



## U.S. NUCLEAR REGULATORY COMMISSION

# STANDARD REVIEW PLAN

### 13.6.2 PHYSICAL SECURITY - DESIGN CERTIFICATION

#### REVIEW RESPONSIBILITIES

**Primary** - Organization responsible for the review of physical security

**Secondary** - None

#### I. AREAS OF REVIEW

For DC applications, the review involves the evaluation of the security program design, to include those physical protection elements determined within scope as previously referenced in a certified design. The NRC staff should review the applicant's submittal to determine with reasonable assurance that the applicant's design incorporates physical protection objectives and criteria into the design of the plant.

The review should encompass the material intended to meet the general performance objective as described in 10 CFR 73.55(a) as well as guidance provided in NRC Regulatory Guide (RG) 1.70, Revision 3, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," issued November 1978.

In addition, the DC review addresses the applicant's analysis of sabotage vulnerability to threats from both insiders and outsiders, with insights of this analysis reflected in the physical design and operating procedures of the facility.

The specific areas of review are as follows:

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#### USNRC STANDARD REVIEW PLAN

This Standard Review Plan, NUREG-0800, has been prepared to establish criteria that the U.S. Nuclear Regulatory Commission staff responsible for the review of applications to construct and operate nuclear power plants intends to use in evaluating whether an applicant/licensee meets the NRC's regulations. The Standard Review Plan is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC regulations.

The standard review plan sections are numbered in accordance with corresponding sections in Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)." Not all sections of Regulatory Guide 1.70 have a corresponding review plan section. The SRP sections applicable to a combined license application for a new light-water reactor (LWR) are based on Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

These documents are made available to the public as part of the NRC's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-0800 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments may be submitted electronically by email to [NRR\\_SRP@nrc.gov](mailto:NRR_SRP@nrc.gov).

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1. Diagrams, to approximate scale, displaying the following:
  - A. Designated owner-controlled, protected area(s), including the associated isolation zone, and vital areas of the plant site, including physical barriers.
  - B. The locations of alarm stations.
  - C. The locations of vital equipment and vital areas, to include access control points to protected and to vital areas.
  - D. The locations of parking lots relative to the clear areas adjacent to the physical barriers surrounding protected areas.
2. The physical barrier construction for the protected and vital areas, and personnel/ vehicle/material portal(s) into the owner controlled, protected and vital areas.
3. The design features to be used for protecting all potential access points into vital areas against authorized intrusion. Such features should include locking devices and intrusion detection devices.
4. All intrusion alarms, emergency exit alarms, duress alarms, alarm systems, and line supervisory tamper indicating systems, and communication systems.
5. The provisions to be utilized in the design for the protection of security system service panels, conduits and wiring devices integral to security communication systems, intrusion detection systems, security power systems, security digital systems and other related physical security features.
6. The identification of vital equipment and locations, and provisions incorporated into the design to detect malevolent acts by both insiders and outsiders to impair performance.

For a DC application, the review will also address COL action items and requirements and restrictions (e.g., interface requirements and site parameters).

### Review Interfaces

Other SRP sections interface with this section as follows:

1. Review of the adequacy of the physical security hardware Inspection, Test, Analysis, and Acceptance Criteria (PS-ITAAC) as performed under SRP Section 14.3.12 - Physical Security Hardware.
2. For COL reviews of operational programs, the review of the applicant's implementation plan is performed under SRP Section 13.4, "Operational Programs."

The specific acceptance criteria and review procedures are contained in the referenced SRP sections.

## II. ACCEPTANCE CRITERIA

### Requirements

Acceptance criteria are based on meeting the relevant requirements of the following Commission regulations:

1. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities"

2. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants"
3. 10 CFR 73.1(a)(1), "Radiological Sabotage"
4. 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage" and Appendices B, C, G and H
5. 10 CFR 74, "Material Control and Accounting of Special Nuclear Material"
6. 10 CFR Part 100, "Reactor Site Criteria"

Although there are no Commission regulations governing the contents of a DC application with respect to security, there are several regulatory guidance documents that can be applied. They are as follows:

