



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

**Physical Protection
Requirements for
Nuclear Power Reactors
(Design Certification)**

**Office of Nuclear Security Incident Response
Division of Security Policy**

Revised May 2014



Regulatory Requirements

- Subpart B, 10 CFR 52.47 - requires that information submitted for a design certification must include performance requirements and design information sufficiently detailed to permit the preparation of acceptance and inspection requirements by the NRC, and procurement specifications and construction and installation specifications by an applicant.
- 10 CFR 52.48 - requires the applications filed will be reviewed for compliance with the standards set out in 10 CFR Part 73, “Physical Protection of Plants and Materials.”



Regulatory Requirements

- 10 CFR Part 73 - includes performance-based and prescriptive regulatory requirements that, when adequately met and implemented provide protection of nuclear power reactors against acts of radiological sabotage, prevent the theft or diversion of special nuclear material, and protect safeguards information against unauthorized release.



Regulatory Requirements

- 10 CFR 73.55(b) - requires that the applicant “shall establish and maintain an onsite physical protection system and security organization which will have as its objective to provide high assurance that activities involving special nuclear material are not inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety.”



Regulatory Requirements

- 10 CFR 73.55(b)(2) - requires a licensee to provide a high assurance of protection against the DBT of radiological sabotage. A DC application only describes the design bases for physical security structures, systems, and components (i.e., hardware) that are relied on for implementation of a physical protection program that protect against the design basis threat of radiological sabotage.
- 10 CFR 73.55(b)(3) – requires assurance of capabilities to detect, assess, interdict, and neutralize (i.e., design of a physical protection system) threats up to and including the design basis threat of radiological sabotage.
- 10 CFR 73.55(b)(3)(ii) – requires defense-in-depth for the physical protection.



Regulatory Requirements

- The following sections contain requirements for designs of physical security systems:
 - 10 CFR 73.55(b)(1) through (b)(11), General performance objectives and requirements
 - 10 CFR 73.55(e)(1) through (e)(10), “Physical barriers”
 - 10 CFR 73.55(g)(1) through (g)(8), “Access controls”
 - 10 CFR 73.55(i)(1) through (i)(6), “Detection and assessment systems”
 - 10 CFR 73.55(j)(1) through (j)(6), “Communications Requirements”



Regulatory Requirements

- The following sections contain requirements for administrative and management systems for a physical protection program:
 - 10 CFR 73.55(c)(i) through (c)(iv). “Security plans”
 - 10 CFR 73.55(d)(1) through (d)(3), “Security organization”
 - 10 CFR 73.55(f)(1) through (f)(4), “Target sets”
 - 10 CFR 73.55(h)(1) through (h)(3), “Search program”
 - 10 CFR 73.55(k)(1) through (k)(8), “Response requirements”
 - 10 CFR 73.55(m)(1) through (m)(4), “Security program reviews”
 - 10 CFR 73.55(n)(1) through (n)(8), “Maintenance, testing, and calibration”
 - 10 CFR 73.55(o)(1) through (o)(3), “Compensatory measures”
 - 10 CFR 73.55(p)(1) through (p)(4), “Suspension of security measures”
 - 10 CFR 73.55(q), “Records”



Regulatory Requirements (continued)

Other programmatic or licensing requirements:

- 10 CFR 73.55(l)(1) through (l)(7), “Facilities using mixed-oxide (MOX) fuel assemblies containing up to 20 weigh percent plutonium oxide,” is applicant only to applicant that plans to use MOX fuel assemblies.
- 10 CFR 73.55(r)(1) through (r)(4), “Alternative measures” is applicable only if an applicant plans to provide a measure for protection against radiological sabotage other than one required by 10 CFR 73.
- 10 CFR Part 73.21, “Protection of Safeguards Information: Performance Requirements” and 10 CFR 73.22, “Protection of Safeguards Information, Specific Requirements”
- 10 CFR Part 73.54, “Protection of digital computer and communication systems and net works”



Regulatory Requirements (continued)

- 10 CFR Part 73.56, “Personnel access authorization requirements for nuclear power plants”
- 10 CFR Part 73.58, “Safety/security interface requirements for nuclear power reactors.”
- 10 CFR Part 100.21 (f) “Non-Seismic Siting Criteria” [10 CFR 52.17(a)(1)(x)] *{Note: Title 10 CFR 100.21(f) requires that site characteristics must be such that adequate security plans and measures can be developed. }*



Regulatory Requirements

- A COL applicant may incorporate by reference a certified design in meeting various requirements of 10 CFR 73.55. However, the standard design of physical protection systems is limited to the scope of the design certification and the COL applicant must provide the remaining and complete the descriptions of a physical protection system, along with security programs, organization, and processes, for meeting all requirements of 10 CFR 73.55.



Regulatory Requirements

- 10 CFR 52.47 - requires that the application will contain a final safety analysis report (FSAR) that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components and of the facility as a whole.
- 10 CFR 52.6 - requires that the information provided to the Commission by the applicant must be complete and accurate and the applicant will notify the Commission of information that the applicant, licensee, or holder has been identified as having a significant implication for public health and safety or common defense and security.



