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DESIGN CONTROL DOCUMENT TIER 2

CHAPTER 13
CONDUCT OF OPERATIONS

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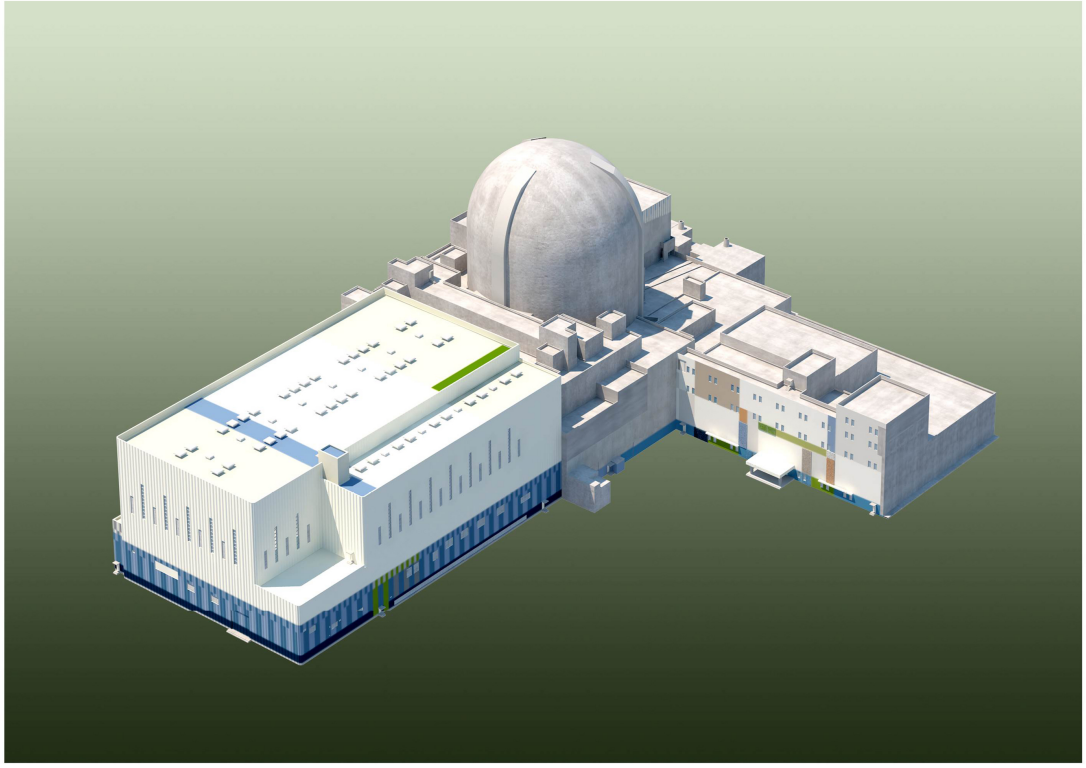

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ACRONYM AND ABBREVIATION LIST

CFR	Code of Federal Regulations
COL	combined license
CRE	control room envelope
EOF	emergency operation facility
ERDS	emergency response data system
HVAC	heating, ventilation, and air conditioning
ITAAC	inspections, tests, analyses, and acceptance criteria
MCR	main control room
OSC	operational support center
RG	Regulatory Guide
SGI	security safeguards information
SPDS	safety parameter display system
SRI	security-related information
SRP	Standard Review Plan
TSC	technical support center

CHAPTER 13 – CONDUCT OF OPERATIONS

13.0 Conduct of Operations

This chapter provides information related to the preparations and plans for the design, construction, and operation of the APR1400 plant. Its purpose is to provide adequate assurance that the combined license (COL) applicant establishes and maintains a staff of adequate size and technical competence and that operating plans followed by the licensee are adequate to protect public health and safety (References 1 through 5 in Subsection 13.1.5).

13.1 Organizational Structure of the Applicant

13.1.1 Management and Technical Support Organization

The COL applicant is responsible for developing the management and technical support organizational structure. The COL applicant is to provide a description of the corporate or home office organization, its functions and responsibilities, and the number and qualifications of personnel. The COL applicant is to be directed to activities such as the facility design, design review, design approval, construction management, testing, and operation of the plant (COL 13.1(1)).

13.1.1.1 Design, Construction, and Operating Responsibilities

The COL applicant is to develop a description of its experience in the design, construction, and operation of nuclear power plants and in activities of similar scope and complexity (COL 13.1(2)). The COL applicant is to describe its management, engineering, and technical support organizations. The description includes organizational charts for the current headquarters and engineering structure and any planned modifications and additions to those organizations to reflect the added functional responsibilities within the nuclear power plant (COL 13.1(3)).

