DRAFTING GROUP ON RECOMMENDATIONS FOR THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES

REPORT ON MEETING FROM 14 TO 17 APRIL 2009

The first meeting of this Drafting Group was held at the IAEA Headquarters in Vienna from 14-17 April 2009. Participants at this meeting were:

- Mr Sergio Solmesky (Argentina)
- Mr Axel Hagemann (Germany)
- Mr Takao Yagi (Japan)
- Mr Muhammad Khaliq (Pakistan)
- Mr John Matter (United States of America)
- Mr Denis Winter (AIEA/NSNS).

The meeting was chaired by Mr D. Winter, Office of Nuclear Security (NSNS), who opened the meeting by reading the Chairman's direction (sent by email the preceding week). The Drafting Group was governed by the Terms of Reference (TOR) agreed by the Working Group (see Annex A).

The first task assigned to this group through the TOR was to re-draft and re-arrange some parts of chapter 5 and 7 of the draft version dated 18th January 2009 and reviewed during the last Consultancy Meeting (2-6 of February 2009), in accordance with the remarks and comments detailed in Annex A of the Chairman's report.

The result of this task was a separate document attached in Annex B. Changes are highlighted in yellow in the proposed text. Two proposed modifications did not reach an agreement:

- the requirements related to the use of material control and accountancy system for detecting theft of nuclear material (5.2.1.1.),
- the future of detail information contained in articles 5.2.3.11. and 5.2.4.1.

During this task, some comments were also expressed concerning:

- the consistency between the definition of "nuclear facilities" and the terms "use and storage" for describing the different activities done in nuclear facilities;
- the necessity to review some definitions such as "protected area" and "inner area";
- the necessity to review some titles of chapter such as "mitigation and minimizing radiological consequences …".

The second task assigned was to propose a new generic chapter containing requirements on the protection of nuclear facilities against unauthorized removal of nuclear material and on sabotage of these facilities.
A discussion took place on the content and on the structure of this generic chapter. Work commenced on the text proposed by the Agency during the last consultancy meeting structuring this chapter in specific elements of the physical protection system (protected area, central alarm station, inner and vital area, guards, contingency planning and performance testing). The result of this task is at Annex C, presenting similar current requirements appearing in chapter 5 and 7 and the new text proposed for chapter 5.

During this work, four main issues were raised:

- the fact that requirements from chapter 5 have been updated several times while those for sabotage have not been yet reviewed. So, there is now a lack of consistency between the two chapters;
- according to the previous remark, some other requirements have been moved from previous chapter 5 to chapter 4, and some repetitions appeared in chapter 7 (i.e. 7.2.1.24);
- the need to revise chapters 5 and 7 in accordance with the generic requirements chapter, before making a final decision to accept this approach;
- the possibility to do a similar generic chapter on transport should be studied.

The next step of this work for a new chapter was to identify or draft text with a common wording of each requirement. Due to time constraints, the text in Annex C is a first draft that has not received a thorough review.

The third task – to identify details information in the draft text – was not done due to a lack of time.

The drafting group also discussed the next work to be done by it. A proposal was agreed to review the part of chapter 7 on sabotage of nuclear facilities in the light of the draft implementing guide on Physical Protection of Nuclear Facilities and Nuclear Material against Sabotage. The work to be done will be:

- to delete requirements which already appeared in chapter 4 and which have been moved in the new generic chapter;
- to move general requirements from the implementing guide and combine them with those already in chapter 7.

The IAEA scientific secretary proposed to organize the next meeting of the Drafting Group from 8 to 12 of June 2009.

Finally, it was suggested that the next consultancy meeting (14 and 15 of May 2009) should discuss:

- the two proposed texts by the Drafting Group and approved modifications;
- the comments made by the drafting group; and,
- a new terms of reference for the next meeting of the drafting group.

28 April 2009

ANNEX A

TERMS OF REFERENCE
DRAFTING GROUP OF THE WORKING GROUP ON RECOMMENDATIONS FOR THE PHYSICAL PROTECTION OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES

TERMS OF REFERENCE

Purpose

The Drafting Group is established to accelerate the work of drafting Recommendations for the Physical Protection of Nuclear Material and Nuclear Facilities (to also serve as INFCIRC/225/Rev.5) which may obtain broad consensus at a forthcoming Technical Meeting. Working under the direction of the Working Group Chairman, the drafting group will:

- Re-draft text contained in the "Working Draft for the Revision of INFCIRC/225/Rev.4" dated 18 January 2009 in accordance with agreements recorded in the Chairman's Report of Working Group meetings following the Working Group's review of this text;
- Draft for the Working Group's consideration a new Chapter containing recommendations extracted from Chapters 4, 5 and 7 of the "Working Draft" which are generic to the protection of nuclear facilities by operators against unauthorised removal of nuclear material and sabotage of these facilities;
- Identify for the Working Group detailed text contained in this "Working Draft" which may not be consistent with confining recommendations to those which subscribe to a performance based approach and which are written in a general descriptive format to provide flexibility for States to interpret the recommendations in their national legislations;
- Undertake such other tasks assigned to it in future by the Working Group, such tasks being detailed in the Chairman's Report of the Working group meetings; and
- Make proposals to the Working Group for any additional work it considers might be undertaken to facilitate production of a high quality draft Recommendations document.

Membership

The Drafting Group will comprise one representative from the United States of America, the Russian Federation, a European Union Member State (to be mutually agreed between these Member States), India, Pakistan, Japan and Argentina. Such representatives should ideally also be representatives of the Working Group.

Support

The Agency Secretariat will provide necessary support to facilitate productive meetings of the Drafting Group, including administrative and secretarial assistance.

Methods of work

Meeting as necessary following each Working Group meeting, the Drafting Group will:

- Determine its own working procedures;
- Only undertake work within its Terms of Reference;
- Ensure that revisions of the "Working Draft" produced by it are annotated to indicate, as appropriate, the original paragraph number of the "Working Draft" and of INFCIRC/225/Rev.4; and
- Report on the outcome of its deliberations to the Working Group in a manner such that its report is available to Working Group members at least 3 weeks before the next meeting of the Working Group.

23 March 2009

ANNEX B

PROPOSED CHANGES IN DRAFT VERSION 18/01/09
(PARTS OF CHAPTER 2, 3, 5 AND 7)

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- **Note: New suggested text is in RED**
- **Note: Original INFCIRC/225/Rev.4 text is in BLACK**
- **Note: Original INFCIRC/225/Rev.4 text to be deleted is strike-through ~~BLACK~~**
- **Note: The right hand column identifies the Section and Subsection numbers for identity of original text in INFCIRC/225/Rev.4.**
- **Note: Text highlighted in yellow reflects changes proposed by the Drafting Group, 14-17 April 2009, in Vienna**

2. DEFINITIONS	
2.1. ACCESS DELAY: The element of a *physical protection system* designed to impede *adversary* penetration time for entry into and/or exit from the *nuclear facility* or *transport*. *Access Delay* can be accomplished by *physical barriers*, *activated delay*s, and/or personnel.	
2.2. ACTIVATED DELAY: A device or system that can be activated to impede *adversary* access to *nuclear material*, *malicious acts* involving *nuclear material* and /or removal of *nuclear material*	
2.3. ADVERSARY: A person planning or performing a *malicious act* in pursuit of interests antagonistic to those of a facility or *transport. An adversary* might be a person without authorized access to a *nuclear facility* or *transport*, or an *insider*.	
2.4. ASSESSMENT*:* The determination by a *guard* or an electronic system of the cause of an alarm and the extent of the *threat*.	(2.1.)
2.5. CARRIAGE: The conveying of goods from one place to another.	
2.6. CARRIER: Any person, organization or government entity licensed or authorized for undertaking the *carriage* of *nuclear materials* by any means of *transport.*	
2.7. CENTRAL ALARM STATION: An installation which provides for the complete and continuous alarm monitoring, *assessment* and communications with *guards*, facility management and the *response force*.	(2.2.)
2.8. COMPENSATORY MEASURES: Temporary security activity designed to afford appropriate protection for security interests when a protection system element has failed or a new requirement or changing *threat* has been identified.	
2.9. COMPETENT AUTHORITY: An organization of the State legally designated or otherwise recognized as such by the State that has been assigned authority and responsibility for implementing laws and regulations within a designated area or field.	

