Superseded by NRRC-R-11 Rev. 0.1 2024

NRRC Technical Regulations

Nuclear Security

NRRC-R-11
2022

هيئة الرقابة النووية والإشعاعية
Nuclear and Radiological Regulatory Commission

Superseded by NRRC-R-11 Rev. 0.1 2024

Regulation

Nuclear Security

2022
NRRC-R-11

Preamble

In accordance with the provisions of the Law of Nuclear and Radiological Control issued by Royal Decree No. (M/82) dated 25/7/1439 AH, and NRRC's Statue issued by the Minsters' Cabinet Resolution No. (334) dated 25 /6/1439 AH, the NRRC prepared regulations that ensure control over radiological activities and practices as well as nuclear and radiological facilities.

This regulation has been prepared on the basis of International Atomic Energy Agency (IAEA) standards, international best practices and the experiences of similar international regulatory bodies, and in accordance with the Kingdom's international commitments. This Regulation has been presented in "the Public Consultation Platform" for the public review, comments, feedback.

This regulation has been approved by the NRRC's Board of Directors in resolution No. (R/1/1/2022), dated 20/04/2022.

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Chapter 1: Objective, Scope, and Definitions

Section 1: Objective

1. This regulation provides regulatory requirements for the physical protection of nuclear facilities and nuclear material, including during transport, against malicious acts.

Section 2: Scope

2. This regulation shall apply to general aspects of nuclear security of nuclear facility and nuclear material in use, storage and during transport.

3. This regulation prescribes the nuclear security requirements for the authorized person of a nuclear facility and nuclear material as stipulated in the Regulation on Licensing and Regulatory Oversight of Nuclear Facilities (NRRC-R-03) and the Regulation on Notification on and Authorization of Facilities and Activities with Radiation Sources (NRRC-R-02).

4. This regulation prescribes the nuclear security requirements for the licensee of a nuclear material in transport as stipulated in the Regulation on Safe Transport of Radioactive Materials (NRRC-R-15).

5. This regulation does not address nuclear security requirement for radioactive material that is prescribed in the Regulation on Security of Radioactive Materials (NRRC-R-17).

Section 3: Definitions

Access control

Means to ensure that access is authorized and restricted based on business and security requirements.

Adversary

Any individual performing or attempting to perform a malicious act, an adversary may be an insider, outsider, or collusion of both.

Assessment

The process of analyzing systematically and evaluating an information alert or an instrument alarm to determine whether a nuclear security event has occurred.

Carrier

Any person or organization engaged in the transport of nuclear material with responsibility for implementing and maintaining security measures in accordance with national requirements.

Central alarm station

An installation which provides for the complete and continuous alarm monitoring, assessment and communication with guards, facility management, and response forces.

Competent security agencies

A governmental organization or institution that has been designated by in the Kingdom to carry out one or more nuclear security functions.

Cybersecurity

Protection of networks, IT systems, operational technologies systems and their components of hardware and software, their services and the data they contain, from any penetration, disruption, modification, access, use or unauthorized exploitation. The concept of cybersecurity also includes information security and digital security.

Confidentiality

The prevention of the disclosure of sensitive information that could compromise physical protection.

Contingency plan

A predefined set of actions for response to unauthorized acts indicative of attempted unauthorized removal or sabotage, including threats thereof, designed to effectively counter such acts.

Control (of nuclear material)

shall mean activities, devices, systems, and procedures that ensure that the continuity of knowledge (e.g., location, quantitative measurements) about nuclear material is maintained.

Information and Cybersecurity plan

A plan for the implementation of the information protection and cybersecurity policy specifying organizational roles, responsibilities, and procedures.

Computer-based systems

The computation, communication, instrumentation and control devices

that make up functional elements of a facility or activity, including desktop computers, mainframe systems, servers and network devices, as well as lower-level components such as embedded systems and programmable logic controllers.

Delay

The element of a physical protection system designed to increase adversary penetration time for entry and/or exit from the nuclear facility or transport.

Defense in depth

The combination of multiple layers of systems and measures that have to be overcome or circumvented before nuclear security is compromised.

Design basis threat

The attributes and characteristics of potential insider and/or external adversaries who might attempt unauthorized removal or sabotage against which a physical protection system is designed and evaluated.

Detection

A process in a physical protection system that begins with sensing potentially malicious or otherwise unauthorized activity and that is completed with the assessment of the cause of the alarm.

Effective intervention

An intervention that is timely and powerful enough to prevent a person or group of persons, including those equipped with weapons or explosive material, from committing an unauthorized removal or sabotage.