13.1.1.2 Organizational Arrangement

The COL applicant is to develop a description of the organizational arrangement. The description includes organizational charts that include the current headquarters and engineering structure and any planned modifications or additions functional responsibilities associated with the addition of a nuclear plant to the applicant's power generation capacity. The description shows how the responsibilities are delegated and assigned or expected to be assigned to each of the working or performance-level organizational units that are identified to implement these responsibilities. The organizational charts include the current corporate structure and the working- or performance-level organizational units that provide technical support for the operation (COL 13.1(4)).

The information also includes a description of the activity and an organizational description that includes lines of authority and responsibilities for the project, the number of persons assigned to the project, and qualifications for the principal management positions for the project.

13.1.1.3 Qualifications

The COL applicant is to develop the description of the general qualification requirements in terms of educational background and experience for positions or classes of positions described in the organizational arrangement (COL 13.1(5)). For identified positions or classes of positions that have functional responsibilities for other than the identified application, the applicant is to describe the expected proportion of time assigned to the other activities.

13.1.2 Operating Organization

The COL applicant is to develop a description of the structure, functions, and responsibilities of the onsite organization established to operate and maintain the plant (COL 13.1(6)).

13.1.2.1 Plant Organization

The COL applicant is to provide an organizational chart showing the title of each position, minimum number of persons to be assigned to duplicate positions, number of operating shift crews, and positions that require reactor operator and senior reactor operator licenses (COL 13.1(7)).

13.1.2.2 Plant Personnel Responsibilities and Authorities

The COL applicant is to provide the following organizational information (COL 13.1(8)).

a. Description of the functions, responsibilities, and authorities of the following plant positions or their equivalents:

    1) Plant managers

    2) Operations supervisors

    3) Operating shift crew supervisors

    4) Shift technical advisors

    5) Licensed operators

    6) Non-licensed operators

7) Technical supervisors

8) Radiation protection supervisors

9) I&C maintenance supervisors

10) Equipment maintenance supervisors

11) Fire protection supervisors

12) QA supervisors (when part of the plant staff)

b. The description of the line of succession of authority and responsibility for the station operation in the event of unexpected temporary contingencies, and the delegation of authority.

13.1.2.3 Operating Shift Crews

The COL applicant is to develop a description of the position titles, applicable operator licensing requirements for each, and the minimum number of personnel planned for each shift for all combinations of units proposed to be at the station in either operating or cold shutdown mode. The COL applicant is also to develop the description of shift crew staffing plans unique to refueling operations (COL 13.1(9)).

13.1.3 Qualifications of Nuclear Power Plant Personnel

13.1.3.1 Qualification Requirements

The COL applicant is to provide the education, training, and experience requirements for each management, operating, technical, and maintenance position category in the operating organization (COL 13.1(10)).

13.1.3.2 Qualification of Plant Personnel

As applicable, the COL applicant is to provide the qualification requirements of the initial appointees to plant positions for key plant managerial and supervisory personnel through the shift supervisory level (COL 13.1(11)).

13.1.4 Combined License Information

COL 13.1(1) The COL applicant is to provide a description of the corporate or home office organization, its functions and responsibilities, and the number and the qualifications of personnel. The COL applicant is to be directed to activities such as the facility design, design review, design approval, construction management, testing, and operation of the plant.

COL 13.1(2) The COL applicant is to develop a description of experience in the design, construction, and operation of nuclear power plants and experience in activities of similar scope and complexity.

COL 13.1(3) The COL applicant is to describe its management, engineering, and technical support organizations. The description includes organizational charts for the current headquarters and engineering structure and any planned modifications and additions to those organizations to reflect the added functional responsibilities with the nuclear power plant.

COL 13.1(4) The COL applicant is to develop a description of the organizational arrangement. The description is to include organizational charts reflecting the current headquarters and engineering structure and any planned modifications and additions to reflect the added functional responsibilities associated with the addition of the nuclear plant to the applicant's power generation capacity. The description shows how these responsibilities are delegated and assigned or expected to be assigned to each of the working or performance-level organizational units identified to implement these responsibilities. The description includes organizational charts reflecting the current corporate structure and the working- or performance-level organizational units that provide technical support for the operation.

COL 13.1(5) The COL applicant is to develop the description of the general qualifications in terms of educational background and experience for positions or classes of positions described in the organizational arrangement.

COL 13.1(6) The COL applicant is to develop a description of the structure, functions, and responsibilities of the onsite organization established to operate and maintain the plant.

COL 13.1(7) The COL applicant is to provide an organizational chart showing the title of each position, minimum number of persons to be assigned to duplicate positions, number of operating shift crews, and positions that require reactor operator and senior reactor operator licenses.

COL 13.1(8) The COL applicant is to provide organizational information such as the functions, responsibilities, and authorities of the plant position. The COL applicant is to develop a description of the line of succession of authority and responsibility for overall station operation in the event of unexpected temporary contingencies, and the delegation of authority.

