U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

13.6.5 SECURITY ASSESSMENT - MITIGATIVE MEASURES EVALUATION

REVIEW RESPONSIBILITIES

Primary – Office of Nuclear Security and Incident Response

Secondary - None

I. AREAS OF REVIEW

For the mitigative measures evaluation of the voluntary security assessment, the review involves the evaluation of how mitigative measures are incorporated into the design such that these measures could mitigate the effects of circumstances associated with loss of large areas of the facility due to explosions or fire. The review encompasses parts of the applicant's security program during the licensing phase, including the identification and incorporation of applicable mitigative measures into security design features, its impact on plant operations and security program implementation, as stated in 10 CFR 73, Appendix C. If an applicant chooses to consider cost effectiveness of mitigative strategies developed and implemented and submits them as part of the security assessment, NRC staff will review the adequacy of such considerations.

The scope of the assessment performed by an applicant would depend upon the specific type of the application and would determine the security design features and/or security functions to be incorporated into the facility design, site, and security operational programs (as applicable). A license application that incorporates by reference a construction permit, design certification, or manufacturing license, would not address the design of the facility or site within the scope of a previously completed assessment for the referenced permit, certification, or license. If a

combined license (COL) applicant references a certified design, the assessment would not be intended to identify enhancements to the portions of the design that have been certified [1].

Specific information to be reviewed, referenced to applicable sections of 10 CFR Part 73.55 and Appendix C to Part 73, include the following:

1. The purpose and objectives of the applicant's mitigative measures evaluation

2. The scope of the assessment for the applicant in a specific licensing phase.

3. The conduct of the analysis, including quality assurance controls, staff participation, peer reviews that have been performed, and training programs.

4. Validity of resources (security engineering publications) for the input data for the mitigative measures assessment.

5. Clear diagrams, tables and/or detailed descriptions of the security design features and/or security functions, as well as the incorporation of these features into the design, which display the following:

    a. Compliance with the Fire Fighting Response strategy
    b. Compliance with the Operations to Mitigate Fuel Damage strategy
    c. Compliance with the Minimize Release strategy
    d. Mitigative Measures for Spent Fuel Pools
    e. Mitigative Measures for Reactor Core and Containment

6. Insights gained from the security assessment mitigative measures process.

Review Interfaces

The listed SRP sections interface with this section as follows:

1. Review of the adequacy of the high assurance evaluation of the physical protection system as part of the security assessment submittal is performed under SRP 13.6.4.

2. Review of the adequacy of establishing a cyber security program as a part of the security assessment submittal is performed under SRP 13.6.6.

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

(1) While the Tier 1 portion of the design-related information requires a rulemaking to be modified, the unmodified Tier 2 and Tier 2* portions do not have this requirement. However, this assessment is not intended to require enhancements to any of the portions of the design that have been certified.

II. ACCEPTANCE CRITERIA

The security assessment, with respect to mitigative measures, for a reactor facility is acceptable if the physical protection system meets the relevant requirements of the following Commission regulations:

A. 10 CFR Part 73, §73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage," as it relates to the general performance objectives and requirements as described in §73.55(a) of the physical protection program and the inclusion of security design features as a result of the security assessment.

B. 10 CFR Part 73, in the proposed[2] Appendix C, "Licensee Safeguards Contingency Plan." The safeguards contingency plan must describe how the criteria set forth in this appendix will be satisfied through implementation and must provide specific goals, objectives and general guidance to licensee personnel to facilitate the initiation and completion of predetermined and exercised responses to threats, up to and including the design basis threat described in § 73.1(a)(1). Specifically, Appendix C, Section II, paragraph (j) describes the integrated response plan to be developed to mitigate the effects of a loss of large areas of the plant due to fires or explosions.

Specific criteria acceptable to meet[3] the relevant requirements of the Commission's regulations identified above are as follows for each review described in subsection I of this SRP section:

1. The requirements of 10 CFR Part 73, §73.55 regarding general performance objectives and requirements of the physical protection program of a reactor facility may be met by demonstrating through a security assessment, that there is assurance that activities involving special nuclear material will not be inimical to the common defense and security and do not constitute an unreasonable risk to the public health and safety and that the physical protection program of the reactor facility is designed to detect, assess, intercept, challenge, delay, and neutralize threats up to and including the design basis threat (DBT) of radiological sabotage and of theft and diversion, when conducting operations.

