U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

13.6.3 PHYSICAL SECURITY – EARLY SITE PERMIT

REVIEW RESPONSIBILITIES

Primary - Organization responsible for the review of physical security

Secondary - None

I. AREAS OF REVIEW

For early site permit (ESP) applications, the review involves the evaluation of the site characteristics, pursuant to Title 10 of the *Code of Federal Regulations* (CFR), Paragraphs 100.21(f) and 52.17(a)(x), to provide reasonable assurance that adequate security plans and measures can be developed to meet the applicable requirements under 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors against Radiological Sabotage," as well as guidance provided in U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 4.7, Revision 2, "General Site Suitability Criteria for Nuclear Power Stations," issued April 1998.

The specific areas of review are as follows:

1. a description of the physical land characteristics to indicate that adequate distances exist between vital equipment and vital areas (VAs) and the probable location of a security boundary

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2. a description of the site characteristics that indicates that adequate space exists for the construction and installation of physical barriers, isolation zones, and associated intrusion detection and assessment equipment, access control portals, if applicable, owner-controlled area (OCA) access control points and associated OCA vehicle search areas, alarm stations and the implementation of a physical protection program.

3. a description of the site characteristics that may require measures in order to control approaches to the facility (e.g., barge slips within the OCA, main access road from OCA to PA, transportation routes, cliffs, depressions, hills, mounds, open waterways, and roadway or railroad that penetrate the OCA boundary)

4. a description of nearby facilities and pipelines to identify potential hazards in the site vicinity; and,

5. a description of planned culverts and unattended openings that extend from outside to inside the proposed protected area (PA), the area for powerblock structures, and the area for safety-related water sources (e.g., cooling towers)

The staff will also review diagrams, to approximate scale, displaying the following:

A. pedestrian land approaches
B. vehicular land approaches
C. railroad approaches
D. water approaches
E. potential “high-ground” adversary advantage areas
F. nearby road transportation routes
G. nearby pipelines
H. existing and planned culverts
I. location of vital equipment and VAs
J. nearby hazardous facilities
K. location of proposed intake structure
L. location of proposed PA boundary for powerblock and safety-related water structures and,
M. locations of proposed OCA and PA vehicle checkpoints

Review Interface

Other Standard Review Plan (SRP) sections interface with this section as follows:

1. If applicable, the review of the adequacy of the physical security hardware inspections, tests, analyses, and acceptance criteria (ITACC) performed under SRP Section 14.3.12 Physical Security Hardware-Inspections, Tests, Analyses, and Acceptance Criteria.

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

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 52.17(a)(x)

4. 10 CFR 73.1(a)(1)

5. 10 CFR 73.2, "Definitions"

6. 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage."

7. Appendix B, "General Criteria for Security Personnel," to 10 CFR Part 73, "Physical Protection of Plants and Materials"

8. Appendix C, "Nuclear Power Plant Safeguards Contingency Plans," to 10 CFR Part 73

9. Appendix G, "Reportable Safeguards Events," to 10 CFR Part 73

10. Appendix H, "Weapons Qualification Criteria," to 10 CFR Part 73

11. 10 CFR Part 100, "Reactor Site Criteria"

12. 10 CFR 100.21, "Non-Seismic Siting Criteria"

SRP Acceptance Criteria

A licensee's ESP application should demonstrate that the site selected for the construction of the power reactor provides the licensee with the ability to construct and install security- related equipment and components and implement a physical security program in accordance with the requirements of 10 CFR 73.55. 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. 10 CFR 73.55(e)—Physical Barriers. The licensee shall locate vital equipment only within VAs, which must be located within a PA so that access to vital equipment requires passage through at least two physical barriers (except as otherwise approved by the

Commission and identified in the security plans) that possess the characteristics of physical barriers as defined in 10 CFR 73.2., "Definitions." The physical barriers at the PA perimeter shall be separated from any other barrier designated as a VA physical barrier unless otherwise identified in the physical security plan. Isolation zones must be maintained in outdoor areas adjacent to the PA perimeter and must be designed of sufficient size to permit observation and assessment of activities on either side of the PA barrier. The isolation zone shall be monitored with: intrusion detection equipment designed to satisfy the requirements of 10 CFR 73.55(i) and capable of detecting both attempted and actual penetration of the PA perimeter barrier before completed penetration, and; assessment equipment designed to satisfy the requirements of 10 CFR 73.55(i) and provide real-time and play-back/recorded video images of detected activity before and after each alarm annunciation. Vehicle control measures (which include vehicle barrier systems) shall be established consistent with the physical protection program design requirements and in accordance with the site-specific analysis to protect against the design- basis threat of a radiological sabotage vehicle bomb assault. Licensees shall, design, construct, install, and maintain a vehicle barrier system, to include passive and active barriers, at a stand-off distance adequate to protect personnel, equipment, and systems necessary to prevent significant core damage and spent fuel sabotage against the effects of the design- basis threat of radiological sabotage land vehicle bomb assault. Where a site has rail access to the PA, the licensee shall install a train derailer, remove a section of track, or restrict access to railroad sidings and provide periodic surveillance of these measures. Licensees shall identify areas from which a waterborne vehicle must be restricted, and, where possible, in coordination with local, State, and Federal agencies having jurisdiction over waterway approaches, deploy buoys, markers, or other equipment.