COL 13.1(9) The COL applicant is to develop a description of the position titles, applicable operator licensing requirements for each, and the minimum numbers of personnel planned for each shift for all combinations of units proposed to be at the station in either operating or cold shutdown mode. The COL applicant is also to develop the description of shift crew staffing plans unique to refueling operations.

COL 13.1(10) The COL applicant is to provide a description of the education, training, and experience requirements for each management, operating, technical, and maintenance position in the operating organization.

COL 13.1(11) The COL applicant is to provide the qualification requirements of the initial appointees to plant positions for key plant managerial and supervisory personnel through the shift supervisory level.

13.1.5 References

1. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants," U.S. Nuclear Regulatory Commission.

2. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," U.S. Nuclear Regulatory Commission.

3. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," U.S. Nuclear Regulatory Commission, various dates and revisions.

4. Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)," U.S. Nuclear Regulatory Commission, June 2007.

5. NUREG-0711, "Human Factor Engineering Program Review Model," Rev. 3, U.S. Nuclear Regulatory Commission, November 2012.

13.2 Training

The COL applicant is to develop the description and schedule of the training program for licensed reactor operators and non-licensed plant staff (COL 13.2(1)).

13.2.1 Plant Staff Training Program

13.2.1.1 Program Description

A complete generic training program description for use with COL applications is provided in NEI 06-13A (Reference 3), "Template for an industry Training Program Description." The document reflects guidance provided by the NRC and industry-NRC discussions on training-related issues.

The COL applicant is to develop a site-specific training program by using NEI 06-13A as the template for the basic structure and content (COL 13.2(2)).

13.2.1.1.1 Licensed Plant Staff Training Program

The COL applicant is to develop a licensed plant staff training program by using NEI 06-13A as the template for the basic structure and content (COL 13.2(3)).

13.2.1.1.2 Non-licensed Plant Staff Training Program (to be verified during construction)

The COL applicant is to develop a non-licensed plant staff training program by using NEI 06-13A as the template for the basic structure and content (COL 13.2(4)).

13.2.1.2 Coordination with Preoperational Tests and Fuel Loading

The COL applicant is to develop training programs. The programs include a chart that shows the schedule of each part of the training program for each functional group of employees in the organization in relation to the schedule for preoperational testing, expected fuel loading, and expected time for examinations prior to plant criticality for licensed operators (COL 13.2(5)).

13.2.2 Applicable Nuclear Regulatory Commission Documents

The COL applicant is to determine the extent of the NRC guidance that is applicable to the facility training program or the justification of exceptions (COL 13.2(6)).

13.2.3 Combined License Information

COL 13.2(1) The COL applicant is to develop the description and schedule of the training program for licensed reactor operators and non-licensed plant staff.

COL 13.2(2) The COL applicant is to develop the site-specific training program by using NEI 06-13A as the template for the basic structure and content.

COL 13.2(3) The COL applicant is to provide a licensed plant staff training program in accordance with NEI 06-13A.

COL 13.2(4) The COL applicant is to provide a non-licensed plant staff training program in accordance with NEI 06-13A.

COL 13.2(5) The COL applicant is to develop training programs. The programs are to include a chart that shows the schedule of each part of the training program for each functional group of employees in the organization in relation to the schedule for preoperational testing, expected fuel loading, and expected time for examinations prior to plant criticality for licensed operators.

COL 13.2(6) The COL applicant is to determine the extent of the NRC guidance that is applicable to the facility training program or the justification of exceptions.

13.2.4 References

1. Regulatory Guide 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," Rev. 3, U.S. Nuclear Regulatory Commission, May 2000.

2. 10 CFR Part 55, "Operators' Licenses," U.S. Nuclear Regulatory Commission.

3. NEI 06-13A, "Template for an Industry Training Program Description," Rev. 2, Nuclear Energy Institute, March 2009.

13.3 Emergency Planning

The COL applicant is to develop the emergency planning. The design features, facilities, functions, and equipment necessary for emergency planning are considered in the design bases for the standard plant (References 1 through 5). Details of the features that are related to the design are described in Section 13.3. The COL applicant is to develop the interfaces of design features with site-specific designs and site parameters (COL 13.3(1)).

Technical Support Center

The technical support center (TSC) is an onsite facility that provides plant management and technical support to the plant operations personnel during emergency conditions. The technical data displays and plant records are available in the TSC to assist in the diagnosis of abnormal plant conditions and any significant release of radioactivity to the environment.