7. Regulatory Guide 1.70, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants, November 1978
8. Regulatory Guide 1.91, Evaluations of Explosions Postulated to Occur at Transportation Routes Near Nuclear Power Plants, February 1978
9. Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations, April 1998
10. Regulatory Guide 5.12, General Use of Locks in the Protection and Control of Facilities and Special Nuclear Materials, November 1973
11. Regulatory Guide 5.65, Vital Area Access Controls, Protection of Physical Security Equipment and Key and Lock Controls, September 1986
12. Regulatory Guide 5.7, Entry/Exit Control for Protected Areas, Vital Areas, and Material Access Areas, Revision 1, May 1980
13. Regulatory Guide 5.44, Perimeter Intrusion Alarm Systems, Revision 3, October 1997
14. Information Notice No. 86-83: Underground Pathways into Protected Areas, Vital Areas, and Controlled Access Areas, September 19, 1986
15. Regulatory Information Summary 2005-04, Guidance on the Protection of Unattended Openings that Intersect a Security Boundary or Area, April 14, 2005
16. Regulatory Guide 5.29, Material Control and Accounting for Nuclear Power Reactors
17. American National Standards Institute (ANSI) N15.8, Nuclear Material Control Systems for Nuclear Power Plants, 1974
18. Review Standard (RS)-002, Processing Applications for Early Site Permits
19. NUREG-1555, Standard Review Plans for Environmental Reviews of Nuclear Power Plants

## SRP Acceptance Criteria

Specific SRP acceptance criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for the review described in this SRP section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations.

1. Section (c) of 10 CFR 73.55 - Physical Barriers. The licensee shall locate vital equipment only within a vital area, which in turn, shall be located within a protected area such that access to vital equipment requires passage through at least two physical barriers as defined in 10 CFR 73.2. The physical barriers at the perimeter shall be separated from any other barrier designated as physical barrier for a vital area within the protected area. Isolation zones in outdoor areas adjacent to the physical barrier at the perimeter of the protected area permit observation. Intrusion detection system detects penetration or attempted penetration of the protected area (PA) barrier. All exterior areas within the protected area are illuminated. The external walls, doors, ceiling and floors in the main control room are bullet resistant. Vehicle control measures which include vehicle barrier systems protect against the use of land vehicle.
2. Section (d) of 10 CFR 73.55 - Access Requirements. The licensee shall control all points of personnel and vehicle access into a protected area, to include detection equipment capable of detecting firearms, explosives and incendiary devices. Unoccupied vital areas are locked and alarmed with activated intrusion detection systems that annunciate in both the central and secondary alarm stations upon intrusion into a vital area. The individual responsible for the last access control function (controlling admission to the protected area) must be isolated within a bullet-resisting structure.
3. Section (e) of 10 CFR 73.55 - Detection Aids. All alarms required pursuant to this part shall annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station, not necessarily onsite, such that a single act cannot remove the capabilities of calling for assistance or otherwise responding to an alarm. The central alarm station shall be considered a vital area, shall be bullet-resisting, the interior will not be visible from the protected area perimeter, and associated onsite secondary power supplies for alarm annunciators and non-portable communication equipment must be located within vital areas. Alarm devices and transmission lines must be tamper indicating and self checking. Alarm annunciation shall indicate type of alarm and location. All emergency exits from protected and vital areas shall be alarmed.
4. Section (f) of 10 CFR 73.55 - Communication Requirements. Each security officer, watchman or armed response individual shall be capable of maintaining continuous communications with an individual in each continuously manned alarm stations. Conventional telephone and radio or microwave transmitted two-way voice communications shall be established with local law enforcement authorities.
5. Section (g) of 10 CFR 73.55 - Testing and Maintenance. Each applicant shall develop test and maintenance provisions for intrusion alarms, emergency alarms, communication equipment, access control equipment, physical barriers, and other security-related devices or equipment.

## Technical Rationale

The technical rationale for application of these acceptance criteria to the areas of review addressed by this SRP section is discussed in the following paragraphs:

1. 10 CFR 50.34(c) requires that license applications to operate a production or utilization facility include a physical security plan that describes how the applicant will meet the requirements of 10 CFR Part 73 (and 10 CFR Part 11 if applicable). See Technical Rationale for 10 CFR 73.55 (Item 2) below.
2. 10 CFR 73.55 establishes the detailed requirements for development and implementation of a physical security plan. The physical security plan defines the administrative, physical and operational measures that provide protection of the facility, and any associated special nuclear material, from both internal and external threats. Compliance with 10 CFR 73.55 provides high assurance that the plant is protected against theft of nuclear material or radiological sabotage.
3. 10 CFR 100.21(f) establishes that site characteristics must be such that adequate security plans and measures can be developed.