Graded approach

The application of nuclear security measures proportional to the potential consequences of a malicious act.

Guard

A person who is entrusted with responsibility for patrolling, monitoring, assessing, escorting individuals or transport, controlling access and/or providing an initial response.

Information security

The preservation of the confidentiality, integrity and availability of information.

Insider

One or more individuals with authorized access to nuclear facilities or nuclear material in transport who could attempt unauthorized removal or sabotage, or who could aid an external adversary to do so.

Malicious act

An act or attempt of unauthorized removal of radioactive material or sabotage

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.

Nuclear security culture

The characteristics, attitudes and behaviors of individuals, organizations

and institutions which serves as a means to support, enhance, and sustain nuclear security.

Nuclear security event

An event that has potential or actual implications for nuclear security that must be addressed.

Nuclear security measures

Measures intended to prevent a nuclear security threat from completing criminal or intentional unauthorized acts involving or directed at nuclear material, other radioactive material, associated facilities, or associated activities or to detect or respond to nuclear security events.

Off-site response force

The armed competent security agencies forces whose members are not located at a nuclear facility

On-site nuclear response force

A team of personnel whose members are -

a. Trained in the use of firearms, permitted to carry firearms in the Kingdom and qualified to use them, and

b. Permanently located at a high-security site.

Performance testing

Testing of nuclear security measures and the physical protection system to 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.

Physical barrier

A fence, wall or similar impediment which provides access delay and complements access control.

Physical protection measures

The personnel, procedures, and equipment that constitute a physical protection system.

Physical protection system

An integrated set of nuclear security measures intended to prevent the completion of a malicious act.

Quality assurance

A process that provides confidence that the physical protection requirements are satisfied on a continuing basis.

Response

All the activities by the Kingdom that involve assessing and responding to a nuclear security event.

Response forces

Persons, on-site or off-site, who are armed and appropriately equipped and trained to counter an attempted unauthorized removal or an act of sabotage.

Risk assessment

Overall process systematically identifying, estimating, analysing, and evaluating the risk

Sensitive information

The information in which, the unauthorized disclosure (or modification, alteration, destruction or denial of use) of which could compromise nuclear security or otherwise assist in the carrying out of a malicious act against a nuclear facility, organization or transport.

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 the environment by exposure to radiation or release of radioactive substances.

Security area

For the purpose of implementing defense in depth principle by assigning areas as the following:

i. **Limited access area:** designated area containing a nuclear facility and nuclear material to which access is limited and controlled for physical protection purposes and where the movement and stay is limited by the decision or decree by a national competent authority.

ii. **Protected area:** area inside a limited access area containing Category I or II nuclear material and/or sabotage targets surrounded by a physical barrier with additional nuclear security measures.

iii. **Vital area:** area inside a protected area containing equipment, systems or devices, or nuclear material, the sabotage of which could directly or indirectly lead to high radiological consequences.

iv. **Inner area:** an area with additional protection measures inside a protected area, where Category I nuclear material is used and/or stored.

Security plan

A document prepared by the licensee and required to be approved by NRRC that presents a detailed description of the security measures in place at a facility.

Stand-off attack

An attack, executed at a distance from the target nuclear facility or transport, which does not require adversary hands-on access to the target, or require the adversary to overcome the physical protection system.

Sustainability program

A program where the licensee defines activities to ensure sufficient nuclear security measures are maintained.

Target

Nuclear material, other radioactive material, associated facilities, associated activities, or other locations or objects of potential exploitation by a nuclear security threat, including major public events, strategic locations, sensitive information, and sensitive information assets.

Threat

A person or group of persons with motivation, intention, and capability to commit a malicious act.

Threat assessment

An evaluation of the threats based on available intelligence, law enforcement, and open-source information that describes the motivation, intentions, and capabilities of these threats.

Transport control center

A facility, which provides the continuous monitoring of a transport conveyance location and security status and for communication with the transport conveyance shipper, receiver, carrier and, when appropriate, its guards and the response forces.

Transport security plan

A document prepared by the licensee and required to be approved by NRRC that presents a detailed description of the security measures in the transport of nuclear material.

Two-person rule

A procedure that requires at least two authorized and knowledgeable persons to be present to verify that activities involving nuclear material and nuclear facilities are authorized in order to detect access or actions that are unauthorized.

Unauthorized removal

The theft or other unlawful taking of nuclear material.

Unirradiated nuclear material

Material not irradiated in a reactor or material irradiated in a reactor but with a radiation level equal to or less than 1 Gy/h (100 rad/h) at 1 m unshielded.