The TSC provides the following functions:

a. The TSC provides plant management and technical support for plant operations personnel during emergency conditions.

b. The TSC relieves the reactor operators of peripheral duties and communications not related directly to reactor system manipulations during emergency conditions.

c. The TSC performs a function of the primary onsite communication center during emergency conditions.

d. The TSC technical data system receives, stores, processes, and displays plant information as needed to perform the TSC function. The data available for display in the TSC are sufficient for plant management, engineering, and technical personnel assigned to the TSC to aid the MCR operators in emergency conditions.

e. The TSC provides telephones and facsimile machines, including land-line, cellular, and satellite communication capabilities, which use multiple methods of telecommunication including private and public lines and satellite communications. Communication systems are addressed in Subsection 9.5.2.

f. The TSC is adjacent to the MCR in the auxiliary building. The walking time from the TSC to the MCR does not exceed 2 minutes.

g. The TSC is sized to provide working space, without crowding, for the personnel assigned to the TSC at the maximum level of occupancy. The working space is approximately 7 m^2 (75 ft^2) per person. The TSC is sized for a minimum of 25 persons, including five NRC persons. It provides the necessary space to maintain and repair TSC equipment and is sufficient for storage of plant records and historical data.

h. TSC personnel are protected from radiological hazards, including direct radiation and airborne radioactivity from in-plant sources under accident conditions, to the same degree as control room personnel.

   1) TSC is within the control room envelope (CRE), which maintains habitability during normal, off-normal, and emergency conditions as described in Subsection 6.4.2.

   2) A detailed description of CRE habitability, including radiological protective provisions, is provided in Section 6.4. The control room HVAC system is described in Subsection 9.4.1.

Operations Support Center

The operational support center (OSC) is an onsite facility that is separated from the MCR and the TSC. The OSC is located in the compound building. Direct communications are established with the MCR and the TSC so that the personnel reporting to the OSC can be assigned to duties in support of emergency operations.

Emergency Operations Facility

The emergency operations facility (EOF) supports the management of the licensee emergency response such as coordination with federal, state, and local officials, coordination of radiological and environmental assessments, and determination of recommended public protective actions.

The EOF is a licensee-controlled and operated offsite support center. The primary functions of the EOF are as follows:

a. Management of overall licensee emergency response

b. Coordination of radiological and environmental assessment

c. Determination of recommended public protective actions

d. Coordination of emergency response activities with federal, state, and local agencies

The EOF is staffed to manage licensee resources and to provide continuous evaluation and coordination of licensee activities during and after an accident.

The EOF technical data system is designed to receive, store, process, and display information to perform assessments of the actual and potential onsite and offsite environmental consequences of an emergency condition. Data on the general condition of the plant are available for display in the EOF.

Emergency Response Data System

The emergency response data system (ERDS) is a real-time electronic data transmission system to the NRC operations center that provides a set of parameters from the onsite computer system in the event of an emergency. The ERDS transmits information to allow the NRC to provide advice and support to the licensee, state, and local authorities, and other federal officials. The ERDS satisfies the requirements in 10 CFR Part 50, Appendix E.

Voice and Data Communication

A voice and data communication system establishes the interface and link with the TSC and the EOF and allows data exchange with the plant.

Safety Parameter Display System

The safety parameter display system (SPDS) provides a display of plant parameters that an operator in the MCR, TSC, and EOF can use to assess the safety status of the APR1400.

The primary function of the SPDS is to help operating personnel in the MCR make quick assessments of the plant safety status.

Duplication of the SPDS displays in the TSC and the EOF improves the exchange of information between these facilities and the MCR and assists corporate and plant management in the decision-making process.

The SPDS is operated during normal operations and during all classes of emergencies.

The SPDS has sufficient flexibility to allow future modifications, such as the capability to handle operator interaction and diagnostic analysis.

The SPDS in the MCR functions during all events expected to occur during the life of a plant, taking into account the human-system interface.

The post-accident sampling system is provided for emergency response and is addressed in Subsection 9.3.2 and Section 12.3.

Decontamination Facilities

Decontamination facilities are provided to remove or reduce radioactive contaminants from plant equipment, protective clothing, and personnel. Personnel decontamination areas are located in the compound building, and equipment decontamination facilities are located in the hot machine shop. Hot laundry facilities are located in the compound building. Personnel and equipment decontamination facilities are described in Section 12.3.

13.3.1 Combined License Application and Emergency Plan Content

The COL applicant is to develop a comprehensive emergency plan. The plan is developed as a physically separate document and includes copies of letters of agreement (or other certifications) from state and local governmental agencies with emergency planning responsibilities (COL 13.3(2)).

The COL applicant is to address an emergency classification and action level scheme as required by 10 CFR 50.47(b)(4) (COL 13.3(3)). The plan includes security-related aspects of an emergency plan (COL 13.3(4)).

13.3.2 Emergency Plan Considerations for Multi-Unit Sites

The COL applicant is to develop an emergency plan for a multi-unit site depending on the location of the new reactor relative to an operating reactor site with an existing emergency plan (COL 13.3(5)).

13.3.3 Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria

The COL applicant is to develop emergency planning inspections, tests, analyses, and acceptance criteria (COL 13.3(6)).