### III. REVIEW PROCEDURES

The reviewer will select material from the procedures described below, as may be appropriate for a particular case.

These review procedures are based on the identified SRP acceptance criteria. For deviations from these acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II.

For DC reviews, the review consists of careful examination of the information submitted and a comparison against the acceptance criteria as described in subsection II above. If the applicant chooses to provide only the minimum required information, the reviewer will review the application to determine if sufficient information exists to formulate a positive determination.

If the reviewer determines insufficient information is provided in the application to make a positive determination, then the reviewer should identify those issues deemed as unresolved and to be further addressed by a future applicant who herein references this specific design.

1. The reviewer should ensure that the applicant has provided clear, approximate to scale diagrams, figures, drawings, etc. that provides a clear visual depiction of the facility and site physical layout, to include, but not limited to the following: physical structures and their location on the site, owner-controlled area, protected area(s), vital areas and vital equipment, physical barriers, alarm stations, access control points, parking lots relative to the areas adjacent to physical barriers surrounding protected areas, and any special features of the terrain which may present special vulnerability problems. The site and facility layout should also include a visual depiction of the site in relation to nearby towns, roads, and other environmental features important to the effective coordination of response operations.
2. The reviewer should ensure that the applicant has described the design of the site physical barriers to include protected area barrier, personnel/vehicle portals into the protected area, vehicle barrier system, delay barriers, bullet/blast resistant barriers, bullet/blast resistant enclosures/defensive positions are of sufficient strength provide

reasonable assurance for protection against acts of radiological sabotage. This description should confirm access to vital equipment: 1) requires passage through at least two physical barriers, 2) physical barriers at the perimeter shall be separated from any other barrier designated as a physical barrier for a vital area within the protected area, 3) access portals into vital areas are of sufficient strength such that the integrity of the wall is not lessened by any opening, and 4) isolation zones in outdoor areas adjacent to the physical barrier at the perimeter of the protected area permit observation. The external walls, doors, ceiling and floors in the main control room, central alarm station, bullet-resistant enclosures, and the last access control function for access to the protected area are bullet resistant. Vehicle control measures which include vehicle barrier systems protect against the use of land vehicle. Intrusion detection system detects penetration or attempted penetration of the protected area (PA) barrier. A listing and description of the design of physical barriers should also include an analysis of credited delay times.

3. The reviewer should ensure that the applicant has described the design features of the access control system that permits control of all points of personnel and vehicle access into the owner-controlled area, protected and vital areas, to include detection equipment capable of detecting firearms, explosives and incendiary devices. The description should include that unoccupied vital areas are locked and alarmed with activated intrusion detection systems that annunciate in both the central and secondary alarm stations upon intrusion into a vital area. The reviewer should assure that locks are manipulative resistant.
4. The reviewer should ensure that the applicant has listed and described all intrusion alarms, emergency exit alarms, duress alarms, alarms systems, line supervisory and tamper indicating systems, and communication systems. This list should include all alarm assessment subsystems, entry control subsystems and the alarm communication and display systems. The reviewer should ensure all alarms annunciate in a continuously manned central alarm station located within the protected area and in at least one other continuously manned station, not necessarily onsite, such that a single act cannot remove the capabilities of calling for assistance or otherwise responding to an alarm. The central alarm station shall be considered a vital area, shall be bullet-resisting, the interior wall not be visible from the protected area perimeter, and associated onsite secondary power supplies for alarm annunciators and non-portable communication equipment must be located within vital areas. Each security officer, watchman or armed response individual shall be capable of maintaining continuous communications with an individual in each continuously manned alarm stations. Conventional telephone and radio or microwave transmitted two-way voice communications shall be established with local law enforcement authorities. Alarm devices and transmission lines must be tamper indicating and self checking. Alarm annunciation shall indicate type of alarm and location. All emergency exits from protected and vital areas shall be alarmed.
5. The reviewer should ensure that the applicant has described the conduit pathway design or the means of accommodating fiber-optics and electric utilities to interface with security service panels, communications systems, security power systems, security digital systems and other security related features.
6. The reviewer should ensure that the applicant list and describe all vital equipment and locations. This review should confirm that a valid methodology was utilized in the development and identification of vital equipment, and an analysis of sabotage vulnerability to threats from both insiders and outsiders. The reviewer should ensure that the insights from this analysis are reflected in the physical design of the facility.



