which might entail unacceptable radiological consequences.

The vital area should provide at least level B physical protection. Nuclear materials, radiation sources, radioactive wastes requiring level B physical protection should be placed within the vital area, as well as those systems and components requiring level B physical protection, sabotage against which might entail unacceptable radiological consequences and those systems and components, sabotage against which might entail unacceptable application-safety consequences.

The inner area should provide at least level A physical protection. Nuclear materials, radiation sources, radioactive wastes requiring level A physical protection should be placed within the inner area.

The physical protection areas should be designated in such a way that the potential targets are located within the area providing the required protection. Another aspect for determination of the areas is that a reasonable combination of the areas encompassing the targets requiring the same level of protection (for example more non-adjacent areas are placed within one vital area) can provide optimal protection against a credible attack. During the determination of the zones it should be taken into account that the designated emergency routes should go along along with the zone borders only for the shortest distance, cross them only in a minimum number and should not be used in an unauthorized manner (provided by appropriate monitoring).

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Unauthorized trespass between physical protection areas should be prevented.

3.3 Designation of physical protection areas

3.3.1 *Designation of the protected area*

The designation of the protected area might take place with in-depth knowledge of the use and store of nuclear or other radioactive materials or the processes of the nuclear facility.

Regarding the use and store of nuclear or other radioactive materials the protected area should be designated in such a way that it should contain all such areas of the use and/or store, which might take place by designating more non-adjacent protected areas within the same site or building.

Regarding nuclear facilities all such areas, where safety classified systems or components are located should be within the protected area. In a nuclear facility either a single protected area or more non-adjacent protected areas can be designated.

The protected area should be separated from its environment by physical barrier/barriers. Access to the protected area should take place only based on appropriate permit and with appropriate control.

3.3.2 *Designation of the vital area*

A vital area should only be designated within protected area and should be separated by physical barriers from that. There can be more non-adjacent vital areas inside the protected area.

Access to the vital area should be matter of a respective permit by trespassing the protected area in a controlled manner.

Designation of the vital area should be based on the determination of the so-called essential areas, which is a multistep assessment and analysis process.

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3.3.3 *Designation of the inner area*

The inner area should be designated within the vital area. All areas that serve to use and/or store nuclear material requiring Level A physical protection should be within the inner area.

The inner area should be arranged in such a way that its access should only be possible through trespass of the border of the protected and the vital areas, holding a permit and in a controlled manner.

Entrance to the inner area should be permitted via a lock system, through a door which provides an appropriate physical barrier in its closed state.

3.4 Documentation of designation of physical protection areas

Designation of the physical protection areas should be visualized on a site plan.