13.3.4 Combined License Information

COL 13.3(1) The COL applicant is to develop the interfaces of design features with site-specific designs and site parameters.

COL 13.3(2) The COL applicant is to develop a comprehensive emergency plan. The plan is developed as a physically separate document and includes copies of letters of agreement (or other certifications) from state and local governmental agencies with emergency planning responsibilities.

COL 13.3(3) The COL applicant is to address an emergency classification and action level scheme as required by 10 CFR 50.47(b)(4).

COL 13.3(4) The COL applicant is to develop the security-related aspects of an emergency plan.

COL 13.3(5) The COL applicant is to develop a multi-unit site interface plan depending on the location of the new reactor on or near an operating reactor site with an existing emergency plan.

COL 13.3(6) The COL applicant is to develop emergency planning inspections, tests, analyses, and acceptance criteria.

13.3.5 References

1. 10 CFR Part 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," U.S. Nuclear Regulatory Commission.

2. Regulatory Guide 1.101, "Emergency Planning and Preparedness for Nuclear Power Reactors," Rev. 5, U.S. Nuclear Regulatory Commission, June 2005.

3. NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Rev. 1, U.S. Nuclear Regulatory Commission, November 1980 (supplemented by March 2002 Addenda).

4. SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," U.S. Nuclear Regulatory Commission, October 2005.

5. Staff Requirements Memorandum to SECY-05-0197, "Staff Requirements - SECY-05-0197 - Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," U.S. Nuclear Regulatory Commission, February 2006.

6. NUREG-0696, "Functional Criteria for Emergency Response Facilities," U.S. Nuclear Regulatory Commission, February 1981.

13.4 Operational Program Implementation

The COL applicant is to develop a list of operational programs, a description of the operational programs, and the associated implementation milestones (COL 13.4(1)).

13.4.1 Combined License Information

COL 13.4(1) The COL applicant is to develop operational programs and provide schedules for implementation of the programs, as defined in SECY-05-0197 (Reference 1). The COL applicant is to provide commitments for the implementation of operational programs that are required by regulation. In some instances, the programs may be implemented in phases, where practical, and the applicant is to include the phased implementation milestones.

COL 13.4(2) The COL applicant is responsible for developing a leakage monitoring and prevention program for the systems, as specified in Subsection 5.5.2 in Chapter 16 Technical Specifications. The leakage monitoring and prevention program is to provide suitable methods and acceptance criteria as defined in NUREG-0737 Item III.D.1.1 (Reference 2).

COL 13.4(3) The COL applicant is to develop an implementation plan for an inspection and monitoring program of the cladding material integrity of SG channel heads. The COL applicant is to provide a commitment for the implementation plan of the inspection and monitoring program.

13.4.2 References

1. Staff Requirements Memorandum to SECY-05-0197, "Staff Requirements - SECY-05-0197 - Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," U.S. Nuclear Regulatory Commission, February 2006.

2. NUREG-0737, "Clarification of TMI Action Plan Requirements," U.S. Nuclear Regulatory Commission, November 2006.

13.5 Plant Procedures

The COL applicant is to describe the administrative and operating procedures. Administrative procedures provide for administrative control over safety-related activities for the operation of the facility. Operating procedures are used to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner. This section is not expected to include detailed written procedures. The COL applicant is to provide a description of the nature, content, and development process for the administrative and operating procedures, including preliminary schedules for preparation and target dates for completion (Reference 1 through 3) (COL 13.5(1)). NRC RG 1.33 (Reference 1) endorses ANSI/ANS 3.2. ANSI/ANS 3.2, Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors" (Reference 2), lists typical safety-related activities that should be covered by written procedures, but does not provide a complete listing of needed procedures. Appendix A may be used as guidance to ensure the minimal procedure coverage.

13.5.1 Administrative Procedures

The COL applicant is to develop administrative procedures.

13.5.1.1 Administrative Procedures-General

Administrative procedures provide administrative controls for procedures and define and provide controls for operational activities of the plant staff. The COL applicant is to provide a program for developing and implementing administrative procedures (COL 13.5(2)).

13.5.2 Operating and Maintenance Procedures

The COL applicant is to develop operating and maintenance procedures.

13.5.2.1 Operating and Emergency Operating Procedures

This subsection pertains to procedures that operators will use in the main control room and locally in the plant for plant operations. COL applicant responsibilities with regard to procedure classification, the operating procedure program, and the emergency operating procedure program are described below.

13.5.2.1.1 Procedure Classification

The COL applicant is to describe the different classifications of procedures the operators use in the MCR and locally in the plant for plant operations. The COL applicant is to identify the group in the operating organization that is responsible for maintaining the procedures and is to describe the general format and content of the different classifications (COL 13.5(3)). Each applicant's procedures do not necessarily conform precisely to the same classification because the objective is to ensure that procedures are available to the plant staff to accomplish the functions in NRC RG 1.33.