Chapter 2: Nuclear Security Principles

Section 4: General Principles

6. The licensee shall be primarily responsible for nuclear security of its nuclear material, nuclear facilities, and activities.

7. The licensee shall consider and maintain nuclear security from the early stage of a nuclear facility.

8. The licensee shall ensure the availability of nuclear security measures that is commensurate with the threat assessment at each stage of the licensing process.

9. The licensee shall apply the requirements of this regulation based on the design basis threat or national threat assessment as prescribed by the NRRC.

10. The licensee shall set up physical protection measures for nuclear material based on its category, prior to arrival of the nuclear material on site.

11. The licensee shall ensure that the physical protection system is integrated and effective against both sabotage and unauthorized removal.

12. The licensee shall be responsible for ensuring that nuclear security interface with safety and nuclear material accounting and control systems, and measures at the nuclear facility is mutually supportive as practicable.

13. Where potential conflicts between safety and security are identified, the licensee shall immediately adopt compensatory and/or mitigative actions to maintain safety and security in a way that both shall be considered and implemented in a consistent and non-conflicting manner in order to achieve an adequate level of security

Section 5: Categorization of Nuclear Material

14. The licensee shall apply security measures for protecting nuclear material and for preventing each level of potential radiological consequences based on the category as per Appendix I.

15. The licensee shall apply aggregation on the total amount of nuclear material in determining the categorization of the nuclear material in any specific location within the facility for designing and implementing the physical protection measures against the unauthorized removal.

16. The categorization shall not be applicable in determining physical protection against sabotage, in which the licensee shall use the threshold for unacceptable radiological consequences prescribed by the NRRC.

Section 6: Responsibilities to the Competent Security Agencies

17. The licensee shall make documented, needed arrangements with competent security agencies to ensure that nuclear security measures are adequate to counter the threats identified in the design basis threat.

18. The licensee shall arrange for the training and familiarization of the nuclear facility for the competent security agencies as defined in the

documented arrangements between the licensee and competent security agencies.

19. The licensee shall consult the offsite response force regarding the arrangements, resources, and the equipment available to the licensee and the off-site response force, and any other security related matter at the facility.

20. Transfer of leadership responsibility during nuclear security event from the licensee to the offsite response forces shall be jointly agreed upon and documented in the contingency plans.

Section 7: Defense in Depth Principle

21. The defense in depth principle shall be applied in the design of the physical protection system for each of the functions of detection, delay, and response, with independent capabilities so that the failure of one capability does not mean loss of that function.

22. The licensee shall have protection measures combining design mixture of security devices, procedures and facility design that have to be overcome or circumvented by an adversary in order to achieve his objectives.

23. The licensee shall ensure the diversification and redundancy is based on a graded approach in applying the defense in depth principle.

Chapter 3: Nuclear Security Requirements

Section 8: Facility Threat and Risk Assessment

24. The licensee shall perform a threat and risk assessment specific to the facility in which it conducts licensed activities in order to determine the adequacy of its physical protection system based on the design basis threat or threat assessment as prescribed by the NRRC.

25. The licensee shall make modifications to its physical protection system, as necessary, to counter any credible threat identified as a result of the threat and risk assessment and shall keep a written record of each threat and risk assessment conducted.

26. The licensee shall provide a copy of the written record, along with a statement of actions taken as a result of the threat and risk assessment, to the NRRC within the time period specified by the NRRC upon completion of the assessment.

Section 9: Assignment of Nuclear Security Responsibilities

27. The licensee shall assign qualified personnel, subject to the NRRC approval, in charge with a defined role and responsibility to effectively implement nuclear security measures ensuring the facility's continuous operational functions, and to liaise and cooperate with the NRRC and competent security agencies.

28. At the minimum, the licensee shall ensure the availability of the following effective nuclear security functions:

a. Security management;

b. Security operations; and

c. Physical protection.

29. The licensee shall have in place trained and adequately equipped guards to perform their functions in accordance with nuclear security measures and arrangement.

30. The licensee shall ensure that assigned personnel and guards are familiar with nuclear security measures, the locations of nuclear material at the site, and procedures contributing to the implementation of the regulatory requirements of this regulation.

Section 10: Protection Areas and Layers

31. The licensee shall designate a nuclear security area depending on the category of nuclear material and sabotage targets for which defense in depth needs is applied based on the following:

a. limited access area;

b. protected area; and

c. inner areas and vital areas.

32. The protection areas shall be physically separated through each having its own protection layer.

33. The licensee shall establish sufficient nuclear security measures in each security areas as prescribed by the NRRC.

34. The licensee shall control and manage procedures and record for the movement of persons and vehicles inside the security areas.