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2.10. CONVEYANCE: For *transport* (a) by road or rail: any vehicle used for *carriage* of *nuclear material* cargo; (b) by water: any seagoing vessel or inland waterway craft, or any hold, compartment, or defined deck area of a seagoing vessel or inland waterway craft used for *carriage* of *nuclear material* cargo; and (c) by air: any aircraft used for *carriage* of *nuclear material* cargo.	
2.11. CYBER SECURITY: The protection of information, computer systems, computer networking, digital instrumentation and control systems, or software systems against *unauthorized access* to or modification of information, whether in storage, processing, or transit, against potential vulnerabilities including loss of accountability for information and user actions, denial of service to authorized users, loss of control, and any other impacts on the safety, security and emergency preparedness of a *nuclear facility* including those measures necessary to protect against, detect, and counter such *threats*.	
2.12. DEFENCE IN DEPTH: A concept used to design *physical protection systems* that requires an *adversary* to overcome or circumvent multiple obstacles, either similar or diverse, in order to achieve his objective.	(2.3)
2.13. DESIGN BASIS THREAT: The attributes and characteristics of potential *insider* and/or external *adversaries*, who might attempt *unauthorized removal* of *nuclear material* or *sabotage*, against which a *physical protection system* is designed and evaluated. A *design basis threat* is derived from the State's evaluation of the *threat*.	(2.4.)
2.14. DETECTION: A primary function and process of physical protection that begins with a device or person sensing a potentially *malicious* or otherwise unauthorized act, and that is completed with the *assessment* of the cause of the alarm.	
2.15. FORCE-ON-FORCE (FOF) EXERCISE: A *performance test* of the *physical protection system* that uses designated personnel in the role of an *adversary* force to simulate an attack consistent with the *threat* or *the design basis threat*.	
2.16. GUARD: A person who is entrusted with responsibility for *patrolling*, monitoring, assessing, escorting individuals or *transport*, controlling access and/or providing initial response. When possible and appropriate, the *guard* should be armed.	(2.5.)
2.17. INNER AREA: An area with additional protection systems inside a *protected area*, where Category I *nuclear material* is used and/or stored.	(2.6.)
2.18. INSIDER: Any individual with authorized access to *nuclear facilities* or *transport* who could attempt *unauthorized removal* or *sabotage*, or who could aid an external *adversary* to do so.	

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2.19. INSPECTION: A systematic examination of one or more areas including management and planning, personnel, procedures, administrative operations, training, maintenance, equipment, software, systems and facilities.	
2.20. INTRUSION DETECTION: *Detection* of an intruder by a *guard* or by a system ~~comprising~~ comprised of: • a sensor(s), • transmission medium and control panel to annunciate an alarm, and • means to assess the cause of the alarm.	(2.7)
2.21 MALICIOUS ACT: An attempt to accomplish *unauthorized removal* of *nuclear material* or *sabotage* of a *nuclear facility or nuclear material* in use, storage, or *transport*.	
2.22. MATERIAL CONTROL AND ACCOUNTING SYSTEM: An integrated set of measures designed to provide information on, control of, and assurance of the presence of *nuclear materials*, including those systems necessary to establish and track *nuclear material* inventories, control access to and detect loss or diversion of *nuclear material*, and ensure the integrity of those systems and measures.	
2.23 NUCLEAR FACILITY: A facility (including associated buildings and equipment) in which *nuclear material* is produced, processed, used, handled, stored or disposed of, if damage to or interference with such a facility could lead to the release of significant amounts of radiation or *radioactive material*.	
2.24. NUCLEAR MATERIAL: Plutonium except that with isotopic concentration exceeding 80% in plutonium-238; uranium-233; uranium enriched in the isotope 235 or 233; uranium containing the mixture of isotopes as occurring in nature, other than in the form of ore or ore-residue; any material containing one or more of the foregoing.	
2.25. NUCLEAR SECURITY: The prevention and *detection* of and response to *theft, sabotage*, *unauthorized access*, illegal transfer or other *malicious acts* involving *nuclear material*, other radioactive substances or their associated facilities.	
2.26. NUCLEAR SECURITY CULTURE: That assembly of characteristics, principles, attitudes and behaviors of individuals, organizations and institutions, which serves as a sustainable means to support and enhance *nuclear security,* and ensures that it receives the attention warranted by its significance.	
2.27. OPERATOR: Any person, organization, or government entity licensed or authorized for undertaking the operation of a *nuclear facility*.	
~~**2.28. PATROL:** A function carried out by *guards* to inspect elements of physical protection at regular or~~	(2.8.)

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~~irregular intervals.~~	
2.29. PERFORMANCE TESTING: ~~The assessment or evaluation~~ Testing of the *physical protection system* element(s) and the total system ~~under realistic conditions~~ to ~~ascertain~~ determine whether or not they are implemented as designed; adequate for the proposed natural, industrial and *threat* environments; and in compliance with established performance requirements.	
2.30. PHYSICAL BARRIER: A fence or wall or a similar impediment which provides penetration delay and complements *access control*.	(2.9.)
2.31. PHYSICAL PROTECTION MEASURES: The personnel, procedures, and equipment that constitute a *physical protection system*.	
2.32. PHYSICAL PROTECTION REGIME: A regime including: • the legislative and regulatory framework governing the physical protection of the *nuclear material* and *nuclear facilities*; • the institutions and organizations within the State responsible for ensuring the implementation of the legislative and regulatory framework; and • facility-level and activity-level *physical protection systems.*	
2.33. PHYSICAL PROTECTION SYSTEM: An integrated set of *physical protection measures* intended to prevent an *adversary* from completing a *malicious act*.	
2.34. PROTECTED AREA: An area with *physical protection systems*, under surveillance, containing any of the following: *inner areas (Category I nuclear material)*, *vital areas*, and areas containing ~~or~~ Category II *nuclear material* surrounded by a *physical barrier*.	(2.10.)
2.35. QUALITY ASSURANCE: An effort Including all policy, programmes and actions that ensure the adequacy of the *physical protection system* in design, implementation, and operation. The existence and adequacy of these actions to meet protection requirements is verified by periodic *inspections.* A process is maintained for identifying and *evaluating* deficiencies, and monitoring corrective actions.	
2.36. RECEIVER: Any person, organization or government entity which receives a consignment of *nuclear material*.	
2.37. RESPONSE FORCES: Persons, on-site or off-site, who are armed and appropriately equipped and trained to counter an attempted *unauthorized removal* of *nuclear material* or an act of *sabotage*.	(2.11)
2.38. SABOTAGE: Any deliberate act directed against a *nuclear facility* or *nuclear material* in use, storage or *transport* which could directly or indirectly endanger the health and safety of personnel, the public or ~~and~~	(2.12)

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the environment by exposure to radiation or release of radioactive substances.	
2.39. SECURITY PLAN: An approved document between the appropriate *competent authority* and *operator* and/or *carrier* regarding what *physical protection measures* must be present for *nuclear facility* or *transport* operations to be approved. A *security plan* includes sections dealing with design, evaluation, implementation, maintenance of the *physical protection system,* and with emergency management for response to malicious acts.	
2.40. SECURITY SURVEY: A detailed examination made by the State's *competent authority*, of proposed *physical protection ~~measures~~ systems* in order to evaluate them for approval.	(2.13.)
2.41. SHIPPER: Any person, organization or government which prepares a consignment of *nuclear material* for *transport*.	
2.42. SUSTAINABILITY: The continuous capability, as ensured by training, testing, and maintenance, of a State's *physical protection regime*, together with the *operator's* physical protection system at a *nuclear facility* and/or a *carrier*'s *physical protection system* during *transport*, of satisfying all performance and prescriptive requirements.	
2.43. THREAT: An entity with motivation, intention and capability to commit a *malicious act.*	
2.44. THREAT ASSESSMENT: A State's evaluation of the actual or potential *threat*, based on available intelligence, law enforcement, and open source information, that describes the motivations, intent, and capabilities of the *adversaries*.	
2.45. TRANSPORT: International or domestic *carriage* of *nuclear material* by any means of transportation, beginning with the departure from a facility of the *shipper* and ending with the arrival at a facility of the *receiver*.	(2.14.)
2.46. TRANSPORT CONTROL CENTRE: An installation which provides for the continuous monitoring of *transport* vehicle location and security status and for communication with the *transport* vehicle, its *guards*, the *response forces* and the *shipper/receiver*.	(2.15.)
2.47. TWO-PERSON RULE: A procedure that requires at least two authorized and knowledgeable persons are present to observe and verify that access and activities to *nuclear materials* and *nuclear facilities* are authorized, and to detect access or actions that are unauthorized.	
2.48. UNACCEPTABLE RADIOLOGICAL CONSEQUENCES: A possible result of *sabotage* that is deemed, by the State or *competent authority*, to be sufficiently serious that a facility or transport is required to employ special *physical protection measures* to protect against it. The State determines what represents	

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an unacceptable danger to the health and safety of facility personnel, the public or the environment	
2.49. UNAUTHORIZED ACCESS: Entering, trespassing within, interacting or interfering with facilities, equipment, material, information, computers, programs or networks without permission.	
2.50. UNAUTHORIZED REMOVAL: The theft or other unlawful taking of *nuclear material*.	(2.16.)
2.51. VITAL AREA: An area inside a *protected area* containing equipment, systems or devices, or *nuclear material*, the *sabotage* of which could directly or indirectly lead to *unacceptable radiological consequences*.	(2.17.)