   Applicants for a license to operate a nuclear power reactor, applicants for a design certificate, or applicants for a combined operating license that incorporate security design features as a result of performing a security assessment have a greater probability of meeting the requirements, as described in 10 CFR 73.55, without undue reliance on operational security programs.

2. The requirements of 10 CFR Part 73, Appendix C regarding establishing mitigative measures are met by demonstrating that specific guidance and strategies exist to

---

(2)The requirement to develop mitigative strategies for loss of large areas of the plant due to fires and explosions may not be codified in 10 CFR 73. However, it is anticipated to be codified within 10 CFR and will apply to all NRC-licensed nuclear power reactors.

(3) Note: The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, pursuant to 50.34(h), 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.

maintain or restore core cooling, containment, and spent fuel pool cooling capabilities using existing or readily available resources (equipment and personnel) that can be effectively implemented under the circumstances associated with the loss of large areas of the plant due to explosions or fires.

Technical Rationale

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

1. 10 CFR 73.55 (current and proposed rule) contains security program requirements for power reactor licensees. This section describes security requirements: 1) imposed by Commission orders issued after the terrorist attacks of September 11, 2001; 2) that are based upon experience and insights gained by the Commission during implementation; and 3) that fulfill certain provisions of the Energy Policy Act of 2005. This regulation requires security plans that describe protection starting at the owner controlled area boundary and implement defense-in-depth concepts and protective strategies based on protecting target sets from the various attributes of the design basis threat. The security program requirements in § 73.55 would apply to all nuclear power plant licensees that hold a 10 CFR Part 50 license and to applicants who are applying for either a Part 50 license or a Part 52 combined license. Performance of a security assessment provides greater assurance that either a COL applicant referencing a certified design or an applicant who is applying for either a Part 50 license or a Part 52 combined license will meet the requirements of § 73.55 without undue reliance on operational security programs.

2. 10 CFR Part 73, Appendix C (proposed rule) describes requirements that govern the development of safeguards contingency plans. Following the terrorist attacks of September 11, 2001, the NRC conducted a thorough review of licensee security conditions to ensure that nuclear power plants had effective security measures in place given the changing threat environment. Appendix C increases the information required in the safeguards contingency plans for responses to threats, up to and including, design basis threats, as described in § 73.1. A notable part of the Appendix C requirements, directly applicable to the security assessment process, is that of mitigating measures. Current regulations do not include requirements to develop mitigating strategies for events such as loss of large areas of the plant due to explosions or fires. The orders issued after September 11, 2001, included a requirement to preplan strategies for coping with such events. Therefore, Appendix C codifies this element of the orders, known as integrated response plans, in Section II, paragraph (j), to require that licensees preplan strategies to respond to and mitigate the consequences of potential events, including those that may result in the loss of large areas of the plant due to explosions or fires.

III. REVIEW PROCEDURES

The "Nuclear Power Plant Security Assessment Format and Content Guide," dated August 2007, provides guidance on the methodology and format and content of a security assessment. The format and content guide evaluates an applicant's physical protection system (physical protection system requirements for nuclear power plants are defined in 10 CFR 73.55) against the design basis threat of radiological sabotage as described in 10 CFR 73.1(a)(1) and addresses mitigative measures for loss of large areas of the plant due to explosions or fires as described in Appendix C to 10 CFR Part 73. Section 3 of the format and content guide provides guidance for the mitigative measures program and Section 5.3 provides format and content guidance for the applicant's mitigative measures submittal as part of the security assessment.

The scope of the mitigative measures part of the security assessment varies depending on the particular stage of the application process as described in 10 CFR Parts 50 and 52. Therefore, the reviewer will select and emphasize material from the procedures described below, as may be appropriate for the applicant's particular stage in the design process. See the Standard Review Plan for the associated High Assurance Evaluation (SRP 13.6.4) for further discussion of the scope for each stage.

In conducting the reviews for the various licensing stages described above, the reviewer will select and utilize material from the following procedures, as may be appropriate for the particular case. For each area of review specified in subsection I of this SRP section, the review procedure is identified below. These review procedures are based on the identified SRP acceptance criteria. For deviations from these specific acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives to the SRP criteria provide an acceptable method of complying with the relevant NRC requirements identified in subsection II.