Section 11: Information and Cybersecurity

35. The licensee shall have sufficient measures for protecting computer-based systems, including those used for nuclear safety, nuclear material accounting and control, and the physical protection. Consideration shall be given to the potential capabilities of the adversary, from the perspective of both internal and external threats.

36. The licensee shall implement requirements for protecting the confidentiality of information, the unauthorized disclosure of which could compromise the physical protection of nuclear material and facility.

37. The licensee shall ensure the protection of information and cyber security in accordance with the Information Protection and Cyber Security Regulations (NRRC-R-20).

38. The licensee shall submit to the NRRC for approval information and cybersecurity plan describing details measures prescribed in Article 37 of this Regulation.

Section 12: Training

39. The licensee shall develop and implement training program for their staff, including guards and other employees having security responsibilities. The record of such trainings should be maintained for inspection purposes

Section 13: Security Culture

40. The operators shall foster a positive nuclear security culture through positive role models of leaders and/or managers, training, positive reinforcement through recognition of nuclear security culture, sound policies and processes that support nuclear security

Section 14: Quality Assurance

41. The licensee shall establish and implement a quality assurance policy and quality assurance program in order to ensure that specified requirements for all activities important to nuclear security measures are satisfied.

Section 15: Trustworthiness

42. The licensee shall ensure the trustworthiness of persons working or having authorized access to the nuclear facility or confidential information, as well as those participating in activities involving nuclear material, in use and storage, onsite movement, transport and treatment, and nuclear waste.

43. The licensee shall ensure the trustworthiness of employees and persons working or having authorized access, with or without escorted access, to the nuclear facility or confidential information or participating in activities dealing with nuclear material in cooperation with competent security agencies.

Section 16: Insider Mitigation

44. The licensee shall establish, maintain, and implement insider mitigation measures to monitor the initial and continual trustworthiness and reliability of individuals granted or retaining unescorted access authorization to a protected or vital area or sensitive information.

45. The licensee shall implement defense-in-depth methodologies to minimize the potential for an insider to adversely affect, either directly or indirectly, the licensee's capability to prevent sabotage and unauthorized removal of nuclear material.

46. Measures for preventing threats related to persons who have authorized access to nuclear facility, nuclear material during transport or confidential information, shall be implemented systematically and extended to the licensee's subcontractors and employees.

Section 17: Records and Reports

47. A record of all persons who have access to or possession of nuclear security systems including computer systems that control access to nuclear material and/or protection areas shall be kept in an up-to-date record by the licensee.

48. The licensee shall ensure the identity of persons transacting any activity at the licensee's premises and shall keep up-to-date records of this control.

49. The licensee shall comply with the requirements for the duration for maintaining the records as prescribed by the NRRC

50. The licensee shall maintain all records and reports related to the implementation of all requirements prescribed under this regulation for compliance and verification measures by the NRRC.

Section 18: Nuclear Material Accounting and Control for Nuclear Security

51. The licensee shall ensure control of, and be able to account for, all nuclear material at a nuclear facility at all times.

52. The licensee shall design and implement a Nuclear Material Accountancy and Control (NMAC) system as prescribed in Nuclear Material Accountancy and Control (NRRC-R-12).

53. The licensee shall ensure that the nuclear material accountancy and control system is able to provide accurate information about the potentially missing nuclear material in the facility following a nuclear security event.

54. The licensee shall report any confirmed accounting discrepancy in a timely manner as prescribed by the NRRC.

55. The licensee shall ensure sufficient measures for nuclear material accounting and control are in place for nuclear security purposes and comply with the requirements prescribed in the Regulation on Nuclear Material Accountancy and Control (NRRC-R-12).

Section 19: Sustainability Program

56. The licensee shall develop, implement, and maintain means and procedures for maintenance and testing of physical protection systems.

57. Performance testing shall be carried out in accordance with the nuclear security plans and implementing procedures.

58. The licensee shall ensure that the intended function of the nuclear security equipment and system do not compromise in the event when modifications and replacement take place.

59. Maintenance of nuclear security equipment shall be performed according to approved procedures, vendor's recommendations, experience feedback, and system performance to ensure that design requirements are not compromised.

60. The licensee shall establish sustainability programs for its physical protection systems that encompass:

    a. Operating procedures and instructions;

    b. Human resource management and training;

    c. Equipment updating, maintenance, repair, and calibration;

    d. Performance testing and operational monitoring;

    e. Configuration management; and

    f. Resource allocation and operational cost analysis.

