Table	Item Number
2.6.1-3	8
2.6.1-3	18a
2.6.1-3	18b
2.6.1-3	19
2.6.1-3	23
2.6.1-3	24
2.6.1-3	25

The staff finds the applicant has included ITAAC in the APR1400 electrical design for verifying the adequacy and independence of the preferred offsite sources. The staff determined that the information in DCD Tier 1, Section 2.6, which addresses offsite power, has been prepared in accordance with the guidance in SRP Section 14.3.6, "Electrical Systems – Inspections, Tests, Analyses, and Acceptance Criteria," and RG 1.206, which states that the applicant should develop ITAAC to verify capacity and capability of the offsite sources to supply power to the Class 1E divisions and the independence of those sources. The staff finds that the applicant provided ITAAC to verify 1) the direct connection of the offsite sources to the Class 1E divisions, 2) the capacity and capability of the offsite sources to ~~feel~~ the Class 1E divisions, and 3) the independence and separation of offsite sources. Therefore, the staff finds that the subject ITAAC verify capacity and capability of the offsite sources to supply power to the Class 1E divisions and the independence of those sources by both inspections and tests. Because the ITAAC verify the capacity and capability of the offsite sources to supply power to the Class 1E divisions and the independence of those sources, the staff finds that the as-built systems will meet the requirements of GDCs 17 and 18, as discussed in Chapter 8 of this report. Therefore, the staff finds the ITAAC are necessary, sufficient, and meet the requirements of 10 CFR 52.47(b)(1).

supply power to

14.3.6.4.1.7 Containment Electrical Penetrations

The ITAAC for containment electrical penetrations (both Class 1E and non-Class 1E circuits) verify that the containment electrical penetrations do not fail due to electrical faults and potentially breach the containment. The ITAAC should verify that all electrical containment penetrations are protected against postulated fault currents, i.e., currents greater than the continuous current rating. The applicant in DCD Tier 2, Section 14.3.2.6, has committed to have ITAAC to verify that the containment penetrations are protected against postulated fault currents greater than their continuous current rating. DCD Tier 1 Table 2.6.5-1, "Containment Electrical Penetration Assemblies ITAAC," Items 1, 2, 3, 4, 5, and 6 capture the applicant's containment electrical penetration assemblies ITAAC.

The staff issued RAI 234-8284, Question 14.03.06-5 (ML15296A005), requesting the applicant to provide additional information regarding why an ITAAC was not necessary to confirm that separate electrical penetrations are provided for medium voltage circuits, low voltage circuits, control power circuits, and instrumentation signal circuits. In its response to RAI 234-8284,

ASME AG-1-2009 with addenda. Finally, the applicant proposed adding ductwork and ACU housing leak testing to DCD Tier 2 for the containment purge system, fuel handling area heating, ventilation, and air conditioning (HVAC) system, compound building HVAC system, and the auxiliary building controlled area HVAC system.

However, while the applicant's response indicated that the ductwork and ACU housing leak testing will occur in accordance with TA-4300 of ASME AG-1-2009 with addenda, the proposed DCD updates do not specify which version of ASME AG-1 is being referenced. Therefore, the staff closed RAI 116-8054, Question 14.03.08-6 and issued RAI 329-8424, Question 14.03.08-13 (ML15343A330), requesting that the applicant specify which version of ASME AG-1 is being referenced in the DCD. In addition, DCD Chapter 15 specifies that unfiltered in-leakage to the MCR and technical support center from the ventilation systems during design basis accidents is assumed to be 8.50 cubic meters (300.2 cubic foot) per minute. If leakage exceeds this value, it is outside the accident dose analysis performed in Chapter 15. If this occurred, it is unclear if the dose limit of 5 rem for control room operators in GDC 19 would be met. In Question 14.03.08-13, the staff also requested that the applicant include an ITAAC to ensure that the in-leakage to the MCR and technical support center does not exceed 8.50 cubic meters per minute.