13.5.2.1.2 Operating Procedure Program

The COL applicant is to provide a program for developing and implementing operating and shutdown procedures (COL 13.5(4), COL 13.5(8)). The applicant is to develop target dates for completion of program elements.

13.5.2.1.3 Emergency Operating Procedure Program

The COL applicant is to provide a program for developing and implementing emergency operating procedures (COL 13.5(5)). The applicant also is to develop target dates for completion and submittal to the NRC (as required) of program elements. The procedure-generation package includes the following:

a. Plant-specific technical guidelines

b. Plant-specific writer's guide

c. Description of the program for verification and validation

d. Description of the program for training operators

13.5.2.2 Maintenance and Other Operating Procedures

This subsection pertains to procedures that provide coverage for other safety-related plant operating activities (i.e., operating activities not procedurally covered under the operating or emergency operating procedure programs), including related maintenance activities. COL applicant responsibilities include providing a description of the nature, content, and development process for these procedures, and providing preliminary schedules for preparation and target dates for completion. The COL applicant is also responsible for

describing how the maintenance and other operating procedures are classified, describing the general format and content of the various classifications, identifying the group(s) within the operating organization responsible for performing and maintaining the procedures, and providing a program for procedure development and implementation (COL 13.5(6), COL 13.5(7)). ANSI/ANS 3.2, Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water Reactors" (Reference 2), lists typical safety-related activities that should be covered by written procedures, but does not provide a complete listing of needed procedures. Appendix A may be used as guidance to ensure the minimal procedure coverage.

The COL applicant is to provide a program for developing shutdown procedure including the installation and removal order of the pressurizer manway and the nozzle dams (COL 13.5(8)).

13.5.3 Combined License Information

COL 13.5(1) The COL applicant is to describe the administrative and operating procedures. Administrative procedures provide for administrative control over safety-related activities for the operation of the facility. Operating procedures are used to ensure that routine operating, off-normal, and emergency activities are conducted in a safe manner. The COL applicant is to provide a description of the nature, content, and development process for the administrative and operating procedures, including preliminary schedules for preparation and target dates for completion (Reference 1 through 3).

COL 13.5(2) The COL applicant is to provide a program for developing and implementing administrative procedures.

COL 13.5(3) The COL applicant is to describe the different classifications of procedures the operators use in the MCR and locally in the plant for plant operations. The COL applicant is to identify the group within the operating organization responsible for maintaining the procedures and describe the general format and content of the different classifications.

COL 13.5(4) The COL applicant is to provide a program for developing and implementing operating procedures.

COL 13.5(5) The COL applicant is to provide a program for developing and implementing emergency operating procedures.

COL 13.5(6) The COL applicant is to describe the procedures that provide coverage for other safety-related plant operating activities (i.e., operating activities not procedurally covered under the operating or emergency operating procedure programs), including related maintenance activities. The COL applicant is to provide a description of the nature, content, and development process for the maintenance and other operating procedures, including preliminary schedules for preparation and target dates for completion. In addition, the COL applicant is to describe how these procedures are classified, describe the general format and content of the various classifications, and identify the group(s) within the operating organization responsible for performing and maintaining the procedures.

COL 13.5(7) The COL applicant is to provide a program for developing and implementing procedures that provide coverage for other safety-related plant operating activities (i.e., operating activities not procedurally covered under the operating or emergency operating procedure programs), including related maintenance activities.

COL 13.5(8) The COL applicant is to provide a program for developing shutdown procedure including the installation and removal order of the pressurizer manway and the nozzle dams.

13.5.4 References

1. Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)," Rev. 3, U.S. Nuclear Regulatory Commission, June 2013.

2. ANSI/ANS 3.2, "Managerial, Administrative, and Quality Assurance Controls for Operational Phase of Nuclear Power Plants," American Nuclear Society, 2012.

3. NUREG-0899, "Guidelines for the Preparation of Emergency Operating Procedures," U.S. Nuclear Regulatory Commission, 1982.

4. NUREG-0737, "Clarification of TMI Action Plan Requirements," U.S. Nuclear Regulatory Commission, 1980.

5. NUREG-0737, Supplement No. 1, "Clarification of TMI Action Plan requirements: Requirements for Emergency Response Capability," U.S. Nuclear Regulatory Commission, 1983.

6. 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," U.S. Nuclear Commission.

7. 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants," U.S. Nuclear Commission.

13.6 Physical Security

The security plans required by 10 CFR 52.79(a)(35) and 10 CFR 52.79(a)(36) (Reference 1) are to be submitted to the NRC by the combined license (COL) applicant. The plans include a physical security plan, safeguards contingency plan, training and qualification plan, and a cyber-security plan. The plans are to meet 10 CFR 50.54(p) (Reference 2) requirements.