The NRC staff will conduct the acceptance review using a checklist, based on the Mitigative Measures Evaluation section of the Nuclear Power Plant Security Assessment Format and Content Guide. To conduct the acceptance review, NRC staff will compare the contents of the mitigative measures submittal with the requirements in 10 CFR 73 Appendix C. The staff uses a simple scale of acceptability to help the reviewers document their results: (1) Acceptable, (2) Acceptable, but Request for Additional Information Prepared, and (3) Rejected, Inadequate to Support Detailed Review. The reviewer should use the review checklist provided in Table 1 to determine whether the submittal is reasonably complete and conforms to the requirements described in the proposed 10 CFR Part 73 Appendix C.

Table 1. Acceptance Review Checklist for Mitigative Measures Evaluation

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	The submittal provides:				
3.1	Introduction				
	A description of how mitigative strategies were considered and implemented in the security assessment parameters or security design features of the reactor plant design	Section B.5.b of the Feb 25, 2002 Order Review Criteria: Mitigative measures are developed in the following areas: 1. Fire fighting 2. Operations to mitigate fuel damage 3. Actions to minimize release			
	A description of how the cost-effectiveness and impacts of the mitigative strategies on plant operations and security program implementation were considered.	NEI 05-07 Rev. 1 4.2 Identifying Additional Candidate Strategies Review Criteria: At least one high confidence mitigating strategy was identified, regardless of cost.			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
3.2	Description of the security design feature or security assessment parameter associated with: Fire Fighting Response Strategy, Elements and Measures				
	Pre-defined coordinated fire response strategy and guidance:				
	Staging of personnel	"Nuclear Power Plant Security Assessment Format and Content Guide." [Hereafter referred to Format and Content Guide] Review Criteria: Section 3.1.1.1.1			
	Outside organization support	Format and Content Guide Review Criteria: Section 3.1.1.1.2			
	Treatment of casualties	Format and Content Guide Review Criteria: Section 3.1.1.1.3			
	Site assembly areas (mass casualties)	Format and Content Guide Review Criteria: Section 3.1.1.1.4			
	Industry best practice - feeding the fire protection ring header	Format and Content Guide Review Criteria: Section 3.1.1.1.5			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	Assessment of mutual aid fire fighting assets:				
	Airlifted resources	Format and Content Guide Review Criteria: Section 3.1.1.2.1			
	Mobilization of fire fighting resources - MOUs	Format and Content Guide Review Criteria: Section 3.1.1.2.2			
	Mobilization of fire fighting resources - coordination with other than local mutual aid fire fighting resources	Format and Content Guide Review Criteria: Section 3.1.1.2.3			
	Designated staging area for equipment and materials:				
	Staging of equipment	Format and Content Guide Review Criteria: Section 3.1.1.3.1			
	Controlling emergency response vehicles (includes rad monitoring)	Format and Content Guide Review Criteria: Section 3.1.1.3.2			
	Command and control:				
	Command and control	Format and Content Guide Review Criteria: Section 3.1.1.4.1			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	Communications enhancements	Format and Content Guide Review Criteria: Section 3.1.1.4.2			
	Training of Response Personnel:				
	Training considerations	Format and Content Guide Review Criteria: Section 3.1.1.5.1			
3.3	Operations to Mitigate Fuel Damage Strategy, Elements, and Measures				
	Protection and use of personnel assets:				
	Personnel considerations	Format and Content Guide Review Criteria: Section 3.1.2.1.1			
	Communications:				
	Communication measures	Format and Content Guide Review Criteria: Section 3.1.2.2.1			
	Minimizing fire spread:				
	Compartmentalization of plant areas	Format and Content Guide Review Criteria: Section 3.1.2.3.1			
	Procedures for implementing integrated fire response strategy:				.