In its response to RAI 329-8424, Question 14.03.08-13 (ML16028A460), the applicant proposed updating the DCD additions to specify that the 2009 version of ASME AG-1-2009, with Addenda, is being referenced. This is consistent with RG 1.52 and is, therefore, acceptable. In addition, the applicant proposed updating DCD Tier 2, Section 14.2.12.1.95 to specify that one of the acceptance criteria for the control room HVAC system is that the total unfiltered inleakage rate is less than 510 cubic meters per hour (300 cfm or 8.5 cubic meters per minute) in the emergency mode. This is consistent with the information in Chapter 15 and is, therefore, acceptable. Finally, in the response, the applicant also indicated that DCD Tier 1 Subsection 2.7.3.1.1, item 11, already provides the ITAAC for control room envelope leakage. While Subse
leakage is w
provided an
specified val
acceptable.
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Unfiltered inleakage rate was changed from 300 cfm to 100 cfm in the RAI 108-7973_Question 15.00.03-02_Rev.1.
The RAI 329-8424 will be revised to incorporate the RAI 108-7973_Rev.1.

revised as committed in the response to RAI 329-8424, Question 14.03.08-13. Therefore, RAI 329-8424, Question 14.03.08-13, is resolved and closed.

Other aspects of the ventilation system ITAAC review, including other system design related ITAAC are discussed in Section 9.4 of this SER.

14.3.8.4.5 *Minimization of Contamination*

The staff could not identify any design features associated with minimizing contamination in the Tier 1 ITAAC. The staff issued RAI 116-8054, Question 14.03.08-7 (ML15208A511), requesting the applicant to provide this information. In its response to RAI 116-8054, Question 14.03.08-7

- Intrusion detection system capabilities and recording of functions.
- Communications capabilities from CAS to various locations.

The DCD Tier 1, Section 2.12 also provides specifics on engineered PSS th 3.b Add 4.b Delete in the scope of the APR1400 standard design, which will not be certified and are addressed by the COL applicant. Section 2.12.1 Items 2.a; 2.b; 2.c; 3.a; 3.c; 4.a; ~~4.b;~~ 4.c; 8.a; 8.b; and 9; are structures, systems, or components of a physical protection system that are located outside of the nuclear power block, within the plant protected area and owner control area, or engineered systems implementing elements of the physical security program that may be addressed by the COL applicant (i.e., outside of the scope a standard design).

The staff issued RAI 197-8176 (ML15247A004) Questions 14.3.12-1a, 12.c, and 12.d, requesting that the applicant provide additional design descriptions sufficient to describe the PSS within and outside of the scope of the APR1400 standard design for the physical security ITAAC, conforming to guidance in Revision 1 of SRP 14.3.12. In its response to RAI 197-8176 (ML15315A042) Question 14.3.12-1a, the applicant included proposed revisions to the design descriptions for engineered PSS, conforming to SRP 14.3.12. In response RAI 197-8176, Question 14.3.12-1.c, the applicant proposed to revise DCD Tier 1 Section 2.12.1, to identify the design descriptions to include that "[t]he alarm system will not allow the status of a detection point, locking mechanism or access control device to be changed without the knowledge and concurrence of the alarm station operator in the other alarm station." In response to RAI 197-8176, Question 14.3.12-1d, the applicant committed to update DCD Tier 1, Section 2.12.1, to establish item 11.c and provide a design description that states "[e]quipment will record onsite security alarm annunciation, including the location of alarm, false alarm, alarm check, and tamper indication; and the type of alarm, location, alarm circuit, date, and time," and renumber a subsequent item as 11.d. The additional design descriptions for the intrusion detection and assessment system in Section 2.12.1 conforms to SRP Section 14.3.12 and the staff finds the applicant's response acceptable. The staff confirmed that DCD Tier 2, Revision 1, dated March 10, 2017, was revised as committed in the response to RAI 197-8176, Questions 14.3.12-1a, 14.3.12-1c and 14.3.12-1d. Therefore, RAI 197-8176, Questions 14.3.12-1a, 14.3.12-1c and 14.3.12-1d are resolved and closed.