Section 20: Compensatory Measures

61. The licensee shall immediately identify and implement measures to compensate for, degraded or inoperable equipment, systems, and components, as well as in the case that physical protection equipment is taken out of service.

62. The licensee shall implement compensatory measures in case nuclear security measures are determined to be incapable of providing the required level of security and the relevant corrective actions shall be submitted to NRRC for approval.

63. Compensatory measures shall provide a level of protection that is equivalent to the protection that was provided by the equipment, system, or components prior to degradation or inoperability.

64. The licensee's Nuclear Security Plan shall include a plan for compensatory measures.

Section 21: Nuclear Security Plan

65. The applicant shall submit a nuclear security plan for the approval by the NRRC as part of the licensing process for the facility or activity to be licensed.

66. The nuclear security plan shall be designed according to the category of nuclear material being protected and the levels of the potential radiological consequences of sabotage.

67. The licensee shall notify the NRRC without delay about any significant events concerning unauthorized actions that affect the physical protection of nuclear material or nuclear facilities that deviate from the approved nuclear security plan.

68. The licensee shall submit all other relevant plans, programs and measures prescribed by this regulation as part of the nuclear security plan.

Section 22: Contingency Plan

69. The licensee shall prepare and submit a contingency plan to respond to nuclear security event as defined in the design basis threat.

70. The licensee shall include written arrangements with an off-site response force in the contingency plan to ensure the protection of a facility where it conducts licensed activities.

71. The licensee shall ensure capability at all times for immediate communication among the security monitoring room, the on-site nuclear response force, and the off-site response force.

72. The licensee shall ensure that the off-site response force can support the on-site nuclear response force in making an effective intervention when requested to do so by the licensee.

73. The licensee shall implement joint exercises between on-site response force and the off-site response force as prescribed by the NRRC.

74. Whenever a threat is detected, the person in charge of the security at the facility shall take control of nuclear security measures preventing

the threat and submit the relevant reports to the NRRC.

Chapter 4: Measures Against Unauthorized Removal

Section 23: Prudent Management Practices

75. Nuclear material below Category III and/or nuclear material, which is in a form that is no longer usable for any nuclear activity, minimizes environmental dispersal and is practicably irrecoverable, shall be managed and protected by the licensee in accordance with prudent management practices prescribed by NRRC.

Section 24: Measures for Categories I, II and III Nuclear Material

76. The licensee shall ensure that nuclear material is used or stored within a restricted access area at the very least.

77. The licensee shall develop and maintain detection capability for any potential unauthorized intrusion to the nuclear material at the facility.

78. The licensee shall establish and implement procedures for transferring nuclear material withing the authorized facility.

79. The licensee shall establish and implement technical means and procedures for access control that provide protection against compromise to the access.

80. For movements of Category III nuclear material within a restricted access area, the licensee shall apply all prudent and necessary nuclear security measures.

81. The licensee shall prepare a contingency plan to effectively counter malicious acts.

Section 25: Measures for Categories I and II Nuclear Material

82. Notwithstanding to the requirement in Section 24, the licensee shall comply to the requirements made under this section for Category I and II nuclear material.

83. The licensee shall use or store Category II nuclear material within a protected area located inside a limited access area.

84. The protected area perimeter shall be equipped with a physical barrier, intrusion detection devices, and assessment to detect any unauthorized access.

85. The protected area's access points shall be kept to the minimum necessary and appropriately secured and fitted with alarms.

86. Vehicles, persons, and packages entering and leaving the protected area shall be subject to search for detection and prevention of unauthorized access and prohibited items or removal of nuclear material.

87. Attention shall be given to the detection of contraband material, explosives, and firearms, as well as devices or measures, in which appropriate measures for detection shall be used.

88. The licensee shall implement measures prescribed by the NRRC for authorized access to protected areas.

89. Licensee shall provide technical means and procedures for access control, including keys and computerized access lists against manipulation, falsification, or any other form of compromise

90. The licensee shall establish a central alarm station based on the requirements prescribed by the NRRC.

91. The licensee shall establish and maintain, at all times, properly trained and properly equipped guards and response force to interdict and neutralize threats The licensee shall establish measures under which on-site movements of nuclear material between two protected areas are treated in compliance with the requirements for nuclear material during transport, taking into account existing nuclear security measures at the facility.

Section 26: Measures for Category I Nuclear Material

92. Notwithstanding to the requirement in Section 24 and 25, the licensee shall comply to the requirements made under this section for Category I nuclear material.