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3. OBJECTIVES OF A STATE'S *PHYSICAL PROTECTION REGIME*	(3.)
3.1. The objectives of the State's *physical protection* ~~*system*~~ *regime* ~~is part of the larger State's Nuclear Security Regime that includes nuclear and other radioactive materials. The objectives of the State's *physical protection system regime* should be:~~ which is an essential component of the State's overall *Nuclear Security* Regime should be: ~~(a) To establish conditions which would minimize the possibilities for *unauthorized removal* of *nuclear material* and/or for *sabotage*[1]; and~~ ~~(b) To provide information and technical assistance in support of rapid and comprehensive measures by the State to locate and recover missing *nuclear material* and to cooperate with safety authorities in minimizing the radiological consequences of *sabotage*[2].~~	(3.1)
3.1.1. To protect against ~~theft~~ unauthorized removal: protecting against theft and other unlawful taking of *nuclear material* in use, storage, and *transport*.	
3.1.2. To locate and recover missing *nuclear material*: ensuring the implementation of rapid and comprehensive measures to locate and, where appropriate, recover missing or stolen *nuclear material.*	
3.1.3. To protect against *sabotage*: protecting *nuclear material* and *nuclear facilities* against *sabotage.*	
3.1.4. To mitigate or minimize *sabotage*: mitigating or minimizing the radiological consequences of *sabotage*.	

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3.2. The basic elements ~~to prevent and to counter the threats of theft and sabotage~~ of a States *physical protection regime* are: • Prevention of a malicious act by means of deterrence and by protection of sensitive information; • Management of an attempted malicious act or a malicious act by an integrated system of detection, delay, and response ~~These three elements are integrated to be effective as a system~~, and; • Mitigation of the consequences of a malicious act.	

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5. ~~CATEGORIZATION OF *NUCLEAR MATERIAL*~~ REQUIREMENTS FOR PHYSICAL PROTECTION AGAINST *UNAUTHORIZED REMOVAL* OF *NUCLEAR MATERIAL* IN USE, ~~AND~~ STORAGE, AND *TRANSPORT*	
5.1. ~~Categorization of *Nuclear Material*~~ Basis for protection The *physical protection measures* recommended in this section are made on the basis of the *nuclear material* attractiveness for use in a nuclear explosive device. Other recommendations ~~may apply~~ for the physical protection ~~of *nuclear material*~~ against *sabotage is* contained in Section 7. Protection requirements against *unauthorized removal* of *nuclear material* ~~for subsequent dispersal~~, and subsequent radiological dispersal which could cause *unacceptable radiological consequences* ~~should be subject~~ are provided ~~to those protection requirements~~ in the Nuclear Security Series Radioactive Materials Recommendations document. ~~[This document does not consider the attractiveness of nuclear material for radiological dispersal (see Nuclear Series Radioactive Materials Recommendations document).] Therefore, this section should be read in conjunction with the recommendations for security of radioactive material.~~	
~~5.1.1. Basis for Concern Protection~~	
~~5.1.1.1.~~ ~~In determining the level of physical protection to be implemented for to prevent *unauthorized removal* of *nuclear material* in use and storage or during *transport*, account should be taken of the possibility that the *unauthorized removal* of plutonium, highly enriched uranium or uranium-233 could lead to the construction of a nuclear explosive device by a technically competent group. Protection requirements against *unauthorized removal* of *nuclear material* for subsequent dispersal, which could cause *unacceptable radiological consequences*, are addressed in the Nuclear Security Series Radioactive Materials Recommendations document.~~	(5.1.1.)
5.1.2. Categorization	
~~5.1.2.1.~~ ~~This *Nuclear material* categorization should be based on the potential risk of the material being used~~	(5.2.2.)

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~~for a nuclear explosive device for protecting against *unauthorized removal*, which itself depends on: the type of *nuclear material*, e.g. plutonium, uranium; isotopic composition, i.e. content of fissile isotopes; physical and chemical form; degree of dilution; radiation level; and quantity. For example:~~ ~~(a) The protection of *nuclear material* with a radiation level that exceeds 1 Gy/hr (100 rad/hr) at one meter unshielded, which is classified as Category I or II, may be reduced one category level below that determined by the fissile content of the material; and~~ ~~(b) *Nuclear material* that is in a form that is no longer usable for any nuclear activity, minimizes environmental dispersal and is practicably irrecoverable, may be protected in accordance with prudent management practices.~~	
5.1.2.1. The primary factor for determining the *physical protection measures* against *unauthorized removal* of *nuclear material* is the *nuclear material* itself. The categorization table below ~~categorized in accordance with the following table which~~ gives a categorization of the different types of *nuclear materials* ~~and with the considerations given below. The categorization should be based on the potential risk of the material being used for a nuclear explosive device, which itself depends on~~ based on ~~their type, isotope and physical quantity.~~ the type of *nuclear material*, e.g. plutonium, uranium; isotopic composition, i.e. content of fissile isotopes; physical and chemical form; degree of dilution; radiation level; and quantity. This categorization is the basis for a *graded approach* for protection against *unauthorized removal* of *nuclear material* that could be used in a nuclear explosive device.	(5.2.1.) (5.2.2)
5.1.2.2. According to footnote "e" of the categorization table, the protection of *nuclear material* with a radiation level that exceeds 1 Gy/hr (100 rad/hr) at one meter unshielded, which is classified as Category I or II, may be reduced one category level below that determined by the fissile content of the material. However, if the *threat assessment* or *design basis threat* includes an *adversary* who is willing to die to accomplish their mission, States should carefully consider whether or not to reduce the categorization levels of the material based on radiation levels sufficient to incapacitate the *adversary* before the *malicious act* is completed. ~~The protection of *nuclear material* with a radiation level that exceeds 1 Gy/hr (100 rad/hr) at one meter unshielded, which is classified as Category I or II, may be reduced one category level below that determined by the fissile content of the material.~~	(5.2.2.(a))

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5.1.2.3. *Nuclear material* that is in a form that is no longer usable for any nuclear activity, minimizes environmental dispersal, and is practicably irrecoverable, may instead be protected against *unauthorized removal* in accordance with prudent management practices.	(5.2.2.(b))
5.1.2.4. In determining the levels of physical protection in a facility, which may consist of several buildings, it is possible that the ~~State's *competent authority*~~ *operator* may identify, in agreement with the State's *competent authority*, part of the *nuclear facility* which contains *nuclear material* of a different category and which is therefore protected at a different level than the rest of the *nuclear facility*. Conversely, consideration may need to be given to adding together the total amount of *nuclear material* contained in a number of buildings to determine the appropriate protection arrangements for this group of buildings.	(5.2.3.)