2. 10 CFR 73.55(g)—Access Controls. Consistent with the function of each barrier or barrier system, the licensee shall control personnel, vehicle, and material access, as applicable, at each access control point. The licensee shall locate access portals outside of, or concurrent with, the physical barrier system through which it controls access. Before granting access into the PA, the licensee shall search individuals, vehicles, and materials in accordance with 10 CFR 73.55(h).

3. 10 CFR 73.55(h)—Search Programs. Where the licensee has established physical barriers in the OCA, the licensee shall implement search procedures for access control points in the barrier.

4. 10 CFR 73.55(i)—Detection and Assessment Systems. The licensee shall establish and maintain intrusion detection and assessment systems that satisfy the design requirements of 10 CFR 73.55(b) and provide, at all times, the capability to detect and assess unauthorized persons and facilitate the effective implementation of the licensee's protective strategy. Both alarm stations required by 10 CFR 73.55 (i)(2) must be designed and equipped to ensure that a single act, in accordance with the design basis threat of radiological sabotage defined in 10 CFR 73.1(a)(1), cannot disable both alarm stations. Consistent with 10 CFR 73.55(e)(9)(v)(C), the central alarm station shall be considered a VA. It shall be bullet resisting and the interior must not be visible from the PA perimeter. In accordance with 10 CFR 73.55(i)(4)(iii), the secondary alarm station shall be constructed, located, protected, and equipped to the standards for the central alarm station. Unattended openings that intersect a security boundary such as underground

pathways must be protected by a physical barrier and monitored by intrusion detection equipment or observed by security personnel at a frequency sufficient to detect exploitation.

5. 10 CFR 73.55(j)—Communication Requirements. The licensee shall establish and maintain continuous communication capability with onsite and offsite resources to ensure effective command and control during both normal and emergency situations.

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 52.79(a)(35)(i) requires that license applications for a combined license include a physical security plan that describes how the applicant will meet the requirements of 10 CFR Part 73 (and 10 CFR Part 11, "Criteria and Procedures for Determining Eligibility for Access to or Control over Special Nuclear Material," if applicable). See the 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 program which is described in the 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 the 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 Section II.

1. The reviewer should ensure that the applicant has provided clear, approximate-to-scale diagrams, figures, and drawings that provide a clear visual depiction of the proposed facility and site physical layout, including, but not limited to, the following: pedestrian land approaches, vehicular land approaches, railroad approaches, water approaches, potential "high-ground" adversary advantage areas, and any existing and planned culverts or unattended openings. The submission should include a clear visual depiction of VAs and vital equipment; the intake structure; OCA and PA checkpoints and the PA boundary for powerblock and safety-related intake structures; and nearby roads, transportation routes, pipelines, and hazardous facilities.

2. Consistent with the SRP acceptance criteria identified above, the reviewer should ensure that the applicant has described the site's characteristics as they currently exist. The applicant should confirm that the site-specific analysis considered each aspect of the acceptance criteria and that the site is of sufficient size to provide adequate space and distance for the construction and installation of: (1) physical barriers, isolation zones, and associated intrusion detection and assessment equipment required by 10 CFR 73.55(e); (2) access control portals consistent with the design requirements of 10 CFR 73.55(g); if applicable, (3) OCA access control points and associated OCA vehicle search areas in accordance with 10 CFR 73.55(h), and; (4) alarm stations consistent with 10 CFR 73.55(i). The applicant should also confirm that the site-specific analysis considered the implementation of a physical protection program at the site and that the site is adequate for the implementation of a physical protection program to meet the requirements of 10 CFR 73.55.

3. As applicable, the ESP application should describe any site-specific characteristic that may require the implementation of specific measures to prevent interference during the normal operation of the facility. These characteristics include, but are not limited to, features such as barge slips within the OCA, transportation routes, cliffs, depressions, hills, mounds, open waterways, roadways, or railroads that penetrate the OCA boundary.