93. The licensee shall use or store Category I nuclear material within an inner area located inside a protected area.

94. The licensee shall ensure that the inner areas is secured and alarmed when unattended.

95. The inner areas shall be equipped with systems and measures that provide delay against unauthorized access to allow for a timely and appropriate response against malicious acts. These systems and measures shall be designed to counter potential capability of the insider

and external adversary for all potential points of intrusion.

96. Vehicle barriers shall be installed at an appropriate distance from the inner area to prevent the penetration of unauthorized land, water-borne, and/or airborne threats that could be used by an adversary for committing a malicious act.

97. The licensee shall ensure effective access control measures to inner areas are developed and implemented at the facility and during the conduct of activity.

98. The licensee shall develop and adhere to procedure on measures for detection and prevention unauthorized access to the Category I nuclear material.

99. The licensee shall ensure detection of unauthorized action by continuous surveillance using the two-person rule or other equivalent means, whenever an inner area is occupied for the purpose to counter the insider threat.

100. The licensee shall ensure that the storage of Category I nuclear material is in accordance with the requirements prescribed by the NRRC.

101. The number of access points into the inner area shall be kept to the minimum necessary in which, all points of potential access shall be appropriately secured and alarmed.

Chapter 5: Sabotage

Section 27: General Requirements Against Sabotage

102. Notwithstanding the requirement prescribed in Chapter 4, the physical protection system of a nuclear facility should be integrated and effective against both sabotage and unauthorized removal.

103. The licensee shall conduct an analysis for each nuclear facility for NRRC's approval to determine whether the radioactive inventory has the potential to result in unacceptable radiological consequences, assuming that the sabotage acts will be successfully completed while ignoring the impact of the physical protection or mitigation measures.

104. The licensee shall implement a set of physical protection design objectives and measures for each assigned level of protection as prescribed by the NRRC, based on the results of analyses in Article 103.

105. The licensee of a nuclear facility whose radiological consequences do not exceed the threshold limit established by NRRC shall protect the equipment, systems, devices, and nuclear material against the sabotage based on a graded approach and per requirements provided by NRRC.

106. The licensee of a nuclear facility whose radiological consequences exceed the threshold limit established by NRRC shall identify equipment, systems or devices, or nuclear material that could directly or indirectly become a potential sabotage target and protect them in accordance with the design process and protection requirements as prescribed by the NRRC.

107. The licensee shall assess, on detection of a malicious act, whether this act could lead to radiological consequences and notify the NRRC.

108. The licensee shall take measures specified in the contingency plan Immediately following an act of sabotage to prevent further damage, secure the nuclear facility, and protect emergency equipment and personnel.

Section 28: Designing a Physical Protection System Against Sabotage

109. The licensee shall define credible sabotage scenarios against the nuclear facility and nuclear material based on the design basis threat, including, but not limited to stand-off attacks, in-siders, collusion of adversary and cyber threats.

110. The licensee shall design a physical protection system that is effective against the sabotage scenarios approved by the NRRC taking into account other systems of the facility.

111. The physical protection system shall be designed to deny unauthorized access of persons or equipment to the targets, to minimize the opportunity of insiders, and to protect the targets against possible stand-off attacks consistent with design basis threat.

112. The licensee shall ensure the effectiveness of nuclear security measures against the sabotage scenarios and make modifications and/or improvements accordingly which shall be subject to the NRRC approval.

Section 29: Requirements Against Sabotage at Nuclear Facilities

113. All equipment, systems or devices, or nuclear material, the sabotage of which could directly or indirectly lead to high radiological consequences shall be located inside one or more vital areas.

114. The licensee shall meet the requirements of Section 28 of this regulation along with the following additional requirements:

    a. Timely detection of tampering or interference with vital area equipment, systems or devices shall be provided.

    b. Maintaining strict access control to vital areas during a shutdown and maintenance period.

    c. Conducting searches and testing to detect any tampering that may have been committed during shutdown and maintenance.

    d. Establishing a central alarm station based on the requirements prescribed by the NRRC including a secondary alarm station to ensure that the functions of central alarm station in monitoring and assessment of alarms, initiation of response and communication shall continue during emergency.

115. For nuclear material and other nuclear facilities other than nuclear power plants, sabotage of which can result in unacceptable radiological consequences to the public shall be protected depending on the degree of consequences.

Chapter 6: Nuclear Security During Transport

Section 30: General Nuclear Security Requirements to Protect Nuclear Material During Transport

116. The licensee shall aggregate the total amount of nuclear material on or in a single conveyance to determine a categorization and identify and implement the appropriate security requirements and measures for the conveyance.