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5.2. Requirements for Use and Storage	
5.2.1. General This section provides recommended requirements for the protection of *nuclear material* against *unauthorized removal* in use and storage. In addition to the recommendations in this section, other recommendations may apply for the physical protection of *nuclear material* against *sabotage* as set forth in Section 7.	
~~**5.2.1.1.** The concept of physical protection is one which requires a designed mixture of hardware (security devices), procedures (including the organization of *guards* and the performance of their duties) and facility design (including layout). The level of the *physical protection measures* should be specifically designed to take into account the *nuclear material* or *nuclear facility* and the State's *threat assessment* or *design basis threat*. Emergency procedures should be prepared to counter effectively the State's *design basis threat*. A *physical protection system* should integrate *detection* with *assessment*, *access delay* and *response force* measures.~~	(6.1.1.)
~~**5.2.1.2.** Achievement of the objectives of the *physical protection system* should be assisted by:~~ ~~a. Taking into account physical protection of *nuclear material* in the design of the *nuclear facility* as early as possible, including the interfaces with *material control and accounting systems* and safety systems, as appropriate;~~ ~~b. Limiting access to *nuclear material* or *facilities* to a minimum number of individuals.To accomplish this aim, the State's *competent authority* should validate the *operator*'s designation of *protected areas*, and *inner areas*. In designating such areas, the *operator* should give consideration to the plant safety design, the location of the *nuclear material*, the location of the plant, and the *threat assessment* or *design basis threat*. Access to these areas should be limited and controlled; and~~ ~~c. Requiring predetermination of the trustworthiness of all individuals permitted access to *nuclear material* or *facilities*, and, where appropriate, enforcing the *two-person rule* or equivalent protection measures for persons accessing *nuclear material*; and~~ ~~d. Taking into account the security of the physical protection data and networks during transmission, display, and storage.~~	(6.1.2.)

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5.2.1.1. The operator should maintain control of and be able to account for all nuclear material at all times. Information from this material control and accounting system that indicates possible *unauthorized removal* of *nuclear material* should be communicated ~~as soon as possible in a timely manner~~ to the facility manager responsible for physical protection. The *operator* should ~~maintain positive control of *nuclear material* at all times and~~ report in a timely manner any ~~significant~~ confirmed accounting discrepancy as stipulated by ~~to~~ the *Competent Authority*	
5.2.1.2. Potential ~~conflicting~~ differing requirements resulting from safety and physical protection considerations should be carefully analyzed to ensure that they do not jeopardize each other ~~nuclear including during emergency conditions~~.	(6.1.3.)

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5.2.2. Requirements for Category III *Nuclear Material* In addition to the general requirements stated above in section 5.2.1., the following are further requirements for Category III *nuclear material.*	(6.4.)
5.2.2.1. ~~Category III~~ *Nuclear material* should be used or stored only within an area to which access is controlled and ~~All~~ any technical means and procedures for access control, ~~such as keys and computerized access lists,~~ should be protected against compromise, e.g. manipulation or falsification.	(6.4.1.)
5.2.2.2. Provision should be made for detecting unauthorized intrusion and for appropriate action by *guards* or *response forces* to attempted intrusions in this area.	(6.4.4.)
5.2.2.3. ~~On-site~~ Movements of *nuclear material* in this area should be the responsibility of the *operator*, who should apply all prudent and necessary *physical protection measures*.	(6.4.3.)
5.2.2.4. ~~Emergency P~~lans of action should be prepared to counter effectively any attempted *unauthorized removal* of *nuclear material*. Such plans should provide for the training of facility personnel in their actions in case of ~~an emergency~~ a security incident. They should also provide for appropriate response by *guards* or *response forces* to attempted intrusion.	(6.4.5.)
5.2.2.5. Evaluations ~~and~~ including *performance testing,* of the implemented *physical protection system* and the timely response of the *guards* and *response forces* should be conducted ~~periodically~~ regularly to determine their reliability and effectiveness in full cooperation between the operator and response forces ~~for preventing the unauthorized removal of nuclear material~~. When deficiencies are identified, corrective action should be taken as soon as possible.	(6.4.6.)

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5.2.3. Requirements for Category II *Nuclear Material* In addition to the general requirements stated above in 5.2.1 and 5.2.2 for Category III *nuclear material*, the following are further requirements for Category II *nuclear material*.	(6.3)
5.2.3.1. Category II *nuclear material* should be used or stored only within a *protected area*.	(6.3.1.)
5.2.3.2. ~~Access to and the number of access points~~ The number of access points into the *protected area* should be kept to the minimum necessary. All points of potential access should be appropriately secured and alarmed. **5.2.3.3.** Vehicles, persons and packages entering ~~or~~ and leaving the *protected area* should be subject to search for detection and prevention of unauthorized access and of introduction of prohibited items or removal of *nuclear material*, as appropriate. Entry of vehicles into the *protected area* should be strictly minimized and limited to designated parking areas.~~Persons authorized unescorted access to the *protected area* should be limited to persons whose trustworthiness has been determined. Persons whose trustworthiness has not been determined such as temporary repair, service or construction workers and visitors should be escorted by a person authorized unescorted access. The identity of all persons entering such areas should be verified and they should be issued with appropriately registered passes or badges.~~	(6.3.2.)
5.2.3.3. ~~Vehicles, persons and packages entering or and leaving the *protected area* should be subject to search.~~ Only authorized persons should have access to protected area. Effective access control measures should be taken to ensure the detection and prevention of unauthorized access. Number of authorized persons entering into the *protected area* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* should be limited to persons whose trustworthiness has been determined. Persons whose trustworthiness has not been determined such as temporary repair, service or construction workers and visitors should be escorted by persons authorized unescorted access.	(6.3.3.)
5.2.3.4. ~~Entry of private motor vehicles into the *protected area* should be strictly minimized and limited to designated parking areas.~~ The identity of ~~all~~ authorized persons entering ~~such areas~~ into the *protected area* should be verified. Passes or badges should be issued and visibly displayed inside the protected area ~~by authorized person. with appropriately registered.~~ ~~The identity of persons entering should be verified. Passes or badges should be issued and visibly displayed~~	(6.3.4.)
~~5.2.3.5.~~ ~~The *operator* should maintain positive control of *nuclear material* at all times and report any~~	

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~~significant accounting discrepancy to the *Competent Authority* in a timely manner.~~	
5.2.3.6. Every *nuclear material* handler should be required to conform to procedures for transferring custody of the *nuclear material* to the succeeding handler. Additionally, *nuclear material* handlers should endeavor to ascertain on reporting for duty that no interference with or *unauthorized removal* of *nuclear material* has taken place. ~~and report to a senior authority whenever they have reason to suspect that a discrepancy exists.~~	(6.3.6)
~~**5.2.3.7.** All technical means for access control, such as keys and computerized access lists, should be protected against compromise.~~	
5.2.3.8. A record should be kept of all persons having access to or possession of keys, ~~or~~ key-cards ~~concerned with the containment or storage of~~ and/or other systems ~~to~~ including computer systems that control access to *nuclear material*. ~~Arrangements should be made for:~~ ~~(a) The checking and custody keys or key cards, particularly control of such access control devices to minimize the possibility of duplication or unauthorized use; and~~ ~~(b) The changing of combination settings at suitable intervals; and~~ ~~(c) The changing of locks, keys, or combinations and other access control technology at suitable intervals, and whenever there is evidence or suspicion that they have been compromised, or when personnel who had access no longer have authorized access.~~	(6.3.7.) .
5.2.3.9. ~~Movements of *nuclear material* within a *protected area* should be the responsibility of the *operator* who should apply all prudent and necessary *physical protection measures*.~~ On-site movements ~~out of or~~ between two *protected areas* should be treated in full compliance with the requirements for *nuclear material* during *transport*, ~~due~~ after taking account ~~should be taken~~ of prevailing conditions.	(6.3.8.)
5.2.3.10. The protected area perimeter should be equipped with a physical barrier, intrusion detection and assessment to detect unauthorized access. This physical barrier should provide time for assessment of the cause of sensor alarms, and help provide delay for an appropriate response. Alarms generated by *intrusion detection* sensors should be promptly and accurately assessed and appropriate action taken.	(6.3.9)

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~~*Intrusion detection* should be performed at the *physical barrier* surrounding the *protected area* and timely *assessment* should be carried out. Clear areas should be provided on both sides of at the perimeter of the *protected area* with illumination sufficient for *assessment*. To protect against *unauthorized access* or *malicious acts*, special attention should be paid to all points of potential access. The perimeter of the *protected area* should normally consist of a *physical barrier* in addition to and outside the building walls. In cases where the walls of a building are of an especially solid construction, these walls may be designated as being the perimeter of the *protected area* under conditions specified by a *security survey*.~~	
5.2.3.11. ~~All *intrusion detection* sensors should annunciate and be recorded alarm information should be stored and protected in a continuously staffed *central alarm station* to provide for monitoring and *assessment* of alarms, initiation of response~~ A permanently staffed central alarm station should be provided for monitoring and assessment of alarms, initiation of response, and communication with the guards, response force, and facility management. The central alarm station should normally be located in the protected area ~~unless its function will be more effectively performed in another area nearby~~ and hardened so that its functions can continue in the presence of the ~~*design basis*~~ threat. Access to the *central alarm station* should be strictly controlled. Alarm information should be stored in a secure manner.	(6.3.10.)
5.2.3.12. ~~Dedicated, tamper-indicating transmission systems and independent power supplies, should be provided between the *intrusion detection* sensors and the *central alarm station*.~~ Alarm equipment, alarm communication paths and central alarm station should be provided with uninterruptible power supply and protected against manipulation and falsification by tamper protection. ~~Alarms generated by *intrusion detection* sensors should be promptly and accurately assessed and appropriate action taken. Protection measures should include:~~ ~~• All alarm communication paths and alarm equipment should be tamper-indicating, secure, and highly reliable;~~ ~~• Uninterruptible power should be provided to all powered elements of the alarm *detection* and communication system;~~ ~~• Redundant independent alarm communications paths should be provided to convey alarm information into the *central alarm station;* and~~ ~~• Regular functional testing of the detector, alarm path and annunciator should be conducted.~~	(6.3.11.)
5.2.3.13. Dedicated, redundant, secure and diverse transmission systems for two-way voice communication between the *central alarm station* and the *response force* should be provided for activities involving	(6.3.12.)