DCD Tier 1, Table 2.12-1, "Physical Security Hardware ITAAC [4 sheets]," provides the ITAAC for the PSS that are within the scope for the APR1400 standard design. The design commitments include those related to vital equipment locations, physical barriers, physical controls and security measures for vital areas, intrusion detection, assessment, CAS and SAS, secondary power supply, access controls of vital areas, and communications meeting requirements of 10 CFR Part 73, "Physical Protection of Plants and Materials." The applicant indicated that the descriptions of site-specific physical protection systems design and related ITAAC are to be addressed by the COL applicant that references the APR1400 DC. RAI 197-8176, Question 14.3.12-1b requested the applicant to provide additional design descriptions in sufficient detail in Section 2.12.1 to fully address the requirements in 10 CFR 73.55, conforming to SRP Section 14.3.12, and identify whether they are within the scope of the APR1400 standard design or will be addressed by the COL applicant. In its response to RAI 197-8176, Question 14.3.12-1b, the applicant revised the design descriptions for PSS, conforming to SRP 14.3.12. The staff therefore finds the applicant's response to be acceptable. The staff confirmed that DCD Tier 2, Revision 1, dated March 10, 2017, was revised as committed in the response to RAI 197-8176, Question 14.3.12-1b. Therefore, RAI 197-8176, Question 14.3.12-1b, is resolved and closed. Revision 1 to Tier 1 DCD Table 2.12-1, "Physical Security Hardware ITAAC [7sheets]," incorporates changes to indicate

Analyses, and Acceptance Criteria." The test abstracts support the verification of PSS ITAAC identified in DCD Tier 1 to meet the regulatory requirement of 10 CFR 52.47(b)(1).

14.3.12.4.3.5 Inspections, Tests, and Analyses for Security Lighting Systems

DCD Tier 1, Section 2.6.8, "Lighting Systems," and Table 2.6.8-1, "Lighting Systems ITAAC," describes the design commitments for the plant lighting systems, which include normal and emergency lighting systems. DCD Tier 1, Section 2.12.1, "Design Description," includes a design commitment for the security lighting system to provide illumination of the exterior area of the PA and the isolation zone. Table 2.12-1, "Physical Security Hardware ITAAC," identified ITAAC 5, for security lighting providing illumination for security functions.

DCD Tier 1, Table 2.1.2-1, "Physical Security Hardware ITAAC," included ITAAC 5, which verifies the design commitment that isolation zones and exterior area within the protected areas are provided with illumination to permit observation of abnormal presences or activity of persons or vehicles. DCD Tier 2, Section 14.2.12.1.138, "Equipment to permit observation of abnormal presence or activity of persons or vehicles," describes test abstract objective to verify that CCTV equipment is in place to observe the isolation zones and areas at the PA for abnormal presence or activity of persons and/or vehicles. The test methods included inspection of monitors to allow observation of a subject individual on the CCTV monitors in the isolation zone and the PA, determination of the clarity and visual range of CCTV cameras, and testing of camera capability to zoom and pan to assess plant areas. The acceptance criteria include assurance that the camera and systems provide fields of observations of persons, vehicles, and activities in the isolation zone and areas of the PA barriers. Although the applicant addresses verification of camera system(s) for observation, along with test abstracts in Section 14.2.12.1.144, the test abstract described does not verify that equipment is provided and adequate exterior illuminations at the isolation zone and the PA permits observations of abnormal presence or activity of person or vehicle. RAI 465-8565 (ML16110A100), Question 14.3.12-10.a, was issued for the applicant to address the verification of system and equipment that will provide illumination, along with CCTV, to permit observation and assessment of the isolation zone and the PA in DCD Tier 2, Section 14.2.12.1.138. In its response RAI 465-8565 (ML16183A350), Question 14.3.12-10.a, the applicant committed to revise Test Abstract 14.2.12.1.138 to address the illumination equipment discussed in ITAAC Item 5 in Table 2.12-1. The staff finds the applicant's response to be acceptable. The staff confirmed that DCD Tier 2, Revision 1, dated March 10, 2017, was revised as committed in the response to RAI 465-8565, Question 14.3.12-10.a. Therefore, RAI 465-8565, Question 14.3.12-10.a is resolved and closed. Revision 1 to DCD Tier 2, Section 14.2.12.1.143, "Equipment to permit observation of abnormal presence or activity of person or vehicles," incorporates and provides adequate descriptions for the verification of systems and equipment that will provide illumination levels that are sufficient to allow observation of persons and/or vehicles in the exterior area of the protected area.