Security communications are described in Subsection 9.5.2. Security lighting is described in Subsection 9.5.3.2.

13.6.1 Physical Security - Design Certification

This Design Control Document (DCD) contains physical security elements and information needed for review. These elements, because of their inherent nature, are included within the physical design of the power reactor and supporting systems. These physical security elements are designed, located, and constructed to support the protection of equipment essential to the safe operation and shutdown of the power reactor. A list of vital equipment and vital areas is to be contained in the technical report "Physical Security Design Features" (Reference 3) discussed in Subsection 13.6.2 below. The physical security hardware ITAACs are contained in Section 2.12 of Tier 1 of the DCD.

13.6.2 Physical Security - Design Features

This section provides noncategorized, high level, details on the systems, structures and components (SSCs) that make up the Physical Security system. Additional details are provided in the technical report "Physical Security Design Features" (Reference 3) which includes details on the systems, structures, and components (SSCs) that require protection as vital equipment, as defined in 10 CFR 73.2 (Reference 4), as well as details on the installed security features required for physical protection. This report is to be incorporated by reference. Reference 3 is categorized as security safeguards information (SGI) and is withheld from public disclosure pursuant to 10 CFR 73.21 (Reference 6).

13.6.2.1 Vital Areas and Vital Area Barriers

Vital equipment is identified as part of the design and located inside vital areas. Access to the vital equipment requires passage through two physical barriers. One of the barriers is the protected area barrier that is site specific and is provided by the COL applicant and the

other barrier is the walls, floors, ceilings, and doors of the vital area. The vital area barriers are constructed of substantial materials to meet the performance requirements of 10 CFR 73.55(b) (Reference 5). There are several separate vital areas in the APR1400 design including the control room, the spent fuel pool area, the central alarm station, and the secondary alarm station.

13.6.2.2 Protected Area Barrier

The protected area barrier design is the responsibility of the COL applicant. Penetrations through the protected area barrier and unattended openings in the protected area barrier are addressed by the COL applicant.

13.6.2.3 Isolation Zones

Isolation zones are designed by the COL applicant to provide for monitoring of the protected area barrier to detect attempted or actual penetration of the barrier. Where permanent buildings do not allow sufficient observation distance between the intrusion detection system and the protected area barrier, the building and the area around the building is monitored by the COL applicant to detect attempted or actual penetration of the protected area barrier.

13.6.2.4 Protected Area Perimeter Intrusion Detection and Assessment Systems

The protected area perimeter intrusion detection system is designed and provided by the COL applicant. The system is designed to detect attempted or actual penetration of the protected area barrier and annunciate an alarm in both alarm stations. Video assessment equipment is provided by the COL applicant to feed video information to the APR1400 infrastructure to perform real time recording and to concurrently display the monitored zones where the alarm occurs to both the alarm stations. The intrusion detection equipment and video assessment equipment interfaces with the APR1400 alarm annunciation and video assessment system infrastructure to provide data to both alarm station operators. The design by the COL applicant also provides an uninterruptible power supply for the intrusion detection equipment and the assessment equipment located at the protected area perimeter in the event of the loss of normal power. The APR1400 design provides a secondary power supply for the annunciation and video assessment equipment located in the alarm stations in the event of the loss of normal power.

13.6.2.5 Illumination Systems

The illumination of the isolation zones is designed and provided by the COL applicant. The illumination of the exterior areas outside the isolation zones within the protected area is provided as part of the standard APR1400 design and is 0.2 foot candles measured horizontally or, alternatively, sufficient to permit observation of abnormal presence or activity of persons or vehicles. The lighting within structures that are part of the APR1400 standard plant is sufficient to allow security response actions and other emergency response activities within the structures.

13.6.2.6 Bullet Resisting Barriers

The external walls, doors, ceiling, and floors of the main control room, central alarm station, and secondary alarm station are constructed of materials to provide bullet resistance to at least Underwriters Laboratories Ballistic Standard 752, Level 4. The last access control function location will be the responsibility of the COL applicant and is designed to the same bullet resistance minimum. Fighting positions designed and installed by the COL applicant as part of the defensive strategy are bullet resistant to the same standard.

13.6.2.7 Vehicle Control Measures

A vehicle barrier system is designed and installed by the COL applicant at the minimum safe standoff distance to prevent the design-basis threat vehicle bombs from approaching the plant to within a distance which could cause damage to vital equipment. The design of the APR1400 buildings provides the structural characteristics to determine the minimum safe standoff distance where the vehicle barrier must be located and this distance is provided to the COL applicant. An active vehicle barrier is installed by the COL applicant to allow authorized vehicles to pass through the vehicle barrier to perform authorized activities.