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detection, *assessment* and response. ~~Also,~~ Dedicated two-way secure voice communication should be provided between *guards* and the *central alarm station*.	
5.2.4.12. A 24-hour *guarding* service *and response force* should be provided ~~The objective should be the arrival~~ to ensure the deployment of adequately armed *response force*s in time to counter armed attacks and prevent the *unauthorized removal* of *nuclear material*. The ~~*guard* force or the~~ *central alarm station* personnel should report at scheduled intervals to the off-site *response force*s ~~during non-working hours~~. *Guard*s and response force should be trained and adequately equipped for their function in accordance with national laws and regulations. ~~When *guards* are not armed, compensating measures should be applied.~~	(6.2.14)
5.2.3.14. The plans of action for coordination between the guards and *response force*s during a security incident should be regularly exercised. In addition, other facility personnel should be trained and prepared to act in full co-ordination with the *guard*s, *response force*s and other response teams for implementation of the plans.	(6.3.13.)
5.2.3.15. Arrangements should be made to ensure that during emergency conditions (including exercises), the effectiveness of the physical protection system is maintained.	(6.3.14.)
5.2.3.16. ~~*Operator*s should regularly test the performance of the *intrusion detection*, *assessment* and communications systems as well as other physical protection functions, *delay* systems, and the integrated system, to determine their continued~~ Evaluations including *performance testing,* of the implemented *physical protection measures* and integrated *physical protection system* including the timely response of the *guards* and *response forces* should be conducted regularly to determine their reliability and ~~operability~~ their effectiveness against the threat and to detect any equipment malfunction in full cooperation between the operator and response forces. ~~Such testing should be performed to counter risks from equipment malfunction and from *threats*.~~ When ~~significant~~ deficiencies are identified, corrective actions should be taken as soon as possible. Significant deficiencies and actions taken should be reported as stipulated by the Competent Authority.	(6.3.16)

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5.2.4. Requirements for Category I *Nuclear Material* In addition to the general requirements stated above in 5.2.1 and in 5.2.2 for Category III *nuclear material* and 5.2.3 for Category II *nuclear material*, the following are further requirements for Category I *nuclear material*.	(6.2.)
5.2.4.1. Category I *nuclear material* should be used or stored only within an *inner area* ~~or *inner areas*~~ that provides ~~a second~~ an additional layer ~~of protection~~ of detection and delay against *unauthorized removal*. *Inner area* should be located as far as possible away from public accessible areas. The ceilings, walls, and floor of *inner areas* and all penetrations of those surfaces should provide penetration delay against *unauthorized* ~~*removal* of~~ *access* to *nuclear material*.	(6.2.1.)
5.2.4.2. Vehicle barriers should be installed ~~around the *protected area*~~ to prevent the penetration ~~at any location~~ of unauthorized land and waterborne vehicles specified in the *design basis threat* that could be used by an *adversary* for conducting a *malicious act*. Special attention should be given to provide protective measures against an airborne threat specified in the DBT. ~~To ensure that a vehicle is not used as a ramming tool, explosive device or fighting platform; to make the *adversary* travel on foot; and to force the *adversary* to hand carry equipment, weapons, and stolen material, *operators* should verify that vehicles cannot penetrate through a *protected area* boundary at any location.~~	
5.2.4.3. ~~All persons and packages entering or leaving *inner areas* should be subject to search to prevent the introduction of prohibited articles or the *unauthorized removal* of *nuclear material*.~~ Vehicles, persons and packages should be subject to search on entering both the *protected* and *inner area* for detection and prevention of *unauthorized access* and of introduction of prohibited items. Vehicles, persons and packages leaving the *inner area* should be subject to search for detection and prevention of removal of *nuclear material*. Instruments for the detection of *nuclear material*, and metals, and explosives can be used for such searches.	(6.2.3.)
5.2.4.4 Private ~~motor~~ vehicles should be prohibited access to *inner areas*.	(6.2.4.)
5.2.4.5. Whenever persons are present in *inner areas*, those areas should be under constant surveillance as a protection measure against the insider threat. ~~In addition, no fewer than two persons should be in the area to ensure~~ ~~The surveillance can be effected by~~ When occupied, at least two persons should be in the inner area to provide for mutual observation ~~between two or more co-workers~~ (e.g. the *two-man* ~~*person rule*~~).	(6.2.5.)
~~**5.2.4.6.** On site Movements of *nuclear material* in the *access control area* should be the responsibility of the *operator* who should apply all prudent and necessary *physical protection measures*~~	(6.2.9)

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5.2.4.7. *Inner areas* should be so arranged that the number of entries and exits is minimized (ideally only one), ~~taking into account safety~~. ~~*Inner areas* should not be sited close to public thoroughfares.~~ All points of potential access should be appropriately secured and alarmed.	(6.2.11)
5.2.4.8. Storage ~~areas~~ for Category I *nuclear material* should be ~~of the "strong room" type in design~~ in a hardened room or enclosure ("strong room") ~~located within~~ inside the *inner area* that provides ~~a third~~ an additional layer of detection and delay against removing the *nuclear material*. ~~They should be continuously~~ The hardened room or enclosure should be locked and alarms activated except during authorized access to the *nuclear material* ~~when not occupied~~. When *nuclear material* is held in an unoccupied work area outside this hardened room or enclosure, e.g. overnight, equivalent compensatory *physical protection measures* should be established. ~~The issuing of keys or key cards should be closely controlled and keys or key cards should remain in the *protected area*. Access to storage should be strictly limited to assigned persons and to others only when under their escort. Where *nuclear material* is held in an unmanned work area, e.g., overnight, a layer of protection should be established to protect the *nuclear material*. *Intrusion detection* and *assessment* or *patrols* can satisfy this requirement.~~	(6.2.12)
~~5.2.4.9.~~ ~~Strong room designs should contain interior delay elements to secure *nuclear material*.~~	
5.2.4.10.	(6.2.12)
5.2.4.11. Provisions including redundancy measures should be in place to ensure that the *central alarm stations*' key functions can continue during an emergency (e.g. back-up *central alarm station*).~~A secondary or back-up alarm station that is hardened against the *threat* should receive and annunciate sensor alarms that are provided independently from signal paths to the *central alarm station*. Both alarm stations should be staffed by a minimum of two knowledgeable people at all times. The *operators* for the alarm stations should be dedicated to their physical protection task, and should not be given other assignments while operating the alarm station.~~	
~~**5.2.4.12.** A 24-hour *guarding* service *and response force* should be provided. The *guard* force or the *central alarm station* personnel should report at scheduled intervals to the off-site *response forces* during non-working hours. *Guards* should be trained and adequately equipped for their function in accordance with national laws and regulations. When *guards* are not armed, compensating measures should be applied. The objective should be the arrival of adequately armed *response forces* in time to counter armed attacks and prevent the *unauthorized removal* of *nuclear material*.~~	(6.2.14)

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5.2.4.13. The *guards* should conduct random patrols of the *protected area*. The functions of the patrols should be to provide deterrence and uncertainty to an *adversary*, inspect physical protection components, and supplement the existing *physical protection measures*.	(6.2.15)
5.2.4.14. *Performance testing* of the integrated *physical protection system* should include appropriate exercises, for example *force-on-force* ~~or other appropriate~~ exercises to determine if the *response force* can provide an effective and timely response to prevent the *unauthorized removal* of *nuclear material*.	