Regulatory References

- RG 5.7, “Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas,” Revision 1, May 1980
- RG 5.12, “General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials,” November 1973
- RG 5.44, “Perimeter Intrusion Alarm Systems,” Revision 3, October 1997
- RG 5.65, “Vital Area Access Controls, Protection of Physical Protection System Equipment and Key and Lock Controls,” September 1986



Regulatory References

- RG 5.68, “Protection Against Malevolent use of a Vehicle at Nuclear Power Plants”
- RG 5.78, “Protection of Mixed Oxide Fuel at Nuclear Power Plants”
- RG 5.81, “Target Set Identification and Development for Nuclear Power Reactors”
- NUREG-1959, “Intrusion Detection Systems and Subsystems,” updating technical information in RG 5.44

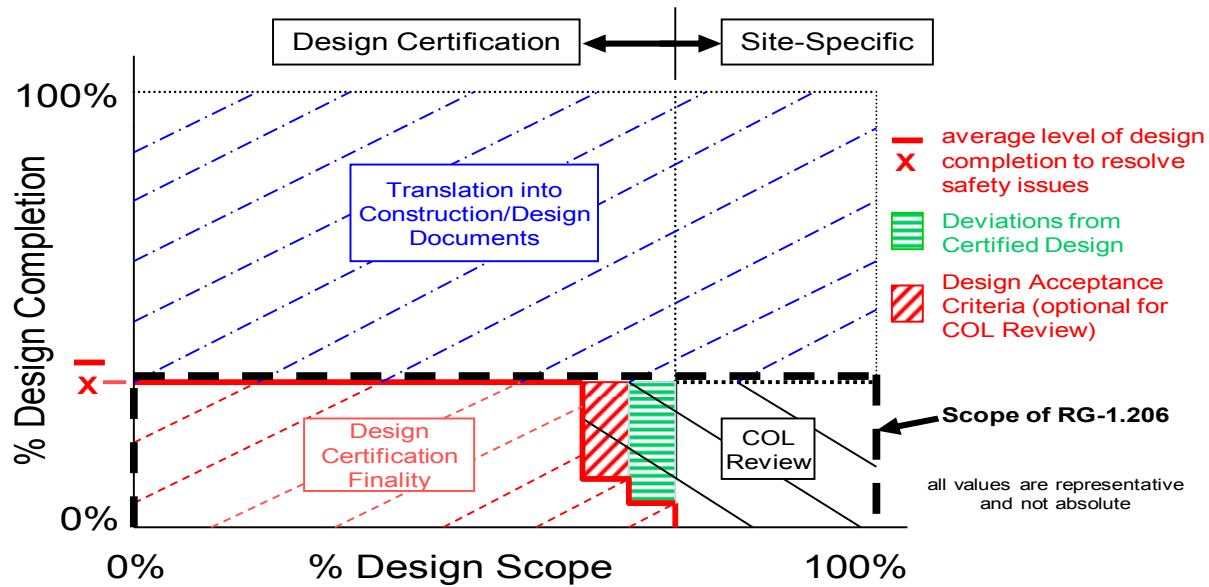


Regulatory References

- RG 5.71, Cyber Security Programs for Nuclear Facilities, January 2010
- RG 5.74, “Managing the Safety/Security Interface,” March 2009
- RG 5.77, “Insider Mitigation Program (IMP),” July 2009
- RG 1.206, “Combined License Applications for Nuclear Power Plans (LWR Edition), June 2007
 - Figure 1: Combined License Application Referencing a Certified Design

Note: Regulatory guides are not substitutes for regulations, and compliance with them is not required.

Regulatory References



Combined License Application Referencing a Certified Design



Staff Guidance

- The relevant staff guidance for licensing review and the associated technical guidance and acceptance criteria are given in following sections of the NUREG-0800:
 - SRP 13.6.1, Physical Security – Combined License and Operating Reactors
 - SRP 13.6.2, Physical Security – Review of Physical Security System Designs – Standard Design Certification and Operating Reactor Licensing Applications (Revision 2 - in process)
 - SRP 13.6.3, Physical Security – Early Site Permit (10 CFR Part 52) and Reactor Siting Criteria (10 CFR 100)
 - SRP 14.3.12, Physical Security – Inspections, Tests, Analyses, and Acceptance Criteria



Other References for Designing and Evaluating Physical Protection Systems

- NUREG/CR-1345, Nuclear Power Plant Concepts for Sabotage Protection [latest - DOE SAND2007-5591, "Nuclear Power Plant Security Assessment Technical Manual]
- NUREG/CR-7145, Nuclear Power Plant Security Assessment Guide
- NUREG/CR-4250, Vehicle Barriers: Emphasis on Natural Features



Other References for Designing and Evaluating Physical Protection Systems

- NUREG/CR-6190, Protection Against Malevolent Use of Vehicles at Nuclear Power Plants

Note: NUREGs and other technical reports are not Regulatory Guides, and should not be used as acceptable methods for meeting regulatory requirement,



Other References for Designing and Evaluating a Physical Protection System

Design Related – NRC Policy Statement and Staff Requirements

- “Policy Statement on Regulation of Advanced Reactor - Federal Register Notice, Volume 73, No. 199, October 18, 2008 {e.g., design include considerations for safety and security requirements together in the design process such that security issues (revised DBT) can be effectively resolved through design and engineered security features . . . with reduced reliance on human action}

Note: Policy statement and staff requirements are not regulatory requirements for licensing.