13.6.2.8 Personnel, Vehicle, and Material Access Control Portals and Search Equipment

Access control portals are established and designed by the COL applicant for personnel and vehicle access into the protected area. These control points are equipped with access control equipment as well as equipment for detection of firearms, explosives, incendiary devices or other items which could be used to attack the plant with the intent to create a radiological release. The protected area access control equipment provided by the COL

applicant will interface with the APR1400 access control system which will be used to grant authorized access to the protected area and other areas of the plant for performing authorized activities.

13.6.2.9 Picture Badge Identification System

The COL applicant uses an access authorization system with a numbered photo identification badge to control authorized access to both the protected area and internal plant areas. The picture badge system interfaces with the APR1400 access control systems to allow authorized access to the protected area and other areas of the plant to perform authorized activities.

13.6.2.10 Vital Area Access Controls

Vital areas have locked and alarmed doors that are monitored with active intrusion detection devices. The APR1400 access control system controls access through these doors and will annunciated any unauthorized passage through the doors to both alarm stations. The devices and circuits for this data transmission are self-checking and tamper indicating.

13.6.2.11 Alarm Stations

The APR1400 alarm annunciation system provides intrusion detection alarm annunciation and video assessment information concurrently to both the central alarm station and the secondary alarm station. Both alarm stations are located inside the protected area, are designed as vital areas, and the interiors are not visible from the perimeter of the protected area. Both alarm stations are designed, protected, equipped, and constructed to be equivalent and redundant with both having the same capability to provide the required functions. Both alarm stations are equipped with real time playback video capability to provide assessment of activities before and after each alarm annunciation within the protected area perimeter barrier. In the event of a single act in accordance with the design basis threat of radiological sabotage, at least one of the alarm stations retains the ability to provide the necessary functions to respond to an attack.

13.6.2.12 Secondary Power Supplies for Alarm Annunciation and Non-portable Communications Equipment

The APR1400 design provides a secondary power supply system for the alarm annunciation system and one for the non-portable communications equipment used by security personnel. Both of these secondary power supply systems are located within vital areas.

13.6.2.13 Intrusion Detection Systems Console Displays

The APR1400 intrusion detection system alarm devices including the transmission lines are tamper indicating and self checking. There is an automatic visual and audible indication provided to the alarm station operators when an alarm occurs, failure occurs within the system, or when the system is operating on standby power. The alarm annunciation system indicates the type of alarm and location to the station operators on displays mounted on the console. The console also has video displays that concurrently show the assessment videos of appropriate areas where the alarm occurred.

13.6.2.14 Intrusion Detection Recording Systems

The APR1400 intrusion detection and assessment recording system is capable of recording each security alarm location, assessment video, and displaying the information to both alarm stations. The alarm annunciation system records the date, circuit, and time for each alarm including the location of the alarm, if it is a false alarm, if it is an alarm check, or if it is a tamper alarm.

13.6.2.15 Vital Area Emergency Exits

Emergency exits through the vital area boundaries are locked and are alarmed with intrusion detection devices. The locking devices are designed to allow prompt egress (crash bar, etc.) from the area during an emergency.

13.6.2.16 Communications Systems

The central and secondary alarm stations are equipped with conventional (land line) telephone service with the main control room and local law enforcement authorities. Both alarm stations are capable of continuous communication with on-duty security force personnel who have responsibilities within the physical protection program and during contingency events. The non-portable communication devices (including the conventional

telephone system) in both alarm stations are wired to an independent power supply that enables these systems to remain operable during a loss of normal power. The portable communication devices are site specific and will be provided by the COL applicant. The portable devices will use the APR1400 infrastructure for communications within the plant areas and the patrol areas and response locations.

13.6.3 References

1. 10 CFR 52.79, "Contents of Applications; Technical Information in Final Safety Analysis Report," U.S. Nuclear Regulatory Commission.

2. 10 CFR 50.54, "Conditions of Licenses," U.S. Nuclear Regulatory Commission.

3. APR1400-E-A-NR-14002-P-SGI, "Physical Security Design Features," Rev. 1, KEPCO & KHNP, May 2016.

4. 10 CFR 73.2, "Definitions," U.S. Nuclear Regulatory Commission.

5. 10 CFR 73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage," U.S. Nuclear Regulatory Commission.

6. 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements," U.S. Nuclear Regulatory Commission.

13.7 Fitness for Duty

The COL applicant is to develop a fitness-for-duty program required by 10 CFR Part 26 and its implementation for the operating plant (COL 13.7(1)). The COL application also includes a description of the applicant's fitness-for-duty programs during construction (Reference 1).

13.7.1 Combined License Information

COL 13.7(1) The COL applicant is to develop the description of the fitness-for-duty programs during construction and for the operating plant.

13.7.2 References

1. 10 CFR Part 26, "Fitness for Duty Programs," U.S. Nuclear Regulatory Commission.