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7. REQUIREMENTS FOR PHYSICAL PROTECTION AGAINST *SABOTAGE* OF *NUCLEAR FACILITIES* AND *NUCLEAR MATERIAL* DURING USE, ~~AND~~ STORAGE, AND *TRANSPORT*	
7.1. General Concepts and Requirements	(7.1.)
7.1.1. This section addresses the third physical protection objective, protecting *nuclear material* and *nuclear facilities* against *sabotage*. In addition to *sabotage* of *nuclear facilities*, *sabotage* of *nuclear material* on-site at a *nuclear facility* and *sabotage* of *nuclear material* during *transport* are addressed.	
7.1.2. The State's evaluation of the *threat* should determine if there is a credible *threat* to disperse *nuclear material* ~~malevolently~~ maliciously. ~~The State should then apply the level of *physical protection measures* needed to ensure protection against acts leading to radiological consequences without regard to the categorization of the material.~~	(4.2.5.6.)
7.1.3. The primary factor for determining the *physical protection measures* to protect against *sabotage* is the level of potential radiological consequences if the facilities and material were *sabotage*d. The categorization specified in Section 5 is based on the attractiveness of material for the potential construction of a nuclear explosive device, and cannot be directly applied to protection against *sabotage.*	
7.1.4. Several types of *nuclear facilities* pose a hazard to the public and the environment in case of *sabotage* because of the potential for release of radioactivity. This section applies to all types of *nuclear facilities*, including nuclear reactors (nuclear power plants and research reactors) and nuclear fuel cycle facilities (including conversion, enrichment, fabrication, reprocessing, and storage facilities). Therefore, it is ~~important~~ essential that a *graded approach*, based in particular on the potential radiological consequences, be applied to physical ~~the level of~~ protection ~~of the facility should take radiological consequences into consideration~~ to counter *sabotage* of a *nuclear facility* or *nuclear material*s.	(4.2.5.4.)
7.1.5. ~~An act of *sabotage* involving *nuclear material* or against a *nuclear facility* could create a~~ The radiological consequences of *sabotage* of ~~hazard to the personnel, and a potential radioactive release to the public and the environment. Radiological hazards~~ *nuclear material* and *nuclear facilities* are strongly dependent on the *threat* to be considered and the nature of the *sabotage* event, on the type of *nuclear material*, on the inventory of *nuclear material* and associated fission products and their susceptibility to release, on the design and construction of the facility or package, and on its safety features. Consequently, a ~~plant~~ facility ~~specific or package specific~~ design evaluation of the potential for *sabotage* and associated radiological consequences for	(7.1.1.)

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both facility and transport should be made ~~in close consultation~~ between ~~safety and~~ physical protection, safety, and radiation protection specialists.	
7.1.6. The State should determine what constitutes *unacceptable radiological consequences* (URCs). These are one or more quantitative measures of dose, radioactive material release, or plant condition that have been established as thresholds (lower limits), and that if equaled or exceeded, are deemed to represent a condition that would endanger the health and safety of facility personnel, the public, or the environment to such a degree that the State would develop regulations that require resources be expended specifically for its prevention.	
7.1.7. At some facilities, nuclear and other radioactive material may be at the same location. When analyzing scenarios in which *sabotage* could result in *unacceptable radiological consequences*, the State should consider holdings of nuclear and other radioactive material that could be used in the same scenario. *Nuclear facilities* frequently contain other hazardous materials that could have severe non-radiological consequences. This document does not address such materials.	
7.1.8. The concept of physical protection to protect against *sabotage* requires a designed mixture of hardware (security devices), procedures (including the organization *of guards* and the performance of their duties) and ~~facility~~ design (including facility layout, and *transport conveyance* and package). The level of the *physical protection measures* should be specifically designed to take into account the *nuclear facility* or *nuclear material*, the State's *threat assessment* or *design basis threat*, and the potential radiological consequences. ~~Emergency~~ Protective ~~procedures~~ measures should be prepared to counter effectively the State's *threat assessment* or *design basis threat*.	(7.1.2.)
7.1.9. A *graded approach* for physical protection against *sabotage* should be followed to ensure that appropriate resources (equipment, facilities, procedures and human resources) are applied to every *sabotage* target. The *graded approach* to physical protection against *sabotage* results in the application of increasing levels of protection as the severity of potential radiological consequences increases. To apply graded protection to prevent *sabotage*, appropriate levels of physical protection as a function of potential radiological consequence should be defined. ~~This is illustrated in the figure below. In this example, the State groups the potential radiological consequences that exceed its *unacceptable radiological consequences* into low, medium, and high ranges. Corresponding to this the State establishes physical protection requirements and measures for low, medium, and high levels of physical protection. Prudent management practices are applied for potential radiological consequences that are less than the *unacceptable radiological consequences*.~~	

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7.1.10. Safety and health studies can provide information on potential radiological consequences ~~Caution should be exercised, however, a~~ but safety studies may not consider *malicious acts* as the direct or indirect initiating event leading to an *unacceptable radiological consequence*. In order to identify what needs to be protected from *sabotage*, additional analysis should be performed to consider such *malicious acts*.	
7.1.11. The (physical protection / security) response strategy should be conceived as an element of the (global) prevention / protection system against the potential consequences of a *sabotage* that rests also on safety systems, operational measures, fire protection measures, radiation protection measures and emergency preparedness.	
7.1.12. To prevent radiological consequences from an act of *sabotage*, the response strategy should be either denial of access to the *sabotage* targets or denial of *adversary* task completion time at the *sabotage* targets. ~~This can be achieved by the~~ ~~The objective of the physical protection system should be to prevent or delay access to or control over the *nuclear facility* or *nuclear material* through the use of a set of protective measures including *physical barriers*, *access control* or other technical means, and or the use *of guards* and *response forces* so that the *guards* or *response forces* can~~ The protection measures should consist of a combination of physical delay elements and response force times that ensure the response force can respond in time to prevent ~~the successful completion of~~ radiological *sabotage*. ~~In general these sabotage response force times required to prevent *sabotage* are generally should be shorter than the response force times to prevent *unauthorized removal* of *nuclear material*, for which the response strategy is typically containment of the adversary and the *nuclear material* within the facility.~~	(7.1.3.)

ANNEX C

INITIAL PROPOSAL FOR NEW CHAPTER

GENERIC REQUIREMENTS FOR PHYSICAL PROTECTION AGAINST UNAUTHORIZED REMOVAL AND SABOTAGE OF NUCLEAR MATERIAL AND NUCLEAR FACILITIES

PROTECTED AREA

5.2.3.2. Access to and the number of access points into the *protected area* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* should be limited to persons whose trustworthiness has been determined. Persons whose trustworthiness has not been determined such as temporary repair, service or construction workers and visitors should be escorted by a person authorized unescorted access. The identity of all persons entering such areas should be verified and they should be issued with appropriately registered passes or badges.

5.2.3.3. Vehicles, persons and packages entering or leaving the *protected area* should be subject to search.

5.2.3.4. Entry of private motor vehicles into the *protected area* should be strictly minimized and limited to designated parking areas.

7.2.1.5. The number of access points and persons authorized into the *protected area* and *vital area(s)* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* or *vital areas* should be limited to persons whose trustworthiness has been determined. The *two-person rule* should be considered for *vital areas*. Persons whose trustworthiness has not been determined, such as temporary repair, service or construction workers, and visitors, should be escorted by a person with authorized unescorted access. The identity of all persons entering such areas should be verified and they should be issued with appropriately registered passes or badges.

7.2.1.6. All persons and packages entering *protected areas* should be subject to search to prevent the introduction of articles that could be used for *sabotage*. All vehicles entering the *protected area* should be subject to search. Instruments for the *detection* of explosives and metals should be used for such searches.

7.2.1.7. Entry of private motor vehicles into *protected areas* should be strictly minimized and limited to designated parking areas. Private motor vehicles should be prohibited access to *vital area*s.

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5.2.3.2. Number of access points into the *protected area* should be kept to the minimum necessary. Vehicles, persons and packages

entering and leaving the *protected area* should be subject to search for detection and prevention of unauthorized access and of introduction and removal of prohibited items. Entry of private motor vehicles into the *protected area* should be strictly minimized and limited to designated parking areas.