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	Procedures for loss of large areas of the plant events	Format and Content Guide Review Criteria: Section 3.1.2.4.1			
	Evaluation of vulnerable buildings and equipment	Format and Content Guide Review Criteria: Section 3.1.2.4.2			
	Best practices for containment venting and vessel flooding	Format and Content Guide Review Criteria: Section 3.1.2.4.3			
	Best practices for compensatory functions	Format and Content Guide Review Criteria: Section 3.1.2.4.4			
	Best practices for use of plant equipment	Format and Content Guide Review Criteria: Section 3.1.2.4.5			
	Best practices involving plant areas potentially affected by loss of large area of the plant due to fires and explosions	Format and Content Guide Review Criteria: Section 3.1.2.4.6			
	Best practices for establishing supplemental response capabilities for makeup to the ultimate heat sink	Format and Content Guide Review Criteria: Section 3.1.2.4.7			
	Best practices for establishing supplemental response capabilities for closed cooling water heat removal	Format and Content Guide Review Criteria: Section 3.1.2.4.8			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	Identification of Readily Available, Pre-Staged Equipment:				
	Best practices for usage of plant equipment such as a portable generator and transformer	Format and Content Guide Review Criteria: Section 3.1.2.5.1			
	Best practices involving reliance on portable and offsite equipment	Format and Content Guide Review Criteria: Section 3.1.2.5.2			
	Training on Integrated Fire Response Strategy:				
	Training considerations	Format and Content Guide Review Criteria: Section 3.1.2.6.1			
	Spent Fuel Pool Mitigation Measures:				
	Dispersal of fuel	Format and Content Guide Review Criteria: Section 3.1.2.7.1			
	Hot fuel over spent fuel pool rack feet	Format and Content Guide Review Criteria: Section 3.1.2.7.2			
	Downcomer area natural circulation	Format and Content Guide Review Criteria: Section 3.1.2.7.3			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	Enhanced air circulation	Format and Content Guide Review Criteria: Section 3.1.2.7.4			
	Emergency pool makeup leak reduction/repair	Format and Content Guide Review Criteria: Section 3.1.2.7.5			
3.4	Operations to Minimize Release Strategy, Elements and Measures				
	Water Spray Scrubbing:				
	Water spray scrubbing	Format and Content Guide Review Criteria: Section 3.1.3.1.1			
	Prestaging of equipment	Format and Content Guide Review Criteria: Section 3.1.3.1.2			
	Dose to Onsite Responders:				
	Dose projection models	Format and Content Guide Review Criteria: Section 3.1.3.2			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
3.5	Mitigative Measures for Spent Fuel Pools				
	Spent Fuel Pool Mitigative Measures				
	Diverse Spent Fuel Pool Makeup Source	Format and Content Guide Review Criteria: Section 3.2.1.1			
	SFP Makeup Capability	Format and Content Guide Review Criteria: Section 3.2.1.2			
	SFP Spray Capability	Format and Content Guide Review Criteria: Section 3.2.1.3			
	SFP Leakage Control Strategies	Format and Content Guide Review Criteria: Section 3.2.1.4			
	Fire System Management Strategies	Format and Content Guide Review Criteria: Section 3.2.1.5			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
3.6	Mitigative Measures for Reactor Core and Containment				
	Command and Control Enhancements				
	Off-Site and On-Site Communications	Format and Content Guide Review Criteria: Section 3.2.2.1.1			
	Notifications/ERO Activation	Format and Content Guide Review Criteria: Section 3.2.2.1.2			
	Initial Operational Response Actions	Format and Content Guide Review Criteria: Section 3.2.2.1.3			
	Initial Damage Assessment	Format and Content Guide Review Criteria: Section 3.2.2.1.4			
	Site Reactor Core and Containment Mitigation Strategies for Designs				
	Manual Operation of Steam Driven Core Cooling Systems	Format and Content Guide Review Criteria: Section 3.2.2.2.1			
	Manual Depressurization of Steam Generators to Reduce Inventory Loss (PWR Only)	Format and Content Guide Review Criteria: Section 3.2.2.2.2			

Format and Content Guide Section	Requirement	Basis and Acceptance Criteria	Accept	Accept with RAI	Rej.
	DC Power Supplies to Allow Depressurization of Reactor Pressure Vessel and Injection with a Portable Pump (BWR Only)	Format and Content Guide Review Criteria: Section 3.2.2.2.3			
	Makeup to the RWST (PWR) or CST (BWR)	Format and Content Guide Review Criteria: Section 3.2.2.2.4			
	Containment Flooding with Portable Pump (PWR Only)	Format and Content Guide Review Criteria: Section 3.2.2.2.5			
	Inject Water into the Drywell (BWR Only)	Format and Content Guide Review Criteria: Section 3.2.2.2.6			
	Portable Sprays	Format and Content Guide Review Criteria: Section 3.2.2.2.7			

Additional guidance for the reviewer is provided below:

1. The reviewer should verify that the scope of the security assessment is appropriate for the design stage (e.g., design certification, combined license) of the reactor facility being reviewed.