For review of a DC application, the reviewer should follow the above procedures to verify that the design, including requirements and restrictions (e.g., interface requirements and site parameters), set forth in the final safety analysis report (FSAR) meets the acceptance criteria. DCs have referred to the FSAR as the design control document (DCD). The reviewer should also consider the appropriateness of identified COL action items. The reviewer may identify additional COL action items; however, to ensure these COL action items are addressed during a COL application, they should be added to the DC FSAR.

After this review, SRP Section 14.3 should be followed for the review of Tier I information for the design, including the postulated site parameters, interface criteria, and ITAAC.

#### IV. EVALUATION FINDINGS

The reviewer should verify that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's safety evaluation report. The reviewer should also state the bases for these conclusions.

For DC reviews, the findings will also summarize (to the extent that the review is not discussed in other SER sections) the staff's evaluation of the Physical Security - Inspections, Test, Analyses, and Acceptance Criteria (PS-ITAAC), including design acceptance criteria, as applicable, relevant SRP Section 14.3.12 - Physical Security Hardware.

The evaluation finding at the DC stage should be substantially equivalent to the following statement:

The applicant has provided a description of the design for protecting the plant against potential acts of radiological sabotage. The design adequately describes the plant layout and protection of vital equipment in accordance 10 CFR 73.55 and applicable regulatory guidance, and provides reasonable assurance for this stage of the licensing process that the plant design will provide adequate protection against acts of radiological sabotage.

#### V. IMPLEMENTATION

The staff will use this SRP section in performing safety evaluations of DC applications and license applications submitted by applicants pursuant to 10 CFR Part 50 or 10 CFR Part 52. Except when the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the staff will use the method described herein to evaluate conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section, unless superseded by a later revision.

#### VI. REFERENCES

1. Conventional Weapons Effects (CONWEP) software and manual, U.S. Army Corps of Engineers, Omaha, NE. Restricted to government agencies and their contractors.
2. Single Degree of Freedom Blast Design Spreadsheet (SBEDS) Version 3.1 software and Methodology Manual, U.S. Army Corps of Engineers, Omaha, Nebraska. Unclassified.

3. Waterborne Sub-Surface Blast Effects to the Design Basis Threat, D. Sulfredge, Oak Ridge National Laboratory, Oak Ridge, TN. Safeguards Information.
4. Waterborne Surface Blast Effects to the Design Basis Threat, D. Sulfredge, Oak Ridge National Laboratory, Oak Ridge, TN. Safeguards Information.
5. Guidance for Using Underwater Explosion (UNDEX) Data for Estimating Loads on Submerged Targets, D. Sulfredge, Oak Ridge National Laboratory, Oak Ridge, TN, and B. Tegeler, U.S. Nuclear Regulatory Commission, Washington, DC. Unclassified.
6. NUREG/CR-4250, "Vehicle Barriers: Emphasis on Natural Features," Sandia National Laboratory, Albuquerque, NM. Unclassified.
7. Regulatory Information Summary 2003-06, "High Security Protected and Vital Area Barrier/Equipment Penetration Manual," U.S. Nuclear Regulatory Commission, Washington, DC. Safeguards Information.
8. FM 5-250, "Explosives and Demolitions," Department of the Army, Washington, DC. Restricted to government agencies and their contractors, export controlled.
9. DOETIC-11268, "Manual for the Prediction of Blast and Fragment Loading for Structures," U.S. Department of Energy, Washington DC. Unclassified.
10. SD-STD-02.01, "Certification Standard, Test Method for Vehicle Crash Testing of Perimeter Barriers and Gates," U.S. State Department, Washington, DC. Unclassified.
11. Department of Defense and Department of State certified vehicle barrier list, (updated periodically by the U.S. Army Corps of Engineers, Omaha, NE, available at <https://pdc.usace.army.mil/library/BarrierCertification/>). Unclassified.
12. TM 5-1300, "Structures to Resist the Effects of Accidental Explosions," Department of Defense, Washington, DC. Unclassified. (Also designated as Air Force AFR 08-22 and Navy NAVFAC P-3897)
13. SAND2001-2168, "Technology Transfer Manual - Access Delay Technology, Volume 1," Sandia National Laboratory, Albuquerque, NM. In addition, all manuals in the Technology Transfer series: SAND99-2390, SAND2000-2142, SAND2004-2815P, SAND99-391, SAND99-2388, SAND99-2392 and SAND99-2389. Unclassified Controlled Nuclear Information.
14. Air Force Manual (AFMAN) 91-201, "Explosive Safety Standard," U.S. Air Force, Washington, DC. Unclassified.
15. NUREG/CR-6190, Protection Against Malevolent Use of Vehicles at Nuclear Power Plants, U.S. Army Corps of Engineers, Omaha, NE. Safeguards Information.
16. WINGARD (Window Glazing Analysis Response and Design) software, U.S. General Services Administration (GSA), Washington, DC. Restricted. (Available at [www.oca.gsa.gov](http://www.oca.gsa.gov))
17. Regulatory Information Summary 2005-09, "High Security Protected and Vital Area Barrier Breaching Analysis," U.S. Nuclear Regulatory Commission, Washington, DC. Safeguards Information.