5.2.3.3. Only authorized persons should have access to protected area. Effective access control measures should be taken to ensure the detection and prevention of unauthorized access. Number of authorized persons entering into the *protected area* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* should be limited to persons whose trustworthiness has been determined. Persons whose trustworthiness has not been determined such as temporary repair, service or construction workers and visitors should be escorted by a person authorized unescorted access.

5.2.3.4. The identity of authorized persons entering into the *protected area* should be verified. Passes or badges should be issued and visibly displayed.

5.2.3.10. *Intrusion detection* should be performed at the *physical barrier* surrounding the *protected area* and timely *assessment* should be carried out. Clear areas should be provided at the perimeter of the *protected area* with illumination sufficient for *assessment*. To protect against *unauthorized access* or *malicious acts*, special attention should be paid to all points of potential access. The perimeter of the *protected area* should normally consist of a *physical barrier* in addition to and outside the building walls. In cases where the walls of a building are of an especially solid construction, these walls may be designated as being the perimeter of the *protected area* under conditions specified by a *security survey*.

7.2.1.13. *Intrusion detection* should be performed at the *physical barrier* surrounding the *protected area,* and timely *assessment* should be carried out. Clear areas should be provided on both sides of the *physical barrier* with illumination sufficient for *assessment*. To protect against *unauthorized access* or *malicious acts*, special attention should be paid to all points of potential access. The perimeter of the *protected area* should normally ~~i~~include *physical barriers* to protect against the intrusion of personnel and vehicles commensurate with the *design basis threat*. In cases where the walls of a building are of an especially solid construction, these walls may be designated as being the perimeter of the *protected area* under conditions specified by a *security survey*.

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5.2.3.10. The protected area perimeter should be equipped with a physical barrier, intrusion detection and assessment to detect unauthorized access. This physical barrier should provide time for assessment of the cause of sensor alarms, and help provide delay for an appropriate response. Alarms generated by *intrusion detection* sensors should be promptly and accurately assessed and appropriate action taken.

5.2.3.12. Alarms generated by *intrusion detection* sensors should be promptly and accurately assessed and appropriate action taken. Protection measures should include:

- All alarm communication paths and alarm equipment should be tamper-indicating, secure, and highly reliable;
- Uninterruptible power should be provided to all powered elements of the alarm *detection* and communication system;
- Redundant independent alarm communications paths should be provided to convey alarm information into the *central alarm station;* and
- Regular functional testing of the detector, alarm path and annunciator should be conducted.

7.2.1.19. Alarms generated by *intrusion detection* sensors should be promptly and accurately assessed and appropriate action taken. Security measures should include:

- All alarm communication paths and alarm equipment should be tamper-indicating and highly reliable;
- Uninterruptible power should be provided to all powered elements of the alarm *detection* and communication system;
- Redundant, independent alarm communications paths should be provided to convey alarm information into the *central alarm station;* and
- Regular functional testing of the detector, alarm path and annunciator should be conducted.

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5.2.3.12. Alarm equipment, alarm communication paths and central alarm station should be provided with uninterruptible power supply and protected against manipulation and falsification by tamper protection.

5.2.3.7. All technical means for access control, such as keys and computerized access lists, should be protected against compromise.

5.2.3.8. A record should be kept of all persons having access to or possession of keys, ~~or~~ key-cards and/or other systems to include computer systems that control access to *nuclear material*. Arrangements should be made for:

(a) control of such access control devices to minimize the possibility of duplication or unauthorized use; and

(c) The changing of locks, keys, or combinations and other access control technology at suitable intervals, and whenever there is evidence or suspicion that they have been compromised, or when personnel who had access no longer have authorized access.

7.2.1.12. A record should be kept of all persons having access to or possession of keys, key cards, passwords, personal

identification numbers (PINs) and/or other devices, including computer systems, that control access to *nuclear material* or to *vital areas.* Arrangements should be made for the changing of locks, keys, combinations and other *access control* instruments at suitable intervals, whenever personnel with access authority lose their access authority, and whenever there is evidence or suspicion that *access control* has been compromised.

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5.2.3.8. A record should be kept of all persons having access to or possession of keys, ~~or~~ key-cards and/or other systems including computer systems that control access to *nuclear material*.

5.2.3.15. Arrangements should be made to ensure that during emergency evacuation conditions (including exercises), *unauthorized removal* of *nuclear material* does not occur.

7.2.1.22. Arrangements should be made to ensure that during emergency evacuation exercises, access to *protected areas* and *vital areas* remains controlled.

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5.2.3.15. Physical protection system effectiveness should not be degraded during any emergency exercise.

CENTRAL ALARM STATION

5.2.3.11. All *intrusion detection* sensors should annunciate and alarm information should be stored and protected in a permanent staffed *central alarm station* to provide for monitoring and *assessment* of alarms, initiation of response and communication with the *guards,* facility management and, *response force*. The *central alarm station* should normally be located in the *protected area* unless its function will be more effectively performed in another area nearby. The *central alarm station* should be hardened so that its functions can continue in the presence of the *threat*. Access to the *central alarm station* should be strictly controlled.

7.2.1.16. All *intrusion detection* sensors should annunciate and alarm records should be securely stored in a continuously staffed *central alarm station* to provide for monitoring and *assessment* of alarms, initiation of response, and communication with the *guards,* facility management, and the *response force*. The *central alarm station* should normally be located in the *protected area* unless its function will be more effectively performed in another area nearby. The *central alarm station* should be hardened so that its functions can continue in the presence of the *design basis threat*.

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5.2.3.11. A permanently staffed central alarm station should be provided for monitoring and assessment of alarms, initiation of

response, and communication with the guards, response force, and facility management. The central alarm station should normally be located in the protected area and hardened so that its functions can continue in the presence of the threat. Access to the central alarm station should be strictly controlled. Alarm information should be stored in a secure manner.

5.2.3.13. Dedicated, redundant, secure and diverse transmission systems for two-way voice communication between the *central alarm station* and the *response force* should be provided for activities involving *detection*, *assessment* and response. Dedicated two-way secure voice communication should be provided between *guards* and the *central alarm station*.

7.2.1.20. Dedicated redundant, and diverse transmission systems for two-way voice communication between the *central alarm station, guards,* and the *response forces* should be provided for activities involving *detection*, *assessment* and response.

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5.2.3.13. Dedicated, redundant, secure and diverse transmission systems for two-way voice communication between the *central alarm station* and the *response force* should be provided for activities involving *detection*, *assessment* and response. Dedicated two-way secure voice communication should be provided between *guards* and the *central alarm station*.

VITAL OR INNER AREA

5.2.4.2. Vehicle barriers should be installed around the *protected area* to prevent its penetration at any location. To ensure that a vehicle is not used as a ramming tool

7.2.1.8. Vehicle barriers that are designed to counter the *design basis threat* should be installed at a calculated distance to prevent rapid ingress and egress of *adversaries*; transportation of *adversary* tools, equipment and explosives; and the use of a vehicle as a bomb, a ramming device, or a hardened fighting position.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.2. Vehicle barriers should be installed to prevent the penetration of unauthorized land and waterborne vehicles specified in the threat that could be used by an *adversary* for conducting a *malicious act*. Special attention should be given to an airborne threat.

5.2.4.3. All persons and packages entering or leaving *inner areas* should be subject to search to prevent the introduction of prohibited articles or the *unauthorized removal* of *nuclear material*. Instruments for the detection of *nuclear material*, and metals, and explosives can be used for such searches.

7.2.1.5. The number of access points and persons authorized into the *protected area* and *vital area(s)* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* or *vital areas* should be limited to persons whose

trustworthiness has been determined. The *two-person rule* should be considered for *vital areas*. Persons whose trustworthiness has not been determined, such as temporary repair, service or construction workers, and visitors, should be escorted by a person with authorized unescorted access. The identity of all persons entering such areas should be verified and they should be issued with appropriately registered passes or badges.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.3. Vehicles, persons and packages should be subject to search on entering both the protected and *inner area* for detection and prevention of unauthorized access and of introduction of prohibited items. Vehicles, persons and packages leaving the *inner area* should be subject to search for detection and prevention of removal of prohibited items. Instruments for the detection of *nuclear material*, and metals, and explosives can be used for such searches.

5.2.4.4. Private motor vehicles should be prohibited access to *inner areas*.

7.2.1.7. Entry of private motor vehicles into *protected areas* should be strictly minimized and limited to designated parking areas. Private motor vehicles should be prohibited access to *vital areas*.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.4. Private vehicles should be prohibited access to *inner areas*.