2. The reviewer should verify that the level of detail of the mitigative measures portion of the security assessment submittal is consistent with the guidance provided in Section 3.0 of the Nuclear Power Plant Security Assessment Format and Content Guide.

3. The reviewer should confirm that the applicant presents proper justification if a mitigative measure is not to be implemented.

4. The reviewer should verify that the mitigative measures assessment has been accurately and satisfactorily conducted. The analysis should have been performed by a knowledgeable team of experts that together cover the entire expertise scope of the mitigative measures assessment. A one page resume of each team member should be

provided to verify their expertise. Additionally, the reviewer should confirm that a proper quality assurance program is in place and independent and peer reviews have been performed. Documentation should be available of the protective measures taken for sensitive information used during the analysis.

5. The reviewer should verify that COL action items are identified where necessary.

IV. EVALUATION FINDINGS

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

The evaluation finding for a review of the Mitigative Measures section of the Security Assessment should be substantially equivalent to the following statement:

> The applicant submitted a Security Assessment to address the mitigative measures required by Appendix C, Section II, paragraph (j) of 10 CFR 73 to mitigate the effects of circumstances associated with loss of large areas of the plant due to explosions or fires. Parts of the Security Assessment have been withheld from public disclosure pursuant to 10 CFR 2.390(d).
>
> The applicant described how mitigative measures were incorporated into the design such that the these measures could mitigate the effects of circumstances associated with loss of large areas of the plant due to explosions or fires, in accordance with the requirement of Appendix C of 10 CFR 73. The applicant identified, in its completed Security Assessment, mitigative measures that were incorporated and resulted in compliance with the Fire Fighting Response, Operations to Mitigate Fuel Damage, and Minimize Release strategies as well as mitigative measures for the Spent Fuel Pool, Reactor Core, and Containment. Additionally, the applicant provided a description of this process for identification and incorporation of applicable mitigative measures into security design features and security functions, its impact on plant operations and security program implementation and, as applicable, cost-effectiveness considerations.
>
> The staff reviewed the Security Assessment mitigative measures section for format and content utilizing Section 3 of the "Nuclear Power Plant Security Assessment Format and Content Guide," and found that the applicant adequately addressed mitigative measures in accordance with Appendix C to 10 CFR Part 73.

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when reviewing the mitigative measures section of the security assessment submittals of license applications submitted by applicants pursuant to 10 CFR 50 and 10 CFR 52. Except in those cases in which the applicant proposed an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the NRC staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications immediately to accommodate design certification and COL application schedules.

VI. REFERENCES

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 Part 73, “Physical Protection of Plants and Materials,” (Sections §73.1 and §73.55).

4. 10 CFR Part 73, Appendix C, “Licensee Safeguards Contingency Plans.”

5. EA-02-026, "Interim Compensatory Measures (ICM) Order," dated February 25, 2002

6. “Nuclear Power Plant Security Assessment Format and Content Guide,” Information Systems Laboratories, Rockville MD, August 2007. Safeguards Information.

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the draft Standard Review Plan are covered by the requirements of 10 CFR Part 50.54, which were approved by the Office of Management and Budget, approval number 3150 - 0011.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

SRP Section 13.6.5
Description of Changes

Section 13.6.5 is a new SRP section not previously included in NUREG-0800 and was developed to provide guidance for the review of Security Assessments.

In addition this SRP section was administratively updated in accordance with NRR Office Instruction, LIC-200, Revision 1, "Standard Review Plan (SRP) Process." The revision also adds standard paragraphs to extend application of the updated SRP section to prospective submittals by applicants pursuant to 10 CFR Part 52.

The technical changes are incorporated in Revision 0, dated [Month] 2007:

REVIEW RESPONSIBILITIES - Reflects changes in review branches resulting from reorganization and branch consolidation. Change is reflected throughout the SRP.

I. AREAS OF REVIEW

None.

II. ACCEPTANCE CRITERIA

None.

III. REVIEW PROCEDURES

None.

IV. EVALUATION FINDINGS

None.

V. IMPLEMENTATION

None.

VI. REFERENCES

None.