Emergency Lighting System Test

DCD Tier 2, Sections 14.2.12.1.80, "Normal Lighting System Test," and 14.2.12.1.81, "Emergency Lighting Test," describes the test abstracts for verifying the normal and emergency lighting systems provide illuminations of plant areas within the nuclear island or structures. In addition, DCD Tier 2, Sections 14.2.12.1.86 through 14.2.12.1.88, include verification of the continuity of power sources for plant lighting systems, to ensure that portions of the plant systems, including building interior lighting, remain available during accident scenarios and power failures. The ITAAC for plant normal and emergency lighting systems are established in DCD Tier 1, Table 2.6.8-1, "Lighting Systems ITAAC." The lighting systems are credited by safety and security programs for illumination necessary to perform required response in the

event of a safety or security event. The staff's findings for descriptions of test abstract for verifying design commitments for normal and emergency plant lighting are addressed under review of DCD Tier 2, Section 14.3.2.6, "ITAAC for Electrical Systems," and are not included in this portion of the staff security review and finding for verification of dedicated PSS.

Title 10 CFR 73.55(i)(6)(i), requires that "the licensee shall ensure that all areas of the facility are provided with illumination necessary to satisfy the design requirements of 10 CFR 73.55(b) and implement the protective strategy." Section 73.55(i)(6)(ii) requires a minimum of illumination level of 0.2-foot (2.4 inches)-candles in the isolation zones and appropriate exterior areas within the protected areas. The applicant described desi requirements of security lighting within the facilities in Tier 1, wh for the plant normal and emergency lighting that satisfy these re Sections 14.2.12.1.80; 14.2.12.1.81; 14.2.12.1.86, "Emergency Diesel Generator Mechanical System Test"; Section 14.2.12.87, "Emergency Diesel Generator System Test"; and Section 14.2.12.1.88, " Emergency Diesel Generator Auxiliary Systems Test"; address the verification of interior plant lighting systems and subsystems relied on to perform safety and security (e.g., implementing security functions and the protective strategy). In these sections, the applicant provided information that adequately and reasonably described the ITA that specifically addressed the verification of plant lighting for meeting the requirements of 10 CFR 73.55(i)(6)(i).

Emergency Diesel Generator Electrical System Test

The staff issued RAI 197-8176, Question 14.3.12-3.a (ML15247A004), requesting the applicant to discuss whether the plant emergency DC lighting subsystem, described in Section 2.6.8.1, Item No. 4.b, is relied on for illumination for performing security functions. In its response to RAI 197-8176, Question 14.3.12-3.a (ML15322A217), the applicant stated:

> *In the APR1400 lighting system, the isolation zones and exterior areas within the protected area are provided with the illumination, a minimum of 0.2 foot-candle, by the dedicated security lighting system as described in DCD Tier 2, Subsection 9.5.3.2 (paragraph c). The interior areas for internal security response, as well as the plant operation areas, are provided with the illumination by the plant lighting systems such as the normal, emergency AC, and DC lighting system as described in DCD Tier 2, Subsection 9.5.3.2 (paragraphs a and b). In the event of a loss of plant normal lighting, the emergency AC and DC lighting systems provide sufficient illumination to perform security functions with the illumination levels as described in DCD Tier 2, Subsection 9.5.3.2 (paragraph b). For the security alarm stations, the lighting equipment is supplied from the security power system, which is backed up by a dedicated uninterruptible power supply (UPS) for the security power system. The minimum illumination level in the security alarm stations is included in the response to Question "d". The ITAAC for the plant lighting system and the security lighting system for the isolation zones and exterior areas are included in DCD Tier 1, Table 2.6.8-1 and Table 2.12-1, respectively. The ITAAC for the lighting equipment in the security alarm stations will be included in DCD Tier 1, Subsection 2.12.1 and Table 2.12-1.*

The staff finds the applicant's response to be acceptable. Therefore, RAI 197-8176, Question 14.3.12-3.a is resolved and closed.