5.2.4.5. Whenever persons are present in *inner areas*, those areas should be under constant surveillance. In addition, no fewer than two persons should be in the area to ensure mutual observation (e.g. the *two-person rule*).

5.2.4.7. *Inner areas* should be so arranged that the number of entries and exits is minimized (ideally only one), taking into account safety. *Inner areas* should not be sited close to public thoroughfares. All emergency exits should be fitted with *intrusion detection* sensors. Other points of potential access should be appropriately secured and alarmed.

7.2.1.14. *Vital areas* should be so arranged that the number of entries and exits is minimized (ideally only one), taking into account safety. All exits should be fitted with *intrusion detection* sensors and only permit emergency egress. Other points of potential access should be appropriately secured and alarmed. *Vital areas* should not be sited close to public thoroughfares.

7.2.1.5. The number of access points and persons authorized into the *protected area* and *vital area(s)* should be kept to the minimum necessary. Persons authorized unescorted access to the *protected area* or *vital areas* should be limited to persons whose trustworthiness has been determined. The *two-person rule* should be considered for *vital areas*. Persons whose trustworthiness has not been determined, such as temporary repair, service or construction workers, and visitors, should be escorted by a person with authorized unescorted access. The identity of all persons entering such areas should be verified and they should be issued with

appropriately registered passes or badges.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.5 Whenever persons are present in inner areas, those areas should be under constant surveillance as a protection measure against the insider threat. When occupied, at least two persons should be in the inner area to provide for mutual observation (i.e. the two-person rule).

5.2.4.7. *Inner areas* should be so arranged that the number of entries and exits is minimized (ideally only one). All emergency exits should be fitted with *intrusion detection* sensors. Other points of potential access should be appropriately secured and alarmed.

5.2.4.1. Category I *nuclear material* should be used or stored only within an *inner area* that provides a second layer of protection, located in a *protected area*. The ceilings, walls, and floor of *inner areas* and all penetrations of those surfaces should provide penetration delay against *unauthorized access* to *nuclear material*.

7.2.1.15. *Vital areas* should provide balanced penetration delay for all potential points of entry, including doors, windows, ventilation ducts, utility ports, and tunnels. They should be appropriately secured and alarmed when unattended.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.1. Category I *nuclear material* should be used or stored only within an *inner area* that provides an additional layer of detection and delay against unauthorized removal. The inner area should be located in a *protected area* to ensure sufficient separation from public accessible areas. The ceilings, walls, and floor of *inner areas* and all penetrations of those surfaces should provide penetration delay against *unauthorized access* to *nuclear material*.

GUARDS

5.2.4.12. A 24-hour *guarding* service *and response force* should be provided. The *guard* force or the *central alarm station* personnel should report at scheduled intervals to the off-site *response force*s during non-working hours. *Guard*s should be trained and adequately equipped for their function in accordance with national laws and regulations. When *guard*s are not armed, compensating measures should be applied The objective should be the arrival of adequately armed *response force*s in time to counter armed attacks and prevent the *unauthorized removal* of *nuclear material*.

7.2.1.17. A 24-hour *guarding* service should be provided. The *guard* force, or *central alarm station* personnel, should report at scheduled intervals to the off-site *response forces*. *Guards* should be trained and adequately equipped for their function, in accordance with national laws and regulations. When *guards* are not armed, *compensatory measures* should be considered. *Compensatory measures* should provide sufficient delay to allow the *response force* to arrive in time to interdict the *adversary* before

completing an act of *sabotage*.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.12. A 24-hour *guarding* service *and response force* should be provided to ensure the deployment of adequately armed *response force*s in time to counter armed attacks and prevent the *unauthorized removal* of *nuclear material*. The *central alarm station* personnel should report at scheduled intervals to the off-site *response force*s. *Guard*s and response force should be trained and adequately equipped for their function in accordance with national laws and regulations.

5.2.4.13. Random *patrol*s of the *protected area* by the *guard*s should be provided. The functions of the *patrol*s should be to inspect physical protection elements, to provide deterrence and uncertainty to an *adversary*, and to provide redundancy to the *physical protection system*.

7.2.1.18. *Patrols* of the *protected area* should be provided.

----------Proposed text from Drafting Group on Chapter 5

5.2.4.13. The guards should conduct random patrols of the protected area. The functions of the patrols should be to provide deterrence and uncertainty to an adversary, inspect physical protection components, and provide some redundancy to some of the physical protection measures.

CONTINGENCY PLAN

5.2.2.4. P~~l~~ans of action should be prepared to counter effectively any attempted *unauthorized removal* of *nuclear material*. Such plans should provide for the training of facility personnel in their actions in case of a security incident. They should also provide for appropriate response by *guards* or *response forces* to attempted intrusion.

5.2.3.14. The plans of action for coordination between the guards and *response force*s during a security incident should be regularly exercised. In addition, other facility personnel should be trained and prepared to act in full co-ordination with the *guard*s, *response force*s and other response teams for implementation of the plans.

7.2.1.21. Plans of action should be prepared to counter effectively any attempted *sabotage*. Such plans should provide for the training of *guards* and *response forces* in their actions in case of an emergency. They should also provide for appropriate response by *guards* or *response forces* to attempted intrusion into the *protected area* and *vital areas* or regaining control. The close co-ordination between *guards* and *response forces* should be regularly exercised. In addition, other facility personnel should be prepared to act in full coordination with *guards, response forces* and safety response teams for implementation of the plans.

----------Proposed text from Drafting Group on Chapter 5

5.2.2.4. Plans of action should be prepared to counter effectively any attempted *unauthorized removal* of *nuclear material*. Such plans should provide for the training of facility personnel in their actions in case of a security incident. They should also provide for appropriate response by *guards* or *response forces* to attempted intrusion.

5.2.3.14. The plans of action for coordination between the guards and *response forces* during a security incident should be regularly exercised. In addition, other facility personnel should be trained and prepared to act in full co-ordination with the *guards*, *response forces* and other response teams for implementation of the plans.

5.2.3.15. Physical protection system effectiveness should not be degraded during any emergency or exercise.

7.2.1.22. Arrangements should be made to ensure that during emergency evacuation exercises, access to *protected areas* and *vital areas* remains controlled.

----------Proposed text from Drafting Group on Chapter 5

5.2.3.15. Physical protection system effectiveness should not be degraded during any emergency exercise.

PERFORMANCE TESTING

5.2.2.5. Evaluations including *performance testing* of the implemented *physical protection system* and the timely response of the *guards* and *response forces* should be conducted regularly by the *operator* to determine their reliability and effectiveness for preventing the *unauthorized removal* of *nuclear material*. When deficiencies are identified, corrective action should be taken as soon as possible.

5.2.4.14. *Performance testing* of the integrated *physical protection system* should include *force-on-force* or other appropriate exercises to determine if the *response force* can provide an effective and timely response to prevent the *unauthorized removal* of *nuclear material.*

7.2.1.23. *Performance testing* and evaluations of the *physical protection system*, including its information networks, procedures and the timely response of the *guards* and *response forces,* should be conducted at least annually by the *operator* to determine their reliability and effectiveness. The evaluations should include *force-on-force exercises* or other appropriate exercises to determine if the *response force* can provide an effective and timely response to prevent *sabotage.*

----------Proposed text from Drafting Group on Chapter 5

5.2.2.5. Evaluations including *performance testing,* of the implemented *physical protection system* and the timely response of the

guards and *response forces* should be conducted regularly by the *operator* to determine their reliability and effectiveness. When deficiencies are identified, corrective action should be taken as soon as possible.

5.2.4.14. *Performance testing* of the integrated *physical protection system* should include appropriate exercises, for example *force-on-force* exercises.

GENERAL REQUIREMENTS

5.2.1.2. Potential differing requirements resulting from safety and physical protection considerations should be carefully analyzed to ensure that they do not jeopardize either safety or physical protection.

Last sentence of 7.1.14. Potential differing requirements, resulting from safety and physical protection considerations, should be carefully analyzed and managed to ensure that they do not jeopardize either physical protection or nuclear safety, including during emergency conditions.

----------Proposed text from Drafting Group on Chapter 5

5.2.1.2. Potential differing requirements resulting from safety and physical protection considerations should be carefully analyzed to ensure that they do not jeopardize each other.