117. When different types of nuclear material are transported on the same conveyance, an appropriate aggregation formula shall be used by the licensee to determine the category of the consignment according to the requirement provided in the Regulation on Safe Transport of Radioactive Materials (NRRC-R-15).

118. The licensee shall implement nuclear security measures against unauthorized removal during transport applying graded approach mechanism.

119. Licensee shall identify and implement additional nuclear security measures to prevent malicious act on nuclear material during transport, based on the design basis threat and potential radiological consequences.

120. The safety features of the design of transport package, container, and conveyance shall be taken into account while deciding additional physical protection measures for the protection of the material against malicious act.

121. The licensee shall protect sensitive information relating to transport operations, including detailed information on the schedule and route, and shall disseminate such information only based on the need to know.

122. The licensee shall not use unnecessary markings on conveyances and shall avoid the use of open channels for transmission of messages concerning shipments of nuclear material.

123. When a security related message is transmitted, such information shall be protected in accordance with applicable information protection requirements prescribed by the NRRC.

124. The authorized person shall establish procedures to ensure the security of keys to conveyances and security locks commensurate with the categorization of the nuclear material being transported.

125. If the conveyance comes to an unexpected extended stop, the physical protection measures appropriate for that category of material in storage shall be applied to the extent possible and practicable.

126. Physical protection of nuclear material in storage incidental to transport shall be at a level appropriate for the category of the nuclear material and provide a level of protection consistent with that required in Chapter 4 for use and storage.

Section 31: Requirements for Categories I, II and III Nuclear Material

127. In addition to requirements in Section 30 the requirements in this Section shall be applicable to Categories I, II and III nuclear materials.

128. The licensee shall ensure that prior agreements among, receiver, and carrier specify the time, place, and procedures for transferring physical protection responsibilities; and that adequate physical protection arrangements are in place.

129. An application for a license to transport Category I, II or III nuclear material shall contain, in addition to any other information required in Section 30, a written transportation security plan as prescribed by the NRRC.

130. The licensee shall ensure that packages containing nuclear material are carried in a closed, locked, and sealed conveyance, compartment, or freight container.

131. The licensee shall make the necessary arrangement for a detailed search of conveyance to ensure that nothing has been tempered with and that nothing has been affixed to the package or conveyance that might compromise the security of the consignment.

132. The licensee shall ensure the availability of an uninterrupted communication system for the conveyance to communicate with response forces.

133. Upon arrival, the licensee shall ensure the integrity of the packages and locks and seals in verifying that the security of the consignment has not been compromised and accepts the shipment and notifies the NRRC in writing immediately.

Section 32: Requirements for Categories I and II Nuclear Material

134. In addition to requirement provided in Section 30 and 31, the requirements in this Section shall apply to Categories I and II nuclear material.

135. Prior to commencing transport, the licensee shall ensure that all measures necessary to implement the approved transport security plan are in place.

136. The conveyance shall be searched immediately prior to loading and shipment, and the conveyance shall be placed in a secure area or kept under guard surveillance until its loading and shipment for transport and unloading, immediately upon completion of the search.

137. The licensee shall ensure that physical protection measures are able to provide sufficient delay in the conveyance, freight container and package so that guards and response forces have reasonable time for an appropriate response.

138. The licensee shall ensure each shipment is accompanied by adequately equipped and trained guards, including prior to and during loading and unloading operations.

139. Surveillance of the route shall be conducted for any threat indicators, and any necessary response shall be initiated.

140. Continuous, effective surveillance of the packages or locked cargo hold, or compartment holding the packages, shall be maintained at all times, especially when the conveyance is not on move.

141. Nuclear security measures shall include provision of continuous two-way voice communication systems between the conveyance, any guards accompanying the shipment, the designated response forces, and where appropriate, the shipper and receiver. Such systems shall be redundant, diverse, and secure.

142. The licensee shall make arrangements for the availability of response forces proportional to the prevailing threat to deal with nuclear security events in time to prevent the unauthorized removal of nuclear material.

Section 33: Requirements for Category I Nuclear Material

143. In addition to requirement provided in Section 30, 31 and 32, the requirements in this Section shall apply to Category I nuclear material.

144. The NRRC shall be intimated about exact date and time of shipment prior to the commencement of each shipment.

145. The licensee shall conduct a detailed route surveillance based on the threat assessment or intelligence information and comply to modal requirement prescribed by the NRRC for each shipment.

146. The licensee shall establish a transport control center for the purpose of keeping track of the current position and physical protection measures status of the shipment of nuclear material and alerting response forces in case of an attack.