The staff issued RAI 197-8176, Question 14.3.12-3.d (ML15247A004), requesting the applicant to specify the minimum illumination level that will be provided by design of a plant emergency

within the facilities in DCD Tier 1, Section 2.6.6, "Plant Lighting Systems," which provides design descriptions for the plant normal and emergency lighting. DCD Tier 1, Table 2.6.6-1, "Plant Lighting System Inspections, Tests, Analyses, and Acceptance Criteria [2 sheets]," includes security lighting systems and DCD Tier 2, Sections 14.2.12.1.42 and 14.2.12.43, address the verification of interior plant lighting systems relied on to perform security functions to implement the protective strategy.

- The staff concludes that the selected physical security system ITAAC addresses verification of the requirements of 10 CFR 73.55(i)(6)(ii) and conforms to the staff's guidance provided in SRP 14.3.12. The verification of PSS performance meeting the requirement of 10 CFR 73.55(i)(6)(i), which includes areas within the interior of the facility, is not specifically necessary to conform to SRP 14.3.12 for physical security ITAAC, and is addressed by ITAAC identified in Table 2.6.6-1 and supporting test abstracts. The test abstracts support the verification of PSS ITAAC identified in DCD Tier 1 to meet the regulatory requirement of 10 CFR 52.47(b)(1).

14.3.12.4.3.6 Inspections, Tests, and Analyses for Verifying Physical Barriers and Vehicle Barrier Systems

Bullet Resisting Barriers: The applicant's test abstract for physical security ITAAC 6 for bullet-resisting barriers for MCR, CAS, SAS, is not described in Sections of 14.2. RAI 465-8565 (ML16110A100), Question 14.3.12-10.b, was issued for the applicant to provide a procedure test abstract for physical security hardware ITAAC No. 6 in Table 2.12-1. In its response RAI 465-8565 (ML16183A350), Question 14.3.12-10.b, the applicant committed to revise DCD Tier 1 Table 2.12-1, Item 6 to incorporate the requirement of design and verification of physical barriers for bullet-resisting. The staff finds the applicant's response to be acceptable. The staff confirmed that DCD Tier 2, Revision 1, dated March 10, 2017, was revised as committed in the response to RAI 465-8565, Question 14.3.12-10.b. Therefore, RAI 465-8565, Question 14.3.12-10.b is resolved and closed. Revision 1 to DCD Tier 2, Section 14.2.12.1.152, "Bullet-Resisting Barriers," provides the test abstract that adequately described the test objective, prerequisite, test method, data required, acceptance criteria, and specification for the ITA of ITAAC Item 6.

Vehicle Barrier System: DCD Tier 2, Section 14.2.12.1.139, "Vehicle barrier system to protect against the design basis threat vehicle bombs," describes the test abstracts for verifying the vehicle barrier system protects against the design basis threat vehicle bombs. The applicant stated that the objective is to demonstrate that the vehicle barrier system (VBS) is installed and located at the necessary stand-off distance to protect against the DBT vehicle bombs. The verification method is inspection to validate that the VBS is installed at the minimum stand-off distance (MSSD) or a distance greater than the MSSD to determine that the system and components are installed in accordance with manufacturer's specifications. The applicant also described prerequisites, data required, and acceptance criteria. The acceptance criterion that must be met is the distance measured exceeds the minimum safe stand-off distances required in the applicant's TeR APR1400-E-A-NR-14002-P-SGI, "Physical Security Design Features," that is incorporated by reference.

The staff finds that the applicant has provided an adequate and reasonable description of the test objectives, prerequisites, test methods, required data, and acceptance criteria in Tier 2, Section 14.2, that support the identified physical security ITAAC related to bullet-resisting