4. The reviewer should ensure that the applicant has described nearby facilities or pipelines to identify possible hazards that may have the potential to interfere with the normal operation of the facility. If applicable, the ESP application should describe these potential hazards and any special arrangements and measures it has established in case of an event at such locations. This description should include an analysis to confirm that the distances to those facilities or pipelines and the associated materials do not pose an impediment to the development of adequate security plans or measures.

5. The reviewer should ensure that the applicant has described all planned and existing culverts and unattended openings that extend from outside of, to the inside of the proposed PA to ensure that appropriate measures and features are considered to prevent undetected access into the PA.

6. The reviewer should ensure that the applicant has described the proposed intake structure location and the reliance on the intake structure to provide safe-shutdown capabilities.

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

IV. EVALUATION FINDINGS

The reviewer should verify that the applicant has provided sufficient information and that the review supports a conclusion of the following type to be included in the staff's safety evaluation report. The reviewer should also state the bases for this conclusion.

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

> The applicant provided a description of the site characteristics, and the staff has examined the site characteristics with respect to their potential to affect the establishment of an

adequate physical protection program, security plans and measures. The staff examined pedestrian, vehicular, and waterway approaches, including existing and proposed culverts and unattended openings, as well as terrain features. Additionally, the staff reviewed nearby transportation routes, hazardous facilities, and railroad lines. Based upon the above evaluation, the staff concludes that the ESP site characteristics would allow an applicant for a combined license to develop adequate security plans and measures for a reactor(s) that it might construct and operate on the ESP site in accordance with 10 CFR 100.21(f).

V. IMPLEMENTATION

The staff will use this SRP section in performing safety evaluations of 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.

REFERENCES

1. RG 1.206, "Combined License Applications for Nuclear Power Plants."

2. RG 5.54, "Standard Format and Content of Safeguards Contingency Plans for Nuclear Power Plants."

3. RG 5.69, "Guidance for the Application of the Radiological Sabotage Design-Basis Threat in the Design, Development and Implementation of a Physical Security Program That Meets 10 CFR 73.55 Requirements."

4. RG 5.76, "Physical Protection Programs at Nuclear Power Reactors."

5. NUREG-1267, "Technical Resolution of Generic Safety Issue A-29," September 1989. Unclassified.

6. Conventional Weapons Effects (CONWEP) software and manual, U.S. Army Corps of Engineers, Omaha, NE. Restricted to government agencies and their contractors.

7. Single Degree of Freedom Blast Design Spreadsheet (SBEDS), Version 3.1, software and methodology manual, U.S. Army Corps of Engineers, Omaha, NE. Unclassified.

8. "Waterborne Sub-Surface Blast Effects to the Design Basis Threat," D. Sulfredge, Oak Ridge National Laboratory, Oak Ridge, TN. Safeguards Information.

9. "Waterborne Surface Blast Effects to the Design Basis Threat," D. Sulfredge, Oak Ridge National Laboratory, Oak Ridge, TN. Safeguards Information.

10. "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.

11. NUREG/CR-4250, “Vehicle Barriers: Emphasis on Natural Features,” Sandia National Laboratory, Albuquerque, NM, July 1985. Unclassified.

12. FM 5-250, “Explosives and Demolitions,” Department of the Army, Washington, DC. Restricted to government agencies and their contractors, export controlled.

13. DOETIC-11268, “Manual for the Prediction of Blast and Fragment Loading for Structures,” U.S. Department of Entergy, Washington DC. Unclassified.

14. TM-5-1300, “Structures to Resist the Effects of Accidental Explosions,” U.S. Department of Defense, Washington DC. Unclassified (also designated as Air Force AFR 08-22 and Navy NAVFAC P-3897).

15. Air Force Manual 91-201, “Explosive Safety Standard,” U.S. Air Force, Washington, DC. Unclassified.

16. NUREG/CR-6190, “Protection against Malevolent Use of Vehicles at Nuclear Power Plants,” U.S. Army Corps of Engineers, Omaha, NE, March 27, 2003. Safeguards Information.

SRP Section 13.6.3
"Physical Security – Early Site Permit"
Description of Changes

This Revision 1 to SRP Section 13.6.3, dated June 2010, updates the initial issuance of this section, dated March 2007, to reflect the changes of the recently issued 10 CFR Part 73, Power Reactor Security Rule (published in the *Federal Register* on March 27, 2009 (74 FR 13926)).

The technical changes in accordance with the new 10 CFR Part 73 Rule are incorporated in each section of this revision (Revision 1, dated June 2010) of the SRP as applicable.