147. The transport control center shall be protected so that its function can continue in the presence of the threat.

148. While the shipment is in process, the transport control center shall be staffed by appropriate personnel whose trustworthiness has been predetermined.

Chapter 7: Response to Nuclear Security Event

Section 34: Licensee Responsibility to Nuclear Security Event

149. The licensee shall immediately report to the NRRC and competent security agencies any occurrence of the following nuclear security events and any changes that may affect nuclear security related to nuclear facilities or transport of nuclear material as defined in the approved contingency plan:

a. Actual or attempted intrusion into the facility or into a limited access area, protected area, inner area, or vital area.

b. Attempted or actual unauthorized removal, loss, or unauthorized movement of nuclear material, whether involving external adversaries or insiders.

c. Attempted or actual acts of sabotage, including tampering or interference with vital area equipment, systems, or devices.

d. Loss or unauthorized disclosure of sensitive information.

e. Failure of any physical protection equipment and system leading to loss of physical protection system's function.

f. Compromise or attempted compromise of digital computers, communication systems and networks used for nuclear security and safety.

g. Any other event that could potentially compromise security measures.

150. The licensee shall assign a sufficient number of persons with expertise in nuclear safety, security, and radiation safety to assist the competent security agencies during a nuclear security event.

151. The licensee shall initiate its contingency plan after detecting and assessing any malicious act.

Section 35: Measures to Locate and Recover Missing or Stolen Nuclear Material

152. The licensee shall ensure that any missing or unauthorizedly removed nuclear material is detected in a timely manner.

153. The licensee shall confirm any missing or stolen nuclear material by means of a rapid emergency inventory as soon as possible within the period specified by the NRRC.

154. The licensee shall ensure timely reporting to the NRRC on any significant events concerning unauthorized actions that affect the physical protection of nuclear material or nuclear facilities.

155. The licensee shall take all appropriate measures to locate, as soon as possible, any declared missing or stolen nuclear material on-site and possibly off-site as defined in the approved contingency plan.

156. The licensee shall secure the missing or stolen nuclear material in accordance with the contingency plan once located and identified in situ and return it to an appropriate nuclear facility upon approval by the NRRC.

157. The licensee shall provide any other necessary assistance to the NRRC and competent security agencies to locate and recover nuclear material, as well as cooperate during subsequent investigations and prosecution.

Section 36: Measures to Mitigate or Minimize the Radiological Consequences

158. The licensee shall assess, on detection of a malicious act, whether this act could lead to radiological consequences and notify the NRRC.

159. Immediately following an act of sabotage, the licensee shall take measures specified in the contingency plan to prevent further damage, secure the nuclear facility and nuclear material, protect emergency equipment and personnel.

Appendix 1 Categorization of Nuclear Material

Material	Form	Category I	Category II	Category III[c]
1. Plutonium [a]	Unirradiated[b]	2 kg or more	Less than 2 kg but more than 500 g	500 g or less but more than 15 g
2. Uranium-235 (^{235}U)	Unirradiated[b] – Uranium enriched to 20% ^{235}U or more	5 kg or more	Less than 5 kg but more than 1 kg	1 kg or less but more than 15 g
	– Uranium enriched to 10% ^{235}U but less than 20% ^{235}U		10 kg or more	Less than 10 kg but more than 1 kg
	– Uranium enriched above natural, but less than 10% ^{235}U			10 kg or more
3. Uranium-233 (^{233}U)	Unirradiated[b]	2 kg or more	Less than 2kg but more than 500 g	500 g or less but more than 15 g
4. Irradiated fuel (The NRRC may assign a different category for domestic use, storage and *transport* taking all relevant factors into account.)			Depleted or natural uranium, thorium or low enriched fuel (less than 10% fissile content)[d, e]	

Note: *This table is not to be used or interpreted independently of the text of the entire publication.*

a. All plutonium except that with isotopic concentration exceeding 80% in plutonium-238.

b. Material not irradiated in a reactor or material irradiated in a reactor but with a radiation level equal to or less than 1 Gy/h. (100 rad/h) at 1 m unshielded.

c. *Quantities not falling in Category III and natural uranium, depleted uranium and thorium should be protected at least in accordance with prudent management practice.*

d. *Based on evaluation of the specific circumstances, the NRRC may assign a different category of physical protection.*

e. *Other fuel which by virtue of its original fissile material content is classified as Category I or II before irradiation may be reduced one category level while the radiation level from the fuel exceeds 1 Gy/h (100 rad/h) at one metre unshielded.*

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