18. PDC-TR-01-01, "Structural Assessment of Spent Fuel Pools Attacked with a Sophisticated Sabotage Threat," U.S. Army Corps of Engineers, Omaha, NE. Safeguards Information.
19. PDC-TR-01-02, "Structural Assessment of Spent Fuel Pools Attacked with an Unsophisticated Sabotage Threat," U.S. Army Corps of Engineers, Omaha, NE. Safeguards Information.
20. NIJ Standard 0108.01, Ballistic Resistant Protective Materials, National Institute of Justice, Washington, DC. Unclassified.
21. Underwriters Laboratories (UL) Standard for Bullet Resisting Equipment, UL 752. Unclassified.
22. Federal Register 50 FR 32138, 10 CFR 50, "Policy Statement on Severe Reactor Accidents in Regarding Future Designs and Existing Plants."
23. NUREG-1226, "Development and Utilization of the NRC Policy Statement on the Regulation of Advanced Nuclear Power Plants."
24. NUREG /CR-1345, "Nuclear Power Plant Design Concepts for Sabotage Protection," Sandia National Laboratory, Albuquerque, NM. Unclassified
25. EA-02-026, "Interim Compensatory Measures (ICM) Order."
26. EA-03-086, "Design Basis Threat Order"
27. NRC Guidance on Implementation of the April 2003 Revised Design Basis Threat. U.S. Nuclear Regulatory Commission, Washington, DC. Safeguards Information
28. NUREG-1267, "Technical Resolution of Generic Safety Issue A-29," U.S. Nuclear Regulatory Commission, Washington, DC. Unclassified
29. NUREG/CR-1381, "A Methodology for Evaluating Safeguards Capabilities for Licensed Nuclear Facilities," Sandia National Laboratory, Albuquerque, NM. Unclassified
30. NUREG/CR-1198, "Design Guidance and Evaluation Methodology for Fixed-Site Physical Protection Systems," Sandia National Laboratory, Albuquerque, NM. Unclassified
31. NUREG/CR-2643, "A Review of Selected Methods for Protecting Against Sabotage by an Insider," Sandia National Laboratory, Albuquerque, NM. Unclassified
32. NUREG/CR-2585, "Nuclear Power Plant Damage Control Measures and Design Changes for Sabotage Protection," Sandia National Laboratory, Albuquerque, NM. Unclassified
33. NRC Letter to Mr. Stephen D. Floyd, Vice President, Regulatory Affairs, Nuclear Generation Division, NEI. NRC Staff Review of NEI 03-12: Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan, [and Independent Spent Fuel Storage Installation Security Program] ADAMS ML033640038.

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**PAPERWORK REDUCTION ACT STATEMENT**

The information collections contained in the Standard Review Plan are covered by the requirements of 10 CFR Part 50 and 10 CFR Part 52, and were approved by the Office of Management and Budget, approval number 3150-0011 and 3150-0151.

**PUBLIC PROTECTION NOTIFICATION**

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